

SYMONS'S

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ANEMOMETERS.

(Continued from page 53.)

THE next instrument requiring notice, and the one by far most frequently used, is Robinson's Hemispherical Cup Anemometer, the notice of which in Admiral Fitz Roy's *Weather Book* is so thoroughly to the point, that we can hardly do better than quote it :—

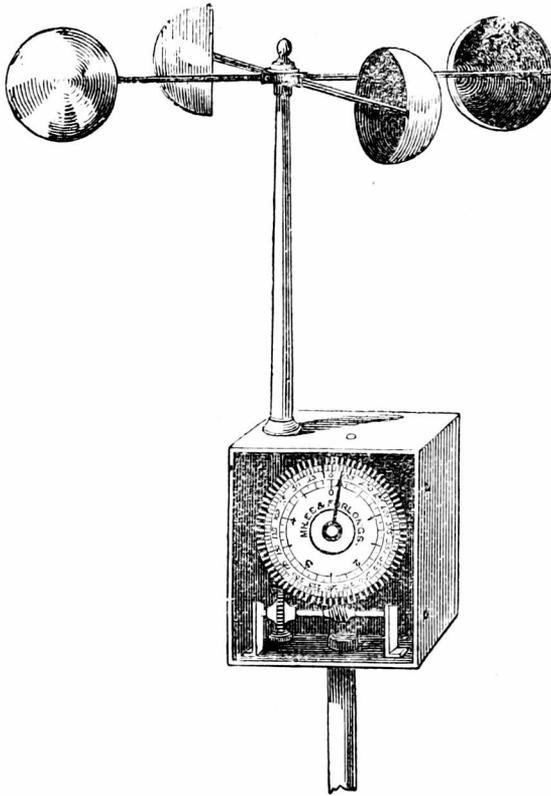
“Wind-gauges have been tried ; that by Lind—also a modification of it by Sir W. Snow Harris—and the well-known pressure plate ; but these seem to yield only partial, if not equivocal results. The beautiful cup and dial anemometer (due to Robinson chiefly, if in some degree suggested by Beaufort or Edgeworth,) is more approved, after having been tried experimentally through several years of exposure.

“Dr. Robinson showed (in the Transactions of the Royal Irish Academy) that a current of air is opposed by a concave hemisphere, one-fourth more than by a convex one of the same size. Thence experimental trials and mathematical reasoning induced him to adopt the arrangement now general, namely, four hemispherical cups, on horizontal arms, revolving on a friction rolled axis, at a known proportional rate, one-third slower than the passage of air or wind current. Hence velocity, and, from it, pressure, are readily calculated.”

Two modes of indicating the number of revolutions made by the cups have prevailed. The first consisted of an endless screw on the axis working into the right hand of a train of 5 dials, each of which revolved ten times for one revolution of the next to the left, the dial next the endless screw showing 10 revolutions, the next showed 100, then 1,000, 10,000, and lastly 100,000. The reading was, therefore, taken as in a gas meter, from left to right, the figures being noted down as read off, it being remembered that if the index points *between* two figures, the lesser of the two is to be taken. To take an imaginary case :—At 9 a.m., June 17th, the hands (counting from left to right) pointed to 176,420, and at the same hour on the 18th they read 297,340; then $297,340 - 176,420 = 120,920$ has been the number of revolutions in the 24 hours. The dimensions of these instruments are understood to be such that the circle described by the centre of each cup is $\frac{1}{3} \frac{1}{6} \frac{1}{8}$ of a mile—the amount of wind requisite to produce this being $\frac{1}{3} \frac{1}{6} \frac{1}{8}$ of a mile ; 500 revolutions equal one mile. Therefore $(\frac{1}{3} \frac{1}{6} \frac{1}{8} \frac{20}{20} = 241 \cdot 84$

miles) in the case supposed, about 242 miles of wind had passed in the course of the day, that is to say, just 10 miles an hour. It is almost needless to point out that if the three left hand dials alone are read, (for example as above, 176 and 297, then $297 - 176 = 121$,) and the result doubled, it gives at once the miles passed $121 \times 2 = 242$ miles.

Fig. 3.



To Mr. Casella, we believe, is due the improved mode of indicating shown in fig. 2, whereby one dial is substituted for five, and the record is read off in miles at sight. Two further improvements on fig. 2 have since been adopted, so that the record is now read off in miles and tenths, instead of miles and furlongs as shown; and secondly, by the adding another dial, it is made available for examination at long intervals. Another modification was introduced by Messrs. Negretti and Zambra, in which the registering wheels could be disconnected from the cups, and wear and tear thus avoided. Of course by this modification continuous records are not obtained. The price of these instruments ranges from £3 to £5.

Position desirable for Anemometers.—This all important, yet utterly neglected matter, may be advantageously considered before we proceed

to notice the more expensive class of anemometers. The only instructions we can find are, "It should be fixed in an exposed situation, as high above the ground as may be convenient for reading."* "When in use, it may be screwed on a shaft or ordinary piece of gas pipe, which accompanies it, and elevated to any desirable altitude."† In the instructions of the Scottish Meteorological Society, it is stated that "A wind vane ought to be elevated 12 ft. at least above surrounding objects;" but though "the Council would strongly recommend that every observatory be furnished with a Hemispherical Cup Anemometer," they do not say where it should be fixed.

In this recommendation of the cup anemometer for *general* use, we fully concur, and would gladly render all the aid in our power if some one with leisure volunteers as superintendent of an Amateur Anemometrical Association. We are certain that good results are within reach, but some preliminaries must first be attended to. Of these the most important are—(1) testing the anemometers, and (2) taking observations for a few months with several instruments differently placed, but near together. The desirability (not to say necessity) of testing the instruments is so obvious, that it is unnecessary to dwell upon it. We trust that some steps will be taken to provide this security at a reasonable charge—say five shillings; and we would recommend that observers already provided with anemometers should send theirs to be tested, so that all might start fair.

We think the second preliminary indispensable, for the confusion and irregularity in the location of anemometers can only be realized by those who have visited a considerable number of observers. Let us jot down a few as examples. A has his anemometer on a pole 6 ft. above ground, while B has his on a pole 10 ft. above ground, and has a pair of steps to enable him to read it; C has it on a sentry box 12 ft. high, and with steps up the side; D goes higher still, having a stout pole 20 ft. high, with cross bars, up which he climbs like a bear; E being perhaps too stout for this performance, mounts his among the chimney pots on the top of his house, where the anemometer and himself get sadly begrimed; F has a long rod to bring the registration in doors, while G has an elaborate electrical arrangement whereby the motion of the cups on a distant hill is registered in his library. Surely the time has come when such differences should be swept away. What reliance can we place on records from instruments so variously circumstanced? Experiment alone can give us the relative motion

* Negretti's Treatise on Meteorological Instruments, p. 121.

† Casella's Catalogue, p. 29.

recorded at different heights above the surface of the ground. These, however, would be very easy to conduct and discuss; the expense would probably be about £20 or £30. We conceive that an open, level station should be selected, and anemometers placed with their cups 10, 20, and 30 ft. above the ground mounted on poles, or better still, on ladders steadied by guys—not that the observer need climb daily to the top (for he can easily read them with a telescope), but that access may be practicable for oiling, &c., when necessary. One should also be placed on the roof of the house, that we may learn the amount of motion due to such a position. Without forestalling the results of the investigation (if taken up), we may record our impression that such positions always register much in excess of the truth.

(To be continued.)

Abstracts of Meteorological Works. No II.

PUBLISHED A.D. 1783.

Essais sur l'Hygrométrie. Par Horace-Bénédict de Saussure, Professeur de Philosophie à Geneve. Neuchatel, Samuel Fauche; quarto, xxiv—367 pages, 2 plates.

It is rather a noteworthy coincidence that two of the most forward steps in hygrometry are mainly due to the illness of those by whom they were taken. Although Gay Lussac used a dry and wet bulb thermometer in 1822, it is to Dr. Mason that we are indebted for its introduction into this country, he being led, while residing in Madeira for the benefit of his health, to devise the arrangement so well known as Mason's hygrometer, which, slightly modified by Mr. Glaisher, now leaves nothing to be desired in that branch of research. So again with Saussure in 1780. Surprised by illness in the midst of his "*Voyages dans les Alpes*," even on the ridge of a lofty mountain, he was compelled to postpone his laborious researches, to return to Geneva, and, during his forced residence there, he perfected the hygrometer, the rough idea of which he had conceived five years previously, compiled a portion of the work now under notice, and prepared some of his new instruments for his mountain tours in 1781, the results whereof are discussed in this volume.

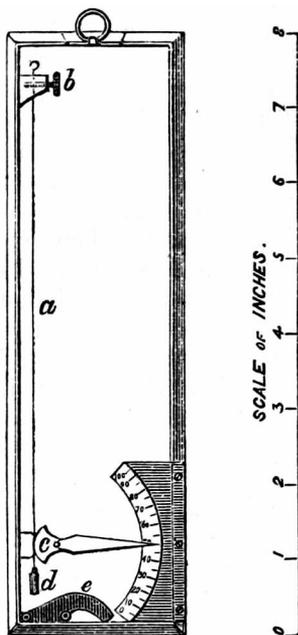
The four essays have the following titles:—

- I. Description of a new comparable hygrometer.
- II. Theory of hygrometry.
- III. Theory of evaporation.
- IV. Application of the preceding theories to some meteorological phenomena.

The first essay may be rapidly disposed of, the hygrometer therein described being now superseded. Saussure's hygrometer, as is generally known, consisted of a single hair, freed from unctuousness, and stretched by a slight weight, one end being fixed, and the other attached to the

short arm of a lever ; the long arm thereof of course multiplied the expansion and contraction of the hair produced by variations of humidity, and thus rendered them visible. The arrangement will be clearly understood by reference to fig. 3, where (a) is, the hair attached to the framework by the screw (b,) its bottom is fastened to the back of the index (c), and continued tension is ensured by the small weight (d) also attached to (c.) Of course if the hair contracts, the index will be carried towards 0, and if it elongates towards 100, the dark arm (e) is hinged to the corner of the frame, and designed to clamp the instrument when travelling.

Fig. 3.



It appears that the variation in the length of a healthy hair between the extremes of dryness and moisture is $\frac{1}{42}$ of its length, and this, we need hardly say, afforded in careful hands a useful approximation, though one to be superseded. Many reasons rendered Saussure's hygrometer better than its precursors, many reasons caused it to give place to the dry and wet bulb thermometer. Foremost among the former was its portability, which, as compared with previous ones, was very great, while among the objections which caused its abandonment, none was greater than the loss of sensibility which gradually supervenes.

It will be interesting to quote Saussure's description of a few of the hygrometers in use before his was brought out, the first class consisting of strings, animal fibres, and other substances which elongate or contract with damp. Of course his own hair hygrometer was but the best of these, but he rightly points out that though they had been made, no one had examined the effect on any of them of variations in the pressure, density, movement, &c., of the air, nor had they even examined if the varying indications of the instrument were proportional to the amount of vapour in the air. The second class is based on the principle that the drier air is, the more water it can absorb, and on this M. Le Roi constructed an hygrometer, which Saussure says led to "enormous errors;" he goes on to describe one of these experiments, and as there is something erroneous in the account thereof, we transcribe it *litteratim* :—

"On a, par exemple, renfermé une quantité d'eau bien déterminée dans un vase exactement luté ; au bout d'un certain tems on a mesuré la diminution de cette eau, et l'on a cru que l'air contenu dans le vase s'étoit chargé de tout le déficient, sans penser que cette eau avoit toujours continué de s'évaporer, même après la parfaite saturation de l'air, parce que les vapeurs se condensant contre les parois du vase, il se faisoit une vraie distillation, qui auroit pu consommer à la longue une quantité d'eau, pour ainsi dire illimitée."

The third class may be shortly described as dew point instruments. For example, the Academicians of Cimento took a conical glass vessel, which they kept full of broken ice or snow; they suspended this vessel point downwards in the open air, the moisture was condensed on the surface of the glass, and distilled drop by drop from the point of the cone, the greater or less frequency of the drops indicated to them the degree of humidity of the air. L'Abbé Fontana rendered this more portable by taking a plate of glass, quite clean and well polished, and of known weight; this he cooled to a certain temperature, exposed to the air for a certain time and then reweighed, the increase showing the amount of condensation. Lastly, M. Le Roi adopted a still more simple method, merely standing a glass of water in the air and at the air temperature, then gradually cooling it by the addition of iced water, until dew was deposited on the glass, when he noted the temperature of the water, and "judged the air more or less damp according to the degree of cold necessary to produce this deposition." Poor Saussure, here was the dew point instrument all but completed, and yet he proceeds to demolish it in the following paragraph:—

"These ingenious processes do honour to those who have invented them, and may even sometimes be useful, but if we consider that we can seldom make use of the closed vessel, and never employ any of them when the air is below freezing point, nor when the air is very dry, and that besides, the least particle of grease, and other causes difficult to avoid, may disturb the precipitation of this dew, and cause uncertain results, we can easily see that it will be very difficult for any such hygrometer to become universal. I have often tried M. Le Roi's process, with this difference, that instead of using ice, which is not easily carried about, I employed powdered sal ammoniac, which I throw little by little into the water, and which, when the air is not very dry, cools it sufficiently to produce condensation, but when I repeat it at short intervals, and when the air apparently remains unchanged, I do not always find the deposition commences at the same temperature."

(To be continued.)

DRYNESS OF THE AIR ON JUNE 27TH.

THE greatest difference between the dry and wet I remember noticing previous to this year was 20°·4 on June 28th, 1857, but as the temperature then was very high (dry 90°·4, wet 70°·0), the humidity on the natural scale was 33°, that is to say, the air contained just one-third of the quantity of moisture which it would hold if in a state of saturation.

On the 27th of last month the following readings were taken:—

Hygrometrical Observations at Camden Road, N. W., June 27th, 1867.

Lat. 51° 33' N.; Lon. 0° 8' W.; Height above Sea, 100 ft.

Time.	4 ft. above ground.			20 ft. above ground.		
	Dry Bulb.	Wet Bulb.	Humidity.	Dry Bulb.	Wet Bulb.	Humidity.
	Deg.	Deg.	0—100.	Deg.	Deg.	0—100.
9 a.m. ...	67·0	51·4	35	66·8	53·3	44
Noon ...	71·4	54·6	34	71·0	57·0	41
1 p.m. ...	76·4	57·6	32	75·5	60·0	39
2 p.m. ...	78·3	58·1	30	77·1	59·9	36
3 p.m. ...	78·5	58·1	29	78·0	60·8	37
4 p.m. ...	77·6	58·0	31	76·5	60·5	38

From this we learn (1) that the dryness was 4 per cent. greater this year than previously noted at this station; (2) that the dryness was much greater near the earth than at 20 ft. above it; (3) In both cases the greatest drought was preceded by a period of easterly winds and high barometer; in both the rainfall was similar in quantity and in the few days on which it fell. Just as the dryness was greatest in 1867, so also was the range of temperature, which amounted to 35°·1 (80·0 — 44·9) in 1867, against 31°·3 (91·7 — 60·4) in 1857.

136, Camden Road, July 1st.

G. J. SYMONS.

P.S.—Dry as the air was here, it was even drier at Aldershot, where at the same hour as I had 29° of humidity, Mr. Arnold had only 22°, his readings at 3 p.m., 27th, being dry 82°·0, wet 57°·0, humidity 22°.

HEAVY RAINFALL AT WORTHING, JUNE 3RD, 1867.

To the Editor of the Meteorological Magazine.

SIR,—I think it quite worth my while to bring before your readers some particulars of the heavy downpour of rain we had here on the night of June 2nd and 3rd.

After a magnificent summer day of intense heat, the thermometer standing at 75° Fah. in the shade, and the barometer (corrected to 32° and sea level) having fallen from 30·031 at 9 a.m. on the 2nd to 29·721 in. at 9 a.m. on the 3rd, after which period the mercury began to rise again; symptoms of an approaching storm began to show themselves in the course of the evening. Rain began to fall about 10 p.m. on the night of the 2nd, and continued without cessation for five and a half hours, viz., till about 3.30 a.m. of the 3rd. The greatest downpour, however, took place between 12 midnight and 1.15 a.m., when for about three quarters of an hour the rain came down in a perfect sheet of water, with *very* little hail. During the whole of this period the thunder was very loud, and the lightning most vivid.

On measuring the contents of my rain gauge next morning, I found the large amount of 2·08 inches in the receiver. This is almost equal to a fifteenth part of our yearly average, and is considerably in excess of the monthly average for June. I beg to annex to this a table, which I have deduced from the Registrar-General's returns for the town, whereby you will perceive that our yearly average for the last five years is 30·72 inches, and that for the month of June is 1·98 inches.

The thunderstorm which passed over this neighbourhood was not altogether *local*, but I am pretty sure we were almost the centre of the same.

I may, perhaps, remark that the highest reading of the barometer here this last month was (corrected and reduced to 32° and sea level) 30·541 inches at 9 a.m. on the 27th, the highest reading of the thermometer in the shade being 79·75°.

Yours truly,

W. J. HARRIS.

Worthing, July 3rd, 1867.

Table as above, in inches.

	Yearly Total.	Total for June.
1862	32·9	1·8
1863	28·7	3·6
1864	24·3	1·1
1865	35·7	1·1
1866	32·0	2·3

Mean average for 5 yrs. 1862-66... 30·72 Mean for June... 1·98

P.S.—There have only been *five wet days* this past month, and the total fall has been 2·45 inches. The last 16 days of the month were perfectly fine.

THE STORM AT STEYNING.

To the Editor of the Meteorological Magazine.

SIR,—The bar. fell about 0·2 in. between 9 a.m. and 9 p.m. on June 2nd, and was followed by a remarkable thunderstorm between 12.40 and 2.40 a.m. 3rd, the rain falling in a way not often known except in the tropics. The lightning was a magnificent display, one flash preceding the report only by one second, the thunder crashing or rattling according to distance, but in the nearest flash seeming to *split* the obstructing medium with a snapping explosion.

The fall of rain, which began steadily at 10 p.m. 2nd, and continued with slight intermission until the deluge of the storm began about 1 a.m. 3rd, after which it moderated about 1.50 a.m., and had ceased entirely before 5.30 a.m., amounted by my rain gauge to the enormous quantity of 2·44 inches. I believe the most of this fell between 1 and 2 a.m., and all between 10 p.m. 2nd, and 4 a.m. 3rd, but I am enquiring on this point. Of course the low parts of roads, the cellars of houses, &c., have suffered severely by the flood.

I am, Sir, yours faithfully,

HUGH INGRAM.

Steypning, Sussex, June 3rd.

[The storm began in the West of England in the afternoon of the 2nd, as may be inferred from the following notes :—*Calne*, Col. Ward, heavy rain in afternoon; 24 in 30 minutes, and 88 in the 24 hours.—*Wainsford*, *Lymington*, H. Fawcett, Esq., a heavy TS passed over the Isle of Wight between 7 and 8 p.m.—*Uckfield Observatory*, C. L. Prince, Esq., terrific TS between 1 and 3 a.m.; total rain was 1·47 in.—*Framfield Lodge* (1½ miles S. of Uckfield), Rev. T. E. Crallan, three heavy TSS between 2 and 5 a.m.; total rain 1·53 in.—T was heard at *Staplehurst*, *Hastings*, and *Royston*.—The *locale* of the heavy rainfall may be inferred from the following data :—

	in.		in.		in.
Steypning	2·44	Bromley Common	0·85	Ore, Hastings	0·69
Worthing	2·08	Harrow	0·33	Winchmore Hill... ..	0·62
Framfield	1·53	Twickenham	0·83	Pevensey	0·49
Uckfield	1·47	Camden Town	0·74	Waltham Abbey... ..	0·47
Seven Oaks	1·25	Banbury	0·72	Linton Park	0·37
Calne	0·88				

—Ed.]

METEOROLOGICAL PERIODS.

To the Editor of the Meteorological Magazine.

SIR,—I have much pleasure in giving Mr. Nutter the information he asks relative to the weather 29 years ago. He will perceive that, in most respects, the recorded meteorology of the first half of 1838, might be used to describe the weather of the first half of 1867. The following notes are chiefly taken from Mr. Whistlecraft's "Climate of England." After a remarkably mild Christmas in 1837, we had a very severe winter with unusually intense frost; in January, 1838, the snow was excessively deep in some counties, so that the roads were impassable until excavations were made; the spring was cold. May 2nd, a delightful change, very fine and warm; 3rd, fine and warm; 4th, very fine and warm; 5th, clear and fine; 7th and 8th, fine, clear, and hot; 9th, cold morning but a hot day; 10th to the 19th, chiefly fine, but generally very cold and ungenial with piercing winds and some wintery frosts; 20th, a rise of temperature; 21st to the 26th, unsettled, but cold for the season; 28th, a rise of temperature; 29th, fine and warm; 30th and 31st, hot and sultry. At Chiswick the maximum temperature in May, 1838, was 78°, on the 8th. June had very few hot days, and the mean temperature at Greenwich was rather below the average. The 2nd of that month was hot, on which day there was heavy thunder, and to the 5th electrical showers were passing about. The rainfall, on account of the great storms, amounted to 3·37 inches (which was much more than we had in June, 1867), towards the end of the month a few days were very hot. 0·32 in. of rain and some thunder occurred in the first week of July, and a few days were very hot. In the second week several days were very hot, but after the

middle of the month the weather was frequently cool for the season. August was a cool month, indeed the whole summer was considered a very cool one and rather fickle. The hay harvest was favoured by fine weather for the greater part and so was the corn harvest, but the crops were moderate. From the latter part of August to the middle of September the weather was chiefly fine, and occasionally very hot; indeed on the whole, it was fair to the equinox, and October was chiefly fine for about 3 weeks. It is remarkable that in 1809 as well as 1838, the mean temperature of nearly every summer month was below the average, and in each of those years the rainfall was rather below the average.

I do not expect that the weather of the remaining portion of this year will occur exactly in the same order as the weather of 1838, but it will probably bear a considerable resemblance to it.

July 4th, 1867.

G. D. BRUMHAM.

REVIEWS.

Tableau Comparatif des Observations Pluviométriques faites dans le Sud-Ouest de la France de 1861 à 1864, par V. Raulin.

THE "missing link" between the two works by Professor Raulin which we noticed on a previous occasion; the former included rainfall returns from 1714 to 1860, the latter the year 1865; the present rendering the series complete, we have drawn up the following abstract of the fall at a few of the principal stations during the last six years. Professor Raulin is persevering steadily with his good work, and we congratulate him on his success.

Rainfall in France, 1860—65.

STATIONS.	1860	1861	1862	1863	1864	1865
	in.	in.	in.	in.	in.	in.
Paris	27·4	18·8	21·2	18·0	15·6	19·8
Poitiers	33·5	22·2	27·0	20·6	22·1	32·3
La Rochelle	39·3	23·0	23·7	24·8	19·5	33·6
Rochefort	33·9	18·7	18·1	23·3	23·0	34·9
Bordeaux	38·2	23·0	23·2	26·3	28·1	34·6
Bayonne	58·2	31·4	43·0	41·2	40·7	45·2
Aragori .....	...	...	96·1	69·5	51·8	75·8
Pau	40·7	26·1	44·4	29·8	34·6	...
Bagnères de Bigorre	68·9	38·2	52·0	53·2	48·3	59·0
" de Luchon .....	...	...	40·8	40·5	33·8	42·3
Toulouse (Observatory)	21·9	21·7	22·2	20·8	18·9	...
Castelnaudary	32·0	28·3	29·3	17·5	23·2	15·6
Montpellier (Botanic Gardens)	40·6	33·3	52·9	32·7	40·8	30·4
Geneva	41·0	30·7	29·9	35·3	24·6	28·2
Great St. Bernard	56·2	31·7	33·0	51·0	61·6	43·7

From this we see that even at Aragori, the wettest station, the fall is not half what we have in Borrowdale.

Remarks on the Meteorology of 1866, by C BARHAM, Esq., M.D.

[*Extract from Journal of Royal Institution of Cornwall.*] 8vo, 10 pp.

WELL written notes on the weather in Cornwall in 1866; copious abstracts of the observations made at the Royal Institution at Truro; and monthly rainfall at eight stations.

JUNE, 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 fall.	TEMPERATURE.				No. of nights below 33°.
		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	1.22	- 1.83	.74	2	6	82.5	12	42.8	29	0
II.	Staplehurst (Linton Park) ...	.85	- 1.89	.37	3	9	80.0	2, 11	40.0	29	0
	Selborne (The Wakes).....	1.98	- 1.26	.81	2	8	75.5	2*	34.5	29	0
III.	Hitchen .....	...	...	...	...	...	...	...	...	...	...
"	Banbury	1.80	- 1.48	.72	3	9	79.0	11	39.5	29	0
"	Wisbech	1.25	...	.30	2	13	79.0	11	40.7	8	0
IV.	Bury St. Edmunds (Culford).	.73	- 1.85	.68	5	10	82.0	12	36.0	28	0
V.	Calne	2.18	...	.88	2	10	79.0	27	39.8	29	0
"	Plymouth (Goodamoor)	2.25	- 2.90	...	...	10	83.0	...	36.0	...	...
"	Barnstaple	1.02	- 3.10	.24	20	9	...	...	...	...	...
"	Taunton (Fulland's School)	1.39	- 1.48	.46	2	7	80	27	44.0	8	0
VI.	Shrewsbury (Highfield)	1.45	- 1.49	.49	3	9	76.0	26	...	...	...
"	Tenbury (Orleton)	1.20	- 2.33	.35	2	13	79.8	27	39.8	8	0
VII.	Leicester (Wigston)	2.01	- .75	.84	4	9	84.0	11	40.0	13¶	0
"	West Retford .....	...	...	...	...	...	...	...	...	...	...
"	Derby	2.38	- .51	1.02	3	10	80.0	11†	45.0	15**	0
VIII.	Manchester	1.59	- 1.75	.40	3	13	81.8	12	45.0	15††	0
IX.	York .....	...	...	...	...	...	...	...	...	...	...
"	Skipton (Arncliffe)	1.81	- 2.29	.40	7	8	74.0	29	40.0	8	0
X.	North Shields	1.49	- 1.25	.67	3	11	71.5	27	39.2	8	0
"	Borrowdale (Seathwaite).....	4.90	- 5.61	1.96	6	13	...	...	...	...	...
XI.	Abercarn	1.46	...	.31	5, 7	7	84.0	28	46.0	8	0
"	Haverfordwest .....	.71	- 2.94	.33	13	...	77.5	11	43.0	30	0
"	Rhayader (Cefnfaes).....	.55	- 3.43	.20	3	8	78.0	...	37.0	...	0
"	Llanberis (R. Victoria Hotel)	...	...	...	...	...	...	...	...	...	...
XII.	Dumfries	1.72	- 1.18	.30	4	14	78.5	26	43.0	23	0
"	Hawick (Silverbut Hall)	1.12	...	.24	3	11	...	...	...	...	...
XIV.	Ayr (Auchendrane House) ...	3.17	- .18	1.12	4	13	75.0	11‡	38.0	8	0
XV.	Otter House	3.04	- .80	.50	9	12	70.0	11	38.0	8	0
XVI.	Leven (Nookton)	1.96	- .28	.58	3	13	70.0	29	42.0	8	0
"	Stirling (Deanston)	2.20	- .72	.36	6	14	74.0	26	41.0	5|||	0
"	Logierait	1.89	...	.77	3	11	...	...	...	...	...
XVII.	Ballater	1.37	...	.22	5	16	75.0	26	36.0	20	0
"	Aberdeen	1.29	...	.45	6	12	75.0	28	40.4	8	0
XVIII.	Inverness (Culloden)	2.38	...	.59	6	12	69.8	26	40.7	8	0
"	Fort William	3.95	...	.95	5	16	...	...	...	...	...
"	Portree	5.66	+ .88	1.46	5	13	68.0	26	32.3	8	0
"	Loch Broom	2.98	...	.65	3	20	...	...	...	...	...
XIX.	Helmsdale	1.45	...	.27	8	12	...	...	...	...	...
"	Sandwick	1.79	+ .26	.34	7	17	...	...	...	...	...
XX.	Cork	1.57	...	1.13	4	7	...	...	...	...	...
"	Waterford .....	.93	- 2.05	.43	6	12	78.0	22§	46.0	8	0
"	Killaloe	2.34	- 1.29	1.18	2	8	81.0	10	41.0	8	0
XXI.	Portarlington .....	.85	- 2.40	.51	5	10	70.0	11	41.0	8	0
"	Monkstown .....	.48	- 2.14	.27	4	5	...	...	...	...	...
XXII.	Galway	1.75	...	.99	4	11	75.0	19	46.0	6, 8	0
"	Bunninadden (Doo Castle) ...	1.64	...	.51	3	8	71.0	27	33.0	26	0
XXIII.	Bawnboy (Owendoon)	1.20	...	.62	4	13	...	...	...	...	...
"	Waringstown .....	.87	...	.37	4	9	76.0	11||	38.0	7	0
"	Strabane (Leckpatrick)	1.77	...	.57	4	15	74.0	10	37.0	26	0

* And 10th & 27th. †And 27th. ‡And 26th. §And 24th. ||And 26th & 27th. ¶And 28th.

**And 16th. ††And 23rd. |||And 14th & 19th.

+ 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 morning of 3rd.

LINTON PARK.—T on 3rd, 5th, and 7th, after which time the weather was exceedingly dry, though at no time hot, compared with former years; prevailing winds S. and S.W. up to the 14th, after that mostly N. and N.E. Wheat not generally in ear till the 21st being three days later than the average; 27th very dry day. Hay crop abundant and fine weather to mature it.

SELBORNE.—Prevailing wind N., with but little variation. The changes of temp. were remarkable, both at the beginning and end of the month. At Woolmer Forest on 30th I observed potatoes in every cottage garden cut by the frost, and the young ferns in the wood were also much cut.

BANBURY.—Wheat in bloom on 26th.

WISBECH.—Nearly half the month was dull, the wind being N.E. or N.W. was very cold; wheat in ear on 10th. There is a fine crop of hay, and as the last week was free from R, it was stacked in fine condition.

CULFORD.—A month of very variable temp. but chiefly very cold for the season, and the latter part of the month unusually dry.

CALNE.—Heavy R on 2nd, 24 fell in $\frac{1}{2}$ hour; TS in S. at 5 p.m. on 3rd; TS on 24th.

ORLETON.—The first 8 days were cold, with R every day; the remainder of the month dull, hot, and dry, with occasionally bright days. Bar. very high on 27th and 28th, with small misty R on the latter day from 7 to 11 a.m.; temp. of month below the average; no T or L.

DERBY.—Great progress made in securing a marvellous crop of hay.

NORTH SHIELDS.—Heavy R on 3rd, T on 4th. A cloudy month, though the R was little more than half the average. St. Bernard's lily, double red flycatcher, and summer violet in flower at the beginning of the month, French rose, scarlet geranium, grass iris, and double red campion in the middle of the month, pencilled geranium, perennial blue lupine, and red catchfly on 20th, 21st, and 24th; pink mimulus and dwarf summer aster on 25th, and many others at the end.

SEATHWAITE.—Only one day on which more than $\cdot 60$ of R fell, the total fall being less than half the average, though the month was cold and cloudy.

W A L E S.

ABERCARN.—A fine month, with genial harvest weather.

HAVEFORDWEST.—First three weeks of June, cloudy and cold, wind constantly from N. and N.E.; after the 18th weather more genial; general characteristic of the month, dry, evaporation rapid, and almost entire absence of R; warmer during the last fortnight but the nights cold. Turnip crop likely to be a total failure; hay crop heavy, and likely to be saved in excellent condition.

CEFNFAES.—A dry month. Cold for the season at the beginning of the month, but warm and fine after the first 10 days.

S C O T L A N D.

DUMFRIES.—First 9 days of the month showery with a low temp. Heavy R on 14th and occasional showers up to the 24th, after which the weather was warm and dry. T on 3rd and 14th; the mean temp. $1^{\circ} \cdot 78$ lower than the corresponding month last year; the copious showers at the beginning of the month caused a vigorous growth; crops of all kinds much heavier than last year but two or three weeks later. At close of month fine weather for haymaking.

SILVERBUT HALL, HAWICK.—The most pleasant and genial month of June that we have had for some years, the crops all look well and give promise of an abundant harvest.

AUCHENDRANE.—Although the mean temp. of this June has been rather low, especially during the nights, there have been no frosts, and vegetation made great progress. Heavy R between the 5th and 8th.

OTTER HOUSE.—A calm, cloudy, and moderately warm month; ther. from 38° to 70° ; R below the average. The country may now be said to be in its fullest beauty.

DEANSTON HOUSE.—T on 3rd and 5th. Weather changeable from hot to cold; latter part of the month warm and fine; garden produce at the end of the month still backward for the season of the year.

LOGIERATT.—A fine month, and crops looking well. T on 3rd, something approaching a water-spout very closely, which cut up roads and did much damage.

BALLATER.—T on 2nd and 3rd. R fell to a considerable extent during the first week, and to the middle of the month the prevailing weather was cold for the season; after that time the temp. increased, reaching 75° on the 26th. Vegetation (which had previously been somewhat checked) advanced rapidly, and by the end of the month the country presented a very fine appearance.

ABERDEEN.—T on 4th, 6th, and 13th. A month of good, though somewhat changeable weather. Bar. about $\frac{1}{10}$ above the average, with $\frac{1}{10}$ greater range. R below the average. Prevailing winds N.N.W. Crops looking well, but from three weeks to a month later than last year, though much progress has been made during the last fortnight. Wild plants only coming into flower that were in seed at this time last year.

FORT WILLIAM.—T on 3rd. A pleasant month, though the fall of R, especially in the earlier portion, was rather above the average.

PORTREE.—This month on the whole has been the coldest June for many years, and consequently the crops are backward.

LOCHBROOM.—S and sleet on 7th, 8th and 9th. R daily from 1st to 17th.

I R E L A N D.

MONKSTOWN.—The driest month I have recorded since September, 1865, when '06 fell; also the longest period without R since that date. We had from June 6th to the 2nd of July (26 days) only '01 of R.

DOO CASTLE.—Wet to 6th, from which time to the end of the month only '10 of R fell, the wind during this period being mostly N., N.W., and N.E. The temp. low for June. The early sown corn looks healthy and luxuriant, but oats sown in April and beginning of May, though looking green at a distance, are poor and short, and the ground cracked for lack of moisture. Though the weather has been dry, there has been less sunshine than usual.

OWENDOON.—The latter part of the month remarkably fine, and, with the exception of oats in some localities, all the crops look well. Fruit seems to have suffered much from the severity of the spring. Considering the long spell of dry weather we have had, there have been fewer sunny days than we expect in June, and evaporation consequently has been less. As an instance I may mention that there is low lying land near here, on which in winter we have a beautiful lake, and in summer excellent pasturage. Generally it is quite dry at the end of April, but this year there is water up to July, which I attribute to lack of powerful sun; others ascribe it to complete saturation of land from previous rains, probably both causes act together.

WARINGSTOWN.—First week showery, remainder of month dry and warm. Wheat very good, but flax and turnips failures.

LECKPATRICK.—Greater part of the R was measured in the first week. Most favourable weather for all growing crops; turnips promise well; meadows give heavy produce of hay. Heat moderate during the hottest period. N. winds and partial clouds prevented the ther. rising above 75°. Bar. nearly stationary at 30·75 from 10 p.m. on 26th to 10 a.m. 28th, from which time it fell gradually to 29·922 on 30th.

EVAPORATORS.

To the Editor of the Meteorological Magazine.

SIR,—I see that you have opened a department in the *Meteorological Magazine*, for gossip, queries, and the like. May I, therefore, enquire whether evaporating gauges give the exact loss of water from the earth? It is the custom, I believe, to leave a space unoccupied by water, in order that a sudden fall of rain may not cause the gauge to overflow. But then the sides of the vessel must shade a portion of the water surface from the sun's rays, so that evaporation must be retarded. I have an evaporator which is read at the close of each month only, and I am not aware if the leaving of a space, as described above, affects the result or not; could you inform me?—I remain, Yours truly, E. G. ALDRIDGE.

[We consider evaporators as at present constructed very unreliable, and have often expressed that opinion. We hope to discuss the matter fully before long, and shall be glad of Mr. Aldridge's assistance.—Ed.]

