

S Y M O N S ' S
M O N T H L Y
M E T E O R O L O G I C A L M A G A Z I N E .

CXLI.]

OCTOBER, 1877.

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LE VERRIER.

THE name of Urbain Joseph Le Verrier will descend to remote posterity, associated with geometrical skill, the resolute attack of astronomical problems, so vast, that even his friend Adams describes the work as "appalling," and with the conquest and completion of almost every thing upon which he had set his heart. Future generations will know Le Verrier as, jointly with Adams, the discoverer of Neptune. But meteorologists claim also the right to lay a wreath upon his tomb.

Le Verrier was beyond everything else an astronomer, but if he had not been that, his labours for meteorology would have been more appreciated. True, he wrote few original papers upon the subject, his care was chiefly given to organization, but he may fairly be said to have founded the present system of telegraphic meteorology, for we believe that his "Note sur un système régulier d'Observations Météorologiques, établi en France par les soins de l'Administration des lignes télégraphiques et de l'Observatoire Impérial de Paris" is the earliest work on weather telegraphy, just as the "Bulletin International" is the oldest daily weather report.

Again, Le Verrier's "Atlas des Orages," "Atlas Météorologique," and "Atlas des mouvements généraux de l'Atmosphère" may fairly be put in the front rank of meteorological publications.

Le Verrier's latest work in Meteorology was not of a high order, he was perfectly conscious that it was so, but he desired to effect two objects, he wished to lessen the serious losses which his countrymen suffer from late frosts in spring and from hail-storms, and he desired to scatter broadcast throughout the country an acquaintance with the first principles of meteorology. Concerning this work we venture to reprint, from the June number of this magazine, the closing lines of an account of this branch of Le Verrier's work.

"We believe that the erection of these public barometers, and the publication of the bulletins from the Paris Observatory, will lead a few people to think, and if only one person is induced by each public barometer to study Meteorology, how grand an assemblage of thinkers will France possess! Real thinkers, workers and students of Meteorology.

logy, are as rare in France as in England, and if Le Verrier's 1,000 barometers kindle a thirst for meteorological knowledge in a thousand breasts, our science will make such progress as it has never made before, and Le Verrier's latest will be amongst his most useful labours."

THE FRENCH ASSOCIATION AT HAVRE.

THE meeting of the French Association for the Advancement of Science was held this year at Havre, and commenced on Thursday, August 23rd. The opening meeting took place at half-past two, in the Theatre which was well filled. On the platform were the Mayor, the President, and Council of the Association, and a number of distinguished *savants*. The president, M. Broca, after referring to the increasing prosperity of the Association, delivered an elaborate address on "The Fossil Races of Western Europe." The Mayor having bid the members welcome to the town of Havre, the general secretary, M. P. P. Déhérain read the report for the past year, in which allusion was made to the loss the Association had sustained by the death of the late M. C. Sainte Clair-Deville. The financial statement having been presented by the treasurer, M. G. Masson, the meeting terminated. The President and a number of the members then went to the old Palais de Justice to take part in the opening of the Geological and Paleontological Exhibition which had been organized by the Geological Society of Normandy. This was one of the best and most carefully arranged local exhibitions of the kind that we have ever seen, and reflects great credit upon its promoters.

In the evening a reception was held at the Hôtel de Ville, which was very largely attended. During the proceedings the Mayor proposed the health of the President and Members of the Congress, to which M. Broca replied, and said that he had been greatly impressed with the magnificent reception given to the Association by the municipality and inhabitants of Havre. In referring to the admirable Geological Exhibition which had been opened that afternoon, he expressed the hope that such a collection would not be dispersed, but that a permanent exhibition might be established.

The fifteen sections into which the Association was divided met at 9 o'clock on Friday morning in the various rooms of the Hôtel de Ville for the reading and discussion of papers, and meetings were held daily at that hour, except on Tuesday, which was given up to excursions; some of the sections had afternoon sittings. The Anthropological, Chemical, Mathematical and Medical Sections were the best attended, but in several of the others the attendance was very meagre.

A general *séance* was held on Friday afternoon, when the following communications were read:—"The Progress of Navigation," by M. Vial; "Geology of Havre; the Mouth of the Seine," by M. Lennier, President of the Geological Society of Normandy; "On the Works of the Port of Havre," by M. Quinette de Rochemont. In the evening

a lecture was delivered in the Theatre by M. le Comte de Saporta "On the Ancient Climates considered in their relations with the march and variations of European Vegetation."

On Wednesday afternoon another general *séance* was held, when Lieut. G. Biard explained the programme of the proposed voyage round the world which has been organized for the year 1878 by the Société des Voyages d'Études. In the evening Prof. Levasseur lectured in the Theatre on the "Soil and Wealth of the United States."

The concluding meeting of the Association was held on Thursday afternoon, when Montpellier was selected as the place of meeting for 1879, and several recommendations to the Government were passed.

M. Frémy has been elected President for next year's meeting, which will be held at Paris.

Excursions were made to Fécamp and Etretat on Sunday, to Tancarville and Lillebonne on Tuesday, and to Rouen by steamer on Friday returning on Saturday, September 1st.

The town during the meeting was very gaily decorated, and a fête of some kind took place every evening, including concerts, illuminations, fireworks, grand Venetian fête, procession of Chinese lanterns, &c.

THE METEOROLOGICAL SECTION.

The bureau consisted of—Prof. D. Ragona, Director of the Observatory, Modena, *Honorary President*; M. Alluard, Director of the Observatory on the Puy de Dome, *President*; Gen. De Nansouty, Director of the Observatory, Pic du Midi, *Vice-President*; and M. Angot, Secretary of the French Meteorological Society, *Secretary*.

Amongst those present at the meeting of this Section, in addition to the above, were—Lieut. Brault, MM. Dumas, De Fonvielle, Glaisher, Janssen, Lemoine, Marchand, Marié-Davy, Marriott, Capt. Mouchez, MM. Rédier (senr. and junr.), Tarry, Tissandier, and Vinot.

The papers read were:—

Prof. Ragona—"On the annual march of the Barometer."

" " "On the diurnal change of absolute and relative Humidity."

" " "On the effective variations of Temperature."

M. Alluard—"New Hygrometer." (Exhibited.)

M. Rédier—"Self-registering Thermometer." (Exhibited.)

M. Marchand—"On the Atmospheric Absorption of the forces contained in Sunlight, and on the calculation of this Absorption."

Mr. Glaisher—"On Nocturnal Increase of Temperature with Height."

Mr. Marriott—"On the Dry and Wet Bulb Thermometers."

M. De Fonvielle—"On Observations of Atmospheric Pressure made in Balloons."

M. Alluard exhibited some very interesting diagrams showing the variations in atmospheric pressure during storms at the summit of the Puy de Dome, nearly 5,000 feet above sea level, and at Clermont Ferrand, 1,500 feet. These clearly show that the changes of pressure

in the upper regions of the atmosphere are by no means similar to those at the surface of the earth, for when the pressure at the lower station was decreasing that at the upper was shown to be rising, and *vice versâ*; or, when the former was steady, the latter was very greatly disturbed or rapidly rising or falling.

There was brought before the Section a Report on the re-organization of French Meteorology, which had been drawn up by a joint committee of the French Association and the Meteorological Society. The committee recommended that a National Meteorological Institute should be established in Paris, which should have charge of the whole of French Meteorology. Two sittings were given up to the discussion of this report, but it was not adopted. A resolution was, however, passed calling the attention of the Government to the inferiority of French Meteorology, and asking that an official enquiry might be instituted into its working.

On the motion of Dr. Janssen, it was resolved to request the Transatlantic Steamship Companies to have meteorological observations made on board their vessels. It was also resolved to ask M. Giffard to organize a Meteorological Observatory in his captive balloon during the Exhibition at Paris.

Another resolution was passed deprecating the delay in the construction of a telegraphic line from Bagnères to the Pic du Midi, over 9,000 feet above sea level, for the purpose of sending regular observations when the observatory upon the latter is cut off by snow from all communication with the lower world.*

It was stated that in consequence of the International Exhibition and the meeting of the French Association being next year at Paris, a free International Meteorological Congress will be held in that city under the auspices of the French Meteorological Society.

THE WINTER OF 1876-7 IN ALGIERS.

To the Editor of the Meteorological Magazine.

SIR,—We had a most remarkable summer (!) last winter in Algiers! Great heat and drought. End of November gave us 87° in shade; December maxima *averaged* about 70°. I doubt if there were six days all the winter when max. did not reach 60°. The “old year and new year met” at a temperature of 67° (300 ft. above sea). On April 3rd, at 2 p.m., I saw a veritable shade 92° in a small wood, on blowy top of a hill 700 ft. above sea, far from any road or building! M. Bulard, at his station near the town, but little above the sea, registered 100° on that day! In the province of Oran there has been famine, and the whole of Algiers was visited by locusts in May, not very seriously however. The rainfall is about half or two-thirds what it should be, and not only that, but the greater part of the October rain ran off,

* The line (17 miles long) is now finished—October 8th.

SUN SPOTS AND FAMINES.

NOTE FROM DR. BUIJS BALLOT.

The question of the relation between the sun-spot period and rainfall, which had rather slumbered, has been brought forward again in connection with the Indian Famine, the most important fact being that the list of believers in the connection now includes Mr. Buchan. As, however, Mr. Buchan, in his letter to the *Times*, did not give any reasons for accepting the theory, except the evidence of the Madras register, we scarcely know whether to regard his advocacy as due merely to friendship and generous impulse, or as the result of an examination of all the evidence on both sides, sufficiently thorough to be worthy of his reputation.

Respecting the various letters which have subsequently appeared we need perhaps only mention that Mr. Symons urged that the enquiry being a purely statistical one, astronomers and meteorologists should separately provide the data, and some entirely unprejudiced statisticist should report upon the subject. The desire for an investigation appears to be unanimous.

We may also mention here that we have been requested by Dr. Buijs Ballot to state that the Harlem Society of Sciences intend to reward with a gold medal the best answer to the following question:—

What meteorological phenomena have we sufficient reason to consider related to the solar spot cycle?

Answers are to be sent before January, 1878, to Professor von Baumhauer, Secretary to the said Society, at Harlem. The essays are to bear a motto, and the motto is also to be upon a sealed envelope containing the author's name.

OZONE.

We have not the least desire to take part in the discussion on the above subject, commenced in our pages, but we think it desirable to point out the very important fact revealed by the two letters in our last number, and the unsatisfactory conclusion to which they lead.

Dr. Fox, if not actually the best read man on Ozone in this country, is at any rate one of the very highest authorities; after close reading and many experiments, he says—

“To estimate ozone apart from all other bodies in the air, it is necessary to pass a *known* quantity of air over a test paper, alone influenced by ozone, at a *known* and *unvarying* velocity.”

This is evidently a very carefully worded phrase, it enunciates four requirements:—

1. The paper must be so prepared as to be affected by nothing but ozone.
2. The quantity of air passing over it must be known.
3. The velocity of the air passing over it must be known.
4. The velocity must be uniform.

Therefore the paper must be placed in some kind of chamber, and a definite amount of external air must be drawn through the chamber past the paper.

Thus much for Dr. Fox's requirements ; if they are valid it is certain that all observations made by fastening a strip of paper in a thermometer stand, or even in an ozone cage, are useless.

This is an unpleasant state of matters, because we believe that nineteen-twentieths of the observations now being published are made in the manner we have mentioned. We may go further and state that we believe the stations where Dr. Fox's conditions are carried out do not number half-a-dozen in the whole of the British Isles.

There are about thirty stations belonging to the Scottish Meteorological Society, about fifteen belonging to Mr. Glaisher, and a large number under the Army Medical Department, at work at the present time on the plan which Dr. Fox condemns. Surely it is necessary that it should be definitely settled whether observations made in the rough way at present prevalent are of any use or not. If Dr. Fox's conditions are reasonable and ought to be complied with, let us try to get half-a-dozen well-selected stations properly equipped.

If observations on the existing plan are useless, it is as wrong to let observers continue making useless observations, as it is to spend time and money over publishing figures which can only mislead. But, on the other hand, before stopping any observations of this class let it be quite certain that they are really useless. We have a strong objection to all but very good observations ; we believe that it would be a good thing if some scores of thermometers were broken, and if some of the journals now kept were thrown behind the fire ; but we have also an almost superstitious respect for continuity, and would never stop any observations calculated to be of real service.

As to the Ozone subject, we need answers to the following questions :—

(1). Is it possible to deduce useful results from observations upon an ozone paper hung up in a thermometer stand ?

(2). Should the answer to No. 1 be a negative, why not stop all the observers unprovided with aspirators, &c. ?

HIGH BAROMETER AND THE COMING WINTER.

To the Editor of the Meteorological Magazine.

SIR,—I think the remarkably high range of the barometer last Saturday requires special notice, as in all my previous observations I never knew it so high.

February, 1863	...	...	...	it was	30·50 in.
October, 1875	...	...	...	"	30·50
January, 1876	...	...	...	"	30·60
Saturday, October 6th, 1877	...	...	...	"	30·64

These are the highest I have known. The mercury began to fall on Saturday evening, and is now 30·12, and inclining to rise.

Yours truly,

JAS. NUTTER.

Beech House, Cambridge, Oct. 8th, 1877,

P.S.—The enclosed I have extracted from the “Miller” paper, and is in your way :—

“*To the Editor of the MILLER.*”

“SIR,—I wish through the medium of your valuable paper to give my brethren in the trade a statement of what the weather will be for the next six months. I have watched very carefully the state of the atmosphere from September the 15th to the 25th. The sun crossed the Equator on Sunday, the 23rd, and entered the tropic of Capricorn in the southern hemisphere. The farmers will have a fine, dry autumn for sowing their wheat, and getting in the remainder of the crops. There is a hard, dry, frosty winter in store for us, but this will not be very acceptable for water millers, as it means a short supply of water. The wind will blow from the north chiefly, and it must be patent to every thinking mind that a regular north wind contains no vapour.—Yours truly,

“Sept. 25th.”

THOMAS BEBBINGTON.”

Mr. Bebbington is evidently an implicit believer in the theory that the general characteristics of each half year resemble those of the equinoctial week preceding it. This is a very old idea, but though it has many supporters, and upon the mere law of probabilities is bound to be *sometimes* right, we are not aware of any person who having written down at the end of each equinoctial week his opinion of the weather of the coming half-year, and compared it with the subsequent weather, has remained convinced of the accuracy of the method. This is the true test of all predictive rules, write in a book what you expect, and compare it with what you get. The late Mr. DuBoulay, of Sandgate, was a firm believer in this rule, and for three years published annually a pamphlet stating what the summer would be over the South-Eastern quarter of England :—

1862 was to be remarkable for excessive rain, little sun, and cold. The rainfall was exactly the average, temperature a little below it.

1863 was to be fine, especially July, August, and September. June was rather wet, July and half August very fine, rest of August and September very wet.

1864. The summer was to be remarkably dry. June was cold, and with frequent but slight rain ; July to September very dry.

The above, though not sufficient to prove anything, may serve as specimens of what it would be well to do for a series of years.

To Mr. Bebbington's prediction we add another copied from *Nature* of October 4th :—

“ON THE COMING WINTER.

“Having recently computed the remaining observations of our earth-thermometers here, and prepared a new projection of all the observations from their beginning in 1837 to their calamitous close last year—results generally confirmatory of those arrived at in 1870 have been obtained, but with more pointed and immediate bearing on the weather now before us.

"The chief features undoubtedly deducible for the past thirty-nine years, after eliminating the more seasonal effects of ordinary summer and winter, are :—

"1. Between 1837 and 1876 three great heat-waves, from without, struck this part of the earth ; viz., the first in 1846·5, the second in 1858·0, and the third in 1868·7. And unless some very complete alteration in the weather is to take place, the next such visitation may be looked for in 1879·5, within limits of half a year each way.

"2. The next feature in magnitude and certainty is, that the periods of minimum temperature, or cold, are not either in, or anywhere near, the middle time between the crests of those three chronologically identified heat-waves, but are comparatively close up to them *on either side*, at a distance of about a year and a half, so that the next such cold wave is due at the end of the present year.

"This is, perhaps, not an agreeable prospect, especially if political agitators are at this time moving amongst the colliers, striving to persuade them to decrease the out-put of coal at every pit's-mouth. Being, therefore, quite willing, for the general good, to suppose myself mistaken, I beg to send you a first impression of plate 17 of the forthcoming volume of observations of this Royal Observatory, and shall be happy if you can bring out from the measures recorded there, any more comfortable view for the public at large.

"PIAZZI SMYTH, Astronomer-Royal for Scotland.

"Royal Observatory, Edinburgh, September 27th."

SUPPLEMENTARY TABLE OF RAINFALL IN SEPT., 1877.

[For the Counties, Latitudes, and Longitudes of most of these Stations, see Met. Mag., Vol. XI., p. 28., but the list is under revision.]

Div.	Station.	Total Rain.	Div.	Station.	Total Rain.
		in.			in.
II.	Acol	1·82	XI.	Llanfrechfa	4·36
„	Hailsham .....	...	„	Castle Malgwyn	2·69
„	St. Lawrence, I. of W.	1·57	„	Heyope	3·32
„	Andover.....	1·81	„	Carno	2·70
„	Strathfield Turgiss	1·29	„	Rhug, Corwen	3·50
III.	Addington Manor.....	2·17	„	Port Madoc	4·28
„	Oxford	2·55	XII.	Melrose	2·41
„	Northampton	2·20	XIV.	Cessnock, Glasgow	1·47
„	Cambridge.....	1·95	XV.	Gruinart	1·96
IV.	Sheering	1·49	XVII.	Keith	2·85
„	Ipswich	·88	XVIII.	Dalwhinnie .....	...
„	Diss	1·93	„	Auchnasheen	3·00
„	Swaffham	2·40	„	Springfield, Tain	1·04
V.	Compton Bassett	2·63	XX.	Skibbereen .....	...
„	Dartmoor	5·75	„	Glenville, Fermoy	4·46
„	Teignmouth	2·36	„	Tralee	2·67
„	Langtree, Torrington	2·93	„	Newcastle W., Limerick	2·37
„	Cosgarne, St. Austell	8·17	„	Kilrush	1·41
„	Taunton.....	2·15	XXI.	Kilkenny	2·58
VI.	Bristol	2·90	„	Kilsallaghan	1·90
„	Sansaw	2·78	„	Twyford, Athlone	3·91
„	Cheadle	2·29	XXII.	Ballinasloe	3·53
VII.	Coston, Melton Mowbray	2·17	„	Kylemore	3·10
„	Bucknall	2·30	„	Carrick on Shannon.....	2·97
VIII.	Walton, Liverpool	2·92	XXIII.	Rockcorry	2·00
„	Broughton-in-Furness	3·07	„	Warrenpoint	1·83
IX.	Stanley, Wakefield	2·48	„	Carnlough, Larne.....	...
X.	Gainford	2·18	„	Bushmills	1·69
„	Shap	4·49	„	Buncrana	3·12

REVIEWS.

Le Climat de Brest. Première partie, Température et Pluie ; par Prof. A. BORIUS. Brest, 1877, 8vo.

OUR readers will remember the name of Dr. Borius as that of the author of an excellent book upon Senegal. In the work before us he commences a similar treatise upon the climate of Brest, where he is now residing. We greatly admire the frank way in which Dr. Borius points out the imperfect conditions of exposure of some of the thermometers upon which he has had to rely, and can only express our surprise that the resultant mean temperature ($52^{\circ}7$) should be so near the truth as it appears to be. We regret that the author has adopted a seasonal year (December to November) instead of the civil one (January to December), and trust that it will be the last time that we shall see large masses of data grouped in that way. The relations between meteorology and civil life are too numerous and important for it to be desirable that the periods embraced should be incomparable. The mean monthly temperature is lowest in December ($43^{\circ}3$), highest in July ($64^{\circ}2$). In discussing the temperatures of the four seasons Dr. Borius puts forward the claims of Brest to a high winter temperature. We are inclined to think that, even allowing for the bad placing of the Brest thermometers, and for uncertainty as to the application of corrections for index error, the fact remains that Brest has a very mild winter and not hot summer temperature. We translate a few paragraphs upon this subject:—

“The mean winter temperature ($44^{\circ}2$) is remarkably high, and it may reach $47^{\circ}7$, as in 1869, or even $48^{\circ}2$, as in the winter just passing. The coldest winter at Brest ($41^{\circ}2$) is warmer than an average one in Paris ($38^{\circ}3$), or even in London.”

“This high winter temperature is one of the most characteristic phenomena of our climate, and greatly surprises strangers, especially those residing in the centre or east of France. The contrast between Brest, Paris, and our frontier towns is very striking, not only as regards the general mildness of the winter but also for the rarity of frosts and their slight intensity when they do occur.”

“The only French towns in which the winter is as mild as, or milder than, Brest are Bayonne, Perpignan, Marseilles, Grasse, Nice and the towns in the department of Alpes-Maritimes. In all other parts of France the cold is much more severe. Bayonne and Perpignan are, therefore, the only towns north of the Pyrenean chain which enjoy as mild a winter as Brest; one must go into Spain, to the southern slopes of the Pyrenees, in order to find winters comparable with those of Brest. The departments of the Bouches-du-Rhône, of the Var, and the Alpes-Maritimes are the only ones which can in this respect be compared with Finistere. These comparisons would still remain even if a subtractive correction of 1° were applied to the Brest observations, which is more than can be necessary.”

“But if the uniformity of the Brittany climate gives mild winters, it gives also summers cooler than those of other towns in the same latitude.

“The mean summer temperature of Brest (62°·8) may, rather than the winter, be proved to be too high by future observations made under favourable conditions, but it will not probably be more than 0°·2 or 0°·4. The towns situated within a few miles of the shore of the English Channel are the only ones at which the summers are as cool as at Brest.”

“All these comparisons refer to temperature alone. Such a mild winter temperature in the latitude of Brest cannot co-exist with a clear sky. Cloud is almost constant, rain abundant and frequent, so that the advantages of a mild temperature are counterbalanced by dark weather, a misty horizon, and a very disagreeable hygrometric condition. One would never think of recommending to an invalid a town where the fine days are so rare, that usually he would be obliged to remain shut up in his room.”

That is something like an honest paragraph. What a pity it is that such straightforward statements are so rare.

Three sets of rainfall observations have been made at Brest, but not one of the gauges seems to have been well placed, and consequently the averages differ greatly. The true quantity seems to be about 40 inches, of which the larger portion falls between September and February.

We hope that ere long the quality of the Brest observations will be greatly improved, and we think that the town would be fortunate if it placed their reorganization in the hands of Dr. Borius.

Report of the Rugby School Natural History Society for 1876.

Rugby: Billington, 1877, 8vo, 88 pp., 11 plates.

Twenty-fourth Half-yearly Report of the Marlborough College Natural History Society. Christmas, 1876. Marlborough: Perkins & Son,

1877, 8vo, 206 pp., 3 plates.

The Natural History Journal, Nos. 1 to 3 and 6. York: W. Sessions, 1877, 8vo, 56 pp.

THANKS rather to the energy of the masters than of the boys these are two capital reports, but the Rugby boys seem to have done more than usual, and we have no wish to be hard upon anybody. Of course, it is only our duty to look at the meteorological portion, but, having satisfied ourselves respecting that part of the Rugby report, we own to having had a good laugh over the anonymous paper on “Cats.”

The Marlborough report contains very few papers, and only two by the boys themselves; but, at the same time, they seem to have worked hard both at Ornithology and Botany. The concluding portion of the Flora of Marlborough is given as an appendix, and is very valuable.

The last work on our list is a monthly periodical conducted by the Societies in Friend's Schools. It does not aim quite so high as the two other books with which we have grouped it, but it appears to accomplish so much useful work in Natural History, that we should strongly advise the Editors to put themselves in communication with the Phenological Committee of the Meteorological Society. Both parties, and Science itself, would gain by co-operation.

The Astronomical Register. Jan. to Sept. 1877. 8vo. London : J. D. Potter.

The Observatory. April to Sept., 1877. 8vo. London : Taylor and Francis.

WHEN a periodical has reached its fourteenth year, and its early volumes are so scarce as to be priceless, it needs little help from its contemporaries. This is the case with the *Astronomical Register*, and we need only say that recent numbers sustain its old character.

The *Observatory* is a new periodical edited by Mr. W. H. M. Christie ; it occupies nearly the same ground as its elder contemporary, contains many excellent articles, mostly signed, and is altogether a valuable publication.

We trust that amid the numerous English reading people devoted to Astronomy there are amply sufficient to support both these journals.

Ponts et Chaussées. Service Hydrométrique du bassin de la Seine. Résumé des observations centralisées pendant l'Année 1875. Par M. G. LEMOINE, Ingénieur des ponts et chaussées, sous la direction de M. E. BELGRAND, Inspecteur Général. 8vo. Versailles, 1876.

WHAT a pity it is that people are both too proud and too self-willed to learn ! Here is the annual report on the rainfall and discharge of the river Seine, worked out most carefully, treated in a strictly scientific manner, and consequently yielding, as truly scientific work generally does yield, information of great practical importance. Messrs. Lemoine and Belgrand not only keep up to the high level they first assumed in their administration of the great river, they go beyond it ; their work is both accurate and complete. Why can we not have similar reports upon the Thames ? We fear the true answer is, Because the general public knowing nothing of science are rather afraid of it ; they prefer " practical " men (as if a scientific man were necessarily unpractical), and though it is now fashionable to speak of scientific men with respect, and to talk much about the desirability of science-teaching, the people have yet to be born who would entrust matters of importance to purely scientific hands. Truly England can learn as much from France, as France from England. Why are we too narrow-minded to do it ?

SEPTEMBER, 1877.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL.					TEMPERATURE.				No. of Nights below 32°	
		Total Fall.	Difference from average 1860-5	Greatest Fall in 24 hours.		Days on which .01 or more fell.	Max.		Min.		In shade	On grass
				Dpth	Date.		Deg.	Date.	Deg.	Date.		
		inches	inches.	in.								
I.	Camden Town .....	.83	- 1.43	.28	3	10	73.3	11	36.1	25	0	1
II.	Maidstone (Hunton Court)...	.73	- 1.39	.25	2	8	...	...	...	...	...	...
III.	Selborne (The Wakes).....	1.44	- 1.00	.50	2	9	68.0	10*	29.0	25	2	6
IV.	Hitchin	1.79	- .07	1.04	3	13	61.0	2†	33.0	24**	0	...
V.	Banbury	2.22	- .15	.85	3	13	65.0	12	33.0	25	0	...
VI.	Bury St. Edmunds (Culford).	1.40	- .21	.51	3	17	72.0	11	32.0	24	1	6
VII.	Norwich (Sprowston).....	3.05	...	1.28	3	17	...	...	...	...	...	...
VIII.	Bridport	2.40	+ .08	.86	11	9	...	...	...	...	...	...
IX.	Barnstaple	3.13	- .58	1.71	2	9	69.0	11‡	36.0	22	0	...
X.	Bodmin	3.75	+ .08	1.13	10	13	67.0	6	39.0	22	0	0
XI.	Cirencester	2.10	- .76	.54	11	7	...	...	...	...	...	...
XII.	Shifnal (Haughton Hall) ...	2.66	+ .71	1.11	2	12	...	...	...	...	...	...
XIII.	Tenbury (Orleton)	2.22	- .46	.77	2	8	66.5	15	34.0	5	0	2
XIV.	Leicester (Belmont Villas) ...	1.52	...	.51	3	10	67.8	12	35.8	25	0	...
XV.	Boston	2.18	+ .56	.70	2	14	70.0	11	35.0	25||	0	...
XVI.	Grimsby (Killingholme)...	4.82	...	1.79	2	16	67.0	11	38.0	27|||	0	...
XVII.	Mansfield	3.53	...	1.48	2	14	69.5	11	33.5	25	0	1
XVIII.	Manchester .....	...	...	...	...	...	...	...	...	...	...	...
XIX.	York	3.20	+ .87	1.22	14	11	64.0	11§	35.0	28	0	...
XX.	Skipton (Arncliffe)	4.24	- .72	1.29	13	18	64.0	18	32.0	24	1	...
XXI.	North Shields	1.76	+ .06	.46	20	13	...	...	...	...	...	...
XXII.	Borrowdale (Seathwaite)....	8.98	- 4.23	4.78	12	11	...	...	...	...	...	...
XXIII.	Cardiff (Crockherbtown)....	3.25	...	1.39	2	7	69.3	10	36.8	5	0	...
XXIV.	Haverfordwest	3.92	+ .21	.90	10	9	65.2	10	35.0	21||	0	4
XXV.	Aberdovey	2.59	...	.77	14	12	71.0	1||	37.0	22	0	...
XXVI.	Llandudno	4.30	+ 1.96	1.78	14	15	68.9	10	42.5	8	0	...
XXVII.	Dumfries (Crichton Asylum)	2.37	- .57	.77	11	6	63.5	11	33.5	21	0	...
XXVIII.	Hawick (Silverbut Hall).....	1.67	...	.50	12	9	...	...	...	...	...	...
XXIX.	Kilmarnock (Annanhill).....	1.81	...	.58	5	8	64.0	12	34.1	21	0	3
XXX.	Castle Toward	2.36	- 2.26	.71	14	7	61.0	17	32.0	21§§	2	0
XXXI.	Mull (Quinish)	2.57	...	.74	11	12	...	...	...	...	...	...
XXXII.	St Andrews (Cambo Ho.) ...	2.20	...	...	...	...	...	...	...	...	...	...
XXXIII.	Grandtully	2.13	...	.89	5	6	...	...	...	...	...	...
XXXIV.	Braemar	2.10	- .54	.65	5	9	61.2	8	30.0	2	3	12
XXXV.	Aberdeen	1.80	...	.52	5	16	64.2	14	37.5	3	0	3
XXXVI.	Gairloch	2.50	...	.54	13	16	...	...	...	...	...	...
XXXVII.	Portree	3.80	- 6.96	.86	13	17	...	...	...	...	...	...
XXXVIII.	Inverness (Culloden)	1.41	- 1.28	.80	6	8	66.9	11	35.3	3	0	8
XXXIX.	Helmsdale	1.21	...	.26	12	14	...	...	...	...	...	...
XL.	Sandwick	1.63	- 2.03	.26	13	20	59.9	13	39.8	30	0	0
XLI.	Caherciveen DarrynaneAbbey	3.02	...	.66	14	11	...	...	...	...	...	...
XLII.	Cork	3.23	...	.83	10	8	...	...	...	...	...	...
XLIII.	Waterford	3.63	+ .50	1.76	10	8	69.0	4	33.0	22	0	...
XLIV.	Killaloe	2.62	- 1.54	.72	14	10	75.0	5	32.0	22	1	...
XLV.	Portarlington	1.52	- 1.76	.64	14	21	64.0	14	35.0	21	0	...
XLVI.	Monkstown, Dublin	2.01	+ .02	.79	10	8	71.0	5	34.0	4	0	...
XLVII.	Galway	2.42	...	.61	12	13	68.0	11¶	36.0	22	0	...
XLVIII.	Ballyshannon	2.43	...	.65	10	12	...	...	...	...	...	...
XLIX.	Waringstown	2.16	...	.59	11	14	66.0	17	33.0	3	0	...
L.	Edenfel (Omagh)	2.27	...	.83	10	14	64.0	11	31.0	3	1	...

* And 11. † 10, 11, 15. ‡ 13. § 12. || 26, 28. ¶ 16, 17. ** 27. §§ 28. §§ 22.
 †-Shows that the fall was above the average; -that it was below it.

METEOROLOGICAL NOTES ON SEPTEMBER.

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

ENGLAND.

SELBORNE.—A chilly and ungenial month, with frequent fogs, especially towards the end. Prevailing wind first half S. and W., second half N. and N.E. R and H on 12th.

HITCHIN.—The coldest September in our record.

CULFORD.—The coldest September during many years; mean temp. $52^{\circ}1$. On the morning of six days the grass was crisp with frost; N.E. winds on six days, and during 11 of the remaining 24 the wind was from the N.W.; T on 3rd and 11th.

BODMIN.—Mean temp. $57^{\circ}7$, being $1^{\circ}6$ below the average.

SHIFNAL.—The previous R continued for the first 4 days, with a fall of $\cdot50$ on the 3rd, when a change for the better ensued till the 11th, then R again during 5 days, thence to the end dry, with three slight exceptions, enabling the farmers to get in the rest of their damaged crops, some out till the end. Winds westerly generally with clouded sky till the 20th, when from E. with bright weather; morning foggy from 27th; no equinoctial gales. Clouded yellow butterflies (*Colias Edusa* and *Hyale*) appeared here as elsewhere, after many years' interval; few others. Not a damson in the parish, and very few plums and wall fruit; blackberries the only substitute abundant, also hazel nuts; hardly any acorns.

ORLETON.—A heavy fall of R occurred on the 2nd and 3rd, which flooded the brooks and river, and retarded the harvest, which was very late. The wind then changed to the N. and E., and gradually dried up the land; R fell only on 5 days afterwards during the month, but the temp. was low, and the sky generally cloudy till after the 20th, when the sky became clear with sunny days and cold nights. The wind was violent on the 3rd and 15th. No T heard nor L seen. Mean temp. of the month was about $3^{\circ}5$ below the average, and much lower than that of any September during the last 16 years.

LEICESTER.—Nearly all the R fell in the first half of the month, one-third of the total amount having fallen on the 3rd; the last fortnight very fine. Very foggy mornings during the last week. Much N.E. wind, and temp. generally below the average.

BOSTON.—The temp. of the month 5° below the average of the last 13 years in this neighbourhood. The wind blew from a north-easterly direction on 18 days; the average for this month being four days. Harvest much impeded by the very heavy R at the beginning of the month. The crops generally are below the average, but not so deficient as in other districts of the country. The potatoe crop is a failure, two-thirds of the tubers being affected by disease. Hay and grass keeping has been plentiful; fruit generally has yielded a very poor crop. The deficiency in the corn crops is accounted for by the cold, wet, backward spring, and the lowness of the temp., and stormy weather in July, when the wheat was in flower. The fruit was ruined by the frosts in spring, when the trees were in blossom; and the potatoes by the wet weather of the late summer and early autumn.

GRIMSBY.—Air very moist throughout the month. The wheat proves to be in a worse condition than was at first imagined; some barley carried in fair condition at the end of the month. August and September have each had a fall of more than $4\cdot00$ of R, a thing that has never occurred in two consecutive months since I have kept a register; neither have I ever before recorded three falls of more than $1\cdot00$ in. within a month, as was the case this year, viz., August 25th, $1\cdot55$; September 2nd, $1\cdot79$, and September 14th, $1\cdot22$. The rainfall of the year is now $24\cdot60$. For the same period in 1872 it was $25\cdot51$, but last autumn was far wetter than that of 1871. TS on 11th, at 5 p.m.; and T at the same time of day on the 12th.

MANFIELD.—The early part of the month was marked by heavy R on the 2nd and

3rd, amounting together to 2·14, and all falling between 6 p.m. on 2nd, and 6 p.m. on 3rd, giving 1·48 to the 2nd, and ·66 to the 3rd; the remaining part of the month has been fine autumnal weather, with occasional showers; after the 14th they were very slight, it being fine autumnal weather with haze. Mean temp. of month 51°·9

NORTH SHIELDS.—TS with H on 20th.

WALES.

HAVERFORDWEST.—With the exception of the very wet weather, from the 10th to 14th, this has been a magnificent month; certainly the finest in the year. Although the crops are light in quality, especially the oats, yet all has been saved well. Latter half of the month barometer high.

ABERDOVEY.—A warm, genial month; very favourable for the harvesting in these parts, especially on the hill sides. Winds generally calm; about 2 inches less R than fell in September of last year. No frost here.

LLANDUDNO.—The first half of the month wet and variable in every respect, but it was much less so in the second half. There was a heavy gale on the night of the 13th, followed the night after by an unusually heavy fall of R (1·78), from this time to the end the fall only amounted to ·22. Sea fog from 10 to noon on 24th, and another from 2 to 4.30 p.m. on 29th. Mean temp. of the month about 3° below the average; and the fall of R much above it.

SCOTLAND.

DUMFRIES.—September has been a dry month; R fell only on six days, but on three of them following each other it was nearly 2·00, and there was not any fell between the 13th and the end of the month. Both rainfall and temp. was below the average; winds have been light, the prevailing direction being northerly; bar. high. T and L only recorded once.

HAWICK.—On the night of the 1st there was much L, which was followed by two frosty nights; very high winds on 12th and 13th. The month has been the driest of this year, much hay has been got in, and harvest operations have gone on without much interruption; potatoes are much diseased; and the turnip crop is far from satisfactory. The flower gardens are now looking summerlike.

ABERDEEN.—Bar. above the average; mean temp. 51°·1, or 1°·7 below the average (20 years); and rainfall, 1·80, is 1·31 below it. Wind pressure less than the average; but wind from N.W., N. and S. more frequent than usual. A month of rather dry, but dull weather.

PORTREE.—On the whole a favourable month for farmers, the corn crops have ripened wonderfully well during the month, harvest work is now carried on briskly, but there will be no full ripe corn in the island this year. The potatoes are free from blight, but the unprecedented frost on the 1st of the month has retarded the growth. Straw and hay, if got in well, will be plentiful all over the island.

SANDWICK.—September has been much drier than the average, and also colder owing to the prevalence of northerly winds which blew on twenty days. Harvest is unprecedentedly late, and very few oats are yet ripe enough for cutting. Aurora on the 15th.

IRELAND.

DARRYNANE.—Heavy TS on 14th.

WATERFORD.—Mean temp. 54°·4; wind N. on 21 days; high wind on 8th; heavy R (1·76 in.) on 10th; extremely heavy R, with high wind, 5.30 to 6.15.

KILLALOE.—From 14th to end of the month perfect weather, and all that could be desired for concluding harvest operations. Mean temp. 54°·0.

MONKSTOWN.—First and last 10 days of month very fine and dry, rather cool N.W. winds being prevalent; 11th to 14th very damp and warm, with daily falls of R.

BALLYSHANNON.—Although more than 2 in. of R has fallen, the month on

the whole has been favourable for gathering in the grain crops, but the potato crops throughout the district are more than half diseased.

WARINGSTOWN.—Latter part fine and favourable for the harvest, which has been delayed till now.

EDENFEL, OMAGH.—The first fortnight of September was a continuation of the raw, rainy, unseasonable weather which has made the year remarkable; the hay was not all saved, and but little had been attempted at the grain harvest; but since the 14th, and as if to leave a better impression behind of the dying year, we have been blessed with weather as like summer as it could be at this season, so that what would have been a disastrous, will now be but an unfavourable, year for the farmers.

GREENWICH EXTREME TEMPERATURES.

The extreme Shade Temperatures of the month of September at the Royal Observatory, Greenwich, during the past 36 years.

Year.	Maximum.		Minimum.		Year.	Maximum.		Minimum.	
	deg.	date.	deg.	date.		deg.	date.	deg.	date.
1841	79·6	12	36·6	5	1859	76·0	24	41·5	12, 20
1842	75·8	2	41·1	21	1860	69·7	7, 8	35·7	12
1843	79·9	17	34·0	28	1861	81·1	1	37·7	27
1844	78·0	1	34·8	29	1862	73·8	15	39·2	23
1845	73·5	9	33·4	23	1863	71·8	19	35·0	30
1846	86·4	6	39·2	29	1864	75·5	8	40·9	12
1847	72·5	11	33·1	27	1865	86·0	8	40·2	23
1848	80·5	22	33·2	13	1866	71·0	28	41·3	25
1849	79·0	6	42·7	18	1867	79·9	1	35·5	25
1850	70·5	2	39·0	7	1868	92·1	7	43·6	11
1851	76·6	1	37·6	10	1869	80·0	5	41·2	1
1852	77·5	4	37·9	17	1870	72·6	1	37·4	25
1853	73·0	17	37·5	27	1871	82·0	1	39·0	23
1854	81·2	4	37·9	29	1872	81·4	3	34·5	23
1855	78·2	23	34·1	27	1873	72·5	27	38·2	22
1856	72·5	10	40·0	20, 21	1874	78·1	25	43·4	19
1857	80·7	17	41·5	21	1875	81·0	18	44·6	1
1858	83·8	12	41·5	25	1876	72·5	21	41·6	13, 18

Extremes in 1877, Max. : 73°·4 on 11th; Min. : 33°·3 on 25th.

	Year.	Max.	Date.	Min.	Date.	Year.
Means of 36 years	...	77·7	11	38·5	20	...
Highest	1868	92·1	7	44·6	1	1875
Lowest	1860	69·7	7, 8	33·1	27	1847
Range .....	...	22·4	...	11·5	...	...

Addiscombe, 8th Oct., 1877.

EDWD. MAWLEY.