

SYMONS'S
MONTHLY
METEOROLOGICAL MAGAZINE.

CCXVIII.]

MARCH, 1884.

[PRICE FOURPENCE,
or 5s. per ann. post free.

En Memoriam.

PROF. ARNOLD GUYOT,

BORN SEPT. 28TH, 1807.
DIED FEB. 8TH, 1884.

CAPT. N. H. C. HOFFMEYER,

BORN JUNE 3RD, 1836.
DIED FEB. 16TH, 1884.

EMINENT Meteorologists not unfrequently depart in couples. It was so with Charles St. Claire De Ville and Jelinek, and now, within little more than a week we have lost in Guyot the author of *Earth and Man*, a work which as an introduction to Physical Geography is almost unequalled, and whence hundreds of thousands of his fellow-men have imbibed correct views of the world they inhabit; and also the compiler of *Tables Meteorological and Physical*, a work with which scarcely any working meteorologist can dispense.

Captain Hoffmeyer will long be remembered for work in a very different department of meteorology, notably for his great and self-denying labours in giving us daily charts of Atlantic weather. Scientific facts once honestly ascertained and printed and distributed over the world, can scarcely be lost while the world itself remains, hence the truth of Lord Derby's remark that the victories of science are not for one time or one place, but for all times and all places, and hence it is that long after our friend's remains have returned to their original state, his *Cartes synoptiques* will continue available, and future generations will honour his industry, though they will know nothing of the agreeable personal character so sadly missed by his many friends.

ANOTHER SOURCE OF VOLCANIC DUST.

WE have in previous issues referred to the excellent weekly, published at Cambridge, Massachusetts, entitled *Science*. The number for February 15th, just received, contains a very important and interesting paper by Mr. G. Davidson, communicated by Prof. Hilgard, Superintendent of the United States Coast and Geodetic Survey.

The record is so similar to that of the Krakatoa eruption that but for the facts bearing the indisputable *imprimatur* of Prof. Hilgard, and that some accounts have already been published by the United States Signal Service, one would almost suspect some colouring, or even a hoax. From its origin, however, it is certain that it is absolutely true.

The account, as given in *Science*, is illustrated by a large map of Alaska and the adjacent regions, and also by a view of the island concerned; this we have reproduced, but we do not give the map, partly because of the cost, partly because it would delay this article, and partly because any good map of the extreme north-west of America will show Cook's Inlet, in lon. 152° W. and lat. 60° N. and Augustin Island lies in the mouth of the inlet.

The narrative is not very compactly written, and our first intention was to recast it in a systematic form, but of course retaining the very expressions used by Mr. Davidson. We have, however, eventually decided on reprinting it *verb. et lit.*, and, having regard to its importance, we suspend our ordinary custom of using small type for reprints, and give it all the prominence of an original communication:—

“NOTES ON THE VOLCANIC ERUPTION OF MOUNT ST. AUGUSTIN,
ALASKA, OCT. 6, 1883.

“ON the western side of the entrance to Cook's Inlet (forty-five miles wide) lies Cape Douglas; and to the northward of the cape the shore recedes over twenty miles, forming the Bay of Kamishak. In the northern part of this bay lies the Island of Chernaboura ('black-brown'), otherwise called Augustin Island. It is eight or nine miles in diameter, and near its north-eastern part rises to a peak called by Cook, Mount St. Augustin. As laid down by Tebenkoff, the island is nearly round. The northern shores are high, rocky, and forbidding, and are bordered by vast numbers of rocks and hidden dangers. The southern shore is comparatively low.

“Mount St. Augustin was discovered and named by Capt. Cook, May 26, 1778; and he describes it as having 'a conical figure, and of very considerable height.' In 1794 Puget describes it as—

“A very remarkable mountain, rising with a uniform ascent from the shores to its lofty summit, which is nearly perpendicular to the centre of the island, inclining somewhat to its eastern side . . . Towards the seaside it is very low, from whence it rises, though regular, with a rather steep ascent, and forms a lofty uniform, and conical mountain, presenting nearly the same appearance from every point of view, and clothed with snow and ice, through which

neither tree nor shrub were seen to protrude; so that, if it did produce any, they must either have been very small, or the snow must have been sufficiently deep to have concealed them."

"At that time there were native hunters, under the direction of two Russians, hunting or living in the vicinity of the north-eastern point of the island.

"Vancouver placed the peak of this mountain in latitude $59^{\circ} 22'$: Tebenkoff places it in latitude $59^{\circ} 24'$.

"The peak of St. Augustin is distant forty-nine miles nearly due west (true) from the settlement on the southern point of Port Graham, or, as it is sometimes called, English Harbor. This harbor is situated on the eastern side of Cook's Inlet, near Cape Elizabeth.

"In connection with the fall of pumice-dust at Iliuliuk* on Oct. 16, 1883, it may be of interest to observe, that the peak of Augustin is over seven hundred miles to the north-eastward of Bogosloff Island, off Unalashka.

"About eight o'clock on the morning of Oct. 6, 1883, the weather being beautifully clear, the wind light from the south-westward (compass), and the tide at dead low water, the settlers and fishing-parties at English Harbor heard a heavy report to windward (Augustin bearing south-west by west three-fourths west by compass). So clear was the atmosphere that the opposite or north-western coast of the inlet was in clear view at a distance of more than sixty miles.

"When the heavy explosion was heard, vast and dense volumes of smoke were seen rolling out of the summit of St. Augustin, and moving to the north-eastward (or up the inlet) under the influence of the lower stratum of wind; and, at the same time (according to the statements of a hunting-party of natives in Kamishak Bay), a column of white vapor arose from the sea near the island, slowly ascending, and gradually blending with the clouds. The sea was also greatly agitated and boiling, making it impossible for boats to land upon or to leave the island.

"From English Harbor (Port Graham) it was noticed that the columns of smoke, as they gradually rose, spread over the visible heavens, and obscured the sky, doubtless under the influence of a higher current (probably north or north-east). Fine pumice-dust soon began to fall, but gently, some of it being very fine, and some very soft, without grit.

"At about twenty-five minutes past eight a.m., or twenty-five minutes after the great eruption, a great 'earthquake wave,' estimated as from twenty-five to thirty feet high, came upon Port Graham like a wall of water. It carried off all the fishing-boats from the point, and deluged the houses. This was followed, at intervals of about five minutes, by two other large waves, estimated at eighteen and fifteen feet; and during the day several large and irregular waves came into

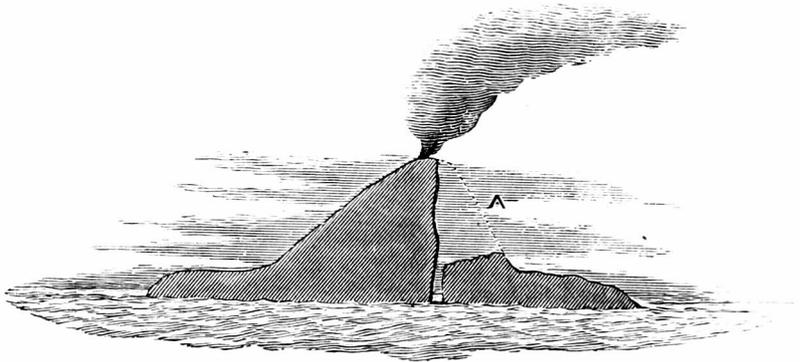
* Lat. $53^{\circ} 52'N.$, Lon. $166^{\circ} 32'W.$ —Ed. *M.M.*

the harbor. The first wave took all the boats into the harbor, the receding wave swept them back again to the inlet, and they were finally stranded. Fortunately it was low water, or all of the people at the settlement must inevitably have been lost. The tides rise and fall about fourteen feet.

"These earthquake waves were felt at Kadiak,* and are doubtless recorded on the register of the coast-survey tide-gauge at that place. Also the pumice-ashes fell to the depth of four or five inches, and a specimen of the deposit was given to the tidal observer at St. Paul. It will be interesting to compare these ashes with those collected at Iliuliuk on the 16th of October, and which, from a confusion of dates, were supposed to have come from the new Bogosloff volcanic island. I am of the opinion that they came from St. Augustin.

"The condition of the Island of Augustin or Chernaboura, according to the latest accounts, is this :—

"At night, from a distance of fifty or sixty miles, flames can be seen issuing from the summit of the volcano ; and in the day-time vast volumes of smoke roll from it. Upon nearer approach from English Harbor, it was found that the mountain had been split in two from peak to base by a great rupture extending across it from east to west, and that the northern slope of the mountain had sunk away to the level of the northern cliff.† This is corroborated by the statement of the hunting party in Kamishak Bay. Smoke issued from the peak at a very short distance to the southward of the rupture.



"The party of natives on Kamishak did not approach the islet, though they gave clear and distinct accounts of its eruption and subsequent appearance ; but Capt. C. T. Sands, who was at English Harbor, gave the Alaska company a full description ; and Capt. Cullie of the Kodiak states, that, if there were plenty of water in the line of rupture, it would be possible for a vessel to sail through (see figure). At the time of Capt. Sand's observations the low ground of the island was visible, and seemed to be a vast crater, from which smoke and flames were issuing.

* Lat. 58°N., Lon. 152°W.

† Capt. Cullie's account.

“But beyond all these phenomena, apart from the volcanic eruption and the rupture of the island, we have the report of Capt. Cullie of the schooner Kodiak (from whom we also obtain a statement in regard to the rupture), who approached the island from English Harbor on the 10th of November, and found that a new island, about a mile and a half long and seventy-five feet high, had been upheaved in the ten-fathom passage between Augustin and the mainland to the westward. This passage is from six to eight miles wide, and was sailed through by Puget in Vancouver's voyages of discovery.

“This new island (also reported by the hunting-party in Kamishak) would appear to have arisen during the late volcanic activity. It lies to the north-westward of Chernaboura Island (Augustin), and was distinctly seen from the Kodiak, as that vessel lay ten miles to the north-eastward, and had clear weather.

“To show the violence of the volcanic convulsions at this time, two extinct volcanoes on the Alaska peninsula, which are reported to be about west (true) from the active volcano Iliamna (twelve thousand feet high), had burst into activity; and during the day volumes of smoke were distinctly seen, and columns of flame at night. Usually, at that season, Augustin and the peak are covered with deep snow. On the 10th of November, however, when Capt. Cullie approached the island, while there was a depth of four feet of snow at Port Graham (English Harbor), Mount St. Augustin was bare and black.

“During this same season, a party of seven or eight Aleuts had established themselves on Chernaboura (Augustin) Island to hunt the otter during the winter. Two of the women refused to remain on account of the violent noises inside St. Mount Augustin; and they were taken to St. Paul, Kadiak. Since the eruption no one of this party has been seen, nor any signs of their bidarkas, although a rescuing party of natives had gone along the coast to learn of their whereabouts. It is feared, therefore, that they have been destroyed. In confirmation of this report of the native women, Capt. Sands says that he and others noticed that St. Augustin was emitting smoke as far back as August; but no other signs were observed before the heavy report of Oct. 6.

GEORGE DAVIDSON,
Assistant U. S. Coast and Geodetic Survey.

EXTRAORDINARY PHENOMENON ON THE DEE.

ON Thursday, 21st February, 1884, a most remarkable occurrence took place in the Dee at Connah's Quay, near Chester. The tide flowed at 6.40 a. m., and after two hours' ebb it began to flow again at 8.30, and rose to a height of three feet, when at 9.30 a. m. it ebbed again. Pilots depending upon the tide to come up the river were exceedingly puzzled. So remarkable an event is not remembered among local shipping men.—*Hereford Times.*

RAINFALL AT THE WETTEST KNOWN STATION.

THE rainfall at Cherrapunji last year (1883) was 355.25 inches, as compared with 389.82 inches during the year 1882.—*The Colonies.*

THE SUNSETS AND THE JAVA EARTHQUAKE.

To the Editor of the Meteorological Magazine.

SIR,—I found the *Meteorological Magazine* on my return from a delightful walk in the Tyrol over some five feet of hard snow, and hasten to reply to your note appended to my letter.

These sunsets have from time to time been noticed in the local papers, but I have never cut any of them out, being simply a line or two describing what one had seen one self. They first attracted my notice and that of others on the 9th of May, and being unusual, I noted them in my daily weather diary, and enclose the extracts just as I noted them, if they will be of any use.

A navy officer, who passed through Partenkirchen early in August, told me he had noticed them in the Engadine, and that they were much what they saw in northern latitudes, and were considered generally as forerunners of increased cold and bad weather. With the exception of the sunrise of 1st December, when everyone thought Munich was on fire two hours before sunrise, I never saw anything to equal the sunset of Feb. 7th, and sunrise of the 8th, at the Walchensee, the sunset being over the mountains, and the sunrise over the lake. But for the sunset of the previous evening, I should have said the sunrise betokened bad weather. The following day, as my son and I were walking over the pass to Innsbruck, the sun was most extraordinary, with its rings of blue immediately round it, and then the copper band of about 45° diameter, the outer edge shading down to the blue sky, which, though cloudless, almost was milky. Nothing resulted, the weather continuing fine and frosty till Sunday last, 24th, when we had again an orange sunset and glow; and it has snowed, more or less, ever since Monday morning till now (Thursday). My son's remark on the sun on the 9th, was that it was a "sunset all day." At the Walchensee, the people told me that the sunrises and sunsets had continued ever since the summer, and they had never known so much snow. The old man, whose business it is here to look after the ice on the lake, said to me last week that he hadn't known so much snow and so little skating for 47 years; and at Partenkirchen, though there was so much snow on the mountains all the summer, they never were so bare of snow as at the end of August. I was on the Zug-spitz on that day, and there was literally bare rock to the summit, the glacier itself being bare of snow in many places, but it had been a glorious month.

Sincerely yours,

M. F. WARD.

20, Hees Strasse, Munich, 28th Feb., 1884.

NOTES COPIED FROM MY DAILY WEATHER ACCOUNT.

1863.

- May 9. Unusual sunset glow.
 11. Unusually brilliant sunset.
 18. Very fine sunset and afterglow.
 June 7. Brilliant sunset and glow.
 12. Red sunrise.
 15. Brilliant sunrise and glow, and orange sunset; 11 p.m., dry bulb 60°, wet 55°, unusually warm for that hour.
 20. Brilliant solar halo and evening glow; treble rainbow.
 27. Red clouds in E. and S.E. at sunset.
 July 20. Brilliant mountain glow after 4 hours' rain.
 21. Brilliant red sunrise; mountains fiery red 4 a.m.; double rainbow; cone of light like tail of comet in S.E. an hour or so before moonrise; disappeared in a quarter of an hour or so.
 30. Brilliant mountain glow and sunset.
 Aug. 16. Brilliant sunset and afterglow; cone before moonrise as on 21st July.
 N.B.—Capt. Noble and others saw cone over moon before rising on the 28th and 29th; here it was cloudless, and moon rose perfectly clear on those evenings.
 Since 11th January there have been—
 1884. Jan. 19. Fine red sunset, no afterglow.
 27-28. Brilliant orange sunsets.
 Feb. 7. Gorgeous red sunset } I was on the mountain about 3,000 feet above sea.
 8. " " sunrise } feet above sea.
 9. Sun surrounded all day by a large copper-coloured band; blue immediately round sun; sky milky. (About 4,000 feet above sea.)
 A blunt cone of white light, something similar to the zodiacal light in direction and form, has been very conspicuous on all clear evenings, an hour or so before sunset, more so when the body of the sun is behind a chimney stack or other object.
Fresh snow.—June, 4 days; July, 8; August, 2; Sept., 6; Oct., 11; Nov., 7; Dec., 13; Jan., 9; Feb., 4; total, 64.
Rain.—June, 20 days, 14 thunderstorms; July, 17, all thunderstorms; August, 8, ditto; Sept., 15, 4 days thunderstorms; Oct., 9; Nov., 9; Dec. 5; Jan., 8; Feb. 3; total, 94.
- May 10-12. Snow, strong wind; snow down to plain.
 16-17. Series of thunderstorms.
 19-20. Snow, strong wind; snow nearly down to plain.
 June 8-11. Incessant thunderstorm, with heavy rain; snow on mountains.
 12. Heavy rain 4 p.m. till 4.30 on 13th; 24 hours' rain 1-77 inches.
 16-19. Incessant heavy rain; floods.
 21. Violent thunderstorms; heavy rain and snow on mountains; hail; thunderstorm 9.45-12 ('70 in. fell in 25 min.)
 27. Very fine weather till 13th July, with usual daily thunderstorms.
 July 21. Heavy rain, 5.10 a.m.
 22-25. Incessant thunderstorms; snow very low down on mountains.
 31. Rain; snow on mountains.
 Aug. 17. Snow; rain; then almost cloudless to end of month.
 All these sunsets were orange, red and green; I never saw green or blue sun or moon.
 Jan. 17-23. Clear frost.
 28 & 29. Snow; strong wind; hail.
 Feb. 2-11. Clear weather.

[Having no desire for the attainment of anything except the truth, we print Col. Ward's letter and extracts in full, though they are *not what we asked for*. A meteorological register whence one could extract no records of fine sunsets, and specially a register kept amid snow-covered mountains, would be a strange one. We asked for "any printed notices of unusual sunsets, afterglows, &c., published before August 26th," but we have not yet received even one.—ED.]

To the Editor of the Meteorological Magazine.

SIR,—In consequence of what has appeared respecting the presence of iron in the atmosphere, I have been induced, several times since the commencement of the year, to examine the sediment at the bottom of my gauges, and have, in every case, found iron. It seems to be decreasing in quantity, but even this morning I detected its presence.

I think it would be well if observers would examine, and if able to do so analyze, the sediment that they may find in their gauges. It is possible that substances may float in the atmosphere, the existence of which has never been suspected.—Yours respectfully,

S. KING.

Elswick Lodge, Great Eccleston, Garstang, March 5th.

ROYAL METEOROLOGICAL SOCIETY.

THE usual monthly meeting of this Society was held on Wednesday evening, the 20th ult., Mr. R. H. Scott, M.A., F.R.S., President, in the chair. T. G. Benn, Capt. C. F. Cooke, Francis Galton, M.A., F.R.S., Prof. S. A. Hill, B.Sc., Capt. A. W. Jeffrey, G. Paul, F.G.S., F.R.H.S., R. Veevers, H. T. Wakelam, and E. Wells were balloted for and elected Fellows of the Society. The following papers were read:—

(1.) "The Great Storm of January 26th, 1884," by William Marriott, F.R. Met. Soc. This storm was remarkable for its violence and large area, as well as for the unprecedentedly low barometer reading at its centre. The author had prepared isobaric charts for each hour from noon on the 26th to 3 a.m. on the 27th, and by this means was able to track the storm across the British Isles. The centre of the depression appeared to have first reached the north-west coast of Ireland at noon, and passed in a north-easterly direction over the north of Ireland and across the middle of Scotland, reaching Aberdeen about midnight. Its rate of progress was therefore about 30 miles an hour. A violent gale was experienced all over the British Isles, the greatest hourly velocity of the wind being 68 miles at Valencia at 11 a.m., 70 miles at Holyhead at 2 p.m., 63 miles at Falmouth at 3 p.m., 69 miles at Armagh, and 59 miles at Aberdeen at 5 p.m., 58 miles at Greenwich from 5 to 7 p.m., and 76 miles at Alnwick at

midnight. Thunderstorms occurred on the south-eastern side of the depression, and travelled across the south of Ireland and England at the rate of about 30 miles an hour. The lowest readings of the barometer (reduced to sea level) yet reported were 27·26 ins.* at Kilcreggan at 8.30 p.m., and 27·332 ins. at Ochtertyre, near Crieff, at 9.45 p.m. In the southern part of England, directly after the minimum had occurred, there was a very sudden rise in the reading of the barometer, in some cases amounting to 0·08 inch in five minutes. From an examination of previous records it appears that there has never before been so low a barometer reading as 27·26 ins., so that this storm may be considered as one of the most remarkable that has occurred in the British Islands.

(2.) "The Height of the Neutral Plane of Pressure and Depth of Monsoon Currents in India," by Prof. E. D. Archibald, M.A., F.R. Met. Soc.

(3.) "The Sunrises and Sunsets of November and December, 1883, and January, 1884," by Hon. F. A. Rollo Russell, M.A., F.R. Met. Soc. The author gives a very interesting account of all the special features of the remarkable sunrises and sunsets which have been observed from November 8th to February 2nd. The following are stated to be the marks distinguishing the peculiar sky-haze from cirrus:—

1. It is commonly much more evenly spread over the sky than cirrus.
2. It is visible (except when very dense or in the neighbourhood of the sun) only about the time of sunrise and sunset. During the day not the faintest trace obscures the clear azure, whereas cirrus becomes more distinct with more daylight.
3. When actually glowing with bright colour it loses its wavy appearance.
4. It has no perceptible motion, unless perhaps when watched through a long period.
5. It does not interfere with the clear definition of the moon, or brilliancy of the stars.
6. It lies almost without exception in long streaks, stretching from between south-south-west and west-south-west to between north-north-east and east-north-east.
7. Its radiant point lies not on the horizon, but far below it.
8. If both cirrus and sky-haze be present, the sky-haze begins to shine with a red light soon after the cirrus has ceased to glow above the western horizon. When cirrus is present, however, there is in general a reaction of effects.
9. The sky-haze is destitute of the fibrous twists and angular branches of cirrus, and, since the sunlight leaves it in regular progression, it must be stratified at the same uniform level.
10. It has always been visible on every clear day for more than two months, and has been quite independent of wind and weather.

* This is from an aneroid barometer, which is believed to be nearly correct.

THE WINTER OF 1883-84.

To the Editor of the Meteorological Magazine.

SIR,—December, January and February constituting the three winter months, we are now in a position to review the winter season of 1883-84. The remarkable feature about an exceedingly mild and excessively dry winter seems to be the smallness of the rainfall, notwithstanding the prevalence of S.W. wind, which generally produces mild but wet seasons. I append a short summary of my own observations, placing side by side the record of the last four winters; from this it will be seen that with a higher temperature and a larger percentage of S.W. wind, there has been a far smaller fall in the winter of 1883-84 than in the corresponding season of the three preceding years. I think that those whose record carries them back considerably further than mine carries me, will find it is many years since we experienced a winter at the same time so uniformly mild and dry.

	1880-81.	1881-82.	1882-83.	1883-84.
Temperature, Mean	34·9	38·8	39·0	39·8
„ Absolute Max. ...	53·9	53·4	54·5	53·9
„ „ Min. ...	10·7	24·9	19·1	26·7
Frosty nights	44	52	50	50
Rainfall Total	6·60	6·16	7·96	3·75
Number of Wet Days	53	41	66	42
Wind, Percentage of S.W.....	14	23	15	25

Thermometers are verified and placed in a Stevenson screen.

Yours faithfully,

C. W. HARVEY, F.R.Met.Soc.

Throcking Rectory, Herts, March, 1884.

 THE FORTH BRIDGE.

DURING the gales of the 26th and 27th ult., unprecedented wind pressures were experienced at the Forth Bridge works. We learn from Mr. B. Baker, M.I.C.E., that the strongest gusts gave a momentary pressure of 35½ lbs. per square foot on the large board 300 square feet area, put up under the instructions of Mr. Baker, and no less than 65 lbs. per square foot on the small board containing 1·5 square feet.—*The Engineer, Feb. 1, 1884.*

 NATURAL BAROMETER.

THE natives of the Chiloe Islands make use of a curious natural barometer, to which, from its having been first noticed by the captain of an Italian corvette, the name, "Barometro Araucano" has been given. This novel weather guide was described at a recent meeting of the Linnean Society of New South Wales, as the shell of a crab, one of the *Anomura*, probably of the genus *Lithodes*. It is peculiarly sensitive to atmospheric changes, is nearly white in dry weather but exhibits small red spots on the approach of moisture, and becomes completely red in the rainy season.—*English Mechanic.*

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, JULY, 1883.

STATIONS. <i>(Those in italics are South of the Equator.)</i>	Absolute.				Average.				Absolute.		Total Rain.		Aver. Cloud.
	Maximum.		Minimum.		Max.	Min.	Dew Point.	Humidity.	Max. in Sun.	Min. on Grass.	Depth.	Days.	
	Temp.	Date.	Temp.	Date.									
England, London	84·7	2	42·1	16	70·5	52·1	50·7	81	112·9	48·1	2·92	14	6·4
<i>Cape of Good Hope</i> ...	...	...	...	...	...	...	...	...	...	...	...	...	...
<i>Mauritius</i>	76·5	5	58·0	25	73·4	64·1	58·8	70	...	...	·72	12	5·3
Calcutta.....	92·5	11	74·9	18	88·0	78·5	78·3	87	158·4	73·6	16·16	27	8·8
Madras .....	...	...	...	...	...	...	...	...	...	...	...	...	...
Bombay.....	86·8	6	73·4	10	84·2	76·8	76·7	87	140·2	72·0	39·88	29	9·2
Ceylon, Colombo.....	87·0	2	72·8	16	84·8	77·6	71·3	75	148·0	63·5	3·16	12	7·8
<i>Melbourne</i>	62·0	1	31·7	23	55·0	41·4	41·7	80	109·5	26·2	2·55	14	6·1
<i>Adelaide</i>	66·5	6	34·2	20	58·2	44·5	42·9	73	130·2	25·1	4·20	17	5·2
<i>Wellington</i>	59·4	14	32·0	6	51·6	42·0	...	...	110·0	30·0	6·27	24	...
<i>Auckland</i>	61·0	1, 15	36·0	23	57·0	47·4	44·2	74	126·0	30·5	4·79	25	5·8
<i>Falkland Isles</i>	48·0	9	21·1	20	41·2	33·2	35·0	90	93·0	22·4	2·63	19	6·4
Jamaica	93·3	28	70·6	17	88·6	73·8	71·5	72	...	62·6	1·25	5	6·0
Barbados	83·0	10	70·0	3, 27	82·0	72·0	74·1	85	147·0	69·0	5·46	15	6·6
Toronto.....	83·4	4	46·1	1	74·7	55·9	58·0	73	146·4	39·8	5·57	14	5·5
New Brunswick, } Fredericton	87·7	6	38·0	1	75·9	52·9	56·6	74	...	...	4·37	13	5·8
Manitoba, Winnipeg ...	84·5	25	43·0	3, 7	74·6	50·0	54·6	55	...	...	1·63	8	6·7
British Columbia, Yale	...	...	...	...	...	...	...	...	...	...	...	...	...

REMARKS, JULY, 1883.

Mauritius.—Rainfall 1·88 in. below, and mean temp 0°·3 above the average; mean pressure 30·216 in.; mean hourly velocity of wind 11·9 miles, extremes 27·6 miles on 31st, and 1·7 miles on 25th, prevailing direction E.S.E. C. MELDRUM, F.R.S.

CEYLON.—TSS occurred on the 10th, 11th and 12th. G. H. SYMONDS.

Melbourne.—Mean temp. of air and of dewpoint slightly above the average, and rainfall ·80 in. above it. Prevailing direction of wind N.; strong breezes occurred on 8 days, dense fog on 3rd, 4th and 19th, H showers on 9th, heavy dew on 8 days, hoar frost on 6 days, ice on 4 days; lunar rainbow on 22nd. R. L. J. ELLERY, F.R.S.

Adelaide.—Mean pressure 30·212 in., being slightly above the average. Mean temp. 0°·3 below the average; the night of the 19th–20th, was the coldest with one exception experienced for the last 20 years, the min. temp. being 34°·2, while the thermometer on wool registered 22°·9. The rainfall at Adelaide was nearly 1·75 in. above the average of the previous 26 years; the fall was heavy at all places on the Adelaide plains, and especially in the Mount Lofty ranges, where over 8 inches fell. A severe shock of earthquake was experienced at Adelaide on the night of July 7th, and a severe shock was felt at Launceston (Tasmania) on 13th. C. TODD.

Wellington.—Showery cold weather almost throughout the month; prevailing winds S.E. and N.E.; very strong on nights of 3rd, 7th and 10th, with R; T on 19th, H on 21st; earthquakes on 4th, 5th and 9th. Mean pressure slightly below, and mean temp. 1°·0 below the average. R. B. GORE.

Auckland.—Mean pressure below the average, mean temp. slightly above the average, rainfall also slightly above it. T. F. CHEESEMAN.

BARBADOS.—Mean temp. 76°·0, the same as the average of 25 years, prevailing direction of wind N.E., average velocity 13·9 miles per hour; rainfall 13 per cent. below the average. Five days were overcast; TS on 1st, T and L on 17th.

R. BOWIE WALCOTT.

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, AUGUST, 1883.

STATIONS. <i>(Those in italics are South of the Equator.)</i>	Absolute.				Average.				Absolute.		Total Rain.		Aver. Cloud.
	Maximum.		Minimum.		Max.	Min.	Dew Point.	Humidity.	Max. in Sun.	Min. on Grass.	Depth.	Days.	
	Temp.	Date.	Temp.	Date.									
	°		°	°	°	°	0.100	°	°	inches			
England, London	82.7	21	46.9	20	73.4	54.2	52.8	71	113.2	49.6	.93	10	5.7
<i>Cape of Good Hope</i> ...	...	...	...	...	...	...	...	...	...	...	...	...	...
<i>Mauritius</i>	77.5	3	58.6	18†	74.1	64.2	59.5	72	...	...	1.33	16	6.0
Calcutta	89.7	9	74.2	14	87.3	78.3	78.1	87	156.5	70.8	8.15	26	8.8
Madras .....	...	...	...	...	...	...	...	...	...	...	...	...	...
Bombay	88.1	17	72.0	30	84.1	77.0	75.3	84	143.2	70.5	12.57	26	8.1
Ceylon, Colombo	86.9	2.4	72.4	30	82.0	76.3	73.5	84	145.5	68.0	17.86	22	7.8
<i>Melbourne</i>	67.2	26	32.9	22	59.3	42.9	41.0	71	125.0	27.9	.87	8	5.5
<i>Adelaide</i>	67.2	3	37.6	22	60.4	44.4	43.3	72	133.0	31.6	3.05	16	4.8
<i>Wellington</i>	65.0	21	33.0	6	55.1	43.2	...	...	116.0	30.0	3.61	13	...
<i>Auckland</i>	63.0	22	36.5	7, 24	57.0	45.1	43.8	77	126.0	31.0	4.41	17	5.4
<i>Falkland Isles</i>	50.3	28	22.3	8	42.5	33.2	35.5	90	104.0	18.8	1.17	17	6.7
Jamaica, Kingston	90.8	15	70.7	11	88.5	73.6	74.1	81	...	63.2	6.62	12	4.1
Barbados	86.0	24*	71.0	5	83.0	73.0	74.8	83	154.0	71.0	5.12	12	6.0
Toronto	82.7	22	46.3	7	72.9	54.1	55.2	70	141.8	39.0	1.33	8	4.8
New Brunswick, Fredericton	89.7	23	40.3	29	76.6	51.5	54.7	75	76.6	51.5	1.06	12	4.7
Manitoba, Winnipeg	84.8	8	40.0	23‡	73.7	48.7	54.9	55	...	...	2.97	14	7.0
British Columbia, Yale	...	...	...	...	...	...	...	...	...	...	...	...	...

* And 25. † And 31. ‡ And 26.

REMARKS, AUGUST, 1883.

Mauritius.—Rainfall .59 in. below, and temp. 0°·3 above the average; mean pressure 30.156 in.; prevailing direction of wind E.S.E., mean hourly velocity 11.7 miles; strong trade wind blew from 25th to the end of the month; an unusual disturbance of the tides occurred on 27th. C. MELDRUM, F.R.S.

CEYLON.—TSS occurred daily from 9th to 16th inclusive; T was heard on 7th and 8th, and L was seen on 19th. Earthquake on 27th. G. H. SYMONDS.

Melbourne.—Mean pressure, mean temp. and humidity all about the average; mean temp. of dew point 1°·2, amount of cloud .7, and rainfall 1.07 in. below their respective averages; prevailing direction of wind N., strong breezes on 7 days, heavy dew on 7 days, hoar frost on 5 days, severe TS on 4th. R. L. J. ELLERY, F.R.S.

Adelaide.—Mean pressure 30.116, slightly below the average of the previous 26 years; min. 29.416 in. on 11th, the lowest reading in August with one exception; mean temp. (52°·4) was 1°·6 below the average; amount of cloud .7 below the average; rainfall nearly 1 inch above it. The rainfall was considerably in excess of the average over the colony generally. C. TODD.

Wellington.—Up to 4th the weather was showery and dull, with S.E. wind; from 5th to 12th bright, with N.W. wind; a severe N.W. gale occurred on 13th, followed by R on 14th; 15th fine, with falling bar, and at night heavy R; from 17th to 21st fine, from 22nd to 26th cold and showery, with H on 22nd-24th; the weather was then fine until the night of 30th, when the wind changed to S.E. with R. Prevailing winds N.W.; mean temp., 1°·1 above the average. R. B. GORE.

AUCKLAND.—Mean pressure a little above the average, mean temp. slightly below the average; rainfall above it. T. F. CHEESEMAN.

BARBADOS.—Mean temp. 77°·2, very slightly above the average; mean hourly velocity of wind 9.0 miles; rainfall 52 per cent. below the average; five days were overcast. TS to N.W. on 25th. R. BOWIE WALCOTT.

SUPPLEMENTARY TABLE OF RAINFALL,
FEBRUARY, 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	1·92	XI.	Carno, Tybrith	5·45
"	Margate, Birchington...	1·14	"	Corwen, Rhug	4·65
"	Littlehampton	1·72	"	Port Madoc	5·58
"	Hailsham	1·81	"	I. of Man, Douglas	4·79
"	I. of W., St. Lawrence.	2·29	XII.	Stoneykirk, Ardwell Ho.	4·30
"	Alton, Ashdell.....	3·01	"	Melrose, Abbey Gate ..	3·87
III.	Winslow, Addington ...	1·23	XIII.	N. Esk Res. [Penicuick]	3·55
"	Oxford, Magdalen Col...	1·32	XIV.	Ayr, Cassillis House ..	3·93
"	Northampton	·60	"	Glasgow, Queen's Park.	5·04
"	Cambridge, Beech Ho...	·66	XV.	Islay, Gruinart School..	4·02
IV.	Southend	·99	XVI.	St. Andrews, Newton Bk	1·73
"	Harlow, Sheering ...	1·16	"	Balquhidder, Stronvar..	12·20
"	Diss	·83	"	Dunkeld, Inver Braan..	6·47
"	Swaffham	·91	"	Dalnaspidal H.R.S. ...	5·36
"	Hindringham	·89	XVII.	Keith H.R.S.	1·11
V.	Salisbury, Alderbury ...	2·35	"	Forres H.R.S.	·93
"	Warminster	2·61	XVIII.	Strome Ferry H.R.S....	6·01
"	Calne, Compton Bassett	1·58	"	Lochbroom	4·53
"	Ashburton, Holne Vic..	10·29	"	Tain, Springfield.....	1·04
"	Holsworthy, Clawton...	3·95	"	Loch Shiel, Glenaladale	14·11
"	Lymouth, Glenthorne.	4·54	"	Invergarry	7·51
"	Probus, Lamellyn	6·29	XIX.	Lairg H.R.S.	1·05
"	Wincanton, Stowell Rec.	2·35	"	Forsinard H.R.S.	1·45
"	Taunton, Fullands	2·68	"	Watten H.R.S.	·85
VI.	Bristol, Clifton	1·85	XX.	Dunmanway, Coolkelure	11·38
"	Ross	2·66	"	Fermoy, Gas Works ...	7·42
"	Wem, Sansaw Hall.....	2·02	"	Tralee, Castlemorris ...	5·30
"	Cheadle, The Heath Ho.	2·06	"	Tipperary, Henry Street	5·31
"	Worcester, Diglis Lock	2·02	"	Newcastle West	5·06
"	Coventry, Coundon	1·87	"	Miltown Malbay.....	4·09
VII.	Melton, Coston	·85	"	Corofin	4·39
"	Ketton Hall [Stamford]	·85	XXI.	Carlow, Browne's Hill..	4·42
"	Horncastle, Bucknall ...	1·46	"	Navan, Balrath	2·75
"	Mansfield, St. John's St.	2·78	"	Mullingar, Belvedere...	3·26
VIII.	Macclesfield, The Park.	1·53	"	Athlone, Twyford	4·49
"	Walton-on-the-Hill.....	2·71	XXII.	Galway, Queen's Col....	4·16
"	Lancaster, South Road.	2·24	"	Clifden, Kylemore .....	...
"	Broughton-in-Furness...	5·09	"	Crossmolina, Enniscoe..	4·72
IX.	Wakefield, Stanley Vic.	2·11	"	Carrick-on-Shannon ...	3·75
"	Ripon, Mickley	2·09	XXIII.	Dowra	2·96
"	Scarborough.....	1·75	"	Rockcorry.....	2·99
"	East Layton [Darlington]	1·35	"	Warrenpoint	4·59
"	Middleton, Mickleton..	2·38	"	Newtownards	3·01
X.	Haltwhistle, Unthank..	2·15	"	Belfast, New Barnsley .	3·38
"	Shap, Copy Hill	7·45	"	Cushendun	3·76
XI.	Llanfrechfa Grange ...	4·64	"	Bushmills	3·16
"	Llandovery	5·26	"	Stewartstown	3·43
"	Solva	3·72	"	Donegal, Revelin Ho....	...
"	Castle Malgwyn	8·52	"	Buncrana	3·55
"	Rhayader, Nantgwillt..	7·26	"	Carndonagh	4·22

FEBRUARY, 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° In shade On grass
		Total Fall.	Difference from average 1870-9		Greatest Fall in 24 hours.		Max.		Min.		
			inches.	inches.	in.	Dpth	Date.	Deg.	Date	Deg.		Date.
I.	London (Camden Square) ...	1.40	— .24	.30	1	14	56.3	13	28.2	3	514
II.	Maidstone (Hunton Court)...	1.57	— .05	.30	10	17	...	...	...	...	...
III.	Strathfield Turgiss	1.76	+ .01	.27	1	13	55.1	13	27.4	3	615
IV.	Hitchin .....	.93	— .67	.21	21	13	53.0	13	25.0	28	15...
V.	Banbury .....	.96	— .88	.17	1, 9	13	53.0	13	25.5	29	11...
VI.	Bury St. Edmunds (Culford)	.55	— 1.22	.11	21	14	53.0	14b	25.0	29	8...
VII.	Norwich (Cossey) .....	.50	— 1.25	.12	21	12	54.0	20	28.5	27f	614
VIII.	Weymouth(LangtonHerring)	3.08	...	.34	27	20	52.0	20c	26.0	3	2...
IX.	Barnstaple	4.45	+ 1.26	.77	1	22	54.0	1d	29.0	3	...
X.	Bodmin	7.69	+ 2.82	1.80	17	23	53.0	9	29.0	3	1 5
XI.	Cirencester	1.65	— .99	.35	9	16	...	...	...	...	...
XII.	ChurchStretton(Woolstaston)	3.29	+ .79	.54	1	21	50.0	14	24.5	3	711
XIII.	Tenbury (Orleton)	2.29	— .18	.34	17	17	54.0	14	26.7	29	613
XIV.	Leicester .....	.96	...	.33	1	13	55.2	13	28.0	29	410
XV.	Boston .....	.72	— 1.06	.41	1	...	55.0	12e	29.0	27	4...
XVI.	Grimsby (Killingholme).....	1.57	— .23	.93	1	19	54.0	20	29.0	29	4...
XVII.	Hesley Hall [Tickhill].....	1.18	...	.42	1	17	54.0	13	24.0	29	3...
XVIII.	Manchester (Ardwick).....	2.00	— .19	.42	23	16	52.0	13	25.0	26	6...
XIX.	Wetherby (Ribston Hall) ...	2.77	+ .62	1.28	3	10	...	...	...	...	...
XX.	Skipton (Arncliffe)	4.89	+ .25	.85	9	21	50.0	22	24.0	22	...
XXI.	North Shields .....	.92	— .92	.15	1	17	53.8	4, 5	25.8	29	5 7
XXII.	Borrowdale (Seathwaite).....	14.96	+ 3.51	2.12	9	21	49.8	13	26.7	3	2...
XXIII.	Cardiff (Ely).....	4.63	+ .97	1.34	17	22	...	...	...	...	...
XXIV.	Haverfordwest	6.84	+ 2.39	1.05	12	23	51.5	5	27.0	2	310
XXV.	Plinlimmon (Cwmsymlog) ...	4.25	...	.63	1	20	...	...	...	...	...
XXVI.	Llandudno	2.98	+ .69	.47	1	19	57.0	9	32.2	29	0...
XXVII.	Cargen [Dumfries]	6.96	+ 3.15	2.12	12	19	50.2	4	27.0	3	7...
XXVIII.	Hawick	4.18	+ 1.89	1.30	1	16	...	...	...	...	...
XXIX.	Douglas Castle (Newmains)	7.17	+ 4.00	1.54	12	22	...	...	...	...	...
XXX.	Lochgilhead (Kilmory).....	5.77	+ 1.38	1.17	2	20	52.0	4	25.0	25	14...
XXXI.	Oban (Craigvarren).....	4.27	— .59	.20	16	16	51.0	9, 13	28.5	2	7...
XXXII.	Mull (Quinish).....	7.06	...	.75	9	19	...	...	...	...	...
XXXIII.	Loch Leven Sluices	1.80	— 1.16	.30	20	12	...	...	...	...	...
XXXIV.	Arbroath	1.75	— .41	.30	1, 9	14	50.0	4	30.0	29	6...
XXXV.	Braemar	7.74	+ 5.07	2.10	12	17	47.0	5	16.2	29	1925
XXXVI.	Aberdeen	1.90	...	.46	13	20	53.0	4	27.0	7	6...
XXXVII.	Skye (Sligachan)	13.66	...	2.00	10	20	...	...	...	...	...
XXXVIII.	Culloden	1.53	+ .48	...	...	...	52.0	9	25.0	29	7 24
XXXIX.	Dunrobin .....	...	...	...	...	...	...	...	...	...	...
XL.	Orkney (Sandwick).....	1.34	— 1.21	.25	4	19	48.9	4	30.8	2	3 8
XLI.	Cork (Blackrock)	9.44	+ 4.85	1.32	20	21	54.0	18	28.0	2	5...
XLII.	Dromore Castle	8.30	...	1.36	20	25	55.0	27	30.0	2	4...
XLIII.	Waterford (Brook Lodge) ...	7.41	...	.91	13	23	52.0	9	27.0	3	1 7
XLIV.	Killaloe .....	...	...	...	...	...	...	...	...	...	...
XLV.	Portarlington	3.01	+ .80	.50	9	24	53.5	9	30.5	2	3...
XLVI.	Dublin (FitzWilliam Square)	3.52	+ 1.36	.70	13a	20	54.6	9	31.8	2	2 3
XLVII.	Ballinasloe	3.66	+ 1.15	.76	20	24	50.0	19	30.0	2g	9...
XLVIII.	Waringstown	3.46	+ 1.21	.51	20e	18	56.0	10	21.0	3	814
XLIX.	Londonderry (Creggan Res.)	3.47	...	.71	20	22	...	...	...	...	...
L.	Omagh (Edenfel)	3.75	+ 1.47	.60	20	22	56.0	8	29.0	25	3...

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

a And 20. b And 15. c And 22. d And 10, 13, 15. e And 13. f And 19. g And 3, 11, 22, 26.

METEOROLOGICAL NOTES ON FEBRUARY.

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.

STREATHFIELD TURGISS.—On the whole the weather was mild and stormy, the R being sufficient to make the clay lands wet and unworkable, on lighter soils spring work is in a forward state. Red japonica in flower on 10th; elm in flower on 21st.

BANBURY.—A dry month with much wind; mean temp. $41^{\circ}4$; vegetation very forward, and weather spring-like towards the end of the month; very welcome frosts on last three days; high wind on 10 days; gale on 20th; S on 3rd and 10th; L on 21st; fog on 7th, 8th and 9th.

CULFORD.—A fine open month, apricots in full bloom, and every kind of vegetation very forward; mean temp. $41^{\circ}2$.

COSSEY.—A very dry month; the only Februaries on record with a smaller rainfall being 1857, 0.41 in., 1862, 0.40 in., and 1863, 0.45 in.

LANGTON HERRING.—Mean temp. $1^{\circ}5$ above the average of 12 years; the only cold days were the 3rd and 29th; the contrast between the temp. at 9 a.m. on the 3rd and on the 4th is striking, the readings being $29^{\circ}0$ and $45^{\circ}0$ respectively. On 10th violent hailstorms occurred, accompanied by T and L, and a less violent hailstorm on 11th.

BODMIN.—Another singularly mild month, the temp. only once falling below 32° ; mean temp. 43° .

CIRENCESTER.—A mild month with moderate rainfall.

WOOLSTASTON.—A wet month; S fell on 1st, 10th, 16th and 29th; a gale of great violence raged during the night of 20th-21st, accompanied by H; mean temp. $44^{\circ}6$.

ORLETON.—Much R fell on 1st, and S on 2nd till 8 a.m., when the hills were covered; no R fell afterwards till the 9th, but the sky was generally obscured by clouds, after that date R fell every day till the 24th, making the heavy clay lands very wet; the remainder of the month was dry and colder, with occasional sunshine. The mean temp. was about $1^{\circ}5$ below the average of 23 years, and the fluctuations were trifling.

LEICESTER.—The month was very dry and mild for the season.

KILLINGHOLME.—The month was unusually mild throughout; both wild and garden flowers blooming remarkably early; heavy R and N.E. gale on night of 1st, but very little R afterwards.

HESLEY HALL.—The weather was mild during the first half of the month, but cold during the latter half, especially on the last day; a little S on 28th.

ARDWICK.—February was on the whole a gloomy month, but not cold; R fell frequently, but not heavily. The temp. was rather high, and there was very little frost, and only one slight fall of S.

SEATHWAITE.—A violent storm of R occurred on the afternoon of the 20th, followed by a S.W. gale, which did considerable damage to plant and property.

WALES.

HAVERFORDWEST.—The month generally was very stormy and milder than usual. A fierce gale from N. raged all night on 1st, by which roofs were much damaged, and trees blown down; damp, gloomy weather prevailed from 2nd to 8th, when another very serious depression passed over with H, L and sleet; at 8 a.m. terrible forked L, followed by very loud T, occurred over a great part of the county, several houses were struck, and much damage was done, the L struck the Treffgarn Rocks, splintering large masses and hundreds of smaller pieces, and hurling them to great distances, the L ploughing up the ground

round about ; the most violent gale of the winter occurred on the night of the 26th, when many large trees were blown down, plantations destroyed, and houses unroofed ; the month continued unsettled, but colder, to the end ; S fell on 7 days.

SCOTLAND.

CARGEN.—A very dull, stormy month ; rainfall greatly above the average, and sunshine less than half the average ; a very severe gale was experienced between 2 a.m. and 4 a.m. of 22nd, causing much damage to trees and plantations in the district ; mean temp. $40^{\circ}1$, about the average ; L on 9th ; T on 21st.

HAWICK.—The month on the whole was mild and open. The 1st was very wet, 1 inch of R falling in 7 hours, which made every rivulet overflow ; 4 in. of S fell on 29th.

CRAIGVARREN.—On the whole the month was fine and dry and unusually warm ; the last week was very dry, cold and fair with S.E. wind, ending with a fall of S on 29th. Gale with T on 9th ; very severe gale on 20th, one of the most severe since the Tay Bridge gale ; several gables of new masonry were blown over.

ABERDEEN.—High S. to S.E. winds were frequent, and the weather was dry and open till 27th, when S and H set in ; total rainfall considerably below the average ; aurora on 29th ; L on 22nd.

CULLODEN.—The month generally was fine, without S, and many days were warm and genial.

SANDWICK.—February was warmer and drier and more windy than the average ; temp. $1^{\circ}2$ above the average ; wind 4126 miles above it ; before the 12th S.W. winds prevailed, and after that S.E. winds almost every day ; auroræ seen on 23rd and 29th.

BLACKROCK.—Very stormy weather prevailed up to the 23rd, causing much damage to life and property by land and sea ; little sunshine and frequent heavy falls of R.

IRELAND.

DROMORE CASTLE.—The characteristics of the month were high temp. and continual R with occasional storms ; during a TS about the middle of the month, a house in a mountain glen was struck by L and part of the roof was taken off ; three distinct streams of electric fluid could be traced, the furniture was damaged, and three cows and one pig in an out-building were killed, but several persons who were in the house were uninjured.

WATERFORD, BROOK LODGE.—The wettest February during the last 10 years, rainfall nearly 3 inches above the average for that period ; H on 4 days ; T and L on 20th and 21st ; L on 19th ; some of the hailstones that fell on 21st in Waterford were as large as marbles ; northerly gale on 1st.

DUBLIN, FITZWILLIAM SQUARE.—The frostless character of the winter was maintained throughout February, but there was a decrease in the temp. owing to the increasing prevalence of S.E. winds ; the amount of cloud was unusually large (7.7), and the weather was often cheerless and wet. A very violent S. gale occurred on the night of 20th ; mean temp. $43^{\circ}0$, about the average ; S or sleet fell on 2nd, 10th and 11th ; H on 10th ; L was seen on 21st, and solar halos on 20th and 25th.

BALLINASLOE.—A very wet and blustering month ; the country much flooded.

OMAGH, EDENFEL.—The weather of the month was as unsettled and wet as that of January, but with a considerably lower temp.