

Symons's Meteorological Magazine.

No. 458.

MARCH.

VOL. XXXIX.

THE DAWSON-LANDER SUNSHINE RECORDER.

IN our very brief notice of this instrument when describing the Meteorological Exhibition at Southport we inadvertently did less than justice to a very ingenious piece of apparatus, and we are now glad to give a fuller account of it. The recorder is very compact, strongly and neatly made and the whole measures only 4 inches in diameter. The instrument consists of a fixed drum, on which a piece of silver chloride photographic printing paper is fixed under a film of transparent celluloid. A light-tight outer cover is rotated by a clock once in 24 hours and a very narrow slit is thereby always directed towards the sun. A funnel-shaped hood protects the slit from diffused light and allows of an error of about half-an-hour in the clock before the direct sunlight is cut off from the slit. The general external appearance is shown in Fig. 1. By an ingenious device the drum carrying the sensitive paper is made to travel (without rotation) along the axis of the cylinder, so that the records of a number of days may be obtained one below the other. We reproduce in Fig. 2 a whole month's record.

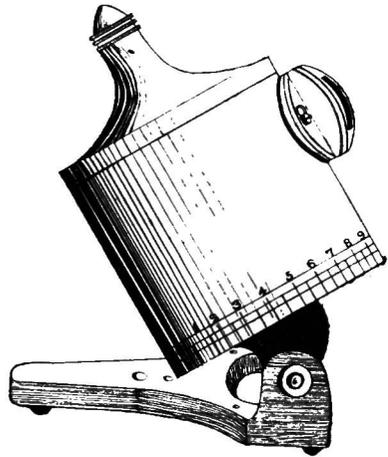


Fig. 1.—The Dawson-Lander Sunshine Recorder.

The advantages of the instrument are obvious. The use of chloride of silver paper makes it possible to have a standard of intensity of sunshine which can readily be reproduced, thereby distinguishing it from other photographic recorders, which depend on the fickle ferrous-prussiate paper. The same size of paper is used at all times of the year and the instrument is as serviceable for the twenty-four hours sunshine of the polar regions as for temperate latitudes. The disadvantage is that if the clock is not correctly set, no record can be

obtained, but we understand that there is no practical difficulty on that account. A more difficult question is likely to be the selection of the exact shade of intensity of the print which is to be measured as bright sunshine. Here the very perfection of the record, which faithfully sets down the intensity as well as the duration of sunlight, is almost a drawback. By narrowing the slit to one-hundredth of an inch the inventors state that the amount of sunshine recorded is the same as that obtained by the Campbell-Stokes instrument.

The Dawson-Lander sunshine recorder is made by Messrs. Lander and Smith, of Canterbury.

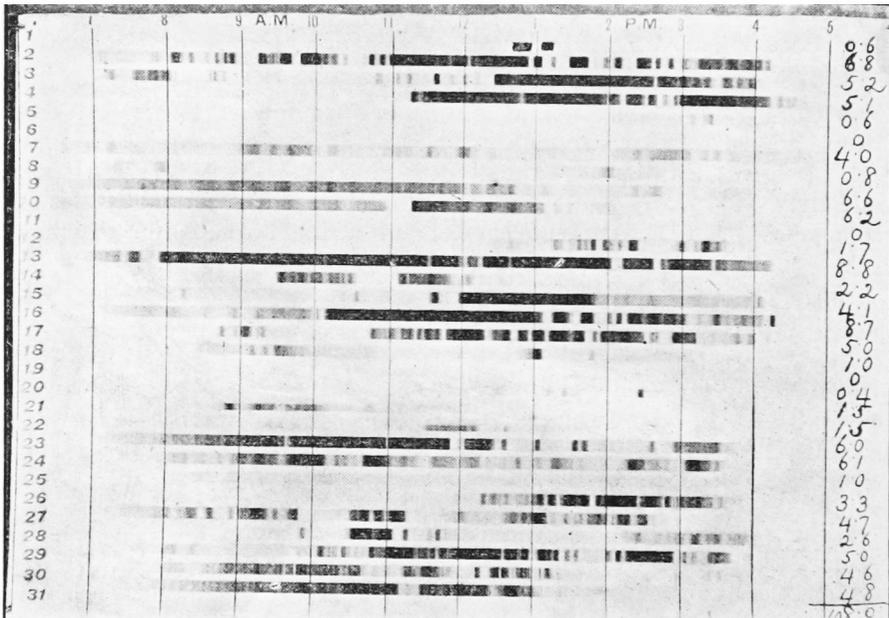


Fig. 2.—Specimen of the Record of the Dawson-Lander Sunshine Recorder.

FIVE MONTHS' WINTER RAINFALL.

The Table compares the total rainfall of the five months of the winter half-year with the average; the first column of figures gives the number of inches at each station in excess (+) or in defect (—) of the average, and in the second column the total amount of rain is given as a ratio taking the average as 100. It will be remembered that November and December, 1903, were months of small rainfall, the amount being considerably below the average in almost all parts of the country. October, 1903, was however an exceptionally wet month; and the two months of 1904 which have passed have also been very wet in most parts of the country.

October, 1903—February, 1904.

Stations.	Diff. from Aver.	Per cent. of Aver.	Stations.	Diff. from Aver.	Per cent. of Aver.	Stations.	Diff. from Aver.	Per cent. of Aver.
	in.			in.			in.	
London+	4·17	142	Arnccliffe ...+	5·51	118	Braemar ...—	·64	96
Tenterden+	4·01	135	Hull+	·96	109	Aberdeen ...+	2·68	118
Hartly Wntn'y +	7·48	167	Newcastle...+	6·69	161	Cawdor—	·41	97
Hitchin+	4·73	147	Seathwaite +	2·88	104	Glencarron —	2·85	94
Winslow+	4·75	146	Cardiff+	11·13	159	Dunrobin ...+	·72	105
Westley+	2·74	126	Haverdwest+	7·56	133	Darrynane +	4·88	120
Brundall+	1·69	116	Gogerddan +	8·24	137	Waterford +	8·17	146
Alderbury+	9·10	168	Llandudno +	3·79	126	Broadford.. +	7·28	149
Ashburton+	14·20	151	Dumfries ...+	2·74	112	Carlow+	1·93	112
Polapit Tamar +	15·09	184	Lilliesleaf...+	4·30	132	Dublin+	·15	101
Stroud+	6·68	156	Colmonell...+	5·45	125	Mullingar...+	2·92	119
Woolstaston...+	6·08	146	Glasgow ...+	2·29	113	Ballinasloe +	3·07	119
Boston+	3·81	145	Inveraray...+	2·24	106	Clifden ...+ +	4·05	111
Hesley Hall ...+	2·63	128	Islay+	5·44	123	Crossmolina +	5·69	121
Derby+	4·04	143	Mull+	6·76	124	Seaforde ...+	4·44	126
Bolton+	6·75	139	Loch Leven +	1·13	107	Londonderry+	3·06	117
Wetherby+	7·79	180	Dundee+	1·71	113	Omagh+	6·93	139

The winter has been a dry one only in the north of Scotland, where there is a considerable area stretching from Braemar through Inverness to Glencarron in which the rainfall of the five months was below the average. No other part of the country has been so favoured. Except for small patches in the south of Scotland and in the east of Ireland, the whole of the northern kingdom and the sister isle have had an excess of rainfall decidedly less than 25 per cent., and thus cannot seriously complain of a wet winter.

In England, on the other hand, only the Lake District and a narrow strip on the east coast have had so small an excess as 25 per cent., a stretch of country in the east of Northumberland, Durham and Yorkshire, had an excess greater than 50 per cent., and one station showed as much as 80 per cent. The south-east of Wales and the whole of south-western England, including the counties Cornwall, Devon, Somerset, Gloucester, Dorset, Wilts, Hants, Berks, Oxford and Worcester, had also an extremely wet winter, the excess exceeding 50 per cent. This means that the average amount of rain for the period had fallen and, at least, half as much more. At one station on the boundary line between Cornwall and Devon, the excess reached the remarkable amount of 84 per cent.

The Tables on pp. 36-37 show how the heavy rains of February were distributed. During that month the north-east of Scotland was remarkably dry; but a very large part of our islands had more than four inches of rain, the greater part of Cornwall, Devon and Wales, having more than six inches. London was comparatively dry, and the east of England had little to complain of so far as moisture is concerned, though cloudy skies and low temperatures made the month far from pleasant in its weather.

**METEOROLOGICAL OBSERVATIONS OBTAINED BY
THE USE OF KITES, OFF THE WEST COAST
OF SCOTLAND, 1902.**

A PAPER embodying the results of the kite experiments made by Mr. Dines off the west coast of Scotland during July and August, 1902, was read before the Royal Society on May 14th, 1903, by Dr. W. N. Shaw, F.R.S., and Mr. Dines. It is published in the *Philosophical Transactions*, Series A, Vol. 202, pp. 123—141. A description of the instruments used, and a tabular statement of the results of each ascent, as laid before the British Association in September, 1902, was given in this Magazine for October, 1902. In the present paper the results were presented graphically in the form of a diagram, representing the height in the air of a series of temperature at successive intervals of 1° C. for each ascent. For purposes of comparison the barometer curves at Fort William and Ben Nevis, and some particulars of the dry and wet bulb temperatures, are printed on the same diagram.

The average fall of temperature for each 500 metres of ascent was found to be as follows:—

	July.	August.
0 to 500 metres, 22 ascents,	3 $^{\circ}$ ·0 C.	13 ascents, 2 $^{\circ}$ ·6 C.
500 „ 1000 „ 16 „	2 $^{\circ}$ ·8	11 „ 2 $^{\circ}$ ·8
1000 „ 1500 „ 9 „	2 $^{\circ}$ ·2	9 „ 2 $^{\circ}$ ·3
1500 „ 2000 „ 2 „	2 $^{\circ}$ ·0	7 „ 2 $^{\circ}$ ·1
2000 „ 2500 „ 1 „	2 $^{\circ}$ ·0	3 „ 2 $^{\circ}$ ·0
2500 „ 3000 „ ...	...	2 „ 2 $^{\circ}$ ·0
3000 „ 3500 „ ...	...	2 „ 1 $^{\circ}$ ·7

It was shown that on the approach of a barometric depression the temperature gradients diminish on the average by as much as 50 per cent., and the paths of the depressions which produced the changes are also shown on maps.

The average value of the temperature gradient per 100 metres at different heights varies from 0° ·56 C. in a column of 500 metres to 0° ·43 at 3500 metres, and the average differs very slightly from that given in Hann's "*Meteorologie*," or from the conventional figure in common use. It was pointed out that a moderately strong wind was required for the higher ascents, and that the values obtained at great altitudes therefore refer to a more or less special type of weather.

Comparisons between the temperature observed at Ben Nevis and that in the free air at the same altitude showed that the latter are on the average 2° ·6 higher, a result apparently due to the mechanical action of the sides of the mountain itself in causing an upward flow.

ROYAL METEOROLOGICAL SOCIETY.

THE usual monthly meeting of this Society was held on Wednesday evening, February 17th, at the Institution of Civil Engineers, Great George Street, Westminster, Captain D. Wilson-Barker, President, in the chair.

The following gentlemen were elected Fellows of the Society : Rev. W. C. Eppstein, M.A., Mr. T. Green, Mr. N. V. Iyya, Mr. W. Matern, and Mr. T. Edmondston Saxby, L.R.C.S.

Mr. E. Mawley read his "Report on the Phenological Observations for 1903." He stated that, taken as a whole, the year had been warm, very wet, and sunless. As affecting vegetation the most noteworthy meteorological features were the severity of the April frosts ; the three weeks of dry, warm and sunny weather which occurred towards the middle of an otherwise cold, rainy and gloomy summer ; and the excessive and persistent rainfall in October. Owing to the mildness of the winter and early spring wild plants flowered in advance of their average dates until about May, after which time only backward dates were recorded. In no previous year since the present series of reports was first instituted in 1891 have such spring migrants as the swallow, cuckoo and nightingale been so late in reaching our shores. The yield of wheat, barley, potatoes, turnips and swedes were somewhat under the average, but all the other farm crops yielded well, especially those of hay and beans, which were unusually abundant. On account of the wet and protracted harvest most of the grain of the cereals was more or less discoloured, while potatoes were almost everywhere much diseased. Throughout the country this was one of the most disastrous years for fruit ever known. In fact, the only fruit crop which gave anything like an average yield was that of strawberries.

An interesting discussion followed the reading of this report, in which the President, Mr. F. Campbell Bayard, Mr. C. Harding, Mr. A. Brewin, Mr. Baldwin Latbam, Mr. F. Druce, Mr. W. B. Tripp, Mr. R. H. Curtis, Mr. J. E. Clark, Mr. J. Hopkinson, and Dr. H. R. Mill took part, and Mr. E. Mawley replied.

Mr. W. H. Dines read a paper on "Observations by means of kites at Crinan in the summer of 1903." These observations were carried out by Mr. Dines under the auspices of a joint Committee of the Royal Meteorological Society and of the British Association, the Government Grant Committee of the Royal Society providing funds for the hire of a vessel for the purpose. The author, after describing various improvements which he had effected in the kites, stated that the weather last summer was most unfavourable for kite flying, as not only was there heavy rainfall, but gales were of frequent occurrence. Repeatedly a kite was carried up a thousand feet or more in a few minutes, or dropped the same height by a convection current. On August 20th a thunderstorm came on suddenly, when

the kite was at a considerable altitude. Mr. Dines's account of this storm is as follows:—

“I should not deliberately send up a kite during a thunder-storm, and was therefore the more pleased, when accidentally surprised by one, to recover the instruments safely. There is, however, nothing in any way peculiar about the chart, the temperature gradient being close to its average value. The kite when the first flash of lightning occurred was at a height of 4550 ft., 8230 ft. of wire being out, and we had little expectation of getting it back. Full steam was turned on, and the engine left to pull in the wire as fast as it could, since electrical indications could decidedly be felt by any one touching the steam valve. During the winding in, what at first appeared to be a squall overtook the vessel, the appearance being that of a definite wall, behind which nothing could be seen except the white tops of a few breaking waves. It was, however, only rain and hail, and mist, produced by the splashing of the rain and hail on the sea. As it passed the vessel the water ran down the deck in sheets, and I do not think I have ever seen rain of such intensity. Some difficulty was experienced with the kite when it was near the vessel, owing to the fitful character of the wind, which several times dropped entirely, and allowed the wire to become slack. No hail occurred at Crinan, some five miles to the north-east, but thunder and very heavy rain. The thunder was not of a severe character or very frequent, but there were several flashes of lightning less than a mile distant. The chart shows that rain of an exceptional character and hail may occur under normal conditions of temperature gradient near the surface. It would have been interesting to have had records from the higher strata.”

The results of the observations show that in August 1903 the mean temperature gradient for the first 5000 feet was $3^{\circ}2$ per 1000 feet. This is substantially the same as that obtained during the preceding summer although the conditions of weather were different.

The President, Dr. W. N. Shaw, Mr. J. Hopkinson, Dr. R. H. Scott, Mr. J. E. Clark, and Mr. W. Marriott took part in the discussion on this paper, and Mr. Dines replied.



Correspondence.

To the Editor of Symons's Meteorological Magazine.

ATMOSPHERIC PRESSURE AND CLIMATE.

I WAS much interested in reading the article by Mr. Bonacina in the February number, and fully agree with him as to the important influence that the position of the isobars has upon climate, but I should prefer to put the statement in the form "prevailing winds" instead of "isobars," although of course if we know one we can infer the other. I should like, however, to ask his authority for the supposition that if the conditions were anticyclonic the mean temperature of January at Greenwich would be 20° F. instead of 37°. Unless "anticyclonic" is to be taken as meaning a north-easterly wind, a meaning that I think it often incorrectly bears, the supposition is not at all in accordance with observational results. As a general rule if a frost in the south of England is of exceptional length and severity it is accompanied by a barometer below the mean (*Quarterly Journal R. Met. Soc.*, Vol. 23, page 239); also, the mean temperature of the days at Greenwich in the winter on which the barometer is much above its usual level—viz., above 30.20 in.—comes out for the 50 years 1841—1890 as 38.3 F., a value close to the mean. (*Quarterly Journal R. Met. Soc.* Vol. 25, page 33.) These facts, and that they are facts any one who will take the trouble may verify for himself, are utterly antagonistic to the idea that anticyclonic conditions are accompanied by exceptional cold in the British Isles. No doubt an anticyclone situated over Scandinavia or Iceland produces cold in England, and an anticyclone over France or Spain produces warmth; but I see no reason why the one condition rather than the other should be described as anticyclonic conditions over the British Isles.

W. H. DINES.

THE STUDY OF SUNSPOT CYCLES.

I HAVE read Mr. H. H. Clayton's letter and 11-year sunspot cycle scheme with interest. The criticisms as to the maxima and year-joining I agree with after more application of the table. The former differ for the reason indicated rather than expressly said in my foot note. I took the years with "unsmoothed" maxima for the months August—October, on which I was mainly working. But I conclude now that, though this and the extra year-joining were more accurate in theory, they are not needed in practice, and in any fresh investigation I should use the simpler series and the "smoothed" maxima and minima that apply to the whole year.

J. EDMUND CLARK.

SNOW FALLS EIGHTY YEARS AGO.

WITH regard to the severe winters of eighty years ago, you may like to make a note of some records in our Sturminster Marshall Churchwarden's books. I may say that the Church consists of nave and north aisle. The snow would accumulate in the valley between the two roofs.

1820. Jan. 7.—Wm. Cox and F. Everett.

Throwing snow off the Church, 2 days each ... 8s.

Dec. 23. do. do. 6s.

1823. March 25.—Throwing snow, &c. 4s.

Perhaps other churchwardens' books might give information of bygone years before rain gauges.

I may say that in the last 25 years we have only had snow thrown off about once or twice, and the sexton has done that as part of his ordinary work, so I imagine these must have been very heavy falls.

JAMES CROSS.

Bailie House, Wimborne, 18th Feb., 1904.

THUNDERSTORM AT BROUGHTON-IN-FURNESS,

February 12th, 1904.

REAL thunderstorms so rarely occur near this station that a short account of one that occurred on February 12th may be of interest.

Clouds gathered towards 10 p.m., and for an hour or more after that there were pretty frequent flashes of vivid reflected lightning, which lit up most strongly the low hills to the S.E., over which they seemed to play. About 11.35 p.m. some loud peals of thunder were heard, having a very peculiar rolling and continuous sound for 30 seconds or more at a time, with very short intervals between the peals; a few fitful gusts of wind sprang up about this time and died away again after blowing for a minute or two. About 11.45 p.m. a strange hissing and rushing sound of wind was heard in the distance to the S., lasting for a minute or two and increasing in intensity and volume as the wind apparently came nearer. This sound was sufficiently peculiar to arrest the attention of all who heard it. Perhaps it was due to falling hail. Then, all at once, with terrific fury the storm was on us: blinding flashes of lightning, crashing peals of thunder, and hailstones beating on the glass with such violence that one could scarcely be heard when speaking; this continued incessantly for twelve minutes or so, then the storm died away as quickly as it had arisen, and in ten more minutes all was calm and still.

CHAS. P. CHAMBERS.

Orchard Head, Broughton-in-Furness.

OBSERVATIONS OF RAIN AND DUST AND EVAPORATION, EDINBURGH, 1903.

I SEND for your inspection monthly tables of rain and dust and soot fall for Edinburgh central district for 1903, with that of evaporation also deduced from observations by a 6 in. gauge in back garden. The fall of dust and soot was registered by an open dish or gauge of 74 square inches area, or $8\frac{1}{2}$ inches square, and amounted to 17 ounces for the year, giving 32 oz. per square foot. This considerable increase of dust fall for 1903 over that of 1902, when it was only 2 oz. for $8\frac{1}{2}$ in. gauge, consisted mostly of sand blown from the building operations carried on at the girls' school in George Square, and at the extension works of the University Union building, by south-westerly, westerly and north-westerly winds blowing across the garden. The rainfall was much greater than usual, nearly double that of 1902, or 30.032 in. compared with 16.227 in., owing to wintry weather in January, February and March, to summer rains in July and August, and equinoctial gales in September and October. The number of rainy days was 218, compared with 179 in 1902, owing to like occurrences.

As might have been expected, the amount of evaporation for 1903 was much decreased from that of 1902, or 11.970 in. from 13.540 in., due to the general cloudy weather prevailing, and the absence of sun's heat during the general wet state of the whole year.

A curious contrast between the rainfall and evaporation of common observation in small and large gauges is, that the small evaporators register more reduction in the water than the large ones, and that the large rain gauges register more increase in the rainfall than the small ones—in fact, just the opposite.

Rain gauges, in pursuance of these observations, would require to be not below a certain moderate area, and if too small in the mouth they would register less rain than naturally falls to the earth.

So in the case of evaporation; a small gauge is less objectionable for registering than a large one, but this regular action is liable to be influenced besides by material of construction, as one of glass evaporates much less water than one of metal.

W. G. BLACK, F.R.Met.Soc.

2, George Square, Edinburgh.

[The measurement of evaporation in small vessels containing a shallow layer of water is, we fear, too largely dependent on the material of which the vessel is composed to give results of great value. The experiments on evaporation, recorded from year to year in "British Rainfall," have shown the necessity of using large tanks so as to avoid the complications due to local heating, and the standard size, 6 feet square and 2 feet deep, seems to have secured this result.—ED. S.M.M.]

LOW MAXIMUM TEMPERATURES.

THE winter which has just come to an end has been, meteorologically speaking, very commonplace; but it possessed one feature which was somewhat unusual, especially as the mean temperature ($39^{\circ}\cdot 1$) was above the average ($38^{\circ}\cdot 6$) for the last twenty years, for this locality; namely, the remarkable absence of high maximum temperatures.

The average number of days in winter, for the last twenty years, on which the *maxima* have touched 50° is 18·5; whereas for the winter just over, there were only seven days on which 50° was reached, viz. :—one day in December, and three each in January and February.

There have only been two winters during the past twenty years in which there have been fewer maxima of 50° , namely, 1887-8 with five days, and 1885-6 with four, even the very severe winters of 1894-5 and 1890-1 had respectively eight and nine, while 1893-9 had forty-four, 1902-3 thirty-four, 1897-8 twenty-six, and 1900-1 twenty-four days with maxima of 50° and upwards.

Is it not probable that the saturated condition of the soil, owing to the abnormally heavy rainfall of the past fourteen months, may be the cause of the absence of high maxima during a winter which in every other respect must be characterized as having been a mild one?

H. K. S. ROGERS.

26, Charlton Road, Blackheath, S.E., 6th March, 1904.

GRADUATION OF RAIN GLASSES.

NOW that our rain gauges are in such unceasing use, may I trespass upon your space to make a suggestion.

It is that it would be of much help to observers if the meteorological instrument makers would slightly alter the form in which the scale of the measuring glasses is at present engraved.

As now inscribed on the glass a very careful scrutiny is necessary, and the reading has often to be checked both upwards and downwards. If on the *left* hand of the vertical scale the fives were distinctly shown by a side line of half-an-inch (ordinary measure)—say, for example, the 15, 25, 35, and so on—the tens could be given in a somewhat similar manner and rather bolder on the *right* hand side of the scale—for example, the 20, 30, 40, etc. An additional safeguard against any error of level when the reading is taken might also be added, viz., (without having a full double scale) a straight line (or dash stroke) engraved for each hundredth on the *opposite* side of the measuring glass, the “fives” and “tens” having longer strokes.

If this suggestion should seem feasible, and be endorsed by the weight of your approval, one might hope before long that our rain

glasses would be both quicker and more certain in being read accurately.

One would like to add how often it happens that the half-inch is very slightly exceeded—in which case a scale extended to 60 would be found very convenient. Beyond that it would be imprudent to go, for it might lead to greater chance of breakage of the slenderer and longer glass.

A RAINFALL OBSERVER OF OVER A QUARTER OF A CENTURY.

[We shall be glad to have the opinion of observers on this subject.—ED. S.M.M.]

REVIEWS.

Examen de la méthode de la prédiction du temps de [Examination of the method of weather forecasts of] M. N. DEMTSCHINSKY, par A. KLOSSOVSKY. Odessa, 1903. Size 9 × 6½. Pp. 74. Plates.

IN this Magazine for May, 1901, (vol. 36, p. 53), we applied the simple test of comparing the curves of temperature and pressure predicted by M. Demchinsky for Aberdeen and Valencia for April, 1901, with the curves showing the actual facts as they occurred, and we summed up our conclusions in the words, "practically the forecasts as a whole appear to us to be valueless." M. Demchinsky has continued to apply his theory of lunar action to the prediction of weather, and from his influential position in Russia as a personal friend of the Tsar his views have naturally attracted much attention and his predictions are regarded by many people as of great importance. In the memoir under review Professor Klossovsky of the University of Odessa has examined both the theories and the predictions of the clever Russian engineer with remarkable acuteness and erudition, and after an exhaustive discussion of the whole matter, with comparative curves of prediction and fulfilment for several stations, and for several years at each station, he sums up in a series of propositions, which we think English readers will be glad to see translated in full. It is pointed out that M. Demchinsky claims that on certain "nodal days" of the lunar year the curves of temperature of any number of lunar years cut each other at the same point—in other words, that the temperature on a "nodal day" is the same in every successive lunar year, however different the temperature of the various years may be on other days. He also claims that the climate of any particular season bears an ascertainable relation to the climate of the succeeding season at the same or at some other place.

Professor Klossovsky, on the other hand, says:—

1.—The verifications made for Odessa, Kieff and Moscow have not revealed any nodal days in the march of the curves of pressure, temperature, cloud or

rain. Consequently, the "ideal line" does not exist, unless it be the mean annual curve for the lunar year.

2.—The relation between the pressure and temperature of winter and summer holds good in fifty cases out of one hundred; in other words, it is equal to the probability of heads or tails turning up in pitch and toss. The process by which M. Demchinsky fills up the internodal parts of his thermal curves in winter and of the general march of the barometer remains unknown to us; and the same is true for the prediction of the other elements of climate.

3.—The law according to which certain days of "similar years" should have the same temperature is not justified even at Warsaw. The elements of weather have a very varied appearance in the course of "similar years," even in those which are separated by a cycle of 19 years.

4.—The formula of Tippenhauer and the application of it made by M. Demchinsky only reveal a succession of serious misunderstandings.

5.—The assertion that equal temperatures correspond to equal amounts of work is in complete contradiction to all the principles of modern science.

6.—All the predictions hitherto published have succeeded or failed according to the same probability by which heads or tails turn up in pitch and toss.

7.—M. Demchinsky's system in its entirety is without a single new idea, the deductions are based on the method of means, that of the earliest stage of meteorology.

Professor Klossovsky concludes by saying that if, after the proofs he has adduced, M. Demchinsky persists in his errors, he ought to submit his views to a special committee to be nominated by the International Meteorological Committee, and pending the decision of this tribunal, desist from publishing his predictions either in "Climat" or in the press.

Weather Folk-Lore and Local Weather Signs. Prepared under the direction of WILLIS L. MOORE by EDWARD B. GARRIOTT, Professor of Meteorology. Washington, 1903. Size 9 x 6. Pp. 154. Plates.

THE title of the book is English, not so the title of the author, for the British Isles do not boast a single professor of Meteorology, nor does the science receive with us more than a semi-contemptuous recognition in any seat of learning. The first part of this interesting memoir contains a selection of the weather-lore of all countries—most of which are familiar to us in Mr. Inwards' delightful collection—carefully arranged, with notes as to their applicability to the weather of the United States. Long range weather-forecasts in relation to sun-spot cycles and lunar influence are also referred to. Two-thirds of the book are occupied by summaries of local weather signs reported by the Weather Bureau observers. They deal with sequences of weather, relation of winds to rainfall and other conditions, periods of frost, &c. These must be of considerable utility to residents in the districts in question, but the utility is practically destroyed by the unscientific arrangement, which is alphabetical under the names

of towns. Suppose anyone were anxious to know the weather signs of the State of New York, he could only find them scattered amongst others under the names of Albany, Binghamton, Buffalo, Ithaca, New York, Oswego, and Rochester. For such a list a simple geographical arrangement of the data, with a key-map as well as an index of towns, ought unquestionably to have been adopted.

Magnetic and Meteorological Observations made by the "Southern Cross" Antarctic Expedition, 1898—1900, under the direction of C. E. Borchgrevink. London: Published by the Royal Society of London. 1902. Size 12 × 9. Pp. 112. Chart and Plates.

THE magnetic observations made by Mr. Bernacchi and Lieutenant Colbeck, both of whom are again in the Antarctic regions as members of the British expeditions, on board the "Discovery" and "Morning," have been reduced and discussed by Dr. Charles Chree, of Kew.

The meteorological observations were reduced, under the superintendence of Dr. W. N. Shaw, at the Meteorological Office, and they are furnished with an introduction and notes by Mr. Bernacchi. No doubt owing to the absence of the latter when the proofs were passed for press, the names of several of the members of the staff of the "Southern Cross" have suffered somewhat from the printer. Thus we read Dr. Herlof Klovstad, Mr. Nicolas Hanson, and Mr. A. Tongner, instead of Dr. Herluf Klövstad, Mr. Nicolai Hanson, and Mr. A. Fougner.

The observations are set out in detail as taken at two hourly intervals at the land station near Cape Adare ($71^{\circ}18'S.$, $170^{\circ}9'30''E.$), from March 3rd, 1899, to January 29th, 1900, and these are then summarised to show the mean monthly conditions. Monthly wind-roses are given, which show in a very striking way the preponderance of south-easterly winds on the shores of the Antarctic continent, and the almost entire absence of wind from points between north-west and south-west. This, combined with the records of earlier, and now of later expeditions also, proves that the zone of the Brave West Winds lies far to the north of Antarctica, and promises good results to any expedition which, breaking away from a tradition for which there is no justification, will attempt a circumnavigation from east to west in high latitudes. The question of Antarctic winds is discussed by Mr. Bernacchi, who gives interesting particulars of some of the terrific storms which frequently made the lives of the explorers miserable.

The meteorological log of the "Southern Cross" in Antarctic waters is given in a condensed form, and the volume is valuable as a record of data secured in very arduous conditions and requiring much care before they could be presented in a form available for reference.

The State of the Ice in the Arctic Seas, 1903. Special print of the Nautical Meteorological Annual of the Danish Meteorological Institute. Copenhagen, 1904. Size $12\frac{1}{2} \times 9\frac{1}{2}$. Pp. xxiv. Maps.

THIS prompt and useful publication gives for each month, from April to August, a chart showing the condition of the ice in the whole Arctic Sea, so far as it can be ascertained from the reports of vessels trading to those inhospitable regions. The conclusions drawn from a careful study of all the available data are that the temperate seas have been invaded by about the normal quantity of drifting ice during 1903, but that the Labrador current flowing down past the Banks of Newfoundland carried with it an unusual number of icebergs, many of them being of exceptional size. In fact, on the routes of the trans-Atlantic steamers there has not been so much ice to be seen for many years. This condition of things had been foreseen and predicted a year ago on account of the small number of bergs liberated in 1902; but there is no indication to be drawn from last year as to the probable condition of the ocean routes in 1904.



METEOROLOGICAL NEWS AND NOTES.

THE INTERNATIONAL COUNCIL FOR THE STUDY OF THE SEA met for the third time from February 22nd to 27th at Hamburg, when the physical and meteorological aspects of the work were represented by the following delegates and experts:—Belgium, Professor Gilson of Louvain; Denmark, Mr. Martin Knudsen of Copenhagen; Finland, Professor Homén of Helsingfors; Germany, Professor Krümmel of Kiel; Great Britain, Dr. H. R. Mill of London; Holland, Dr. Wind of the Royal Meteorological Institute de Bilt; Norway, Professor Fridtjof Nansen of Christiania; Russia, Professor Knipovich of St. Petersburg; Sweden, Professor Pettersson of Stockholm. New forms of apparatus for measuring the direction and velocity of currents at various depths in the sea were exhibited by Professors Nansen and Pettersson, the latter also showing improved deep-sea thermometers. The Council recommended that current measurements be made a part of the routine of the seasonal cruises of the various countries, and also that an effort be made to extend the admirable system of observations of surface temperature made on board the steamers of the Dutch lines to all parts of the North Sea. The Senates of Hamburg and of Bremen, and the Directors of the Hamburg-American line, entertained the International Council in princely style during the meeting.

DAILY KITE ASCENTS now form part of the routine of the meteorological work at the Deutsche Seewarte in Hamburg as well as at the Aeronautical Institute in Berlin. The temperatures, humidities, and wind velocities observed at various heights, up to 7,000 or 8,000 feet in favourable conditions, are published daily in the weather reports. The number of kites used depends on the strength of the wind, and there are comparatively few days when an ascent of some kind is impossible. The German meteorological authorities make a special point of recording the observations from high-level observatories, and they hope at an early date to supplement the continental records with those from Ben Nevis.

MR. W. C. NASH has, we learn from *The Observatory*, retired, in accordance with the rules of the Admiralty Service, from the post of Superintendent of the Magnetical and Meteorological Department at Greenwich Observatory. Mr. Nash was attached to this department when he joined the staff of the Observatory in 1856, and assisted Mr. Glaisher in much of his work, including some of the balloon ascents. He succeeded Mr. William Ellis as Superintendent of the Department in 1894.

LE TEMPS QU'IL FAIT—which may be Englished as *The Weather we have*—is the title of a new monthly magazine designed for the popularization of meteorology, and published at Mons in Belgium. The first three numbers have already appeared, and the cover at once attracts attention by its artistic if somewhat wintry appearance. The contents are designed for the non-scientific person interested in observing the weather.

THE PATH OF THE AIR IN CYCLONES is investigated in a recent number of the *Meteorologische Zeitschrift* by Dr. W. Meinardus, who proves by mathematical reasoning that the trajectories of particles of air in an unsymmetrical moving cyclone correspond very closely with the actual trajectories found by Dr. W. N. Shaw to be followed by the air in particular cases. Dr. Meinardus mentions that Dr. Assmann has devised a method by which a balloon may be caused to float in any desired stratum of air and trace out its path on the surface of the ground by dropping some easily recognisable material continuously for a considerable time.



RAINFALL AND TEMPERATURE, FEBRUARY, 1904.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables in <i>British Rainfall</i> to which each station belongs.]	RAINFALL.				Days on which 0.1 or more fell.	TEMPERATURE.				No. of Nights below 32°.	
		Total Fall.	Diff. from average, 1890-9.	Greatest in 24 hours.			Max.		Min.		Shade	Grass
				Depth	Date.		Deg.	Date.	Deg.	Date.		
I.	London (Camden Square) ...	2.58	+ 1.11	.48	9	19	54.3	20	27.9	29	8	24
II.	Tenterden.....	2.94	+ 1.24	.63	9	21	51.0	20, 21	25.5	29	12	21
„	Hartley Wintney	3.43	+ 1.80	.57	12	23	54.0	20a	27.0	27b	15	19
III.	Hitchin	2.86	+ 1.40	.55	9	17	53.0	21	25.0	28	17	...
„	Winslow (Addington)	3.18	+ 1.72	.78	9	17	53.0	21	24.0	29	14	23
IV.	Bury St. Edmunds (Westley)	2.81	+ 1.27	.50	9	18	54.5	21	25.0	23	...	...
„	Brundall	3.17	+ 1.65	.38	17	24	55.0	21	26.2	28	9	18
V.	Alderbury	4.10	+ 2.02	.67	12	24	47.0	20	23.0	28, 29	16	...
„	Winterborne Steepleton	6.49	...	.96	2	22	49.7	20	21.4	29	10	15
„	Torquay (Cary Green)	5.93	...	.89	12	22	53.9	22	32.3	19	0	14
„	Polapit Tamar [Launceston]	7.59	+ 4.98	1.14	14	24	51.1	21	23.2	29	11	12
VI.	Stroud (Upfield)	4.40	+ 2.48	.73	9	22	49.0	20	26.0	28	14	...
„	Church Stretton (Woolstaston)	4.08	+ 2.08	.42	9	23	50.5	20, 21	20.0	29	20	...
„	Bromsgrove (Stoke Reformatory)	2.86	+ 1.44	.37	9	20	48.0	20, 21	21.0	28	17	...
VII.	Boston	2.31	+ .96	.42	17	14	50.0	20	27.0	27	...	...
„	Bawtry (Hesley Hall)	2.92	+ 1.47	1.21	3	20	50.0	19, 20	24.0	29	17	...
„	Derby (Midland Railway)	2.80	+ 1.35	.65	3	20	54.0	20	24.0	28	17	...
VIII.	Bolton (The Park)	3.82	+ 1.38	.54	3	20	50.2	21	23.2	29	10	22
IX.	Wetherby (Ribston Hall)	3.34	+ 1.90	.53	3	22	...	...	...	...	...	...
„	Arncliffe Vicarage	5.18	+ .36	.88	12	23	...	...	...	...	...	...
„	Hull (Pearson Park)	2.18	+ .46	.58	3	23	54.0	21	29.0	29	12	26
X.	Newcastle (Town Moor)	2.60	+ 1.13	.33	3	19	...	...	...	...	...	...
„	Borrowdale (Seathwaite)	10.13	+ 1.64	2.44	13	16	...	...	...	...	...	...
XI.	Cardiff (Ely)	6.21	+ 3.32	.76	9	22	...	...	...	...	...	...
„	Haverfordwest (High St)	6.10	+ 2.76	.94	25	21	50.8	12, 20	28.0	29	5	18
„	Aberystwith (Gogerddan)	4.59	+ 1.44	.60	19	17	51.0	21, 23	20.0	29	17	...
„	Llandudno	3.00	+ 1.05	.60	3	22	53.0	21	25.5	29	2	...
XII.	Cargen [Dumfries]	2.89	— .77	.76	12	15	49.0	22	21.0	19, 29	12	...
XIII.	Edinburgh (Royal Observatory)	2.38	...	.40	5	20	43.4	21	22.1	29	12	22
XIV.	Colmonell	3.80	+ .39	.90	19, 25	...	50.0	19	24.0	1	10	...
XV.	Tighnabruach	5.44	...	1.14	24	15	46.0	20	26.0	14c	16	18
„	Mull (Quinish)	5.47	+ 1.08	.83	25	20	...	...	...	...	...	...
XVI.	Loch Leven Sluices	2.92	+ .14	.44	3	15	...	...	...	...	...	...
„	Dundee (Eastern Necropolis)	4.25	+ 2.12	.95	6	20	46.9	20	25.0	29	17	...
XVII.	Braemar	1.44	— 1.14	.34	12	19	42.2	27	10.8	11	24	29
„	Aberdeen (Cranford)	4.07	+ 1.66	.65	12	21	47.0	12, 13	25.0	16, 18	16	...
„	Cawdor (Budgate)	2.29	+ .35	.40	13	19	...	...	...	...	...	...
XVIII.	Glencarron Lodge	4.34	— 2.98	1.39	19	22	46.1	28	20.2	19	19	...
„	Bendamph	3.76	— 2.88	1.00	19	16	...	...	...	...	...	...
XIX.	Dunrobin Castle	3.78	+ 1.36	.87	21	16	49.5	27	24.0	19	18	...
„	Castletown	4.40	...	.44	21	25	42.0	19	23.0	16, 17	22	...
XX.	Killarney	5.72	+ 1.51	.59	18	26	58.0	12	29.0	1	...	...
„	Waterford (Brook Lodge)	6.39	+ 3.48	.77	29	25	53.0	20	25.0	1	9	...
„	Broadford (Hurdlestown)	4.89	+ 2.67	.75	28	25	49.0	20	28.0	...	15	...
XXI.	Carlow (Browne's Hill)	3.75	+ 1.20	.52	12	24	...	...	...	...	...	...
„	Dublin (Fitz William Square)	3.31	+ 1.36	.46	12	17	56.5	21	30.0	17	5	16
XXII.	Ballinasloe	5.17	+ 2.74	.56	29	28	67.0	19, 20	20.0	1	23	...
„	Clifden (Kylemore House)	8.04	+ 2.13	1.41	28	24	...	...	...	...	...	...
XXIII.	Seaforde	4.34	+ 1.55	.68	12	22	51.0	21	24.0	9	15	17
„	Londonderry (Creggan Res.)	2.78	+ .07	.39	25	18	...	...	...	...	...	...
„	Omagh (Edenfel)	5.40	+ 2.80	.95	12	21	50.0	19, 21	24.0	10, 16	16	20

Bandamph (January) 12.58 + 2.98 1.98 10 22

+ Shows that the fall was above the average; — that it was below it. a and 21, 22. b and 28 29. c and 18, 29.

SUPPLEMENTARY RAINFALL, FEBRUARY, 1904.

Div.	STATION.	Rain. inches	Div.	STATION.	Rain. inches
II.	Dorking, Abinger Hall	3·92	XI.	New Radnor, Ednol	6·01
„	Sheppey, Leysdown	2·33	„	Rhayader, Nantgwilt ...	7·38
„	Hailsham	3·56	„	Lake Vyrnwy	6·77
„	Crowborough	3·96	„	Ruthin, Plâs Drâw.....	4·18
„	Ryde, Beldornie Tower.....	3·23	„	Criccieth, Talarvor.....	3·25
„	Einsworth, Redlands.....	3·60	„	Anglesey, Lligwy	3·24
„	Alton, Ashdell	4·36	„	Douglas, Woodville	4·74
„	Newbury, Welford Park ...	3·72	XII.	Stoneykirk, Ardwell House	3·84
III.	Harrow Weald	2·58	„	Dalry, Old Garroch	5·32
„	Oxford, Magdalen College..	2·84	„	Langholm, Drove Road....	4·09
„	Banbury, Bloxham.....	4·54	„	Montaive, Maxwellton House	4·20
„	Pitsford, Sedgebrook.....	3·41	„	Lilliesleaf, Riddell	2·97
„	Huntingdon, Brampton.....	2·91	XIII.	N. Esk Reservoir [Penicuik]	3·85
„	Wisbech, Bank House	2·28	XIV.	Maybole, Knockdon Farm..	2·90
IV.	Southend	1·90	„	Glasgow, Queen's Park	2·23
„	Colchester, Lexden.....	2·16	XV.	Inveraray, Newtown	6·28
„	Saffron Waldon, Newport...	3·25	„	Ballachulish, Ardsheal	7·64
„	Rendlesham Hall	2·18	„	Campbeltown, Redknowe...	3·64
„	Swaffham	3·15	„	Islay, Eallabus	4·07
„	Blakeney	3·02	XVI.	Dollar	3·79
V.	Bishop's Cannings	3·13	„	Balquhider, Stronvar	6·32
„	Ashburton, Druid House	9·51	„	Coupar Angus Station	3·70
„	Okehampton, Oaklands.....	7·84	„	Blair Atholl	2·58
„	Hartland Abbey	5·22	„	Montrose, Sunnyside.....	3·18
„	Lynmouth, Rock House ...	5·86	XVII.	Alford, Lynturk Manse ...	4·21
„	Probus, Lamellyn	7·20	„	Keith, H. R. S.....	3·35
„	Wellington, The Avenue ...	5·50	XVIII.	Fearn, Lower Pitkerrie.....	2·21
„	North Cadbury Rectory ..	4·21	„	S. Uist, Askernish	3·81
VI.	Clifton, Pembroke Road ..	4·09	„	Invergarry	4·39
„	Moreton-in-Marsh, Longboro'	5·03	„	Aviemore, Alvie Manse.....	1·34
„	Ros, The Graig	4·42	„	Loch Ness, Drumnadrochit.	2·16
„	Shifnal, Hatton Grange.....	3·50	XIX.	Invershin	3·86
„	Wem Rectory	3·13	„	Altnaharra	3·06
„	Cheadle, The Heath House.	3·11	„	Bettyhill	2·53
„	Coventry, Kingswood	3·42	„	Watten, H. R. S.....	3·01
VII.	Market Overton	3·51	XX.	Cork, Wellesley Terrace ...	5·78
„	Market Rasen	2·55	„	Darrynane Abbey	7·51
„	Worksop, Hodsock Priory..	3·23	„	Glenam [Clonmell]	5·81
VIII.	Neston, Hinderton.....	3·28	„	Ballingarry, Hazelfort	4·10
„	Southport, Hesketh Park...	3·81	„	Miltown Malbay.....	6·09
„	Chatburn, Middlewood	4·14	XXI.	Gorey, Courtown House ...	4·28
„	Duddon Valley, Seathwaite Vic.	6·75	„	Moynalty, Westland	4·25
IX.	Langsett Moor, Up. Midhope	6·27	„	Athlone, Twyford	5·49
„	Baldersby	2·46	„	Mullingar, Belvedere.....	5·24
„	Scalby, Silverdale	3·01	XXII.	Woodlawn	5·60
„	Ingleby Greenhow Vicarage	3·06	„	Westport, Murrisk Abbey..	7·25
„	Middleton, Mickleton	1·80	„	Crossmolina, Enniscoe	7·53
X.	Beltingham	2·21	„	Collooney, Markree Obsy...	4·47
„	Bamburgh	2·55	XXIII.	Enniskillen, Portora	5·21
„	Keswick, The Bank	5·13	„	Warrenpoint	3·23
„	Melmerby Rectory.....	2·95	„	Banbridge, Milltown	2·92
XI.	Llanfrechfa Grange.....	6·68	„	Belfast, Springfield	4·10
„	Treherbert, Tyn-y-waun ...	10·00	„	Bushmills, Dundarave	2·52
„	Llandovery, Tonn	4·57	„	Stewartstown	3·80
„	Castle Malgwyn	5·23	„	Killybegs	5·33
„	Llandefaelog-fach	5·47	„	Horn Head	3·51

Ryde, Beldornie Tower (January) 2·97.

METEOROLOGICAL NOTES ON FEBRUARY, 1904.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Temp. for Temperature; 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 AND WALES.

LONDON, CAMDEN SQUARE.—Un genial and lacking in sunshine, with frequent R and uniform temp. Slight frost during the last week with light S showers. Duration of sunshine 41·5 hours, and of R 57·1 hours. Mean temp. 39°·4, or 0°·4 below the average.

TENTERDEN.—Again wet, with much wind in the middle. The last week was drier with E. wind, but S at the close. Duration of sunshine 75 hours. Very low bar. from 8th to 11th, reading 28·68 in. on 9th.

SHEPPEY, LEYSDOWN.—Mild and unsettled until 23rd, then cold N.E. wind with frost, and about 6 inches of S from 27th to 29th. Terrific gale on 12th and strong gales on 8th, 9th and 21st. TS on 13th.

CROWBOROUGH.—The first three weeks were mild with R almost continuously, and the last week very cold with frost and S. H on 3 days, S on 6 days. Prevailing winds W. and S. till 22nd, then N. and E. Mean temp. 37°·4.

HARTLEY WINTNEY.—The cloud and gloom of the preceding month continued until the end of the third week, with R daily. The last week was brighter with more sun, cold E. wind and slight S showers. Ozone on 17 days with a mean of 4·0.

WINSLOW, ADDINGTON.—Except 1883 and 1900 the wettest February in 34 years. The last week was very cold, with a slight sprinkling of S.

PITSFORD, SEDGEBROOK.—Another wet, cold and gloomy month with constant slight S. R 1·42 in. above the average of 10 years. Mean temp. 36°·6.

COLCHESTER, LEXDEN.—Stormy till 14th, with R every day but one. Then colder and much drier with E. wind from 24th and traces of S.

BURY ST. EDMUNDS.—Only 3 days without R till 17th, with southerly winds. E. winds set in on 22nd with frosts and dry weather.

BRUNDALL.—Mean temp. 38°·9, or 0°·7 above the average of 20 years, but 5°·4 below that of February, 1903. Very damp and rainy for the first three weeks. Winterly at the close with S.

WINTERBORNE STEEPLTON.—R more than double the average of 11 years.

TORQUAY, CARY GREEN.—R 3·24 in. above the average. Mean temp. 42°·7, or 0°·4 below the average. Duration of sunshine 62·7 hours, or 18·9 hours below the average. Mean amount of ozone 5·9. Max. 9·0 on 13th with W. wind; min. 1·0 on 28th with E.N.E. wind.

ASHBURTON, DRUID HOUSE.—Excessive R, the total being 4·84 in. above the average of 38 years. This fall was exceeded in 1883, 10·10 in., and 1900, 11·07 in. The lowest falls in February were ·00 in. in 1895 and ·03 in. in 1891.

LYNMOUTH, ROCK HOUSE.—Colder than January with very heavy H storms.

WELLINGTON.—Abnormally wet, R falling every day, and at times very heavily. The total fall was almost double the average.

NORTH CADBURY.—Temp. about normal in all points, but the last week a good deal the coldest. The air was reeking with moisture till the last week when drying E. airs began.

CLIFTON, PEMBROKE ROAD.—Very wet, with R 1·60 in. above the average and frequent gales from S.W. Sharp frost on 28th and 29th and S or sleet on four days. T and L on the night of 12th.

ROSS, THE GRAIG.—Very wet till 17th, and very unpleasant weather most of the month. The meadows were saturated from the excess of R, but the Wye was not much flooded. Temp. near the average.

BOLTON.—Dull, changeable and humid, with low temp., particularly during the last 3 days. Mean temp. 36°·6, or 0°·8 below the average. Duration of sunshine 16·8 hours on 9 days, being 21·6 hours less than the average, and the lowest February record. S on 6 days, 2 inches falling on 15th and 5 inches on 25th.

SOUTHPORT.—Exceptionally wet and cloudy, the mean pressure being

exceedingly low. Mean temp. $0^{\circ}\cdot9$ below the average. Duration of sunshine 28 hours below the average. The underground water level was remarkably high. Total depth of S $4\cdot3$ in. E $1\cdot81$ in. above the average.

SEATHWAITE VICARAGE.—Generally mild and rainy till the closing week, which was marked by the heaviest S and sharpest frost of the season.

HULL, PEARSON PARK.—Very dull, with E and frequently cold. Extremely cloudy throughout. S on 18th.

LLANFRECHFA GRANGE.—Mild till 15th, then frost at night. E rather unusually heavy, but in 1900 there was $9\cdot31$ in., and in 1893 $6\cdot44$ in.

LLANDOVERY.—Cold, wet and changeable for the most part, with mean temp. $39^{\circ}\cdot0$. Violent storms with T from 12th to 14th, after which S, E and frost to 20th. Mild and wet to 25th, afterwards fairly dry and cold.

HAVERFORDWEST.—Remarkable for low max. temp., reaching 50° on 3 days only. Very wet from 8th to 10th, with bar. below 29 in. From 12th to 14th stormy and cold. Duration of sunshine 28·9 hours.

ABERYSTWTH.—Very cold and wet till the last few days, which were fine, with cold N.E. winds. Unseasonable throughout.

DOUGLAS.—Very wet, sunless and depressing. E fell on every day till 27th. Frost on 1st and on last two days. Temp. about the average. H on 11th; S on 3 days. Spring flowers were ruined by wet.

SCOTLAND.

CARGEN [DUMFRIES].—Sunless though dry. Vegetation was severely checked by cold E. wind in the last week.

MAXWELTON HOUSE.—Cold, wet and snowy, with a few very fine days. Mean temp. 35° , or 5° below the average. E $1\cdot10$ in. above the average. Seven inches of S on 17th.

MULL, QUINISH.—Cold, wet and unsettled, with constant sudden changes.

COUPAR ANGUS.—Exceedingly wet and very mild. Persistent E during the first half, but no floods. Mean temp. $43^{\circ}\cdot2$, the highest for 25 years.

ALTNAHARRA.—Very fine and open, and upon the whole exceptionally mild.

BETTYHILL.—The E was light except for a day or two, and the weather generally frosty with a few bright warm days.

WATTEN.—Wet and squally and very changeable, with slight frosts and frequent storms of E, sleet and S.

CASTLETOWN.—The first part was very damp, with E. and S.E. winds and daily E or S.

IRELAND.

CORK.—E $2\cdot34$ in. over the average, and mean temp. $5^{\circ}\cdot0$ below the average. The city floods of 1st and 2nd were due to the diminished pressure over the ocean, S.E. wind blowing into the harbour, and the river swollen from the recent E. On 14th $\cdot60$ in. of E fell in 9 hours.

DARRYANE ABBEY.—The wettest February in 25 years, the fall being 76 per cent. above the average. The fall for January and February was 46 per cent. above the average.

MILTOWN MALBAY.—Very cold, stormy and wet, preventing all attempts at tillage, and winding up with a storm of S, sleet and E, which flooded the entire country. Much H; T, L, and stormy weather prevailed.

DUBLIN, FITZWILLIAM SQUARE.—Dull, cold, damp and rainy. Mean temp. $40^{\circ}\cdot7$. The bar. was persistently low in the week ending 13th, the mean for the seven days being only $29\cdot035$ in. Sharp TS on the evening of 12th.

COLLOONEY, MARKREE OBSERVATORY.—Frequent S storms. T and L on one day. Gales on four days. Duration of sunshine $41\cdot4$ hours.

BELFAST, SPRINGFIELD.—Rather an unpleasant month. The frost was not sufficient to benefit the land. The wettest February since 1894.

OMAGH, EDENFEL.—Raw, wet and unsettled almost without intermission, with E above and temp. below the average, and frequent strong winds, approaching but not reaching the violence of gales.

Climatological Table for the British Empire, September, 1903.

STATIONS. <i>(Those in italics are South of the Equator.)</i>	Absolute.				Average.				Absolute.		Total Rain.		Aver.
	Maximum.		Minimum.		Max.	Min.	Dew Point.	Humidity.	Max. in Sun.	Min. on Grass.	Depth.	Days.	Cloud.
	Temp.	Date.	Temp.	Date.									
London, Camden Square	83·7	2	38·1	17	67·6	50·8	52·0	83	121·8	35·1	2·64	13	5·3
Malta.....	100·3	13	55·4	29	82·1	68·4	64·4	71	148·7	53·5	1·09	3	3·6
Lagos, W. Africa	85·0	21 ^a	68·0	28	82·9	73·9	73·1	79	145·0	68·0	9·92	15	...
Cape Town	87·2	4	40·6	15	66·8	51·2	51·8	77	...	...	2·29	13	5·2
Durban, Natal	96·1	29	48·9	2	75·9	57·2	...	...	144·3	...	·62	7	3·7
Mauritius.....	80·5	19	55·4	9	76·5	62·0	58·2	70	143·7	45·3	1·66	20	5·8
Calcutta.....	91·9	21	72·8	12	87·8	77·8	77·2	86	158·4	71·9	14·02	12	8·2
Bombay.....	88·1	16	73·3	19	85·4	77·2	76·2	84	138·8	71·7	7·82	24	7·2
Madras	96·3	7	71·6	20	90·3	76·2	75·7	84	147·1	70·8	8·21	15	5·5
Kodaikanal	66·0	27	50·8	11	62·2	52·9	53·1	89	143·6	46·1	9·73	20	8·3
Colombo, Ceylon.....	89·2	20	72·5	22	87·2	77·1	74·7	84	149·0	72·0	8·06	21	8·1
Hongkong.....	87·7	19	73·0	6	82·9	75·8	73·1	84	134·8	...	16·54	15	6·2
Melbourne.....	80·2	11	34·4	15	62·7	47·5	43·3	70	141·7	28·2	3·18	11	6·6
Adelaide	81·2	11	40·1	30	66·2	48·5	45·2	65	135·3	33·7	2·85	16	5·0
Coolgardie	87·8	26	37·9	7	68·9	45·7	44·4	62	149·4	33·9	·61	12	4·6
Sydney	85·0	12	44·4	21	67·0	53·0	47·9	69	117·0	38·0	4·33	15	5·0
Wellington	63·5	12	33·0	6	56·1	42·8	39·9	64	111·0	22·0	4·36	17	6·5
Auckland	64·5	21	42·0	6	59·6	49·2	45·1	71	134·0	39·0	2·40	16	5·2
Jamaica, Negril Point..	91·0	27	70·2	12	87·5	73·6	73·9	80	...	...	6·26	9	...
Trinidad .....	...	...	...	...	...	...	...	...	...	...	...	...	...
Grenada.....	90·0	21	72·0	2	85·4	75·1	71·6	75	154·0	...	9·51	19	2·9
Toronto	83·8	13	33·8	29	71·3	50·6	54·5	78	...	...	·41	7	4·3
Fredericton	81·2	17	32·0	30	69·1	46·5	46·2	60	...	...	2·34	9	4·0
Winnipeg	77·6	18	24·0	15	60·9	38·3	...	...	...	...	2·77	8	5·6
Victoria, B.C.	70·7	4	42·4	30	61·5	49·6	...	...	...	...	3·76	14	6·3
Dawson	65·0	3	19·5	30	51·6	33·3	...	...	...	...	2·41	6	4·0

a and 22, 30.

MALTA.—Mean temp. of air 0°·6 below, dew point 1°·5, and E·11 in. below averages. Mean hourly velocity of wind 4·0 miles above average. Mean temp. of sea 77°·8. L on 7 days.

Mauritius.—Mean temp. of air 1°·0, and dew point 1°·6 below, and E·27 in. above, averages. Mean hourly velocity of wind 12·3 miles, or 0·8 above average; extremes, 30·5 on 20th and 2·1 on 7th; prevailing direction E.S.E.

MADRAS.—Rainfall 50 per cent. above average. Bright sunshine 131·5 hours.

KODAIKANAL.—Mean temp. of air 56°·2. Mean velocity of wind 314 miles per day. Bright sunshine 78 hours.

COLOMBO, CEYLON.—Mean temp. of air 81°·0 or 0°·2 above, of dew point 1°·4 above, and E 3·02 in. above, averages. Mean hourly velocity of wind 9·6 miles, prevailing direction S.W. TSS on 5 days.

HONGKONG.—Mean temp. of air 78°·6, or 1°·8 below, and E 3·90 above, averages. Bright sunshine 165·7 hours, or 34 below average. Mean hourly velocity of wind 13 miles; prevailing direction E.

Adelaide.—Mean temp. of air 0°·3 above, and E 1·11 in. above, averages.

Sydney.—Mean temp. of air 1°·1 above, humidity 1·4 below, and E 1·32 in. above, averages.

Auckland.—Mean temp. of air close to the average, and E quite one inch under the average.