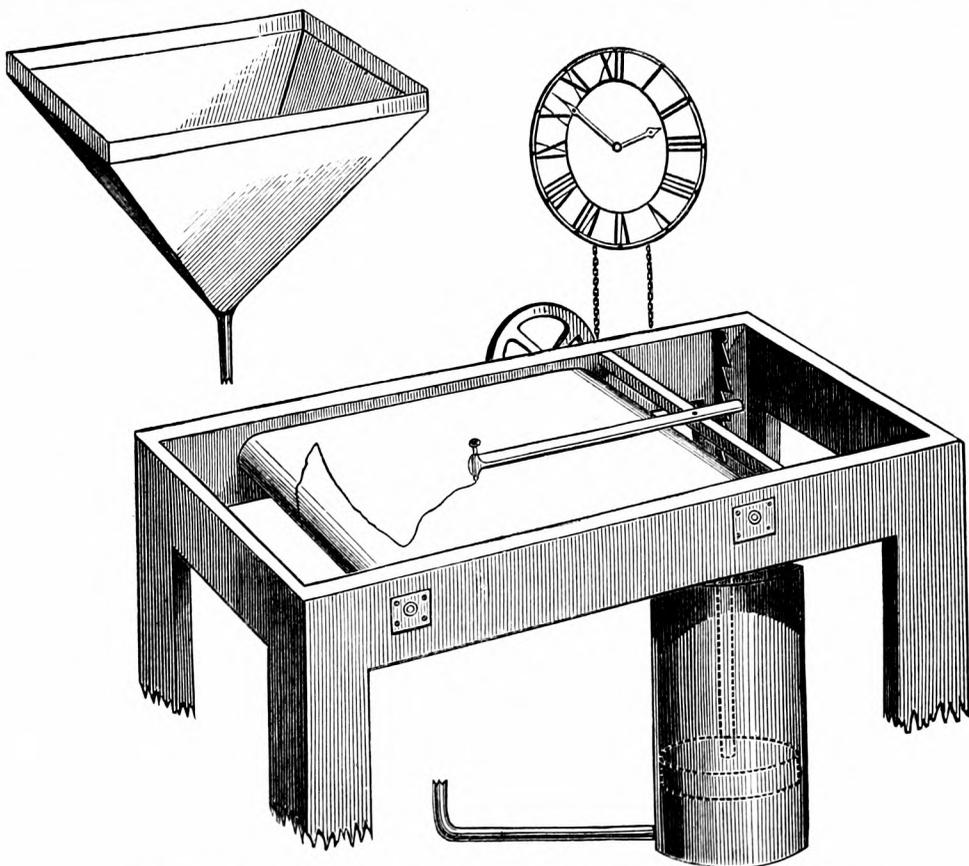


(1.) BEVAN'S SELF-RECORDING RAIN GAUGE. (Scale  $\frac{1}{8}$ ).



(4.) DOLLOND'S SELF-RECORDING RAIN GAUGE. (Scale  $\frac{1}{8}$ ).

# BRITISH RAINFALL, 1878.

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ON

# THE DISTRIBUTION OF RAIN

OVER THE

# BRITISH ISLES,

DURING THE YEAR

# 1878,

AS OBSERVED AT ABOUT 2000 STATIONS IN GREAT BRITAIN  
AND IRELAND,

WITH A DESCRIPTION OF ALL KNOWN FORMS OF  
SELF-RECORDING RAIN GAUGES.

COMPILED BY

## G. J. SYMONS, F.R.S.,

*Secretary of the Meteorological Society; Membre du Conseil de la Société Météorologique de France; Member of the Scottish Meteorological Society; Member of Council of the Royal Botanic Society; Member of Council of the Social Science Association; Member of Council of the Sanitary Institute; Fellow of the Royal Colonial Institute; Hon. Mem. Watford Nat. Hist. Soc., &c.*

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LONDON:

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1879.

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—  
1879.

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Page 154.—Keswick, *for* 69·03 *read* 67·03 ; *for* 8·47, 6·47 ; and *for* 14. 1F.

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ERRATA IN BRITISH RAINFALL, 1877.

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- Page 21.—Eighth line below table, *for* 24 in. S.E. *read* 5 in. S.E.
- „ [24].—August 20th *for* Rhuy *read* Rhug.
  - „ [25].—August 23rd, the Babbacombe entry refers to the 24th.
  - „ [94].—Fall at Dartmoor Prison in December *should be* 6·00, and in year 107·82.
  - „ [96].—Castle Hill, Fishguard, is in Pembrokeshire.
  - „ [98].—Castle Lough, Nenagh, is in Tipperary ; but Ennis and Mil-  
town are, as stated, in Clare.
  - „ [113].—Riversdale, Hanworth, 27·68, *should be* 26·68.
  - „ [142].—W. Hendon Ho., Sunderland, 30·48 *should be* 30·51.
  - „ [146].—Cardigan, Warne Hill *should be* Waen bull.

## BRITISH RAINFALL, 1878.

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THE yearly increasing severity of the ordeal of examination and comparison through which the returns upon which this publication is based have to pass, is both beneficial and prejudicial. It is beneficial, because it greatly increases the accuracy of the figures finally published ; it is prejudicial, for it enormously increases the labour of verification, and in spite of the most strenuous efforts, it delays the publication. I know that perfect accuracy is unattainable, but both inclination and duty compel me to use every effort in that direction, efforts which have hitherto been very successful.

I venture to ask special attention to the article on Self-Recording Rain Gauges. It is the only attempt at compiling such a history which has ever been made, and affords remarkable evidence of the necessity for some arrangement whereby mankind can easily learn what their predecessors have done, not only in their own country but abroad. For it will be seen from the chronological narrative that after nearly perfect instruments have been invented and made, others of the crudest nature have been designed, and also instruments practically identical have been designed and brought out as novelties over and over again. I purpose completing the article in the next volume, and shall be obliged by references to any omissions in the present list.

G. J. SYMONS.

62, CAMDEN SQUARE, N.W.,

*May* 28, 1879.

## R E P O R T .

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It is always a difficulty, in compiling an annual report, to decide how much repetition is expedient. The Astronomer Royal evidently believes that every volume should be perfect in itself, and reprints page after page verbatim year after year. There are many reasons in favour of this course, and I know of only two against it : (1) that it augments the already frightful accumulation of printed matter, and (2) that it is costly. The first objection is not a very serious one, but the second is fatal with any organization which is crippled for want of funds. I do not bring forward these remarks with the remotest idea of complaining of deficient support, or of swerving from my fixed determination that so long as I have the honour of carrying on this rainfall work, it shall, in point of accuracy and efficiency, be second to none. But I know that there are a dozen subjects which might with advantage be set forth in this report, and I know also that if I made this report as long as I should like, the cost would involve the stoppage of more important work. It is better to do good work, than to spend money in announcing that you are doing it. I shall therefore make it as short as possible, and bring into it one or two parts of the work which have hitherto formed separate sections.

**Routine.**—This is a capital section to start with, because it includes so much ; the collecting and checking of some 4,000 monthly returns and the accurate printing of about one-third of them ; the collecting and checking of about 1,000 full daily registers ; the collecting and checking of over 2,000 yearly abstracts ; the maintenance of mountain gauges in various districts ; the due arrangement and preservation of every document received ; the entry of the values reported in all the necessary record books ; the maintenance of a perfect list of all the observers' addresses ; the maintenance of a perfect record of the life history (if I may so describe it) of every rain-gauge station, with notes of all the changes in the instruments, the position, the trees surrounding it, in its height, and in the time of observation, or person by whom it is observed ; the correspondence with the observers and

with foreign *savants*; the supply of all necessary forms; the extraction from the observers' reports of the data required for publication; the preparation of this volume; the testing of rain-gauges before use; and travelling in all parts of the country to see that the observations are supplied from good instruments well placed. The foregoing, which is far from an exhaustive list, is sufficient proof how hard my two valued assistants and I myself have to work; whether it is expedient that such a pressure should be left upon us is at least a matter for consideration; but I am glad, and rather proud, to say that in every one of the branches mentioned, our work is complete up to the present date.

**Our Staff of Observers.**—In the last volume, facts relative to this subject were given under three headings—"County Lists," "Missing Returns," and "Chronicle of New Stations established and required, and of changes in the permanent staff of observers during the year." This year, for brevity, I purpose compressing these various notes into a single statement. The first subject, "County Lists," may be dismissed with the remark that our MS. list is as perfect as it is possible to make it. "Missing Returns" is a title which ought to disappear, and would do so if all observers were as anxious for the perfection of the rainfall organization as I am myself. But some people have the terribly bad habit of procrastinating, and the tardiness of some observers in forwarding their records gives my assistants weeks of work, costs many pounds for postages alone, and, worst of all, seriously retards the date of publication. I have often wished that it were possible to make a hard and fast rule that all records *must* be forwarded before the 1st of March; surely two months is ample time for anybody to make up so simple a return as I require. But if I had done so this year, several hundred returns would have been shut out, and the utility of the work more seriously injured by incompleteness, than it is by apparently tardy publication. It has been suggested that late returns might be published in subsequent volumes, but that would be too much of a premium for being behind, and would mitigate the only punishment which I can inflict, that of exclusion. I am glad to say that the systems of publication of tables of the rainfall of each month, in county newspapers, are all maintained, as is also the separate issue of monthly tables for Wiltshire, by the Rev. T. A. Preston. I am not aware that any more of the county superintendents have begun to issue such tables, or, indeed, that they have carried out any operations of a sufficiently

important nature to claim notice here. There are, however, two gentlemen who have contributed greatly to advance rainfall work during the past year, and to improve our organization. Mr. Baldwin Latham, C.E., who resides at Croydon, has for years been studying the *régime* of the water in the chalk of that part of Surrey, and he has during the year 1878 established a set of twenty stations in Surrey and Kent over an area of about 100 square miles reaching approximately from N. to S. from London to Reigate, and from E. to W. from Westerham in Kent to Reigate in Surrey. The stations have been most carefully chosen, and those that I have inspected have been perfect in all respects. As most of the stations were only started during 1878, the records are necessarily imperfect for that year, but in my next volume I hope to give all the returns and a map showing the position of the stations. The other gentleman to whom thanks are especially due is Mr. Maitland, of Chester Place. Regular readers of these volumes will remember that in the year 1863 the late Mr. Isaac Fletcher, M.P., F.R.S. (whose recent untimely decease is so generally regretted) established a number of rain gauges on the mountains and in the valleys around Sca Fell, and employed an assistant to observe them regularly. For several years Mr. Fletcher devoted considerable attention to them, and valuable articles written by him will be found in our early volumes. By degrees, however, Parliamentary and other subjects prevented him attending to rainfall, and for several years we have been unable even to obtain a copy of the monthly results. These facts coming to the knowledge of Mr. Maitland, he communicated with Mr. Fletcher, and arrangements were made whereby Mr. Maitland has undertaken the entire trouble and cost of maintaining this series of gauges, which includes the highest station in the British Isles (Sca Fell, 3,200 ft.) and the wettest station in Europe (The Styne, where the fall in 1878 was 149·04 in., although in that locality the fall was far below the average). As regards individual stations, I do not think that any need especial mention; there are several hundred new ones, and on the whole I believe that the distribution geographically considered continues to improve; but our obituary is a long one this year, and we can only keep our staff up to its present strength by the constant accession of new observers. I hope that all my readers know that I am always ready to answer any questions respecting the expediency of starting stations in any locality, and if they will consider who would be likely to make regular correspondents, and will!

consult me as to the necessity for returns from their residences, they will render valuable aid.

**Arrangements for the systematic observation and record of the Rainfall of the British Isles.**—Under this title I wrote a short pamphlet last year containing the following sections: (1) Introductory and Historical; (2) Patterns of rain gauges, and where to buy them; (3) Testing gauges; (4) Blank forms; (5) Change of residence of observers; (6) Rainfall rules; (7) List of publications. Between two and three thousand copies of this were gratuitously distributed, and I believe that they have effected the object which I had in view, viz., to increase the observers' interest in the subject, and therefore their care in keeping the gauge in good order, and the record with accuracy. They are especially useful for new beginners, and I am prepared to supply gratuitously any reasonable number which may be required.

**Finance.**—This is still the main obstacle to progress, for our work grows apace while the new subscribers, and the augmented subscriptions of some of our old ones, are but just sufficient to replace the losses due to the death of many old supporters, and the numerous (I trust temporary) withdrawals due to commercial and agricultural depression. There are two aspects of the financial question which are eminently gratifying—(1) that those who once begin to subscribe scarcely ever cease to do so except from death or misfortune; this surely indicates that they are satisfied with the conduct of the work; (2) that to my own knowledge there are hundreds of observers who would supply funds as readily as they do observations, if it were in their power to do so; (3) that while we do not receive a farthing from any society, or from Government—indeed, we pay the latter about £100 per annum for postage—we, that is to say the volunteer observers of this country, keep up a system of rainfall registration which has no equal in the world, not even in the United States.

**Circular to Members of the British Association.**—Before closing this subject, I ought to mention another branch of it. Readers of these volumes will recollect the stoppage of the British Association grant, and the very flattering resolution of Section G as to the importance of rainfall work, and the desirability that its support “should be taken up in a larger public spirit,” which was passed at the Glasgow meeting. I thought that as there are upwards of 3,000 members and associates of the British Association, it was desirable to bring this resolution before the whole body, and I therefore

prepared a circular which had the approval of several members of the extinct rainfall committee. Three thousand copies were printed and issued, but the response has been scarcely sufficient to repay the cost of issuing the circular. Only 69 replies were received (or 1 in 43), and nearly all were confined to forwarding the bare price (5s.) of a copy of this work—out of the 3,000 there are but 8 who have come forward and claimed a place in the following list.

LIST OF ALL SUMS OF £1 AND UPWARDS RECEIVED IN PAYMENT  
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Palmer, A., Esq. ....	1	7	6	Tasker, T., Esq. ....	1	1	0
Parker, Rev. Dr. ....	1	5	0	Taylor, F., Esq. ....	1	1	0
Parkin, A., Esq. ....	1	5	0	"    Rev. H. ....	2	0	0
Parnell, J., Esq. ....	2	5	0	Tippinge, F. G., Esq. ....	1	1	0
Pasley, Admiral Sir T. S., Bt..	1	13	6	Trimleston, The Rt. Hon. Lord	1	0	0
Paterson, Miss (2 years).....	1	0	0	Tucker, H., Esq. ....	1	0	0
Paulin, T., Esq. ....	2	12	0	Tuckett, F. F., Esq. ....	1	10	0
Peake, H. B., Esq. ....	1	1	0	Tyndall, W. H., Esq. ....	1	1	0
Pearson, F. F., Esq. ....	1	1	0	Vibert, J. E., Esq. ....	1	1	0
Peckover, A., Esq. ....	1	1	0	Walker, A. O., Esq. ....	1	16	0
Pennant, P. P., Esq. ....	1	0	0	Wallis, J., Esq. ....	1	0	0
Perry, Rev. S. J., F.R.S. ....	1	5	0	Ward, H., Esq. ....	1	1	0
Phillips, E. P., Esq. ....	1	10	0	Waring, Major ....	1	10	0
Phipps, P., Esq., M.P. ....	1	6	0	Warren, G., Esq. ....	2	11	0
Pleydell, J. C. Mansel, Esq. ...	1	0	0	Watkins, J., Esq. ....	2	16	0
Preston, Rev. T. A. ....	4	10	0	Wells, L. B., Esq., C.E. ....	1	1	0
Prior, M. R., Esq. (8 years) ...	2	0	0	Wheatley, T. E., Esq. ....	1	1	0
Pryse, Sir Pryse, Bart. ....	1	1	0	Whitaker, B. J., Esq. ....	1	0	0
Radford, Dr. ....	2	0	0	Whitbread, S. C., Esq., F.R.S.	1	0	0
Rankin, J., Esq. (2 years).....	2	2	0	White, J., Esq. ....	1	0	0
Reade, T. M., Esq., C.E. ....	1	12	0	Wildgoose, R. W., Esq. ....	1	16	4
Robertson, H., Esq., M.P. ....	2	7	0	Wilkin, F., Esq. ....	1	0	0
Robinson, J., Esq. ....	1	1	0	Williams, Rev. W. W. ....	1	1	0
Robson, J. W., Esq. ....	1	6	0	Wilson, G. S., Esq. ....	1	5	0
Rylands, T. G., Esq. ....	1	1	0	"    Thomas, Esq. ....	1	7	0
Scott, J. W., Esq. ....	2	2	0	Wingfield, Rev. C. L. ....	1	0	0
"    Russell, Esq. ....	2	10	0	Woodhouse, A. J., Esq. ....	2	0	0
Shackleton, J., Esq. ....	1	0	0	Woollett, G. C., Esq. ....	1	0	0
Sharples, G., Esq. ....	1	1	0	Wortham, H., Esq. ....	1	10	0
Shelford, W., Esq., C.E. ....	1	1	0	Yonge, Duke, Rev. ....	1	0	0
Shiffner, Miss I. ....	1	0	0	Young, W. B., Esq. ....	1	0	0

[Subsequent receipts will be acknowledged monthly in the *Meteorological Magazine*. Cheques should be crossed National Bank, and Post Office Orders drawn on Camden Road, London, N.W.]

## ON SNOW-FALL MEASUREMENTS.

By COL. M. F. WARD, F.R.A.S., F.M.S., of Rossinière, Canton Vaud, Suisse.

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A WINTER of continuous low, though not unusually severe, temperature, and of snow—such as an old man 70 years of age told me a day or two ago he has never before seen—has enabled me to pursue the subject of “Measurement of Snow,” the result of which I send to you. I know you dislike tables, so I have made the following one as short as possible, and I have omitted the column for “inverted funnel,” having invariably found that, when snow fell during a hard frost, the measure by it agreed with that of the Snowdon gauge; when, on the contrary, it fell during a temperature above  $32^{\circ}$ , it shewed considerably less than the gauge, the snow not lying for some time after the commencement of the fall. All such falls I have omitted, entering only those during which the temperature, on the ground at least, was below  $32^{\circ}$ .

The measurement of depth was taken from a board placed close by the gauge, and also from a level path close by.

The temperature column shews the extreme range during the fall (as shewn by a Six's thermometer), read as nearly as possible at its commencement and end, the first reading being that of the commencement.

I have also omitted all falls during any part of which rain fell, but I have inserted the fall of snow and hail which fell in 40 minutes during a thunderstorm on the evening of December 21st, an account of which appeared in the *Meteorological Magazine* of January, 1879, and with reference to which I may mention that I have since ascertained from the inhabitants of châteaux (about 1,500 feet above this) that the sky there was, as I fancied, cloudless, and that the storm was below them.

TABLE I.

DATE.	Yield in water.	Depth of fall.	Dura- tion of fall.	Temperature during fall.	Force of wind.	Remarks.	Inches of S = lin. R
	in.	in.	hours.	deg.			
1878.							
Oct. 29	0.400	4.0	12	29.0—31.0	2	Small crystals	10
30	.480	4.5	22	15.0—20.0	3	"	9
31	.050	1.0	...	20.0—22.0	4	"	20
Nov. 5	.230	3.5	8	27.0—30.0	0	Very light fleecy flakes	15
6	.430	8.0	...	27.0—29.0	0	"	19
8	.400	7.5	7	29.0—30.0	2	"	19
13	.070	1.0	...	27.0—27.5	0	Small flakes	14
21	.200	2.5	5	29.0—30.0	0	"	12
30	.040	0.5	3	30.0—31.0	0	"	12
Dec. 5	.220	5.0	6	26.0—32.0	0	Very light fleecy flakes	23
6	.200	5.0	9 $\frac{1}{4}$	28.0—21.0	0	"	25
8	.390	3.5	24 $\frac{1}{4}$	5.0—23.0	0	Powder	9
11	.200	2.0	7	14.0—20.0	0	"	10
14	.350	3.0	4	10.0—19.5	0	"	9
15	.330	5.0	12	26.0—28.0	0	Very light snow	15
16	.100	1.0	1	22.0—23.0	0	Powder	10
17	.230	6.0	6	30.0—32.0	0	Light fleecy flakes	26
"	.340	6.0	4	30.0—23.0	0	"	18
18	.680	2.0	2	30.0—26.0	0	"	25
19	.950	8.0	3	15.0—26.0	0	Large dense flakes	8
20	.990	17.0	12 $\frac{1}{2}$	30.0—32.0	0	Very light fleecy flakes	17
21	.300	8.0	4	26.5—27.0	0	"	27
"	.600	6.0	3	26.5—26.0	0	Snow and hail, T L	10
1879.							
Jan. 4	0.680	4.0	7	33.0—25.0	0	Very dense heavy flakes	6
5	.040	0.5	$\frac{1}{2}$	26.0—19.0	0	Light snow	12
8	1.300	13.0	12 $\frac{1}{2}$	7.0—17.0	0	Powder	10
9	.500	5.0	1 $\frac{1}{2}$	12.0—13.0	0	"	10
10	.170	2.0	2	-9.0—7.4	0	"	12
17	.090	2.0	2	28.0—30.0	0	Light fleecy flakes	22
18	.130	2.0	...	6.0—9.0	0	Powder	15
19	.030	1.0	...	28.0—32.0	0	Light fleecy flakes	33
Feb. 5	.160	1.5	2	32.0—33.3	0	Dense flakes	9
13	.060	0.5	4	30.0—32.0	0	"	8
16	.220	2.0	4	31.5—33.0	0	"	9
17	.420	3.5	7	26.0—37.0	0	"	8
18	.890	12.0	24	29.0—30.0	0	Violent gale 5 hours	13
19	.200	2.0	8	26.0—27.0	0	Powder	10
20	.300	3.0	8	32.0—26.0	0	"	10
21	.290	3.0	3	30.0—28.0	0	"	10
22	.150	1.5	...	29.0—28.0	0	"	10

When the weather was fine, I made a few experiments with fresh fallen snow, with a view of ascertaining its density and also the amount of evaporation or condensation. I placed a tin box in the open air, the surface of the snow being fully exposed to the sky but sheltered from the rays of the sun. I weighed it at 9 a.m. and 3 p.m., measuring the depth at the same time. Table No. II. shews the results.

TABLE II.

	Weight of Snow.			Depth of snow.	Temp. at time of weighing	Temp. since last weighing.		Weather.	Remarks.
	Grammes	lb.	oz. 100ths.			Min.	Max.		
				in.	°	°	°		
Fine snow. Temperature during fall 7°·0 to 23°·0.									
3 p.m.	302	0 11	·39	4·2	23·0	...	23·0	b	
9 a.m.	300	0 10	·58	4·1	13·0	8·0	...	o	
3 p.m.	298	0 10	·51	3·9	22·2	...	31·8	o	
9 a.m.	285	0 10	·06	3·4	31·0	21·0	...	b	
3 p.m.	322	0 11	·36	2·6	35·8	...	37·0	o	Thaw.
9 a.m.	320	0 11	·29	1·1	35·3	30·0	...	o	„ slush.
Dense heavy flakes. Temperature during fall 34°·0 to 36°·0.									
9 a.m.	791	1 11	·90	4·0	36·5	...	...	b	
3 p.m.	791	1 11	·90	3·5	39·0	...	40·0	b	
9 a.m.	709	1 9	·01	2·8	26·0	25·0	...	b	Fresh snow fell.
Snow in powder. Temperature during fall 7°·0 to 17°·0.									
9 a.m.	245	0 8	·65	4·5	12·5	12·5	...	o	
3 p.m.	239	0 8	·44	4·3	13·5	...	13·5	o	
9 a.m.	239	0 8	·44	4·3	—9·0	—9·3	...	b	
3 p.m.	239	0 8	·44	4·2	7·4	...	7·7	b	
9 a.m.	238	0 8	·40	4·0	34·0	33·0	...	b	
3 p.m.	237	0 8	·37	2·0	32·0	...	35·5	b	
9 a.m.	231	0 8	·16	1·8	22·0	18·0	...	b	
3 p.m.	225	0 7	·95	1·5	36·5	...	38·0	b	
9 a.m.	220	0 7	·77	1·2	22·0	21·0	...	b	
3 p.m.	214	0 7	·55	1·1	28·5	...	28·5	b	
9 a.m.	209	0 7	·38	1·1	26·0	15·0	...	b	
3 p.m.	195	0 6	·88	1·0	25·5	...	25·5	b	Fresh snow fell.

[I have ventured to add one column to Col. Ward's first table, in order to examine the equivalent depths of snow and water and their relation to the character assigned to the snow. It will be seen that the range is almost identical with that which I gave in *British Rain-fall*, 1865, Appendix p. vii., where the minimum density was 35 to 1, the maximum 5 to 1, and the mean 14 to 1. In the present table the minimum is 33 to 1, the maximum 6 to 1, and the mean 14 to 1.

The accuracy of the Colonel's descriptions is singularly confirmed by the following table, in which the mean equivalent is placed against each character of snow.

	in.		in.
Very dense heavy flakes.....	5·9	Small crystals.....	13·1
Large dense flakes.....	8·4	Small flakes.....	13·1
Dense flakes.....	8·8	Very light snow.....	15·1
Snow and hail.....	10·0	Very light fleecy flakes.....	20·6
Powder.....	10·4	Light fleecy flakes.....	24·9
Light snow.....	12·5		

I do not see that any modification of Rule XV. is rendered necessary by the above recorded experiments; on the contrary, they appear to confirm its statements.—Ed.]

## ROTHERHAM EXPERIMENTAL RAIN GAUGES.

The fullest set of gauges erected for the purpose of determining the rate of decrease in the amount collected by rain gauges at various altitudes is that originally started by Mr. Chrimes, and they have, besides, the advantage of being so constructed as to present the least possible surface to the wind, and therefore deflect it as little as is possible. These gauges were erected in 1866, on Boston Reservoir, Rotherham, and observed daily until the end of 1873. During 1874 they were removed to a much more exposed position on the Bank of Ulley Reservoir,\* and have been regularly observed, and abstracts of the results published, ever since. I desire to avoid inserting masses of figures in this article, and therefore give only the results, which are as follows :—

*Ratio of Rainfall at various heights to that at one foot.*

BOSTON RESERVOIR.			ULLEY RESERVOIR.			
Height of Gauges.	Gauges read Daily.	Diff.	Gauges read Monthly.	Gauges read Daily.	Diff.	Gauges read Monthly.
1 ft.	100·0	o	100·0	100·0	o	100·0
5 ft.	94·5	—0·6	93·9	84·5	+0·3	84·8
<b>10 ft.</b>	<b>90·9</b>	<b>—0·4</b>	<b>90·5</b>	<b>86·7</b>	<b>—1·0</b>	<b>85·7</b>
15 ft.	89·7	+0·4	90·1	86·1	—2·0	84·1
20 ft.	88·5	+0·2	88·7	88·0	—1·1	86·9
25 ft.	87·9	—0·6	87·3	90·1	—1·8	88·3

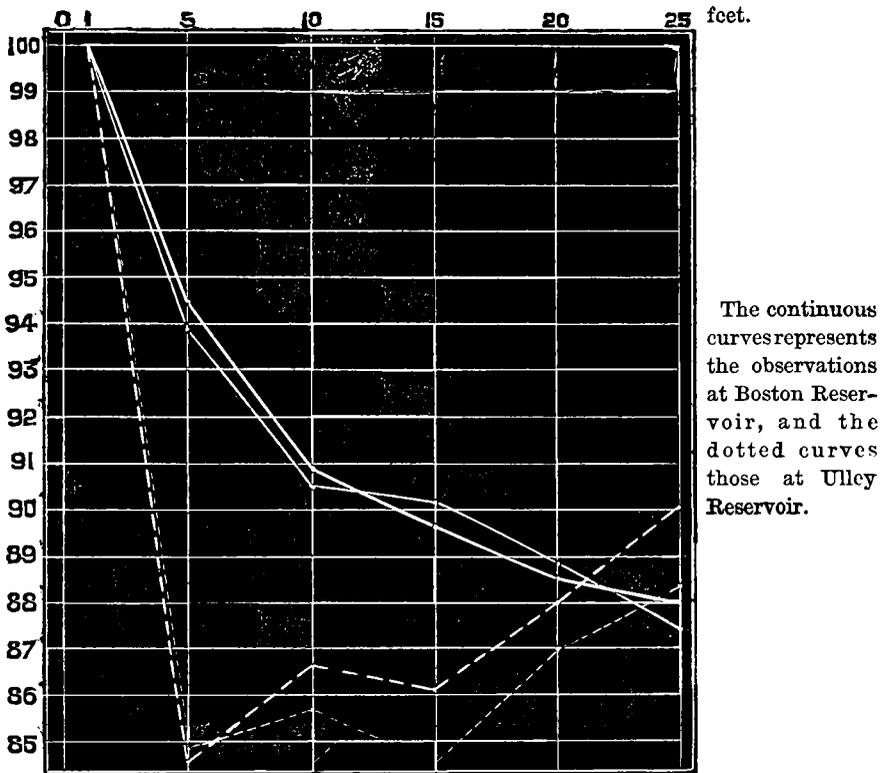
These values are also given on the annexed diagram.

These Ulley Reservoir values are very extraordinary, and unlike any others; but as the differences between the duplicate gauges at each height are generally under 1 per cent., and never exceed 2 per cent., while the difference between the 5 ft. ratio at the two stations is very nearly 10 per cent., I believe that it is impossible to impugn the accuracy of the observations. The following diagram makes plain the exceptional fact that the fall at 5 feet above the ground is less than at any other height. Therefore the only thing to be done is to search for the cause.

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\* Engraving and ground plan are given in *British Rainfall*, 1875.

*Decrease of Rainfall, with elevation, at Boston Reservoir and Ulley Reservoir, Rotherham.*



The first step towards finding the explanation of the wide difference between the rate of decrease at the two sites was to ascertain if the rain fell at the same angle at each. In order to compute this, the results of two gauges are used, neither of which forms part of the elevation series, hence we have entirely independent evidence. And it proves very remarkable, for the final outcome of the calculations is that the angle from the vertical, at 5 ft. above the ground, was at—

Boston Reservoir, 41°.      Ulley Reservoir, 55°.

That is to say, the wind blows the rain much more nearly horizontal at the latter station than at the former. Unfortunately, we have no means of knowing whether the angle from the vertical was equally discordant at other heights above the ground.

As an interim trial, I have cut up Table II. in Mr. Stow's article in *British Rainfall*, 1871, and re-arranged it according to the mean monthly angle of the rain falling at 5 ft. above the ground, and from this examination I am inclined to believe that the discordant curve

is due to the cause which I suggested in 1876, viz., the sweep of the wind over the reservoir bank.

It may at first appear very disheartening to obtain such discordant results as those at Ulley, but I do not so regard it. Rule I. says "A rain gauge should not be set on a slope or terrace, but on a level piece of ground." Ulley Reservoir bank, on which the gauges are placed, runs from S. 38° W. to N. 38° E., is about 750 feet long, and the elevation of its top above the natural surface of the ground on the N.W. side varies from nothing at each end to 54 feet in the centre. The outer or N.W. slope rises at an angle of about 25°, the inner of about 18°.

The gauges are all within 200 feet of the S.W. end of the bank, and it was thought that as the chief rains were supposed to come from the S.W., and the gauges were nearly in a line from S.W. to N.E. on the level top of the bank, no serious effect would arise from its sloping sides.

There are three gauges with funnels identical in shape, in size, and in elevation (5 ft.) above the ground, viz., the horizontal mouth of the 5-mouthed gauge, and the two gauges of the elevation series, of which one is measured daily and the other monthly. In the following table the records of these three gauges are compared with those of the 1 ft. gauge read daily. The following particulars will, in conjunction with the plan and view in *British Rainfall*, 1875, furnish all the data required respecting these gauges:—

(1) Description of gauge	... 1 ft.	} Horizontal mouth of 5-mouthed gauge.	5 ft. gauges	
			Elevation series.	
(2) Diameter	... 5 in.	5 in.	5 in.	5 in.
(3) Height above ground	... 1 ft.	5 ft.	5 ft.	5 ft.
(4) Read	... Daily.	Daily.	Daily.	Monthly.
(5) Distance from S.W. end of bank	... } 73 ft.	85 ft.	170 ft.	170 ft.
(6) Height of bank above natural level of ground	... } 10 ft.	12 ft.	28 ft.	28 ft.

Details Nos. (1) to (4) apply both to Boston Reservoir (where the gauges were on a level plateau) and to Ulley; details (5) and (6) refer to Ulley only.

We have already seen that the rain falls much more horizontally at Ulley than at Boston Reservoir. The following table shows that it is very different at different parts of the bank, and thus throws further light upon the question which has detained us so long.

		Amounts.				Ratios.			
		1 ft. Daily.	5 ft. 5mouth'd Horizon'l	5 ft. Daily.	5 ft. Monthly.	1 ft.	5 ft. 5mouth'd Horizon'l	5 ft. Daily.	5 ft. Monthly.
<i>Boston Reservoir.</i>	1871	25·094	24·157	23·684	23·634	100	96·3	94·4	94·2
	1872	37·029	36·313	35·548	35·712	100	98·2	96·0	96·5
	1873	16·789	15·901	15·967	16·201	100	94·8	95·1	96·5
		in.	in.	in.	in.		96·4	95·2	95·7
<i>Ulley Reservoir.</i>	1876	28·655	25·199	23·480	23·861	100	87·9	82·0	83·3
	1877	31·347	28·658	26·361	26·641	100	91·5	84·1	84·9
	1878	24·376	23·198	21·750	21·908	100	95·2	89·3	89·9
						91·5	85·1	86·0	

Before stating the inferences which I draw respecting the reasons for the anomalous curve at Ulley Reservoir, it is desirable to mention one other fact—viz., that the indications of the five-mouthed gauge prove that the fall of rain at that station is rarely from the S.W. and heaviest from E.

*Suggested Explanation of the Anomalous Curve at Ulley.*—I do not wish any higher value placed upon the following suggestions than that assigned to them by that word:—

I think that the bank causes an upward deflection of the wind, and also that the velocity of the wind is greatest in the centre of the bank which crosses the former valley between two slightly rising grounds. If so, the fall in gauges near the level of the ground may be slightly too high, and the amount collected by gauges high enough to feel the full force of the wind (5 to 15 feet) will decrease from the ends to the centre of the bank. It has already been shown that the difference between the amount collected by the horizontal mouth of the five-mouthed gauge, and that by the two ordinary gauges at the same height is now six per cent. instead of one per cent. This difference must be due to position; the gauges which collect least are those nearest the centre of the bank, and if this five per cent. be added to their readings the curve on p. 17 would become much more like the usual shape.

The 25 feet gauges collect more than those at 20 feet; this is the reverse of what usually occurs, but is, very likely, evidence that the upthrow of the wind by the slope of the bank does not extend to more than 15 or 20 feet above it, which is not improbable.

*Conclusion.*—I think that the above affords ample evidence that it is useless trying further experiments as to decrease with elevation in

this position, and ample proof of the wisdom of Rule I. But there are still many gauges in positions quite as bad as these (although not at such elevations above the ground), and I therefore think that it would be desirable to dismount all the elevation series and adapt them for measuring the fall at 1 foot and at 3 feet above the surface—six at the former and six at the latter—and to place them, equidistant, all along the bank. This would not be costly or difficult, and yet I think it would yield very instructive information, and throw light on anomalous records from other localities.

RAIN GAUGE EXPERIMENTS, ULLEY RESERVOIR,  
ROTHERHAM, 1878.

Lon. 1° 19' 9" W. Lat. 53° 22' 59" N. Altitude 184 ft.  $\bar{N}$

FIVE MOUTHED GAUGE.

INCLINED ROTATING GAUGES.

Height above ground.	5ft.					5 ft.	
	Months.	Facing East.	Facing North.	Facing West.	Facing South.	Horizon Centre.	45°
January .....	·790	·990	1·861	1·166	1·424	...	3·887
February.....	·694	·256	·100	·594	·873	1·669	1·159
March .....	·215	·663	·731	·151	·379	1·031	...
April ... ..	·501	·451	·716	·302	1·317	1·484	1·325
May.....	1·048	1·035	·999	1·144	3·208	4·018	2·702
June... .	·912	·510	·244	·632	2·376	2·944	1·777
July.....	·203	·159	·107	·055	·642	·646	·321
August .....	2·989	2·275	·725	·752	6·086	6·710	3·800
September ...	·507	·379	1·003	·898	1·734	2·541	1·817
October .....	·704	·976	1·100	1·017	2·645	3·573	2·819
November ...	·891	3·494	1·528	·728	1·655	3·908	4·634
December ..	·906	·764	1·283	·658	·859	1·133	1·419
Totals .....	10·360	11·952	10·397	8·097	23·198	...	...

RAIN GAUGE EXPERIMENTS, ULLEY RESERVOIR (*continued*).

## ELEVATED GAUGES.

Height above Ground ...	1 ft.			5 ft.			10 ft.		
	Read Daily.	Read Mnthly.	Diff.	Read Daily.	Read Mnthly.	Diff.	Read Daily.	Read Mnthly.	Diff.
Months.									
January .....	1·557	1·548	—·009	1·201	1·271	+·070	1·295	1·209	—·086
February .....	·907	·912	+·005	·799	·803	+·004	·822	·826	+·004
March .....	·498	·489	—·009	·335	·349	+·014	·359	·357	—·002
April .....	1·398	1·406	+·008	1·210	1·215	+·005	1·239	1·246	+·007
May .....	3·376	3·399	+·023	2·986	3·035	+·049	2·976	2·942	—·034
June .....	2·497	2·556	+·059	2·330	2·328	—·002	2·345	2·382	+·037
July .....	·679	·693	+·014	·613	·630	+·017	·619	·631	+·012
August .....	6·198	6·344	+·146	5·992	6·043	+·051	5·960	6·024	+·064
September ...	1·793	1·831	+·038	1·596	1·651	+·055	1·665	1·693	+·028
October .....	2·655	2·668	+·013	2·406	2·356	—·050	2·523	2·531	+·008
November ...	1·770	1·866	+·096	1·389	1·376	—·013	1·524	1·343	—·181
December ...	1·048	1·050	+·002	·893	·851	—·042	·945	·958	+·013
Totals .....	24·376	24·762	+·386	21·750	21·908	+·158	22·272	22·142	—·130

ELEVATED GAUGES (*continued*).

Height above ground .....	15 ft.			20 ft.			25 ft.		
	Read Daily.	Read Mnthly.	Diff.	Read Daily.	Read Mnthly.	Diff.	Read Daily.	Read Mnthly.	Diff.
Months.									
January .....	1·194	1·166	—·028	1·280	1·333	+·053	1·284	1·314	+·030
February .....	·813	·808	—·005	·841	·849	+·008	·822	·840	+·018
March .....	·326	·317	—·009	·338	·352	+·014	·352	·363	+·011
April .....	1·191	1·186	—·005	1·240	1·250	+·010	1·248	1·257	+·009
May .....	2·919	2·839	—·080	3·054	3·039	—·015	3·002	3·002	·000
June .....	2·310	2·269	—·041	2·372	2·381	+·009	2·358	2·368	+·010
July .....	·593	·585	—·008	·615	·633	+·018	·611	·604	—·007
August ... ..	5·870	5·729	—·141	5·991	5·789	—·202	5·916	5·794	—·122
September ...	1·627	1·555	—·072	1·674	1·750	+·076	1·641	1·667	+·026
October .....	2·466	2·363	—·103	2·512	2·512	·000	2·446	2·555	+·109
November ...	1·482	1·393	—·089	1·493	1·449	—·044	1·476	1·469	—·007
December ...	·890	·720	—·170	·918	·838	—·080	·866	·853	—·013
Totals .....	21·681	20·930	—·751	22·328	22·175	—·153	22·022	22·086	—·064

# RAINFALL AT THE ROYAL OBSERVATORY, GREENWICH.

Lat. 51° 28' 38'' N. Long. 0° 0' 0''

Communicated by SIR G. B. AIRY, K.C.B., D.C.L., &c., Astronomer Royal.

No. of days on which rain fell.	1878	MONTHLY AMOUNT OF RAIN COLLECTED IN EACH GAUGE.								
		Self-registering Gauge of Osler's Anemometer.	Second Gauge at Osler's Anemometer.	On the roof of the Octagon Room.	On the roof of the Library.	On the roof of the Photographic thermometer shed.	Crosley's.	Cylinder partly sunk in the ground. read daily.	Cylinder partly sunk in the ground read mntly	On the Royalist Police Ship.
		in.	in.	in.	in.	in.	in.	in.	in.	in.
11	Jan. ...	0·448	0·512	0·586	0·586	0·815	0·975	0·868	1·000	0·684
13	Feb. ...	0·775	0·885	0·973	1·000	1·048	1·285	1·096	1·100	0·888
11	March	0·221	0·283	0·479	0·826	0·888	1·040	1·058	0·970	0·543
15	April..	3·482	3·835	3·626	4·313	4·174	3·630	4·308	4·270	3·761
22	May...	3·292	3·413	3·767	4·157	4·202	4·695	4·292	4·280	2·897
14	June...	3·956	4·269	4·295	4·692	4·480	5·010	4·572	4·455	3·949
9	July...	0·177	0·190	0·240	0·280	0·282	0·400	0·306	0·253	0·390
19	Aug...	4·290	4·636	4·804	5·200	5·347	6·560	5·378	5·400	6·374
9	Sept...	0·428	0·489	0·719	0·732	0·776	1·025	0·820	0·842	0·563
13	Oct. ...	1·033	1·072	1·346	1·408	1·559	1·820	1·663	1·675	1·137
15	Nov ...	1·068	1·223	2·299	3·334	3·289	3·730	3·454	3·500	2·453
16	Dec. ...	0·634	0·706	1·002	1·078	1·079	1·270	1·162	1·211	0·773
167	Sums..	19·804	21·513	24·136	27·606	27·939	31·440	28·977	28·956	24·412

*The heights of the receiving surfaces are as follows :*

	Above the mean level of the Sea.	Above the Ground.
	ft. in.	ft. in.
The two Gauges at Osler's Anemometer ... ..	205 6	50 8
Gauge on the roof of the Octagon Room ... ..	193 2½	38 4½
Gauge on the roof of the Library ... ..	177 2	22 4
Gauge on the roof of the Photographic Thermometer Shed	164 10	10 0
Crosley's Gauge ... ..	156 6	1 8
The two Cylinder Gauges, partly sunk in the ground	155 3	0 5
		Above deck.
Gauge on the "Royalist" Police Ship moored in Blackwall Reach	17 0	8 8

The unusual excess of rain collected at the "Royalist" in the month of August is due to unequal fall during thunderstorms on August 4th. The amount registered at the "Royalist" at 9 a.m. on August 5th was 1·330 in., that registered at the Royal Observatory being only 0·335 in.

January 5th, 1879.

WILLIAM ELLIS,  
For the Astronomer Royal.

RAINFALL AT WOODSIDE, HERSHAM,  
WALTON-ON-THAMES.

Lat. 51° 21' 40" N. ; Long. 0° 24' 40" W.

See *British Rainfall* for 1877, page 17, for further particulars as to Gauges.

Month.	5" Gauge 1 ft. above Ground. 52 ft. ⌈	8" Gauge 4 ft. above Ground. 55 ft. ⌈	On Tower 50 ft. above Ground.			
			5" Gauge S.E.	24" Gauge S.W.	24" Gauge N.W.	24" Gauge N.E.
January .....	·969	·975	·670	·765	·888	·896
February .....	1·063	1·087	·775	·854	1·001	1·015
March .....	1·137	1·104	·332	·518	·444	·357
April.....	3·577	3·530	2·940	3·124	3·325	3·081
May .....	3·475	3·498	3·018	3·186	3·358	3·168
June .....	2·669	2·569	2·294	2·371	2·523	2·249
July .....	1·532	1·432	1·277	1·345	1·433	1·277
August .....	4·447	4·436	3·788	4·011	4·483	4·040
September .....	·912	·915	·715	·727	·826	·798
October.....	2·196	2·250	1·705	1·824	2·208	2·234
November .....	2·637	2·666	2·100	2·127	2·206	2·278
December.....	1·305	1·275	·942	1·091	1·238	1·173
	25·919	25·737	20·556	21·943	23·933	22·566

The March returns, and also the totals for the year, are much interfered with by the snowstorm of March 28th and 29th. (See *British Rainfall*, 1877, page 22).

G. DINES.

*Woodside, Hersham.*

## DIFFERENCE OF RAINFALL WITH ELEVATION.

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THOSE who recollect the long and vigorous discussion of this subject in the various volumes of *British Rainfall*, and especially also in the *Meteorological Magazine* for 1871 (vol. vi.) may not unreasonably feel rather nervous when writing upon the subject. It is, however, my duty to give in this volume the latest facts upon it, and as neither Mr. Stow, Mr. Dines, nor any of those who have previously written upon it have sent any notes this year, I must attempt it myself.

In the first place, I am extremely glad to announce a discovery, not a new one, but what often passes as such, viz., a set of facts entirely forgotten. It will be remembered that in the last volume Mr. Dines reported upon the results of a set of rain gauges on the top of the square tower of his residence at Hersham. The conclusions to which he was led are thus stated :—

As far as the present paper is concerned, I have, up to this time, confined myself to observation, and care only has been required to take, and to give the record of, those observations correctly. I almost fear to draw conclusions from them ; but there are some points which have a bearing upon the decision of this question, and which may be considered as fairly proved by the observations given.

1st. One gauge only, placed upon a building, cannot be depended upon to give the amount of rain falling at the same elevation above the ground.

2nd. That of two gauges somewhat similarly placed, that which is farthest removed from the windward side of the building will collect the most rain.

3rd. The greater the force of the wind, and the smaller the size of the rain-drops, the greater the amount of difference between the rain collected in a gauge upon the ground and one elevated above it ; on the contrary, when the force of the wind is less and the rain drops are greater, that difference becomes less.

Lastly. That on those occasions when there is no wind, the rain collected at an elevation of 50 ft. is equal to that collected upon the ground.

In the *Meteorological Magazine* for August, 1878, there was a very careful analysis, discussion, and diagram, of Mr. Dines' observations, drawn up by Mr. Rogers Field, M.I.C.E., and the following are the results at which he arrived :—

After making due allowance for the above disturbing causes, and for the uncertainty in many cases as to the precise direction of the wind at the time the

rain was falling, I would submit that the preceding discussion of Mr. Dines' observations proves the following points :—

(1). That the ratio of the rainfall on the tower to the rainfall on the ground depends on the force and direction of the wind.

(2). That when there is no wind the amount of rainfall on the tower is about the same as that on the ground.

(3). That when there is wind the amount of rain falling on the tower will vary on different portions of the tower, the portion nearest the point at which the wind strikes the tower receiving less rain than falls on the ground, and the portion furthest from the point at which the wind strikes the tower receiving the same or more rain than falls on the ground.

(4). That the excess of rain falling on the portion of the tower furthest from where the wind strikes will, to a large extent, compensate the deficiency of rain on the portion nearest to where the wind strikes, but whether to a sufficient extent to make the average amount of rain falling on the tower equal to that falling on the ground, cannot be determined from these experiments.

To Mr. Field's letter the following remark was appended :—

[We think that experiments somewhat resembling those of Mr. Dines's, with four rain gauges at the top of one tower, were tried about twenty years since, either in Denmark or the United States. We have entirely forgotten the results, and have but a very dim recollection of the circumstance; any one who can give full particulars will be rendering a service to all students of the subject.]

I am very glad to have found the record of the experiments above referred to, and although rather long, believe that their interest fully justifies their republication, especially as they are essential to a complete survey of the subject. They will be found on pages 25–27 of the second portion of the *Report of the British Association for 1838* :—

*Note on the Effect of Deflected Currents of Air on the Quantity of Rain collected by a Rain-gauge. By Professor A. D. BAICHE, of Philadelphia.*

The experiments referred to, grew out of a report made at the request of the British Association, on the quantity of rain collected at different heights, which was presented at the Cambridge meeting of the Association by Professor Phillips and Mr. William Gray, jun. Professor Rogers was then present, and at his instance the author commenced a series of observations about the close of the year 1833. Philadelphia, from the extent of the plain on which it stands, is a good locality for such a purpose. The observations were at first made by gauges placed at three different heights. One of these stations was the top of a tower formerly used for making shot. The height of the tower is 162 feet. A second was near the ground within the inclosure about the tower, and the intermediate one was the roof of the university. The author's attention was ultimately fixed upon the fact that the effect of eddy winds upon the phenomena observed was by no means a secondary one in amount, and that he could not hope to deduce a law, nor to throw any light on the nature of the phenomena, until this disturbing action was got rid of. He has therefore thought that it

might be useful to those who may undertake similar experiments, to submit some of the evidence of the effects which he attributes to deflected currents of air. The observations on this point were chiefly made at the upper station, on the top of the tower. The tower is square in its section, and the alternate sides are nearly parallel and perpendicular to the meridian. At the roof the horizontal section is about twelve feet on a side, and a parapet wall, cut like a battlement, surrounds it. At first, one gauge was placed at the N.W. angle of the tower, rising about six inches above the parapet wall; subsequently, a gauge for collecting snow was placed at the S.W. angle; and ultimately, four gauges, besides the original one, were placed at the four corners of the tower, upon the parapet wall, above which they rose about ten inches. The rain gauges consisted of an inverted cone, with a cylindrical rim, about five inches in diameter, attached to the base, and a small aperture near the vertex; this fastened tightly upon a vessel serving as a reservoir. The snow gauges were frustrums of upright cones, the upper section being nearly four inches in diameter. The water was measured in a glass tube, in which one-thousandth of an inch of rain falling was measurable. When the snow gauges became useless, they were used as rain gauges, by attaching a funnel to them, or were finally replaced by rain gauges similar to those described. The quantity of water collected was measured after each rain, and the direction of the wind during the rain was frequently noted. To illustrate the effects which are attributed to currents of air deflected by the tower, Professor Bache has taken from the journal of the latter months of observation the records of the quantities of rain collected by four similar gauges, placed at the four angles of the tower, under different circumstances as to the direction of the wind. These are selected so as to present, as far as possible, a case of rain with each principal direction of the wind.

Date.	Wind.	Angle of the Tower at which the Gauge was placed.				Relative Quantities at different Angles.			
		N.E.	S.E.	S.W.	N.W.	N.E.	S.E.	S.W.	N.W.
July 26	N.	in. 0·552	in. 0·760	in. 0·749	in. 0·583	1·00	1·37	1·35	1·05
Aug. 6	N.E.	0·311	0·378	0·607	0·491	1·00	1·21	2·08	1·58
July 15	E. & N. by E.	0·912	1·398	1·868	1·715	1·00	1·53	2·04	1·88
April 13	N.E., S.E., S.W.	1·316	1·186	1·568	1·670	1·10	1·00	1·31	1·40
Aug. 26	S. & S.S.E.	0·407	0·253	0·241	0·391	1·68	1·04	1·00	1·62
June 19	W.S.W. & S.S.W.	0·389	0·285	0·252	0·198	1·96	1·43	1·26	1·00
Sept. 1	W.	0·302	0·328	0·202	0·141	2·14	2·32	1·43	1·00
Sept. 5	W.N.W., N.	0·638	0·731	0·429	0·679	1·48	1·70	1·00	1·58

On this table the author remarks,—1. That it illustrates the very great differences between the quantities of rain collected at the different angles of the tower. In one extreme case the quantity collected at the S.E. angle was  $2\frac{1}{4}$  times that at the N.W. angle. 2. That, in general, the gauges to leeward received more rain than those to windward. Thus, with a north wind, the gauges at the S.E. and S.W. angles received more rain than those at the N.E. and N.W. angles. With a N.E. wind the gauge at the S.W. corner of the

tower received the most rain. In the case given in the table, the ratio of the quantities is nearly 2·1 to 1. With an easterly wind the N.E. and S.E. gauges received less than the N.W. and S.W. With a south-easterly wind the S.E. gauge received the least, and the N.W. the greatest quantity of rain, and so on, nearly in the order stated in the general remark. 3. As the more considerable rains accompany certain winds, it is not to be expected that averages of any number of observations exposed to such errors will lead to an accurate result of the quantity of rain falling at a certain height above the surface. In fact, the averages from a period of nine months do not agree nearly so well as those from the selected specimens in the table. These give ratios of 1, 1·19, 1·24, and 1·20, for the quantities at the different angles; while the former-mentioned averages at the N.E. and S.W. angles are nearly as one to one and a half. 4. The connection between the direction of the wind and these effects is easily made out; but without an anemometer this is not possible for that of the force. "I have found, however," observes the author, "in the case of the N.E. wind, which most frequently attends our greatest rains, considerable differences, even with a moderate wind amounting, for example, as high as a ratio of one and a half to one. Having seen that I could not hope for accurate results by these arrangements, I next tried the effect of elevating the gauge upon a high pole, as was done by Professor Phillips and Mr. Gray with the gauge on the top of York Minster. The differences that appeared in this case were very trifling indeed: thus, on the 26th of August, when the N.E. and S.W. gauges upon the parapet wall gave quantities in the ratio of 1 to 1·68, those six feet above the parapet gave 1 to 1·08; with a more moderate wind the quantities were more nearly the same."

The author proposes to resume this inquiry with reference to the general question on his return to America. (See Reports of the Association, Vols. II. III. IV. for the researches conducted during three years at York.)

Although, in some respects, it was certainly unfortunate that the above paper was entirely unknown to Messrs. Dines and Field, there is the advantage of precisely similar results being obtained in the two hemispheres, under very different conditions, and by different modes of discussion.

Before proceeding to sum up the whole matter, it may be well to bring together a few more facts and references. The ratio which the rain collected in an elevated gauge bears to that collected in one near the surface of the ground is fully discussed in *British Rainfall*, 1869 (pp. 17-24), and also in the *Report of the British Association for 1870* (pp. 174-176). A diagram, based upon the Rotherham experiments, is given in the former article, which shows in the shortest and simplest form the results then arrived at. The Rotherham instruments enable us to determine the mean angle from the vertical at which every shower falls, the means for each month during the four years 1866-69 are given at the top of the diagram, and show that

in March it fell at an average angle of about  $64^\circ$ , but in July of only  $23^\circ$ .

The comparison of two gauges, one with its orifice 25 ft. above the ground and the other with its 1 ft. above it, afford the data for the next curve marked "per centage," whence we learn that the upper gauge collected (relatively to the 1-ft. gauge) least in March, and most in July, August, and September.

The anemometer curve shows that the velocity of the wind on days with rain was greatest in March (221 miles), and least in July (93 miles).

This is probably sufficient proof that the decrease with elevation is due to wind.

In *British Rainfall*, 1871, there is an extremely valuable paper by the Rev. F. W. Stow, which bears upon this subject. It does not lend itself readily to condensation, and is far too long for reproduction; I therefore quote only two paragraphs:—

It is my belief, then, that if the whole of a shower were intercepted 10 or 20 feet above the ground, there would be just about as much rainfall at that height as actually falls to the ground within the whole area covered by the shower: but that the fall on the ground is most unequally distributed by upward and downward currents of air; the latter, for the reasons stated, prevailing in those places where we generally set our gauges, and causing, therefore, an excess in the fall at 1 foot over that at a height less affected by the down-current.

\* \* \* \* \*

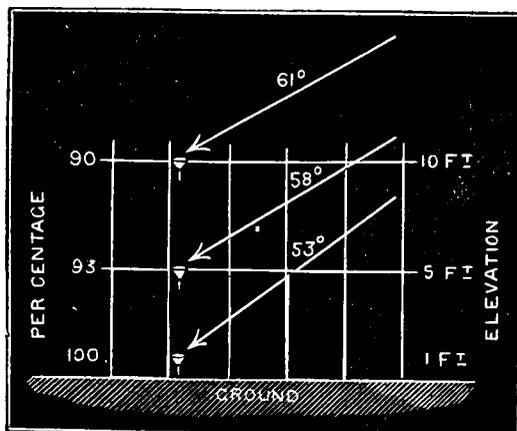
But, at all events, the undeniable fact which these tables appear to me to establish is this: That decrease with elevation has a direct connection both with the absolute obliquity of the path of the falling rain at the higher level, and with the difference in that obliquity at the two levels.

In Mr. Stow's paper, Table II. gives the results of three pairs of gauges, 1 ft., 5 ft., and 10 ft. high respectively, each pair consisting of one horizontally-mouthed gauge, and one with its mouth vertical and kept face to wind by a vane. The totals were:—

	HORIZONTAL.				VERTICAL.		
	1 ft.	5 ft.	10 ft.	...	1 ft.	5 ft.	10 ft.
Amount	21·038 in.	19·485 in.	18·949 in.	...	28·213 in.	32·318 in.	34·969 in.
Ratio	100·0	92·6	90·1	...	100·0	114·5	123·9

Here it is proved that while the amount collected by ordinary horizontally-mouthed gauges decreases with the height of the gauge above the ground, exactly the reverse occurs with gauges whose mouths are vertical. The annexed diagram may tend to fix the results of these six gauges in the memory. The arrows show the

mean angle at which rain fell into each pair of gauges. All the facts are so obvious that it is needless to re-state them :—



In a short editorial note in the same volume I epitomized the results obtained at Aldershot by Sergeant Arnold with four rain gauges, two with their mouths (as usual) horizontal, and two with their mouths inclined at  $45^\circ$  and kept face to wind by vanes. One pair was 6 ft. above the ground, the other pair about 30 ft. The following is the table :—

Height above Ground .....	Horizontal.		Inclined at 45 deg.	
	6 ft.	25 ft.	6 ft.	30 ft.
	in.	in.	in.	in.
Total rain in 1869 .....	27·22	20·37	41·59	41·55
„ „ 1870 .....	22·94	16·51	33·05	32·95
„ „ 1871 .....	25·59	20·89	34·98	34·89
Ratio of each pair, 1869...	100	75	100·0	99·9
„ „ 1870...	100	72	100·0	99·7
„ „ 1871...	100	82	100·0	99·7

This seems to prove that with gauges whose mouths are tilted  $45^\circ$ , and kept face to wind, there is no decrease with elevation.

Another paper upon the subject was inserted in *British Rainfall*, 1876 (pp. 34–37), which terminated with the following conclusions :—

- (1) The deficiency produced by the *four* feet between 1 ft. and 5 ft. is very nearly the same as that produced by the *fifteen* feet between 5 ft. and 20 ft.
- (2) The decrease is greater in exposed than in sheltered localities. This is shown by the much sharper curve at Castleton than at Calne, and this agrees perfectly with the conclusion drawn in *British Rainfall*, 1869, pp. 17–24, that the principal cause of elevation-decrease is wind. Of two stations, the decrease will be greater at the more windy one, just

as at the same station the decrease will be greater on a windy day than on a calm one.

- (3) The decrease is greater the smaller the gauge; it is greater with 3 in. than 5 in., and with 5 in. than 8 in. gauges.

Does not this last fact indicate that the decrease observed is, in part at least, due to the mode of measurement, rather than to an actual decrease in the fall of rain.

Lastly, I quote a paragraph from one of my earliest publications (*British Rainfall*, 1863, p. 4), as it is singularly corroborated by the results obtained at Hersham:—

“At Colney Hatch Asylum a very accurate gauge has been for many years placed on the roof of the main buildings, 40 ft. from the ground. The amount collected by it is nearly, if not quite, equal to the probable fall on the ground in that locality; a similar result is found at Castle House, Calne, where the gauge is 32 ft. above the ground. In both cases the bulk, if I may so term it, of the edifice, is considerable, and it has always struck me that in such cases the customary diminution with height does not hold good. To take an instance from the examinations in 1862:—Messrs. Marshall’s gauge at Holbeck, Leeds, placed on the roof of their factory, 32 ft. above the ground, collects the same as the one belonging to the Water Works close by, and on the ground level. But Messrs. Marshall’s factory roof is remarkable for being no less than two acres in extent and covered with earth and grass, above which the gauge is only elevated 4 ft. May not so extensive a plateau be regarded as the ground level for that gauge?”

*Summary.*—I venture to think that the terribly hard-fought battle respecting the reason that a smaller quantity of rain is collected by rain gauges elevated above the surface of the ground is nearly settled, for the following points seem proved:—

The greater part of the decrease is due to wind.

The stronger the wind, the greater the horizontality of the path of the rain, and the more horizontal the rain, the greater the decrease with elevation.

Although the actual total falling at (say) 25 ft. above the ground may really be slightly less than that at 1 ft., the greater part of the decrease in the amount collected is due to the eddies produced by the rain gauge funnels, and by the buildings on which they are placed.

The less the diameter of the elevated gauge the less will it indicate; the larger the gauge, or the more it is protected from the direct impact of the wind, the more will it indicate.

A gauge on the leeward side of a tower may collect as much rain as one on the ground.

A gauge in the middle of a large roof may, notwithstanding its height, collect very nearly the same as one upon the ground.

## SELF-RECORDING RAIN GAUGES.

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IF one is never to do anything unless one can do it perfectly, very few things will be done at all; on the other hand, much time is wasted by slipshod work, mere re-habilitated extracts from easily accessible books being passed off as new contributions to literature, by which process evil is produced instead of good, for the amount of literary matter to be waded through is increased, and yet no new information is afforded.

In the absence of the "Subject Index," which would undoubtedly confer inestimable benefits upon science, it is no easy matter to write a monograph upon any subject, and it is impossible to ensure its completeness. I have tried hard to make the following article perfect, and it is far more comprehensive than any other that I know of, but doubtless there are many omissions, and it will confer a favour upon my readers and upon myself if every one who reads this article will try to detect any omission, and to supply it. Details of any patterns not herein described, will be thankfully received for insertion next year.

Before commencing the history of self-recording rain gauges, it is desirable to point out that self-registering gauges are not self-recording ones. A minimum thermometer is a self-registering instrument, but it is not a self-recording one. It does not produce a record of the phenomena which occur. Hence, although I have found\* that a rain gauge, which would enable one to ascertain the total fall in each hour, was invented nearly a century since, I must not describe it here. Perhaps another time I may show how nearly Stutter re-invented Herrmann's gauge.

Another respect in which infallibility is unattainable is true chronological sequence. It is not at all easy to ascertain precisely when the various patterns of self-recording rain gauges were first made, but I shall adopt the nearest approach to that order which I can. There is one other preliminary point to mention, and that is with reference to the engravings. I do not want to bear harshly on my fellow-

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\* Herrmann, C. *Mechanischer verbesserter Wind, Regen und Trockenheits Beobachter*. Freyberg: 1789, 8vo.

workers, but if the engravings do not look like some of those from whence they are professedly copied, the fault does not lie at my door. The fact is, that all the accompanying engravings are as nearly drawn to scale as the published data will permit, while many of the engravings hitherto published are terribly wanting in consistency, prettiness rather than accuracy having apparently been considered of primary importance.

The list of inventors may best be given alphabetically under the designers' names, which, with the earliest date of published description or of actual use, and a reference number shewing its position in the chronological record, are as follows:—

Reference Number.	Inventor or Maker.	Earliest details known to Compiler.
8	Apps, A., London.....	Made in 1866
11	Beckley, R., Kew.....	„ 1869
1	Bevan, B., Leighton Buzzard.....	„ 1817
19	Bréguet, M., Paris.....	Described in 1876
13	Casella, L. P., London.....	Made in 1871
7	Della Casa, Prof., Italy.....	Described in 1857
27	Denza, Padre, Italy.....	„ 1879
4	Dollond, G., London.....	Made in 1846
2	Donovan, Prof., Dublin.....	„ 1820
20	Eccard, Private, United States.....	„ 1876
6	Fagnoli, Dr. G., Italy.....	„ 1854
21	Festing, A. M., Devonport.....	Described in 1876
14	Field, Rogers, C.E., London.....	Made in 1872
22	Fines, Dr., France.....	Described in 1876
23	Gibbon, Lieut. D. J., United States.....	Made in 1876
10	Hipp, M., Switzerland.....	Described in 1868
25	Höttinger & Co., Zurich.....	Made in 1877
17	Hough, Prof. G. W., United States.....	Described in 1874
5	Kreil, Dr., Prague.....	Made in 1848
28	Latham, Baldwin, C.E., London.....	„ 1879
3	Osler, A. F., F.R.S., Birmingham.....	„ 1837
12	Osnaghi, Dr.....	Described in 1870
26	Redier, M., Paris.....	„ 1878
15	Russell, H. C., Sydney, N.S.W.....	„ 1872
9	Secchi, Padre, Rome.....	„ 1866
16	Van Rysselbergh, Prof.....	Described in 1873
18	Von Baumhauer, E. H., Harlem.....	„ 1874
24	Yeates, Messrs., Dublin.....	„ 1876

(1). BEVAN, B., C.E. Leighton Buzzard.\*

I have not been able to find any engraving of this gauge, but as it is the earliest, and a very full description has been given by the author, I have drawn it in accordance therewith. The details given by Mr. Bevan are that the funnel was 12 in. in diameter, and

\* "Philosophical Magazine." Vol. II. p. 74.

the cylinder into which the rain passed 3ft. long and 6 in. in diameter, (therefore the scale was four times the natural one); the float which rested on the water in the cylinder carried a rod of wood 4 in. wide and a quarter of an in. thick, which moved up and down between guides, and to the upper end of which was attached a pencil, which was pressed against a long paper-covered recording cylinder 5 in. in diameter, which was driven by a clock. B is the cylinder into which the rain passes, and CC the rod attached to the float and carrying the pencil. The chief merits of this arrangement are its direct action, and extreme simplicity; it was very large, at least 5 ft. high and probably more; but it could easily have been sunk in a pit or placed at a distance from the funnel which, therefore, need not necessarily have been more than a foot above the ground; it had ample capacity, for the cylinder would hold 8 in. of rain, and the paper would take the record of 6 in.

It is rather curious that scarcely any one seems to have heard of this gauge, and that I cannot find that more than one was ever made. The only reference to it (besides the original description) is in Dr. Lortet's "Instructions sur les Instruments destinés a mesurer l'eau de pluie," published in the *Annuaire Météorologique de la France pour 1851*.

(2). DONOVAN, PROF. Dublin.\*

The only particulars which I can obtain respecting this gauge are given in the following notice, which, although apparently full, will be found to afford not the slightest hint as to the construction of the gauge; I cannot find any other publication in which it is even mentioned. It is, of course, impossible to engrave that of which we cannot get a description.

*Self-registering Rain Gauge.*

"Mr. Donovan, Professor of Chemistry, Materia Medica, and Pharmacy, to the Apothecaries' Hall of Dublin, with whose merits as a chemist and philosopher my readers are well acquainted in consequence of his very valuable work on galvanism, and his important chemical papers, of which due notice has been given in the *Annals of Philosophy*, has just completed a very curious and ingenious rain-gauge possessed of the following properties:

"This machine is calculated to keep an exact register of the quantity of rain that falls during any period of time in the absence of the observer. Nothing more is required than to put a card into the machine and wind it up. At the

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\* Thomson's "Annals of Philosophy." Vol. XVI., p. 228. (Sept., 1820.)

end of every week, the card is to be removed, and a new one put in : on it will be found registered the following particulars :

“It will show at what precise hour and minute of the day, and upon what day, the first cubic inch of water fell during any series of weather.

“It will show how many cubic inches of rain fell during the whole week, and the precise hours at which each fell, what day of the month, and whether it was night or day. Hence we have also an exact measure of the heaviness of the showers.

“It will show when the rain commenced (at least so as to be worth noting); how long it continued; what intervals there were of tolerably dry weather; and when the rain ceased.

“The descent of each inch of rain will also be announced by a bell, which will act as a notice at night when access cannot be had to the detailed account on the register. The examination of the register card need not be weekly; it may be consulted at any time.

“The machine will tell not only the individual cubic inches of rain with their times, but it will show the total quantity at one view.

“At the end of the week, the card is to be put on a file, and thus, without any trouble of writing or watching, may be kept a precise register, that can at any time be consulted with ease, of the weather with regard to rain.

“The machine can be adjusted in such a manner that instead of cubic inches of rain it will register its results in ounce measures, which, being the sixteenth of a pint, would be more generally appreciated.

“It requires winding once a week, and a new card; this is all the trouble it gives; but it may be constructed very easily so as to require these operations but once a month. It is not liable to go out of order; for however complicated its functions may appear, its individual parts are simple.’”

### (3). OSLER, A. FOLLETT, F.R.S. Birmingham.\*

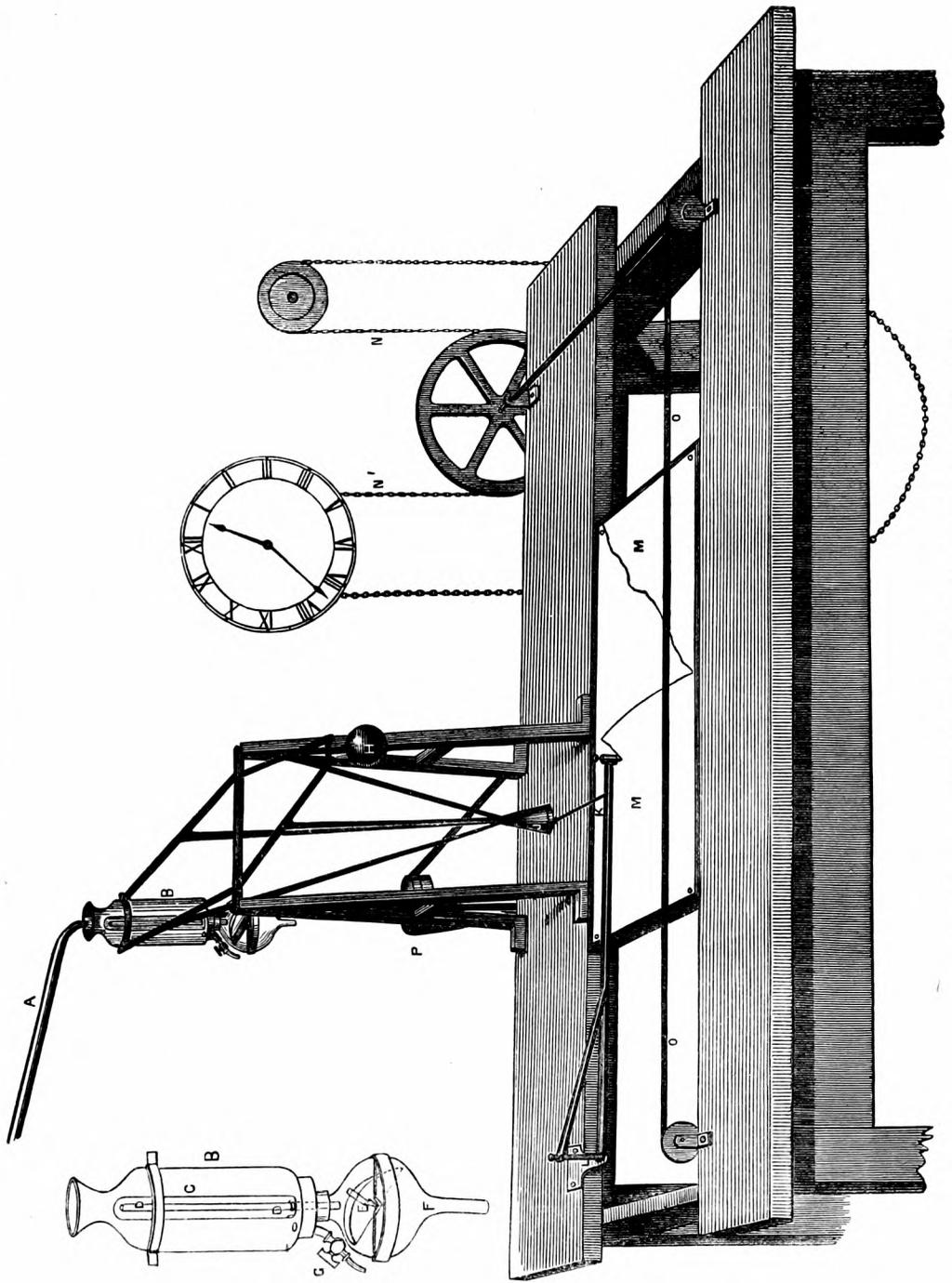
This rain gauge is only a part of an instrument which records also the force and direction of the wind, and generally included in the title of “Osler’s Anemometer;” all the phenomena are recorded on the sheet MM, which is drawn along by the chain movement NN, and the endless band OO, but all parts of the instrument that do not refer to the rain gauge have been omitted in the engraving.

Mr. Osler’s description of the gauge is so clear and concise that the best plan is to quote from the original paper, merely changing the letters to suit our engraving.

“The rain funnel exposes an area of 200 square inches, and the water from it is conveyed by means of a tube A into a cylindrical glass vessel B, which is

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\* A description of the Self-registering Anemometer and Rain Gauge, erected at the Philosophical Institution, Birmingham, by A. Follett Osler. 4to. Birmingham.



(3.) OSLER'S SELF-RECORDING RAIN GAUGE. (Scale 1/2).



suspended at one extremity of a double beam.\* A heavy counterpoise weight *J* is firmly attached underneath the double beam by four iron rods.

“The little ball *H* balances the reservoir *B* when empty. The beam, reservoir, &c., are all suspended on knife-edged joints. A light bar forms a communication between the weight *J*, and the pencil rod *K*, which is pivoted at *L*. It is now evident that any water coming into the reservoir *B*, will, by its weight, cause the end of the beam at which it is suspended to descend; and, consequently the weight *J* will advance, and push the pencil to which it is attached forward: the rate at which it moves being determined by the quantity of water that enters it. The time at which any rain falls, as well as the amount and mode of falling, is thus accurately delineated.

“The rain reservoir, of which there is an enlarged sketch, is made of glass,  $3\frac{1}{2}$  in. in diameter, and  $5\frac{1}{2}$  in. in the straight part of the body. It contains exactly  $\frac{1}{4}$  in. of water of an area of 200 square inches, or 50 cubic inches. It empties itself when full by means of a syphon; the one I have constructed is a slight modification of the common syphon, and is thus made: A glass tube *D D*, open at both ends, is firmly cemented in the centre of the reservoir *B*; over this tube a larger one *C*, closed at the top like a bell-glass, is placed; the smaller tube thus forms the long and the larger tube the short leg of the syphon. The peculiar advantage of this construction is, that it is easily cleaned, it being straight, as the rain water would be liable to clog up the bend of a tube. The mode in which the syphon is called into action, and the reservoir emptied, is as follows: The water having risen to the level of the top of the inner tube *D D*, begins to drop over into the little tilt *E* beneath; the instant one side of this tilt is full, it tumbles over, and the contents of it fill the pipe *F*, which thus causes a slight approach towards a vacuum in the glass bulb in which the tilt is placed, and this is found to be quite sufficient to set the syphon in action, when immediately the whole of the water runs off into a vessel *P* kept underneath to receive it. *G* is a pipe for the convenience of letting off the water, in case there is not sufficient for it to discharge itself, as the pencil should start at zero each day. The reservoir *B* being released from the weight of the water, the double beam resumes its horizontal position, and the pencil returns to zero, or however nearly so, for it does not quite return, as a small quantity of water will remain adhering to the glass; there is also some that the syphon does not completely take up, and a little left in the tilt, but this is of no consequence, as the pencil not returning to the zero line indicates how much there is left, and that the next quarter of an inch does not exactly start at zero, therefore, in taking an account of it the amount so left will have to be deducted. I have found that a scale magnified six or eight fold is a good one for registering the rain; that is to say, a quarter of an inch is recorded on a surface of two inches; by this means the 100th part of an inch can be shown with tolerable accuracy. It is evident that this scale can be easily adjusted; for by increasing or diminishing the weight *J*, or by increasing the length of the rods by which the weight is suspended, the range that the pencil shall take is regulated.”

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\* Many other plans might be adopted for suspending the reservoir *B*; as on springs, bent levers, or floats; but as I find the mode here described answers exceedingly well, I can recommend its adoption.

In the majority of the anemometers lately constructed the arrangement of the rain gauge is different from that shown in the engraving because springs have been substituted for the balance, and the chain arrangement for drawing the board under the recording pencil is now usually replaced by rackwork, but both these are details, and do not involve fresh principles. As this rain gauge has always been constructed in connection with Mr. Osler's well-known anemometer, the gauge has not had a fair chance of giving accurate records; the funnels having always been placed at considerable heights above the surface. There would, however, be no difficulty in so arranging it, that the funnel need not be more than 3 ft. above the ground.

There is no limit to the openness of scale attainable with this instrument, and its flying back to zero prevents waste of paper, without there being any risk of losing the record, no matter how large the fall may be; but as stated by Mr. Osler, there must necessarily be a little inaccuracy during the time the syphon is in operation.

(4). DOLLOND, G. London.\*

This again is only part of an instrument, but in the engraving everything that is not necessary to show the working of the gauge has been omitted. The following is the author's description:—

“The pluviometer, or that part of the apparatus which is arranged for registering the quantity of rain that falls, is now to be described. On the top of the observatory there is a receiver of one foot square, clear from all surrounding matter that might interfere with the direct fall of the rain upon its surface. From this receiver a pipe conducts the rain into another receiver inside the observatory, directly under the registering apparatus; in this there is an air float, connected with a set of inclined planes, each inclined plane being equal to one inch of rain. These inclined planes, as they pass up, move the indicator across the destined proportion of the paper; showing, as it proceeds, the result of each drop to the hundredth part of an inch in superficies (!) and continues to advance until it arrives at one inch. It is then instantly discharged, and returns to the zero of the scale, or commencement of another inch. The internal receiver is calculated to contain six inches of rain, a quantity that seldom falls in this island during one month. The register will show when it is nearly full. The water can then be drawn off without the slightest inconvenience, and the float be re-adjusted to the zero of the first inch.”

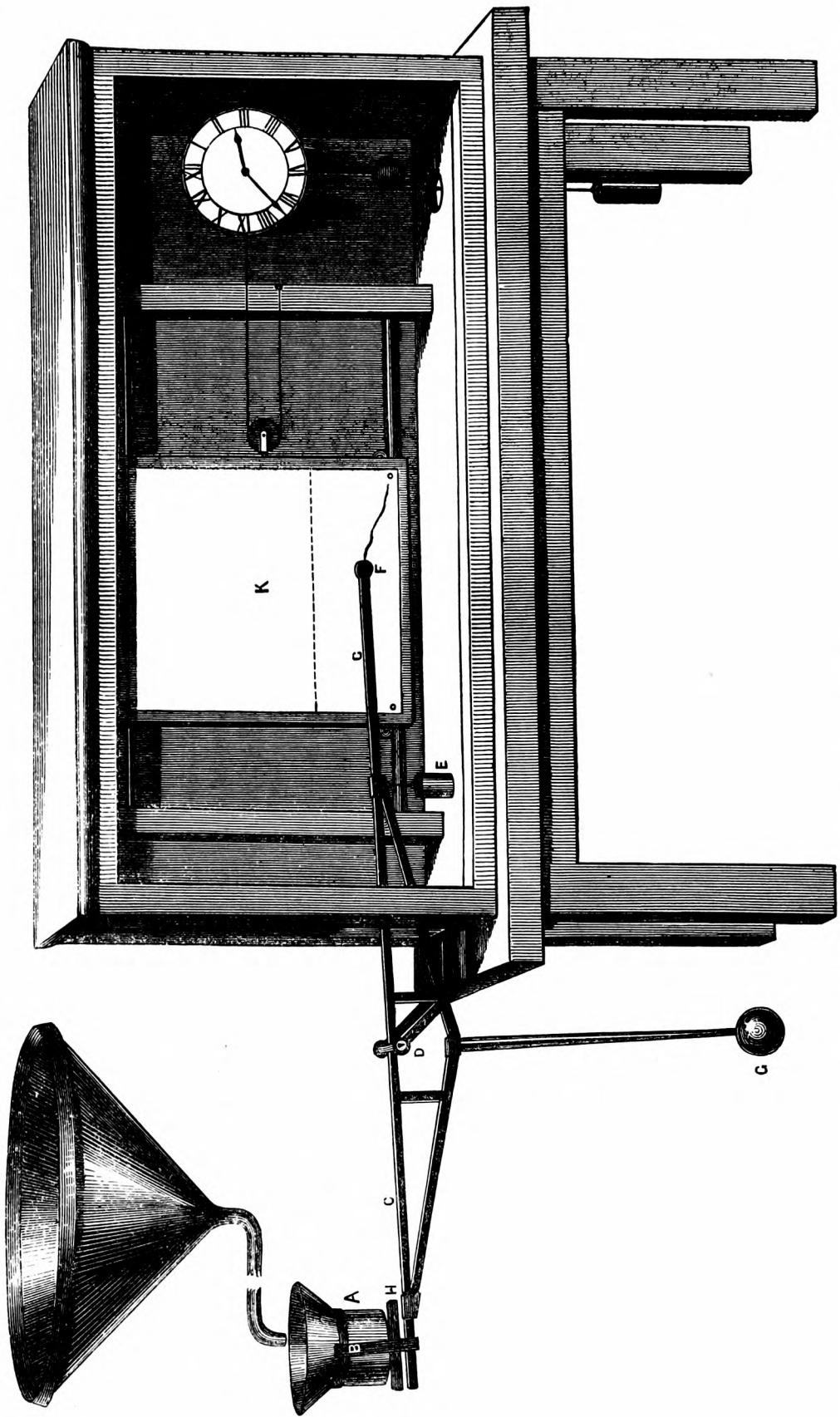
(5). KREIL, DR. Prague.†

This is another instrument of which the rain gauge forms only a

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\* Description of the Atmospheric Recorder, by G. Dollond, 4to. London.

† Entwurf eines Meteorologischen Beobachtungs-Systems für die österreichische Monarchie. Wien, 1850. 8vo.



(5.) KREIL'S SELF-RECORDING RAIN GAUGE. (Scale  $\frac{1}{2}$ ).



part, the upper part of the recording sheet K being used for the register of wind, &c.

This is a form of balance rain gauge which can only be understood by reference to the engraving. The water is led from the funnel to the vessel A, which is supported by a ring on pivots at B, which again are carried by the uprights at one end of the balance CC, pivoted at D. This balance is provided with the counterpoise G; there is also a sliding weight E, which is used to bring the pencil F exactly to the zero line on the recording sheet K, when the vessel A is empty.

When rain falls the weight of the water depresses the end of the balance at CC, and soon brings the corner of the vessel A into contact with H; this prevents the vessel remaining horizontal, and shifts the centre of gravity of the water, which at length becomes sufficient to tip over the vessel, and *nearly* empty its contents. It appears from Herr Kreil's description, and from the *fac simile* of the record of a rain storm on June 3rd, 1849, that the upsetting does not always occur with exactly the same amount, and also that the residuary quantity is not always the same. Hence the curves must each be measured from its own turning point and not from any fixed scale; this is undoubtedly a disadvantage. On the other hand, Herr Kreil claims for the instrument the merit of extremely prompt discharge. He says "The outpouring is so rapid that there is not time for all the water to be thrown out; this far from being an evil is a positive advantage, because there is time for little or no rain to be lost, as is the case when slower methods are adopted, such as for example by a syphon."

(6). FAGNOLI, DR. G.\*

This is so nearly identical with the instrument made by Bevan that it is unnecessary to engrave it. The only difference is that the rain is led from the funnel to the cylinder through a glass tube, in which the water stands at the same height as in the cylinder. A scale placed behind this tube (like the scale of a Howard's tube rain gauge) enables the observer to compare the scale reading on the paper with the reading by the tube. I do not see that this is any advantage, and although harmless in Italy, it would in this country lead to constant evil from the freezing of the water in the tube bursting it. The scale adopted by Dr. Fagnoli was four times the

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\* Memorie dell' Accademia delle Scienze dell' Istituto di Bologna. Tomo V., page 445. 1854. 4to.

natural one, and the instrument would register 3·9 in. before overflowing.

(7). DELLA CASA, PROF.\*

This is a suggestion, not a description of an instrument constructed, and no engraving is given. Prof. Della Casa describes a method of obtaining a curve by using the motive power of a float, resting on the short leg of a syphon barometer, to direct an electric current through a sheet of paper saturated with cyanide of potassium. On the last page of his memoir Prof. Della Casa says that a similar arrangement can be applied to record the fall of rain, or any element which can be made to support a float, but he does not say how he would do it, and the mechanical details of his barometrical arrangements are so bad that it is needless to waste space in guessing how it might be done.

(8). APPS, A. London. (*No description published*).

This is a very compact form of gauge, but the only specimen we have seen was not as delicate in action as is now considered desirable. The arrangement is very simple: the rain passes from the funnel, through the pipe, into the cylinder, in which is a float A, from which a silk cord passes over two pulleys, B and B, to the back of the recording pencil at C. This is kept in its place by two upright rods, and on which run four rolling wheels at the ends of the curved steel springs, D, which provide the pressure needed to ensure a distinct trace; and the friction of the pencil, plus that of the rolling wheels and of the pulleys, is the only limit to the sensitiveness of this gauge. As represented, with the cylinder two-thirds the diameter of the funnel, the scale would be about double the natural one, and therefore a recording paper a foot long would give scope for 6 in. of rain, but falls of 0·01 in. or even 0·03 in. would scarcely be recorded. The clamping gear for the recording cylinder at E is very simple and apparently effective.

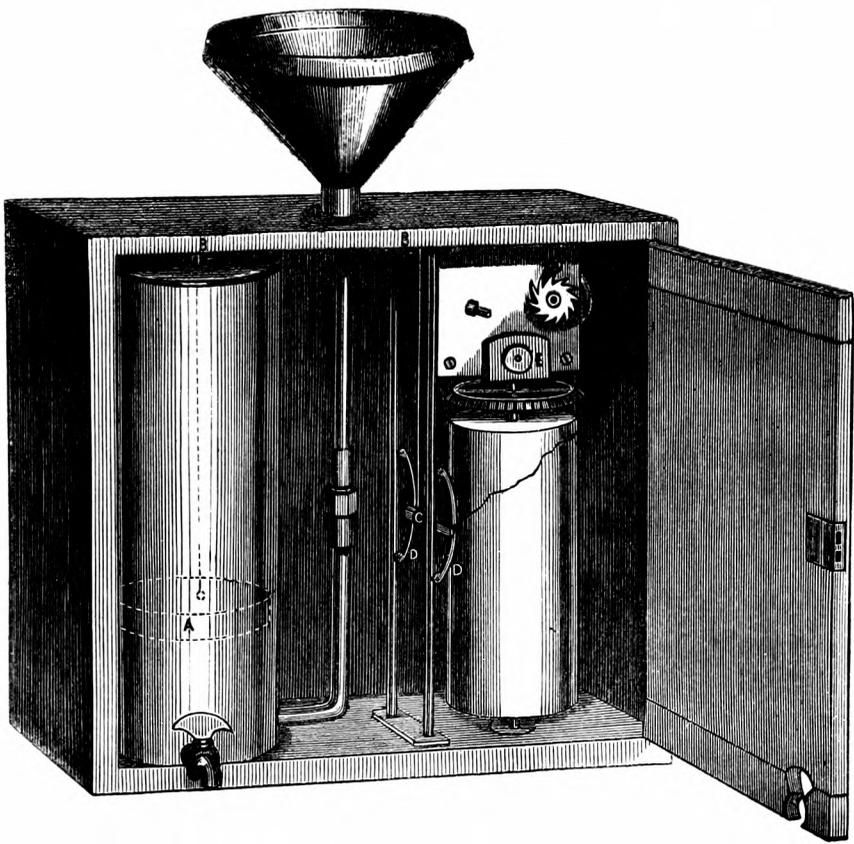
(9). SECCHI, PADRE. Rome.†

The Meteorograph invented by Padre Secchi, and erected at the Observatory of the Collegio Romano, had originally a very primitive

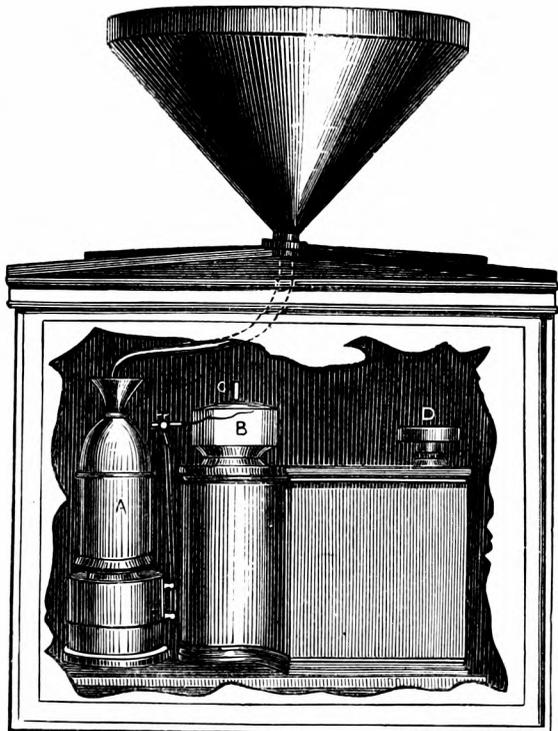
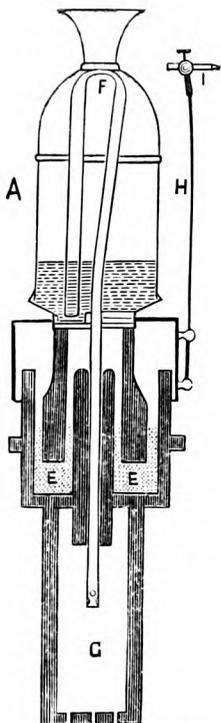
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\* Memorie dell' Accademia delle Scienze dell' Istituto di Bologna. Tomo IX. 1858. 4to.

† Descrizione del Meteorografo dell' osservatorio del Collegio Romano del P. Angelo Secchi, D.C.D.G. 1866. 4to.



(8.) APPS'S SELF-RECORDING RAIN GAUGE. (Scale  $\frac{1}{2}$ ).



(11.) BECKLEY'S SELF-RECORDING RAIN GAUGE. (Scale  $\frac{1}{2}$ ).



and rough arrangement for recording the fall of rain. It was merely as follows : a pipe lead the water from any roof, and discharged it over a water wheel, to which an eccentric was attached ; as the wheel turned, it alternately pulled and slackened a cord, which caused an alternating motion in a rod, and hence a backward and forward trace of a pencil upon a recording sheet. No attempt was made to ascertain the value of these traces, and indeed it is obvious that they could not have any, and the strokes were too close together to be counted ; all, therefore, that this apparatus did was to show the time during which water was running off the roof.

(9). SECCHI, PADRE. Rome. (*Second*).\*

At the Paris Universal Exhibition of 1867, Padre Secchi exhibited a second Meteorograph. The only engraving of it which I possess is a bad one and not intelligible ; I therefore merely give a translation of the description written by Padre Secchi:—

*Rain.*

“The time of rain is marked upon the same paper by means of a lever actuated by an electro-magnet. The movement of the electro-magnet is produced by a little overshot wheel which is fixed under a spout on some part of the building, and which as it turns opens and closes the circuit of the pile.

“The quantity of rain is measured in a vessel placed in the base of the apparatus. The water collected by a funnel placed on the roof is conveyed by a tube to this vessel and raises a float which carries a scale furnished with an index which traverses a graduated scale. The scale fixed to the float carries a chain which is wrapt round an axle furnished with a paper disc ; the rotation of the disc is therefore proportional to the depth of rain. A pencil is made to move along a radius of this disc at the rate of about one-fifth of an inch per diem, so that each day’s record is marked at a different distance from the centre of the disc.

“The funnel is 15 in. in diameter and the receiving vessel  $7\frac{1}{2}$  in., so that the area of the former is four times that of the latter, and hence there is available ample motive force to overcome the friction of the pencil.”

(10). HIPPI, M. Neufchâtel.†

This is not strictly entitled to mention, but if I omit to refer to it someone may regard it as an omission. The facts are briefly these : at the meeting of the Société Météorologique de France on March 10th, 1868, M. Hervé-Mangon exhibited a barograph made by M. Hipp, and in a foot-note it is stated that the same method of re-

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\* *La Météorologie et le Météorographie a l'exposition Universelle. 1867. 8vo.*

† *Annuaire de la Société Météorologique de France. Tome XVI. (1868) p. 67.*

ording would answer well for a rain gauge. The chief peculiarity of the plan is, that the record is obtained by striking a steel needle into the recording paper while the latter is *at rest*. The recording paper is not carried forward continuously, as is the case in nearly all modes of registration, but it advances a few hundredths of an inch immediately after each prick has been made ; by this means, all risk of stopping the clock by the friction of the paper, or of the paper being dragged or torn by the pricker is avoided.

(11). BECKLEY, R. Kew.\*

This gauge is strongly constructed, and the machinery is calculated to resist the action of the weather. The apparatus is enclosed in a thin cast-iron box, the top of which opens as a lid ; the funnel is also of cast-iron, enamelled inside, and has an area of 100 square inches, or a diameter of 11·3 in., from this the rain is conveyed into the copper bottle A, of which a sectional view is given ; the bottle is supported on a stand, floating in a cistern of mercury E E, in which it gradually sinks as the weight of rain in the bottle increases, until ·20 in. of rain has fallen, and the water reaches the bend of the syphon F, and sets it in operation, drawing off the water into the reservoir G, from thence it is either drained away or subsequently measured, the stand and bottle then float back to their original level. At the end of the short leg of the syphon there is a slight depression in the bottom of the bottle, so that it may be thoroughly emptied, and at the end of the long leg, holes are drilled in the side of the pipe to prevent the retention of water by capillarity ; to the floating stand is also fixed a cover which slides over the cistern of mercury like a gasometer, keeping out all dust and dirt ; to this is attached a pliable rod H carrying the pencil I, which is drawn down on the recording cylinder B as the bottle sinks with the weight of rain, the pencil being pressed against the paper by the spring of the rod H ; cylinder B revolves once in 24 hours, and the clock is wound by reversing the movement of B, for which purpose a temporary handle or key is fitted on to the square pin C. There is a milled wheel at D for starting the pendulum, so that there is no need to open the clock, which is enclosed in an air-tight case, B and D both turning in mercury joints, so that it cannot be affected by damp, or any other action of the weather. The cases for the clock

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\* Report of the Meteorological Committee of the Royal Society, for the year ending 31st December, 1869. London, 8vo.

weight and the reservoir G project below the bottom of the box, and pass into a hole in the ground ; the funnel is then less than 2 ft. above ground, which is an advantage that few recording gauges possess.

(12) OSNAGHI, DR.\*

The only information here given is conveyed by a paragraph on providing the Marine Academy at Fiume with self-recording meteorological apparatus, and the rain gauge is thus referred to :—

“A self-registering rain-gauge, as designed by Osnaghi ; syphon formed, bent glass tube, at the lower part of which is a shank filled with quicksilver, and carrying a float.”

A further description of this gauge is subsequently given by Dr. Osnaghi on pp. 271-273 of the same volume, but there is no engraving, and he does not describe clearly the mode of recording. The essential principle of the instrument appears to be the rather singular one of using the weight of the rain-water in the long leg of a reversed syphon to raise the level of mercury in the short leg, and from the arrangement of the instrument as described by its inventor the level of the mercury was only raised a quarter of an inch by each inch of rain that fell. This motion was multiplied four times by the lever that carried the recording pen, and which was attached to an iron float resting on the mercury, so that the recording scale was only equal to the fall of rain, therefore it could not be read with any degree of accuracy. When the description was written, the gauge had not been made, so that its practical working could not be commented upon.

(13) CASELLA, L. London. (*No description published*).

This gauge, like nearly all other mechanical recording gauges, is constructed on the principle of a balance, only the mechanism is more nearly perfect, for in most of them the record obtained is the deviation from the segment of a circle, not from a straight line, and therefore it is almost impossible to calculate accurately the values of the curve ; in many the radius of the circle is so great that the error is almost negligible, but still it exists ; in this instrument, however, it is entirely nullified by the adoption of a radius bar.

The rain from an 8 in. funnel falls into the vessel A, hung by pivots to the arms BB, which gradually sinks as the water accumulates ; the vessel is hung a little out of the centre, so that as it fills

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\* Zeitschrift der österreichischen Gesellschaft, Band V., s. 192.

it tips over towards the incline C, and slides down it till .20 in. of rain has fallen into it, by which time it has reached the bottom of the incline and turns right over, emptying the water out of a slit into the shoot D, from which it runs away. The arms B B are fixed to an axis turning at E, and to this axis are also fixed the rod with the counterpoise F, and the lever G; as B B are depressed by the weight of A, G moves to the right drawing with it the framework H H, which is supported at the other end by the radius bars J J; therefore the curved arms K K, which are attached to an axis pivoted in the middle of this framework, move towards the right in a horizontal line. At the end of one arm K is the pencil M, which is drawn across the recording cylinder L, turned by the clock P, and at the end of the other arm is a little wheel which runs under the plate N; the two ends of this plate are turned downwards so that if the vessel A in turning over jerks the framework H H too far to the right, the little wheel runs down under one of the inclined ends and lifts the pencil on the other arm off the paper, so that the record is kept neat, and the risk of breaking the pencil is avoided. Again if the vessel jumps up too far, the wheel runs under the other end and lifts the pencil, so that it can only touch the paper within the limits of the record.

(14) FIELD, ROGERS, C.E. London. (*No description published*).

I place here in its proper position the reference to the self-recording evaporator at Strathfield Turgiss, because although designed for the measurement of evaporation, it is also the most perfect self-recording rain gauge in existence. As, however, it is far more complex than is at all necessary for the registration of rainfall *alone*, I will not anticipate Mr. Field by publishing any description.

(15) RUSSELL, H. C. Sydney, New South Wales.\*

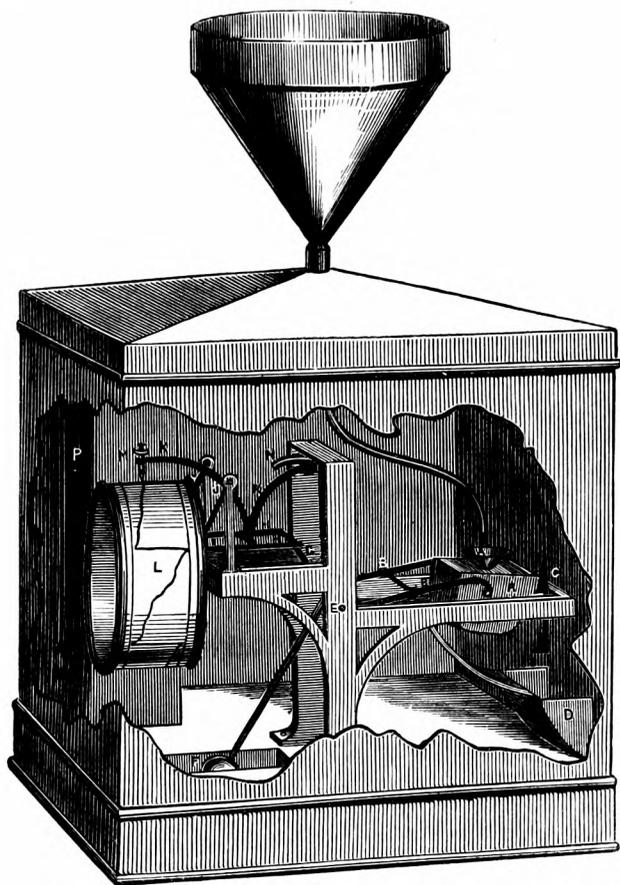
It is not certain that I am right in attributing the following pattern of gauge to the able Director of Sydney Observatory, but the following extract from the Sydney Observations is the only description of which I am aware, and if it be not Mr. Russell's he will doubtless transfer the credit to the rightful owner:—

*Self-registering Pluviometer.*

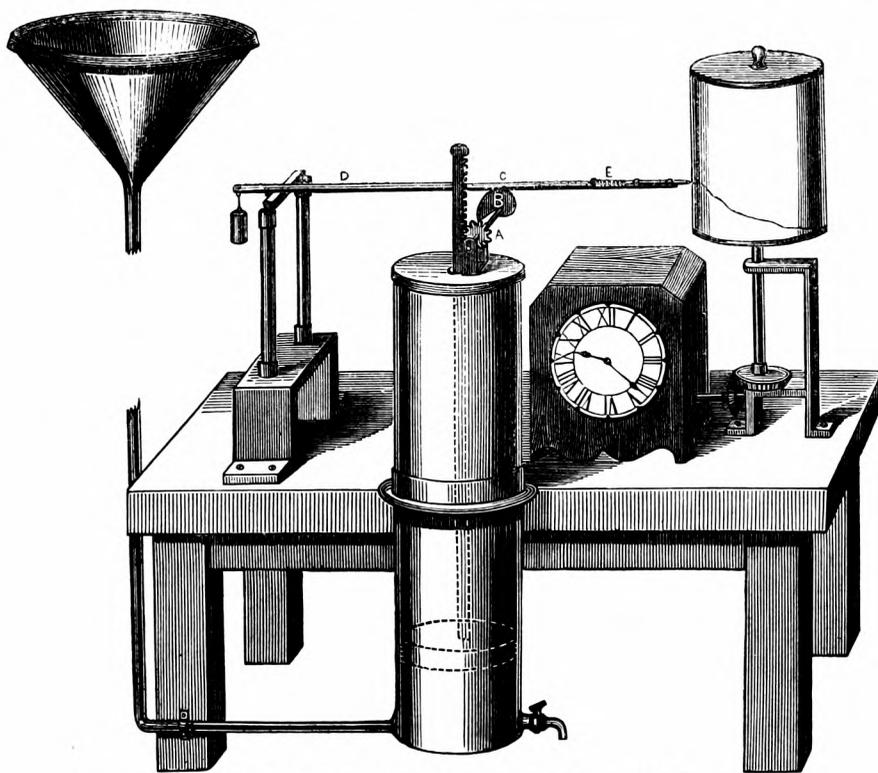
“The receiving surface is seven feet from the ground, and the rain collected is discharged into the bottom of a vertical cylinder, the piston of which it

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\* Results of Meteorological Observations made in New South Wales during 1871, under the direction of H. C. Russell, B.A. Sydney, 1872, page 5.



(13.) CASELLA'S SELF-RECORDING RAIN GAUGE. (Scale  $\frac{1}{8}$ ).



(19.) BRÉGUET'S SELF-RECORDING RAIN GAUGE. (Scale  $\frac{1}{8}$ ).



forces up two inches for every inch of rain which falls ; the piston rod turns the paper roller in the same proportion, and the pencil which travels along the roller, by clockwork, records the time and amount by a curved line."

This is, therefore, Mr. Bevan's gauge reversed, for the clock moves the pencil and the rain turns the cylinder ; while in Mr. Bevan's, the rain moves the pencil and the clock moves the paper.

(16) VAN RYSSSELBERGHE, PROF. F. Ostend.\*

Neither of the two papers quoted gives details of the precise form in which the rain gauge of Prof. Van Rysselberghe's Meteorograph is arranged. As a part of this important apparatus it appears to work very well, but I scarcely think that Prof. Van Rysselberghe himself would recommend the employment of the method unless (as in the Meteorograph) the records of several other instruments were desired.

(17) HOUGH, PROF. G. W. Dudley Observatory, U.S.A.†

All the information which I have yet been able to obtain respecting this pattern is contained in the following paragraph :—

"The success of Prof. G. W. Hough, of the Dudley Observatory, in constructing self-recording barometers and thermometers, lends additional interest to his announcement of the successful construction of an automatic evapometer and rain gauge. The apparatus consists of a vessel two feet square and one foot deep, suspended on levers, and held in equilibrium by a small spring, the amount of change in the weight of the mass, either from rainfall or evaporation, being indicated on the scale of a delicate balance. In order to secure the mechanical record of the hourly variations in the weight of the vessel and of its contents, the professor causes the lever to vibrate between two platinum points so placed that whenever a change in the weight of the vessel by a given amount (say ten grains) takes place, a magnetic circuit will be established, passing through an electro magnet. A micrometer screw will then be operated upon by means of clockwork, thereby tracing a curve on a revolving drum, precisely as in the case of the self-recording barometer and thermometer."

(18) VON BAUMHAUER, E.H. Harlem.‡

This is a suggestion for an instrument, rather than a description of one actually constructed ; at any rate there is nothing in M. Von

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\* Notice sur un système Météorographique Universel par M. F. Van Rysselberghe : Bruxelles, 1873, 8vo.—On a Universal System of Meteorography, by Prof. F. Van Rysselberghe, *Quarterly Journal Meteorological Society*, New Series, vol. II., page 367.

† *Nature*, vol. IX., page 250 (January 29th, 1874).

‡ Sur un Meteorographe Universel destiné aux Observations Solitaires, par E. H. Von Baumhauer. 1874. 8vo.

Baumhauer's paper to imply that it has ever been constructed. It is in short a Crosley's rain gauge with one new feature, viz.—that instead of the pipe leading into the vibrating bucket being as is usual straight and open at the end, it is provided with a sort of small rose, in order that the water may pass into the bucket more gently. The sketch in M. Von Baumhauer's pamphlet represents this tube as fixed, but it certainly ought to be easily removable for the purpose of being cleansed. The record of the number of discharges is to be first carried by a train of wheels to an endless chain with pointers attached, and the position of these is picked up by contact with the minute hand of a clock, and this being electrically connected with the recording apparatus, the position of the pointers is duly registered at any desired distance. As, however, it is only intended that this position shall be recorded once an hour, it is evident that although the *Meteorographe* as a whole may have many advantages, the rain gauge records would be inferior to those of almost all the instruments already described.

(19) BRÉGUET.\*

This is the instrument used by M. Marié Davy, at Montsouris Observatory. The rain is conveyed into a cylinder containing a float attached to which is a rod bearing a rack. This rack gears in the toothed wheel which carries on its axis a cam B, which works against a small nob at C, and lifts the recording pencil to a height equal to the breadth of the recording cylinder, and then suddenly allows the pencil to fall back and begin a fresh excursion; at E there is a spring to keep the pencil pressed against the paper. At Montsouris the instrument produces its traces by scratching the soot off a paper blackened with smoke, but in the engraving it is shown as provided with an ordinary pencil.

(20) ECCARD, PRIVATE A., Signal Service, U.S.A. †

This was exhibited at the International Exhibition at Philadelphia in 1876, and is thus described :—

*Rain-Gauge, devised by Private A. Eccard, Signal Service United States Army.*

“This instrument, mechanical in its action, records the amount of rainfall and the moment of beginning and ending thereof, during the twenty-four hours. The rain is collected in a funnel-shaped vessel on the roof of the observing station, conducted through a tube to the gauge, where it flows into a cylinder. In the latter a float is suspended, and as the water rises the float is carried with it. A light silk thread passes from the float over rollers and gives motion

\* *Annuaire de l'Observatoire de Montsouris pour l'an 1878.* Paris 1877, p. 320.  
 † Report of Chief Signal Officer, U.S.A. 1877, page 509.

to a pencil, which, by travelling over the record sheet, gives amount of rainfall and time. As the float rises the pencil sinks, and the figures on the sheet and corresponding lines give the amount of rainfall. The pencil is also connected with the clockwork which turns the cylinder bearing the record sheet and registers the amount of water in the gauge every four minutes. The sheet is changed daily."

From this it appears to be nearly the same as Apps's; except that Eccard's seems only to record each four minutes, not continuously.

(21). FESTING, A. M.\*

In this gauge which is part of a large meteorograph, the movement of a Crossley's bucket is recorded by electrical connection, in a series of dots on a pewter plate, each bucketfull registering  $\cdot 01$  in. of rain, by one dot; the register can be transferred from the pewter to a lithographic stone, and any number of copies printed therefrom. The method is, however, too elaborate to be employed for a rain gauge alone, and moreover the scale adopted by the inventor is quite inadequate for rainfall purposes, for with a heavier fall than  $\cdot 20$  in. per hour, the dots would be so close together that they could not be distinguished; and if it were altered so that each dot represented a larger amount, it would destroy the value of the record for light rains.

(22) FINES, DR.†

This gauge is somewhat elaborate and complicated, considering the kind of record it gives. It has, however, one or two good features that have not been adopted in other gauges. The rain is brought from the funnel—which is 8.89 in. in diameter—by the pipe A, and falls into the glass receiver B, at the bottom of which there is an intermittent syphon C, similar to that described in Osler's gauge; as soon as the rain collected reaches the top of the bell glass in the vessel B, the syphon is set in operation, and empties the water into the cup D, which is fixed into a rod pivoted at E; to this rod is also attached the arm G, carrying a pencil at its extremity, and as the cup D falls with the weight of the water discharged by the syphon, the pencil makes a short stroke on the recording cylinder, which is turned by a clock, and the distance between these strokes shows the interval between each amount of  $0.04$  in., but there is no means of telling whether it rained all the time, or whether the whole amount fell in a few minutes. At the bottom of the

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\* Description of a new form of Meteorograph, by A. M. Festing, F.M.S. Devonport, 1876. 8vo.

†Annuaire de la Société Météorologique de France. Tome XXIV. (1876) p. 156.

cup D there is a small hole which drains off the water into the vessel F, and the counterpoise weight and spring gradually bring the cup back to its original position; the water eventually passes into the reservoir under the table, which has a graduated tube at the side so that the quantity recorded can be checked before emptying the water away. One defect that is found in most gauges in which an intermittent syphon is used, is that all the rain that falls while the syphon is in operation is not recorded as it is carried away with the registered amount; in this instrument, however, the evil is overcome in a very simple manner: at the end of the funnel pipe A is placed a little valve H, which closes against the pipe by means of a connecting rod and lever as soon as the cup D descends, and thus the rain accumulates in the pipe and funnel till the vessel B is empty, and the cup D rises again and pushes off the valve.

(23) GIBBON, LIEUT. D. J., U.S.A.\*

This gauge was also at the Philadelphia Exhibition, and seems to be much more delicate than Eccard's. The following is the description:—

*Rain-gauge, devised by Lieut. D. J. Gibbon, United States Army.*

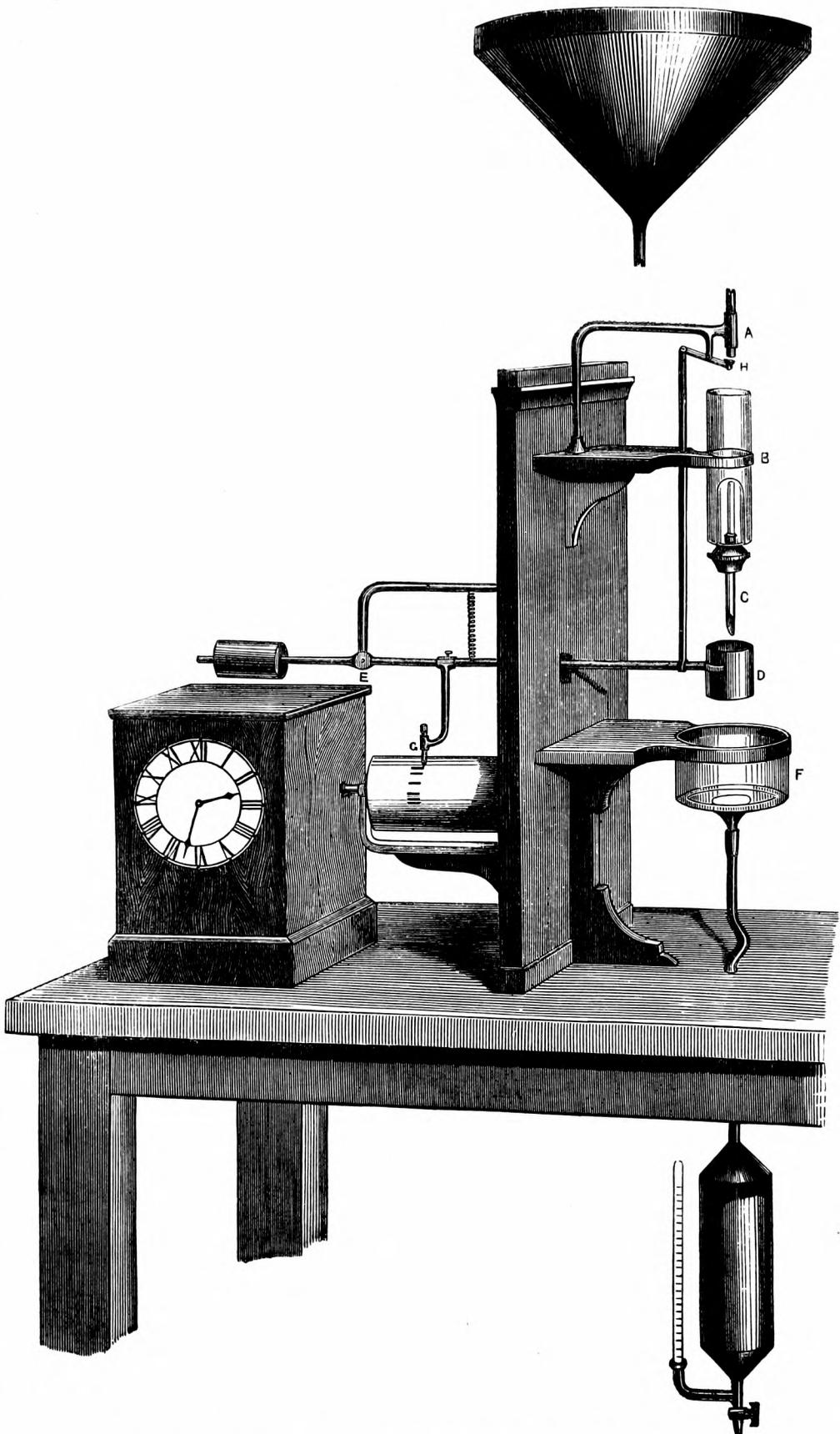
“This instrument has a funnel, cylinder, and float similar to No. 2. A thread from the float passes over a lever bearing a small weight, the latter to keep a constant tension on the thread. As the float rises, the tension is lessened, the lever sinks, closing an electric contact, the armature of the magnet is attracted, and the circuit completed. To the armature is attached a long, vertical, toothed arm, resting in a cogged wheel. When the armature is attracted, the extremity of the arm sinks into a cog of the wheel and turns the spiral, this latter being on the horizontal axis which supports the cogged wheel. The spiral travels across the surface of a sheet fastened to a cylinder turned by clockwork. Every closing of the circuit indicates 1-400th of an inch rainfall; the passing of the marker once across the sheet indicates that one-fourth of an inch of rain has fallen. The time of beginning and ending of rain is also indicated by rulings on the paper. An escapement throws the armature from the magnet after each registration. The sheet is changed daily at 12 m.”

(24). YEATES & Co. Dublin. (*No description published*).

I am not certain that this instrument is entitled to mention here. In the account of the Scientific Loan Exhibition at South Kensington given in the *Meteorological Magazine*, Vol. XI. p. 153, will be found the description and engraving of an arrangement for making a Crossley's rain gauge register electrically at any distance the number

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\* Report of Chief Signal Officer, U.S.A. 1877, page 510.



(22.) FINES'S SELF-RECORDING RAIN GAUGE. (Scale  $\frac{1}{2}$ ).



of times that the bucket tipped, and thence the amount of rain. In commenting upon it we remarked that it only needed a driving clock and paper-covered drum to convert it into a self-recording rain gauge. We are not aware that anybody has yet done this, and until they have it must appear here merely as a suggestion.

(25). HÖTTINGER & Co. Zurich. (*No description published*).

The engraving of this gauge was executed in Switzerland, and was not received in time to reduce it to the same scale as the other drawings, and on examination we find that the various parts of the instrument are not in proportion to each other, but the principle and mode of working are clearly shown.

The rain is brought from a funnel 9.95 in. in diameter, into the reservoir D, which by its increased weight raises the counterpoise on the arm B, and depresses the arm C; the end of the arm B travels over a fixed scale A, so that the amount of rain in the gauge can be read off at any time; at the end of the arm C there is a pricker which does not quite touch the paper, but is driven into it every ten minutes by the tapper G.

This tapper is worked by the cog wheel above the clockwork E, which raises and releases the tooth F, as each cog passes, the tapper has a pricker attached to its lower extremity, which marks the base line and time scale, on the recording sheet.

The paper is wound from cylinder No. 2 over No. 1, on to No. 3, by clockwork, so that the position of the point is registered every ten minutes; but the radius or arm C is so short that the curve described in the downward movement of the pricking point seriously interferes with the facility of reading the record; the reservoir D holds 3.94 in. of rain, and when it is full the water escapes by the pipe near D into the chamber H, and no record of it is obtained, but its amount can be subsequently ascertained by a measuring glass.

(26) REDIER, A. Paris.\*

This gauge is very similar to Apps's, the only difference being that it has two cylinders for the recording sheet, so that continuous paper can be used; and also that there is an electrical apparatus attached to the pencil, for making decided dots at certain intervals of time.

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\* Notice sur les Instruments de Météorologie de A. Redier. Paris 1878, 8vo.

## (27). DENZA, Padre. Italy.\*

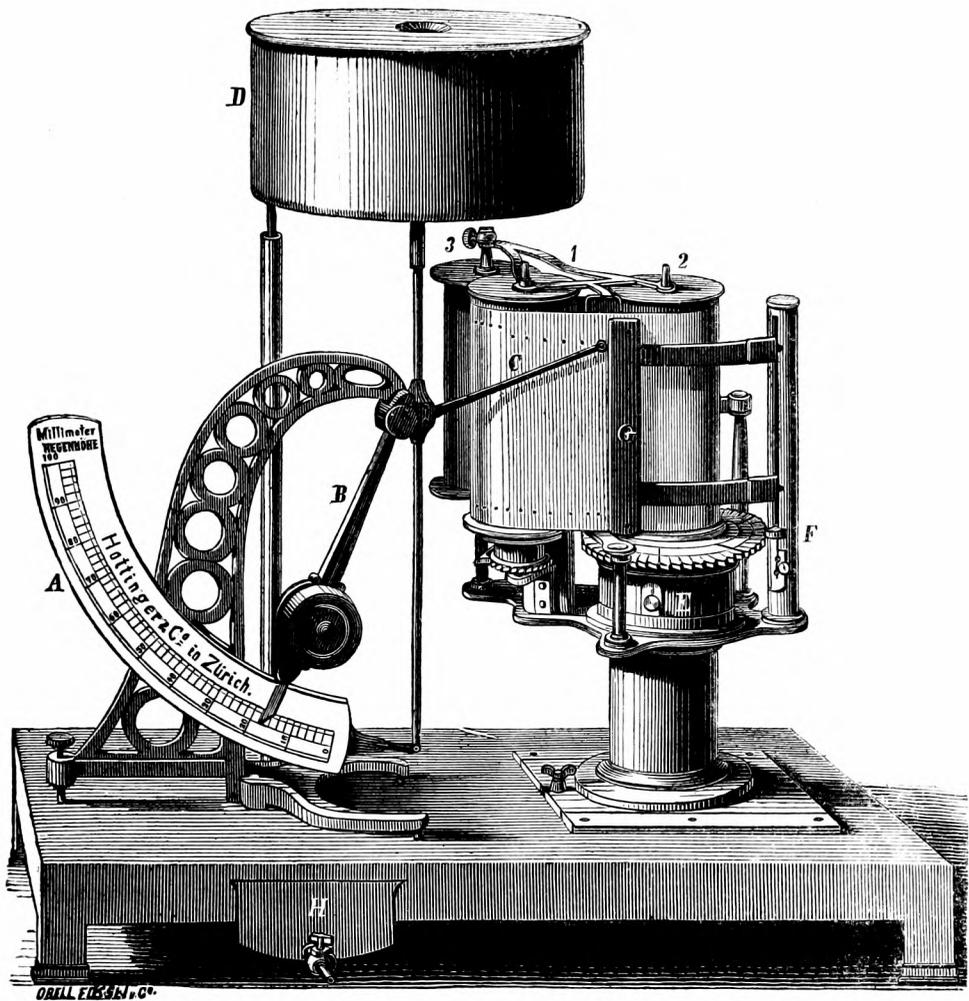
The description of this instrument is not yet all published, only two parts of Padre Denza's account of his new Anemograph and Pluviograph having appeared, but several engravings of the apparatus have been given. It would, therefore, be premature to attempt to describe it fully, but apparently it resembles in some respects both Hipp's (No. 10), and Von Baumhauer's (No. 18), for, as in No. 18, the motive power is produced by the alternate tipping of a double bucket, as in a Crossley's registering rain gauge, and this motion produces pricks upon a strip of paper as is the case with No. 10; but the paper moves continuously, and no electrical battery is required; the time is marked upon the paper by hourly pricks, but the space devoted to each hour is not equal, as no arrangement is made to prevent the irregularity which arises from the increasing diameter of the cylinder on which some hundreds of thicknesses of paper (Padre Denza, speaks of one drum of paper lasting two months) are gradually wound.

(28). LATHAM, B., C.E. Croydon. (*No description published.*)

This gauge (of which there is only one in existence) has been constructed mainly with the idea of getting a perfect instrument. The principle is the same as Apps', but an immense amount of care has been bestowed upon the arrangement and improvement of the mechanism; among the improvements and points of difference may be mentioned:—(1) the funnel has an area nine times that of the cylinder in which the float rises, so that a very open scale is obtained; (2) the cord from the float to the pencil, only passes over one large pulley instead of two small ones; (3) the pressure is brought upon the pencil and not upon the guides, which of course reduces the friction; (4) the rain enters at the top of the cylinder instead of the bottom; (5) the recording drum can be moved independently of the driving gear, so as to adjust it accurately; (6) a tapping apparatus is added to the instrument which jars the machinery every quarter of an hour, so as to prevent the possibility of a want of movement in any part; (7) the instrument is provided with a special heating apparatus for melting snow. It would occupy too much space to describe all these parts minutely, as special attention has been bestowed on every detail; but enough has been said to give a general idea of the gauge.

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\* *Bullettino Meteorologico dell' Osservatorio del Collegio Reale Carlo Alberto in Moncalieri.* Vol. XIII. Nos. 11 and 12.



(25.) HÖTTINGER'S SELF-RECORDING RAIN GAUGE.

(This gauge appears to be approximately drawn to a scale of  $\frac{1}{8}$ , but no definite measures of the different parts are given in the description.)



**RAINFALL AND METEOROLOGY**

OF

**1878.**

## INTRODUCTORY.

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IT is one of my fixed rules never to ask for data unless I see my way quite clearly to utilising it. There is quite enough necessary work to render it wrong to give any needless trouble. I do not ask of my correspondents any returns, except accurate ones of the fall of rain, but along with them they kindly send me many notes of other meteorological phenomena ; considering the very large number of stations, and how widely they are spread over the country, there can be little doubt that their records of weather form a most important supplement to the (chiefly numerical) data published by the Meteorological Council, the Meteorological Societies, and the Registrars General of England and Scotland. These general notes respecting the weather are also very useful for reference, when considering the facts recorded in the later sections upon “Heavy falls of short duration,” and “Heavy daily falls ;” and lastly, observers who will lay their own observation book open by the side of the following pages, will find the explanation of many facts which they did not at the time understand, and will be enabled to trace from their origin to their close many phenomena of which but a part was observable at their own station.

My own responsibility as regards this part of the work is limited to seeing that the facts are accurately copied, accurately printed, and correctly arranged. I believe that in the 80 pages devoted to this department in my last volume, there must be 1,800 separate entries. I am proud to say, that only one error has been detected amid this immense number. May I and my assistants be equally fortunate in the present volume.

## ON THE METEOROLOGY OF 1878.

WITH NOTES OF SOME OF THE PRINCIPAL PHENOMENA.

[These Notes should be read in conjunction with those on Heavy Rains in 1878.]

### JANUARY.

- 1st.—*Dartmoor Prison* (V). Squally.  
5th.—*Coston Rectory* (VII). Aconite in flower.  
6th.—*Druid House* (V). Hail showers.—*Lochbroom* (XVIII). Very stormy, S and sleet.—*Kilrush* (XX). Stormy, H and R.—*Ballinasloe* (XXII). Heavy squalls at night.  
8th.—*Compton Bassett* (V). Squally and cold.  
9th.—*Abbey Gate* (XII). S and sleet, corona at 6 p.m.  
11th.—*St. Lawrence Rectory* (II). Bright meteor at 6.30 p.m. fell to N.W.—*Merton Villa* (III). High bar., hard frost.  
13th.—*Abbey Gate* (XII). Fine ; owls screaming in evening.  
14th.—*Addington* (III). Mild day ; ther. 50°.—*Magdalen College* (III). Squally.—*Ballinasloe* (XXII). Very high wind at night.  
15th.—*Forest Row* (II). Bat flying at 4 p.m.—*Addington* (III). Very mild ; ther. 52°.—*Lochbroom* (XVIII). Terrific storm.  
17th.—*St. Lawrence Rectory* (II). First snowdrop.  
18th.—*St. Lawrence Rectory* (II). Winter aconite in flower.  
19th.—*Littlehampton* (II). Sharp frost.  
20th.—*Littlehampton* (II). Sharp frost.—*Merton Villa* (III). Very squally from S.W. after 9 p.m.—*Diss, Norfolk* (IV). Half a gale all night.—*Bickenhill Vicarage* (VI). Gale of wind, which gradually died out on the 23rd, followed by R and S.—*Copy Hill* (X). A great storm of wind and R.—*Carno* (XI). Stormy.—*Abbey Gate* (XII). Gale S.W.—*Dava* (XVIII). Very high wind.  
20th and 21st.—*Miltown Malbay* (XX). Very heavy gale from S.W. to W., with heavy, thick weather.  
21st.—*Bromley Common* (II). High wind ; very mild.—*Addington* (III). High wind at night ; very mild, temp. 54°.—*Merton Villa* (III).

Strong gale from S.W. after 4 p.m.—*Diss, Norfolk* (IV). Half a gale all day, increasing at night.—*Langtree Wick* (V). Stormy.—*Buckden* (IX). Gale and flood.—*Gainford* (X). Strong S.W. gale, wind increasing in afternoon.—*Llanfrechfa Grange* (XI). Blowing hard all day.—*Castle Malgwyn* (XI). Rough wind from S.W.—*Carno* (XI). Stormy and wet.—*Tubrid Cahir* (XX). Gale of wind.—*Kilconnell Rectory* (XXII). Storm from S.W.—*Killygarvan* (XXIII). Heavy R all day and hail showers.

22nd.—*Diss, Norfolk* (IV). Blowing hard.—*Gainford* (X). Dull, cold and squally.—*Copy Hill* (X). Dull and foggy; a flash of L at 10.25 p.m.—*Abbey Gate* (XII). High west wind; hills covered with S.—*Newcastle West* (XX). Violent storm with H.

22nd and 23rd.—*Miltown Malbay* (XX). Fierce hurricane in squalls, with hail showers, one squall lasting half an hour. Between 2 and 3 a.m. on the 22nd was the most powerful storm felt on this coast for the past ten years. The storm was accompanied by T and L.

22nd.—*Kilrush* (XX). Storm from 10 p.m. to 3 a.m. on 23rd; no damage reported.

22nd and 23rd.—*Buncrana* (XXIII). Gale from N.W. and N.

23rd.—*Addiscombe* (II). Sharp shower of small hailstones, lasting ten minutes, at 0.50 p.m.—*Bromley Common* (II). High wind, H.—*Strathfield Turgiss* (II). A peacock butterfly flying about the house.—*Alderbury* (V). Hailstorm; T and L from 4 to 10 p.m.—*Holt* (V). L in the evening.—*Compton Bassett* (V). Hailstorm and high wind.—*Whatcombe* (V). Severe H storm about noon, succeeded by S and R.—*Babbacombe* (V). Sleet, R and H showers; TS 7.14 to 7.20 p.m. Solar halo 9.15 to 10 a.m.—*Druid House* (V). Squally. H, S and R.—*Langtree Wick* (V). Heavy gale during the day and previous night.—*Meshaw* (V). H and S, blowing hard from W.—*Stanley Vicarage* (IX). A furious gale blew for three minutes at 1.5 a.m.—*Gainford* (X). Wild stormy day, snow showers.—*Castle Malgwyn* (XI). Cold wind with H.—*Abbey Gate* (XII). Very stormy, with S.—*Kilmory House* (XV). Frequent hail showers.—*Lochbroom* (XVIII). Fearful storm, R and S.—*Tubrid Cahir* (XX). High wind, squalls of sleet.—*Newcastle West* (XX). Violent storm with H.—*Ballinasloe* (XXII). Much T and L about 2 a.m.—*Kilconnell Rectory* (XXII). Storm from N.W. with S, T and L.—*Killygarvan* (XXIII). Heavy squalls, and hail showers at night.

24th.—*Hailsham* (II). Snowstorm, frost.—*Copy Hill* (X). A fall of S; L at 10 p.m.—*Watten* (XIX). High wind and snow showers.—

*Newcastle West* (XX). Violent storm with H and S.—*Killygarvan* (XXIII). Gale with S and H.

25th.—*Addiscombe* (II). Humidity at 3 p.m., 41 (dry bulb 30°·8, wet 25°·6). S fell for some time thickly, and in large flakes after 6.15 a.m.—*St. Lawrence Rectory* (II). Yellow crocus in bloom.—*Addington* (III). S; a bitter cold day; max. 36°.—*Merton Villa* (III). Heavy S from 9 to 10.30 p.m.; coldest day this winter.—*Alderbury* (V). S on ground.—*Compton Bassett* (V). Frost, then snowstorm, thaw, and frost again.—*Babbacombe* (V). Heavy showers of S and soft H at 4 p.m.; glazed frost 5 to 8 p.m.—*Dartmoor Prison* (V). S falling, very stormy.—*Langtree Wick* (V). Stormy.—*Meshaw* (V). H and S.—*Sansaw* (VI). S.—*Woodlands* (X). Fine until 1.30 p.m., when showers of S; L in the night.—*Castle Malgwyn* (XI). H and S.—*Abbey Gate* (XII). S half an inch deep; L at 6 p.m.—*Watten* (XIX). Stormy and changeable.—*Kilrush* (XX). Storm, R, H, and sleet.—*The Gardens, Belvedere* (XXI). Quarter of an inch of S; freezing sharp at 10 a.m.

26th.—*Copy Hill* (X). Bitter cold, L.—*Abbey Gate* (XII). Halo at 6.30 a.m.; frost.

27th.—*Babbacombe* (V). S.W. gale.—*Watten* (XIX). Storm of wind and R.—*Kilrush* (XX). A heavy squall from 11.55 p.m. to 1 a.m.

28th.—*Bromley Common* (II). Sharp hail storm.—*St. Lawrence Rectory* (II). Earthquake at 11.57 a.m., very distinct.—*Druid House* (V). Squally, H storm.—*Kilmory House* (XV). Hail showers.

## FEBRUARY.

1st.—*Addington* (III). Cold frosty day, ice 1½ in. thick on pond.

2nd.—*Addington* (III). A steady thaw set in.

7th.—*Landscore* (V). Shock of earthquake.

8th.—*East Layton* (IX). Lovely day, bees out for the first time.

11th.—*Gainford* (X). Lunar halo, 9 p.m.

12th.—*Hailsham* (II). Storm at night.—*Magdalen College* (III). Hail, rain, and wind in night.—*Druid Ashburton* (V). Heavy storm in night, 1.15 in. of rain.—*Coston Rectory, Melton Mowbray* (VII). R and S during night, with high wind.

14th.—*Addington* (III). Large flood.—*Miltown Malbay* (XX). Sudden squall, approaching hurricane force.

16th.—*Miltown Malbay* (XX). Heavy gale from S. to S.W., without R.

17th.—*Addiscombe* (II). Winter aconites in blossom, under a

south wall.—*Sedgebrooke* (III). Temp. 59°, the highest registered in February for three years.

18th.—*Addiscombe* (II). A polyanthus in blossom in an exposed border.—*Druid Ashburton* (V). Brightly coloured lunar rainbow.

20th.—*Babbacombe* (V). Solar halo, 9.15 to 10.30 a.m.—*Ashley Down, Bristol* (VI). Solar halo.—*Copy Hill, Shap* (X). T with R.

21st.—*Meshaw* (V). Blowing hard from S.W.

23rd.—*Babbacombe* (V). Faint solar halo, at 2 p.m.

28th.—*Littlehampton* (II). Gale during night.—*Dartmoor Prison* (V). Very stormy, 1.48 in. of R.

### MARCH.

1st.—*Ashley Down*.—(VI). Continuous R all day, 1.29.—*Llan-frechfa* (XI). Heavy gale and much R all day.

2nd.—*Stanley Vic.* (IX). Rooks commenced building.

4th.—*Addiscombe* (II).—Apricot tree in blossom, on a south wall.—*Littlehampton* (II). Cold sea fog.—*St. Lawrence* (II). Sea fog from 0.30 to 4 p.m.—*Buckden* (IX). Strong wind, aurora.

5th.—*Magdalen College* (III). High wind.—*Stanley Vicarage* (IX). Gale during night.—*Buckden* (IX). Aurora.

6th.—*Swallowfield* (II). Very high wind.—*Addington* (III). High wind at night.—*Merton Villa* (III). Hard gales from W.N.W.—*Diss* (IV). Gale S. to S.W.—*Alderbury* (V). Heavy gale.—*Coston Rectory* (VII). Gales.—*Melrose* (XII). Gale for 24 hours.—*Annanhill* (XIV). Hard W. gale.—*New Barnsley, Belfast* (XXIII). Gale.—*Knockan* (XXIII). High wind.—*Allan Rock* (XXIII). Gale.—*Killygarvan* (XXIII). Gale all day.

7th.—*Dartmoor* (V). Stormy.—*Buckden* (IX). Gale, aurora.

9th.—*Babbacombe* (V). Solar halo and parhelion.

11th.—*Littlehampton* (II). Bright meteor, at 8 p.m., N.N.W.

14th.—*Littlehampton* (II). Sharp frost.—*Swallowfield* (II). Ther. fell to 25°.

15th.—*Compton Bassett* (V). Sharp frost.—*Tavistock* (V). Temp. fell to 21°.

16th.—*St. Lawrence* (II). Severe frost.

17th.—*Littlehampton* (II). Very sharp frost.—*Swallowfield* (II). Temp. fell to 22°.—*Tavistock* (V). Dense fog.

19th.—*Littlehampton* (II). Quite hot.—*Melrose* (XII). Butterfly on the wing.

22nd.—*Littlehampton* (II). Aurora.

23rd.—*Addiscombe* (II). With this day ended a rainless period of twelve days, the longest during the whole year.—*St. Lawrence* (II). Severe frost.—*Addington* (III). Sharp frost.—*Alderbury* (V). Heavy falls of S.—*Langtree Wick* (V). S.—*Walton-on-the-Hill* (VIII). Severe frost.—*Shap* (X). Very hard frost.—*Broadford, Skye* (XVIII). Severe gale, with S.—*New Barnsley, Belfast* (XXIII). Gale.

24th.—*Littlehampton* (II). Violent squalls and S at 4 p.m.—*Magdalen College* (III). High wind, S.—*Northampton* (III). Heavy snowstorm, 2 to 3 p.m.—*Merton Villa* (III). Heavy S. Heavy squall, 3.30 p.m.—*Diss* (IV). Short snow and hail showers, from N.W.; sudden gust at 4.30 p.m.—*Compton Bassett* (V). Sharp frost.—*Dartmoor* (V). Squally, with S.—*Holt* (V). About 2.30 p.m., weather cold, though fine and bright, the sky suddenly became overcast, and there sprang up a heavy squall, with a blinding whirlwind of S, which, after lasting some quarter of an hour or twenty minutes, passed off as promptly as it came, leaving the heavens as clear as before.—*Porlock* (V). Hurricane of wind, accompanied by a mixture of sleet and R, lasting in full force, from about 1.30 to 2 p.m.—*Upfield, Stroud* (VI). Sudden squall at 2.30 p.m., with one vivid flash of L, and T; T also in the evening.—*Saul Lodge* (VI). The S squall in which the "Eurydice" went down, passed this house at 2 p.m., and lasted but a few minutes; it came from N.W. and passed in a S.E. direction.—*Cheltenham* (VI). Terrific snowstorm for short time in afternoon, and heavy S in evening.—*Bishop's Castle* (VI). S squall began here at 11.50 a.m. S 2 in. deep.—*Leaton Vicarage* (VI). Violent snowstorm, with heavy wind at noon, darkness so great that reading was difficult.—*Thorpe Arnold* (VII). Heavy gale and blinding snowstorm came on very suddenly, at half-past 1 p.m.—*Hodsock* (VII). S, with gust of wind, from about 0.30 to 3.30 p.m.—*Walton-on-the-Hill* (VIII). Severe storm, with heavy T, and brilliant L.—*Elterwater* (X). Showers of S; windy.—*Llanfrechfa* (XI). Strong scud of wind, with sleet between 4 and 5 p.m.—*Killygarvan* (XXIII). Strong gale all day.

25th.—*Diss* (IV). Driving snow and hail storms from N.W. Blowing hard.

26th.—*St. Lawrence* (II). Very sharp frost.—*Addington* (III). Sharp frost, snow showers.

27th.—*Bickenhill* (VI). Deep S.

28th.—*Muswell Hill* (I). Heavy fall of snow, yielding .30 in.—*Magdalen College* (III). S and high wind.—*Northampton* (III). Heavy

gale of wind.—*Diss* (IV). S and heavy gale, from E. by N. during night.—*Clevelands* (V). Heavy snowstorm, high road blocked in places by deep drifts. Area of heavy S fall was rather circumscribed, and specially affected this district.—*Babbacombe* (V). Severe snowstorm with N.E. gale (1·20 in.)—*Meshaw* (V). Unusually severe snowstorm (measuring ·59 in.) causing heavy drifts, and the loss of numerous sheep on Exmoor and adjacent commons, and rendering the roads impassable in various places in this neighbourhood.—*Bincombe House* (V). Heavy fall of S, with gale from E.N.E. all day and night.—*Porlock* (V). ·95 in. from S; roads on hills rendered impassable; great loss of sheep in the drifts.—*Bickenhill* (VI). Gale from 9 p.m. to noon on the 30th.

29th.—*Littlehampton* (II). S with much wind.—*Addington* (III). Very stormy, S and rough wind.—*Diss* (IV). Heavy gale; heavy S from 5 a.m. to 4.30 p.m.—*Babbacombe* (V). N.E. gale.—*Dartmoor* (V). Great snowstorm.—*Tavistock* (V). Heavy snowstorm.—*Arlington Court* (V). Deep S.—*Langtree Wick* (V). S.—*Coston Rectory* (VII). High gale all day and night.—*Tubrid* (XX). Very cold, S.

30th.—*Addiscombe* (II). The cold winds of the last few days destroyed all the leaves and flower buds on the rose-trees, and most of the blossoms on the apricot-trees.—*Littlehampton* (II). Sharp frost.—*Coston Rectory* (VII). Gale with S.—*Allan Rock* (XXIII). Bitterly cold day; snow showers.

31st.—*Littlehampton* (II). Heavy S and sharp frost.—*St. Lawrence* (II). Sharp frost.—*Addington* (III). R at night, followed by S and sharp frost.—*Diss* (IV). Hard frost and heavy S.—*Coston Rectory* (VII). H, S, and R.—*Allan Rock* (XXIII). Bitterly cold day; snow showers.

#### APRIL.

1st.—*Addiscombe* (II). Snow showers during the afternoon; distant T in N., N.E., and E., between 3.30 and 3.45 p.m.—*Bromley Common* (II). S.—*Littlehampton* (II). Blackbird first heard.—*Babbacombe* (V). H.—*Dartmoor* (V). Passing snow showers.—*Cheltenham* (VI). H.—*Langton* (VII). The min. temp. (17°) was lower than any recorded during the previous months of 1878 or the whole of 1877.—*Buckden* (IX). Hard frost, S.—*Carno* (XI). S.—*Melrose* (XII). Slight S.—*Dalnaspidal* (XVI). S.—*Tomintoul* (XVII). S.—*Forres* (XVII). S.—*Budgate Cawdor* (XVIII). S.—*Dava* (XVIII). S.—*Kinbrace* (XIX). S.—*Watten* (XIX). S and sleet.—*Newcastle West* (XX). H.—*Belvedere* (XXI). White frost, S.—*Dowra* (XXII). S.—*Belfast* (XXIII). Snow

showers.—*Rathmullan* (XXIII). H.—*Buncrana* (XXIII). S, H, and heavy northerly squalls.

2nd.—*St. Lawrence, Isle of Wight* (II). Bluebells in flower.—*Rhûg* (XI). H.—*Melrose* (XII). S.—*Dava* (XVIII). S.—*Newcastle West* (XX).—H and sleet.—*Ballymore Eustace* (XXI). S.—*Belvedere* (XXI).—H.—*Kilconnell* (XXII). H.—*Dowra* (XXII). S.

3rd.—*Babbacombe* (V). Faint aurora.—*Bickenhill* (VI). S.—*Elterwater* (X). S.—*Belvedere* (XXI). H.—*Kilconnell* (XXII). H.

4th.—*Melrose* (XII). H.—*Newcastle West* (XX). H.

5th.—*Addiscombe* (II). T in N.W. at 0.27 p.m. S with R 0.45 till 1 p.m. L and T overhead at 1.50 p.m.—*Riverhead Vicarage* (II). H.—*Littlehampton* (II). Thick fog; curious rainbow, 6.30 a.m.—*Swallowfield* (II). T at midday.—*Addington* (III). T.—*Upfield, Stroud* (VI.) TS at 0.30 p.m., two trees struck about a quarter of a mile hence.—*Melrose* (XII). H.

6th.—*Pinner Hill* (I). Swallow seen.—*St. Lawrence, Isle of Wight* (II.) First white butterfly seen; wryneck heard.

7th.—*Melrose* (XII). Lark heard.

8th.—*Diss* (IV). Heavy gale from N.E.—*Dartmoor* (V). High wind.—*Shap* (X). Gale.—*Newcastle West* (XX). Stormy.

9th.—*Belvedere* (XXI). Boisterous wind.

10th.—*Camden Road* (I). 2.54 in. of R.—*Stoke Newington* (I). 2.29 in.—*Muswell Hill* (I). 2.34 in.; this far exceeds any fall that has occurred in the 24 hours ending 9 a.m., since January, 1872. Hitherto 1.38 in. on July 14th, 1875, has been the maximum.

10th and 11th.—*Addiscombe* (II). During the 26 hours ending 6 p.m. of the 11th, R fell to the depth of 2.21 in. On only two previous occasions during the last 18 years, in Croydon, has the rainfall of any two consecutive days exceeded 2 in., and in both instances these heavy falls occurred in July. During the 12 hours ended 9 a.m. on the 11th R was falling at the average rate of .132 in. per hour.—*Riverhead Vicarage* (II). 2.20 in.—*Bromley Common* (II). 2.35 in. of R fell between 4 p.m. on 10th and 4 p.m. on 11th.—*Foxgrove, Beckenham* (II). 4.30 p.m. 10th to 4.45 p.m. 11th (24¼ hours) 3.46 in. fell.—*Eltham Green* (II). Total fall of R, 2.81 in 21 hours ending 2 p.m. on 11th.

11th.—*Diss* (IV). Cuckoo heard.

12th.—*Littlehampton* (II). Swallow seen.—*Cambridge* (III). Fine lunar halo after 9 p.m.—*Holt* (V). Cuckoo heard.—*Coston Rectory* (VII). Fog in morning.—*Newcastle West* (XX). Stormy.

13th.—*Pinner Hill* (I). Nightingale heard.—*Alderbury* (V). Nightingale heard.—*Stanley Vicarage* (IX). First swallow seen.

14th.—*Pinner Hill* (I). Wryneck heard.—*Swallowfield* (II). Swallow seen.—*St. Lawrence, Isle of Wight* (II). First swallow seen.—*Alderbury* (V). Wryneck heard.

16th.—*St. Lawrence, Isle of Wight* (II). First nightingale heard.—*Bushmills* (XXIII). TS; the total rainfall of the day (.53 in.) fell in about 15 minutes.

17th.—*Swallowfield* (II). Cuckoo heard.—*Addington* (III). Slight hail shower.—*Cambridge* (III). T in S.W. at 4 p.m.—*Uppfield, Stroud* (VI.) TS at 2.30 p.m. with H and R; a tree struck within 80 yards of the house.—*Cheltenham* (VI). L and T.—*Hodsock Priory* (VII). T and L to S. at 5 p.m., going from W. to E.

18th.—*Littlehampton* (II). Nightingale heard.—*Addington* (III). Cuckoo reported.—*Diss* (IV). Swallow seen.—*Compton Bassett* (V). Dense fog in morning.—*Babbacombe* (V). Solar halo.—*West Coker* (V). Swallow seen, cuckoo heard.—*Llanfrechfa* (XI). Thick fog till 11 a.m.

19th.—*Pinner Hill* (I). Cuckoo heard.—*Llanfrechfa* (XI). Thick fog till 9.30 a.m.

20th.—*Diss* (IV). Nightingale heard.—*Alderbury* (V). Cuckoo heard.—*Babbacombe* (V). Solar halo.

21st.—*Cambridge* (III). Swallow seen.

23rd.—*St. Lawrence, Isle of Wight*. Distant T.—*Coston Rectory* (VII). Cuckoo first heard.

24th.—*St. Lawrence, Isle of Wight* (II). Cuckoo heard.

27th.—*Stanley Vicarage* (IX). Cuckoo first heard.

28th.—*Addington* (III). Cuckoo heard.—*Newtownards* (XXIII). Cuckoo and corncrake heard.

29th.—*Littlehampton* (II). Fine day, hot, T in evening; cuckoo heard.—*Walton-on-the-Hill*. (VIII). Shade temp. 70°.

30th.—*St. Lawrence, Isle of Wight* (II). Lilac and laburnum in flower.—*Addington* (III). Much L at night.—*Cambridge* (III). L in N. 8 to 9 p.m.—*Coston Rectory* (VII). T in W. about 7 p.m.

## MAY.

1st.—*Stoke Newington* (I). TS.—*Addington* (III). T in evening.—*Coston* (VII). Vivid lightning to E. during evening.—*Bucknall* (VII). T.—*Langton* (VII). T and L.—*Hodsock Priory* (VII). TS, 1 p.m.—*Manchester* (VIII.) Severe TS and very heavy rain.

5th.—*Miltown Malbay* (XX). Heavy gale from S.E.

6th.—*Melrose* (XII). L during night.

7th.—*Branch Hill Lodge* (I). Very heavy R, total 1·86 in.—*Babbacombe* (V). Oak in leaf.—*Saul Lodge* (VI). TS.

8th.—*Kibworth* (VII). 2 in. of R fell between 4 p.m. on 7th and 4 p.m. on 8th.—*Willey Rectory* (VI). A continuous fall of R for 24 hours, 1·67 in. ; 0·96 in. fell on 7th, and ·71 in. on 8th.

9th.—*Magdalen College, Oxford* (III). T and L.—*Cheltenham* (VI). T.

10th.—*Littlehampton* (II). Heavy T and L.—*Addington* (III). T and L at night.—*Alderbury* (V). TS.—*Holt* (V). A TS commenced at 7.30 p.m., and lasted nearly all night ; depth of R fallen by 9 a.m. on the 11th, 1·01 in.—*Compton Bassett* (V). TS.—*Beaminster* (V). TS.—*Shaftesbury* (V). TS.—*Babbacombe* (V). TS. Swallow first seen.—*Dartmoor* (V). T and L.—*Tavistock* (V). T and L.—*Druid House* (V). T and L.—*Meshaw Rectory* (V). T and L.—*Cosgarne* (V). T and L.—*Bincombe House* (V). Gale from E. all day ; TS at night, 1·50 in. of R in 1¼ hours.—*West Coker* (V). Fearful TS.—*Weston, Bath* (V). Heavy TS 8 to 10 p.m., and R all night, total 2·00 in., but land was so dry that the streams showed little of it.—*Bristol* (VI). Heavy TS.—*Upfield, Stroud* (VI). TS began 8.30 p.m., lasted all night ; R 1·75.—*Cheltenham* (VI). Heavy TS at night.—*Llanfrechfa* (XI). L and T, 8 to 10 p.m. in S.E.—*Solva* (XI). T and L.—*Castle Malgwyn* (XI). T.—*Melrose* (XII). Oak in leaf.

11th.—*Harbledown* (II). TS.—*St. Lawrence* (II). L and T, at 5 a.m.—*Babbacombe* (V). L.—*Burton-on-Trent* (VI). Trent in high flood.

12th.—*St. Lawrence* (II). Bees swarmed.—*Merton Villa, Cambridge* (III). Fine meteor in N.W., at 8.50 p.m.—*Hodsock Priory* (VII). TS to S, 3 p.m.—*Broughton-in-Furness* (VIII). T.—*East Layton* (IX). TS all day.—*Melrose* (XII). T and L.

13th.—*Babbacombe* (V). Ash in leaf.—*Castle Lough* (XX). T and H.

14th.—*Addington* (III). Stormy, T.—*Holt* (V). T between 3 and 4 p.m.—*Langtree Wick* (V). T.—*Weston, Bath* (V). Heavy TS, R 1·35 in. ; streams in flood.—*Cheadle* (VI). T.—*Hodsock Priory* (VII). TS to W. with H at 1 p.m. ; distant TS to W. in afternoon.—*Stanley Vicarage, Wakefield* (IX). T.

15th.—*Babbacombe* (V). TS.—*Shap* (X). T.—*Melrose* (XII). Hawthorn and laburnum in flower.

16th.—*Northampton* (III). Gale at night.—*Diss* (IV). Heavy gale.—*Unthank Hall* (X). Hailstorm.

17th.—*Stoke Newington* (I). T.—*Addiscombe* (II). Two distinct

TSS at night. One which was nearest at 1.5 a.m. (18th), and which passed away rapidly, and apparently in an easterly direction at 1.20 a.m., and the other which was at its height about 6 o'clock the same morning. The first of these storms was the more severe, but in each case the wind fell very light while the storm lasted, and afterwards increased in force as it subsided. Total amount of R .248 in.—*Magdalen College, Oxford* (III). T and L.—*Diss* (IV). Rather sharp TS to S.W. at 7 a.m.—*Cosgarne* (V). T and L at night.—*Cheltenham* (VI). Heavy TS at night.—*East Layton* (IX). TS, 11 a.m.—*Castle Malgwyn* (XI). T.

18th.—*Pinner Hill* (I). Heavy TS with H at 2.30 a.m.—*Enfield* (I). A remarkably protracted TS, continuing for nearly 8 hours.—*Harbledown* (II). TS.—*Bromley Common* (II). TSS at 1 and 6 a.m.—*Addington* (III). Sharp T.—*Northampton* (III). T and L, 3 a.m.—*Wetherden* (IV). Heavy TS, 7 a.m.—*Hillington, Lynn* (IV). 1.23 in. of R, nearly all of which fell in two hours, during a TS; T and L most intense, and R heaviest 6.10 to 6.40 a.m.—*Holt* (V). Heavy TS between 1 and 3 a.m.—*Langtree Wick* (V). TS.—*Weston, Bath* (V). 2 to 3.20 a.m., a very heavy TS; R .57, the streams more flooded than before.—*Cheadle* (VI). T and L.—*Tean Vicarage, Cheadle* (VI). A TS of considerable violence passed about three miles S. between 10.40 and 11.30 a.m.; the discharges were at the rate of three or four per minute; only a few drops of R fell here.—*Hodsock Priory* (VII). TS, 6 a.m., and at noon.—*Wulton-on-the-Hill* (VIII). Sharp TS.—*Over Durwen* (VIII). .68 in. of R in 15 minutes.—*Stanley Vicarage, Wakefield* (IX). A terrible T and HS for ten minutes, at noon.—*Shap* (X). T.—*Curno* (XI). TS, 6 a.m.—*Melrose* (XII). Ash in leaf.—*Castle Lough* (XX). T and L.—*Ballinasloe* (XXII). L at 5.45 p.m.—*Kilconnell* (XXII). Storm from S.W., with T, and H of very large size.

19th.—*Addiscombe* (II). With this day terminated a remarkable period of warm weather lasting 39 days, during which the mean daily temp. never fell below the average.—*Northampton* (III). Gale.—*Diss* (IV). Heavy gale from S.W.—*Meshaw Rectory* (V). Brisk gale all day.—*Coston* (VII). Gale all day.—*Llanfrechfa* (XI). Heavy gale.

20th.—*Addiscombe* (II). Cut my first rose, a Gloire de Dijon, on a west wall.—*Kibworth* (VII). Severe frost.—*Broughton-in-Furness* (VIII). H.—*East Layton* (IX). Slight S showers.—*Gainford* (X). S on the hills.—*Unthank Hall* (X). H.—*Belfast* (XXIII). H in evening.

21st.—*Addiscombe* (II). Lowest temp. of month 37°.1. Distant T 2.50 p.m.; heavy R 3.10 to 3.25 p.m.; sharp shower of H, at

3.37 p.m. — *Eastbourne* (II). T and L. — *Diss* (IV). H storms. — *Shaftesbury* (V). TS. — *Langton* (VII). TS; two churches in this neighbourhood struck, one greatly injured. — *Shap* (X). S. — *Reagill* (X). Pennine Range and High-street, white with S. — *Melrose* (XII). S. — *Lochbroom* (XVIII). H, S, and high wind. — *Knockan* (XXIII). Mountains covered with S.

22nd. — *Harbledown* (II). TS.

24th. — *Coston* (VII). T.

25th. — *Addiscombe* (II). Distant T at 0.30 p.m., and again in S.W., 4.15 and 4.20 p.m. — *Littlehampton* (II). R, H, and T. — *Strathfield Turgiss* (II). H. — *Coston* (VII). T to W., at 9 a.m. — *Hodsock Priory* (VII). Distant TS to W., 9.30 a.m.

26th. — *Alderbury* (V). Hailstorm. — *Diss* (IV). Heavy TS. at 4.30 p.m. — *Melrose* (XII). H. — *Belfast* (XXIII). T.

27th. — *Cheadle* (VI). T. — *Hodsock Priory* (VII). TS, 3 p.m. — *Walton-on-the-Hill* (VIII). TS at 3.45 p.m. — *Carno* (XI). T showers, — *Melrose* (XII). H. — *Newcastle West* (XX). T and heavy H. — *Belfast* (XXIII). T.

28th. — *Alderbury* (V). T from 3 to 4 p.m. — *Beaminster* (V). TS. — *Druid House* (V). T showers. — *Court Barn* (V). TS. — *Langtree Wick* (V). A sudden storm of R, H, T, and L, between 1 and 4 p.m. — *Cosgarne* (V). T and L. — *Cheltenham* (VI). Heavy H storm, at 2 p.m. — *Melrose* (XII). T and L.

## JUNE.

2nd. — *Newcastle West* (XX). T and L.

3rd. — *Miltown Malbay* (XX). T. — *Dowra* (XXII). TS.

4th. — *Hodsock Priory* (VII). Distant TS in afternoon; heavy R began 1 p.m.

5th. — *Achonachie Lodge* (XVIII). Sharp frost on ground; blackened potatoes.

6th and 7th. — *Hodsock Priory* (VII). Heavy dew.

7th. — *St. Lawrence* (II). L and T over the sea.

8th. — *Addiscombe* (II). Heavy TS 3.50 to 5 p.m.; nearest about 4.30 p.m.; forked L at 4.53 p.m.; amount of R .38 in. — *Bromley Common* (II). TS. — *Wetherden Rectory* (IV). Heavy TS 7 p.m. — *Bishop's Castle* (VI). Severe TS with heavy R.

9th. — *Coston Rectory* (VII). T, L, and heavy R at 1.30 p.m.

10th. — *Compton Bassett* (V). Hailstorm. — *Saul Lodge* (VI). TS.

11th.—*Bromley Common* (II). Gale.—*Babbacombe* (V). S.W. gale.—*Cricket St. Thomas* (V). Wind quite a gale; very cold, quite wintery; ground covered with leaves blown from the trees.—*Green Manor* (VI). Heavy storm of R, .70 in. falling in 30 minutes.—*Hodsock Priory* (VII). R began 7 a.m., TS 4 p.m.—*Shap* (X). TS.

12th.—*Berkhamstead* (III). Distant T and heavy R 1 p.m.

13th.—*Weston, Bath* (V). A peculiar storm or waterspout occurred. A dark cloud appeared suspended for more than an hour, over Lansdown, which is north of this, about 5 p.m., a flash of L was seen, accompanied by T, and immediately followed by a heavy fall of R and H, which ran down the hill on the N.W. and S.W. sides, in sheets of water. It continued to fall for nearly an hour. My gauge on the outskirts registered .56 in., but in the immediate circle of the storm, which fell on about 4 square miles, the R must have been several inches. The R scarcely reached Bath, on the S.E. of Lansdown, but it caused a very deep flood in this village and very great damage.

14th.—*Castle Lough* (XX). T.

15th.—*Babbacombe* (V). T.—*Kilworthy Hill* (V). T, L, and heavy H.—*Dowry* (XXII). TS.—*Ballymully Glebe* (XXIII). Heavy T, but distant.

16th.—*Camden Square* (I). Loud T, 1 to 1.20 p.m.—*Addiscombe* (II). A TS, or rather a succession of heavy thunder showers; R with periods of intermission from 2.45 p.m. till 8.30 p.m. Amount, .257 in.—*Bromley Common* (II). T.—*Littlehampton* (II). Heavy TS.—*Oxford* (III). T and L.—*Week St. Mary* (V). A local storm at Bude, 7½ miles away by road. The first intimation of a storm was a downpour of water into the river channel.—*West Coker* (V). Barley began to come out in ear.—*Manchester* (VIII). Heavy hailstorm at 0.30 p.m.—*Cardiff* (XI). 1.78 in. of R in one hour.

17th.—*Dale Park* (II). Heavy R; 1.55 in. fell in about 4 hours.—*Compton Bassett* (V). TS.—*Bincombe House* (V). Heavy TS; 1.09 fell in one hour.—*Uppfield, Stroud* (VI). TS between 4 and 5 p.m. L vivid and constant, R .51 in.—*Broughton Hall* (VIII). Unusually heavy rainfall; 1.08 in the hour, 11.40 a.m. to 0.40 p.m.

18th.—*Pinner Hill* (I). T and L.

19th.—*Godmanchester* (III). TS, 2.30 to 5 p.m.—*Huntingdon* (III). From 3 to 5 p.m.; rainfall 2.61 in.—*Melrose* (XII). Thunder showers.—*Red Hills, Caran* (XXIII). 2.48 in. fell in 2½ hours.

22nd.—*Cricket St. Thomas* (V). First day of summer.

23rd.—*Thornton Heath, Croydon* (II). Heavy TS with H, total amount 3.30 in.—*Sutton* (II). Hailshower, the stones weighing in many cases  $1\frac{1}{4}$  oz. The storm was greater in a N.E. direction from Sutton, though even in Sutton scarcely a square of glass escaped being broken. On the S. side of the Brighton Railway the damage was less.—*Tanfield Lodge, Croydon* (II). Fine morning; about 1 p.m. a smart shower fell, and soon after T was heard, which by 1.45 was very frequent and near, and L very vivid. Heavy R began about 2, and from then till 4 tremendous storms of R and H; hailstones at times very large, some measuring seven-eighths of an inch in diameter, and being nearly spherical. R taken at 4 p.m., 1.89.—*Beechholme* (II). 1.83 of R fell during a storm of unprecedented violence, between 1.30 and 3.30 p.m.—*Addiscombe* (II). Remarkably heavy TS. It began in earnest at 1.34 p.m., and lasted till 4.10 p.m., or 2 hrs. 36 mins. Amount of R, 1.412 in. R fell at times very heavily, and for 4 minutes from 3.10 p.m. there was a shower of very large H; the hailstones were roughly spherical in shape, and varied in size from that of peas to that of common marbles; throughout the first 40 minutes, the time interval between the rapidly-repeated L and the accompanying claps of T never exceeded 5 seconds.—*Riverhead* (II). Much T.—*Bromley Common* (II). Violent TS.—*Bayfordbury* (III). No R, but TS very violent a short distance S. and S.E. of us.—*Cambridge* (III). Heavy TS.—*Leyton* (IV). Very heavy TS from 0.30 to 2.30 p.m. H storm in the middle; storm from E. then from W., finally from S.; L most vivid; 3.10 in. R fell in 2 hours.—*Cheltenham* (VI). TS from 9 to 9.20 p.m.—*Leaton Vicarage* (VI). TS.—*Stanley Vicarage* (IX). Heavy thunder shower.—*Sunderland* (X). TS between 4 and 5 p.m., about 5 miles S. of here.

25th.—*Hodsock Priory* (VII). TS passed to S. between 6 and 7 p.m. from W. to E. No R here.

26th.—*Pinner Hill* (I). TS.—*Bromley Common* (II). T.—*Oxford* (III). TS.—*Northampton* (III). Terrible storm of T, L, and R from S.S.E. from 4.15 to 5.15 p.m. Rainfall 1.25 in 50 minutes.—*Coston Rectory* (VII). Vivid L to S. and W. between 6 and 7 p.m.—*Findern* (VII). Between 6 and 7 p.m., R 1.08.—*Spondon* (VII). TS.—*Tybrille Carno* (XI). T.

27th.—*Babbacombe* (V). L.—*Otterburn-in-Craven* (IX). L and T at 11 a.m., 2.10 in  $1\frac{1}{2}$  hours.—*Luham, Penrith* (X). .51 fell in 12 minutes from 11.35 a.m. Immediately preceding this excessive fall, distant T was heard and a dark fiery cloud observed in the

S.W. ; the atmosphere at the time was peculiarly warm and balmy ; the poultry and sheep exhibited great uneasiness, the former cackling and seeking for shelter, and the latter bleating and running about the field wildly ; in a few minutes the R was seen to be advancing in a dense mass, having the appearance of a wall, and moving along at a rapid rate. During the storm the L was very vivid, accompanied by loud and instantaneous peals of T ; the storm ceased as suddenly as it commenced, and not more than 20 minutes elapsed between the first peal of T and the end of the storm.—*Grainart* (XV). TS.—*Dalnaspidal* (XVI). Thunder shower.—*Tomintoul* (XVII). T.—*Nairn* (XVII). TS.—*Budgate Cawdor* (XVIII). TS.—*Springfield Tain* (XVIII). Violent TS.—*Fermoy* (XX). TS in night.—*Tubrid* (XX). T.—*Tipperary* (XX). TS ; 1·60 in of R.—*Rathfriland* (XXIII). TS.—*New Barnsley, Belfast* (XXIII). Thunder showers.—*Bushmills* (XXIII). TS doing considerable damage at Coleraine.—*Moneydig* (XXIII). Violent TS.—*Newtown Limavady* (XXIII). TS.

27th and 28th.—*Janeville* (XX). 2·88 in. of R fell in 18 hours, causing the highest flood for 30 years.

28th.—*Babbacombe* (V). L.—*Balbriggan* (XXI). Very heavy TS between 3 and 6 p.m.—*Dowra* (XXII). TS.

29th.—*Littlehampton* (II). TS.—*East Tisted Rectory*. (II). Heavy TS with H ; several of the hailstones resembled, both in shape and size, the upper half of a large acorn, though at the same time they were polygonal from the apex downwards, whilst the whole mass of each consisted of some nine or ten alternately transparent and opaque white bands, arranged parallel with the base of the cone.—*Addington* (III). A good deal of T.—*Beaminster* (V). T at 11 a.m.—*Langtree Wick* (V). Severe TS with H and R between 2 and 4 p.m.—*Babbacombe* (V). T and L.—*Weston, Bath* (V). A heavy TS, R ·76.—*Castle Malgwyn* (XI). Violent TS 6 to 7 p.m., with H ; 1·40 in. of R.—*Ballinasloe* (XXII). Sheet L.

29th and 30th.—*Holt* (V). TS with heavy R ; above half an inch falling in less than two hours.

30th.—*Addiscombe* (II). TS from 1.10 to 4.35 p.m. Amount of R ·61 in. At 1.27 p.m. the R which had fallen in the previous 20 minutes measured ·507 in., indicating a rate of fall of 1½ inches per hour.—*Littlehampton* (II). Waterspouts at sea.—*Wansford House, Watford* (III). The flood occasioned by the fall (1·99 in.) was higher than any for at least the last 80 years.—*Leyton* (IV). Heavy storm commencing at 10.30 a.m. ; distant T ; R began at 11.15 a.m., con-

tinued till 5.30 p.m. ; lightning very infrequent, not more than six flashes throughout the storm.—*Weston Bath* (V). R 1.46 in., which nearly all fell in 1 hour. The village was flooded, but not half so deep as on the 13th.—*Tubrid* (XX). Much distant T between 3 and 4.30 p.m.—*Tipperary* (XX). T and heavy R.—*Castle Lough* (XX). T.—*Newcastle West* (XX). T and L.—*Kilrush* (XX). T and L.—*Ennis* (XX). T and L.—*Miltown Malbay* (XX). Terrific TS.

## JULY.

5th.—*Saul Lodge* (VI). TS.

6th.—*Spring Grove, Isleworth* (I). Unusually fine solar halo 3 to 4 p.m.

18th.—*Fettercairn* (XVII). Hottest day for 22 years, 84°.—*Newcastle West* (XX). TS.

19th.—*Holt* (V). 3.45 to 4.45 p.m. almost continuous T, but no R.—*Solva* (XI). Heavy and continuous T.—*Castle Malgwyn* (XI). Vivid L and heavy T at night.

20th.—*St. Lawrence* (II). Distant L.—*Babbacombe* (V). TS.

21st.—*Babbacombe* (V). TS.—*Shap* (X). Severe TS with H.

22nd.—*Addiscombe* (II). T frequent, 11.40 a.m. till 0.10 p.m. R .004 in.—*Littlehampton* (II). T at a distance.—*Strathfield Turgiss* (II). TS.—*Diss* (IV). Heavy TS at 2 a.m.—*Alderbury* (V). TS.—*Compton Bassett* (V). TS.—*Holt* (V). Long TS in evening, with R and very vivid L.—*Babbacombe* (V). TS.—*Dartmoor Prison* (V). TS ; a sheep killed on the farm.—*Holne Vicarage* (V). TS.—*Druid House* (V). T, L, H, and R.—*Cosgarne* (V). T and L in afternoon.—*Porlock* (V). Heavy TS.

23rd.—*Camden Square* (I). T at 7 p.m. L and T at 8.17. Time interval, 25 secs.—*Addiscombe* (II). T and L between 2.25 and 8.45 p.m. R .006 in.—*Strathfield Turgiss* (II). TS.—*Compton Bassett* (V). TS.—*Gainford* (X). TS at midnight.—*Newcastle West* (XX). TS for 5 hours.—*Ennis* (XX). TS with heavy R.—*Kilconnell* (XXII). Heavy TS.—*Dowra* (XXII). TS.

24th.—*Oundle* (III). 1.13 in. of R fell in 2 hours.—*Addiscombe* (II). R between 10.35 and 11.40 a.m. Distant T about 6 p.m.—*Magdalen College* (III). TS with H and R at 4.20 p.m.—*King's Sutton* (III). Heavy TS ; man and tree struck by L.—*Wetherden Rectory* (IV). TS.—*Diss* (IV). Sharp TS to W.—*Alderbury* (V). TS.—*Compton Bassett* (V). TS.—*Holt* (V). TS in afternoon.—*Coundon* (VI). 2.43 in. of R fell

—*Tean Vicarage* (VI). TSS in afternoon and evening ; cow killed by L.—*Arnesby Vicarage* (VII). TS ; heavy R at 5.30 p.m., 1.08 in. in about 1½ hours.—*Coston* (VII). Very violent TS.—*Allerton* (VIII). .53 in. fell in the hour.—*Walton-on-the-Hill* (VIII). Sharp TS at 2 p.m.—*Melrose* (XII). T and L 2 a.m.

25th.—*West Coker* (V). Rye cut.

26th.—*Enfield* (I). Violent TS.—*Addiscombe* (II). TS, beginning 9.40 p.m. Amount, .197 in.—*Bromley Common* (II). Severe TS 10 to 11 p.m. ; .83 in. of R.—*Winchelsea* (II). 1.23 in. of R fell between 11 p.m. and 9 a.m.—*Addington* (III). Heavy TS in evening.—*Merton Villa, Cambridge* (III). Distant TS.

27th.—*Babbacombe* (V). Solar halo.

#### AUGUST.

2nd.—*Coston Rectory* (VII). Heavy gale, 10 to 11 p.m.

3rd.—*Muswell Hill* (I). TS between 10 a.m. and 2 p.m.—*Addiscombe* (II). TS or heavy T showers, 10 a.m. till 0.40 p.m. Storm nearest at 10.55 a.m. ; amount at 9 p.m. .216 in. ; another TS at night, from 11 p.m., amount .540 in. Storm nearest at 0.23 a.m. (time interval, 3 secs).—*Eltham Green* (II). TS and 1.69 in. of R.—*Littlehampton* (II). T and L all day.—*St. Lawrence* (II.) T and L, at 11 a.m.—*Strathfield Turgiss* (II). TS.—*Holt* (V). TS followed by 0.34 in. of R in one hour.—*Compton Bassett* (V). Terrific T and L, at 1 p.m.—*Druid Ashburton* (V). TS and heavy R.—*Kilworthy Hill* (V). TS.—*Cosgarne* (V). T and L.—*Nantgwiltt* (XI). .58 in. of R fell in 12 minutes, from 3.15 to 3.27 p.m.

4th.—*Stoke Newington* (I). A flash of L at 7.45 p.m., which melted part of the telegraph instrument in the police office, close by.—*Muswell Hill* (I). Frequent T with L, between 1.30 p.m. and 10 p.m.—*Addiscombe* (II). T, 1.30 p.m. ; sharp shower for 3 minutes, at 7.35 p.m. ; lightning, 7.45 p.m., and after.—*Strathfield Turgiss* (II). TS.—*Magdalen College* (III). TS with 1.00 of R.—*Broughton, Banbury* (III). Remarkable TS, the L being incessant, and exceedingly brilliant. The R fell between 5.45 and 6.25 p.m., the amount in 40 minutes being 1.00 in. ; I think at least two-thirds of it must have fallen in 13 minutes, 5.54 to 6.7, when the rain was tremendous.—*Cambridge* (III). T and L in W., at 4 p.m.—*Leyton* (IV). Storm of R and T from 1.30 to 8.30. H fell with R.—*Tean Vicarage* (VI). TS in evening, 7.15 to 8 p.m. ; fine rose-coloured sheets of L, about

four per minute, with grand peals of T; rainfall .62 in.—*Coston Rectory* (VII). R with T and L, 6.30 a.m.—9 a.m.—*Walton-on-the-Hill* (VIII). T and L, at 8.30 p.m.—*Miltown Malbay* (XX). T and L.

5th.—*Addiscombe* (II). Visibility at 1 p.m. Frequent L, 8 to 8.45 p.m. T and L nearly overhead, 8.35 p.m., began to R, 8.35. Amount at 9 p.m. .080 in., at 9 a.m. of 6th, .385 in.—*Winchelsea* (II). Very sharp TS, 1.14 in. fell between 7 p.m. and midnight.—*Littlehampton* (II). Violent squall, with T and L, at 8 p.m.—*Wetherden* (IV). TS at midnight.—*Diss* (IV). Heavy TS, 1 to 3 p.m.—*Saul Lodge* (VI). TS.—*Leaton Vicarage* (VI). TS at 7.45 p.m. L continued till 9.30 p.m.—*Walton-on-the-Hill* (VIII). A good deal of L and T.—*Llanfrechfa Grange* (XI). Violent T and L, 8 to 10 p.m.

6th.—*Tean Vicarage* (VI). Heavy TS between 11 a.m. and 0.30 p.m.; rainfall .78 in.—*Leaton Vicarage* (VI). TS, very violent, flashes very vivid.—*Thorpe Arnold* (VII). Severe TS; R 1.37 in.—*Hodsock Priory* (VII). Distant TS at noon; getting gradually closer, R began about 2 p.m., heavy till 3 p.m., with very frequent L; but T not very loud; R ceased at 4 p.m., when 0.72 in. had fallen. Another shower at 4.30 p.m., and another at 6 p.m.; occasional T all the time. Fog at night.—*Belper* (VII). TS. R commenced 0.12, by 5.15 p.m. 1.48 in. had fallen.—*Matlock Bath* (VII). TS 2½ in. of R in less than 2 hours.—*Walton-on-the-Hill* (VIII). T and L.—*Witton, Blackburn* (VIII). R, 1.46 in.; 1.39 in. of this came down in less than 45 minutes.—*Magdalens, Doncaster*, (IX). TS in afternoon lasting three or four hours; T and L almost incessant during the height of the storm, and between 3.20 and 3.50, 1.25 in. of R fell, flooding cellars and low-lying buildings.—*Castle Malgwyn* (XI). TS.—*Annanhill* (XIV). TS.—*Castle Lough* (XX). TS.—R 1.30 in.—*Mullingar* (XXI). TS at 11.30 a.m. T at a distance all afternoon.—*Kilconnell Rectory* (XXII). TS.—*Ballinasloe* (XXII). TS. Very heavy R, 4 to 6 p.m., 1.00 in.—*Dowra* (XXII). TS.

7th.—*Holt* (V). A very heavy TS, from 2 to 6.30 p.m., during which a tall chimney at Staverton Factory, about half a mile from here was struck and shivered.—*Caistor* (VII). T and L, and R; .89 in. in 10 minutes at 4 p.m.—*Annanhill* (XIV). TS.—*Budgate Cawdor* (XVIII). TS.—*Dava* (XVIII). TS.—*Bushmills* (XXIII). TS, and greatest rainfall for many years; 1.64 in.

10th.—*Pinner Hill* (I). TS.—*Bayfordbury* (III). 1.10 in. of R fell.—*Addington* (III). Heavy TS, 4.30 p.m. to 8 p.m.—*Northampton* (III). TS.—*Cambridge* (III). TS, at 8.30 p.m.—*Holt* (V). T and L, from about 3.15 to 4.15 p.m.—*Cheltenham* (VI). Heavy R, 1.18 in. in 55

minutes.—*Leaton Vicarage* (VI). TS at 4·30 p.m.—*Coston Rectory* (VII). TS at 7·30 p.m.

11th.—*Miltown Malbay* (XX). T and L.

12th.—*Muswell Hill* (I). T with L at intervals, during middle of the day.—*Addiscombe* (II). TS, or a succession of thunder showers, 11.24 a.m. till 7·30 p.m.; amount ·573 in. Probably nearest at 2·25 p.m.—*Diss* (IV). TS, 2 p.m.—*West Coker* (V). Barley mown.

13th.—*Seething Wells, Surbiton* (II). Thundershower, when 2·92 in. fell in about 4 hours.—*Littlehampton* (II). T and L all day.—*Newcastle West* (XX). T and L.—*Newry* (XXIII). 0·15 in. of R fell in half an hour, 0.30 to 1 p.m.

15th.—*St. Lawrence* (II). L and T at night.—*Strathfield Turgiss* (II). TS.—*Springfield* (XI). Rainfall extraordinarily heavy; it did not extend over a large area, but a narrow belt, direction E. and W.—*Castle Gardens, Cardiff* (XI). Heaviest rainfall of year during TS; R commenced about 5 p.m., continued till 12 p.m., in which time 3·65 in. fell.—*Auchtermuchty* (XVI). The fall (2·08) took place in 2 hours.—*Newcastle, W.*—(XX). T and L.—*FitzWilliam Square* (XXI). R, ·106 in. Phoenix Park, W. of Dublin; ·457 in. at FitzWilliam Square; and 2·28 in. at Kingstown, 6 miles S.E. of the city.

16th.—*Addington* (III). Heavy TS, 3.15 p.m.—*Cheltenham* (VI). TS at 3 p.m.—*Hodsock Priory* (VII). Distant T to E. in afternoon.—*Woodlands, Elterwater* (X). TS at 11.30 a.m.

18th.—*Babbacombe* (V). Prismatic solar halo.

22nd and 23rd.—*Sibford, Banbury* (III). During the night of August 22nd and the day of the 23rd, 3·17 in. of R fell in 24 hours.

23rd.—*Muswell Hill* (I). Heavy TS about noon.—*Pinner Hill* (I). T and L.—*Addiscombe* (II). Distant T in N.E., between noon and about 2 p.m., and again in N. at 4 p.m.; R ·026 in.; R at night, amount ·423 in.—*Berkhampstead* (III). TS, with very heavy R in afternoon.—*Magdalen College* (III). TS.—*Hulcote Rectory* (III). Of the 2·34 in. registered at 9 a.m. on August 24th, 2·25 in. fell between 2.40 p.m. and 4.15 p.m. of 23rd.—*Holt* (V). TS from 3.40 to 7 p.m.—*Druid Ashburton* (V). T, L, and R.—*Weston, Bath* (V). ·50 in. of R fell in 10 or 12 minutes.—*Saul Lodge* (VI). TS; ·75 in. fell in 30 minutes.—*Burbage House* (VII). 2·90 in. of R in 24 hours.—*Llanfrechfa Grange* (XI). Distant T all afternoon, and L in evening.—*New Cemetery, Cardiff* (XI). 2 in. of R between 5 and 7 p.m. during TS.—*Llandysill* (XI). R began about 11 p.m. on 22nd; at 9 a.m. on 23rd I registered ·95 in.; at 2 p.m. ·72 in. had fallen in addition; at 6 p.m. ·35 in.

more was registered, at 0 a.m. (Aug 23—24); 0·58 in. more had fallen ; and at 9 a.m. 24th there was an additional ·05 in. Thus 2·60 in. fell in 24 hours (for the R ceased about 11 p.m., 23rd), and altogether there has been a fall of 2·65 in.

24th.—*Pinner Hill* (I). T and L.—*Addiscombe* (II). Two TS, 8.30 a.m. till 5·15 p.m. ; amount at 9 p.m. ·782 in. First storm nearest at 11.30 a.m. : second at 4.30 p.m. ; time interval between L and T, 2 secs.—*Bromley Common* (II). Bad TS, at 9 a.m.—*Manor House, Hastings* (II). In the afternoon a very severe TS ; 3·34 in. fell in a little more than 12 hours.—*Ivy Bank, Southampton* (II). Storm began 2.20 p.m., and ended at 5 p.m. it was accompanied with some, but not much T, and the rainfall was 2·35 in.—*Berkhampstead* (III). TS, with very heavy R in afternoon.—*Northampton* (III). TS, 3 to 4 p.m. *Cambridge* (III). TS, 0·30 to 1.30 p.m. T incessant.—*Dartmoor* (V). TS, ·81 in. of R fell in 1 hour.—*Kilworthy Hill* (V). T and L.—*Coston Rectory* (VII). Thunderstorms from W. and N.E., met here about 5 p.m., and then another came up from S.E.—*Hodsock Priory* (VII). TS.

25th.—*Seething Wells* (II). T shower, when 2·50 in. fell in about 3 hours.—*Annanhill* (XIV). TS.

26th.—*Dowra* (XXII). 1·03 in. of R in 5 hours.

27th.—*Magdalen College* (III). TS.—*Babbacombe* (V). Large meteor fell at 9·19 p.m.—*Dartmoor* (V). TS.—*Walton-on-the-Hill* (VIII). TS at 7.30 p.m.—*Castle Lough* (XX). TS.—*Dowra* (XXII). TS.

28th.—*Strathfield Turgiss* (II). TS.

29th.—*Addiscombe* (II). Distant T at 7.30 a.m. ; heavy thunder-shower at 9.5 till 9.45 a.m. Nearest 9.30 a.m. (8 seconds). R at night ; amount ·203 in.—*Littlehampton* (II). Gale.—*St. Lawrence* (II). L and T in early morning.—*Strathfield Turgiss* (II). TS.—*Diss* (IV). Blowing hard from S.W. ; T and L in forenoon.—*Babbacombe* (V). A S.E. gale on the evening of the 29th, followed by a N. gale on the morning of the 30th, when a cyclone centre must have passed nearly over us, the wind being almost calm at 0.43 a.m., when the bar. had fallen to its min. point.—*Bincombe House* (V). Very stormy from S. to S.W.

30th.—*Addiscombe* (II). Heavy thundershowers, 10.45 a.m. till about 8 p.m. ; amount ·316 in.—*Cambridge* (III). TS, at 1 p.m.—*Leaton Vicarage* (VI). TS, at 0.30 p.m.—*Coston Rectory* (VII). TS,

at 7.30 p.m.—*Hodsock Priory* (VII). Distant thunderstorm.—*Gainford* (X). TS at noon, with very large hailstones.

31st.—*Belper* (VII). Very heavy TS; R came down in torrents for a few minutes.

### SEPTEMBER.

2nd.—*Miltown Malbay* (XX). Heavy gale S. to S.W.

3rd.—*Babbacombe* (V). Solar halo.

5th.—*West Coker* (V). Harvest finished.

6th.—*Cheltenham* (VI). A splendid aurora.

7th.—*Kilworthy Hill* (V). T, L, and R at night.

8th.—*Addiscombe* (II). Distant T 0.30 p.m.; R between 4.45 and 8 p.m. Amount .105.—*Addington* (III). T at 5 a.m.—*Northampton* (III). TS and 1.31 in. of R from 6 a.m. to 8 a.m.—*Merton Villa* (III). Much T in E. 2 to 4 p.m.; L at 9.30 p.m.—*Diss* (IV). TS all afternoon and evening.—*Holt* (V). 1 to 4 p.m. distant T.—*Pewsey* (V). T.—*Compton Bassett* (V). T and L at night.—*Bishop's Castle* (VI). Terrific TS; 0.33 in. of R fell in 10 minutes; rate, 1.98 in. in an hour.—*Stretton* (VI). Most severe TS at about 4 a.m. 1.84 in. of R fell in about an hour.—*Arnesby Vicarage* (VII). Very heavy TS at 7 a.m. R to 10 a.m., 1.11 in.—*Ashby Parva* (VII). TS.—*Coston Rectory* (VII). TS.—*Buglawton Vicarage* (VIII). .63 in. in one hour.—*Llanfrechfa* (XI). T and L at 11 a.m.

12th.—*Acrise* (II). Morning very hot, not much wind, what there was from the N.W.; 11.30 a.m. overcast, with increased wind and sudden fall of temp. until 2 p.m.; from this time till 3 p.m. very hot, when a very heavy black bank of clouds from the S.W. by N. to N.E. came travelling along with remarkable velocity; it burst upon the district with great fury; the dust along the roads was blown in dense clouds for 5 minutes, so thick that objects at 10 feet distance were invisible; after this had passed, it rained at intervals, but the temp. kept intensely cold; the clouds and wind travelled at the rate of 50 miles per hour; at 3.30 p.m. wind veered to the N., and at 4.30 p.m. sky clear, bright sunshine, but a very low temp.

13th.—*Harbledown* (II.) Very dark at 2.30 p.m., violent N.W. wind.—*Coston Rectory* (VII). A very severe S.W. squall between 10.30 and 11.30 a.m.

14th.—*Broughton-in-Furness* (VIII). Very high wind,—*Lochbroom* (XVIII). Terrible storm.

15th.—*Littlehampton* (II). Half a gale all day, damaging shrubs and flowers.—*Magdalen College, Oxford* (III). High wind.—*Northampton* (III). S.W. gale during day.—*Merton Villa* (III). Gale S.W. to W.—*Wetherden Rectory* (IV). Heavy gale.—*Diss* (IV). Heavy gale from S., and in evening and night from W.—*Alderbury* (V). Heavy gale in evening.—*Babbacombe* (V). S.W. gale in evening.—*Coston Rectory* (VII). Very high wind nearly all night.—*Walton-on-the-Hill* (VIII). Heavy gale.—*Elterwater* (X). A very wild day; a great number of strongly rooted trees blown down.—*Shap* (X). A dreadful storm of wind and R; trees blown down and some land flooded. 2·34 in. of R fell.—*Llanfrechfa* (XI). Heavy gale at night.—*Castle Malgwyn* (XI). Very rough wind.—*Tybritle Carno* (XI). Very stormy.—*Melrose* (XII). S.W. gale.—*Tomintoul* (XVII). Hurricane.—*Budgate Cawdor* (XVIII). Very windy.—*Strome Ferry* (XVIII). W. gale.—*Lochbroom* (XVIII). Hurricane.—*Castle Lough* (XX). A S. gale sprung up during the night of 14th, and during the 15th blew hard from W., and on the night of the 15th from N.; it blew hard on the 16th, but the violence of the gale had abated.—*Miltown Malbay* (XX). Storm with extraordinarily high sea; much damage to outlying hay, thatched houses, &c.; wind S.W. to N.W.—*Kilconnell* (XXII). Storm from S.W.—*Dowra* (XXII). Very stormy.—*Knockan* (XXIII). Very heavy gale.—*Killygarvan Glebe* (XXIII). Gale all day.—*Buncrana* (XXIII). Severe gale from W.N.W.

16th.—*Magdalen College* (III). High wind.—*Coston Rectory* (VII). Very high wind.—*Walton-on-the-Hill* (VIII). Heavy gale.—*Castle Malgwyn* (XI). Very rough wind.—*Tybritle Carno* (XI). Very stormy.—*Melrose* (XII). S.W. Gale.—*Tomintoul* (XVII). Hurricane.—*Ballinasloe* (XXII). Heavy squalls from N.W. all day.—*Killygarvan Glebe* (XXIII). Heavy gale all day.

18th.—*Walton-on-the-Hill* (VIII). Very stormy in evening; hail shower.—*Tralee* (XX). Gale.

21st.—*Mullingar* (XXI). White frost.—*Dowra* (XXII). Storm S.W.—*Buncrana* (XXIII). Strong S.W. wind.

22nd.—*Alderbury* (V). T at 8.30 p.m.—*Babbacombe* (V). S. gale at midday.—*Whalley House* (VIII). 1·33 in. of R in 24 hours.

23rd.—*Merton Villa* (III). Distant L 8 p.m.—*Alderbury* (V). Sheet L.—*Hodsock Priory* (VII). One clap of T at 4 p.m.—*Miltown Malbay* (XX). N.W. gale.

24th.—*Littlehampton* (II). White frost.—*Addington* (III). Slight frost.

26th.—*Addington* (III). Slight frost.—*Holt* (V). Some T.

29th.—*Magdalen College* (III). High wind.—*Diss* (IV). Heavy TS at 7 a.m.—*Compton Bassett* (V). TS in early morning.

30th.—*Addington* (III). T in early morning.—*Magdalen College* (III). High wind.—*Northampton* (III). T and L.—*Merton Villa* (III). TS and heavy R 5.30 to 7 a.m.—*Saul Lodge* (VI). TS at 4 a.m., and violent squall, which twisted off the tops of several trees in the valley.—*Bishop's Castle* (VI). Violent TS.—*Cheadle* (VI). T and L at 4 a.m.—*Tean* (VI.) TS 5 to 5.30 a.m.—*Thorpe Arnold* (VII). TS.—heavy R 6 a.m.

## OCTOBER.

1st.—*Miltown Malbay* (XX). Solar halo with mock suns.

3rd.—*Babbacombe* (V). Solar halo 3 to 4 p.m.

5th.—*Babbacombe* (V). Solar halo 1.15 to 3 p.m. Lunar halo 8 to 8.30 p.m.; *Miltown Malbay* (XX). L with distant T.—*Kilconnell Rectory* (XXII). TS from S.

7th.—*Arlington Court* (V). Heavy gale.—*Cricket St. Thomas* (V). Wind blowing quite a hurricane; no damage done.—*Solva* (XI). Gale at night.

8th.—*Melrose* (XII). T and L at 2 p.m.

9th.—*Diss* (IV). Heavy gale from S.E.—*Babbacombe* (V). TS.—*Dartmoor* (V). TS; 1.48 in. of R fell.—*Druid Ashburton* (V). Heavy and continuous R, 1.61 in.; afternoon, T and L; 11 p.m. hurricane.—*Langtree Wick* (V). Heavy gale during the day.—*Cosgarne* (V). T and L 10 to 12 p.m.; R fell 1.10 in.—*Bincombe* (V). Very wet all day, with L and T at night.—*Ashley Down* (VI). Gale, R; T and L in p.m.—*Llandoverly* (XI). Strong gale; 1.46 in. of R fell.—*Castle Malgwyn* (XI). Very wet with strong gale; L and T at night; .47 in. of R fell.—*Buncrana* (XXIII). Strong gale from N.W.

10th.—*Buxted Park* (II). .66 in. of R fell, of which .55 in. fell between 9 and 11.30 a.m., a very unusual quantity in this neighbourhood, in 2½ hours.—*Melrose* (XII). Gale S.W. for 24 hours.

11th.—*Spring Grove* (I). Fine lunar halo.—*Cambridge* (III). Lunar halo 10 p.m.—*Ashley Down* (VI). Lunar halo.

12th.—*Babbacombe* (V). Parhelion 22½° S. of sun at 3.15 p.m.

16th.—*Babbacombe* (V). Lunar halo after 10.30 p.m.

17th.—*Addiscombe* (II). Dense fog early morning; buildings 100 yards distant completely hidden from view.

20th.—*Addiscombe* (II). An espalier pear tree in blossom in my garden ; a laburnum in the neighbourhood, almost in its early summer glory ; and in another part of Surrey I noticed a lilac with many little stunted bunches of blossom on it. Similar instances of abnormal flowering have been unusually numerous this autumn.

21st.—*Bishop's Castle* (VI). Winter commenced with S ; from this date until Dec. 27th almost continuous frost and S.—*Diss* (IV). Heavy gale from S.—*Ashley Down* (VI). Solar halo.

22nd.—*Compton Bassett* (V). Sheet L at night.—*Cricket St. Thomas* (V). T and L.—*Ashley Down* (VI). Storms ; L p.m.

23rd.—*Ashley Down* (VI). Storms ; L p.m. 1·05 in. R.

24th.—*Bromley Common* (II). L at night.—*Littlehampton* (II). Solar halo ; T and L.—*Steeple Ashton* (V). ·53 in. fell in 45 minutes.

25th.—*Winchelsea* (II). 1·61 in. fell during the night.—*Balcombe Place* (II). Tremendous R ; between 3 and 6 a.m. 1·42 in. fell, doing great damage to roads and fields by tearing up and washing away soil.—*Babbacombe* (V). Parhelion W. of sun at 9.30 a.m.—*Thorpe Arnold, Melton Mowbray* (VII). TS.

26th.—*Castle Malgwyn* (XI). L and T at night.

27th.—*Leyton* (IV). A swallow seen.—*Bushmills* (XXIII). Violent storm from N.

28th.—*Wetherden Rectory* (IV). Violent hurricane for about 15 minutes between 3 and 4 p.m.—*Thorpe Arnold* (VII). Fieldfares arrived.—*Coston Rectory* (VII). Very heavy R with squalls about 5 p.m. ; L to E. afterwards.—*Astle Hall, Chelford* (VIII). Severe gale and T.—*Buncrana* (XXIII). Strong gales from N. and N.W.

29th.—*Littlehampton* (II). Solar halo.—*Clapham Park, Bedford* (III). S fell.—*Wetherden* (IV). Heavy S from 8 to 9.30 a.m.—*Diss* (IV). Slight snowfall in early morning.—*The Heath House, Cheadle* (VI). H, R, and S, T and L.—*Whiterock Green, Belfast* (XXIII). S.

30th.—*Harbledown* (II). S from 8 a.m. to 11 a.m.—*Seven Oaks* (II). First S.—*Waresley Vicarage* (III). ·46 in. of S fell between 7 and 10 a.m.—*Cambridge* (III). Very heavy S 7 to 11 a.m. ; cold W. wind.—*Coston Rectory* (VII). Heavy snowstorm between 6 and 9 a.m.—*Solva* (XI). Cold, with H.

31st.—*Ashley Down* (VI). Heavy R and S at night, 1·85 in.—*Solva* (XI). Hail showers.—*Castle Malgwyn* (XI). Very heavy hail showers frost in morning.—*Lochbroom* (XVIII). S, R and H, 1·66 in.

## NOVEMBER.

1st.—*Babbacombe* (V). L at 6.55 and 9.25 p.m.—*Druid Ashburton* (V). L at 9 p.m.—*Kilworthy Hill* (V). Hail showers.

6th.—*Llanfrechfa* (XI). T and L 4 a.m.—*Dalnaspidal* (XVI). Sleet and S.—*Miltown Malbay* (XX). Storm; wind N.W. to N.

7th.—*Babbacombe* (V). Lunar halo after 11 p.m.—*Druid Ashburton* (V). Large lunar halo 11 p.m.—*Ashley Down* (VI). Lunar halo.—*Newcastle West* (XX). Storm during night from N.W; H.

8th.—*St. Lawrence* (II). L and T at 9.15 a.m.—*Kilworthy Hill* (V). H and R.—*Langton* (VII). Strong gale evening and night; many trees injured or blown down.—*Craggside, Rothbury* (X). S fell, and continued to end of the year to a total depth of 24 in.—*Castle Malgwyn* (XI). T and L.—*Nairn* (XVII). S.—*Lochbroom* (XVIII). S.—*Kilconnell* (XXII). S and sleet.—*Dowra* (XXII). S.—*Allan Rock* (XXIII). Heavy showers of S.

9th.—*Dalnaspidal* (XVI). Sleet and S.—*Lochbroom* (XVIII). Snow-storm, very wild.—*Newcastle West* (XX). Storm from S.S.W.—*Newtownards* (XXIII). Heavy fall of S.

10th.—*Caistor* (VII). S.—*Llandoverly* (XI). Heaviest flood for 26 years; S fell in the night.—*Newcastle West* (XX). Storm with H.

11th.—*Babbacombe* (V). Parhelion at 3.40 p.m.—*Caistor* (VII). S.—*Stanley Vicarage* (IX). Heavy S; violent T and L in evening.—*Town Moor, Newcastle-on-Tyne* (X). S, 1.12 in.—*Nairn* (XVII). S.—*Lochbroom* (XVIII). Very severe snowstorm.—*Tubrid Cahir* (XX). S.—*Newcastle West* (XX). S.—*Miltown Malbay* (XX). S and H.—*Kilkeel* (XXIII). S.—*Bushmills* (XXIII). S.—*Knockan* (XXIII). Heavy S, several inches deep.—*Killygarvan* (XXIII). Heavy S.

12th.—*Babbacombe* (V). L at 8.2 p.m.—*Druid Ashburton* (V). Snowing to 4 p.m., 4 in. deep; L in evening.—*Caistor* (VII). S.—*East Layton* (IX). Deep fall of S.; average depth 18 in.; drifted in some places to 6 ft.—*Whitley* (X). Very severe TS with S.—*Lochbroom* (XVIII). Terrible day of storm.—*Rathfriland* (XXIII). S.—*Killygarvan* (XXIII). Heavy squalls and hail showers.

13th.—*Babbacombe* (V). Solar halo 9.10 to 9.30 a.m.—*Druid Ashburton* (V). L in evening.

14th and 15th.—*Hillington Rectory, Lynn* (IV). 2.87 in. of R fell; the fall during the first 15 days of the month is unprecedented, 6.31 in., the average for the month being 2.93 in.

15th.—*Babbacombe* (V). Solar halo 0.45 p.m.

16th.—*Wetherden* (IV). Severe inundations round here.—*Dava* (XVIII). R and T.—*Killygarvan* (XXIII). Gale all day.

19th.—*Mullingar* (XXI). Very beautiful rime on the trees.

24th.—*Buckden* (IX). S showers.

26th.—*Nairn* (XVII). S.—*Innismore* (XXI). Frost, H, S, and R.

27th.—*Twyford* (XXI). Smart S for 3 hours, about 3 in.—*Bushmills* (XXIII). S.—*Knockan* (XXIII). S, 2 in. deep.

28th.—*Balrath* (XXI). S, sleet and R.

29th.—*Babbacombe* (V). Solar halo 11 a.m. to noon.

#### DECEMBER.

3rd.—*Laggan* (XVIII). Slight shock of earthquake.

5th.—*Watten* (XIX). H showers.

6th.—*Babbacombe* (V). Lunar halo, 9.10 p.m.—*Ashley Down* (VI). Lunar halo.—*Solva* (XI). H.

7th.—*Llandovery* (XI). The hardest frost set in that we have had here for 18 years; calm; no drift; the S fell to a depth of 3 ft. The thaw was splendid and rapid.—*Melrose* (XII). Corona, 9 p.m.—*Newcastle W.* (XX). Lunar halo.

8th.—*Newcastle W.* (XX). S and H.

9th.—*Littlehampton* (II). Lunar halo in early morning; also Solar halo. Parhelion at 3.30 p.m.—*Druid Ashburton* (V). Heavy S showers.—*Cosgarne* (V). S; L.

10th.—*Littlehampton* (II). Sharp frost and rime.—*Diss* (IV). Skating on ponds, and low meadows.—*Camborne* (V). Ther. 32°; L.—*Newcastle W.* (XX). S and H.

11th.—*Melrose* (XII). Halo, 9 p.m.

12th.—*Littlehampton* (II). L, R, and S, 2 in. deep.—*Arlington Court* (V). Temp. 14°; lowest registered for 20 years.—*Camborne* (V). Ther. 23°; heavy TS with S.—*Cosgarne* (V). S, T, and L.—*Miltown Malbay* (XX). Intense frost with rimy fog.—*Castle Lough* (XX). S began to fall about 7 a.m. 12th, and by 11 o'clock lay about 6 in. deep.

13th.—*Exeter Institution* (V.) S 6 in. deep.—*Camborne* (V). Ther. 34°, heavy gale, wind S.E.; S and L.—*Coston Rectory* (VII). Hoar frost; trees with nearly an inch of rime on branches.—*Humshaugh* (X). Min. in Stevenson stand 3°·7.—*Sheepwash* (X). Min. temp. —10°·0.—*Fettercairn* (XVII). Coldest day for 22 years; ther. ranging from 6° to 18°.

14th.—*St. Lawrence* (II). Heavy S, 3 in. deep.—*Court Barn* (V). R freezing as it fell.—*Humshaugh* (X). Min. in Stevenson stand —2°·3.—*Whitton Tower* (X). Min. temp. —2°·0.—*Cragside* (X). Min. temp. —2°·0.—*Whinfell Hall*. Min. temp. 5°·0.—*Melrose* (XII). Min. temp. of month 1°.

15th.—*Bradninch* (V). A verified ther. in a Stevenson stand, read 11° this morning.

16th.—*Addiscombe* (II). Dense fog all day ; flower borders frozen to depth of 5 in.—*Littlehampton* (II). Men skated on the high road from the beach to the village.—*Solva* (XI). H and R.—*Melrose* (XII). Corona, 6.30 a.m.—*Mullingar* (XX). Rime on trees ; temp. 16° at 10 p.m.

18th.—*Coston Rectory* (VII). S during night (4 in).—*Copy Hill, Shap* (X). Snowstorm.—*Melrose* (XII). T and L, 8 p.m.

19th.—*Stanley Vicarage* (IX). Ther. on the ground fell to 16°.

22nd.—*Exeter Institution* (V). The Exe frozen over near the bridge.

23rd.—*Miltown Malbay* (XX). Intense frost ; coldest day of month.

23rd–24th.—*Withington* (VIII). Ther. at zero during night.

24th.—*Compton Bassett* (V). Intense frost, 15°.—*Middlecott House* (V). Slight shock of earthquake in the night.—*Court Barn* (V). Sleet and R freezing as it fell.—*Walton-on-the-Hill* (VIII). Lowest temp. on record.—*Manchester* (VIII). Intense cold.—*Tomintoul* (XVII). Hurricane and S drift.—*Castle Lough* (XX). Ther. went down to 15° in shade.

25th.—*Addiscombe* (II). Lowest temps. of month (registered about 11 p.m. of 24th) and of the year 11°·4 (Stevenson screen), and over grass 3°·9 ; S fell to depth of half an inch early in the afternoon, raising depth of S already on ground to 2½ inches ; a slight fall of R took place between 5.30 and 7 p.m., producing a silver thaw ; flower borders frozen to the depth of 7 in.—*Fernhurst* (II). Curious shower of ice which lasted half an hour.—*Diss* (IV). Ther. down to 12° during night, but there was a total break up of the frost on 25th in afternoon.—*Compton Bassett* (V). Snowstorm.—*Druid Ashburton* (V). Squally. S and R.—*Court Barn* (V). Frost breaking up.—*Langtree Wick* (V). Fall of S during night ; thaw set in.—*Town Museum Leicester* (VII). Min. during past night, 9°·8.—*Thorpe Arnold* (VII). Either early in the morning or the night preceding, the ther. had been down to 1°.—*Coston Rectory* (VII). Very cold night (24th to 25th) ; ther. well below zero.—*Walton-on-the-Hill* (VIII). Intense frost ; min. 11°·5 in shade.

26th.—*Coston Rectory* (VII). Night of 25th—26th, very rough ; H, B, and frost ; cold thaw all day.—*Walton-on-the-Hill* (VIII). Thaw.

28th.—*Compton Bassett* (V). S and ice nearly gone, high W. wind at night.—*Coundon* (VI). Large flood.—*Watten* (XIX). Storm of wind and R.—*Allan Rock* (XXIII). Fall of S in the night, 10 in. deep on ground. Thaw commenced.

29th.—*Diss* (IV). Heavy gale from S.—*Ballinasloe* (XX). Very heavy rain ; squalls.

30th.—*Coston Rectory* (VII). Gale and flood.—*Walton-on-the-Hill* (VIII). Temp. in shade  $51^{\circ}5$ , being 40 degrees warmer than Christmas eve.—*Copy Hill, Shap* (X). Great storm all day.—*Melrose* (XII). Corona, 9 p.m.—*Ballinasloe* (XX). Very heavy R ; squalls.

31st.—*Bromley Common* (II). Very high wind.—*Cambridge* (III). Gale from S.W.—*Wetherden Rectory* (IV). Gale at night till 5 a.m.—*Compton Bassett* (V). T and L at 3.30 p.m. ; boisterous wind at night.—*Coston Rectory* (VII). Gale, especially at night.—*Llanfrechfa* (XI). Very heavy gale of wind last night, and all day.—*Inverary* (XV). Loch Fyne is frozen across.

## OBSERVERS' NOTES ON THE MONTHS.

## JANUARY.

I. *Muswell Hill*. The total for the month (1·52 in.) is very little more than half the average (2·93 in.) of January for the previous six years, and is a remarkable contrast to the same month of last year, when 5 in. fell. The point worth noticing in the distribution of the R, is the number of days on which very small quantities have been recorded; thus on 10 days out of the 18 on which R fell, the amount was ·03 in. or less.—*Enfield*. The month has been on the whole fine and open, but very cloudy; the rainfall nearly 4 in. below the amount registered in January, 1877; frost on thirteen nights.

II. *Harbledown*. Mild; blackbirds and thrushes in good song; a few S showers beginning and end of month; high S.W. winds 21st and 22nd.—*Bromley Common*. The remarkable feature of the month has been the high barometrical reading, the mercury having stood above 30 in. on no less than 16 days, and 11 successive ones. This has never happened before in my recollection. The month has been fine and open, with no S, little wind, and few fogs.—*Littlehampton*. Mild, with few frosts and slight rainfall; prevailing winds W.N.W. to N. Wall-flowers in bloom out of doors, also coronella, veronica, laurustinas, primroses, snowdrops, and violets; ferns, verbenas, calceolarias and even geraniums quite green and standing in the open gardens now.—*Arle Bury*. Much T and L.

III. *Addington*. The least January rainfall since 1871; early part of the month mild from 7th to 12th; cold and frost from 15th to 17th; very mild and fine also 20th, 21st, and 22nd; from 25th to the end cold and frosty.—*Merton Villa, Cambridge*. Mostly mild; sharp frosts occurred on the 11th to 25th, but were of very short duration. No heavy R till close of month; very mild from 20th to 23rd, with strong S.W. wind. Mean of max. 45°·3; mean of min. 34°·3.

IV. *Diss*. Damp and dull, with little frost, S, or severe cold. Bronchial attacks and colds very prevalent, and many varieties of cutaneous affections abundant.

V. *Holt*. Mild and dull.—*Compton Bassett*. The first week was cold and wet ; the second dry, mild, and open ; the third stormy, with two light falls of S, which soon melted ; the last bright and sunny by day and sharp frosts by night.—*Babbacombe*. A dry month ; no R was measured from the 8th to the 19th inclusive, 12 days ; the ground was covered with S on the 25th, when a bitter N.W. wind blew, and the min. temp. ( $29^{\circ}\cdot3$ ) occurred between 3 and 4 p.m., followed by a glazed frost and then by a thaw. The temp. was variable, being warm in the first week and from the 13th to 22nd, and cold in the second week and after the 23rd. The bar. was generally high, especially in the middle and at the end of the month ; on the 12th it rose to 30·718 in. The winds were mostly W., veering to N. at the close of the month.—*Altarnum*. The driest January (2·95 in.) in 15 years, except 1876 (2·28 in.) ; average of 15 years is more than 8 in.—*Cricket St. Thomas*. Fine, mild and dry up to the 18th, more like spring ; blackbirds and thrushes singing like in April.—*Taunton*. Heavy gales, but deficient rainfall.

VI. *Cheltenham*. The early part dull but fine, very damp generally ; the latter part sharper with S and frost.—*Coundon*. An unusually high bar. during the month, notwithstanding storms.—*Bickenhill Vicarage*. The month was generally damp ; a hard frost set in on the 29th ; S fell on 5 days.

VII. *Coston Rectory*. A month with great variations of temp. ; Range of  $35^{\circ}$  in three days, 18th to 21st ; bar. high, but unsteady ; latter part of month more seasonable.

VIII. *Walton-on-the-Hill*. Very mild month.

IX. *Stanley Vicarage*. Very mild ; primrose and polyanthus in flower ; thrush and starling singing daily.—*Buckden*. Mild and open up to the 19th ; strong gales and heavy rainfall for a few days, then S and frost to the end of the month ; winds variable, but N.W. and S.W. prevailing.

X. *Copy Hill*. The month began with a cold damp air, and heavy fogs, followed by flying showers. High winds at daytime, with flashes of fire nearly every night throughout the month. Farm work nearly all at a stand, except carting ; the ground covered with a little S at the end of the month, rivers and ponds with a surface of ice.

XI. *Llanfrechfa Grange*. Mild weather and unusually little R.—*Castle Malgwyn*. Not so wet as January, 1877, but a seasonable month.—*Nantgwilt*. The average of January here from 1871 to 1875

was 8·82 in. ; the rainfall, therefore, of January in the present year is 1·99 in. below the average ; the bar. during the whole month was higher than I can remember for so long a period during the winter ; on the 13th, when 1·30 in. of R fell, the bar. did not fall at all, and only very slightly on the 21st, when 1·49 in. of R fell.

XII. *Abbey Gate*. Rainfall 0·25 in. above the average of the last seven years ; bar. very high towards the end of the month, 30·10 ; not been so high since January, 1876 ; temp. low ; prevailing winds from W.

XVIII. *Lochbroom*. Very variable month with sudden changes and storms.

XIX. *Watten*. Good open month, but damp.

XX. *Kilrush*. A very wild, severe month, and also unhealthy ; many complaining of colds ; the death-rate high.

XXI. *Ballymore Eustace*. A dull uninteresting month.

XXIII. *Newtownards*. Very mild month ; rainfall about average ; heavy S from 22nd to 25th ; hoar frost every night from 28th to 31st ; very high bar. 28th to 31st.—*New Barnsley, Belfast*. Weather very changeable, from soft drizzly R to hard frost for a very short time ; a good deal of S fell from the 23rd to the 25th, and the wind being strong it drifted very much, but the R on evening of the 25th cleared it nearly all away ; from the 25th to the end of the month very favourable, drying up the ground and giving promise of an early spring.—*Bushmills*. Stormy and unpleasant.—*Ballymully Glebe*. The first ten days mild and comparatively warm, then cold weather, with occasional snow showers ; the last few days dry and cloudy.—*Killygarvan*. Rather a fine month ; a good deal of R, but mostly at night ; stormy from the 22nd to 26th, with occasional S ; some frost at the end of the month and very fine days.—*Buncrana*. Not so wet as the corresponding month of last year, the fall of January, 1877, being 6·68 in. ; frost set in on the 30th and 31st.

## FEBRUARY.

II. *Addiscombe*. Very mild, rather dry and dull, with calms and light airs. This is the first instance of a snowless February of which I have here any record (1873—1878) ; bar. again exceptionally high ; on only 122 hours, or five days, did the wind blow from any point in the northern half of the compass.—*Bromley Common*. Fine and mild, scarcely any frost and no S ; bar. very high throughout, the

average taken at 10 p.m. being no less than 30·00, a mean I have never recorded since I kept an account.—*Balcombe Place*. Birds' nests found in the middle of the month.—*St. Lawrence Rectory*. High and steady bar. throughout.

III. *Addington*. From the 1st to 11th cold, the remainder of the month generally mild, frost occurring only twice after the 9th; vegetation not so advanced as at this time last year.—*Merton Villa, Cambridge*. Fine with no strong winds; R in any considerable quantity fell only in the middle and end of the month; mean temp. only 1°·5 above that of January; cold till the 12th, then mild to the end.

IV. *Diss, Norfolk*. Fine with many beautifully bright days; the weather on the whole has more resembled that of late spring than of winter, and some of the nights have been almost oppressively warm. The condition of the public health, however, has been decidedly bad; catarrh, bronchitis, and pulmonary affections, accompanied by an unusual degree of prostration, have been very general; and, as in January, skin diseases of all kinds very abundant.

V. *Holt*. Very mild, with an excessive amount of cloud; max. temp. 58°·3, the highest I have ever recorded in February.—*Compton Bassett*. Dry, with slight frosts up to the 9th, then showery to the 20th; the rest of the month fine and mild.—*Babbacombe*. A dry month as regards the rainfall, but the humidity of the air (90 at 9 a.m. and 9 p.m.) has been considerable; cold polar winds and very high bar. till the 9th; generally mild, damp weather with equatorial winds, and calms prevailed thence till the end of the month with very high bar.—*Altarnum*. Driest February in 15 years except 1875 (2·44 in.); average about 6 in.—*Court Barn*. Unusually fine; many days and nights as warm as the early part of May.

VI. *Ashley Down, Bristol*. The first nine days cold and dry; during the last 16 days the max. shade temp. rose to above 50° every day; heavy R at the end of the month.—*Cheltenham*. The early part of month cold, frosty, with fog, and consequently hoar frost; several delightfully sunny days followed: the month closed with damp, dull and unhealthy weather.—*Bickenhill Vicarage*. Dry but gloomy, with little sunshine and no high winds; the early part cold, the latter half mild.

VII. *Melton Mowbray*. Fine on the whole; mean bar. very high; generally very mild; vegetation forward; flowers, buds, and leaves coming out on trees and hedges.

VIII. *Walton-on-the-Hill*. Mild and dry ; rather foggy at intervals.

IX. *Stanley Vicarage*. Most suitable weather for agricultural purposes.—*Mickley, Ripon*. Temp. very high.—*Buckden*. Rainfall much below the average ; bar. high ; prevailing winds S. and S.W.—*East Layton*. Primroses, hepaticas, aconites and polyanthus in bloom.

X. *Copy Hill, Shap*. Throughout the month (with a few exceptions) the weather has been too mild.

XI. *Llanfrechfa Grange*. Very mild ; wild flowers out unusually early.—*Castle Malgwyn*. Remarkably fine, with less R than any month last year ; there has been no frost, and hardly any wind, but much cloud.

XII. *Abbey Gate, Melrose*. Unusually mild ; a blackbird's nest containing four eggs was found at Redpath Rig, about three miles from Melrose, as early as the 12th ; the wallflower in full bloom on Melrose Abbey on the 10th.

XVII.—*Tomintoul*. Remarkably mild.

XVIII. *Lochbroom*. Finest month of February ever seen in this country. — *Broadford, Skye*. Remarkably mild ; good fishing of herring, haddock, cod, and ling ; mortality of the district unusually high.

XX. *Tralee*. Unusually mild and dry.—*Newcastle West*. Remarkably mild.

XXI. *Ballymore Eustace*. Early part dry, and of low temp. ; about the middle some storms and heavy R ; one day heavy fall of soft S ; on the whole fine open spring time.

XXII. *Kilconnell*. Remarkably dry, with very high temperature.

XXIII. *Rathfriland*. From 1st to 10th nice genial weather, almost like April ; at other parts of the month stormy, but not cold.—*Newtownards*. Very mild ; no rain during first nine days.—*New Barnsley, Belfast*. Very fine and open, the early part in particular ; after the 8th variable, yet good for out-door work, the land drying very much.—*Bushmills*. Very fine for the season.—*Knockan*. Unusually warm and fine.—*Ballymully Glebe*. The general temp. has been mild, no severe gales ; the dry days at the beginning were very useful for ploughing and sowing.—*Killygarvan*. Fine, with very little R and no heavy wind ; only one day of frost or cold.—*Buncrana*. Exceptionally fine and mild for the time of year, and most favourable for farmers preparing their lands for cropping.

## MARCH.

II. *Addiscombe*. Rather mild, with a deficient rainfall ; about the

average amount of cloud and high winds ; the first half of the month was very mild, and the latter half very cold for the time of year.—*Harbledown*. Mild and windy till 13th ; after that date 12 frosty nights and occasional S showers ; on the 31st wind changed to S.W., and the thermometer stood at 40° at 11 p.m.—*Bromley Common*. Fine and dry till the last week, and mild on the whole till the 23rd, when severe weather set in ; in fact the only winter we have had, was in the last ten days of March.—II. *Littlehampton*. Wind mostly N.N.W., beginning of month good for getting in crops ; end very bad.—*Balcombe Place*. A cold month.—*St. Lawrence*. Dry, with the exception of the heavy rains on the 28th and 31st ; the cold nights in the middle and at the end did much mischief to vegetation.—*Arle Bury*. Much east wind.

III. *Addington*. A fine month for working the land ; the rainfall from the 1st to the 22nd being only 0·23 in. ; but for the R and S of the 31st, this would have been the driest March for some years.—*Broughton, Banbury*. The driest month of the year ; total only '66 in.—*Northampton*. The month came in like a lamb, and certainly went out like a lion. Westerly winds prevailed, except from 12th to 16th, and 28th and 29th.—*Merton Villa*. Mostly fine, dry, and mild for first three weeks, then a sudden period of great cold, heavy snowstorms and frosts prevailed to the end ; mean temp. only 1° higher than that of February ; the mean min. being 7° lower ; wind very steady from N.W. for most of month.

IV. *Bury St. Edmunds*. More S in March than in any month.—*Diss*. Gales on 6th, 7th, and 8th, but otherwise fine and dry to 20th, when severe weather set in, and the ground was hardly clear of S to the end of the month ; the first three weeks were very favourable for farming operations and the young lambs ; public health very bad ; great prevalence of catarrh, bronchitis, laryngeal affections, and skin diseases ; also scarlatina and measles.

V. *Steeple Ashton*. Very dry month.—*Compton Bassett*. Fine and mild till 14th, when a cold period set in with sharp frosts and snowstorms.—*Babbacombe*. Temp. high till the 12th, and from the 18th to the 21st ; during the remainder of the month it was low, especially in the last week.—*Dartmoor*. Month generally fine ; S fell on 28th.—*Clawton*. Last ten days excessively and unusually cold, with N.E. wind.—*Altarnum*. Very snowy in the last week of March.—*Cricket St. Thomas*. Beginning mild, end very cold ; S 3 in. deep.—*West Bank, Ledbury*. Very mild and dry up to middle, severe frost to end, destroying fruit buds, especially apples.

VI. *Ashley Down*. A good deal of S in the last week.—*Cheltenham*. The month opened warm and pleasant, with W. wind, but on the 14th the temp. fell to 22°; the frost gained in intensity till 25th, the temp. in shade on that day falling as low as 12°·2, and on grass to 8°·5, and the nights were more or less frosty till the end of the month.—*Bickenhill Vicarage*. First three weeks warm, the last very cold, with severe frost at night, and deep S on 27th.

VII. *Coston Rectory*. Very dry until the 24th; the winds very cold and drying, and hence vegetation is not so forward as it would otherwise have been; constant gales during the last week.—*Tolethorpe Hall*. Very small quantity of R.—*Bucknall*. Last week very cold with a good deal of S.—*Hodsock Priory*. The driest month since April, 1875; R fell on only two days out of the first twenty.

VIII. *Walton-on-the-Hill*. Cold and wintry, but fairly dry; stormy towards the close; a good deal of S in the last week.—*Manchester*. The month began with pretty fine weather and moderate warmth; there were very high winds on the 6th and 7th; the middle of the month was frosty; the end of the month was altogether wintry, bitter keen E. wind, frost, and plentiful snow.

IX. *Buckden*. Wet at the beginning with occasional electrical disturbance; fine and dry with slight frost occasionally up to the 23rd, then severe winterly weather, hard frosts and S to end.

X. *Easdale*. Hard frost with S and gales.—*Birkside*. Much S in the last week.—*Kirkstone Pass*. S fell on ten days, with severe frost.—*Measandbecks*. Weather during early part wet; middle, dry and fine; latter part S and frost.—*Shap*. March began with a few windy cold wet days; the middle of the month was warm and springlike, and the end cold with a good deal of S.

XI. *Llanfrechfa*. Beginning of month mild; end very stormy, with sudden changes of barometer and some S; fruit trees brought into flower at the beginning of the month, and much injured by the cold of the last week.—*Castle Malgwyn*. First part fine and mild; latter part thoroughly wintry, with much S, exactly reversing the old saying, "March comes in like a lion and goes out like a lamb."—*Carno*. Very stormy and rough at commencement, and very severe cold with S at end.

XII. *Melrose*. Very fine, except the last ten days, which were very stormy, with S or H every day, and sharp frosts at night.

XIV. *Annanhill*. Generally fine and favourable for farming operations; S at end of month.

XVII. *Keith*. Middle of month very fine, much S at end.—*Nairn*. Very fine till about the 20th, after which wintry weather, S, wind, and severe frosts.

XVIII. *Lochbroom*. Beginning and end extremely stormy; the middle the perfection of spring weather.—*Sligachan*. Frost and S the last 8 days; 5 in. of S fell on the 25th.

XX. *Tralee*. Unusually mild and dry till 24th, when the temp. fell, and N. wind set in with S.—*Tipperary*. Dry, and generally fine.—*Castle Lough*. The early part mild, the latter part cold, with showers of S or sleet and H, and occasionally frost at night.—*Newcastle West*. Wind mostly N., very harsh and cold during the latter part of the month; in other respects favourable to spring operations.—*Kilrush*. Very fine; not much sickness, with the exception of colds and influenza.—*Miltown Malbay*. March opened mild and rainy, with high temp.; the middle of the month was like early summer, mild and balmy; on the 22nd a change set in, wind veered to N. and N.E., thence to the end frost every night, with fierce cutting cold winds, sometimes blowing very hard, and carrying with them showers of S, H, and sleet; very severe frosts on the nights of the 28th and 30th.

XXI. *Ballymore Eustace*. Vegetation was forward in the early part of the month, but met with a severe check towards the close.—*Belvedere*. First week very warm and mild, remainder of month cold and wintry with S, H, and frost, giving a great check to vegetation.

XXII. *Kilconnell*. An extraordinarily dry March; it reversed the usual order by coming in like a lamb and going out like a lion.

XXIII. *Rathfriland*. Very cold for the spring; a black frost nearly all the month.—*Newtownards*. Very favourable for farm labour, unusually mild till 22nd, remainder extremely cold; S showers every day, and severe frost at night.—*New Barnsley, Belfast*. Part of the month exceedingly stormy, but taken altogether a very fine month for the land, the drying winds, slight frosts, and occasional hot sun getting the ground in good condition to receive the seed.—*Moneydig*. At the end of the month such swarms of small black flies as made it nearly impossible for animals to stop in the fields, particularly on a calm moist day.—*Knockan*. A good deal of snow towards the end.—*Ballymully Glebe*. The beginning very mild; after the 13th, came sharp frosts with bitter winds and snow showers, these continued with an intermission of a few days till the beginning of April.—*Killygarvan*. Mild up to the 21st, but from that date to the end very cold, with a

good deal of snow.—*Buncrana*. Latter part very cold, with high winds and S, and H showers, adverse to farming operations.—*Carndonagh*. Cold intense during the greater part of the month.

## APRIL.

I. *Muswell Hill*. The rainfall this month has been altogether abnormal; the average of April for the preceding six years is only 1·64 in.; the large total of 4·44 in. is chiefly owing to the enormous fall of 2·77 in., which occurred between 5 p.m. on 10th and 1 p.m. on 11th, and it is a singular fact that this amount of 2·77 in. is as nearly as possible the amount of the excess over the average, the total of the other 28 days being 1·67 in. Months in the preceding six years in which the fall exceeded that of this month: October 1872, 5·80 in.; December 1872, 4·79 in.; July 1875, 5·20 in.; December 1876, 6·63 in.; January 1877, 5·01 in.

II. *Addiscombe*. Mild, very wet and very bright, with wind of about the average velocity; the first 10 days cold, and the remaining 20 warm for the time of year; more R fell this month than during the whole of the previous three months.—*Bromley Common*. Wet month, and on the whole cold; vegetation backward; tremendous R between 4 p.m. on 10th and 9 a.m. on 11th, 2·35 in.; this is the heaviest recorded since January 16th, 1866, when 2·56 in. fell.—*Littlehampton*. Warm month; good for growing.—*St. Lawrence, Isle of Wight*. Cold frosty nights for the first seven days; splendid show of bloom on apple and pear trees; good prospect of hay crop.—*Cadland*. Unusually wet.

III. *Addington*. The opening days of April were very cold, just a continuation of the frosty weather of the end of March; spring trees late.—*Cambridge*. Heavy R during the third week; vegetation kept backward by the cold nights; milder after 10th, and warm at the close.

IV. *Diss*. With the exception of the gales of the 7th, 8th, and 9th, the weather was magnificent; lambing season very favourable, and young crops of all kinds looked strong and healthy. Apricots and gooseberries were cut off by the frosts at the end of March, but the prospect of fruits of other kinds is good; influenza and bronchial attacks, some of them proving rapidly fatal to old persons, very prevalent; severe spasmodic coughs and false croup abounded.

V. *Compton Bassett*. Cold and showery, with N. and N.E. winds, to

the 25th, when the wind changed to S, and the remainder was fine and springlike.—*Babbacombe*. Wet, damp, and foggy, but some fine days occurred in the first week and about the 26th; sharp frost in the first week, after which time the weather was generally warm, moist, and favourable to vegetation, which made rapid progress; E. winds prevailed in the second and last weeks, and S.W. during the rest of the month; bar. rather below the average.—*Druid House*. N.E., E., and S.E. winds prevalent.—*Dartmoor*. Showery and foggy; a few bright summer days.—*Taunton*. A most genial growing month, very favourable for all agricultural pursuits.

VI. *Cheltenham*. Very pleasant, the latter part especially delightful.—*Ledbury*. Fine spring weather, with abundance of grass.—*Bickenhill*. The month opened with very cold weather, which continued for a week, when it gradually became warmer; E. winds prevalent.

VIII. *Walton-on-the-Hill*. Dry, fine, and warm.—*Manchester*. Beautiful weather in latter part.

IX. *Stanley Vicarage*. From the 16th to the end of the month the weather was most favourable for vegetation.—*Mickley*. Very warm.—*Buckden*. April was fine and dry, with the exception of a little S and sleet, with rather keen frosts and cold bleak weather at the beginning; prevailing winds, E., N.E., and N.—*East Layton*. Bright and sunny.

X. *Easdale*. Very fine.—*Measandbecks*. Early part mild with occasional showers; latter part cold and slightly rainy.—*Shap*. Seasonable weather.

XI. *Llanfrechfa*. Cold during the early part; latter part very warm.—*Castle Malgwyn*. Cold on account of the easterly winds, but a much more favourable month than April 1877.

XII. *Melrose*. Very fine.

XVIII. *Lochbroom*. The most charming month ever known here at any season.—*Glenfinnan*. Very fine and warm for the time of year; prevailing winds E. and S.E.

XIX. *Watten*. Very fine seed time; E. winds prevalent.

XX. *Kilrush*. Month favourable, but vegetation backward; colds and influenza very prevalent.—*Miltown Malbay*. The month opened with a week of very bitter weather; wind from N.W. to N.E., bringing H and snow showers; weather very unsettled and cold to the 20th, when it became intensely dry, with parching sun and cold high winds; a change to something approaching summer temp. on 30th.

XXII. *Kilconnell*. Remarkably dry April, with an unusual amount of E. wind.—*Dowra*. Weather very good for April.

XXIII. *Rathfriland*. Weather most suitable for agriculture.—*Newtownards*. Very favourable for farming operations, which are in a forward state.—*Belfast*. Beginning of month remarkably dry and fine; after the 16th the weather was all that could be desired, and vegetation progressed wonderfully.—*Knockan*. Fine month.—*Ballymully Glebe*. After the first 11 days the weather became so mild and genial that vegetation rapidly advanced, and the spring seems now favourably settled.—*Rathmullan*. A fine month; rainfall above the average; a sharp frost at the beginning of the month killed early potatoes and damaged fruit buds.—*Buncrana*. From the 4th the weather was most favourable for farming operations.

#### MAY.

I. *Muswell Hill*. The total rainfall (3·47 in.) is greater than that of any May in the preceding six years, and is 1·59 in. above the average for that period; this is the more remarkable as following on the excessive rainfall of April.

II. *Addiscombe*. Very warm, very wet, rather dull and windy. The first 19 days were warm, and the remaining 12 cold for the time of year; this has been the warmest May since that of 1868; Thunder showers frequent.—*Renfrew Villa, Margate*. Very wet and cold.—*Bromley Common*. Very showery, cold, and with very little sun; grass crop very heavy.—*Littlehampton*. All vegetation very promising at the beginning of the month, but trees, flowers, and vegetables were damaged by the wind and H; heavy hay crop; wind unsettled all the month.—*East Grinstead*. Very wet.

III. *Addington*. The wettest May for years; early part of month fine mild growing weather; crops of all kinds advanced rapidly, but the constant rainfall began to tell on the grain crops before the end; wheat, barley, and oats all suffered very much in this district.—*Broughton, Banbury*. The wettest month of the year (5·05 in.).—*Northampton*. Oak in leaf about two weeks before the ash.—*Cambridge, Merton Villa*. Very showery after the 5th; TSS prevalent at beginning and in latter half of month; mean temp. 54°·2.

IV. *Sheering*. By far the most rainy May for 15 years, the nearest being May, 1869, when 3·40 in. fell.—*Boxford*. Wettest May yet recorded.—*Bury St. Edmunds*. Wetter than average.—*Diss*. At the

beginning of the month there was much bright warm weather, which continued at intervals till the third week in spite of the heavy rains, but the latter part was very stormy, with frequent T and some rather heavy gales; although the weather was cool, there were no night frosts to injure vegetation; the great amount of wet has impeded the early farming operations, and barley on heavy land looks weak and yellow; on dry light land, however, it is doing well, and other crops look vigorous; there is an abundant crop of grass, and straw (which has been so much wanted for the last few years) will be plentiful; the gardens look well; there has been much sickness, principally bronchitis and severe bilious attacks.—*Geldeston*. Wettest May yet recorded.—*Hillington*. R in May, 3·95 in.; more than twice the average, and greater than for at least 13 years.

V. *Steeple Aston*. Very wet month.—*Holt*. The heaviest rainfall (6·66 in.) of any month in the year, and the longest continuous period of daily down-pour, 6·63 in. falling in 24 days.—*Compton Bassett*. Very wet and unsettled; R on 22 days; no sharp frosts to injure vegetation.—*Babbacombe*. Another rainy, damp, and cloudy month; temp. about the average; generally warm till the 19th, then rather cold; solar halos on five days; vegetation made rapid progress, and was luxuriant at the end of the month.—*Dartmoor*. Cold and unseasonable, more like March than May.—*Altarnum*. Wettest May in 15 years.—*Court Barn*. The excessive wet was very injurious to agricultural works; T frequent.—*Meshaw Rectory*. The heaviest rainfall (5·61 in.) in May since 1869, when 7·15 in. fell.—*Cricket St. Thomas*. Very wet and stormy; R on 25 days.—*Literary Institution, Bath*. The highest monthly fall (7·06 in.) registered at the institution.—*Weston, Bath*. Total fall 7·51 in., higher than ever previously registered by me.

VI. *Upfield*. Excessively wet.—*Cheltenham*. Early part fine and pleasant; after the 10th the weather changed to wet, an unbroken succession of rainy days (with the exception of the 23rd) following till 28th.—*Ledbury*. Very sunless and the latter part cold.—*Preen Manor*. Very wet, greatly injuring the crops.—*Burton-on-Trent*. May 6th to 28th incessant R, making it the wettest month of the year.—*Cheadle*. Unusually wet and sunless; a good deal of T.—*Bickenhill*. Extremely wet, the earlier part warm, the latter part cold with E and N.E. winds.

VII. *Coston*. Very wet; vegetation very luxuriant; corn on this cold land suffering from wet and want of sunshine.—*Tolethorpe Hall*. Heavy rainfall.—*Langton*. Remarkably gloomy and rainy.—*Hodsock*

*Priory.* Out of the 29 days from April 29th to May 27th inclusive, R fell on 27, 22 of them being consecutive.

VIII. *Astle Hall, Chelford.* Frequent TS.—*Walton-on-the-Hill.* Very wet and unsettled, with a good deal of T.—*Manchester.* Middle of month wet and dreary; close very fine; the whole month more like April weather.—*Rochdale.* Wettest May since register began in 1864.

IX. *Stanley Vicarage, Wakefield.* Very wet; favourable for grass, but corn looks very yellow.—*Buckden.* On the whole favourable to vegetation, though occasional night frosts may have checked bloom and retarded garden produce; bar. moderately high and steady; electrical disturbances frequent.

X. *West Hendon House.* Severe TS.—*Howick Hall.* Severe frosts, which totally destroyed the apple crops.—*Elterwater.* Vegetation very forward here, and promise of a very plentiful and early crop of hay; T on four days, but no L visible.—*Easdale.* More R than we have had in May for some years.—*Kirkstone Pass.* R fell on 26 days, with much T.—*Measandbecks.* Early and middle part rainy, with severe TS.—*Shap.* Very wet, at times mild and warm; land in a very wet state, and fruit trees have suffered from the wind.

XI. *Castle Malgwyn.* Beautiful weather at the beginning and end, but the middle very wet; vegetation earlier than last year by nearly a fortnight.—*Nantgwillt.* The wettest May here in the course of 20 years.

XII. *Melrose.* Very wet; mean temp. about the average; grass exceedingly plentiful, so that hay promises to be a most abundant crop.

XIV. *Annanhill.* Barometric pressure uniform; wind principally easterly and westerly; T heard on six days; L seen on two days; H fell on four and S on three days.

XVIII. *Glenfinnan.* Beautiful month throughout; vegetation far advanced; the week beginning Monday, 20th, very cold; the hills white with S.

XIX. *Watten.* First half dry, latter cold and dry; favourable for farming operations, but checking growth of vegetation very seriously.

XX. *Castle Lough.* Generally cold and showery with high wind and squalls.—*Kilrush.* Wet and wild, except the last week, which was better.—*Miltown Malbay.* Blustering, boisterous, and stormy, more so than any May within recollection; temp. rather low, and air generally keen and cold; the last few days were dry, with a keen cold wind and scorching sun.

XXI. *Ballymore Eustace*. A good deal of R and wind with low temp., and consequently vegetation retarded.—*Belvedere*. A fine growing month, although somewhat cold at the beginning with strong breezes.

XXIII. *Newtownards*. Although the temp. was rather low, there were no frosty nights, an unusual circumstance ; the sowing of swedes delayed by the incessant R.—*Belfast*. Changeable ; often cold, then suddenly warm ; vegetation progressing well, except on wet clay lands, which are still too cold for much growth.—*Knockan*. Cold and wet.—*Ballymully Glebe*. The temp. (especially at night) has been very variable ; the dry days in April enabled the farmers to sow their crops, which promise well ; the rapid growth of grass has been very favourable for the graziers, and there is hope of a large hay crop.—*Killygarvan Glebe*. Rather wet and windy with a good deal of sunshine, so that it has been good for the country generally ; temp. about the average.—*Buncrana*. A fine spring month ; good promise of a rich harvest.

## JUNE.

I. *Muswell Hill*. Another month in which the R exceeds the average of the preceding six years.

II. *Renfrew Villa, Margate*. A fine summer month, rather cold at times, but a few very hot days.—*Bromley Common*. Early part unusually cold and showery, the mean temp., however, was brought up by the extreme heat of the last week.—*Littlehampton*. First part unseasonably cold, latter part very hot ; potatoe disease observed about the 23rd, exceptionally early for this district. White butterflies unusually scarce.

III. *Addington*. The early days were fine, but from the 9th to the 18th the weather was unsettled and stormy ; latter part of month very fine ; splendid weather for haymaking.—*Cambridge*. Very cool till the 22nd, when great heat suddenly set in, and continued till the last day ; frequent heavy R with TSS in the neighbourhood.

IV. *Diss*. Cold and wet, till after the middle of the month, when hot summer weather set in, with the ther. frequently up to 85° in the shade ; splendid hay crop, well secured in the latter days of the month ; the barley has improved wonderfully, and all the crops look well ; strawberries fine and plentiful, other fruits scanty.

V. *Compton Bassett*. Up to the 20th dull, cold, and showery, thence

to the end, bright, and sunny; temp. in shade at or above  $80^{\circ}$  on 5 days.—*Babbacombe*. Wet, cloudy, and generally cold, with variable winds, mostly south-westerly till 19th; after which date fine, bright, warm dry weather prevailed, with north-easterly winds.—*Altarnum*. Wettest June in 15 years.—*Taunton*. First part wet and chilly, the latter very hot with thunderstorms.

VI. *Cheltenham*. Early part cold and ungenial, changing to beautiful weather on the 20th, from which day to the close it was very hot.

VII. *Coston Rectory*. First part very chilly, and the last week excessively hot.

VIII. *Walton, Liverpool*. Cold and unsettled up to the 19th, then fine and hot.

IX. *Buckden*. Rainy up to the 12th, with rather low temp. up to the 21st, after which the temp. rose suddenly, and the weather remained hot to the close.

X. *Easdale*. Very fine weather.—*Measandbecks*. Weather during early part very fine, latter part rainy, with some violent TSS.

XI. *Castle Malgwyn*. Beginning of month very showery; very hot from 22nd to 29th.—*Tybrille*. First part very wet and cold; very hot at the end.

XII. *Melrose*. A fine seasonable month; rainfall and temp. about the average; the latter part splendid for haymaking.

XVIII. *Glenfinnan*. Weather beautiful throughout the month; warm and calm, and very beneficial for all descriptions of farming.

XIX. *Watten*. A good month, though very dry, and the first half cold; unusually hot during the last week.

XX. *Tralee*. Weather unusually wet, but not cold.—*Tubrid*. Cool; more R than usual, and dry weather wanted; all crops promising, hay particularly so.—*Tipperary*. Very wet and winter-like.—*Castle Lough*. Very wet; farmers have not been able to put in the turnip crop, and the potatoe blight has already made its appearance.—*Kilrush*. A good month for growing crops, particularly grass.—*Mil-town Malbay*. The wettest June on record, the temp. up to the 15th was very low, this changed on the 16th to a genial warmth, verging on oppressive sultriness.

XXI. *Trim*. Flood in June most destructive to meadows in low-lying land.

XXII. *Kilconnell Rectory*. The wettest June in the memory of any in these parts.—*Ballinasloe*. The wettest June for years; the R on the 26th and 27th was very heavy, falling continuously for more than

48 hours; the river Suck rose to the level of the highest winter floods, portions of the roadway which the floods had not reached for more than 30 years being covered with water.

XXIII. *Newtownards*. Owing to the heavy R in the early part of the month, the planting of swedes was delayed about a month beyond the usual time; potatoe blight made its first appearance on 25th, never before seen so early.—*New Barnsley, Belfast*. Very showery; but no harm done to crops, which are improving fast. *Bushmills*. Very fine.—*Ballymully Glebe*. Temp. of early part of month variable; more steady in latter part.—*Killygarvan Glebe*. Fine, with warm sun; only two days of strong wind, and no very heavy R or thunderstorms.—*Buncrana*. Fine, seasonable, and most favourable for the hay harvest; crops in general, and especially the potatoe crop, look very well, and promise an abundant harvest.

#### JULY.

I. *Muswell Hill*. Total rainfall little more than a-fifth of the average of the six preceding years.

II. *Addiscombe*. Rather cool, very dry and dull, with calms and light airs; twenty-four days were of seasonable temp., while the remaining seven were either very hot or very cold for the time of year; between the 3rd and 24th, or for nearly three weeks, there was very little R indeed.—*Tenterden*. Very dry.—*Renfrew Villa, Margate*. A very fine hot summer month.—*Bromley Common*. Fine warm month notwithstanding easterly winds; very hot about the 15th.—*Littlehampton*. Hot and dry.—*St. Lawrence*. A beautiful month, bringing forward the harvest in a manner which the farmers had not at all anticipated; remarkably free from TS.

III. *Addington*. Splendid month; the dry period which set in on June 25th, continued till July 24th, only .04 in. of R falling during that period. In this district many hundred acres of hay secured without a drop of R; very little T.—*Kings Sutton*. Nearly all the R fell during a heavy TS on 24th.—*Granchester Mills*. Lowest quantity of R on record.—*Merton Villa, Cambridge*. Dry; nearly all the R fell on the morning of the 23rd; a hot period from 17th to 23rd; T and L observed at intervals, from 23rd to 29th.

IV. *Bocking*. Total R only three-hundredths of an inch, whereas the average is over  $2\frac{1}{2}$  in.—*Boxford*. Driest July yet recorded.—*Bury St. Edmunds*. Drier than average.—*Diss*. First three weeks dry, and some

days very hot ; splendid hay crop well secured ; garden crops rather poor ; public health good.—*Mattishall*. Dry.

V. *Steeple Ashton*. Very dry.—*Compton Bassett*. Fine ; max. in shade above 80° on four days.—*Babbacombe*. Dry, fine and hot.—*Altarnum*. Driest since 1869.

VI. *Cheltenham*. Early part dull, with slight sprinklings of R, succeeded by bright hot days, which became almost unbearably so from the 17th to the 24th, when a welcome TS moistened the ground and cooled the air ; a few rainy days followed, and the month closed with bright pleasant weather.

VII. *Coston*. Very dry, with the exception of a wet period from 23rd to 27th ; max. temp. not so high as June, although higher than July 1877.

VIII. *Walton-on-the-Hill*. Very dry.—*Manchester*. Very dry and fine ; no thunderstorms.

IX. *Buckden*. Dry and fine ; often very hot, no severe TSS ; fine month for gathering in hay and ripening cereals.

X. *Mardale*. Only one slight shower of R.—*Shap*. Very dry ; favourable for gathering in the abundant hay crop.

XI. *Llanfrechfa*. Unusually fine and warm ; wheat and oat harvest very early.—*Tybrille, Carno*. Very dry, and some days hotter than it has been for years.

XII. *Melrose*. Remarkably dry and warm ; rainfall scarcely one-third of the average ; hay a splendid crop, well secured ; corn ripening fast, and promises an early crop.

XVII. *Fettercairn*. A long period of dry hot weather.—*Nairn*. The driest July for 8 years.

XVIII. *Lochbroom*. A most glorious month ; hay all secured ; potatoes sound and splendid.—*Glenfinnan*. Beautiful weather throughout ; very high temp. and very little wind.—*Broadford, Skye*. Remarkably dry ; crops look well ; herring fishery fairly successful.

XIX. *Watten*. Dry and warm, with very light winds.

XX. *Glenville*. Dry, with the exception of a local TS on the 20th, when 1·25 in. of R fell in half an hour.—*Tralee*. Unusually dry ; only 9 days on which R fell.—*Tubrid*. Fine, dry month ; good crop of hay well saved ; wheat looking very well.—*Tipperary*. Frequent T, preceded by great heat.—*Castle Lough*. Some days of unusual heat about the middle of the month.—*Kilrush*. Very fine.—*Miltown Mulbay*. Very favourable for farming interests.

XXI. *Ballymore Eustace*. Fine and pleasant, healthy, and good for

hay harvesting. *Kilsallaghan*. Very warm and fine, with some T and broken weather at the conclusion.

XXIII. *Rathfriland*. Very warm and dry.—*Newtownards*. Remarkably dry and fine; potatoe disease, which had made its appearance early in the month, seems to have been checked by the drought; good prospect of abundant harvest.—*New Barnsley*. Remarkably fine and hot; crops maturing wonderfully, and promising to be very productive.—*Donaghmore*. Remarkably fine hot weather.—*Stewartstown*. Much less R than the average of the last four years.—*Ballymully Glebe*. The drought and heat have produced an unusually heavy crop of hay; green crops were in some danger, but have been restored by occasional showers; potatoes look well.—*Killygarvan Glebe*. Fine month, very little R.—*Buncrana*. Very dry, and heat excessive. R is wanted.

#### AUGUST.

I. *Camden Road*. The wettest month since my gauge was put up in August, 1876.—*Muswell Hill*. The wettest August for seven years; the total rainfall (6·13 in.) is nearly two and a half times the average of this month for the past six years.

II. *Tanfield Lodge, Croydon*. Rainfall (5·24 in.) much heavier than recorded in the previous 18 years, during which time the max. was 3·59 in. (in 1865), and the average 2·18 in.—*Addiscombe*. Rather warm and very wet; temp. extremely equable; the extreme range in shade only 27°·6, and of the soil at one foot only 7°·1; the wettest August in Croydon during the past 18 years; thunderstorms and thunder showers very frequent.—*Benenden*. Very continuously wet; harvest much delayed.—*Bromley Common*. Very wet with much T; harvest very much delayed.—*Littlehampton*. Cold and ungenial for harvest.—*Eridge Castle*. The largest rainfall ever remembered.—*Shillinglee Park*. Rainfall 4·39 in., the most measured for the month in 11 years.—*Buckingham Place, Brighton*. Rainfall 4·52 in., greatest in Brighton in any August during 30 years.—*Manor House, Hastings*. Total rainfall the greatest for this month since I began observations in July, 1874.—*East Grinstead*. Very wet.—*St. Lawrence*. The wettest August I have known; very trying for farmers; potatoe disease very prevalent.—*Cadland*. Unusually wet.—*The Acacias, Reuding*. Unusual number of TSS.—*Long Wittenham*. Very wet.

III. *Addington*. More R and a greater number of wet days than in

any August for a number of years. T has been frequent, sometimes very near.—*Clapham Park, Bedford*. Rainfall remarkably heavy ; no month equally so since July 1875.—*Cambridge*. Frequent TSS and heavy R.

IV. *Sheering*. The most rainy August in the last 15 years.—*Bury St. Edmunds*. More TSS than for several years, doing much damage in the town.—*Diss*. Wet and a slow harvest ; TSS have been frequent ; the public health has been decidedly good.—*Geldeston*. Wettest August recorded.—*Pickenham Hall*. TSS on 10 days.—*Mattishall*. Wet ; barley much injured.

V. *Steeple Ashton*. Very wet.—*Compton Bassett*. Wet, R having fallen on 21 days ; loud T and vivid L occurred on seven days.—*Lamorna*. R exceeded that of any August during the immediately preceding 14 years.—*Babbacombe*. Wet, stormy, and cloudy ; the temp. warm and equable ; S.W. gales occurred on the 11th, 13th, and 14th.—*Middlecott House*. Very wet ; a great deal of wheat exposed on these hills, but little or no damage done.—*Altarnum*. Wet and cool.—*Court Barn*. Frequent T.—*Meshaw Rectory*. Wet both as regards total rainfall and the number of days on which R fell, but chiefly remarkable for the number of thunder showers.—*Cricket St. Thomas*. Bad harvest weather.

VI. *Ashley Down*. Warm ; rainfall more than an inch above the average.—*Cheltenham*. Wet ; generally little T ; only one heavy storm ; temp. of month very uniform.—*Church Stretton*. On six days, more than half an inch of R fell.

VII. *Coston Rectory*. Very wet, the rainfall exceeding by nearly 1·75 in. the max. fall in August during the last five years ; harvest operations seriously hindered by the continuous R.—*Tolethorpe Hall*. Rainfall quite unprecedented.—*Doddington*. R (nearly 8 in.) unprecedented.—*Highfield House*. The greatest rainfall (8·76 in.) registered here in any month since 1840.—*Hodsock Priory*. With the exceptions of October 1875, and December 1876, the wettest month for more than three years.—*Trent College*. Rainfall (5·57 in.) greatest on record at Trent College ; in 1875, 3·40 in.—*Duffield*. Rainfall greater than in any month for upwards of 12 years.

VIII. *Walton-on-the-Hill*. Wet, cold and unsettled.—*St. Bedes, Manchester*. More R has fallen than during any other month of the year ; a great deal of electric disturbance.

IX. *Mickleby, Ripon*. Continuous and heavy TS.—*Buckden*. Rather wet ; frequent electrical disturbances, though no very severe thunderstorms ; bar. moderately high.

X. *Shap*. Considering the quantity of R that has fallen, it has been fine harvest weather; T and L common at the end of the month.

XI. *Llanfrechfa Grange*. Unusually wet with very low bar. and changeable wind.—*Solva*. The largest rainfall for any August since 1863.—*Castle Malgwyn*. Very wet, having been showery the whole time; not much wind, but chiefly from S.W.—*Llandyssil*. Rainfall the greatest yet registered in any one month, 6·01 in.

XVIII. *Lochbroom*. Nearly as fine and dry as July; very good weather for the farmers.

XIX. *Watten*. Dry, warm, and fine.

XX. *Castle Lough*. Most disastrous for farmers; the heavy R accompanying the TS on the 6th did great damage to the ripe oats.—*Miltown Malbay*. The month opened with intense heat, and the first half was remarkable for the frequency and intensity of the T and L; during the remainder of the month the air appeared charged with electricity.

XXII. *Kilconnell Rectory*. Remarkably wet, which rendered the harvest later than usual.

XXIII. *Newtownards*. On the whole favourable for harvest operations.—*New Barnsley*. Showery, but mostly in the night.—*Ballymully Glebe*. Singularly favourable for haymaking and for ripening the grain crops; potatoes abundant, and generally free from disease.—*Killygarvan Glebe*. Fine, with the exception of one S.W. gale on the 12th and heavy R on the 14th and 15th, but as the R was much required, August might be called an exceptionally favourable month.—*Buncrana*. Very fine for all out-door pleasure and farming operations, the principal falls of R having taken place at night.

#### SEPTEMBER.

I. *Muswell Hill*. Very dry, the rainfall being less than half the average.—*Enfield*. Very fine and unusually free from thunderstorms and heavy R, a great contrast to its predecessor; from the 22nd to the 27th the nights were very cold.

II. *Littlehampton*. Ungenial month; very few moonlight nights; marked absence of wasps, butterflies, &c.—*St. Lawrence*. A beautiful month; quite half the potatoes diseased, but a large crop makes up the deficiency.—*East Worldham*. Only two days on which R fell; on 16th ·15 in., and on 18th ·14 in.

III. *Addington*. Very fine; wind very high on 15th and 16th; slight frost on 24th and 26th.—*Merton Villa*. Very dry.

IV. *Diss*. Rather cold and uncomfortable; harvest not completed till 10th, and much barley was in bad condition; root crops will be good; public health decidedly good.

V. *Compton Bassett*. The weather during the first part of the month was very fine and bright, the middle part showery and squally, the last week clear and sunny.—*Babbacombe*. Dry and fine, especially the first half, when the temp. and the bar. were high; prevailing winds westerly; harvest was completed during the first week.

VI. *Cheltenham*. Atmospheric pressure tolerably steady; mean temp.  $55^{\circ}1$ ; low temp. between 19th and 26th.

VII. *Coston Rectory*. Rainfall below the average of the past six years; temp. about the average; two comparatively warm periods 3rd to 10th, and 27th to 29th.

VIII. *Walton-on-the-Hill*. Latter half of the month extremely unsettled.

IX. *Buckden*. Fine and genial up to the 15th, then storms of R with high wind for some days, followed by almost daily rainfall to the end.

X. *Measandbecks*. Early part very fine; middle and latter part rainy, with high winds.—*Shap*. Early part fine and dry, and the crops well secured; heavy showers at the end.

XI. *Solva*. The smallest amount of rainfall recorded in September since 1870.—*Castle Malgwyn*. Very showery after the 6th, but on the whole warm.

XII. *Melrose*. Favourable for harvest operations, which were finished about three weeks earlier than usual; temp. about the average; rainfall about  $\cdot 50$  in. above the average; prevailing winds from W. to S.W.

XVIII. *Lochbroom*. Both the beginning and end of the month were beautiful, but there was a violent storm on the 13th, 14th, and 15th.—*Glenfinnan*. From about a fortnight before until about a week after the equinox, the weather was extremely tempestuous with a considerable fall in temp.

XIX. *Watten*. On the whole warm, although somewhat unsettled; first 14 days fine, but in the latter half high winds and R prevailed.

XX. *Tralee*. Bad harvest weather from small and frequent falls of R; very mild and only one equinoctial gale.—*Kilrush*. Very changeable and partially severe, but on the whole healthy.—*Miltown Malbay*.

Weather very unsettled and bad for harvesting ; temp. up to the 15th high, but the storm of that day was accompanied by an icy chill, and followed by a week of squally weather with hail showers ; the close of the month was milder and the weather promising.

XXIII. *Newtownards*. Dry and fine till 21st, and corn saved in excellent condition ; equinoctial gales and a great fall of temp. commenced about the 15th.—*New Barnsley*. Beginning very fine and seasonable ; from 15th to 19th very severe gales, but not much R and very little damage in this neighbourhood ; abundant crops safely gathered.—*Stewartstown*. Very showery, though the total rainfall was not above the average.—*Ballymully Glebe*. Altogether very favourable for the farmers ; high wind about the 16th, but not such violent gales as were reported from other places ; little or no T and no heavy floods.—*Killygarvan Glebe*. Pretty fine till the 12th, after which it was stormy and wet, but the crops were nearly all saved before the equinoctial gales began.

#### OCTOBER.

I. *Muswell Hill*. The rainfall was very little more than half the average of the last six years.

II. *Addiscombe*. A very enjoyable month, being warm, dry, bright and calm ; the first twenty-six days were warm, and the remaining five very cold for the time of year ; this has been the third dry October in succession.—*Bromley Common*. Fine all through the early part of the month, but rather rough and cold towards the close ; a remarkable absence of frost.—*Littlehampton*. Cold, wet and dull ; marked absence of frost.

III. *Addington*. Early part fine and mild ; cold towards the end.—*Northampton*. Extremely mild in early part ; heavy snowstorm on 30th.—*Cambridge*. Mostly fine and warm till the fourth week, which brought frequent R ; at close of month extremely cold, with heavy fall of S on 30th, covering the ground thickly.

IV. *Diss*. Pleasant open weather during the first three weeks, then a good deal of wet, with frequent heavy winds to the end of the month ; sharpish frosts and very chilly air from 27th to 30th ; weather generally favourable for the later farming operations ; later garden crops good ; out-door grapes ripened very well ; very little prevailing sickness.

V. *Compton Bassett*. The weather during the first half very fine,

the latter half dull, hazy, and showery; only three slight frosts.—*Babbacombe*. Dry and fine, with a high bar. at the beginning and middle of the month, wet and stormy with low bar. from 6th to the 10th, and after the 21st; very cold on the 29th and 30th, when a little S fell.—*Altarnun*. S and H showers the last week.

VIII. *Walton-on-the-Hill*. Very unsettled throughout.

IX. *Stanley Vicarage*. Very fine, and farming operations forward.—*Buckden*. Rainfall abundant: bar. somewhat unsteady, and taking a wide range; electrical disturbance, with the exception of occasional displays of aurora, very slight through the month; gales about the 9th, 10th, and 21st, with heavy rainfalls and floods.

X. *Shap*. Very wet and cold; the country in general has the appearance of an early winter.

XI. *Castle Malgwyn*. The beginning of the month very fine; from the 7th to the 10th stormy, then fine again till the 18th, almost like summer; the latter part of the month exceedingly wild and stormy, and the last few days cold.—*Tybritle, Carno*. Very wet most of the month.

XII. *Melrose*. Remarkably fine, especially the middle.

XVII. *Nairn*. Very stormy during the latter half of the month, with low temp.

XIX. *Watten*. Remarkably mild up to the 28th, then cold boisterous weather to the end, with a strong gale of wind from the N., and showers of S, H and R.

XX. *Tipperary*. Fine but stormy occasionally.—*Newcastle W.* Remarkably stormy; frosts occurred on the nights of the 29th, 30th, and 31st.—*Kilrush*. Very severe, and seems to denote a bad winter.—*Miltown Malbay*. The month opened fair, but changed on the 7th to a week's heavy R with T; the latter part of the month stormy and very cold, with H showers and frosts at night.

XXIII. *Newtownards*. Very fine, from 10th to 19th; latter part, cold, wet, and stormy.—*Ballymally*. The latter part has been cold and raw, but altogether farming work has gone on prosperously.—*Killygarvan*. Wet and stormy except one week; much L and some heavy wind; the temp. about the average.—*Buncrana*. Very wet and stormy, with the exception of one week from the 11th to 18th.

## NOVEMBER.

II. *Tenterden*. The fourth wet November in succession, making the average for the past seven years for that month 4.45 in., whereas

for the previous seven years it was only 1·81 in.—*Bromley Common*. Wet, foggy, and very little sun.—*Littlehampton*. An unpleasant month; although free from fogs, there was little sun after the 6th.

III. *Addington*. Rather cold and dull; no severe frosts, but frequent slight frost on the grass.—*Granchester Mills*. Largest quantity of R on record.—*Cambridge*. Very wet and cold, especially at the middle and end of month, when much land was flooded.

IV. *Audley End*. Rainfall 3·00 in. above the average.—*Diss*. A wretched month of wet, windy and chilly weather; the low-lying lands in the neighbourhood have been much flooded and roads under water; the rainfall (5·65 in.) is the heaviest registered in any month since I commenced reporting in 1870; the nearest approach to it was in November, 1875, when it was 5·06 in.—*Geldeston*. The total R (6·95 in.) is 1·75 in. more than in any other month yet recorded here, and nearly three times the average.—*Essex Street, Norwich*. The rainfall is without a parallel in the present century, viz., 8·45 in., accompanied by the deepest flood in Norwich on the 16th since 1640, rising 7 ft. above the usual level in the river; I measured 4 ft. 1 in. to the water-line in one house I entered in the flooded part of the city; most of the R fell during the first 15 days, amounting to 6·37 in. The greatest quantity of R in November previously registered in Norwich was 6·90 in. in 1875.—*Cossey*. During 18 years I never measured so much R in one month before.—*Honingham*. Never so wet a November (7·80 in.); in 1875 it was 5·92 in.—*Mattishall*. The wettest month on record for 15 years.—*Worstead Vicarage*. The rainfall was very excessive, but in July, 1875, there was more (8·84 in.), but as that came after six dry months the effects were not so serious as in November, 1878.

V. *Compton Bassett*. Dull, gloomy and wet, but without severe frosts, although the mean temp. has been unusually low for November.—*Babbacombe*. The first and third weeks dry with a high bar.; the second and last weeks wet with a low bar.; bitterly cold weather and northerly winds prevailed throughout the month, the only warm days being the 10th and 24th, when S.W. winds and R occurred; it has been colder than any month of the last two winters.—*Dartmoor*. Extraordinary freedom from fog.—*Altarnum*. Cold and snowy.

VI. *Ashley Down*. Very cold; R·50 in. in excess of the average.—*Cheltenham*. A raw, damp and disagreeable month; calm with the wind almost persistently in the N.; atmospheric pressure low.

VII. *Coston Rectory*. Very wet and dull, the latter part very foggy.

—*Horncastle*. Great rainfall, 2·24 in. above the average of eight years.

—*Langton*. Very wet, misty and dreary, with a low temp.

VIII. *Manchester*. Very severe ; the fogs have been especially bad ; the month ended with fine and frosty weather.

IX. *Buckden*. Cold, stormy and inclement, with very low temp.

X. *West Hendon House, Sunderland*. Rainfall 7·10 in., being 1·33 in. more than in any previous month in the last 19 years.—*Shap*. Very dark and cold ; S has fallen on several days, but not in great quantities ; from the 18th to 27th heavy fogs.

XI. *Castle Malgwyn*. The first half of the month very wet with frequent H, T and L ; the latter part tolerably fine.—*Tybritle, Carno*. Very cold ; S and frost earlier than usual.

XVIII. *Lochbroom*. Very stormy, in which all sorts of good, bad, and indifferent weather prevailed, but certainly the bad predominated.

XIX. *Watten*. Strong gales during first and second weeks, accompanied by sleet and snow showers ; remainder of month calm and frosty.

XX. *Glenville*. The most severe November I can recollect here, and the driest.—*Tralee*. Unusually dry, with a fall of S on the 11th, the heaviest for many years back.—*Tubrid, Cahir*. Unusually cold ; more and severer frosts than for several years.—*Castle Lough*. Low temp. for time of year, but plenty of sun with a light bracing air, generally from N.—*Newcastle West*. Remarkably cold ; frost occurred on every night excepting the 2nd, 7th, 13th, 30th and 31st.—*Kilrush*. Very changeable ; death-rate rather high.—*Miltown Malbay*. The month opened with wild blustery cold north winds, continuing very bitter up to the 17th, when a milder type of cold set in with light hoar frosts each morning ; a dry month with the exception of one heavy fall on the 9th.

XXII. *Dowra*. Steady northern blow almost all the month, very unusual.

XXIII. *Rockcorry*. Dry and frosty.—*Newtownards*. Rainfall much less than the average for the month ; temp. on the whole low ; very little fog, weather clear and bright ; an unusually heavy fall of S for the season on the 9th.—*New Barnsley*. Wintry month ; after the storm on the 11th, which brought S, the weather settled down and was very fine, but cold till the 23rd ; rainfall very light.—*Stewartstown*. Rainfall below the average.—*Killygarvan*. Very cold ; a great prevalence of N. winds, H, sleet and S ; no very heavy gale, but some heavy squalls from N.—*Buncrana*. From the 8th to the 13th

of this month high winds amounting to a gale on the 10th ; the rest of the month changeable.

### DECEMBER.

I. *Camden Road*. Very cold, the lowest mean I have ever recorded, 19 consecutive days frost 8th to 26th.—*Muswell Hill*. Rainfall very little more than half the average for the last 6 years.

II. *Addiscombe*. Dull and calm ; very cold, with the exception of the last six days, two of which were exceptionally mild.—*Renfrew Villa, Margate*. Frost on 22 days, but on the 24th a sudden thaw set in, and the S soon melted.—*Bromley Common*. Remarkably cold and comparatively dry ; dense fogs on several days, the thaw was most rapid ; on Christmas-day the ther. on the grass was 4°, on the following day 47°. The mean temp. of the month was below freezing point ; this is most unusual, and has not happened since February 1864.—*Littlehampton*. Unusually cold ; nearly three weeks' continuous frost.—*St. Lawrence*. The coldest December I have known since resident here.—*Arle Bury*. Severe frost.

III. *Addington*. Cold ; fogs frequent ; beautiful hoar frost lasting for many days at a time ; intensely cold on Christmas eve ; ther. within 5 degrees of zero, immediately after which a great change took place : a rapid thaw set in, and the last days of the year were very mild.—*King's Sutton*. The temp. on Christmas eve 5° ; lowest ever recorded.—*Cambridge*. Severe frost prevailed (more or less) from the 6th to 25th inclusive ; weather warm on last two days of month ; not much S.—*Merton Villa*. Long and severe frost till Christmas-day.

V. *Holt*. Bitterly cold ; ther. in stand below 32° on 22 days, on grass on 27 ; mean temp. 32°·8 ; max. 53°·4 on 31st ; min. 16°·1 on 24th ; min. on grass, 9°·5 on 24th.—*Compton Bassett*. From the 2nd to the 25th, a succession of keen frosty nights, followed by cold, hazy, and foggy days ; a snowstorm occurred on the morning of the 25th, and heavy R at night, which caused a rapid thaw.—*Solway Uplyme*. Bitterly cold.—*Babbacombe*. Very cold ; frosts occurred in the air on 18 days, and on the grass every day until the 25th ; N. winds accompanied by intense cold and S from the 9th to the 25th, when an E. gale and thaw occurred, followed by strong S.W. winds, heavy R and mild weather to the end of month.—*Middlecott House*. Very hard frosts and S, most unusual in this part of the country, the

like has not been experienced since 1863.—*Druid Ashburton*. Very cold and calm.—*Altarnun*. Cold and snowy.—*St. Agnes*. An unusual fall of S; no such cold has been experienced here since 1854.—*Fore Street, Bodmin*. Very cold, like the old winters 30 years since.—*West Coker*. No S.—*Taunton*. Unusually cold.

VI. *Bristol*. Intensely cold; temp. fully 7 degrees below the average; a period of very severe frost between the 6th and 25th, after which a thaw set in, and at the end of the month the weather was abnormally mild.—*Cairns Cross*. Remarkably dry in the early part, and the greatest cold since 1860.—*Cheltenham*. Frost set in on the 3rd, at first slight with hoar frosts, but gradually increasing in intensity; skating commenced on the 9th, and continued without much intermission till the 25th; the month concluded with fog, rain, and wind.—*Stretton*. Gauge frozen from December 16th to 29th.—*Sansaw*. The brightest December I can recollect.—*Tamworth*. Three weeks' severe frosts.

VII. *Coston Rectory*. Very severe weather from the 6th to the 26th, during the whole of which time the ground was white; a series of hoar frosts from 11th to 15th; splendid examples of "ragged rimes" as they call them here; the last three days were very mild compared with the rest of the month, being the only three on which the ther. did not fall below 32°.—*Doddington*. Sharp frost for three weeks.—*Hodsock Priory*. Rainfall rather below the average; temp. considerably below the average; there were only six nights in the month on which the shade temp. did not fall below 32°.

VIII. *Walton-on-the-Hill*. Very severe.—*Manchester*. Terribly severe; dense fogs on several days, especially Christmas eve, the keenest bitterest day yet experienced.—*Broughton-in-Furness*. A month of the greatest wintry beauty, and the cold not too intense to be pleasant.

IX. *Stanley Vicarage*. The cold has been so intense that many small birds have been found dead in the fields.—*East Layton*. After the severe frost, a few bees were out, and I noticed a blue bottle fly, and two or three large buds on a white clematis outside.—*Copy Hill, Shap*. Very stormy hard frost, and thick snow; R began to fall on the 28th and continued up to the end.

XI. *Llanfrechfa*. Sharp frost from 8th to 25th; rapid thaw 26th to 31st, with warm temp.—*Castle Malgwyn*. Very wintry with more frost than has been here for many years; the river Teifi frozen over and people skating.—*Tybritle*. More snow and greater cold than has been for many years.

XII. *Melrose*. Rainfall fully .50 in. below the average ; made up principally of S, more than 16 in. having fallen ; the mean temp. was 5° below the average ; frost occurring on every night except the 31st ; the lowest being on the 14th, when 1° was registered.

XVI. *Arthurstone House*. About 6 in. of S fell ; being no wind at the time it nearly all melted into gauge.

XVII. *Tillydesk*. Of the total amount (6.54 in.) not less than 4.99 in. was from S.—*Tomintoul*. Storm of S of great severity ; roads blocked and postal communication cut off for seven days.—*Gordon Castle*. S 16 in. deep.—*Grantown*. S 2 ft. deep.—*Elgin*. Intense frost ; many blackbirds, thrushes, and redwings found dead in the fields.—*Nairn*. One of the most severe months for many years ; heavy snowfalls and very low temp. ; a thaw set in towards the end of the month.

XVIII. *Gairloch*. Heaviest fall of S for 30 years.—*Lochbroom*. Within the memory of man no such month has been known ; for 24 days no abatement of the frost and S.—*Achonachie Lodge, Beauly*. Keepers say there has not been such a fall of S on the hills for 60 years.—*Glenfinnan*. Remarkable for its wintry character in point of temp., also for its great calmness ; prevailing direction of wind N. and N.E. ; lowest temp. 8° at 11 p.m. on 27th ; thaw commenced during the night of 28th.

XIX. *Watten*. Very unsettled month ; we have had one of the most severe S storms that has been experienced for many years, accompanied by very keen frosts.

XX. *Glennville*. The severest December I ever knew or heard of in this locality.—*Darrynane Abbey*. The first three weeks the severest frost known for many years, certainly since 1855.—*Tralee*. The hardest frost and most continuous for the first three weeks that has been in Kerry for the last 44 years.—*Tubrid*. A month of excessive, and for this country extraordinary cold up to Christmas-day.—*Tipperary*. A very severe frost set in about the 9th, and lasted until the 24th ; S fell frequently, but the falls were not heavy.—*Castle Lough*. The most severe winter weather we have experienced here since 1867 ; upon the night of the 9th there was a sharp frost, and upon the succeeding days till the morning of the 12th, when there was a fall of S some 6 in. deep ; although on several occasions there was a partial thaw and some R, it always froze again more or less until the 25th, keeping the ground well coated with S ; then alternate S and R to the end of the month.—*Kilrush*. I do not recollect so severe a month, nor such a long frost so early in the winter.—

*Miltown Malbay.* The month opened fine, with light frosts which daily increased in intensity, continued nearly to its close ; much S fell, the ground remaining covered for 9 or 10 days ; Christmas-eve and day were the coldest and bitterest of the frost ; end of month blustery.—*Killaloe.* Mean temp.  $31^{\circ}3$  ; much below average.

XXI. *Fitzwilliam Square.* Frequent snowstorms ; mean temp.  $32^{\circ}5$  or  $8^{\circ}7$  below average of preceding 12 years.—*Mullingar.* A more severe month than has been known for many years.—*Drumcashel.* remained on ground for 22 consecutive days, which is very unusual in County Louth.—*Stephenstown.* The coldest December any one can remember.

XXII. *Ardtarmon.* Very hard frost.

XXIII. *Warrenpoint.* Very severe frost ; temp. as low as  $6^{\circ}$ .—*Abbeyville.* A season so severe for so long continuance has not been remembered for several years.—*Bushmills.* Very severe, with frost, S and sleet.—*Moneydig.* On 2 nights temp. down to zero, and once to  $-1^{\circ}$ .—*Allan Rock.* Snowstorm with hard frost ; birds dying from cold and want of food.—*Stewartstown.* Severest weather for many years ; S never disappeared from 7th to 29th.—*Ballymully Glebe.* Severe and continued frosts, except for a few days now and then, at irregular intervals.—*Strabane.* Extraordinarily hard frost and S.—*Killygarvan Glebe.* Hard frost and S for nearly the entire month ; not much wind or R ; heavy fog on 13th, 14th and 26th, accompanied by hard frost which formed rime on trees and hedges to the depth of an inch ; temp.  $8^{\circ}5$  below the average.—*Buncrana.* An unusually long continuance of frost and S ; such has not been known in the north of Ireland for many years, and is looked upon as a winter of the older time.

## OBSERVERS' NOTES ON THE YEAR 1878.

## ENGLAND.

## DIVISION I.—MIDDLESEX.

HAMPTON WICK.—Rainfall slightly below the average ; its exceptional features are : the small R in January and February, and the unusual wetness of August.

277, CAMDEN ROAD.—Four falls of over 1 in. in the year.

ROSSLYN, HAMPSTEAD.—A fine season with heavy thunder-showers, and excess of R in August and September.

MUSWELL HILL.—Total rainfall of the year exceeds the average of six years by 1 in. The most remarkable feature has been the excessive fall of the 10th and 11th April, when 2·77 in. was recorded between 5 p.m. of 10th and 2 p.m. of 11th ; this far exceeds anything hitherto registered in 24 hours ; nearly half the total fall fell in the three months—April, June and August.

ENFIELD.—The early part of the year was fine and dry ; the summer months had an almost incessant succession of TSS, many of them of remarkable severity and duration, accompanied by extraordinary rainfall ; close of the year very cold.

## DIVISION II.—SOUTH EASTERN COUNTIES.

WYCOMBE.—Total rainfall 3 in. below 7 years' average.

HORSHAM ROAD, DORKING.—Rainfall below the average.

WEYBRIDGE HEATH.—Wet and mild in the early part ; a fair average spring ; a generally fine summer, but attended with severe TS ; an unusually fine autumn, with but little wind ; an early and severe winter.

WANDLE ROAD, CROYDON.—Rainfall 2·65 in. in excess of the average.

ADDISCOMBE.—Barometer : Highest observed, 30·695 in., January 12th ; lowest, 29·046 in., October 26th ; mean at 9 a.m., 29·942 in. Temperature (Stevenson's screen) : Highest, 86°·8, June 27th ; lowest, 9°·6, December 25th ; mean (max. and min.) 49°·5.

**Humidity:** mean at 9 a.m. 82; lowest, 51, June 27th. **Rain:** Total fall 29·213 in.; greatest fall in 24 hours, 1·618 in., April 10th; number of rainy days, 182; number of days on which S fell and was entered in rainfall columns, 20.

**TENTERDEN.**—Fewer heavy dews than usual, only three days amounting to ·01 in.

**BETHERSDEN.**—Much T and heat for short periods.

**RIVER HILL, SEVENOAKS.**—Temp. low throughout the year; soil damp.

**FOXGROVE, BECKENHAM.**—Rainfall on four days over 1 in., and on 12 days over ·50 in.

**ELTHAM GREEN.**—Wettest year registered since observations were commenced in 1869.

**CROSSNESS.**—The first quarter of the year's rainfall was below the average of 16 years' observations—viz., 3·64 in. against 5·76 in.; the second quarter the rainfall was heavy for the time of year—viz., 9·99 in. against the average 5·35 in.; both April and May were very wet months, the 4·03 in. in April being the highest recorded here for that month since the commencement of observations 16 years ago; the 3·34 in. for May had only been twice exceeded during that period; the third quarter's rainfall (although exceeding the average, being 8·81 in. against 6·97 in.) was only noticeable from the great rainfall in August, when 6·27 in. were recorded against an average of 2·20 in.; this immense rainfall has not been approached here for that month since a registry has been kept, the nearest approach being 3·58 in. in 1865; over 2·00 in. fell here on the 3rd, doing much damage; the fourth quarter's rainfall amounted to 6·82 in. against the average of 7·55 in., November being a very wet month; the year's total was 29·26 in. against the average 25·62 in., or 3·64 in. in excess; a curious coincidence is that the total rainfall of the last two years was exactly the same.

**LITTLEHAMPTON.**—Harvest began with fine weather and ended wet; marked absence of severe gales and of both sea and land fogs.

**WEST THORNEY.**—The least quantity of R we have had for many years.

**WOLDRINGFOLD, COWFOLD.**—Larger rainfalls in short times than usual; one peculiarity seems to be the way in which bright afternoons with frost are succeeded by drenching R the next day, then the weather clears up that day or next about noon.

**LYNCH.**—Little S in January; more in the latter end of March,

and some in the second week in December ; many TSS in May and June, but especially in August, and some in September and latter end of October ; January and February mild ; November and December cold, especially the latter month.

SHILLINGLEE PARK.—So small a rainfall as 1878 has not been registered since 1870, when it was 24·67 in. ; in fact, so little has not been registered in the last 11 years except in 1870, and in 1867 when 26·26 in. was measured.

BUCKINGHAM PLACE, BRIGHTON. — Total rainfall the smallest since 1875 ; total duration of sunshine (estimated daily) 1,566 hours ; on 110 days no sunshine was observed.

FOREST LODGE.—There was a measurable amount of R found in the gauge upon 192 days, as against 215 in 1877 ; the total amount, 31·69 in. is only ·16 in. in excess of the average of the preceding 22 years (31·53 in.), but this is interesting as pertaining to another year, in which the persistent absence of sunspots has been most remarkable, the promoters of a solar physical observatory, be it remarked, pretending that even British rainfall is in defect during the periods of sunspot minima.

BALCOMBE PLACE.—Good weather for haymaking, and a heavy crop ; harvest rather late and weather showery ; crops under the average in most cases ; the first hard frost commenced on December 6th, and although we had a few partial thaws and light falls of R and S, it never fairly broke up till Christmas night, the ice on a large lake here being 7 inches thick.

EAST GRINSTEAD.—Very cold autumn.

NEWPORT, I. W.—R considerably below the average.

CADLAND.—Total rainfall about 3 in. below average.

ELING HOUSE.—A very wet harvest.

MICHELMERSH RECTORY.—Greatest fall in 24 hours only ·84 in. !

ARLE BURY.—Wet harvest ; generally an unfavourable season for farm crops.

EAST WORLDHAM.—No occasion to melt S except on Dec. 20th.

HURSTLEIGH, BLACKWATER.—Fewer heavy falls than in the two previous years.

STREATLEY.—A dripping year, with many storms near at hand, but not felt at this station.

WALLINGFORD.—Surrounding hills and woods attract the R away from this place.

LONG WITTENHAM.—A wet spring, and unusually frequent TS.

## DIVISION III.—SOUTH MIDLAND COUNTIES.

THE LAWNS, SOUTHGATE.—Very wet season ; low temp.

WANSFORD HOUSE, WATFORD.—The fourth year in succession, with a rainfall 5 to 6 in. above the average, and the wettest in quantity of R and number of rainy days of the four. The low meadows between Watford Junction and Bushy Stations have been more often flooded than I have ever before seen them.

RIDING COURT, DATCHET.—The oak buds and leaves again appeared ten days before the ash, indicating a dry year ; and I think 1878 may be called dry. The months of May and August, and the first two-thirds of June were very wet, 10·70 in. of R fell, leaving only 13·40 in. for the remainder of the year ; the total (24·10 in.) is precisely the average of the eight preceding years, in this part of the Thames Valley.

LANGLEY.—The total (23·54 in.) is 1·48 in. below average of 1872–8 ; the greatest fall was only ·89 in., and it exceeded half-an-inch on six days only.

THORNTON HALL GARDENS.—Abundance of grass and hay, in consequence of heavy R in April, May, and June.

BROUGHTON, near BANBURY.—The rainfall of 1878 was about the average of the last 10 years, 1868–77, being only ·29 in. above it.

KING'S SUTTON.—Rainfall below the average, especially that of the first quarter.

ASPLEY GUISE.—Summary of rainfall for the 20 years, 1856-65 and 1868-77 inclusive, and monthly fall in 1878 :—

Month.	1878.	Mean.	Maximum.		Minimum.	
			Amount	Year.	Amount	Year.
	in:	in.	in.		in.	
I.	1·35	2·10	4·30	1865	·44	1858
II.	1·71	1·33	2·91	„	·25	1857
III.	·70	1·76	4·63	1862	·60	1856
IV.	2·48	1·62	3·85	1858	·60	1873
V.	4·00	1·93	4·22	1860	·49	1868
VI.	2·00	2·23	4·77	1859	·48	1870
VII.	·38	2·37	6·19	„	·26	1868
VIII.	4·96	2·27	4·65	1856	·44	1861
IX.	·91	2·67	5·48	1876	·70	1865
X.	2·37	2·63	5·90	1857	·67	1871
XI.	2·88	2·15	3·70	1876	·86	„
XII.	1·27	1·90	5·13	„	·19	1857
Fall in 1878..25·01		24·96	Mean Annual Fall.			

GRANCHESTER MILLS.—Mill stopped 15 days during the year by floods.

MERTON VILLA.—No hot weather till Midsummer day. Many and severe TSS during the summer. Mild autumn till end of October. The three summer months, May, June, and August, together with November, were extremely wet, the rainfall of these four months yielding 60 per cent. of yearly total.

MARCH.—Slightly below average of last six years.

KETTERING.—Rainfall: 1878, 27·16 in.; 1877, 27·41 in.; 1876, 31·24 in.; 1875, 37·53 in.; mean, 1864 to 1875, 25·37 in.

PETERBOROUGH.—Heavy fall in May, followed by an unusually high temperature in June, consequently zymotic illness prevalent in July, August, and September.

#### DIVISION IV.—EASTERN COUNTIES.

HIGH RODING.—Rainfall almost exactly the same as the average of the previous 12 years.

AUDLEY END.—Rainfall for the year 1·34 in. above the average for previous 10 years. A cold year, particularly the autumn, the mean for the year being only 46°·3, the mean for the previous 10 years being 48°·2.

DISS.—A coldish, early spring. A good hay harvest, and fair crops of cereals, but the R greatly damaged the barley; good farmers got good crops of wheat; root crops excellent. There was much illness during the first five months, but the rest of the year was healthy.

GELDESTON.—Total fall 2¼ in. above average of 13 years. Falls exceeding 1 in. occurred on two occasions.

GELDESTON RECTORY.—Very wet harvest; crops much injured, especially the barley. Harvest deficient.

COSSEY.—Heavy falls occurring when the river was in flood, caused a serious inundation at Norwich.

EAST DEREHAM.—An excessive rainfall. More TSS than usual in the summer.

WORSTEAD VICARAGE.—The fall has been greater than in any year since observations began in 1867.

LEATHERINGSETT HALL.—The largest rainfall I ever remember in this county, especially in November.

#### DIVISION V.—SOUTH-WESTERN COUNTIES.

HOLT.—A mild beginning, and a cold ending, to the year.

COMPTON BASSETT.—The weather during the first two months of

the year was not marked by any excess. The spring was not genial. The summer remarkable for its frequent TSS. The autumn cloudy and showery, with the exception of September, which was very fine.

OSMINGTON.—Total fall 4·51 in. below the average of 12 years. Few heavy falls.

MINTERNE RECTORY.—Rainfall less by 12·73 in. than 1877.

SHAFTESBURY.—Only two rather severe TSS in the year, both of which occurred in May.

NAVIGATION SCHOOL, PLYMOUTH.—For the first three months only about one-half the average quantity of R fell, but the next three months made up the average almost exactly for the half-year. The number of rainy days for the year was 12 per cent. above the average, whilst the rainfall was about  $4\frac{1}{2}$  per cent. below the average; thus we have not had such heavy rains as usual. Not once was an inch measured in 24 hours.

LAMORNA.—Total rainfall 7 per cent. below, and the annual number of wet days 3 per cent. above the average during 14 years immediately preceding. There was no instance of a rainfall amounting to as much as 1 in. in 24 hours, a fact without a parallel during the above period.

BABBACOMBE.—Rainfall a little below the average; heavy falls rare, only two exceeding 1 in. Mean temp.  $50^{\circ}0$ , max. only  $78^{\circ}3$  (July 18th), min.  $20^{\circ}6$  (Dec. 11th, 15th); frost in air on 32 days, on grass 103. Latest spring frost, May 21st; earliest in autumn, October 27th. Longest consecutive wet periods, 13 days, April 12th to 24th and June 7th to 19th; longest dry period, also 13 days, March 10th to 22nd, during which no R fell.

BOVEY TRACY.—Rainfall about 5 in. above the average of 21 previous years, but remarkable for heavy falls at rather unusual times. Weather unfavourable for agricultural operations.

SIDMOUTH.—Rainfall almost exactly the same as preceding 8 years.

BRAMPFORD SPEKE.—Fruit fairly plentiful, but ripened badly. Very few wasps, flies, and butterflies. Corn harvest fitful; crops fair, hay and roots generally good. In December much more S in Devon than in Somerset.

EXE VILLA.—Greatest number of consecutive dry days, 11, from January 29th to February 8th, inclusive; greatest number of consecutive wet days, 13, from March 23rd to April 4th, inclusive.

ST. AGNES.—Game never so abundant for 50 years, more particularly woodcock; ducks and curlews, which are exceptional visitors to us, were seen and shot in great numbers.

ALTARNUM.—Snow-drifts in March 5 to 12 feet in depth on the highlands, some of them were to be seen on Exmoor on April 24th. Great loss of sheep.

WEEK ST. MARY.—Spring fairly dry till middle of May; summer wet; harvest time hopelessly bad; early winter excessively severe. Last two winters have been mild, and in consequence the country is overrun with slugs and snails; very considerable damage was done to the root crops, and in gardens. From April to beginning of October but little wind; the trees made good and vigorous growth, usually the topmost twigs are lost by the beginning of July, this year they remained on in September.

EXFORD RECTORY.—The year was chiefly remarkable for a heavy fall of S at the end of March, sweeping storms in October and November; flood on November 10th, when the river Exe was higher than known to be for 10 years, and a continuous three weeks' frost in December.

LITERARY INSTITUTE, BATH.—Rainfall of 1878 was in excess of any previously recorded during the last 18 years; total was 37·79 in., being 8·24 in. above the yearly average for that period; the average fall of R in the Bath district during the 15 years prior to 1875 was 27·31 in.; the average of last four years, has amounted to 36·54 in.

#### DIVISION VI.—WEST MIDLAND COUNTIES.

SOUTH PARADE, CLIFTON.—Fifth consecutive year of excessive rainfall.

ASHLEY DOWN, BRISTOL.—Rainfall of 1878 has been  $5\frac{1}{2}$  in. in excess of the average of 25 years' observations, which gives the annual average fall, 1853 to 1877, as 33·32 in.

CAIRNS CROSS.—Wet spring.

SAUL LODGE.—One great peculiarity of the year was the electrical disturbance of the atmosphere in May, June, July, and August.

THE GRAIG, ROSS.—Rainfall 5·53 in. in excess of average of 20 years, 1859-1878; of which 5·29 in. occurred in August, being by far the wettest since observations commenced in 1818; the period from March 29th to June being unprecedentedly wet; January, March, July, and September were much drier than usual; no frost of any consequence in beginning of year; grass minimum not below 32° between April 10th, and Midsummer, which is extraordinary; from

October 28th to December 27th, probably lower mean temp. than for the same season in any year since 1788.

WEST BANK, LEDBURY.—Fine hay harvest ; very disastrous corn harvest.

CLEOBURY MORTIMER.—Very wet year ; especially May, June, August, and October.

BISHOP'S CASTLE.—Rainfall slightly below average of last five years ; TS very frequent ; hay crops heavy and harvested in good condition ; grain crops generally below average.

MORE RECTORY.—January and February mild. Incessant showers in May gave a splendid hay crop.

CHURCH STRETTON.—The great summer rainfall which occurred in London did not prevail here.

PREEN MANOR.—On the whole a wet year.

WHITCHURCH.—Rainfall above the average ; an exceptionally dry period from June 24th to August 3rd ; during this time only 1·03 fell.

TAMWORTH.—Rainfall of the first four months less than the fall in the harvest month of August. Year remarkable for its terrific TSS, which were general all over England, and did immense damage to hay and corn, making the fourth bad year in succession for farmers. Scotch and northern farmers had a much better time than the southern.

SHOBNALL.—Total rainfall 3·62 in. below 1877.

BARRELLS PARK.—Rainfall 4·30 in. in excess of average of eight years.

#### DIVISION VII.—NORTH MIDLAND COUNTIES.

BELMONT VILLAS, LEICESTER.—Rainfall nearly 4 in. above the average. May and August were wet months ; 3·35 in. fell between 2nd and 6th of August.

COSTON RECTORY.—Rainfall 1·15 in. above average of 1873-1877. Mean temp. 47°·0 ; below the average of preceding five years.

PODE HOLE.—The year 1878 will long be remembered by farmers of Lincolnshire ; harvest delayed and corn damaged to a fearful extent.

DODDINGTON.—Remarkable for the long period of five weeks without R, from June 18th to July 23rd, followed by the unprecedented R of August.

LOUTH.—Rainfall 1·31 in. above the average of last 14 years.

**HODSOCK PRIORY.**—The year 1878 has not been an eventful one as regards rainfall. The total rainfall, though considerably less than either of the last three years, is probably not much below the average. The only point which calls for remark is the distribution of this total among the different months. The unusually dry autumn of 1877 was succeeded by a still drier winter and early spring, the total fall for the six winter months, October, 1877, to March, 1878, inclusive, being only 7·72 in., or an average of 1·29 in. per month. The totals for the corresponding periods in 1875-76 and 1876-77 were 16·66 in. and 19·01 in. respectively. The annual total was considerably brought up by the heavy falls of May and August, months which are not usually among the wettest; in the former of these 15 per cent., and in the latter 19, of the annual fall were recorded. There have been no heavy daily falls during the year, and on no day has more than 1 in. fallen, though this figure was nearly reached on April 20th (0·99 in.). The early part of the year was open and mild, with no long or severe frosts, and generally favourable for agricultural operations. The heavy rains of May caused vegetation to grow most luxuriantly, and the crops of hay and clover were heavier than for several years past. A hot week in June and another in July helped to ripen the fruit, of which there was a good supply of all sorts. The harvest too would have been an unusually good one if the R of August had not interfered to a certain extent with getting it in. The rainfall in the autumn, though larger than last year, was not above the average. There was a good deal of S in November, and the three weeks' frost of December was more severe than has been experienced here for several years, though it is too early yet to estimate the damage done to evergreens. Mean temp. for the year, 48°·3.

**SPONDON.**—The year was remarkable for the frequency and violence of the TSS, always accompanied by tropical R, that of June 26th descending not in drops, but streams or cords of water; no glass was broken by hail, but leaves of cabbages and beet were torn and perforated by it.

#### DIVISION VIII.—NORTH-WESTERN COUNTIES.

**PULFORD HALL.**—The rainfall exceeds the average by 2 inches. Wheat crops deficient; hay crops heavy and well got in.

**CHESTER LEAD WORKS.**—Few TSS, which will probably make our rainfall low compared with London.

WINNINGTON.—The average rainfall in 10 years has been 31·35 in. on 173 days; this year 30·99 in. fell on 187 days.

FOX HILL, CHESTER.—Nothing remarkable to record, except severe frost in November and December. Very much more S than usual.

HINDERTON.—Rainfall one per cent. above average of previous 16 years.

BREEZE HILL.—An ordinary average year.

BLUNDELLSANDS.—Compared with 1877, a dry year, particularly in the winter months; favourable for out-door amusements all the year.

BOLTON-LE-MOORS.—The total rainfall was 14·54 in. less than 1877, and 1·56 less than mean of previous 47 years.

ROCHDALE.—Total fall 1·4 in. below the average; no falls above 1 in.; no severe TS.

CLITHEROE.—Rainfall about 3 in. below the average of 14 years.

BROUGHTON HALL.—Considerably more than one-third of the whole fall occurred in the three months, August, September, and October.

BRATHAY HALL.—Beautifully dry spring and summer.

#### DIVISION IX.—YORKSHIRE.

RICHMOND HILL, SHEFFIELD.—Rainfall above average, owing to continuous rains in May and August, the latter quite unprecedented; rainfall continuous rather than heavy.

THORPE, HALIFAX.—Rainfall about the average for previous 10 years.

BASHALL LODGE.—Rainfall 10·61 in. below the average of previous 12 years, and the least yet recorded here.

CONISTON COLD.—A remarkably productive summer and autumn in this grazing district.

BUCKDEN.—Rainfall considerably less than 1877.

STONE HOUSE, DENT.—The year has been remarkable for its beautiful summer and very dry winter.

THORN, SEDBERGH.—A very pleasant year, almost without T.

#### DIVISION X.—NORTHERN COUNTIES.

DINSDALE RECTORY.—One of the most unsettled seasons remembered.

GAINFORD.—Only three days in the year on which 1 in. or more fell, and no month in which 5 in. fell.

WEST HENDON HOUSE.—The rainfall exceeds that of any year since 1860 inclusive, except 1872. This is the fourth consecutive wet year. The excessive fall in the last two months is more than sufficient to account for the excess of the year.

CRAGSIDE.—The rainfall for 1876, '77, and '78 has in each year been a long way above the average of the 15 previous years, which was 27 in. ; but the last three years gives an average of 30 in.

DEADWATER.—Little R, little T.

HOWICK HALL.—Spring cold and backward.

PAWSTON.—November and August were exceptionally wet months, and in consequence the rainfall slightly over an average for the year. We had no heavy TSS during the year.

BRAYSTONES.—Rainfall 27·63 in. less than in 1877, and 7·68 in. less than mean of previous 14 years.

ABBOTS COURT, ST. BEES.—Rainfall about 4 in. below the average. The fall in 1877 was about 20 in. above it.

MIREHOUSE.—Remarkably fine summer, dry, and temperature high.

WHINFELL HALL.—Exceptionally dry year, summer hot.

DERWENT HOUSE.—The driest year since commencement of observations in 1862.

BROUGHTON GRANGE.—Rainfall much below the average of the last five years. No heavy falls.

RISEHOW MARYPORT.—Exceptionally small rainfall and splendid year for all crops throughout the west of Cumberland.

SCALEBY HALL.—Year remarkable for extreme heat of July and extreme cold in December.

BRATHAY VICARAGE.—Rainfall 19·81 in. below average of last five years.

REAGILL.—Cold backward spring. Remarkably fine dry summer and autumn until October 24th.

#### DIVISION XI.—MONMOUTH, WALES, AND THE ISLANDS.

DINGESTOW COURT, MONMOUTH.—A remarkable year. Fine and mild winter, 1877--78, and spring with west wind. Bar. high to March 14th, then four weeks east wind to April 25th, west wind prevailing to end of year, except three weeks east wind end of May

and beginning of June ; eight weeks winter (only four nights no frost), and a fortnight's skating before Christmas, a thing quite without precedent. Many more TSS than usual ; few spots in the sun ; the sun scorching.

NANTLLYS.—Not a year of extremes. Wet May made hay cheap ; dry July made corn cheap. The springs show the good effects of the wet autumn of 1877, and are generally in better condition than since 1868.

TREVALYN HALL.—Rainfall nearly 2 in. above average of previous ten years, 1868–77.

DYFFRYN ALED.—Rainfall on the whole above the average.

BRYNGWYNANT.—Summer mostly fine and warm, at times hot. Beautiful hay harvest ; crops mostly good.

DOUGLAS.—Rainfall below average ; great contrast to previous year.

ST. AUBINS.—Total fall exceeds the average by at least 8 in.

MILLBROOK.—R 7 in. in excess of average of last 16 years.

## SCOTLAND.

### DIVISION XII.—SOUTHERN COUNTIES.

COLVEND MANSE.—Great deficiency in apples, pears, and gooseberries.

KIRKBEAN.—Rainfall 24·66 in. less than in 1877.

DRUM PARK.—Total rainfall far below average.

WANLOCKHEAD.—Rainfall considerably below the average ; periods of drought occurred several times, especially during November and December. Crops of hay, potatoes, and turnips were all better than usual, the summer heat being above the average.

GOLDIELANDS.—The lowest rainfall recorded since 1861, except 1870, 24·80 in.

ABBEYGATE.—Rainfall (33·39 in.) below average ; mean temp. 45° below. Good year for agriculturists, crops having been better than for many years.

WOOP LAW.—Fine spring and latter half of summer ; autumn wet ; severe frosts and heavy S falls.

DIVISION XIII.—SOUTH-EASTERN COUNTIES.

MARCHMONT.—A very fine season ; cereals a good crop, and of first-class quality—roots especially good ; fruit crops a failure, the result of the wet of 1877, and want of sunshine.

DIVISION XIV.—SOUTH-WESTERN COUNTIES.

RIDGE PARK.—Rainfall 1.50 in. below the average.

DIVISION XVII.—NORTH-EASTERN COUNTIES.

GORDON CASTLE.—First seven months dry, mild, and growing ; the last five very wet.

DIVISION XVIII.—NORTH-WESTERN COUNTIES.

ARDROSS CASTLE.—From end of March to beginning of August weather dry ; October and November floods, and December quantity of S.

LOCH MADDY.—This has been an exceptionally favourable year as to weather for crops ; the rainfall has been pretty equally distributed over the whole year.

LAGGAN.—Heat during summer quite tropical ; harvest about the best and earliest during the present century.

DIVISION XIX.—NORTHERN COUNTIES.

SANDWICK.—Rainfall about 1 in. above the average of 37 years.

IRELAND.

DIVISION XX.—MUNSTER.

DARRYNANE ABBEY.—Spring and summer very wet, but R more continuous than heavy.

TRALEE.—The smallest rainfall registered since 1873 ; nearly one-

fourth of the whole rainfall fell in May and June, making the corn harvest the worst on record.

GLENAM.—A dry spring ; much rain in early summer.

TIPPERARY.—First quarter unusually dry.

CASTLE LOUGH.—Except in the month of June there has not been an excess of rainfall in any one month ; TSS have been unusually frequent.

MILTOWN MALBAY.—Less rainfall this year by 16 in. than the previous year ; end of harvest changeable.

#### DIVISION XXI.—LEINSTER.

LONGRAIGUE.—Rainfall lowest observed for last ten years, 33·09 in. ; next lowest was 33·14 in. in 1870 ; average of ten years, 43·355 in.

BESSBOROUGH PARK.—Frosts in spring did much damage ; no fruit here ; slugs have been a plague ; potatoes looked well but were attacked by disease very early ; summer cold, but a glorious autumn and early winter.

FITZWILLIAM SQUARE.—Wet period from April 29th to June 16th inclusive.

BALBRIGGAN.—Total 28·71 in. ; average fall in preceding ten years, 33·47 in.

TRIM.—Although the rainfall was not heavy, it was almost continuous for the first six months.

DRUMCASHEL.—Summer very dry ; less R in July than in any month for some years past.

#### DIVISION XXII.—CONNAUGHT.

KILCONNELL RECTORY.—Rainfall about 10 in. less than in 1877 ; the bulk of it falling in the summer months, and not in the winter as most usual in these parts, the winter being exceptionally dry.

GARDENFIELD.—Winter very severe ; many shrubs killed.

#### DIVISION XXIII.—ULSTER.

RED HILLS.—From middle of October to end of year, one of the driest seasons known for the last 25 years.

FLORENCE COURT.—Rainfall under average ; potatoes, oats, and hay crops were good ; garden fruits were scarce owing to spring frosts.

NEWRY.—No R from July 6th to August 5th.

NEW BARNSELY, BELFAST.—Early spring, though April dry, May wet. Crops abundant, and well gathered.

ALMA HOUSE, SYDENHAM.—The rainfall of 1878 was 33·60 in., 15·82 in. below that recorded in 1877, and no less than 5·75 in. less than the mean of the preceding 11 years. The early spring months were dry, with an excellent seed time in March. April was peculiarly dry and cold, only 1·55 in. recorded ; whilst May, on the contrary, was generally genial and moist, literally made up of “smiles and tears,” R being recorded on 20 days to the depth of 4·25 in. The R in June, July, and August was below the average, but they were warm and genial and with no extraordinary high temperatures ; there was much sunshine, producing correspondingly good crops generally, the potatoes especially being particularly fine, abundant, and free from disease, the tuber attaining a perfection scarcely equalled since the “blights” in 1846 and 1847. September and October had about the average rainfall, affording most propitious weather for the in-gathering of an abundant and excellent harvest. November was particularly dry and fine (1·95 in.), the first S appearing as early as the 11th with pretty keen frost, which continued with occasional snowfalls almost uninterruptedly throughout December until the close of the year. The frosts in this latter month (December) were unusually keen, the extremely low reading of 4° being recorded on Christmas Eve (24th), no such min. being recorded since January 4th, 1867.

BALLYMONEY.—The rainfall, while not so great as 1877, is rather over the average, but number of rainy days considerably less. The season generally genial, spring and summer warm, and but for the cheapness of farm produce would have been a good year for the farmers. Winter very severe, frost before Christmas very intense.

MONEYDIG.—First class hay year for all kinds, both as regards quantity and quality ; the same as to grazing ; other things about an average. Prices for all farm produce, save butter, very low.

STEWARTSTOWN.—Rainfall rather below average, but came generally at the best season for farmers.

BALLYSHANNON.—Rainfall less than 1877 by 6·15 in. Harvest favourable, crops generally good and plentiful. Year closed with severest frost and S which have been known for many years. Part of the tidal waters have been frozen. Many birds perished from cold and want of food.

CONVOY, RAPHOE.—Cold and backward spring ; May and June both wet, the former being bad for fruit and garden produce. Summer very fine and warm ; harvest and all agricultural produce the best for many years, as, although there was much R, it fell at favourable times. Very cold winter.

KILLYGARVAN GLEBE.—Year on the whole fine ; no heavy gales. Very fine summer ; rainfall about 2 in. above the average.

ROCKFORT.—Crops very good, especially potatoes and turnips ; very bad salmon year. Much frost and S last two months, unusual for north of Ireland.

## HEAVY RAINS IN SHORT PERIODS.

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IN last year's volume I inserted full descriptions and engravings of the only two patterns of Storm Rain Gauge yet brought out, and urged strongly the necessity for additional data respecting the maximum intensity of rainfall to which we are liable in this country.

We know roughly that in every year there is sure to fall at several stations *at least* the following amounts :—

	in.
In a quarter of an hour ... ..	0·30
In half an hour ... ..	0·50
In three-quarters of an hour ... ..	0·60
In an hour ... ..	0·70
In two hours ... ..	0·80

But we do not know anything as to their relative prevalence in different districts nor in different years ; *e.g.*, the observer at Buxted Park writes (p. [24]) “0·55 in. of R fell between 9.0 and 11.30 a.m., a very unusual quantity in this neighbourhood in 2½ hours.” Why there are dozens and dozens of instances all through Sussex which far exceed it. Has the observer made a mistake as to its rarity ? or are torrential rains in the habit of passing on each side of that station ? Is it a fact, or is it an optical illusion, which leads to the frequent statement that “the storms always divide before they come here and go on the two sides.” These are some of the points which require examination.

I am very sorry that up to the present time scarcely any storm gauges have been erected. There is one at Bristol Docks, Mr. Punnett of Tunbridge has just erected another, Mr. Griffith has one of the old pattern at Strathfield Turgiss, and there is one at Camden Square, but with the exception of the last we have not a single storm record from one of them. The phenomena at Camden Square have been so exceptional, that I have treated them separately, and *all* the values in the following table are from ordinary gauges. In previous years I have struck out of the corresponding table, entries which were below the limits given above, because the only reason that these tables are

not a hundredfold larger, is that the observers do not always look as sharply after heavy falls as they might, and obviously if there were a hundred times as many entries, the least important must be rejected. For instance, I believe that the record of 0·53 in. in an hour at Allerton is unworthy of special notice (see the number of far greater amounts above it), but perhaps by and bye some unexpected geographical features (like that indicated by the remark from Buxted Park) may be discovered, and therefore possibly it is safer to insert it.

*Heavy Falls in Short Periods.*

Date.	Division.	Station.	Amount.	Duration.		Rate
			in.	hr.	min.	per hour.
Aug. 4 ...	I.	Winchmore Hill .....	·25	...	5	3·00
Aug. 7 ...	VII.	Caistor .....	·89	...	10	5·34
Sept. 8 ...	VI.	Bishop's Castle .....	·33	...	10	1·98
Aug. 4 ...	I.	Winchmore Hill .....	·95	...	11	5·13
Aug. 23 ...	V.	Weston, Bath .....	·50	...	11 ?	2·73
Aug. 3 ...	XI.	Nantgwilt, Rhayader ...	·58	...	12	2·90
June 27 ...	X.	Luham, Penrith .....	·51	...	12	2·55
Aug. 4 ...	III.	Broughton, Banbury .....	·67	...	13 ?	3·12
June 30 ...	I.	Winchmore Hill .....	1·08	...	14	4·62
May 18 ...	VIII.	Over Darwen .....	·68	...	15	2·72
Aug. 4 ...	I.	Winchmore Hill .....	1·07	...	16	4·01
July 26 ...	III.	Amwell .....	·62	...	20	1·86
June 30 ...	II.	Addiscombe .....	·51	...	20	1·53
July 20 ...	XX.	Glenville .....	1·25	...	30	2·50
Aug. 6 ...	IX.	Magdalens, Doncaster ...	1·25	...	30	2·50
Aug. 23 ...	VI.	Saul Lodge .....	·75	...	30	1·50
June 23 ...	I.	Upper Clapton .....	·73	...	30	1·46
June 11 ...	VI.	Preen Manor .....	·70	...	30	1·40
June 18 ...	II.	The Bourne, Farnham ...	·68	...	30	1·36
June 30 ...	„	Eltham .....	1·32	...	40	1·98
Aug. 4 ...	III.	Broughton, Banbury .....	1·00	...	40	1·50
Aug. 6 ...	VIII.	Witton, Blackburn .....	1·39	...	45	1·85
June 30 ...	II.	Wimbledon .....	·86	...	45	1·15
Aug. 3 ...	„	Purley .....	·58	...	45	·77
Oct. 24 ...	V.	Steeple Ashton .....	·53	...	45	·71
June 26 ...	III.	Northampton .....	1·25	...	50	1·50
Aug. 10 ...	VI.	Cheltenham .....	1·18	...	55	1·30
June 16 ...	XI.	Cardiff .....	1·78	1	...	1·78
June 30 ...	III.	Much Hadham .....	1·60	1	...	1·60
June 29 ...	XI.	Castle Malgwyn .....	1·40	1	...	1·40
June 30 ...	II.	Balham .....	1·15	1	...	1·15
June 17 ...	V.	Bincombe Ho., Crewkerne	1·09	1	...	1·09
June 26 ...	VII.	Findern, Derby .....	1·08	1	...	1·08
June 17 ...	VIII.	Broughton Hall .....	1·08	1	...	1·08
July 26 ...	II.	Bromley Common .....	·83	1	...	·83
Aug. 24 ...	V.	Dartmoor .....	·81	1	...	·81
Aug. 6 ...	VII.	Hodsock Priory .....	·72	1	...	·72
Sept. 8 ...	VIII.	Buglawton .....	·63	1	...	·63
July 24 ...	„	Allerton, Liverpool .....	·53	1	...	·53

*Heavy Falls in Short Periods—(continued).*

Date.	Division.	Station.	Amount.	Duration.		Rate
				hr.	min.	per hour.
			in.			in.
Sept. 8 ...	VI.	Stretton, Hereford.....	1·84	1	...	? 1·84
June 30 ...	V.	Weston, Bath.....	1·46	1	...	? 1·46
June 8 ...	II.	Worthing.....	1·00	1	10	·86
May 10 ...	V.	Bincombe House.....	1·50	1	15	1·20
June 27 ...	IX.	Otterburn.....	2·10	1	30	1·40
July 24 ...	VII.	Arnesby.....	1·08	1	30	·72
Aug. 23 ...	III.	Hulcote, Beds.....	2·25	1	35	1·42
July 23 ...	V.	Pewsey.....	2·68	1	45	1·53
June 23 ...	IV.	Leyton.....	3·10	2	...	1·55
June 19 ...	III.	Huntingdon.....	2·61	2	...	1·31
Aug. 6 ...	VII.	Matlock Bath.....	2·50	2	...	1·25
Aug. 15 ...	XVI.	Auchtermuchty.....	2·08	2	...	1·04
Aug. 23 ...	XI.	Cardiff Cemetery.....	2·00	2	...	1·00
June 23 ...	II.	Tanfield Lodge.....	1·89	2	...	·95
June 23 ...	„	Beechholme.....	1·83	2	...	·92
Sept. 8 ...	III.	Northampton.....	1·31	2	...	·66
July 24 ...	„	Oundle.....	1·13	2	...	·57
May 18 ...	IV.	Hillington, Lynn.....	1·23	2	...	? ·62
June 23 ...	II.	Filter Works, Croydon...	2·22	2	15	·99
June 30 ...	III.	Bayfordbury.....	1·85	2	15	·82
June 23 ...	II.	Wandle Road, Croydon..	1·82	2	15	·81
June 23 ...	IV.	Leyton.....	2·76	2	30	1·10
June 19 ...	XXIII.	Redhills, Cavan.....	2·48	2	30	·99
Oct. 10 ...	II.	Buxted Park.....	·55	2	30	·22
June 23 ...	„	Addiscombe.....	1·41	2	36	·54
Aug. 24 ...	„	Ivy Bank, Southampton..	2·35	2	40	·88
Oct. 23 ...	„	Balcombe Place.....	1·42	3	...	·47
Aug. 24 ...	„	Seething Wells.....	2·50	3	...	? ·83
June 30 ...	III.	Oaklands, Watford.....	2·74	3	30	·78
Aug. 13 ...	II.	Seething Wells.....	2·92	4	...	? ·73
June 17 ...	„	Dale Park.....	1·55	4	...	? ·39
Aug. 15 ...	XI.	Cardiff Castle.....	3·65	7	...	·52
Aug. 24 ...	II.	Manor House, Hastings..	3·34	13	...	? ·26
June 27 ...	XX.	Janeville.....	2·88	18	...	·16

## STORM GAUGE READINGS AT CAMDEN SQUARE.

THE heavy falls of rain in London during 1878 were of such an exceptional character that we think it will be interesting to give a detailed account of them, as recorded at Camden Square with Pastorelli's storm rain gauge.

### APRIL 10TH—11TH.

Rain began to fall slightly about 5 p.m. on the 10th, but it was of a perfectly ordinary character till midnight, when .26 in. was measured; after midnight the fall became very heavy, and continued so with little change of rate till noon on the 11th, during which time 2.87 in. fell; rain fell slightly during the first part of the afternoon, but the amount was only .10 in., making a total altogether of 3.23 in.

The readings of the storm gauge were as follows, and show that the rate of fall was tolerably uniform:—

Time.	Reading of gauge.	Amount since previous reading.	Time.	Reading of gauge.	Amount since previous reading.
5.0 p.m.	... .00 in....	—	10.0 a.m.	... 2.75 in....	.09 in.
9.0 „	... .08 ...	.08 in.	10.30 „	... 2.95 ...	.20
Midnight	... .26 ...	.18	11.0 „	... 3.04 ...	.09
7.30 a.m.	... 1.96 ...	1.70	11.30 „	... 3.09 ...	.05
8.0 „	... 2.15 ...	.19	Noon	... 3.13 ...	.04
8.30 „	... 2.35 ...	.20	0.30 p.m.	... 3.16 ...	.03
9.0 „	... 2.56 ...	.21	1.0 „	... 3.19 ...	.03
9.30 „	... 2.66 ...	.10	2.0 „	... 3.23 ...	.04

### MAY 6TH.

Heavy rain commenced at 5h. 11m. p.m.; by 5h. 31m. .65 in. had fallen; by 5h. 46m. .83 in.; and by 9 p.m. 1.27 in. was recorded; between then and 9 a.m. of the 7th .435 in. fell, making a total of 1.705 in.

JUNE 23RD.

With the exception of the fall on April 10th-11th (just described) the fall on June 23rd was quite unequalled in amount during the 20 years that observations have been made at Camden Square; and as regards rate of fall, it is entirely without precedent.

The rain fell during a severe thunderstorm, or rather two storms, in the afternoon; one commencing at 1 h. 32 m. and ending 2 h. 12 m., the second commencing at 2h. 46m. and ending at 3h. 2m.

The following table of the storm gauge reading each half minute will give the details of the fall:—

*Detailed Measurements during First Storm, according to Pastorelli's Storm Rain Gauge.*

Time.	Reading.	Total in 5 min.	Time.	Reading.	Total in 5 min.
1 hr. 32 min. 0 sec.	·00		1 hr. 57 min. 30 sec.	1·18	
37 " 0 "	·01	·01	58 " 0 "	1·21	
41 " 0 "	·07	·07	58 " 30 "	1·26	
42 " 0 "	·08		59 " 0 "	1·29	
43 " 0 "	·10	·26	2 hr. 0 " 0 "	1·46	·54
44 " 0 "	·12		0 " 30 "	1·55	
44 " 30 "	·15		1 " 0 "	1·61	
45 " 0 "	·21		1 " 30 "	1·64	
45 " 30 "	·23	·52	2 " 0 "	1·68	·46
46 " 0 "	·26		2 " 30 "	1·71	
46 " 30 "	·31	·28	3 " 0 "	1·75	·28
47 " 0 "	·34		3 " 30 "	1·78	
47 " 30 "	·38	·28	4 " 0 "	1·85	·28
48 " 0 "	·42		4 " 30 "	1·95	
48 " 30 "	·46	·28	5 " 0 "	2·02	·28
49 " 0 "	·49		5 " 30 "	2·04	
49 " 30 "	·56	·28	6 " 0 "	2·08	·28
50 " 0 "	·59		6 " 30 "	2·12	
50 " 30 "	·67	·28	7 " 0 "	2·14	·28
51 " 0 "	·73		7 " 30 "	2·17	
51 " 30 "	·78	·28	8 " 0 "	2·20	·28
52 " 0 "	·86		8 " 30 "	2·21	
52 " 30 "	·87	·28	9 " 0 "	2·23	·28
53 " 0 "	·88		9 " 30 "	2·24	
53 " 30 "	·89	·28	10 " 0 "	2·32	·28
54 " 0 "	·91		10 " 30 "	2·33	
54 " 30 "	·96	·28	11 " 0 "	2·36	·28
55 " 0 "	·98		11 " 30 "	2·40	
55 " 30 "	1·03	·28	2 hr. 12 " 0 "	2·42	·28
56 " 0 "	1·07				
56 " 30 "	1·11				
57 " 0 "	1·14				

*Measurements during Second Storm.*

-2 hr. 46 min. 0 sec.	.00	}	.35	2 hr. 56 min. 30 sec.	.69	}	.16
46 ,, 30 ,,	.04			57 ,, 0 ,,	.72		
47 ,, 0 ,,	.08			57 ,, 30 ,,	.73		
47 ,, 30 ,,	.10			58 ,, 0 ,,	.74		
48 ,, 0 ,,	.12			58 ,, 30 ,,	.77		
48 ,, 30 ,,	.15			59 ,, 0 ,,	.78		
49 ,, 0 ,,	.18			59 ,, 30 ,,	.81		
49 ,, 30 ,,	.23			3 hr. 0 ,, 0 ,,	.83		
50 ,, 0 ,,	.29			0 ,, 30 ,,	.84		
50 ,, 30 ,,	.33			1 ,, 0 ,,	.84		
51 ,, 0 ,,	.35			1 ,, 30 ,,	.85		
51 ,, 30 ,,	.37			3 hr. 2 ,, 0 ,,	.86		
52 ,, 0 ,,	.44						
52 ,, 30 ,,	.46						
53 ,, 0 ,,	.50						
53 ,, 30 ,,	.53						
54 ,, 0 ,,	.56						
54 ,, 30 ,,	.58						
55 ,, 0 ,,	.62						
55 ,, 30 ,,	.65						
56 ,, 0 ,,	.68						

From the above it will be seen (1) that the total duration was only 1½ hours; (2) that during 34 minutes no rain fell; and, therefore, (3) that in 58 minutes there fell 3.28 inches of rain; (4) that in the ten minutes between 1.57 and 2.7 p.m. there fell one inch; and (5) that as a tenth of an inch fell in 30 seconds, the maximum rate between 2h. 4m. and 2h. 4m. 30s. was 12 in. per hour, a rate which has never before been recorded in this country.

JUNE 30TH.

This storm was very similar to the one on the 23rd, and would have been considered remarkable if it had not been preceded by the much heavier falls of April 10th and June 23rd.

Rain commenced at 0.43 p.m., and the readings of the gauge were:—

Time.	Reading of gauge.	Amount since previous reading.
0.43 p.m.	... .00	...
0.48 ,,	... .16 in.	... .16 in.
0.53 ,,	... .26	... .10
0.58 ,,	... .31	... .05

after which it rained steadily for six hours, at the expiration of which the total fall was 1.13 in.

AUGUST 3RD.

This fall was chiefly the product of two storms. The first began at 10.25 a.m., and rapidly became heavy; yielded .32 in. by 11 a.m.

and .44 in. by noon, when it ceased. Some short showers afterwards brought the amount up to .53 in. At night, lightning was seen from 11.30 p.m., and thunder heard shortly after midnight; rain began about 0.30 a.m. on 4th, and by 0.45 a.m. was very heavy.

Time.	Reading of gauge.	Amount since previous reading.	Time.	Reading of gauge.	Amount since previous reading.
0.30 a.m.	... .00	... —	1.20 a.m.	... .47 in.	... .05 in.
1.0 ,,	... .25 in.	... .25 in.	1.35 ,,	... .57	... .10
1.5 ,,	... .30	... .05	1.47 ,,	... .57	... .00
1.7.30,,	... .37	... .07	2.0 ,,	... .59	... .02
1.15 ,,	... .42	... .05	2.20 ,,	... .88	... .29

The amount of the fall during the day storm, .53 in., added to the night fall of .88 in., gives therefore 1.41 in. for the 24 hours.

This amount was rendered somewhat more remarkable by the fact that over half an inch was registered on each of the two following days, viz., .60 in., on the 4th and .52 in. on the 5th.

There were seven other falls above .30 in. during the month, and the total, 6.72 in., is the largest monthly total on record at Camden Square, as will be seen by the following table giving all the totals above 5.00 in. since observations were commenced in December, 1857.

1860	June	...	5.47 in.	1872	October	...	5.20 in.
1865	October	...	6.22	1876	December	...	6.25
1868	December	...	5.12	1878	June	...	6.71
1871	August	...	5.28	1878	August	...	6.72

*Table showing the maximum rate of fall in each storm during the year.*

Date.	Period.	Time.	Amount.	Rate per hour.
April 11	... 8.30 a.m. to 9 a.m	... 30 m.	... .21 in.	... .42 in.
May 6	... 5.11 p.m. to 5.31 p.m.	... 20 m.	... .65	... 1.95
June 23	... 2.4 p.m. to 2.4.30 p.m.	... ½ m.	... .10	... 12.00
June 30	... 0.43 p.m. to 0.48 p.m.	... 5 m.	... .16	... 1.92
Aug. 3	... 1.5 a.m. to 1.7.30 a.m.	... 2½ m.	... .07	... 1.68

## HEAVY FALLS IN 1878.

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### PART I.—CHRONICLE.

NOTE.—The letter **M** throughout this article is used as an abbreviation of the term “Maximum daily rainfall during the year.” The day being in all cases, where not otherwise specified, the rainfall day, terminating at 9 a.m. on the succeeding civil day.

#### JANUARY 21st.

**M** at 14 stations in Northumberland and the N.W. of Yorkshire. **M** amount 3·75 in. or 6·3 per cent. at Oughtershaw in Yorkshire, W.R. ; there were also amounts of more than 2·00 in. at three other stations in that county.

#### APRIL 10th.

**M** at 63 stations, mostly surrounding London, on the S. and W., extending as far as Winchelsea on the S., and Newbury on the W. to St. Alban’s on the N., and to Barking on the E. ; the **M** was also recorded at several stations in Devon, and a few scattered in the E. of England ; the heaviest falls were in London and the suburbs ; the **M** was 3·90 in. or 11·8 per cent. at Haverstock Hill, on the N.W. of London ; there were 14 other stations in the suburbs at which the fall exceeded 2·00 in.

These figures, however, do not give a true idea of the exceptional nature of this fall, as they are only the amounts registered up to the termination of the true rainfall day at 9 a.m. on the 11th. The **R** commenced about 5 p.m. on the 10th, and continued till shortly after noon on the 11th, so that the whole fall occurred in less than 24 hours, though not in one rainfall day.

The following table gives the details of the fall in the neighbour-

hood of London, from which the unusual character of the R will be seen, in fact there is no record of such a fall having previously occurred in the north of London for the last 100 years.

*Total Rainfall of April 10th and 11th, with the amount falling during certain periods.*

NOTE.—Most of the values for “Before Midnight of 10th,” and for “After Noon of 11th,” are estimated, but the observed values are so uniform that no error can exceed a few hundredths, and by adopting this course we obtain the fall in the 9 hours midnight to 9 a.m., and in the 12 hours midnight to noon.

STATIONS.	Apl. 10th.	April 11th.			Apl. 10th and 11th.
	Before Midnight.	Midnight to 9 a.m.	Midnight to Noon.	After Noon.	Total.
	in.	in.	in.	in.	in.
Addiscombe .....	·25	1·37	1·86	·10	2·21
Bromley Common .....	·25	2·10	2·84	·10	3·19
Beckenham .....	·25	2·44	3·11	·10	3·46
Forest Hill .....	·25	2·23	2·67	·10	3·02
Sidecup .....	·25	2·14	2·63	·10	2·98
Lower Norwood .....	·25	1·45	2·08	·10	2·43
Balham .....	·25	1·38	1·80	·10	2·15
Acre Lane, Brixton .....	·25	1·65	2·42	·10	2·77
Eltham .....	·25	2·01	2·46	·10	2·81
Lee .....	·25	2·17	2·73	·10	3·08
Battersea .....	·25	1·65	2·35	·10	2·70
Peckham .....	·25	1·73	2·20	·10	2·55
Royal Observatory, Greenwich	·28	2·01	2·46	·08	2·82
Deptford .....	·25	2·03	2·61	·10	2·96
Chiswick .....	·25	1·07	1·97	·10	2·32
Spring Gardens, S.W. ....	·25	·90	1·91	·10	2·26
Regent's Park, N.W. ....	·25	1·90	2·54	·10	2·89
Hamilton Terrace, N.W. ....	·25	1·74	2·38	·10	2·73
Springfield Road, N.W. ....	·25	1·75	2·34	·10	2·69
Camden Square, N.W. ....	·26	2·30	2·87	·10	3·23
Hackney, E. ....	·25	1·97	2·27	·10	2·62
Stoke Newington, N. ....	·25	2·04	2·21	·10	2·56
235, Camden Road, N. ....	·25	2·22	2·82	·10	3·17
277, „ „ N. ....	·25	2·29	2·82	·10	3·17
Clapton Common, N.E. ....	·25	2·10	2·22	·10	2·57
Haverstock Hill, N.W. ....	·25	3·65	4·27	·10	4·62
Roslyn, Hampstead, N.W. ...	·25	2·05	2·64	·10	2·99
Kentish Town, N.W. ....	·25	2·10	2·65	·10	3·00
Southill Park, Hampstead ...	·25	2·66	3·08	·10	3·43
Squire's Mount, „ ...	·25	1·57	2·20	·10	2·55
The Pryors, „ ...	·25	1·63	2·15	·10	2·50
Branch Hill Lodge, „ ...	·25	1·77	2·56	·10	2·91
Helenslea, Child's Hill .....	·25	1·87	2·62	·10	2·97
Highgate .....	·25	2·40	2·86	·10	3·21
Muswell Hill .....	·25	2·09	2·42	·10	2·77

## APRIL 20TH.

**M** at 30 stations, chiefly in the neighbourhood of Leeds; there were, however, several near Carlisle, and a few scattered in the S.W. of Scotland; the amounts were very small, the **M** being only 2·05 in. or 5·4 per cent. at Lanrick Castle, Perth, and there was no other fall of 2·00 in. recorded.

## MAY 7TH.

**M** at 56 stations mostly in Suffolk, Cambridge, and Bedford, and some in the north of Buckingham and Oxford; the **M** was also recorded at one station in mid Kent, and one station as far north as Richmond, Yorkshire, but these were evidently exceptional cases; the falls were none of them very large, the **M** amount being 2·49 in. or 11·2 per cent., at Lower Park, Dedham, in the N. of Essex, and there was only one other fall recorded exceeding two inches.

## MAY 10TH.

**M** at 31 stations scattered over a belt of country from Dorset to Shropshire; the heaviest falls were in the neighbourhood of Beaminster, in Dorset, the **M** amount, 2·13 in. or 5·4 per cent., being recorded there; and also at Bincombe-house, Crewkerne, Somerset, where the per-centage was 3·8.

## JUNE 23RD.

The **M** only occurred at 11 stations on this day; it was nevertheless a somewhat remarkable fall, though very local, its intensity being principally confined to the north of London; the **M** amount being 3·28 in. or 9·7 per cent. at Camden-square (further details of this fall will be found in the article on "Storm Gauge Readings, at Camden-Square"); 3·10 in. was registered at Leyton on E. of London, and 2·86 in. at Camden-road, in the N. of London; heavy falls were also recorded at three stations in Yorkshire.

## JUNE 30TH.

**M** at 13 stations; this was another local storm similar to the one on June 23rd; heavy falls were recorded over the S.E. of Hertfordshire, East Essex, and N. Middlesex; much damage was done by the **R** at Hertford, Hatfield, Ware, Cheshunt, and Waltham Cross; the **M** amount was 3·68 in., or 11·5 per cent., at Bayfordbury in Hertford; falls of over 3·00 in. were also recorded at Enfield, Middlesex, and Waltham Abbey, Essex.

## JULY 24TH.

M at 29 scattered stations, principally in the West Midland counties; the amounts were not large, the M being 2·43 in., or 6·8 per cent. at Coundon, near Coventry; there was only one other fall over 2·00 in. recorded, and that was also in Coventry.

## AUGUST.

A good deal has been said about the exceptional rainfall of this month, and it is particularly noticeable among the M falls, for out of 1186 stations at which the M during the year was recorded, it occurred in this month at more than a quarter of them; nor was the heavy rainfall confined to one locality only, for M falls were registered in almost every part of England on one day or another during the month. Scotland and Ireland seem to have been very free from heavy falls during the year.

## AUGUST 3RD.

The M at 29 stations (although two or three have wrongly returned it for August 4th), but they are much scattered, and the amounts and per-centages are small, except in the neighbourhood of Rutlandshire, where they are high; the M amount was 3·03 in., or 10·5 per cent. at Burley-on-the-Hill, in that county.

## AUGUST 4TH.

M at 10 stations, chiefly in Oxfordshire, and in South Wales; but neither amounts nor per-centages at all remarkable.

## AUGUST 6TH.

M at 26 stations, chiefly surrounding the towns of Nottingham, Derby, and Sheffield, M amount, 3·12 in., or 7·5 per cent. at Matlock; a heavy fall (3·02) was also recorded at Tardebigge Reservoir, near Bromsgrove in Worcestershire.

## AUGUST 13TH.

M at 61 stations, chiefly in Lancashire and the west of Yorkshire; the M was also recorded at a few stations in N. Wales and in the E. of Ireland; the heaviest amounts were in the extreme north of Lan-

cashire, the *M* being 3·00 in., or 6·3 per cent., at Poaka Beck, and amounts exceeding 2·00 in. were recorded at seven other stations near to it.

## AUGUST 15TH.

*M* at 19 rather scattered stations, but mostly in the E. of Scotland, more especially in the county of Aberdeen ; the heaviest amounts, however, were at a few stations in S. Wales, the *M* amounts being 4·24 in., or 8·6 per cent., at Newport in Monmouth ; amounts exceeding 3·50 in. were also registered at two stations in Cardiff.

## AUGUST 22ND.

*M* at 42 stations, spread over a belt of country from Wiltshire to Denbigh ; the heaviest falls were in the neighbourhood of Ross, in Herefordshire ; the *M* amount, 2·29 in. or 6·5 $\frac{1}{2}$  per cent., being recorded at The Graig, a station in that town.

## AUGUST 23RD.

*M* at 34 stations, scattered over somewhat the same districts as those at which the *M* occurred on the 3rd, only extending more to the N. and E. *M* amount 2·90 in., or 8·0 per cent., at Burbage House, Derbyshire ; there were six other *M* falls, exceeding 2·00 in. recorded on this day ; it was evidently a similar instance to the fall of the 3rd and 4th ; heavy amounts were registered on both days, but at some stations the *M* occurred on the 22nd and at others on the 23rd.

## AUGUST 24TH.

*M* at 19 widely scattered stations ; the heaviest amounts were mostly in the neighbourhood of Hastings ; but the *M* was 3·05 in., or 9·6 per cent., at Red Lodge, Southampton.

## AUGUST 30TH.

*M* at 16 stations, concentrated in three small districts, one round Eastbourne in Sussex, another in Durham and the North of Yorkshire, and the third in the extreme S.E. of Scotland ; *M* amount 2·50 in., or 6·5 per cent., at Glencorse, a few miles south of Edinburgh.

## SEPTEMBER 15TH.

*M* at 21 stations, nearly all in Westmoreland and the South of Cumberland ; the amounts were very small for the locality ; *M* 2·52 in., or only 4·9 per cent. at Keswick Post Office.

SEPTEMBER 22<sup>ND</sup>.

**M** at 33 stations, in two distinct districts, one in Devon and Somerset, the other in Cheshire and Lancashire; the **M** amount 1·93 in., or 2·3 per cent., was at a station just N. of the latter district, High Close, Grasmere, a very insignificant **M** as the per cent-age shows.

SEPTEMBER 29<sup>TH</sup>.

**M** at 21 stations, chiefly in County Down, and the borders of the adjoining counties, and a few on the coast of Forfar; **M** amount 2·20 in., or 6·0 per cent., at Seaforde, County Down. This is the only case during the year of the **M** occurring at many stations in Ireland on one day.

OCTOBER 9<sup>TH</sup>.

**M** at 20 stations, mostly scattered over Devonshire, Somerset, and Wales; **M** amount 2·51 in., or 3·8 per cent., at Ebbw Vale, in Monmouthshire.

OCTOBER 21<sup>ST</sup>.

**M** at 15 stations, chiefly in the N.W. of Yorkshire, Westmoreland, and the S. of Cumberland; **M** amount 3·65 in., or 4·1 per cent., at Bridge End, Little Langdale, in the extreme N. of Lancashire.

OCTOBER 25<sup>TH</sup>.

**M** at 20 stations in Kent and Sussex; the amounts were very small; the **M** being 2·01 in., or 4·2 per cent., at Hythe.

NOVEMBER 9<sup>TH</sup>.

**M** at 36 stations, spread over Wales and the W. of England, with a few in the S.W. of Ireland; **M** amount 3·40 in., but only 3·7 per cent., at Treherbert, in Glamorgan; there were ten other stations, at which the fall exceeded 2·00 in., and several at which it exceeded 3·00, but the falls were none of them large for the districts, the **M** per-centage being only 6·3.

NOVEMBER 14<sup>TH</sup>.

**M** at 16 stations, chiefly in Norfolk and Essex; the **M** amount 1·47 in., or 3·4 per cent., was registered at Ballyshannon, County Donegal, the only station in Ireland at which a **M** was recorded on

that day; a fall of 1·44 in. was registered at Moor Hall, in Essex, and also at Swaffham, in Norfolk.

NOVEMBER 15TH.

M at 43 stations, distributed along the East Coast of England; the majority were in Norfolk; M amount 1·63 in. or 5·2 per cent. at Cawston Rectory, Norfolk.

The total of these two consecutive days at most stations in Norfolk exceeded two inches.

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PART II.—ABSTRACT.

It will astonish residents in London (who had in 1878 an unprecedented series of heavy falls of rain) to learn that they alone had that experience. Such, however, is the fact, and reference to Table II., which is an abstract of Table I., shows that the mean of the 16 greatest recorded falls is almost exactly the average, and that the greatest fall (4·24 in. at Springfield, Newport, Monmouth), is far below the average.

The London falls come to the front in Tables III. and IV., and not only does Haverstock Hill head the list of per-centages (*i.e.* had it a larger proportion of its yearly total in one rainfall day than any other of the 1,186 stations, whose records have been examined for this purpose), but three of the heavy London falls appear in Table III. April 10th, is represented by Haverstock Hill, Hampstead, Highgate and Loxford Hall; June 23rd, by Leyton Observatory and Camden Square; and June 30th, by Bayfordbury, Waltham Abbey, and Enfield.

As regards Table V., which contains the summing up of the whole matter, the remarkable feature is the extremely close agreement of the values for 1878 with the means for the previous thirteen years. I am not quite sure that the compilation of this table need be continued for many years on its present exhaustive basis. It takes considerable time to extract, classify, and compute the per-centages of each of 1,186 entries, and for the compilation of Tables I. to IV. it would suffice to extract all falls of 2·00 in. or upwards in the rainfall day; but continuity and uniformity are of such importance in rainfall work, that I shall make no change without full consideration.

TABLE I.—*Maximum Falls in 1878.*

Date.	Div.	Stations.	Depth.	Per cent.	Fall in year.
Aug. 15 ...	XI.	Springfield, Newport .....	4·24in.	8·6	49·45in.
Oct. 7 ...	XX.	Darrynane Abbey.....	4·00 ,,	7·5	53·22 ,,
April 10 ...	I.	Haverstock Hill .....	3·90 ,,	11·8	33·04 ,,
Jan. 21 ...	IX.	Oughtershaw.....	3·75 ,,	6·2	60·01 ,,
June 30 ...	III.	Bayfordbury .....	3·68 ,,	11·4	32·47 ,,
Aug. 15 ...	XI.	Castle Gardens, Cardiff .....	3·65 ,,	7·7	47·34 ,,
Oct. 21 ...	VIII.	Bridge End .....	3·65 ,,	4·1	88·89 ,,
Aug. 15 ...	XI.	Gold Tops, Monmouth .....	3·61 ,,	7·5	48·17 ,,
Nov. 10 ...	,,	Bryn Gwynant .....	3·56 ,,	3·8	95·00 ,,
Aug. 16 ...	XVII.	Forest of Glentamar .....	3·50 ,,	11·2	31·25 ,,
Nov. 9 ...	XI.	Ty Draw, Treherbert .....	3·40 ,,	3·7	91·51 ,,
Feb. 28 ...	X.	Seathwaite.....	3·32 ,,	3·0	111·88 ,,
Nov. 9 ...	XI.	Aberdare .....	3·31 ,,	5·1	65·37 ,,
June 23 ...	I.	Camden Square.....	3·28 ,,	9·6	34·08 ,,
Aug. 6 ...	VII.	Matlock Bath .....	3·12 ,,	7·5	41·85 ,,
June 23 ...	IV.	Leyton Observatory.....	3·10 ,,	9·6	32·18 ,,

TABLE II.—*Comparison of Maximum Falls with those in previous years.*

Years.	MEAN.			ABSOLUTE.			
	Depth.	Per Cent.	Mean total fall at these stations.	Depth.	Per Cent.	Station.	Division.
1865 ...	in. 3·67	6·4	in. 61·8	in. 6·41	5·5	Seathwaite.....	X.
1866 ...	3·40	4·4	86·2	6·38	3·6	Seathwaite.....	,,
1867 ...	3·17	9·0	42·5	4·78	17·7	Hartlip .....	II.
1868 ...	3·32	6·1	65·9	5·60	4·8	Camusinas.....	XV.
1869 ...	3·68	5·0	77·7	6·70	4·5	Seathwaite.....	X.
1870 ...	3·20	7·5	43·8	6·00	17·1	Tongue .....	XIX.
1871 ...	3·08	5·7	61·6	4·24	9·6	Melbury.....	V.
1872 ...	4·10	6·6	73·1	5·82	3·2	Seathwaite.....	X.
1873 ...	2·97	6·2	60·7	4·20	2·9	Seathwaite ...	,,
1874 ...	3·96	4·6	86·5	5·32	4·4	Bryn Gwynant	XI.
1875 ...	4·52	7·8	63·9	5·33	9·7	Newport W.W.	,,
1876 ...	3·37	5·9	57·6	4·50	5·5	Foffany .....	XXIII.
1877 ...	3·77	4·6	93·4	4·98	5·3	Skye, Portree..	XVIII.
Mean ...	3·55	6·1	67·2	5·40	7·2	.....	...
1878 ...	3·57	7·4	57·2	4·24	8·6	Springfield ...	XI.
Diff. ...	+·02	+1·3	-10·0	-1·16	+1·4	.....	...

TABLE III.—*Maximum Per-Centages in 1878.*

Date.	Div.	Stations.	Per Cent.	Depth.	Fall in year
April 10 ...	I.	Haverstock Hill .....	11·8	3·90in.	33·04 in.
June 30 ...	III.	Bayfordbury .....	11·4	3·68 ,,	32·47 ,,
Aug. 16 ...	XVII.	Forest of Glentamar .....	11·2	3·50 ,,	31·25 ,,
May 7 ...	IV.	Lower Park, Dedham .....	11·2	2·49 ,,	22·20 ,,
June 30 ...	,,	Waltham Abbey .....	10·6	3·10 ,,	29·27 ,,
Aug. 3 ...	VII.	Tolethorpe Hall .....	10·4	2·75 ,,	26·49 ,,
April 10 ...	I.	South Hill Park, Hampstead.	10·3	2·91 ,,	28·27 ,,
Aug. 3 ...	VII.	Burley-on-Hill ... ..	10·3	3·03 ,,	29·42 ,,
,, 13 ...	II.	Seething Wells .....	10·0	2·92 ,,	29·22 ,,
June 23 ...	IV.	Leyton Observatory.....	9·6	3·10 ,,	32·18 ,,
,, 23 ...	I.	Camden Square.....	9·6	3·28 ,,	34·08 ,,
Aug. 3 ...	VII.	Ryhall .....	9·6	2·64 ,,	27·54 ,,
,, 24 ...	II.	Red Lodge, Southampton ...	9·5	3·05 ,,	32·21 ,,
April 10 ...	I.	Highgate Nurseries .....	9·3	2·65 ,,	28·46 ,,
,, 10 ...	IV.	Loxford Hall.....	9·3	2·73 ,,	29·43 ,,
June 30 ...	I.	Enfield .....	9·2	3·08 ,,	33·65 ,,

TABLE IV.—*Comparison of Maximum Per-Centages with those in previous years.*

MEAN.				ABSOLUTE.			
Years.	Per Cent.	Depth.	Mean total fall at these stations.	Per Cent.	Depth.	Station.	Division.
1865 ...	9·9	2·62	28·4	13·0	4·40	Fleckney .....	VII.
1866 ...	8·1	2·31	29·3	10·0	2·48	Burton .....	VI.
1867 ...	11·0	2·85	25·3	17·7	4·78	Hartlip .....	II.
1868 ...	8·6	2·55	30·1	11·0	4·00	Tongue .....	XIX.
1869 ...	7·9	2·17	27·9	10·0	3·40	Tillydesk .....	XVII.
1870 ...	10·0	2·34	22·9	17·1	6·00	Tongue .....	XIX.
1871 ...	9·0	2·43	26·8	11·5	3·62	Warter .....	IX.
1872 ...	8·1	3·43	42·5	10·0	3·70	Hillington Hall	IV.
1873 ...	9·7	2·39	24·7	11·8	2·77	Oscott.....	VI.
1874 ...	9·2	2·16	23·7	11·9	3·95	Welwyn.. [Hall	III.
1875 ...	10·2	3·76	37·5	13·2	2·50	Letheringsett	IV.
1876 ...	7·4	2·49	33·7	8·5	3·70	Cragside .....	X.
1877 ...	8·2	2·73	33·1	9·3	3·09	Wellington ...	VI.
Mean...	9·0	2·63	29·6	11·9	3·72	.....	...
1878 ...	10·2	3·05	30·0	11·8	3·90	Haverstock Hill	I.
Diff. ...	+1·2	+·42	+·4	-0·1	+·18	.....	...

TABLE V.—*Comparison of the Mean of all the Maximum Falls in 1878 with similar data for previous years.*

Year.	Number of Returns.	Mean Percentage.	Mean Amount.	Mean Total Fall in year.	1867 being assumed =100.	Ratio of Rainfall to the Mean.	Total Fall being assumed =34 in. Mean Max. =
1865	481	5·1	1·70 in.	33 in.	106	102	5·00 percent.
1866	590	3·7	1·48 ,,	40 ,,	129	119	4·35 ,,
1867	584	4·6	1·44 ,,	31 ,,	100	100	4·24 ,,
1868	676	4·3	1·43 ,,	33 ,,	106	106	4·21 ,,
1869	637	4·2	1·42 ,,	34 ,,	108	101	4·18 ,,
1870	687	4·9	1·30 ,,	27 ,,	81	82	3·82 ,,
1871	752	4·9	1·49 ,,	30 ,,	98	97	4·38 ,,
1872	743	3·4	1·59 ,,	47 ,,	151	136	4·68 ,,
1873	809	4·6	1·35 ,,	29 ,,	94	95	3·97 ,,
1874	1010	4·4	1·41 ,,	32 ,,	103	96	4·15 ,,
1875	1081	5·0	1·83 ,,	37 ,,	119	108	5·38 ,,
1876	1112	3·9	1·49 ,,	38 ,,	123	114	4·38 ,,
1877	1180	3·8	1·56 ,,	41 ,,	132	125	4·59 ,,
Mean ...	796	4·4	1·50 ,,	35 ,,	112	106	4·41 ,,
1878	1186	4·3	1·49 ,,	35 ,,	113	95	4·38 ,,
Diff .....	+390	— ·1	—0·01 ,,	0 ,,	+ 1	— 11	— ·03 ,,

MONTHLY FALL OF RAIN IN 1878.

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WE have again the pleasure of giving monthly values from two hundred and forty-five stations, selected principally on account of their geographical distribution. The order agrees exactly with that of the General Tables, and therefore if there should be any difficulty in identifying the stations by the names given on the following pages, it will immediately be removed by turning to the county in the General Tables. As regards the distribution of the stations, we will only say that we hope it will be examined, because although as regards county boundaries there may seem to be imperfections, yet if the stations are plotted on a map, we think that most persons will admit that they are remarkably well distributed. Of course this quality arises solely from the abundant materials at our command.

We endeavour, as far as possible, to quote the same station in each successive year, so as to facilitate comparison, and, as a general rule, avoid taking returns of which the monthly fall has been published in the *Meteorological Magazine*, as by this course the total number of monthly values given by us is considerably increased.

*Monthly Rainfall at 245 Stations in the British Isles during 1878.*

Div.	County.	Station.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Total.
I.	Middlesex	Camden Square	1.31	1.49	1.12	4.97	3.89	6.71	.64	6.72	.82	1.99	2.95	1.47	34.08
"	"	Uxbridge (Harefield)	1.51	1.39	1.28	2.84	4.26	3.81	1.12	4.60	1.22	1.60	3.49	1.24	28.36
II.	Surrey	Guildford (Guildown)	1.38	1.39	.86	2.57	3.86	2.41	1.60	4.14	.95	2.54	2.90	1.68	26.28
"	Kent	Tenterden	1.38	1.65	1.44	3.81	4.22	1.74	1.22	5.06	1.64	3.85	4.77	2.21	32.99
"	"	Hythe	3.68	1.87	3.50	2.10	4.68	2.46	1.01	7.66	2.49	6.91	7.09	4.07	47.52
"	"	Seven Oaks (River Hill)	1.63	1.61	1.61	4.56	3.43	2.51	1.39	3.99	1.58	2.45	4.57	1.84	31.17
"	"	Faversham (Osprings)	1.24	1.46	2.42	.63	3.90	1.30	1.25	2.71	.92	2.90	5.12	2.20	26.05
"	Sussex	Worthing	1.89	2.11	1.29	2.48	2.88	2.73	.78	4.49	1.98	3.55	3.13	2.11	29.42
"	"	Maresfield (Forest Lodge)	1.97	2.10	1.67	3.21	4.24	2.01	.84	3.85	1.56	3.80	4.09	2.35	31.69
"	Hants	I. of Wight (St. Lawrence)	1.90	2.18	2.26	2.78	2.77	.80	3.54	5.72	2.08	3.42	4.21	1.93	33.59
"	"	Droxford	1.90	2.91	1.59	2.79	4.81	1.90	2.11	4.19	1.82	2.90	3.40	2.02	32.34
"	"	Basingstoke (The Vyne)	1.00	1.87	.96	2.24	3.44	1.67	1.36	3.82	.89	2.96	3.82	1.65	25.68
"	Berks	Newbury (Welford)	1.54	1.82	.89	3.06	4.05	2.72	1.81	4.23	1.06	3.13	3.23	1.52	29.06
III.	Herts	St. Albans (Bayfordbury)	1.39	1.48	1.05	2.76	3.86	5.09	1.39	7.64	1.22	1.55	3.94	1.10	32.47
"	"	Royston	1.66	1.11	1.03	1.73	3.89	1.47	.33	4.39	.79	1.97	3.84	1.15	23.36
"	Bucks.	High Wycombe	1.50	1.69	.56	2.38	2.94	1.50	1.28	4.77	1.00	2.57	3.63	1.62	25.44
"	"	Buckingham (Adstock)	1.68	1.58	1.05	2.66	5.27	2.64	1.16	4.87	1.30	2.12	2.95	1.58	28.86
"	Oxford	Oxford	1.80	1.26	.85	2.25	5.08	1.91	1.17	5.57	1.49	3.20	2.24	1.30	27.82
"	Northampton	Wellingborough	1.50	1.46	.77	1.88	4.24	1.58	1.20	3.37	.96	2.04	2.50	1.74	23.54
"	Bedford	Bedford	1.25	1.25	.57	2.00	3.97	2.35	.75	5.67	.82	1.84	3.43	1.62	25.52
"	Cambridge	Ely (Stretham)	1.35	1.27	.50	1.53	4.74	1.37	1.94	3.57	1.14	1.83	5.24	1.15	25.63
IV.	Essex	Wisbech	1.64	1.69	.85	1.41	3.41	1.31	.48	3.59	1.19	2.09	4.68	1.47	23.81
"	"	Waltham Abbey	1.49	1.45	.95	3.51	3.62	5.33	.55	5.03	.87	1.84	3.65	1.18	29.27
"	"	Chelmsford	1.32	1.26	1.17	1.37	4.32	1.35	1.16	5.12	1.91	1.97	3.59	1.11	25.65
"	"	Rivenhall	1.35	1.02	1.14	1.77	4.62	1.51	.05	4.63	.74	1.95	3.33	1.01	23.12
"	Suffolk	Hadleigh Boxford	2.10	1.31	1.31	1.48	4.38	.97	.05	3.28	1.62	1.80	4.46	1.16	23.92
"	"	Ipswich	1.68	1.16	1.27	1.48	4.14	.63	.12	2.32	1.15	1.49	4.58	1.11	21.13
"	"	Saxmundham	1.37	1.28	1.59	1.62	3.68	.96	1.44	3.29	1.63	1.50	5.61	2.24	26.21
"	Norfolk	Yarmouth	2.15	1.10	1.77	1.03	3.72	1.16	1.32	4.41	2.86	2.06	8.20	2.09	32.37
"	"	Swaffham	2.00	1.47	.84	1.11	4.22	2.21	1.19	4.88	1.87	2.78	6.60	1.94	31.17
"	"	Holt	1.76	1.11	1.09	.94	3.34	2.21	1.05	5.95	2.15	2.29	8.04	2.86	32.79
V.	Wilts	Salisbury	1.75	2.49	1.31	2.65	4.16	2.99	1.79	3.66	1.54	3.53	2.17	1.65	29.69
"	"	Pewsey	1.68	1.84	1.29	2.54	3.89	2.68	5.31	5.28	1.43	3.45	2.82	1.69	33.90
"	"	Trowbridge (Steeple Ashton)	1.23	1.48	1.07	2.58	4.72	3.16	.83	6.30	1.44	3.62	2.30	1.62	30.35
"	Dorset	Weymouth (Osmington)	1.33	2.51	1.98	4.14	4.09	.63	1.89	3.25	1.95	3.77	2.41	2.44	30.89

Div.	County.	Station.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Total.
V.	Dorset	Wimborne (Chalbury).....	1.48	2.38	1.11	3.56	4.85	1.97	1.61	3.43	1.61	2.93	1.85	1.57	28.35
"	"	Shaftesbury .....	2.52	1.95	1.53	4.00	4.24	1.67	2.16	5.10	1.76	3.87	2.60	2.53	33.93
"	Devon	Kingsbridge .....	2.19	2.83	2.71	5.76	4.69	2.25	2.07	5.36	3.51	3.50	3.35	3.27	41.49
"	"	Dartmoor Prison .....	5.75	5.49	4.55	6.25	9.33	6.05	2.41	9.12	5.21	8.79	6.50	7.02	76.47
"	"	Bovey Tracey .....	2.16	3.11	2.15	4.78	6.41	4.34	1.71	6.50	2.23	5.71	4.61	4.55	48.26
"	"	Cullompton (Bradinch).....	2.10	1.64	2.26	3.42	4.98	2.66	1.17	4.41	2.52	4.49	3.10	3.25	36.00
"	"	S. Molton (Rose Ash) .....	2.31	1.68	3.15	3.17	5.12	2.43	1.78	6.14	3.13	5.89	4.02	3.33	42.15
"	Cornwall	Penzance .....	3.21	2.29	2.50	4.46	4.00	2.56	2.06	4.18	2.56	5.52	8.39	7.24	48.97
"	"	St. Agnes .....	2.35	1.66	1.69	2.48	4.95	2.37	1.39	4.41	3.54	4.72	5.37	5.45	40.38
"	"	Stratton (Week St. Mary) .....	2.52	2.34	2.83	2.17	5.38	5.30	2.48	5.22	4.13	6.87	4.97	3.82	48.03
"	Somerset	Ilminster .....	1.50	2.04	1.74	3.94	6.06	2.28	2.06	4.09	2.58	4.76	4.24	2.22	37.51
"	"	Glastonbury (Street) .....	1.81	1.25	.90	4.13	5.79	2.22	2.08	6.55	1.77	4.15	2.77	2.03	35.45
"	"	Dunster .....	2.06	2.01	1.79	2.96	5.04	1.89	2.15	3.72	2.66	6.51	3.47	2.51	36.77
VI.	Gloucester	Clifton .....	1.58	1.84	2.31	2.95	5.86	3.17	2.03	4.22	2.92	5.96	3.14	2.04	38.02
"	"	Stroud (Upfield) .....	1.44	1.97	1.47	3.93	6.26	2.86	2.03	4.73	2.67	4.53	2.86	1.92	36.67
"	"	Fairford (Hatherop Rec.).....	1.60	1.97	1.06	3.07	4.58	2.58	.84	5.59	2.17	4.07	2.75	1.65	31.93
"	"	Moreton-in-Marsh .....	1.66	1.64	.83	2.53	5.60	2.68	1.04	5.72	1.63	3.29	3.26	2.07	31.95
"	Hereford	Ross (Rocklands) .....	1.00	2.42	1.18	2.91	5.20	2.74	1.58	6.16	1.86	3.77	3.23	2.29	34.34
"	Salop	Ch. Stretton (Woolstaston) .....	2.86	1.54	1.25	1.85	5.61	3.92	.90	6.03	2.80	6.28	4.22	2.88	40.14
"	"	Wellington .....	2.22	.99	.89	1.73	5.69	3.36	2.84	5.19	2.84	3.85	2.83	1.90	34.33
"	"	Oswestry .....	2.84	1.81	2.06	2.06	5.38	3.09	1.77	5.60	2.27	5.15	3.48	3.17	38.68
"	Stafford	Tamworth .....	2.03	.92	.99	1.97	4.57	4.33	1.25	6.03	1.62	3.01	2.63	2.35	31.70
"	"	Burton (Horninglow) .....	3.32	1.04	1.03	1.33	5.16	3.09	.81	5.18	1.91	2.57	2.40	2.45	29.29
"	"	Stoke (Burlaston).....	3.15	1.48	.96	1.90	5.20	3.83	1.70	6.49	3.05	3.65	2.65	2.44	36.50
"	Worcester	Malvern .....	1.60	1.63	.99	2.68	6.22	2.53	.82	5.82	2.41	4.41	2.92	2.19	34.22
"	"	Tenbury (Orleton) .....	1.83	1.53	1.13	2.56	6.12	3.19	2.16	7.81	3.66	4.26	3.21	2.08	39.54
"	"	Stourbridge (Hagley) .....	2.51	1.31	1.39	2.60	6.58	2.31	.13	8.08	3.04	3.09	4.00	2.06	37.10
"	Warwick	Leamington (Blackdown).....	1.85	1.28	1.01	3.26	4.88	2.70	2.07	5.02	1.93	2.64	4.02	1.91	52.57
"	"	Willey Rectory .....	1.72	1.62	.89	1.94	5.79	2.45	.81	4.75	2.80	3.12	3.29	2.09	31.27
VII.	Leicester	Loughborough .....	2.12	1.18	1.02	1.90	4.76	1.84	1.24	5.79	1.85	2.79	2.95	1.95	29.38
"	"	Harston [Grantham] .....	1.76	1.33	.41	2.05	3.88	2.23	1.50	7.08	2.38	2.36	3.88	1.82	30.68
"	Rutland	Oakham (Burley).....	1.31	1.31	.58	1.92	4.26	1.82	1.75	7.33	1.77	2.57	3.17	1.63	29.42
"	Lincoln	Horncastle .....	2.12	1.51	1.28	1.10	4.46	2.20	.71	7.04	.91	2.85	5.12	1.87	31.17
"	"	Brigg (Appleby Vic.) .....	1.67	1.15	1.18	1.28	2.28	3.10	.84	5.42	2.12	2.54	3.00	1.84	26.42
"	Notts	Mansfield .....	1.97	1.35	.49	1.53	4.37	2.40	1.08	8.27	1.54	2.93	2.43	1.80	30.66

Div.	County.	Station.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Total.
VII.	Derby.....	Buxton .....	8.04	2.50	3.63	2.40	6.04	4.11	1.76	6.76	5.41	6.32	4.73	2.66	54.36
VIII.	Cheshire.....	Congleton .....	2.85	1.64	1.30	1.82	5.83	3.35	1.50	4.96	4.56	2.86	2.83	2.36	35.86
"	Lancashire.....	Manchester (Withington) .....	3.01	1.15	1.56	1.53	3.62	2.56	1.42	4.88	4.36	3.23	2.23	2.18	31.73
"	"	Ormskirk (Rufford) .....	2.99	1.40	1.34	1.58	4.31	3.37	.41	5.58	4.24	4.36	2.57	2.48	34.63
"	"	Burnley (Brierfield) .....	6.22	1.70	3.03	1.78	4.09	1.60	.56	4.50	5.39	5.22	3.51	2.70	40.10
"	"	Garstang Parsonage .....	3.46	1.86	1.99	1.98	3.96	3.81	.93	4.83	4.64	3.02	2.51	2.80	35.09
IX.	York, W.R. ....	Ulverston .....	5.53	3.32	2.34	2.51	3.87	3.77	1.01	8.30	5.27	5.90	3.34	3.06	48.22
"	"	Rotherham .....	1.96	.96	.68	1.68	3.31	2.46	.69	6.62	1.97	2.57	2.32	1.51	26.73
"	"	Goole .....	1.06	.85	.36	.59	2.30	2.64	1.23	3.71	1.50	2.37	2.49	1.64	20.74
"	"	Huddersfield (Dalton) .....	3.09	.95	1.56	1.41	4.38	2.67	1.03	6.83	3.02	3.07	2.14	2.39	32.54
"	"	Leeds (Methley Park) .....	2.41	.92	.61	2.51	3.33	2.81	1.12	5.02	2.89	1.67	3.09	2.05	28.43
"	"	Pateley Bridge (Castle St.) .....	4.98	2.03	1.86	3.12	5.95	3.60	.62	7.67	3.29	3.92	5.35	2.36	44.75
"	"	Malham Tarn .....	7.71	1.86	4.47	3.75	5.82	6.92	2.15	6.21	6.68	6.02	4.25	3.25	59.09
"	York, E.R. ....	Patrington .....	2.45	1.23	1.12	1.09	2.74	2.58	.40	4.50	2.50	2.46	5.13	3.12	29.32
"	"	Pocklington (Warter) .....	2.08	1.70	1.63	1.57	3.43	2.58	1.41	5.36	2.52	2.83	5.59	2.83	33.53
"	York, N.R. ....	Ganton .....	2.76	.98	1.56	2.12	2.96	2.88	1.01	4.33	1.67	2.38	5.34	3.90	31.89
"	"	Northallerton .....	1.83	.75	.69	1.42	3.27	4.06	1.31	3.89	.95	2.35	3.75	1.93	26.20
"	"	Lockwood Beck .....	2.56	.88	1.26	2.18	2.95	2.48	.81	5.76	1.80	1.88	7.95	5.76	36.27
X.	Durham.....	Gainford .....	2.07	1.29	.61	1.85	4.07	2.89	.49	4.89	2.36	1.48	6.14	2.46	30.60
"	"	Hartlepool (Hart Res.) .....	1.45	.72	.88	1.85	2.49	3.43	.36	5.52	1.26	1.70	5.45	2.89	28.00
"	"	Wolsingham .....	2.66	1.31	.86	2.06	5.55	2.41	.81	5.09	1.96	2.30	7.65	2.87	35.53
"	"	Haltwhistle .....	3.99	2.89	1.94	2.49	4.35	3.52	1.70	6.57	3.57	3.01	3.53	2.59	40.15
"	Northumberland	Stamfordham .....	3.62	1.08	.80	2.20	2.59	2.32	.36	4.90	1.60	1.36	5.42	2.07	28.32
"	"	Alwinton (Harbottle) .....	2.57	1.40	1.41	3.00	3.56	2.79	.74	4.56	2.85	3.02	6.54	2.47	34.91
"	"	Howick .....	3.34	1.16	1.22	1.11	2.61	2.60	.60	5.16	2.59	2.48	5.54	4.48	32.89
"	Cumberland	Braystones .....	2.37	2.88	1.40	1.84	2.02	2.25	.50	5.91	4.61	3.36	2.41	1.34	30.89
"	"	Scalby Hall .....	3.56	2.15	1.22	2.63	3.00	3.13	.99	4.96	3.97	3.22	1.49	1.38	31.70
"	Westmoreland	Kendal .....	5.69	2.96	2.58	3.15	4.88	3.77	.55	4.37	5.41	5.37	2.44	2.59	43.76
"	"	Kirkby Stephen .....	3.68	2.31	2.20	2.16	4.83	3.55	.77	4.93	3.66	5.23	2.29	2.47	38.08
"	"	Lowther Castle .....	2.63	1.85	2.04	1.91	4.58	2.30	1.03	3.68	4.69	4.81	2.46	2.92	34.90
XI.	Monmouth.....	Dingestow .....	.83	2.02	.45	3.33	4.39	3.80	2.04	5.45	4.35	3.47	2.79	2.16	35.08
"	"	Abergavenny .....	.92	2.63	1.05	3.45	5.59	4.88	2.31	6.01	2.33	4.95	3.23	2.86	40.21
"	"	Cardiff .....	3.10	4.04	2.13	3.64	5.59	4.39	1.76	7.55	4.16	6.16	3.57	3.10	49.19
"	Glamorgan.....	Ystalyfera .....	6.54	4.87	2.85	3.69	6.09	4.85	3.45	3.18	4.36	7.67	5.34	3.69	59.58
"	"	Caerthven .....	3.65	2.92	2.04	3.44	4.46	2.99	1.95	7.03	3.73	6.36	4.68	2.75	46.00

Div.	County.	Station.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Total.
XI.	Pembroke	Stackpole Court	2.56	2.37	1.75	2.50	4.52	3.56	3.08	6.87	3.15	5.42	4.63	3.50	43.91
"	"	Fishguard (Castle Hill)	2.98	2.06	1.82	2.72	4.84	3.69	2.78	6.44	3.56	7.07	6.31	3.83	48.10
"	Cardigan	Lampeter College	4.37	2.34	1.64	2.81	4.28	3.45	1.04	5.94	3.29	8.54	5.31	1.08	44.09
"	"	Aberystwith (Gogerddan)	3.90	2.00	1.97	1.95	3.96	2.42	1.83	5.96	4.00	6.24	3.86	2.61	40.70
"	"	Brecknock	2.75	2.64	1.32	3.40	6.21	3.67	3.07	7.29	2.23	7.19	4.15	3.81	47.73
"	Radnor	Rhayader (Nantgwilt)	6.83	3.18	3.41	3.22	6.83	4.72	1.36	8.91	4.81	9.17	5.61	5.71	63.76
"	"	Heyhope	3.69	3.46	2.26	2.24	6.73	5.13	1.66	8.40	2.49	5.65	4.73	3.69	48.13
"	"	Newton (Dolfor)	3.05	1.70	1.60	1.62	5.81	4.45	1.07	6.35	3.01	4.91	3.78	3.34	40.69
"	Flint	St. Asaph (Nantillys)	2.51	.98	1.40	1.08	3.18	1.91	.59	3.96	3.51	3.77	3.61	2.35	28.85
"	Denbigh	Rosset (Trevallyn Hall)	2.46	1.33	1.01	1.65	4.39	3.30	1.57	4.39	2.13	3.44	2.78	2.80	31.25
"	"	Merioneth	5.58	4.13	3.14	2.05	8.11	6.26	1.75	4.78	5.10	7.67	4.77	4.49	57.83
"	"	Bala	6.42	2.64	3.46	1.26	6.03	3.38	1.50	4.90	3.55	7.46	5.66	4.47	50.73
"	"	Port Madoc	4.10	1.85	3.19	1.84	3.72	3.38	.62	5.10	4.05	5.56	5.19	3.44	42.04
"	Carnarvon	Bodewyd	2.75	2.40	1.72	1.12	2.91	3.04	.52	4.67	4.41	4.07	3.35	3.21	34.17
"	Anglesey	Douglas	4.59	3.41	2.29	2.37	3.41	2.68	.67	3.70	3.44	4.90	2.45	2.56	36.47
"	Isle of Man	Millbrook	2.69	2.01	2.06	3.95	3.00	2.56	1.63	3.27	2.34	4.68	7.70	4.41	40.30
"	Jersey	Grange Road	2.67	2.50	1.46	4.22	2.92	2.92	2.96	2.74	3.51	5.54	7.23	5.27	43.94
XII.	Guernsey	North Balfem	6.75	2.17	2.61	2.30	3.29	2.55	.83	2.96	1.30	3.05	2.20	.40	29.91
"	Wigtown	Dalbeattie	4.42	3.57	1.38	4.08	4.45	2.85	.25	5.08	3.77	3.73	1.69	2.14	37.41
"	Kirkcudbright	Carsplairn	7.33	4.10	2.30	3.34	4.77	2.32	.45	4.80	6.36	9.22	1.95	2.94	49.88
"	"	Annan (Warnanbie)	3.84	2.79	1.33	2.70	3.93	2.19	.68	4.19	4.26	2.67	1.65	3.50	33.73
"	Dumfries	Moffat (Ericstane)	6.30	3.80	3.20	1.60	4.80	3.50	.50	3.80	6.00	5.70	2.60	7.60	49.40
"	"	New Castleton (The Flatt)	3.60	2.60	.40	3.40	4.40	3.40	.60	4.90	5.30	4.40	3.40	3.40	39.80
"	Roxburgh	Jedburgh	2.54	.84	.87	1.36	2.41	2.52	1.07	3.51	2.53	1.99	4.07	1.94	25.65
"	"	Wooplaw [Galashiels]	3.36	1.54	1.17	2.49	4.31	2.33	1.59	4.24	3.68	2.45	4.12	3.13	34.41
XIII.	"	Bowhill	3.58	1.71	.80	2.57	4.15	2.73	.83	4.59	3.88	2.50	4.17	2.37	33.88
"	Selkirk	Glenrath	4.31	2.10	2.35	1.62	4.32	2.05	.70	4.04	5.33	3.97	1.69	3.74	36.23
"	Peebles	Penicuik	5.50	2.05	1.45	1.95	3.15	1.95	1.15	6.55	4.40	4.50	3.60	4.05	40.30
"	"	Marchmont House	3.11	1.67	1.16	1.70	2.81	2.83	1.19	5.64	3.10	2.76	3.27	3.22	35.46
"	Berwick	East Linton	2.58	.66	.59	1.23	2.81	1.84	.99	3.70	2.60	2.55	4.68	2.42	26.65
"	Haddington	Charlotte Square	2.56	.50	.58	1.43	2.91	2.41	.76	4.02	2.80	1.79	2.92	2.22	24.90
XIV.	Edinburgh	Douglas Castle	6.34	2.63	2.17	2.15	3.23	2.09	.78	3.32	5.61	4.26	3.06	2.05	37.69
"	Lanark	Baronald	4.01	1.96	1.33	1.89	3.50	2.74	1.16	3.69	4.63	3.82	1.29	.25	30.27
"	"	Girvan	6.51	2.85	2.45	2.54	3.25	3.16	1.01	3.06	7.04	8.11	2.46	1.94	44.38
"	Ayr	Old Cumnock	5.14	2.32	1.99	2.38	2.66	1.58	1.01	2.83	6.13	5.97	2.02	1.85	35.88

Div.	County.	Station.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Total.
XIV.	Ayr.....	Kilmarnock .....	4.95	2.40	1.84	2.50	2.26	2.50	1.64	3.19	4.94	5.34	1.73	1.97	35.26
	Renfrew .....	Stanely Reservoir.....	5.81	3.16	2.21	3.31	3.51	3.40	.20	3.77	5.90	6.84	2.23	2.19	42.58
XV.	Dumbarton .....	Arddarroch .....	9.70	3.91	6.30	2.80	5.91	4.85	1.05	7.95	9.59	10.39	2.78	2.28	69.51
	Stirling .....	Falkirk .....	3.40	1.30	.90	1.60	3.60	2.50	.30	2.70	2.80	3.20	2.10	4.00	26.10
	" .....	Ben Lomond.....	7.40	6.20	6.00	2.70	8.90	6.50	.60	8.90	9.10	7.40	1.10	.00	64.80
	Bute .....	Pladda .....	4.95	1.66	2.92	2.29	2.05	2.62	.75	2.10	5.08	5.45	2.12	1.77	33.76
	Argyll .....	Loch Gilphead .....	7.87	3.07	3.69	3.35	3.76	4.18	1.36	4.34	7.76	8.56	1.64	2.14	51.72
	" .....	Dalmally .....	9.70	6.11	5.96	3.17	4.92	4.20	3.41	5.45	9.09	9.48	3.40	1.62	66.51
	" .....	Airds .....	5.80	3.60	3.50	2.50	3.80	3.80	2.40	4.20	7.80	6.40	2.80	2.20	48.80
	" .....	Strontian (Laudale).....	9.03	4.33	6.54	3.41	3.99	3.69	2.86	5.26	9.94	10.88	4.87	3.75	68.55
	" .....	Devaar .....	6.33	1.91	2.46	1.58	2.35	2.58	1.28	2.72	3.68	7.38	2.81	2.07	37.15
	" .....	Islay (Eallabus) .....	6.24	2.20	2.97	3.24	3.21	3.17	.87	4.09	6.07	6.81	3.03	3.22	45.12
	" .....	Jura .....	7.90	2.27	3.90	3.13	3.41	2.86	.84	2.66	3.42	6.51	1.84	.51	39.25
	" .....	Tyre (Hynish) .....	2.87	1.91	2.79	3.01	2.21	2.87	1.06	3.10	4.07	6.20	2.37	3.80	36.26
XVI.	Fife .....	Craigluscar .....	1.20	.50	.80	1.00	3.00	2.40	.50	1.70	3.00	3.20	2.30	.50	19.60
	" .....	Auchtermuchty .....	3.03	1.35	.49	1.37	4.32	2.72	.51	5.52	3.01	3.83	2.36	1.99	30.50
	Perth .....	Auchterarder (Colquhalzie).....	3.70	2.22	.58	2.20	4.75	3.80	.25	6.30	3.20	4.00	1.88	1.70	31.08
	" .....	Stronvar .....	7.10	5.15	4.35	4.05	7.80	3.80	.70	6.30	8.00	10.40	2.60	3.11	63.36
	" .....	Aberfeldy .....	2.38	1.33	1.29	1.07	3.57	2.29	.20	5.25	3.23	4.35	1.88	2.40	29.24
	" .....	Dalnaspidal .....	6.02	3.00	5.28	1.92	5.88	4.36	.77	7.25	6.82	8.66	4.24	4.99	59.19
	Forfar.....	Dundee .....	1.62	1.63	.71	1.82	2.66	2.68	1.00	3.40	2.66	2.38	1.63	1.56	23.75
XVII.	Kincardine .....	The Burn .....	1.90	1.60	1.50	1.80	1.90	3.80	.50	7.80	4.80	4.70	3.50	3.20	37.00
	Aberdeen .....	Braemar.....	1.27	1.13	1.85	.82	2.30	2.85	.43	7.85	5.03	5.01	4.58	2.01	35.13
	" .....	Coldstone (Manse) .....	1.12	.65	2.91	1.13	1.53	2.58	.41	7.21	3.59	5.56	6.09	3.50	36.28
	" .....	Inverury .....	1.52	.80	3.56	1.04	2.24	2.69	1.09	4.92	2.93	4.06	4.69	4.12	33.66
	" .....	New Pitsligo.....	2.31	.83	4.08	.86	2.29	2.33	1.76	4.91	2.83	4.56	5.68	5.16	37.60
	Banff .....	Gordon Castle .....	1.87	.34	2.52	.60	2.95	1.64	1.74	6.58	2.98	3.95	6.21	3.85	35.23
	Moray .....	Elgin Institution .....	1.12	.32	2.05	.90	4.90	1.50	1.87	5.85	3.45	2.65	5.90	3.90	34.41
	Nairn.....	Nairn.....	1.59	.41	1.51	.37	1.58	3.39	1.03	4.66	2.93	2.14	2.44	1.65	23.70
XVIII.	Ross .....	Loch Alsh (Inverinate) .....	8.90	4.65	8.25	2.40	5.15	3.05	2.25	4.00	11.62	10.05	8.80	4.90	74.02
	" .....	Applecross.....	6.59	3.36	4.23	2.41	3.20	1.78	3.20	3.84	6.27	7.68	8.71	6.23	55.90
	" .....	Gairloch.....	4.39	2.04	3.31	.64	3.38	2.85	3.20	2.51	6.00	7.05	6.60	6.43	48.40
	" .....	Braemore House .....	5.03	1.97	4.62	1.48	5.20	2.00	1.66	2.99	5.89	5.04	14.47	4.23	54.58
	" .....	Stornoway (Lewis Castle).....	5.83	2.27	5.09	1.55	2.83	2.85	2.07	2.54	6.05	6.58	4.80	6.93	49.48
	" .....	Invergordon .....	1.58	.72	1.48	.48	2.71	2.44	1.03	3.10	3.18	2.31	2.62	5.61	27.29

Div.	County.	Station.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Total.
XV III.	Inverness	Skye (Sligachan)	4 50	2 00	5 13	1 50	4 25	3 12	4 00	5 38	8 25	9 50	7 12	5 00	59 75
"	"	Dunvegan	9 76	5 35	4 10	1 98	4 43	5 10	2 75	2 67	11 31	9 35	7 10	7 45	71 36
"	"	Farraline	4 30	1 60	2 80	1 50	2 50	2 60	2 70	3 20	5 80	5 10	4 20	2 90	39 20
"	"	Grantown	2 38	33	3 15	66	2 12	1 65	1 41	4 40	2 63	4 51	6 90	4 29	34 43
"	"	Glenstrathfarrar	8 24	4 05	7 99	1 40	3 83	2 81	1 75	5 66	7 79	6 82	5 90	3 37	59 61
XIX.	Sutherland	Invershin	2 76	2 03	3 42	1 97	3 28	2 85	2 24	5 75	4 27	5 89	3 54	32	38 32
"	"	Assynt (Achumore)	11 20	5 30	11 30	70	4 30	2 10	9 70	1 70	8 70	9 80	13 00	6 60	84 40
"	"	Altnabreac	2 69	1 82	3 08	59	2 89	2 45	2 76	1 51	2 84	2 94	3 10	1 39	28 06
"	"	Wick	2 55	1 65	4 43	44	1 61	1 36	2 49	1 80	4 22	2 48	3 71	5 49	32 23
"	"	Balfour	2 00	60	1 90	10	1 90	1 20	1 20	1 00	4 60	4 30	4 10	4 20	27 10
"	Orkney	East Yell	4 79	2 19	2 98	62	1 51	1 43	1 75	1 69	4 47	4 64	2 86	1 59	30 52
"	Shetland	Cork (Black Rock)	2 48	3 06	1 03	4 97	5 30	7 35	1 35	5 12	2 64	3 24	2 05	2 44	41 03
XX.	Cork	Fermoy (Glenville)	4 17	2 77	1 25	3 57	6 19	6 83	2 82	7 83	3 38	4 44	2 51	2 64	48 40
"	"	Darvynane	5 94	3 06	1 83	3 99	4 50	5 24	2 43	6 46	4 70	8 31	3 19	3 57	53 22
"	"	Dromore Castle.	6 86	3 69	2 08	2 63	4 90	8 24	2 70	9 91	4 74	5 70	4 28	4 69	60 42
"	"	Valentia (Knightstown)	5 86	3 17	1 73	3 65	6 04	5 45	1 90	6 31	3 75	6 30	3 45	4 27	51 88
"	"	Cara, Lake Side	4 14	3 30	2 32	2 43	5 35	4 37	2 42	5 64	3 60	6 45	3 36	4 11	47 49
"	"	Tralee (Godfrey Place)	4 86	2 49	1 80	2 35	4 91	4 95	1 30	4 82	3 69	6 98	3 81	3 70	45 66
"	Waterford	Waterford Gas Works	2 30	3 45	76	3 69	5 30	5 27	88	3 68	2 62	2 88	1 85	1 75	34 38
"	"	Clonmel	3 19	3 41	80	2 10	4 79	6 39	78	3 02	3 12	3 82	1 97	2 03	35 42
"	Tipperary	Tipperary, Henry Street	3 31	2 23	1 26	2 76	4 73	7 92	1 84	4 20	3 57	4 99	2 32	1 72	40 85
"	"	Gurteen	3 11	1 67	1 32	1 53	4 09	6 10	1 31	4 55	2 97	3 26	2 10	2 20	34 21
"	"	Newcastle West	3 85	1 26	1 40	1 81	4 02	6 27	2 25	5 58	2 99	5 78	3 14	1 91	40 26
"	Limerick	Nenagh (Castle Lough)	3 67	2 19	1 43	2 39	4 05	7 01	1 14	5 60	3 18	4 50	2 14	2 27	39 57
"	Tipperary	Ennis	3 55	63	1 41	1 23	2 78	7 69	1 27	4 41	4 49	5 06	1 18	94	34 64
"	Clare	Miltown Malbay	3 88	2 08	1 73	1 57	2 40	7 32	1 46	3 92	4 31	4 19	2 29	2 94	38 09
XXI.	Wexford	Ballyhyland	2 51	3 46	1 22	3 76	5 01	4 44	1 60	3 31	2 24	3 74	1 90	2 02	35 21
"	"	Gorey (Courtown)	2 03	2 75	94	3 35	4 43	5 00	64	4 69	2 06	2 27	1 24	2 01	31 41
"	"	Tullagher	2 66	3 35	1 04	4 51	5 95	5 50	1 47	4 23	2 16	4 49	2 10	1 74	39 20
"	"	Kilkenny (Butler House)	2 69	2 20	77	2 38	3 91	5 63	5 1	4 29	2 32	3 19	1 38	1 57	30 84
"	"	Delgany (Innismore)	1 79	2 56	1 06	3 19	7 10	4 82	5 9	4 42	2 19	3 48	1 46	1 99	34 65
"	Wicklow	Brown's Hill	2 32	1 80	1 27	2 73	4 95	4 56	1 21	3 43	3 05	3 44	2 03	1 25	32 04
"	Carlow	Abbey Leix, Blandistford	2 55	2 00	1 09	1 48	4 50	5 48	1 38	4 84	2 31	3 06	1 83	1 45	31 97
"	Queen's Co.	Clonbrin	2 39	2 04	1 89	1 27	5 43	3 84	69	3 59	2 99	2 46	1 33	1 50	29 42
"	King's Co.	Tullamore	3 00	1 40	1 71	1 28	3 47	3 99	1 28	4 27	3 05	2 68	1 47	40	28 00

Div.	County.	Station.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Total.
XXI.	Kildare	Naas, (Ballymore Eustace)	2.52	1.63	1.90	2.29	4.00	5.50	.98	3.37	3.20	3.37	2.53	2.14	33.43
"	Dublin	Glasnevin Botanic Gardens	1.78	1.69	1.31	3.05	4.95	4.92	.79	4.89	1.85	1.87	1.38	1.57	30.05
"	"	Balbriggan	2.48	1.48	1.02	2.09	4.96	3.24	.36	5.81	2.91	1.94	1.09	1.33	28.71
"	Meath	Trim	2.74	2.60	1.69	1.84	4.91	5.20	1.02	4.37	2.66	2.35	1.37	1.94	32.69
"	Westmeath	Athlone	3.62	2.03	1.92	2.15	3.99	7.37	2.03	5.36	4.12	4.06	1.29	1.72	39.66
"	"	Mullingar (Belvedere)	3.15	2.02	2.23	1.65	4.67	6.08	1.88	5.15	3.95	2.97	1.64	1.67	37.06
"	"	Rathowen (Daramona)	3.71	2.12	2.16	1.22	4.06	4.74	2.09	4.67	4.57	2.86	1.21	1.35	33.76
"	"	Castle Bellingham	3.17	1.82	1.62	3.18	6.59	4.25	.23	3.14	4.23	2.20	1.26	1.84	33.63
"	Louth	Stephenstown	2.98	1.70	1.53	2.23	6.31	4.65	.44	3.52	3.52	1.89	1.16	1.11	30.46
"	"	Cregg Park	3.72	1.19	1.66	2.10	3.18	7.05	1.54	5.38	3.46	3.91	1.68	1.74	36.61
XXII.	Galway	Ballinasloe	3.61	1.77	1.60	1.73	4.38	5.17	1.14	4.78	3.37	3.31	1.78	1.71	34.35
"	"	Clifden Kylemore	8.86	4.83	4.68	6.00	6.33	11.32	2.23	7.13	10.52	8.41	5.41	4.68	80.40
"	"	Tuam	3.12	1.58	1.22	2.01	3.50	6.21	1.49	3.82	3.42	3.13	2.09	2.85	34.44
"	Roscommon	Holywell	3.90	1.80	1.40	2.50	4.50	4.30	2.50	4.00	4.08	3.78	2.20	2.50	37.46
"	Mayo	Hollymount (Cloona Castle)	4.00	2.00	2.00	1.20	4.00	5.00	3.20	3.00	3.20	3.80	2.50	3.20	37.60
"	"	West Port (Old Head)	7.00	2.55	2.70	.80	3.20	7.60	1.55	6.10	6.80	5.00	3.20	3.20	51.80
"	"	Crossmolina (Enniscoe)	6.89	2.79	2.69	2.99	4.76	6.05	1.20	5.99	4.92	6.18	4.46	5.15	54.07
"	Sligo	Collooney (Markree)	5.12	1.44	2.50	1.80	4.04	4.70	1.14	3.63	4.18	5.25	3.55	1.92	39.27
"	"	Ballinful	4.33	1.70	1.67	1.74	2.78	3.87	2.23	1.86	2.95	2.76	1.37	1.65	36.57
"	Leitrim	Carrick-on-Shannon	5.93	1.47	2.36	2.39	4.47	4.55	1.98	4.10	3.54	2.26	1.59	2.63	34.03
"	Cavan	Killshandra (Drummany)	4.39	1.55	2.70	1.25	3.85	3.25	.69	4.80	5.07	2.26	1.88	2.06	33.77
XXIII.	Fermanagh	Enniskillen (Lisbellaw)	3.57	1.49	1.96	1.68	3.58	3.93	.53	4.46	4.09	4.54	1.88	2.63	33.52
"	Monaghan	Rockcorry	3.90	2.03	1.67	1.60	4.50	6.80	.92	3.82	4.29	3.00	1.31	1.68	28.59
"	Armagh	Armagh	3.42	1.38	1.76	1.24	4.05	3.51	.17	2.72	4.10	2.93	1.65	1.66	28.59
"	Down	Newcastle (Fairleigh)	3.16	3.66	1.85	4.77	7.98	4.08	1.04	4.50	6.05	3.01	2.07	2.96	45.13
"	"	Newtownards	3.64	2.33	1.10	1.78	4.20	2.25	1.13	2.39	2.80	3.42	2.01	2.17	29.22
"	"	New Barnsley	4.77	2.65	2.03	1.13	4.77	3.39	1.72	3.68	3.56	4.31	2.41	2.41	36.88
"	Antrim	Ballymena	5.10	2.12	2.18	2.55	5.72	2.40	1.72	4.23	3.70	4.70	3.91	3.72	42.05
"	"	Bushmills	4.89	1.28	2.38	1.82	3.06	3.99	1.46	6.61	4.66	3.61	3.45	4.08	41.29
"	"	Newtown Limavady	4.37	1.48	2.47	2.29	4.13	4.56	.87	4.85	4.16	4.66	4.68	4.15	42.67
"	Donegal	Ballyshannon	5.24	1.39	1.80	1.12	4.01	4.45	2.04	3.87	5.66	6.20	4.67	3.24	43.69
"	"	Inver Glebe	5.46	1.58	2.67	2.63	3.86	3.48	1.43	4.55	6.00	6.63	4.07	2.75	45.11
"	"	Ramelton	5.02	1.26	2.66	2.47	4.11	2.01	.39	2.70	4.45	6.90	5.83	5.67	43.47
"	"	Dunfanaghy	4.39	1.25	3.25	2.34	3.04	2.95	1.44	5.35	4.37	6.62	4.54	3.58	43.12
"	"	Carrinbeg	5.12	1.62	2.22	4.00	4.03	2.96	.77	3.59	4.20	5.63	4.47	3.49	42.40

## NOTES ON MONTHLY FALL OF RAIN IN 1878.

## JANUARY.

The rainfall was below the average over nearly the whole of the Southern half of Great Britain, the fall at several stations in the South and South-West of England being less than half the average, and at some stations in South Wales less than a quarter. The deficiency decreased eastward, and the fall in Norfolk, Lincoln, Leicester, Nottingham, nearly all Yorkshire, and the Northern Counties was about the average. In North Wales, Cheshire, Stafford, Derby, and South Lancashire the rainfall was above the average, but the excess was slight except in the neighbourhood surrounding Buxton. In the North of Scotland the distribution was very irregular; in Central Scotland the amounts recorded were rather small, and in the South there was about an average fall. The chief feature of the rainfall in Ireland was the marked deficiency at stations on the South and East Coast, in many cases amounting to 50 per cent. Inland the fall was about the average, except in the North, where there was a slight excess.

## FEBRUARY.

Over England generally the rainfall was certainly small, though there were stations scattered nearly all over the country, where the fall was above the average; the deficiency was most marked in Norfolk and North Wales, the North-Midland Counties, Yorkshire, and South Lancashire. In the Northern Counties and in the South of Scotland there was nearly an average quantity, but in the North-West the amounts were very small indeed, many stations having less than half-an-inch.

In Ireland the distribution was regular, being an average amount about Dublin, above the average in the South-East, and below it over the rest of the country, especially in the North.

## MARCH.

Excepting in the North and North-West of Scotland the rainfall of March was below the average. In the Midland Counties of England few stations had so much as an inch of rain; several had less than half-an-inch, and others had only one quarter of the usual March fall. Large falls occurred at several stations in the North-West of Scotland—*e.g.*, 6·54 in. at Laudale in the North of Argyll; 8·25 in. at Inverinate House in West Ross; 7·99 in. at Glen Strath-farrer in Inverness; and 11·30 in. at Achumore, Assynt, in West Sutherland.

## APRIL.

The distribution of rain this month was in many respects the opposite to that of March; the fall at Achumore was only 0·70 in. against 11·30 in. in March, and at Banbury, instead of being 80 per cent. below the average, as in March, it was more than 80 per cent. above it. The greatest departures from the average were, however, in the South-East of England, and especially in London, owing to the enormous rainfall of the 10th and 11th. The April average for Camden Square is 1·13 in.; the fall in 1878 was 4·97 in., or 340 per cent. in excess. On the contrary, in the Orkney Isles the fall scarcely exceeded 0·25 in., and at many stations was 0·10 in. or less.

## MAY.

A wet month generally, but the excess general and moderate, rather than local and extreme. There were very few stations with less than two inches of rain, the only localities where such prevailed being the North-East of England and of Scotland, and even there very nearly the two inches fell.

## JUNE.

At the majority of stations the rainfall of June was below the average, especially in South Hampshire, in Dorset, and also in Suffolk. In the North of London the fall was more than double the average, but that was purely a local phenomenon, due wholly to the thunderstorms of June 23rd and 30th, which have already been fully described. The most noticeable feature of rainfall distribution in June is the very heavy fall along the West Coast of Ireland, where several stations had rain on nearly every day, and many of the falls exceeded an inch.

## JULY.

A dry month over England, North Wales, and most of Scotland; rather dry also in Ireland. In Essex and Suffolk scarcely any rain fell. The following are returns from stations in that division at which less than 0·10 in. fell:—

	Total fall.		Total fall.
	in.		in.
Essex, Rivenhall .....	0·05	Suffolk, Boxford .....	0·07
„ Fennes, Bocking.....	·03	„ Woodbridge Rd, Ipswich	·06
„ Bocking Place.....	·07		
„ Earls Colne .....	·06		
„ Lower Park, Dedham ...	·05		

The two returns from Ipswich agree in showing that the total for the two months, June and July, was not more than three-fourths of an inch. One gives the total as 0·75 in. ; the other, 0·71 in.

As is almost always the case, there were a few stations where the fall in July was much above the average, but in the majority of instances, if not in all, this excess was due to heavy local thunderstorms—*e.g.*, at Haverfordwest the fall was 1½ in. above the average, but all this excess, and nearly as much besides, was due to the fall of 2·86 in. during a thunderstorm on the 17th.

### AUGUST.

This was a wet month generally; the only districts in which there was any deficiency were the English Lakes, the West of Scotland, and the South-West of Ireland. In all other parts there was an excess, variable in amount according to the incidence of thunderstorms, but everywhere an excess, and this was as much due to frequency, as to heaviness, of fall, for at the majority of stations there was not one day out of three without rain. Some of the driest parts of England had very heavy monthly totals; even Bedford, where the average is only 22 in. per annum, had 5·67 in., or more than a quarter of its average yearly total.

The following table gives other comparatively dry places where the fall was exceptionally large :—

		Total fall.			Total fall.
		in.			in.
Herts	.....St. Albans	7·64	Lincoln	...Boultham, Lincoln	7·53
Hereford	...Ross	7·96	„	Carholme Villa „	8·20
„	Stoke Bliss	8·12	„	Skellingthorpe Hall.	8·09
Shropshire	Cleobury Mortimer	7·63	„	Barnetby	8·26
Stafford	...The Heath House	7·91	Notts.	.....Highfield House, Not-	
Worcester	Orleton	7·81		tingham	8·76
„	Stoke Prior	7·88	„	Woodboro' Rd., „	8·41
„	Tardebige Reservoir	9·29	„	Mansfield	8·27
„	Bromsgrove Cemetery	8·32	Derby	.....Duffield	7·78
„	Hagley, Stourbridge.	8·08	„	Holloway	8·45
Warwick	...Bot. Gar, Birmingham	8·11	„	Willersley	8·82
Leicester	...Thornton Reservoir.	7·91	„	Matlock Bath	9·27
Rutland	...Tolethorpe	7·75	„	Hardwicke Hall	8·09
„	Ryhall	7·94	„	Chatsworth	9·00
			„	Norwood	7·58

### SEPTEMBER.

There was nothing remarkable about the rainfall of this month, except, perhaps, that the amount was above the average in the West Midland counties, where the fall had been very great in August.

The driest district was the South-East of England, and that of the greatest excess the North-West of Scotland.

OCTOBER.

Another month of which the details do not call for special notice. The fall generally was near the average, and on the whole a trifle below it. In North Cornwall and West Devon there was an excess, and also (for the third consecutive month) the fall in Worcestershire and the surrounding counties was above the average. There was also a tremendous local rain in the South-West of Ireland, of which details are given in the *Meteorological Magazine*, Vol. XIII., p. 155.

NOVEMBER.

Rainfall generally near, but rather above, the average. In the Eastern Counties it was greatly in excess, exceeding even the hitherto unprecedented fall in that district which occurred in 1875. Before giving the figures it is desirable to mention that the mean fall in Suffolk and Norfolk during November is between 1·9 and 2·2 in.—in fact, just a trifle above 2 in.

We shall quote only returns of 8 in. or upwards—that is to say, those where the fall was nearly, quite, or more than, four times the average :—

Yarmouth .....	8·20 in.	Reepham .....	8·57 in.
" (Halvergate Hall)...	8·09	Cawston .....	8·22
Norwich (Thorpe) .....	8·40	North Walsham (Worstead)...	8·39
" (Essex Street) .....	8·45	"    " (Knapton) ...	8·25
Filby .....	8·72	Hindringham .....	8·05
Hockering .....	8·02	Holt (Letheringsett Hall) ...	8·04
Drayton .....	8·13		

DECEMBER.

Nothing very remarkable in the December rainfall (or rather snowfall, for the fall was chiefly snow). It was generally very near the average amount, the principal excess being on the Coast of Northumberland, and in the extreme North of Scotland. Snowfall measurements during such weather as prevailed in December afford an excellent test of the interest in their observations taken by the observers. I am glad to find that, in the great majority of cases, the rules appear to have been obeyed and accurate results obtained.

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COMPARISON OF THE RAINFALL IN 1878 WITH THE AVERAGE OF PREVIOUS YEARS.

ENGLAND AND WALES.

Div.	STATION.	COUNTY.	Average			Depth in 1878.	Difference from Average, 1860-5	
			1850-9.	1860-9.	1860-5.		Per Amount.	cent
			in.	in.	in.	in.	in.	
I.	Camden Square .....	Middlesex ...	(24·30)	25·68	25·01	34·08	9·07	+ 36
II.	Chichester (Shopwyke)...	Sussex .....	26·25	29·19	28·41	28·87	·46	+ 2
"	" (Chilgrove) ...	" .....	32·23	33·22	32·77	33·34	·57	+ 2
"	" (W. Dean) ...	" .....	35·30	37·08	37·02	34·85	2·17	— 6
III.	Hemel Hempstead .....	Herts .....	26·43	26·39	25·47	30·37	4·90	+ 19
"	Berkhempstead .....	" .....	28·05	29·28	28·02	34·16	6·14	+ 22
"	Hitchin .....	" .....	24·72	23·92	23·25	28·30	5·05	+ 22
"	High Wycombe .....	Bucks .....	23·20	25·71	24·29	25·44	1·15	+ 5
"	Althorp .....	Northants ...	20·34	23·35	21·77	27·28	5·51	+ 25
"	Cardington (8 in. gauge)..	Bedford .....	21·60	22·49	21·87	25·22	3·35	+ 15
IV.	Norwich (Honingham) ...	Norfolk .....	25·99	23·98	23·28	31·52	8·24	+ 35
V.	Exeter Institution .....	Devon .....	26·91	31·76	30·17	31·48	1·31	+ 4
"	Bodmin .....	Cornwall .....	43·48	47·71	46·12	51·97	5·85	+ 13
VI.	Burford .....	Shropshire ...	25·52	26·74	26·25	31·10	4·85	+ 18
"	Shiffnal (Haughton Hall)	" .....	24·02	24·87	23·74	33·73	9·99	+ 42
"	Orleton .....	Worcester ...	28·82	30·90	30·06	39·54	9·48	+ 32
VII.	Spalding, (Pode Hole) ...	Lincoln .. ...	23·38	25·34	25·11	25·63	·52	+ 2
VIII.	Bolton (The Folds) .....	Lancashire ...	44·01	48·98	48·33	45·79	2·54	— 5
"	" (Belmont) .....	" .....	51·19	56·61	55·70	60·60	4·90	+ 9
"	Ormskirk (Rufford) .....	" .....	33·24	35·00	34·81	34·63	·18	— 1
"	Stonyhurst .....	" .....	43·40	48·56	49·08	45·36	3·72	— 8
"	Holker .....	" .....	39·17	45·63	44·98	39·31	5·67	— 13
IX.	Rednires .....	York, W.R... ..	37·86	39·68	37·89	45·80	7·91	+ 21
"	Standedge .....	" .....	49·58	53·70	52·17	48·55	3·62	— 7
"	Leeds (Holbeck, M. & Co.)	" .....	20·91	22·85	21·98	27·84	5·86	+ 27
"	York .....	" .....	22·02	24·48	23·38	27·25	3·87	+ 17
X.	Whittle Dean .....	Northumb'nd ..	22·96	25·42	25·08	25·91	·83	+ 3
"	Seathwaite .....	Cumberland.. ..	126·98	154·05	153·47	111·88	41·59	— 27
"	Keswick (Post Office) ...	" .....	55·01	62·40	60·56	52·25	8·31	— 14
"	Kendal (Kent Terrace) ...	Westmore'nd ..	44·91	53·32	52·88	43·76	9·12	— 17
XI.	Lampeter .....	Cardigan .....	43·81	45·18	39·87	44·09	4·22	+ 11
"	Holywell (Maes-y-dre) ...	Flint .....	24·25	24·43	23·58	19·51?	4·07	— 17
"	Guernsey .....	Channel Isds. ..	34·46	37·18	37·09	43·73	6·64	+ 18

COMPARISON OF THE RAINFALL IN 1878 WITH THE AVERAGE OF PREVIOUS YEARS.

SCOTLAND.

Div.	STATION.	COUNTY.	Average			Depth in 1878.	Difference from Average, 1860-5	
			1850-9.	1860-9.	1860-65.		Amount.	Per cent.
			in.	in.	in.	in.	in.	
XII.	Mull of Galloway ... L.H.	Wigtown.....	22·52	27·66	28·31	21·25	7·06	— 25
„	Little Ross ..... L.H.	Kirk'udbright	25·27	26·98	27·35	22·88	4·47	— 12
XIII.	Haddington .....	Haddington..	24·35	25·63	26·93	27·45	·52	+ 2
„	Glencorse .....	Edinburgh ...	36·96	37·45	36·77	38·25	1·48	+ 4
„	Inveresk .....	„ .....	24·72	29·02	30·05	27·42	2·63	— 9
XIV.	Bothwell Castle .....	Lanark.....	27·76	28·89	28·33	26·91	1·42	— 5
„	Cessnock Park .....	„ .....	34·01	37·96	37·98	34·24	3·74	— 10
„	Waulk Glen .....	Renfrew .....	43·94	49·85	48·96	42·10	6·86	— 14
XV.	Arddaroch .....	Dumbarton ...	66·55	78·32	75·83	69·51	6·32	— 8
„	Pladda ..... L.H.	Bute .....	35·23	40·14	38·12	33·76	4·36	— 11
„	Mull of Cantyre ..... L.H.	Argyll .....	41·19	44·17	44·61	38·56	6·05	— 14
„	Rhinn of Islay ..... L.H.	„ .....	30·58	33·43	32·66	31·89	·77	— 2
„	Tyree (Hynish) ..... L.H.	„ .....	73·90	79·99	84·77	36·26	48·51	— 57
„	Lismore ..... L.H.	„ .....	38·44	46·22	46·95	36·63	10·32	— 22
„	Ardnamurchan ..... L.H.	„ .....	38·50	45·59	47·94	45·73	2·21	— 5
XVI.	Dundee (Hill Head) .....	Forfar .....	31·06	35·19	35·59	34·53	1·06	— 3
„	„ (Craigton) .....	„ .....	31·87	34·88	35·64	34·90	·74	— 2
„	Arbroath .....	„ .....	25·08	29·05	29·71	25·65	4·06	— 14
XVII.	Girdleness[Aberdeen] L.H.	Kincardine ...	19·71	22·72	22·13	14·34	7·79	— 35
„	Buchanness... .. L.H.	Aberdeen.....	23·40	25·59	22·51	23·83	1·32	+ 6
„	Kinnairdhead ..... L.H.	„ .....	22·05	24·17	23·32	19·68	3·64	— 19
XVIII.	Cromarty..... L.H.	Cromarty ...	23·67	25·94	27·80	20·80	7·00	— 25
„	Barrahead ..... L.H.	Inverness W.	32·67	31·73	32·62	29·30	3·32	— 10
„	Island Glass ..... L.H.	„ .....	31·92	31·13	23·86	31·57	7·71	+ 24
„	Culloden .....	Inverness, E.	22·70	27·08	26·86	23·32	3·54	— 13
XIX.	Cape Wrath ..... L.H.	Sutherland ...	36·94	39·37	39·59	45·53	5·94	+ 15
„	Noss Head ..... L.H.	Caithness ...	25·57	24·70	23·57	24·22	·65	+ 3
„	Dunnethead ..... L.H.	„ .....	22·09	25·40	25·93	27·21	1·28	+ 5
„	Pentland Skerries ... L.H.	„ .....	24·12	28·76	28·92	22·57	6·35	— 22
„	Sandwick .....	Orkney .....	36·14	38·85	36·79	38·17	1·38	+ 4
„	Start Point ..... L.H.	„ .....	23·77	31·37	24·32	26·87	2·55	+ 10

IRELAND.

XX.	Cork .....	Cork .....	34·23	34·77	34·41	38·92	4·51	+ 13
XXI.	Woodstock .....	Kilkenny.....	36·35	39·38	38·83	37·08	1·75	— 5
„	Portarlington .....	King'sCounty	26·94	36·86	41·38	30·21	11·17	— 27
„	Tullamore .....	„ „	24·37	27·94	28·09	28·00	·09	— 0
XXIII.	Armagh .....	Armagh .....	(28·20)	32·01	32·40	28·59	3·81	— 12

ABSTRACT.

England .....	34·98	38·34	37·38	38·28	·90	+ 2
Scotland .....	32·15	35·72	35·31	31·46	3·85	— 12
Ireland .....	30·02	34·19	35·02	32·56	2·46	— 7
Mean of the whole .....	32·38	36·08	35·90	34·10	1·80	— 5

REMARKS UPON THE PRECEDING COMPARISON TABLE  
AND UPON SOME OTHER ANALOGOUS  
INVESTIGATIONS.

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The table on the previous page gets shorter year by year, for observations continuous and perfect during thirty years are now required to fill all the columns, and the number of stations fulfilling that condition is necessarily small. Next year, or at any rate in the year following, it will be possible to use the decade 1870-79 for the purpose of comparison, and then this table may be considerably extended by including all stations of which the records are perfect from Jan. 1st, 1860, to Dec. 31st, 1879—that is to say, ceasing to regard as indispensable the decade 1850-9.

I do not think that it is necessary to tie myself tightly to a commentary upon the previous table, but rather to state the final conclusions to which I have been led by various comparisons and investigations. The yearly total is unusually affected by the distribution of the storm rains; in fact, I remember no year in which it has been so much influenced by them. Roughly speaking, the fall has been above the average over all England and Wales, except the North-Western parts. But some of the minor details are interesting, *e.g.*, at my own station the fall has been greater than in any year since I began a continuous record in 1858; the only years when the fall has exceeded 30 in. have been 1860, 32·24 in.; 1866, 31·60 in.; 1872, 33·86 in.; and 1878, 34·08 in.

Before proceeding I must insert a digression. Everybody has heard of cyclical meteorology. The above figures are a splendid contribution to such researches. Every sixth year is evidently a wet one; this is a grand discovery, and is a development of that to which I some years since called attention, namely, the 12-year period for wet years, *viz.*, 1836, 1848, 1860, 1872. These rules look very tempting, but they always break down somewhere; and if I had been observing regularly in 1854 the above 6-year cycle

would have been completely spoiled, for the year 1854, which, according to the 6-year rule, ought to have been very wet, was very dry, probably 19 in.,—in accordance (I suppose I shall be told) with the other rule—viz., that every year ending with 4 is a dry one, *e.g.*, 1834, 1844, 1854, 1864, and 1874. I am far from denying that there may be something at the bottom of all these coincidences ; but they are fascinating, and apt to act like *ignes fatui*, *e.g.*, the fall of 1878 was in other parts of London not more than three or four inches above the average, and it is too much to expect one to believe that a special 6-year cycle applies to one part of London and to no other.

The South Coast generally had less than the average fall, and in the neighbourhood of Southampton and the Isle of Wight the deficiency was considerable, amounting at two stations to 20 per cent. and at a third to 16 per cent. In the Northern area the deficiency was greatest at Seathwaite, where the fall was only 111 in. instead of 154, a deficiency of about 27 per cent. At most of the surrounding stations the deficiency was not so great, and averaged between 15 and 20 per cent. Thus we see that the totals reported by Mr. Maitland for The Styne and for Taylor's Ghyl—149·04 in. and 135·66 in.—represent mean falls of about 181 in. and 165 in. respectively, values which agree well with those computed more than ten years since, and given on p. 20 of *British Rainfall*, 1867, viz., 182 in. and 174 in.

As regards the areas of excess, they are nearly all traceable to local details mentioned in previous pages. In North London we have had an altogether unprecedented number of torrential rains—(see page [78])—and naturally our total is greatly in excess. Another area of great excess is North Norfolk, and the explanation of that is found in the list of enormous totals for November on page [103]. Lastly, there is an area of excess in Shropshire and Worcestershire, which is traceable to the heavy falls in that district on the early days of August.

In Scotland we are far too dependent upon Lighthouse records, but things are rapidly mending, and in a year or two we may be able to trust entirely to stations less liable to invalidation by spray. Still it is right to point out that, with the exception, perhaps, of Hynish and Girdleness, the values reported are very consistent.

The distribution over Scotland appears to have been remarkably uniform ; the area of deficiency already reported as having prevailed

in the North-West of England reached up the whole West of Scotland ; and similarly the excess in the North-Eastern Counties of England extended inland in Scotland across Haddington, West Aberdeen, and Banff, and is traceable in Sutherland and Caithness.

Old Irish records are still so scarce that it is not easy to determine the relation of the fall in 1878 to the mean, but there appears to have been an excess in the west, and a deficiency in the east ; neither however, of great importance.

Finally, the summing up of the whole matter seems to amount to this:—In England and Wales an average fall, in Scotland and Ireland rather a deficiency, but not extreme in any part.

EXTREMES OF RAINFALL IN 1878.

Largest Rainfall, at The Stye, in Cumberland ..... 149·04 in.  
 Least Rainfall, at Keadby, in Lincolnshire ..... 17·35 in.

ENGLAND.

GREATEST.		LEAST.	
Div.	in.	Div.	in.
X. The Stye .....	149·04	VII. Crowle (Keadby) .. .. .	17·35
„ Taylor's Ghyl .....	135·66	IV. Ashbocking Vicarage .....	19·03
„ Seathwaite.....	111·88	III. Horseway Lock.....	19·74
„ Styehed Tarn .. .. .	103·33	IX. Doncaster .....	19·74
VIII. Bridge End .....	88·89	IV. Manningtree (Wix) .....	20·10
X. Sprinkling Tarn .....	88·37	IX. Goole .....	20·74

WALES AND THE ISLANDS.

GREATEST.		LEAST.	
Div.	in.	Div.	in.
XI. Pen-y-gwryd .....	100·25	XI. Rhyl .....	25·58
„ Beddgelert (Bryn Gwynant)..	95·00	„ Prestatyn (Nant).....	25·95
„ Plynlimmon (Nantiago Mine).	91·79	„ Denbigh (Glan-y-wern) .....	28·01
„ Aberdare (Tydraw) .....	91·51	„ Colwyn (Nant-y-Glyn) .....	28·12
„ Neath (Glyn Corrwg) .....	83·03	„ Holywell (Bagillt) .....	28·65
„ Pontypridd (Treorchy).....	79·59	„ St. Asaph (Nantlys) .....	28·85

SCOTLAND.

GREATEST.		LEAST.	
Div.	in.	Div.	in.
XVIII. Loch Shiel (Glenfinnan) .....	97·46	XIII. Leith .....	21·27
„ Glenquoich .....	91·83	XIX. Wick H. R. S.....	21·82
XV. Glen Etive (Druimachoish)...	85·63	XVIII. Inverness H. R. S. ....	22·21
XIX. Assynt (Achumore) .....	84·40	XVI. St. Andrews .....	22·72
XVI. Glen Gyle .....	82·00	XVIII. Tain (Fearn).....	22·99
XV. Loch Lomond (Firkin) .....	77·00	XVII. Nairn (Brit. Linen Bank) ..	23·02

IRELAND.

GREATEST.		LEAST.	
Div.	in.	Div.	in.
XXII. Clifden (Kylemore) .. .. .	80·40	XXIII. Banbridge (Katesbridge) .....	22·79
XX. Dromore Castle .....	60·42	„ „ (Corbet Reservoir).	26·20
„ Kenmare (Derreen) .....	59·09	„ Lisburn (Prospect Hill School)	26·39
XXII. Crossmolina (Enniscooe) .....	54·07	XXI. Dundalk (Farndreg).....	26·80
XX. Darrynane Abbey.....	53·22	XXIII. Rathfriland .....	26·82
„ Valentia.....	51·83	„ Banbridge (Milltown) .....	26·83

## NOTE UPON THE PRECEDING TABLE.



I HAVE before mentioned, but in case this volume falls into the hands of some who have not read previous works of the series, it may be well to state briefly, the rule in accordance with which the preceding table is formed :—

As every reader knows, and as we have amply shown in the earlier part of this work, the higher the mouth of a rain gauge above the ground the less will it collect. The decrease thus obtained is, of course, no indication of climatic change, and the only fair comparison is between stations where the fall is observed under nearly identical conditions : consequently the previous table contains no records obtained at considerable heights above the ground, and none from lighthouse stations.

**GENERAL TABLES**  
**OF**  
**TOTAL RAINFALL IN 1878,**  
**AT ABOUT**  
**2000 STATIONS**  
**IN THE**  
**BRITISH ISLES.**

## INTRODUCTORY NOTE.

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During the past year I printed and gratuitously distributed upwards of two thousand copies of the "*Arrangements for the Systematic Observation and Record of the Rainfall of the British Isles,*" containing the code of rules for observers, with remarks for their guidance. I purpose keeping a stock of copies of it, and sending them to all who intimate a desire for a copy, and therefore do not see any use in printing the rules here, as I have previously done.

It is, however, essential, not merely for the benefit of the individual observers, but for the credit of the organization whereof each observer forms a unit, that every one of them should not only possess a copy, but should read it through and obey rigorously the rules laid down for the common benefit and credit of all. I therefore hope that any observer who has not a copy will send for one (there is no charge for them), and that any observer who has not read them will do so.

It is especially desirable that observers should see that their arrangements are all according to rule this year, because with January 1st, 1880, a new decade of rainfall observations will commence, and everything ought to be in the most perfect order possible before that date.

I have omitted this year—(1) "Supplementary Table of Imperfect Returns, and of those which for various reasons are not inserted in the General Tables;" and (2) "List of Stations of which the records were quoted in 1877, but are not in 1878, with the reasons for their omission," because I do not think the information they contain of sufficient general utility to justify their insertion.

As regards the first, if observers allow their gauges to run over, or to be upset, or choked by dirt, or, in short, their records to become imperfect, we have now stations enough to feel that it is better to leave them out entirely than to undertake the trouble of, and delay the publication by, trying to complete them. As regards the second table, the information is necessarily preserved in this office, but I do not think that it is used by anyone else, and therefore cease to print it. I hoped that the publication of the fact that from stations of which the name was given "no reply" was received to repeated applications for returns, might have led to penitence and to explanations; but I was disappointed, and begin to feel that observers who fail to reply to three successive applications for copies of their returns, can scarcely take sufficient interest in the subject to render the loss of those returns a source of much regret.

## EXPLANATION OF THE ARRANGEMENTS OF THE FOLLOWING GENERAL TABLES.

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The divisions are the same as those adopted by the Registrars General of England and Scotland. The boundaries of these divisions are shown on the map facing p. 170 of *British Rainfall*, 1876.

The counties follow the same order as in the reports of the before-mentioned officers; but an alphabetical list of the counties is given at the end, whereby the page or pages on which all returns from each county will be found can be at once ascertained.

The stations in each county are arranged nearly in the order of their latitude from South to North.

In order to facilitate finding the fall in any part of the country, the first name is almost always that of a place given in *Bradshaw*, the *British Postal Guide*, or the *Clergy List*; the second name is generally added to fix accurately the site of Observation; but in a very few instances, this second name is in [ ] instead of ( ); it then shows that the nearest town is in an adjoining county. For instance, "Lowestoft (Gisleham)" means Gisleham, near Lowestoft, both being in one county, but "Geldeston [Beccles]" means Geldeston, Norfolk, near Beccles, in another county—Suffolk.

The contents of the columns are sufficiently explained by the headings, except that in the column headed "diameter," figures will occasionally be noticed of a different type from the rest of the tables; these figures indicate the length of the sides of rectangular mouthed gauges. These measurements are all in inches.

The letter D denotes that a copy of the daily record has been received, that it is perfect throughout the year, and that the printed amount is the correct total of these daily entries.

An asterisk \* denotes that the gauge was tested before erection, and a † that it has been visited and examined since. A note of interrogation (?) implies doubt, not necessarily error. ... indicates the absence of information.

In the column of altitudes several symbols are used, their meaning is as follows:— $\bar{n}$ , that a series of levels have been taken from the gauge to an Ordnance bench mark; I, that the height is estimated or ascertained approximately from the same source; L, that levels have been taken from the gauge to the sea, or to some datum other than Ordnance mean sea level; B, that the altitude has been taken by the barometer; and ?, that the height is uncertain.

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DIVISION II.—SOUTH-EASTERN COUNTIES—(continued.)

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain.	Days on which ·01 or more fell.
		Diameter	Height Above Ground	Height Above Sea Level	1878	
			ft. in.	feet.	inches.	
SURREY—(con.)						
*†Croydon (Addiscombe) <i>monthly</i>	E. Mawley, Esq. ....	8	0 9	202 $\bar{\pi}$	29·79	...
Surbiton (Seething Wells) .....	G. Lott, Esq. ....	10	0 6	25	29·22	170
D " (Grove Road) .....	C. Mostyn, Esq. ....	8	1 0	21	24·50	...
Norwood (Beulah Hill) .....	S. R. Scott, Esq. ....	5	1 0	350 $\bar{P}$	28·69	156
Wimbledon.....	T. Devas, Esq. ....	12	3 0	170 $\bar{T}$	27·30	175
D†Lower Norwood .....	W. Marriott, Esq. ....	8	1 0	185 $\bar{T}$	28·27	177
Staines (Cooper's Hill) .....	The Meteor. Council ...	8	1 1	280	23·47	153
New Wandsworth .....	H. Colborne, Esq. ....	5	1 0	64 $\bar{T}$	26·53	...
D Richmond (Halford House) .....	J. Billett, Jun., Esq. ....	5	0 9	50 $\bar{\pi}$	28·78	182
D Kew Observatory .....	The Kew Committee ...	11	1 9	19 $\bar{\pi}$	29·95	180
Brixton (Acre Lane) .....	The Meteor. Council ...	8	1 2	77 $\bar{T}$	28·42	...
D Battersea.....	Sir J. W. Bazalgette, CE.	5	1 0	11 $\bar{\pi}$	29·72	206
D Peckham (Asylum Road) .....	" " "	5	0 6	15 $\bar{\pi}$	30·62	204
KENT.						
D Hawkhurst (Sandhurst Rectory)	Rev. G. Ridout .....	5	1 3	208 $\bar{\pi}$	32·63	165
D Dymchurch.....	H. D. Goode, Esq., C.E.	8	1 0	12 $\bar{\pi}$	29·07	143
Benenden (East End) .....	J. Ellis Mace, Jun. Esq.	8	1 9	193 $\bar{\pi}$	33·27	...
Tenterden .....	" " "	8	1 5	190 $\bar{\pi}$	32·99	193
D " " <i>Snowdon</i> .....	" " "	8	1 5	190 $\bar{\pi}$	32·10	...
" (Ashbourne) .....	A. Pinyon, Esq. ....	5	2 8	45 $\bar{T}$	32·76	...
D†Hythe .....	H. B. Mackeson, Esq. ....	8	0 6	12 $\bar{T}$	47·52	212
Folkestone (Trinity Vicarage) ...	A. H. Taylor, Esq. ....	8	1 3	160	28·95	194
†Cranbrook (Swattenden) .....	R. Appach, Esq. ....	8	1 2	350 $\bar{T}$	32·59	178
" (Hartley) .....	G. Pile, Jun., Esq. ....	5	4 0	405 $\bar{T}$	37·35	200
Hythe (Paddlesworth) .....	Mr. R. Dixon .....	8	0 6	608 $\bar{\pi}$	38·45	...
Dover Station.....	The Meteor. Council ...	8	23 0	46	25·11	...
D† " (Russell Street) .....	H. J. Poulter, Esq. ....	5	1 0	30 $\bar{P}$	30·13	145
D Ashford (Bethersden) .....	W. H. Mold, Esq. ....	5	1 0	111 $\bar{T}$	29·50	156
D " (Beaver Green) .....	T. Nickalls, Esq. ....	5	1 0	155 $\bar{T}$	34·08	199
D Acrise .....	G. C. Woollett, Esq. ....	8	0 6	484 $\bar{\pi}$	40·68	214
D Staplehurst Park .....	Mr. W. Wilson .....	5	1 0	73 $\bar{T}$	32·59	157
Ashford (East Hill) .....	J. S. Burra, Esq. ....	8	1 0	126 $\bar{\pi}$	31·33	...
" (Kennington) .....	" " "	8	...	...	31·07	...
D Tunbridge Wells (Pembury) ...	W. Brentnall, Esq. C.E.	8	1 8	181 $\bar{\pi}$	30·25	150
Edenbridge (Falconhurst).....	J. G. Talbot, Esq. M.P.	5	1 0	400 $\bar{L}$	29·00	173
D Tunbridge (St. Mary's).....	W. C. Punnett, Esq. ....	5	2 0	96 $\bar{\pi}$	29·63	172
D†Maidstone (Hunton Court) .....	Mr. P. Goddard .....	8	0 6	80 $\bar{T}$	28·75	157
Deal (Northbourne) .....	H. J. Hannam, Esq. ....	5	1 2	60	33·33	178
Sevenoaks (Ide Hill).....	J. Frost, Esq. ....	5	1 0	700	37·39	191
D Maidstone (East Farleigh) .....	J. Case, Esq. ....	5	1 6	120 $\bar{T}$	31·29	171
D Canterbury (Chilham) .....	J. Martin, Esq. ....	5	1 0	330 $\bar{\pi}$	31·26	168
Charing (Otterden) .....	Rev. W. A. Paxton ...	5	1 0	507 $\bar{\pi}$	31·22	...
†Sandwich (Walton House, Eastry)	Colonel Rae .....	5	2 10	55 $\bar{T}$	27·20	...
†Sheldwich .....	Rev. B. S. Malden.....	5	1 0	259 $\bar{T}$	27·70	139
D†Selling (Harefield).....	E. Neame, Esq. ....	5	1 0	217 $\bar{T}$	30·25	199
D " (Gosmere) .....	W. Butcher, Esq. ....	5	1 0	255 $\bar{P}$	28·48	177



## DIVISION II.—SOUTH-EASTERN COUNTIES—(continued).

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain. 1878	Days on which ·01 or more fell.
		Diameter	Height Above Ground	Height Above Sea Level		
			ft. in.	feet.	inches.	
WEST SUSSEX—(con.)						
Milland House [Liphook] .....	Rev. J. M. Heath .....	18	30 0	350	30·70	...
d Horsham (Albion Terrace) .....	R. Sheppard, Esq. ....	6	5 0	150 $\bar{\pi}$	28·08	176
Shillinglee Park [Haslemere] ...	Lady Jane Turnour ...	5	1 1	253 $\bar{\pi}$	26·74	172
EAST SUSSEX.						
Beachy Head .....	Miss W. L. Hall .....	5	1 0	515 $\bar{\tau}$	25·31	...
" " .....	" " " .....	5	1 0	495 $\bar{\tau}$	26·07	...
Eastbourne, (Cavendish Place) ...	The Meteor. Society ...	8	1 0	25	29·57	...
d " (The Gore) .....	Miss W. L. Hall .....	5	1 0	85 $\bar{\tau}$	30·17	178
d† " (Cemetery) .....	" " " .....	5	4 0	160 $\bar{\pi}$	32·96	183
" (Manor House) .....	Russell Scott, Esq. ...	5	0 10	120 ?	32·72	177
Pevensey (Walls End Cottage)...	M. Vidler, Esq., C.E. ...	8	1 0	0	30·19	166
Brighton (West Pier Head) .....	E. Rowley, Esq. ....	5	...	...	18·63	...
d† " (The Steyne) .....	Dr. R. P. B. Taafe ...	5	1 0	39 $\bar{\tau}$	33·65	173
d† " (St. James' Street).....	E. Rowley, Esq. ....	5	1 0	37 $\bar{\pi}$	33·03	167
" (West) .....	Rev. E. W. Holland ...	5	1 9	55	30·75	...
d " (Buckingham Place) ...	F. E. Sawyer, Esq. ...	5	5 0	206 $\bar{\pi}$	29·79	164
" (Cambridge Rd., Hove) .....	The late H. B. Peake, Esq.	5	1 0	111 $\bar{\pi}$	29·08	...
d† " (W. W., Lewes Road)..	Brighton Water Works	5	3 8	90 $\bar{\pi}$	35·24	179
† " (Goldstone Bottom) ...	" " " .....	5	0 10	140 $\bar{\pi}$	31·13	...
d St. Leonard's (The Grove) .....	W. B. Young, Esq. ...	5	1 1	110 $\bar{\tau}$	37·36	167
† Hastings (Bleak House) .....	Mr. J. Banks .....	8	1 0	77 $\bar{\pi}$	35·92	103
d† " (The Hollies) .....	A. H. Wood, Esq. C.E.	8	3 0	100 $\bar{\pi}$	40·43	228
d† " (Cemetery) .....	Mr. Field .....	5	1 0	500 $\bar{\tau}$	36·17	152
" (Harmer's Res.) .....	W. Andrews, Esq. ....	8	0 8	77	34·92	174
d " (Manor House) .....	A. E. Murray, Esq. ...	8	1 0	173 $\bar{\pi}$	36·72	201
Hailsham .....	Rev. F. Clyde Harvey..	5	1 0	105	30·08	...
d† Falmer .....	R. R. Verrall, Esq. ...	5	2 0	312 $\bar{\pi}$	35·82	104
† Lewis (Glynde Place) .....	Mr. J. McLeod .....	5	2 9	50 $\bar{\tau}$	32·14	153
† Hastings (High Beech Hollington)	Capt. Lewis .....	5	1 0	315 $\bar{B}$	35·79	169
" (Brookwood " " )	J. Rock, Esq. ....	8	1 0	225 $\bar{\tau}$	35·27	...
d " (The Firs, Ore) .....	C. M. Murray, Esq. ...	8	1 0	378 $\bar{B}$	38·07	195
d† Poyning (Dyke House) .....	Mr. W. Thacker .....	5	1 6	680	36·30	184
d Winchelsea .....	Mr. Budden .....	5	1 0	110 $\bar{\tau}$	34·95	192
" (The Friars) .....	Miss Stileman .....	5	1 1	115 $\bar{\tau}$	36·45	196
d† Newick (Ketches) .....	Miss I. Shiffner .....	8	0 5	192 $\bar{\tau}$	28·94	168
d Rye (Peasmarsh) .....	Hon. R. Henley Eden..	5	1 0	180	35·25	148
d† Buxted Park .....	Col. Harcourt .....	8	0 10	193 $\bar{\tau}$	31·81	175
d† Hayward's Heath Asylum .....	Rev. T. E. Crallan .....	5	1 0	281 $\bar{\tau}$	29·47	203
d† Maresfield (Forest Lodge).....	Capt. W. Noble .....	8	1 2	247 $\bar{\pi}$	31·69	192
d Ticehurst .....	F. Wilton, Esq. ....	8	4 0	380 $\bar{\tau}$	41·34	201
Balcombe Place .....	J. A. Hankey, Esq. ...	8	1 8	300 $\bar{B}$	32·78	...
Frant (Eridge Castle) .....	Mr. J. Rust .....	8	1 2	400	39·86	186
Forest Row (Ashdown Cottage)..	H. J. Slack, Esq. ....	8	3 7	386 $\bar{\tau}$	28·28	...
East Grinstead .....	W. V. K. Stenning, Esq.	5	1 3	356 $\bar{\pi}$	34·30	156

DIVISION II.—SOUTH-EASTERN COUNTIES—(continued).

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain. 1878	Days on which ".01 or more fell.
		Diameter	Height Above Ground	Height Above Sea Level		
			ft. in.	feet.	inches.	
<b>HAMPSHIRE.</b>						
<b>ISLE OF WIGHT.</b>						
D† St. Lawrence .....	Rev. C. Malden .....	5	1 0	75 $\pi$	33.59	178
D Newport .....	E. G. Aldridge, Esq. ....	5	12 9	57 $\pi$	30.06	172
D† Osborne .....	J. R. Mann, Esq. ....	8	0 8	172 $\pi$	24.65	150
—						
Bournemouth (South Bourne) .....	Dr. Compton .....	5	0 6	90	23.60	155
Hurst Castle .....	The Meteor. Council ...	8	0 11	9	24.65	...
Christchurch (Carbery) .....	F. Moser, Esq. ....	8	0 9	98 $\pi$	28.14	156
Lymington (Wainsford) .....	H. Fawcett, Esq. ....	5	1 0	58 $\pi$	26.77	129
D Southampton (Cadland) .....	J. Laurie, Esq. ....	8	4 6	52 $\uparrow$	30.09	187
" (Woolston Lodge) .....	F. Ekless, Esq. ....	5	1 0	75	30.07	...
" (Ordnance Survey Office) .....	Col. Parsons, R.E. ....	5	0 8	74 $\pi$	32.60	178
" (Eling House) .....	" " .....	14	18 6	92 $\pi$	29.77	165
" .....	W. C. Spooner, Esq. ...	5	1 2	20	30.38	...
D Botley (Moorhill, Shedfield) .....	Ald. Sir T. S. Pasley, Bt.	8	2 0	160 $\pi$	27.80	173
Southampton (Millbrook) .....	Rev. C. Parkin .....	5	1 0	22 $\uparrow$	32.43	175
D " (Highfield) .....	Rev. H. Garrett .....	5	1 0	130 $\pi$	33.23	193
D† " (Red Lodge) .....	R. C. Hankinson, Esq. ..	5	0 6	200 $\uparrow$	32.21	189
" " " .....	" " " .....	5	0 6	194 $\uparrow$	35.43	...
D Droxford Rectory .....	Rev. S. Bridge .....	5	0 8	180	32.34	181
Fordingbridge .....	T. Westlake, Esq. ....	5	0 9	130	29.24	...
" (Wood Green) .....	H. Hinxman, Esq. ....	5	1 2	140 $\pi$	30.43	...
D Petersfield (Castle House) .....	The late H. J. Stowe, Esq.	5	1 0	216 $\pi$	31.06	158
D† Winchester (Otterbourne) .....	J. B. Yonge, Esq. ....	5	1 3	115 $\pi$	29.04	137
D Romsey (Michelmersh Rectory) ..	Rev. Dr. Merriman ...	5	1 6	273 $\pi$	28.45	145
Petersfield (Liss Place) .....	G. E. Coryton, Esq. ...	7	0 7	250 $\pi$	30.45	...
D Alresford (Ovington) .....	Rev. W. H. B. Stocker	5	5 1	225 $\uparrow$	29.43	188
† Alton (East Tisted Rectory) .....	Rev. F. Howlett .....	5	1 1	420 $\pi$	32.94	...
† Alresford (Arle Bury) .....	Capt. G. F. Marx .....	5	1 6	238 $\pi$	29.18	123
D† Selborne (The Wakes) .....	T. Bell, Esq., F.R.S. ...	6	4 0	400 $\pi$	33.27	...
Alresford (Swarraton Rectory) ..	Rev. W. L. W. Eyre ...	5	1 0	310 $\pi$	28.46	...
Alton (Medstead) .....	Rev. E. Silver .....	5	1 1	690 $\uparrow$	29.24	...
" (East Worldham) .....	Rev. G. H. Fell, D.D. ..	5	1 6	499 $\pi$	28.90	157
† " (Ashdell) .....	F. Crowley, Esq. ....	8	3 6	396 $\pi$	29.64	...
Andover (Red Rice) .....	Mr. C. W. Learman ...	5	0 7	277 $\uparrow$	30.06	133
D Odiham Priory .....	Rt. Hon. G. S. Booth, M.P.	5	4 4	...	27.59	170
Dogmersfield Park .....	Sir H. B. Mildmay, Bt.	5	1 6	...	26.43	...
D Basingstoke (Chapel Hill) .....	G. Stephens, Esq. ....	5	1 0	328 $\uparrow$	27.91	187
Rotherwick (Tylney Hall) .....	C. E. Harris, Esq. ....	5	0 8	330 $\uparrow$	23.90	...
D† Basingstoke (Sherborne St. John) ..	Rev. D. W. Chute .....	5	1 2	276 $\uparrow$	29.19	188
D† " (The Vyne) .....	W. Wiggett Chute, Esq.	8	1 2	236 $\uparrow$	25.68	148
" " " .....	" " " .....	3	1 2	236 $\uparrow$	26.40	148
Hartley Grange .....	W. Walkinshaw, Esq. ..	5	1 0	220 $\pi$	26.56	...
" Westpall .....	Rev. J. Keate, M.A. ...	8	0 9	233 $\pi$	22.74	...
D Blackwater (Hurstleigh) .....	Miss Gibson .....	5	1 0	220 $\uparrow$	26.14	203
† Strathfield Turgiss .....	Rev. C. H. Griffith .....	5	1 0	200 $\pi$	24.69	...
D† " " .....	" " " .....	5	3 0	200 $\pi$	23.19	152

DIVISION II.—SOUTH-EASTERN COUNTIES—(continued).

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain.	Days on which ·01 or more fell.
		Diameter	Height Above Ground	Height Above Sea Level	1878	
			ft. in.	feet.	inches.	
<b>HAMPSHIRE—(con.)</b>						
†Strathfieldsaye .....	Mr. J. Bell .....	8	1 0	160 T	27·80	134
†Heckfield (Park Corner) .....	J. Martineau, Esq.....	5	1 3	258 T	24·30	129
<b>BERKS.</b>						
D Reading (Beech Hill) .....	Rev. C. S. Turner .....	5	1 0	226 A	25·80	165
Newbury (Greenham) .....	Capt. J. Ward, R.N....	5	1 0	260 L	27·14	172
" .....	W. J. Cowper, Esq. ....	5	3 6	...	28·75	...
Hungerford (Denford Park) .....	C. Cherry, Esq. ....	5	1 2	...	29·98	202
Reading (Englefield) .....	R. Benyon, Esq. ....	5	1 1	...	30·81	...
D† " (Russell Street) .....	Dr. Workman.....	5	2 0	154 A	28·70	167
" (The Acacias) .....	A. Palmer, Esq.....	5	3 0	146 T	27·74	139
D Newbury (Welford Park) .....	Mr. C. Ross.....	5	1 0	335 A	29·06	192
" ( " " ) .....	" " " .....	5	1 0	341	28·87	192
Reading (Purley) .....	Hon. R. Boyle .....	5	1 0	40 ?	27·70	139
Maidenhead (Kimber Cottage) .....	Mr. J. Silver .....	8	1 2	93 A	23·99	...
D Streatley Vicarage.....	Rev. J. Slatter .....	12	1 0	150 A	24·48	174
East Ilsley .....	R. Osmond, Esq. ....	5	3 3	...	29·98	155
D Maidenhead (Cookham Vic.) ...	Rev. R. W. Rogers ...	5	1 3	90 T	28·73	191
D " (The Halls, Cookham) .....	F. W. E. Jowers, Esq..	5	1 6	108	28·93	184
" (Ashbury Vic.) .....	Rev. H. Miller .....	5	1 0	479 A	30·47	153
D Wantage (Letcombe Regis) .....	S. W. Silver, Esq.....	5	1 0	...	31·71	173
*† " .....	E. C. Davey, Esq.....	5	12 8	320 A	28·16	166
Wallingford (The Castle) .....	J. Kirby Hedges, Esq..	5	0 8	175 A	27·22	114
D† Long Wittenham .....	Rev. J. C. Clutterbuck.	12	1 0	170 A	29·97	159
Faringdon (The Elms) .....	W. Dundas, Esq. ....	5	1 0	500 ?	28·05	178

DIVISION III.—SOUTH MIDLAND COUNTIES.

<b>HERTS.</b>						
D Southgate (The Lawns).....	H. P. Church, Esq. ....	6	0 6	240 T	32·63	165
D Rickmansworth (Moor Park) ...	Rt. Hon. Lord Ebury...	...	2 0	340	35·02	198
Watford (Bushey Heath).....	Forrester Scott, Esq....	5	1 3	480 T	32·63	172
" (Bushey Station) .....	R. Savill, Esq. ....	5	0 8	...	33·00	...
D " (Wansford House).....	J. Hopkinson, Esq. ...	5	1 0	225 T	34·27	190
D " (Oaklands) .....	E. Harrison, Esq. ....	5	5 6	273 T	33·67	179
St. Albans (Gorhambury).....	Mr. J. Thompson .....	6	2 0	...	26·37	144
D Hemel Hempstead (Nash Mills) ...	Messrs J. Dickinson & Co.	12	3 9	237 T	30·37	171
D Gt. Berkhamstead (High Street)	W. Squire, Esq.....	8	1 6	370 B	34·16	167
Hertford (Bayfordbury) .....	W. C. Baker, Esq.....	8	0 4	250	32·47	162
Tring (Cowroast) .....	H. Thomas, Esq. ....	10	4 2	345 L	32·00	145
Harpenden (Rothamstead) .....	Messrs. Lawes & Gilbert	5	2 0	420 T	31·96	195
" ( " " ) <i>new g.</i> .....	" " " .....	72x87	0 9	420 T	32·33	195
Hatfield (Brockett Hall) .....	Mr. W. Gurney .....	8	1 0	...	30·28	151
D Ware .....	J. Muir, Esq., C.E. ...	12	3 0	114 T	26·46	178
D Welwyn Rectory .....	Rev. C. L. Wingfield...	5	0 4	...	29·14	191
D Kensworth [Dunstable] .....	Miss Jones .....	5	1 0	...	33·58	159
D Ware (Much Hadham) .....	Rev. H. S. Mott.....	5	1 0	222 B	28·94	176

DIVISION III.—SOUTH-MIDLAND COUNTIES—(continued.)

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain.	Days on which ·01 or more fell.
		Diameter	Height Above Ground	Height Above Sea Level	1878	
			ft in.	feet.	inches.	
<b>HERTS—(con.)</b>						
d Welwyn (Datchworth Rectory)..	Rev. J. Wardale .....	6	1 0	350 T	26·99	154
Stevenage (Knebworth Rectory).	Rev. F. G. Jenyns.....	5	1 0	407 T	30·97	161
„	Rev. J. O. Seager .....	8	2 0	319 L	28·14	178
Buntingford (Aspenden Rectory)	Rev. A. P. Sanderson..	5	1 1	329 T	27·19	162
d† Hitchin .....	W. Lucas, Esq. ....	8	1 0	238 A	28·30	195
„ (High Down) .....	J. Pollard, Esq. ....	5	1 1	422 T	27·00	...
Royston (Therfield Rectory).....	Rev. T. Edwards .....	5	4 3	400 P	24·42	154
d† „ .....	H. Wortham, Esq.....	8	0 6	269 A	23·36	152
<b>BUCKINGHAMSHIRE.</b>						
Datchet (Riding Court).....	C. S. Cantrell, Esq. ...	5	1 0	61 T	24·10	...
d Slough (Langley) .....	R. H. Major, Esq.....	8	0 10	85 T	23·54	175
Greenlands [Henley-on-Thames]	Rt. Hon W. H. Smith, MP	8	1 2	100 P	26·51	122
High Wycombe .....	H. S. Wheeler, Esq. ...	8	0 9	225 A	25·44	...
Great Missenden .....	Mr. J. Begbie .....	6	1 0	...	32·47	...
Aylesbury (Serena Terrace) .....	J. Copcutt, Esq. ....	12	1 0	284 T	24·40	105
d† Winslow (Addington Manor) ...	E. Hubbard, Esq., M.P.	8	1 0	309 A	27·50	181
d† Buckingham (Adstock).....	J. E. S. Weston, Esq...	5	0 9	350 T	28·86	179
† „ (School Lane) .....	Mr. W. Walker.....	8	1 3	269 A	27·52	160
Stony Stratford (Thornton) .....	Mr. W. Sturdy .....	5	1 0	...	28·32	...
d Newport Pagnell .....	R. Littleboy, Esq.....	5	2 0	...	25·57	134
<b>OXFORD.</b>						
Henley-on-Thames (Greys) .....	Rev. N. Pinder .....	5	1 8	370 T	31·06	...
Burcote [Abingdon] .....	H. J. Hannam, Esq. ...	5	1 3	168	25·40	136
Thame (Aston Rowant).....	T. Taylor, Esq. ....	8	1 0	395 B	26·96	156
Baldon [Abingdon] .....	G. Thomson, Esq. ....	8	1 11	...	26·18	181
d† Oxford (Mag. Coll. Laboratory).	E. Chapman, Esq. ....	5	1 0	185 A	27·82	187
„ (Radcliffe Observatory)..	The Meteor. Council ...	8	0 11	209	25·62	...
„ { „ „ } ..	Rev. C. Pritchard, F.R.S.	10	22 0	229 A	25·90	161
„ { „ „ } ..	„ „ „ ..	12	24 0	231 A	23·52	137
„ { „ „ } ..	„ „ „ ..	10	112 0	320 A	20·05	...
Witney (Ringwood Farm) .....	Mr. W. J. Abraham ...	5	5 0	...	30·57	151
d Chipping Norton (Chadlington)..	W. Searle, Esq. ....	5	5 0	800	27·28	131
„ „ (Kingham).....	Rev. J. W. Lockwood..	5	3 6	442 B	29·02	...
* Bicester (Stratton Audley Park).	G. Glen, Esq. ....	5	2 5	381 A	27·32	153
Banbury (Bloxham Grove) .....	Rev. G. Warriner .....	8	3 6	450 P	28·17	164
d „ (Cotefield, Bodicote) ...	T. E. Cobb, Esq. ....	8	1 0	...	28·07	187
d „ (Sibford).....	Miss Smith .....	5	1 2	685	34·69	203
d „ (Broughton Lodge) .....	E. C. Morrell, Esq. ...	5	0 9	442 B	28·53	199
d† „ (High Street).....	T. Beesley, Esq.....	6	7 0	350 B	28·57	204
„ (Wroxton) .....	A. R. Tawney, Esq. ...	5	3 0	525 B	32·59	195
<b>NORTHAMPTON.</b>						
d Kings Sutton [Banbury] .....	Mr. E. Good .....	5	1 0	400 B	27·98	151
d Thorpe Mandeville [Banbury] ...	Rev. W. T. Browning..	5	1 0	580	31·34	167
d Towcester .....	Mr. J. Webb .....	5	1 0	...	27·25	157
„ (Easton Neston) .....	Mr. E. Slarke .....	8	1 0	340 T	28·17	151

DIVISION III.—SOUTH MIDLAND COUNTIES—(continued.)

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain.	Days on which "01 or more fell.
		Diameter	Height Above Ground	Height Above SeaLevel	1878	
			ft. in.	feet.	inches.	
<b>NORTHAMPTON—(con.)</b>						
D Daventry (Helidon Vicarage) ...	Rev. C. S. Holthouse...	5	2 6	600 T	32·33	161
† Weedon Beck.....	R. Capell, Esq. ....	5	4 0	265 T	28·06	152
D Castle Ashby .....	R. G. Scriven, Esq. ....	5	1 0	275 B	26·04	165
D Northampton (St. Giles's Street)	H. Terry, Esq. ....	5	5 0	253 A	26·88	171
D " (The Holly's) .....	Alderman Macquire ...	8	1 6	232	27·56	171
D " (Gold Street) .....	Mr. S. Law.....	5	6 6	230 A	25·67	167
D " (Sedgebrooke) .....	C. A. Markham, Esq....	5	1 0	250 P	28·37	196
D " (Althorp House)...	C. S. Groom, Esq. ....	8	3 10	310 A	27·28	163
D " (Chapel Brampton)	E. Dowdall, Esq. ....	5	2 6	...	29·20	176
D Wellingboro' (Croyland Abbey).	E. Sharman, Esq. ....	5	0 2	...	23·54	181
D Thrapstone (Hargrave) .....	J. L. Baker, Esq. ....	5	1 0	219 T	26·00	151
Kettering .....	J. Wallis, Esq. ....	8	1 3	300 B	27·16	181
Rothwell.....	J. More, Esq., M.D. ...	8	1 2	300	24·49	152
" (Braybrooke) .....	J. Marriott, Jun., Esq.	5	4 3	...	28·06	...
Oundle (Pilton Rectory) .....	Rev. F. G. Hodgson ...	5	1 0	...	25·17	...
" .....	J. S. Clarke, Esq. ....	5	1 0	103 A	25·63	127
Rockingham Castle .....	Mr. J. Brown .....	5	1 0	400 L	27·38	145
D Peterborough (Springfield Ho.)..	J. Whitwell, Esq. ....	8	1 10	25	23·60	140
" (Westgate).....	Dr. W. Thomson .....	5	1 0	32 A	23·37	154
D Easton [Stamford].....	C. Day, Esq. ....	5	1 0	220 P	25·72	172
<b>HUNTS.</b>						
D St. Neots (Tetworth Hall) .....	Mrs. Kaye .....	5	0 8	114 T	25·75	159
D " (Waresley) .....	Rev. W. M. H. Elwyn.	8	1 0	193 A	24·01	153
Godmanchester (Farm Hall).....	G. I. Bevan, Esq. ....	8	0 8	30 P	25·84	150
Huntingdon .....	Mrs. C. Margetts .....	5	0 4	52 T	30·36	158
D* " (Wistow) .....	Rev. T. Woodruff .....	5	1 2	...	28·63	123
Whittlesea Mere .....	R. Lunn, Esq. ....	8	1 0	...	25·25	178
<b>BEDFORD.</b>						
D† Aspley Guise (Oaklands) .....	E. E. Dymond, Esq. ...	5	1 1	433 T	25·01	176
† " ( " ) <i>monthly</i> .....	" " " .....	5	1 1	433 T	25·70	...
Silsoe .....	H. Trethewy, Jun., Esq.	5	1 2	...	24·52	...
" (Wrest Park) .....	Mr. G. Ford .....	5	1 1	...	23·81	...
D Stotfold [Baldock].....	Dr. Swaine .....	5	0 9	220	23·45	184
Amphill.....	Mr. J. Brown .....	5	1 0	375 A	24·90	173
" (Lidlington) .....	Rev. F. Veasey .....	5	1 0	...	24·75	...
D Woburn (Hulcote Rectory) .....	Rev. B. Chernocke Smith	5	1 0	310 T	26·74	171
Biggleswade (Old Warden) .....	Mr. G. R. Allis .....	8	1 2	...	23·39	133
" .....	C. T. Newbery, Esq. ...	5	28 0	...	22·22	...
D Potton (Wrestlingworth) .....	H. J. King, Esq. ....	5	1 0	...	24·46	176
Cardington .....	Mr. J. McLaren .....	8	0 0	106	25·22	...
D " .....	" " " .....	12	3 6	109	23·98	160
" .....	" " " .....	8	36 0	142	21·30	...
D Sandy Rectory .....	Rev. J. Richardson .....	5	0 7	...	23·13	130
D " (The Lodge) .....	A. W. Peel, Esq., M.P.	5	1 0	...	22·49	...
Bedford .....	D. Robie, Esq. ....	5	0 4	115 T	25·52	147
" (Clapham Park) .....	Miss Howard .....	8	1 0	200 P	24·60	...

DIVISION III.—SOUTH MIDLAND COUNTIES—(continued.)

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain.	Days on which ".01 or more fell.
		Diameter	Height Above Ground	Height Above Sea Level	1878	
			ft. in.	feet.	inches.	
BEDFORD.—(con.)						
Tempsford Hall .....	Col. W. Stuart .....	5	0 9	140 B	25·02	...
Bedford (Milton Ernest) .....	F. Newbery, Esq. ....	5	5 0	...	26·17	...
CAMBRIDGE.						
D† Odsey Grange [Royston] .....	H. G. Fordham, Esq. ...	5	1 0	264 N	22·52	172
D† Guilden Morden [ „ ] .....	J. G. Johnson, Esq. ...	5	1 2	106 N	22·44	167
† Abington Pigotts [ „ ] .....	Miss Foster .....	8	0 6	130 B	22·85	...
D Pampisford Hall .....	Mr. Morley .....	5	1 0	113 N	24·01	189
D Granchester Mill .....	J. Nutter, Esq. ....	5	5 0	31 N	24·23	171
D Cambridge (Fulbourn Asylum) ..	Dr. Bacon .....	5	1 0	68 N	24·34	172
„ (W. W. Cherryhinton) ..	H. Tomlison, Esq., C.E.	5	1 0	35 N	22·29	184
D „ (Beech House) .....	J. Nutter, Esq. ....	8	4 0	40 N	22·89	171
D „ (Merton Villa) .....	G. Warren, Esq. ....	5	1 0	30 N	24·87	180
D „ (Sidney Street) .....	Mr. W. E. Pain .....	8	60 0	92 N	22·39	177
D „ (Trinity College) .....	J. W. Glaisher, Esq. FRS	8	0 5	40	24·90	193
Hardwicke .....	Rev. J. S. Brown .....	5	0 7	...	22·43	...
D† Cambridge Observatory .....	Professor Adams, F.R.S.	5	1 0	85 N	25·91	180
„ „ .....	The Meteor. Council ...	8	1 0	84	25·38	...
„ Caxton (Papworth Everard) ..	B. Ding, Esq. ....	5	1 0	127 N	27·42	138
D Ely (Stretham) .....	Mr. Edwin Stanley .....	9	4 9	...	25·63	137
„ (Littleport) .....	C. T. Ennals, Esq. ....	5	1 0	...	26·07	166
D Chatteris (Aylesby House) .....	A. S. Ruston, Esq. ...	8	0 6	...	25·13	185
„ (Horseway Lock) .....	R. Lunn, Esq. ....	8	1 0	...	19·74	204
D March .....	R. Dawbarn, Jun., Esq.	5	1 0	...	23·33	145
D „ .....	R. Lunn, Esq. ....	...	...	...	21·90	...
„ .....	A. Grounds, Esq. ....	...	2 0	...	23·22	...
Stanground Sluice .....	R. Lunn, Esq. ....	8	1 0	...	22·95	118
* March (Stags Holt) .....	W. C. Little, Esq. ....	5	1 0	15 ?	24·17	...
Upwell (Marmont Priory Lock) ..	R. Lunn, Esq. ....	8	1 0	...	22·10	178
D „ (Euximoor House) .....	H. West, Esq. ....	5	0 8	...	24·51	169
Wisbech (Coldham Hall, Elm) ..	H. J. Little, Esq. ....	5	1 0	12	24·82	...
D „ (Bank House) .....	A. Peckover, Esq. ....	8	0 8	6 T	24·92	162
† „ (Observatory) .....	Mr. W. J. D. Ward ...	8	0 6	10 T	23·81	138

DIVISION IV.—EASTERN COUNTIES.

ESSEX.

Canning Town [London] .....	Lewis Angell, Esq., C.E.	24	31 6	32 T	26·04	154
D Shoeburyness .....	Capt. Fairford Ellis, R.A.	5	4 7	18	21·16	123
D Barking (Loxford Hall) .....	Mr. J. Douglas .....	5	1 0	...	29·43	146
D Leyton Observatory .....	C. G. Talmage, Esq. ...	8	1 3	97	32·18	...
Chigwell Row .....	The Meteor. Council ...	8	1 8	188	30·70	167
Brentwood (Sawyer's Hall Farm)	Rogers Field, Esq., C.E.	5	1 0	270 T	25·65	141
Maldon (Norton Hall) .....	C. Clarke, Esq. ....	5	2 6	130 T	22·08	118
D Waltham Abbey (Gunpdr. Factory)	The Superintendent ...	8	4 0	82 L	29·27	122
Little Waltham .....	W. L. Soper, Esq. ....	8	1 6	130	22·48	143
Chelmsford (Great Baddow) .....	C. B. Fox, Esq., M.D..	5	1 1	...	24·75	174



DIVISION IV.—EASTERN COUNTIES—(continued.)

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain.	Days on which .01 or more fall.
		Diameter	Height Above Ground	Height Above SeaLevel		
			ft. in.	feet.	inches.	
NORFOLK—(con.)						
Long Stratton.....	Rev. J. M. Du Port ...	...	...	...	33·40	...
D† West Tofts [Brandon] .....	Mr. R. Martin .....	5	1 6	91 T	28·26	164
Wymondham (Hapton) .....	Rev. J. M. Du Port ...	...	...	...	31·59	...
" (Mulbarton) .....	" .....	...	...	...	31·86	...
D† Downham Market (W. Dereham) .....	Mr. C. Blanchfield.....	5	0 11	20	29·52	188
†Stoke Ferry (Wereham) .....	Rev. J. M. Du Port .....	5	6 0	66 T	25·42	...
Watton (Ovington) .....	Rev. C. J. Evans .....	5	1 9	...	30·01	165
Swaffham (Pickenham Hall) .....	E. A. Applewhaite, Esq. ...	5	1 0	160 T	29·37	187
Outwell Sluice .....	R. Lunn, Esq. ....	9	...	...	22·48	175
Yarmouth (Sailors' Home) .....	The Meteor. Council ...	8	4 0	12	32·37	...
" (Halvergate Hall) .....	Rev. J. M. Du Port ...	5	3 3	48 T	32·62	...
Norwich (Eaton).....	J. Pymar, Esq. ....	6	1 0	...	32·34	...
†Downham Market (Fincham) .....	Rev. W. Blyth .....	3	4 0	50 T	30·46	...
†Norwich (Thorpe St. Andrews) .....	W. Birkbeck, Esq. ...	5	1 0	137 T	35·55	194
" (St. Catherine's Close) .....	Mrs. Evans .....	5	2 3	120	33·06	174
D    " (Essex Street) .....	F. Dix, Esq. ....	9	2 6	85 T	32·80	167
" (Literary Institution) .....	The Secretary.....	12	30 0	53 T	25·44	169
D*Swaffham (Grammar School) .....	C. J. Drury, Esq. ....	5	1 10	239 T	31·17	188
†Acle (Rectory) .....	Rev. R. W. Kennion... ..	8	0 9	40 T	28·17	170
†Mattishall .....	Rev. J. M. Du Port .....	8	1 2	165 T	32·15	211
Norwich (Honingham) .....	" .....	12	1 3	90	31·83	...
D†    " (Honingham Hall) .....	Lady Bayning .....	5	0 6	110 T	31·52	194
D    " (Cossey) .....	H. Culley, Esq. ....	5	1 0	...	30·51	198
D Sprowston (Oak Lodge).....	T. C. Hardy, Esq. ....	5	1 0	...	30·00	203
D†Filby .....	Mr. Crisp .....	5	2 4	11	31·91	160
East Dereham.....	G. H. Cooper, Esq. ...	8	3 0	161	34·84	182
†Hockering .....	Rev. J. M. Du Port ...	8	1 2	140 ?	31·54	...
Drayton .....	Miss Howell .....	5	1 2	...	32·00	203
Swaffham (Dunham).....	Rev. J. M. Du Port .....	...	...	...	35·01	...
St. Germans (Outlet Syphons) .....	R. Lunn, Esq. ....	8	...	...	25·78	135
D Terrington .....	J. T. Seccombe, Esq., M.D. ...	5	1 0	17 T	30·73	176
Felthorpe .....	Rev. J. M. Du Port ...	...	...	...	32·47	...
D Reepham (Hackford).....	W. D. Bircham, Esq. ...	5	1 0	...	31·97	...
Cawston .....	Rev. T. H. Marsh .....	5	1 0	110 T	31·94	211
North Walsham (Worstead) .....	Mrs. Cooke .....	5	0 9	...	35·13	182
" (Dilham) .....	Rev. J. M. Du Port .....	...	...	...	32·34	...
D†Lynn (Hillington Rectory) .....	Rev. H. Ffolkes.....	8	1 0	90 T	31·98	...
D†    " (School) .....	" .....	5	3 6	94 T	31·58	179
D    " (Hall) .....	Mr. Platt .....	5	1 0	74	32·71	146
Fakenham (Colkirk) .....	Rev. J. M. Du Port ...	5	1 2	200 ?	31·78	...
North Walsham (Knapton) .....	" .....	...	...	...	37 13	...
Hindringham .....	Mr. S. Cushing .....	5	1 0	...	32·19	198
Holt (Letheringsett Hall).....	W. H. C. Hardy, Esq. ...	8	1 0	...	32·79	144
Cromer (Colne Lodge) .....	J. Cooper, Esq., M.D. ...	5	1 0	100 ?	29·10	174
D Holkham.....	J. Davidson, Esq. ....	12	4 0	39 T	28·14	168
D Hunstanton Hall .....	Mr. Nisbet .....	11	3 8	60 T	24·64	109
D Wells-next-the-Sea .....	H. R. Rump, Esq. ....	5	1 0	16 T	30·22	192

DIVISION V.—SOUTH-WESTERN COUNTIES.

STATIONS.	AUTHORITIES.	Rain Gauge			Depth of Rain. 1878	Days on which >01 or more fell.
		Diameter	Height Above Ground	Height Above SeaLevel		
			ft. in.	feet.	inches.	
<b>WILTS.</b>						
D Landford	J. R. Wigram, Esq. ....	5	1 10	160 T	27·14	190
D† Salisbury (Alderbury) .....	Rev. R. S. Hutchings...	5	0 8	263	29·69	176
D† „ (West Dean) .....	Rev. W. L. W. Eyre...	5	1 0	137 B	29·40	152
D „ (Wilton House).....	W. Hussey, Esq. ....	5	1 0	160	31·55	...
D „ (Wilton House).....	Mr. Challis .....	8	0 5	180 A	34·22	173
D Codford (Bapton) .....	J. Dean Willis, Esq. ...	5	1 0	300 T	34·52	187
D Salisbury Plain (Chiltern House)	R. Hayward, Jun., Esq.	11	4 0	380 P	32·11	177
D Warminster (Downside) .....	W. J. Stent, Esq. ....	8	2 0	439	35·48	189
Ludgershall [Andover] .....	Rev. W. H. Awdry ...	8	0 8	422 A	32·87	...
D Trowbridge (Steeple Ashton Vic.)	Rev. A. O. Hartley ...	5	1 0	240 T	30·35	186
D „ (Rodney House).....	W. J. Mann, Esq. ....	5	1 1	140 A	34·70	177
D Pewsey .....	Mr. J. P. Robins .....	5	1 0	...	33·90	183
D Trowbridge (Holt) .....	Major F. B. Gritton ...	5	1 2	120 T	37·84	195
Chippenham (Lacock) .....	The late Sir J. W. Awdry	5	0 11	250 P	34·64	...
D† Marlborough (The Green)	Rev. T. A. Preston ...	5	1 0	472 A	35·83	175
D „ ( „ ) <i>monthly</i> .....	„ „ „ .....	5	1 0	472 A	35·06	...
D „ (Mildenhall) .....	Rev. C. Soames .....	5	1 0	456 A	31·66	155
D Corsham .....	C. T. Mayo, Esq. ....	5	1 0	350	40·73	179
D Calne (Compton Bassett) .....	Mr. J. Allen .....	8	1 0	400 T	33·51	177
D Swindon (Mechanics' Institution)	Mr. J. Hulme Preece...	8	0 4	378 B	32·20	179
D „ (Pen Hill) .....	T. Arkell, Esq. ....	5	0 10	400	30·84	179
D Thames' Head [Cirencester].....	J. H. Taunton, Esq., C.E.	8	4 0	350 A	33·27	159
<b>DORSET.</b>						
Portland (Verne Citadel) .....	Col. Akers, R.E. ....	12	20 0	473 A	25·69	176
D† Weymouth (Osmington Lodge)...	Major Hall .....	5	1 0	225 P	30·89	173
† Abbotsbury .....	Mr. A. Dight .....	5	3 6	150	28·08	...
D Bridport .....	G. M. Evans, Esq.....	8	1 3	...	32·95	...
Wimborne (West Borough) .....	W. Wyke Smith, Esq..	5	2 0	66 A	33·91	151
D Beaminster Vicarage .....	Rev. A. Codd .....	5	0 10	...	40·34	178
D Blandford (Whatcombe) .....	J. Mansel-Pleydell, Esq.	5	0 4	340 B	35·45	133
D „ (Bingham's Melcombe)	Rev. C. W. Bingham...	5	1 3	300 P	37·90	192
Cerne Abbas (Minterne Rectory)	Rev. H. Pix .....	5	2 0	566 T	38·68	147
D „ „ (Melbury) .....	Mr. T. C. Elliott .....	12	2 9	...	34·89	142
D† Wimborne Minster (Chalbury)...	Rev. G. H. Billington..	5	2 0	338 A	28·35	155
D Sherborne School .....	W. L. Hetherington, Esq	5	1 0	200 A	31·69	176
D Shaftesbury .....	T. Ackland, Esq. ....	5	1 3	722 A	33·93	163
<b>DEVON.</b>						
† Kingsbridge (Bolt Tail) .....	(58) W. Balkwill, Esq. ....	5	2 0	297 L	33·58	...
D† „ (Fore St. Hill) .....	(56) G. Fox, Esq. ....	5	1 0	63 B	41·49	154
D Dartmouth (Strete) .....	Dr. Madden .....	8	1 0	200 B	33·73	164
D Newton Ferrers .....	(79) Rev. Duke Yonge .....	5	1 0	113 A	39·43	205
† Plymouth (Old Town Street) .....	(52) Mr. A. P. Balkwill ...	5	35 0	150	43·47	...
D „ (Navigation School)...	J. Merrifield, Esq. LL.D.	8	9 2	75 A	35·53	204
Plympton (Rose Hill Cottage) ..	Mr. J. Snow .....	5	0 3	116	43·74	...

NOTE.—The numbers in parentheses in this and the three following pages refer to a Map inserted between pages 148 and 149 of *British Rainfall*, 1872.

DIVISION V.—SOUTH-WESTERN COUNTIES—(continued).

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain.	Days on which "01 or more fell.
		Diameter	Height Above Ground	Height Above Sea Level	1878	
			ft. in.	feet.	inches.	
DEVON.—(con.)						
†Plympton (Ridgeway) .....(50)	Miss B. T. Phillipps ...	5	0 6	116 N	46·42	186
n†Ivybridge.....(49)	Dr. Liddell .....	10	3 0	175 B	48·82	188
Plympton (Hemerdon) .....(69)	Rev. G. Woollcombe ...	5	1 0	360	54·46	...
Paignton (Hollacombe) .....	J. Greenfield, Esq.....	5	7 0	70 P	35·37	215
†Dartmoor (Lee Moor).....(44)	W. L. Martin, Esq. ...	5	0 9	860 N	64·28	...
Bere Ferrers .....	Rev. F. T. W. Wintle.	5	1 0	100	47·33	207
n†Torquay (Lamorna) .....(43)	W. Pengelly, Esq. F.R.S	5	1 0	200 N	35·87	196
" (Rocombe House) .....	H. Hearder, Esq. ....	5	1 0	400 T	32·98	185
" (Babbacombe) .....	E. E. Glyde, Esq. ....	5	1 0	294 N	37·34	...
n†" ( " ) <i>Snowdon</i> .....	" " " " .....	5	1 0	294 N	36·08	189
Ashburton (Holne Vicarage) (33)	Rev. J. Gill.....	5	1 0	650 B	64·11	218
Abbots Kerswell (Court Grange)	Mrs. Hare .....	5	1 0	130 B	41·22	210
n†Ashburton (Druid House) ... (32)	Fabyan Amery, Esq....	5	1 0	570 T	52·76	201
Bickington (Holbrook) .....	P. Symons, Esq.....	...	5 0	360	44·18	...
Kingsteignton (Teignbridge Ho.)	F. H. Plumptre, Esq...	5	1 0	27 N	36·74	174
†Teignmouth (Landscape) ... (29)	Mrs. Clark .....	5	0 6	200 N	37·33	...
" (Lower Reservoir)...	W. C. Lake, Esq., M.D.	5	1 0	140 L	36·89	183
n†Dartmoor (Medical Officer's Lawn)	Dr. Power .....	5	0 8	1389 N	76·47	242
" (Prison Farm) ... (34)	Mr. A. Watts.....	5	3 0	1460 T	71·86	...
†Tavistock (Public Library)... (38)	Mr. W. Reynolds .....	8	20 0	283 T	45·01	212
*†" (Mount Tavy).....(37)	H. Clark, Esq. ....	5	1 0	316 T	49·00	...
n†" (Kilworthy Lane) (67)	Mr. W. Merrifield .....	5	1 0	362 T	50·71	217
Ashburton (Widecombe Vicarage)	Rev. J. Williams .....	...	7 0	810	49·12	...
n†Ilsington (Middlecott House) (23)	Alfred Lyon, Esq. ....	9	3 0	649 T	54·73	200
Ashburton (Cator Court) .....	F. H. Firth, Esq. ....	5	1 0	1060 T	64·33	227
Dawlish (Great Oak Park) .....	I. Stevens, Esq. ....	5	1 0	110	36·72	197
†Milton Abbot (Endsleigh) ... (26)	Mr. Cornelius .....	5	1 0	180 P	51·37	...
n†Bovey Tracey .....	J. Divett, Esq. ....	5	0 6	94 N	48·26	225
n†Exmouth (Budleigh Salterton)...	Dr. R. Walker .....	5	4 0	33	34·16	170
" (East Budleigh) .....	R. H. Lipscomb, Esq...	5	1 0	70 P	34·44	171
Coryton (Low Down) .....	Mr. T. Symons .....	5	4 0	445	47·51	208
Polapit Tamar [Launceston] (76)	E. Coode, Esq. ....	12	3 0	...	43·09	238
†Sidmouth (Sidmount) .....	Dr. Radford .....	5	1 0	149 N	33·19	180
†Topsham (Clyst St. George).....	Rev. H. T. Ellacombe..	5	1 3	76 T	33·90	...
†Seaton (White Cliff Glen).....	T. F. A. Byles, Esq. ...	5	3 6	126	35·06	...
n†Clevelands [Lyme Regis] .....	E. L. Ames, Esq. ....	5	1 11	465 N	36·71	177
n†Exeter (Devon & Exet. Inst.) (17)	Mr. E. Parfitt.....	6	13 7	155 N	31·48	164
" (High Street) .....	W. H. Ellis, Esq. ....	5	47 11	183 T	29·08	168
" ( " ) .....	" " " " .....	10	44 3	180 T	30·55	180
" (Manston Terrace) ... (18)	Miss Dymond .....	5	1 0	166 N	31·17	201
" (The Quarries) .....	E. N. Snow, Esq. ....	5	1 0	250	37·98	171
Uplyme [Lyme Regis] .....	H. Tucker, Esq.....	5	1 0	120 B	35·19	175
†Okehampton (Oaklands).....(19)	W. H. Holley, Esq. ...	5	1 0	521 T	49·75	200
" (Goldburn) .....	E. P. Burd, Esq. ....	5	0 3	500	50·78	235
Exeter (Brockhill, Broad Clyst).	W. T. Bayne, Esq. ....	5	1 2	93	29·91	191
n†" (Brampford Speke) ... (13)	W. H. Gamlen, Esq. ...	5	1 0	140 T	35·25	219
" ( " " ) ... (13)	" " " " .....	8	0 3	140 T	33·91	...
" ( " " ) ... (13)	" " " " .....	5	1 0	140 B	33·16	...

DIVISION V.—SOUTH-WESTERN COUNTIES—(continued.)

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain.	Days on which '01 or more fell.
		Diameter	Height Above Ground	Height Above SeaLevel	1878.	
			ft. in.	feet.	inches.	
<b>DEVON—(con.)</b>						
D Holsworthy (Clawton) .....(16)	W. W. Melhuish, Esq..	5	1 1	400 P	44·29	195
D Honiton (Gittisham) .....	C. Hardy, Esq. ....	5	1 0	...	39·75	182
D Zeal Monachorum .....(63)	Rev. H. J. A. Fothergill	5	0 9	600 B	44·95	179
D Hele (Strath Culm) .....	C. R. Collins, Esq.....	8	0 6	159 A	30·99	141
Clyst Hydon .....	Rev. J. Huish .....	...	1 0	200 A	32·50	...
D Bradninch Vicarage .....	Rev. W. A. Strong ...	5	1 0	316 B	36·00	206
Tiverton (Exe Villa).....	H. S. Gill, Esq. ....	5	1 0	230 L	41·79	210
D „ (Rose Bank) .....	H. B. Sharland, Esq....	5	1 0	280	42·58	219
D†Torrington (Langtree Wick)(72)	Miss Bazely .....	5	1 0	451 T	50·29	...
D† „ .....(61)	Rev. S. Buckland .....	5	1 0	323 T	45·04	204
„ (Little Silver).....	R. H. Lipscomb, Esq... 5	5	1 0	400 T	48·24	217
Tiverton (Cove).....(9)	W. N. Row, Esq. ....	11	0 4	450 P	46·20	...
D Bampton (Huntsham) .....	C. A. W. Troyte, Esq.. 8	8	0 6	600 B	50·76	212
South Molton (Rose Ash) ..(60)	Lieut. Col. Davy .....	8	1 0	650 T	42·15	201
D Bideford(Heale House Littleham)	R. Sanders, Esq. ....	8	1 0	280 B	44·14	200
D South Molton (East Street) (59)	N. C. Hatherly, Esq. M. D	5	1 0	430 B	46·68	206
„ (Castle Hill) ... (4)	Mr. D. Wilson .....	12	3 1	300	44·64	133
*†Bideford (Horwood) .....(71)	Rev. J. Dene .....	5	1 0	288 T	39·03	202
*† „ (Northam) .....(5)	Rev. M. D. Churchward	5	1 0	173 A	41·03	212
D†Barnstaple .....(3)	Mr. Knill .....	8	1 0	31 A	44·08	197
D „ (Arlington Court).....	Sir Bruce Chichester, Bt.	8	1 1	613	56·04	218
D†Ilfracombe Hotel .....(1)	Mr. W. Tattam .....	12	9 0	34	29·83	189
†Martinhoe.....(70)	Rev. C. Scriven .....	5	1 0	825	46·82	214
†Lynton (Lee Abbey) .....	C. F. Bailey, Esq. ....	5	0 6	320	39·33	...
D†Lynmouth (Glenthorne) .....	Mrs. Halliday.....	5	0 9	93	49·91	155
<b>CORNWALL.</b>						
†Penzance (South Parade) .....	W. H. Richards, Esq... 12	12	3 0	94 T	48·97	...
D „ (St. Clare) .....	Rev. Preben. Hedgeland	5	1 0	218	46·92	240
D „ (Poltair) .....	Col. Trelawny.....	5	0 6	243 B	71·80	250
D Falmouth (Carclaw) .....	Mr. G. Palmer .....	5	0 6	...	49·26	213
D Camborne .....	J. T. Rodda, Esq. ....	11	1 4	330 L	45·56	175
D†Truro (Royal Institution).....	Mr. Newcombe .....	5	40 0	56 A	45·04	216
D Probus (Lamellyn).....	H. Tresawna, Esq.....	5	0 6	...	47·42	176
St. Agnes .....	Mr. Opie .....	5	1 3	278 B	40·38	187
D Rame Rectory [Plymouth] .....	Rev. W. C. Evans.....	5	1 0	300 T	37·32	207
St Austell (St. Mewan).....	Rev. G. L. Woolcombe.	5	1 0	275 T	49·57	187
D* „ (Cosgarne) .....	C. Truscott, Jun., Esq.	5	1 0	194 A	53·98	232
D†* „ (Trevarna) .....	W. Coode, Esq. ....	5	0 6	300 A	56·09	241
Par Station (Penellick) .....	W. E. Geach, Esq. ...	5	0 9	240 B	40·47	...
Empacombe [Devonport] .....	L. Harvey, Esq.....	5	1 0	20	38·89	199
D St. Johns [Devonport] .....	Rev. J. H. Kirwan.....	5	1 0	20	37·61	201
D†Newquay .....	Mr. W. H. Tregidgo...	6	1 9	90 B	40·79	189
D†Liskeard (Dean Terrace) ... (47)	S. W. Jenkin, Esq., C.E.	5	1 1	375 A	53·00	232
D†Saltash (Pentillie Castle) ... (46)	Mr. C. Edwards .....	5	1 3	150 B	50·25	196
†Bodmin (Castle Street) ... weekly	Capt. Liddell, R.N. ...	5	0 1	338 T	55·48	...
D† „ { „ „ } .....	„ „ „ .....	5	1 0	338 T	53·93	235
† „ { „ „ } .....	„ „ „ .....	8	2 4	338 T	51·97	235

DIVISION V.—SOUTH-WESTERN COUNTIES—(continued.)

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain.	Days on which ·01 or more fell.
		Diameter	Height Above Ground	Height Above SeaLevel	1878	
			ft. in.	feet.	inches.	
<b>CORNWALL—(con.)</b>						
d† Bodmin (Fore Street).....	Mr. A. Hambly .....	8	2 6	336 T	53·67	244
Liskeard (St. Cleer) .....	(68) S. W. Jenkin, Esq., C.E.	5	1 1	620 T	51·74	...
d† Callington (Hingston Down) (39)	Capt. Richards .....	5	3 0	850 T	51·05	237
d† Wadebridge (Treglines S Minver)	Mr. T. Liddell, Jun. ...	5	1 8	140 T	40·61	203
† Launceston (Altarnum) .....	(28) Rev. G. Tripp.....	5	1 0	570 B	61·14	208
† „ (Hexworthy) ...	(27) H. M. Harvey, Esq. ...	5	2 7	410 T	45·28	186
D „ (South Petherwin Vic)	Rev. C. G. May .....	5	0 4	470 B	58·74	224
D Stratton (Week St. Mary) .....	Rev. G. H. Hopkins ...	8	1 3	450 B	48·03	212
<b>SOMERSET.</b>						
Crewkerne (Seaborough) .....	J. T. Stevens, Esq. ...	5	1 0	250 P	37·98	151
Chard (Cricket St. Thomas) .....	RtHn. Viscount Bridport	5	1 0	244 B	40·88	202
D Crewkerne (Bincombe House) ...	F. J. Sparks, Esq. ....	5	1 2	250 T	38·43	158
D Yeovil (West Coker) .....	Mr. A. Spurr .....	5	1 0	236 T	33·91	192
D Ilminster (White Lackington) ...	Rev. G. T. Gowing ...	5	1 0	136 T	37·51	198
D South Petherton .....	W. Blake, Esq. ....	8	0 8	150 P	30·78	189
Ilebrewers (Walrond Park) .....	J. Ostler, Esq. ....	5	0 8	116 T	30·53	142
d* Taunton (Fullands School) .....	W. Reed, Esq. ....	5	1 4	...	32·88	150
D Milverton .....	J. H. Bere, Esq. ....	5	1 0	335 P	38·87	189
D „ (Halse Rectory) .....	Rev. W. S. Thomas ...	5	1 0	245	37·02	188
D Wiveliscombe .....	Mrs. Boucher .....	5	1 2	...	39·57	205
„ (Withycombe Ho.) .....	R. P. Mogridge, Esq. ...	5	1 0	800 B	46·39	...
D Taunton (Bishops Lydeard) .....	C. Smith, Esq. ....	5	1 0	...	38·02	191
Cothelston House .....	C. Esdaile, Esq. ....	5	1 6	500	39·40	160
D Glastonbury (Street) .....	W. S. Clark, Esq. ....	8	1 0	70	35·45	194
D Exford Rectory .....	Rev. J. G. Howes .....	5	1 0	905 B	57·27	241
D Dunster (The Priory) .....	Rev. J. Utten Todd ...	5	1 0	150 B	36·77	158
Minehead (Porlock) .....	Rev. R. H. D. A. Troyte	5	...	175 P	45·60	165
Frome (North End) .....	J. Parsons, Esq. ....	8	42 6	...	32·58	158
D „ (Mells Rectory) .....	Rev. G. Horner .....	5	1 0	342 T	43·94	218
D Burnham .....	Capt. Estlin .....	5	1 0	18 T	31·15	190
E. Harptree (Sherborne Reservoir)	Bristol Water Works...	5	1 0	338 T	42·39	183
Axbridge (Winscombe) .....	Rev. R. F. Follett .....	8	1 0	150	40·94	154
Chew Magna .....	Bristol Water Works...	5	1 0	160 T	38·76	172
d† Bath (Royal Literary Institute).	C. P. Russell, Esq. ....	6	8 0	75 T	37·80	155
„ (Queen's Parade) .....	H. Stokes, Esq. ....	5	1 2	100	37·49	171
D „ (Weston) .....	.....	5	10 0	205 T	40·03	179
D Batheaston Reservoir .....	A. Mitchell, Esq. ....	6	2 0	226 T	42·35	160
Backwell .....	Rev. T. W. Huthwaite	5	1 3	200 B	39·15	177
Barrow Gurney Reservoir .....	Bristol Water Works...	5	1 0	320 T	41·99	173
D Bristol Docks .....	T. Howard, Esq., C.E. ...	8	15 3	36 T	34·28	164

DIVISION VI.—WEST MIDLAND COUNTIES.

GLOUCESTER.

Bristol (Small Street) .....	A. J. Alexander, Esq. ...	...	33 10	49	35·78	167
† Clifton (South Parade) .....	Dr. G. F. Burder .....	8	0 6	192 T	38·02	169
D Bristol (Ashleydown) .....	W. F. Denning, Esq. ...	5	0 8	200 P	38·87	198

## DIVISION VI.—WEST MIDLAND COUNTIES—(continued.)

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain. 1878	Days on which ·01 or more fell.
		Diameter	Height Above Ground	Height Above Sea Level		
			ft. in.	feet.	inches.	
<b>GLOUCESTER—(con.)</b>						
Bristol (Cote House) .....	H. St. V. Ames, Esq. ...	12	3 0	200 ?	35·82	...
D Fairford (Kempsford) .....	R. A. Iles, Esq. ....	5	0 9	...	28·25	165
D Berkeley (Salter Street) .....	J. H. Cooke, Esq. ....	5	8 0	60	35·63	159
D Nailsworth (Spring Hill) .....	E. P. Westley, Esq. ...	8	2 0	160 ?	41·66	186
D Minchinhampton (The Coigne)...	Hon. R. Henley Eden..	8	1 6	640	41·30	191
D Berkeley (Sharpness New Docks)	W. B. Clegram, Esq., C.E.	5	3 6	50	41·74	185
D Cirencester (The Firs) .....	F. Bravender, Esq. ...	5	0 8	352 $\pi$	33·02	174
D Stroud (Brimscombe Port) .....	J. H. Taunton, Esq., C.E.	8	10 0	200 $\pi$	32·87	141
„ (Cain's Cross) .....	Mr. W. B. Baker .....	5	1 0	120 $\tau$	37·18	146
D „ (Upfield) .....	Miss Stanton .....	5	1 0	226 $\pi$	36·67	190
D Fairford (Hatherop Rectory) ...	Rev. R. P. Davies .....	8	1 4	412 $\pi$	31·93	155
D Frampton-on-Severn (Saul Lodge)	W. B. Clegram, Esq., C.E.	5	3 6	42 $\pi$	34·14	222
Great Barrington [Burford] .....	J. P. Wakefield, Esq. ...	8	0 9	...	31·42	125
Northleach (Yanworth) .....	T. Arkell, Esq. ....	5	1 0	...	32·09	...
„ (Sherborne Park) ...	Hon. R. Henley Eden..	5	1 1	445	34·70	101
Gloucester (Quedgeley House) ...	Capt. T. C. Hayward...	5	0 4	50 ?	34·15	...
„ (Witcombe Res.) .....	R. Read, Esq. ....	8	3 0	300	34·26	127
D Mitcheldean (Edge Hill House)..	W. H. M. Phillips, Esq.	5	1 6	750 $\tau$	39·44	184
D Cheltenham (Battledown) .....	Sir Brook Kay, Bt. ...	5	0 9	392 $\pi$	34·97	173
„ (Northfield) .....	W. McLandsboro', Esq.	...	...	...	35·59	165
„ (Hewletts Res.) ...	„ „ „ „	8	0 6	232 $\perp$	35·46	166
„ (Southam Villa) ...	R. Tyrer, Esq. ....	5	1 0	184 $\pi$	33·18	176
„ (Prestbury) .....	The late G. Makgill, Esq.	5	1 0	271 $\pi$	33·25	196
D Moreton-in-Marsh (Frogmore)...	W. Arkell, Jun., Esq. ..	5	0 9	...	31·95	163
<b>HEREFORD.</b>						
D Ross (Rocklands) .....	J. M. Herbert, Esq. ...	8	1 10	108 $\pi$	34·34	173
† „ (The Graig) .....	H. Southall, Esq. ....	5	1 0	213 $\pi$	35·35	193
Longtown Vic. [Abergavenny] ...	Rev. C. L. Eagles .....	5	0 8	...	45·96	138
Bryngwyn .....	J. Rankin, Esq. ....	5	0 10	420 B	34·19	176
D Much Marcle (Caerswall) .....	T. Charles, Esq. ....	5	2 0	423 B	32·60	187
D Whitfield .....	Mr. W. Wheatley .....	5	0 6	427	37·14	197
Fownhope Vicarage .....	Rev. T. West .....	5	1 0	192 B	32·70	...
D Ledbury (West Bank) .....	T. E. Wheatley, Esq. ...	5	1 0	350	31·78	150
D † Hereford (Richmond Place) .....	F. Anderson, Esq. ....	8	4 9	188 $\pi$	33·50	182
D „ (Castle Street) .....	J. E. Norris, Esq. ....	8	0 6	184	34·61	174
„ (Tupsley) .....	P. Ballard, Esq. ....	5	1 1	242	33·32	...
„ (Hagley Park) .....	A. Hutchinson, Esq. ...	5	0 6	300 B	32·24	...
Ledbury (Colwall) .....	Mrs. Devas .....	5	1 0	640 ?	35·06	...
D „ (Canon Frome Vic.) ...	Rev. M. Hopton .....	8	1 3	...	31·43	166
Hereford (Stretton) .....	Rev. H. C. Key .....	5	1 0	198 $\tau$	33·33	177
„ (Credenhill Court) .....	F. W. Herbert, Esq. ...	5	1 6	450	33·11	168
„ (Burghill) .....	T. A. Chapman, Esq. M.D.	5	1 4	275	32·31	...
D „ (Thinghill, Withington)	H. Higgins, Esq. ....	5	0 10	...	30·93	192
D Staunton-on-Wye .....	Rev. H. W. Phillott ...	5	1 1	255 B	35·63	199
Bodenham (Hampton Court) .....	J. H. Arkwright, Esq. ..	8	1 4	...	32·06	150
D Kington (Lynhales) ...	S. Robinson, Esq. ....	8	1 0	...	38·72	149
D Leominster (West Lodge) .....	The late E. Southall, Esq.	5	1 0	260 $\tau$	33·08	175

DIVISION VI.—WEST MIDLAND COUNTIES—(continued.)

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain. 1878.	Days on which '01 or more fell.
		Diameter	Height Above Ground	Height Above SeaLevel		
			ft. in.	feet.	inches.	
<b>HEREFORD—(con.)</b>						
D Stoke Bliss .....	Rev. G. E. Alexander..	5	1 2	400 B	36·92	174
Wigmore.....	Rev. E. Barton .....	5	1 6	...	32·49	162
<b>SHROPSHIRE.</b>						
Burford [Tenbury] .....	Rt.Hon.LordNorthwick	5	1 2	193 A	31·10	...
D Cleobury Mortimer .....	J. Bourn, Esq. ....	5	1 0	414 A	39·58	165
Craven Arms (Stokesay) .....	Rev. J. D. La Touche..	5	1 0	371 A	34·61	185
Bishop's Castle (Castle Street) ...	E. Griffiths, Esq. ....	5	4 0	750 T	36·14	203
D " " (More Rectory)...	Rev. A. S. Male .....	5	1 0	646 A	36·14	213
D Much Wenlock (Larden Hall) ...	Miss F. Rouse Boughton	8	1 3	658 A	36·65	196
Church Stretton (Stretton House)	W. Hyslop, Esq. ....	5	1 0	613 A	40·50	195
" " (Cardington) ...	Rev. W. Elliot .....	5	1 0	700 A	36·91	190
" " (Preen Manor)...	A. Sparrow, Esq. ....	5	0 9	700 P	37·36	207
" " (Church Preen)..	Rev. F. H. Paley .....	5	0 10	750 T	37·77	207
D " " (Woolstaston)...	Rev. E. D. Carr. ....	5	1 0	807 A	40·14	210
Coalbrookdale (Horsehay).....	G. Rooum, Esq. ....	5	3 0	...	31·51	...
D Shiffnal (Haughton Hall).....	Rev. J. Brooke .....	5	3 6	353 A	33·73	160
Wellington (Old Hall School) ...	Dr. J. E. Cranage .....	5	1 6	...	34·33	181
Shrewsbury.....	Marshall & Co. ....	10	5 6	240	28·95	128
" (Fitz Manor) .....	R. Middleton, Esq. ...	5	2 6	287 B	33·34	...
" (Leaton Vicarage) ...	Rev. E. V. Pigott .....	5	1 0	267 T	33·51	203
Wem (Sansaw Hall) .....	F. G. Tippinge, Esq....	5	1 0	310 T	36·47	160
Oswestry (Hengoed) .....	Rev. A. R. Lloyd .....	5	6 0	470 A	38·68	...
Market Drayton (Buntingsdale).	Mrs. Tayleur .....	5	1 0	276 A	32·91	175
" " (Norton-in-Hales)	Rev. F. Silver .....	8	1 0	335 A	35·28	...
D " " (Adderley) .....	Rev. Athelstan Corbet..	5	0 9	245 P	33·04	...
Whitchurch .....	A. B. George, Esq., M.D.	5	3 0	...	36·50	173
<b>STAFFORD.</b>						
Kinver [Stourbridge] .....	E. B. Marten, Esq., C.E.	8	0 6	165 P	34·05	194
Amblecote [Stourbridge] .....	" " " .....	8	0 6	347 A	33·57	175
Sedgley .....	" " " .....	8	3 0	740 A	31·48	192
Walsall .....	" " " .....	8	4 0	463 A	34·04	193
D Patshull Gardens .....	Mr. T. W. Dell .....	8	1 5	400	34·33	175
D Wolverhampton (Thorganby Vil.)	G. C. Broom, Esq., C.E.	8	3 4	459 A	33·11	189
D " (Wrottesley) ...	Mr. E. Simpson .....	8	1 0	500	33·91	169
D Tamworth (Lichfield Street).....	W. Arnold, Esq. ....	5	1 0	160 P	31·70	182
Lichfield (St. Michael's) .....	Rev. J. J. Serjeantson..	5	0 6	325 A	35·78	...
D Weston-under-Lyziard [Shiffnal]	Hon. Rev. J. Bridgeman	3	0 10	...	34·55	210
D Penkridge (Rodbaston) .....	H. Ward, Esq. ....	5	0 10	260 P	34·05	184
D Church Eaton (Shushions Manor)	T. James, Esq. ....	5	1 0	325 L	34·77	191
D Burton-on-Trent (Grammar Schl)	C. U. Tripp, Esq. ....	5	1 0	160	30·53	200
D " " (Shobnall) .....	R. W. Abbotts, Esq....	5	6 0	160	27·11	155
D " " (Horninglow)...	" " " .....	5	4 0	150	29·29	205
D Stoke (Barlaston) .....	W. Scott, Esq. ....	5	1 0	520 T	36·50	173
D† Cheadle (The Heath House) .....	J. C. Philips, Esq. ....	5	1 0	647 A	37·57	190
D† " (Tean Vicarage) .....	Rev. G. T. Ryves .....	5	1 0	470 T	37·81	199
Stoke (Stanley Reservoir).....	W. H. Stubbs, Esq. ...	5	3 1	550 T	33·46	127

DIVISION VI.—WEST MIDLAND COUNTIES—(continued.)

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain.	Days on which "01 or more fell.
		Diameter	Height Above Ground	Height Above Sea Level	1878	
			ft. in.	feet.	inches.	
<b>STAFFORD—(con.)</b>						
Knypersley [Congleton] .....	W. H. Stubbs, Esq. ...	5	14 0	500 T	36·31	171
Alstonfield Vicarage).....	Rev. W. H. Purchas...	5	1 0	910 T	41·87	161
D Leek .....	S. Eyre, Esq. ....	3	6 0	530 T	35·01	197
„ (Rudyard) .....	W. H. Stubbs, Esq. ...	5	12 7	500 T	38·13	126
Biddulph Moor .....	Rev. F. Gordon .....	5	1 6	800	37·35	...
<b>WORCESTER.</b>						
D Blockley .....	R. B. Belcher, Esq. ...	5	1 0	400 ?	34·65	...
D Evesham (Lansdowne) .....	R. Burlingham, Esq....	6	5 6	124 B	30·86	136
West Malvern .....	A. H. Hartland, Esq...	8	1 6	850 B	35·13	...
D Great Malvern (Hornvold Ter.)..	W. Sandoe, Esq. ....	5	0 7	550 L	34·22	167
D Worcester (St. John's) .....	G. B. Wetherall, Esq..	5	1 0	...	32·90	167
D Tenbury (Orleton) .....	T. H. Davis, Esq. ....	5	0 9	200 ?	39·54	202
D Bromsgrove (Stoke Reformatory)	Mr. J. Macpherson.....	5	1 0	225	34·08	134
D „ (Tardebigge Res.)...	W. B. Clegram, Esq. C.E.	5	3 0	433 T	40 90	219
D „ (Upper Bittal Res.)..	„ „ „ .....	5	3 0	518 T	37·94	176
D „ Cemetery .....	The late Mr. Rose .....	5	0 9	...	34·13	...
Kidderminster (Winterfold).....	J. Harward, Esq. ....	10	5 6	327 T	28·50	181
D Hagley Rectory .....	Mr. D. Mackie .....	8	0 5	636	37·10	130
D Stourbridge (Pedmore) .....	E. B. Marten, Esq., C.E.	8	0 11	350 T	35·90	187
„ (Longlands) .....	„ „ „ .....	8	1 0	266 T	35·63	173
Dudley (Himley Road) .....	„ „ „ .....	8	5 0	605 T	34·16	175
<b>WARWICK.</b>						
D Shipston (Compton Wynyates)...	J. Sargent, Esq.....	5	2 6	...	32·72	199
Radway (Ivy Lodge).....	Rev. G. Miller .....	5	1 1	530 T	34·02	181
Stratford-on-Avon (Avonside) ...	C. Lucy, Esq.....	8	0 7	123 T	27·44	...
Leamington (Upper Parade).....	J. Barnitt, Esq. ....	5	0 8	195 T	29·97	182
Henley-in-Arden (Barrells Park)	T. H. G. Newton, Esq.	5	1 0	300 T	38·19	179
Leamington (Blackdown Hill) ...	A. S. Field, Esq. ....	5	0 9	270 T	32·57	158
D Rugby School.....	A. Sidgwick, Esq. ....	5	0 11	383 T	30·60	187
Coventry (Priory Row) .....	J. Gulson, Esq. ....	8	1 2	279 T	34·81	189
D „ (Coundon) .....	Colonel Caldicott .....	5	1 0	350 T	36·40	195
Bickenhill Vicarage).....	Rev. W. R. Capel .....	5	1 2	371 T	34·71	...
D Willey Rectory [Lutterworth]..	B. P. M. Payler, Esq...	8	1 6	350 T	31·27	203
D Birmingham (Botanic Gardens)..	Mr. Latham .....	5	5 2	...	33·40	166
† „ (Bloomsbury Street)	D. Smith, Esq. ....	8	0 8	340 T	35·43	166
† Oscott (St. Mary's College) .....	Rev. S. Whitty .....	5	0 6	461 T	29·50	189

DIVISION VII.—NORTH MIDLAND COUNTIES.

LEICESTER.

†Market Harboro' (Fairfield Rd.)	S. Watson Cox, Esq. ...	5	2 6	...	30·28	...
„ (Foxton Locks)	J. F. Bentley, Esq. ...	...	...	...	25·71	...
Bruntingthorpe .....	Rev. F. H. Bridges ...	5	1 0	400	29·07	...
D Ashby Magna .....	Rev. E. Willes .....	5	1 0	438 B	27·16	186

DIVISION VII.—NORTH MIDLAND COUNTIES—(continued.)

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain. 1878	Days on which -01 or more fell.
		Diameter	Height Above Ground	Height Above Sea Level		
			ft. in.	feet.	inches.	
<b>LEICESTER—(con.)</b>						
† Arnesby Vicarage .....	Rev. W. P. Orton .....	8	1 2	400 ?	27·89	137
† Fleckney .....	J. B. Putt, Esq. ....	5	0 10	411 †	28·70	...
D † Kibworth Beauchamp .....	T. Macaulay, Esq. ....	5	2 0	355 †	29·32	...
† Kibworth Harcourt .....	J. Marriott, Esq. ....	5	3 8	331	27·96	...
D † Leicester (Town Museum) .....	W. J. Harrison, Esq. ..	5	1 0	238 †	29·73	197
D † „ (Belmont Villas) .....	H. Billson, Esq. ....	8	1 3	240	30·03	...
D † Thornton Reservoir .....	C. Tebbutt, Esq. ....	10	2 8	420 ?	29·71	138
Barkby .....	Rev. E. N. Pochin .....	5	0 1	212	28·70	123
D Thurcaston (Cropston) .....	C. Tebbutt, Esq. ....	8	1 0	...	29·03	183
D Syston (Grove House) .....	J. Hames, Junr., Esq. ...	5	5 0	...	28·76	212
D Melton Mowbray (Dalby Hall) ...	Mr. G. Jones .....	8	2 6	480 B	27·76	176
D „ „ (Thorpe Arnold) .....	Rev. J. S. Swift .....	8	2 3	320 ?	27·65	177
Loughborough (Cedar Cottage) ...	J. Giles, Esq. ....	5	0 9	400 ?	29·38	...
„ (Water Works) .....	G. Hodson, Esq. ....	8	0 9	287	25·95	159
D Melton Mowbray (Coston Rect.) ..	Rev. A. M. Rendell ...	5	1 0	300 ?	28·27	181
D Waltham-le-Wolds .....	Mr. E. Ball .....	5	1 6	500 †	28·52	168
D Harston [Grantham] .....	C. Beasley, Esq. ....	...	1 3	...	30·68	130
D † Belvoir Castle .....	W. Ingram, Esq. ....	8	1 0	237 †	27·54	184
<b>RUTLAND.</b>						
D Uppingham (West Deyne) .....	Rev. G. H. Mullins ...	8	0 11	485	28·53	175
„ (Ayston Hall) .....	Rev. Sir J. H. Fludyer, Bt	5	1 0	...	29·36	...
D Tolethorpe Hall [Stamford] .....	C. O. Eaton, Esq. ....	8	0 8	100 ?	26·49	145
Burley-on-the-Hill .....	Mr. W. Temple .....	8	1 0	...	29·42	165
Ryhall .....	Rev. C. Pothett .....	5	1 2	...	27·54	126
D Oakham (Greetham) .....	Rev. C. A. Holmes ...	5	0 8	...	27·05	156
D Market Overton .....	Miss H. E. G. Wingfield	8	0 11	...	29·08	231
<b>LINCOLN.</b>						
Stamford (Barn Hill Ho.) .....	Dr. Newman .....	5	1 0	116 †	24·22	...
* Bourne (Wytham-on-the-Hill) ..	A. C. Johnson, Esq. ...	5	1 0	167 ?	26·09	...
Long Sutton (Tydd Gote) .....	Mr. J. Tilson .....	5	4 0	...	26·25	179
Spalding (Pode Hole) .....	Mr. A. Harrison .....	12	0 3	20 †	25·63	...
† Grantham .....	J. W. Jeans, Esq. ....	8	0 6	179 †	27·43	153
„ (Heydour Vicarage) ..	Rev. G. F. Deedes .....	5	1 10	...	24·91	130
D Boston (High Street) .....	W. H. Wheeler, Esq. C. E	5	6 6	24 †	26·77	174
D „ (Grand Sluice) .....	Mr. J. Porter .....	8	6 0	22	25·58	190
D „ (Churchyard) .....	Mr. E. C. Hackford ...	5	3 0	22	25·58	177
D Stubton [Newark] .....	G. Nevile, Esq. ....	5	4 6	...	27·70	160
Sleaford (Bloxholm) .....	Mr. D. Lumsden .....	5	1 0	20	30·18	159
D Navenby .....	Rev. J. Hays .....	8	0 6	...	28·40	187
Spilsby .....	Dr. West Walker .....	5	1 1	...	32·68	205
Horncastle (Miningsby) .....	W. H. Wheeler, Esq. C. E	5	0 6	131 †	29·15	157
D Lincoln (Longhills) .....	A. S. Leslie Melville, Esq.	5	0 6	110 ?	29·29	164
D „ (Branston Hall) .....	Mr. W. Wright .....	5	1 0	130 †	27·78	149
D Horncastle (Bucknall) .....	W. Carter, Esq. ....	5	1 2	150	28·93	155
„ (Queen Street) .....	H. George, Esq., M.D. ..	5	1 0	100	31·17	...
D † Lincoln (Boultham) .....	J. H. Teague, Esq. ...	5	1 3	18 †	28·58	158



DIVISION VII.—NORTH MIDLAND COUNTIES—(continued.)

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain.	Days on which "01 or more fell.
		Diameter	Height Above Ground	Height Above Sea Level	1878	
			ft. in.	feet.	inches.	
<b>DERBY.</b>						
Bretby Park [Burton] .....	Mr. W. Brown .....	5	4 6	340	32·17	172
Winshill [ „ ] .....	J. Matthews, Esq. ....	5	1 0	272	30·12	182
Melbourne .....	R. T. Tasker, Esq. ....	5	0 6	...	32·36	167
Derby (Findern) .....	Rev. B. W. Spilsbury..	5	0 9	188 †	29·70	...
Trent College .....	C. U. Tripp, Esq. ....	5	1 0	120	25·16	163
D Derby (Mickleover Manor) .....	Mr. J. Campbell.....	5	2 0	280	32·54	155
D „ (Christ Church Vic.) .....	Rev. W. H. Askwith..	5	1 0	265 †	34·01	166
„ (Spondon) .....	J. T. Barber, Esq. ....	5	0 7	262 †	32·32	154
„ (Duffield).....	Mr. W. Bland . ....	5	0 6	200 †	33·96	190
D Milford .....	B. Cooper, Esq. ....	5	6 0	210 †	36·33	201
D Belper (Fernslope).....	J. G. Jackson, Esq. ...	5	0 8	353 †	33·57	196
D „ (Field Head House) .....	J. Hunter, Jun., Esq. ...	8	0 8	355 †	33·65	196
D Wirksworth (Holloway) .....	R. Wildgoose, Esq. ...	5	1 1	320 †	37·11	...
†Matlock (Willersley Gardens) ...	Mr. J. Tissington .....	6	1 3	440 †	38·38	...
† „ Bath.....	R. Chadwick, Esq. ....	5	1 6	500 †	41·85	174
D Chesterfield (Hardwick Hall) ...	Mr. Wilson.....	8	1 6	594	33·70	172
D „ (Grassmoor Colliery).....	E. Bromley, Esq. ....	5	19 10	370 †	27·84	202
D Chatsworth Gardens .....	T. Speed, Esq. ....	8	6 0	372	43·64	123
Chesterfield (St. Thomas' Rect.)	Rev. J. M. Mello .....	5	3 0	314 †	30·14	146
„ .....	M. S. & L. R. Co. ....	9	3 6	248	32·73	107
†Buxton (Axe Edge) .....	E. J. Sykes, Esq. ....	8	1 0	1620 †	47·69	...
Chesterfield (Tapton Grove).....	R. G. Coke, Esq., C.E.	8	0 9	336 †	32·10	183
D „ (Linacre Reservoir).....	C. E. Jones, Esq. ....	8	5 6	490 †	31·94	167
Buxton (Poole's Cavern) .....	E. J. Sykes, Esq. ....	8	5 0	1085	49·87	...
† „ (Devonshire Hospital)...	„ „ „ .....	8	5 0	989 †	54·36	198
† „ „ „ .....	„ „ „ .....	5	1 0	995 †	53·62	...
†Stony Middleton .....	Rev. U. Smith .....	5	4 0	692 †	36·19	157
D Barlow Reservoir .....	R. G. Coke, Esq., C.E.	5	4 3	612 †	33·81	188
†Comb's Moss .....	M. S. & L. R. Co. ....	9	3 6	1669 †	35·64	...
† „ Reservoir .....	„ „ „ .....	9	3 6	710 †	37·82	200
†Chapel-en-le-Frith .....	„ „ „ .....	9	3 6	965 †	35·48	162
†Burbage House .....	Mr. J. Farrer .....	5	2 10	1277 †	35·53	...
Kilnarsh (Norwood) .....	M. S. & L. R. Co. ....	9	3 6	238 †	28·23	148
†Castleton.....	Miss Hall .....	5	1 0	700	42·76	...
†Glossop (Spire Hollin) .....	F. Hawke, Esq. ....	10	0 10	612 †	40·24	...
†Woodhead .....	M. S. & L. R. Co. ....	9	3 6	878 †	47·92	195

DIVISION VIII.—NORTH-WESTERN COUNTIES.

**CHESHIRE.**

D Nantwich (Cholmondely Castle)	Mr. J. Malcolm .....	8	1 6	42	38·50	202
Chester (Pulford Hall) .....	R. Massie, Esq. ....	5	3 0	60 †	30·95	204
D Congleton (Buglawton Vic.).....	Rev. W. Besant .....	8	5 0	347 †	35·86	200
Macclesfield (Wincle) .....	W.H. Stubbs, Esq., C.E.	5	3 0	500	41·71	148
Bosley Reservoir .....	M. S. & L. R. Co. ....	9	3 6	590 †	37·19	158
„ Minns .....	„ „ „ .....	9	3 6	1210 †	34·70	147
Chester (Curzon Park) .....	F. F. Brown, Esq. ....	5	1 0	74 †	27·74	...



DIVISION VIII.—NORTH-WESTERN COUNTIES—(continued.)

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain.	Days on which '01 or more fell.
		Diameter	Height Above Ground	Height Above SeaLevel	1878	
			ft. in.	feet.	inches.	
<b>LANCASHIRE—(con.)</b>						
Gorton.....	J. F. Bateman, Esq. FRS. ...	...	...	263 T	33.64	...
D Manchester (Plymouth Grove) ...	J. F. Roberts, Esq. ...	5	3 9	150 A	34.77	185
D " (Ardwick) .....	J. Casartelli, Esq. ....	9	3 0	140 A	33.58	180
† " (Piccadilly) .....	M. S. & L. R. Co. ....	9	40 0	194 T	34.35	167
" (Fairfield) .....	" " " " .....	9	6 0	312 T	33.59	179
D Blundellsands (Heath House) ...	T. M. Reade, Esq. C.E. ...	5	1 0	36 A	28.95	207
Stalybridge (Brushes Clough) ...	J. F. Bateman, Esq. FRS. ...	5	4 0	950 T	41.83	...
Ashton (Waterhouses) .....	M. S. & L. R. Co. ....	9	3 6	345 T	37.77	162
Manchester (Prestwich) .....	The Meteor. Council ...	8	1 0	295	36.13	191
" ( " Res.) ...	J. F. Bateman, Esq. FRS. ...	...	...	347 T	35.36	...
Oldham (Gas Works) .....	" " " " .....	5	4 0	600 T	35.79	...
D Wigan (Beech Hill) .....	S. A. Oliver, Esq. ....	5	0 6	190 ?	35.17	178
D " (Waterworks) .....	W. Bolton, Esq. ....	8	1 6	225	38.66	180
Bolton-le-Moors (The Folds) ...	H. H. Watson, Esq. ...	10	3 6	286 T	45.79	...
D " (The Freehold) ...	W. Musgrave, Esq. ....	9	6 6	352 A	47.64	190
" (Heaton) .....	R. H. Swindlehurst, Esq. ...	6	1 3	500	40.10	145
" ( " ) .....	J. S. Holdsworth, Esq. ...	10	3 6	497 A	45.56	198
" (Hurst Bank) ...	J. Watkins, Esq. ....	5	3 1	442 A	45.37	...
" (Moss Bank) ...	R. H. Ainsworth, Esq. ..	8	1 2	570 T	45.84	162
" (Smithill's Hall) .....	" " " " .....	8	1 5	515 T	46.74	196
Bury (Gin Hall).....	T. Rigby, Esq. ....	8	1 0	475	24.88	116
Rochdale (Piethorne).....	J. F. Bateman, Esq. FRS. ...	5	4 0	800 T	33.61	...
" .....	J. M. Wilson, Esq. M.D. ...	8	0 5	470 T	41.58	174
D " (Drake Street) .....	T. H. Hayle, Esq. ....	5	3 7	473 A	36.70	193
D Ormskirk (Rufford) .....	J. Porter, Esq. ....	5	0 8	38 T	34.63	204
Bolton (Belmont) .....	R. H. Swindlehurst, Esq. ...	6	0 9	800	60.60	166
Rochdale (Nayden Dane) .....	J. Diggle, Esq. ....	5	1 6	900 T	40.26	...
Southport .....	J. Baxendell, Esq. ....	5	2 8	23 A	34.17	171
Entwistle .....	R. H. Swindlehurst, Esq. ...	7	1 0	700	50.30	151
D Chorley (Whittle-le-Woods) ...	Theodore Hare, Esq. ...	5	2 6	...	36.96	172
Haslingden (Holden Wood) .....	T. Rigby, Esq. ....	8	1 0	653	68.94	154
Chorley (Withnell Hall) .....	J. Shackleton, Esq. ...	5	0 6	545	44.33	...
D Over Darwen (St. James's Vic.) ..	Rev. W. H. Blamire ...	5	1 0	564 A	47.15	180
Bacup (Calf Hey) .....	T. Rigby, Esq. ....	...	...	700	57.25	...
Blackburn (Pickup Reservoir) ...	W. B. Bryan, Esq. C.E. ...	...	1 0	720	44.50	...
" (Guide Reservoir) ...	" " " " .....	...	1 0	650	42.40	...
D Oswaldtwistle.....	W. Gourlay, Esq. ....	6	0 6	635	51.05	171
Lytham (Whalley House) .....	S. Stott, Esq. ....	8	2 1	...	33.36	225
Blackburn (Witton) .....	W. B. Bryan, Esq., C.E. ...	8	2 6	315 A	41.05	189
" (Water Works Office) .....	" " " " .....	6	30 0	400	36.31	...
" (Preston New Road) ..	" " " " .....	8	5 0	515 A	45.88	207
Accrington (Warmden Reservoir) ..	R. Crossley, Esq. ....	8	1 9	650	41.49	...
Bacup (Holmes).....	T. Aitken, Esq. ....	5	3 0	870	52.14	219
Preston (Corporation Offices) ...	H. Reah, Esq. ....	8	16 0	133	35.71	184
Rawtenstall (Clough Bridge Res.) ..	T. Rigby, Esq. ....	8	1 0	900 A	45.76	196
Huncoat (Burnley Road Res.) ...	C. Harrison, Esq. ....	9	1 6	620 A	41.14	...
Burnley (Rosegrove Cemetery) ...	W. B. Bryan, Esq., C.E. ...	8	1 0	493 A	40.41	168
" (Yorkshire Street) .....	J. Emmett, Esq. ....	...	20 0	420 A	34.58	...

DIVISION VIII.—NORTH-WESTERN COUNTIES—(continued.)

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of	Days on which ·01 or more fell.
		Diameter	Height	Height	1878	
			Above Ground	Above Sea Level		
		ft.	in.	feet.	inches.	
<b>LANCASHIRE—(con.)</b>						
Burnley (Palace House) .....	W. B. Bryan, Esq., C.E.	8	1 0	450 $\bar{\pi}$	36·86	185
„ (Brierfield) .....	„ „ „	8	1 0	402 $\bar{\pi}$	40·10	...
„ (Simonstone) .....	„ „ „	5	1 0	365 $\bar{\pi}$	38·76	182
„ (Swindon) .....	J. Emmett, Esq.	18	18 0	750 $\bar{\pi}$	43·00	...
Alston .....	H. Reah, Esq.	8	1 2	320 $\bar{\pi}$	39·43	...
Blackpool (South Shore) .....	G. Sharples, Esq.	10	1 8	29	31·92	...
„ (Arnold House) .....	T. Ward, Esq.	5	1 0	30	32·32	...
Kirkham (Weeton Res. Bank)...	J. Bradley, Esq.	10	1 0	150 $\bar{\tau}$	22·52	...
<sup>D</sup> Ecclestone (Elswick Lodge) .....	S. King, Esq.	10	1 4	55 $\bar{\tau}$	35·59	181
<sup>D</sup> Stonyhurst College .....	Rev. S. J. Perry, F.R.S.	11	1 3	376 $\bar{\pi}$	45·36	194
„ „ .....	„ „ „	11	1 0	376 $\bar{\pi}$	44·85	...
<sup>Preston</sup> „ (Knowl Green) .....	H. Reah, Esq.	8	1 2	400 $\bar{\tau}$	38·84	...
<sup>W. Works.</sup> „ (Loud-scales) .....	„ „	8	1 2	400 $\bar{\tau}$	40·56	...
„ (Spade Mill) .....	„ „	8	1 2	400 $\bar{\tau}$	39·58	...
„ (Jeffrey Hill) .....	„ „	8	1 2	900 $\bar{\tau}$	42·95	...
<sup>D</sup> St. Michael's-on-Wyre .....	Rev. P. J. Hornby	5	0 10	26 $\bar{\pi}$	35·93	169
Garstang (The Parsonage) .....	Rev. T. B. Armitstead.	5	1 0	71 $\bar{\tau}$	35·09	...
<sup>D</sup> „ (Calder Mount) .....	C. Wilson, Esq.	5	10 0	100 $\bar{\tau}$	35·19	...
Clitheroe (Downham Hall) .....	R. Assheton, Esq., M.P.	10	1 6	464 $\bar{\pi}$	39·33	...
<sup>D</sup> Garstang (Vale House) .....	J. Jackson, Jun., Esq.	6	4 3	455 $\bar{\pi}$	41·15	183
„ (Grizedale) .....	J. Bradley, Esq.	10	1 0	480 $\bar{\tau}$	37·76	...
<sup>D</sup> Lancaster (South Road) .....	W. Roper, Esq.	12	3 6	114 $\bar{\pi}$	36·26	155
„ (Escowbeck Caton) .....	J. Greg, Esq.	12	2 0	150 $\bar{\tau}$	37·88	...
„ (Halton Park) .....	A. Greg, Esq.	...	2 0	250	35·05	125
<sup>D</sup> „ (Wray) .....	Rev. C. L. Reynolds	...	1 1	165	41·82	185
Melling (Hornby Castle) .....	W. P. Blacow, Esq.	8	2 0	100 $\bar{\tau}$	41·40	188
<sup>D</sup> Barrow (Cavendish Park) .....	F. Slade, Esq., C.E.	8	2 0	60 $\bar{\pi}$	36·73	182
Arkholme (Storr's Hall) .....	F. F. Pearson, Esq.	5	1 0	220 $\bar{\tau}$	39·67	...
Cartmel (Flookburgh) .....	T. R. Croasdale, Esq.	5	2 4	70 $\bar{B}$	35·73	118
<sup>D</sup> Grange (Kent's Bank) .....	J. H. Matthews, Esq.	5	1 0	37 $\bar{\pi}$	39·14	158
<sup>†</sup> Cartmel (Holker) .....	Mr. W. Fox	8	4 8	155 $\bar{\pi}$	39·31	175
Grange (Nutwood) .....	Rev. E. Massie	5	1 6	100	41·30	181
<sup>D</sup> *Ulverston .....	J. H. Matthews, Esq.	5	5 6	98 $\bar{\pi}$	48·22	189
<sup>D</sup> „ (Powka Beck) .....	Mr. W. Fergusson	12	1 6	500 $\bar{\tau}$	48·00	169
Cartmel (Broughton Hall) .....	Col. Ainsworth	5	2 8	230 $\bar{\tau}$	46·17	174
<sup>D</sup> Ulverston (Colton) .....	Rev. A. Christopherson	5	1 0	226 $\bar{\pi}$	50·68	172
<sup>D</sup> Broughton-in-Furness .....	Rev. F. A. Malleson	5	1 3	40 $\bar{\tau}$	48·27	127
<sup>D</sup> „ (Woodland Rectory) .....	Rev. E. C. Shawfield	5	3 9	100 $\bar{\tau}$	50·21	164
Coniston (Torver Rectory) .....	Rev. T. Ellwood	5	0 6	400 $\bar{B}$	58·66	...
<sup>†</sup> Monk Coniston Park .....	V. Marshall, Esq.	10	4 11	150 $\bar{\pi}$	57·80	...
<sup>D</sup> „ „ „ .....	„ „ „	5	1 0	305	75·17	192
Hawkshead .....	W. Lane, Esq.	5	1 2	280 $\bar{\tau}$	61·37	180
<sup>D</sup> Bridge End [Little Langdale] ...	E. B. W. Balme, Esq.	...	0 9	385	88·89	175
Brathay Hall [Ambleside] .....	G. Redmayne, Esq.	5	1 6	120	62·84	169

DIVISION IX.—YORKSHIRE.

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain. 1878.	Days on which 101 or more fell.
		Diameter	Height Above Ground	Height Above SeaLevel		
			ft. in.	feet.	inches.	
<b>WEST RIDING.</b>						
Sheffield (Brincliffe Rise) .....	A. Chadburn, Esq.....	5	1 0	500 T	34·20	174
„ (Edge) .....	M. S. & L. R. Co. ....	9	3 6	336 T	33·99	168
<sup>D</sup> „ (Richmond Hill).....	W. D. Gainsford, Esq..	5	2 10	460 T	28·75	...
† „ (Redmires) .....	J. Gunson, Esq.....	10	5 0	1100 T	45·86	203
„ ( „ ) .....	„ „ „ .....	8	4 0	1100 T	45·96	...
<sup>D</sup> „ (Ranmoor) .....	J. Dixon, Esq. ....	10	3 6	600	37·24	169
<sup>D</sup> „ (Broomhall Park) .....	D. Doncaster, Jun. Esq	10	2 0	330 A	32·84	199
„ (Rivelin).....	J. Gunson, Esq. ....	10	4 0	564 A	38·24	195
„ ( „ ) .....	„ „ „ .....	8	4 0	564 A	38·76	...
„ (Crookes).....	„ „ „ .....	10	2 0	629 A	31·36	187
„ ( „ ) .....	„ „ „ .....	8	2 0	629 A	31·62	...
†Rotherham (Ulley Reservoir) ..	Mr. L. Berry .....	5	1 0	184 A	24·38	139
Sheffield (New Shoreham Street).	The Meteor. Council ..	...	10 0	269	28·42	181
† „ Station.....	M. S. & L. R. Co. ....	9	3 6	188 T	24·74	158
„ (Tinsley Locks) .....	„ „ „ .....	9	...	143 T	27·91	165
Tickhill (Sandbeck Park) ... ..	Earl of Scarborough ...	5	1 0	150 T	26·88	179
†Rotherham (Moorgate Grove) ...	R. Chrimes, Esq. ....	5	1 0	262 A	26·73	174
<sup>D</sup> Tickhill .....	G. G. Phillips, Esq. ...	8	1 0	61 A	27·10	158
Elsecar .....	M. S. & L. R. Co. ....	9	...	175 T	27·88	155
<sup>D</sup> Wath-upon-Dearne (Chapel St).	W. M. Burman, Esq... ..	8	1 0	185 A	27·25	176
„ (West Melton).....	Rev. J. Boyd .....	6	0 10	172 T	24·95	146
<sup>D</sup> „ „ .....	J. N. Baxter, Esq.....	5	1 0	100	27·93	189
Worsborough .....	M. S. & L. R. Co. ....	9	...	225 T	26·65	162
Stainborough(Wentworth Castle)	Mr. W. Fisher .....	8	2 6	520 T	29·70	167
Doncaster .....	M. S. & L. R. Co. ....	9	...	35 T	19·74	141
<sup>D</sup> „ (Magdalens) .....	Mr. J. Howorth .....	5	4 9	46 T	25·53	153
†Dunford Bridge Station .....	M. S. & L. R. Co. ....	9	3 6	954 T	57·61	178
<sup>D</sup> † „ „ „ .....	The Station Master ...	8	1 8	954 T	57·32	177
<sup>D</sup> † „ „ (Reservoir).....	Mr. G. Whitfield .....	12	2 0	1100 T	52·09	209
† „ „ ( „ ) .....	„ „ „ „ .....	8	2 1	1100 T	54·41	209
†Penistone (Carlcotes).....	M. S. & L. R. Co. ....	9	3 6	1075 T	47·96	162
† „ „ „ .....	„ „ „ „ .....	9	3 6	717 T	33·51	139
„ (Hazlehead) .....	„ „ „ „ .....	9	...	868 T	40·95	142
„ (Ingbirchworth Res.).....	W. Greenwood, Esq... ..	8	1 4	853 T	39·54	209
Holmbridge (Batley W. W.) ...	J.F.Bateman, Esq.FRS. ...	...	...	917	48·70	...
Barnsley .....	W. Greenwood, Esq... ..	8	15 4	352 T	25·10	174
<sup>D</sup> „ (Church Street) .....	Dr. Sadler .....	5	5 2	350 A	26·01	188
„ „ .....	M. S. & L. R. Co. ....	9	...	175 T	24·24	144
†Saddleworth Station .....	E. B. Smith, Esq. ....	10	4 9	610 T	34·71	...
Strines Dale [Oldham] .....	J.F.Bateman, Esq.FRS. ...	5	4 0	800 T	32·46	...
†Meltham (Harden Moss) .....	J. B. Abbey, Esq. ....	8	1 2	1200 T	46·18	...
†Marsden (Standedge).....	E. B. Smith, Esq. ....	8	1 4	1150 T	48·55	..
Denshaw [Oldham] .....	J.F.Bateman, Esq.FRS. ...	5	4 0	1050 T	43·44	...
†Meltham Grange .....	J. B. Abbey, Esq. ....	8	1 2	925 T	41·95	...
<sup>D</sup> Slaithwaite (Blackmoorfoot).....	J. Stanway, Esq. ....	8	1 0	800 T	38·11	188
<sup>D</sup> †Huddersfield (Dalton) <i>new gauge</i>	J. W. Robson, Esq. ...	8	1 0	350 A	32·54	175
Longwood (Bilberry Edge) .....	J. B. Abbey, Esq. ....	8	1 2	1100 T	39·82	...
<sup>D</sup> Mirfield (Cote Wall) .....	E. B. W. Balme, Esq. ...	...	0 9	200	32·37	165

DIVISION IX.—YORKSHIRE—(continued.)

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain. 1878	Days on which ·01 or more fell
		Diameter	Height Above Ground	Height Above Sea Level		
			ft. in.	feet.	inches.	
<b>WEST RIDING—(con.)</b>						
† Wakefield Prison .....	Dr. H. Clarke.....	8	1 0	96 $\bar{\pi}$	27·88	181
Rastrick .....	A. Clay, Esq. ....	5	1 3	410 $\bar{\tau}$	32·97	199
D Goole .....	Mr. R. G. Boyd .....	11	3 4	21 $\bar{\pi}$	20·74	136
„ .....	H. F. Parsons, Esq. ...	5	8 9	25	24·01	178
D Wakefield (Stanley Vicarage) ...	Rev. R. Burrell .....	5	1 0	100 $\bar{\tau}$	26·36	169
Halifax (Bermerside Observatory)	J. Gledhill, Esq. ....	8	0 6	490	38·11	123
„ (Thorpe) .....	F. G. S. Rawson, Esq..	8	0 8	360	45·44	168
† „ (Victoria) .....	J. E. Lambert, Esq. ...	5	1 0	795 $\bar{\tau}$	38·80	...
† „ (Gibbett) .....	„ „ „ .....	5	5 0	568 $\bar{\tau}$	39·80	...
† „ (Ramsden Wood).....	„ „ „ .....	8	1 2	816 $\bar{\tau}$	50·78	...
Methley Park.....	J. Richardson, Esq., C.E.	5	0 9	98 $\bar{\pi}$	28·43	171
Leeds (Leventhorpe Hall).....	J. T. Leather, Esq., C.E.	10	3 6	92	23·06	...
† Halifax (Midgley Moor) .....	J. E. Lambert, Esq. ...	7	0 6	1350 $\bar{\tau}$	49·72	...
† „ (Warley Moor) .....	„ „ „ .....	7	0 6	1425 $\bar{\tau}$	47·94	...
† „ (Ogden) .....	„ „ „ .....	8	1 3	990 $\bar{\tau}$	42·08	...
† „ (Walshaw Dean).....	„ „ „ .....	8	0 3	1380 $\bar{\tau}$	46·68	...
D South Milford Rectory .....	Rev. F. J. Young .....	5	1 4	60 $\bar{\tau}$	28·72	181
Bradford (Queensbury).....	W. Foster, Esq.....	8	2 2	1050 $\bar{\pi}$	49·34	173
„ (Brayshaw Reservoir) 2	A. R. Binnie, Esq., C.E.	5	1 0	982 $\bar{\pi}$	42·47	175
„ (Town Hall) .....	J. McLandsborough, Esq	8	1 0	326 $\bar{\pi}$	38·60	...
„ (The Exchange).....	„ „ „ .....	8	65 6	395 $\bar{\pi}$	35·43	170
„ (Midland Station) .....	„ „ „ .....	8	0 10	319 $\bar{\pi}$	39·42	...
„ (Farcliffe) .....	E. Milnes, Esq. ....	5	0 0	575 $\bar{\tau}$	43·09	...
„ (Thornton Moor) ...	A. R. Binnie, Esq., C.E. ..	5	1 0	1401 $\bar{\pi}$	47·50	...
„ ( „ „ Res.) 8	„ „ „ .....	5	1 0	1176 $\bar{\pi}$	50·48	197
„ (Stubden) <i>old gauge</i> 8	„ „ „ .....	8	1 0	1075 $\bar{\pi}$	49·60	197
„ (Brown Royd Res.) ...	„ „ „ .....	5	1 0	385 $\bar{\tau}$	37·70	175
„ (Nan's Scar) .....	„ „ „ .....	5	1 0	1101 $\bar{\tau}$	41·70	...
„ (Shay Green) .....	„ „ „ .....	5	1 0	1201 $\bar{\tau}$	48·56	197
„ (Stairs, Oxenhope) ...	„ „ „ .....	5	1 0	1401 $\bar{\pi}$	47·16	...
„ (Leeming Reservoir) 12	„ „ „ .....	5	1 0	850 $\bar{\pi}$	39·55	...
„ (Doe Park) <i>old gauge</i> 7	„ „ „ .....	8	1 0	810 $\bar{\pi}$	46·08	199
„ ( „ „ ) .....	„ „ „ .....	5	1 0	811 $\bar{\pi}$	45·30	200
„ (Chellow Dean) .....	„ „ „ .....	5	1 0	645 $\bar{\pi}$	38·54	166
„ (Leeshaw Reservoir) 13	„ „ „ .....	5	1 0	875 $\bar{\pi}$	44·53	164
„ (Hewenden Reservoir) 6	„ „ „ .....	5	1 0	701 $\bar{\pi}$	39·55	186
„ ( „ „ ) <i>old g.</i> 6	„ „ „ .....	5	1 0	700 $\bar{\tau}$	43·96	186
„ (Heaton Res.) <i>old gauge</i> 5	„ „ „ .....	8	1 0	530 $\bar{\pi}$	40·04	151
„ ( „ „ ) .....	„ „ „ .....	5	1 0	531 $\bar{\pi}$	40·02	151
D† Leeds (Holbeck).....	Messrs. Marshall & Co.	10	32 0	127 $\bar{\pi}$	27·84	167
„ ( „ „ ) .....	„ „ „ .....	5	1 8	95 $\bar{\pi}$	29·25	167
„ ( „ „ W. Works Depot)	E. Filliter, Esq., C.E..	8	0 9	93 $\bar{\pi}$	30·96	172
„ (Woodhouse Moor).....	„ „ „ .....	8	0 9	307 $\bar{\pi}$	31·93	182
„ (Elmete Hall, Roundhay).	J. Kitson, Esq. ....	5	1 0	400 $\bar{\tau}$	33·32	184
„ (Weetwood Reservoir) ...	E. Filliter, Esq., C.E...	8	0 9	328 $\bar{\pi}$	32·07	189
„ ( „ „ Hall) .....	H. C. Marshall, Esq....	5	0 7	400 $\bar{\pi}$	34·24	201

The figures in this type 26 refer to the Map facing page 50 of *British Rainfall*, 1876.

DIVISION IX.—YORKSHIRE—(continued.)

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain. 1878	Days on which ≥ .01 or more fell
		Diameter	Height Above Ground	Height Above Sea Level		
			ft. in.	feet.	inches.	
WEST RIDING—(con.)						
Leeds (Allerton Hill) .....	T. Fenwick, Esq., C.E.	5	0 7	418 $\nabla$	31·82	...
<sup>D</sup> „ (Crag Wood, Horsforth) 36	J. Fox, Esq., C.E. ....	5	1 0	350 $\nabla$	36·33	205
Shipley (Victoria Park) ..... 35	J. McLandsborough, Esq.	5	1 0	360	33·17	...
„ (Moor Head) .....	G. Knowles, Esq. ....	8	10 0	450	32·42	...
Bingley (The Grange) .....	J. McKie, Esq. ....	5	0 11	430 $\nabla$	36·38	182
Shipley (Eldwick) .....	E. Filliter, Esq., C.E. ...	8	0 9	848 $\nabla$	32·73	176
Leeds (Eccup) .....	„ „ „ .....	8	0 9	343 $\nabla$	34·71	194
<sup>D</sup> Bashall Lodge [Clitheroe] .....	W. Garnett, Esq. ....	5	1 10	217 $\nabla$	45·60	167
Skipton (Rye Croft, Crosshills) 42	G. Parkinson, Esq. ...	8	1 0	405 $\nabla$	43·07	164
Harewood (Arthington) .....	E. Filliter, Esq., C.E. ...	8	0 9	139 $\nabla$	36·67	188
Skipton (Gill Grange, Silsden) 15	A. R. Binnie, Esq., C.E. ...	5	1 0	883 $\nabla$	35·82	...
<sup>D</sup> Ilkley (Ashburn) .....	J. I. Dymond, Esq. ....	8	0 8	400 $\nabla$	42·66	201
<sup>D</sup> „ (West Parade) .....	J. Hainsworth, Esq. ...	3	0 7	278 $\nabla$	35·55	...
Skipton (Silsden Reservoir) ... 16	A. R. Binnie, Esq., C.E. ...	5	1 0	560 $\nabla$	34·74	160
<sup>D</sup> Thornton-in-Craven .....	T. Wilson, Esq. ....	5	5 4	456 $\nabla$	41·19	192
Slaidburn (Whiteholme) .....	Mrs. Birchall .....	5	1 3	475 $\nabla$	57·12	147
Skipton (Cringles Reservoir) 17	A. R. Binnie, Esq., C.E. ...	5	1 0	760 $\nabla$	35·76	158
„ (Counter Hill) .....	„ „ „ .....	5	1 0	951 $\nabla$	37·15	...
„ (Chelker Reservoir) ... 19	„ „ „ .....	5	1 0	730 $\nabla$	36·75	...
York (Phil. Soc. Gardens) .....	The Meteor. Council ...	8	1 9	53 $\nabla$	28·72	...
<sup>†</sup> „ (Cherry Hill) .....	H. Richardson, Esq. ...	5	1 6	60 $\nabla$	27·94	...
„ (Bootham) .....	J. F. Fryer, Esq. ....	5	0 6	50 $\nabla$	27·25	...
„ (Heworth) .....	Mrs. Kitching .....	5	1 0	...	28·77	...
Wetherby (Ribston) .....	Mr. Jones .....	5	1 2	130 $\nabla$	31·83	117
Harrogate .....	J. Coupland, Esq. ....	...	0 6	380	34·84	142
Skipton (Coniston Cold Vicarage)	Rev. J. Stansfeld .....	6	2 3	474 $\nabla$	40·26	...
„ (Barden Res.) <i>old g.</i> 20	A. R. Binnie, Esq., C.E. ...	8	1 2	746 $\nabla$	47·86	184
„ ( „ „ ) .....	„ „ „ .....	5	1 0	746 $\nabla$	46·26	184
Otterburn-in-Craven .....	W. Gomersall, Esq. ...	5	1 0	510 $\nabla$	45·97	153
<sup>D</sup> Nun Monkton Rectory .....	Rev. S. I. Crawhall ...	8	1 0	46 $\nabla$	32·52	175
Skipton (Upper Res., Barden) 21	A. R. Binnie, Esq., C.E. ...	5	1 0	1250 $\nabla$	43·82	184
„ (Thorpe Fell „ ) 22	„ „ „ .....	5	1 0	1661 $\nabla$	41·96	...
„ (Sandbed Beck, Burnsall) 23	„ „ „ .....	5	1 0	676 $\nabla$	47·54	...
<sup>D</sup> † Settle (Langcliffe) .....	Rev. T. McIntire .....	8	2 0	623 $\nabla$	45·31	211
Pateley Bdg (Grimwith Res) <i>old g.</i> 24	A. R. Binnie, Esq., C.E. ...	8	1 0	890 $\nabla$	45·06	196
„ „ ( „ „ ) .....	„ „ „ .....	5	1 0	893 $\nabla$	45·00	196
„ „ ( „ „ Trunla) 25	„ „ „ .....	5	1 0	1201 $\nabla$	46·33	...
<sup>D</sup> „ „ (Castle Stead) .....	Mr. A. C. Young .....	5	1 0	410 $\nabla$	44·75	194
Boroughbridge (Aldbrough) ...	Rev. R. W. Marriott ...	5	3 7	70	29·70	...
<sup>D</sup> Malham Tarn .....	Mr. Coulthard .....	5	1 0	1296 $\nabla$	59·09	208
<sup>D</sup> Arncliffe .....	Rev. W. Boyd .....	8	2 6	750 $\nabla$	58·55	207
Ingleborough .....	J. Farrer, Esq. ....	10	6 2	514	39·06	...
Ripon (North Lodge) .....	F. D. Wise, Esq. ....	5	1 0	120	29·55	...
„ (Borrage House) .....	Rev. S. Joy .....	8	1 0	...	30·10	...
„ (High Bank, Mickley) ...	Miss Harrison .....	5	1 0	225 $\nabla$	36·46	170
<sup>D</sup> Kettlewell (Buckden) .....	Rev. W. R. Metcalfe ...	10	2 7	800 $\nabla$	59·14	190
Wharfedale (Oughtershaw Hall).	C. H. L. Woodd, Esq. ...	8	1 6	1200 $\nabla$	60·01	125
Dent (Stone House) .....	Mrs. Nixon .....	5	2 0	800 $\nabla$	56·49	184

## DIVISION IX.—YORKSHIRE—(continued.)

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain. 1878	Days on which ·01 or more fell.
		Diameter	Height Above Ground	Height Above Sea Level		
			ft. in.	feet.	inches.	
<b>WEST RIDING—(con.)</b>						
D Sedbergh (Brig Flatts).....	J. Handley, Esq. ....	5	1 0	300	44·98	180
D „ .....	J. Dockeray, Esq. ....	5	4 4	420	50·56	210
„ (Thorne Hall) .....	Miss Elam .....	5	1 6	400 †	47·55	199
<b>EAST RIDING.</b>						
D Patrington .....	W. B. Pugh, Esq. ....	5	0 3	10 †	29·32	204
Hull .....	The Meteor. Council ...	8	1 0	15	26·89	192
D† „ (York Parade, Beverley Rd)	H. Smith, Esq. ....	8	4 8	12 †	27·86	212
D „ (Derringham) .....	W. Lawton, Esq. ....	5	2 2	10 †	27·58	192
D „ (People's Park).....	Mr. E. Peak .....	5	0 6	6	30·24	193
Brough (Brantinghamthorpe) ...	Mr. R. C. Kingston ...	5	2 6	...	30·29	...
D Cottingham.....	J. N. Hill, Esq. ....	8	1 3	26 †	23·62	203
D Beverley (Alexandra Terrace)...	T. Dyson, Esq. ....	12	8 0	54 †	23·84	161
D Market Weighton (Holm-on-the-Wolds)	Mrs. Harland .....	5	4 0	154 †	26·99	...
Hornsea (East Gate House) .....	J. A. Wade, Esq. ....	5	3 0	40 †	25·99	134
D Pocklington (Warter) .....	J. Coxon, Esq. ....	5	1 10	230 †	33·53	190
„ (Gt. Givendale) ...	Miss Singleton .....	5	4 3	473 †	36·29	...
D Thixendale.....	Rev. W. H. Fox .....	10	0 9	425 †	37·76	203
Lowthorpe (The Elms) .....	H. Onslow Piercy, Esq.	5	1 0	63 †	34·23	200
D Langton [Malton] .....	Rev. A. Shadwell .....	10	1 0	150 †	29·52	171
D Hunmanby (Foxholes Rectory)...	Rev. R. H. Foord .....	5	1 0	234 †	37·02	205
„ (Wold Newton Vic.)	Rev. T. S. Ackland ...	5	1 9	195 †	48·78	209
D Ganton Hall [Scarborough] .....	Mr. Greasley .....	5	1 0	250 B	31·89	199
<b>NORTH RIDING.</b>						
Flaxton Grange .....	H. Richardson, Esq. ...	5	1 0	90	27·31	...
†Malton.....	H. Hurlley, Esq. ...	10	1 0	75 †	30·61	...
D Thirsk (Kilburn) .....	Rev. G. Richardson ...	5	1 0	329 †	33·27	175
Bishopdale (Kidstones) .....	Rev. F. W. Stow .....	3	1 0	990 †	56·58	...
D „ (The Rookery) .....	Mr. J. Loving.....	5	1 0	605	52·63	222
Aysgarth (Nell Bank, Walden)...	Rev. F. W. Stow .....	3	1 0	1100 †	45·86	...
D Bedale (Thorpe Perrow) .....	Mr. W. Culverwell ...	5	1 6	170	29·68	165
Scarborough (Osgodby).....	E. Filliter, Esq., C.E. ...	8	0 9	162 †	27·57	132
Thirsk (Mawnby Hall) .....	Mr. Jackson .....	5	1 2	100	27·22	...
Aysgarth Vicarage.....	Rev. F. W. Stow .....	12	2 0	650 †	41·23	...
D „ (Thornton Rust) .....	Mr. H. A. Pearson.....	5	2 0	850	42·17	172
Leyburn (Wensley) .....	G. W. Wray, Esq.....	7	1 0	650 †	37·33	...
Scarborough Post Office .....	The Meteor. Council ...	8	1 2	130	32·25	...
D†Hawes (Hardrow Vicarage) .....	Rev. R. Pink .....	5	1 0	790 †	53·74	220
D „ (Lunds Church) .....	„ „ .....	5	1 0	1100 †	62·40	200
D Swaledale (Summer Lodge)....	Mr. Broderick.....	5	1 0	1041 †	55·79	193
*Northallerton .....	Dr. Hodgson .....	5	1 3	133 †	26·20	...
Catterick (Tunstall) .....	H. C. Marshall, Esq....	5	1 0	350	29·00	...
D Richmond (The Grove) .....	G. Roper, Esq. ....	5	1 3	...	34·67	125
Northallerton (Rounton) .....	I. L. Bell, Esq., M.P., FRS.	8	0 7	200	28·57	...
Reeth (Eskeleth House) .....	W. Whitwell, Esq. ....	8	1 0	947 †	48·10	145
D Richmond (Middleton Tyas).....	J. E. Backhouse, Esq..	8	1 0	350 B	25·35	...
+ „ (Barningham Park)...	Sussex Millbank, Esq..	5	1 2	650	28·96	...

Numbers printed thus [1] refer to the Map facing page 52 of *British Rainfall, 1876.*

DIVISION IX.—YORKSHIRE—(continued.)

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain.	Days on which ·01 or more fell.
		Diameter	Height Above Ground	Height Above SeaLevel	1878	
			ft. in.	feet.	inches.	
NORTH RIDING—(con.)						
D East Layton [Darlington] .....	Mrs. Maynard .....	5	1 0	575	30·49	...
†Brignall Mill [Barnard Castle][5]	Mr. T. Tennett .....	5	1 0	660 †	35·79	...
D Richmond (Forcett Park) .....	Mr. E. Shinner .....	5	1 0	360 †	31·91	177
D Whitby (Guisborough Road) ...	M. Simpson, Esq. ....	5	2 0	184 †	27·01	176
" (Port Mulgrave) .....	J. Hodgson, Esq. ....	5	4 6	350 †	27·98	...
Middlesboro' (Grey Towers).....	W. R. J. Hopkins, Esq.	8	1 6	317 †	29·11	158
Guisborough (Hutton Hall) .....	J. W. Pease, Esq., M.P.	5	1 3	400 †	31·70	177
D " (Lockwood Beck Res.) ...	W. P. Anson, Esq., C.E.	8	1 0	632 †	36·27	178
†Mile Rigg [Brough] .....	G. J. Symons, Esq. F.R.S	8	1 0	1400 †	48·50	...
†Romaldkirk (Balder Head) [11]	" " " .....	8	1 0	1100 †	44·00	...
" (Hury Mill) ...[10]	" " " .....	8	1 0	...	36·55	...
†Lune Head [Brough].....[13]	Mr. G. Wade .....	8	1 0	1779 †	53·10	...
D Middlesboro' (Southfield Villas).	W. Fallows, Esq. ....	5	2 0	21 †	28·12	155
†Mickleton [Middleton] .....	G. J. Symons, Esq. F.R.S	8	1 0	775 †	38·76	...
" (Lime Kiln Pasture)..	" " " .....	8	1 0	...	41·20	...

DIVISION X—NORTHERN COUNTIES.

DURHAM.

D Darlington (Dinsdale Rectory)...	Rev. J. W. Smith .....	5	2 0	54 †	30·06	151
D†Eaglescliffe [Yarm] .....	Rev. J. Hull .....	5	1 0	80 †	31·66	178
D " (South End) .....	Mr. N. Black .....	8	0 10	140	28·28	185
D " (Flora Gardens).....	Mr. W. Wrather .....	8	2 0	147 †	28·22	150
D " (Cleveland Parade)..	S. Hare, Esq.....	5	1 0	160 †	28·97	193
D " (Brinkburn) .....	Mr. H. Ward.....	8	1 3	165 †	28·25	146
D†Gainford .....	A. Atkinson, Esq. ....	5	1 0	250 †	30·60	173
†Staindrop (Raby Castle) .....	Mr. R. Westcott .....	8	1 0	460 †	29·75	...
Darlington (Heighington).....	Rev. C. C. Chevallier ..	5	4 0	460 †	31·99	171
D Sedgfield Asylum .....	R. Smith, Esq., M.D...	5	1 0	360 †	32·80	151
†Widdy Bank [Brough] .....	Mr. A. Hood .....	8	1 0	1550 †	54·50	...
†Middleton (Langdon Beck) [19]	" " .....	8	1 0	1600 †	50·80	...
D Hartlepool (Heugh Lighthouse)..	W. Belk, Esq., C.E. ...	5	0 6	34 †	35·72	231
D " (Hurworth Burn) ...	T. Fenwick, Esq., C.E.	5	0 7	360	32·61	118
D " (Hart Reservoir).....	" " " .....	8	0 9	164	28·00	119
D†Wolsingham .....	Mr. A. Mitchell .....	5	1 0	464 †	35·53	188
D Durham Observatory.....	G. A. Goldney, Esq. ...	12	4 8	340 †	36·69	190
Seaham Harbour .....	The Meteor. Council ...	8	1 9	60	29·63	...
" (Vicarage) .....	Rev. A. Bethune .....	5	0 4	80 †	30·82	121
D " (Hall) .....	Mr. R. Draper .....	5	1 0	100 †	29·98	109
D Chester-le-Street (Birtley) .....	R. C. Clephan, Esq. ...	5	0 9	205 †	30·50	198
Sunderland (W. Hendon House)	T. W. Backhouse, Esq.	5	1 0	132 †	31·03	...
" (The Limes) .....	J. W. Mounsey, Esq...	5	0 6	120	29·15	...
D Gateshead (Eighton Cottage) ...	T. M. Favell, Esq., C.E.	5	0 10	515 †	34·81	145

NORTHUMBERLAND.

D†Allenheads .....	Mr. J. Charlton .....	8	0 4	1353 †	47·72	204
D Shotley Hall .....	Mr. J. Coulson .....	5	0 9	315 †	33·94	139

DIVISION X.—NORTHERN COUNTIES—(continued.)

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain. 1878	Days on which 1/10 or more fell.
		Diameter	Height Above Ground	Height Above SeaLevel		
			ft. in.	feet.	inches.	
<b>NORTHUMBERLAND—(con.)</b>						
Shotley House .....	Mr. R. Inglis .....	5	2 6	340	30·62	142
Bywell.....	Mr. J. Dawson .....	8	0 6	87 †	35·00	210
Haltwhistle (Unthank Hall) ...	Rev. Dixon Brown.....	5	0 9	380 †	40·15	...
D Corbridge-on-Tyne (LauderGnge)	T. Hurst, Esq., jun. ...	5	0 8	270	28·56	173
Newcastle (Philos. Society) .....	W. Lyall, Esq. ....	8	1 5	105 †	34·86	...
„ (Rye Hill) .....	Robert Foster, Esq. ...	8	1 2	220 †	31·94	177
„ (Gladstone Terrace)...	W. Smurthwaite, Esq..	2	6 0	150 †	30·93	144
D „ (Town Moor) .....	Mr. W. Neill .....	5	0 6	201 †	33·54	192
North Shields (Wallsend).....	J. W. Dees, Esq. ....	10	0 6	100 †	32·06	...
„ (Post Office) .....	The Meteor. Council ...	8	1 4	100	26·77	...
D† „ (Rosella Place) ...	R. Spence, Esq. ....	8	1 0	126 †	29·81	179
„ (Low Lights) .....	J. R. Proctor, Esq. ...	8	3 4	22 †	30·93	182
D „ (Tynemouth) .....	P. J. Messent, Esq., C.E.	5	2 8	65 †	29·01	199
„ (Clementhorpe) ...	J. R. Procter, Esq. ...	5	1 0	150 †	30·47	177
„ (Billy Mill Res.)..	T. M. Favell, Esq., C.E.	5	0 10	197 †	26·03	...
„ (Whitley Convales. Ho.)..	C. Roope, Esq. ....	5	0 6	38	25·03	...
D „ (Earsdon) .....	Late John Taylor, Esq.	5	2 10	185 †	28·73	163
Humshaugh .....	Rev. H. Taylor .....	5	1 6	286 †	29·97	...
Stamfordham .....	Rev. J. F. Bigge .....	8	1 0	400 †	28·32	...
Bingfield House .....	J. Coppin, Esq. ....	5	1 0	445 †	31·33	178
Newcastle and Gateshead W. Works {	D. D. Main, Esq. ....	10	...	...	25·91	...
Whittle Dean .....	„ „ „ .....	10	0 6	500 †	32·16	...
{ Swinburn (Woodford).....	„ „ „ .....	10	0 6	800 †	35·67	...
{ North Tyne (Green Crag) ...	„ „ „ .....	10	0 6	300	32·42	...
{ „ „ (Valley) .....	„ „ „ .....	10	0 6	469 †	33·89	...
{ Hallington .....	„ „ „ .....	10	0 6	563 †	31·93	...
{ „ (Fawcett) .....	„ „ „ .....	10	0 6	676 †	33·83	...
{ Gunnerton Burn (Camphill)..	„ „ „ .....	10	0 6	373 †	39·74	180
Bellingham (Hesleyside) .....	W. H. Charlton, Esq... †	5	1 0	399	35·90	205
D Hartburn (Wallington).....	Mr. W. McCombie.....	5	1 0	...	33·18	183
D Morpeth (Meldon Park) .....	Mr. J. Finlay .....	5	0 10	24 †	30·31	181
D „ (Sheepwash) .....	Hon. & Rev. W. C. Ellis	5	0 10	1000 †	48·90	...
Deadwater .....	Mr. Scott .....	3	1 6	300 †	34·20	156
Rothbury (Brenckburn Priory) ..	C. H. Cadogan, Esq. ...	5	1 0	410 †	38·61	170
D „ (Whitton Tower) .....	Rev. Dr. Ainger.....	8	1 0	400 †	35·17	137
„ (Cragside) .....	Mr. W. Bertram .....	5	1 0	500 †	34·91	121
Alwinton (Harbottle) .....	T. Thompson, Esq. ...	...	...	...	37·21	...
D Howick Hall .....	Rt. Hon. Earl Grey, K. G.	8	0 10	121 †	32·89	205
Ilderton (Lilburn Tower) .....	E. J. Collingwood, Esq.	10	6 0	300 †	39·51	...
Cheviot (Broadstruther) .....	G. P. Hughes, Esq. ...	8	4 0	1692 †	50·19	...
D Pawston [Coldstream] .....	B. P. Selby, Esq. ....	8	1 0	328 †	33·02	191
*Wooler (Milfield) .....	G. A. Grey, Esq. ....	5	0 6	200 †	31·51	...
Belford (Middleton Hall) .....	J. T. Leather, Esq., C.E.	10	2 0	240 †	29·55	...
<b>CUMBERLAND.</b>						
Ravenglass (The Grove) .....	J. Ross, Esq. ....	5	3 6	80 †	31·83	...
Braystones .....	J. D. Watson, Esq. ...	10	3 8	36 †	30·89	...

DIVISION X.—NORTHERN COUNTIES—(continued.)

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain.	Days on which ·01 or more fell.
		Diameter	Height Above Ground	Height Above Sea Level	1878	
			ft. in.	feet.	inches.	
<b>CUMBERLAND—(con.)</b>						
Scafell Pike .....	(4) J. Maitland, Esq. ....	4	0 6	3200 T	49·25	...
Esk Hause .....	(6) " " " .....	4	0 6	2550 T	61·62	...
Wasdale Head .....	(1) " " " .....	4	0 6	247 T	80·25	...
Brant Rigg .....	(3) " " " .....	4	0 6	695 T	56·46	...
Sprinkling Tarn .....	(7) " " " .....	4	0 6	1985 T	88·37	...
Styehead Tarn .....	(8) " " " .....	4	0 6	1472 T	103·33	...
†The Stye .....	(10) " " " .....	4	0 6	1077 T	149·04	...
Taylor's Gill .....	(9) " " " .....	4	0 6	1077 T	135·66	...
St. Bees (Abbot's Court) .....	A. Hodgetts, Esq. ....	5	1 1	20 L	33·99	151
†Seathwaite .....	(11) Mr. Birkett.....	4	0 6	422 T	110·96	...
D† " .....	(11) " " .....	5	1 0	422 T	111·88	177
* " .....	(11) " " .....	8	1 0	422 T	110·25	...
* " .....	(11) H. C. Marshall, Esq....	5	1 0	420 P	103·75	...
†Wythburn Vicarage.....	(20) Rev. Basil Lawson.....	8	1 0	574 T	76·75	...
†Watendlath.....	(13) G. J. Symons, Esq. F.R.S.	8	1 0	867 T	68·00	...
†Whitehaven (Irish Street) .....	T. F. T'Anson, Esq. ...	5	1 1	21 N	34·16	153
D†Keswick (Barrow House) ...	(46) S. Z. Langton, Esq. ...	8	0 6	282 N	58·74	203
D Loweswater (Waterend) .....	Mrs. Jackson .....	5	1 0	432 T	40·44	170
†Ullswater (Hallsteads) .....	(36) A. Marshall, Esq. ....	10	4 0	490 T	51·90	...
D†Keswick (Deer Close) .....	(45) H. C. Marshall, Esq....	7	1 9	300 T	50·77	197
D† " (Derwent Island)...	(14) " " " .....	5	0 7	280 T	44·87	224
D† " (Post Office) .....	(16) Mr. Crosthwaite.....	8	6 4	270 T	52·25	161
†* " .....	(16) " " " .....	5	1 0	270 T	51·19	161
D Cocker mouth (Whinfell Hall) ...	W. Robinson, Esq. ...	5	2 0	265 N	43·03	211
" (Brandlingill) .....	Capt. F. R. Sewell.....	5	1 0	320 T	40·08	188
†Bassenthwaite (Mirehouse) .....	Mrs. Spedding .....	5	0 6	310 T	47·15	185
Workington (Stainburn) .....	C. Litt, Esq. ....	8	1 0	101 N	31·26	155
D Cocker mouth (Derwent House...)	Dr. Dodgson .....	5	0 6	144 N	36·05	190
D† " (Higham) .....	T. A. Hoskins, Esq. ...	8	0 6	478 N	40·70	198
" (Broughton Grange) .....	G. S. Wilson, Esq. ...	5	1 6	209 N	32·59	168
†Penrith (Sandath House) .....	Miss Crone .....	5	1 0	570 T	30·77	188
† " (Fell Lane) .....	T. Lester, Esq. ....	5	5 0	575 N	28·97	158
D " (The Luham, Edenhall). .....	G. Varty Smith, Esq... ..	5	1 0	270 T	30·83	186
D Blencowe School.....	T. Fawcett, Esq. ....	8	0 9	601 B	35·93	176
Maryport (Wyndham Row) .....	G. S. Wilson, Esq. ...	5	1 0	350 T	31·36	...
" (Risehow) .....	" " " .....	5	1 0	50 T	27·83	...
" (Netherhall) .....	H. P. Senhouse, Esq....	8	0 6	27 N	28·93	138
D Aspatria (Brookfield) .....	M. Lidbetter, Esq.....	5	0 9	124 N	29·18	176
D Alston (Love Lady Shield)..[21]	T. W. Dickinson, Esq..	5	1 0	1145 N	47·40	236
Carlisle (Wreay Vicarage) .....	Rev. T. Lees .....	5	2 0	310 P	27·67	199
D Silloth (The Rectory) .....	Rev. F. Redford.....	8	3 0	28 N	29·26	166
D†Carlisle (Cemetery).....	Mr. T. Bell.....	8	0 8	114 N	29·68	185
† " (Scotby) .....	A. Sutton, Esq. ....	8	5 0	140 T	29·08	160
D " (Kirkandrews-on-Eden). .....	Miss M. E. Creighton..	5	0 7	...	31·52	189
D† " (Scaleby Hall) .....	R. A. Allison, Esq. ...	5	1 0	112 N	31·70	155
Kirkandrews-on-Esk Rectory ...	Rev. F. Taylor .....	5	0 6	100 N	33·51	...

NOTE.—The numbers marked thus (11) on this and the next page refer to the Map facing p. [144] of *British Rainfall, 1877.*

DIVISION X.—NORTHERN COUNTIES—(continued.)

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain.	Days on which '01 or more fell.
		Diameter	Height Above Ground	Height Above Sea Level	1878	
			ft. in.	feet.	inches.	
<b>WESTMORELAND.</b>						
Kirkby Lonsdale .....	Mr. W. Harrison .....	5	1 6	209	45·55	...
D " " (Casterton).....	R. A. Clarke, Esq.....	8	1 0	305 N	47·57	179
" " (Biggins House).....	Miss Tomlinson .....	12	3 6	400 T	45·56	...
" " (Whelprigg) ...	Mrs. Gibson .....	5	2 0	475 N	45·61	187
D Kendal (Kent Terrace) .....	R. J. Nelson, Esq.....	5	1 6	146 T	43·76	179
" (Highgate) .....	E. Hayton, Esq.....	8	5 0	180 N	44·35	163
D " (Underfell) .....	F. Wilson, Esq.....	8	1 0	300 B	46·97	174
D " { " } .....	" " " .....	8	1 0	300 B	45·20	...
" " { " } .....	" " " .....	8	3 0	300 T	44·94	174
D " (Hawesmead) .....	G. Braithwaite, jun. Esq.	8	0 6	175 N	44·92	202
Bowness (Matson's Grounds) ...	G. Healey, Esq.....	12	0 8	451 N	51·10	193
D Staveley .....	I. B. Godfrey, Esq. ...	5	1 0	320 N	53·78	209
D Windermere (The Wood) .....	Rev. G. Crewdson .....	8	3 2	322 N	57·18	...
" (Holehird) .....	R. M. Dunlop, Esq. ...	8	1 0	425 T	51·86	...
D Ambleside (Brathay Vic.) ... (56)	Rev. H. S. Callender...	5	1 3	150 N	61·77	203
D Elterwater (Woodlands)..... (50)	E. Tucker, junr., Esq..	5	0 9	244 N	77·52	213
D† Ambleside (Nook Cottage) ... (51)	Mr. E. Hird .....	5	1 0	229 T	65·07	214
† " (Lesketh Howe) (26)	F. M. T. Jones, Esq....	5	2 6	175 T	66·33	...
D† Grasmere (High Close) .....	E. B. W. Balme, Esq....	8	0 9	553	66·71	202
D Ravenstonedale (Brownber) .....	J. Fothergill, Esq.....	5	3 0	855 T	36·53	189
Kirkstone Pass..... (34)	G. J. Symons, Esq. F.R.S	5	1 0	1500 T	84·38	...
† Grasmere (Easdale Tarn)..... (47)	Mr. R. Hayton .....	8	1 0	1175 T	84·50	...
D*† Kirkby Stephen .....	T. Mason, Esq. ....	5	1 0	574 T	38·08	174
D Shap (Copy Hill)..... (58)	Mr. W. Hoggarth .....	5	1 0	874	45·33	228
† Crosby Ravensworth .....	Rev. G. F. Weston ...	8	1 0	600 T	38·61	...
Haweswater (Measandbecks) (41)	G. J. Symons, Esq. F.R.S	8	1 0	1200 T	45·50	...
D Patterdale Hall .....	Mr. H. H. Hurt.....	7	1 6	490 T	74·81	193
D† Crosby Ravensworth (Reagill) (54)	Mr. W. Wilkinson.....	8	0 6	890 T	37·50	151
† Patterdale (Greenside Mine) (32)	Mr. T. Taylor.....	7	1 6	1000 T	85·89	183
Ulleswater (Swarth Fell) ... (39)	G. J. Symons, Esq. F.R.S	8	1 0	1000 T	45·00	...
" (SharroW Bay) mtlly (38)	A. Parkin, Esq. ....	5	0 7	500 T	41·10	...
" ( " " ) ... (38)	" " " .....	8	1 6	500 T	38·25	...
Appleby .....	Dr. Armstrong .....	5	1 0	442 N	29·89	...
" (Morland Hall) .....	Mrs. E. Busfield .....	5	5 0	500 T	25·03	...
† Great Strickland [Penrith]... (44)	Late H. Plumer, Esq....	5	1 0	650 T	36·27	152
† Lowther Castle [Penrith] ... (43)	Mr. W. Shand .....	8	3 6	750 T	34·90	129
D Brougham Hall [Penrith].....	Mr. A. Lodge.....	5	5 5	470	31·80	176
† Hurth Syke [Alston]..... [20]	Mr. T. Todd .....	8	1 0	2000 T	69·40	...

DIVISION XI.—MONMOUTH, WALES, AND THE ISLANDS.

<b>MONMOUTH.</b>						
D Newport (Springfield) .....	G. B. Getling, Esq. ...	5	1 0	180 T	49·45	182
D " (Gold Tops).....	T. Dyne Steel, Esq. C.E.	...	0 6	90	48·17	174
" (The Grove, Malpas) ...	T. D. Roberts, Esq., C.E.	8	1 6	50	41·24	...
D Llanfrechfa Grange .....	F. J. Mitchell, Esq. ...	5	4 0	326 N	56·90	162
D Caerleon (Lansoar) .....	Rev. J. James .....	5	3 2	75 T	41·22	146

DIVISION XI.—MONMOUTH, WALES, AND THE ISLANDS—(continued.)

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain.	Days on which ·01 or more fell.
		Diameter	Height Above Ground	Height Above SeaLevel	1878	
			ft. in.	feet.	inches.	
<b>MONMOUTH—(con.)</b>						
Pontypool (Llanthewy Vach Rec.)	Rev. J. E. J. Machem..	5	...	...	46·00	...
D Chepstow (Piercefield Park).....	H. Clay, Esq.....	5	1 6	300 ?	48·13	165
D Newport (Llangibby Castle).....	D. Lawrence, Esq.....	8	2 10	...	41·46	177
D „ (Cwm Tyllery) .....	T. Jones, Esq.....	5	1 0	954 $\nabla$	58·67	203
D Tredegar (Bedwellty House) ...	J. Colquhoun, Esq. ...	8	1 0	972 $\nabla$	57·74	192
„ (Ebbw Vale) .....	R. S. Jordan, Esq.....	5	1 0	918 $\nabla$	66·31	195
D Abergavenny (Larchfield) .....	Dr. McCullough.....	5	1 0	220 B	40·21	182
Monmouth (Dingestow Court) ...	S. R. Bosanquet, Esq ..	5	1 0	250 ?	35·08	...
<b>GLAMORGAN.</b>						
* Cowbridge (Ham) .....	G. W. Nicholl, Esq. ...	8	1 3	96 ?	34·81	130
Porthkerry (Buttrill) .....	D. Davis Joseph, Esq...	5	1 0	250 $\uparrow$	38·25	124
Cardiff (Cemetery).....	Mr. C. Hatch .....	5	1 0	95 $\uparrow$	50·11	182
D „ (Crockherbtown) .....	T. Garrett Horder, Esq.	8	1 0	36 $\uparrow$	47·14	170
D† „ „ .....	W. Adams, Esq., C.E..	5	1 0	37 $\nabla$	45·71	183
D „ (Castle) .....	Mr. A. Pettigrew .....	5	1 3	...	47·34	183
„ (Ely) .....	T. G. South, Esq. ....	5	3 0	45	43·47	163
Cowbridge (Ash Hall) .....	D. Owen, Esq. ....	8	1 0	315 $\nabla$	43·23	199
D† Cardiff (Pentyrch).....	F. G. Evans, Esq. ....	5	1 1	100 $\uparrow$	49·19	181
„ (Lisvane) .....	T. G. South, Esq. ....	5	2 0	142	44·30	170
Pontypridd (Treorchy) .....	W. T. Lewis, Esq., C.E.	5	1 0	554 $\nabla$	79·59	173
D Swansea (South Dock Lock).....	R. Capper, Esq.....	12	14 9	40	27·74	144
D Neath .....	H. S. Ludlow, Esq. ...	5	1 0	240 $\uparrow$	46·40	190
D „ (Glyncorwg) .....	D. Brown, Esq. ....	5	4 6	730	83·03	218
Aberdare (Treherbert) .....	W. T. Lewis, Esq., C.E.	5	1 0	640 $\nabla$	74·41	177
„ (Ty Draw Treherbert)	D. Davis Joseph, Esq...	5	1 0	735 $\uparrow$	91·51	182
„ (Mardy) .....	W. T. Lewis, Esq., C.E.	5	1 0	431 $\nabla$	65·37	167
„ (Abernant) .....	E. Jones, Esq. ....	5	1 0	425 $\uparrow$	65·57	172
Merthyr Tydfil (Thomas Town)..	T. J. Dyke, Esq. ....	6	4 0	550 $\nabla$	48·03	163
D Ystalyfera .....	Dr. D. Thomas .....	8	1 2	250	59·58	169
<b>CARMARTHEN.</b>						
Llanelly Water Works.....	E. H. Douglas, Esq. ...	13	5 0	255 L	40·94	123
† Carmarthen (Gaol).....	Mr. Rees .....	8	0 6	92 $\nabla$	45·83	218
D† „ (Joint Co. Asylum)..	Dr. Hearder .....	8	1 0	189	46·00	219
Tegfynydd [Narberth] .....	H. S. Morgan, Esq. ...	5	1 0	158 $\nabla$	52·61	164
Llandilo (Golden Grove) .....	Rt. Hon Viscount Emllyn	6	0 6	...	54·99	216
Dynevor Castle .....	Rt. Hon. Lord Dynevor	8	1 0	236 $\uparrow$	53·88	215
<b>PEMBROKE.</b>						
Pembroke (Stackpole Court).....	Rt. Hon. Earl of Cawdor	5	1 0	60 $\uparrow$	43·91	151
„ (St. Ann's Head).....	The Meteor. Council ...	8	0 8	150	37·01	...
D* Haverfordwest (High Street) ...	E. P. Phillips, Esq. ...	5	1 0	95 $\uparrow$	54·05	172
D Solva .....	E. Robinson, Esq. ....	5	1 0	90 B	40·40	196
D Fishguard (Castle Hill).....	Dr. J. H. Wathen .....	5	0 10	200 B	48·10	177
D Llechryd (Castle Malgwyn) .....	Mr. H. Howard .....	5	1 0	...	46·10	204

## DIVISION XI.—MONMOUTH, WALES, AND THE ISLANDS—(continued.)

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain. 1878	Days on which ·01 or more fell.
		Diameter	Height Above Ground	Height Above Sea Level		
		ft.	in.	feet.	inches.	
<b>CARDIGAN.</b>						
D Lampeter (St. David's College) (63)	Prof. A. W. Scott .....	4	...	420	44·09	173
D Aberystwith (Goginan) .....	H. Trenwith, Esq. ....	5	2 6	290	42·46	190
D† " (Gogerddan) ... (93)	Sir Pryse Pryse, Bart. ..	5	1 0	80 B	40·70	215
Waenbull [Machynlleth] .....	" " " .....	8	1 0	1380 B	74·50	...
<b>BRECKNOCK.</b>						
D Nanthir Reservoir [Aberdare] ...	T. L. Edwards, Esq. ....	5	1 0	860 T	61·97	225
" " [ " ] ...	" " " .....	8	1 0	860 T	62·36	...
Crickhowell (Llangatock Park).	Usk Fishery Board ...	...	...	300	46·92	...
" (Glanusk Park) .....	Mr. Ireland .....	8	0 6	300 ?	44·62	...
D Brecknock .....	J. Kirk, Esq. ....	5	2 0	437 T	47·73	177
" (Watton Mount) .....	G. Overton, Esq. ....	5	4 6	450 T	46·41	...
<b>RADNOR.</b>						
D Rhayader (Nantgwilt) .....	R. L. Lloyd, Esq. ....	5	1 0	767 B	63·76	211
D† Heyope Rectory .....	Rev. W. W. Griffith ...	5	1 0	690 T	48·13	179
<b>MONTGOMERY.</b>						
† Llanidloes (Ystrad-olwyn-fawr) 59	Mr. J. Jones ... ..	8	1 0	950	64·80	...
† " (Dolenog) .....	T. F. Roberts, Esq. ...	5	2 6	550 T	49·43	191
Plynlimmon (Nantiago Mine) ...	Mr. W. J. Lefeaux ...	5	1 0	2000 B	91·79	178
D Newtown (Dolfor) .....	W. B. Pugh, Esq. ....	5	0 3	1027	40·69	195
Churchstoke (Mellington Hall) ..	P. Wright, Esq., F.C.S.	5	1 6	550 T	34·18	...
D Montgomery (Llandysil) .....	Rev. R. J. Roberts .....	5	1 0	300 ?	33·12	205
D Carno (Tybrite) .....	Miss Marsh .....	5	1 6	...	51·38	207
† Garthbibio (Lluest fawr) ... (49)	Mr. J. Jones .....	8	1 0	990 T	55·80	...
<b>FLINT</b>						
Treiddyn (Nant-y-ffrith) .....	R. V. Kyrke, Esq. ....	5	1 0	850	38·66	...
Mold (Bryn Alyn) .....	Rev. R. B. Cooke .....	5	1 2	483 T	35·48	...
Hawarden [Chester] .....	Dr. Moffat .....	8	0 6	270	29·21	166
Flint (Soughton Hall, Northop).	J. Scott Bankes, Esq. ...	5	0 8	418	35·60	209
St. Asaph (Nantllys) .....	P. P. Pennant, Esq. ...	5	1 0	173 T	28·85	...
Holywell (Maes-y-dre) .....	J. Williams, Esq. ....	10	5 0	370 T ?	19·51	...
" (Bagillt) .....	A. O. Walker, Esq. ...	5	1 6	20 T	28·65	179
D Rhyl .....	W. T. Girdlestone, Esq.	5	2 3	21 T	25·58	166
† Prestatyn (Nant) .....	T. G. Dixon, Esq. ....	5	1 2	30 ?	25·95	198
<b>DENBIGH.</b>						
D† Ruabon (Wynnstay) ..new gauge	Mr. Middleton .....	12	3 0	484 T	36·75	213
Wrexham (Plas Power) .....	Mr. J. Clark .....	5	1 0	472 T	38·22	195
" (Brymbo) .....	C. E. Darby, Esq. ....	6	6 3	632 T	36·44	...
D Rosset (Trevalyn Hall) .....	Capt. Griffith Boscawen.	5	1 0	58 T	31·25	199
Denbigh (Glan-y-Wern) ... (84)	Lt.-Col. Humberston ...	5	1 0	...	28·01	149
D " (Vale Street) .....	J. Lloyd Roberts, Esq. ..	5	1 0	230 T	32·95	188
" (Dyffryn Aled) .....	P. W. Yorke, Esq. ...	5	1 2	650 T	42·08	173

The numbers in parenthesis refer to the Map facing page 196 of *British Rainfall, 1875.*

## DIVISION XI.—MONMOUTH, WALES, AND THE ISLANDS—(continued.)

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain. 1878.	Days on which ·01 or more fell.
		Diameter	Height Above Ground	Height Above Sea Level		
			ft. in.	feet.	inches.	
DENBIGH—(con.)						
Abergele (Kinnel Park).....(80)	Lady F. Hughes .....	5	0 4	250	31·45	...
Colwyn (Nant-y-Glyn).....	A. O. Walker, Esq. ...	5	1 3	160	28·12	161
Abergele (Bryn Euryn).....(76)	Mr. T. Hutchings .....	5	1 0	125 T	30·18	176
MERIONETH.						
Aberdovey .....	Miss Charles .....	5	12 0	48 T	34·61	...
D Towyn (Peniarth) .....	Mr. G. Murray .....	5	2 0	12	40·62	180
Mynfford Junction .....	E. Mathews, Esq. ....	5	1 3	...	43·11	217
†*Dolgelly (National School)...(21)	Mr. Williams .....	5	1 0	43 T	57·83	211
† " (Brithdir) .....	J. Hill, Esq. ....	5	1 6	465	55·53	...
† " ( " ) .....	" .....	5	5 3	474	40·79	...
" (Nannau Park) .....	Mr. G. Cooke .....	12	3 0	690	58·31	197
Trawsfynydd.....(4)	Major Mathew .....	5	0 7	700	52·70	162
Bala .....	" .....	5	1 0	544	50·73	154
D Llanderfel (Palé Gardens)...(88)	Mr. T. Ruddy.....	8	1 0	606 T	48·06	212
D Corwen (Rhug Gardens) .....	Mr. J. Bennett .....	5	1 0	500	39·25	154
CARNARVON.						
Pwllheli (Bodfaen) .....	Major Mathew .....	5	4 9	80	36·98	182
*Llanystumdwy (Talarvor)...(16)	" .....	5	3 0	50	32·14	146
†*Port Madoc .....	" .....	5	3 0	10	42·04	219
*Llangybi (Cefn) .....	" .....	5	1 1	200	41·91	152
Beddgelert (Bryn Gwynant) (66)	J. Wyatt, Esq. ....	9	3 0	264 B	95·00	189
Pen-y-gwryd .....	Mr. H. Owen .....	8	...	860	100·25	172
Carnarvon (Cocksidia) .....	Major Mathew .....	5	1 1	120	33·28	218
†Llanfairfechan .....	R. Luck, Esq. ....	5	0 8	150 B	39·36	154
D†Llandudno (Warwick House)(29)	Dr. Nicol .....	8	0 8	99 T	29·66	187
ANGLESEA.						
D Llangadwaladr (Bodorgan) .....	Mr. J. Ellam .....	8	4 0	...	32·37	200
D Rhianva [Bangor].....	Capt. E. H. Verney, R.N.	8	1 5	24 L	33·91	194
Holyhead .....	The Meteor. Council ...	8	1 2	44	31·15	...
ISLE OF MAN.						
D Douglas (Derby Square) .....	P. Killey, Esq. ....	5	1 1	78	38·18	179
" (Victoria Road) .....	H. Story, Esq. ....	8	1 0	120 L	36·47	188
Point of Ayre.....	Bd. of Northern Lights	...	...	...	23·37	118
ISLES OF SCILLY.						
St. Mary's .....	The Meteor. Council ...	8	1 6	77 L	38·75	...
JERSEY.						
St. Helier (Noirmont) .....	The Meteor. Council ...	8	1 0	270	40·07	...
D St. Aubins .....	J. E. Vibert, Esq. ....	8	1 0	140 B	41·12	199
" .....	" .....	8	18 4	155	35·01	...
D Millbrook .....	P. Langlois, Esq. ....	5	1 0	50 L	40·30	205
Rozel Manor .....	R. R. Lempriere, Esq..	...	...	...	46·00	...
GUERNSEY.						
D Guernsey (Grange Road) .....	Dr. Mansell .....	5	1 0	174 B	43·94	211
" (York Place) .....	Dr. Hoskins, F.R.S. ...	12	12 0	204 B	43·73	190

## SCOTLAND.

## DIVISION XII.—SOUTHERN COUNTIES.

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain.	Days on which -01 or more fell.
		Diameter	Height Above Ground.	Height Above Sea level	1878	
			ft. in.	feet.	inches.	
<b>WIGTOWN.</b>						
Mull of Galloway .....	Bd. of Northern Lights	...	...	...	21·25	...
*Wigton (N. Balfern).....	T. MacLelland, Esq. ...	5	0 9	100 $\bar{\pi}$	29·91	...
Corsewall .....	Bd. of Northern Lights	...	3 4	22 $\bar{p}$	29·88	...
<b>KIRKCUDBRIGHT.</b>						
Little Ross .....	Bd. of Northern Lights	...	3 3	130 $\bar{p}$	22·88	...
Kirkcudbright (Auchencairn) ...	A. Buchan, Esq. ....	...	...	20	38·93	...
Dalbeattie (Colvend Manse).....	Rev. J. Fraser .....	5	1 6	120 $\bar{\tau}$	30·37	...
Twynholm (Cally).....	A. Buchan, Esq.....	5	1 0	87	36·12	...
Kirkbean (Woodside Cottage) ..	Mr. J. Foulds.....	5	3 0	30 $\bar{\tau}$	37·90	...
*Dalbeattie .....	R. W. Macnab, Esq....	5	0 8	50 $\bar{p}$	37·41	...
<sup>D</sup> New Abbey (St. Mary's) .....	Rev. W. Downie .....	3	0 4	54 $\bar{\tau}$	36·67	102
<sup>D</sup> Cargen [Dumfries] .....	P. Dudgeon, Esq. ....	3	0 4	80 $\bar{\pi}$	34·35	158
Ashbank [Dumfries].. ..	T. Corrie, Esq. ....	3	0 6	...	31·30	...
<sup>D</sup> New Galloway .....	R. McKay, Esq.....	8	20 0	220 $\bar{\pi}$	35·85	162
Irongray (Drum Park) .....	D. J. Kay, Esq.....	3	0 6	230	43·58	...
<sup>D</sup> *Carsphairn .....	J. Hannah, Esq.....	5	3 10	574 $\bar{\tau}$	49·88	136
<b>DUMFRIES.</b>						
<sup>D</sup> Annan (Warmanbie).....	Mr. Elliot .....	8	3 0	100 $\bar{\tau}$	33·73	147
Canobie (Byreburnfoot).....	W. Doughty, Esq.....	3	0 6	200	39·63	174
Langholm (Caulfield) .....	J. C. Little, Esq. ....	3	1 0	650 $\bar{\tau}$	39·80	...
„ (Ewes School) .....	„ „ .....	3	0 6	450 $\bar{\tau}$	47·70	...
Closeburn (Wallace Hall).....	Mrs. Ramage .....	3	0 10	207 $\bar{\tau}$	26·30	...
Thornhill (Capenock) .....	T. S. Gladstone, Esq...	5	1 0	300	37·98	162
Kirkpatrick Juxta (Broomlands)	A. Buchan, Esq. ....	3	0 3	346	50·90	...
Durrisdeer (Drumlanrig Castle)	„ „ .....	3	0 6	191	38·20	...
Moffat (Ericstane) .....	Mr. Welsh .....	...	...	550	49·40	...
<sup>D</sup> Sanquhar (Wanlockhead).....	Mr. G. Dawson .....	3	0 5	1330 $\bar{\tau}$	58·73	...
<b>ROXBURGH.</b>						
New Castleton (The Flatt) .....	J. Elliot, Esq. ....	3	0 9	350 $\bar{\tau}$	39·80	...
„ „ (Kirndeane) .....	Miss Elliot .....	3	0 9	400 $\bar{\tau}$	41·20	...
<sup>D</sup> Teviothead Manse .....	Rev. R. Young .....	...	...	...	44·05	157
Hawick (Wolfelee) .....	Sir W. Elliot, Bt., F.R.S.	5	0 3	608	36·83	...

DIVISION XII.—SOUTHERN COUNTIES—(continued).

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain.	Days on which '01 or more fell
		Diameter	Height Above Ground.	Height Above Sea level	1878	
			ft. in.	feet.	inches.	
<b>ROXBURGH—(con.)</b>						
Hawick (Braxholme) .....	A. Buchan, Esq.....	...	0 2	451	27·99	...
„ (Goldielands) .....	Prof. Elliot.....	3	0 8	534 $\nabla$	30·63	...
„ (Kirkton) .....	Mr. J. Welsh .....	3	0 6	759 $\nabla$	33·40	...
<sup>D*</sup> „ (Silverbut Hall) .....	Mr. D. Elder .....	5	4 0	512 $\nabla$	31·90	176
*Jedburgh (Sunnyside) .....	G. Hilson, Jun., Esq... 5	6 0	350 $\nabla$	25·65	134	
St. Boswell's (Elliston) .....	The Hon. G. Dalrymple 5	1 0	350 $\nabla$	29·93	193	
<sup>D</sup> Kelso (Springwood Park) .....	Sir G. Douglas, Bt..... 10	1 0	130 $\nabla$	27·12	199	
Melrose (Dingleton Mains) .....	Miss Turnbull.....	5	5 0	500 ?	34·99	...
<sup>D</sup> „ (Abbey Gate) .....	Mr. A. Dodds.....	5	0 6	280 $\nabla$	33·39	229
<sup>D</sup> Wooplaw [Galashiels] .....	J. Murray, Esq.....	5	1 0	880 $\nabla$	34·41	214
„ [ „ ] .....	„ „ .....	3	1 0	880 $\nabla$	31·34	215

DIVISION XIII.—SOUTH-EASTERN COUNTIES.

<b>SELKIRK.</b>						
Borthwickbrae [Hawick] .....	W. E. Lockhart, Esq... 8	0 2	800 $\nabla$	40·28	...	
Bowhill .....	Mr. Mathison.....	9	11 0	548 $\nabla$	33·88	...
Galashiels (Abbotsford Rd.).....	Dr. Somerville .....	5	0 6	412 $\nabla$	36·32	201
<b>PEEBLES.</b>						
<sup>D</sup> Glenrath (Manor) .....	Mr. S. Linton.....	5	1 2	764 $\nabla$	36·22	128
Cairnmuir .....	A. Buchan, Esq... ..	12	0 5	1150	40·70	...
<sup>D</sup> Penicuik (N. Esk Reservoir) ...	Mr. J. Garnock .....	11	0 6	1150 $\nabla$	40·30	164
<b>BERWICK.</b>						
Coldstream (Milne Graden) .....	A. Buchan, Esq.....	8	0 8	103	26·90	...
Lauder (Thirlestane Castle).....	„ „ „ .....	3	0 3	558 $\nabla$	33·55	...
<sup>D</sup> Marchmont House .....	Mr. P. Loney .....	5	1 0	500 $\nabla$	35·46	201
Dunse (Mungo's Walls) .....	Mr. J. Thomson.....	3	0 6	267	30·47	...
St. Abb's Head .....	Bd. of Northern Lights ...	...	0 4	211 ?	26·56	120
<b>HADDINGTON.</b>						
Yester.....	A. Buchan, Esq.....	12	1 0	425	28·92	...
Haddington Asylum .....	„ „ „ .....	5	1 0	235	29·00	...
„ (Millfield) .....	Mr. J. R. Brown .....	6	4 0	140	27·45	...
Dunbar (Thurston) .....	A. Buchan, Esq.....	6	4 0	327	27·00	...
<sup>D</sup> East Linton .....	Mr. J. Storie .....	3	0 3	90 $\nabla$	26·65	151
Prestonkirk (Smeaton) .....	A. Buchan, Esq.....	...	...	...	25·18	..
North Berwick (Seacliffe).....	„ „ .....	8	5 0	80	25·80	...
<b>EDINBURGH.</b>						
Harehill .....	W. H. Cameron, Esq... ..	...	...	...	42·70	...
Rosewell Asylum .....	A. Buchan, Esq.....	5	0 6	695	29·53	...
<sup>D</sup> Glencorse .....	W. H. Cameron, Esq... ..	...	0 6	787	38·25	125



DIVISION XIV.—SOUTH-WESTERN COUNTIES—(continued).

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain.	Days on which .01 or more fell.
		Diameter	Height Above Ground	Height Above Sea Level		
			ft. in.	feet.	inches.	
<b>RENFREW.</b>						
	Mearns (Newton) .....	P. R. Murdoch, Esq....	5 1 0	350	40.75	...
Gorbals's Dist.	Ryat Lynn .....	†Glasgow Water Works	8 0 5	310	44.30	...
	Waulk Glen .....	" " "	12 0 5	280	42.10	...
	Middleton .....	" " "	12 0 5	550	51.45	...
Paisley W. Works	Nither Cairn .....	" " "	...	700	53.20	...
	Stanely Reservoir .....	R. Sharp, Esq.....	12 1 0	190	42.53	...
	Back Thornlymuir .....	" " .....	12 1 0	646	44.68	...
	Muirhead .....	" " .....	12 1 0	482 $\pi$	47.01	...
	Springside .....	" " .....	12 1 0	532	50.80	...
	Glasgow (Queen's Park) .....	Mr. D. McLellan .....	8 0 5	144 $\pi$	26.18	140
	Shaws W. Wks (Compensation Res) .....	J. Wilson, Esq., C.E....	6 0 9	600	55.00	...
	" " (Loch Thom) .....	" " " .....	5 1 0	643	56.29	211
	" " (Shiel Hill) .....	" " " .....	6 0 9	962 $\pi$	55.70	...
	" " (Mansfield) .....	" " " .....	5 1 0	580 $\rho$	56.61	216
	" " (Spango Burn) .....	" " " .....	6 0 9	757 $\pi$	51.40	...
	Greenock .....	A. Buchan, Esq.....	...	...	47.48	...
D	" (Hole Glen) .....	J. Wilson, Esq., C.E....	5 1 0	603 $\pi$	51.90	178
	" (Glenbrae) .....	" " " .....	6 0 9	574 $\pi$	54.40	...

DIVISION XV.—WEST MIDLAND COUNTIES.

DUMBARTON.

	Helensburgh (Lyleston) .....	Forrest Frew, Esq.....	...	...	39.75	...
	Alexandria (Caldarvan) .....	R. D. Mackenzie, Esq..	11 0 1	260 $\dagger$	42.50	...
	" (Auchendennan).....	A. Scott, Esq.....	6 0 9	...	44.40	...
	Helensburgh Water Works).....	J. M. Gale, Esq., C.E..	6 0 3	296 $\pi$	45.92	142
	Alexandria (Cameron House) ...	A. Smollett, Esq. ....	6 1 0	50	48.20	...
	" (Balloch Castle).....	A. J. D. Brown, Esq...	7 0 4	91 $\pi$	43.95	167
	Loch Long (Arddaroch) .....	J. White, Esq.....	5 0 9	80	69.51	...
	Loch Lomond (Firkin) .....	A. McDowall, Esq.....	3 1 0	100	77.00	...
	Arrochar.....	Rev. J. Dewar .....	5 0 9	10	68.19	...

STIRLING.

	Strathblane (Mugdock Reservoir)	Glasgow Water Works	8 0 6	320	38.50	...
	Falkirk (Kerse) .....	Rt. Hon. Earl Zetland.	8 1 0	...	26.10	...
D	Killearn (Old Ballikrain) .....	Miss Anstruther.....	5 0 6	200	42.04	164
	Stirling (Polmaise Gardens).....	Mr. W. Ritchie .....	6 0 9	12	31.85	...
	Ben Lomond .....	Glasgow Water Works	...	1800	64.80	...

BUTE.

	Arran (Pladda) .....	Bd. of Northern Lights	...	3 3	55 $\rho$	33.76	119
	Holy Island (Lamlash Light Ho.)	" " "	...	...	...	30.80	...
	Rothsay (Mount Stuart) .....	J. Kay, Esq. ....	3 3 0	100	42.30	...	
D	" (Barone Cottage) .....	" " .....	5 1 0	116 $\pi$	42.42	176	

† Information supplied by J. M. Gale, Esq., C.E.

DIVISION XV.—WEST MIDLAND COUNTIES—(continued).

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain.	Days on which '01 or more fell.
		Diameter	Height Above Ground	Height Above Sea Level		
			ft. in.	feet.	1878	
					inches.	
ARGYLL—(MAINLAND.)						
	Lochgilthead (Kilmory) <i>Thom's g</i>	Capt. Sir J. W. P. Orde, Bt	6 0 4	92	52.77	...
D	„ „ „	„ „ „	5 0 4	92	56.39	...
D	„ „ „ <i>Snowdon</i>	„ „ „	5 ...	...	53.74	...
D	„ „ (Auchnaba).....	„ „ „	5 1 0	40	51.72	200
D	„ „ (Callton Mór or Polta'loch)	Mr. J. Russell .....	3 4 0	65	48.14	...
	„ „ (Ederline) .....	Mr. D. McLeod .....	5 1 0	80	60.13	155
	Inverary Castle .....	Mr. J. Caie .....	6 0 6	28 †	53.00	...
D	Dalmally.....	J. B. Lawes, Esq., F.R.S.	5 1 0	200 †	66.51	201
	Oban (Dunollie).....	A. Buchan, Esq.....	...	55	47.73	...
	Forest Lodge [Tyndrum] .....	A. McDowall, Esq.....	3 1 0	600 †	70.00	...
	Appin (Aird's) .....	R. Macfie, Esq. ....	6 0 11	38 †	44.40	...
	„ „ „ <i>old gauge</i>	„ „ „	5 0 11	38 †	48.80	...
D	Glen Etive (Druimachoish) .....	Mr. A. Greig .....	5 2 0	100	85.63	160
D	Strontian (Laudale) .....	A. Fletcher, Esq. ....	8 1 4	15	68.55	195
D	Loch Sunart (Glenborrodale) ...	J. J. Dalgleish, Esq. ...	5 0 2	60 †	61.35	177
	Ardnamurchan .....	Bd. of Northern Lights	...	82 †	45.73	189
	Loch Eil (Corran) .....	„ „	...	14 †	69.03	173
ARGYLL—(INSULAR.)						
	Cantire, Mull of.....	Bd. of Northern Lights	...	279 †	38.56	139
	„ „ (Campbeltown, Devaar)	„ „ „	...	3 4 75 †	37.15	...
	„ „ (Skipness Castle) .....	Mr. P. Maclean .....	6 1 6	20 †	43.30	...
D	„ „ (Stonefield, Tarbert) ...	Colin G. Campbell, Esq	3 0 8	90	63.30	190
D	Islay (Ardbeg) .....	Mr. C. Hay .....	5 1 0	7 †	45.92	205
	„ „ (Rhinns) .....	Bd. of Northern Lights	...	3 0 74 †	31.89	...
	„ „ (Lochindaul).....	„ „	...	...	41.89	...
	„ „ (McArthurshead).....	„ „	...	...	57.75	...
D*	„ „ (Eallabus).....	J. S. B. Ballingall, Esq.	5 1 0	67 †	45.12	199
D	„ „ (Gruinart School House) ...	Mr. D. Mac Gilp .....	5 1 0	214 †	39.37	185
	„ „ (Rhuvaal).....	Bd. of Northern Lights	...	...	41.40	...
	Jura (Lowlandmansbay) .....	„ „	...	...	51.67	...
	„ „ (Fladda) .....	„ „	...	...	39.25	...
	Lismore (Mousedale).....	„ „	3 4	37 †	36.63	...
	Mull (Earraid) .....	„ „	...	...	22.12	...
	„ „ (Calgary) .....	J. M. Mackenzie, Esq. ...	5 1 6	120	67.62	...
D	„ „ (Quinish) .....	J. N. Forsyth, Esq. ...	5 0 6	35	46.35	207
	„ „ Sound of .....	Bd. of Northern Lights	...	...	62.20	...
	Tyree (Hynish) .....	„ „	...	...	36.26	...

DIVISION XVI.—EAST MIDLAND COUNTIES.

CLACKMANNAN.

Dollar .....

Mr. A. Blackwood .....	...	...	174	40.17	...
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KINROSS.

Loch Leven Sluice .....

W. Tullis, Esq. ....	...	0 6	360	32.10	...
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DIVISION XVI.—EAST MIDLAND COUNTIES—(continued).

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain. 1878	Days on which ·01 or more fell.
		Diameter	Height Above Ground	Height Above Sea Level		
			ft. in.	feet.	inches.	
<b>FIFE.</b>						
D Dunfermline (Craigluscar) .....	W. Chisholm, Esq. ...	10	0 10	460 $\bar{\pi}$	219·60	...
D " (Outh) .....	L. Dalgleish, Esq. ....	5	0 2	890 $\bar{\pi}$	31·90	164
Isle of May .....	Bd. of Northern Lights	...	...	...	20·89	...
Elie .....	A. McDowall, Esq. ...	5	1 0	30	27·00	...
Falkland (Lothrie Reservoir) ..	A. Buchan, Esq. ....	5	0 1	700	30·76	...
Auchtermuchty .....	Dr. Troup .....	5	1 0	179 $\bar{\pi}$	30·50	139
Cupar Asylum .....	A. Buchan, Esq. ....	5	0 3	204	23·16	...
" (Birkhill) .....	" " .....	5	0 5	130	24·53	...
St. Andrews .....	" " .....	5	0 6	57	22·72	...
Leuchars (Ballmullo) .....	" " .....	5	0 9	100	23·62	...
Kilmany (Mountquhanie House).	D. Gillespie, Esq. ....	3	1 3	240	25·00	...
<b>PERTH.</b>						
D Culross (West Grange) .....	J. J. Dalgleish, Esq. ...	5	0 2	116 $\bar{\pi}$	31·93	213
Aberfoyle .....	Glasgow Water Works	8	0 6	60	45·30	...
Dunblane (Kippenross) .....	J. Stirling, Esq. ....	6	0 4	150	26·40	...
Loch Dhu .....	Glasgow Water Works	8	0 6	325	68·30	...
Ledard .....	" " "	...	...	1500	60·80	...
Loch Drunkie .....	" " "	8	0 6	420	51·10	...
" Vennachar .....	" " "	8	0 6	275	49·70	...
D Lanrick Castle .....	A. Glover, Esq. ....	3	0 9	...	37·55	...
Bridge of Turk .....	Glasgow Water Works	8	0 6	270	57·90	...
Loch Katrine (Tunnel Hill Top)	" " "	8	0 6	830	65·70	...
Between Glen Finlas & Bed Ledi.	" " "	8	0 6	1800	48·40	...
Callander (The Gart) .....	A. Buchan, Esq. ....	6	0 4	242	42·78	...
Glen Gyle .....	Glasgow Water Works	...	...	380	82·00	...
Auchterarder (Glensherup) .....	W. Chisholm, Esq. ...	11	0 11	900 $\bar{\pi}$	41·92	...
" House .....	Mr. Maclean .....	8	2 3	172 $\bar{\pi}$	37·31	...
D " (Colquhalzie) .....	Mr. R. Morton .....	8	0 5	150 ?	31·08	106
Lochearnhead (Stronvar) .....	A. Buchan, Esq. ....	...	...	...	63·36	...
" (Balquhiddel) .....	" " .....	5	1 0	...	53·77	...
Crieff (Ochertyre) .....	" " .....	3	0 9	325	32·46	...
Perth Academy .....	Dr. Miller, F.R.S.E. ...	15	64 5	83 $\bar{\pi}$	18·27	...
" (Inchbank) .....	" " .....	10	1 6	24 $\bar{\pi}$	24·11	...
" (Prison) .....	A. Buchan, Esq. ....	5	0 3	38	26·30	...
Glenalmond .....	The Meteor. Council ...	...	1 0	530	36·16	153
D Dunkeld (Inver Braan) .....	Rev. J. M. B. Murdoch	...	...	...	29·63	...
" (H.R.S.) .....	The Station Agent .....	5	1 0	225	29·33	...
Meigle (Belmont Castle) .....	P. Murray, Esq. ....	8	37 0	237	25·40	...
" (Arthurstone House) .....	P. Carmichael, Esq. ...	5	2 3	187 $\bar{\pi}$	26·54	...
" ( " Garden) .....	" " .....	5	2 3	196 $\bar{\pi}$	25·97	...
D Aberfeldy (H.R.S.) .....	The Station Agent .....	5	...	...	29·24	...
Pitlochrie (Bonskeid) .....	A. Buchan, Esq. ....	6	0 6	600	30·87	...
D Dalnaspidal (H.R.S.) .....	The Station Agent .....	5	1 6	1450	59·19	194
<b>FORFAR.</b>						
D† Dundee (Westfield Cottage) .....	Charles Clark, Esq. ...	5	6 0	50 $\bar{\pi}$	23·75	172
D† " (Eastern Necropolis) ...	Mr. W. R. McKelvie ...	3	0 5	167 $\bar{\pi}$	25·50	128

DIVISION XVI.—EAST MIDLAND COUNTIES—(continued).

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain. 1878.	Days on which ·01 or more fell.
		Diameter	Height Above Ground	Height Above Sea Level		
			ft. in.	feet.	inches.	
<b>FORFAR—(con.)</b>						
D Broughty Ferry (Douglas Ho.)...	Mr. K. Graham .....	5	5 6	60 $\nabla$	25·69	162
D†Craigton .....	J. Watson, Esq., C.E.	5	0 3	481	35·37	123
† " .....	" " "	11	0 3	481	34·90	...
†Crombie Reservoir .....	" " "	11	0 3	522 $\nabla$	35·89	...
†Hill Head .....	" " "	11	0 3	570 $\nabla$	34·53	...
D Arbroath.....	A. Brown, Esq., LL.D.	8	2 0	60 $\nabla$	25·65	141
Guthrie (Bolsham) ..	A. Buchan, Esq. ....	...	...	300	28·41	...
D Kirriemuir (Lintrathen) .....	J. Watson, Esq., C.E.	8	1 0	700	32·93	199
" { " } <i>monthly</i>	" " "	11	1 0	700	32·74	...
" { " } <i>Creich Hill</i>	" " "	8	1 0	1500	31·40	...
Montroseness .....	Bd. of Northern Lights	...	...	...	18·36	...
Montrose (Sunnyside Asylum)...	A. Buchan, Esq. ....	5	0 5	200	27·06	...

DIVISION XVII.—NORTH-EASTERN COUNTIES.

<b>KINCARDINE.</b>						
The Burn [Brechin] .....	Col. McInroy .....	4	0 6	250	37·00	...
Lawrencekirk (Johnstone Lodge)	A. Buchan, Esq. ....	5	0 11	370	30·01	...
Fettercairn .....	A. C. Cameron, Esq. ...	5	0 3	230 $\nabla$	30·68	160
Girdleness [Aberdeen] ...	Bd. of Northern Lights	...	4 7	86	?14·34	...
<b>ABERDEEN.</b>						
D†Braemar .....	Mr. J. Aitken.....	8	0 9	1114 $\nabla$	35·13	158
†Aboyne (Glentanar) .....	Mr. D. Thomas .....	3	1 1	576 $\nabla$	31·25	...
Drumoak (Drum Castle) <i>monthly</i>	Mr. G. Gammie .....	5	1 8	275 $\nabla$	34·05	...
Cromar (Logie Coldstone Manse)	Rev. G. Davidson .....	5	1 0	694 $\nabla$	36·28	180
" { " } Loanhead	Mr. A. Farquharson ...	5	1 0	743 $\nabla$	35·07	172
" (Tillypronie).....	Mr. R. Littlejohn .....	5	1 0	1120 $\nabla$	35·08	192
†Aberdeen (Bonaccord Street) ...	Rev. A. Beverley .....	5	1 0	82	28·16	212
† " (Rose Street) <i>new g.</i> ...	A. Cruickshank, Esq. ...	5	0 5	95 $\nabla$	28·05	...
" .....	The Met. Council .....	8	1 9	103	27·80	...
" (Skene Street) <i>new g.</i> ...	Rev. A. Beverley .....	5	2 0	95 $\nabla$	25·35	...
* " (Grammar School) ...	" " .....	5	4 8	98 $\nabla$	28·93	216
D Midmar (Blackstock) .....	Mr. J. Barron.....	5	0 8	570 $\nabla$	35·96	160
D " (Dunecht Observatory)..	Rt. Hon. Lord Lindsay	8	0 11	461 $\nabla$	29·56	184
Monymusk (Cluny Castle) .....	Mr. McDonald .....	5	0 1	280 $\nabla$	26·30	146
Inverury (Manar Farm) .....	Mr. J. Walker .....	8	15 0	270 ?	33·66	...
" Manse .....	Rev. J. Davidson .....	9	0 0	220 $\nabla$	38·06	...
Ellon (Tillydesk) .....	W. Hay, Esq.....	11	0 4	349 $\nabla$	33·33	...
Peterhead (Buchanness) .....	Bd. of Northern Lights	...	...	...	23·83	...
" .....	A. Buchan, Esq. ....	5	0 6	20	26·83	...
D Old Deer.....	J. Walker, Esq.....	5	2 0	135 $\nabla$	34·24	207
" " Manse .....	Rev. J. Peter .....	8	0 6	146 $\nabla$	34·15	...
D New Pitsligo .....	Mr. D. Sturrock.....	3	0 3	505	37·60	188
Kinnairdhead.....	Bd. of Northern Lights	...	3 4	64?	19·68	...

DIVISION XVII.—NORTH EASTERN COUNTIES—(continued).

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain. 1878	Days on which ·01 or more fell.
		Diameter	Height Above Ground	Height Above Sea Level		
			ft. in.	feet.	inches.	
<b>BANFF.</b>						
D Tomintoul .....	Rev. A. Guthrie.....	6	1 1	1103	31·77	179
D Keith (H.R.S.) .....	The Station Agent.....	5	1 0	364	38·64	...
Gordon Castle.....	Mr. Webster .....	8	1 3	70	35·23	...
<b>ELGIN OR MORAY.</b>						
Grantown .....	Mr. W. Duncan.....	5	1 1	712 $\bar{\pi}$	34·43	162
Forres (H.R.S.) .....	The Station Agent.....	5	1 0	20	22·95	152
Elgin (Institution).....	Mr. J. Martin.....	6	0 6	50 $\bar{\Gamma}$	34·41	...
D „ (Highfield) .....	A. Cameron, Esq. ....	5	0 11	80 $\bar{\Gamma}$	29·63	179
Burghhead (H.R.S.) .....	The Station Agent.....	5	1 1	18	26·62	...
Covesea Skerries.....	Bd. of Northern Lights	...	...	...	16·75	...
<b>NAIRN.</b>						
D Nairn (Acharéidh).....	A. Clarke, Esq. ....	8	1 0	60 $\bar{\Gamma}$	24·19	183
„ .....	The Meteor. Council ...	8	1 9	84	23·70	...
D „ (British Linen Bank).....	J. H. Brown, Esq.....	5	2 0	47	23·02	165

DIVISION XVIII.—NORTH-WESTERN COUNTIES.

<b>WEST ROSS. ‡</b>						
D*Loch Alsh (Inverinate House) .....	Mrs. Matheson .....	5	3 0	150	74·02	160
D Strome Ferry (H.R.S.) .....	The Station Agent.....	5	1 0	40	56·12	...
D „ „ (Duncraig) .....	Mr. Lorraine .....	5	1 0	124 $\bar{\Gamma}$	35·35	130
Applecross Gardens .....	Mr. D. McCowan .....	5	1 0	70 $\bar{\pi}$	55·90	...
Strathconan [Beaully] .....	Mr. D. McIver .....	...	...	...	52·94	196
D Auchnasheen (H.R.S.) .....	The Station Agent.....	5	1 0	450	58·89	163
D Gairloch (Auchtercairn) .....	Mr. M. Lamont .....	5	1 0	22 $\bar{\pi}$	48·40	120
Loch Vraon.....	J. D. Baldry, Esq., C.E.	8	0 7	750	49·44	...
Lochbroom (Loch Drome) .....	„ „ „	8	0 7	850	62·38	...
Braemore House.....	„ „ „	8	0 7	750	54·58	...
„ „ „ Lodge.....	„ „ „	8	0 7	100	56·62	...
Loch Broom .....	Mr. M. Macleay .....	5	0 4	48	57·80	212
Isle of Lewis (Stornoway) .....	Bd. of Northern Lights	...	3 4	31 $\bar{?}$	29·22	155
„ „ ( „ Lewis Castle)	A. Buchan, Esq. ....	...	...	...	49·48	...
„ „ (Butt of Lewis) ...	Bd. of Northern Lights	...	3 6	...	42·37	204
<b>EAST ROSS. ‡</b>						
Achonachie Lodge [Beaully].....	W. C. Preston, Esq. ...	5	1 0	125 $\bar{B}$	32·28	221
Dingwall (H.R.S.).....	The Station Agent.....	5	1 1	3	27·84	117
D Garve (H.R.S.) .....	„ „ „	5	...	...	30·41	...
Cromarty.....	Bd. of Northern Lights	...	3 4	28 $\bar{?}$	20·80	...
*Invergordon Castle .....	B. B. Æ. McLeod, Esq.	5	1 0	20 $\bar{?}$	27·29	139
D Alesn (Ardross Castle).....	Mrs. Matheson .....	5	1 0	450 $\bar{\pi}$	39·72	196
D*Tain (Fearn) .....	R. Gordon, Esq.....	5	1 0	58 $\bar{\pi}$	22·99	145
Tarbetness .....	Bd. of Northern Lights	...	3 4	61 $\bar{?}$	13·49	...

‡ Including Cromarty.

DIVISION XVIII.—NORTH-WESTERN COUNTIES—(continued).

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain.	Days on which ·01 or more fell.	
		Diameter	Height Above Ground	Height Above Sea Level	1878		
			ft. in.	feet.	inches.		
<b>WEST INVERNESS.</b>							
	Loch Shiel (Kinlochmoidart) ...	W. R. Macdonald, Esq.	5	0 8	27	56·45	211
D	Fort William (Public School) ...	C. Livingstone, Esq. ...	5	0 3	36	66·90	223
D	Loch Sheil (Glenfinnan) .....	Major Macdonald .....	5	1 0	35 ?	97·46	...
	Glenquoich .....	A. Buchan, Esq. ....	8	2 0	660	91·83	...
	Beauly (Beaufort Castle) .....	Mr. W. Anderson .....	8	4 0	155	31·76	189
	Isle of Skye (Oronsay) .....	Bd. of Northern Lights	...	0 6	15 ?	33·02	...
D	„ (Broadford) .....	Mr. Logan .....	5	1 0	45	59·68	177
	„ (Kyle Akin) .....	Bd. of Northern Lights	...	0 2	3 ?	62·57	...
	„ (Sligachan) <i>monthly</i> .....	Mr. Butters.....	8	1 4	100	59·75	...
D*	„ (Portree) .....	Mr. J. Grant .....	5	1 3	165 ?	73·47	254
	„ (Dunvegan) .....	Mr. R. Mackintosh.....	5	1 0	24	71·36	197
	Rona .....	Bd. of Northern Lights	...	...	...	33·60	...
	Barrahead .....	„ „ „	...	3 0	640 ?	29·30	...
	S. Uist (Ushenish).....	„ „ „	...	0 4	157 ?	52·95	...
	N. Uist (Monach) .....	„ „ „	...	...	...	42·40	...
	„ (Spanish, Loch Maddy)..	C. Shaw, Esq. ....	5	1 0	30	64·88	...
	Harris (Island Glass) .....	Bd. of Northern Lights	...	3 4	50 ?	31·57	...
<b>EAST INVERNESS.</b>							
D	Roy Bridge (Kinhillie) .....	J. Hutton, Esq. ....	5	1 2	407 †	45·74	211
D	„ „ (Brae Lochaber) ...	Sergt. A. Fraser.....	5	1 0	306 †	47·37	211
	*Laggan .....	Mr. A. McIntosh .....	5	0 9	821 ?	46·28	169
	Strath Errick (Farraline House).	Capt. Fraser .....	3	1 4	700 †	39·20	...
	Glen Strathfarrer .....( <i>monthly</i> )	Mr. D. Fraser.....	5	1 0	461 †	59·61	...
D	Dava (H.R.S.) .....	The Station Agent.....	5	1 2	1000	35·01	199
D	Inverness (H.R.S.) .....	„ „ „	5	...	...	22·21	...
D†	„ (Culloden House).....	D. Forbes, Esq. ....	7	3 0	82 †	23·32	...
D	Cawdor [Nairn] .....	J. Joss, Esq. ....	5	1 0	260	30·79	195

DIVISION XIX.—NORTHERN COUNTIES.

<b>SUTHERLAND.</b>							
	Dornoch (Ospisdale House) .....	W. E. Cattley, Esq. ...	5	0 9	30 ?	34·12	212
	*Bonar Bridge (Invershin).....	Mr. G. Young .....	5	4 0	20	38·32	...
	Golspie (H.R.S.) .....	The Station Agent.....	5	0 9	27	34·09	...
D	„ (Dunrobin Castle) .....	Mr. D. Melville .....	5	3 0	9 †	33·28	180
	„ ( „ „ ) <i>monthly</i> .....	„ „ „	3	0 3	6 †	34·36	...
	Lairg .....	A. Buchan, Esq. ....	3	3 4	451	40·87	...
	Assynt (Achumore) .....	J. Elliot, Esq. ....	3	0 9	200 ?	84·40	...
D	Kinbrace (H.R.S.).....	The Station Agent.....	5	...	...	23·74	...
	Cape Wrath .....	Bd. of Northern Lights	...	3 6	355 ?	45·53	...
<b>CAITHNESS.</b>							
D	Altnabreac (H.R.S.) .....	The Station Agent.....	5	...	...	28·06	...
D†	Wick (Pulteney House) .....	Rear Adml. Rutherford	5	0 11	70	32·23	187
	„ .....	The Meteor. Council ...	8	1 9	77	24·77	...
D†	„ (H.R.S.) .....	The Station Agent.....	5	1 0	...	21·82	...

DIVISION XIX.—NORTHERN COUNTIES—(continued.)

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain.	Days on which '01 or more fell.
		Diameter	Height Above Ground	Height Above SeaLevel	1878	
			ft. in.	feet.	inches.	
<b>CAITHNESS—(con).</b>						
† Wick (Nosshead) .....	Bd. of Northern Lights	8	4 8	127 ?	24·22	...
D† Watten (H.R.S.) .....	The Station Agent .....	5	0 10	75	27·89	230
D Georgemas Junction (H.R.S.) ...	" " .....	5	...	...	34·36	...
Thurso.....	The Meteor. Council ...	8	1 9	50	37·91	...
† " (Holburnhead) .....	Bd. of Northern Lights	3	0 8	60 ?	30·40	...
Dunnethad .....	" " "	...	3 0	...	27·21	...
Pentland Skerries .....	" " "	...	3 3	72 ?	22·57	...
<b>ORKNEY.</b>						
D S. Ronaldshay (Roeberry) .....	J. Gray, Esq. ....	5	1 2	101 $\pi$	30·21	213
Hoy (Cantickhead) .....	Bd. of Northern Lights	...	0 6	...	36·00	...
" {Graemsay Sound, East} ...	" " "	...	3 4	27 ?	28·91	...
" { " " West} ...	" " "	...	3 4	...	32·65	...
D† Pomona (Tankerness) .....	S. Leitch, Esq. ....	5	0 9	121	31·84	202
" (Deerness) .....	Rev. C. Clouston, LL.D.	5	...	...	29·85	...
Shapinsay (Balfour Castle) .....	Col. Balfour .....	4	0 6	50	27·10	...
D† Pomona (Sandwick) .....	Rev. C. Clouston, LL.D.	11	2 0	78	38·17	...
Stronsay (Auskerry) .....	Bd. of Northern Lights	...	...	...	27·05	...
Sanda (Start Point) .....	" " "	11	0 6	29 ?	26·87	...
North Ronaldsay .....	" " "	...	3 4	21 ?	25·21	...
<b>SHETLAND.</b>						
Sumburghead (Dunroseness) ...	The Meteor. Council ...	8	1 0	84	30·45	...
Bressay Lighthouse .....	Bd. of Northern Lights	5	0 4	60	21·19	...
Stourhead .....	" " "	...	...	...	48·80	...
D East Yell .....	Mr. A. D. Mathewson..	5	1 0	178	30·52	276

IRELAND.

DIVISION XX.—MUNSTER.

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain. 1878.	Days on which ·01 or more fell.
		Diameter	Height Above Ground	Height Above SeaLevel		
			ft. in.	feet.	inches.	
<b>CORK.</b>						
Roche's Point .....	The Meteor. Council ...	8	1 9	32	49·92	...
Queenstown (Altavilla).....	D. Scott, Esq., M.D. ....	32	15 0	140	30·65	...
Cork (Blackrock) .....	J. B. Binyon, Esq. ...	10	6 0	30 †	41·03	180
D „ (Queen's College) <i>new gauge</i>	Professor England .....	8	0 5	59	46·61	163
D „ (Royal Institution) .....	Dr. Caulfield .....	10	50 0	70	38·92	169
„ (Newsom's Quay) .....	W. Miller, Esq. ...	3	30 0	40	41·40	...
D Glenville.....	H. Hudson, Esq., M.D.	8	2 0	514 †	48·40	198
Fermoy (Gas Works) .....	G. Anderson, Esq. ....	5	1 1	...	41·13	...
<b>KERRY.</b>						
D Caherciveen (Darrynane Abbey)	D. O'Connell, Esq. ....	5	1 1	12 †	53·22	249
Dromore Castle .....	R. J. Mahony, Esq. ...	5	1 0	64 †	60·42	213
Kenmare (Derreen) .....	W. Holbrow, Esq. ....	6	1 0	74 †	59·09	198
Valentia (Telegraph Station) ...	The Meteor. Council ...	8	1 0	12	51·88	...
Cara (Lake side).....	J. B. Kennedy, Esq. ...	5	0 4	125 †	47·49	...
D Tralee (Godfrey Place) .....	H. Stokes, Esq., C.E. ...	5	26 0	50 †	45·66	199
D „ (Castlemorris) .....	W. H. Deane, Esq., C.E.	5	1 0	25	40·52	218
<b>WATERFORD.</b>						
Summerville .....	E. A. White, Esq. ....	5	1 4	140 †	32·36	...
D Waterford (Brook Lodge).....	C. Perceval Bolton, Esq.	5	3 8	100 †	31·21	143
„ (Roanmore Lodge) ...	H. A. Nevins, Esq. ...	5	1 1	74 †	32·04	164
D „ (Gas Works) .....	G. Anderson, Esq. ....	5	...	...	34·38	104
D Portlawn (Mayfield Factory) .....	S. B. Pim, Esq. ....	24	20 0	50	28·88	105
„ (Curraghmore).....	Mr. G. Fairbairn .....	5	4 0	...	32·22	...
<b>TIPPERARY.</b>						
D Cahir (Tubrid) .....	T. Palmer, Esq., M.D. ..	5	1 0	280 †	32·15	214
D Clonmel (Glenam) .....	Miss Grubb.....	8	1 4	80 †	35·42	198
D Tipperary (Henry Street).....	J. Dowling, Esq., M.D.	5	1 0	400 †	40·85	215
D Ballina [Killaloe] .....	J. Digan, Esq. ....	10	5 0	115	45·44	190
D Nenagh (Castle Lough).....	A. Parker, Esq. ....	5	1 3	120 †	39·57	219
D „ (Luska Lodge).....	G. A. Waller, Esq. ...	5	1 0	116	27·02	121
D Gurteen [Shinrone] .....	Miss Smith .....	5	1 0	267 †	34·21	221
<b>LIMERICK.</b>						
D Newcastle West.....	Rev. J. T. Hayes .....	5	3 0	219 †	40·26	212
Jane Ville [Tipperary].....	R. Harding, Esq. ....	5	1 0	504	39·71	...
Limerick (Kilcornan).....	Mr. P. Sweeny .....	5	1 0	...	37·04	...

DIVISION XX.—MUNSTER—(continued).

STATIONS.	AUTHORITIES.	Diameter	Rain Gauge.		Depth of Rain. 1878	Days on which "01 or more fell.	
			Height Above Ground	Height Above Sea Level			
			ft.	in.	feet.	inches.	
<b>CLARE.</b>							
D Kilrush .....	Mr. M. Bourke .....	5	7	0	61 T	34·12	217
D Ennis .....	J. Hill, Esq. ....	10	3	2	21 L	34·64	162
D Miltown Malbay .....	M. Molohan, Esq. ....	5	1	0	400 P	38·09	240
D Corofin .....	J. W. Macnamara, Esq. ....	5	1	0	...	37·25	182

DIVISION XXI.—LEINSTER.

<b>WEXFORD.</b>							
New Ross (Hovetown House) ...	S. D. Goff, Esq. ....	10	1	0	100 B	30·68	197
D " (Longraigue).....	J. W. Deane, Esq. ....	5	1	1	210 T	33·09	189
Enniscorthy (Castle Boro') .....	T. L. Bashford, Esq. ....	5	1	0	270	38·15	176
D " (Ballyhyland) .....	J. Moffat, Esq. ....	5	1	0	420 B	35·21	209
Gorey (Courtown) .....	RtHon Earl of Courtown	5	3	0	80 P	31·41	167
<b>KILKENNY.</b>							
D Piltown (Bessborough Park).....	Mr. I. Laidley .....	8	1	0	74 T	31·35	172
D Rosbercon Castle [New Ross] ...	A. E. Graves, Esq. ...	6	2	6	60 N	31·04	129
Tullagher [ " ] .....	D. A. Milward, Esq. ....	5	1	0	500 N	39·20	165
D Inistioge (Woodstock) .....	Lady Louisa Tighe ...	5	4	6	400 T	37·08	170
Kilkenny (Butler House) .....	C. E. James, Esq., M.D.	5	1	0	198 T	30·84	...
<b>WICKLOW.</b>							
D Delgany (Innismore) .....	Miss Connor .....	...	1	0	220	34·65	211
D Enniskerry .....	Dr. E. E. Barrington... 10	10	4	0	275	40·09	209
D† Bray (Fassaroe) .....	R. M. Barrington, Esq. 10	10	5	0	250	37·25	197
<b>CARLOW.</b>							
D Carlow (Browne's Hill).....	R. C. Browne, Jun., Esq. 5	5	1	0	291 N	32·04	202
<b>QUEEN'S COUNTY.</b>							
Abbey Leix (Blandsfort) .....	J. L. Bland, Esq. ....	8	3	0	532 N	31·97	206
" " ( " ) <i>monthly</i> .....	" " " " .....	5	...	...	...	33·15	...
Stradbally (Polesbridge) .....	Hastings Brooke, Esq.. 5	5	1	0	...	32·68	...
<b>KING'S COUNTY.</b>							
D Birr Castle .....	RtHnEarl of Rosse, FRS	8	0	8	180 N	31·07	195
D Portarlington .....	Dr. Hanlon .....	5	1	2	240 L	30·21	269
D Rathangan (Clonbrin) .....	Mrs. W. Gresson .....	5	1	4	224 T	29·42	177
Tullamore .....	H. J. B. Kane, Esq. ... 10	10	3	0	235	28·00	182
<b>KILDARE.</b>							
D Naas (Ballymore Eustace) .....	Mr. P. Homan .....	5	1	4	...	33·43	...
<b>DUBLIN.</b>							
Dalkey (Bellevue Park) .....	Mr. J. Kevans .....	6	1	3	148	29·37	161
D Monkstown (Easton Lodge) .....	Greenwood Pim, Esq. ... 8	8	0	8	90	27·67	158

DIVISION XXI.—LEINSTER—(continued).

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain. 1878	Days on which of or more fall.
		Diameter	Height Above Ground	Height Above Sea Level		
			ft. in.	feet.	inches.	
<b>DUBLIN.—(con.)</b>						
Kingstown .....	The Meteor. Council ...	8	3 5	50	27·30	...
†Dublin (Fitz William Square) ...	Dr. J. W. Moore .....	5	3 4	54 †	28·26	202
„ (O. S. O. Phoenix Park)..	Col. Martin, R.E. ....	5	3 0	170 †	28·66	217
Glasnevin (Botanic Gardens) ...	D. Moore, Esq. ....	8	0 11	56 †	30·05	167
D Balbriggan .....	Rev. S. P. Warren ...	5	1 0	57 †	28·71	195
„ .....(monthly)	„ „ „	5	1 0	57 †	27·80	...
<b>MEATH.</b>						
D Clonee (Williamstown) .....	W. Johnston, Esq.....	5	0 10	200	31·33	209
D Trim .....	P. Malone, Esq., C.E.	10	4 2	180 †	32·69	244
D Navan (Balrath) .....	R. W. Walsh, Esq., C.E.	5	1 0	160	27·85	141
<b>WESTMEATH.</b>						
D Athlone (Twyford) .....	J. Hodson, Esq.....	5	5 0	188	39·66	242
D Belvedere (The Gardens) .....	C. Brinslay Marlay, Esq.	5	1 0	367 †	37·06	...
Rathowen (Daramona) .....	W. E. Wilson, Esq. ...	5	1 0	270	34·76	168
<b>LOUTH.</b>						
D Castle Bellingham (Drumcashel)	Mrs. Macan .....	8	1 3	225 †	33·63	234
Stephenstown .....	Col. Fortescue .....	5	0 11	75 †	30·46	191
D Dundalk (Fardreg) .....	J. Barton, Esq. ....	5	1 0	90 †	26·80	147
„ (Ravensdale Park).....	Rt. Hon. Lord Clermont	8	1 0	360 †	37·75	163
D Greenore.....	T. Chambers, Esq.....	5	1 0	4 †	26·88	139

DIVISION XXII.—CONNAUGHT.

<b>GALWAY.</b>						
Gort (Cregg Park).....	R. J. Lattey, Esq.....	5	3 0	130 †	36·61	181
D Ballinasloe (Kilconnell) .....	Rev. H. E. Muriel.....	5	2 6	320 †	38·12	201
D „ .....	W. H. Kempster, Esq.	5	0 6	150 †	34·35	235
Ahascragh (Clonbrock) .....	Rt. Hon. Lord Clonbrock	10	4 6	200	41·22	...
D Clifden (Kylemore) .....	Sir A. Guinness, M.P....	5	0 1	105 †	80·40	272
Tuam (Gardenfield) .....	H. Kirwan, Esq. ....	5	6 3	136 †	34·44	...
„ ( „ ) .....	„ „	5	6 0	160 †	37·96	...
<b>ROSCOMMON.</b>						
*Holywell.....(monthly)	H. Smyth, Esq. ....	5	5 6	250 †	37·46	...
<b>MAYO.</b>						
Ballinrobe (Creagh) .....	Mrs. Knox .....	...	...	...	43·31	..
Hollymount (Cloona Castle).....	J. Simson, Esq. ....	3	2 0	120 †	37·60	...
Westport (Oldhead House) .....	H. Wilbraham, Esq....	3	2 6	100 †	51·80	...
Doo Castle [Tobercurry] .....	Mr. D. O'Dowd .....	5	1 0	...	45·96	...
D Crossmolina (Enniscoe) ..	J. Pratt, Esq.....	5	0 11	50 †	54·07	241
<b>SLIGO.</b>						
Collooney (Markree Observatory)	Miss A. Doberck .....	5	0 5	134	45·72	...
„ ( „ „ ) .....	„ „	31	16 7	148	39·27	222

DIVISION XXII.—CONNAUGHT—(continued).

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain.	Days on which ·01 or more fell.
		Diameter	Height Above Ground	Height Above Sea Level	1878	
			ft. in.	feet.	inches.	
<b>SLIGO.—(con.)</b>						
D Sligo (Mount Shannon).....	F. M. Olpherts, Esq....	5	4 5	70 B	41·99	220
Ballinful (Ardtarmon Cottage)...	C. J. Henry, Esq. ....	5	3 3	100	31·36	169
<b>LEITRIM.</b>						
D Mohill .....	H. Ross, Esq.....	5	4 7	...	34·48	186
D Carrick-on-Shannon .....	R. Bradshaw, Esq., M.D.	5	1 0	150 ?	36·57	195
D " " .....	Mr. J. Cox.....	5	0 9	150	31·58	186
D Drumkeeran (Spencer Harbour)...	Lough Allen Clay Co...	5	1 0	166	41·60	188
D " " ( " " Coll.) ..	" " " ..	5	1 0	1100 ?	46·86	154

DIVISION XXIII.—ULSTER.

<b>CAVAN.</b>						
D Killeshandra (Drummany) .....	H. M. Anketell Jones Esq	10	32 6	292 A	34·03	214
D* Belturbet (Redhills) .....	Rev. E. Whyte Venables	5	0 9	208 A	35·50	200
D Lough Allen (Dowra) .....	H. Howe, Esq. ....	5	...	...	39·09	248
<b>FERMANAGH.</b>						
Enniskillen (Florence Court) ...	Earl of Enniskillen FRS	8	1 9	250	46·73	179
" (Lisbellaw) .....	R. Eadie, Esq.....	5	1 0	200 ?	33·77	183
<b>MONAGHAN.</b>						
D Rockcorry .. .....	Mr. W. R. Loudon ...	5	1 0	290 A	35·52	192
<b>ARMAGH.</b>						
Flurrybridge .....	Rt. Hon. Lord Clermont	8	1 0	340 A	34·34	150
Edward St. Station [Newry] ...	J. L. D. Meares, Esq...	5	1 0	22 A	30·84	155
D Armagh Observatory.....	Rev. Dr. Robinson F.R.S	10	1 7	208 A	28·59	185
<b>DOWN.</b>						
D Kilkeel .....	Rev. E. O'Brien Pratt	5	1 8	40	27·61	185
D Warrenpoint (Summer Hill).....	Mr. B. M. Kernan.....	5	1 0	30	30·05	120
D Hilltown .....	Mr. H. Hall, jun. ....	5	1 0	430	31·77	148
Newcastle (Fairleigh) .....	Rev. J. H. Seymour ...	5	1 5	12	45·13	168
Castlewellan (Lough Island) ...	J. Smyth, jun. Esq., C.E.	10	3 0	440	31·40	...
† " (Bann Res.) .....	" " " " " "	8	1 0	440 T	31·90	...
D Rathfriland .....	B. B. Meek, Esq. ....	5	1 0	500	26·82	115
Banbridge (Katesbridge) .....	A. Mulligan, Esq. ....	5	1 0	230	22·79	113
D Seaforde .....	Col. Forde .....	8	0 5	180 A	36·89	193
Banbridge (Corbet Reservoir) ...	J. Smyth, jun., Esq. C.E.	10	3 0	234 T	26·20	114
D† " (Milltown) .....	" " " " " "	8	0 8	200 T	26·83	191
D† Waringstown .....	Major Waring .....	8	0 4	191 A	31·97	220
D Hillsborough (Anahilt).....	Mr. A. Clements .....	5	1 0	...	31·95	184
D Newtownards .....	Mr. M. Harbison .....	5	1 7	10	29·22	151
D Sydenham (Alma House).....	R. Reade, Esq. ....	5	1 0	60	33·60	208
Donaghadee .....	The Meteor. Council ...	8	1 6	30	30·05	...

DIVISION XXIII.—ULSTER—(continued).

STATIONS.	AUTHORITIES.	Rain Gauge.			Depth of Rain.	Days on which 101 or more fall.
		Diameter	Height Above Ground	Height Above Sea Level		
			ft. in.	feet.	inches.	
<b>ANTRIM.</b>						
Lisburn (Prospect Hill School)...	Messrs Morton & Pearson	5	1 2	241 T	26.39	156
D Aghalee [Lurgan] .....	Lancelot Turtle, Esq...	5	1 0	105 N	30.02	175
D Crumlin (The Schools) .....	Mr. T. J. English .....	5	1 0	240	31.46	194
D† Belfast (Queen's College).....	Mr. W. Taylor .....	11	7 4	68 N	29.14	171
D „ (New Barnsley) .....	J. Firth, Esq.....	5	1 0	200 T	36.88	209
† „ (Old Park) .....	W. Girdwood, Esq. ...	5	4 0	224 N	35.80	205
D† „ (Antrim Rd.) .....	G. Thompson, Esq. ...	7	7 0	144 T	31.34	204
White Abbey (Abbeyville) .....	Rev. R. W. Bland.....	8	1 9	63 N	34.57	199
D Ballymena .....	A. Dawson, Esq. ....	5	1 0	150 T	42.05	239
D Larne (Carnlough) .....	J. Reside, Esq. ....	5	1 0	8	44.54	192
Ballymoney (Church Street).....	Mr. J. Craig .....	5	1 0	150 T	37.63	...
D Bushmills .....	Mr. D. Elliott .....	5	1 0	33 T	41.29	210
<b>LONDONDERRY.</b>						
Londonderry (Knockan) .....	Rev. H. F. Stevenson..	5	1 0	300 T	47.37	...
D* Garvagh (Moneydig) .....	H. R. Morrison, Esq...	5	1 0	121 T	40.15	201
Newtown Limavady (Drenagh)..	C. T. McCausland, Esq	5	1 0	80	42.67	247
Bellarena .....	Sir F. Heygate, Bt. ...	5	1 0	12 T	41.00	222
<b>TYRONE.</b>						
D Caledon Glebe .....	Rev. W. B. Armstrong	5	1 0	125	29.96	221
D Aghnacloy Archdeaconry .....	Rev. T. G. Stokes .....	5	4 6	254 N	33.91	196
Moy (Derrygally) .....	W. M. Bond, Esq.....	5	5 0	70	29.58	188
D Dungannon (Donaghmore) ..	J. Brown, Esq. ....	5	1 0	300	37.30	195
Beragh (Clogherly) .....	Rev. R. Dixon, D.D....	...	...	...	43.11	...
D Stewartstown (The Square) .....	A. Johnston, Esq. ....	5	1 4	350	36.72	215
D Dungannon (Allan Rock).....	Rev. St. A. Brenan ...	5	1 0	350	40.41	220
D „ (Rockdale).....	Major Lowry .....	5	1 0	300 T	40.91	...
D Cookstown (Ballymully Glebe)...	Rev. T. H. Porter, DD.	5	1 0	200	38.82	198
D Stewartstown (Ardrea Rectory)	J. M. Churchill, Esq...	5	0 11	191 T	35.73	223
D Omagh (Edenfell) .....	Major Buchanan .....	8	1 0	280	34.18	224
D Strabane .....	W. McKinlay, Esq. ...	5	...	...	33.10	...
<b>DONEGAL.</b>						
D Ballyshannon .....	H. Allingham, Esq. ...	5	1 1	25	43.69	173
Inver .....	Rev. F. Carre.....	5	1 0	100	45.11	204
Raphoe (Convoy Ho.) .....	Col. Montgomery .....	5	1 0	110 T	45.44	232
„ ( „ „ ) .....	„ „ .....	5	4 0	109 T	44.87	232
D Ramelton .....	J. A. Mahony, Esq. ...	5	1 2	21	43.47	207
D „ (Ballyare) .....	G. M. W. Hill, Esq....	5	1 0	60	41.42	...
D „ (Killygarvan) .....	C. H. Cochrane, Esq...	5	0 10	11 L	43.97	222
D Buncrana (Rockfort).....	T. Colquhoun, Esq. ...	5	1 0	15	43.21	227
Dunfanaghy (St. Helen's) .....	C. B. Wolseley, Esq. M.D	5	1 0	52 T	43.12	243
Moville .....	The Met. Council .....	8	1 6	78	48.67	...
D Carrdonagh .....	Rev. A. Pinkerton .....	5	5 0	255	42.40	235

OBITUARY.

WE regret to have the longest obituary list which it has ever been our duty to print. We have lost fifty observers in one year, which is more than twice the average number; several are serious losses in many respects; ten of them were observers of more than twenty-five years' standing; others (like Mr. Fletcher) had devoted attention to many branches of observational and experimental work; in other cases the loss is especially to be regretted because it leaves important places without a representative, *e.g.*, the Island of Sark, as well as Alderney, is now without an observer. Moreover, many of these observers were liberal subscribers, and their death takes about £25 off the subscription list.

There are, in fact, only two pleasant thoughts which arise from contemplating this list,—(1) that there is not a single name which brings back the memory of anything but agreeable intercourse and correspondence, although there is scarcely one observer whose returns I have not been obliged to send back for correction; and (2) that all the mass of information indicated by the figures in the last two columns is safe, and cannot share the fate which so often befel observations in bygone years, *viz.*, to be destroyed as waste paper almost immediately after the observer's death.

		Perfect yearly records.
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## DIAGRAMS AND BLANK REGISTERS.

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MR. G. J. SYMONS has frequently been applied to for simple and compact forms for the registration of Barometers, Thermometers, &c., so arranged that the monthly means may be readily taken; he has, therefore, prepared such as seem to him the most generally suitable. The Register is in the form of a quarto book, arranged for two observations daily (of course both *need* not be filled up), with columns for all the usual purposes, and ample room for extra columns and remarks.

Mr. SYMONS has also prepared a Blank Diagram for the graphic representation of Barometer, Thermometer, Wind, and Rain. This he would suggest should be fastened by drawing-pins to a board, and suspended by the side of the barometer.

Verbal description always inadequately conveys the appearance and character of forms, in which the judicious appropriation of space is the chief element. Therefore specimens of both the Register and Diagrams will be sent on application. Though last mentioned, it is by no means of the least importance, that good forms should be accompanied by clear and correct instructions, and that they should be well printed on good paper. Concerning these points also the specimens will afford the best testimony.

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### TERMS.

#### METEOROLOGICAL REGISTERS.

##### THIRD EDITION.

Forms for 1 year, with Instructions, in stiff covers, 4to ...	2/0
„ 5 years, „ half-bound, 4to ...	7/6

#### BAROMETER DIAGRAMS.

##### TWELFTH EDITION.

Set of 12, for one year ... ..	1/0
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#### RAINFALL REGISTER.

Form of Daily Entry for One Year, fcap. fol. ... ..	0/3
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#### SPECIMEN.

Specimen of Forms and Diagrams ... ..	0/6
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