

SYMONS'S MONTHLY METEOROLOGICAL MAGAZINE.

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In Memoriam.

CHARLES CLOUSTON, LL.D., L.R.C.S. EDIN.

The number of contributors to *British Rainfall* and to this Magazine is so large that if we were to notice any losses but those of altogether exceptional importance, these pages would become biographical rather than meteorological. The Rev. Dr. Clouston, a descendant of one of the Norwegians by whom the Orkney Isles were chiefly peopled, was born in 1800, was trained for the medical profession and took the degree of L.R.C.S. at Edinburgh in 1819, but on returning to his father's manse at Stromness, he decided upon entering the Church.

The first printed note upon meteorology which we can trace to him was 62 years since, viz., a record of the pocky cloud having been seen on March 5th, 1822, when the barometer fell from 29·5 in. at 10 a.m. to 28·3 in. at 7 p.m. His observations of temperature and wind have been published for every month since 1826. The importance of such a long record, kept in an eminently good position on the west coast of Pomona, in the Orkney Isles, will be evident to everyone, and as far back as 1844 this was recognized by the editors of the *Philosophical Magazine*, who published monthly the daily values from Sandwick, having some years previously (in 1839) published a table by him of Orkney mean temperature. In 1841 we find Mr. Clouston writing the articles on "Sandwick," and on the "Orkney Isles" for Sir J. Sinclair's *New Statistical Account of Scotland*. Passing over shorter papers, we come to one which is the standard authority on Orkney climate, the paper read by Dr. Clouston before the British Association at Aberdeen (when the Prince Consort was president) in 1859, and which was subsequently printed *in extenso* by Admiral FitzRoy in the *Fifth Number of Meteorological Papers*. A year or two later Dr. Clouston wrote a *Guide to the Orkney Islands*, which was printed separately, and also as part of *Anderson's Guide to the Highlands and Islands of Scotland*. And last of all, in 1867, we have *An Explanation of the Popular Weather Prognostics of Scotland on Scientific Principles*.

We ought not to omit to mention that Dr. Clouston was the first

to describe and explain the formation of "Snow Rollers." This he did in the *Ann. Nat. Hist.* for 1847, and his paper was reprinted in *Silliman's American Journal* for the same year.

Dr. Clouston's contributions to meteorology were, however, of more importance as an observer than as an author. We have already referred to the publication of his observations by the *Edinburgh Philosophical Journal*. He was for many years a corresponding member of La Commission Hydrométrique de Lyon; and his observations were quoted in several of the reports of that body. When in 1856, Dr. Stark laid the foundations of the *Scottish Meteorological Society*, and tables began to be published by the Registrar-General for Scotland, Sandwick was immediately enlisted; when *British Rainfall*, 1860-61, appeared, the Sandwick returns were there; when Admiral FitzRoy wanted a station, at which to erect a large Robinson anemometer, Sandwick was selected. (By the bye, Dr. Clouston was one of the first to point out the evils of placing anemometers on roofs. Admiral FitzRoy sent instructions for the anemometer to be placed on the roof; but when the assistant-in-charge arrived at Sandwick, Dr. Clouston said, "Oh, that won't do; in the first place the wind is so strong that it will tear the roof off, and therefore our heritors won't allow it; and besides that, up above the roof you will get too much wind, you will get that due to the position of the anemometer, and besides that, you will get the wind which, not being able to get through the house, is deflected to the two sides and over the top." Hence it was that the Sandwick anemometer was mounted on the top of an acute pyramidal structure of wood). Thanks to Admiral FitzRoy's judgment, to the continued support of the meteorological office, and to Dr. Clouston's skill and perseverance, meteorology is richer by a series of almost perfect continuous records of the direction and force of the wind on that wild Atlantic shore for 22 consecutive years. The results for 1863-68 have been worked up, and published in the *Quarterly Weather Report* for 1871.

It would be useful to meteorology, and a graceful memorial to Dr. Clouston, if the results of the entire series were worked up, and published by the Meteorological Office.

The University of St. Andrew's conferred upon him the degree of LL.D., but we believe that he was even more pleased at his election as a Member by the Royal Society of Northern Antiquaries of Copenhagen.

In these pages, we have naturally dwelt chiefly upon Dr. Clouston's meteorological work; but he was a thoroughly well-informed man, he was closely associated with Mr. Farrer in the exploration of that archæological enigma, Maes-Howe, he was a good botanist, but beyond all he was an excellent Pastor. For years he was the only medical man in the parish; in fact, he was in 1882 both Minister and Parochial Medical Officer. He was ordained to the ministry in 1826, and his jubilee in 1876 was celebrated with great *éclat*, addresses and testimonials being presented, and a dinner given to him at Kirkwall,

at which Orcadians "of all shades of opinion" (we quote from the *Orcadian*) assembled to do him honour.

Sandwick Manse was not only a centre of comfort to the parish, it was more than that; we could say much on our own behalf, but we prefer to quote from the leading English scientific journal, *Nature*, and the leading journal in Dr. Clouston's own country, the *Scotsman* :—

"In conclusion, we can only say that a visit to Sandwick was ever a rare treat; the warm hospitality of the Manse, and the interest of the conversation carried on round the table, could not fail to leave an impression which will not easily wear away."—*Nature*.

"Dr. Clouston was a tall, handsome, benevolent, and, of late years, a most venerable looking man. His tastes were cultivated, his home-life refined, his manner stately and courteous, with the old-fashioned dignity. Most distinguished men who went to Orkney, especially if they were scientifically inclined, found their way to Sandwick Manse, where they were always welcomed. A talk of Orkney botany, of Orkney weather, of Orkney customs past and present, a turn to see his full set of meteorological instruments, on which he dilated as on things he loved, a walk to the wild western cliffs and the surging Atlantic, were the incidents of such a visit, and the impressions left on the mind of the visitor were pleasing and enduring. He was, indeed, a man who ministered all his life to his fellow-men in body and mind, who served God, and did his duty."—*Scotsman*.

HEAVY RAIN IN THE N.W. OF SCOTLAND.

DURING the first half of November, while England generally was suffering from drought, and some of our large towns were still facing the possibility of a water famine, unusually heavy rains were falling over the western highlands of Scotland. At Sligachan, Skye, 6·20 in. fell on the 8th, and at Glenaladale 5·21 in. fell on the same day, but although these amounts are exceptionally large, the observers are so used to heavy rain, that they called forth no special comment. At Oban, however, where *only* 2·65 in. fell, the observer writes :—

"The town was flooded, and people had to be removed from houses on the S. side by boats, roads were torn up on the hill sides and became torrents. Several road bridges were swept away, and others were wholly immersed under the flood. The railway bridge over the Nant, of a span of 60 ft., was wrecked, through the abutment being swept down by the torrent, and altogether such destruction from sudden rainfall has not been known previously within living memory."

The fall of this one day was specially heavy at somewhat irregularly distributed stations, as the following table shows, probably due to the very irregular conformation of the country, but

it appears strange that Quinish and Kilmory should have registered such comparatively small amounts.

During the first 12 days of the month rain was general over the whole of Scotland, and was very heavy over the west of the country ; at the following nine stations, the fall during that period either exceeded 10 per cent. of the mean annual fall, or was greater than the average fall for the whole month.

STATION.	Rainfall Nov. 1st to 12th.	Per-centage of Mean Annual Fall.	Per-centage of Mean Fall for November.
Gruinart.....	5·76 in.	13	112
Kilmory.....	5·95 in.	10	111
Stronvar.....	6·35 in.	13 ?	150 ?
Oban	7·04 in.	11 ?	99 ?
Quinish	8·58 in.	15	124
Dalnaspidal	6·73 in.	11	99
Glenfinnan.....	8·40 in.	13	153
Sligachan	17·41 in.	21	189
Strome Ferry	7·62 in.	12	99

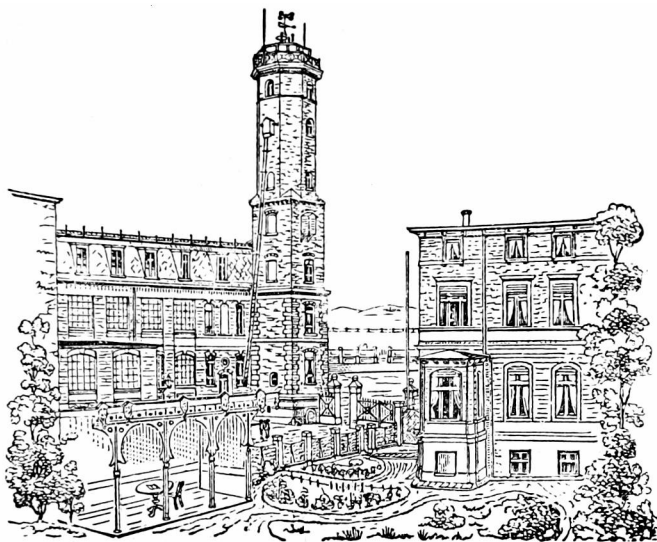
The values for Stronvar and Oban can be considered only as an approximation, as in both cases, the mean is computed from the fall at two different stations.

The greatest intensity of the downpour occurred between the 4th and 8th, and it has been considered of sufficient importance to justify the insertion of the following table ; but at many stations heavy falls occurred also on the 11th and 12th.

STATION.	COUNTY.	NOVEMBER, 1884.					
		4	5	6	7	8	Total, 5 days.
Cassillis	Ayr	·34	·02	·22	·20	1·28	2·06 in.
Gruinart.....	Argyll	·96	·48	·41	·36	·24	2·45 „
Glasgow	Renfrew	·30	·55	·60	·10	·90	2·45 „
Holy Loch	Argyll	·61	·43	1·11	·56	3·23	5·94 „
Kilmory	Argyll	·64	·84	·77	·40	1·22	3·87 „
Stronvar.....	Perth	1·64	1·09	·92	·37	3·51	7·53 „
Oban	Argyll	·63	·25	·51	·78	2·65	4·82 „
Quinish	Argyll	1·08	·36	1·48	·82	1·09	4·83 „
Dalnaspidal	Perth	1·40	·89	·67	·54	1·32	4·82 „
Glenfinnan.....	W. Inverness.	1·85	·74	·81	1·13	5·21	9·74 „
Invergarry.....	W. Inverness.	1·50	·66	·40	·61	2·12	5·29 „
Sligachan	Isle of Skye...	1·86	1·00	·43	2·00	6·20	11·49 „
Strome Ferry ...	W. Ross	·72	·52	·32	·72	2·07	4·35 „
Loch Maddy ...	W. Inverness.	1·25	·09	·53	·65	·90	3·42 „
Lochbroom	W. Ross	·35	·44	·39	·66	·92	2·76 „

THE METEOROLOGICAL OBSERVATORY OF THE "MAGDEBURG NEWS."

IN the number of this Magazine for February, 1882 (vol. xvii. p. 10), was given under the title "Newspaper Meteorology," a full account of the equipment and organization, under the direction of Dr. Assmann, of the unique meteorological establishment of the *Magdeburgische*



Zeitung. Thanks to the courtesy of Dr. Assmann, we now give an engraving of their lofty (112 ft.) tower, but as regards the instruments and arrangements, we must ask our readers to turn back to the article above quoted, as we, on this occasion, have to deal with the publications of the office.

Some of the methods adopted in order to bring the subject of meteorology before the public at Magdeburg are so original that we cannot refrain from mentioning two of them.

At the principal theatre there is a weather case, which is designed to give the public the earliest information possible as to weather changes. It contains (1) a weather map of the previous day, and extracts from the Journal of the *Magdeburgischen Zeitung* Observatory; (2) a reproduction of the curves of all the self-recording instruments for the previous day; (3) a large scale weather map for that day; (4) the forecast for the next day; (5) reports on the heights of the principal rivers of North Germany.

The next, and a still greater novelty, is the following:—In a niche at the corner of two of the chief streets (Hasselbach and Kaiserstrasse) where there is a capital current of air, a barograph and thermograph by Richard, of Paris, have been placed so that the public may see the records of each instrument in the act of being inscribed. Both instruments work admirably in the open air, and they excite in the public a very remarkable amount of interest.

As regards the books which have led to this article, we consider the annual volumes in the highest degree creditable; the director claims for the station rank as a "Station of the 1st Order," and substantiates the claim by two handsome quartos,* of about 100 pages each. They are arranged almost precisely upon the plans recommended by the Vienna Conference, but as may be inferred from our previous article, they give much more than is usual. For example, on pages 64 to 69 of the first volume we find *in extenso* hourly records on 1st and 15th of each month of dry bulb, amount of vapour and humidity at 6 ft., 56 ft., and 105 ft. above the ground. On subsequent pages, we have the hygrometric values for 56 ft. and 105 ft., at 8 a.m., 2 p.m., and 8 p.m. every day, printed *in extenso*. We have also earth thermometers, at 0, 2 in., 6 in., 3 ft. 3 in., 9 ft. 10 in., and 16 ft. 5 in. deep; and lastly, the result of a Wild's evaporator, giving for 1882 17·91 in., and for 1883, 19·49 in.

In the volume for 1883, the curves of the "Sprung" barograph are given on their full scale—i.e., $\frac{1}{4}$ inch per hour of time, and 4 inches per inch of barometric change. On this very open scale, it is not remarkable that we have one of the clearest sets of the records of the Krakatoa air waves which we have yet seen.

Dr. Assmann has, however, started another enterprize, and in it seems as successful as in his other efforts. He started in April last a popular Meteorological Magazine.†

It is an 8vo, of about 30 pages per month, and, if we understand aright, will be sent post free (within the Postal Union) for 6s. 3d. per annum. All to whom German type and the German language are no obstacle, would do well to order this interesting periodical.

Perhaps we ought to justify this expression by some quotations, but space is precious. We will quote the contents of the first number, and of a few articles from subsequent ones:—

Introduction.

On Local Weather Forecasting, by Prof. Boernstein. (This runs through several numbers.)

The Brownish-red Ring round the Sun, by A. Grützmacher.

The Thunderstorm of May 13, 1884, by Dr. Assmann.

Survey of the Weather of Central Europe during January, 1884 (continued for each month in subsequent numbers).

Notes and Correspondence. Night Frost in May. Snow in May. Budgets for Meteorology in various countries. Action of Oil in diminishing roughness of the Sea.

* *Jahrbuch der Meteorologischen Beobachtungen der Wetterwarte der Magdeburgischen Zeitung. Station I. Ordnung. Herausgegeben von Dr. R. Assmann, Vorsteher. Magdeburg, 1883 and 1884.*

† *Das Wetter. Meteorologische Monatschrift für Gebildete aller Stände. Nos. 1-7. A. & R. Faber, Magdeburg.*

From following numbers we may select :—

Explanation of the Brownish-red Ring round the Sun, by Prof. Kiessling.

Prof. Kiessling, of Hamburg, describes the absence of bright blue sky, which has prevailed for many months, and the coloured ring, which is frequently visible round the sun ; its diameter being about 25° with the red (a brownish red) outside, then a silverish zone and a violet inside ; he describes fully and clearly the phenomena of diffraction, produced by minute particles of vapour and of dust, and states that the identity of the results observed, with those which can be produced experimentally, is such that there can be no doubt that we have to deal with diffraction, though as yet there is no evidence to show whether its source is in particles of vapour or of dust. Simultaneous observations at Flensburg, Hamburg, Magdeburg, and other places, have proved that the matter is higher than the most lofty cirrus.

While upon this subject, we may mention two subsequent kindred notes, viz., *On the abnormal colouring of the sky*, by Prof. Richter, of Salzburg, in which he calls attention to the almost entire absence since December, 1883, of the usual brilliancy in the blue of the sky, and the substitution for it of a milky opaqueness. The other is an extract from the *Gazette de Lausanne*, of August 1st, giving a description of the rings identical with that above quoted from Prof. Kiessling, and indeed with what we see in England, and closing with the enquiry to which the answer has yet to be given—Are these phenomena the sequel of the wonderful optical phenomena seen all over the world last year, and are they due to the eruption of Krakatoa on August 26th, 1883 ?

We have space on the present occasion only to mention two other articles, each of considerable interest and ability, viz., *On the theories of the Aurora*, by Dr. Hoppe, of Hamburg ; and *On the irregularities in the barometer curve during thunderstorms* by Dr. Ciro Ferrari, of Rome.

If *Das Wetter* goes on as it has begun, the meteorologist who ignores it will do so at his peril.

DISTRIBUTION OF RAIN IN CEYLON DURING THE DECADE, 1871-80.

BY PROF. V. RAULIN, of Bordeaux.

Ceylon is formed by a mountain mass which occupies the southern portion of the island, and is surrounded by plains which increase its size especially towards the north.

For the period 1871 to 1880 there are 40 stations in the mountain district at which observations were made from 4 to 10 years. But the low lands, though having ten coast stations, have unfortunately only two stations in the interior, Anuradhapura, a little N.W. of the centre of the island, and Ratnapura, in the S.W.

Ceylon offers, in the seasonal distribution of rainfall, a diversity

of systems greater than, according to my researches, is found in any part of India, except the Madras Presidency and Mysore ; a diversity as great as that in Southern France, to which I have called attention in the *Atlas Météorologique de l'Observatoire de Paris, pour 1869-71*, published in 1875, and in my *Observations pluviométriques de la France méridionale* in 1876.

Régime I. (dry winter and wet summer) is only found in the high central circle between Pedrotallagalla (8327 ft.) and Adam's Peak (7415 ft.). Stations 1-9 in table.

Régime II. (gradual increase from winter to autumn) prevails only at a few isolated stations near those belonging to *Régime III.* Stations 10—13.

Régime III. (winter and summer dry, autumn very wet).—This forms a large zone surrounding *Régime I.* on the S.E., S., W. and N.W., and reaching down to the sea coast at Galle, in the S.S.W., and at Chilaw in the W. Stations 14—26.

Régime IV. (winter and autumn very wet, summer very dry) prevails on the N., E., and S.E. coasts, and is also found at the N.E. foot of Pedrotallagalla. Stations 27—33.

Régime V. (winter and autumn very wet, spring and autumn rather dry) is found to the N.N.E. of the central mass, at several stations at heights of about 3000 feet. Stations 34—41.

Régime VI. (spring very wet, summer dry) is found at three stations in the S.W. Stations 42—44.

We have, therefore, round the highest part of the island, on the one hand at Ramboda (3300 ft.) near its N.W. foot, and at Nuwara Eliya (6240 ft.) at the S. foot, and at the Leangwella Estate (3750 ft.) towards the N.N.E. foot, and at only eight miles distance, the two most opposite *régimes*, viz., I. and IV. In France these two *régimes* never approach within at least eighty miles, and then, as between Thiers (Puy de Dome) and Montpezat (Ardèche) they are separated by the intermediary *régimes* II. and III.—V. RAULIN.

[For the further elucidation of this paper, we have prepared the accompanying map, which itself requires a few words of explanation. Owing to the way in which the rainfall stations are packed together in the higher part of the island, space had to be economized as much as possible. Therefore, the names of the stations are nearly all omitted, but they can be ascertained by referring to the table, the figures given being the mean annual rainfall in inches at the localities over which the figures are placed. Above (in a few cases, to avoid crowding, below) these figures are placed horizontal lines, indicative of the *régime* which Prof. Raulin has assigned to each, therefore $\overline{\overline{51}}$ indicates a mean rainfall of 51 inches per annum, falling in accordance with *régime III.*

The series of small diagrams are not to be regarded as quantitatively accurate, but merely as indicative of the character of the distribution of each *régime*. The letters denote respectively, Winter, Spring, Summer, Autumn.—ED.]

RAINFALL IN CEYLON.

Stations. Height Years. Winter Spring Summ'r Aut'mn Year.

RÉGIME I. (as at Moulins).—*Dry Winter and Wet Summer.*

			in.	in.	in.	in.	in.
1. Rungboda Estate	3300	1870-80 (11)	15·22	24·93	50·02	45·55	135·72
2. Nuwara Eliya.....	6240	1870-80 (10½)	15·60	18·71	35·16	29·50	98·97
3. Langdale Estate.....	4600	1868-75 (6¾)	10·64	16·08	44·56	36·07	107·35
4. Kabragala Estate	3750	1875-80 (5¾)	13·03	42·97	82·30	54·45	192·75
5. Gingeran Oya.....	3850	1871-80 (10)	11·05	25·67	62·39	47·81	146·92
6. Templestove	4000	1872-80 (8½)	11·55	37·50	87·75	62·67	199·47
7. Deeside Estate	4400	1873-80 (7½)	15·43	39·39	43·19	36·73	134·74
8. Quensland	4300	1873-77 (4½)	10·30	23·48	50·54	30·85	115·17
9. Newton Estate	4000	1875-78 (3½)	10·45	37·52	45·13	33·66	126·76

RÉGIME II. (as at Lyon).—*Gradual increase from Winter to Autumn.*

10. Kandanuwara Estate	2700	1872-80 (8¾)	21·83	24·14	22·48	37·95	106·40
11. Pendleton	2300	1870-80 (10½)	18·11	19·62	20·05	29·56	87·34
12. Ratnapura	109	1870-80 (11)	17·78	38·33	46·25	46·84	149·20
13. New Forest.....	3500	1875-80 (5¾)	20·85	24·11	25·93	34·51	105·40

RÉGIME III. (as at Mende).—*Winter and Summer dry, Autumn very wet.*

14. Anuradhapura.....	312	1870-80 (10½)	11·45	14·52	4·54	20·54	51·05
15. Puttalam.....	11	1869-80 (11)	9·19	14·13	2·82	18·73	44·87
16. Horakele Estate	50	1870-80 (10¾)	8·58	18·85	10·67	21·81	59·91
17. Ettapola Estate	2500	1877-80 (4)	16·60	26·75	20·51	36·77	100·63
18. Kandy	1650	1870-80 (11)	15·56	16·74	20·82	28·70	81·82
19. Del Rey, Bagawantalawa	4300	1872-80 (9)	16·04	33·93	32·57	38·44	120·98
20. Galle	40	1870-80 (11)	14·35	25·92	18·97	31·53	90·77
21. Springwood Estate	2250	1871-77 (6½)	19·05	29·20	27·09	37·86	113·20
22. Vegeriya	2800	1870-80 (9¾)	22·51	23·25	19·59	34·92	100·27
23. Nanagalla, Craven Estate	?	1874-79 (4½)	21·33	43·95	41·74	46·48	153·50
24. Wiharagalla	3100	1871-80 (11)	20·04	27·17	6·47	34·28	87·96
25. West Meeriabedde.....	3500	1872-80 (8½)	17·22	27·07	8·81	36·62	89·72
26. Badulla	2220	1870-73 (5½)	15·99	17·98	8·33	25·09	67·39

RÉGIME IV. (as at Montpellier).—*Winter and Autumn very wet, Summer very dry.*

27. Manaar	12	1870-80 (10¾)	8·91	7·89	1·38	14·62	32·80
28. Jaffna	9	1871-80 (10)	9·90	6·15	2·67	23·22	41·94
29. Trincomalee	175	1870-80 (11)	20·49	5·65	8·46	25·40	60·00
30. Batticaloa	21	1870-80 (11)	25·06	7·02	5·19	20·53	57·80
31. Rukam.....	120	1870-80 (10½)	30·32	7·79	9·16	23·72	70·99
32. Leangwella Estate.....	3750	1872-80 (8½)	40·22	17·14	5·81	28·30	91·47
33. Hambantota	40	1870-80 (11)	9·99	7·77	5·15	14·71	37·62

RÉGIME V. (as at Limoges).—*Winter & Autumn very wet, Spring & Summer rather dry.*

34. Matella West	?	1869-72 (4)	16·87	14·16	17·69	34·94	83·66
35. Gammaduwa Estate	2400	1875-80 (5¾)	46·33	20·57	11·96	34·27	113·13
36. Sudu Ganga.....	1500	1870-78 (8¾)	18·94	16·50	14·32	25·11	74·87
37. Leangolla Estate ..	2800	1876-80 (5)	24·32	23·06	29·29	33·86	110·53
38. Illagala Estate	3300	1870-80 (10½)	22·52	20·19	17·02	33·73	93·46
39. Nugatenna Estate	3000	1870-80 (5¾)	33·32	14·21	11·75	27·39	86·67
40. Upper Rajawella	1500	1870-80 (10½)	14·12	12·50	10·38	18·78	55·78
41. Gourakelle Estate	4200	1876-80 (4¾)	25·88	21·73	13·79	34·85	96·25

RÉGIME VI. (as at Toulouse).—*Spring very wet, Summer dry.*

42. Colombo	40	1870-80 (11)	11·01	29·50	17·14	29·21	86·86
43. Geekianekanda	200	1872-80 (8¾)	22·85	47·58	37·65	43·61	151·69
44. Sprinvale Estate.....	2200	1875-80 (5½)	17·77	46·94	41·45	46·07	152·23

ROYAL METEOROLOGICAL SOCIETY.

THE first Monthly Meeting of this Society for the present Session was held on Wednesday evening, the 19th instant, at the Institution of Civil Engineers, 25, Great George Street, Westminster, S.W., Mr. R. H. Scott, F.R.S., President, in the chair. Messrs. R. Aitken, N. E. Ballow, M.D., Ph.D., F. C. Bayard, LL.M., G. W. Brennan, A.M.Inst.C.E., H. T. Burls, A. Chadwick, M.D., M.R.C.S., R. Cooke, P. H. Emerson, B.A., M.R.C.S., S. Johnson, M.B., C.M., L.R.C.P., F.R.A.S., G. J. Lee, R. M. Mercer, L. P. Muirhead, J. D. W. Vaughan, and J. B. Wilson, were elected Fellows of the Society.

The following Papers were read :—

(1.) "A new Method of Reading the Direction of the Wind on exposed heights and from a distance," by H. Leupold, F.R.Met.Soc. The author has devised a very ingenious and simple electrical anemograph which records both the direction and velocity of the wind on an ordinary Morse printing telegraph paper.

(2.) "Description of a Component Anemograph," by A. N. Pearson, F.R.Met.Soc.

(3.) "On the Injury by Lightning (April 28th, 1884) to the Monument to the first Duke of Sutherland at Lilleshall, Shropshire," by C. C. Walker.

(4.) "On the Mechanical Characteristics of Lightning Strokes," by Col. the Hon. Arthur Parnell. The main objects of this paper were : First, to attempt to show that lightning is not a sort of electric fluid that descends from the clouds, injures buildings and persons in its course, and dissipates itself in the earth, but that it is a luminous manifestation of the explosion caused by two equal forces springing towards each other simultaneously from the earth and the under surface of the inducing cloud, and coalescing or dying out, nearly midway between the two plates of the electrical condenser formed by the earth and the cloud. Secondly, to demonstrate that of these two forces it is the earth-spring, or upward force alone, that injures buildings, persons, or other objects on the earth's surface, and that constitutes tangibly what is rightly known as a lightning stroke. The author gives the details of 278 instances, the records of which he considers demonstrate with more or less precision the existence of an upward direction in the force of the stroke.

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, MARCH, 1884.

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.	Cloud.
	Temp.	Date.	Temp.	Date.									
	°		°		°	°	°	0-100	°	°	inches		0-10
England, London	68·0	16	27·5	1	52·7	37·5	38·6	80	79·7	34·1	1·40	7	6·3
Malta	69·2	1	45·8	26	62·4	51·3	50·7	84	127·8	41·5	1·38	8	4·5
<i>Mauritius</i>	85·3	6	69·3	14,19	82·6	72·3	70·3	81	136·6	63·0	6·75	25	6·6
Calcutta	100·2	31	65·7	11	93·2	71·6	68·5	68	154·1	54·8	0·06	1	1·4
Bombay	89·4	30	69·8	8,9	85·2	73·0	70·0	72	141·1	57·9	0·00	0	1·2
Ceylon, Colombo	88·7	1	72·3	9,22	86·1	74·7	73·0	78	142·6	62·0	3·84	10	2·9
<i>Melbourne</i>	96·9	25	37·1	17	74·5	54·4	51·7	68	147·9	28·9	3·11	9	5·9
<i>Adelaide</i>	101·6	6	50·3	12	83·5	60·2	48·7	44	166·9	36·6	1·74	5	3·8
<i>Wellington</i>	72·5	22	45·5	25	64·3	52·8	...	...	128·0	36·0	2·44	11	...
<i>Auckland</i>	73·5	18	50·0	25	69·0	56·3	53·0	71	142·0	42·0	2·85	11	5·5
Jamaica	90·2	31	63·2	22	83·7	67·5	67·8	80	...	...	1·14	...	2·9
Barbados	79·0	1,31	67·0	var.	78·0	69·0	70·4	67	141·0	64·0	4·76	18	6·0
Toronto	49·3	27	—7·0	1	35·1	20·5	23·8	77	118·0	—15·0	2·53	17	5·9
New Brunswick, Fredericton	52·3	24	—12·7	5	33·9	12·4	19·8	77	...	...	3·14	18	5·9
Manitoba, Winnipeg ...	37·8	26	—32·7	5	23·5	—13·0	—13·0	92	...	...	1·20	5	3·7
British Columbia, Spence's Bridge ... }	63·3	22	9·2	6	49·8	27·8	...	...	...	...	0·27	3	...

REMARKS, MARCH, 1884.

MALTA.—Mean temp., 55°·9; mean hourly velocity of wind, 11·4 miles. Sea temp. steady at 61°.

J. SCOLES.

Mauritius.—Rainfall 0·70 in., and temp. 1°, below average; mean hourly velocity of wind, 7·9 miles, extremes 18·3 and 0·0 miles. Prevailing direction, S.E. by E. to E.N.E. T and L on 13 days. Colourations of sky before sunrise and after sunset few and faint.

C. MELDRUM, F.R.S.

CEYLON.—TSS occurred on 13 days, and T or L alone on 7 days.

J. STODDART.

Melbourne.—Mean temp. of air and of dewpoint, each 0°·6 below average; humidity, average; mean pressure and amount of cloud slightly above average; and rainfall ·98 in. above average. Prevailing winds, S. and S.E., generally light. Heavy dews on 8 days. T and L, 25th and 27th; L on 6th.

R. L. J. ELLERY, F.R.S.

Adelaide.—Mean temp. 1° above average; max. above 90° on 8 days. Total rainfall above the average, but only ·05 in. fell before the 28th. Temp. of soil at 5 ft. and 8 ft. more than 1° below the average. Dew on 14 nights.

C. TODD.

Wellington.—Altogether a pleasant month. Prevailing winds, S.E. and N.W., moderate in force. Slight earthquake on 19th. Mean temp., 3°·7, and rainfall ·40 in. below average.

R. B. GORE.

Auckland.—Mean temp. unusually low. Rainfall slightly above average; pressure also above average. Heavy TS on 23rd.

T. F. CHEESEMAN.

BARBADOS.—Pressure very unsteady. Mean temp., 1°·4 below average. Prevailing wind, N.E.; average velocity 15·5 miles, extremes 20·5 and 13·3 miles. Rainfall 60 per cent. above the average, and only once exceeded in March during 33 years. Evaporation high, and nearly equal to the rainfall. Three days overcast.

R. BOWIE WALCOTT.

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, APRIL, 1884.

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.	Cloud.
	Temp.	Date.	Temp.	Date.									
°		°		°	°	°	0.100	°	°	inches			
England, London	68·4	2	29·9	23*	54·9	37·8	37·5	74	87·6	34·2	1·02	14	6 4
Malta.....	74·2	19	50·9	2	68·7	55·5	53·2	76	133·3	46·0	·34	2	3 3
<i>Mauritius</i>	82·8	1	67 3	8	81·0	71·3	68·1	79	136·0	59·7	6·02	17	6 6
Calcutta.....	103·7	14	69·2	23	96·5	75·5	72·8	69	157·2	62·7	1·38	4	2 6
Bombay.....	92·4	4	73·9	14	87·5	76·4	73·1	74	145·8	64·0	0·00	0	2 0
Ceylon, Colombo	88·5	23	73·3	27‡	86·7	75·6	73·9	79	142·3	65·0	5·35	12	4 5
<i>Melbourne</i>	88·2	2	40·7	30	69·7	50·7	49·3	71	138·2	34·7	·76	8	5 9
<i>Adelaide</i>	88·0	13	43·8	20	71·6	54·1	47·6	58	146·0	36·6	1·34	10	5 2
<i>Wellington</i>	67·0	13	39·8	11‡	60·4	48·3	...	...	121·0	36·0	2·09	6	...
<i>Auckland</i>	72·0	7	46·0	21	65·4	53·1	49·1	69	138·0	39·0	1·21	5	4 5
Jamaica, Kingston.....	89·1	28	64·7	30	84·3	68·9	70·0	80	...	...	·11	...	3 0
Barbados	81·0	var.	67·0	15	80·0	70·0	70·1	77	144·0	64·0	4·69	10	5 0
Toronto.....	67·8	27	25·1	6,12	48·5	33·2	29·0	63	123·5	16·0	·95	11	6 0
New Brunswick, Fredericton	66·5	24	19·9	15	49·3	32·3	33·1	76	...	...	3·87	18	7 5
Manitoba, Winnipeg	66·0	25	8 7	10	42·4	23·0	32·0	78	...	...	2·69	12	7 1
British Columbia, Spence's Bridge ... }	79·3	8	35·9	18	66·0	42·7	...	...	...	...	·10	2	...

* And 24. † And 28. ‡ And 25.

REMARKS, APRIL, 1884.

MALTA.—Mean temp., 61°·0; mean hourly velocity of wind, 11·6 miles; on 28th, velocity averaged 27 miles for 7 hours. Sea temp. rose from 61° to 65°. J. SCOLES.

Mauritius.—Rainfall, average; mean temp., 1°·1 below average. Mean hourly velocity of wind equal to average, extremes 27·4 and 2·3 miles; prevailing direction, S.E. to E. L on 7 days, and T on 4 other days. C. MELDRUM, F.R.S.

CEYLON.—TSS or L occurred on every day, but 29th and 30th. J. STODDART.

Melbourne.—Mean temp., 0°·3 above, and rainfall 1·51 in. below average. Pressure, temp. of dew point, humidity and amount of cloud, all very near their respective averages. Prevailing winds, S.E. and N., generally moderate; heavy squalls on 24th. Heavy dew on 9 nights. T and L on 14th; L on 22nd. R. L. J. ELLERY, F.R.S.

Adelaide.—Mean pressure, ·050 above the average of 27 years; the max. reading (30·525 in.) was one of the highest recorded, and the min. (29·513 in.) was only ·008 in. above the lowest on record. Mean temp. (62°·8) unusually low for April. Dew on 16 nights, and the red glow only noticed twice. C. TODD.

Wellington.—Showery from 5th to 10th and on 30th, remainder of month fine and bright. L on 16th. Earthquakes on the 11th, 16th and 25th. Mean temp., 2°·8, and rainfall 1·51 in. below their respective averages. R. B. GORE.

Auckland.—On the whole a remarkably fine month, with little rain or wind. Pressure unusually high throughout. T. F. CHEESEMAN.

JAMAICA.—The rainfall over the Island generally was only one-half the average; at many places no R fell at all, and at only a few places in the west central districts was there any considerable rainfall. MAXWELL HALL.

BARBADOS.—Pressure fairly steady; mean temp. (74°·2), 1°·1 below average. Prevailing wind, N.E.; mean hourly velocity, 10·6 miles, extremes 14·5 miles and 6·2 miles. Rainfall 47 per cent. above, and evaporation 30 per cent., below their averages. 2·06 in. of R fell on 14th; only 2 days overcast. R. BOWIE WALCOTT.

SUPPLEMENTARY TABLE OF RAINFALL, NOVEMBER, 1884.

[For the Counties, Latitudes, and Longitudes of most of these Stations,
 see *Met. Mag.*, Vol. XIV., pp. 10 & 11.]

Div.	STATION.	Total Rain.	Div.	STATION.	Total Rain.
		in.			in.
II.	Dorking, Abinger	2·12	XI.	Carno, Tybrith	3·15
„	Margate, Birchington...	1·28	„	Corwen, Rhug	3·02
„	Littlehampton	1·11	„	Port Madoc	4·26
„	Hailsham	1·40	„	I. of Man, Douglas	4·54
„	I. of W., St. Lawrence.	·50	XII.	Stoneykirk, Ardwell Ho.	3·38
„	Alton, Ashdell	1·48	„	Melrose, Abbey Gate...	2·72
III.	Winslow, Addington...	1·41	XIII.	N. Esk Res. [Penicuik]	2·30
„	Oxford, Magdalen Col...	1·74	XIV.	Ayr, Cassillis House...	3·53
„	Northampton	1·36	„	Glasgow, Queen's Park.	3·80
„	Cambridge, Beech Ho...	1·13	XV.	Islay, Gruinart School..	6·81
IV.	Southend	·75	XVI.	St. Andrews, Newton Bk	1·78
„	Harlow, Sheering	1·93	„	Balquhider, Stronvar..	10·08
„	Diss	1·67	„	Dunkeld, Inver Braan..	2·96
„	Swaffham	2·37	„	Dalnaspidal H.R.S.	7·59
„	Hindringham .....	...	XVII.	Keith H.R.S.	4·05
V.	Salisbury, Alderbury...	1·92	„	Forres H.R.S.	2·45
„	Warminster	1·85	XVIII.	Strome Ferry H.R.S....	9·89
„	Calne, Compton Bassett	1·71	„	Lochbroom	8·64
„	Ashburton, Holne Vic..	3·15	„	Tain, Springfield	3·20
„	Holsworthy, Clawton...	3·17	„	Loch Shiel, Glenaladale	15·92
„	Lynmouth, Glenthorne.	2·69	„	Invergarry	9·52
„	Probus, Lamellyn	2·91	XIX.	Lairg H.R.S.	4·26
„	Wincanton, Stowell Rec.	1·89	„	Forsinard H.R.S.	5·29
„	Taunton, Fullands	1·23	„	Watten H.R.S.	3·61
VI.	Bristol, Clifton	1·69	XX.	Dunmanway, Coolkelure	6·43
„	Ross	1·90	„	Fermoy, Gas Works	3·10
„	Wem, Sansaw Hall	1·70	„	Tralee, Castlemorris	4·91
„	Cheadle, The Heath Ho.	1·85	„	Tipperary, Henry Street	2·96
„	Worcester, Diglis Lock	1·82	„	Newcastle West	3·01
„	Coventry, Coundon	1·74	„	Miltown Malbay	3·75
VII.	Melton, Coston	1·28	„	Corofin .....	...
„	Ketton Hall [Stamford]	1·46	XXI.	Carlow, Browne's Hill..	2·13
„	Horncastle, Bucknall	1·39	„	Navan, Balrath	2·16
„	Mansfield, St. John's St.	1·62	„	Mullingar, Belvedere ..	3·12
VIII.	Macclesfield, The Park.	1·87	„	Athlone, Twyford	4·58
„	Walton-on-the-Hill .....	...	XXII.	Galway, Queen's Col...	4·63
„	Lancaster, South Road.	1·85	„	Clifden, Kylesmore	8·96
„	Broughton-in-Furness ..	2·31	„	Crossmolina, Enniscoe..	5·24
IX.	Wakefield, Stanley Vic.	·85	„	Carriack-on-Shannon ...	3·93
„	Ripon, Mickley	1·60	XXIII.	Dowra .....	...
„	Scarborough	2·19	„	Rockcorry	2·50
„	East Layton [Darlington]	1·55	„	Warrenpoint	2·89
„	Middleton, Mickleton..	2·37	„	Newtownards	2·81
X.	Haltwhistle, Unthank..	1·72	„	Belfast, New Barnsley..	3·51
„	Shap, Copy Hill	4·39	„	Cushendun	4·88
XI.	Llanfrechfa Grange	2·71	„	Bushmills	4·49
„	Llandovery	2·92	„	Stewartstown	3·10
„	Lower Solva	3·05	„	Donegal, Revelin Ho....	...
„	Castle Malgwyn	4·55	„	Buncrana	5·59
„	Rhayader, Nantgwillt..	3·27	„	Carndonagh .....	...

NOVEMBER, 1884.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL.						TEMPERATURE.				No. of Nights below 32°	
		Total Fall.	Difference from average 1870-9	Greatest Fall in 24 hours.		Days on which -01 or more fell.	Max.		Min.				
				Dpth.	Date.		Deg.	Date.	Deg.	Date.			
											In shade	On grass	
I.	ENGLAND.	London (Camden Square) ...	1.92	— .52	.79	30	12	60.2	7	25.3	25	7	18
II.		Maidstone (Hunton Court)...	1.15	— 1.75	.43	21	7	...	...	...	...	...	...
III.		Strathfield Turgiss	1.49	— 1.26	.42	5	14	60.6	5	21.2	24	13	21
IV.		Hitchin	1.92	— .69	.80	30	12	56.0	2	22.0	24	16	...
V.		Banbury	1.41	— 1.30	.47	30	11	59.0	2	23.5	30	14	...
VI.		Bury St. Edmunds (Culford) ..	1.51	— 1.32	.43	30	14	59.0	7, 8a	23.0	23	18	...
VII.		Norwich (Cossey)	2.31	— 1.00	.26	20	17	59.0	7	23.0	30	8	18
VIII.		Weymouth (Langton Herring) ..	1.82	...	.66	30	14	...	...	...	...	...	...
IX.		Barnstaple	3.18	— .97	.66	5	20	61.0	1	29.0	30	...	...
X.		Bodmin	3.20	— 2.12	.48	5	20	57.0	5	30.0	18e	6	11
XI.		Cirencester	1.65	— 1.33	...	...	...	...	...	...	...	...	...
XII.		Church Stretton (Woolstaston) ..	1.51	— 1.93	.32	2	19	54.0	1, 6b	27.0	30	6	15
XIII.		Tenbury (Orleton)	1.85	— 1.01	.47	2	15	60.2	1	22.0	30	11	15
XIV.		Leicester	1.57	...	.36	5	13	59.5	2	23.5	30	7	20
XV.		Boston	1.87	— .50	.58	30	13	58.0	2	26.0	26	6	...
XVI.		Grimsby (Killingholme)	1.62	— 1.48	.46	30	17	48.5	2	25.0	30	5	...
XVII.		Hesley Hall [Tickhill] .....	.94	...	.40	30	12	60.0	1	24.0	30	11	...
XVIII.		Manchester (Ardwick)	1.66	— 1.31	.38	4, 30	11	55.0	6	26.0	30	7	...
XIX.		Wetherby (Ribston Hall) ..	1.19	— 1.57	.42	5	9	...	...	...	...	...	...
XX.	Skipton (Arncliffe)	3.23	— 2.52	.81	4	17	58.0	8	22.0	29	...	...
XXI.	North Shields	1.62	— 1.83	.23	4	17	60.0	1	18.2	30	7	8	
XXII.	Borrowdale (Seathwaite)	6.70	— 5.12	1.46	1	15	54.8	6	22.8	30	...	...
XXIII.	WALES.	Cardiff (Ely)	2.21	— 1.99	.53	30	13	...	...	...	...	...
XXIV.		Haverfordwest	3.75	— 1.59	1.00	29	14	57.5	1	25.0	25	6	12
XXV.		Plinlimmon (Cwmsymlog) ..	3.72	...	.73	4	16	...	...	...	...	...	...
XXVI.		Llandudno	2.23	— 1.68	.46	28	17	61.0	1	29.2	30	1	...
XXVII.	SCOTLAND.	Cargen [Dumfries]	2.40	— 1.51	.78	6	9	56.6	1	21.8	30	13	...
XXVIII.		Hawick (Wilton Hill)	1.64	...	.83	4	8	...	...	...	...	...	...
XXIX.		Douglas Castle (Newmains) ..	2.69	— .86	.89	4	11	...	...	...	...	...	...
XXX.		Lochgilphhead (Kilmory)	6.92	+ 1.56	1.22	8	15	...	...	...	...	...	...
XXXI.	IRELAND.	Oban (Craigvarren)	7.57	...	2.65	8	16	55.5	6, 7c	29.0	24	2	...
XXXII.		Mull (Quinish)	9.52	...	2.05	11	19	...	...	...	...	...	...
XXXIII.		Loch Leven Sluices	2.90	— .65	.70	9	8	...	...	...	...	...	...
XXXIV.		Arbroath	1.47	— 1.68	.40	6	7	54.0	1	21.0	30	7	...
XXXV.	SCOTLAND.	Braemar	4.03	+ .26	.66	3	20	52.2	1	15.4	30	13	24
XXXVI.		Aberdeen	3.22	...	.78	4	20	55.0	1	14.0	30	8	...
XXXVII.		Skye (Sligachan)	21.51	...	6.20	8	20	...	...	...	...	...	...
XXXVIII.		Culloden	2.93	+ .23	.83	8	7	55.0	11d	22.0	30	7	22
XXXIX.	IRELAND.	Dunrobin	3.63	...	1.24	26	15	55.0	1	22.5	30	8	...
XL.		Orkney (Sandwick)	3.94	— .50	.50	7	23	57.8	11	23.6	30	3	9
XLI.		Cork (Blackrock)	3.68	— .93	1.14	6	14	57.0	1c	24.0	24	14	...
XLII.		Dromore Castle	2.94	...	.85	8	11	58.0	4	31.0	17	...	...
XLIII.	IRELAND.	Waterford (Brook Lodge) ..	2.73	...	1.11	6	11	56.2	4	28.0	25	6	19
XLIV.		Killaloe	3.98	...	1.06	11	13	58.0	12	26.0	22f	...	...
XLV.		Portarlinton	2.27	— .13	.70	1	19	57.0	1	28.0	22	13	...
XLVI.		Dublin (Fitz William Square) ..	1.41	— .87	.55	1	14	58.6	1	31.1	16	3	19
XLVII.	IRELAND.	Ballinasloe	3.81	+ .81	.84	11	19	54.0	1	25.0	22	17	...
XLVIII.		Waringstown	2.16	— .55	.48	6	14	57.0	11	26.0	21	15	21
XLIX.		Londonderry (Creggan Res.) ..	5.30	...	.95	4	24	...	...	...	...	...	...
L.		Omagh (Edenfel)	3.75	+ .70	.60	11	20	52.0	11	27.0	13	12	17

a And 9. b And 7. c And 11. d And 12. e And 25, 30. f And 25.

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

METEOROLOGICAL NOTES ON NOVEMBER.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; 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.

STRATHFIELD TURGISS.—The early part of the month was warm and bright; insects were out, and flowers abundant. The last fortnight was cold, with haze by day and frosts by night; land as dry as at Midsummer.

BANBURY.—Mean temp. $42^{\circ}0$; high wind on 3 days; fog on 2 days; S on 3 days.

CULFORD.—A very changeable month, showers occurring suddenly, but not delaying out-door work.

LANGTON HERRING.—The fourth very dry month in succession, the total rainfall for the four months, August to November inclusive, being only 5.38 in., while the average is 13.80 in. The first 12 days were mild, but the mean temp. is $2^{\circ}8$ below the average of 12 years. The continued absence of storms was noticeable.

BODMIN.—A remarkably fine month, with little wind, and a rainfall of little more than half the average. Springs lower than they have been at any other time during at least 80 years. Mean temp., $43^{\circ}8$.

WOOLSTASTON.—The first fortnight was mild and genial, and several primroses were seen in blossom. After the 14th, a cold period set in, with sharp frost at night. S fell on 27th and 30th. Mean temp., $41^{\circ}0$.

TENBURY.—During the first week R fell daily, and the temp. was high, with the exception of two frosty nights; little R fell afterwards, till the 30th, when a steady fall of S for six hours occurred after a severe frost, covering the ground to a depth of two-and-a-half inches. After the 14th, the temp. was much below the average, with many frosty nights; but the mean for the month was nearly $0^{\circ}5$ above the average of 23 years: the bar. was generally high and steady. A favourable time for wheat planting on the strong clay lands.

LEICESTER.—The month was very misty, with several sharp frosts and snow on 23rd, 24th and 30th, the fall on the latter day lasting from 2 p.m. until late at night.

KILLINGHOLME.—Scarcity of water seriously felt both in town and country. Three inches of snow on the ground when the month closed, and more was falling.

ARDWICK.—November was a fine, open month; there was comparatively little fog, and little frost. A fall of about three inches of S occurred on the afternoon of the 30th, but it only remained on the ground about 24 hours.

NORTH SHIELDS.—TS on 20th; S on 24th, 29th, and 30th.

WALES.

HAVERFORDWEST.—An unusually fine dry month. Considerable rainfall during the first 10 days, principally at night; but from 10th to 24th it was fine, with cold days and frosty nights. Towards the end the air was bleak and stormy, with cold R and sleet.

LLANDUDNO.—A mild, but dull month. It began with a high temp., and ended with a snowstorm and slight frost, both of which, however, disappeared the following day. The mean temp. was about half a degree above the average, the total range being slightly above, and the mean daily range slightly below, the average. Duration of bright sunshine only 42 hours.

SCOTLAND.

CARGEN.—Temp. of the month 1° below, and duration of sunshine 20 hours below the average. L on 4th and 20th; S on 30th.

HAWICK.—A most genial month, with the exception of the last five nights, which were frosty; very windy on 4th, 5th, 6th and 16th; much L at night on 20th.

OBAN.—A remarkable month. The early part was stormy, and on the 8th the heaviest known rainfall (2.65 in.) occurred here and throughout the west coast. The town was flooded, and much damage done. The remainder of the

month was unusually fair, cold, and calm, with a prevalence of N. winds. H on 2nd, 9th and 28th, L on 9th; S on 24th.

QUINISH.—The rainfall of the first 11 days (8·49 in.) is quite unprecedented. The rest of the month was fine with slight frosts.

ABERDEEN.—Rainfall exactly the average. Till the 17th, the prevailing winds were S. to S.W., with showery weather; thereafter the wind veered to N.W., with lower temp. S set in on 28th, and the temp. fell to 14° on the forenoon of the 30th. Strong gale on the 9th; much L on 20th; lunar halos on 27th and 28th: S and H on 30th.

CULLODEN.—The month was favourable for work generally. A dry period with a steady bar. prevailed between the 8th and 26th.

SANDWICK.—Aurora on 2nd; L on 9th; S on 27th.

IRELAND.

DROMORE.—The month was very fine, with light winds now and again, and slight frosts.

WATERFORD.—Rainfall an inch below the average, and but for the heavy falls during the first week, it would have been a very dry month; N.E. winds prevailed during the latter half; S.W. gale on the 4th; thick fog on the 14th.

KILLALOE.—The amount of R was nearly the average, but the number of rainy days was much below the average. From the 11th to the 25th clear, bright, frosty days. Mean temp. 42°·4.

DUBLIN.—At first unsettled and rainy, the month ultimately proved fine and quiet, and at the close cold and winterly. The mean temp. (43°·0) was 0°·7 below the average of 20 years. During the last 20 years there have been five Novembers with a smaller rainfall than that of the present month, the smallest being 1870, 1·22 in. Solar halo on 2nd, lunar halo on 29th; fog on five days; H on two days; S on one day. Mean humidity 86; mean amount of cloud 5·9.

EDENFEL.—With the exception of the first week, and a few days at the end, the weather of the month was settled and fine, with sunshiny days and slight frost at night; S on 28th and 29th.

THE BROCKEN SPECTRE IN SCOTLAND.

To the Editor of the "Scotsman."

SIR,—Such of your readers as care for mountain phenomena, may be interested to learn that the appearance known as the "Spectre of the Brocken" was developed on Ben More, Perthshire, on Sunday evening.

Along with a friend, I arrived on the top of the mountain about 5 p.m., and we had not enjoyed the fine view for more than a few minutes before the wind brought up a chill mist that very shortly enveloped the whole summit. Looking into the west, where the sun was now declining, the appearance was very peculiar, the mist assuming a greenish hue, while lower down the mountain, where not so dense, it was shaded into a lovely rose colour. But it was in the east that the great surprise awaited us. Slightly above our level, and within a hundred yards, as it seemed, was a nimbus of pale light, on which the shadow of the cairn and of ourselves standing upon it were projected. Sometimes the images were quite faint, sometimes so strong that all our movements and the minutest details—such even as the spiked end of a walking stick—were depicted. There are two cairns on the top of Ben More, within forty yards of each other, and while from the one both halo and figures were visible, from the other it was the halo only. The picture lasted about five minutes, and then faded away.

I believe this phenomenon is very rarely witnessed in Scotland; for my own part, I have climbed a great number of mountains, and never saw it till the present occasion.

I may mention that while walking down from Lochearnhead about five o'clock this morning, I saw a very perfect lunar fog-bow. The moon was bright at the time, and heavy wreaths and banks of vapour were resting in all the hollows and watercourses. This, too, I think is an appearance that is uncommon.—I am, &c.,

J. G. S.

Edinburgh, Oct. 6, 1884.