SYMONS'S

MONTHLY

METEOROLOGICAL MAGAZINE.

CXLIII.] DECEMBER, 1877. [PRICE FOURPENCE or 5s. per ann. post free.

WHY ARE NOT HYGROMETERS SO GENERALLY USED AS THERMOMETERS?

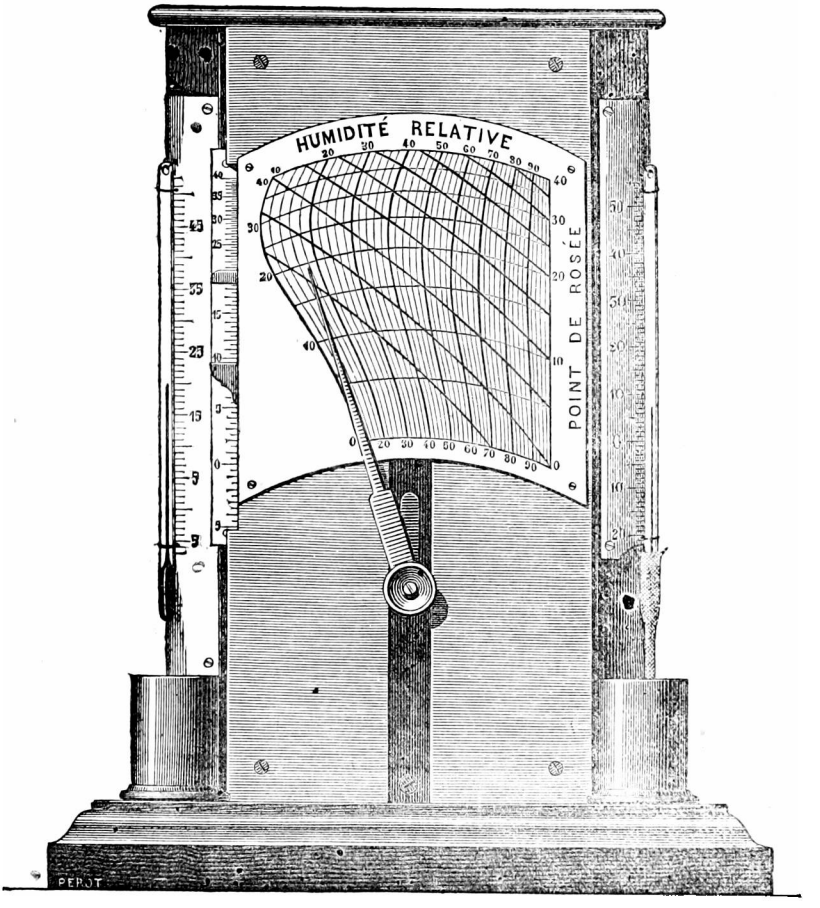
For their own personal comfort the upper and middle classes generally have thermometers in their rooms and houses, and they regulate (at any rate, partially) the heating of their apartments by the indications of the thermometer. The same is true, to a still greater extent, with reference to conservatories, greenhouses and hothouses, one of which without a thermometer is a rarity.

But our sensations and those of plants do not depend upon temperature alone; there is another element of equal importance, namely, the humidity of the air. People in health merely feel a little depression when the air is very damp, and slightly irritable when it is very dry; but to invalids even a change of two or three per cent. in the humidity is perceptible, and the very life of plants depends upon their having s suitable atmospheric humidity—that is to say, it is not sufficient to atand a plant in water, if at the same time you surround its leaves with a dessicated air. Why, then, is it quite an exception to find a hygrometer either in a private house, or a greenhouse, and a still greater rarity to find one in working order?

We believe that this arises from two causes, partly from the difficulty of obtaining a true indication of the humidity, and partly from laziness. Hitherto one has not only been obliged to attend to the muslin of the wet bulb, and to the supply of water, but the instrument only gave the difference between the dry and wet bulb temperatures, and, therefore, to obtain any indication of the humidity of the air, tables had to be consulted and calculations made. It is perhaps not much to be wondered at that, under these circumstances, hygrometers have remained to a great extent unpopular and have rarely been used properly except by meteorologists, who, by the bye, are generally very neglectful in their treatment of this instrument.

It appears to us that the form of hygrometer designed by Mr. Lowe, of Boston, U.S., removes most of the objections, inasmuch as it renders tables of all descriptions unnecessary. We are not aware that it is on sale in this country, but it is well known in France, and Messrs.

Redier have kindly lent us an engraving. It will be seen to consist primarily of the two usual thermometers, one dry and one wet. By the side of the dry bulb an extra scale will be noticed, with two dark



indices travelling upon it. In the middle there is a knob with a long pointer attached to it, which can be raised or lowered, and also turned round.

The mode of use is as follows:—(1) read the dry bulb thermometer and *raise* the knob in order to set the upper index on the extra scale at the dry bulb temperature; (2) read the wet bulb and *turn* the knob until the lower index is at the wet bulb temperature. The end of the long hand will then point to the (*a*) humidity, (*b*) dew point, and (*c*) elastic force of vapour, according as one reads the vertical, oblique, or horizontal lines.

We are not sure that the accuracy is sufficient for strictly scientific work, and, for general use, we think it would be better not to give so many details, as they are rarely required and tend to confuse those who are not accustomed to reading curves. The humidity is un-

doubtedly the best expression of the moisture in the air, for domestic or horticultural purposes, and an instrument which will give it accurately without any calculations appears to us extremely good, and likely to lead to a greatly increased use of the hygrometer for hospitals, &c.

As regards the mechanical arrangements, they are, we believe, entirely due to Mr. Lowe, but as regards indicating the humidity on a set of curves, we believe priority rests with Mr. H. C. Russell, of Sydney Observatory.*

Since writing the above, a case has been mentioned to us which will serve extremely well as an illustration of prevailing ignorance in high quarters, and of the importance of the cause we are pleading :—

A physician in attendance on a patient, directed that a kettle with a long spout, so as to send the steam into the room, should be put on the fire, and kept constantly steaming all night. So much vapour was created that the sheets, &c., became damp, and injury resulted.

Under the new system the physician would merely say, "Do not let the temperature go below 60° nor the humidity below 90," and with the apparatus above described, an intelligent nurse would be able to keep the patient in the most favourable conditions possible.

METEOROLOGICAL REGISTERS.

To the Editor of the Meteorological Magazine.

SIR,—As I am of opinion that Meteorological Registers would be rendered more valuable by the adoption of the following suggestions, I offer them, hoping you will kindly find room for them in your Magazine :—

First. An additional column to be set apart for the amount of barometrical fluctuation daily, and at the end of the month the total movement of the mercurial column noted, together with the mean daily motion. This would be very useful information, teaching us more concerning the true character of the month than the mean height or the simple extremes. Why one month was stormy and unsettled, possessing the same mean pressure as another of opposite character, would be made plain at a glance.

Secondly. With regard to the temperature of the air, I would suggest that a column be set apart wherein is stated each day the difference from the same observation of the previous day, and at the end of the month the mean daily difference noted.

Stability or instability of temperature being a very important matter in the consideration of climate, having as much to do with the health of the community as mean temperature or daily range.—I am, Sir, yours respectfully,

HENRY COLBORNE, M.R.C.S., F.M.S.

St. John's Hill, New Wandsworth, Nov. 30th, 1877.

* *Table to facilitate finding the Humidity of the Air,* reviewed in *Met. Mag.* Vol. V., p. 74.

OBSERVATIONS TAKEN AT ADDISCOMBE, SURREY, DURING THE GALE OF SUNDAY, 11TH NOV., 1877.

Date and Time.	Barometer.		Wind.		Temperature. (Stevenson screen.)		Remarks.
	Corrected and reduced to Sea-level.	Rate of rise or fall per hour.	Direction	Velocity in previous h'r.	Dry Bulb.	Wet Bulb.	
					°	°	
Nov. 8th—							
9 p.m...	29·877	...	SSW	9	48·5	46·6	Cloudless.
Nov. 10th—							
9 a.m...	29·435	— ·037	SSW	13	51·8	48·3	Rainfall since 9 p.m. of 8th, ·445.
3 p.m...	29·376	— ·010	SSW	21	52·5	48·2	
9 ,, ...	29·437	+ ·010	SSW	14	48·1	46·5	Rainfall during previous 12 hours, ·118.
Nov. 11th—							
9 a.m...	29·356	...	S by W	19	50·2	47·9	Rainfall during previous 12 hours, ·014.
8 p.m...	29·085	— ·045	S by W	28	52·1	49·9	Light R falling. Scud from S.S.W.
8 ,, ...	28·894	— ·038	S	32	...	...	Driving R with but slight periods of intermission since 3 p.m.
8.30 ,, ...	28·863	— ·062	S	...	...	...	Driving R.
9 ,, ...	28·848	— ·030	S	32	51·0	49·4	,, ,,
9.30 ,, ...	28·823	— ·050	S	...	...	...	,, ,,
10 ,, ...	28·805	— ·036	S	31	...	...	,, ,,
10.30 ,, ...	28·780	— ·050	S	...	...	...	,, ,,
11 ,, ...	28·752	— ·056	S by E	34	...	...	,, ,,
11.30 ,, ...	28·734	— ·040	S by E	...	...	...	,, ,,
Midnight ...	*28·723	— ·022	S	†38	...	...	,, ,,
Nov. 12th—							
0.15 a.m...	28·726	+ ·012	S	...	...	...	,, ,,
0.30 ,, ...	28·765	+ ·156	WSW	...	...	...	Very heavy R between 0.25 and 0.40 a.m.
0.45 ,, ...	28·780	+ ·060	WSW	...	...	...	Heavy R.
1 ,, ...	28·779	— ·004	WSW	22	...	...	,, ,,
1.30 ,, ...	28·783	+ ·008	WSW	...	...	...	,, ,,
2 ,, ...	28·788	+ ·010	WSW	10	...	...	,, ,, Min. 40°·6.
2.30 ,, ...	28·794	+ ·016	WSW	...	...	...	Light R only.
3 ,, ...	28·789	— ·010	SSW	7	...	...	
3.30 ,, ...	28·790	+ ·002	SSE	...	...	...	
4 ,, ...	28·788	— ·004	S	9	...	...	
5 ,, ...	...	...	W	13	...	...	Heavy H shower for about 15 min.
6 ,, ...	...	...	SSW	12	...	...	Light shower.
7 ,, ...	...	...	SSW	12	...	...	
8 ,, ...	...	...	SSW	11	...	...	Light shower.
9 ,, ...	28·967	...	SSW	13	43·7	41·1	Bright sunshine.
10 ,, ...	29·000	+ ·033	S	11	...	...	
3 p.m...	29·047	+ ·009	SSW	10	48·7	44·3	Light R.
9 ,, ...	29·088	+ ·007	SE	7	43·3	41·6	Rainfall since 9 a.m., ·067.
Nov. 14th—							
9 a.m...	30·086	+ ·028	SW by S	3	40·8	40·3	Rainfall since 9 p.m. of 12th, ·045.

* Lowest observed, and also the lowest of the year as yet. At 9 p.m. on the 16th the reading was 30·460 in., thus indicating an increase of pressure of 1·737 inches in 4 days 21 hours.

† Maximum velocity in any one hour, also the maximum of the year as yet. Cistern of barometer 210 feet above sea level, and cups of anemometer (Beckley's self-registering) about 15 feet above roof of house, and 50 feet above ground.

During this gale occurred the lowest barometer, the heaviest rainfall, and the highest wind of the present year.

At 0.25 a.m. of 12th the wind suddenly veered from S. to W.S.W., and at once dropped from a velocity of 35 miles to one of 11 miles an hour; at the same time the rain began to fall very heavily, and continued to do so for about 15 minutes. During the previous half-hour or so the barometer had risen about ·04 inch from its absolute minimum.

The mean velocity of the wind for the 12 hours ending 0.30 a.m. of 12th was 31·5 miles, for previous 6 hours 19·7 miles, and for following 6 hours only 10·3 miles per hour.

During the 12 hours ending 9 p.m. of 11th ·581 in. of rain fell, and during the next 12 hours ·925 in., bringing up the total fall for the 24 hours ending 9 a.m. of 12th to 1·506 inches. This is the heaviest fall in any similar 24 hours of which I have any record (1873—77).

EDWD. MAWLEY.

Addiscombe, 29th Nov., 1877.

[We have been favoured with several other very full reports of this storm, which, with the consent of the senders, we should be glad to hand over to any person who may have leisure to study them.—ED.]

THE RAINFALL OF NOVEMBER, 1877.

To the Editor of the Meteorological Magazine.

SIR,—The heavy and continuous rainfall for the past month of November has been exceptional here as elsewhere, for which reason I forward you the daily fall for comparison. The greatest fall took place on the 24th, when from about 3 p.m. till 9 p.m. 1·65 in. fell, and during 12 hours of continuous rain, 9 a.m. to 9 p.m., 1·30 in. was measured by the gauge. The fall for the month (8·[illegible] in.) is 5·30 in. above the average for the previous eight years, and 5·12 in. above the average for the previous ten years. The total fall for the eleven months hitherto is 33·34 in., whereas our average annual fall is about 28 in.

Three low depressions of the barometer occurred during the month, viz., on 12th, at 0.30 a.m., 28·710 in.; on 24th, at 6 p.m., 28·992 in.; and on the 30th, at 9 a.m., 28·819 in.

The anemometer recorded 13224·5 miles as the total horizontal movement of air for the month; giving a mean velocity of 440·8 miles daily. The two greatest amounts registered were for the 24 hours ending November 12th and 23rd, at 10 a.m., and being 907·5 and 962·5 miles respectively; the greatest rate per hour was about 3.30 p.m. of 11th, being equal to a velocity of 60 miles per hour, or a force of from 9 to 10.—I am, Sir, yours most obediently,

WM. J. HARRIS, F.M.S.

Worthing, Dec. 4th, 1877.

Rainfall at Worthing. Height above sea, 18 *ft.*; *height above ground,* 1 *ft.*

	in.		in.		in.		in.		in.		in.		in.		in.
1	...	5	0·07	9	0·39	13	0·05	17	...	21	0·26	25	0·03	29	0·51
2	0·02	6	0·13	10	0·62	14	0·01	18	0·12	22	...	26	0·34	30	0·45
3	...	7	0·26	11	0·59	15	...	19	0·64	23	0·35	27	0·42		
4	0·10	8	0·23	12	0·83	16	0·04	20	...	24	1·46	28	0·27	Sum	8·19

W. J. HARRIS, F.M.S.

REVIEWS.

Weather Warnings for Watchers. By "THE CLERK" himself. Houlston & Sons, London. Post 8vo, 96 pages. 1877.

POPULAR, and no mistake. Why, the cover alone ought to sell this little manual, and yet there are 67 additional engravings inside, and there is a great deal of light information on elementary branches of Meteorology.

We are rather inclined to be inquisitive as to the credentials of the gentleman who signs himself "The Clerk of the Weather," because though he shows himself to be well acquainted with the catalogue of an optician who is, and shall remain, nameless, he, on the other hand, trips in spelling many of the names which should be quite familiar to him, *e.g.*, we have Réaumur for Reaumur, Fitzroy for FitzRoy, Sanssaure for Saussure, Dyne for Dines, Drebel for Drebbel, and Glashier for Glaisher. As to Latitudes and Longitudes, he gets into a muddle which would disgrace a schoolboy.

The errors which are of importance are extremely few, and we need perhaps only mention that, as regards lightning, "a galvanized iron wire rope is" [*not*] "the best possible conductor," and is [*not*] the "material now generally employed for the purpose." Copper is so much less liable to oxidation, and has so much greater conducting power that galvanized iron wire rope is rarely used. A caution as to the very great doubt if the camphor and water "Storm glasses" are of any use, should have been given.

As the title is "Weather Warnings," it is rather droll that we cannot find the official signals, drums, or cones, mentioned anywhere except in the Preface. There is also a scarcity of weather proverbs.

With all its small failings, it is a capital shillings-worth, and there are few who would not learn from it something that they did not know before.

Stanford's Orographical Map of Europe, showing the contoured levels of the land and the depths of the sea. Edited by PROF. A. C. RAMSAY, LL.D., F.R.S. London, Stanford.

THIS map has no date, but we know that it is at least a twelvemonth since it was sent to us for review. But we do not approve of reviewing works which we cannot thoroughly test. We were competent to examine the similar map of the British Isles which Mr. Stanford

published previously; we tested it in many ways, found it accurate, and said that it was so.

But it did not follow that because Mr. Stanford published an accurate picture of the altitude of the soil of the British Islands, his similar publication of a map of the whole of Europe would be correspondingly good. Our own knowledge of continental altitudes was insufficient to check it, nor would examining the British Isles suffice, as they would merely be reduced from the larger scale map, and the heights of well known mountain peaks or passes were hardly likely to be wrong. It did not seem easy to say whether the map was good or bad, and therefore for at least a year we said nothing. Among a lot of books which have recently come into our hands was a copy of Major Fils's work, entitled "*Barometer Höhen-Messungen von dem Kreise Schleusingen im Königl. Regierungsbezirk Erfurt.*" This contains a very carefully contoured map, on a scale of nearly four inches to the mile, of the country S.W. of the Thuringian Forest. Whether Mr. Stanford's draughtsmen have seen this map or not is immaterial; if they have and have reproduced its features as nearly as the scale of their map will allow, it is fair to assume that other parts of Europe have received equal attention; if they have not seen it, and yet are approximately correct, it is equally in their favour.

This test the map bears very well, but we have given it a more severe one. We have compared the altitudes of many of the Russian Meteorological Stations as given in the official publications, with the map, and have only found *one* discrepancy. Gulynki, Lat. 54° 15′ N, Lon. 40° W, is reported by Dr. Wild to be about 305 feet above the level of the sea. Mr. Stanford's map indicates that it is more than 500 feet. We could hardly give the map higher praise than by stating that this is the only blemish we have discovered.

Climate of New South Wales: Descriptive, Historical and Tabular. By H. C. Russell, B.A., F.R.A.S., F.M.S., &c., Government Astronomer for New South Wales. Charles Potter, Acting Government Printer, Sydney, 1877. Large 8vo. viii. – 189 – 66 (= 263) pages, 6 plates.

Every one who wishes to learn anything about the climate of New South Wales ought to obtain this book. We do not know whether copies can be purchased in this country, but being an official publication the Sydney price is very low [3s. 3d.], and they would still be extremely cheap if the carriage over here cost as much as their original price. We mention this matter of cost because the book is so essentially one for reference that meteorologists ought to get copies for themselves, and not be satisfied with skimming over a review, or borrowing the copy from the library of the Meteorological Society.

We do not intend to review this book, but to give a few extracts.

INTRODUCTORY.

"In the following pages an attempt has been made to put into a form suitable

for convenient reference, such facts concerning the climate of New South Wales as may be useful to the student of meteorology, as well as to the general public.

"The historical part has been prepared under difficulties, and it is no exaggeration to say that 'the facts were buried under a thousand times their bulk of other matter.' A short abstract of some of these facts was first published by Mr. Jevons in his valuable work on 'The Climate of New South Wales,' but in many cases most important information was passed over; and in going over some of the same ground again, it has seemed better to give complete details, and a great many additional facts, which rewarded a diligent search, as well as to correct some mistakes caused by an error in Ford's Almanac. Many facts have been added derived from sources not made use of before, and from living authorities, who must, of course, pass away in time. The effort has been to make this so complete that it shall not be necessary to go over other works of reference, whenever it is thought desirable to re-open the important question of *periodicity* in our climatic changes, or to ascertain the state of the weather in any particular year, or period in the history of the Colony. How far I have succeeded others must judge; but I hope the following pages will at least be found to meet a want that has often been felt, viz., for a work of reference on the droughts, floods, and climatic condition of the past years of the Colony, as well as an answer to many book statements which have been published without sufficient inquiry.

LAKE LEVELS AS INDICATORS OF SEASONS.

"As Lakes George and Bathurst form one of the best indexes to the state of the seasons, all the information that could be obtained about them has been given. I have, however, reason to believe that there are some persons unknown to me who could give valuable information about these lakes. Should they detect in the following accounts of the lakes an omission of any facts which they could supply, I hope they will make them public, or allow me to do so for the public information."

DROUGHTS AND FLOODS—EXAGGERATIONS.

"The literature specially devoted to the subject of our climate is very small, though many notices about it may be found in works on the Colonies generally, and on New South Wales in particular; unfortunately many of them have been made on most imperfect information, and have given rise to grave misconceptions both as to droughts and floods. Of the former, it has been stated that not a drop of rain fell in Sydney for many months (Stokes), November, 1838, to March, 1839, and now newspaper and other extracts for this date show that rain fell several times during this period said to be without rain. It is worth while mentioning also that the actual measurements of rain now extend over thirty-six years, nearly half the period since the foundation of the Colony, and may fairly be taken as an index of possible weather. From these observations it appears that there never has been during those years one whole calendar month absolutely without rain—though in October, 1848, it was only 0·070 in., and in April, 1868, only 0·060 in. October, November, and December, in 1867, passed over with a total fall of only 1·26 in., and July, August, and September, 1871, with only 1·34 in.

"So with regard to floods, which are stated to have been from 93 to 96 feet above the ordinary level, I have been able to prove that the highest of these floods was only about 50 feet (see great flood, March, 1809)."

CLIMATIC EXTREMES.

"The extreme dryness of the climate may be judged from the following:—In October, 1876, it was stated on good authority that at one station on the Darling no rain had fallen for thirty months, and Mr. L. S. Donaldson, who took meteorological observations at Cowga, on the Bogan River, 80 miles above Gongolgan, rom 1864 to 1868 inclusive, says—'In these five years, thirty-seven months have been absolutely without rain, unless perhaps for five or ten minutes; eleven months

have been distinguished by only one or two good showers, or perhaps a day or two very light rain, leaving only twelve months in which there has been good rain. The river has only run five times in five years through to the Darling; two other slight freshes have only gone part of the way down.'"

"At Newcastle, however, the heaviest downpour of rain ever recorded in Australia occurred on the 18th March, 1871. On that morning the sea was going down, and the southerly gale that had been blowing from the 15th was waning at S.E.; by 2.30 p.m., however, the wind backed to south, with barometer at 29·736; at 1.30 p.m. a fearful squall of wind and rain came on with thunder and lightning, and lasted to 4 p.m., when the rain was measured, and found to be 10·610 inches for the 2½ hours."

"Within the Colony of New South Wales may be found all climates, from the cold of Kiandra, where the thermometer sometimes falls eight degrees below zero, and frost and snow hold everything in wintry bonds for months at a stretch, and where upwards of 8 feet of snow sometimes falls in a single month, to the more than tropical heat and extreme dryness of our inland plains, where frost is never seen, and the thermometer in summer often for days together reads from 100° to 116°, and sometimes in hot winds reaches 130°, and where the average annual rainfall is only 12 to 13 inches, and sometimes nil for a whole year."

"Generally parallel to the coast, but varying in distance from 20 to 120 miles, runs the Dividing Range or Blue Mountains, the altitude of which varies from 1,500 to 7,000 feet, but is generally between two and three thousand feet. The highest point is Mount Kosciusko, in lat. 36° 23′ south, and long. 148° 19′, which is the highest known mountain in Australia. Snow may be found in sheltered places all the year round, though the altitude, 7300 feet, is far below the snow-line for that latitude. In winter snow lies on a large part of the range near this elevated peak, many feet thick, and before the severity of the climate was known many cattle caught in snow-storms in the mountains perished. The mountains generally are well wooded, but owing to bush fires and strong winds the timber is often poor, and a few peaks are bare. In the valleys abundance of fine timber may be found.

"By this mountain range the Colony is divided into two great districts, the meteorological characteristics of which are very diverse."

"The actual temperature of the wind varies from 80° to 110° in Sydney, but it seldom reached 100°, and only twice in twenty years has it reached 106°·9, the highest recorded temperature at this Observatory. Inland the heat is much greater, and in Central Australia Capt. Sturt says his thermometer rose to 131° in the shade on the 21st January, 1845. The heating effects of this wind are well known, and little protection is afforded by doors and windows, for a house rapidly heats, and it is only the greater heat outside that makes it endurable, which is manifest directly the cool 'burster' displaces it, for the house then feels like an oven."

"1791.—In January and February, the colonists experienced several weeks of excessive heat, and the settlement was visited by myriads of flying foxes, which died in such numbers about the fresh water as to render it unfit for use; hot winds also prevailed on several occasions about the beginning of the year, being the first visitation of the kind which they had experienced. Birds dropped dead from the trees, and almost every green thing was burnt up.

"In February the surveyor was employed clearing and deepening the stream of water which supplied Sydney, and which through the long drought was at this time very low. Fresh water was scarce everywhere, and most of the streams about the cove were dry. On the 10th and 11th of February, 1791, on which days the temperature at Sydney stood in the shade at 105°, the heat was so excessive at Parramatta, made worse by the bush fires, that immense numbers of large fox-bats were seen to drop from the trees into the water, and many dropped dead while on the wing. At Sydney about the harbour in many places the ground was found covered with small birds, some dead, others gasping for

water. At Parramatta, an officer of the relief guard left the boat to find a drink of water, and had to walk several miles in a dry watercourse before he found it, and many birds dropped dead at his feet. The wind was north-west, and burned up everything before it. Persons whose business obliged them to go out declared that it was impossible to turn the face for five minutes to the wind."

"From the *Gazette* of Thursday, June 30, 1836 :—'On Tuesday morning, June 28, between the hours of 8 and 9 o'clock, there was a heavy fall of snow in Sydney, which lasted for half an hour, a thing unprecedented in the memory of the 'oldest inhabitant.' "

"On the longest day of 1851 (21st to 22nd December), I was in camp just under the summit of Kosciusco, and my blankets lay on full 40 feet of hard dry crystallised snow that had been melted and re-frozen times without number. From November to May I was never out of sight of the snow along the ranges from Kosciusco to the head of the Murrumbidgee. I watched it day by day, and saw it gradually melting away under the summer's sun ; but I was driven off the snowy plain afterwards by a fearful snow and wind storm in May, and the day before I had found dry snow in the hollows of the granite rocks on that plain, on the Gungarlin River."— *W. B. Clarke.*

In addition to a mass of iuformation like that we have quoted, and to a series of tables of the numerical data observed in the Colony up to the end of 1875, this work contains a reprint of a paper by Mr. Russell read before the Royal Society of Sydney, in October, 1876. It is entitled *Meteorological Periodicity*, and is the best article on the subject which we have yet seen ; it occupies 20 octavo pages, but we need hardly say more than that he quotes believers in periods of two years, three years, five years, between six and seven years, nine years, eleven years, twelve years, thirteen years, seventeen years, eighteen years, nineteen years, thirty years, and one of fifty-nine years. Truly here is variety enough to suit sun-spots or anything else.

Monats-und Jahresresumés der beobachtungen der meteorologischen stationen in Russland. [Aus den annalen des physicalischen central-observatoriums, Jahrgang, 1875.] St. Petersburgh, 1876. 4to. xlix.–46 pages and one map.

THIS is the Russian contribution to the system of uniform meteorological publications recommended by the Vienna Conference. It is printed throughout in Russian and German, and while it is in all respects strictly conformable to the decisions of the Conference, it exceeds them in some important points. We may note especially, and we do it with much pleasure, the full information which is given respecting each station, of which the following is a specimen.

SSEMIPALATINSK is in lat. 50° 24′ N., and long. 80° 13′ E., and, therefore, upon the river Irtish, in Western Siberia, not very far from the centre of Asia. The altitude of the barometer above mean sea level is unknown. Its correction is believed to be + ·044 in. The thermometers are verified ones, of which the corrections are known, and are 10½ ft. above the ground. The hygrometer is placed in one of the stands supplied by the Central Observatory at St. Petersburgh. [We wish M. Wild would engrave one, in position.] The rain gauge

was also supplied from St. Petersburgh, and the station is provided with a wind vane and pressure plate or anemometer. The station was established through the friendly offices of the Governor, General-Major Poltaratzkij, and supplied with instruments from the Central Observatory. The observations are made by M. Ssubbotin, superintendent of Ssemipalatinsk School, and in his absence they are made by his wife. The zinc thermometer screen, with the psychrometer (dry and wet), hair hygrometer and minimum thermometer, is placed, in accordance with instructions, in the court yard of the school, in a wooden shed, 4 ft. 6 in. long, 4 ft. 2 in. broad, and 4 ft. high. The rain gauge is fixed on the top of this shed, 10 ft. 5 in. above the soil. The wind vane is upon a separate pole, 39 ft. 8 in. high, and overtops the surrounding buildings, which are quite 40 ft. distant. The syphon barometer, Turrettini No. 6, was filled through a capillary tube, and not boiled. The correction of the barometer for the presence of air in the vacuum, as determined by many observations of the diminution of the vacuum (raising the mercury), gives for a barometer reading of 750 mm. at 20° C. a correction of +1·1 mm. A table has been computed from these observations, whence the observer takes out the correction corresponding to the observed temperature and barometer reading.

Perhaps our readers may like to see some of the results from this station; we will therefore convert some of those for 1875 into English values—

Mean barometer, 29·390; max., 30·516; min., 28·654; range, 1·862; mean temperature, 37°·8; max., 100°·0; min., —42°·0; range, 142°·0; mean humidity, 65; mean cloud, 5·1; total rain and snow, 9·70 in.; max. in 24 hours, 0·64 in., on April 22nd; days with rain or snow, 111; snow alone, 56; hail, 2; thunder and lightning, 11; clear, 75; overcast, 71; and stormy, 38.

The range of temperature will be seen to be very great—truly continental, and accordant with the locality; the minimum, however, though very low, is not so extreme as at the neighbouring station of Akmolinsk (lat. 51° 12′ N., lon. 71° 23′ E.,) where it fell to —52°·4.

Lastly, it may be well to give the temperatures for Kischinew (lat. 46° 59′ N., lon. 28° 51′ E.,) the nearest station to the European seat of war—

Mean temperature, 46°·2; max., 94°·1; min. —18°·0; range, 112°·1.

We need only add that there is a good map of the stations, and a carefully compiled list of errata in previous publications. No one likes to print a long list of errata, but on the other hand it shows conclusively that the Editor is conscious that his duties do not terminate with the publication of a mass of figures, but extend onwards to their subsequent verification.

GREENWICH EXTREME TEMPERATURES.

The extreme Shade Temperatures of the month of November 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	58·3	29	22·6	16	1859	60·4	6	25·5	14
1842	55·9	12	31·1	5	1860	55·3	1	28·5	3
1843	57·5	7	27·4	12	1861	57·8	26	23·2	19
1844	58·1	16	27·4	26	1862	57·0	3, 4	24·8	23
1845	59·6	6	26·6	3	1863	60·8	4	28·1	10
1846	61·5	4	23·4	29	1864	54·4	28	25·9	10
1847	67·3	8	24·5	19	1865	56·4	24	31·0	5
1848	57·3	21	25·9	5	1866	59·6	5	26·5	21
1849	61·7	11	23·5	28	1867	64·0	1	27·5	28
1850	61·3	2	27·9	15	1868	57·1	1	26·1	6
1851	53·4	1	24·3	19	1869	58·8	15	26·8	21
1852	63·8	5	32·6	25	1870	58·9	24	24·3	19
1853	60·8	1	25·8	23	1871	51·0	3,|15	20·3	19
1854	61·6	1	25·9	27	1872	61·8	5	32·3	18
1855	58·0	6	25·7	16	1873	55·2	3	25·8	13
1856	58·0	23	19·4	30	1874	62·6	6	25·0	27
1857	64·3	3	30·0	12	1875	58·5	4	28·3	30
1858	58·0	26	20·5	24	1876	63·3	14	25·5	10

Extremes in 1877, Max. : 58°·7 on 8th ; Min. : 31°·9 on 17th and 26th.

	Year.	Max.	Date.	Min.	Date.	Year.
Means of 36 years	...	59·1	10	26·1	17	...
Highest	1847	67·3	8	32·6	25	1852
Lowest	1871	51·0	3, 15	19·4	30	1856
Range	...	16·3	...	13·2	...	...

Addiscombe, 8th Dec., 1877. EDWD. MAWLEY.

[We regret to state that Mr. Brumham, who originally extracted the data in the above table, and also that for previous months, for Mr. Mawley, has detected about a dozen errors, some in the Greenwich publications and some in his extracts. Under these circumstances we purpose reprinting in a re-arranged form the whole of the tables corrected for all the errors which a thorough re-examination can detect.—*Ed.*]

SUPPLEMENTARY TABLE OF RAINFALL IN NOV., 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	3·87	XI.	Llanfrechfa	8·46
,,	Hailsham	7·04	,,	Solva	4·12
,,	St. Lawrence, I. of W.	9·13	,,	Castle Malgwyn	6·99
,,	Andover	5·90	,,	Carno	6·78
,,	Strathfield Turgiss	4·92	,,	Rhug, Corwen	7·35
III.	Addington Manor	3·78	,,	Port Madoc	9·83
,,	Oxford	3·69	XII.	Melrose	3·56
,,	Northampton	2·86	XIV.	Cessnock, Glasgow	7·24
,,	Cambridge	2·96	XV.	Gruinart	7·96
IV.	Sheering	3·28	XVII.	Keith	3·27
,,	Ipswich	3·80	XVIII.	Dalwhinnie	...
,,	Diss	3·00	,,	Auchnasheen	11·05
,,	Swaffham	3·07	,,	Springfield, Tain	3·58
V.	Compton Bassett	5·58	XX.	Skibbereen	...
,,	Dartmoor	16·78	,,	Glenville, Fermoy	5·56
,,	Teignmouth	6·80	,,	Tralee	9·16
,,	Langtree, Torrington	8·40	,,	Newcastle W., Limerick	6·69
,,	Cosgarne, St. Austell	7·95	,,	Kilrush	7·79
,,	Taunton	5·56	XXI.	Kilkenny	4·10
VI.	Bristol	5·62	,,	Kilsallaghan	3·87
,,	Sansaw	2·73	,,	Twyford, Athlone	6·29
,,	Cheadle	3·48	XXII.	Ballinasloe	6·37
VII.	Coston, Melton Mowbray	2·32	,,	Kylemore	18·25
,,	Bucknall	2·42	,,	Carrick on Shannon	4·87
VIII.	Walton, Liverpool	5·53	XXIII.	Rockcorry	4·84
,,	Broughton-in-Furness	10·93	,,	Warrenpoint	5·67
IX.	Stanley, Wakefield	2·17	,,	Carnlough, Larne	...
X.	Gainford	2·71	,,	Bushmills	5·24
,,	Shap	13·12	,,	Buncrana	6·69

BOOKS RECEIVED.

AUSTRALIA.

ELLERY, R. L. J. Monthly Record of the Observations taken at the Melbourne Observatory, Nov. 1. 8vo.

Zeitschrift der Osterreichischen Gessellschaft für Meteorologie, Aug. 15 to Nov. 15, 1877. 8vo.

BELGIUM.

HOUZEAU, J. C. Annales de l'Observatoire Royal de Bruxelles, March and April, 1877. 4to.

,, ,, AND BUYS-BALLOT, C. H. D. Observations Météorologiques faites aux Stations Internationales de la Belgique et des Pays-Bos. April–June, 1877. 4to.

CEYLON.

FYERS, A. B., Lieut.-Col., R.E. Results of Meteorological Observations in Ceylon, May–July, 1877. Single sheets folio.

NOVEMBER, 1877.

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	3·88	+ 1·47	·88	11	22	59·1	16	31·2	26	2	11
II.		Maidstone (Hunton Court)	5·15	+ 2·12	·87	24	19	...	...	...	...	...	...
,,		Selborne (The Wakes)	7·96	+ 4·42	2·00	11	24	58·0	1	29·0	17	5	12
III.		Hitchen	3·94	+ 1·80	1·31	11	22	54·0	6	29·0	5, 23	12	...
,,		Banbury	3·09	+ ·89	·94	11	23	50·0	7	28·0	14	13	...
IV.		Bury St. Edmunds (Culford)	2·77	+ ·38	·55	27	21	58·0	16	28·0	23	7	15
,,		Norwich (Sprowston)	2·10	...	·60	27	20	...	...	...	...	...	...
V.		Bridport	7·70	+ 4·54	1·52	24	23	...	...	...	...	...	...
,,		Barnstaple	8·77	+ 4·63	·88	11	25	60·0	16	35·0	25	0	...
,,		Bodmin	8·26	+ 3·28	1·35	11	28	58·0	1	36·0	25	0	2
VI.		Cirencester	4·60	+ 1·81	1·03	26	21	...	...	...	...	...	...
,,		Shifnal (Haughton Hall)	2·89	+ 1·32	·42	11	21	55·0	6,9	27·0	24	11	16
,,		Tenbury (Orleton)	3·32	+ ·85	·96	11	22	59·6	6	27·7	14	8	11
VII.		Leicester (Belmont Villas)	2·70	...	·51	11	20	58·2	6	32·0	24	1	...
,,		Boston	1·99	— ·15	·33	26	16	58·0	6	30·0	24	4	...
,,		Grimsby (Killingholme)	1·95	...	·31	11	20	56·0	6	31·0	26	1	...
,,		Mansfield	2·67	...	·39	11	24	57·6	6	27·6	24	5	14
VIII.		Manchester	..	...	...	...	...	...	...	...	...	...	...
IX.		York	2·23	+ ·25	·64	21	15	58·0	15	30·5	14	...	...
,,		Skipton (Arncliffe)	10·63	+ 4·18	2·02	21	26	56·0	6	26·0	24	6	...
X.		North Shields	1·42	— 1·28	·25	14	16	57·4	15	30·0	24	6	10
,,		Borrowdale (Seathwaite)	28·47	+11·80	4·06	5	27	...	...	...	...	..	...
XI.	WALES.	Cardiff (Crockherbtown)	6·54	...	1·06	24	25	59·2	9	32·0	14	1	...
,,		Haverfordwest	8·16	+ 2·49	1·00	6, 21	23	57·0	6	31·0	13	1	6
,,		Aberdovey	6·44	...	1·11	6	27	65·0	8	32·0	24	1	...
,,		Llandudno	6·35	+ 3·19	·89	11	22	62·0	15	35·0	24	0	...
XII.	SCOTLAND.	Dumfries (Crichton Asylum)	7·79	+ 4·53	·85	28	25	58·2	4	27·0	25	11	13
,,		Hawick (Silverbut Hall)	3·69	...	·47	29	22	...	...	...	...	...	...
XIV.		Kilmarnock (Annanhill)	5·81	...	·76	5	25	57·6	16	29·0	25	2	6
XV.		Castle Toward	...	...	..	..	...	...	...	...	...	...	...
XVI.		Mull (Quinish)	12·49	...	1·10	26	30	...	...	...	...	...	...
,,		St. Andrews (Cambo Ho.)	2·80	...	...	...	...	...	...	...	...	...	...
,,		Grandtully	5·92	...	1·00	11	25	...	...	...	...	...	...
XVII.		Braemar	4·69	+ 1·87	·73	22	22	55·8	16	21·9	24	7	19
,,		Aberdeen	4·94	...	·73	28	21	57·3	16	28·1	24	4	19
XVIII		Gairloch	6·81	...	·67	2, 6	29	...	...	...	...	...	...
,,		Portree	15·69	+ 5·21	1·48	11	30	...	...	...	...	...	...
,,		Inverness (Culloden)	2·67	+ ·08	·84	20	17	57·1	15	27·8	25	5	15
XIX.		Helmsdale	5·45	...	·90	6	27	...	...	...	...	...	...
,,		Sandwick	7·00	+ 3·00	1·22	29	25	53·0	2	30·0	24	1	6
XX.	IRELAND.	Caherciveen Darrynane Abbey	9·27	...	1·08	10	30	...	...	...	...	...	...
,,		Cork	4·37	...	·72	11	24	...	...	...	...	...	...
,,		Waterford	6·35	+ 2·40	·80	11	27	60·0	15	29·0	24	4	...
,,		Killaloe	9·23	+ 4·34	·90	21	26	61·0	1	26·0	24	7	...
XXI.		Portarlington	4·31	+ ·39	·63	22	28	55·0	15	30·0	24	2	...
,,		Monkstown, Dublin	2·37	— ·52	·59	21	20	56·0	15	30·0	3	3	3
XXII.		Galway	...	...	...	...	...	...	...	...	...	...	...
,,		Ballyshannon	7·64	...	1·00	21	29	...	...	...	...	...	...
XXIII		Waringstown	4·00	...	·70	22	24	56·0	15	28·0	23	8	16
,,		Edenfel (Omagh)	5·35	...	·71	21	[illegible]	53·0	5,14	28·0	23	7	...

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.

SELBORNE.—A very foggy month, fog every morning after the 3rd; more R on the 11th (2·00) than on any day for many years, with the exception of July 13th, 1873, when 2·16 fell, and July 14th, 1875, when 2·14 fell; much wind from S. and S.W. on 9th; TS at 4 a.m. on 10th, and T on 12th and 22nd; 24th, a few flakes of S.

HITCHIN.—Heavy gale on 6th; TS on 10th; terrific gale on 11th and again on 22nd.

BANBURY.—L on 9th; high wind on 11th, ceased suddenly at 9.50 p.m., also on 21st, 28th and 29th.

CULFORD.—A wet and very stormy month; high wind on the 10th, 22nd, and 24th, and a gale on the 11th.

OAK LODGE, SPROWSTON.—Rainfall slightly below average; several gales during the month, that on night of 11th unroofed stacks and twisted large branches off trees; the gale on 22nd from W. was very strong, followed on 24th and 25th by another from E., which did much damage to shipping on E. coast.

HAUGHTON HALL.—A wet stormy unpleasant month, only 8 days without R, and this following the continuous R of last month sadly impeded farming operations; heavy R on the night of 9th, with T L and H at 3.30, and another heavy fall on 11th; frost on 11 nights, but none severe; bar. most unsettled throughout.

ORLETON.—Generally cloudy, rainy and damp, with a few bright days. Rapid changes of temperature and pressure, with rough gales of wind; great wind and fall of R on 11th and again on 29th; strong gale on 22nd; L was seen on the nights of 9th and 22nd, and very distant T heard on 8th; mean temp. 2½° above average.

LEICESTER.—Very changeable weather; temp. generally above the average; very little frost; very heavy gales on 11th and 22nd; wind S.W. or W. on every day but two.

GRIMSBY.—Several pleasant days for the time of year, and less fog and gloom than usual; but the weather was very unsettled, and gales were very frequent. The three barometrical depressions lasting for a long time, were a very rare, if not unprecedented, occurrence. L at night on 9th.

ARNCLIFFE.—Bar. unusually low on 11th, 12th, 22nd and 30th.

NORTH SHIELDS.—Lunar halo on 21st; very large bright meteor on 23rd.

SEATHWAITE.—L on 11th and 28th; falls of R exceeding 1 in. on 14 days, and on the 5th a fall of 4·06 in.

WALES.

HAVERFORDWEST.—A very wet, stormy month; very little frost. The weather about the 9th to 12th, and from the 22nd to the end, exceedingly wild, characterized by sudden and violent squalls, with H, T and L.

ABERDOVEY.—An unusually wet month; very heavy R on 6th, stormy on 8th 9th and 10th, accompanied by L and H. TS on the 11th. A large meteor crossed from N. to S., visible for several seconds about 8 p.m., on the 21st.

LLANDUDNO.—A wet, but warm, month; rainfall more than double the average; temp. nearly 3° above the average. Though the weather was variable, there were several very fine days; but only eight without R. No frost during the month, the min. being 35°. A large and splendid meteor, followed several minutes after by a long and loud explosion, at 8.30 p.m., on 23rd.

SCOTLAND.

DUMFRIES.—A very wet and stormy month. Bar. greatly below and temp. considerably above the average. Heavy gales from W. and S.W., but not so severe as in some parts of the country.

SILVERBUT HALL.—A mild and wet month, with very little sunshine. A very

pretty nosegay of wild flowers could have been gathered here before the frosts of the 20th cut them down. A very brilliant meteor on the night of the 23rd.

ANNANHILL.—Barometric pressure less than last month; mean temp. 3°·6 lower; ozone well developed. Winds principally south-westerly, usually moderate to strong. On the 4th, 11th, 12th, 14th, 15th, 25th and 28th, the wind rose to a gale. T and L on 13th, 14th and 22nd; H on the 11th and 27th.

QUINISH.—The largest amount of R recorded in one month since the gauge was established in 1866; the nearest approach being Sept., 1874, when 11·23 in. fell.

ABERDEEN.—A month of mild wet weather, with remarkably low bar., and frequent heavy gales.

PORTREE.—A wet, stormy month; gales on 11th and 15th, with H, T and L; doing much damage to houses and corn stacks. Harvest operations not yet finished, and nothing can save either grain or straw, but dry frosty weather.

SANDWICK.—Uncommonly wet and stormy. The storm of the 16th exceeded any that I have experienced since Dec. 25th, 1806; from 2.30 to 3.30 a.m. it travelled 80 miles an hour, unroofing houses, blowing down stacks, and strewing them over the fields, and in a few cases over the sea. Several vessels were driven on shore and wrecked, and many boats that were thought to be safely laid up on land for the winter were knocked to pieces. Aurora on 8th and 9th.

IRELAND.

DARRYNANE.—R every day. Wind S.W. to N.W., except on 24th, when it was N.N.E. Very heavy gale on 22nd, and heavy sea. Heavy gales on 29th and 30th. Mountains covered with S on morning of 24th; H on 27th and 29th; T and L on 9th and 29th.

WATERFORD.—Stormy on 11th, 19th, 21st, 22nd and 26th. Lunar halo on 16th and 20th.

KILLALOE.—Rainfall much above average, with frequent and heavy gales, chiefly from S.W. Altogether a very wild and wintry month. Gale of the 11th not severe here. Very heavy squalls on 22nd, and squally to the end of the month. S on hills on morning of 28th.

WARINGSTOWN.—Wet and stormy. Temp. above the average.

EDENFEL.—Storms and R prevailed all the month to a degree remarkable even for November. On the night of the 11th the bar. uncorrected stood at 27·60, the lowest reading in 15 years.

RAINFALL OF NOVEMBER.

To the Editor of the Meteorological Magazine.

SIR,—The rainfall during the past month of November having been excessive, you may think it interesting to know the amount that fell here, viz., 9·750 in. This was collected on 24 days; on three of these more than an inch fell, the heaviest fall being on the 5th, viz., 1·400 in. Only once during the last sixteen years has this amount been exceeded in any single month, and this was as long ago as October, 1862, when 10·38 in. fell.

There was a flood on the 12th November.

The rain which fell on the 30th is included in the 9·75 in.—I am, yours truly,

H. DODGSON.

Derwent House, Cockermouth, 7th Dec., 1877.

P.S.—The rainfall for this year is already much above the average.