Symons's Meteorological Magazine.

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Correspondence.

To the Editor of Symons's Meteorological Magazine.

A THREE YEARS' PERIOD IN RAINFALL.

I HAVE stumbled on a period in my own rainfall figures which may be only a coincidence, but it is so regular that I should like to know whether it would hold good for other parts. The period is a three year one, and goes back for the whole time of my observations, *viz.*, 24 years.

I.	1879...No record Very wet	1882...57·53	1885...49·81	1888...51·64
II.	1880...45·09	1883...48·60	1886...48·16	1889...40·59
III.	1881...48·04	1884...41·11	1887...30·44	1890.. 48·18
I.	1891...54·41	1894...51·16	1897...52·06	1900...53·84
II.	1892...37·43	1895...46·97	1898...38·41	1901...39·11
III.	1893...37·36	1896...37·77	1899...41·08	1902...39·72

I.	1903...58·76		I. 53·65
II.	1904... —	Means...	II. 43·04
III.	1905... —		III. 40·46

How I came upon this is interesting, though this too may be a coincidence. In accordance with my usual custom if I hear of any periodic terrestrial or cosmic phenomena, I try to see if I can find any relation to meteorological records. Thus, in *Nature* of the 17th ult., I found a report of a six years' period for the polar motion, the latest maximum deviations occurring in 1891 and 1897, whilst the minima were in 1894 and 1900. On referring to my table it will be seen that all these years are those of maximum rainfall, the rainfall period being thus half the length of the polar period.

I note that the sequence appears to begin in 1879, and in this connection the figures for Truro since 1850, which I have been examining since writing the above, may be of interest. They seem, in one way, to destroy the validity of the three years' period, and yet this is scarcely so, as may be seen from the rainfall chart issued by the Royal Institution of Cornwall. It shows that 1852 is a year

of maximum rainfall; 1855 is a year of minimum, which is the beginning of severe recurrences of minima in three years; then we have two periods not well marked, followed by seven (now eight) recurrences of maximum rainfall in three years. It looks rather, if such a thing were possible, as if there is something causing a reversal, and the period from 1874 to 1880 gives the appearance of being a transition period and under the influence of two opposing forces or conditions. It will be noticed, too, that from 1852 to 1877 is 25 years, and if this is the length of the cycle we should now be near another time of reversal. The year 1852, just before the change it may also be noticed, was a year of exceptional rainfall something like last year (1903). Again, the average yearly rainfall from 1855 to 1872, inclusive, is about three inches more than that for the years 1882 to 1902 inclusive.

Thus, in this neighbourhood, there has been, with two exceptions, a three years' period certainly from 1852 onward, but at about the middle of this period there was a reversal. This reversal idea may look like special pleading, but the regularity of the sequence in the two periods is certainly striking. The reversal peculiarity, too, would tend to mask the three year period if the observations ran over a long series of years.

ARTHUR P. JENKIN.

Trewirgie, Redruth, April, 1904.

[Mr. Jenkin has hit upon a very interesting recurrence which we have often noticed and frequently referred to as an example of an undoubted cycle springing up suddenly and therefore not to be depended on for the future. There is no doubt as to the recurrence of one wet and two less wet years in all parts of the British Isles during the last fifteen or sixteen years. Some stations do not show the relation clearly, but the general average of the whole country does so from 1891 onwards, as is shown in the Table on p. [154] of *British Rainfall, 1902*. The figures as percentage differences from the mean may be grouped as follows:—

1891 + 5	1894 + 5	1897 + 2	1900 + 11	Mean	I. + 6
1892 — 6	1895 — 8	1898 — 5	1901 — 10		II. — 7
1893 —15	1896 — 7	1899 — 2	1902 — 15		III. —10

The earlier years given in the Table just cited show no relation to the Cornish record or to the three-years' cycle, except in the means. They are:—

1882 +22	1885 — 3	1888 —6	Mean	I. + 4
1883 + 8	1886 + 7	1889 —8		II. + 2
1884 —11	1887 —28	1890 —4		III. —14

The subject is one of the many which we hope to investigate fully when time can be found. With reference to this repetition of one wet and two dry years, we wrote in *The Times* of 18th November, 1903, in the course of a controversy on Meteorological Cycles, as follows:—

"I could mention some curious and quite empirical recurrences of short period which have held good for the British Isles as a whole for many cycles, but which did not hold before a given date, and consequently cannot be expected to continue throughout the future. Should they hold good once more, 1904 and 1905 will prove dry."

There is some indication that Mr. Jenkin's suggestion of a reversal of the order of wet and dry years might carry a three years' cycle further back. It may be that in dry spells like 1891—1902 the order of one wet and two dry years holds, and in wet spells the order of one dry year and two wet. In the meantime, we shall gladly receive the opinions of our readers, and in the future we may discuss the problem in all its bearings.—ED. *S.M.M.*]

A DANGER IN "SMOOTHING" RAINFALL VALUES.

DEALING with 73 years of monthly rainfall at York (1831—1903), I had first smoothed to three-yearly means, before testing for any possible association with Wolfer's eleven-year sun-spot cycles, by taking the average of the $6\frac{1}{2}$ cycles for each year, I. to XI., of the smoothed cycle, where I. is the year of minimum sun-spots and VI. of maximum. The examination dealt specially with the three autumn months, August to October. The method was fully justified when considering the cycle as a whole.

On re-working the results without first smoothing, however, I found that a striking peculiarity had been entirely obscured: namely, a sudden rise from the second to the third year of the cycle. In August and October this gives the highest point of the curve. This is the more striking in October as the minimum is in the previous year (II.) The same is the case for the whole year, based on 87 years in all, or nearly eight cycles. The actual means are: for October, 1·5 inches in II., 3·6 inches in III.; for the year, 23·0 inches in II., 27·7 inches in III. Thus III. compares with II. as 240 and 120 to 100, respectively. The means are 2·59 and 24·73 inches.

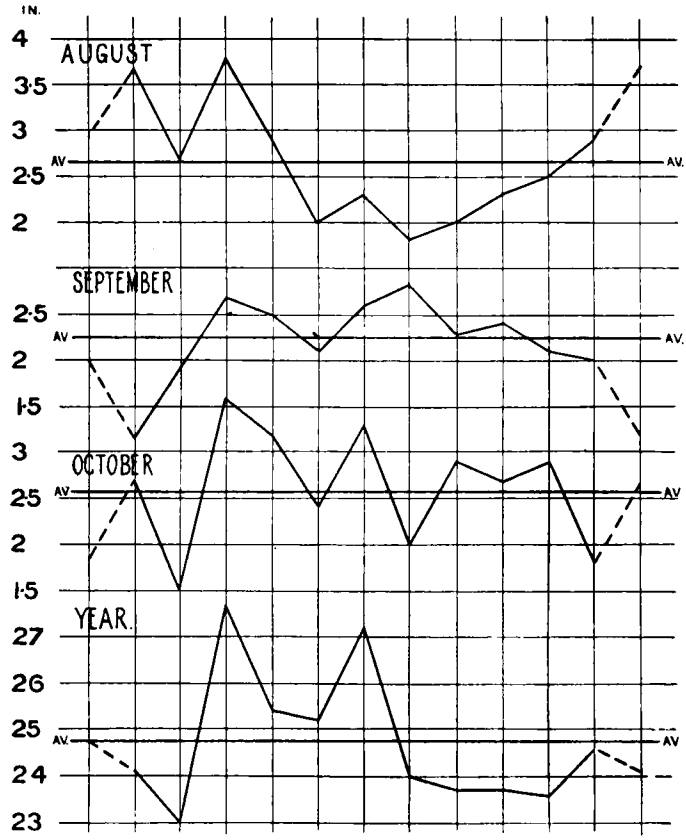
When the smoothed figures were used, the annual maximum was transferred to IV. and V. and the minimum to IX. As stated above, this, for general results, is important. It is instructive that we get a continuous, very regular curve, from 23·7 in. to 25·9 in.

In 1902 the York year's rainfall was 18·69 in. In 1903 it rose to 30·31 in. It is significant that these are, presumably, the years II. and III. of the current sun-spot cycle (*i.e.*, if the period from minimum to maximum proves normal).

Taking all 12 months and the whole year, the following further facts are of interest:—

(*a*). Six of the thirteen show an apex in the curve at III.; in three othere there is a considerable rise, but continued to IV. January, June and November are neutral. February gives the minimum in III.

	MIN.	II	III	IV	V	MAX.	VII	VIII	IX	X	XI	MEANS. INCHES.
AUG.	37	27	38	29	20	23	18	20	23	25	29	268 (70 Years)
SEPT.	12	19	27	25	21	26	28	23	24	21	20	226 („ „)
OCT.	27	15	36	32	24	33	20	29	27	29	18	259 („ „)
YEAR.	241	230	277	254	252	272	240	237	237	236	246	2473 (84 „)



CURVES OF RELATION OF SUNSPOTS TO RAINFALL.

(*b.*) Twenty of the twenty-six maxima and minima fall either on I. and VI. or on the two years following. Chance distribution would make us expect fourteen only.

(*c.*) No maximum or minimum occurs in XI.; only one in V.

(*d.*) In nearly every case of a marked break in the regularity of the curves this occurs in III.

(*e.*) Lockyer's curves from Tacchini's solar prominence values show precisely similar sudden rises from a minimum to a maximum in 1881 and 1892.

The object of the present note is that other records may be considered in the same way. The long series from Padua shows very similar peculiarities, though these are rather less marked when only the last seventy years are considered. J. EDMUND CLARK.

CLOUD OBSERVATIONS AND UPPER ATMOSPHERIC CURRENTS.

AETER numerous observations I have noticed repeatedly how thin rolled stratus bands, if watched for some time, will gradually break up into cirro-cumulus cloudlets of varying size; also, the large drifts of stratified cumulus will break up into alto-cumulus drifts. It would appear that warmer currents with an ascensional movement are setting in, in the upper atmosphere, to produce these disintegrations, and unsettled weather may as a rule be looked for to follow. These cloud formations and their gradual change were visible to the best advantage on January 17th last. The wind blew from the W. with the force of a light breeze and cloud movement was from the N.W. At 4 p.m. the sky from the W. to zenith was covered with thin roll stratus in the form of narrow pleats, which by 4.30 p.m. had completely broken up, giving place to a pallium of cirro-cumulus. At 9 a.m. on the same day the same changes were visible but on a larger scale, the thin roll stratus being replaced by strato-cumulus and the cirro-cumulus by alto cumulus. Another peculiarity I have noticed is the relation of the wind, when blowing in eddies at the earth's surface, to the cloud formation above. To take an example: on February 4th last, at 5.30 p.m., after a fine day with a light S.W. breeze, straight tapering bands of cirro-macula and alto-stratus were visible in the S.W., parallel to the S.W. horizon; by 6 p.m. the wind, though variable in force at times, reached the force of a moderate breeze from the W. to S.W., coming in eddies with a whirling movement; the bands of cirro-macula and alto-stratus by this time had the appearance of being swept backwards and forwards and twisted up, as though under the influence of irregular currents with a whirling movement as were prevalent at the Earth's surface.

Lately specially strong currents appear to have been at work in the upper atmosphere when a light breeze has been blowing at the surface of the ground. On March 22nd last, during the evening, cumulo-nimbus was very prevalent with fair intervals. Cloud movement was from the N.W., the estimated motion being 2; when the cloud-bank had passed over zenith and was in the S.E. quarter, the bank had the peculiar appearance of being heaped upwards with a swept-up appearance, as though under the influence of strong currents with a sweeping upward movement.

On March 28th air currents were most diversified in force; at a height of 6 ft. from the ground in an open situation the wind blew with the force of a gentle breeze from the S.S.W.; higher up, at about 40 ft., among an avenue of elm trees, the wind reached the force of a strong breeze, their top branches swaying most rapidly; and lower down, though equally exposed, the movement was nil. A moderate gale sprang up from the S.W. towards 10 p.m. on the above date.

Sutton, Surrey. S. C. RUSSELL.

HISTORY OF THE DAUBENY LABORATORY.

IN your recent review of "A History of the Daubeny Laboratory, Magdalen College, Oxford" (*Met. Mag.*, p. 73), the figures given for the average rainfall for the months of October, November and December, as well as for the averages for the year, are given correctly, but in certain copies of the book, which were sent out before the corrections were made, they have been wrongly stated. I am much obliged to you for having drawn my attention to an important clerical error.

R. T. GÜNTHER.

Magdalen College, Oxford, May 23rd, 1904.

HEAVY RAIN OF MAY 27th.

ON Friday morning the rainfall registered ·33 of an inch, from 10.15 to 12.25 ·75 of an inch fell, at 7.30 p.m. 1·69 inches had fallen, and at 9 a.m. on Saturday morning there was ·04 of an inch, giving a total of 2·48 inches for the 24 hours. Very heavy thunder and lightning occurred about 12 o'clock overhead. This is a record for this station, being the highest ever registered for the previous 24 hours for the 10 years during which observations have been taken.

WILLIAM HALL.

Swerford, Oxford, 30th May, 1904.

ROYAL METEOROLOGICAL SOCIETY.

THE first of the Afternoon Meetings for the present session was held on Wednesday, May 18th, in the Society's Rooms, 70, Victoria-street, Westminster, Captain D. Wilson-Barker, President, in the chair. Mr. W. M. Edwards, Mr. E. G. Fenning, Mr. K. H. M. ffinch, Mr. R. G. Kirkby, and Mr. L. G. H. Lee were elected Fellows of the Society.

Previous to the discussion on Mr. W. L. Dallas's paper on "The Variation of the Population of India compared with the Variation of Rainfall in the decennium 1891–1901," which had been postponed from the last meeting, Dr. H. R. Mill gave a brief summary of the contents of the paper. [See this *Magazine*, vol. **39**. p. 71.]

Dr. A. Buchan, F.R.S., and Mr. Baldwin Latham showed that Plague was influenced to a great extent by meteorological conditions, and that it followed the tensional difference between the temperature of the soil at a depth of 5 feet and the tensional difference due to the temperature of the dew point of the air, or that it arose from exhalations from a polluted and pest-sown soil.

Dr. H. R. Mill said that the paper had a special interest for him on account of the way in which it sought for a connection between

varying meteorological conditions and vital statistics. The problem was one of great geographical interest, and he believed that the relations pointed out by the author were not likely to be set aside. Dr. Mill then criticized Mr. Dallas's method of obtaining the mean rainfall for the various provinces, and said that it seemed to him that the only possible way of comparing the fluctuations of rainfall in such a case was by reducing all the values to percentages and allowing for the area of the division, or by weighting the means in proportion to the areas to which they referred so as to yield figures representative of the actual volume of precipitation.

The Hon. F. A. Rollo Russell read a paper on "The Principal Causes of Rain." He stated that the chief causes of rain are only four, but several of these are often in co-operation. These causes might be briefly described as follows :—(1.) The forced ascent of moist air by the slopes of mountains. (2.) A mass of air invading rather suddenly another mass moving from an opposite direction and maintaining its flow below the opposing current which it displaces. (3.) The ascent of more or less moist air through heavier and colder air to a height where condensation of vapour takes place, increased radiation of heat towards space, and often electrical developments producing further condensation, increase of temperature and renewed ascent with the same results. (4.) The mixture of currents of air from different directions.

A brief discussion followed, in which the President, Mr. D. W. Horner, Mr. H. Southall, and Mr. F. Gaster took part, and Mr. Russell replied.

Mr. W. C. Nash read a paper on "The Observations of Rainfall at the Royal Observatory, Greenwich, in the years 1815 to 1903." The author has made a critical inquiry into the circumstances relating to the early history of the Greenwich register, and has drawn up an authoritative table of monthly rainfall for the long period of 89 years. The average annual rainfall is 24·36 in., and the number of rainy days 157. The greatest annual fall was 35·54 in. in 1903, and the least 16·38 in. in 1864. During the five months January to May no monthly fall exceeding 4·37 in. was recorded; but in the remaining seven months there were 24 falls exceeding 5 inches, distributed in the following proportion :—June 3, July 8, August 2, September 1, October 6, November 2, and December 2. Light falls of rain are spread principally through the nine months January to September, with a decided preponderance in spring. Of falls to a less amount than 0·3 in. per month, 5 have been recorded in the month of April, 4 in February, 3 each in March, May and July, 2 in January, June and September, and 1 in August.

An interesting discussion ensued, which was taken part in by the President, Mr. W. Marriott, Mr. W. Ellis, F.R.S., Mr. F. J. Brodie, Mr. C. Harding, Dr. H. R. Mill, and Dr. H. N. Dickson, and Mr. W. C. Nash replied.

ROYAL OBSERVATORY, GREENWICH.

THE Annual Visitation of the Royal Observatory took place on Saturday, June 4th. A large number of scientific men were, as usual, invited to visit the Observatory, the various buildings of which were open for inspection, and as the day was fine, the visit was enjoyable.

The Board of Visitors—which consists of six representatives from the Royal Society, and six from the Royal Astronomical Society, as well as the Savilian Professor of Astronomy at Oxford, the Plumian Professor of Astronomy at Cambridge, and the Hydrographer of the Navy—met in the Octagon Room at 3 o'clock to receive the Report of the Astronomer Royal, Mr. W. H. M. Christie, F.R.S., on the work of the Observatory during the year ending May 10th, 1904. The Report dealt mostly with astronomical matters, but the following extracts will be of interest to meteorological readers:—

The solar activity has increased considerably during the year ending May 10, the Sun being free from spots on only 25 days, as against 100 in the previous year. The mean daily spotted area for 1903 is nearly six times as great as for 1902; still, as yet, the rate of increase is not so great as in the corresponding periods of the two preceding cycles. The greatest outburst of the year commenced on October 5, 1903, with the appearance at the east limb of the Sun of a group of spots much larger than any seen since September, 1898. Several fine groups have appeared since, particularly those first seen on October 25, October 30, November 5, November 30, 1903, and April 21, 1904.

The mean magnetic declination for 1903 was 16° 19′ West, and the mean dip 67° 0′ 51″.

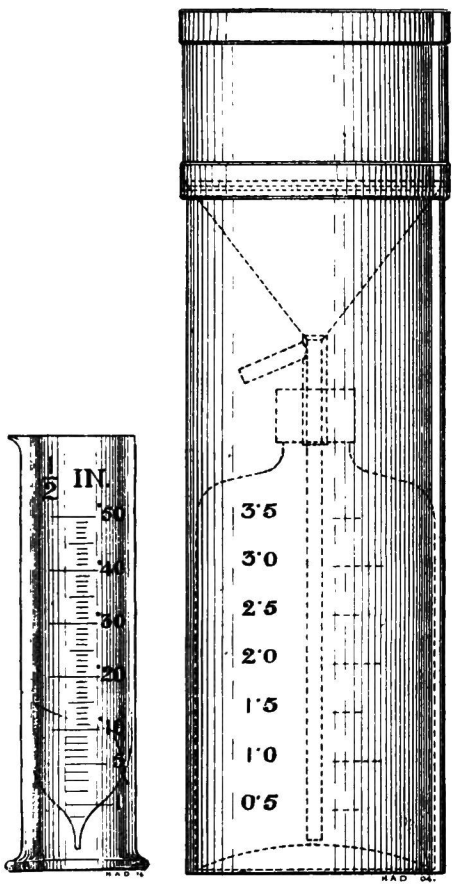
The mean temperature for the year 1903 was 50°·2, or 0°·7 above the average for the 50 years 1841–90.

The rainfall during 1903 was 35·54 in., the heaviest ever recorded at Greenwich during one calendar year. The summer months in particular were very wet, more than 16 inches being recorded in June, July and August—viz., 6·07 in. in June, 5·27 in. in July, and 4·82 in. in August. The greatest fall registered at Greenwich in a single day for many years past—viz., 2·46 in.—occurred on July 23. In 1904, January and February were wet months, so that the total fall from March 1, 1903, to February 29, 1904, was over 37 inches.

A Fineman nephoscope has been provided for cloud observations in connection with the international balloon ascents.

Mr. W. Carpenter Nash retired on December 31, after a long and honourable connection with the Observatory of nearly 48 years, having been for the last 10 years Superintendent of the Magnetic and Meteorological Branch. He has been succeeded by Mr. W. W. Bryant.

A NEW PATTERN OF RAIN GAUGE.



MESSRS. LANDER & SMITH, of Canterbury, have recently brought out a new pattern of rain gauge which contains some interesting features. The standard pattern of Snowdon rain gauge is not likely to be displaced where durability and good workmanship outweigh the necessarily somewhat high price; and it undoubtedly ought to continue to be the standard. Still, Messrs. Lander & Smith have produced a rain gauge which is accurate and cheap, and appears likely to last well with careful handling. The material is japanned zinc and the chief novelty is that the receiving vessel is a glass bottle permanently fixed to the funnel, the tube of which passes through a cemented cork and reaches almost to the bottom. A second short tube, like the spout of a soda-water syphon, permits of the contents of the bottle being emptied for measurement into the ordinary glass, which we are glad to notice is conical below and has a mark to indicate ·005 in., the quantity which determines whether or no a day is to be classed as rainy. The bottle itself is graduated in half inches of rain, a precaution which we commend as it is a valuable check on the graduated glass, making it practically impossible to mistake the number of half-inches which fall during heavy rain.

Some observers will doubtless be inclined to try the new gauge, though many will greatly prefer the old and tried pattern. We welcome, in the new instrument, the indication it affords of living interest in the subject of rainfall measurement, and of a desire to supply instruments of good quality at a moderate price. In such circumstances competition is wholesome and deserves encouragement.

THE FIVE MONTHS' RAINFALL OF 1904.

Aggregate Rainfall for January—May, 1904.

Stations.	Total Rain.	Per cent. of Aver.	Stations.	Total Rain.	Per cent. of Aver.	Stations.	Total Rain.	Per cent. of Aver.
	in.			in.			in.	
London	9·60	124	Arncliffe	29·66	129	Braemar	11·34	95
Tenterden	11·38	128	Hull	8·73	103	Aberdeen	14·02	125
Hartley Wintney	12·22	141	Newcastle.....	10·17	118	Cawdor	9·52	95
Hitchin	...	...	Seathwaite ...	62·60	119	Glencarron ..	37·09	107
Winslow	10·59	133	Cardiff	19·63	145	Dunrobin	13·24	119
Westley.....	9·09	110	Haverfordwest	19·15	124	Killarney ...	24·15	122
Brundall.....	9·27	114	Gogerddan ...	18·03	118	Waterford ...	18·54	130
Alderbury	14·32	147	Llandudno ...	11·13	111	Broadford..	16·39	138
Ashburton	27·11	143	Dumfries	17·25	106	Carlow	14·59	117
Polapit Tamar ...	20·88	166	Lilliesleaf	13·56	129	Dublin	11·75	120
Stroud	12·83	134	Colmonell	16·19	100	Mullingar.....	16·77	129
Woolstaston	12·69	122	Glasgow	15·64	121	Ballinasloe ...	16·96	130
Boston	7·41	109	Inveraray ...	30·50	112	Clifden	35·56	123
Hesley Hall	9·05	127	Islay	21·23	131	Crossmolina ...	26·96	138
Derby.....	9·90	126	Mull	26·56	128	Seaforde	15·37	115
Bolton	15·33	117	Loch Leven ...	15·24	118	Londonderry..	15·99	113
Wetherby	12·86	158	Dundee	12·05	121	Omagh	18·49	136

NOTE.—In the above Table the first column gives the total rainfall of the five months, not, as in former years, the difference from the average.

SOUTH AFRICAN RAINFALL.

AN important paper on the Study of South African Rainfall was presented to the South African Philosophical Society in Cape Town, on December 29th, 1903, by Mr. J. R. Sutton. It gives a history of Kimberley rainfall from 1877 to 1902, and discusses the annual, monthly, daily and hourly quantities, both statistically and by means of harmonic analysis. The following notes are from an abstract of the paper in which quantities are expressed in vulgar fractions, as the limit of accuracy is evidently intended to be only to the nearest quarter inch it would be misleading to translate these into decimals, so that we must apologize for introducing this rather clumsy notation in our pages.

Mr. Sutton gives the heaviest annual fall at Kimberley as $31\frac{1}{4}$ inches in 1891, the least as $8\frac{3}{4}$ inches in 1897. This range he points out is less than that of similarly-situated places in Australia and India but greater than in South America. In Great Britain it is usual to find the wettest year with about twice the rainfall of the driest; in Kimberley we see that in a record of only 26 years' duration the wettest year had four times as much rain as the driest. The greatest daily fall was more than $4\frac{1}{2}$ inches, and we suppose that this means less than five inches. The last week of February

was the wettest, and the first week of August the driest time of the year.

The hourly variation of rainfall gave a curve which is nearly the inverse of the barometric oscillation and is closely connected with the dew-point curve. Rather more rain fell at night than during the day, but the rate of fall was greater in the day time. The relation of wind to monthly rainfall was found to be that the amount of rain decreased when the wind varied from its normal direction for the month.

A comparison was made between Kimberley and other places in South Africa, the wettest cited being Maclear's Beacon on Table Mountain with 87 inches, the driest Port Nolloth with only $2\frac{1}{2}$ inches in the year.

The author's conclusion is that the rain of central South Africa originates in the main in the Doldrums, being reinforced more or less by the moisture evaporated from the Indian Ocean; and that the aridity of the west coast is not caused, as Dr. Buchan believes, by the southern anticyclonic belt, but simply by the coldness of the water. The passage as to the Doldrums is somewhat obscure; possibly it may be a slip for the Calms of Capricorn; but the full paper will of course make the matter clear.

REVIEWS.

The Climate of Australasia in reference to its control by the Southern Ocean, by Professor J. W. GREGORY, D.Sc., F.R.S. Melbourne, Whitcombe and Tombs, Ltd. Size $7\frac{1}{2} \times 5$. Pp. 96.

THE versatile professor of geology, whose appointment to the University of Glasgow we rejoice to see, while holding a similar chair in the University of Melbourne, delivered a presidential address to the Dunedin meeting of the Australasian Association for the Advancement of Science on January 11th, 1904, upon the climate of Australasia, which he has now expanded into a plump pamphlet. Professor Gregory accepts as proved the existence of weather cycles, precise and recognisable enough to furnish a sure basis for long period weather forecasts, basing his opinions largely on the experience of the Indian meteorological service. We fear, however, that he does not make adequate allowance for the difference between the climatic conditions of the tropical and the temperate zones when he attempts to apply to southern and temperate Australasia deductions from observations made in tropical India. We are glad to see that Professor Gregory holds that long period forecasts will continue impossible until meteorology has advanced another stage, and we sympathise with his hope that the publication of this pamphlet will do something to help forward the proposals for the establishment of a united meteorological service for Australasia.

We are sure that it is wholly good that men who pursue one branch of physical science should occasionally look over the field of their neighbours, and bring to other specialists the advantage of a fresh eye and the suggestions of a mind untrammelled by the inevitable precautions and hesitations which impede the specialist in reaching a little beyond the facts with which he deals daily. Professor Gregory has read widely, and supports his arguments with numerous references to original sources of information, and his pamphlet is bound to be of service to all who read it. So far as Australasian meteorology is concerned, we may rest assured that the Antarctic expeditions now returned or returning to Europe will bring an immense addition to our knowledge of the Southern Ocean, which will provide meteorologists in the temperate parts of the southern hemisphere with very valuable material.

Nedböriagttagelser i Norge. Udgivet af det Norske Meteorologiske Institut. Aargang IX. [Rainfall Observations in Norway. Published by the Norwegian Meteorological Institute. Ninth year.] 1903. Size 15½ × 11½. Pp. xviii. + 126. Christiania, 1904. Price 6 kr.

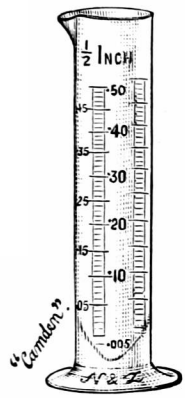
We have again to congratulate Professor Mohn on being first in the field with his account of Norwegian Rainfall for 1903. We know of no other official meteorological institution which is so prompt in publishing its annual volume, and our object in singling this out from the mass of annual reports for one, two or three years ago which we have received during the last few months, is to hold it up as an example which larger and richer nations than Norway would do well to follow.

U.S. Department of Agriculture. Weather Bureau Bulletin L. Climatology of California. Prepared by Alexander G. McAdie, *Professor of Meteorology.* Washington, 1903. Size 12 × 9. Pp. 270. *Plates, &c.*

Different sections of this memoir are treated by different authors, and the general results are pointed out by Professor McAdie, though less fully than we should like to see. We are glad to notice that attention is paid to the distribution of climate in typical months of different character. While we are far from considering the determination and use of averages as valueless in climatological discussions, we feel strongly that they should be reinforced by a discussion of typical normal and extreme years, months, and even days. The volume before us is well illustrated by maps and diagrams, and it contains a selection of Professor McAdie's own fine photographs of clouds—or fog—from Mount Tamalpais.

METEOROLOGICAL NEWS AND NOTES.

THE "CAMDEN" RAIN GLASS has been designed by Messrs. Negretti and Zambra in order to include all the improvements suggested by recent correspondents in this Magazine. The scale is more clearly marked, the half-tenths being indicated on the left hand side, an undoubted improvement, while the lower part is conical so as to enable the first hundredth to be distinctly subdivided. This removes the decision as to whether the amount is sufficient to justify it to be entered as nearer ·01 than ·00, and so to give a nominal "rainy day," from the region of guessing. This is a very important feature, for it compels the maker to calibrate the first two divisions, and thus overcomes the most fruitful cause of variation in the number of rainy days assigned to a station. A third addition is a duplicate scale on the back, which is liked by some observers, though we confess we can obtain accurate readings without its aid: still it can do no harm. The new glass is necessarily a little more expensive than the usual pattern.



THE BEN NEVIS OBSERVATORIES have been the subject of an interchange of correspondence in the Scottish press in connection with statements made by Lord McLaren at the recent meeting of the Scottish Meteorological Society. Lord McLaren stated that the Meteorological Office had "never made the slightest use of the observations furnished to them" from Ben Nevis and did not utilize these observations for weather forecasts. Sir Herbert Maxwell, as Chairman of the Treasury Committee on the expenditure of the Meteorological Grant, after rebutting certain allegations as to the conduct of his Committee, replied to the charge that the information telegraphed from Ben Nevis was supplied to the Meteorological Council by the Directors subject to the definite proviso that it should not be published in a "form which would anticipate the daily reports from Ben Nevis which are supplied to the newspapers." It was on this account that the Meteorological Office requested that the telegrams be discontinued, because without the right of publication they could not be utilised. Lord McLaren, in reply, said the observations might have been used for forecasting without publication. We greatly regret the delay in the completion and issue of the report of the Treasury Committee, the earlier appearance of which might possibly have prevented a controversy which seems more likely to hurt than to help the cause of meteorology in Great Britain.

THE GERMAN METEOROLOGICAL SOCIETY held its tenth general meeting at Berlin from April 7th to 9th, 1904. The President, Professor von Bezold, gave an introductory address, visits were paid

to various observatories and places of interest to meteorologists, and the following amongst other papers were read:—On the influence of forests on climate, by Professor Schubert of Eberswalde; On the variations in water-temperature on the western coasts of Europe, by Dr. Meinardus of Berlin; On the thermal régime on the continents, at sea and in the atmosphere, by Professor Schubert; On the tides of the atmosphere, especially on the movements during ebb, by Professor Möller of Brunswick; On the movements of summer rains across Germany, by Dr. Less of Berlin; On precipitation in cyclones, by Dr. Polis of Aix-la-Chapelle; and On the meteorological causes of the winter-killing of grain.

Mr. R. C. Mossman, the accomplished meteorologist of the Scottish Antarctic Expedition, has remained in the South Orkney Islands while his companions, after a second cruise to high latitudes, have returned in the "Scotia," and are due to reach the Clyde about the beginning of July. Mr. Mossman has taken charge of a staff of observers from the Argentine Republic, who are supported by their government. The result will be a second year's observations in a most interesting position on the edge of the Antarctic. Mr. Mossman sends a poetical New Year's greeting to his friends (the mails are infrequent) from Omond House, Scotia Bay:—

"From this most salubrious spot, where the weather's never hot,
And the snow keeps merrily drifting all the year,
Where the sun is seldom seen, and the hills are never green,
And the mighty bergs are always very near."

Measuring the Rainfall is the heading of a letter recently addressed to the editor of the *Journal of Commerce*, Liverpool, which runs thus:—

Sir,—The following method of measuring the rainfall may interest and amuse Mr. Hugh R. Mill:—

A good many years ago an old friend of my father's had a rain gauge in his grounds, which he carefully watched and recorded its readings daily. One summer he went from home for a short holiday, and the first thing he did on his return was to visit the gauge, which, to his great surprise, the weather having been fine in the interval, contained a good deal more water than when he had last sounded it. Whilst puzzling over the matter, his old housekeeper came out of the house, and, seeing what her master was after, astonished him by saying: "Oh, sir, it's all right; I put a wee drap in every day since ye went away."—Yours, &c.

April 9th, 1904. Aquarius.

No doubt the anecdote will amuse our readers also.

METEOROLOGY ON THE ANTARCTIC EXPEDITION.

THE Rev. D. C. Bate has been kind enough to forward from New Zealand copies of the *Canterbury Times* for April 13th and 20th, 1904, containing some admirable reproductions of photographs of Antarctic life and scenery, together with descriptive articles on the expedition of the "Discovery," and on the scientific results written from data supplied by the members of the expedition. The meteorological work is described in considerable detail, no less than four and a half columns being devoted to details of the instruments used and the results obtained. So far as actual figures are concerned the only new records quoted are the minimum temperatures for April and May, 1903. These were at the ship's winter quarters, —43°·0 for April and —52°·2 for May, and at Cape Armitage, —56°·0 for April, and —67°·7 for May.

With regard to the anemometers the article says:—

"Of mechanical instruments we have one Robinson cup anemometer, a small Dines', and also another of Dines', which records the maximum force the wind has blown since the last observation, and the mean force at the present time, but as this has not been working at all satisfactory we will not deal with it in this paper. Our anemometers have had their work to do down here, and it cannot be said that they have wholly succeeded. In fact, the constant drift-snow effectually chokes and stops the working of both the Dines'. The Robinson has kept going to a large extent, but has had to be repaired several times, when the cups worked loose, or when snow accumulated inside the works. In the small Dines' the snow not only got inside the head but also down into the piping, and at last effectually stopped any record. The large Dines', which is a self-recording instrument, has been going more or less continually, and very interesting are the curves traced on the sheet, but this, again, soon gets choked, and it is no joy having to climb up the mizzen rigging to clear the head when a gale is blowing, and the temperature is well into the minus sign."

We have also heard from Captain Scott and Lieutenant Royds, but their letters do not contain any facts for publication. They state, however, that from the point of view of scientific observations the second year spent in the shadow (or perhaps we ought to say in the glare) of Mount Erebus was even more successful than the first. It is gratifying to know that so far from the second winter breaking down the health of the ship's company, it was not felt so severely as the first, though the temperatures recorded were considerably lower.

RAINFALL AND TEMPERATURE, MAY, 1904.

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, 1890-9.	Greatest in 24 hours. Depth	Greatest in 24 hours. Date.	Days on which ·01 or more fell.	TEMPERATURE. Max. Deg.	Max. Date.	Min. Deg.	Min. Date.	No. of Nights below 32°. Shade	No. of Nights below 32°. Grass
		inches	inches.	in.								
I.	London (Camden Square) ...	1·96	+ ·40	·36	31	16	76·6	16	34·1	9	0	4
II.	Tenterden ...	2·04	+ ·23	·47	31	15	77·0	26	34·0	9	0	3
,,	Hartley Wintney ...	2·87	+ 1·01	·97	20	15	72·0	29	32·0	9	1	3
III.	Hitchin	...	...	...	...	...	...	...	...	...	...	...
,,	Winslow (Addington) ...	2·18	+ ·47	·53	20	17	71·0	16	34·0	3, 20	0	5
IV.	Bury St. Edmunds (Westley)	2·14	+ ·30	·38	31	15	76·0	27	35·0	10	0	...
,,	Brundall	1·80	— ·01	·45	31	13	75·2	26	34·8	10	0	1
V.	Alderbury ...	2·86	+ 1·17	·73	27	16	71·0	29	33·0	8	0	...
,,	Winterborne Steepleton ...	4·47	...	1·10	23	18	67·2	16	33·5	20	0	5
,,	Torquay (Cary Green) ...	2·37	...	·38	30	18	64·0	27, 28	39·3	9	0	0
,,	Polapit Tamar [Launceston]	2·97	+ ·73	·62	1	21	72·8	16	32·7	20	0	2
,,	Bath ...	1·97	...	·50	27	14	71·0	16	36·2	11	0	...
VI.	Stroud (Upfield) ...	1·86	— ·03	·43	20	14	70·0	29	37·0	10	0	...
,,	Church Stretton (Woolstaston)	2·27	— ·03	·39	1	17	68·0	16	32·0	8	1	...
,,	Bromsgrove (Stoke Reformatory)	4·01	+ 2·50	2·20	27	15	67·0	26	30 0	...	5	...
VII.	Boston ...	1·32	— ·18	·50	31	5	75·0	16	33·0	10	0	...
,,	Bawtry (Hesley Hall) ...	1·74	+ ·20	·48	31	14	...	...	...	...	...	...
,,	Derby (Midland Railway)...	1·81	— ·04	·46	6	19	74·0	26	35·5	7	0	...
VIII.	Bolton (The Park) ...	2·93	+ ·19	·49	31	17	70·5	26	34·2	8	0	5
IX.	Wetherby (Ribston Hall) ...	3·34	+ 1·67	1·13	27	18	...	...	...	...	...	...
,,	Arncliffe Vicarage ...	4·53	+ 1·14	·75	1	21	...	...	...	...	...	...
,,	Hull (Pearson Park) ...	2·12	+ ·31	·54	6	17	71·0	13	35·0	10, 20	0	3
X.	Newcastle (Town Moor) ...	2·84	+ 1·09	·70	27	17	...	...	...	...	...	...
,,	Borrowdale (Seathwaite) ...	7·68	+ ·34	1·99	23	18	70·4	26	34·5	8	0	...
XI.	Cardiff (Ely)	3·04	+ ·69	·46	24	20	...	...	...	...	...	..
,,	Haverfordwest (High St.)..	2·93	+ ·64	·74	23	18	69·2	29	36·4	4, 11	0	5
,,	Aberystwith (Gogerddan)..	3·45	+ ·93	1·00	27	15	77·0	26	30·0	7, 19	3	...
,,	Llandudno ...	1·85	+ ·02	·54	27	14	76·0	16	36·8	8	0	...
XII.	Cargen [Dumfries] ...	2·48	— ·16	·68	1	13	69·5	30	33·0	20	0	...
XIII.	Edinburgh (Royal Observy.)	2·88	...	·60	8	21	68·7	16	32·8	8	0	5
XIV.	Colmonell	2·28	— ·18	·45	23	16	77·0	29	33·0	19	0	...
XV.	Tighnabruaich ...	4·34	...	1·12	23	19	65·0	30	32·0	7	1	1
,,	Mull (Quinish) ...	3·84	+ ·69	·98	1	18	...	...	...	...	...	...
XVI.	Loch Leven Sluices ...	3·25	+ ·96	·81	24	19	...	...	...	...	..	...
,,	Dundee (Eastern Necropolis)	2·50	+ ·74	·60	5	20	66·2	29	34·0	8, 12	0	...
XVII.	Braemar ...	2·12	— ·07	·62	1	15	70·5	30	28·8	12	5	13
,,	Aberdeen (Cranford) ...	2·86	+ ·85	·75	5	18	62·0	25	32 0	11, 19	2	...
,,	Cawdor (Budgate)	2·22	+ ·12	·33	26	16	...	...	...	...	..	...
XVIII.	Glencarron Lodge ...	5·74	+ ·49	·68	14, 18	22	75·8	30	32·0	8	1	...
,,	Bendamph. ...	6 22	+ 2·04	1·25	1	19	..	...	...	...	...	...
XIX.	Dunrobin Castle ...	1·50	— ·43	·37	18	9	61·0	16	35·0	8	0	...
,,	Castletown	1·39	...	·44	26	17	62·0	26, 31	31·0	20	1	...
XX.	Killarney ...	3·11	+ ·06	·81	6	15	68·5	18	34·0	8	0	...
,,	Waterford (Brook Lodge)...	2·42	— ·23	·51	4	15	65·0	28	34·0	4, 11	0	...
,,	Broadford (Hurdlestown) ...	3·00	+ ·77	·69	5	15	68·0	29	38·0	24	0	...
XXI.	Carlow (Browne's Hill) ...	3·00	+ ·70	·79	31	15	...	...	...	...	...	...
,,	Dublin (Fitz William Square)	2·69	+ ·79	1·09	31	18	69·6	16	37·5	8	0	0
XXII.	Ballinasloe	2·80	+ ·35	·87	5	20	74·0	29	32·0	4, 8	2	...
,,	Clifden (Kylemore House)..	4·44	— ·18	1·53	5	15	...	...	..	...	...	...
XXIII.	Seaforde	3·08	+ ·77	·79	31	17	73·0	16	32·0	7	1	1
,,	Londonderry (Creggan Res.)	2·65	+ ·01	·51	31	20	...	...	...	...	...	...
,,	Omagh (Edenfel) ...	2·39	— ·15	·47	1	16	71·0	27, 29	36·0	26	0	1

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

SUPPLEMENTARY RAINFALL, MAY, 1904.

Div.	STATION.	Rain. inches	Div.	STATION.	Rain. inches
II.	Dorking, Abinger Hall	2·76	XI.	New Radnor, Ednol	2·21
,,	Sheppey, Leysdown	1·79	,,	Rhayader, Nantgwillt	2·65
,,	Hailsham	3·36	,,	Lake Vyrnwy	2·82
,,	Crowborough	3·45	,,	Ruthin, Plâs Drâw	1·86
,,	Ryde, Beldornie Tower	3·42	,,	Criccieth, Talarvor	2·35
,,	Emsworth, Redlands	3·76	,,	Anglesey, Lligwy	1·50
,,	Alton, Ashdell	2·58	,,	Douglas, Woodville	3·17
,,	Newbury, Welford Park	3·22	XII.	Stoneykirk, Ardwell House	2·37
III.	Harrow Weald	2·01	,,	Dalry, Old Garroch	3·32
,,	Oxford, Magdalen College	2·89	,,	Langholm, Drove Road	3·76
,,	Banbury, Bloxham	2·25	,,	Moniaive, Maxwelton House	2·85
,,	Pitsford, Sedgebrook	2·22	,,	Lilliesleaf, Riddell	2·93
,,	Huntingdon, Brampton	1·65	XIII.	N. Esk Reservoir [Penicuick]	4·20
,,	Wisbech, Bank House	...	XIV.	Maybole, Knockdon Farm	2·70
IV.	Southend	1·65	,,	Glasgow, Queen's Park	3·36
,,	Colchester, Lexden	1·63	XV.	Inveraray, Newtown	4·07
,,	Saffron Waldon, Newport	1·39	,,	Ballachulish, Ardsheal	6·75
,,	Rendlesham Hall	2·46	,,	Campbeltown, Redknowe	2·17
,,	Swaffham	1·76	,,	Islay, Eallabus	2·97
,,	Blakeney	1·51	XVI.	Dollar	3·09
V.	Bishop's Cannings	3·03	,,	Balquhidder, Stronvar	5·38
,,	Ashburton, Druid House	2·92	,,	Coupar Angus Station	2·40
,,	Okehampton, Oaklands	3·51	,,	Blair Atholl	1·45
,,	Hartland Abbey	3·05	,,	Montrose, Sunnyside	2·58
,,	Lynmouth, Rock House	2·77	XVII.	Alford, Lynturk Manse	2·88
,,	Probus, Lamellyn	2·98	,,	Keith, H.R.S.	2·69
,,	Wellington, The Avenue	2·39	XVIII.	Fearn, Lower Pitkerrie	·86
,,	North Cadbury Rectory	3·06	,,	S. Uist, Askernish	3·48
VI.	Clifton, Pembroke Road	3·19	,,	Invergarry	5·55
,,	Moreton-in-Marsh, Longboro'	3·89	,,	Aviemore, Alvie Manse	3·67
,,	Ross, The Graig	2·11	,,	Loch Ness, Drumnadrochit	3·01
,,	Shifnal, Hatton Grange	2·03	XIX.	Invershin	1·54
,,	Wem Rectory	1·99	,,	Altnaharra	1·74
,,	Cheadle, The Heath House	1·98	,,	Bettyhill	1·01
,,	Coventry, Kingswood	1·32	,,	Watten, H.R.S.	1·26
VII.	Market Overton	1·37	XX.	Cork, Wellesley Terrace	2·26
,,	Market Rasen	1·60	,,	Darrynane Abbey	3·28
,,	Worksop, Hodsock Priory	1·96	,,	Glenam [Clonmel]	2·93
VIII.	Neston, Hinderton	2·10	,,	Ballingarry, Hazelfort	3·26
,,	Southport, Hesketh Park	1·74	,,	Miltown Malbay	1·83
,,	Chatburn, Middlewood	3·11	XXI.	Gorey, Courtown House	1·99
,,	Duddon Valley, Seathwaite Vic.	4·05	,,	Moynalty, Westland	2·75
IX.	Langsett Moor, Up. Midhope	3·17	,,	Athlone, Twyford	2·21
,,	Baldersby	3·84	,,	Mullingar, Belvedere	2·52
,,	Scalby, Silverdale	3·27	XXII.	Woodlawn	2·55
,,	Ingleby Greenhow Vicarage	4·18	,,	Westport, Murrisk Abbey	3·09
,,	Middleton, Mickleton	3·05	,,	Crossmolina, Enniscoe	3·82
X.	Beltingham	2·56	,,	Collooney, Markree Obsy	2·64
,,	Bamburgh	2·36	XXIII.	Enniskillen, Portora	1·97
,,	Keswick, The Bank	3·30	,,	Warrenpoint	2·33
,,	Melmerby Rectory	4·51	,,	Banbridge, Milltown	2·19
XI.	Llanfrechfa Grange	3·12	,,	Belfast, Springfield	2·92
,,	Treherbert, Tyn-y-waun	4·96	,,	Bushmills, Dundarave	2·41
,,	Llandovery, Tonn	2·61	,,	Stewartstown	2·51
,,	Castle Malgwyn	1·78	,,	Killybegs	1·80
,,	Llandefaelog-fach	2·29	,,	Horn Head	2·05

METEOROLOGICAL NOTES ON MAY, 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.—The absence of E. wind, and a sufficiency of sunshine and warm R, following a particularly mild April, combined to produce one of the most beautiful spring months for many years. The average amount of cloud for the month was 7·3, the highest on record, but there were nevertheless many magnificent days, especially in the first and third weeks. The duration of sunshine was 128·4* hours and of R 58·2 hours. Mean temp. 54°·6, or 0°·6 above the average,

TENTERDEN.—A pleasant spring month without much wind, though somewhat deficient in sunshine. Rather cold from 3rd to 11th and about 20th. Great abundance of blossom in orchards and on hawthorn and flowering shrubs. Duration of sunshine 158† hours.

CROWBOROUGH.—A very changeable type of weather. Mild on the whole, with frequent fog, mist and haze. Mean temp. 51°·8.

HARTLEY WINTNEY.—A "Janus-like" month, with one face excessively dry, the other remarkably wet. Cold N.W. wind for the first 19 days, then S.W. to the end. Ozone on 15 days with a mean of 2·9.

BRUNDALL.—Very fine, and the warmest May since 1895. From 8th to 20th it was absolutely rainless, this being the longest period without R since the end of June, 1903. Fruit blossoming proceeded almost without a check, promising an abundant crop.

WINTERBOURNE STEEPLETON.—The wettest May since the record began in 1893.

TORQUAY.—R ·37 in. above the average. Duration of sunshine 183·3* hours, or 38·0 hours below the average. Mean temp. 52°·8, or 0°·3 below the average. Mean amount of ozone 5·7; max. 8·0 on 2nd with W. wind, and min. 1·5 on 27th with N.N.E. wind.

LYNMOUTH.—Fairly warm, with no heavy gales. The range of bar. was only ·65 in.

WELLINGTON.—Very seasonable on the whole, but R ·75 in. above the average.

NORTH CADBURY.—A very good average May, but no settled weather. Temp. normal, the max. being a little lower and min. higher than usual. Fruit blossom was very abundant.

CLIFTON.—The first 10 days were rainy and cool; then fair and warmer till 19th, but not much sunshine. The remainder was rainy and unsettled. No frost. R ·92 in. above the average.

ROSS.—Average temp. and R, but more rainy days than usual. Much fine weather from 2nd to 20th, then frequent R to the close. Vegetation was very luxuriant and flowering shrubs unusually full of blossom.

WEM.—Showery and cold in the first half, without much sun and very damp on several days. Vegetation was well advanced and more than usually luxuriant.

BROMSGROVE.—On 27th 2·20 in. of R fell in about 10 hours. This fall has only been exceeded twice in 28 years.

WORKSOP.—Dry till near the end, and the R of the last few days was very welcome. Crops looked well and there was an unusual profusion of bloom on all trees and shrubs.

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* Campbell-Stokes. † Jordan.

BOLTON.—Very slight range of pressure and temp. The amount of cloud was much in excess, and the sunshine and evaporation were the least yet recorded. Mean temp. 48°·8, or 1°·0 below the average. Duration of sunshine 92·5* hours, or 63·3 hours below the average.

SOUTHPORT.—The most sunless May in 13 years' record, the mean being 69* hours below the average. Otherwise fairly normal. R ·38 in. below the average, the duration being only 40·7 hours. Mean temp. 0°·3 above the average.

HULL.—The early part was variable and frequently cold. Brighter from 14th to 20th, but very cloudy and milder towards the end. Duration of sunshine 79·2 hours.

LLANDOVERY.—Cool and changeable especially after the 7th, but on the whole favourable to vegetation.

HAVERFORDWEST.—Fine but cold, with just sufficient R. Vegetation luxuriant, with a promise of abundant harvests. Duration of sunshine 125·2* hours.

DOUGLAS.—A repetition of February, March and April. Temp. persistently below the average and remarkable deficiency of sunshine. Gales blew for about half the month chiefly from N. Fruit blossom was prolific and foliage good, but spring was extremely late.

SCOTLAND.

LANGHOLM.—R ·77 in. above the average of 28 years.

MAXWELTON HOUSE.—A fine month, the first half being cold and the second warm. R ·24 in. below the average. S on 2nd.

LILLIESLEAF, RIDDELL.—R ·93 in. above the average. There was an excessive amount of blossom on fruit trees, probably owing to the absence of insects caused by last year's R.

INVERARAY.—The first half was cold and showery and everything very backward, but the last few days were quite hot.

BALLACHULISH.—R 3·18 in. above the average.

COUPAR ANGUS.—R and temp. slightly above the average. The first two weeks were cold and wet, but it was fine afterwards.

WATTEN.—The first half was dry, with cold, stormy winds; the latter half dry, mild and fine, particularly the closing week.

CASTLETOWN.—Cold and windy till 20th, afterwards warm and dry, the last few days being very dry and dusty. TS lasting nearly 2 hours on 26th.

IRELAND.

CORK.—Temp. 3°·8 below the average, and R ·08 in. above the average. On 8th the min. temp. 32°·0, the latest frost in 21 years.

DUBLIN.—The month opened and closed with heavy R, but the rest was fine though changeable. Very cold from 5th to 10th. H on 7th, 8th and 17th.

MARKREE OBSERVATORY.—Frequent R and H showers, with strong S. and S.W. winds, in the first half. Fine weather after 17th.

BELFAST.—A very satisfactory May, with many fine summer days. R ·07 in. above the average.

OMAGH.—The greater part was rather cool, blustering and unsettled, but practically without frost. The foliage and flowers, including that of fruit trees, was therefore more abundant and luxuriant than for many years. The month went out in settled summer weather.

Erratum.—In the notes for April, 1904, the mean temp. at Camden Square *should be* 50°·3 *not* 48°·1, and the difference from the average 2°·2, *not* 2°·4.

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* Campbell-Stokes.

Climatological Table for the British Empire, December, 1903.

STATIONS. (Those in italics are South of the Equator.)	Absolute. Maximum. Temp.	Date.	Absolute. Minimum. Temp.	Date.	Average. Max.	Min.	Dew Point.	Humidity.	Absolute. Max. in Sun.	Min. on Grass.	Total Rain. Depth.	Days.	Aver. Cloud.
	°		°		°	°	°	0-100	°	°	inches		
London, Camden Square	52·3	9	26·1	31	42·6	35·5	36·3	92	59·2	19·1	1·30	12	8·4
Malta	70·2	11	43·2	8	63·1	52·0	51·5	75	107·2	40·2	3·55	14	4·3
Lagos, W. Africa	91·0	8	71·0	20	87·8	75·2	77·5	75	143·0	70·0	1·23	5	3·6
Cape Town	90·8	14	50·2	21	76·6	67·9	56·5	68	...	...	·45	4	3·1
Durban, Natal	92·3	25	59·8	13	83·3	66·5	...	...	145·9	...	5·33	20	5·3
Mauritius	88·2	2	65·4	7, 11	83·8	69·3	66·2	72	153·8	60·8	2·74	21	6·1
Calcutta	80·4	12	49·8	16	76·3	54·0	52·8	65	135·0	42·5	·00	0	0·9
Bombay	91·2	3	56·0	27	84·7	68·5	63·4	66	138·5	48·9	·00	0	0·7
Madras	86·2	2	65·3	8	81·3	69·7	68·4	82	135·2	61·6	19·63	11	5·0
Kodaikanal	65·3	24	42·7	14	60·4	47·2	42·9	71	129·3	29·2	12·06	9	4·2
Colombo, Ceylon	90·0	4, 20	70·2	15	79·0	74·1	70·7	79	155·8	66·5	·92	7	4·5
Hongkong	74·7	15	45·8	21	66·9	56·0	45·6	56	124·1	...	·09	2	3·5
Melbourne	95·6	26	45·5	4	72·7	55·5	53·6	74	152·2	38·4	2·30	9	6·1
Adelaide	99·7	26	46·9	2	80·8	57·9	52·0	53	160·5	47·0	1·16	6	3·5
Coolgardie	...	...	...	...	...	...	...	...	...	...	...	...	...
Sydney	86·5	12	57·5	17	75·5	63·3	53·7	67	129·2	48·9	3·93	20	6·0
Wellington	78·7	9	48·5	27	70·9	55·8	51·9	67	138·0	44·0	1·81	11	6·0
Auckland	77·0	28	56·0	13	71·5	59·5	55·7	71	147·0	52·0	3·26	14	4·2
Jamaica, Negril Point.	87·9	15	65·0	9	85·2	70·5	68·0	71	...	...	·56	3	...
Trinidad	90·0	sevl	67·0	sevl	87·7	70·6	72·3	83	166·0	61·0	4·20	15	...
Grenada	87·2	11	70·8	29	83·6	73·1	69·3	70	154·2	...	12·49	24	3·6
Toronto	39·2	13	—9·7	28	29·6	16·2	17·8	81	45·8	—13·5	1·99	25	7·9
Fredericton	49·8	21	—10·7	29	27·0	6·5	5·5	61	...	...	3·36	8	5·8
Winnipeg	32·0	2	—29·8	25	13·2	—8·8	...	...	...	...	1·02	10	5·6
Victoria, B.C.	51·3	15	34·3	2	45·9	40·1	...	...	...	...	2·41	16	8·1
Dawson	32·4	23	—40·0	13	6·0	—5·0	...	...	...	...	·11	2	4·5

MALTA.—Mean temp. of air 56°·6 or 0°·4 above, mean hourly velocity of wind 10·2 or 1·0 below, averages. Mean temp. of sea 62°·7. TSS on 3 days; L on 29th.

Mauritius.—Mean temp. of air 2°·0, dew point 1°·9, and R 2·11 in., below averages. Mean hourly velocity of wind 11·1 miles, or 0·2 below average; mean direction E. by S.

MADRAS.—Bright sunshine 149·2 hours. Max. daily R 8·20 in. on 30th.

KODAIKANAL.—Mean temp. of air 52°·6. Mean velocity of wind 361 miles per day. Bright sunshine 168·6 hours.

COLOMBO, CEYLON.—Mean temp. of air 79°·0 or 0°·2, of dew point 0°·2, and R 2·20 in. or 4·06 in. below, averages. Mean hourly velocity of wind 9·2 miles, prevailing direction N. and N.W.

HONGKONG.—Mean temp. of air 61°·1. R ·92 in. below average. Bright sunshine 222·3 hours, or 32 above average. Mean hourly velocity of wind 12·0 miles; prevailing direction N.E. by E.

Adelaide.—Mean temp. of air 2°·0 below, R ·30 in. above, average. Some severe TSS.

Sydney.—Mean temp. of air 0°·5 below, humidity 1°·4 below, and R 1·39 in. above, average.

Wellington.—Mean temp. 6°·4 above, R 1·93 in. below, averages.

TRINIDAD.—R ·60 in. below the 40 years' average.