Symons's Meteorological Magazine.

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OUR NEW VOLUME.

THE commencement of the fortieth annual volume of a magazine devoted to any branch of science is an occasion of some interest, not diminished by the fact that the magazine really began under a different name three years before the issue of the first number bearing its present title. Mr. Symons issued his first "Monthly Rainfall Circular" of 2 pp. in 1863, increased its size to 4 pp. in 1865, and developed it into "Symons's Meteorological Magazine" in 1866, though the transition was less abrupt than might be supposed, for the Magazine at first consisted of only eight pages. In 1868 the number of pages was increased to sixteen, and this remained the minimum until in 1904 it was increased to twenty pages.

The Magazine has always been an organ of independent opinion and impartial information regarding the progress of the scientific study of the atmosphere. We believe that it fills a useful if unobtrusive place by the punctual publication of meteorological news, and by affording a common meeting ground for the amateur observer and the scientific student. The climatology of the United Kingdom and of the British Dominions beyond the Sea has always been a special feature, though the world-wide interests of meteorology are not neglected. We believe that the utility and interest of the Magazine will still increase, and that the greater attention now being paid to meteorology in English-speaking countries will bring more contributions to our pages alike from observers and students.

Not the least interesting fact about the publications of the British Rainfall Organization is that, though in recent years there have been three changes in editorship, continuity has been preserved unbroken —the same publisher and the same printer having continued to issue them during the forty-five years of their existence. How great the services of a printer can be when his heart is in his work none but an editor can understand, and on the occasion of the commencement of this volume, we have asked our esteemed friend and printer, Mr. Shield, to contribute a few words of reminiscence.

I became acquainted with Mr. Symons in the year 1858, on the occasion of his reading a paper to the Young Men's Association connected with the Presbyterian Church in Chelsea, of which I was a member. The exact title of his paper I am unable to verify, but it contained some interesting particulars in connection with Rainfall, and I think it is not improbable that it formed the basis of the treatise which he subsequently published under the title of "Rain: How, When, Where, and Why it is Measured." The acquaintance then formed with Mr. Symons ripened into friendship, and in 1860 he entrusted me with the printing of his first leaflet of rainfall statistics from 168 stations in England and Wales. Under his able and painstaking editorial guidance, the little leaflet gradually expanded into the annual volume of "British Rainfall," with returns from 3400 stations in every part of the United Kingdom; and it has been my pleasure to take a humble but necessary part in the production of every annual volume.

The *Meteorological Magazine* was started in 1866, and in conducting it Mr. Symons was an ideal editor from a printer's point of view—his copy was always supplied in good time; he had a keen eye for the detection of errors, typographical or other; and an apparently intuitive ingenuity in fitting in any alterations required in proof to avoid "over-running." The Magazine continues to pursue the "even tenour of its way," gradually increasing in size and circulation; and I have literally had a "hand" in the composition of every number from its first appearance to the present time.

G. W. C. SHIELD.

THE HIGH BAROMETER OF JANUARY, 1905.

THE anticyclone which spread over the British Isles in the last week of January led to some very high barometer readings in the south of England and Ireland, and we have received a large amount of correspondence on the snbject, a selection of which is quoted below.

The barometer in London on January 27th and 28th has only twice been surpassed since any record has been kept, viz., on January 9th, 1825, when 30·958 in. was recorded by Belville at Greenwich, and on January 18th, 1882, when 30·975 in. was observed at Camden Square, the readings quoted being corrected to 32° and sea-level, but not reduced to standard gravity.

Unfortunately, the Redier mercurial barograph at Camden Square has a range too limited to take account of extremely high readings, and for 77 hours from 4 p.m. on January 26th to 9 p.m. on January 29th the float in the short arm of the syphon was aground on the bend of the tube. During the whole of that time the barometer was continuously above 30·820 in. The standard Fortin barometer was read at frequent, though necessarily irregular, intervals, and the results were as follows :—

Jan.	in.	Jan.	in.	Jan.	in.
26th— 9.0 p.m....	30·849	28th—10.15 a.m..	30·914	29th— 1.0 a.m...	30·954
11.10 ,, ...	·854	11.0 ,, ...	·910	4.15 ,, ...	·926
27th— 9.0 a.m....	·927	12.0 noon .	·897	9.0 ,, ...	·952
10.30 ,, ...	·913	3.15 p.m..	·871	10.20 ,, ...	·947
4.30 p.m..	·893	5·45 ,, ...	·901	1.0 p.m...	·905
9.0 ,, ...	·885	7.0 ,, ...	·912	2.0 ,, ...	·896
10.0 ,, ...	·894	9.0 ,, ...	·933	4.15 ,, ...	·875
11.0 ,, ...	·904	10.15 ,, ..	·948	9.0 ,, ...	·834
12.0 mid...	·896	11.0 ,, ...	**·955**		
28th— 9.0 a.m...	·915	12.0 mid...	**·955**		

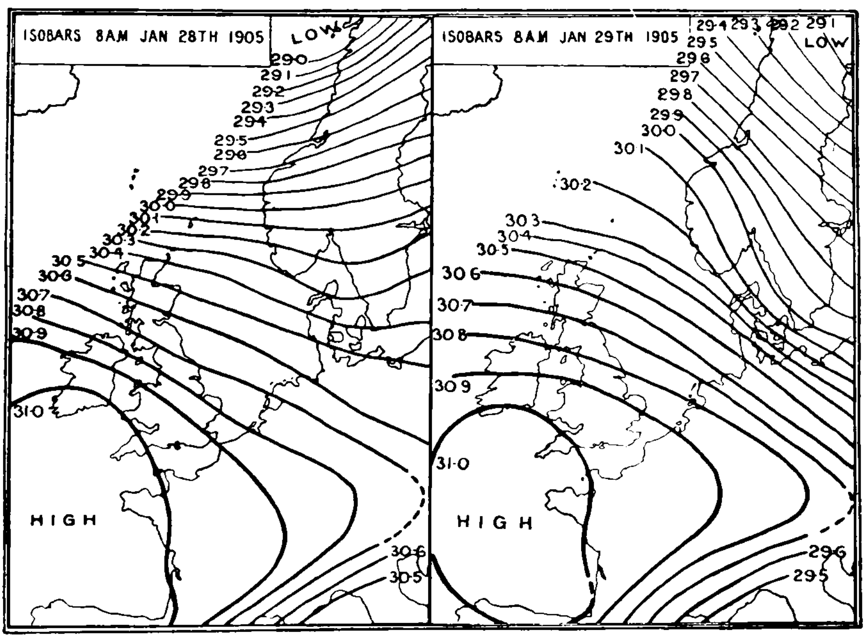
The mercury has now exceeded 30·900 in. on four occasions since the record commenced in 1858. The maxima were :—

	in.		in.
Jan. 18th, 1882—10.30 a.m. ...	30·975	Jan. 30th, 1896—11 a.m..........	30·927
Jan. 9th, 1896—9 p.m..........	30·934	Jan. 28th, 1905—11 p.m. & mid.	30·955

In January, 1902, when the highest recorded pressure in the British Isles, 31·113 in., was attained at Aberdeen, the south of England lay outside the area of maximum pressure; but, as was stated in this Magazine for February, 1902 (Vol. **37**, p. 5), the maximum at Camden Square was 30·874 in. The tendency of abnormally high pressures to occur in pairs, separated by about three weeks, which was pointed out by Mr. C. L. Brook on that occasion (Vol. **37**, p. 6 and p. 23), has been exemplified in the present instance by the maxima at Camden Square—

	in.		in.
Jan. 1st, 1905—7.30 p.m.	30·790	Jan. 28th—11 p.m.	30·955

The 1902 maximum was certainly the more remarkable because



the area with pressures over 31 in. was larger than in 1905 and occurred in a part of the country where the pressure is normally lower than in the south-west.

The general distribution of pressure over north-western Europe is very clearly shown in the two charts we copy from the *Daily Weather Report* of the 28th and 29th—the one before, the other after, the highest pressure occurred. The extension of the Atlantic anticyclone, it will be observed, spread over our islands from the Bay of Biscay on the south, and the pressure appears to have exceeded 31·000 in. only in the south of Ireland, the south-west of England and Wales, and the west of France. So far as we have been able to ascertain, the highest recorded was 31·097 inches at Falmouth Observatory ; but higher readings may have been obtained in Ireland or on vessels near the mouth of the English Channel. The unusual range in pressure of 2 in. of mercury between Ireland and the north of Norway occurred on the 28th. As on previous occasions when an anticyclone with exceptionally high pressures was experienced, the weather throughout was fine, clear, and comparatively warm.

THE following is a selection from the large and interesting correspondence that has reached us on the subject of the high barometer, and the two weather-charts reproduced on the previous page are in close accord with the figures cited below :—

To the Editor of Symons's Meteorological Magazine.

For the fourth time in my record of 26 years the barometer has exceeded 30·900 in.

On January 29th, from 9 a.m. to 10 a.m., the reading was **30·923** in., having previously attained almost, if not quite, the same height from 3 a.m. to 5 a.m.

The three other occasions were—

						in.
1882.	January 18th	......	9.45 a.m.	......		30·928
1896.	,, 9th	......	1–1.45 p.m.	......		31·021
1902.	,, 31st	......	11 a.m.	......		30·951

CHARLES L. BROOK.

Harewood Lodge, Meltham. February 2nd, 1905.

The barometer here gave the following readings :—

		9 a.m. in.		9 p.m. in.
January 27th	......	30·926	......	30·887
,, 28th	......	30·910	......	30·920
,, 29th	......	30·940	......	30·835

30·940 in. at 9 a.m. on January 29th was the actual maximum, though the mercury remained at that height till about 10 a.m., and was as high at the previous midnight. The readings are corrected for temperature and reduced to sea-level.

G. SEARLE.

30 Edith Road, West Kensington, January 31st, 1905.

The sea-level pressure here at the end of last month was without precedent in a record of 32 years:—

		in.			in.
On the 27th at 9 a.m. it was		30·93	......	at 9 p.m.	30·96
,, 28th ,, 9 a.m.	,,	30·98	......	,, 9 p.m.	30·98
				,, 10.30 p.m.	**31·002**
,, 29th ,, 9 a.m.	,,	30·993	......	,, 4 p.m.	30·92
				,, 9 p.m.	30·87

From 6 a.m. on the 27th to 6 p.m. on the 29th, a period of 60 consecutive hours, it was continuously above 30·90 in.

Mine is a standard barometer, Kew pattern, and is verified.

FREDK. SLADE.

Beckford, Tewkesbury, 2nd February, 1905.

The reading of the Kew verified Fortin standard barometer, corrected to 32° and sea-level, was:—

				in.
January 27th	......	9 a.m.	......	30·988
		10 a.m.	......	30·991
,, 28th	......	9 a.m.	......	31·010
		10.30 a.m.	......	31·015
		9 p.m.	......	31·005
		11 p.m.	......	31·017
		11.30 p.m.	......	**31·021**
,, 29th	......	9 a.m.	......	31·011 (bar. falling)

E. L. M. COLVILE.

Kempsey, Bournemouth, January 31st, 1905.

My barometer is exceptionally high; this morning **31·03** in., and yesterday 31·02 in. The highest recorded before was 30·90 in. on 16th January, 1902.

E. PIRIE-GORDON.

Gwernvale, Crickhowell, S. Wales, 28th January, 1905.

I enclose observations for the late high barometer, unprecedented at least in S. Devon, where I have resided since September, 1876. The previous maxima which I have observed were 30·980 in. at 11 a.m. on January 18th, 1882, at Babbacombe, Torquay, and 30·940 in. at 11 p.m. on January 29th, 1896, at Rose Villa, Tavistock.

The highest and lowest pressures recorded on each day are alone transcribed:—

		Highest.			Lowest.
		in.			in.
January 27th,	11 p.m.,	31·050	......	2.40 p.m.,	30·961
,, 28th,	11 a.m. & midnt.,	31·054	......	8 p.m.,	31·017
,, 29th,	0.40 a.m.,	**31·067**	......	11.20 p.m.,	30·898

The barometer was above 31·00 in. continuously from 9.17 p.m. on the 27th until noon on the 29th, a period of 39 hours.

EDWIN E. GLYDE.

Statsford, Whitchurch, Tavistock, February 3rd, 1905.

I am sending you a selection of the tabulated hourly values of the barograph at the Falmouth Observatory on the 28th instant.

The abnormally high reading of **31·097** in. at 11 a.m. is the highest recorded here since the barograph was fixed in 1870. The nearest approach was on the 18th of January, 1882, when it reached 30·981 in.

The readings have been corrected and reduced to 32° at mean sea-level. The weather on the 28th was mild, with uninterrupted sunshine, and light airs from the N.N.W. to N.W.

The barograph belongs to the Meteorological Council.

Falmouth Observatory.—Tabulated Hourly Values of the Barograph at certain hours on the 28th of January, 1905.

	in.		in
9 a.m.	31·062	Noon	31·086
10 a.m.	31·095	1 p.m.	31·068
11 a.m.	**31·097**	2 & 3 p.m.	31·046
From which point the mercury rose to at		10 p.m.	31·069
		11 p.m.	31·081
		Midnight	31·091

Falmouth, 31st January, 1905. W. L. FOX.

Correspondence.

A PARALLEL.

DURING the days of abnormally high pressure at the end of January references have been frequent to the high pressure of January 9th, 1896.

Will you allow me to point out that the resemblance between the January, 1896, and January, 1905, extends much beyond this ?

Not only was the average barometer reading for the whole month exceedingly high in each case, but each of those months saw *two* waves of extraordinarily high pressure—the *first* culminating in 1896 on the 9th, and in 1905 on the 1st and again in less degree on the 10th ; the *second* culminating in 1896 on the 29th, and in 1905 on the 27th, 28th and 29th.

Further, each of those Januaries saw one, and only one, considerable depression, on the 16th in each case. In each month the rainfall was very low ; the wind average, as might be expected, also very low ; and each month, though seasonable and fairly warm, was free from extremes of temperature.

February, 1896, had a barometer average all but equal to that of the January preceding ; had *no* deep depression, and very few days with even moderately low readings ; very small rainfall, and the same seasonable weather without extremes.

It will be interesting to see whether February, 1905, follows this pattern. To say so much is not to make a prediction that it *will* do so.

H. A. BOYS, F.R.Met.Soc.

North Cadbury Rectory, Somerset, Feb. 1st, 1905.

THE GREAT PROBLEM OF METEOROLOGY.

BY L. C. W. BONACINA.

ALL who take an intelligent interest in the weather—that is to say, all who remember its varying phenomena accurately—will be aware, though they may not directly recognise the fact, that each succeeding season, each succeeding month, and each succeeding day, possesses its own distinctive meteorological character. The weather, in other words, is in reality infinitely varied, by which we mean that the movements of the atmosphere, unlike those of many of the heavenly bodies or of certain involuntary muscles like the heart, do not represent a cycle of changes, but are of such a nature that the atmospheric conditions of the globe at each instant of time differ from those of any past and of any future time.

But this infinite variety of atmospheric conditions is intimately associated with another most important aspect of weather changes—namely, the Recurrence of Type. The same type of weather conditions is, as is well known, constantly recurring, but identical conditions, so far as we can tell, never do. Now it must be clearly understood upon what authority we make this assertion. As it was pointed out in a former article,* the precise distribution of atmospheric pressure that prevails at any instant of time over the Earth's surface must be regarded as the product of certain main factors, the differences in the weather of corresponding dates of different years being ascribed to the dependence of existing conditions upon previous conditions. It is, of course, quite within the sphere of possibility, that at some two points of time in the history of the globe, atmospheric conditions may have been identical, inasmuch as they are often very similar, but the chances in favour of such a contingency must be extremely small, and we are accordingly justified in assuming that identical atmospheric conditions have never occurred and never will.† This is, after all, a principle of widespread significance in nature. Consider the impressive and sublime spectacle of a wild and stormy sea beating against a rugged coast line; never do the waves strike the cliffs in exactly the same manner, and never is the surface of the sea exactly the same with regard to its motion.

Or reflect, again, upon the behaviour of a moorland stream as it leaps irregularly over a ledge of rock. Now, though the force of gravity is constant, the water will always at any particular time fall

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* See this Magazine for May, 1904, p. 62.

† In the present state of our knowledge of the dynamics of moving fluids, it would be presumptive to declare that different atmospheric conditions *could not lead* to identical ones, but if this ever were to happen, a cycle of weather changes would at once be born. Such an occurrence, however, is, as we have observed above, immensely improbable, the atmospheric conditions at any moment over the globe always apparently leading to others which from the point of view of their *minutiæ* are such as have never before obtained.

over the ledge in a somewhat different manner, and this will be the case even if the amount of water leaving the tarn remains unaltered; in the latter case there is obviously only one cause to which we can attribute the ever-varying mode of fall of the water over the ledge of rock—namely, the dependence of the movements of the water at one moment upon those at the previous moment. But as soon as the outflow of water from the tarn begins to increase or decrease, an extra and all-important cause of variation in the manner in which the water will behave in its subsequent course down the fell-side commences to operate.*

As the Earth's position in the Solar System—turning once more to the main subject—remains as it must do constant, and as the amount of solar radiation received by the Earth from year to year also remains practically constant, there can only be one cause responsible for the diverse weather conditions of corresponding seasons that form so interesting and puzzling a characteristic of the climatology of, for instance, the British Isles, and this cause is the dependence of one type of weather upon another. Blizzard conditions may usher in the first of January in England one year, a mild and humid atmosphere will as likely as not mark its entry the next.

Why should atmospheric conditions so different prevail on two corresponding dates? Because on these two occasions the distribution of atmospheric pressure has been different. But what is the origin of this differenee in the distribution of atmospheric pressure? This then is the x, the unknown quantity in meteorological problems, and until the value of x has been deduced all attempts to forecast the weather for more than a short period in advance must be futile.

All scientific men know that the movements of the atmosphere are the result of solar radiation, that all meteorological phenomena have their ultimate origin in the same source, and that whatever type of weather may be dominating the atmosphere over any given area of the Earth's surface as the result of secondary causes, this very type of weather is itself modified by the amount of heat received by this area at the time.

The real problem at issue, then, is—given an atmosphere set in motion by the Sun's rays, how do its movements as a whole govern those of its various parts? We possess a tolerably clear conception of the nature of the influence of solar and terrestrial radiation upon the atmosphere, so that the thermo-dynamic aspect of the problem may therefore for the present be disregarded. We also know how

* This principle, of course, does not apply to a fluid *commencing* to move from a state of rest; the force remaining constant it will always respond to its action in the same manner; it is motion once established that affects subsequent motion. Thus in a cistern, natural or artificial, filling at intervals to overflowing, each overflow will be alike, because we may regard the body of water in the cistern as being in a state of rest so long as there is no violent internal agitation.

axial rotation modifies atmospheric circulation. Accordingly x represents the unknown laws which govern the internal motion of a circulating fluid. Let us turn for a moment to some of the recent synoptic charts of the Meteorological Office.

At 8 a.m. on November 24th, 1904, we find that atmospheric pressure was high to the west of Ireland, low over southern Sweden; over central England temperature was very low, 17° F. at Oxford, 15° F. at Nottingham; snow had fallen generally, in very large quantities in the bleak moorland districts of Scotland and the north of England. If now we turn to the chart for 8 a.m. on December 5th, 1904, we find the centre of a deep cyclonic disturbance situated north of Scotland; temperature was everywhere relatively high and rain had fallen heavily in the north of Scotland. We simply refer to these two charts (we might have taken any two) to illustrate what appears to us a fundamental truth, that the severe frost of the morning of November 24th was *à priori* related to the wet, mild and stormy weather of December 5th, and that had a different type of weather prevailed on November 24th, the deep depression of December 5th would either not have appeared when and where it did, or else would have appeared in a modified form—that is to say, it would have been of different size, shape, depth and intensity. We perceive the relation between the weather of those two dates, but are unable at present to ascertain its nature.

Now so long as we have to profess nescience concerning the nature of this fundamental principle underlying the sequence of meteorological phenomena, we might as well while, for instance, admiring some fine specimen of sylvan growth, attempt to predict from the health of the tree and the force and direction of the wind how, when and where each of its leaves will fall to the ground as attempt to infer from present atmospheric conditions what these will be a month hence. How then are we to determine the relation subsisting between different types of weather, and to solve the great problem of meteorology? It behoves theory to advance side by side with observation and experiment. The mathematician and physicist applying the methods of the calculus will have to show us how the gaseous envelope of the Earth, excited by thermal agency into activity, modified by axial rotation, breaks up at any instant into a system of eddies, how this system of eddies leads to others, and so on for all time. On the other hand, it is incumbent upon the practical geographer to remove as far as possible the great difficulties which prohibit meteorological observations from being received from all quarters of the globe, for obviously mathematical and physical knowledge would be of little avail in forecasting future states of weather if the existing state were unknown.

If it were occasionally possible to obtain simultaneous meteorological observations (ignoring local time) from various parts of the globe, so that charts could be constructed showing the atmospheric conditions prevailing both at sea level and at some suitable fixed altitude above it, and if the nature of atmospheric circulation were at the same time thoroughly understood, the present empirical method of long-period weather forecasting which, it will be unnecessary to remark, is altogether worthless, would soon become resolved into one involving the scientific processes of inference and deduction.

AUTUMN RAINFALL AND YIELD OF WHEAT.†

By W. N. Shaw, Sc.D., F.R.S.

In the course of an inquiry into the distribution of rainfall and other meteorological elements in the seasons of the last 21 years, a relationship has been disclosed between the autumn rainfall and the subsequent yield of wheat, which is so remarkable, that it deserves special notice. For the purpose of this comparison "autumn" must be understood to mean the period from the 36th to the 48th week (both inclusive) of the year, as dealt with in the *Weekly Weather Report*. The 13 weeks cover approximately the months of September, October, and November, and the rainfall is that given in the *Weekly Report* for the "Principal wheat-producing districts." The figures for each year are shown in the following table; the year given is the year in which the crop was gathered, the corresponding rainfall is that of the previous autumn. The figures for the yield of wheat express in bushels per acre the average yield for England as given in the annual returns of the Board of Agriculture, rounded off to the nearest half-bushel.

Year.	Yield of Wheat.	Previous Autumnal Rainfall.	Year.	Yield of Wheat.	Previous Autumnal Rainfall.
	Bushels per Acre.	inches.		Bushels per Acre.	inches.
1884	30	8·5	1896 ...	*34	7·9
1885	31·5	5·2	1897 ...	29	10·0
1886	27	10·2	1898 ...	35	5·0
1887	*32	7·8	1899 ...	*33	7·5
1888	*28	7·0	1900 ...	28·5	8·0
1889	30	7·0	1901 ...	31	7·2
1890	31	6·5	1902	33	5·8
1891	31·5	6·6	1903 ...	*30	5·5
1892	26	9·7	1904 ...	26·5	10·4
1893	*26	9·0	1905 ...	—	4·2
1894	30·5	6·9			
1895	*26	7·9	Mean ...	30·0	7·8

* Anomalous years.

The obvious general conclusion to be drawn from this table may be briefly stated; disregarding for a moment the figures marked with an asterisk, the yield of wheat goes up as the autumn rainfall goes down, and *vice versâ*.

† Reprinted from *The Times* of 7th February, 1905.

But the relation indicated is much more specific than a mere general statement would imply. It may be put into a more precise form, as follows:—With certain exceptions every inch of autumn rainfall involves a diminution of the yield of wheat for the following year by a bushel and a quarter per acre. It may be premised that the extreme variation of yield was from 26 bushels in 1892, 1893, and 1895, to 35 bushels in 1898. If the yield be computed from the autumn rainfall by subtracting from the *datum* of 39·5 bushels per acre a bushel and a quarter for every inch of autumn rainfall, the "computed yield" obtained in this way shows an astonishing agreement with the actual yield given in the official returns.

In seven years out of the twenty-one the agreement is within half a bushel. But perhaps the general accuracy of the relationship is more strikingly manifest if the years when the calculation fails most signally to give the yield are considered. In seven of the years the actual yield differed from the computed yield by as much as 2·5 bushels or more, on the one side or the other. These are the years marked with an asterisk in the table. Two of the seven years were 1888 and 1903, when the crops were flooded by summer rains amounting to upwards of 10 in., and the yield fell below the computed value by 2·5 bushels in each case. The two exceptional years 1887 and 1899, when the crops exceeded the computed yield by 2·5 and 3 bushels respectively, are very interesting, for, although the autumn rainfall came up to the average as regards amount, it was so irregularly distributed that there were eight weeks out of the thirteen in the one case, and ten weeks in the other, when the rainfall was less than the 20 years' average, the amount for the quarter being brought up to the average by exaggerated rainfall in a few weeks. These might, therefore, be called dry autumns from a certain point of view, in spite of their having the average total rainfall, and the yield corresponds with the results for dry autumns rather than one with average rainfall. The two consecutive years 1895 and 1896 are also interesting; 1895 is memorable as the year of the extremely cold February, a truly anomalous year. Its yield of wheat was 3·5 bushels below the computed amount, but, strange to relate, the following year, which had in addition the advantage of a very dry winter, gave a yield above the computed return by 4·5 bushels per acre, as though the unused productive power of 1895 had not been lost in consequence of the exceptional cold, but stored. The two years taken together would agree admirably with the rule. The remaining exceptional year is 1893, a year of phenomenal drought.

Thus every year when the difference between the computed and actual yield is more than two bushels is otherwise conspicuously anomalous, except the years 1887 and 1899, and for those years the divergencies have been already, to some extent, explained. In the remaining seven years the computed yield differs from the actual yield by an amount between half a bushel and two bushels. An examination of the details of the statistics does not diminish the evidence of correspondence between the two sets of figures, but we need not consider the details here.

Various reasons may be given for regarding the autumn rainfall as likely to influence the yield of wheat; the washing of nitrates from the soil by the rain or the postponement of sowing to the spring on account of the wet are, no doubt, effective, but that all causes should combine to make the dryness of autumn the dominant factor in determining the yield, as it clearly is, is very remarkable.

The averages both of yield and of rainfall are taken over large areas ; the figures are, in fact, the only ones immediately available for the purpose of such a comparison in the returns of the Board of Agriculture and the Meteorological Office respectively. What modification the induction would suffer if the inquiry were to be pursued for separate districts or individual fields has yet to be determined.

In the meantime the relationship clearly indicates a clue to such a phenomena as the deficiency of yield in 1904, after the favourable seasons of that year, in the excessive autumn rainfall of 1903; and it is sufficiently remarkable that when I first computed the yields on the principle of deducting from 39·5 a bushel and a quarter for each inch of autumn rainfall, and extended the calculation to the years 1904 and 1905, without knowing at the time the wheat yield of either year, the computed yield for 1904, 26·5 bushels per acre, was subsequently found to agree with the actual yield, which is entered at 26·52 bushels in the official returns. This agreement at once raises the interesting speculation whether the exceptionally large yield of 34·5 bushels per acre for 1905, computed from the small autumn rainfall of 1904, will be borne out to the same degree of accuracy. At any rate, it seems clear that in the absence of some extraordinary abnormality of the seasons between now and next September the yield of wheat for England must be unusually large.

ROYAL METEOROLOGICAL SOCIETY.

THE annual general meeting of this Society was held on Wednesday evening, January 18th, at the Institution of Civil Engineers, Great George Street, Westminster, Captain D. Wilson-Barker, President, in the chair.

Mr. F. C. Bayard read the Report of the Council, in which reference was made to the honour which H.R.H. the Prince of Wales had conferred on the Society by consenting to become its Patron. The work in connection with the exploration of the upper atmosphere had been continued. During the summer the Admiralty placed H.M.S. *Seahorse* at the disposal of the Kite Committee for the purpose of carrying on the kite observations off Crinan, under the direction of Mr. Dines. The average height attained by the kites was about one mile. The Society's Howard Silver Medal, annually awarded to the cadets of H.M.S. *Worcester*, had been gained by Cadet E. J. A. Lawson for the best essay on "The Barometric Conditions over the Oceans."

The Report having been adopted, votes of thanks were passed to the Council for their services during the past year, and also to the President and Council of the Institution of Civil Engineers for giving the use of the rooms of the Institution for the meetings.

The President then delivered an address on "The Connection of Meteorology with other Sciences." He said that Meteorology and

Astronomy were doubtless the first of the sciences to attract the attention of men; which of the two exerts most influence in the well-being of humanity is a matter dependent on one's position on the globe. In many regions people are but slightly affected by the weather, while the heavenly bodies, particularly the sun, exert an enormous influence on human life. Everywhere in Nature we find the effects of meteorological agencies. After speaking upon the effects of evaporation, winds, rain, ice, snow, and pointing out the influence of weather on animal life, vegetation, health, &c., Captain Wilson-Barker said that Meteorology is a science deserving more attention than it receives. He thought it ought to be recognised as a preliminary to the studies of geography, geology, and kindred subjects; and he was of opinion that meteorological observatories might very well be fitted up in schools and pupils taught to observe. This could be done at small cost of time or money. The tendency at present is to particularize in all scientific work, but the true path to progress lies in keeping a comprehensive outlook on the whole field of investigation. It is to be regretted that official help and encouragement is so deficient in this country. The difficult and baffling nature of meteorological problems should but serve as an incentive to their elucidation. The persistent observer gains much, not only in knowledge of the subject, but in the habits of close and accurate investigation which he insensibly acquires; and all workers in this field learn to appreciate the difficulties which confront their fellow-labourers and to recognise the value of what has been done by the meteorological organizations of the world.

On the motion of Dr. H. R. Mill, seconded by Mr. R. Inwards, a hearty vote of thanks was accorded to Captain Wilson-Barker for his services as President during the past year, during wnich he had done much to continue the usefulness and uphold the dignity of the Society, and also for his Address.

The following gentlemen were elected the Officers and Council :—

President—Mr. Richard Bentley. *Vice-Presidents*—Mr. F. Druce, Mr. J. Hopkinson, Mr. H. Mellish, and Captain D. Wilson-Barker. *Treasurer*—Dr. C. Theodore Williams. *Secretaries*—Mr. F. Campbell Bayard and Dr. H. R. Mill. *Foreign Secretary*—Dr. R. H. Scott, F.R.S. *Council*—Captain W. F. Caborne, C.B., Mr. R. H. Curtis, Dr. H. N. Dickson, Mr. W. H. Dines. Mr. W. Ellis, F.R.S., Capt. M. W. C. Hepworth, C.B., Mr. R. Inwards, Mr. Baldwin Latham, Mr. E. Mawley, Sir J. W. Moore, M.D., Dr. W. N. Shaw, F.R.S., and Mr. C. T. R. Wilson, F.R.S.

The Annual General Meeting was preceded by a brief Ordinary Meeting, at which the following gentlemen were elected Fellows :—Mr. P. A. Cunningham, Mr. C. C. James, M.Inst.C.E., Dr. J. Arnallt Jones, Mr. J. Owen Jones, Mr. C. J. Thompson, Dr. G. T. Walker, F.R.S., and Mr. E. F. White, F.R.A.S.

METEOROLOGICAL NEWS AND NOTES.

THE METEOROLOGICAL OFFICE is to be congratulated on the extremely important relationship worked out by Dr. Shaw between the autumnal rainfall and the following wheat harvest, which we print on another page. Mr. A. D. Hall, of the Rothamsted experimental farm, points out that the winter rainfall also is an important factor, and it is we believe not too much to hope that many farmers will be induced to keep rain gauges and study for themselves the applicability to special cases of the general results.

MR. R. C. MOSSMAN, after remaining for two complete years at the meteorological station established by the Scottish Antarctic Expedition in the South Orkney Islands, has now completed his work and reached Buenos Aires on February 8th on his way home. The results he has secured cannot fail to be profoundly interesting.

PROFESSOR H. H. HILDEBRANDSSON'S remarkable discussion of the international cloud observations, of which an abstract appeared in this Magazine for 1903 (vol. **38**, p. 122), has been translated in full by Mr. R. G. K. Lempfert and published with the original plates in the *Quarterly Journal* of the Royal Meteorological Society. We believe that the expense of the translation and the production of the plates was borne by the Meteorological Council, a proof of that cordial co-operation between the different Meteorological organizations which it is always a pleasure to recognize.

DUST FALLS may be expected to occur at any time within the next two months, and our readers should be on the watch for any unusual haze or the appearance of coloured dust on trees or windows. For the last three or four years there has been a widespread fall of African dust in Europe at some date between January and March.

OUR RAINFALL AVERAGES.

THE proper use of an average is to serve as a standard which makes it easy to compare one month or year with another, and for this purpose it is well to take the average of a period so long that the addition of the wettest year or of the driest year would not greatly disturb the value. For instance, if the average rainfall of 10 years happened to be 30·00 in., the addition of a very wet year, say, with 45·00 in., would alter the average to 31·36; but if the average of 30 years happened to be 30·00 in., the addition of a year with 45·00 in. would alter the average to 30·48 only, and if the average of 100 years had given the value 30·00 the addition of the wet year supposed would merely alter it to 30·15. It is impossible to obtain averages so long as a century, and undesirable to use averages so short as ten years, but the average of 30 years is a useful figure to employ. While the average of one period of 30 years is very like the average of another period of the same duration, it is satisfactory in comparing the records of a number of stations to refer them to their average for one and the same period. In *British Rainfall* the average for the 30 years 1870–99 has been used for some time, and it is convenient to have the same standard in these pages also. The chief difficulty in the way of doing so is that a good many of the stations quoted in our tables were not established in 1870; but in most cases this difficulty can be overcome. It will not do to piece together the records at two different stations, even though these are not very far apart, for every place has its own rainfall due to a number of local conditions. The way in which the long-period average is calculated for a station with a short record is by comparison with a station not very far away, or perhaps with several stations which have been in action for the longer period. Thus we will suppose that a station which we may call A was established in 1895, and another which we may call B, a few miles distant, was established in 1870. To find the average annual rainfall at A for the period 1870–99 we first deal with B. Supposing that the arithmetical average for the 30 years 1870–99 at B is 35·00 in. and the average for the 10 years 1895–1904 at the same station is 32·50 in., we find that if 32·50 is expressed as 100, 35·00 would be expressed as 107·7; in other words, the average of the shorter period must be increased by 7·7 per cent. in order to make it equal to the average of the longer period. Since the stations A and B are near together, it is safe to assume that, though their actual rainfalls may differ slightly, the same ratio will hold good for both stations; so that, supposing the 10 years' average at A was 32·75 in., we have only to increase that figure by 7·7 per cent. in order to yield the number 35·27, which corresponds to the 30 years' average required.

The average monthly falls are not so easily calculated. The reason is that while it is very rare for the wettest year to be more than 50 per cent. above the average or for the driest year to be more than 30 per cent. below the average, the wettest month may be 300 per cent. or more above the average, and the driest may be 100 per cent. below the average—in other words, the month may be quite without rain. In view of this great variability, 30 years is too short a time by which to determine the average distribution of the mean annual rainfall throughout the months of a year. If, for instance, half a dozen wet Januaries occurred in consecutive years once in a century, the 30 years' average containing that run of wet Januaries would give far too high a value for that month, and any period of 30 years not containing the group would give too low a value. Though we cannot eliminate this uncertainty at present, we can take comfort in the thought that the monthly distribution of rainfall in 30 years is much more than three times as satisfactory as the monthly distribution in ten years.

The table on p. 16 is calculated on the 30 years' means 1870–99, wherever it was possible to do so; and thus it is a distinct improvement on former tables of the kind.

RAINFALL AND TEMPERATURE, JANUARY, 1905.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables in *British Rainfall* to which each station belongs.]	RAINFALL. Total Fall.	Diff. from average, 1870-9.	Greatest in 24 hours. Depth	Date.	Days on which ·01 or more fell.	TEMPERATURE. Max. Deg.	Date.	Min. Deg.	Date.	No. of Nights below 32°. Shade	Grass
		inches	inches.	in.								
I.	London (Camden Square) ...	1·34	— ·55	·60	16	8	54·3	6	21·2	16	17	24
II.	Tenterden ...	1·15	— 1·21	·59	16	12	53·5	6, 7	15·0	2	15	24
,,	Hartley Wintney ...	·72	— 1·98	·36	16	9	57·0	8	19·0	2, 27	21	23
III.	Hitchin ...	1·13	— ·68	·55	16	9	52·0	6	20·0	15	17	...
,,	Winslow (Addington) ...	·84	— 1·21	·19	16	12	53·0	6	18·0	19, 27	19	25
IV.	Bury St. Edmunds (Westley)	1·19	— ·51	·45	16	10	51·0	6	20·0	2	20	...
,,	Brundall ...	·93	— ·74	·47	16	15	52·0	6	21·4	2	17	24
V.	Alderbury ...	·61	— 2·06	·25	16	8	52·0	29	19·0	27	28	...
,,	Winterborne Steepleton ...	1·42	— 2·48	·85	16	15	54·9	7	20·0	27	19	21
,,	Torquay (Cary Green) ...	1·42	— 1·77	·82	16	10	54·8	7	29·4	27	3	15
,,	Polapit Tamar [Launceston]	2·44	— 1·43	·54	16	19	52·1	8	18·2	27	11	13
,,	Bath ...	·61	— 1·91	·17	4	12	54·2	7	19·0	27	17	25
VI.	Stroud (Upfield) ...	·68	— 1·78	·22	8	9	52·0	6, 7	23·0	18	20	...
,,	Church Stretton (Woolstaston)	·70	— 2·11	·16	8	15	52·0	6	20·0	17	16	...
,,	Bromsgrove (Stoke Reformatory)	·77	— 1·14	·28	8	7	51·0	6	15·0	17	20	...
VII.	Boston ...	·81	— ·78	·24	9	11	50·0	9	22·0	19	19	...
,,	Worksop (Hodsock Priory).	·53	— 1·21	·17	16	10	52·9	6	13·4	20	17	24
,,	Derby (Midland Railway)...	·80	— 1·15	·21	16	15	51·0	6, 7	17·0	18, 19	18	...
VIII.	Bolton (The Park) ...	2·23	— 1·15	·38	5	20	49·7	9	22·9	17	13	20
IX.	Wetherby (Ribston Hall) ...	·99	— ·90	·46	11	8	...	...	...	...	...	...
,,	Arncliffe Vicarage ...	3·35	— 2·98	1·00	11	20	...	...	...	...	...	...
,,	Hull (Pearson Park) ...	·62	— 1·18	·15	11	12	54·0	6	21·0	20	15	22
X.	Newcastle (Town Moor) ...	·44	— 1·52	·12	23	10	...	...	...	...	...	...
,,	Borrowdale (Seathwaite) ...	9·15	— 5·56	1·32	11	20	50·5	6	24·7	17	7	...
XI.	Cardiff (Ely) ...	1·64	— 2·21	·44	16	16	...	...	...	...	...	...
,,	Haverfordwest (High St.)..	2·70	— 2·43	·53	16	16	52·6	6	24·4	27	8	14
,,	Aberystwith (Gogerddan)..	3·05	— ·82	·83	8	13	55·0	5	20·0	19	11	...
,,	Llandudno ...	2·20	— ·37	·41	5	16	53·0	8	25·5	16	4	...
XII.	Cargen [Dumfries] ...	2·33	— 2·21	·61	17	13	52·0	28	25·0	22, 26	13	...
,,	Lilliesleaf (Riddell) ...	1·15	— 1·45	·40	11	14	52·0	6	17·0	16	16	21
XIII.	Edinburgh (Royal Observy.)	·76	...	·27	11	11	50·4	6	25·6	17	8	21
XIV.	Colmonell ...	2·98	— 1·54	·47	4	18	49·0	3,5,28	28·0	25	7	...
XV.	Tighnabruaich ...	5·34	— ·52	·98	17	24	47·0	29	27·0	16, 25	15	15
,,	Mull (Quinish) ...	4·29	— 1·56	·61	8	24	...	...	...	...	...	...
XVI.	Dundee (Eastern Necropolis)	·35	— 1·75	·10	3	11	55·9	6	27·0	19	11	...
XVII.	Braemar ...	1·61	— 1·30	·26	7	16	49·2	30	19·2	19	16	...
,,	Aberdeen (Cranford) ...	·73	— 1·59	·20	16	13	54·0	28*a*	25·0	18	13	...
,,	Cawdor (Budgate) ...	2·05	— ·09	·34	11	15	...	...	...	...	...	...
XVIII.	Invergarry ...	7·55	+ ·92	1·30	8	15	...	...	...	...	...	...
,,	Bendamph...	8·51	— ·24	1·02	8	24	...	...	...	...	...	...
XIX.	Dunrobin Castle ...	3·38	+ ·76	·65	11	14	54·5	8	26·5	10, 26	6	...
,,	Castletown ...	3·60	...	·63	31	22	52·0	30	26·0	25, 26	16	...
XX.	Killarney ...	4·52	— 2·05	·86	15	18	53·5	15	32·0	18, 26	2	...
,,	Waterford (Brook Lodge)...	2·73	— 1·33	·71	16	18	53·0	5, 6	24·0	26	8	...
,,	Broadford (Hurdlestown) ...	2·56	— ·42	·59	14	18	52·0	5, 10	29·0	25	6	...
XXI.	Carlow (Browne's Hill) ...	2·40	— ·75	·71	16	16	...	...	...	...	...	...
,,	Dublin (FitzWilliam Square)	1·90	— ·26	·59	16	14	53·9	6, 8	29·9	26	2	9
XXII.	Ballinasloe ...	2·26	— 1·23	·47	16	22	60·0	1, 30	25·0	13, 26	9	...
,,	Clifden (Kylemore House)..	6·08	— 1·78	·81	14	18	...	...	...	...	...	...
XXIII.	Seaforde ...	1·85	— 1·78	·59	16	13	52·0	5	26·0	18	4	11
,,	Londonderry (Creggan Res.)	3·08	— ·48	·49	5	24	...	...	...	...	...	...
,,	Omagh (Edenfel) ...	3·30	— ·04	·52	16	22	51·0	5	28·0	25	6	16

+ Shows that the fall was above the average; — that it was below it. *a*—and 29 30.

SUPPLEMENTARY RAINFALL, JANUARY, 1905.

Div.	STATION.	Rain. inches	Div.	STATION.	Rain. inches
II.	Dorking, Abinger Hall	1·57	XI.	New Radnor, Ednol	1·70
,,	Ramsgate, West Cliff	·94	,,	Rhayader, Nantgwillt	3·71
,,	Hailsham	1·30	,,	Lake Vyrnwy	2·73
,,	Crowborough	1·68	,,	Ruthin, Plâs Drâw	·99
,,	Osborne	1·02	,,	Criccieth, Talarvor	1·89
,,	Emsworth, Redlands	1·16	,,	Anglesey, Lligwy	1·63
,,	Alton, Ashdell	·97	,,	Douglas, Woodville	1·76
,,	Newbury, Welford Park	·67	XII.	Stoneykirk, Ardwell House	1·47
III.	Harrow Weald	1·35	,,	Dalry, Old Garroch	4·93
,,	Oxford, Magdalen College	·74	,,	Langholm, Drove Road	2·66
,,	Banbury, Bloxham	·78	,,	Moniaive, Maxwelton House	2·73
,,	Pitsford, Sedgebrook	·86	XIII.	N. Esk Reservoir [Penicuick]	2·05
,,	Huntingdon, Brampton	1·11	XIV.	Maybole, Knockdon Farm	2·94
,,	Wisbech, Bank House	·98	,,	Glasgow, Queen's Park	1·87
IV.	Southend	·85	,,	Campbeltown, Redknowe	4·04
,,	Colchester, Lexden	·81	XV.	Inveraray, Newtown	7·12
,,	Saffron Waldon, Newport	1·26	,,	Ballachulish House	9·44
,,	Rendlesham Hall	·96	,,	Islay, Eallabus	4·53
,,	Swaffham	1·03	XVI.	Dollar	1·55
,,	Blakeney	·82	,,	Loch Leven Sluices	1·40
V.	Bishop's Cannings	·70	,,	Balquhidder, Stronvar	5·43
,,	Ashburton, Druid House	2·58	,,	Coupar Angus Station	·44
,,	Okehampton, Oaklands	2·74	,,	Blair Atholl	1·37
,,	Hartland Abbey	1·60	,,	Montrose, Sunnyside	·72
,,	Lynmouth, Rock House	2·08	XVII.	Alford, Lynturk Manse	·92
,,	Probus, Lamellyn	2·78	,,	Keith	1·57
,,	Wellington, The Avenue	·90	XVIII.	N. Uist, Lochmaddy	3·02
,,	North Cadbury Rectory	·91	,,	Aviemore, Alvey Manse	1·84
VI.	Clifton, Pembroke Road	·68	,,	Loch Ness, Drumnadrochit	3·12
,,	Moreton-in-Marsh, Longboro'	1·07	,,	Glencarron Lodge	13·39
,,	Ross, The Graig	1·23	,,	Fearn, Lower Pitkerrie	1·61
,,	Shifnal, Hatton Grange	·68	XIX.	Invershin	4·55
,,	Wem Rectory	·72	,,	Altnaharra	6·06
,,	Cheadle, The Heath House	1·41	,,	Bettyhill	4·05
,,	Coventry, Kingswood	·84	,,	Watten	2·33
VII.	Market Overton	·94	XX.	Cork, Wellesley Terrace	3·46
,,	Market Rasen	·63	,,	Darrynane Abbey	4·22
,,	Bawtry, Hesley Hall	·47	,,	Glenam [Clonmel]	3·22
VIII.	Neston, Hinderton	·92	,,	Ballingarry, Gurteen	2·21
,,	Southport, Hesketh Park	1·65	,,	Miltown Malbay	3·31
,,	Chatburn, Middlewood	2·49	XXI.	Gorey, Courtown House	1·20
,,	Cartmell, Flookburgh	2·20	,,	Moynalty, Westland	1·81
IX.	Langsett Moor, Up. Midhope	2·27	,,	Athlone, Twyford	2·05
,,	Scalby, Silverdale	·80	,,	Mullingar, Belvedere	2·40
,,	Ingleby Greenhow	·51	XXII.	Woodlawn	2·79
,,	Middleton, Mickleton	1·28	,,	Westport, Murrisk Abbey	4·57
X.	Beltingham	·88	,,	Crossmolina, Enniscoe	4·70
,,	Font Reservoir, Fallowlees	·99	,,	Collooney, Markree Obsy	3·41
,,	Ilderton, Lilburn Cottage	·59	XXIII.	Enniskillen, Portora	2·27
,,	Keswick, The Bank	3·00	,,	Warrenpoint	2·14
XI.	Llanfrechfa Grange	1·42	,,	Banbridge, Milltown	1·97
,,	Treherbert, Tyn-y-waun	3·36	,,	Belfast, Springfield	2·61
,,	Carmarthen, Friary	1·84	,,	Bushmills, Dundarave	2·74
,,	Castle Malgwyn	2·72	,,	Stewartstown	2·39
,,	Plynlimon	8·95	,,	Killybegs	3·26
,,	Tallyllyn	1·40	,,	Horn Head	3·72

METEOROLOGICAL NOTES ON JANUARY, 1905.

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.—The first 10 days were inclement with little sunshine, but no great amount of rain. From the 10th fine dry weather set in, changing to severe frost which culminated on 16th. On that day the temp. did not rise above 23° until the evening, when there was a driving shower of icy sleet followed by glazed frost and heavy R. The latter part of the month was fine, and beautiful sunny weather accompanied the remarkable barometric conditions of the last week (see p. 2). Duration of sunshine 38·7 hours,* and of R 29·1 hours. Mean temp. 38·0, or 0·1 below the average.

TENTERDEN.—Showery and dull till 11th. Much sleet and R on 16th, making the roads sheets of ice. Then dry and cold till 30th, but with no severe frost. Duration of sunshine 78·3 hours.† Violent N.W. gale on 6th and 7th.

CROWBOROUGH.—Cold but yet genial, considerable bright sunshine and R below the average. Frost on 14 nights, the min. temp. falling to 17°·8 on 2nd. Mean temp. 37°·3.

HARTLEY WINTNEY.—A black January, the chief features being dryness and absence of wind. Hazy windless atmosphere from 21st to 25th. The last week was sunny. Ozone on 18 days; mean 4·1.

HITCHIN.—The bar. readings were: 27th, 30·85 in.; 28th, 30·85 in.; and 29th, 30·90 in. These readings are unprecedented since October 29th, 1849.

BURY ST. EDMUNDS.—Violent barometric oscillations, the pressure ranging from 29·15 in. on 17th to 30·95 in. on 27th. Very fine weather from 17th. Westerly winds on 22 days.

BRUNDALL.—Fine with seasonable frosts, but litte S. Mean temp. 0°·4 above the average, constituting the eighth successive January with mean temp. above the average.

TORQUAY.—Duration of sunshine 87·3 hours,* or 25·9 hours above the average. Mean temp. 42°·8, or 0°·5 above the average. Mean amount of ozone 4·6.; max. 8·0 on 15th with S.E. wind; min. 2·0 on 8 days.

WELLINGTON.—Exceedingly dry, the R being about one-third of the average. The temp. was very equable after 8th, not varying much from the normal. Violent E.S.E. gale on 14th. On 28th the bar. rose to slightly above 31·00 in.

NORTH CADBURY.—Altogether pleasant and not unseasonable, with the smallest R and least cloud in nine years. Cool but not cold, with many but very slight frosts. The first half was windy, the second very calm.

CLIFTON.—The driest January in 49 years, with the single exception of 1896 when only ·60 in. of R fell. Frost from 15th to 28th, and very fine weather with cloudless skies from 25th to 29th. Bar. on 29th, 30·96 in., the highest reading in 55 years. About one and a half inches of S fell on 16th.

ROSS.—Warm from 2nd to 12th and from 28th to 31st, but thick S covering the ground for 12 days from 15th. This was the eleventh month in succession with R below the average, and on 350 days ending on February 1st only 17·41 in. had fallen.

WORKSOP.—The first fortnight was mild, followed by a fortnight's frost. Bitterly cold wind on 16th with S in evening. Only 1880 and 1898 had a smaller January R in the past 29 years.

BOLTON.—Bar. much above the average, the reading of 30·924 on 28th having been exceeded only once since 1886. Temp. fairly normal. Duration of sunshine 9 hours* below the average. Predominant winds westerly. Mean amount of ozone 2·3.

SOUTHPORT.—Decidedly dry, with very high bar., but nevertheless stormy generally. Mean temp. 0°·4 above the average. Duration of sunshine 1 hour* below the average. R 1·04 in. below the average. Underground water level unprecedentedly low for January. Total depth of S 1·5 in.

NEWCASTLE-ON-TYNE.—The smallest R in January since observations were commenced in 1868.

HAVERFORDWEST.—Stormy and wet till 17th, and from 13th to 17th one continuous gale. Cold and changeable from 17th to the end. Unusually high bar. from 26th to 29th, reaching 31·053 at 11.30 a.m. on 28th, the highest reading during 56 years. Duration of sunshine 66·2 hours.*

DOUGLAS.—The first three weeks presented an almost unbroken series of gales, with showery and very cold weather. From 16th to 18th a violent E. gale blew for some 50 hours, with a heavy fall of S. From 24th to 30th was bright, calm and mild. R the least, except 1880 and 1881, in any January recorded.

SCOTLAND.

LANGHOLM.—R 2·02 in. below the average of 29 years. Gales were frequent and the temp. fluctuated a great deal.

COLMONELL.—Mostly strong winds from 6th to 16th, especially from 13th to 16th. Light S on 9th, 15th and 16th. T on 12th.

MULL, QUINISH.—Stormy weather, beginning on 5th, culminated in a hurricane from E. to S.E. on 16th, which did considerable damage. The month otherwise was fine and very mild.

COUPAR ANGUS.—R 1·83 in. below the average. Mean temp. 36°·2, or about one degree above the average. Generally open and mild, with no extremely low temp.

ABERDEEN.—Very mild, with little frost or S, but many gales, one of which blew for 50 hours from S.W.

DRUMNADROCHIT.—Characterized by a series of severe storms of wind, high bar. pressure and generally favourable weather. R ·63 in., and rainy days 16, below the average of 19 years. Mavis and blackbird first heard on 29th.

WATTEN.—Cloudy, fresh and open. A series of storms of wind accompanied by R at the beginning and end.

CASTLETOWN.—The first 12 days were cold, wet and cloudy, with westerly winds and N.W. gale on 6th. From 13th to 23rd was dry and clear with strong S. and S.E. winds. Thence to the end was changeable. Practically no S fell.

IRELAND.

DARRYNANE ABBEY.—Fairly dry, the R being 10·5 per cent. below the average of 25 years. Very mild, with several quite springlike days towards the end.

DUBLIN.—Open, but dull, with W., S.W., and S.S.E. winds. Severe storm of R and sleet on 15th and 16th. Remarkable anticyclone from 25th to 28th, the bar. rising to 30·999 in. at 9 p.m. on 28th at Fitzwilliam Square, and to 31·007 in. at Trinity College.

MILTOWN MALBAY.—Cold and generally wet, though the R fell in small quantities. The weather was stormy, and for many weeks the sun was not seen until it burst out on the 25th.

BELFAST.—A satisfactory month, with R ·86 in. below the average. The S did not stay long.

OMAGH.—The first half was unsettled and inclement, culminating in a blizzard of remarkable severity on 16th, but thence to the end, with a gradually rising bar. (reaching 30·7 in. on 27th), the month was fine and generally mild, the min. temp. only once reaching 28°. This formed the tenth mild January in succession.

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* Campbell-Stokes. † Jordan.

Climatological Table for the British Empire, August, 1904.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Absolute. Maximum. Date.	Absolute. Minimum. Temp.	Absolute. Minimum. Date.	Average. Max.	Average. Min.	Average. Dew Point.	Average. Humidity.	Absolute. Max. in Sun.	Absolute. Min. on Grass.	Total Rain. Depth.	Total Rain. Days.	Aver. Cloud.
	°		°		°	°	°	0-100	°	°	inches		
London, Camden Square	91·0	4	44·3	21	73·6	52·7	55·1	79	135·9	37·7	1·59	9	4·4
Malta	...	...	...	...	...	...	...	...	...	...	...	...	...
Cape Town	81·2	17	42·5	25	61·3	48·9	49·8	82	...	...	4·64	11	6·1
Durban, Natal	83·9	30	49·7	13	76·4	55·5	...	...	138·3	...	·18	3	1·8
Johannesburg	76·9	30	32·5	23	65·5	44·3	34·2	52	...	32·0	·02	1	4·4
Mauritius	78·5	15	55·1	19	75·5	59·8	59·2	76	139·3	45·8	·98	15	5·7
Calcutta	92·4	18	76·9	6	88·8	79·1	77·8	84	157·0	74·8	10·11	16	8·3
Bombay	86·8	1	75·0	25	84·8	77·6	75·3	82	137·9	72·8	5·72	23	8·4
Madras	101·4	28	75·3	4	96·0	78·3	71·2	67	146·9	74·1	2·55	7	5·8
Kodaikanal	67·2	12	49·0	22	64·2	51·6	51·3	81	141·6	35·5	2·53	14	6·9
Colombo, Ceylon	87·4	29	75·8	24	85·2	77·4	73·3	80	150·0	71·2	·36	4	6·0
Hongkong	90·0	18	72·9	11	86·0	77·2	74·9	83	147·2	...	27·64	16	6·8
Melbourne	62·8	22	34·0	26	69·1	33·5	42·1	75	125·3	27·0	3·28	13	7·1
Adelaide	68·4	22	38·1	16	60·9	45·6	44·0	74	125·8	32·6	1·98	16	6·5
Coolgardie	76·0	24	35·6	8	65·3	42·3	42·1	64	140·6	27·6	·24	5	3·6
Sydney	70·5	13	42·0	2	62·1	47·2	44·2	77	104·5	33·9	1·33	17	4·3
Wellington	59·8	14	33·1	3	54·3	42·2	39·6	73	108·0	30·0	3·49	14	5·2
Auckland	61·0	27	37·0	5	56·3	45·6	44·0	78	118·0	32·0	3·57	18	5·7
Jamaica, Negril Point	89·9	5	69·3	1	87·0	72·0	73·4	80	...	...	4·07	12	...
Trinidad	...	...	...	...	...	...	...	...	...	...	...	..	...
Grenada	87·4	10	70·0	18	84·1	74·2	70·4	76	152·0	...	10·78	27	2·7
Toronto	84·2	1	45·0	9	75·3	54·3	56·4	77	116·5	40·2	4·56	10	4·5
Fredericton	85·7	1	38·5	30	74·2	50·6	50·8	59	...	...	3·85	11	4·7
Winnipeg	84·0	26	35·5	29	72·5	49·6	...	...	...	...	1·62	10	4·9
Victoria, B.C.	82·2	4	45·9	11	66·8	51·3	...	...	...	...	·50	2	2·2
Dawson	80·0	9	30·0	26	64·7	42·2	...	...	...	...	1·66	9	4·6

Mauritius.—Mean temp. of air 0°·8, dew point 0°·3, and rainfall 2·18 in., below averages. Mean hourly velocity of wind 9·8 miles, or 2·5 miles below average, prevailing direction E. by S.

MADRAS.—Bright sunshine 163·8 hours, or 42·3 per cent. of possible. R 2·00 in. below average.

KODAIKANAL.—Bright sunshine 158 hours.

COLOMBO.—Mean temp. of air 81°·0, or 0°·2 above, of dew point 0°·1 above, and R 3·41 in. below, averages. Mean hourly velocity of wind 8·9 miles ; prevailing direction S.W.

HONGKONG.—Mean temp. of air 80°·8. Sunshine 172·6 hours. Mean hourly velocity of wind 13·2 miles ; direction E. by S.

Adelaide.—Mean temp. of air 0°·7 below and R ·35 in. below, averages.

Sydney.—Mean temp. of air 0°·1 below, R 1·89 in. below, and humidity 2·5 above, averages.

Wellington.—Mean temp. of air 0°·2 above, and R 1·45 in. below, averages.

Auckland.—Mean temp. of air 2°·0 below the average, and R ·75 in. below the average of previous 36 years.