SYMONS'S
MONTHLY
METEOROLOGICAL MAGAZINE.

CCCXXVI.] MARCH, 1893. [PRICE FOURPENCE, *or 5s. per ann. post free.*

THE SANDGATE DISASTER, MARCH 3RD, 1893.

THAT the pleasant little Kentish watering place should have suffered so severely as it has must be a source of regret to all, and the catastrophe is the more regrettable because (whatever one may think about the Local Board) one can have nothing but pity for a class who rarely receive much pity—viz., the lodging-house keepers, who, finding their houses twisted out of shape, have suffered almost worse than by a fire, while they are, of course, unprotected by any insurance.

The papers, on March the 5th, announced in bold type, "*Earthquake at Sandgate.*" The earth had indeed "quaked," and wrought havoc analogous to that of the real "earthquake" at Colchester in 1884, but the cause of that was deep in the earth; that of the present trouble is superficial, and as far as we can at present judge, is wholly meteorological.

Sandgate is built on a very narrow strip of land, slightly above the level of the sea at high tide, west of Folkestone, and between it and Hythe, while immediately to the north there is a high range of chalk hills on which is Shorncliffe Camp, Sandgate itself being south of the outcrop of the chalk. Without entering into geological questions, all our readers will understand that the green sands resting on the gault, when in a saturated condition, are incapable of resisting a downthrust. Therefore when (as we shall show) a long wet period followed a fortnight's sharp frost, and the high land became waterlogged, a slip forward of the low ground was a probable event, and the wreck of the houses upon it, inevitable.

Moreover, while the Sandgate disaster is by far the most serious one, small slips have occurred in many other parts of the country.

This, by-the-bye, is one strong argument against the theory which has been put forward to the effect that the disaster at Sandgate is traceable to the vibration produced by blowing up the hull of the "Benvenue," which was wrecked on that coast in 1892.

We may as well dispose of this part of the subject at once :—

MARGATE.—Extensive falls of cliff continue to take place along the Thanet coast. At Margate, especially on the east side of the town, the falls recently

have been very heavy. The town council have purchased the foreshore beyond the borough boundary, and a scheme has been mooted for building a sea wall, the probable cost being put down at £10,000.

BROADSTAIRS.—At Broadstairs large falls have taken place close to the new Victoria Gardens.

RAMSGATE.—At other parts along the coast considerable inroads have been made, especially in the neighbourhood of Ramsgate.

FOLKESTONE.—In consequence of the heavy rains, there was a serious landslip near the Warren Inn, Folkestone, on Wednesday night (22nd February). A large quantity of soil fell on the railway, and traffic was delayed while the line was being cleared.

We have heard of slips in other places, near Reigate, also upon the Brighton line, and we were ourselves in a Great Western train delayed by part of that very well made line having slipped.

The following extract from the *Kentish Gazette*, published five days before the Sandgate disaster, gives a vivid idea of the condition of that ordinarily dry corner of England more than a week before the catastrophe occurred :—

EXTRAORDINARY RAINFALL AND FLOODS.

"Weather of a most extraordinary character has prevailed during the past week. Sunday (February 19th) was the warmest day for the time of year we have had for twenty years, but by Monday (20th) the thermometer had fallen considerably, and rain commenced to fall at about eleven o'clock in the evening, and continued without intermission throughout the whole of Tuesday (21st) and Wednesday (22nd). Almost two inches of rain fell during the 33 hours following its commencement. Snow and sleet were intermixed at times with the rain. On Thursday (23rd) rain and sleet fell heavily at intervals. The river is much swollen, and at places has overflowed its banks. As a consequence much damage has been done, houses and other property being completely flooded. At St. Stephen's the whole of the fields adjoining the river are under water, which in some places is from one to two feet deep. The storm-water drain-pipe running under the road, outside the late Colonel Horsley's house in St. Stephen's, and which near this point is reduced in size, was unable to bear the pressure put upon it and burst, flooding St. Stephen's-road and the gardens near. Twelve yards above this another drain proved unequal to its task, bursting and making it necessary to form a temporary bridge of planks for the passage of pedestrians. This has made the road so unsafe that it has been necessary to have a watchman stationed there."

"A considerable amount of damage has also been caused in and around the villages in the neighbourhood of Canterbury. Not only are the public footways in the immediate neighbourhood of the river submerged, but several of the lawns and gardens of riverside residences are also under water. Since Tuesday morning (21st) the river Stour has been greatly swollen, and the current exceptionally

swift. The fields adjoining Mr. S. Williamson's property, near Westgate, present an appearance that has not been witnessed for the past ten years; they are one great sheet of water. For a considerable distance along the Whitehall-road the path is immersed to a depth of from six to seven inches, and a bridge that communicated between Mr. Williamson's residence and his garden, and runs over the river, has been entirely swept away, not even a beam of it remaining. At the bottom of Black Griffin-lane, where there are several plots of land under cultivation, the flooding is serious, and St. Peter's-lane presented a sorry spectacle; three or four houses are inundated to the depth of several inches, and the householders have, in consequence, been compelled to live upstairs. The same state of things exists at Camden Terrace, St. Peter's-place, the living rooms of three houses being flooded."

"We shall have 'Venice in Canterbury' if the rain continues. In St. Peter's-lane, on Thursday (23rd), all that was wanted was the city barge and the bridge that was washed away at Westgate, and the illusion would have been perfect."

"The railway between Ashford and Folkestone has been flooded during the week, but not sufficiently to impede the traffic."

"At South Ashford, on Tuesday (21st), the road was flooded to such a depth that ladies had to be conveyed across the "ford" on trolleys, and the South-Eastern Railway workmen had considerable difficulty in getting to the factory. Many who would not care to wade to work, 'lost a quarter' instead. In the lower parts of the town, basements generally were flooded, and a humane resident in Bridge-street found it necessary to carry his pig upstairs, where it was temporarily quartered in the back bedroom."

As regards the actual damage at Sandgate, and its cause, the following paragraphs will be of interest:—

"Mr. Bromley, surveyor, reported that he had examined 73 houses, 44 of which were quite safe, five of which could be restored, and 24 of which were unsafe for habitation. The result of the proceedings was considered by the Board as most satisfactory and reassuring, and calculated to restore public confidence."

"Practical men all agree more or less in their opinions on this point—the subsoil being of green sand is of such a treacherous nature that, lying as it does upon the gault, a slippery, impermeable clay, the subsidence may continue very much further before it finds a settlement. Some of the gaps in the walls and the earth have widened to-day, and in some cases buildings have sunk further to the extent of several inches. In the area affected by the subsidence there are very few, if any, houses which are not out of line or do not show cracking. Up to the present time the subsidence has not extended any further into the town. It is estimated that one-half the rateable value of the town has been practically destroyed, the total rateable value being about £10,000."

"The idea is that a large quantity of water had accumulated on the soft, springy sides of the hill above the town, and caused the upper strata of sand to slide seaward. The ground has long been held to be dangerous, and it is

thought probable that the recent blowing up of the Benvenue hurried the catastrophe."

"The subsoil of the cliff being soft green sand, resting upon slippery gault clay, and probably charged with water from the late heavy rains, it is thought that the upper stratum came down by its own weight, after the low spring tides, which had lessened the pressure from the sea at the base of the cliff."

"A very remarkable phenomenon has occurred along the foreshore not far from low-water mark, where there has been a distinct upheaval of sea-bed. During the space of a tide a ridge about four or five feet in height was formed."

The local authorities seem to have been very anxious to prove that the disaster was due to the blowing up of the Benvenue. They applied to the Local Government Board to send down an Inspector to examine and report, but he attributed it to excess of water in the soil, and said nothing about the Benvenue. Then they applied to Mr. Baldwin Latham, C.E., and the following is an abstract of his report:—

"The slip extended 1,100 yards, and the chief cause had been, probably, the scouring action of the sea on the beach. He did not think it would be a very serious matter to prevent a further extension of the slip. The remedy was to tap the hill by the insertion of drains at a sufficient depth in the ground where the subsidence had taken place, the drains coming out at what appeared to be the natural outlet for the springs. In proof of this theory he instanced the case of the Military Hospital, where the slip had abruptly stopped, the reason being that sufficient drains were laid from the hospital to the sea which carried off the water. At a cost of about £1,000 the Board could meet the present requirements, and prevent a further extension of the damage."

In conclusion, we give a few details as to the rainfall, and in the first place quote the following letter, which shows that heavy as was the fall on the 21st and 22nd at some of the stations quoted in the table, it was even heavier at Canterbury:—

To the Editor of the Meteorological Magazine.

SIR,—Since Monday last the rainfall here has been very large. The rain began to fall on Monday, the 20th, at about 10 p.m., and continued almost without intermission till Thursday morning, and the amount collected in the rain-gauge during that time measured 2·22 in. The prevailing wind was W. and S.W.

The Stour is very much flooded, but is now going down.

Yours truly,

L. E. METCALFE.

Harbledown, Canterbury, Feb. 24th, 1893.

Rainfall in East Kent, February, 1893.

February, 1893.	Hythe.	Walmer.	Hunton Court	Seven Oaks.	Birchington.	Sheppey.	February 1893.
	in.	in.	in.	in.	in.	in	
1	·08	·04	·06	·13	·05	·06	1
2	·14	·06	·10	·13	·15	·14	2
3	·01	...	·02	·01	·02	·02	3
4	...	...	...	...	...	...	4
5	...	...	...	...	...	...	5
6	·04	·02	·02	...	·03	...	6
7	·10	·10	·10	...	·02	·04	7
8	...	...	·19	..	...	...	8
9	·18	·16	·19	·33	·10	·06	9
10	·06	·06	·06	·06	·04	·04	10
11	·12	·08	·14	...	·13	·04	11
12	·06	...	·04	...	·01	·02	12
13	·07	·12	·06	·11	·03	·07	13
14	·07	·06	·06	·07	·01	·02	14
15	·01	...	·03	·03	...	...	15
16	·13	·07	·05	·08	·04	...	16
17	·04	·03	·02	·05	·02	·01	17
18	·30	·18	·20	·29	·16	·12	18
19	·02	...	...	...	...	...	19
20	·50	·49	·45	·47	·39	·15	20
21	1·06	1·02	·67	·58	1·35	1·25	21
22	·56	·41	·39	·35	·32	·41	22
23	·03	·08	·02	·01	·07	·11	23
24	...	...	...	...	...	...	24
25	·05	·02	·08	·15	·10	·04	25
26	·18	·21	·30	·21	·12	·08	26
27	·45	·48	·02	·34	·64	·38	27
28	·04	...	·38	·06	·02	...	28
Total..	4·30	3·69	3·65	3·46	3·82	3·06	

It will be seen that at Hythe, which is within a mile or two of Sandgate, rain fell on 18 out of the last 19 days of February, the total for the month being about double the average. If that was not calculated to produce a saturated soil, we do not know what would be.

THE JANUARY FROST.

WE thought that the note in our last number would be all that was necessary to print upon the above subject, but our table dealt only with the frost up to January 7th, and it subsequently became much more intense upon the Continent. Two very interesting articles upon the subject have appeared, one by Prof. Van Bebber in *Das Wetter*, the other by Padre Denza in the *Bolletino Mensuale* for February, 1893.

Referring those who desire to study the subject to those articles, and expressing our indebtedness to them for nearly all the facts which we present in an entirely different arrangement, we proceed to give—first, a table of the lowest temperatures recorded at many European stations (and two in Siberia), and secondly, a word or two by way of comment.

Absolute Minima in Shade, January, 1893.

Country.	Station.	Temp.	Date.	Country.	Station.	Temp.	Date.
		°				°	
Italy	Rome.....	22·1	14	Austria.....	Vienna..... ..	— 7·6	17
Spain	Madrid	21·2	4	Germany.....	Neufahrwasser.	— 7·6	14
Algeria ...	Laghouat.....	21·2	21	Bohemia.....	Prague.....	— 9·4	17
Austria...	Trieste.... ...	17·6	13–14	Germany.....	Berlin.....	— 9·4	19
France ..	Nice	17·6	3	France.....	Belfort...	—13·0	18
,, ...	Marseilles.....	15·8	17	Eur. Russia.	Wilna.....	—16·6	17
Italy	Pesaro.....	15·3	14	Germany.....	Memel	—16·6	16
France ...	Cette	14·0	17	Roumania.....	Bucharest.....	—18·4	15
Italy	Turin..... ...	5·0	19	Germany.....	Swinemunde ...	—22·0	18
Belgium..	Brussels	3·2	16	Bulgaria.....	Sofia.....	—23·8	17
France ...	Gap..... ..	1·4	18	Sweden	Haparanda	—31·0	15
,, ...	Paris.....	1·4	16	Eur. Russia..	Moscow	—32·8	1
				,, ,, ...	Kasan.....	—32·8	3
Germany.	Hamburgh.....	—0·4	18	,, ,, ...	Archangel.	—38·2	2
France....	Clermont.....	—4·0	18	,, ,, ...	Ekaterinenberg	—38·2	4
Denmark.	Copenhagen ..	—4·0	18	Asiatic ,, ...	Barnaul	—49·0	11
Germany.	Breslau	—7·6	15	,, ,, ...	Tomsk	—50·8	11

Having plotted upon a map of Europe these values—those given in previous numbers of this Magazine, and others, such as the Roumanian ones, published by M. Hepites—we draw from them the following conclusions. We do not suggest that they are novel, but the facts are certainly not sufficiently well known.

Take first Roumania, lying north of Turkey, and nearly in the same latitude as Bordeaux. At the capital, Bucharest, the temperature, on January 15th, fell to —18°·4, or more than 50° below freezing. This, be it remembered, not on any lofty mountain, but at less than 400 feet above the level of the sea, and about 500 miles nearer the equator than London.

Again, take the mild places, with absolute minima of above 15°, and where do we find them :—Sicily, Corsica, Southern Italy, Lisbon, Trieste, on the Adriatic; Nice, on the Riviera; Laghouat, in

Algeria; Madrid, Marseilles, London, Shields, Yarmouth, Ardrossan, Jersey, Ramsgate, Holyhead, Biarritz, Perpignan, and in almost all parts of Ireland.

Or, on the contrary, take minima, such as we rarely have in England—minima below zero of Fahrenheit's scale. Where do we find them? Our table shows it with sufficient clearness. In Eastern France, Germany, Austria, Hungary; and ever increasing in severity as we pass Eastwards: Moscow and Kasan with —32°·8, Archangel and Ekaterinenberg with —38°·2, and if, crossing into Asiatic Russia our table stops with Barnaul —49°·0, and Tomsk —50°·8, it is not either because thermometers could go no lower, or because it could not be colder, but because the records from Yakutsk have not been received. Severe almost beyond the comprehension of many persons as is a temperature of —50°·8, *i.e.*, 82°·8 degrees below freezing point, there is little doubt that at Yakutsk it was colder still.

REVIEWS.

Meteorological and other Observations made in connection with the Total Solar Eclipse of January 1st, 1889, at Willows, California, by WINSLOW UPTON and A. LAWRENCE ROTCH. [Extract from *Annals Astron. Obs., Harvard*, vol. xxix.] 4to. 34 pages, 2 plates. J. Wilson and Son, Cambridge, Mass. 1892.

WE have read this through with great care. Each of the observers was in every respect perfectly, indeed exceptionally, gifted for the work. They had good instruments, a good site for placing them in, and the atmospheric conditions were on the whole favourable, and (almost needless to add) the printing and editing is of the excellence usual with all Harvard publications; and yet the impression left upon our mind is that but for the third word in the title [other] the time, fatigue, and cost of a journey of several thousand miles right across the United States were of far greater value than the results secured.

That the obscuration of the sun must produce effects analagous to those of sunset upon temperature and humidity seems so obvious that it might have been known from the earliest times, and as a fact, thermometric observations of the cooling of the air due to partial and to total solar eclipses have been made for more than a century and a quarter; and the fact of the lowest point of temperature being reached some minutes after the greatest phase, has been known upwards of seventy years, for Luke Howard, in his account of the eclipse of September 7th, 1820,* says, "The lowest temperature was observed about seven minutes *after* the greatest obscuration."

As regards increasing humidity, we have a record of the actual deposit of dew as early as 1706,† by Dr. J. J. Scheuchzer, of

* *Climate of London*, 2nd ed., vol. iii., p. 32.

† Mr. Ranyard, in "Observations made during Total Solar Eclipses" [Memoirs R. Ast. Soc., 1879], p. 217, quotes J. Joaquim de Ferrer, of 1806, as the first to notice it

Zurich, who sent an account of the eclipse of May 12th, 1706, to the Royal Society, and concluded, "A sensible cold was felt, and a dew fell on the ground."

We have an impression that we have lately seen a circular proposing that in future eclipse expeditions special attention be devoted to observations of atmospheric pressure. Thirty-five years ago, at the foot of a table giving about three hundred barometer readings during the eclipse of March 15th, 1858,* Mr. Glaisher, F.R.S., put the following note, "No special remark is needed upon this table, there being no special change of readings which can be attributed to the eclipse," and a similar result has been arrived at over and over again—even the wonderful curve at Caroline Island in 1883 turning out to represent not a change in pressure, but the application of a correction with a wrong sign!

Every one of these facts is proved over again in the memoir before us, the whole being, as we have already said, as well done as possible. Grant all that, and one cannot help comparing the cost and the benefit, and wondering whether if the time and the money had been applied to tabulating and discussing some of the thousands of records now in existence it would not have produced a more useful contribution to meteorology.

We reserved from criticism the portion of the memoir devoted to "other" observations, because that word "other" covers the puzzling phenomenon of the so-called Shadow Bands, of which we believe that no satisfactory explanation has yet been given, and unfortunately this memoir does not help us. We think, however, that their study belongs rather to the astronomer and to the physicist than to the meteorologist, whose observational work in connection with solar eclipses is, we think, completed.

Das älteste Berliner Wetter-Buch, 1700-1701, *von Gottfried Kirch und seiner Frau Maria Margaretha geb. Winkelmann.* Herausgegeben von G. Hellmann. Berlin, 1893. 4to.

Dr. HELLMANN has certainly done well to print this first meteorological journal kept in Berlin, but we are much surprised that it should be the first. Putting aside Merle's MS. (which is very similar though more than 350 years older), we have in England regular weather journals with instrumental measurements of the depth of the fall of rain 23 years before this record begins, and only three years later we have a table of barometric heights and wind directions whence the general form of a cyclonic storm can be traced. We thought that England was late in such matters, but these facts do not support that idea. True, this is described as the oldest *Berlin* Weather Journal, which by no means excludes the possibility of there being many older ones in other parts of Germany—in fact, Dr. Hellmann, in his *Repertorium*, p. 963, quotes 1576 as the date of

* Report of the British Meteorological Society for 1858.

the "First weather observations at Dresden." Perhaps some day he will print a few pages of it.

It is curious that the MS. whence this pamphlet has been reprinted is not in Germany but in the Crawford Library at Edinburgh Observatory. Dr. Hellmann had been hunting for the MS. in various German libraries without success, and then on reading through the Crawford catalogue, found that the journals had been purchased by Lord Lindsay (now Lord Crawford), and formed part of his magnificent present to the Royal Observatory of Edinburgh. The entire MS. journals kept by Kirch and his wife form upwards of 1,000 quarto pages of old German writing; to decipher and copy them would take much time, and naturally Dr. Copeland is unable to send the MS. abroad. However, a German resident in Edinburgh kindly undertook to copy the commencement, *i.e.*, from August to December, 1700, and the whole of 1701. Dr. Hellmann's preface is very interesting, for he has been successful in tracing the early history of Miss Winkelmann, and of her observations before her marriage; her study of astronomy with the peasant-astronomer, Christoph Arnold; her meeting there with her future husband, Gottfried Kirch (who had been working with Hevelius); their marriage, and removal from Guben to Berlin; the husband's death and the wife's subsequent efforts to maintain herself and family. All this may have little to do with meteorology, but it is most gracefully told, and gives a great insight into the conditions of scientific work in the olden time.

In the part of the journal dealing with the frost of December, 1701, Kirch quotes some temperatures, and Dr. Hellmann tries (we think, with success) to form some notion as to the scale, but he expresses no opinion as to where the thermometer came from. It does not agree precisely with any of the fifteen scales given in Martine's "*Essays on the Construction and Graduation of Thermometers*," but so much resembles II. and III., that we think that it was probably from Florence. With the thermometers which he used in later years we are not now concerned.

ROYAL METEOROLOGICAL SOCIETY.

THE monthly meeting of this Society was held on Wednesday, February 15th, at the Institution of Civil Engineers, 25, Great George-street, Westminster, Dr. C. Theodore Williams, President, in the chair.

Dr. J. H. Davies, Mr. G. F. Deacon, M.Inst.C.E., Mr. A. S. Helps, and Mr. R. H. Jeffery, B.A., were elected Fellows of the Society.

The President referred to the loss which the Society had sustained by the death of Mr. H. F. Blanford and of Mr. G. M. Whipple, both of whom were at one time Members of Council, but who had each retired on account of failing health.

The following papers were read :—

1. "Report on the Phenological Observations for 1892," by Mr. E. Mawley, F.R.Met.Soc. The Royal Meteorological Society has, for a

number of years past, collected observations on natural periodical phenomena, such as the date of the flowering of plants; the arrival, song, and nesting of birds; the first appearance of insects, &c. These observations were supervised and discussed by the Rev. T. A. Preston until 1888, since which time they have been under the direction of Mr. E Mawley. The year 1892 was on the whole very cold and backward. The frequent frosts and dry weather during the first five months greatly retarded vegetation, and consequently all the early wild flowers, were very late in coming into blossom. Bush fruits and strawberries were, as a rule, good and fairly plentiful. Plums and pears were almost everywhere a failure, and apples were considerably under the average. The wheat crop was a very light one, owing in part to the attacks of blight brought on in many places by the frost in June. Oats, beans and peas were much under the average, while barley was the chief crop of the year. Potatoes, turnips and mangolds were above the average. During August butterflies were very numerous, the clouded yellow butterfly exceptionally so.

2. "Relation between the duration of Sunshine, the amount of Cloud, and the height of the Barometer," by Mr. W. Ellis, F.R.A.S. This is a discussion of the observations made at the Royal Observatory, Greenwich, during the fifteen years 1877-91, from which the author arrives at the following conclusions:—From February to October, there is on the whole distinct probability of increased sunshine and correspondingly less cloud, with increase of barometer reading, the increase of sunshine with increased barometer reading being especially marked in the months from April to September. The winter in all conditions of the barometer is uniformly dull. The conclusion is, of course, a general one. It might be interesting to group results of this kind with respect also to different winds, but a period of fifteen years is one probably altogether too short on which to found so extended an inquiry. But it is evident, on the whole, that high barometer in summer presages increased sunshine, that the effect is less pronounced in early spring and late autumn, and that it becomes slightly reversed in winter.

3. "Winter Temperatures on Mountain Summits," by Mr. W. Piffe Brown. In this paper the author gives the lowest winter temperature recorded on the summit of Y Glyder fach, 4 miles E.N.E. from Snowdon, and 3,262 feet above sea level, during the last 25 years. The thermometer used is an ordinary minimum; it is screened against radiation above by a large thick slab of feldspar porphyry, and on the east, west, and south by a chaos of huge blocks of the same, standing, leaning, and prostrate, many of them over 100 tons in weight; while to the north a steep slope of similar blocks falls away. The minima recorded range from 9° in the winter of 1891-2 to 26° in the winters of 1876-7 and 1884-5, the mean of the 23 records, being 16°·3. The President, Dr. Marcet, Mr. Scott, and Mr. Symons took part in the discussion, the main point raised being how far the results were liable to be vitiated by the possible "snowing up" of the thermometer.

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, AUGUST, 1892.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Absolute. Maximum. Date.	Absolute. Minimum. Temp.	Absolute. Minimum. Date.	Average. Max.	Average. Min.	Average. Dew Point.	Average. Humidity.	Absolute. Max. in Sun.	Absolute. Min. on Grass.	TotalRain. Depth.	TotalRain. Days.	Aver. Cloud.
	°		°		°	°	°	0-100	°	°	inches		
England, London	82·1	17	43·1	11	72·6	53·7	52·9	74	126·7	37·3	3·06	17	5·7
Malta	99·2	1	67·3	10	87·4	71·2	67·0	68	153·7	61·4	...	...	0·9
Cape of Good Hope	78·7	14	38·6	11	61·5	46·9	...	...	...	...	4·61	12	6·0
Mauritius	77·5	9	59·8	21	75·1	65·3	61·6	76	127·4	50·2	3·80	16	5·6
Calcutta	91·0	14	74·7	23	86·8	77·3	78·3	88	156·5	74·2	8·86	15	7·3
Bombay	85·7	25	73·6	31	82·3	76·2	75·5	88	142·6	71·1	36·56	29	9·2
Ceylon, Colombo	86·4	10	72·3	13	84·3	76·5	71·2	78	150·0	70·0	1·86	15	6·4
Melbourne	66·8	20	31·0	5	57·9	43·4	44·1	79	121·3	25·5	2·05	16	6·6
Adelaide	67·5	16	37·6	10	61·0	47·2	45·8	76	140·0	30·1	2·63	20	6·5
Tasmania, Hobart	...	...	...	...	...	...	...	...	...	...	...	...	...
Wellington	61·0	30	36·8	13	55·4	45·7	43·1	78	112·0	27·0	5·85	16	4·7
Auckland	65·0	30	39·0	2	60·2	48·9	48·8	80	118·0	30·0	4·34	20	6·2
Jamaica, Kingston	90·5	2, 23	70·1	11	88·6	72·9	72·0	80	...	...	1·09	8	4·4
Trinidad	91·0	19*a*	67·0	4	80·9	70·4	72·5	83	154·0	...	9·21	25	...
Toronto	91·5	9	50·1	29	76·5	58·6	60·8	78	...	44·8	3·99	16	5·3
New Brunswick, Fredericton	85·2	17	42·0	23*b*	72·9	54·5	58·0	78	...	...	6·99	16	6·3
Manitoba, Winnipeg	90·0	15	40·9	29*c*	76·1	52·1	...	...	...	...	3·73	13	4·9
British Columbia, Esquimalt	75·7	29	47·2	27	69·2	51·1	53·8	84	...	...	·72	7	3·6

a And 23, 24. *b* And 27. *c* And 30.

REMARKS.

MALTA.—Mean temp. 78°·4. Mean hourly velocity of wind 6·5 miles. The sea temp. rose to 82°·0. Lightning on 22nd and 27th. J. SCOLES.

Mauritius.—Mean temp. of air 1°·0 above, dew point 2°·4 above, and rainfall 1·63 in. above, their respective averages. Mean hourly velocity of wind 11·6 miles, or 0·6 below average; extremes, 26°·9 on 31st and 1°·8 on 29th. Prevailing wind E.S.E. to E. C. MELDRUM, F.R.S.

Melbourne.—Mean temp of air 0°·1, of dew point 2°·0, humidity 5, amount of cloud 0·4, and rainfall ·22 in., above their respective averages. Squally on 3 days; heavy dew on 10 days; hoar frost on 4 days; fog on 3 days; hail on the 1st. Lunar halos on 3rd and 6th; lightning on the 25th. R. L. J. ELLERY, F.R.S.

Adelaide.—Mean temp. 54°·1—just the average (54°·0). The dry weather over the northern areas broke up during the latter part of the month, and nice rains fell. The southern districts were, as has been the case all through the winter, favoured by good rains. C. TODD, F.R.S.

Wellington.—Up to the 6th, fine weather, with fresh N.W. wind; showery on 6th and 7th, then fine weather from 8th to 13th, with moderate wind; the remainder of the month generally showery. Prevailing wind N.W. Mean temp. 2°·5, and rainfall ·65 in. above the average. R. B. GORE.

Auckland.—A warm and moist month, with no heavy gales or other exceptional features. Mean temp. slightly above the average; rainfall also slightly in excess. T. F. CHEESEMAN.

KINGSTON, JAMAICA.—Rainfall one-fourth of, and temp. also below, the average. R. JOHNSTON.

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, SEPTEMBER, 1892

STATIONS. (*Those in italics are South of the Equator.*)	Absolute.				Average.				Absolute.		TotalRain.		Aver.
	Maximum.		Minimum.										
	Temp.	Date.	Temp.	Date.	Max.	Min.	Dew Point.	Humidity.	Max. in Sun.	Min. on Grass.	Depth.	Days.	Cloud.
	°		°		°	°	°	0-100	°	°	inches		
England, London	73·6	19	36·4	18	65·7	49·0	48·4	74	118·4	28·0	2·12	13	5·1
Malta	95·2	4	62·2	11	81·0	67·7	64·1	75	144·5	58·4	3·28	7	2·5
Cape of Good Hope	75·1	4	38·1	13	61·3	47·7	...	...	...	...	2·51	12	6·2
Mauritius	77·0	17	61·1	3	75·0	64·8	59·1	72	127·0	51·2	1·41	21	5·7
Calcutta	92·0	20	75·7	30	87·8	78·0	78·4	88	157·4	74·1	7·60	17	6·6
Bombay	85·9	28	73·3	1	82·5	75·5	74·9	87	139·3	70·8	18·73	23	7·6
Ceylon, Colombo	87·0	...	74·3	11	85·7	77·4	71·5	77	159·0	67·5	1·12	8	4·8
Melbourne	71·2	13	34·1	13	60·7	45·6	46·4	79	121·1	28·0	2·30	11	...
Adelaide	74·6	4	42·3	12	65·6	48·2	46·7	72	138·0	32·8	2·36	12	5·8
Tasmania, Hobart	...	...	...	...	...	...	...	...	...	...	...	...	...
Wellington	62·0	18	38·0	13	57·2	45·4	42·8	74	115·0	33·0	5·01	18	4·6
Auckland	64·0	24	40·5	12	61·4	49·0	48·1	77	127·0	34·0	3·58	20	6·0
Jamaica, Kingston	91·7	19	69·9	23	88·5	72·8	71·2	77	..	...	3·15	10	...
Trinidad	93·0	27	67·0	15*a*	88·7	70·5	72·6	85	154·0	63·0	3·57	17	...
Toronto	79·7	4	41·6	20	69·3	51·0	52·5	78	...	36·8	3·12	10	4·2
New Brunswick, Fredericton	76·7	4	34·0	30	67 5	44·7	55·5	76	...	...	3·05	10	4·0
Manitoba, Winnipeg	81·8	17	31·5	15	68·2	42·3	..	...	...	...	·86	8	5·6
British Colombia, Esquimalt	70·2	3	40·5	29	63·0	48·0	51·4	90	...	...	4·09	11	6·0

a And 21.

REMARKS.

MALTA.—Mean temp. 73°·1. Mean hourly velocity of wind 7·7 miles. The sea temp. fell from 82°·0 to 76°·8 Thunderstorms on 6 days, and lightning on 5 other days. J. SCOLES.

Mauritius.—Mean temp. of air 0°·6 below, dew point 0°·7 below, and rainfall ·06 in. below, their respective averages. Mean hourly velocity of wind 13·9 miles, or 1·8 above average; extremes, 27·8 on 10th, and 1·8 on 22nd; prevailing direction E.S.E. C. MELDRUM, F.R.S.

Melbourne.—Lightning on evening of 2nd. R. L. J. ELLERY, F.R.S.

Adelaide.—Pressure very unsteady, with great range, the min. (29·231 in.) being the lowest ever recorded here. The mean temp. was slightly (0°·3) below the average, and rainfall was ·06 in. above the average. Good rains fell generally over the Colony, especially over the northern districts, where a severe drought had prevailed since the beginning of the year. C. TODD, F.R.S.

Wellington.—The early part of the month was generally fine, with light wind; from 8th to 11th showery, with strong winds; from 12th to 18th fine, with light wind or calm; from 19th to the end of the month showery, unpleasant weather. Mean temp. 0°·4, and rainfall ·75 in., above the average. Earthquakes on 25th—a few slight shocks after 1 a.m., N.E. to S.W. R. B. GORE.

Auckland.—A showery and unsettled month. Rainfall half-an-inch, and mean temp. 0°·5, above the average. T. F. CHEESEMAN.

SUPPLEMENTARY TABLE OF RAINFALL, FEBRUARY, 1893.

[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 Hall.	4·22	XI.	Builth, Abergwessin Vic.	9·89
,,	Birchington, Thor	3·82	,,	Rhayader, Nantgwillt..	8·70
,,	Brighton, Prestonville Rd	3·36	,,	Corwen, Rhug	5·12
,,	Hailsham	3·81	,,	Carnarvon, Cocksidia ...	4·45
,,	Ryde, Thornbrough	3·71	,,	I. of Man, Douglas	5·57
,,	Alton, Ashdell.....	4·94	XII.	Stoneykirk, Ardwell Ho.	3·52
III.	Oxford, Magdalen Col...	2·54	,,	New Galloway, Glenlee	6·71
,,	Banbury, Bloxham	2·66	,,	Melrose, Abbey Gate...	3·47
,,	Northampton, Sedgebrook	2·51	XIII.	N. Esk Res. [Penicuick]	5·20
,,	Alconbury	1·77	,,	Edinburgh, Blacket Pl..	2·63
,,	Wisbech, Bank House..	2·31	XIV.	Glasgow, Queen's Park.	2·94
IV.	Southend	2·85	XV.	Islay, Gruinart School..	8·17
,,	Harlow, Sheering	2·80	XVI.	Dollar.....	4·63
,,	Colchester, Lexden.....	3·01	,,	Balquhidder, Stronvar..	8·92
,,	Rendlesham Hall	2·51	,,	Coupar Angus Station..	3·05
,,	Diss	2·71	,,	Dunkeld, Inver Braan..	5·09
,,	Swaffham	2·52	,,	Dalnaspidal H.R.S. ...	7·59
V.	Salisbury, Alderbury...	3·66	XVII.	Keith H.R.S.	1·68
,,	Bishop's Cannings	4·30	,,	Forres H.R.S.	2·30
,,	Blandford, Whatcombe.	5·64	XVIII.	Fearn, Lower Pitkerrie.	2·03
,,	Ashburton, Holne Vic....	11·29	,,	Loch Shiel, Glenaladale	10·74
,,	Okehampton, Oaklands.	7·24	,,	N. Uist. Loch Maddy ...	5·36
,,	Hartland Abbey	4·58	,,	Invergarry	8·67
,,	Lynmouth, Glenthorne.	6·23	,,	Aviemore H.R.S.	3·87
,,	Probus, Lamellyn	5·12	,,	Loch Ness, Drumnadrochit	4·87
,,	Wincanton, Stowell Rec.	3·90	XIX.	Invershin	3·19
,,	Weston-super-Mare	3·59	,,	Scourie	2·62
VI.	Clifton, Pembroke Road	4·58	,,	Watten H.R.S.	2·02
,,	Ross, The Graig	2·74	XX.	Dunmanway, Coolkelure	9·23
,,	Wem, Clive Vicarage ...	2·61	,,	Fermoy, Gas Works ...	3·80
,,	Cheadle, The Heath Ho.	3·21	,,	Killarney, Woodlawn ...	7·15
,,	Worcester, Diglis Lock	2·02	,,	Tipperary, Henry Street	3·83
,,	Coventry, Coundon	3·59	,,	Limerick, Kilcornan ...	3·07
VII.	Ketton Hall [Stamford]	2·10	,,	Ennis	5·06
,,	Grantham, Stainby	2·11	,,	Miltown Malbay.....	5·17
,,	Horncastle, Bucknall ...	2·72	XXI.	Gorey, Courtown House	3·16
,,	Worksop, Hodsck Priory	2·66	,,	Mullingar, Belvedere ...	3·34
VIII.	Neston, Hinderton	2·88	,,	Athlone, Twyford	2·75
,,	Knutsford, Heathside...	2·90	,,	Longford, Currygrane...	3·27
,,	Lancaster, Rose Bank...	5·33	XXII.	Galway, Queen's Coll...	4·87
,,	Broughton-in-Furness..	10·12	,,	Crossmolina, Enniscoe..	7·47
IX.	Ripon, Mickley	3·97	,,	Collooney, Markree Obs.	4·08
,,	Scarborough, South Cliff	3·19	,,	Ballinamore, Lawderdale	...
,,	East Layton [Darlington]	3·10	XXIII.	Lough Sheelin, Arley ..	2·98
,,	Middleton, Mickleton..	3·67	,,	Warrenpoint	4·24
X.	Haltwhistle, Unthank..	4·00	,,	Seaforde	3·54
,,	Bamburgh.....	2·54	,,	Belfast, Springfield	4·36
,,	Newton Reigny	4·55	,,	Bushmills, Dundarave...	3·19
XI.	Llanfrechfa Grange	..	,,	Stewartstown	4·19
,,	Llandovery	6·13	,,	Buncrana	3·88
,,	Castle Malgwyn	4·64	,,	Lough Swilly, Carrablagh	3·49

FEBRUARY, 1893.

Div.		STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL. Total Fall.	Difference from average 1880-9.	Greatest Fall in 24 hours. Dpth	Greatest Fall in 24 hours. Date	Days on which ·01 or more fell.	TEMPERATURE. Max. Deg.	Max. Date	Min. Deg.	Min. Date	No. of Nights below 32°. In shade.	No. of Nights below 32°. On grass.
			inches.	inches.	in.								
I.	ENGLAND.	London (Camden Square) ...	2·87	+ ·99	·44	27	22	57·0	19	25·1	6	6	15
II.		Maidstone (Hunton Court)...	3·65	+ 1·85	·67	21	24	...	...	...	...	...	...
,,		Strathfield Turgiss	3·51	+ 1·51	·45	25	25	57·0	17	20·2	6	7	16
III.		Hitchin	3·08	+ 1·33	·60	21	19	56·0	19	25·0	5	10	...
,,		Winslow (Addington)	2·42	+ ·26	·33	21	20	57·0	19	24·0	6	9	15
IV.		Bury St. Edmunds (Westley)	3·05	+ 1·49	·98	21	18	54·0	19	18·0	6	...	...
,,		Norwich (Cossey)	2·12	+ ·53	·70	21	13	...	...	...	...	...	...
V.		Weymouth(LangtonHerring)	3·66	+ 1·06	·46	27	22	53·0	18	28·0	25	4	...
,,		Torquay, Babbacombe...	4·74	+ 1·67	1·01	25	23	55·9	7	30·4	25	1	14
,,		Bodmin (Fore Street)	6·49	+ 1·50	1·00	25	25	...	...	...	...	...	...
VI.		Stroud (Upfield)	3·37	+ ·81	·59	15	20	55·0	19	27·0	24	6	...
,,		ChurchStretton(Woolstaston)	4·03	+ 1·58	·58	25	24	53·5	19	25·0	24*c*	11	15
,,		Tenbury (Orleton)	3·63	+ 1·15	·56	25	21	58·3	19	25·6	6	8	11
VII.		Leicester (Barkby)	2·32	+ ·51	·31	21	20	58·0	19	21·0	5	15	23
,,		Boston	2·15	+ ·47	·73	21	13	58·0	19	26·0	6	8	...
,,		Hesley Hall [Tickhill].....	2·23	+ ·73	·51	21	15	58·0	19	24·0	26	8	...
VIII.		Manchester(PlymouthGrove)	3·38	+ 1·33	·52	9	22	58·0	19	26·0	27	7	11
IX.		Wetherby (Ribston Hall) ...	1·83	+ ·25	·53	27	9	...	...	...	...	...	...
,,		Skipton (Arncliffe)	10·24	+ 5·55	1·94	9	21	...	...	...	...	...	...
,,		Hull (PearsonPark)	2·84	+ 1·04	·48	21	16	57·0	19	25·0	26*d*	12	18
X.		Newcastle (Town Moor)	2·66	+ 1·26	·91	26	17	...	...	...	...	...	...
,,		Borrowdale (Seathwaite).....	20·99	+ 8·35	4·96	13	22	...	...	...	...	...	...
XI.	WALES.	Cardiff (Ely).....	5·72	+ 2·53	·67	25	22	...	...	...	...	...	...
,,		Haverfordwest	5·20	+ 1·08	1·51	26	24	51·4	3	24·9	28	5	8
,,		Aberystwith, Gogerddan.....	4·81	+ 1·55	·84	1	21	...	...	...	...	...	...
,,		Llandudno.....	2·47	+ ·55	·43	25	20	...	...	...	...	...	...
XII.	SCOTLAND.	Cargen [Dumfries]	5·51	+ 1·86	1·29	13	20	50·8	19	19·6	28	6	...
,,		Jedburgh (Sunnyside).....	2·67	+ 1·16	·55	27	16	56·0	10	20·0	28	9	...
XIV.		Old Cumnock	4·41	+ ·91	·78	7*e*	19	...	...	...	...	...	...
XV.		Lochgilphead (Kilmory).....	6·37	+ 1·18	1·37	9	22	...	...	17·0	24	16	...
,,		Oban (Craigvarren)	6·08	...	·74	17	25	52·5	18	24·0	25	7	...
,,		Mull (Quinish).....	5·87	+ ·40	·87	17	18	...	...	...	...	...	...
XVI.		Loch Leven Sluices	4·30	+ 1·55	·60	10*a*	16	...	...	...	...	...	...
,,		Dundee (Eastern Necropolis)	2·90	+ ·80	·70	26	21	50·4	18	23·6	13	9	...
XVII.		Braemar	3·37	+ ·01	·55	14	19	47·7	18	9·0	13	16	23
,,		Aberdeen (Cranford)	2·75	...	1·03	26	20	48·0	7, 20	23·0	12	11	...
XVIII		Strome Ferry.....	5·43	— ·30	·84	9	19	...	...	...	...	...	...
,,		Cawdor [Nairn]	3·73	+ 1·50	·95	10	18	...	...	...	...	...	...
XIX.		Dunrobin	2·41	+ ·32	·37	14	14	53·0	18	26·0	26	...	...
,,		S. Ronaldsay (Roeberry).....	3·23	+ ·59	·76	14	24	47·0	18*b*	25·0	24	8	...
XX.	IRELAND.	Darrynane Abbey.....	6·02	...	·94	4	24	...	...	...	...	...	...
,,		Waterford (Brook Lodge) ...	3·96	— ·12	·73	25	23	55·0	2	22·0	28	6	...
,,		O'Briensbridge (Ross)	3·66	...	·57	1	21	53·0	6, 19	25·0	28	6	...
XXI.		Carlow (Browne's Hill)	2·92	— ·16	·43	1	23	...	...	...	...	...	...
,,		Dublin (FitzWilliam Square)	2·67	+ ·32	·48	9	22	56·4	18	26·0	25	5	13
XXII.		Ballinasloe	3·32	+ ·54	·52	1	23	50·0	6, 18	21·0	25	11	...
,,		Clifden (Kylemore)	10·07	...	1·01	15	23	...	...	...	...	...	...
XXIII		Waringstown	2·94	+ ·49	·56	13	19	57·0	8	20·0	24	10	17
,,		Londonderry (Creggan Res.).	4·32	+ 1·29	·64	12	22	...	...	...	...	...	...
,,		Omagh (Edenfel)	3·00	+ ·31	·52	9	17	51·0	18*b*	25·0	27	12	13

a And 14. *b* And 19. *c* And 25. *d* And 28. *e* And 26.

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

METEOROLOGICAL NOTES ON FEBRUARY, 1893.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; T S for Thunderstorm; R for Rain; H for Hail; S for Snow.

ENGLAND.

STRATHFIELD TURGISS.—A very showery month, with only three days on which R was not measured. A remarkable fall in barometric pressure occurred on the 20th and 21st, and a sharp frost on the 6th, the grass min. registering 15°·8; weather rough and stormy at the close of the month. Land very wet and sodden.

ADDINGTON.—A good deal of cold, stormy weather. Bar. very low from 20th to 27th; reading on 21st, at 9 a.m., 28·752 in. (cor. and red.) On the 22nd, 23rd, and 24th, a remarkably even low temp. prevailed, the max. being 35°, 32°, and 34°, and the min. 35°, 32°, and 29°, a range of 6° only. On the evening of the 25th, a large lunar halo was seen, followed next morning by a heavy wind and rain storm. On the 23rd the ground was white with S, and a big flood occurred on the 26th.

BURY ST. EDMUNDS.—A mild month after the 7th. Only three wetter months of February have occurred since 1856, viz.: 1866, 3·36 in.; 1879, 3·36 in.; 1883, 3·24 in.

LANGTON HERRING.—A changeable, unsettled and very wet month. R fell on 17 consecutive days from the 6th, and on none of these days was less than ·03 in. recorded. Very stormy weather on the 10th and 14th, and at night on the 25th. The 25th and 28th were bright sunny days, but on the evening of the 25th, there was T and L, followed by R, and on the night of 28th, there was a high wind; the mean temp. at 9 a.m. (41°·5), was 1°·8 above the average of 21 years. Solar halo on the 4th; lunar halo on the 28th.

BABBACOMBE.—A warm, wet, damp and windy month, with a large excess of S.W. winds. R on every day except 5, and on 18 consecutive days from 6th to 23rd; 2·12 in. of R fell in the last 4 days, including 1·01 in. on the 25th, most of which fell in heavy showers from 8.30 p.m. on 25th, to early morning on 26th, with T and H. Fine and sunny on 12th. Warm from 1st to 4th, 7th to 11th, 13th to 15th, and 18th to 21st. The shade max. rose to or above 50° on 11 days, and failed to reach 40° on one day only. The R is the greatest in February since 1884, when 5·10 in. fell; the mean temp. (43°·3), is the highest in February since 1885. Gales on 6 days; H on 5; slight S on 4 days; solar halos on 4 days; lunar halo on 28th; fog on 4 days.

BODMIN.—A mild month, with a large rainfall, and a large number of rainy days. Only 5 days on which there was frost, and a little H on 2 days. Rather stormy on the 9th, and also at the end of the month.

STROUD, UPFIELD.—L and T at 11.30 p.m. on 8th; S.W. gales on the 10th and 24th.

WOOLSTASTON.—A wet month, only 4 days without R. The last week was very cold and S fell heavily on the 22nd. Mean temp. 40°·6. Gales on 9th, 10th, and 24th; H on 9th.

TENBURY, ORLETON.—The wettest and warmest month of February since 1885, the mean being 1°·7 above the average of 32 years. The last few days were cold and cheerless, but the first part of the month was very warm and pleasant. Great gales on the night of the 9th and 26th; S on 22nd and 24th.

MANCHESTER, PLYMOUTH GROVE.—A fine month upon the whole. Very stormy on the 9th; slight S on the 24th and S and sleet on the 25th; thick fog on the morning of the 28th. Mean temp. 40°.

WALES.

HAVERFORDWEST.—One of the mildest and wettest Februarys in my record of 44 years. A short, sharp, and destructive TS occurred on the morning of the 15th; it lasted from 8.45 a.m. to 9.15 a.m.; the L was vivid and forked, and

a large tree was literally split into fragments; the T was very appalling, and a storm of large H followed. This storm caused several horses to dash off, in wild affright on the road leading into town, resulting in such damage to one man, that he had to lose his leg. The month ended cold and stormy; prevailing winds, S.W., W. and S.E.

GOGERDDAN.—Stormy and very mild throughout the month, with scarcely a gleam of sunshine.

SCOTLAND.

CARGEN.—A very variable and generally stormy month. The mean temp. of the first 20 days, was 2°·5 above the average of the month, the last eight days, 5°·3 below it. On the 26th S fell to a depth of 5 inches, with heavy sleet in the afternoon. A sharp TS, accompanied by heavy H, occurred on the night of the 7th, and a good deal of L was seen on the night of the 9th. A severe gale was experienced on the 14th, and strong winds on several occasions.

JEDBURGH.—Weather on the whole fairly pleasant, and although there were many rainy days, the heat of the sun soon dried it up. Farm work was little retarded by the frost, but no cereals were sown. Many spring flowers in bloom. T and L on the 8th, H showers on the 9th, S on the 26th and 27th.

OLD CUMNOCK.—From the 7th to the 11th very stormy. Two loud peals of T at 9 p.m, on the 7th. H on the 10th and 11th, S on 25th, 26th and 28th.

SOUTH RONALDSAY, ROEBERRY.—The first week was fine, but afterwards the weather was cold, wet and changeable.

IRELAND.

DARRYNANE ABBEY.—The first three weeks were wet and very mild. S fell at times on 25th. The last few days were cold, with sharp frost at night on 27th. H on the 11th and 16th.

WATERFORD, BROOK LODGE.—Only five days this month without R. Several heavy gales; H on the 9th and 25th, S on 24th and 26th. Mean temp. 42°·2.

O'BRIENSBRIDGE, ROSS.—A remarkable fall of six-tenths of an inch occurred in the bar. on the night of 20th, but neither R nor storm followed. The temp. was high until the 24th, but sharp frost was recorded on 28th. S on 25th, 26th and 27th.

DUBLIN.—The month was wet, cold, stormy and cloudy. R or S fell in measurable quantity on 22 days, and on four days the wind reached the force of a gale. The mean temp. was 42°·7, or 0°·1 below the average. S or sleet fell on seven days, H on six days, fogs occurred on three days. The amount of cloud (6·8) was in excess of the average. High winds occurred on 11 days, L was seen on the 7th, an aurora on the 16th, solar halos on the 15th and 28th, and lunar halo on the 28th.

EDENFEL.—With the exception of a few days of the first week, and the whole of the last week, the weather of the month was persistently wet with temp. rather above the average and a remarkably unsteady and low bar. The last week was fine and dry, except for some light drifting S on 26th.