

# SYMONS'S METEOROLOGICAL MAGAZINE.

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## HANN'S TEXT-BOOK OF METEOROLOGY.\*

WE do not as a rule give much space to the reviews of books in foreign languages, as we think it better to devote these pages mainly to the progress of British meteorology, and to notices of books which are accessible to the majority of our readers. But when so eminent a student of the atmosphere as Professor Hann sums up the experience and the reading of a lifetime in a text-book of meteorology, which must, from the fact of its authorship, at once become an ultimate court of appeal for all matters connected with our science, we feel that an exception must be made.

Dr. Hann's book, though published in ten parts, forms a single volume, a volume that commands respect on account of the mass of information it contains, and wins admiration by the clear and logical way in which it is presented. The large page and small type—too small as regards the innumerable foot-notes—allow its 820 pages to include as much printed matter as five annual volumes of this magazine; and in addition to a certain number of diagrams in the text there are many plates, in the form of maps, or reproductions of photographs of meteorological phenomena. No space is wasted on the description of instruments, and very little is taken up with methods of observation; the aim of the book is to state the fundamental principles of the science of meteorology, and to present in a condensed form the actual data on which these are based. The great department of Climatology is passed over briefly, having been fully discussed in an earlier work by the same author, and the application of meteorology to forecasting the weather is not dealt with in detail on account of the sufficiency of the works of von Beber, Börnstein, Scott, and Abercromby.

Dr. Hann thus expresses himself in the preface:—

“I endeavoured to bring forward as abundantly as possible the securely established results of observations, for these are permanent, forming the foundation for wider inductions and preparing the way for future theories . . .

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\* *Lehrbuch der Meteorologie* von Dr. Julius Hann, Leipzig, C. H. Tauchnitz, 1901. Pp. xiv. + 806.

One cannot expect the student of theory to find the time or take the trouble to look through all the rich and very scattered literature of meteorology in order to hunt out what appears important and serviceable for his purpose. A convenient conspectus of the facts may on this account save many students the trouble of forming speculations and undertaking calculations that can lead to no result. I endeavour also to direct attention to those observational results which correspond with none of the prevailing theories, and so to stimulate further researches as to their relations with established phenomena."

The aim was thus to produce a summary of the facts and theories of meteorology as they were accepted at the end of the nineteenth century, in order to forward the development of the science in the twentieth.

The work is divided into five "books," preceded by a short general introduction, and followed by a valuable appendix on some of the more important mathematico-physical theories of meteorology, such as the calculation of periodical phenomena and the measurement of heights with the barometer.

Book I. treats of Temperature, dealing with the thermal conditions of the Earth's surface affecting land, water and air. Its five chapters discuss solar and terrestrial radiation, the daily and annual march of temperature in land, water and air, irregular variations of temperature, and the temperature conditions of the atmosphere considered vertically from the ground to the upper limits. Professor Hann revives the use of "isopleth" diagrams for displaying graphically the combined result of annual and diurnal changes at a place. By means of such diagrams the hour at which a given temperature occurs on any day in the year may be seen at a glance, and the relative duration of high or low temperatures is very effectively shown.

Book II., dealing with atmospheric pressure and its periodic and irregular changes, is very short. The obscure question of the diurnal variations of the barometer is treated in some detail, but the difficulty of explaining the fact seems rather heightened than diminished. Professor Hann points out that the problem must be attacked by analysing the diurnal oscillation into one component with a whole-day period, which varies with season and place on the Earth's surface, and another component with a half-day period which is found to be independent of season and place, but to vary with the Earth's position in its orbit, thereby suggesting the action of some unknown cosmical influence. The fact that the atmospheric "tides" have no relation to the moon proves that this influence, whatever it may be, is not gravitational.

Book III. treats comprehensively of the Water Vapour of the Atmosphere and the phenomena to which it gives rise. It discusses evaporation, the measurement, variations and distribution of water vapour in the atmosphere, the phenomena of condensation, the nature of fog, cloud, rain, snow and hail, the measurement of rainfall, and its diurnal and annual periodicity. Many observations on the density of freshly fallen snow are cited, and the result

indicates that 10 or 12 inches of snow correspond, on the average, to 1 inch of rain, a result identical with the familiar relationship of a foot of snow to an inch of rain. Professor Hann recognises the authority of *British Rainfall* and *Symons's Meteorological Magazine* as "the chief sources of information on all questions relating to the measurement of rain." With regard to heavy falls in short periods the following definitions are given:—"Heavy rain (*Platzregen*) is a fall of at least five minutes' duration, with an intensity of at least .80 in. per hour; if 2.00 in. or more falls in half-an-hour one usually begins to speak of a cloud burst." Much importance is attached to the proportion which the absolute and average maximum daily falls bears to the annual total, in different regions and climates.

Book IV. is devoted to the phenomena of the movements of the air, including the great currents of atmospheric circulation and the normal winds of the globe. Professor Hann says that he regards Ferrel as the founder of the modern theory of general atmospheric circulation, because the independent statement of the theory by James Thomson was not based upon a mathematical foundation.

The longest division of the work is Book V., on Atmospheric Disturbances. "Weather," we are told, "is not an average atmospheric condition, but the total impression, or total effect, at a particular hour of the atmospheric phenomena actually in operation during a definite short interval of time, to put it more strongly, at a given moment." The German language is fortunate in containing a word, *Witterung*, which has no English equivalent; it indicates something intermediate between *Wetter*, the weather of an hour or a day, and *Klima*, the climate or average condition of a series of years. It is thus used for comparing the phenomena of one month or of one year with another. In the absence of a definite term we are obliged to use some such expression as the "general weather" of a month or a particular year, as distinguished from the climate of the average month or year. The treatment of barometric maxima and minima, and of storms, is especially masterly, and stands out as admirable even in a work every page of which bears testimony to the colossal knowledge, industry, and scientific method of its author.

### RAINFALL AND STORMS IN NOVEMBER.

THE record of rainfall at Camden Square, for November, was the lowest since 1858, and has only once been approached in the intervening 44 years, the average for that period being 2.28 in. The following are the records of less than .75 in. for the month:—

November, 1858	...	...	.53 in. on 8 days.
November, 1871	...	...	.60 in. on 8 days.
November, 1879	...	...	.73 in. on 8 days.
November, 1901	...	...	.59 in. on 7 days.

Similar low readings are reported from the greater part of southern England; a considerable number of stations recorded less than half-an-inch, the lowest being .36 in. at Ryde, Isle of Wight. Less than

one inch was reported everywhere south and east of a line drawn from Harwich to Leicester, thence to Hereford and through Bristol to Torquay, except along the higher part of the Cotswolds where there was a trifle more rain. More than 4 inches fell in the middle of Ireland, in North Wales, Lancashire, the West and North Ridings, Durham, Northumberland, the Lake District and the west of Scotland. The heaviest fall was at The Styne, where over 30 inches were recorded. In the north, therefore, the average was, in most cases, greatly exceeded, and the danger of a water famine which at the beginning of the month was very serious has, for the time, passed away. This is largely on account of the very heavy rain accompanying a deep cyclone, the centre of which passed from the south of Ireland across Wales and central England on the 12th and 13th by a gale of exceptional severity, which caused many shipwrecks all round the coast. Serious floods occurred on the 12th in Ireland as the result of 36 hours of torrential rain and damage is reported from almost all parts of that country. Floods were reported in both North and South Wales. In Lancashire, Yorkshire and Westmorland towns were flooded and railways damaged, especially in the valley of the Calder. At Todmorden the flood is said to have been almost as serious as the memorable disaster of 1866, and to be comparable with nothing that has occurred more recently. At Leeds in the Fewston reservoir, which had been nearly dry, the water rose 13 ft. 6 in. in twelve hours; and the Leeds and Liverpool Canal was put into working order for through traffic by the rain, after having been closed for lack of water since July. Bradford, Halifax, Huddersfield and other towns experienced a similar relief as to their water-supply, and all suffered to some extent from the fury of the storm. It appears that a rainfall exceeding 3 inches fell in the twenty-four hours up to 9 a.m. of the 13th, over a large part of the North of England.

A second spell of very wet weather with a good deal of snow occurred in the Lake District from the 18th to the 20th, and for this period of three days the fall at eight stations exceeded 6 inches, the heaviest fall on one day being 5·66 in. at Dungeon Ghyll on the 19th.

The following are notes from our correspondence:—

Mrs. BACKHOUSE of Hurworth Grange, Croft, Darlington, writes—  
“After ten days without recorded rain it began to rain heavily on Monday the 11th at 10 p.m., and from that time to 9 a.m. on the 13th we have had 3·32 in. of which 2·53 in. fell in twenty-four hours ending at 9 a.m. on the 13th.”

The Rev. J. G. B. KNIGHT of Eastgate, Co. Durham, writes—  
“We have had a terrific gale from N.E. and the rainfall in the twenty-four hours from 9 a.m. on the 12th to 9 a.m. on the 13th has been 3·86 in., a larger amount than I ever remember.”

Mr. AMOS MITCHELL writes from Wolsingham, Co. Durham—  
“The amount of rain registered for the twenty-four hours ending at 9 a.m. on November 13th was 4·21 in.”

As to the West Riding of Yorkshire, Mr. C. L. BROOK of Harewood Lodge, Meltham, says—"Rain commenced at 8.30 p.m. on November 11th.

From 8.30 p.m. November 11th to 9 a.m. on 12th.	1.58 in.
From 9 a.m. November 12th to 11 a.m. on 12th.	.67 in.
From 11 a.m. November 12th to 0.30 p.m. on 12th.	.81 in.

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Total in 16 hours 3.06 in.

This is very much in excess of anything registered in 21 years."

Mr. A. WILSON, Ilkley, says—"The rain here began at 9 p.m. on Monday, 11th November. It fell very gradually at first but heavily later.

November 11th, 9 p.m. to November 12th, 8 a.m.	1.03 in.
November 12th, 8 a.m. to November 12th, 3.15 p.m.	1.97 in.
November 12th, 3.15 p.m. to November 12th, 8.30 p.m.	.03 in.
November 12th, 8.30 p.m. to November 12th, 10.30 p.m.	.37 in.
November 12th, 10.30 p.m. to November 13th, 8 a.m.	.16 in.

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Total in 35 hours 3.56 in.

This is, I believe, the heaviest *Cyclonic* rain that has occurred in the West Riding of Yorkshire since the great rain of October 13th—15th, 1892."

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### ROYAL METEOROLOGICAL SOCIETY.

THE Opening Meeting of this Society for the session was held on November 20th, at the Institution of Civil Engineers, Great George Street, Westminster, Mr. W. H. Dines, B.A., President, in the chair.

The following gentlemen were elected Fellows:—Rev. J. M. Bacon, F.R.A.S., Mr. J. Y. Buchanan, F.R.S., Major H. A. Cummins, M.D., Mr. F. H. Grinlinton, F.R.G.S., Mr. F. E. Hardcastle, Rai Sahib Kali Krishna Mukerju, B.A., Mr. J. Smith, and Mr. J. R. Twentyman.

A paper by Mr. A. Lawrence Rotch on "The Exploration of the Atmosphere at Sea by means of Kites," was read by the Secretary. The readers of the *Meteorological Magazine* are aware that the author has for some years past devoted his attention to the use of kites to obtain meteorological observations at the Blue Hill Observatory, Mass., U.S.A. He has successfully carried on the work of exploring the air there to a height of three miles, by several hundred kite flights, executed in varied weather conditions whenever the velocity of the wind exceeded twelve miles an hour. Certain types of weather, however, such as anticyclones, accompanied by light winds, can rarely be studied. The systematic exploration of the atmosphere above the continent of Europe has been in progress for several years, under the direction of an International Committee, of which Mr. Rotch is the American member. Ascents of manned balloons and of balloons carrying only recording instruments to still greater heights, are now made each month in France, Germany, Austria, and Russia, and kites are used to supplement the obser-

vations at the highest altitudes. It frequently happens, however, that on the day of the balloon ascension, the wind at the ground is insufficient to raise the kites. Since the balloons drift with the upper currents to considerable distances, the comparison of the data obtained from them, with observations made at any station on the ground, is more or less uncertain.

Mr. Rotch now proposes the employment of kites, carrying meteorographs, on steamships; especially on vessels cruising in tropical oceans. This method will obviate the necessity of waiting for windy weather to fly the kites, and will render it possible to obtain at almost all times information about the upper air, and in regions hitherto inaccessible. Mr. Rotch has demonstrated the practicability of this scheme, as on August 22nd last he raised a kite to an elevation of half-a-mile, from a tow-boat in Massachusetts Bay, when the velocity of the wind at sea-level varied from 6 to 10 miles an hour. At the end of August, when crossing the North Atlantic from Boston to Liverpool, on the Dominion line steamer *Commonwealth*, he was able to raise kites carrying a meteorograph to an altitude of 1,800 feet, on five days out of the eight. The chief feature of these records was the rapid change of temperature with height.

Mr. W. N. Shaw thought that the extension of the investigation of the upper air from land stations to the sea was likely to prove very interesting. He was much interested at present in the determination of the variation of temperature with height, because of its influence upon the persistence or disappearance of floating cloud. He had lately come to the conclusion that it depended upon the temperature gradient whether a cloud became thicker or thinner in consequence of the communication or abstraction of heat, as by the sun shining upon it, or by radiation at night.

Dr. H. R. Mill stated that while accompanying the *Discovery* as far as Madeira, on her voyage to the Antarctic regions, he had assisted in several experiments in kite flying, while the vessel was under both sail and steam; and no doubt further experiments would be made during the progress of the voyage. The use of kites for exploring the upper air was originated in this country, and he hoped the work would still be carried on here.

The President, Mr. F. C. Bayard, Mr. R. Bentley, Captain A. Carpenter, Mr. R. H. Curtis, Mr. C. Harding and Captain D. Wilson-Barker, also took part in the discussion, the last-named suggesting that telegraph ships might be able to afford opportunities for such researches.

A paper by Professor John Milne, F.R.S., on "Meteorological Phenomena in relation to changes in the Vertical," was also read by the Secretary. All who are familiar with Horizontal Pendulums are aware that these instruments can without difficulty be so adjusted that they accurately follow changes in the vertical through angles considerably less than one second of arc, and however carefully they may be installed they indicate that such changes are almost con-

tinually in progress. When resident in Japan some years ago the author carried on numerous observations by seismographs, with the object of determining how far these movements were influenced by local conditions. The more important displacements recorded were of three types, viz. :—"long," "intermediate," and "short-period" wanderings. During the last five years Professor Milne has had continuous photographic records of a horizontal pendulum at his residence at Shide, Isle of Wight, and in this paper he gives a comparison of these records with the weather conditions prevailing during the first six months of 1901. He says that "assuming that a locality can be chosen where the diurnal wave and effects due to rain and dessication are small, which his observations indicate as possible, records of what appear to be the effects due to barometrical gradients may be obtained. When these are large and appear suddenly, the movements of the pendulum may be marked. At Shide the westerly displacement of a pendulum has for several yeas past been regarded as indicating the approach of bad weather."

Mr. W. N. Shaw, Mr. R. H. Curtis, Mr. R. Bentley, and the President, took part in the discussion, their opinion being that the horizontal pendulum cannot be regarded as a meteorological instrument until the students of dynamics have sorted out and differentiated the causes upon which its indications depend.

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## Correspondence.

### IRIDESCENT CLOUDS.

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

The iridescence in clouds of which Miss Fry writes in the September number of your Magazine, is not an uncommon phenomenon, although it is seldom seen on account of its proximity to the sun. It is observed in conjunction with high stratus clouds of the mackerel-sky type, and is probably caused by the splitting up of the sun's rays by ice crystals. All the colours visible at times in the high stratus clouds which precede or accompany bad weather produce a most beautiful and impressive effect.

D. WILSON-BARKER.

*H. M. S. "Worcester," off Greenhithe, Kent, November 7th, 1901.*

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### THE MOON AND RAINFALL.

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

Criticizing in the November number the results of a research by Mr. A. B. MacDowall on the possible influence of the moon on the rainfall at Greenwich, you rightly ask for a similar study in other parts of the world, and especially in the tropics.

Without taking part in the controversy, I can quote, on behalf of the persevering labours of your distinguished correspondent, the results of an old enough investigation of mine on that very subject

—not precisely in the tropics, but near their northern border, in lat.  $31^{\circ}$  N. This was in 1875, in China, at the well-known Zi-ka-Wei Observatory, of which I had just undertaken the direction.

The following are the results of that single year's (1875) observations as they were published in the "Annuaire de la Société météorologique de France, tome 24 (1877)."

*Mean amount of Cloud for each Quarter of the Moon.*

From the—

1st day to the 7th	Amount of Cloud	6.76	Departure from the Mean	+0.71
8th „ „ 14th	„	6.43	„ „	+0.38
15th „ „ 22nd	„	5.27	„ „	—0.78
23rd „ „ 30th	„	5.86	„ „	—0.19

Clouds seem to have been, in that year, more frequent during the first than during the second half of the synodic revolution of the moon. The maximum came three or four days after the new moon; the minimum was almost coincident with the full moon.

*Rainfall for each Quarter of the Moon.*

From the 1st to the 7th	.....	Total	16.59	in.	days 35	days for a month	2.92
„ 8th „ 14th	.....	„	14.41	„	29	„	2.42
„ 15th „ 22nd	.....	„	10.93	„	21	„	1.75
„ 23rd „ 30th	.....	„	19.81	„	27	„	2.25

The first part of the lunar month was wetter (64 days in the year) than the second (48 days); wettest indeed about the new moon, least wet at the full moon. I may add that 57 days of rain were found for the half of the orbit which contained the Perigee, and 48 only for the half with the Apogee.

REV. MARC DECHEVRENS, S.J.,

*Director of St. Louis Observatory.*

*Jersey, 17th November, 1901.*

## WEATHER AND THE HORNS OF THE MOON.

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

A PROPOS of the popular superstition of the weather being affected by the changes of the moon, which is so amusingly referred to in this month's Magazine, could you find room to note, and, if you can, to explain, the popular Italian idea that the greater the supposed inclination to the horizon of a line joining the points of the horns the greater the probability of rain?

D. C. P.

*18th November, 1901.*

[The superstition referred to by our correspondent is widespread and is dealt with by Mr. A. K. Bartlett in the October number of the American journal, "Popular Astronomy," his article being translated and commented upon in the Belgian fortnightly, "Ciel et Terre," for November 16th. The fact is pointed out that the appearance of the moon "lying on its back," and the less marked changes

in the inclination of the line joining the horns are astronomical phenomena due to the position of the ecliptic with regard to the horizon. At all times, it is pointed out, the line joining the horns of the moon is at right angles to the line joining the positions of the moon and sun. We cannot explain the superstition, but we are pretty certain that it is not a generalisation of experience.]—ED. S. M. M.

### METEOROLOGICAL NEWS AND NOTES.

DR. ALEXANDER BUCHAN, F.R.S., has been designated by the Council of the Royal Meteorological Society as the first recipient of the Symons Gold Medal, in recognition of the valuable work he has done in connection with meteorological science. Our readers are aware that this Medal has recently been founded in memory of the late Mr. G. J. Symons, F.R.S., the originator of this Magazine and of the British Rainfall Organization. The Medal will be presented to Dr. Buchan at the Annual General Meeting of the Society on January 15th.

CAPTAIN ALFRED CARPENTER, R.N., has been entrusted by the Meteorological Council with the superintendence of the special researches into the occurrence and distribution of London fogs, for which the County Council has given a grant of money. The object of the study is to find data from which it may be possible to forecast the occurrence of fogs sufficiently far in advance to enable warning to be given to the electric lighting companies of exceptional demands on their resources during the hours that should enjoy daylight.

METEOROLOGY AT THE CHANGE OF THE CENTURY was dealt with by the distinguished German meteorologist, Dr. Wilhelm von Bezold, (whose portrait graces the October number of *Terrestrial Magnetism*), at the meeting of the German Meteorological Society at Stuttgart, in April, and his address appears in the *Meteorologische Zeitschrift* for October. He points to the study of the upper air as the characteristic feature of the period, referring with pardonable pride to the simultaneous balloon ascents inaugurated in Germany, but perhaps hardly doing justice to the kite-work in America. The most important part of the address was the suggestion as to the developments in meteorology which may be expected as the outcome of recognising the close relation which exists between magnetic, electric, solar and atmospheric phenomena, and he points out the importance of paying increased attention to the physics of the atmosphere rather than to details of climatology.

PROFESSOR LUIGI PALAZZO has been appointed by the Italian Government as Director of the Central Meteorological Institute in Rome, in succession to the late Professor Pietro Tacchini.

PARTICULARS OF THE CLIMATE OF DAWSON in the Yukon district of northern Canada will be given henceforth in our Climatological Table of the British Empire, the interest of which we hope to increase still further next year.

THE "KNOWLEDGE DIARY FOR 1902" contains a quantity of information useful to scientific observers especially as regards astronomical and meteorological matters. We note, however, that the amateur meteorologist is advised to correct the readings of his instruments before recording them; this is a mistake, the actual readings should always be recorded. The importance of every student of nature keeping systematic notes of his observations need not be insisted upon, but for amateur observers a diary is often more useful than a note-book.

NATURE AND THE WEATHER were the theme of two journalists a few weeks ago. "Unluckily," said one, commenting on the dryness of November in the south, "Nature never fails to restore the balance for the year; and we may expect a rainy season in the winter that is now upon us." "Fortunately," says the other, speaking of the heavy rains of the middle of November that filled the reservoirs in the north, "Nature in this island, although capricious, is not wholly unkind. She has come to the rescue none too soon—and in doing so has interrupted communication and inflicted peril on those at sea. Her benevolence is not without a discount." After which we may be permitted to cite from Dickens a judicial summing up, pronounced in course of a conversation with Mr. Squeers of Dotheboys Hall—"She's a rum un is Natur'!"

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### BOOKS RECEIVED.

Results of Observations in Meteorology and Terrestrial Magnetism made at the Melbourne Observatory and other localities in the state of Victoria, Australia, from the 1st of July to the 31st of December, 1900, under the direction of Pietro Baracchi. Melbourne, 1901. Size  $9\frac{1}{2} \times 16\frac{1}{2}$ . Pp. 48.

Returns of Rainfall, &c., in Dorset in 1900, by Henry Storks Eaton. [From "Proceedings" Dorset Natural History and Antiquarian Field Club, Vol. 22, 1901.] Size  $8\frac{1}{2} \times 6$ . Pp. 14.

Report on the Meteorology of Scotland for the year ending 30th September, 1900. By R. C. Mossman, F.R.S.E. [From the *Transactions* of the Royal Scottish Aborigicultural Society.] 1901. Size  $9 \times 6$ . Pp. 10.

Results of Meteorological Observations taken in Edinburgh during 1900. By R. C. Mossman, F.R.S.E. [From the *Proceedings* of the Royal Society of Edinburgh. Vol. 14.] 1901. Size  $8\frac{1}{2} \times 6$ . Pp. 8.

Colony of Mauritius. Annual Report of the Director of the Royal Alfred Observatory for 1900, Mauritius, 1901. Size  $13\frac{1}{2} \times 8\frac{1}{2}$ . Pp. 24.

Report of the Meteorological Service of Canada, by R. F. Stupart, Director, for the year ended December 31st, 1898. Ottawa, 1901. Size  $11\frac{1}{2} \times 9$ . Pp. 312.

Ceylon. Administration Reports, 1900. Part II. Scientific, Meteorology. Report of Mr. F. H. Grinlinton, F.R.G.S., Surveyor-General. [Colombo, 1901]. Size  $13 \times 8\frac{1}{2}$ . Pp. 40. Maps.

[The compiler of this report is to be congratulated on the promptness with which it appears, and on the interesting coloured maps of rainfall which illustrate it.]

Borough of Margate. Annual Report on the Meteorology of Margate, by the Borough Meteorologist [John Stokes, F.R.Met.Soc.] For the year 1900. Margate [1901]. Size  $10 \times 6\frac{1}{2}$ . Pp. 8.

METEOROLOGICAL OBSERVATIONS AT CAMDEN SQUARE FOR 40 YEARS, 1858-97.

MAXIMUM TEMPERATURE IN SUN.

MONTHS.	BLACK BULB IN VACUO.*						BRIGHT BULB IN VACUO.†					
	MONTHLY MEANS.			EXTREMES.			MONTHLY MEANS.			EXTREMES.		
	Mean 28 years.	Highest.	Lowest.	Absolute Highest.	Lowest Highest.	Absolute Lowest.	Mean 20 years.	Highest.	Lowest.	Absolute Highest.	Lowest Highest.	Mean of all Highest.
January.....	53.7	61.8	44.1	87.3	63.5	44.2	43.9	52.1	35.4	60.3	46.3	55.5
February.....	63.2	74.1	51.9	102.4	73.8	53.0	49.2	54.2	41.2	69.8	51.8	62.4
March.....	81.3	91.3	70.6	112.6	92.8	69.0	58.2	64.6	52.1	78.4	66.2	72.3
April.....	95.5	106.0	87.6	122.0	104.4	82.8	67.2	76.1	61.6	88.4	72.4	80.5
May.....	106.1	114.0	94.8	131.5	115.8	87.1	75.6	81.8	68.7	98.7	78.9	90.5
June.....	113.2	120.4	106.9	136.8	120.6	99.0	82.2	87.8	76.9	104.3	84.9	95.1
July.....	116.2	123.4	105.9	137.7	120.2	111.3	84.6	91.4	75.6	105.4	87.0	96.3
August.....	113.6	120.2	105.4	134.0	122.7	95.1	82.8	88.8	77.2	104.2	89.6	94.8
September.....	102.0	108.7	93.6	131.8	113.6	83.2	75.7	82.6	71.6	93.3	81.6	86.8
October.....	81.3	89.1	75.5	116.9	96.8	61.1	62.3	67.0	58.3	86.8	70.6	76.5
November.....	63.6	70.5	57.7	98.1	78.9	52.4	52.0	57.5	47.1	73.8	56.1	64.4
December.....	51.8	59.1	36.9	87.0	49.3	41.2	44.9	48.3	34.8	62.0	44.8	56.8
Mean.....	86.8	94.9	77.6	116.5	96.0	73.3	64.9	71.0	58.3	85.5	69.2	77.7
Highest.....	116.2	123.4	106.9	137.7	122.7	111.3	84.6	91.4	77.2	105.4	89.6	96.3
Lowest.....	51.8	59.1	36.9	87.0	49.3	41.2	43.9	48.3	34.8	60.3	44.8	55.5

\* Black Bulb readings for 28 years commencing 1870.

† Bright Bulb readings for 20 years commencing 1878.

## CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, JUNE, 1901.

STATIONS.  <i>(Those in italics are South of the Equator.)</i>	Absolute.				Average.				Absolute.		Total Rain.		Aver.
	Maximum.		Minimum.		Max.	Min.	Dew Point.	Humidity.	Max. in Sun.	Min. on Grass.	Depth.	Days.	Cloud.
	Temp.	Date.	Temp	Date.									
	°		°		°	°	°	0-100	°	°	inches.		
London, Camden Square	82·8	9	40·9	19	72·8	50·5	48·1	66	125·7	35·1	1·25	9	5·5
Malta.....	91·8	36	60·5	23	81·6	65·2	61·8	70	140·0	56·2	·21	1	1·3
Lagos, W. Africa .....	90·0	9	69·0	1	86·0	73·9	75·3	85	148·0	55·0	17·37	17	4·8
Cape Town ...	84·8	25	37·1	18	65·9	47·1	48·2	73	...	...	1·37	7	4·7
Mauritius.....	80·5	4	58·7	14	75·7	63·8	60·8	75	134·2	49·4	1·90	14	5·6
Calcutta.....	108·4	11	73·2	19	94·6	79·3	78·1	77	152·8	71·6	8·85	9	6·4
Bombay.....	98·4	9	75·1	13	87·9	79·4	77·5	82	151·5	72·8	25·36	24	7·2
Colombo, Ceylon .....	89·1	15	73·0	8	86·6	76·5	73·7	83	145·0	70·0	5·93	20	5·4
Melbourne.....	59·9	7	30·9	29	53·4	40·7	39·6	76	117·9	23·1	1·98	12	6·8
Adelaide .....	66·1	8	35·9	30	59·0	44·4	43·0	76	121·5	25·9	4·91	19	5·9
Sydney .....	66·0	5	38·4	16	57·8	44·7	39·2	72	109·0	31·3	1·03	10	3·3
Wellington .....	68·0	10	32·0	27	56·6	46·3	43·1	74	103·0	25·0	4·47	17	4·9
Auckland .....	64·0	20	37·0	23b	59·6	51·8	47·5	78	115·0	33·0	2·75	18	6·3
Jamaica, Halfway Tree	93·0	36	69·0	16	87·5	72·1	71·0	79	...	...	12·71	22	5·2
Trinidad' .....	90·0	sev.	62·0	24	86·3	72·0	72·2	76	168·0	57·0	9·21	20	...
Grenada.....	85·0	24a	71·4	2	82·7	74·3	71·3	78	147·2	...	8·28	24	3·9
Toronto.....	97·1	27	40·5	10	77·0	55·0	56·9	73	113·2	36·6	2·07	9	4·8
Fredericton, N.B. ....	90·2	27	34·0	16	74·1	50·6	51·8	60	...	...	3·66	10	4·9
Winnipeg, Manitoba ...	88·8	26	28·5	7	71·7	48·7	...	...	...	...	10·07	16	6·4
Victoria, B.C. ....	74·0	17	43·7	4	60·9	48·4	...	...	...	...	1·06	12	6·5
Dawson, Yukon .....	81·8	19	35·8	15	...	...	...	...	...	...	·94	2	...

a—and 30. b—and 25.

## REMARKS.

MALTA.—Mean temp. of air 72°·2, or 0°·6 above the average. Mean hourly velocity of wind 8·7 miles, the average. Mean temp. of sea 72°·2. L on 11th and 13th.

J. F. DOBSON.

MAURITIUS.—Mean temp. of air 0°·3, of dew point 0°·2, above, and R 0·04 in. below their respective averages. Mean hourly velocity of wind 11·3 miles, the average; extremes, 28·3 on 30th and 1·7 on 17th; prevailing direction S.E. to E.S.E.

T. F. CLAXTON.

COLOMBO, CEYLON.—Mean temp. of air 80°·4, or 0°·7 below the average, dew point 0°·5 below, R 2·42 in. below, their respective averages. Mean hourly velocity of wind 11 miles: prevailing direction S.W. TSS on the 2nd, 8th and 9th. L on 5 days.

J. HAMPTON.

ADELAIDE.—Mean temp. of air 1°·8 below the average. Very wet generally near the coast; at Adelaide R. was 2·09 in. over the average.

C. TODD, F.R.S.

SYDNEY.—Mean temp. of air 3°·1 below, R 4·78 in. above, and humidity 6·8 below, their respective averages.

H. C. RUSSELL, F.R.S.

WELLINGTON.—Mean temp. of air 2°·4 above, and R 0·63 in. below, their respective averages. The early part of the month was generally fine, with moderate N.W. wind; the latter part cold and showery, with prevailing S. wind. Slight earthquake on 6th at 1·25 p.m.

R. B. GORE.

AUCKLAND.—Mean temp. of air slightly above the average; a cloudy and showery month, but the total R considerably under the average.

T. F. CHEESEMAM.

TRINIDAD.—R 0·93 in. above the 30 years' average.

J. H. HART.

WINNIPEG.—Six inches of rain fell in thunderstorm of 26th.

R. F. STUPART.

SUPPLEMENTARY TABLE OF RAINFALL,  
NOVEMBER, 1901.

Div.	STATION.	Total Rain.	Div.	STATION.	Total Rain.
		in.			in.
I.	Uxbridge, Harefield Pk..	·51	XI.	Castle Malgwyn .....	2·90
II.	Dorking, Abinger Hall .	·89	„	Builth, Abergwesyn Vic.	5·01
„	Sheppey, Leysdown .....	·79	„	Rhayader, Nantgwillt...	4·37
„	Hailsham .....	·45	„	Lake Vyrnwy .....	5·15
„	Crowborough.....	·38	„	Corwen, Rhug .....	...
„	Ryde, Beldornie Tower..	·36	„	Criccieth, Talarvor .....	4·92
„	Emsworth, Redlands ...	·49	„	I. of Anglesey, Lligwy..	5·90
„	Alton, Ashdell .....	·92	„	Douglas, Woodville.....	5·44
„	Newbury, Welford Park	·85	XII.	Stoneykirk, Ardwell Ho.	4·22
III.	Oxford, Magdalen Coll..	·41	„	New Galloway, Glenlee	...
„	Banbury, Bloxham .....	·74	„	Moniaive, Maxwellton Ho.	...
„	Pitsford, Sedgebrook .....	·77	„	Lilliesleaf, Riddell .....	3·40
„	Huntingdon, Brampton.	1·22	XIII.	N. Esk Res. [Penicuik]	4·40
„	Wisbech, Bank House...	1·39	XIV.	Glasgow, Queen's Park..	3·27
IV.	Southend .....	·55	XV.	Inveraray, Newtown ...	5·36
„	Colchester, Lexden .....	·77	„	Ballachulish, Ardsheal...	5·95
„	Saffron Waldon, Newport	1·03	„	Islay, Eallabus.....	5·35
„	Rendlesham Hall .....	1·22	XVI.	Dollar.....	3·09
„	Swaffham .....	1·93	„	Balquhider, Stronvar...	4·75
V.	Salisbury, Alderbury ...	·54	„	Coupar Angus Station...	1·56
„	Bishop's Cannings .....	·71	„	Blair Atholl .....	1·51
„	Blandford, Whatcombe .	·82	XVII.	Keith H.R.S.....	3·59
„	Ashburton, Druid House	1·35	„	Forres H.R.S. ....	...
„	Okehampton, Oaklands.	1·65	XVIII.	Fearn, Lower Pitkerrie..	1·67
„	Hartland Abbey .....	1·48	„	S. Uist, Askernish .....	...
„	Lynton, Glenthorne ...	...	„	Invergarry .....	1·92
„	Probus, Lamellyn .....	·98	„	Aviemore, Alvie Manse.	4·20
„	Wellington, The Avenue	1·07	„	Loch Ness, Drumnadrochit	2·25
„	North Cadbury Rectory	·61	XIX.	Invershin .....	3·07
VI.	Clifton, Pembroke Road	·50	„	Durness .....	...
„	Ross, The Graig .....	·87	„	Watten H.R.S.....	2·88
„	Wem, Clive Vicarage ...	1·91	XX.	Dunmanway, Coolkelure	3·51
„	Codsall .....	1·36	„	Cork, Wellesley Terrace	1·52
„	Cheadle, The Heath Ho.	2·66	„	Killarney, District Asyl.	2·44
„	Coventry, Priory Row ..	·82	„	Caher, Duneske .....	1·64
VII.	Market Overton .....	...	„	Ballingarry, Hazelfort...	3·79
„	Grantham, Stainby .....	1·15	„	Limerick, Kilcornan ...	...
„	Horncastle, Bucknall ...	...	„	Miltown Malbay .....	6·04
„	Worksop, Hodsock Priory	2·43	XI.	Gorey, Courtown House	2·34
VIII.	Neston, Hinderton .....	3·30	„	Moynalty, Westland ...	3·23
„	Southport, Hesketh Park	4·29	„	Athlone, Twyford .....	3·24
„	Chatburn, Middlewood.	8·19	„	Mullingar, Belvedere ...	3·41
„	Duddon Val., Seathwaite Vic.	12·69	XXII.	Woodlawn .....	4·64
IX.	Baldersby .....	3·92	„	Crossmolina, Enniscoe..	4·78
„	Scalby, Silverdale .....	3·96	„	Collooney, Markree Obs.	4·39
„	Ingleby Greenhow Vic..	4·84	XXIII.	Enniskillen, Model Sch.	4·45
„	Middleton, Mickleton ...	5·59	„	Warrenpoint.....	4·02
X.	Haltwhistle, Unthank H.	...	„	Miltown, Banbridge.....	3·93
„	Bamburgh .....	3·90	„	Belfast, Springfield .....	4·11
„	Keswick, The Bank .....	...	„	Bushmills, Dundarave..	5·13
XI.	Llanfrechfa Grange .....	1·11	„	Stewartstown .....	3·67
„	Treherbert, Tyn-y-waun	4·25	„	Killybegs .....	8·79
„	Llandoverly .....	2·19	„	Horn Head .....	6·12

## NOVEMBER, 1901.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL.					Days on which "01 or more fell.	TEMPERATURE.						No. of Nights below 32°
		Total Fall.	Differ- ence from average 1890-9.	Greatest Fall in 24 hours.		Max.		Min.		In shade.	On grass.			
				Dpth	Date			Deg.	Date			Deg.	Date	
inches.	inches.	in.			Deg.	Date	Deg.	Date						
I.	London (Camden Square) ...	·59	— 1·63	·37	13	7	54·7	11	24·0	16	12	16		
II.	Tenterden .....	·59	— 1·98	·14	13	13	57·0	11	22·0	17	13	20		
"	Hartley Wintney .....	·54	— 1·94	·25	13	8	55·0	11	17·0	17	15	19		
III.	Hitchin .....	1·13	— 1·29	·74	13	10	55·0	11	21·0	24	16	...		
"	Winslow (Addington) .....	·71	— 1·76	·23	12a	10	55·0	11	15·0	25	13	19		
IV.	Bury St. Edmunds (Westley) .....	1·29	— 1·21	·48	13	9	57·0	2	22·0	17	15	...		
"	Norwich (Brundall) .....	2·38	...	1·17	13	19	58·0	3	25·2	17	11	18		
V.	Winterborne Steepleton .....	·64	...	·20	13	9	55·7	3	19·8	17	14	16		
"	Torquay (Cary Green) ...	·53	...	·16	12	6	58·4	20	29·3	16	...	...		
"	Polapit Tamar [Launceston]..	·88	— 3·00	·35	21	10	58·9	2	17·6	16f	14	15		
VI.	Stroud (Upfield) .....	1·38	— 1·31	·73	13	8	55·0	11	22·0	16g	17	...		
"	Church Stretton (Woolstaston) .....	1·68	— 1·10	·51	11	12	55·5	10	22·0	16	11	18		
"	Worcester (Diglis Lock) .....	·78	— 1·32	·31	12	8	...	...	...	...	...	...		
VII.	Boston .....	1·67	— ·18	·60	11	6	55·0	21	24·0	30	15	...		
"	Hesley Hall [Tickhill].....	2·60	+ ·66	1·30	11	11	59·0	1	20·0	25	12	...		
"	Derby (Midland Railway).....	1·74	— ·19	·82	11	14	55·0	16	19·0	17h	13	...		
VIII.	Manchester (Plymouth Grove) .....	3·84	+ 1·17	1·50	11	10	58·0	10	21·0	15	13	16		
IX.	Wetherby (Ribston Hall) ...	4·56	+ 2·60	2·36	12	8	...	...	...	...	...	...		
"	Skipton (Arncliffe) .....	9·30	+ 3·23	1·93	12	11	...	...	...	...	...	...		
"	Hull (Pearson Park) .....	3·65	+ 1·36	1·89	12	15	56·0	10	21·0	16	15	19		
X.	Newcastle (Town Moor) .....	5·61	+ 3·15	2·53	12	15	...	...	...	...	...	...		
"	Borrowdale (Seathwaite).....	15·57	+ 1·59	4·27	19	13	56·5	1	19·4	16	11	...		
XI.	Cardiff (Ely).....	1·54	— 2·42	·39	11	9	...	...	...	...	...	...		
"	Haverfordwest .....	2·29	— 2·57	1·02	11	8	56·6	11	21·3	17	10	18		
"	Aberystwith (Gogerddan) ...	4·91	— ·04	1·23	11	9	57·0	2	17·0	24	14	...		
"	Llandudno.....	4·16	+ ·82	1·82	11	17	56·5	12	27·5	16	4	...		
XII.	Cargen [Dumfries] .....	3·47	— 1·07	·73	20	9	54·0	12	19·0	16	12	...		
XIII.	Edinburgh (Royal Observatory) .....	3·47	...	1·41	11	8	54·3	5	25·1	16	7	10		
XIV.	Colmonell .....	4·82	+ ·18	1·09	9	13	55·0	1	17·0	15	...	...		
XV.	Tighnabruaich .....	6·75	...	2·05	18	16	50·0	3	24·0	15	6	...		
"	Mull (Quinish).....	5·85	— ·12	1·16	18	19	...	...	...	...	...	...		
XVI.	Loch Leven Sluices .....	2·59	— 1·06	·83	10	9	...	...	...	...	...	...		
"	Dundee (Eastern Necropolis) .....	1·80	— 1·01	·70	9	12	56·0	19	21·0	24	10	...		
XVII.	Braemar .....	2·10	— 1·67	·37	14	15	56·2	10	6·0	16	12	20		
"	Aberdeen (Cranford) ...	2·27	— 1·09	·56	20	17	56·0	6c	18·0	23	10	...		
"	Cawdor (Budgate) .....	3·37	+ ·63	·83	19	16	...	...	...	...	...	...		
XVIII.	Strathconan [Beaully] .....	4·26	— 1·39	·93	22	9	...	...	...	...	...	...		
"	Glencarron Lodge.....	9·33	— ·59	2·33	18	20	53·9	1	20·1	16	6	...		
XIX.	Dunrobin .....	3·05	— ·24	·48	9	15	54·0	6	28·0	16i	...	...		
"	S. Ronaldshay (Roeberry) ...	2·45	— 1·62	·49	8	21	51·0	6	27·0	14	8	...		
XX.	Darrynane Abbey.....	1·65	— 3·30	·75	11	15	...	...	...	...	...	...		
"	Waterford (Brook Lodge) ...	2·24	— 1·28	1·65	11	10	57·0	10	22·0	17	7	...		
"	Broadford (Hurdlestown) ...	3·40	+ ·15	2·05	11	18	54·0	10d	24·0	16	7	...		
XXI.	Carlow (Browne's Hill) .....	2·72	— ·35	2·10	11	9	...	...	...	...	...	...		
"	Dublin (FitzWilliam Square) .....	3·62	+ 1·06	2·04	11	11	56·7	10	28·3	17	4	11		
XXII.	Ballinasloe .....	4·46	+ ·89	2·30	11	16	60·0	19e	20·0	16f	9	...		
"	Clifden (Kylemore) .....	4·21	— 3·73	2·20	11	13	...	...	...	...	...	...		
XXIII.	Seaforde .....	4·64	+ ·94	1·88	12	12	53·0	3, 9	25·0	15	8	8		
"	Londonderry (Creggan Res.) .....	4·86	+ ·99	·97	19	19	...	...	...	...	...	...		
"	Omagh (Edenfel) .....	3·83	+ ·12	·93	12	15	55·0	3	21·0	15	7	9		

+ Shows that the fall was above the average ; — that it was below it.

a—and 13. b—and 2, 10. c—and 10, 19. d—and 11. e—and 20, 21. f—and 17. g—and 24. h—and 25. i—and 23.

# METEOROLOGICAL NOTES ON NOVEMBER, 1901.

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.

## ENGLAND.

LONDON, CAMDEN SQUARE.—The driest November since 1858. From 3rd to 7th dense fogs prevailed, followed by a week of dull and milder weather with one day of heavy R. From 14th to the end was variable in temperature but persistently dry. Mean temp.  $40^{\circ}\cdot6$  or  $2^{\circ}\cdot4$  below the average. Slight S fell on 14th.

TENTERDEN.—The driest November during 39 years except 1871, when only  $\cdot58$  in. fell. Also the smallest fall for the three months September to November,  $3\cdot56$  in., and for the 11 months, January to November,  $17\cdot22$  in. From March 1st, 1900, there were only 35 inches in 21 months, a deficiency of 14 inches. November was very cold from 5th to 7th and from 15th to 17th. Strong winds from 12th to 14th and 18th to 21st. Duration of sunshine 86 hours.

HARTLEY WINTNEY.—A “*mensis mirabilis*.” Fog for the first five days. The driest November observed here, only half-an-inch of R fell and half of that was on one day, the 13th. R 6 inches below the average for the year so far, and water-carts were busy on the uplands. Sharp snaps of frost from 14th to 18th and from 23rd to 27th. A prevalence of very light N. breezes and many calm days. Ozone on 11 days with a mean of  $4\cdot0$ .

WINSLOW, ADDINGTON.—The driest November for 30 years. Weather very variable; frequent dense fogs and two periods of intense frost separated by mild interval. The aggregate number of degrees of frost registered was greater than in any November since 1871.

BURY ST. EDMUNDS, WESTLEY.—A cold month with 15 days of frost. The first week was very foggy. Want of water still continued in W. Suffolk.

NORWICH, BRUNDALL.—The coldest November since 1896, although the mean temp. was about the average. R for the year  $7\cdot64$  in. deficient. Fog on 3 days. Great N. gale and heavy downpour on 13th and gale from N. with floods on 28th. S storm on 15th.

WINTERBORNE STEEPLTON.—Both dry and cold. Between 3rd and 7th, 14th and 18th and from 23rd to the end there were frosts nearly every night. Mean daily temp. only  $40^{\circ}\cdot9$  being  $4^{\circ}\cdot5$  below the average of 7 Novembers, 1896 only having been colder.

TORQUAY, CARY GREEN.—The driest November recorded since 1892. R  $3\cdot37$  in. below the average. Duration of sunshine  $3\cdot5$  hours above the average, with 9 sunless days. Mean temp.  $45^{\circ}\cdot7$  or  $1^{\circ}\cdot7$  below the average. Mean amount of ozone  $3\cdot2$ .

POLAPIT TAMAR [LAUNCESTON].—Cold, calm and very dry. The smallest R for November in 21 years. The total for 11 months was  $5\cdot68$  in. below the average. Morning fogs daily from 4th to 8th. S on 14th and 15th.

SKIPTON, ARNCLIFFE VIC.—An unusually heavy R for so few wet days; between 11th and 20th, 5 days had each a fall of upwards of an inch.

HULL, PEARSON PARK.—Fogs more or less dense characterised the weather during the first part. Afterwards a wet period with much cloud and heavy R set in with N.E. and N.W. winds, often cold and sometimes stormy. It became much finer and warmer towards the end.

## WALES.

HAVERFORDWEST.—Dry, cold and fine with a fair number of sunny days but at times very foggy. The early part was cold and stormy. Disastrous gale on 11th and 12th when the bar. fell a full inch in less than 24 hours. The min. on grass of  $17^{\circ}\cdot1$  on 17th was the lowest recorded for November in 50 years. Duration of sunshine  $69\cdot4$  hours. S on 14th. Prevailing winds during the frosty period E S.E. and E.

ABERYSTWITH, GOGERDDAN.—High winds, R, frost and S with variable bar. Wind variable but chiefly N. and N.W.

## SCOTLAND.

CARGEN [DUMFRIES].—Cold and sunless. Mean temp.  $40^{\circ}\cdot 8$ , being  $1^{\circ}\cdot 1$  below the average of 42 years, and the lowest since 1887.

TIGHNABRUACH, CRAIGANDARAICH.—Remarkable for heavy R; three days with more than one inch, and on 18th  $2^{\circ}\cdot 05$  in. fell. On 11th and 18th the wind had the force of a gale.

S. RONALDSHAY, ROEBERRY.—A cold, dry month. Mean temp.  $41^{\circ}\cdot 0$ , or  $2^{\circ}\cdot 4$  below the average of 11 years.

## IRELAND.

DARRYNANE ABBEY.—A very fine month, having the lowest fall registered in November since 1879. H shower on 15th lasting about an hour.

BROADFORD, HURDLESTOWN.—The R on 11th was remarkable as being the third largest fall in 24 hours on record.

DUBLIN, FITZWILLIAM SQUARE.—A month of paradoxes. Fine, yet the R exceeded the average. The mean temp.,  $44^{\circ}\cdot 9$ , was  $0^{\circ}\cdot 2$  above the average, yet the grass minimum was  $21^{\circ}\cdot 5$  on 17th, and S lay on the ground from 14th to 17th. The most memorable episode in the month's weather was a great R storm on 11th and 12th, during which  $2^{\circ}\cdot 91$  in. of R fell, accompanied in its later stages by a gale of exceptional violence from N.N.E. Duration of sunshine 75 hours. High winds on 8 days, attaining the force of a gale on 4. Fog on 7 days. S, sleet and H on 13th, 14th and 16th. L on 10th and 12th.

OMAGH, EDENFEL.—For the first 8 days the weather was anti-cyclonic and practically rainless, but the cyclonic disturbance that followed from 9th to 12th was of very marked character and culminated on 11th and 12th in a gale of great violence from the N.E., usually the sheltered quarter of this neighbourhood. A very cold spell followed until 16th, after which the remainder was mostly dull and seasonable.

## GENERAL WEATHER IN GLEN NEVIS, NOVEMBER, 1901.

MR. R. C. MOSSMAN sends us the following interesting table comparing the meteorological conditions at his new valley station in Glen Nevis with those at Ben Nevis and Fort William, the returns from the two latter stations being taken from the reports published in the daily papers:—

	<i>Ben Nevis.</i>	<i>Achariach.</i>	<i>Fort William.</i>
Height .....	4407 feet.	150 feet	42 feet
Rainfall .....	$15^{\circ}\cdot 09$ ins.	$5^{\circ}\cdot 42$ in.	$4^{\circ}\cdot 63$ in.
No. of days .....	23	22	21
Max. fall in 24 hours .....	$2^{\circ}\cdot 96$ in., 19th	$1^{\circ}\cdot 66$ in., 18th	$1^{\circ}\cdot 42$ in., 18th
Highest temp. in shade .....	$39^{\circ}\cdot 0$ , 3rd	$54^{\circ}\cdot 6$ , 19th	$53^{\circ}\cdot 5$ , 19th
Lowest „ „ .....	$13^{\circ}\cdot 6$ , 22nd	$17^{\circ}\cdot 3$ , 16th	$20^{\circ}\cdot 9$ , 16th, 23rd
Mean temp. ....	$28^{\circ}\cdot 4$	$42^{\circ}\cdot 4$	$41^{\circ}\cdot 8$
Temp. in shade at or below $32^{\circ}$ on 27 nights	?	7 nights	9 nights
Below $32^{\circ}$ on grass .....	?	13	15
Bright sunshine .....	44 hours	$3^{\circ}\cdot 5$ hours*	40 hours
Sunless days .....	19	27	12
Mean relative humidity .....	92	81	85
Mean amount of cloud.....	8.0	7.6	7.2

\* No possible sunshine after 6th.

Rainfall at head of Glen Nevis, 2 miles above Achariach, and 357 feet above the sea,  $5^{\circ}\cdot 92$  in.