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THE OBSERVATORY OF MONTSOURIS.

ALTHOUGH we may not all be able fully to follow the details of Meteorological progress in France, there are some features which are indisputable. Of these the utility of the Montsouris Observatory, and of the work carried on there by M. Marié-Davy, is probably the most certain. Respecting this work we desire to say a few words, and we can hardly introduce it better than by translating some paragraphs from the introduction to the volume of the *Bulletin** for 1874.

“Everybody knows that heat, light, and moisture are indispensable to the most fertile fields, but if we ask in what proportion, no answer can be given even as regards the most ordinary crops of every country. Also, when we try to compare the yield of the harvests in various years as they pass, with the meteorological observations made during those years, one meets with endless contradictions, so that if it were possible to indicate, even one year before hand, the series of events which would occur at any place throughout the whole period of vegetation, the farmer, though drawing therefrom an inestimable advantage, and placing all the favourable chances on his side, could not tell what would be the result, nor upon what harvest he might reckon.”

“Obedient to the idea which presided over its foundation, viz., the formation in France of an establishment charged with the study of Meteorology by itself, and also in its applications to agriculture, the Observatory of Montsouris endeavours to employ all the resources of science in the study of the atmosphere, and of the effects which its variations produce upon vegetation. In this respect the situation of the Observatory has been happily chosen; the surrounding grounds are sufficient, but as the whole organization and apparatus had to be arranged, and obtained, it is only gradually that it can get into working order. The year 1873 was almost wholly devoted to preparatory studies, which

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led to the conviction that in researches on vegetation, whatever might be their nature, one could not leave altogether the domain of Chemistry. It has therefore been necessary for us to provide laboratories adapted for the most delicate operations on the chemistry of the atmosphere in those branches which touch on agricultural chemistry. Thanks to this addition, it will be possible for us to study the constituent or occasional elements of the atmosphere, and to follow, step by step, the progress of the harvests in their relation to successive changes in the weather."

"A considerable portion of this Bulletin will be devoted to these studies, under the title of "The Physics of Vegetation." We shall not wait to give memoirs as nearly perfect as possible, but we shall record in it the series of facts successively observed, with every possible care, and by methods most carefully considered."

"The 'Bulletin Mensuel' is then, properly speaking, even in its letter-press, a record of the Meteorological and Agricultural observations made at Montsouris, either in the open air or in its laboratories, by the staff of the establishment or by the scientific men admitted there to carry on researches of a similar nature."

Having let the Director speak thus far, we will next run rapidly through a few numbers of the Bulletin so as to enable our readers further to realize the nature of the work in progress at Montsouris. The first paper on "The Physics of Vegetation," describes chemical methods for the analyses of winter wheat, and of rye; then follows a diagram (not so well printed as it might be) of the principal Meteorological elements, and then a series of tables giving in great detail the very numerous and interesting Meteorological observations made at Montsouris. We may, perhaps, on some future occasion describe in detail the Meteorological arrangements at this Observatory, but for the present it will suffice to say that they are already very extensive, and are being rapidly developed.

The February number opens with a notice of the "Bulletin Météorologique du Nord," gives under the Physics of Vegetation a notice of the congress of Agriculturists and Foresters held at Vienna, and then passes on to a resumé of arrangements made for collecting rain water for analysis by means of a funnel made of enamelled iron, which seems too small for M. Marié-Davy's wishes, (why he does not have a large one made in glass we do not know); however, as he has surmounted many far greater difficulties there is no fear of his being beaten by this. Certain large vessels filled with earth, containing plants, have at their bases arrangements for collecting the effluent water, its analysis follows next, and then that of certain typical plants collected weekly. This number ends with some Magnetic observations, a list of presents received, and the usual diagram and tables.

March opens with a graceful tribute to the memory of Quetelet, then notices Brigadier-General Myer's synchronous system of observations, gives next a most alarming *looking* paper by M. Ragona, then the usual analyses of typical plants and of rain water.

The special notes in the April number are on the humidity of the soil as determined by raising and drying equal volumes from various depths, and further notes on the analysis of rain water. In that for May we have notes on Aurora, on the analysis of the air, and on evaporation from plants. In June, the analyses and general details of the progress of vegetation occupy almost the whole number; but in July Meteorology is again in the ascendant, and M. Davy gives a paper on Actinometry, or perhaps more properly, on Solar Radiation, which is much too good to be noticed at the end of an article. It must be taken by itself.

Our summary of what is being done at Montsouris need not be long, for it must either occupy many pages, or be dismissed in a few lines. We think the latter is the preferable course. Our readers may take our word for it, that they can hardly suggest anything which should be done in order to determine the relations between Meteorology and Agriculture without our being able to reply, it is already being done. One word more. No one should lightly intrude on the valuable time of such a man as the Director of this Observatory, or even on that of the assistants; but, on the other hand, we can assure those of our readers who are familiar with Meteorology, Agriculture, and the French language, that if they can obtain permission to visit the Observatory (which is in the extreme south of Paris), they will learn more in an equal time than they ever did elsewhere.

THE WINTER OF 1874-5.

To the Editor of the Meteorological Magazine.

SIR,—I had hoped to have seen, in your Magazine ere this, Mr. Brumham's forecast of winter mean temperature, as deduced from a table such as he contributed to your magazine for April last.

I trust he will give us the results of the rainfall at his 50 stations for the months of April and May, July and August, in your next number.

I am, yours obediently,

C. SOAMES.

Mildenhall Rectory, Marlborough.

To the Editor of the Meteorological Magazine.

SIR,—In your magazine for April last, page 41, I stated that "When the total (mean) rainfall of April, May, July, and August, is less than 10·60 inches, but above 8·60 inches, the following winter is partly very severe. Such was the case in 1869-70, 1866-7, 1863-4, 1860-61, 1857-8, 1855-6, 1853-4, and 1852-3." This year the total (mean) rainfall of the aforesaid four months was exactly equal to the average given in the table on page 40—viz., 10·30 inches. Therefore, according to the above-mentioned law, the coming winter will be, at any rate, partly very severe.

GEORGE D. BRUMHAM.

Barnsbury, Nov. 30th, 1874.

REMARKABLE DARKNESS.

To the Editor of the Meteorological Magazine.

SIR,—Lest no one sends you a more correct account, I beg to forward you the following notes of a very remarkable darkness, which occurred in this neighbourhood on November 18th. In the morning the barometer stood at 29·475, and a thermometer which lay on a stone sill outside of a west window, at 41°. Air very misty and calm, but the smoke came from the east. Shortly after 9 o'clock, however, the smoke came slowly from the opposite quarter, and the mist cleared away gradually. About 11.50 I observed an intensely dark and dense-looking cloud, perhaps half-a-mile above ground, coming from the N.N.W. with considerable rapidity, and the westerly current, which was still gentle, curling rapidly up the front of it, like steam from a boiling cauldron, as it pushed onwards. As the cloud passed overhead suddenly all became dark, so dark as to extinguish all color from objects around. I tried to think of something to measure the intensity of the gloom. I took out my watch,—could see its form, but not read its face. I looked up to see if any stars were visible, forgetting for the moment the thickness of the cloudy screen. This state of matters may have lasted fully a minute, when I observed daylight breaking in the north eastern horizon, over the east end of Glasgow; and light returned quickly as the cloud travelled south south eastwardly, followed by a pretty sharp shower of short duration. In some localities farther east, the shower seems to have been heavier, and preceded or accompanied the darkness. The latter, from what I can learn, extended from the west of Glasgow to the east of Motherwell; so would be fully sixteen miles long, from east to west, and where I saw it, it was fully six miles broad: but I fancy I was near the west end of it, as I have not heard of the great darkness occurring more than four or five miles west of Cambuslang, and it seems to have been more intense, and longer continued, more to the east. At Airdrie four minutes of darkness is the length of time mentioned.

Some of our turkeys expressed alarm by sounds and gestures, and made for their roosts; and the ducks came quacking up the paddock. No other animals, wild or tame, were within reach of observation. There was nothing unusual in the quality of the darkness to distinguish it from a cloudy night an hour or so after sunset.

Sunshine and showers occurred afterwards during the day and next morning the rain-gauge registered a fall of 0·30 in.; bar. 29·3, therm. 42°; wind S. At 9.30 there threatened to occur a repetition of the same phenomenon, from the same quarter; but before the intensely dark cloud reached this, it partially dissipated, with lightning, thunder and hail. The latter larger than any I remember ever to have seen; globular of all sizes, from peas to fully five-eighths of an inch in diameter, made up of agglomerated hailstones about an eighth of an inch across, forming a mulberry-form surface. Only a few fell here. Further north they formed a stratum an inch deep.—Yours truly,

HENRY MUIRHEAD, M.D.

Bushy Hill, Cambuslang, Lanarkshire.

RAINFALL IN WENSLEYDALE.

To the Editor of the Meteorological Magazine.

SIR,—I enclose the details of the two great rain storms which we have experienced recently as recorded by my electrical rain gauge, 3 ft. above ground.

The contrast between the two was very marked. The fall of October 20th accompanied a violent W. wind, that of November 28th an E. wind of considerable, and, on the coast, of excessive force. On the former occasion, after 9 or 10 hours of "Scotch mist," the rain fell in irregular and, towards the end, intermittent squalls for about 12 hours, producing an extraordinary flood. On the latter, snow fell for some hours, succeeded (perhaps about 2 or 3 a.m.) by a perfectly steady down-pour of dense rain, continuing without the slightest break or intermission till about 11 a.m. on the 29th. At 9 a.m. the ground was covered with some 3 inches of semi-liquid slush, but at this level it had all melted before evening. The depth of snow on the hills was very great.

F. W. STOW.

P.S.—The record of the snow was obtained by placing a lamp within the box. I append the record of a third fall, partly of snow, but chiefly of rain, ending with a severe N. gale.

Hour ending (a.m.)	1	2	3	4	5	6	7	8	9	10	11	12
Oct. 20 .....	...	...	...	...	...	...	...	...	01	...	...	...
„ 21	12	14	11	10	17	16	06	08	04	...	05	01
Hour ending (p.m.)	1	2	3	4	5	6	7	8	9	10	11	12
Oct. 20 .....	...	...	04	01	01	01	01	...	01	01	06	...
„ 21	01	...	...	...	01	01	...	...	...	...	...	...
Hour ending (a.m.)	1	2	3	4	5	6	7	8	9	10	11	12
Nov. 29	03	03	12	18	17	17	10	10	13	10	06	01
Hour ending (p.m.)	1	2	3	4	5	6	7	8	9	10	11	12
Nov. 28 .....	...	...	...	01	...	...	...	...	02	02	02	02
„ 29	01	...	01	02	01	02	02	03	01	01	...	...
Hour ending (a.m.)	1	2	3	4	5	6	7	8	9	10	11	12
Dec. 8 .....	...	...	...	...	...	...	...	...	02	16	13	...
„ 9	03	04	04	04	02	01	01	...	...	...	...	...
Hour ending (p.m.)	1	2	3	4	5	6	7	8	9	10	11	12
Dec. 8	06	13	10	06	03	05	04	07	...	07	03	...

RED RAINBOW.

To the Editor of the Meteorological Magazine.

SIR,—This morning, at 7.15, I observed a peculiar rainbow: it was entirely red, no other colour being visible. It formed a perfect arch in the N.W.; the sun was just risen, and the sky was fiery red. Was its colour caused by the red rays only reaching the drops?

I am, Sir, yours obediently,

W. C. HUGHES.

Grammar School, Sutton Valence, Staplehurst, Kent, Nov. 25th, 1874.

FINE METEOR.

To the Editor of the Meteorological Magazine.

SIR.—I take the liberty of sending to you a brief description of a most magnificent meteor seen here last evening. The phenomenon being so remarkable, I do not doubt but that it will have been seen by many in various parts of England.

The sky was cloudless, and the air frosty. At 8.35 notice was first drawn to the meteor by the landscape and surrounding objects being illuminated as by a very bright flash of lightning of a peculiarly white and silvery character. Then, and at no very great elevation, a long and broad band of light was observed proceeding from East to West, at the lower end of which was a large and irregularly shaped mass of white flame, which suddenly seemed to explode, emitting a shower of fragments not unlike that produced by a rocket, the whole of a silvery hue, and lasting perhaps 20 seconds from the time of its first appearance.

I am, dear Sir, yours very truly,

EDWD. TUCKER, JUN.

Woodlands, Elterwater, near Ambleside, Dec. 4th, 1874.

RAINFALL AND YIELD OF WELLS.

To the Editor of the Meteorological Magazine.

SIR,—In confirmation of the statement in my letter of October 31st, namely, that "the prospect of water supply this year, or season 1874-5, as compared with 1873-4 is better," I find that the rain of November, from the 25th to the 30th inclusive, viz., 1.33 in. (the total for the month being 2.17 in.) has produced a marked influence on the water level, so that it now stands higher than at this time last year. This is rather due to September and October rains, which so saturated the ground that the November rain, though little above the average, sunk to the water level in the well in question.

Yours obediently,

J. C. CLUTTERBUCK.

Long Wittenham, Dec. 5th, 1874.

A WARM AUTUMN.

To the Editor of the Meteorological Magazine.

SIR,—The remarkable prolongation of mild weather during the present autumn is, I think, worthy of record, and I therefore send you a few notes concerning the night temperatures, which may be interesting to those who have been surprised to find themselves still revelling in kidney beans, and enjoying the unwonted sight of uninjured dahlias and summer-like roses.

Contrary to general experience, October passed away without the occurrence of a single night's frost. The lowest temperature recorded here during the month was 38.3 degrees; so that there were no really cold nights at all—not even a "frost on the grass," which generally occurs, when the temperature of the air at four feet above the soil falls

to about 35 degrees. The following table, showing the date of the first autumn frost (*i.e.*, 32 degrees or below), in each of the last ten years, and the number of frosty nights (*i.e.*, nights below 35 degrees), from October 1st to November 8th, will render very apparent the unusual character of the season up to the present time.

Year.	Date of first frost. (32 deg. or below).		No. of frosty nights on grass. (below 35 deg. in air).	
1865	...	October 6	...	12
1866	...	" 16	...	4
1867	...	" 4	...	4
1868	...	" 2	...	11
1869	...	" 20	...	5
1870	...	" 15	...	8
1871	...	" 10	...	5
1872	...	" 6	...	5
1873	...	" 13	...	12
1874	...	November 8	...	1

The past month is therefore the only October in the last ten years which has brought us no frost whatever, and is in singular contrast to the wintry autumn days of last year.—I am, Sir, yours obediently,

BOSCAWEN T. GRIFFITH.

Trevalyn Hall, Wrexham, Nov. 1874.

P.S.—I should add that my thermometers are by Casella, and that they are placed on a stand (removed from house walls) at a height of 4 feet above the ground, and 61 feet above mean sea level.—B. T. G.

HEAVY FALL OF RAIN IN NORWAY.

(*Translated extract of a letter from Hans Gabrielsen. Liknæs, near Flekkefjord, Norway, 18th October, 1874, to C. O. F. Cator.*)

"I must now tell you of a sad occurrence. There came here on 5—6th October the greatest fall of rain, so that the river went beyond its highest limits: it has not been so high for 100 years. No old man here can remember the river so high, and it did much damage, of which I will tell you: At Orenslø the river swept away my best soil and broke the enclosing fence, and washed it away, so that I cannot make it as good again as it was for 30 dollars (nearly £7), and all my summer earnings are lost by it. Your bridge also has been swept away with the flood, a little bit of it is left, but the greater part has gone to the sea. There is much damage in many places; the river rose to 2 feet above the floor in Hakon Jarl's house, and people could row in boats from Olsen's (the Post Office) and Hans Hoiart's to Carl Tolaksen's, right over the road.

Your two boats I have kept safely, but many have been lost.

HANS GABRIELSEN."

N.B.—In an ordinary *high* flood the river rises at Liknæs about 6 or 7 feet above its average height; I should estimate from recollection the floor of Hakon Jarl's house about 8 or 10 feet above it, so that the river would appear to have risen about 10 or 12 feet above its average.—C. O. F. C., 19th Nov., 1874.

REVIEWS.

The Diurnal Variations of the Wind and Barometric Pressure at Bombay. By F. CHAMBERS. [Phil. Trans. 1873.]

A VERY good specimen of the class of papers most needed at the present day, and respecting which the only ground for regret is that there are so few persons who are competent to profit by them. It is a very careful, thoughtful paper, not worded perhaps in the most lucid manner, but nevertheless giving all necessary details, and, to a great extent, proving the proposition which the author thus enunciates:—

1.—The object of this paper is to draw attention to a remarkable relation which has been found to exist between the diurnal variation of the wind and the double diurnal oscillation of the barometer at Bombay, and which, it is believed, will be of great interest to all Meteorologists.

The author subsequently discusses some of the British records, especially those from Sandwick Manse, and obtains evidence confirmatory of the relation above-mentioned. The subject may, therefore, be remitted to those who are still working upon that difficult subject, the *cause* of the double diurnal oscillation of the barometer. We have put the word *cause* in italics because there does not appear to be in Mr. Chambers' paper even a hint whether the change of wind direction is a cause or an effect.

Repertorium für Meteorologie herausgegeben von der Kaiserlichen akademie der Wissenschaften, redigirt von Dr. H. Wild. Band III. 4to. St. Petersburg, 1874.

[Continued from *Meteorological Magazine*, page 108.]

ON resuming our notice of this splendid work, we cannot help regretting how few there are in this country competent and willing to profit by its many useful lessons. The time will no doubt come when Englishmen of high mental power will, in increasing numbers, devote themselves to perhaps the most complex of natural phenomena. At present, however, the remarkable dictum, true throughout Europe, is most true in England, now, as when Sir George Airy uttered it, "THE OBSERVING STRENGTH IN METEOROLOGY IS OUT OF ALL PROPORTION TO THE THINKING POWER."

The next memoir which claims our notice is one by Dr. Koppen, on the determination of mean daily temperature, from observations taken at certain pairs, and groups, of hours. And almost on the first page we come upon two most interesting tables, such as we have never seen before: not that there is any special skill in having compiled them, but our own countrymen seem to lack the energy to work up the materials in their possession. If any one demurs to this charge, let him go to work upon the ponderous volumes which have issued from our Indian observatories, upon those of the Colonial Magnetic and Meteorological observatories, and, though last not least, upon the microscopic charts of the Meteorological Committee, and produce from them tables of the mean daily time of minimum and maximum temperature for the British Isles, for India and the Colonies.

Meanwhile we must not pass without briefly indicating the nature of the tables which have led to this process of self-anatomization and self-condemnation of ourselves as Englishmen. The first gives for about 30 stations, ranging from Archangel to Tifis and from Geneva to Pekin, the average time of lowest temperature each day for each month. The second table does the same for the time of maximum. We will give the values for a few stations, in the hope that it may induce others to complete the series, for there are scores of stations which ought to be added to the list.

Hour of Minimum Temperature.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Archangel	4. 0	6.24	6.18	4.12	3.18	1.42	1.48	2.48	5. 6	5.54	3.42	6. 0
St. Petersburg	6. 0	6.42	5.42	4.48	3.42	3.12	3.24	4.24	5.24	6.18	6.42	6.48
Barnaul	7.12	6.24	5.30	4.12	3.36	3.30	3.36	4.12	5. 6	5.42	6.24	6.42
Vienna	6.12	6.24	5.36	4.54	4.18	3.54	4.18	4.42	5. 6	5.36	6.18	6.48
Geneva	6. 0	6. 6	4.18	3.36	3.18	2.42	3.12	3.24	4. 0	4. 6	5.18	6. 6
Gt. St. Bernard	4.24	4.18	3.42	2.54	2.54	3. 0	3. 6	3.18	4. 6	3.18	4.30	5.12

Hour of Maximum Temperature.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Archangel	1.30	2.18	2.36	2.48	2.48	3.36	4.36	2.42	2.12	1.48	1.18	0.18
St. Petersburg	2. 0	2.42	3.36	3.54	3.42	3.42	3.48	3.48	2.48	1.48	1.48	1.48
Barnaul	1.42	2. 0	2.30	2.30	2.48	2.18	2.24	2.48	2.36	2. 6	1.24	1.30
Vienna	2. 6	2.24	2.42	3. 6	3.18	3.30	3.36	3.30	2.36	2.12	2. 0	2. 0
Geneva	2. 0	2.12	2.12	2.12	2.12	2.48	2.48	2.48	2.30	1.42	1.30	1.42
Gt. St. Bernard	0.42	0.42	0.42	0.48	0.48	1.18	1.12	1. 6	1. 6	1. 0	1. 6	1.12

These values alone would afford the basis of much profitable enquiry, but it would be somewhat foreign to the subject of the paper and we, therefore, pass on.

The combinations of hours which are considered are—

$\frac{1}{3}$ (6h.—2h.—10h.)	$\frac{1}{4}$ (7h.—2h.—2h.—9h.)
$\frac{1}{3}$ (7h.—2h.—10h.)	$\frac{1}{3}$ (8h.—8h.)
$\frac{1}{3}$ (7h.—2h.—9h.)	$\frac{1}{3}$ (9h.—9h.)
$\frac{1}{3}$ (7h.—1h.—9h.)	$\frac{1}{2}$ (10h.—10h.)

and these are worked out for every month and for some fifty stations—from Pekin to Nova Zembla (which, by the bye, appears as Nowaja Semlja). As the differences are all given to hundredths of a centigrade degree, our readers will hardly need further details as to the minuteness of the examination. We do not find any final comparison of the results, but on drawing up a short one they appear generally more favourable to the combination of 9 a.m. and 9 p.m. than we could have hoped.

In the last portion of the volume, the “Jahresbericht des Physikalischen Central-observatoriums” for 1872, 1873, we notice with extreme pleasure a new feature, viz., a report by M. Rikatscheff on an inspection tour of Russian meteorological stations in the summer of 1872.

M. Rikatscheff describes with care the testing apparatus which he took with him on his long tour (about 6,000 miles, of which upwards of 1,500 were posting). After a few other pages of introductory matter, he proceeds to report upon each individual station. We rejoice so much over this expedition, and think it so excellent and so useful that we can hardly find it in us to suggest improvements lest, by striving to make the inspection more nearly perfect, we make it so onerous that no one will undertake it. And really what we have here is better than anything ever done before, except as to rain gauges, the inspection of which by Mr. Symons, on behalf of the British Association, has always been exhaustively rigorous. M. Rikatscheff reports upon each station under the following heads: Organization and Observer, Locality, Time (means of ascertaining it), Thermometer and Hygrometer, Thermometer stand, Rain gauge, Barometer, Wind-vane, Resumé. Long may we have such inspectors as M. Rikatscheff, may there be many more like him, willing to devote their time and their physical strength to carrying to the remotest districts the highest meteorological skill, thereby developing the faculties and cheering the hearts of far distant observers, and at the same time giving to those who stay at home confidence in the results forwarded for publication. We have no doubt that, as years roll on, the records of these inspections will become fuller, we shall have plans of the stations, fuller details of the comparisons of the instruments, and perhaps even photographs of them all, but whatever we may have, we must not forget who made the first tour of Russian inspection, and under whose direction it was made.

S. W. Silver & Co.'s Handbook for Australia and New Zealand.

Second edition, post 8vo. viii—449 pages. London: S. W. Silver & Co. 1874.

WHEN a statistical work gets into its second edition in its first year, increases 10 per cent. in size, and 25 per cent. in price, it is not of very much consequence what a reviewer may say about it. As far as we are concerned we have nothing to retract and little to add to what we said in our June number (page 91); we spoke highly of it then, and the rapid appearance of a second edition shows that the public agreed with us. We are glad to find that (though amid some pages of most favourable reviews there is no quotation from our notice) nearly all the suggestions we ventured to offer have been utilised in the present edition, which appears to us to be in every respect a most useful work.

Devonshire Hospital and Buxton Bath Charity. Annual Report, 1873.

Buxton: Bates, 1874. 8vo.

THE meteorological portion of this report is better than usual, and worthy of the hospital, and of the compiler, Mr. E. J. Sykes, who though he has left the hospital, continues his voluntary labours as honorary observer. The mean temperature for 1873 was 45°·2; max., 88°·0 on July 22nd; min., 6°·5 on Feb. 24th. Total rain, 43·27 in. on 212 days.

Lettere Meteorologiche dirette al Sig. Ing. Conte Guido Vimercati in Firenze, dal Prof. D. RAGONA. Florence, 1872. 8vo.

A SERIES of short notes. The firsts treats of "The increase of humidity and the decrease of temperature which produce rain," and is an interesting little note. Prof. Ragona has extracted from the records of the observatory the observations made at the commencement of, and during, rain, and compared them with the normal values. There is, by the bye, one result naturally brought out by this method which, though familiar to those well read in Meteorology, may be new to some of our readers, so we will mention it and leave it for their consideration. When it rains at Modena the average humidity (saturation being 100) is in winter 93·7, spring 86·6, summer 81·7, autumn 89·1, year 87·8. That is to say *while it is raining* the air is 12·2 per cent. short of being saturated. Such conditions we have ourselves observed in England, but they are very far from being usual; we fear our mean value would be nearer 97·8 than 87·8.

Note II. is on "Evaporation from Salt Water," and is a purely theoretical paper based on the difference of the tension of the vapour of pure and of salt water. Its line of argument will be sufficiently gathered from the following table:—

Temperature.	Maximum Tension				Difference
		of the vapour of Pure Water.		of the vapour of Salt Water.	
Fahr.		in.		in.	in.
32°	...	0·181	...	0·146	.. 0·035
50	...	0·361	...	0·248	... 0·113
68	...	0·684	...	0·389	... 0·295
86	...	1·242	...	0·559	.. 0·683

Note III. refers to an "Optical Atmospheric phenomenon," which appears to us to have been merely a fine solar halo, while Note IV. (and last) is devoted to a discussion of the anemometric conditions which subsist during the prevalence of Auroræ. We think that this problem had better be investigated at Toronto or St. Petersburg than in Italy.

Eighteenth half-yearly Report of the Marlborough College Natural History Society. Marlborough: Perkins, 1874. 8vo.

THIS report is virtually the supplement to the previous one, and gives the detailed meteorological observations from which the data given in the previous one were deduced. There is also a short paper on "Tiger Moths," by E. Meyrick, with a good coloured plate, and there is also a very fair entomological report. We are sorry to call attention to a fault, but by so doing we shall benefit so many, that the one concerned may regard himself as a public benefactor. It was too bad that daily readings of a grass minimum thermometer should be recorded without comment, while 10° of spirit was lodged in the top of the tube. Let all who read this look to their own minimum thermometers.

SUNDRY BAROMETRIC NOTES.

We have been favoured with several sets of observations for Nov. 29th–30th, and Dec. 9th. While, on the one hand, it appears to us undesirable to occupy much space with details of depressions not of exceptional extent, on the other, it seems a pity to bury all the records. We, therefore, adopt the intermediate course of printing a few of the salient features, and offering the M.S. *in extenso* to any one who may be working up the meteorology of either date.

Sea Level Pressures.

November 29th—

	9 a.m.	9.30	10.30	10.40	Noon	0.35 p.m.	1.40
Worthing	28·611	(lowest since 20/1/73, when it was 28·539).					
Crowboro' Beacon	28·684	—	—	—	—	—	—
St. James St., Brighton	28·681	—	—	—	—	—	—
Buckingham Place, „ ..	—	28·691	—	—	—	—	—
Magdalen Coll., Oxford	—	—	28·607	—	—	—	—
Geldeston, Norfolk	28·68	—	—	28·63	28·57	28·54	28·56
Bath	28·588	—	—	—	—	—	—

December 8th–9th—

	8th 9 a.m.	9 p.m.	9th 1 a.m.	2 a.m.	3 a.m.	4 a.m.	9 a.m.
Buckingham Place,							
Brighton	29·819	29·026	28·849	28·785	28·705	28·686	28·957
Merton Villa, Cam-					4.30 a.m.	6 a.m.	
bridge	29·81	—	28·71	28·66	28·63	28·65	—
Camden Square,					3.50 a.m.		
London	29·780	28·950	28·774	28·729	28·622	—	28·976
Osmington Lodge, Weymouth—Fall between 11.30 p.m. on 7th, and 0.10 a.m. on 9th (24 hrs. 40 min.)	1·11 in.						
Bath—Fall between 9 p.m. on 7th, and 11 p.m. on 8th (26 hrs.)	1·104 in.						

SUPPLEMENTARY TABLE OF MONTHLY RAINFALL,
NOVEMBER, 1874.

Div.	County.	Station.	Total Fall.
			in.
II.	Kent	Margate (Acol)	1·41
„	Sussex	Hailsham	2·50
„	Hampshire	Strathfield Turgiss	3·18
III.	Oxford	Oxford (Magdalen College)	2·50
„	Cambridge	Cambridge (Merton Villa).....	1·76
IV.	Essex	Harlow (Sheering Rectory)	2·06
„	Norfolk	Swaffham.....	2·70
V.	Devon	Teignmouth (Brookbank)	3·58
„	„	Torrington (Langtree)	3·05
„	Somerset	Taunton (The Castle).....	2·68
VII.	Leicester ..	Melton Mowbray (Coston).....	2·28
„	Lincoln	Horncastle (Bucknall)	2·35
VIII.	Lancashire ..	Liverpool (Walton-on-the-Hill) ..	4·36
IX.	York	Wakefield (Stanley Vicarage)	2·64
X.	Durham	Gainford	2·13
„	Westmoreland	Shap	2·94
XVII.	Banff	Keith	3·45
XVIII.	West Ross.....	Strathconan	7·46
XX.	Cork	Fermoy (Glenville).....	5·48
XXI.	Westmeath	Athlone (Twyford)	4·17
XXII.	Galway	Ballinasloe	3·51

BOOKS RECEIVED.

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- RAWSON, The Hon. R. W. "Rainfall and Meteorological Observations in Barbados," August and September, 1874. Fcap. folio.
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 RAWSON, The Hon. R. W. "Rainfall in Barbados," July and August, 1874. Single sheets, folio.

BELGIUM.

- VAN RYSELBERGHE, Prof. M. F. "Notice sur un Système Météorographique Universel." Brussels, Hayez, 1873. 8vo.

CANADA.

- KINGSTON, Prof. G. T. "Instructions to Meteorological Observers, in correspondence with the Magnetic Observatory, Toronto." 8vo. 1871.
 KINGSTON, Prof. G. T. "Third Report of the Meteorological Office of the Dominion of Canada, for the fiscal year ended 30th June, 1873." 8vo.

CEYLON.

- FYERS, A. B., Lieut.-Col., R.E. "Results of Meteorological Observations at Ceylon for April, May, June, and July, 1874." Single sheets, folio.

DENMARK.

- "Bulletin Météorologique du Nord, publié par les Instituts météorologiques de Norvège de Danemark et de Suède." Oblong 4to. April-October, 1874.

FRANCE.

- "SOCIÉTÉ MÉTÉOROLOGIQUE." Nouvelles, Septième Année, Première livraison, Paris, 1874. 8vo.
 MARIE-DAVY, M. "Bulletin Mensuel de l'Observatoire de Montsouris." Jan.-August, 1874. 4to.

GREAT BRITAIN.

- BIRT, W. R., F.R.A.S. "Selections from the Portfolios of the Editor of the Lunar Map and Catalogue." Part II., second issue. 4to. 1874.
 "Cardiff Naturalist's Society Report and Transactions, for 1873." 8vo. 1874.
 EVERETT, Prof. J. D. "On Underground Temperature." [From Proc: Belfast Nat. Hist. and Philos. Soc.] 8vo. 1874.
 EVERETT, Prof. J. D. "Sixth Report of the British Association Committee on Underground Temperature." 1874. 8vo.
 HOGG, J., and CAMPBELL, D. A. "Microscopical Examination and Chemical Analyses of certain Waters." 8vo. 1874.
 LAWES, J.B., F.R.S., &c., and GILBERT, J. H., Ph.D., &c. "Effects of the Drought of 1870 on the experimental crops at Rothamsted. [From Journal of Royal Agricultural Society.] 8vo. 1871.
 Leicester Literary and Philosophical Society. "Report of the Council." 1874.
 Leicester Town Museum. "1st and 2nd Reports of the Museum Committee to the Town Council." 8vo. 1874.
 "Meteorological Observations at the Royal Engineer Observatory, Chatham, 1873."
 "METEOROLOGICAL COMMITTEE Quarterly Weather Reports," July-Sept., 1873. 4to.
 " " " " Quarterly Weather Reports," Oct.-Dec., 1871. 4to.
 " " " " Charts of Meteorological Data," for square 3. folio.
 " " " " Remarks to accompany Monthly Charts of Meteorological Data," for square 3. 4to. 1874.
 "Report of the Registrar-General of Births, Deaths, and Marriages in Scotland, during the years 1861-70." Supplement, fcap. folio. 1874.
 SILVER, S. W., & Co.'s "Handbook for Australia and New Zealand." Second edition. Small 8vo. 1874.
 "Yorkshire Philosophical Society Annual Report, for 1873." 8vo.

NOVEMBER, 1874.

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.				
				Dpth	Date.		Deg.	Date.	Deg.	Date.			
											inches.	in.	
I.	Camden Town	2.21	—	.20	.90	28	15	60.0	6	25.6	22	11	13
II.	Maidstone (Linton Park)	1.98	—	1.21	.66	29	10	66.0	6	19.0	22	13	...
III.	Selborne (The Wakes)	4.02	+	.48	1.43	28	12	57.5	6, 7	17.0	25	13	14
IV.	Hitchin	1.96	—	.18	.80	28	12	53.0	6	22.0	22†	14	...
V.	Banbury	2.52	+	.32	.66	28	14	56.0	4	21.5	24	15	...
VI.	Bury St. Edmunds (Culford).	2.62	+	.23	.64	28	14	57.0	5, 6	19.0	22	15	18
VII.	Bridport	3.13	—	.03	1.50	28	15	60.0	2*	30.0	12§	3	...
VIII.	Barnstaple	3.06	—	1.08	.94	28	14	62.0	10	36.0	12	0	...
IX.	Bodmin	5.01	+	.03	.91	28	19	57.0	8	34.0	12	0	1
X.	Cirencester	2.81	+	.02	.97	28	16	...	...	...	...	...	...
XI.	Shifnal (Haughton Hall)	3.73	+	2.16	.87	28	18	56.0	5	25.0	24	14	14
XII.	Tenbury (Orleton)	3.29	+	.82	1.03	28	19	59.7	9	25.7	22	11	15
XIII.	Leicester (Belmont Villas)	2.42	—	...	.69	29	17	56.8	9	23.5	24	...	...
XIV.	Boston	2.04	—	.10	.72	28	15	57.0	1	27.0	22†	8	...
XV.	Grimsby (Killingholme)	3.24	—	...	.80	29	19	55.5	4	26.0	22†	9	...
XVI.	Derby	2.71	+	1.08	1.12	28	14	57.0	9	22.0	22	12	...
XVII.	Manchester	4.85	+	2.09	.61	29	17	60.8	5	23.5	12	11	16
XVIII.	York	3.22	+	1.24	.84	28	20	57.0	15	22.5	23	12	...
XIX.	Skipton (Arncliffe)	5.13	—	1.32	.85	29	21	48.0	15	20.0	21	15	...
XX.	North Shields	3.30	+	.60	.50	30	22	59.0	9	28.0	23	9	12
XXI.	Borrowdale (Seathwaite)	13.29	—	3.38	2.52	3	18	...	...	...	...	...	...
XXII.	Cardiff (Ely)	3.39	+	.79	1.33	28	13	...	...	...	...	...	...
XXIII.	Haverfordwest	4.32	—	1.35	1.73	28	11	57.0	8	29.5	30	...	5
XXIV.	Rhayader (Cefnfaes)	4.75	+	.17	1.50	29	11	57.0	...	29.0	...	...	...
XXV.	Llandudno	5.64	+	2.48	.95	28	22	67.5	5	34.8	22	0	...
XXVI.	Dumfries (Crichton Asylum)	5.64	+	2.38	.80	5	21	55.6	10	28.0	22	8	10
XXVII.	Hawick (Silverbut Hall)	4.65	—	...	1.21	29	18	...	...	...	...	...	...
XXVIII.	Kilmarnock (Annanhill)	4.14	—	...	.54	29	20	55.4	10	26.0	12	4	10
XXIX.	Castle Toward	6.12	+	1.48	1.12	30	19	54.0	5	...	...	6	...
XXX.	Leven (Nookton)	2.38	—	.66	.85	29	16	58.0	9	22.0	23	12	20
XXXI.	Stirling (Deanston)	...	...	...	...	...	...	...	...	...	...	...	...
XXXII.	Logierait	...	...	...	...	...	...	...	...	...	...	...	...
XXXIII.	Braemar	2.56	—	.26	1.00	29	20	55.8	9	20.0	23	14	21
XXXIV.	Aberdeen	3.61	—	...	.98	29	22	58.1	5	27.5	1	6	16
XXXV.	Loch Broom	6.12	—	...	.67	18	28	...	...	...	...	...	...
XXXVI.	Portree	6.29	—	9.34	1.09	9	27	...	...	...	...	...	...
XXXVII.	Inverness (Culloden)	1.71	—	.22	.53	10	12	55.8	4	23.0	23	6	20
XXXVIII.	Helmsdale	2.75	—	...	...	...	...	...	...	...	...	...	...
XXXIX.	Sandwick	4.00	+	0.3	.54	25	25	53.2	8	30.9	22	3	7
XL.	Caherciveen Darrynane Abbey	5.28	—	...	1.42	24	20	...	...	...	...	...	...
XLI.	Cork	3.69	—	...	1.20	1	18	...	...	...	...	...	...
XLII.	Waterford	5.19	+	1.24	.93	28	20	56.0	16	30.0	12	2	...
XLIII.	Killaloe	3.94	—	.95	.67	24	24	62.0	4	27.0	12	5	...
XLIV.	Portarlinton	2.81	—	1.11	.55	29	29	57.0	9	27.5	11	4	...
XLV.	Monkstown, Dublin	3.73	+	.84	1.69	28	19	...	...	...	...	...	...
XLVI.	Galway	4.63	—	...	.58	26	24	58.0	2†	32.0	11**	2	...
XLVII.	Ballyshannon	3.60	—	...	.61	17	23	...	...	...	...	...	...
XLVIII.	Waringstown	3.29	—	...	.65	28	19	58.0	4	28.0	9	3	13
XLIX.	Edenfel (Omagh)	3.19	—	...	.84	28	24	54.0	8	28.0	11	8	...

* And 5, 6, 8.

† 5, 10, 19.

‡ 23.

§ 21.

** 20

+ Shows that the fall was above the average; — that it was below it.

METEOROLOGICAL NOTES ON NOVEMBER.

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.

LINTON PARK.—High wind and R on night preceding the 29th, and all that day, with L at night, otherwise a fine dry month; the last week frosty, but so dry that the roads were almost dusty. Bar. lower on 29th than on any former occasion since January, 1873, while 1.25 in. of R out of 1.98 in. (the total fall of the month) fell on that and the following day. Fogs frequent in the early part of the month, and the frosts more severe than usual in November.

SELBORNE.—Frequent fogs; very dense on 5th, 21st, and 28th; followed on the 28th by R in the evening, and all night, bar. falling 0.70 in., from noon on this day till 9 a.m. on the 29th, and standing lower than it has since the 20th of January, 1873. Average min. ther. of the week, 22nd to 28th inclusive, 22.9°; frequent white frosts. Intensely cold on the 22nd.

BANBURY.—On the morning of the 22nd the ther. fell to 23°, and had been low all night, but owing to the fog and the great calm, the ground was but slightly frozen. Lowest bar. at 10.30 a.m. on 29th, 28.25 in., followed in the afternoon by a very high wind. S 2½ in. deep on 26th.

CULFORD.—Stormy, with very low bar. on 29th. The last three weeks of this month have been unusually cold, the mean temp. of the month being only 39°. S to the depth of 2 or 3 in. fell on the 11th. Dense fog on the 21st, and two following days. Easterly winds on 6 days, and westerly on 24 days.

BRIDPORT.—Bar. began to fall rapidly on 27th; on the 28th it fell from 29.50 to 28.85 during the night, at which time the greater portion of the R fell, accompanied by a heavy gale from the S.W. Heavy floods.

BODMIN.—A strong gale from S. to N.W. on the 29th, the bar. fell to 28.75, the lowest since January, 1873. The past month has been remarkable for its mildness.

HAUGHTON HALL, SHIFNAL.—A great variety of weather, with sudden changes throughout the month. After the first two days of R and mist, it was beautifully fine and open till the night of the 7th, when at length a frost cut down the dahlias and tender plants. On the 11th R set in, and fell copiously daily, with one exception (13th) till the 20th. Dense fogs through the 21st and 22nd. Sleet, with heavy R (.81) on 25th, on which night 4 in. of S came from S.S.E., damaging the cedars, &c., greatly; this was carried off on the night of 28th by heavy R (.87). Although the rainfall (3.73) has only been exceeded twice in 40 years, viz., 3.81 in 1839, and 6.59 in 1852, there were 14 frosty nights; the wind for the first five days came from S. and S.W., changed to N.W. on 6th, and so continued till 25th, when it brought the S from the S.S.E., very high on the 17th.

ORLETON.—A variable month, with a temp. rather above the average. On the 1st the sun was seen at noon, the first time for nine days. The weather was generally warm, with a few frosty mornings, till the 21st, when frost set in, with a dense fog. On the 12th, the Cleve hills were covered with S. On the 25th heavy R set in about 6 p.m., changing to S, which covered the land regularly from four to five inches deep, and the air was so still that it remained on the trees till the 28th, when a great fall of R and rapid thaw set in, which filled the river to overflowing on 29th. On the 29th the bar. fell to 28.38 (uncorrected) and remained at that point nearly three hours.

BOSTON.—No water has yet passed through the sluice of the Witham, but it is gradually rising. On the 1st of October the water stood at 6 ft. 9 in. at the sluice door; on the 1st of November it had risen to 7 ft. 9 in.; on the 21st, after a fall of .92 in. of R, it rose to 8 ft. 6 in.; and on the 30th, after a further fall of .93 in.; on the 28th and 29th it rose to 11 ft. 3 in. On 28th the bar. fell during the night from 29.60 to 28.66. Wind from S.E.

GRIMSBY.—First ten days very fine, afterwards cold, with very little intermission. Heavy R on 28th and 29th at night; bar. low on 29th, i.e. 28.55 uncorrected. Several kinds of roses in bloom on 17th. Three inches of S on the ground on the 11th. Fieldfares seen on the 16th. Lunar corona on the 20th.

One inch of S on the ground on the 26th. North Sea roaring very loudly at night on 28th. High wind early on 29th.

MANCHESTER.—H on 19th. S on 25th and 27th.

ARNCLIFFE.—S on 11th, and heavy S on 25th.

NORTH SHIELDS.—S on 12th and 25th. Fog on 2nd, 7th, 8th, 18th, and 23rd.

SEATHWAITE.—Although there were two days (3rd and 29th) on which the fall reached $2\frac{1}{2}$ in. and the total for the month was 13·29 in., it was still 3·38 below the average.

WALES.

HAVERFORDWEST.—On the whole a fine month, marked by an absence of frost. S on the Precilly hills on the morning of the 12th, succeeded by two or three cold days; from the 18th to the end of the month, more or less stormy and wet. Very stormy on 26th, and on night of the 28th, it blew a violent gale, accompanied by a very heavy fall of R (1·73), and great depression of the bar., the readings of which were, 27th, 9 a.m., bar. (corrected) 29·38 in.; 9 p.m., 28th, 28·91 in., 4.30 a.m. bar. 28·580 in.; 9 a.m. 28·766; 9 a.m. following day 28·945 in.; and at 9 p.m. 29·08 in. The storm raged with terrible violence from 5 a.m. on Sunday until noon, when it abated, but continued very stormy to the end of the month.

CEFNFAES.—S on 26th and 27th.

LLANDUDNO.—Altogether a wet month, but for the first nine days warm and fine; no frost, the lowest temp. being 34°·8. The copper beech, plane and common poplar, divested of leaves on the 5th; the wych elm and hawthorn on the 7th; apple trees and mountain ash on 10th. S on the distant hills on 11th, 12th, and 13th.

SCOTLAND.

HAWICK.—A very mild month; hills white with S on the 26th, 27th, and 30th. Heavy R, with high wind on 29th; the total fall of R in the 24 hours was 1·21 in. Frost on nights of 10th, 11th, 12th, and 27th.

CASTLE TOWARD.—This November has been cloudy and dull throughout, scarce a gleam of sunshine, and the temp. low; but little done in either farm or garden, the wet state of the ground preventing it. Cattle and sheep in this locality healthy, but grass being scanty, turnip feeding has commenced. On 29th the Arran hills were again covered with S.

NOOKTON.—29th, high wind and heavy R (·85).

BRAEMAR.—S on 11th, 23rd, and 28th. A very severe month, with prevailing low temperature.

ABERDEEN.—A month of dull, damp, but rather mild weather. S on 10th and 11th; L on 15th and 16th. Bar. on 29th 28·83 (at 32° sea level); a terrible gale S.S.E.-E.N.E. on this day; bar. below the average; rainfall and temp. above it. Winds from N.W. and S.W. more frequent than usual, and the estimated pressure greater than the average.

LOCHBROOM.—Except two days of severe frost, we have had R every day; the hills are covered with deep S, and the valley for days was covered, except when alternate sleet and R would uncover the stunted verdure, which prognosticates a critical season; the cold for days has been intense, and the winter has very rarely been known to commence so early.

IRELAND.

DARRYNANE.—On the whole a fine month, with moderate winds and calms. Fresh N.W. breezes on 2nd and 16th, and N.W. gale on night of 28th and 29th. Trace of S on the mountains on morning of 30th.

MONKSTOWN.—Month very wet, more from the frequency than the quantity of the R.

BALLYSHANNON.—The first part of the month fine and mild, the latter part stormy and constantly wet.

WARINGTOWN.—Very mild; scarce any frost as yet; many bedding plants still uninjured.

EDENFEL, OMAGH.—With the exception of a short interval in the second week, the weather of the month has been remarkable for continuous damp.