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THE MEASUREMENT OF SNOW.

THE frequency of snow showers during the past month, has again called into prominence the best method of measuring it. In *British Rainfall*, 1864, page 12, the following rules were given :—

“ In snow, three methods may be adopted ; it is well to try them all. (1) Melt what is caught in the funnel, and measure that as rain. (2.) Select a place where the snow has not drifted, invert the funnel and turning it round, lift and melt what is enclosed. (3) Measure with a rule the average depth of snow, and take a twelfth as the equivalent of water. (Comparative observations of this class will be very acceptable.)”

In the *Rainfall Circular*, for March, 1865, reprinted on page vii. of the Appendix to *British Rainfall*, 1865, Mr. Harrison, of Weybridge Heath, asked for the results of any direct experiments in confirmation, or otherwise, of the third rule given above. All the observations available were, therefore, thrown into a table. With one exceptional case of 35 inches, almost every equivalent was obtained from 25 to 1, down to 5 to 1, the mean result being 14 inches of snow = 1 inch of rain, the conclusion adopted being that less than 12 to 1 should not be taken. Subsequently several communications were received, suggesting that 12 to 1 was too high, but not containing observations in support thereof. Adverting to these and other remarks, the following suggestions were offered :—

“ A second point is, to take the snow fairly *as it falls*, not to fill a vessel with the snow ; obviously by so doing the snow is rendered more dense. The proper plan, I presume, is—previous to snow, lay down a piece of tin or board in an open place ; after the fall, measure its vertical depth in two or three parts of the board ; then invert the funnel of the rain gauge on the board, taking care to hold it horizontal, press it down firmly till it touches the board, brush away the snow from the rest of the board, turn over funnel and board together, and, leaving the funnel covered by the board, place the funnel in its bottle, or other similar receptacle, and in a moderately warm room.”

Some additional observations from different parts of the country in 1865 gave a mean 11·5 inches of snow equals 1 of rain. The following letters also seem to indicate about the same value :—

SIR,—I am fairly snowed up here, with an average of about 12½ in. deep of snow, so have amused myself by comparing the depth of snow with the rainfall. As the results may be interesting, I send them to you, leaving it to you to make any use of them you please. First as to the gauges—

Casella's 5 in., after the snow in it was melted, measured 155 inch.

Glashier's 8 inch ditto..... 32 ..

The average depth of snow round the gauge, I calculate would

make the fall 97 ..

From the above I expect you will get some rather serious discrepancies in the

January rainfall. Next as to the depth of snow compared with the rain. On this five experiments were carefully made, the snow taken from different places—

11½ inches of snow gave	.97 of rain.
12 " "	1.12 "
7½ " "	.78 "
7½ " "	.71 "
10 " "	1.17 "

These vary for 100 inches of snow from 8.25 to 11.7 of rain. The mean of the five experiments, 9.74 per cent.—I am, dear Sir, yours truly,

Pyports, Cobham, Surrey,

GEO. DINES.

January 2nd, 1867.

P.S. Since writing the above, I have tried 8 other pieces of snow, equal to 68 inches deep. This gave 5.82 inches, or 8.55 inches of water for 100 inches of snow, so that altogether 1 of rain for 11 of snow appears to be about the average.

SIR,—The phenomena of to-day have suggested to me some observations as to the measurement of snow, referred to in your *British Rainfall* 1865.

In the important snowfall we had on 10th January, 1866, I have registered the amount ascertained by actual liquefaction, which I quite see is subject to error, not only from the possibility of the funnel not retaining the whole of the snow, but also from evaporation during liquefaction. Still I cannot feel satisfied with the equivalents suggested, viz. "1 to 12," or "1 to 5.4;" neither can I quite agree with you in your remark that in ascertaining the quantity of rain by measurement of depth of snowfall, "the ratio depends entirely on the density." An illustration of this has occurred to-day; I have on two or three occasions this day measured the depth of snow immediately adjacent to three selected spots. The diminution of depth I hardly think can be accounted for either by evaporation, increased density, or superincumbent pressure, or by these forces combined.

Notwithstanding that the thermometer has continued considerably below freezing point ever since the snow fell, and that the ground was hard when it commenced falling, yet, at the bottom of the snow, the surface of the earth is now soft from the radiation of caloric from a greater depth, and *moist*. Whence does this moisture arise? I infer that it is occasioned from the gradual liquefaction of the *under* surface of the snow, which from being incalculable must necessarily derange estimates formed by measurement of snowfall.—I am, dear Sir, yours truly,

WALTER F. MOATES.

The Pines, Epsom, 2nd January, 1867.

SIR,—In order to ascertain how much water a given quantity of snow yielded, when melted, I made six experiments. I filled a cubic inch measure (made of brass, and which contains one cubic inch of distilled water at 60°) with *newly-fallen snow*, and allowed it to melt at the temperature of the room, 57°. The result of *five* of these trials was, that 1 cub. in of snow = $\frac{1}{1\frac{1}{2}}$ of water, the sixth trial gave 1 cub. in snow = $\frac{1}{2}$ of water. The result of five experiments, therefore, corroborates your rule given, page vii. *Rainfall Circular*. In these experiments the snow was taken from a different place for every experiment, and carefully put into the measure.—I am, truly yours,

JAMES PROCTOR.

Barry Village, Forfar, N.B., 26th January, 1867.

The results are therefore—

Table published in 1865.....	14	inches of snow = 1 of rain.
Observations made in 1866 ...	11½	" " = 1 "
" " 1867 ...	11½	" " = 1 "
Mean	12.33	" " = 1 "

These values, however, agree *too well*; for instance, the snow which fell on January 10th and 11th, 1866, was so dense that 4 inches of it gave 1 inch of rain. (*Approximately*, we have no really good determination.) A few such observations would, of course, materially alter the equivalent,

It is hardly the time of year to ask for additional determinations of the relative yield of freshly fallen snow, but we trust observers will remember when winter returns that there is very much to be done in the matter.

THE ECLIPSE ON MARCH 6TH, 1867.

ALTHOUGH the late eclipse was not in England of great magnitude, it was sufficiently so to be worthy of notice. As a preliminary we may quote the depression of temperature on some former occasions.

Year	Date.	Place.	Shade.	Black Bulb.	Year	Date.	Place.	Shade.	Black Bulb.
1764	April 1 ...	London	1°0	...	1860	July 18..	London ...	7°0	30°
1816	Nov. 19 ...	"	1°0	...	"	" "	Oundle ...	6°0	...
1820	Sept. 7 ...	"	6°0	...	"	" "	Dorset ...	3°0	22
1836	May 15 ...	Cambridge ...	2°5	29°	"	" "	Silloth	2°8	10
1842	July 8 ...	Gloucester ...	3°0	...	1863	May 17..	London ...	1°0	7
"	" "	London	1°5	...	1867	March 6.	"	1°5	13
1858	March 15.	"	5°0	...	"	" "	Leicester...	1°0	...
"	" "	Oundle	4°0	12	"	" "	Liverpool..	1°0	17

It would be very interesting to examine the many existing records (of which the above are not a hundredth), and by collating them, eliminating as far as possible fluctuations not due to the eclipses, but to ordinary atmospheric changes, and moreover in every instance allowing for diurnal range of temperature, and then classifying the records according to the number of solar digits eclipsed. Thus the existing materials might be made to tell their own tale, and one, if we mistake not, of high interest to all.

Explanatory of the following table, we may mention that the 20 ft. thermometers are in an ordinary stand, elevated on a pole 20 ft. high.

Thermometrical Readings at Camden Town, March 6th, 1867.

Eclipse began, 8.17 ; middle, 9.32 ; ended, 10.52. Magnitude (Sun, =1.0.), 0.7.

TIME.	4 feet.				20 feet.		4 feet.	20 feet.
	In Shade.		In Sun.		In Shade.		Humi-	Humi-
	Dry Bulb.	Wet Bulb.	Black Glass Bulb	Black Bulb in vacuo.	Dry Bulb.	Wet Bulb.	dity.	dity.
A.M.	in.	in.	in.	in.	in.	in.		
8.0	35.0	32.8	...	...	34.8	32.4	79	77
8.15	35.4	33.4	37.0	39.0	35.4	33.2	81	79
8.30	36.1	34.1	37.8	40.2	35.8	33.5	82	79
8.45	36.8	34.7	38.2	43.5	36.4	34.1	83	80
9.0	36.5	34.5	37.3	40.6	36.3	34.0	83	80
9.15	36.3	34.6	37.0	39.4	36.0	34.0	85	82
9.30	36.2	34.5	37.0	37.7	36.0	34.0	85	82
9.45	36.3	34.6	37.0	38.0	36.0	34.0	85	82
10.0	36.5	34.7	37.1	38.4	36.2	34.2	85	83
10.15	36.8	35.0	37.8	39.5	36.4	34.3	85	82
10.30	37.0	35.2	38.0	40.3	36.5	34.6	85	84
10.45	37.1	35.4	38.0	41.0	36.5	34.7	86	85
11.0	38.6	36.8	40.8	55.4	37.5	35.6	86	84

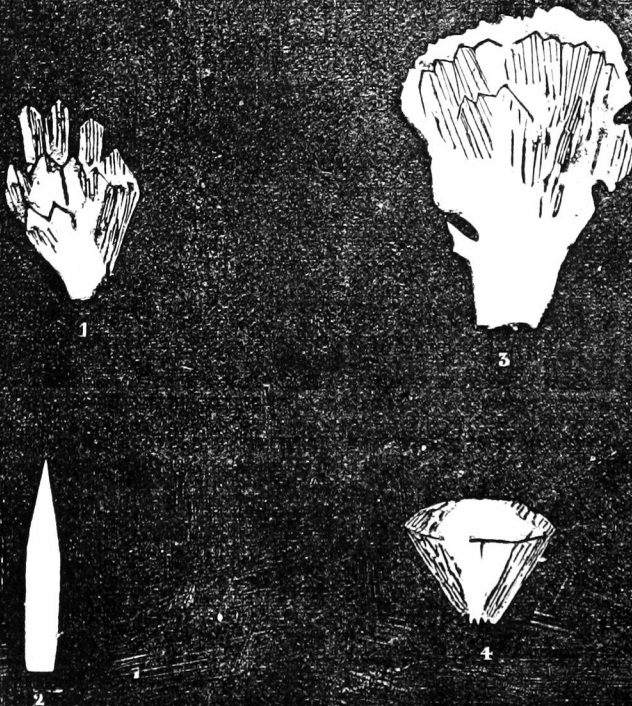
10.16 began to snow. 11.0 sun and snow.

PERIODIC (?) HAIL-BALLS ON MARCH 8TH.

Snow and hail have been so strongly the predominant feature of this month, that the query must remain attached to the above heading for another year. Although in London we had several showers of the soft hail-balls previously referred to*, they were diminutive specimens, very slightly larger than ordinary sleet. The largest that we saw were less than a quarter of an inch in diameter. Although, therefore, they were of the same form as in previous years, and fell on the same day, they fell also on other days, and were in no respect remarkable.

For the convenience of future recognition, we give engravings of the balls which fell in 1857, from a photograph by Mr. Glaisher, (figures 1 and 3); also (fig. 4) those of 1817, copied from Luke Howard's "Climate of London;" and a single spike, reduced (fig. 2) from Mr. Rowell's sketches of hailstones picked up after the Calne hurricane in 1859. Without running into desultory comments, we may point out that the angles in each case closely approach 60° , *i.e.* that of the ordinary crystallization of water; secondly, that even the small balls of the present year generally broke at that angle; lastly, that Mr. Rowell's outline is quoted, in case it may be considered to throw light on how the balls are built up.

* *Met. Mag.*, Vol. I. p. 17—18.



To the Editor of the Meteorological Magazine.

SIR,—On the 8th inst. at about 4—5 p.m., a slight shower of soft hail fell here, only lasting a few minutes, the balls were about $\frac{1}{8}$ in. in diameter.

I remain, yours truly,
Woodland Mount, Nortonthorpe, near Huddersfield.
A. M. BOX.
March 12th, 1866.

SIR,—Since my last communication on the 6th, I have been carefully watching for any further fall of “soft hail,” but none has fallen here except on the afternoon of the 7th, on which I made the following note :—

March 7th, at 1 p.m. a fall of “soft hail” or “miniature snowballs” occurred. of much less duration than yesterday’s fall ; the “balls,” too, were smaller and by no means so compact as those of the 6th. They gave me, and one or two others whose attention I called to it, the idea of one or two snowflakes bound together to form miniature snowballs. The wet and dry bulb were both at 33° F. ; at about 2.30 a dense fall of ordinary snow took place, which lasted for some little time.—I remain, yours sincerely,

ROWLAND HILL FAWCETT.
Staff College, Farnboro’ Station, March 12th, 1867.

SIR,—On the evening of the 11th inst. we had a fall of large half-liquid flakes of snow, much resembling the “natural snowballs” noticed by you in former years. The quantity in my gauge on the morning of the 12th was 0.49 in. On the 8th itself, no snow or rain fell here, but on the evening of the 9th, and through the night there was rain to the quantity of 0.44 in. The rain did not begin till dark, and I did not go out afterwards, but from the sound on the roof of a conservatory, I should think it very likely to have been something more solid than rain,—Yours truly,

Trowbridge, March 14th, 1867.

W. J. MANN.

P.S.—In 1866 we had no snow or rain on the 6th, 7th, 8th, 9th, or 10th of March.

SIR,—On the 6th, 7th, and 8th, I watched for the periodic (?) snow balls with some interest, and send you the following notes from my journal :—

March 6th.—Cloudless till the end of the eclipse—11.20 a.m. : small half-melted flakes of snow fell—12 : small balls or pellets fell, and some few crystals. This continued till 4 p.m., but very few balls fell after 12.10 p.m.—9 p.m. to 11 p.m. : snow flakes at intervals.

March 7th.—6 a.m. to 10 a.m. : snow falling fast in flakes, which fall to pieces when received upon the arm ; these pieces were found to be 5 and 6 rayed crystals—12 to 3 p.m. : snow fell heavily—3.10 p.m. : snow balls $\frac{1}{8}$ size of pea, fell in a heavy shower, and were followed by a storm of dense flakes till 6 p.m.—9 p.m. : snow flakes falling fast, composed of small crystals.

March 8th—9 a.m. : crystals fell—12 : crystals and balls—3.35 p.m. : crystals and grains—4 p.m. : ditto—5 p.m. : ditto,—I am, Sir, your obedient servant,
King Cross, Halifax,

JOSEPH GLEDHILL, F.G.S., F.M.S.

March 19th, 1867.

P.S.—Snow balls also fell at 10.30 a.m. on 12th, and at 6 p.m. on 17th.

RADIATION TEMPERATURES.

To the Editor of the Meteorological Magazine.

SIR,—On the mornings of Feb. 26th & 28th, I noticed what I do not remember having seen before at this time of the year, that the min. temp on the grass for the previous 24 hours had not been so low as at the height of the 4 feet—e. g. :—

26th	At 4 feet—Min. temp.	39°·75.	
„	On Grass— „ „	41°·00.	Excess 1·25.
28th	At 4 feet— „ „	36°·00.	
„	On Grass— „ „	38°·00.	Excess 2·00.

Probably you, or some of your readers could explain the cause of this.

I observe in the last No. of the *Meteorological Magazine* that the min. temp. at some places, is entered as having occurred on the 4th, and others on the 5th; these may possibly be meant for the same time, but some observers may enter it to the day on which they register it, and others to the one previous. Would it not be well in this case, as with the rainfall, to count up to 9 a.m. on each day as belonging to the previous one?

ARTHUR PIM.

[We can hardly reply to the first question more appropriately than by the following extract from "Observations in Meteorology," by the Rev. Leonard Jenyns, M.A. :—

"But there is a phenomenon relating to terrestrial radiation at night, occurring in certain states of the weather, which is still more remarkable; and that is, that occasionally the radiating thermometer, instead of merely rising under the influence of a cloudy sky to the temperature of the air, will be found *higher* than that temperature. This anomalous circumstance, as at first it appears, seems to be the effect of the sudden increase of temperature in the night beyond what prevailed the day previous; such as not unfrequently takes place in winter, on the change from frost to thaw, as also in spring and autumn, but never that I noticed in summer, the nights being hardly ever hotter than the days at that season. This increase of temperature is due to the wind shifting from some point more or less northerly to W. or S.W., and bringing up, not only currents of warmer air, often at a greater elevation than those nearest the earth, but *clouds charged with warm vapours*, which radiate their heat downwards, and thus cause a rise in the radiating thermometer. The rise of the thermometer which marks the temperature of the air is more gradual, the air being only mediately affected through conduction from the earth, with which it is in contact. The following instances in which this occurrence took place are extracted from my Meteorological Register :—

"1848, February 5th.—Radiating ther. last night 3° higher than the other. Mild and generally clouded throughout yesterday: temp. at 10 p.m. 48°; at 10 a.m. this morning risen to 53°·5.

"1848, February 9th.—Radiating ther. last night 1°·5 higher than the other. Yesterday mild, and fine till towards evening; wind then veering to S.W., bringing up clouds and rain. Temp. at 10 p.m. 46°; at 10 a.m. this morning risen to 49°.

"1848, October 3rd.—Radiating ther. last night 4° higher than the other. Mild and fine yesterday, but clouding over in p.m., with rain at night. Temp. at 10 p.m. 57°; at 10 a.m. this morning risen to 60°·5.

"1849, January 19th.—Radiating ther. last night 1° higher than the other. Very fine and mild both yesterday and to-day, but the temp. of to-day rather higher. Ther. at 10 p.m. 49°; this morning at 10 a.m. 50°.

"1849, February 2nd.—Radiating ther. last night 3° higher than the other. Fine and frosty yesterday morning, with the wind N.W.; towards evening wind shifting to S.W., sky at the same time becoming thick and misty, followed by rain. Ther. at 10 p.m. 39°; at 10 this morning risen to 44°·5. Much milder all day than yesterday.

"1849, March 1st.—Radiating ther. last night 1° higher than the other. Weather yesterday very stormy, with rain and snow in p.m. Temp. at 10 p.m. 31°·5; at 10 this morning risen to 38°·5.

"It will be seen that in all the above cases the weather the next morning was warmer than on the evening previous, the increase of temperature amounting in the last instance to 7°, though this was not the one in which the difference between the two thermometers was greatest. Mr. Glaisher, in like manner, found that during cloudy nights a ther. with the bulb placed in the focus of a metallic parabolic reflector, fully exposed to the sky, was frequently higher than a ther. 4 ft. from the ground, and protected from the effect of radiation.—*Phil. Trans.*, 1847, p. 193."

With respect to the second query we must give an emphatic negative. The cases of rain and temperature are not strictly parallel, the former falls pretty equally at all hours, (at least so far as we know at present), the latter has regular hours of maximum and minimum, the minimum with which we are at present concerned, occurs probably 19 times out of 20, at or about the time of sunrise, therefore obviously the minimum read at 9 a.m. is the minimum of *that day*, while the maximum if then read belongs to the day before.]

WIND AT LINTON PARK, STAPLEHURST, KENT.

Number of Days on which the Wind was in the direction given below, the record being taken at noon each day.

	WIND AND NO. OF DAYS.								Not as- certained.	RAIN.		Frosty Days.
	E.	S. E.	S.	S. W.	W.	N. W.	N.	N. E.		Total Quantity.	No. of Days	
1850	17	36	21	60	76	38	40	74	3	inches.		
1851	14	28	29	53	47	55	59	76	4			
1852	36	32	46	93	40	22	25	69	3			
1853	84	27	25	76	59	36	36	68	4			112
1854	32	17	29	100	62	41	36	47	1			122
1855	21	32	23	63	36	48	25	115	2	20·84	160	114
1856	14	44	34	99	29	42	28	72	4	27·79	169	89
1857	14	47	37	81	37	38	21	86	4	24·33	137	
1858	16	71	16	73	24	58	19	87	1	16·33	116	93
1859	8	53	21	125	11	59	9	78	1	29·55	151	93
1860	13	27	64	88	29	49	42	54		33·66	216	93
1861	12	28	66	110	34	21	45	47	2	24·01	158	85
1862	8	24	77	95	33	18	73	37		26·93	195	67
1863	12	31	82	118	29	25	36	31	1	22·75	169	64
1864	30	40	65	66	26	28	35	71	5	21·25	156	96
1865	28	45	59	74	36	29	35	55	4	35·18	172	80
1866	16	32	54	89	71	31	35	31	6	30·82	179	66
Average	19	36	44	86	40	38	35	65	2½			90

From the above table it will be seen that the prevailing winds last year were S., S. W., and W., these three points counting 214 days, and the W. and S. much above the average; it is possibly to this cause that the small number of frosty days is due, and in like manner the increased rainfall may be traced, as most of the rains we have are from that direction; occasionally, however, we have a down fall from an opposite direction, and when it is so, it is unusually heavy; our highest winds are generally from S. W., but the one doing the most damage the past year was from S. E., on 11th February; the driest wind we have is E. but they are few compared with those from N. E., which are usually dry also, but less parching to vegetation than due E.; a steady N. E. wind is usually a dry period, and the barometer keeps high; perhaps, however, the highest point this instrument attains is in a fog, when no trace of wind is perceptible, so that no positive rule can be laid down whereby we can judge of the future. Sudden changes of wind often bring rain, but not always so; for the longest dry period we had the past year without any rain was in the middle of July, when there were 20 days without rain, and during that time the wind was in all directions, and never more than two days in one. It is needless to say the N. and N. W. winds are the coldest, the E. and N. E. the driest, and that warmth and moisture usually proceed from the opposite quarters. I may observe, however, that there have been fewer high winds the past autumn than usual, and, as will be seen elsewhere, these months have been dry ones.

JOHN ROBSON.

Sunshine and Showers: their Influence throughout Creation. A Compendium of Popular Meteorology. By ANDREW STEINMETZ. Reeve and Co., xvi., 432 pages, Cloth 8vo.

TAKEN as a whole, the most pleasantly written, chatty book on Meteorology which has appeared,—a work, moreover, which will probably augment the yearly increasing number of persons who are patiently

chronicling their barometers and thermometers, in the hopes that some good must ultimately come of it, although perhaps at present, they feel the lack of a master-mind at the helm, to teach them and guide them aright. When this Newton of Meteorology is to arise, we know not; Mr. Steinmetz neither takes, nor aims at, any such position. He says:—

“My object has been to make the book entertaining as well as instructive; and it will be found replete with practical suggestions which may be useful to all classes of readers, whilst the leading topic—the curiosities of the weather, and weather wisdom—is, I trust, explained with a fullness never before attempted.”

This object has been fully attained, so far as we are able to judge—we say so far, because, all through the volume, proverbs and rules for judging the future, keep cropping up, and upon the reliability of these, we can express no opinion. Here is a group which will serve as a type of the whole.

“In low-lying lands, but with a good sunny aspect, a cold and windy May is a good prospect for the harvest; hence the special proverb:—

A cold May and windy
Makes a full barn and findy.

“Much wet in May is worse than excessive drought; hence the proverb:—

A May flood,
Never did good.

“If the last eight days of February, and the first twenty days of March are for the most part rainy, then the spring and summer quarters will be so too. It is said that a great drought always enters at that season.”

There are many useful hints as to the management and indications of several instruments, and two new ones are suggested and described, one of these, called a “vaporimeter,” seems by far the most convenient instrument yet introduced for measuring the amount of evaporation. We hope on a future occasion to notice it at length.

Almost the only faults in the work are evident oversights, but a trivial one jars if repeated, and Kaemtz (who, rightly enough, is constantly quoted) is after the first few pages, always spelled Kaemst; Connel is Coumel; Kew Observatory is Royal Kew Observatory; Buys Ballot is Buys Biot; and here and there something is omitted or stated twice over. But these are small errors, and do not materially detract from the unquestionable merits of the book.

Concerning the decrease of rainfall, noticed in certain districts, Mr. Steinmetz eloquently adopts the theory of Becquerel and G. P. Marsh as to the influence of clearing large forests.

“Rain clouds are attracted to certain localities more than others, and probably nature's conductors are the points of the leaves of all vegetation, particularly trees; and hence, to the cutting down of trees, we may trace their ultimate sterility—such as the present sterility of the once fertile, but now deserted and desolate, regions of Syria, Barbary, and Chaldæa. The Euphrates often menaced ancient Babylon with inundation, but at present, thanks to the clearance of the woods from the mountains of Armenia, the river is modestly confined to its banks. The ancient river Scamander, which was navigable at the commencement of the Christian era, has completely disappeared with the cedars of Mount Ida, where it took its rise. If trees do not prevent the drought of countries, their roots open the soil for the percolation of water, and they oppose the scattering of the sands of the seashore upon the plains, another cause of infertility.

MARCH, 1867.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL.				Days on which .01 or more fell.	TEMPERATURE.				No. of nights below 32°.
		Total Fall.	Difference from average 1860-5	Greatest Fall in 24 hours.			Max.		Min.		
				Dpth	Date.		Deg.	Date.	Deg.	Date.	
		inches	inches.	in.							
I.	Camden Town	2.48	+ .40	.48	9	21	57.1	24	25	17	17
II.	Staplehurst (Linton Park) ...	3.42	+ .93	.62	10	23	62	24	21	8	23
„	Selborne (The Wakes).....	3.10	+ .50	.68	13	17	53	31	20	†† 16	25
III.	Hitchen	2.46	+ .29	.44	19	16	56	26	17	16	20
„	Banbury	3.17	+ .97	.72	23	19	54	26	21	17	22
„	Wisbech	1.54	...	.39	19	14	59.6	27	24	16	12
IV.	Bury St. Edmunds (Culford).	1.47	— .73	.35	9	13	57	†24	17	16	16
V.	Calne	3.11	...	.76	23	...	62.5	26	21	16	17
„	Plymouth (Goodamoor) .....	...	...	...	...	...	...	...	...	...	...
„	Barnstaple.....	3.21	+ .06	.76	12	19	...	...	...	...	...
„	Taunton (Fulland's School)	3.81	+1.35	.56	23	17	...	...	25.5	††1	18
VI.	Shrewsbury (Highfield)	2.70	+ .56	.42	23	22	...	...	16.5	21	...
VII.	Tenbury (Orleton)	3.84	+1.42	.67	23	22	56	24	17.7	16	17
„	Leicester (Wigston)	2.88	+ .77	.81	23	16	59	27	18	16	19
„	West Retford .....	...	...	...	...	...	...	...	...	...	...
„	Derby.....	2.09	— .16	.60	23	17	55	24	24	17	18
VIII.	Manchester	1.44	—1.25	.30	23	15	58.5	24	20.6	17	15
IX.	York	1.44	— .55	.60	23	14	52.5	24	22	17	16
„	Skipton (Arncliffe) ...	3.46	—1.35	.82	23	12	45	25	20	17	20
X.	North Shields	1.69	— .66	.28	8	22	52.8	24	22.8	16	16
„	Borrowdale (Seathwaite)	8.32	—5.08	2.53	26	11	...	...	...	...	...
XI.	Abercarn	5.34	...	1.40	23	12	51	§24	26	15	13
„	Haverfordwest	5.68	+2.23	1.91	23	13	55	25	25	3	23
„	Rhayader (Cefnfaes).....	4.03	+ .19	1.66	24	14	52	...	15	...	8
„	Llanberis (R. Victoria Hotel)	4.94	...	1.69	23	8	...	...	...	...	...
XII.	Dumfries	1.72	—1.26	.72	23	9	51	25	19.5	17	16
„	Hawick (Silverbut Hall) ...	1.70	...	.30	23	16	...	...	17	20	20
XIII.	Ayr (Auchendrane House) ...	1.09	—2.64	.28	23	11	56	24	16	§§ 16	21
XIV.	Otter House	2.00	—2.64	.66	24	8	53	4	23	16	13
XV.	Leven (Nookton)	1.18	— .89	.32	9	16	56	24	22.4	27	17
„	Stirling (Deanston)	2.07	—1.46	.71	23	18	58	26	16.3	17	...
„	Logierait	2.61	...	1.22	23	11	...	...	...	...	...
XVI.	Ballater	5.54	...	1.49	23	23	54	3	1	17	24
„	Aberdeen	2.29	...	.66	23	20	54.8	24	18.2	17	14
XVII.	Inverness (Culloden) .....	.93	...	...	...	...	...	...	...	...	...
„	Fort William	2.45	...	.56	29	11	52	25	17	21	16
„	Portree	2.62	—6.41	.68	23	11	53.5	25	13.4	16	12
„	Loch Broom	2.53	...	.56	10*	13	...	...	...	...	...
XVIII.	Helmsdale	2.73	...	.41	23†	16	...	...	...	...	...
„	Sandwick	2.08	—1.25	.53	23	15	...	...	6	||| 16	...
XX.	Cork	2.03	...	1.73	18	14	...	...	...	...	...
„	Waterford	4.71	+1.82	.90	22	20	...	...	...	...	...
„	Killaloe	3.06	—1.26	.53	25	15	58	24	22	16	11
XIX.	Portarlington	3.02	— .29	.31	12	27	49.5	24	23	17	17
„	Monkstown	5.07	+2.58	1.08	26	23	58.7	24	23	2	8
XII.	Galway	3.37	...	.90	18	17	58	|| 2	25	16	8
„	Buinnadden (Doo Castle) ...	2.70	...	.75	25	12	54	24	...	...	16
XIII.	Bawnboy (Owendoon)	3.93	...	.90	27	15	...	...	...	...	...
„	Waringstown	1.95	...	.45	23	16	54	*23	17	15	18
„	Strabane (Leekpatrick)	2.27	...	.61	25	13	59	24	19	16	21

* And 30th. † And 27th. ‡ And 25th. § And on 25th, 27th, & 31st. || And 4th & 30th.

** And 26th. †† And 17th. ‡‡ And 17th & 21st. §§ And 17th. ||| And 17th.

+ 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.

CAMDEN TOWN.—TS on 30th. Frequent S showers during the month.

LINTON PARK.—The first five days dry, the rest a continuance of sleet, S or R, with very little sunshine, and fewer high winds than is usual in March. Very distinct T and L on evening of 30th. Prevailing winds E., N.E., and N.; 23 frosty nights, and altogether the most wintry March for many years.

SELBORNE.—Frequent S from 7th to 22nd, when the wind changed from N.E. (whence it had blown almost without interruption from the 1st) to S.W., with a dense fog and sudden rise of temp. Aurora on 26th. The temp. of the month lower than I have ever known it in March since I have kept a register. In the first three weeks the mean max. was 35°, mean min. 26°; mean max. for whole month 40°; mean min. 29°. From 29th to the end of the month violent and cutting winds from N.

HITCHEN.—Very frequent S between the 7th and 23rd.

BANBURY.—S on 13 days between the 6th and 22nd. Fog on 23rd, and higher floods on 24th than known for many years. Vegetation scarcely advanced since the end of last month. Bar. on 2nd (reduced), 30·83; mean temp. of month, 36°; mean of first three weeks, 33°·3. L on 9th.

WISBECH.—A wintry month. Lunar halo on 16th. Peach in bloom on 30th.

CULFORD.—March is generally expected to be a trying month in this part, from the prevalence of east winds, but the one just closed is supposed by the oldest inhabitants to be the roughest in their remembrance, and it maintained its character to the last, the max. on 31st being only 49°, and min. 24°. Mean, 37°·5.

TAUNTON.—Prevalence of E. and N.E. winds. Inundations very general, and higher than known for many years.

ORLETON.—The average temp. at 9 a.m., for the first 22 days was only 33°·9, and the ground was covered with S to a depth varying from three to six inches where not drifted. S fell on 6th and following days till the 14th; also on 17th, 18th, 19th, 21st, and 22nd, frequently accompanied by strong winds, which, on the 19th and 21st, rendered many of the roads impassable from S drifts till cut through. On 23rd a rapid thaw, which caused the greatest flood in the river Teme since 1852. The Severn was also greatly flooded. After the 22nd the weather was rainy and warm, but the temp. of the whole month was 4° below the average.

WIGSTON.—The total rainfall for January, February and March is nearly 2 in. above the average of the last 11 years. The temp. much below the average.

DERBY.—The month up to 23rd remarkably cold, with biting N.E. wind. The temp. on 16 nights far below freezing.

MANCHESTER.—H and T on 30th. Very cold month, and for the first three weeks continuance of cold N.E. winds.

ARNCLIFFE.—E. winds. A very heavy fall of S in the second week; the whole month wild and ungenial.

NORTH SHIELDS.—S on every day from the 6th to the 22nd except two—the 10th and 21st. Fog and solar halo on 25th.

SEATHWAITE.—Drought to the 24th, except a little S. Hard frost with strong E. winds during the first three weeks.

WALES.

ABERCARN.—A very severe month, 20 inches of S having fallen in these parts. It snowed more or less for 11 days, and continuously for nearly 3 days. A most trying month for aged or weak persons. A great loss in sheep and lambs. Heavy and destructive floods at the latter part of the month from the melted S.

HAVERFORDWEST.—One of the most severe months of March on my record. Temp. uniformly low night and day to the 23rd, when a thaw commenced, accompanied by enormous quantities of R and terrible storms of wind. Air bleak and cold to the end, with the exception of the 28th and 31st, which were fine. The rainfall in this month should, in my judgment, be stated as more (say +·70)

than was actually registered, the S having fallen heavily on 8 days, and drifted in many places to the depth of 10 or 12 ft., but having been so dry that it blew out of the funnel during the violent winds.

CEFNFAES.—The weather during the whole month very inclement, and the storm of frost and S from the 1st to the 21st more severe than any recorded here since 1814. Great loss in sheep and lambs.

SCOTLAND.

DUMFRIES.—The weather very ungenial. Wind from N.E. to the 23rd. S or H on 11 days, but the fall not heavy except on the higher hills, which continued white till the 31st. Temp. below the average for February, and lowest for March for eight years. Vegetation much checked thereby. From the 23rd the weather milder, but R, and occasionally S, less or more nearly every day.

SILVERBUT HALL.—Old men of 70 are of opinion that this has been the coldest March ever felt by them. Farmers are loud in their lamentations over the scarcity of fodder, and gardeners moan over the death of their favourite plants.

AUCHENDRANE HOUSE.—Under the influence of Polar currents of air, this month was cold and dry, with a considerable amount of sunshine, and frequently chilly winds; after the 23rd the weather became mild, wet, and boisterous; there was a slight snow-storm on the 12th, which melted as it fell; none of the great snow-storms of the month reached this locality. The pools in the river were frequently covered with ice, and loose ice occasionally floated about on the streams, as in January. There were no inundations from rivers here, as in so many other places. There was ice from the 12th to the 22nd, when the game of curling was played on a loch near Kilmarnock, an event that is said never within memory to have happened at so advanced a period of the spring.

OTTER HOUSE.—T on 27th; cold, dry, and severe frost till the 23rd; afterwards R or S and H showers, with equinoctial gales, almost to the end; at the close of the month mild, birds singing, trees budding, and flowers blooming.

LOGIERAIT.—Month opened with severe frost to the 9th; then cold E. winds till the 20th; afterwards a heavy fall of S on the 22nd and 23rd; since then more mild and genial; distant T on 27th. Agricultural labour much retarded.

BALLATER.—A very stormy month after the first week, with occasional heavy falls of S. The railway blocked up on the 15th, and again on 22nd; the temp. continued low throughout, falling to 1° above zero on 17th and 21st, and below 10° on 13th, 14th, and 18th. The lower grounds were free from S by the end of the month, and agricultural operations resumed.

ABERDEEN.—The month has been one of cold, unseasonable weather, with bare frosts, and though S or sleet fell on 15 days, there never was sufficient depth to protect vegetation; the greatest depth at any one time was not more than 1½ or 2 inches. Mean temp. 36°·5. being 2°·6 below the ten years' mean. Frequent auroræ during the month.

CULLODEN.—Fog on 4th. Aurora on 7th, also L and some H. A few hailstones alone on the 8th. S nearly every day.

ROSSE PARSONAGE, FORT WILLIAM.—Here as elsewhere the early part of the month was very dry and bitterly cold, but we have had no S except a little sprinkle, which a high wind prevented getting into the gauge. The wind till the 21st was from E. and N.E., it then changed to S.E. and blew a gale; since that day it has been moist, and generally rather mild, with occasional sleet and S. on the hills. A luminous arch, very distinct and defined, spanned the heavens from E. to W. on the night of the 6th, the day of the solar eclipse.

LOCHBROOM.—This month had truly a peacock's head but an adder's tail. The beginning was beautiful; much labour was done, but about the 9th intense frost commenced, and continued until the 24th, which was a terribly showery day, but that week turned out the first sowing days of the season, which is a fortnight later than usual; the last three days again turned out as boisterous and sweeping as the tradition of the ancients ever made them.

PORTREE.—Very dry month; from the 25th of February to the 23rd of March only 0·14 in. of rain fell—a most unusual occurrence in this locality. A very cold month; frost on every day except the 2nd, 6th, 26th, 27th, and 28th; the last

week very stormy, with S, H, and strong, cold winds, very trying for the young lambs.

SANDWICK.—A very cold, dry month, both R and temp. below the average; a long continuance of snow-storms from the 10th to the 23rd. The min. temp. on grass, registered on the 17th and 18th (6°), lower than I ever recorded.

IRELAND.

KILLALOE.—A month of unusual severity here for March; great prevalence of violent and very cold N.E. winds, with frequent snow showers.

MONKSTOWN.—Aurora on the 7th and 28th.—A most severe month, the most so for many years. It commenced fine and frosty, but on the 7th the S again fell, and continued to do so at intervals till the 21st. On 22 days the wind was easterly, and frequently very wild. On the morning of the 16th the atmosphere was so clear that the mountains 60 miles distant, with their snow-capped peaks, were very distinctly seen, and in the evening the Dublin mountains, covered with S down to their bases, were beautifully depicted. This preceded as violent a storm as we have had here for a long time from S.E., and during which a small steamer was wrecked on our coast. Gales also on 21st and 23rd.

GALWAY.—Slight fall of S on 15th, and a heavy fall on 18th.

DOO CASTLE.—TS with H on 25th. One of the most severe months on record; a cold, strong wind, generally from the E., prevailed for three weeks, with frost every night from the 1st to 23rd; to complete the sad character of this blighting month, it closed with heavy R, which completely saturated the land. Very little attempted in the way of spring culture till the end of the month, and no grain to my knowledge sown in this locality to this date, 3rd April.

OWENDOON.—T on 23rd and 25th. H on 24th. Latter part of month very wet.

WARINGSTOWN.—Cold, parching easterly winds, accompanied by frost and occasional slight falls of S from 1st to 23rd, when the wind changed to S.E. with heavy R, and a week of fine though showery weather followed. The last two days intensely cold, with H showers.

LECKPATRICK.—From 1st to 21st constant E. winds, which changed on that day to S.E. Gale from S.E. on 23rd, ending in S. On 25th squalls, heavy downpour and T. 29th, gale from W. Farming operations much retarded.

DERIVATION OF THE WORD "ANEROID."

To the Editor of the Meteorological Magazine.

SIR,—Your correspondent "F. W. S.," rather overstates his case. The word "*νηρός*" is not only "somewhat rare," but never once occurs in the Classics, so far as I can discover. Moreover, his assertion that the form *vapós* "was good enough for Sophocles and Eschylus" indicates (at first sight) something more than its occurrence in a single fragment of either poet, cited respectively by a grammarian and a lexicographer, and resting upon no other authority. "A rare and old word, probably contracted from *veapós*," is the dictum of Liddell and Scott.

"F. W. S." explains away the terminal *είδες* in a very ingenious manner; but as a scholar he must feel that his explanation is quite unsound; *ἀνροειδής* (supposing such a word to be coined) would mean "unfluid-like"; not "unlike fluid"; much less "belonging to a class of *ἀνρᾶ*."

A man sufficiently versed in Greek to be acquainted with the word *νηρός*, would scarce think of adding the terminal *είδης* (neut. *είδες*) to a privative compound.

As Mr. Barham well observed, the only practicable derivation for aneroïd is from *ἀνρῶ*. Supposing the automatic idea to be wholly inadmissible, may not the inventor have had in his mind some of those quaint Dutch and German figures which indicate the weather, and first have applied his new principle to some such popular form?

By the bye, no one has told us who this inventor was. Perhaps some of your correspondents, or yourself, will answer this question.—Yours obediently,

R. D. B.

[We could not venture to decide the "derivation" question, but the following brief extract may be satisfactory at once, to both F. W. S. and R. D. B.:—"As its name implies it is constructed 'without fluid.' It was invented [about 1846?] by M. Vidi of Paris."—*Negretti's Treatise on Meteorological Instruments*, page 50.—ED.]