SYMONS'S

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ANOTHER METEOROLOGICAL CONGRESS.

(Continued from page 24.)

Number and Disposition of Observatories.—Dr. Ballot commences by pointing out that however pleasant it may be to the patriotic sentiments of the inhabitants of each country to expend all the money each can devote to Meteorology in their own territories, such a proceeding is not necessarily nor generally wise, as viewed from a scientific point of view.

There should, he thinks, be in each country three classes of Meteorological Observatories,—(1) central ones, with self-recording instruments of the best class; (2) subsidiary ones, taking frequent eye observations; (3) others devoted mainly to rainfall and extraordinary phenomena. He thinks that the first-class stations need not be closer than fifty leagues one from another, but that possibly the Congress might settle a limit of forty instead of fifty; the precise distance being of course controlled in each case by suitability of position and other circumstances known only to the meteorological director in each country. Making allowance for additional stations on some of the more remarkable mountain tops, Dr. Ballot is of opinion that if re-arranged, the total number of European stations might be considerably reduced; and he then proceeds to point out the lack of observations from Africa, Asia, and Australia, but seems to us scarcely to recognise all that has been done in those countries, *e.g.*,

"Africa is uninhabited for the greater part; France could give us the North coast, England has done much on the South point, and along the Suez canal some stations have arisen."

We admit that African meteorology is not yet very voluminous, but our readers will recollect the monograph of Prof. Raulin on Algerian rainfall, the splendid sets of observations from Oran, Constantine, and other stations, not merely on the coast, but penetrating hundreds of miles inland, to the verge of the Great Sahara; then going to the west coast, we have on our own shelves, several sets of observations from Gambia, Gold Coast, and Sierra Leone; while on the east we have D'Abbadie's Memoir on Thunderstorms in Ethiopia, fragmentary but instructive observations from Abyssinia, and though last not least, Dr. Mann's systematic records from Natal. We have not included

Cairo, Alexandria, or Aden, because though we believe that observations are made at all three, we are not certain that such is the case. We admit that these are not first-class stations, but think that they were entitled to a passing notice; so also was the great work effected under the direction of General Sabine in conjunction with the establishment of the British Colonial Magnetic Observations.

But, although claiming that these various efforts should not have been altogether ignored, we admit the broad general fact which Dr. Ballot puts before us, viz., the desirability of a more equal geographical distribution of observing strength.

On this point we have only to remark that although perhaps a Government might hesitate about the cost of establishing numerous first-class stations,—and even meteorologists might find it hard to prove the necessity for such an expenditure—we are certain that it only requires co-operation among meteorologists and personal energy among those who might be appointed directors, to ensure, within three years of the present time, the inauguration of a network of stations which should "gird the earth" in something more than a flower of speech. Take England, for instance; look down the list of her consular agents, her military and naval stations, and those of the missionaries attached to her various religious societies. Can any one say why these should not be utilized? English clergy take their daily observations before and after service, and we believe that many a missionary in Zululand, or the Arctic circle, would rejoice in another tie to bind him to civilization and the land of his birth. Before any such proposal is brought forward two things in particular *must* be done,—(1) absolute and definite decision as to instruments, position, time of reading, mode of reduction, and publication, must be adopted. This is the main object proposed for the congress, and none more important could be laid before it. (2) Meteorologists must agree together, and unitedly bring the subject before Government; they have ample power to claim attention to their requests, if only they will combine to exert it.

With one caution we leave this subject. It is no use supplying instruments and printing forms if the observers neglect their work; it is, therefore, indispensable that every precaution be taken in the selection of observers. It is our belief that out of any five good meteorological instruments made, not more than two or three, at the utmost, ever furnishes observations of the slightest use. We have in our memory the flourish with which it was announced that instruments costing several hundred pounds were on their way to a certain island; we heard of their arrival, but, alas, we have never seen a single reading from any one of those hundred instruments. Let this be a warning to us all.

Number of Observations to be published.—We think this the weakest section of Dr. Ballot's pamphlet. As far as it goes we agree with it, but it does not go sufficiently into detail. Essentially it amounts to this:—that it is more to the interest of Meteorology to expend money in securing proper geographical representation (by establishing stations

in districts hitherto unprovided) than in the publication *in extenso* of the results obtained at existing observatories. That, as a rule, only a very small portion of the observations at any station are required for discussion by others than the director of that observatory, and, therefore, that the requirements of science are most cheaply and yet perfectly met by manuscript extracts, and of course (though Dr. Ballot does not say so) by annual abstracts. With reference to the second-class stations, Dr. Ballot writes :—

"When we look at the observatories of the second order, it is quite sufficient if they give a record of their observations, which may be very explicity printed on one sheet of paper, for a whole year ; perhaps the observer can persuade the editor of the local newspapers to give a separate copy of those daily communications, and to collect them every month, as we have often proposed, and to have some copies sent to the observer, that he may disperse them. In this case the charge will not be heavy, which is a desideratum ; but, on the whole, we must be very economical in printing, because there is so very much that must be communicated."

Considering the large experience of Dr. Ballot, we think it is to be regretted that he did not give specimens of the forms which seem to him most suitable. One of the greatest drawbacks to Meteorology is discordant publication, and this is essentially a point for a congress to settle. Take our own country as an illustration ; there are the following establishments and systems supported by the National Exchequer—

Meteorological Office,
Royal Observatory, Greenwich,
Army Medical Department,
Registrar-General, England,*
" " Scotland.*

It is hardly to be credited, and yet we believe it is a fact, that of these five departments no two agree in their mode of treating or publishing observations ! Surely, if no other country requires a congress, we need one for ourselves, or a thorough reform which shall sweep away individual crotchets, and utilize the observing strength aud pecuniary resources of British Meteorology.

Invariability of chosen hours and instruments.—This section contains two points with both of which we agree, but we think it should have contained a third. The first is, that as every instrument is liable to go wrong, or to be broken, duplicates should always be in store, and compared monthly with those in use. As to the wisdom of this rule, especially at remote stations, there can be no question. The second point is equally important, viz., that hours of observation once selected should not be altered except with great consideration and the sanction of the supreme authority to whom the results are communicated. To these points we should have added a third, viz., that all observers acting together, observe at the same hours.

Astronomical or local time. What hours ? This section states the arguments *pro.* and *con.* very impartially and clearly, but does not

* Observations made by private gentlemen, cost of reduction of observations alone charged.

leave on our mind any distinct impression but one, viz., that Dutchmen are early risers. Dr. Ballot says that if three daily observations be decided upon, they ought to be at 6 a.m., 2 p.m., and 10 p.m. We sincerely hope that the congress will not assent to this proposal, for in this country we believe three-fourths of the observers would decline to adopt it. And this early rising runs through all his proposals, for he suggests that if only one observation is made, it should be at 7 a.m., and if two hours, then homonymous hours, either 6 and 6, 7 and 7, 8 and 8, or 9 and 9. Speaking both for English and Scotch, we clutch at the mention of 9 a.m. and 9 p.m.—hours already adopted by the larger part of the observers in England, and by nearly every one in Scotland. Evidently there will be considerable difficulty in securing uniformity of practice, in consequence of the change of habit and (almost) of mode of life which it will compel. Perhaps as every station will have self-registering thermometers, and observations at the same hour of local time will not be synchronous over large tracts, national habits may be allowed some weight, and absolute uniformity not be considered indispensable.

REVIEWS.

Devonshire Hospital and Buxton Bath Charity. Annual Report for 1871. Buxton: J. C. Bates. 8vo., 53 pp.

ALTHOUGH this is merely the report of a charitable institution, the fact that it is the medium (and the only one) of obtaining full information as to the climate of one of the most bracing of our English health resorts, has induced us annually to bring it before the notice of our readers. Last year we pleaded for the insertion of a few tabular values; this year we are glad to find that the hospital authorities have inserted two pages of tabular matter, very well arranged by their observer, Mr. E. J. Sykes, F.M.S.

From these tables we have extracted certain salient data, and placed them in juxta-position with similar values from Braemar, Buxton's more northern representative, and Worthing, a type of the warmer climates of our south coast. We may just mention, for the convenience of those unacquainted with these three localities, that Braemar is near the source of the Dee, in Aberdeenshire, about forty-six miles from the sea, and 1,100 feet above it, with lofty mountains in its vicinity, especially on its western side; Buxton is at almost exactly the same altitude, but centrally situated in the hilly part of Derbyshire, and like Braemar, more or less surrounded by ground of greater altitude than that on which the town is built. Worthing differs from these two localities in every respect; it is on the coast (in Sussex), only a few feet above the level of the sea, and with no high land in its vicinity. In one respect the materials for comparison are unsatisfactory; the thermometers at Braemar and Worthing are placed in Stevenson's stands, those at Buxton on one of Glaisher's pattern; the result of this is that the range of temperature both daily, monthly, and annual, at

Buxton appears larger by several degrees than it would have done if all three stations had been similarly equipped. With these prefatory remarks we now give the comparative table.

		MONTHLY TEMPERATURE IN SHADE.					RAINFALL.	
		Mean.	Max.	Min.	Range.	Mean daily Range.	Amount.	Days.
Jan.	Braemar	28·7	45·8	9·3	36·5	12·3	0·61	7
	Buxton	29·6	44·0	—2·5	41·5	12·9	2·05	19
	Worthing	34·9	45·1	20·9	24·2	8·4	3·36	18
Feb.	Braemar	38·2	48·7	27·0	21·7	8·5	3·62	11
	Buxton	41·3	52·5	20·5	32·0	13·5	4·91	22
	Worthing	41·7	53·4	26·2	27·2	8·0	1·58	16
March	Braemar	40·7	61·1	22·0	39·1	15·2	2·73	15
	Buxton	41·9	68·0	18·0	50·0	17·7	1·87	14
	Worthing	44·6	62·7	30·4	32·3	10·9	·84	11
April.	Braemar	38·7	56·8	22·3	34·5	14·8	2·65	20
	Buxton	42·8	60·0	18·0	42·0	15·4	4·31	23
	Worthing	47·8	60·6	34·4	26·2	10·6	3·96	17
May	Braemar	47·5	72·6	26·4	46·2	20·8	1·06	10
	Buxton	46·5	76·0	25·0	51·0	21·8	3·54	24
	Worthing	51·0	70·8	35·8	35·0	15·9	0·46	4
June	Braemar	50·5	69·8	32·2	37·6	15·6	1·90	17
	Buxton	50·0	71·5	33·5	38·0	17·7	3·82	20
	Worthing	53·6	68·7	37·2	31·5	14·4	2·62	16
July	Braemar	54·0	67·3	34·7	32·6	15·1	3·74	23
	Buxton	54·9	78·0	38·0	40·0	16·4	5·09	28
	Worthing	59·8	75·2	48·2	27·0	10·1	2·89	12
Aug.	Braemar	56·7	74·0	36·3	37·7	17·1	2·49	12
	Buxton	58·2	84·0	35·0	49·0	22·4	3·24	12
	Worthing	63·1	85·1	48·2	36·9	15·8	1·54	6
Sept.	Braemar	49·4	69·2	25·3	43·9	14·6	3·74	15
	Buxton	50·7	72·0	29·5	42·5	16·2	5·77	16
	Worthing	58·3	77·8	40·2	37·6	13·1	3·07	10
Oct.	Braemar	43·8	58·0	23·3	34·7	12·9	4·51	21
	Buxton	46·3	63·0	24·0	39·0	14·7	5·99	21
	Worthing	52·4	64·5	38·4	26·1	12·1	1·36	14
Nov.	Braemar	36·0	57·2	20·8	36·4	10·9	1·70	10
	Buxton	35·7	49·0	15·0	34·0	12·4	3·08	17
	Worthing	40·2	54·3	26·4	27·9	10·3	0·62	7
Dec.	Braemar	35·4	56·4	13·3	43·1	12·5	1·61	14
	Buxton	36·7	49·0	5·5	43·5	9·9	3·45	24
	Worthing	39·4	50·2	22·3	27·9	9·4	1·38	12
Year	Braemar	43·3	74·0	9·3	64·7	14·2	30·36	175
	Buxton	44·6	84·0	—2·5	86·5	15·9	47·12	240
	Worthing	48·9	85·1	20·9	64·2	11·6	23·68	143

The disturbing effect of different classes of thermometer-stands affects mean temperature very slightly, and hence the first column of the table is probably the most trustworthy. It shows that Braemer is colder than Buxton by an almost constant quantity of 1°, also that Worthing is warmer than Buxton by about 4°, and (which seems to us rather singular) that this difference is also nearly constant. We

should have expected to find the influence of the sea decreasing the difference in the summer and increasing it in winter, but the contrary seems to be the case, the average excess of the Worthing temperature in November, December, January, and February, was 3°·2, and in May, June, July, August, it was 4°·5. It may be that other years will alter this, but the differences run so evenly that we doubt it. We do not understand the relative warmth of Buxton and Braemar in winter which this seems to involve, and shall gladly see light thrown upon the question.

The second column is largely affected by the form of stands, but some information is to be obtained from it, *e.g.*, that though cooled by the sea breezes (and we know that many inland stations were far above 85°), Worthing was more than 10° hotter than Braemar. Buxton appears to hold an intermediate place (allowing 4° as the excess due to a Glaisher's stand in the position of that at Buxton). We should have thought it would have more closely approached its northern companion, but, probably, the exposed southern slope on which the hospital stands renders it warmer than many parts of Buxton. But we think that it is undeniable that, making all allowances for stands and position, the air on sunny days is hotter at Buxton than at Braemar, although we know no town south of the Tweed which can compare with it as a cool summer retreat, and only three villages, Prince Town, Dartmoor, Devon (altitude 1,400 feet), Allenheads, Northumberland (1,360 feet), and Shap, Westmoreland (about 900 feet).

The nights at Buxton are bitterly cold, at least that is our personal experience at various seasons of the year, and it is fully borne out by the table, even raising the readings 4° for the influence of the stand. We do not attempt to explain the *reason*, but the fact is evident that the minima recorded at Buxton are not only some 8° lower than at Worthing, but in the winter considerably colder than at Braemar. This is another enigma.

Next we come to yearly range of temperature, which is nearly identical at Braemar and Worthing, and very much greater at Buxton.

The daily range is (allowing for the stands) nearly identical at Braemar and Buxton, and 3° less at Worthing.

In rainfall there is a wide but easily understood difference between the stations; Braemar, for its altitude, has a remarkably small rainfall, caused by the fact that the clouds have been previously drained of their moisture by the higher lands of Argyleshire. Buxton has a large fall because it is to the N.E. of the high land of Axe Edge, which is almost the first land of any considerable altitude which meets the clouds after passing the ridges of the mid-Wales mountains. Worthing has a small rainfall because there are no elevations to cause precipitation.

One word in conclusion. Meteorologists are indebted for details of one of the most important climates in England, to a charity which requires additional funds, and copies of the Report, including the Meteorological Table, can be had from Mr. Taylor, the Secretary, for three penny stamps. We recommend our readers to send for the Report, and then to act as they see fit.

Quarterly Weather Report of the Meteorological Office. Part III. July to September, 1870. Quarto. 17 pp., 18 plates. Stanford.

We hope that we are mistaken in an impression that this useful publication is getting further in arrear. It is, as we have said, only an impression, but whether it be correct or not, it is difficult to see why this quarterly publication should be considerably more than a year behind date, and as to that fact there is no shadow of doubt.

There are, in the letter-press, no special features calling for remark, except that in lieu of the small and effective woodcuts illustrative of baric areas, somewhat similar ones are given by the side of the plates of curves. We cannot say that we consider the alteration an improvement, but it is not very material, and will be still less so in future, when the daily maps will go far to supersede their necessity except for afternoon and night charts.

It may be in the recollection of some of our readers that an unusually heavy thunderstorm, with water-spouts and tremendously heavy rain, broke over the hills south-west of Todmorden, between two and three p.m., on July 9th, 1870. It was quite a local storm, and was about fifteen miles distant from Stonyhurst, where not a drop of rain fell, but the Stonyhurst curves give distinct indications of its occurrence. Owing to the contracted scale now adopted, it is impossible to read off precisely the amount of disturbance, but it seems to have been about 0·05 in. of the barometer, and a fall of about 4° or 5° in the temperature, the former a few minutes before three p.m., and the latter just at the hour. Simultaneously, or nearly so, the wind suddenly backed from S.W. to N.E., returning to S.W. in about a quarter of an hour.

HEAVY FALL OF SNOW.

To the Editor of the Meteorological Magazine.

Sir,—One of the most sudden and violent snowstorms I have ever witnessed occurred here this morning.

At 10.45 a.m. the atmosphere became as dark as midnight, and the wind, which had previously been light from S.E., fell calm; at 10.50 snow began to fall very heavily, and a strong N.N.W. breeze sprang up; the storm continued till about 1.30 p.m., when the snow was over 6 in. deep; the amount in the gauge when melted was ·44 in. At 9 a.m. the sky was perfectly clear, with a hoar frost, the min. temp. having been 23°.—Yours truly,

THOS. PAULIN.

Winchmore Hill, 21st March, 1871.

To the Editor of the Meteorological Magazine.

Sir,—The extraordinary fall of snow during the last three days I believe to be quite unprecedented at this period of the year. I consider if it had remained it would have amounted to a depth of quite twenty inches! I have measured 1·46 in. of melted snow, but much of it did not enter the funnel of the rain gauge. Temperature has been very low.—Yours faithfully,

HENRY ST. JOHN JOYNER.

Northwick House, Harrow-sub-Colle, 23rd March, 1872.

NORWAY RAINFALL.

[As in former years, we are indebted to Mr. Cator for the following interesting particulars.—ED.]

RAINFALL IN 1871 AT ÖJE, NEAR FLEKKEFJORD, NORWAY.

Rain Gauge.—Funnel, 12½ in. square; height of top above ground, 8 ft.; above sea level, 18 ft.

Month.	Total Depth.	Greatest Fall in 24 hours.		Days on which ·01 or more fell.	Days of Snow.
	Inches.	Depth.	Date.		
January	3·433	1·021	18	11	5
February.....	3·371	·497	24	18	10
March	1·840	·467	10	8	...
April	·508	·124	30	7	2
May.....	·343	·099	1	6	1
June.....	1·867	·570	1	12	...
July..... ...	4·235	·560	23	22	...
August	3·323	·889	19	10	...
September ...	1·558	1·268	5	7	...
October	2·895	1·031	7	11	...
November ...	4·488	1·303	13	13	3
December ...	6·802	1·959	20	18	3
Totals	34·663	...	...	143	24

The winter, 1870–71, extraordinarily cold, and unusually much snow. The weather only began to be warm on 20th May, and rain on 1st June.

On 9th March, thunder, hail, and rain; 15th March, hail and snow, and after a long continuance of N.E. wind, milder weather and cloudy sky; 18th March, extraordinarily bright aurora over the whole sky, with colors of the rainbow.

25th May, 77°; 26th May, 79°·3; 27th May, 88°·3 Fahr.

20th April, severe snow storm from N.E.; 24th June, ·214 in. rain and hail fell in a few minutes; November and December, and up to 20th January, 1872, copious rainfall.

JENS BEER.

DECREASE OF RAIN WITH ELEVATION.

To the Editor of the Meteorological Magazine.

SIR,—I am surprised at two things; first, that Mr. Parnell's letter on "Altitude Difference of Rainfall" has passed unnoticed by any of your correspondents; second, that after its publication anybody should have had anything more to say. For my part I entirely withdraw, with shame and confusion of face, the letter I wrote on this subject, printed on page 134, of the last volume of the *Meteorological Magazine*.

I shall be still more surprised if any of your correspondents who understand Mr. Parnell's letter, and I confess it is not easy to understand, do not follow my example, wishing, as I do, that they had not written upon a matter they did not comprehend, if it were not that we dunces have stirred up somebody to give the matter under discussion a clear and philosophical demonstration.

It is perfectly marvellous that scientific men with brains, as many of your correspondents are, should have helped, like myself, to swell your last volume with such a mass of nonsense and irrelevant lucubrations as you have been good-natured enough to admit.

I confess I tremble at the thought of the scourging we are to receive in your anticipated editorial summing up.

I am, Sir, your obedient servant,

THOMAS E. CRALLAN.

Hayward's Heath, March 26th, 1872.

OBSERVATIONS AT PATRAS.

To the Editor of the Meteorological Magazine.

SIR,—I send you a second set of tables which give the result of my observations in Patras from June to December, 1871. The remarks that appeared in the July number of this magazine last year concerning the quality and positions of my instruments, and the nature of the neighbourhood, are still applicable. Neither mountains, nor sea, nor house have run away, nor have any of the instruments been broken. I have added, however, to my previous stock a second rain gauge, of 5 inches diameter, with graduated glass carefully prepared by myself, and tested by the measuring glass of the gauge already in use. This second gauge is kept on the wall of a terrace at the top of a house, about a quarter of a mile from the other. It is in quite a sufficiently open position, though 36 feet from the ground. This second gauge came into use on November 11, only a few days before the heaviest rains which I have ever yet seen. About these the table will speak for itself. The results of both gauges are given, that of the new one being placed on the right-hand side. The terrace gauge shows an excess of 4 per cent. over the other, which is slung in a court about 18 ft. from the ground, and very much overhung by the roof. Whenever the 5 inch gauge has registered a smaller fall than the old one, it has happened that the wind was blowing with some violence from the S.E. or S. Respecting the rainfall of the autumn and winter, I may observe that October and November this season have been altogether different from the October and November of my first autumn in the country. This will be clear by comparing the two sets of tables. I am told that though the rain has fallen at the usual times this year, it has come in much greater quantities than usual. The number of falls exceeding one inch in 24 hours has been very great. These falls come generally in very heavy showers, which continue from a quarter of an hour up to two and three hours. A steady, protracted rain we rarely have. The rainfall of Sept. 18-19, was the result of a very heavy thunder-shower between 6.30 and 8.30 a.m. on the morning of the 19th. The rains, however, both on December 9th and December 11th, were steady, protracted, and by no means heavy, accompanied by a light E. wind. Though the rains have been so heavy, there has been a remarkable absence of thunder and lightning.

In respect of temperature, my predictions in my last letter were fully justified. During the period from July 17 to August 5, the maxima ranged from 90° to 99°, and from July 18 to August 7 the minima ranged from 70° to 74°. On July 27, the hottest day of the

summer, another thermometer of mine, hung on an iron rail 2 feet clear of any wall, sheltered from the sun by a house, and from the wind by some trees on the opposite side of the road, and 13 feet from the ground, was seen at 105°. October was remarkable for its great range of temperature. The first eleven days shewed eighties and high seventies, nothing less than 77; while from the 15th onward it never reached 72. How much colder November and December, 1871, were than the corresponding months in 1870, will be seen by a reference to the tables.

The same remarks which I added to the table of clouds last summer are applicable to the one that I send now.

I enclose also a table of earthquakes. We had on the 21st of June a rather severe one, which set the chairs in rooms on the first floor of some houses rocking gently. I was indoors at the time, and saw a chair so shaking. For the next 5 months there was no shock distinctly perceptible to myself or any of my friends, an unusually long respite, for the which we have had to pay this January; December gave one, but of no great severity. January has given very many, one violent one, which brought down a great quantity of plaster from the cornices of the rooms, and caused great alarm. Part of a large convent in the interior of the Morea has been thrown down by one shock, and a huge rock on the road between Megara and Athens was brought down upon the road, destroying and blocking it up. The sensation is horrible; no motion of floors or walls is seen, except in very severe earthquakes, but a vibration passes through one's whole body, the floor or ground seems to be slipping from under one, while the straining of the timbers and walls of the house, and the rattling of doors and windows, are sounds not very pleasant to hear, when another instant may bring them all down together. A new comer is usually rather amused by the sensation, but after the first interest is passed, a feeling of horror rapidly comes instead, and the longer people stay in the country, the more they dread the earthquakes.

The worst earthquakes are felt round the shores of the Gulf of Corinth, particularly near Delphi; also in Zante, Cephallonia, and Leucadia, in each of which islands, within the memory of living men, towns have been more than half destroyed. Patras was destroyed 1,300 years ago, but it is supposed here that we are safe from any very great calamity.

After the experience of a year and a half, I can detect no connection whatever between the earthquakes and other meteorological conditions.

When I have been away from Patras for a time, I have been enabled to continue my observations by proxy, through the kindness of Mr. J. J. Tobler, a Swiss gentleman living here, whose careful assistance during my absence has prevented a good many gaps in the tables.

Yours very truly,

HERBERT A. BOYS.

Patras, Greece, January 31st, 1872.

Table of Temperature at Patras in 1871.

	June.		July.		Aug.		Sept.		Oct.		Nov.		Dec.	
	Deg.	Day	Deg.	Day	Deg.	Day	Deg.	Day	Deg.	Day	Deg.	Day	Deg.	Day
Average max. temp.	83·0	...	90·7	..	89·8	...	82·3	...	73·1	...	65·2	...	54·7	..
Greatest max. temp.	92·0	26	99·0	27	96·0	13	88·0	11	85·0	1/6	73·0	19/11	68·0	5
Least max. temp.	77·0	15	83·0	1/16	80·0	31	77·0	19	64·0	27	58·0	21/24/26	44·0	27
No. of max. between 99 & 95	...		4		1		...		...		...		...	
94 ,, 90	3		18		15		...		...		...		...	
89 ,, 85	5		7		4		7		2		...		...	
84 ,, 80	18		2		1		17		5		..		...	
79 ,, 75	4		...		...		6		5		...		...	
74 ,, 70	...		...		...		...		6		5		...	
69 ,, 65	...		...		...		...		12		14		3	
64 ,, 60	...		...		...		...		1		4		2	
59 ,, 55	...		...		...		..		...		7		10	
54 ,, 50	...		...		...		...		...		...		8	
49 ,, 45	...		...		...		...		...		...		7	
44 ,, 40	...		...		..		..		...		...		1	
Average min. temp.	63·4	...	69·5	...	68·7	...	64·1	...	57·3	...	51·4	...	41·7	...
Greatest min. temp.	67·0	6/22	74·0	25/28/29	72·0	1/28	70·0	22/26	70·5	2	59·0	10	56·0	1
Least min. temp.	58·0	2	64·0	1	59·0	31	58·0	15	47·5	23	45·5	24/28	31·0	19
No. of min. between 74 & 70	...		16		12		2		1		...		...	
69 ,, 65	12		14		16		11		5		...		...	
64 ,, 60	15		1		2		15		3		...		...	
59 ,, 55	3		...		1		2		9		7		1	
54 ,, 50	...		...		...		...		12		13		2	
49 ,, 45	...		...		...		...		1		10		5	
44 ,, 40	...		...		...		...		...		...		11	
39 ,, 35	...		...		...		...		...		...		9	
34 ,, 33	..		...		...		...		...		...		2	
32 ,, 30	...		...		...		..		...		...		1	
29 ,, 25	...		...		...		...		...		...		...	

Table of Earthquakes, 1871.

June.	July.	August.	Sept.	Oct.	Nov.	Dec.
18 .	...	...	..	...	...	2 .
21 .	...	...	...	...	...	...
22 .	...	...	...	...	...	...

The figures represent the days of the month on which the earthquakes took place, and the size of the dots indicates their severity.

Table of Clouds, 1871.

Scale.	June.	July.*	Aug.	Sept.	Oct.	Nov.	Dec.
10—8	1	...	...	...	2	7	9
7—3	16	7	9	12	22	21	20
2—1	12	10	13	11	7	2	1
0	1	4	1	7	...	...	1
...	2·9	1·8	2·3	2·0	4·3	5·5	5·8

* Omitting from July 22nd to August 8th, inclusive.

The cloudiness of each day is indicated by figures ranging from 0 up to 10.
0 representing perfect clearness.
1, 2 ,, clouds hanging on mountains only.
3 up to 7 ,, different degrees of cloudiness over Patras.
8 to 10 ,, different densities of clouds when the sky is entirely covered all day.
The above table shows how many days of each sort there were in each month.

Table of Rainfall at Patras in 1871.

								Second Gauge.	
Date.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Nov.	Dec.
1...	...	...	..	...	...	...	..		...
2 ..	...	...	...	...	...	·29	...		...
3...	...	...	...	...	...	·69	...		...
4...	...	...	...	...	...	·50	...		...
5...	...	...	...	...	...	...	·44		·45
6...	..	...	...	..	...	...	·84		·83
7...	...	...	...	...	...	...	·25		·19
8...	...	...	...	...	...	...	·17		·17
9 ..	...	...	...	...	..	..	1·08		1·11
10...	...	...	..	...	·94	1·09	·35		·39
11...	...	...	...	...	...	...	·01	...	·02
12...	...	...	...	...	1·39	·13	...	·11	...
13...	...	...	...	...	1·36	·02	...	·03	..
14...	·41	...	...	...	·17	...	...	...	...
15...	...	...	...	...	·13	...	...	...	...
16...	...	...	...	...	·86	...	1·65	...	1·80
17...	...	...	...	...	..	·22	...	·23	...
18	...	...	...	2·00	..	·37	...	·39	...
19...	...	...	...	...	...	1·31	...	1·40	..
20...	...	..	...	...	·15	·81	...	·86	...
21...	...	...	...	...	·10	·64	·08	·70	·08
22...	...	..	·08	...	...	1·06	...	1·09	...
23..	...	..	...	...	..	·14	...	·14	...
24...	...	...	...	...	·85	·19	...	·20	...
25...	...	...	...	...	·59	·20	·11	·23	·09
26...	..	...	...	...	...	1·14	·12	1·12	·10
27...	·07	...	...	...	..	·88	·29	·83	·36
28 ..	·52	...	...	...	...	...	·24	...	·25
29...	...	...	·09	...	·03	...	·01	...	·01
30...	...	...	..	..	...	...	..	...	·01
31 ..	...	...	...	...	...	·18	·32	·14	·34
Total..	1·00	...	·17	2·00	6·57	9.86	5·96	7·47	6·20

On November 11th, a second gauge was set up, and its results from that day to the end of the year are given at the end of the table.

MARCH, 1872.

Div.		STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL. Total Fall.	Difference from average 1860–5	Greatest Fall in 24 hours. Dpth	Date.	Days on which ·01 or more fell.	TEMPERATURE. Max. Deg.	Date.	Min. Deg.	Date.	No. of Nights below 32°. In shade	On grass.
			inches	inches.	in.								
I.	ENGLAND.	Camden Town	2·66	+ ·58	·69	28	17	61·1	6	26·1	26	9	12
II.		Maidstone (Linton Park)	1·93	— ·56	·69	28	15	65·0	15	24·0	26	...	11
,,		Selborne (The Wakes)	3·02	+ ·42	1·17	28	15	56·2	16	23·6	26	10	13
III.		Hitchen	1·97	— ·20	·58	22	14	59·0	30	25·0	20§	12	...
,,		Banbury	2·11	— ·09	·59	27	15	60·0	6	25·5	26	11	...
IV.		Bury St. Edmunds (Culford)	2·50	+ ·30	·48	23	16	61·0	30	23·0	20	12	18
V.		Bridport	3·00	+ ·13	·65	27*	19	59·0	16	22·0	26	9	...
,,		Barnstaple	...	..	...	...	...	...	...	...	...	...	...
,,		Bodmin	5·49	+ 1·74	1·19	27	23	58·0	16	30·0	24	5	11
VI.		Cirencester	2·54	— ·06	·71	27*	14	...	...	...	...	...	...
,,		Shiffnal (Haughton Hall)	2·04	+ ·10	·50	17	15	58·0	30	24·0	26	11	...
,,		Tenbury (Orleton)	2·30	— ·12	·56	27	18	60·0	30	23·2	26	10	13
VII.		Leicester (Wigston)	1·90	— ·21	·37	28	15	62·0	30	23·0	25	9	...
,,		Boston	2·36	+ ·57	·57	21	17	60·0	30	28·0	26	6	14
,,		Grimsby (Killingholme)	2·27	..	·34	17	19	58·0	4†	27·5	26	6	...
,,		Derby	1·84	— ·40	·41	17	16	60·0	5	26·0	26	8	...
VIII.		Manchester	2·78	+ ·09	·78	17	19	64·0	30	27·0	26	8	11
IX.		York	2·17	+ ·18	·40	27	20	58·5	3	26·0	26	7	...
,,		Skipton (Arncliffe)	6·39	+ 1·58	1·35	27	23	...	...	...	...	...	...
X.		North Shields	3·45	+ 1·10	·40	20	19	55·6	16	25·0	26	9	10
,,		Borrowdale (Seathwaite)	11·23	— 2·17	1·98	17	15	...	...	...	...	...	...
XI.	WALES.	Cardiff (Ely)	..	...	...	...	...	...	...	...	...	...	...
,,		Haverfordwest	5·37	+ 1·92	1·44	27	17	59·5	30	26·0	25	9	10
,,		Rhayader (Cefnfaes)	3·51	— ·33	1·00	27	12	59·0	...	23·0	...	6	...
,,		Llandudno	2·19	— ·07	·63	27	17	62·0	7	30·7	22	3	...
XII.	SCOTLAND.	Dumfries	3·06	+ ·08	·43	1	19	56·0	29	24·5	26	7	...
,,		Hawick (Silverbut Hall)	2·56	...	·56	28	20	...	...	...	...	...	...
XIV.		Ayr (Auchendrane House)	2·58	— 1·15	·66	11	14	61·0	6	21·0	26	8	11
XV.		Castle Toward	4·35	— ·24	1·60	12	14	57·0	8	23·0	6	...	...
XVI.		Leven (Nookton)	2·61	+ ·54	·44	11	23	55·0	15‡	26·0	21‖	10	18
,,		Stirling (Deanston)	3·74	+ ·21	1·15	11	20	60·5	3	21·5	26	11	12
,,		Logierait	1·82	...	·73	29	16	...	...	...	...	...	...
XVII.		Ballater	..	...	...	...	...	...	...	..	...	...	...
,,		Aberdeen	2·28	...	·33	24	25	55·5	4	28·8	21	6	19
XVIII		Inverness (Culloden)	·84	...	·29	22	17	56·6	4	29·5	21	3	18
,,		Portree	5·16	+ 3·88	1·65	11	21	...	...	...	...	...	...
,,		Loch Broom	1·62	...	·34	14	16	...	...	...	...	...	...
XIX.		Helmsdale	1·52	...	·26	26	19	...	...	...	...	...	...
,,		Sandwick	2·04	— 1·29	·67	11	18	57·2	4	28·8	21	4	19
XX.	IRELAND.	Cork	3·80	...	·60	27	17	...	...	...	...	..	...
,,		Waterford	5·46	+ 2·57	1·34	11	26	59·0	16	28·0	26	4	...
,,		Killaloe	2·92	— 1·40	·81	11	22	66·0	31	26·0	26	7	...
XXI.		Portarlington	2·44	— ·87	·37	12	27	57·0	16	27·0	20	9	...
,,		Monkstown	2·16	— ·42	·57	27	20	62·0	16	27·0	26	5	5
XXII.		Galway	2·72	...	·47	28	20	57·0	30	28·0	26¶	5	...
,,		Bunninadden (Doo Castle)	4·70	...	2·08	29	16	47·0	22	23·0	24	3	...
XXIII		Bawnboy (Owendoon)	...	...	..	...	...	...	...	...	..	...	...
,,		Waringstown	2·06	...	·35	11	17	61·0	7, 30	24·0	25	10	14
,,		Strabane (Leckpatrick)	3·49	..	·75	30	21	...	...	...	...	...	...

* And 28. † And 5, 29, 30. ‡ And 16. § And 25. ‖ And 26. ¶ And 27.
+ Shows that the fall was above the average ; —that it was below it.

METEOROLOGICAL NOTES ON MARCH.

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

ENGLAND.

LINTON PARK.—First 20 days very mild and fine, next 7 very winterly, the ground being covered with snow on 21st and 22nd; last 4 days wet; there have been 11 frosty days, the sharpest on 21st and 26th. Bar. highest on 10th, being 30·06, and lowest on 30th, 28·95. Winds S. and S.W. the early part of the month, but more changeable afterwards; it was, however, S.W. on 21st; highest wind on 28th, but not remarkably so; there has been less wind than usual in March.

SELBORNE.—Prevailing wind first half of the month and last week, S.W.; third week, N.W. and N.E.; frequent white frosts; tempestuous night on 27th.

HITCHIN.—Snow on 22nd, yielding ·58 in.

BANBURY.—Exceedingly dark at 1.45 p.m. on 22nd, during snow storm; H on 18th; S on 21st, 22nd, 23rd, and 24th; ball snow on the 21st.

CULFORD.—The weather up to the 20th, mild and genial; on the 17th, the temp. was 60° in the shade; hail fell frequently during the day of 20th, and the night temp. fell to 23°, and S fell more or less on each of the six succeeding days, accompanied by a very low temp. A favourable change took place on the 27th. E. winds during 16 days and W. on 15. The mean temp. of the month has been but slightly in excess of that of the preceding month, being 44° to 43°·5.

BRIDPORT.—S.W. gale on 27th and 28th. L on the evening of 24th. Ice a quarter of an inch thick on the 22nd and 26th. Mild for the first 18 days, then cold for a week, with a little snow and sleet. Chesnuts in leaf at the end of month.

BODMIN.—Average of bar. 29·80; average temp. 46°·6, or 2°·2 above the average. The rainfall again much above the average of the past 23 years, and the fall since Jan. 1st amounts to no less than 25·65 in., which is far beyond the rainfall of any consecutive three months ever recorded here.

CIRENCESTER.—S on 21st and 23rd, and on those days and the 22nd hard frosts.

HAUGHTON HALL.—This month by no means "came in like a lion," but opened mildly with S.W. winds; on the 5th they turned to S.E., though little reducing the temp., which continued the same with little interruption till the 17th, when heavy R fell with cold wind from N.W. and an inch of S that night; from thence to the 28th it was cold and ungenial, with slight frost every night; R then set in again and continued daily to the close. A remarkable absence of high winds, not even equinoctial gales. Farmers greatly behind in getting in their Lent grain, owing to the saturated soil, but vegetation about 10 days forward. Rooks began to build, and large humble bee seen on the 4th, chaffinch sings and celandine flowers on 5th, willow blossoms on 10th, chiffchaff heard on 30th, wild cherry blossoms on 31st.

ORLETON.—Generally warm, with a few bright days and occasional falls of R till the 20th, then very cold, with severe frosts and slight falls of S, till the 27th; very rainy and warm after. The mean temp. of the whole month about 3° above the average; fogs frequent at the beginning of the month; rough winds on 18th and 21st; L seen at night on 30th. The longest continuance of R ever remembered, between the 17th of Dec. and 2nd of April, 13·92 inches of R has fallen; the average yearly fall is about 30 in.

WIGSTON.—The first half of the month was mild and growing. On the 13th a change of wind to the northward brought a week of cold winterly weather, with slight snow storms on 5 or 6 days.

BOSTON.—Heavy snow storm on 21st, snow 7 in. deep on the ground. Gale at night on 27th. S daily from 19th to 24th inclusive.

KILLINGHOLME—The first half of the month very dry, the last very wet, with bar. unusually low, and the wind much inclined to back. Rooks building on 3rd. Apricot began to flower on 9th; 18th to 28th a cold period, with S almost daily.

DERBY.—The first half of the month beautifully fine and mild, and vegetation progressed above its average, but about the 19th a sudden change took place and the latter half of the month was as cold and disagreeable as the former was pleasant; on the 26th the ther. 5 ft. from the ground registered 26°, which is the lowest point recorded since Dec. 12th, 1871.

MANCHESTER.—Very large lunar halo on 19th; S on 21st, 22nd, and 26th.

YORK.—Solar halo on 14th, L on 28th, S from 19th to 27th.

NORTH SHIELDS.—Solar halo on 11th and 26th; distant lunar halo on 17th; fog on 5th.

SEATHWAITE.—S on tops of hills on 14th; S showers on 23rd, 24th, 25th, 26th, and 27th.

WALES.

HAVERFORDWEST.—Temp. above the average, except from the 20th to the 26th, when it was below; some snow fell during that period; the month ended excessively wet, 2·07 in. of rain fell in 23 hours, one continuous fall.

CEFNFAES.—From 21st to 30th, wintry weather, and many snow storms with occasional T and vivid L; wind generally N.E. or S.E.

LLANDUDNO.—Sweet briar in full leaf on 5th, damson in blossom on 6th, apricot blossom quite set for fruit on 7th, swallows first seen on the 8th, jargonelle pear in full bloom on 9th. Snow on all the hills on the 21st, and very cold, frequent S and H between 21st and 27th.

SCOTLAND.

DUMFRIES.—The general characteristic of the month has been wet; in the first week there were three fine days; from thence to the 19th rainy with occasional frost on grass, from 19th to 26th frosty with occasional snow showers, the last week showery, rainfall above the average. Mean temp. 43°·6. Plum and pear trees in bloom, and vegetation unusually forward.

SILVERBUT HALL, HAWICK.—Beautiful weather up to the 18th, when cold easterly winds with hard frost and heavy snow showers set in and continued up to the 27th, the ther. 27° and 0·89 in. of melted snow was measured during the 9 days. Pear, apricot, and other early fruit tree blossom is hopelessly destroyed; such a heavy fall of snow in March has not been witnessed here since 1837.

AUCHENDRANE.—Solar radiation very strong, and but a small rainfall; the month must have been a drying as well as a warm month and yet but very little 'March dust' was seen, and neither the soil nor the rivers have recovered from the rains of January and February. Both wind and cloud were below the average for March, the wind only once reached the force of 4; snow and hail showers were trifling; the heavy storms so damaging on the eastern coast never reached this district, and the vernal equinox (the 21st) passed without any particular disturbance.

CASTLE TOWARD.—Rain less by 1·02 in. than in February; the prevailing winds from the 1st to the 20th were S. and S.E. and from the 21st to the end cold E. winds; on 26th, 27th, and 28th, we had very hard frosts. On the 9th, the hills were covered with snow, and on the 11th a heavy flood, on 12th T in S.W. followed by L and heavy showers, and on the 13th gooseberry bushes in full flower. Taken as a whole, this has been a better month than the last.

NOOKTON.—Snow or hail daily from 19th to 26th.

DEANSTON.—Excepting 10 days at the beginning of the month the weather was dull, cold and wet, some smart frost on the 20th, 21st, 22nd, 26th, and 27th, and snow and sleet showers without snow remaining on ground.

ABERDEEN.—A month of mild weather, notwithstanding the storm of 19th to 26th. Estimated pressure of wind less than the average.

CULLODEN.—Apricot in blossom by 10th, peach 15th, plums and pears 28th, horse chesnut, plane and larch in leaf, and elm in flower, by 28th; oats and rye sown on 14th, potatoes planted on 27th.

PORTREE.—Very cold, with frost, snow, and sleet; prevailing wind from N. to N.E. Garden shrubs and berry bushes blackened with frost. A strong gale on the 18th, from the west. Snow lying about 6 inches deep on high ground.

LOCHBROOM.—This month has even exceeded its predecessor in mildness and openness. Stock was never so sound and strong before at this time of the year, and field works are as far advanced as the farmer could wish; such a fine winter and spring has not been experienced by any one living in this district.

SANDWICK.—The weather was remarkably mild, while southerly winds prevailed to the 18th, on which day the wind changed towards the N. and so continued during the remainder of the month, with occasional falls of snow. There were gales of 40 miles an hour on 2nd, 3rd, and 27th. Aurora on 13 nights.

IRELAND.

WATERFORD.—Splendid meteor at 8.30 p.m., on 7th, compared by some to a fire balloon. Snow occasionally from 21st to 26th.

MONKSTOWN.—Early part of the month, fine and mild; latter, cold and wet. Mean temp. of month 44°·3. Mean temp., 21st to 27th inclusive 36°·8.

DOO CASTLE.—Gale on 8th; some nights of severe frost, an evening of snow, and fearfully heavy rain, are the characteristics of this month; for on the evening of the 29th (Good Friday) the most tremendous rain ever experienced in this locality came pouring down; small streams became roaring torrents, houses became flooded, and small lakes appeared in the driest land. I regret to have to add, the loss of a valuable life within 8 miles of this place from this sudden downpour.

WARINGSTOWN.—A very disagreeable month, though the mean temp. was above the average, there was much cold weather, rainfall about the average, labor in general very backward.

UNDERGROUND TEMPERATURE.

To the Editor of the Meteorological Magazine.

SIR,—In No. LXX. of the *Meteorological Magazine*, you did me the honour to insert a question on this subject. The only notice of it which you have since admitted to your pages, was from Mr. F. R. Hawkes-Mason, in No. LXXII., with arguments in favour of my hypothesis. If you will now allow me, I shall be glad to say a word or two to your readers, many of whom are probably as much interested in the phenomena of the earth, as they are in that of the atmosphere, knowing how closely the two elements are connected. It is constantly asserted that an internal, eternal fire, within the earth, causes all our volcanic phenomena, and radiates heat through the earth; so that, although it is not perceived within fifty or sixty feet of the surface, our wells and mines below that depth, give an increasing heat with depth. I have denied this cause of earthly external phenomena in "*The Interior of the Earth*," nearly two years since, without opposition, but it is constantly repeated to the world as if it were a fact. My hypothesis is, that *all heat in the earth arises from the stratum where it exists* Man finds heat in the earth increasing with depth irregularly. That depth has never yet gone below deposits; all deposits were laid upon the sea bottom; the sea bottom is cold; there is no reason why a deposit should extract heat from a cold place; every deposit, being wholly or partly composed of earth's produce, must contain within it heating causes, and every deposit beneath other deposits must be liable to pressure. Materials are collected from deposits producing spontaneous or artificial combustion; water can be boiled, and matter can be ignited in air, by pressure; mechanical and chemical arrangements, therefore, produce heat. Both of these arrangements exist beneath our feet; heat and fire can therefore be produced in deposits. Man has never yet measured these deposits, yet he has had the temerity to say that the deposits are unequal to the results. The whole earth, from its surface to that which was once the water bottom, is all deposit, either of void primary matter, or of earth's production. Deposits must therefore be adequate to the phenomena produced by them, consequently each deposit, chemically or mechanically, or with both combined, produces its own heat, and its own phenomena.—Yours, &c., H. P. MALET.

Nettlebed, Oxon.