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THE GALE OF FEBRUARY 1st.

IN our last number we intimated our intention of collecting and inserting in the present a description of the above gale. The notes with which we have been favoured by our numerous correspondents are however so interesting and so much to the point, that it seems more advisable to let them appear as they are, than to attempt to consolidate them into a single consecutive narrative.

The special feature of the gale seems from them to be, the similarity of direction at all places and times; there is not, so far as present evidence goes, the slightest trace of ordinary cyclonic rotation or progression: on the contrary, it seems to claim the title of a "straight line gale," blowing steadily, but with great strength, from W.S.W. Of course it *may* have been a circle, but if so its centre must have been nearly in the Faroe Isles, and remained there for some days. The barometric readings were very much lower in the extreme north of Scotland (28·35 in.) than elsewhere, but we need hardly say that that is of itself no proof of the existence of a centre.

Incredible pressures, of 70 or 80 lbs. per square foot, were reported from Liverpool Observatory, concerning which we have received a communication, which must stand over till next month.

To the Editor of the Meteorological Magazine.

SIR,—I send you, with pleasure, the record of Osler's anemometer for Jan. 31, and Feb. 1st and 2nd:—

Friday, Jan. 31st.—1 a.m., S.W., backing, force 2 lbs. on square foot; 10 a.m., gale set in, S.S.E.; barometer during previous 24 hours fallen 2-tenths, 29·9 sea level; 1 p.m., S., 4 lbs.; 8 p.m., S.S.W., 5 lbs.; midnight, S.W., 7 lbs.

Saturday, Feb. 1st.—1 a.m. to 6 a.m., S.W., 8 to 9 lbs.; 6 a.m. to noon, S.W., 12 lbs = 49 miles, barometer fallen 5-tenths, 29·4 sea-level; 1 p.m., W., 5 lbs.; 4 p.m., 3 lbs.; midnight, calm.

Sunday, 2nd.—From 1 a.m. to 5 p.m., pressure under 1 lb., wind backing; at 6 p.m., a gale set in from S., veering to W.S.W., lasting 8 hours, greatest force, 10 lbs., pressure, 4·5 lbs.

Monday, 3rd.—1 a.m., calm, wind gradually shifting to N.W.; barometer, 9 a.m., 29·95 sea level.

This was a moderate gale compared with that of January 22nd, which reached 30 lbs., its extreme S. edge only passing over the island.

It is interesting to note that the wind on the south coast of England, during the storm of the 22nd, which swept over this island from S.S.E. to W.N.W., blew from the opposite quarters, shewing it to have been a cyclone progressing up Channel. Vessels since arrived here, report that on the 22nd, they ran across channel before a N.E. gale.—Yours very truly,

T. S. MANSELL, M.D.

*Grange Road, Guernsey,
Feb. 20th, 1868.*

BECKENHAM.—Very violent gale—maximum force, 28 lbs. per square foot at 1 p.m. on 1st; large elm trees, chimneys, tiles, &c., blown down; the direction of the wind between S.W. and W. throughout.—*C. O. F. Cator.*

To the Editor of the Meteorological Magazine.

SIR,—At 6 a.m. of 31st January the barometer stood here (corrected and reduced) at 29·99; at 6 a.m. of 1st February at 29·40; and at 6 a.m. of 2nd February at 29·81.

FLUCTUATIONS OF THE BAROMETER DURING FEBRUARY.

I have observed the following remarkable fluctuations:—

Between 6 a.m. of the 3rd, and 6 a.m. of the 4th, the barometer rose 0·67 in. Between the same hours of the 7th and 8th, it fell 0·51 in.; and between the same hours of the 8th and 9th, it rose 0·83 in. Between the same hours of the 18th and 19th, it fell 0·62 in.; and of the 19th and 20th, it rose 0·52 in.

TEMPERATURE OF 25TH FEBRUARY.

The minimum of the night of the 24th was 47·5, and the maximum of the 25th 62°·5. The mean of these was 55°, which, according to Mr. Glaisher's analysis of the mean temperature of 1814 to 1863, was the mean of the hottest day in 50 years on 9th February, 1831.

Yours truly,
D. A. F.

Upper Tooting, Feb. 27, 1868.

To the Editor of the Meteorological Magazine.

Sir,—The terrific hurricane of February 1st was very destructive; the number of large trees torn up by the roots was very great about here. The gale was at its height from noon till 3 p.m., after which it slightly moderated, but continued to blow with great violence till

7 p.m. At 11.35 a.m., there was a terrific storm of wind and rain, in which 0.12 fell in seven minutes. At sunset the sky presented a very peculiar appearance. The sky was of a pale watery yellow colour, and round the horizon it was a pale slate colour; there was no cloud, but the sun was only just discernible through this strange-looking haze.

The barometer commenced to fall on the morning of the 31st of January. At 9 a.m., on the 31st, it stood at 29.97 in.; at 9 p.m., at 29.69 in.; at 9 a.m., on 1st, at 29.29 in. The lowest reading was at 11 a.m., when it stood at 29.25 in.; and at 9 p.m., it had risen to 29.61. It was the heaviest, and one of the longest gales I have ever witnessed.

Hoping that these remarks may prove interesting,

Yours truly,

THOS. PAULIN.

Winchmore Hill, Feb. 19, 1868.

MONKMOOR, SHREWSBURY.—Night of 31st awfully stormy, with heavy driving rain; Feb. 1st, still stormy, with occasional showers, Severn bank-full, and covered with breakers.—*C. Lovett.*

HILLINGTON, LYNN, NORFOLK.—Gale began on night of 31st from S.W., and continued between S.W. and W. until 4th. The gale was very strong, but not, I think, equal in intensity to those of February 28 and Whit-Monday, 1860. Few trees were blown down, owing in part, of course, to their being bare; but stacks were blown down, and the hedges in several places were completely "matted" with straw. I was ascending a hill to high-exposed ground between 1 and 2, the time of the greatest violence; I got out of my dog-cart to walk up. Immediately I left my seat, the heavy waterproof apron was blown over to the back, and the driving seat, heavy, of wood, and covered with cushions, was removed and carried away to the middle of a common bordering the road. I had great difficulty, after picking it up, to regain the cart. The horse would hardly face the wind.—*Henry Ffolkes.*

KILLINGHOLME, ULCEBY, LINCOLNSHIRE.—The gale was very heavy here on the 1st. It blew down part of a wall, and a fine Austrian pine belonging to me, and rolled up much of the lead on the roof of the church.—*J. Byron.*

To the Editor of the Meteorological Magazine.

SIR,—We have had a tremendous gale here to-day; and the 5 in. and 8 in. 20 foot gauges came down with an awful smash, and are broken all to atoms. My anemometer stand was only saved in time; for, observing symptoms of weakness in its lower extremities, I had it propped and made safe. The gauge registered 835 miles in 24 hours; and, as the gale only commenced about 4 p.m., you can imagine what

it must have been in the night. The heaviest rain fell by my registering gauge between 3 and 4 a.m. was as follows :—

3	to 3.15 a.m.	.....	.140
3.15	to 3.30	„	.130
3.30	to 3.45	„	.125
3.45	to 4.0	„	.010
			.405

The receivers of the gauges when emptied contained much of this rain—if not the greater part ; so that they must have come down between 3 and 4 a.m.—Yours truly,

J. CHADWICK BATES.

Castleton Moor Vicarage, Manchester,
Feb. 1, 1868.

P.S.—Barometer's lowest reading, 28.414, unreduced; at 12.45 p.m. to-day (noon).

To the Editor of the Meteorological Magazine.

SIR,—The great gale we had on Saturday brought with it a considerable quantity of sea spray, which settled on the windows, &c., of my house, which is, at least 20 miles in a direct line from the coast in the direction in which the wind came. How much further (doubtless a good deal) inland that may have been the case, would be interesting to know, if, through your magazine, that information could be obtained. Doubtless, you will have abundance of communications respecting one feature or other of the gale ; but I trust you will excuse my troubling you with this.—Yours very respectfully,

JAMES G. HOLDSWORTH.

Heaton, Bolton, Feb. 3rd.

P.S.—I remember a similar occurrence at Wakefield, in Yorkshire in the gale of 1839, a much greater distance than this.

To the Editor of the Meteorological Magazine.

SIR,—I beg to send you a few particulars respecting the storm of Jan. 31st to Feb. 1st, as it was developed in this town :—

A violent gale, from W.S.W., commenced during the evening of the 31st, reached its climax at noon on Feb. 1st, and ceased about 5 p.m. of the same day. The lowest point reached by barometer during this storm was 28.927 inches ; rainfall registered on Feb. 1st was 26 inches. The force and velocity of the most powerful of the gusts of wind were estimated as 30 lbs. per square foot, or 78 miles per hour. Much damage to property.—Yours very faithfully,

CORNELIUS B. FOX, M.D.

South Cliff, Scarborough,
Feb. 24th, 1868.

To the Editor of the Meteorological Magazine.

SIR,—I send you a few extracts from my weather journal, trusting they may be of service.

I may add a few remarks on the storm :—The wind was gusty on the Friday, as the S.W. wind usually is ; on Saturday, from noon to

3 p.m., it was not gusty, but more of a steady current—none of the usual tremendous gusts came even when highest. I always note the gusts during a high wind, and often count the number per minute. I sat near the barometer and anemometer sheets all day, and watched the pencils.

The oscillations of the barometer, even when the wind was at its height, were inconsiderable. I have seen the mercury move through three times the space with ordinary gales. This might be expected from the fact stated in the preceding paragraph.

On the 1st there was generally a very lofty sky of white bands and streaks of cloud, and this partook of motion of wind and lower sky, but moved much more slowly.

Date.	Hour.	Barometer. (Sea Level.)	Thermometer	Wind.		Rain, 30 feet above ground.
				Direction.	Velocity.	
		in.	deg.		miles.	in.
Jan. 29	9 a.m.	30·13	...	...	..	...
"	3 p.m.	·26	...	...	..	...
"	9 a.m.	·19	...	...	...	...
" 30	9 a.m.	30·08	39	W.S.W.↓	15	...
"	3 p.m.	29·97	47	W.	20	...
"	9 p.m.	·91	46	...	20	...
" 31	9 a.m.	·73	47	W.S.W.	15	·15
"	noon.	·67	49	...	25	} No rain.
"	3 p.m.	·53	50	W.S.W.	35	
"	6 p.m.	·44	49	...	40	
"	8 p.m.	·40	...	W.S.W.	35	
"	9 p.m.	·40	49	W.S.W.	35	
"	11 p.m.	29·33	...	W.S.W.	35	} ·40
Feb. 1	9 a.m.	28·95	48	S.S.W.	37		} ·80
"	noon.	28·93	45	...	45	} Very slight rain.
"	3 p.m.	29·05	46	W.S.W.	50	
"	5 p.m.	·33	43	N.W.	35	
"	9 p.m.	29·48	39	N.W.	25		Heavy hail.

Rain on the ground between 8 p.m. 31st and 9 a.m. on 1st, = 2·00 in.

- 30th, 9 a.m.—Windy; lower sky of thin cloud going briskly along; far aloft are white wisps.
- 12 a.m.—Gloomy—overcast.
- 3 p.m.—No upper sky visible; all sky a mass of driving cloud; fine rain.
- 5 p.m.—Upper clouds in E. are red as sun is setting in W.
- 9 p.m.—Windy, and damp evening. Sudden rise of temperature, from 9 p.m. to 3 a.m., 39° to 47°; at 9 p.m., still 46°, Anemometer going at about 10 miles an hour all night; red sky at sunrise.
- 31st, 9 a.m.—Windy—fine rain; rain 0·150; upper and lower skies as at 9 a.m. on 30th.
- 12 a.m.—Sun at times, then wild sky; sharp showers before 1 p.m.
- 2 p.m.—Finer, flying clouds.

31st. 3 p.m.—Clouds less dense. } Wind high ; no rain ;
 6 p.m.—Temp. still 49° (45° at 9 a.m.) } wind vane blown away.
 8 p.m.—Rain now began.
 11 p.m.—Rain 0·400.

I am, Sir, your obedient servant,
 JOSEPH GLEDHILL.

*King's Cross, Halifax,
 Feb 24th, 1868.*

To the Editor of the Meteorological Magazine.

SIR,—As you like notices of excessive rainfall, I will give you some particulars of the late storm in Yorkshire :—

On the 31st, at Ripon, there was a red sunrise, and the day began with high wind and showers, and a very stormy appearance of the sky, and presently a fearful storm burst out, with torrents of rain.

The quantity collected by 9 a.m. on the 1st in my three gauges was—

12 inch, at 5 feet	5 inch gauges, 6 inches from ground.	
	(1)	(2)
1·37	1·40	1·30

The fall in the western moors must have been enormous. No wonder the floods were higher than for many years. I enclose an extract from a local paper.—Yours truly,

F. W. STOW.

Tunbridge Wells, Feb. 6th, 1868.

P.S.—I may remark that the difference between Ripon and Arncliffe would indicate nearly the amount of rain drawn down by the high Yorkshire Moors, which begin to rise a few miles to the W. of Ripon.

RIPON.

“Early on Saturday morning, owing to the heavy rain, accompanied by a violent wind from the S.W., the rivers Ure, Skell, and Laver overflowed their banks, the latter in its course doing considerable damage to the mill dam near the High Clough, and from which the water is brought which feeds three corn-mills, and supplies a portion of the city with water from the old waterworks. A large quantity of ground has been washed away opposite Bishopton Mill. The Skell, after its junction with the Laver, was higher than it has been known to be for many past years, and, in its course, did damage to the tannery of Mr. Wm. Yorke, and also to Alma Bridge. A small cottage between the North Bridge and the New Waterworks, named ‘Noah’s Ark,’ was surrounded by the river Ure, and the inmates were obliged to keep to the upper room, the lower apartments being several feet deep in water, till a boat was taken down on Saturday afternoon, when the mother and children were safely delivered from their perilous position. We have not heard of any loss of life.”

IS THE ROYAL CHARTER GALE PERIODIC ?

To the Editor of the Meteorological Magazine.

SIR,—Mr. P. H. Newnham, M.A., F.M.S., in your last impression gives *his* “Barometrical Readings” for certain dates in October, from 1826 to 1841. How Mr. Newnham obtained this data it is impossible for me to say ; but, when we compare his barometrical readings with those published in the Philosophical Transactions, date for date, for the same period, there is a terrible discrepancy—which, perhaps, Mr

Newnham can explain. The following are the barometrical readings, taken at 8 a.m. and 3 p.m., published by the Royal Society.

				A.M.		P.M.
1826.	October	25	...	29·42	...	29·40
1826.	"	23	...	29·18	...	29·25
1828.	"	23	...	29·73	...	29·82
1829.	"	27	...	30·39	...	30·32
1830.	"	28	...	29·94	...	29·88
1831.	"	26	...	29·53	...	29·57
1832.	"	13	...	29·93	...	29·98
1833.	"	15	...	29·22	...	29·12
1834.	"	25	...	30·08	...	30·13
1835.	"	26	...	29·13	...	29·12
1836.	"	29	...	29·47	...	29·70
1837.	"	25	...	29·70	...	29·84*
1838.	"	29	...	29·35	...	29·55
1839.	"	4	...	29·34	...	29·48

* Lowest reading 31st, p.m., 29·00 in.

I am, Sir, yours faithfully,

GEORGE SHEPHERD, C.E.

26, Throgmorton Street, E.C.
February 22nd, 1868.

To the Editor of the Meteorological Magazine.

SIR,—I observed Mr. Newnham's letter in the last number of the magazine, and having kept a register of the weather since 1857, I have been looking it over, and can corroborate as far as that period what Mr. Newnham observes as to the *double* periodicity in October. I observe, also, that the first of the periods is generally accompanied by heavy rain and winds from the south, while the later period is more generally with wind from the north and north west, and less or more rain. In February, also, I find a period of low barometer prevailing in the beginning of the month. The 5th is the day on which the lowest barometer has occurred here almost regularly for the last eleven years.—I am, yours faithfully,

JOHN MURRAY.

Woolpaw, Galashiels,
Feb. 22nd, 1868.

P.S.—I subjoin a note of the low barometer in February and October, in case you may like to see them.

Low Barometer in October, 1857—68. Two periods about 10th and 25th.

Height above sea, 880 feet.

	1st Period		2nd Period.	
	Bar.	Temp.	Bar.	Temp.
1857	...	28·400	...	45
1858	...	28·500	...	45
1859	28·360	...
1860	...	28·750	28·400	...
1861	...	28·400	...	34
1862	...	28·450	...	42
1863	...	28·600	27·900	...
1864	28·000	...
1865	...	28·500	28·000	...
1866	28·040	...
1867	...	28·500	28·900	...
			28·200	...

On 28th.
26th & 27th.

Low Barometer, February 5th, 1857—68.

1857	...	28·500	...	40	Wind strong.
1858	...	28·700	...	42	Wind do.
1859	...	28·300	...	37	Snow.
1860	...	28·700	...	38	Storm of snow.
1861	...	28·200	...	35	Wind.
1862	...	29·000	...	33	Sleet and rain.
1863	...	28·300	...	40	Thunder and rain.
1864	...	...	...	...	...
1865	...	28·500	...	28	Snow from S.E.
1866	...	28·300	...	38	Rain and wind.
1867	...	27·700	...	38	Heavy rain.
1868	...	27·820	...	41	Upon 1st, gale.
,,	...	28·800	...	43	Upon 5th, storm of wind and rain.

To the Editor of the Meteorological Magazine.

SIR,—Alluding to the storms current about the 25th October, I may state that in 1859, immediately after the Royal Charter gale, I sent a communication to the *Manchester Courier*, shewing that, from observations made from 1807 to 1858, a great fall of the barometer occurred in two years out of every three during this period of 52 years, the average date of the depression being the 25th October.

There seems to be some cause for great disturbances about the 25th October; and, most likely, occurring in this month, it has some connection with the fact that the monthly mean barometric pressure is lower in October than any other month in the year.—Most truly yours,

G. V. VERNON, F.R.A.S.

Old Trafford, Manchester,
Feb. 19th, 1868.

REVIEW.

Remarks on the Climate of Sidmouth, with Tables giving the results of Meteorological Observations. By J. INGLEBY MACKENZIE, M.B. Cantab., F.M.S. London: Churchill. 32 pp. 8vo.

WITH one exception to be presently noticed, this is a very impartially written treatise on the climate of a health resort well worthy of notice, situate in one of those sunny southern valleys where winter is often a name, and a name alone. A horse-shoe valley, somewhat sheltered from north, east, and west, by hills of 400 or 500 feet in height, we should have thought north-easters would have found it harder to find an entrance than seems to be the case. In fact, looking to the humidity of Sidmouth recorded by Dr. Mackenzie—viz., 83°·0—we are inclined to think that some of the winds recorded as E. and N.E. are deflected into that course by the set of the valley, and are not really possessed of the disagreeable attributes of genuine easterly winds.

Concerning temperature we scarcely know what to say, for we believe the different modes of placing thermometers, of reducing the observations, the slope, aspect, size of the garden wherein they are

made—nay, even the state of vegetation and the proximity of trees or houses—separately and collectively produce greater differences in the results than exists between the true characteristics of watering places many miles apart.

We are extremely glad to see that Dr. Mackenzie has set the excellent example of stating the kind of stand on which his thermometers are hung, and their distance from walls in each direction; for this capital idea alone we should welcome his brochure, and hold all writers bound to follow in his steps; but in the absence of similar information from other stations, and until we know the effect of the various conditions, we cannot draw accurate conclusions from temperature tables. But setting aside these considerations, we have a bone to pick with the Doctor anent the following table; the first two columns are reprinted exactly from his pamphlet, the subsequent columns we have added, to show what different results may be obtained.

Temperature at Sidmouth.

Year.	Greenwich M. T.	Sidmouth M. T.	Diff.	Greenwich M. T. 1814-63.	Sidmouth M. T. 1856-61, 63.	Diff.	Greenwich M. T. 1856-61, 63.	Sidmouth M. T. 1856-61, 63.	Diff.
Jan. ...	35.7	41.5	+5.8	36.9	41.5	+4.6	38.5	41.5	+3.0
Feb. ...	38.2	40.6	+2.4	38.7	40.6	+1.9	39.8	40.6	+ .8
March.	40.9	44.0	+3.1	41.6	44.0	+2.4	42.4	44.0	+1.6
April..	45.7	46.4	+ .7	46.2	46.4	+ .2	45.9	46.4	+ .5
May ...	52.6	52.2	- .4	52.9	52.2	- .7	52.3	52.2	- .1
June...	58.0	57.8	- .2	59.1	57.8	-1.3	59.8	57.8	-2.0
July ...	61.3	60.6	- .7	61.8	60.6	-1.2	62.0	60.6	-1.4
Aug...	60.5	61.5	+1.0	61.2	61.5	+ .3	62.5	61.5	-1.0
Sept...	56.3	56.9	+ .6	56.6	56.9	+ .3	56.6	56.9	+ .3
Oct. ...	49.3	53.3	+4.0	50.2	50.3	+3.1	51.9	53.3	+1.4
Nov ...	42.4	45.4	+3.0	43.0	45.4	+2.4	42.2	45.4	+3.2
Dec....	38.8	43.6	+4.8	39.8	43.6	+3.8	40.5	43.6	+3.1
Means.	48.3	50.3	+2.0	49.0	50.3	+ 1.3	49.5	50.3	+ .8
Sums..	...	...	+25.4 - 1.3	...	...	+19.0 - 3.2	...	...	+13.9 - 4.5

We do not know the source whence Dr. Mackenzie obtained the first column in the above table, but taking (as we must) Mr. Glaisher's determination of the mean temperature at Greenwich of every day for fifty years as the standard for that place, we find the true temperature is higher than that given by Dr. Mackenzie in every month, and in the winter months it is 1° higher. It may be thought unfair to compare seven years with fifty, we have therefore tabulated the mean temperature of the same 84 months at Greenwich and Sidmouth, the result being still more different from the Greenwich mean temperature in the work before us. This will be rendered very obvious, by noticing the relation between the temperatures of January and July, the latter being taken as 100. January (according to the table quoted by Dr.

Mackenzie) is 58 at Greenwich, and 69 at Sidmouth; but the 50 years give January = 60, and the seven identical years give Greenwich = 62, and Sidmouth = 69, a difference of 7 instead of 11.

Take, again, the rainfall. On page 16, the rainfall of the three years, 1864-1866, is correctly given as 23·55, 37·88, and 37·63. The mean of these is 33·02; and those years being about 5 per cent. below the mean, the true fall is about 35 inches. Yet, on pages 26 and 32 the mean rainfall at Sidmouth is given at 27·9. How this value has been arrived at, we are curious to know. A table, stated to be quoted from a pamphlet on the "Climate of Torquay," by E. Vivian, Esq., is given on page 32, which is frightfully incorrect—for instance, the annual rainfall is given for—

Torquay as 28·9 in. instead of 42 in.	Oxford as 25·5 in. instead of 25 in.
Exeter ,, 27·3 ,, ,, ,, 33 ,,	Ventnor 27·7 ,, ,, 30 ,,
Clifton ,, 29·3 ,, ,, ,, 33 ,,	Greenwich 22·2 ,, ,, 24 ,,

but, of course, for these errors (the authority being given) Dr. Mackenzie is not responsible.

After thus severely criticizing this pamphlet, we fear our readers may conclude that it is an untrustworthy guide. We believe that the reverse is the case—that it is far superior to many similar treatises—that it justly advocates the claims of the driest of the Devonshire watering-places; but we wish to see great improvements in similar publications in future, and we know not how this is to be obtained without severe criticism.

RAINFALL AT SIERRA LEONE.

Rainfall each month at Military Hospital, Freetown, Sierra Leone, from 1847 to 1851.

Months.	1847.	1848.	1849.	1850.	1851.
January.....	No ob- serva- tions.	0·50	2·30	...	...
February .....		...	1·57	...	...
March	2·92	0·02	...	1·36	1·20
April	5·59	3·36	1·99	6·56	5·03
May	13·21	11·55	10·18	8·92	5·67
June	6·91	10·73	13·31	10·93	16·44
July	18·74	26·18	30·39	42·54	15·05
August	18·17	22·46	37·35	29·33	21·33
September.....	14·35	42·40	30·26	35·66	19·36
October.....	4·22	10·02	9·15	19·09	9·82
November.....	8·83	8·17	5·28	5·74	4·99
December		2·41	1·36	0·17	0·27
Totals	87·94	137·80	143·14	160·30	99·16

There was no observation in January, 1847; during February and March there was no rain.

The observations were made with a tin funnel about eight inches in diameter (but this was carefully determined, though the record has

been mislaid); the receiver was a two gallon earthenware jar, with a narrow neck. The water was measured every morning at 9 a.m. by a pint measure, and for smaller quantities by a half pint graduated glass measure. The capacity of them was determined by ascertaining the weight of the water they contained, and their relative value in depth to the area of the funnel calculated.

The surface of the funnel was about two feet above the ground, quite open to the rain bearing winds, and with no bush or tree in the neighbourhood.

The same instruments were employed during the whole period, and the gauge remained in the same position. The hospital was about half a mile from the river and about 250 ft. above its level.

Rainfall at Sierra Leone in 1828.

Day.	June.	July.	August.	Day.	June.	July.	August.
1	Quantity not ascertained.	4.35	4.25	18	3.00	6.10	...
2		3.00	4.25	19	3.10	2.00	3.15
3		3.25	4.25	20	3.75	2.25	4.00
4		4.00	4.10	21	2.10	..	5.10
5		5.00	4.00	22	2.25	4.25	10.00
6		1.25	...	23	3.10	2.00	16.00
7		4.00	2.15	24	4.25	3.25	8.10
8		1.10	4.25	25	2.25	6.25	2.15
9		2.10	6.00	26	3.25	1.10	3.10
10		2.00	14.10	27	4.00	2.00	1.10
11		4.40	10.50	28	4.25	3.00	1.10
12		1.10	4.00	29	3.25	2.25	1.00
13		3.00	4.25	30	3.00	3.00	2.10
14		2.10	5.10	31	...	3.00	6.00
15		1.10	9.50				
16		3.00	1.00				
17		3.10	1.25	7.00	Total ...	64.55	125.25	123.7

This table is taken from the Statistical Reports on Sickness and Mortality of Troops in Western Africa, p. 4, from 1817 to 1836.

Another table, from same Report, p. 5, for 1819, is as follows :—

July	...	...	...	...	45.47
August	...	...	...	...	46.07
September	...	...	...	...	29.70
October	...	...	...	...	10.73
November	...	...	...	...	5.60
December	..	...	...	...	6.94
Total	...	...	...	...	144.54

[In the second of the above tables, the position of the decimal point has surely been mistaken. The mean of the other returns for June is 13 in. ; July and August about 27 in. each month ; and for the three months 67 in., with which 31.4 will agree far better than 314 in. —though in either case the discrepancy is very wide.—ED.]

POSITIONS OF GAUGES,
WHENCE MONTHLY RETURNS ARE PUBLISHED.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs]	RAIN GAUGE.			Latitude.	Longitude.
		Diameter.	Above Ground.	Above Sea Level.		
		in.	ft. in.	feet.		
I.	Camden Town	8	0 4	100	51°33' N	0° 8' W
II.	Staplehurst (Linton Park)..	8	0 6	296	51 13 N	0 31 E
„	Selborne (The Wakes)	6	4 0	400	51 6 N	0 56 W
III.	Hitchen	9	1 6	240	51 57 N	0 17 W
„	Banbury	6	7 0	350	52 4 N	1 20 W
IV.	Bury St. Edmunds (Culford)	5	1 2	...	52 17 N	0 42 E
V.	Bridport	8	0 8	80	50 43 N	2 45 W
„	Barnstaple	8	0 6	31	51 4 N	4 4 W
„	Bodmin	8	2 6	325	50 28 N	4 45 W
VI.	Cirencester	10	1 2	446	51 43 N	1 58 W
„	Shiffnal	4	3 6	450 ?	52 40 N	2 22 W
„	Tenbury (Orleton)... ..	5	0 9	200 ?	52 18 N	2 27 W
VII.	Leicester (Wigston)	8	0 6	220 ?	52 35 N	1 6 W
„	Boston	5	1 0	20	52 59 N	0 3 W
„	Gainsborough	12	0 8	30	53 24 N	0 47 W
„	Derby	5	5 0	180	52 55 N	1 28 W
VIII.	Manchester	8	2 7	106	53 28 N	2 17 W
IX.	York	5	0 6	50	53 58 N	1 5 W
„	Skipton (Arncliffe)	8	3 0	750	54 9 N	2 6 W
X.	North Shields	8	1 0	124	55 0 N	1 26 W
„	Borrowdale (Seathwaite) ...	5	1 0	422	54 30 N	3 12 W
XI.	Cardiff	5	1 1	20	51 28 N	3 11 W
„	Haverfordwest	5	2 0	60	51 48 N	4 55 W
„	Rhayader (Cefnfaes)	5	2 0	880	52 18 N	3 32 W
„	Llandudno	8	0 6	99	53 20 N	3 50 W
XII.	Dumfries	5	0 5	70	55 5 N	3 36 W
„	Hawick (Silverbut Hall) ...	5	4 0	512	55 26 N	2 46 W
XIV.	Ayr (Auchendrane House)..	8	2 3	94	55 27 N	4 37 W
XV.	Castle Toward	5	4 0	65	55 52 N	4 57 W
XVI.	Leven (Nookton)	5	0 6	80	56 12 N	3 0 W
„	Stirling (Deanston)	6	0 0	130	56 11 N	4 4 W
„	Logierait	5	1 0	250	56 38 N	3 41 W
XVII.	Ballater	5	0 10	656	57 4 N	3 5 W
„	Aberdeen	5	4 8	115	57 9 N	2 6 W
XVIII.	Inverness (Culloden).....	..	3 0	104	57 30 N	4 7 W
„	Fort William	5	0 8	20	56 47 N	5 7 W
„	Portree	3	0 4	60	57 24 N	6 13 W
„	Loch Broom	5	0 8	48	57 47 N	5 5 W
XIX.	Helmsdale	5	1 0	34	58 7 N	3 38 W
„	Sandwick	11	2 0	78	59 3 N	3 17 W
XX.	Cork	10	6 0	65	51 54 N	8 30 W
„	Waterford .....	..	4 0	60	52 16 N	7 6 W
„	Killaloe	10	5 0	128	52 48 N	8 26 W
XXI.	Portarlington	5	1 2	236	53 10 N	7 10 W
„	Monkstown	10	0 6	100	53 17 N	6 8 W
XXII.	Galway	10	6 0	25	53 17 N	9 3 W
„	Bunninadden (Doo Castle).	5	1 0	...	54 3 N	8 38 W
XXIII.	Bawnboy (Owendoon)	5	1 3	218 ?	54 6 N	7 44 W
„	Waringstown	8	0 4	191	54 26 N	6 18 W
„	Strabane (Leckpatrick).....	8	0 5	260	54 53 N	7 26 W

FEBRUARY, 1868.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL.					Days on which in or more fell.	TEMPERATURE.				No. of nights below 32°.
		Total Fall.	Difference from average 1860-5		Greatest Fall in 24 hours.			Max.		Min.		
			inches.	inches.	in.	Dpth		Date.	Deg.	Date.	Deg.		Date.
I.	Camden Town	1·21	—	·01	·50	29	10	62·5	25	26·6	9	6
II.	Staplehurst (Linton Park) ...	1·35	+	·16	·47	29	12	61·0	25	26·0	9	8
III.	Selborne (The Wakes).....	2·19	+	·48	1·23	29	12	58·5	25	27·0	9	6
III.	Hitchin.....	1·49	+	·23	·70	29	11	58·0	25	26·0	8	6
IV.	Banbury	2·13	+	·70	·95	29	15	58·5	25	26·0	9	11
IV.	Bury St. Edmunds (Culford).	1·65	+	·23	·43	2, 29	10	58·0	25	24·0	8	4
V.	Bridport	1·91	—	·15	·84	29	11	60·0	25	24·5	16	8
"	Barnstaple	2·23	+	·15	·41	29	18	...	...	...	...	...
"	Bodmin	2·37	—	·42	·59	23	23	53·0	28	30·0	16	1
VI.	Cirencester	2·03	+	·42	1·02	29	...	47·0	29	31·0	9	1
"	Shifnall	2·17	+	1·28	·40	29	14	58·0	25	24·0	9	8
"	Tenbury (Orleton)	2·21	+	·64	·56	29	22	60·5	25	24·5	9	8
VII.	Leicester (Wigston)	1·64	+	·30	·64	29	...	59·5	25	24·0	8	4
"	Boston	1·40	+	·19	·35	29	13	60·0	25	27·5	9	2
"	Gainsborough	1·42	+	·35	·49	29	10	63·0	25	25·0	8	9
"	Derby.....	2·58	+	·70	·90	29	17	62·0	25+	26·0	9	5
VIII.	Manchester	2·11	+	·16	·28	2	18	60·2	25	25·8	9	7
IX.	York	·96	—	·42	·23	7	13	55·0	25	26·0	9	4
"	Skipton (Arncliffe)	4·82	+	1·15	·78	20	16	...	...	...	...	...
X.	North Shields	1·82	+	·29	·62	18	13	56·0	25	28·0	9	3
"	Borrowdale (Seathwaite).....	...	...	...	...	...	...	...	...	...	...	...
XI.	Cardiff (Town Hall).....	5·69	...	...	1·21	10	18	...	...	...	...	...
"	Haverfordwest	2·22	—	·64	·45	2	13	53·0	23+	25·7	11	5
"	Rhayader (Cefnfaes).....	3·10	+	·12	·50	14	19	55·0	...	23·0	...	...
"	Llandudno.....	3·01	+	1·79	·76	18	14	54·2	24	32·2	9	...
XII.	Dumfries	4·37	+	1·82	·71	18	24	58·5	25	27·5	9	3
"	Hawick (Silverbut Hall) ...	3·48	...	...	·40	18	20	...	...	...	...	10
XIV.	Ayr (Auchendrane House) ...	5·99	+	2·64	·76	20	25	60·0	24+	27·0	9	3
XV.	Castle Toward	6·03	+	2·29	·94	9	25	55·0	24+	24·0	9	4
XVI.	Leven (Nookton)	2·28	+	·58	·33	1	18	57·0	25	27·0	9	5
"	Stirling (Deanston)	5·37	+	2·37	·78	20	26	59·0	13	25·5	5	8
"	Logierait	4·03	...	...	·59	3	19	...	...	...	...	...
XVII.	Ballater	2·26	...	...	·50	27	16	57·5	25	25·0	9	9
"	Aberdeen	1·70	...	...	·84	27	17	59·2	26	25·6	9	5
XVIII.	Inverness (Culloden)	3·88	...	...	·82	28	15	59·0	26	31·4	4	2
"	Fort William	20·13	...	...	1·84	20	29	...	...	...	...	...
"	Portree	20·17	+	9·94	2·30	20	25	51·0	15	30·0	10	3
"	Loch Broom	12·72	...	...	1·21	20*	29	...	...	...	...	...
XIX.	Helmsdale	5·04	...	...	·51	4	22	...	...	...	...	...
"	Sandwick	5·81	+	3·33	·65	9	27	50·0	14+	27·6	9	3
XX.	Cork	2·16	...	...	·59	19	14	...	...	...	...	...
"	Waterford	2·81	+	·78	·51	20	21	60·0	24	30·0	9	1
"	Killaloe	4·41	+	1·50	·64	18	21	57·0	26	27·0	16	4
XXI.	Portarlington	2·27	+	·24	·65	19	21	51·5	25	30·0	9	6
"	Monkstown	1·57	—	·06	·54	18	15	58·3	25	29·0	9	1
XXII.	Galway	5·25	...	...	·99	27	25	56·0	19	31·0	11	1
"	Bunninadden (Doo Castle) ...	3·69	...	...	·71	27	20	54·0	25	27·0	10	2
X XIII	Bawnboy (Owendoon)	3·81	...	...	·53	20	24	54·5	25	29·0	3, 8	4
"	Waringstown	2·49	...	...	·61	18	20	57·0	25	29·0	8	8
"	Strabane (Leckpatrick)	3·31	...	...	·38	20	23	59·0	25	29·0	8, 9	12

* And 23rd. †And 26th. ‡And 24th.

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

METEOROLOGICAL NOTES ON THE MONTH.

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

ENGLAND.

STAPLEHURST.—A remarkably mild dry month. Wind mostly W. and S.W. Half the R. of the month fell on the first and last days; high wind on 1st; bar. generally high, but often unsteady.

SELBORNE.—Wind tempestuous all day from W.S.W. on 1st, and continued high during the 2nd and 3rd; a few flakes of S on the 8th; bar. rose six-tenths in 24 hours on 20th, and five-tenths during the night of the 22nd. Violent R from 10 a.m. to 8 p.m. on 29th, with high wind from S.W. to S.E. On the whole a fine dry month. More R fell in 10 hours on the last day than in the whole of the month previous.

BANBURY.—Very high wind on 1st; walls and trees blown down; slight H and S on the 8th; fog on 18th; wind on 20th, 22nd, and 28th; continuous R on the 29th.

CULFORD.—A tremendous gale on 1st, and on several occasions high winds prevailed, but the month on the whole has been remarkably mild, and on the 28th the weather was quite summer like. Bees at work on the crocuses, &c., by thousands.

BRIDPORT.—North-westerly gale on 19th; from 9th to 17th bar. stood very high, being 30·65 on 10th, 11th, 12th, and 16th; 79 in. of R fell between 9 a.m. and 5 p.m. on 29th, with a gale from S.W.

BODMIN.—Heavy westerly gale on 1st; one from W.S.W. on 2nd; on 19th heavy gale, first from W.S.W., and then from N.W. This month has been remarkable for its high temp. and high bar. The gale of the 19th, so disastrous in many parts of England, was not severely felt here.

CIRENCESTER.—This may be considered a dry month, and very good for agriculture, as, excepting the 2nd and 29th, the R was very trifling, and appeared due to the fitful motion of the wind from S.W. to N., and the change of temp. thereby occasioned. The great rains of the 2nd and 29th were clearly due to the Atlantic. Sulphur butterfly on 21st; violets gathered at the end of the month; the deep hill well sank from 38 ft. to 21 ft. 5 in.; the gravel well only sank 9 in.

SHIFNALL.—Heavy storm of wind for 18 hours on the 1st; snowdrops up on 9th, and open on 12th; crocuses began to flower on 24th, on which and following day the temp. was unusually mild; throstle singing at times during the whole month.

ORLETON.—Generally fine and pleasant, but changeable, with frequent falls of R and high winds. Temp. about 3°·5 above the average. Violent gales on 1st and 22nd, also on 5th, 19th and 20th; the last week very fine, warm and pleasant.

WIGSTON.—An extraordinary high wind on the 1st, amounting to a hurricane, did much damage; an unusually fine month, temp. being 4° or 5° above that of many years past; vegetation forward.

BOSTON.—Severe gale on 1st, chiefly from W.S.W.; gales also on 20th, 22nd, and 29th; lunar halo on 6th; temp. high; vegetation forward; elm in bud on 16th; lime and sycamore on 17th; oak, hawthorn and horse chesnuts on 24th; during the last week rose bushes were in leaf, and gooseberry trees almost so. Ozone moderately developed; bar. very unsteady during the month; it was 30·506 (corrected) on the 11th, and 29·025 on 1st.

GAINSBOROUGH.—Slight S on 3rd and 8th; the first few days were unsettled, then fine till the 29th, when continuous R fell from 1 p.m. to 5.30 p.m.

DERBY.—A remarkable month, as unlike "fill dyke February" of our experience as can well be imagined; warm, genial, and sunny, forcing vegetation alarmingly forward, fruit trees being as advanced as we usually find them in the middle of May.

MANCHESTER.—H, R, and storm on 1st; temp. greatly in excess, the last week having been 7° above that of the last 19 years.

ARNCLIFFE.—A dull, rainy month, but weather open.

NORTH SHIELDS.—Lunar halos on 3rd, 6th, 8th, and 10th; aurora on 10th.

Blue hepatica in flower on 1st, also the dark red primrose, drab auricula, and snowdrop in flower on 7th, small blue periwinkle in flower on 19th, yellow crocus and yellow aconite on 21st, and many others by the end of the month.

W A L E S.

CEFNFAES.—Temp. mild, though the wind was chiefly N.W., and occasionally strong and very boisterous.

LLANDUDNO.—Bar. high during the month; max. on 11th, 30·554; min. on 1st, 28·972. The weather was beautiful and mild during the last week.

HAVERFORDWEST.—The terrific gale of the last of January was continued till the evening of the 1st of February. The month was on the whole mild and damp; winds chiefly north-westerly; a violent gale from that direction on the 19th, doing much damage, and not wholly abating till the evening of the 22nd.

S C O T L A N D.

DUMFRIES.—This month has been wet and stormy, only five days on which no R or S was measured; both tem. and R above the average—the weather mild; and, at the close of the month, the fruit-trees beginning to burst their blossom; the whinn in bloom.

HAWICK.—S flakes prodigiously large on the 1st. The whole month has been remarkably free from frost; lunar halo on 8th; hurricane from the west on 19th and 27th; beautiful rainbow on the morning of the 23rd; gardening and husbandry in a forward state.

AUCHENDRANE.—A warm, wet, and stormy month, with great oscillation of bar. and ther. Abnormally large rainfall, and number of rainy days, and some severe equatorial tempests; no ice during the month, and the S and H quite trifling, and not measureable.

CASTLE TOWARD.—Stiff gale on 1st. The first eight days were rather stormy; but, since that time, it has been too mild for so early a part of the year. Apricots and jargonell pears are almost in flower; the spring garden has been quite gay with ericas, hepaticas, primulas, crocuses, snowdrops, &c., while in the American garden the rhododendrons and laurustinas have been finely in flower; gooseberries and fuschias getting green; clay soil too wet for working.

NOOKTON.—The high winds of last month continued through this, with intervals of days only; tem. mild for the time of year.

LOGIERAIT.—Very boisterous month; heavy gales, with much R.

BALLATER.—A month of very changeable weather, with frequent strong winds from the west; the temp. being mild, any S that fell was soon melted, so that out door work was but little interrupted.

ABERDEEN.—Rainfall below the average; temp. nearly 5° above it; winds more frequently from W. and N.W. than usual, and rather boisterous. L on 1st, 3rd, 19th, and 20th.

ROSSE PARSONAGE, FORT WILLIAM.—It was recorded last month that the unprecedented amount of 18·69 in. of R was registered. That amount is no longer unprecedented; for it rained every day in February, and the amount registered was no less than 20·13 in. In January, upwards of 2 in. fell on four different days; in February, there was no day on which 2 in. fell, but there were seven on which more than 1 in. fell. For wetness and wildness, nothing has been known like this winter. From the 10th of January (with the exception of the 21st and 22nd of that month) R fell on every day to the end of February, and the month ended with S; violent S.W. winds prevailed during the early part of the month, and occasionally afterwards.

PORTREE.—The stormiest February on record, gales and heavy R nearly every day; more than 1 in. fell on six days, and more than 2 in. on the 20th.

LOCHBROOM.—We have not had one fine day this month, and only two since the 9th of January, viz., 21st and 22nd. This month has far exceeded in the amount of R any since I have recorded; and, for the constant severity of its storms, and the ever varying "airs" of the wind, it will long be remembered.

SANDWICK.—This has been the wettest and most stormy February on record—indeed, it was such a succession of storms as I do not remember, while the temp. was 2·26 above the mean, perhaps one may be considered the cause of the other. On the 2nd there were S rollers again all over the parish. I saw thousands of them on my way home from church. The circumstances formerly mentioned

as essential to their formation were all present. There had been a gale of S the previous evening. On the morning of the 2nd, S flakes fell softly for some time, balling under my horse's feet, showing that the temp. was about 32°. The largest roller on my lawn measured 13 in. long, and 11 in. diameter. Auroræ on 20th and 29th; lunar halo at 8 p.m. on 6th; TS on 4th; and L on 15th.

I R E L A N D.

KILLALOE.—A most violent storm on 18th, increasing towards night, with furious gusts of wind; indeed the whole month was remarkable for the frequency and violence of its storms.

MONKSTOWN.—Cold at the commencement, but warm at the end. The whole month almost a succession of gales. On the 1st the most fearful storm we have had for some time; it commenced at 5 p.m. on 31st of January, and continued till 3 p.m. on 1st February. Bar. fell to 29·034; on 19th, at 12.15 a.m., a sudden hurricane burst forth, with H and R, which almost threatened to break the windows; at first it seemed to be on every side, but afterwards blew from N.W.

DOO CASTLE.—Fierce gales on 1st and 21st. Open month; spring work much advanced; continued breezes during the month; T on 22nd.

OWENDOON.—On the whole the month has been very mild, and the buds and other indications of spring are very forward.

WARINGSTOWN.—A succession of gales, all (with the exception of one on the 3rd from N.N.W.) being from S.W.; the wind blew from W. or its compounds on every day but one (the 8th, N.E.), and there were only five on which it had any N. in it.

LECKPATRICK.—The month began with the greatest storm for many years. The bar. had been falling rapidly during the previous day and night; at 9 a.m. on 1st it was at 28·672 (corrected), but had probably been lower, as from that point it rose rapidly; much damage done to houses; several large trees, stacks, and a garden wall blown down. The whole month very stormy, and the weather very unsettled, but the season has been favourable for ploughing and other farm operations.

RAINFALL IN NORWAY.

To the Editor of the Meteorological Magazine.

SIR,—I have just received from Ex-Consul J. H. Beer, his account of the rainfall in 1867 at Oje, near Flekkefiord (lat., 58° 5' N.; lon., 6°50' E.). The gauge is 12 Norse inches square; it is 8 ft. above the ground, and 15 ft. above the sea, from which it is only 300 yards distant.

The monthly amounts, converted into English measures, are as follows:

January	1·11	July	3·86
February	4·31	August	3·18
March	2·89	September	7·12
April	3·73	October	5·04
May	1·52	November	2·57
June	1·77	December	4·60

The following is a translation of the remarks appended to the register:—

May 21st.—At 5.30 p.m. a thunderstorm, with lightning and snow—afterwards for an hour and a half bright. The sun shone on the snow-covered mountains in the east; the evening, was like a fine winter one.*

Nov. 8th to 14th.—Very fine, like summer weather.

The rainfall for the year was below the average, and the snow likewise. Total fall, 41·70 in. (English).—Your truly,

C. O. F. CATOR.

Beckenham.

* Simultaneous with the English snow-storm referred to on pp. 58–60 of *British Rainfall, 1867.*—Ed.