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THE BRITISH ASSOCIATION IN SOUTH AFRICA, 1905.

The meeting of the British Association in South Africa has been a remarkable departure from the traditions of three-quarters of a century, not because it took place beyond the seas, for the Association met at Montreal in 1884, and at Toronto in 1897, but because never before has a meeting been held at a number of separate centres several days' journey apart. New rules were introduced to deal with the new conditions. It was arranged that only members of the Association who had attended earlier meetings, or who had been specially elected by the Council, should be eligible for the special privileges offered by the Union Castle Shipping Company and the Colonial and Municipal authorities in South Africa. A smaller number received the greater privilege of being included in the "Official Party," all of them being present or past officers of the Association, or of the Sections, and this party was favoured with priority in the abounding hospitality lavished on the Association by the people of South Africa, a hospitality so great that it created an uneasy feeling in some minds that it could never be adequately repaid. We believe, however, that the visit of the Association will be productive of real and lasting good to South Africa.

Most of the members of the official party left Southampton on board the Royal Mail Steamer *Saxon*, on July 29th, and the voyage was one of remarkable comfort and interest. The huge vessel of more than 12,000 tons was favoured by calm weather to within a few hundred miles of the Cape, and only on the last day of the voyage was the motion sufficient to make it necessary to have "fiddles" on the tables to control the dishes at meals. The weather was, however, nearly always dull, and surprisingly cool. Only on one day, when passing Cape Verde, was the temperature as high as it had been for a week before our departure from London. The warmth increased slightly, on the whole, from the Channel until the noonday sun became vertical on August 4th, in 20° N.; thereafter, when the North-East Trades gave place to the South-West monsoon of West Africa, and that in turn changed gradually into the South-East Trades, it grew steadily cooler. On the equator, blankets, which had been discarded at Madeira as an encumbrance, came into

favour once more, and long before the south temperate zone was entered upon it became uncomfortably cool for sitting on deck at night without an overcoat.

The President of the Association, Professor G. H. Darwin, of Cambridge, and the Presidents of most of the Sections, were on board, and on the initiation of Mr. Maylard, of Glasgow, a series of short impromptu lectures was arranged, which proved both pleasant and profitable. Amongst these lectures two had some bearing on meteorology, one by Professor W. M. Davis, of Harvard University, given in 1° N., on August 7th, on the Weather of the Atlantic; the other by Dr. H. R. Mill, in 15° S., on August 10th, on the Bed of the Sea and the circulation of its waters. For a week there were two well-attended lectures each day, but that did not interfere with the ordinary ship's sports, which went on with the usual enthusiasm.

The *Saxon* reached Capetown early in the morning of Tuesday, August 15th, and the routine of a British Association meeting commenced immediately. The sectional meetings were not well attended as a rule by the over-sea members, and occasionally very small numbers were present when important papers were being read. Indeed it was generally felt that the primary objects of the Association were better pursued by excursions in the neighbourhood than by presence in the buildings where the sections met.

At the meeting of the General Committee on the afternoon of the 15th, the Report of the Council of the Association was received, and this contained a remarkable resolution regarding the co-ordination of the meteorological services of the British Empire, which we published *in extenso* last month. The meteorological papers were, unfortunately, scattered through several sections, as owing to some unexplained decision of the Council, the Sub-Section of Cosmical Physics, which has been so successful in recent years, was not continued. There were papers enough both in the Astronomical and the Meteorological departments to have made a very successful sub-section, but they suffered from being taken simultaneously in some cases, so that no discussion was possible, while in other cases limitations of time made brevity the first essential. We hope to publish abstracts of the more important papers falling within our scope, and at present give the titles only.

AUGUST 16th, Wednesday.

Prof. Beattie, Mr. Lyle, and Mr. Logeman.—*Observations on Atmospheric Electricity in South Africa.* (Section A).

Mr. A. R. Dwerryhouse.—*Report of the Committee on the underground waters of North-West Yorkshire.* (Section C).

Discussion on the effect of Climate upon Health. Speakers—Sir T. Lauder Brunton, Prof. McKendrick, Dr. Gregory, Dr. Jasper Anderson, Prof. Bohr, Dr. J. A. Mitchell, Dr. C. F. K. Murray, Dr. Jane Waterston, Dr. J. Hewat, Dr. Cassalis, Dr. Fuller, Mr. J. Barcroft. (Section I).

AUGUST 17th, Thursday.

Prof. J. C. Beattie and Prof. J. T. Morrison.—*The Magnetic Survey of South Africa.* (Section A).

Mr. A. W. Rogers.—*Glacial Periods in South Africa.* (Section C).

Prof. A. Penck.—*Changes of Climate as Movements of the Snow Line and Upper Tree Limit since Tertiary Times.* (Section C).

AUGUST 18th, Friday.

Dr. H. R. Mill.—*Comparison of the long-period rainfall records at Capetown and Greenwich.* (Section A).

Mr. C. Stewart.—*The Climatology of South Africa.* (Section E.)

The Meteorological Breakfast was arranged by Mr. Charles Stewart, Secretary of the Cape of Good Hope Meteorological Commission, but on account of the distance from the centre at which many of the visitors lived, and the difficulty of communicating with them, the attendance was much smaller than usual, and many of the over-sea members who were warmly interested in the subject were unable to be present. The following were at the breakfast, which took place on Friday, August 18th, at the Grand Parade Restaurant :—

H. L. Attridge	Sea Point, nr. Capetown.
L. C. Bernacchi	London.
Henry Bohns	Kenilworth, nr. Capetown.
J. Edmund Clark	Croydon.
Richard H. Heward ...	Sea Point, nr. Capetown.
W. A. Legg	Capetown.
R. H. Meunard	Woodstock, nr. Capetown.
Hugh Robert Mill	London.
R. C. Wynne Roberts ...	Capetown.
Charles M. Stewart ..	Capetown.
Thomas Stewart	Capetown.
W. H. Taylor	Capetown.

Dr. H. R. Mill briefly explained the origin and nature of the annual meteorological breakfast of the British Association, and expressed his admiration of the work being done with very inadequate resources by the Cape of Good Hope Meteorological Commission. He hoped that the time might come when the meteorological services of South Africa would be consolidated into one system, and assimilated with that of the rest of the British Empire, in accordance with the resolution passed by the General Committee. Mr. J. E. Clark also made some remarks, and Mr. Charles Stewart replied on behalf of the local meteorologists.

On Saturday, August 19th, a very interesting series of excursions took place to Table Mountain, the parties going and returning by different routes, but meeting at the reservoirs of the Capetown Waterworks, where lunch was served by the kindness of the Capetown Corporation. One party returned through the Woodhead Tunnel, which carries the water-main for a distance of over 2000 feet through the mountain. The exquisite beauty of the surroundings of Capetown in the early spring, and the remarkable hospitality of the people, made the leave-taking very regretful when the last of the British Association party sailed from Table Bay on the night of the 19th.

ON THE USE OF BEAUFORT'S SCALE.

By R. H. Curtis.

(*Continued from p.* 140.)

In Vol. XXIII. of the *Quart.Jour.Roy.Met.Soc.* I have given the results of a determination I made of the velocity equivalents of the numbers of Beaufort's scale, for which I employed several thousands of anemometer observations made exclusively at stations where the instruments are satisfactorily exposed. The results are repeated in the following table :—

TABLE I.

Estd. Force by Beaufort's Scale	0	1	2	3	4	5	6	7	8	9	10	11	12
Mean Velocity Equivalent... In miles per hr. (Curtis' method).	2	4	7	10	14	19	25	31	37	44	53	64	77

After my results had been published I received a letter from Dr. Köppen, of the Hamburg Seewarte, in which he called my attention to a proposal he had made for obtaining the equivalents by a slightly different method to that I had adopted. My plan had been to group under each point of Beaufort's scale the corresponding anemometrical value for each estimation recorded, and then to find the mean velocity value for each point. Dr. Köppen reversed this process, and got his result by sorting out under each velocity the corresponding estimated forces, and thus finding the mean Beaufort scale value for every mile of velocity. At first sight one might think the results by both methods would be identical, but such is not the case. For the middle numbers of the scale the velocity equivalents are the same, but for the lower numbers they are smaller, and for the higher numbers they are larger by Köppen's method than by mine.

The reason for this difference is as follows :—when we compare a number of observations of a given force with the corresponding anemometer values, we always find that the latter cover a considerable range of velocity. In looking for the cause of this we must remember that an estimated force represents the impression conveyed to the mind of the observer by what he observes at a particular moment, or during a brief period, whilst the anemometer value represents the average speed of the wind during a complete hour, of which the moment of observation is but the mid-way point.

Since the wind does not always blow with uniform strength throughout an hour, it is easy to see how an increase or decrease in its force at some part of the interval will account for some of these variations in the velocity equivalents, whilst others are no doubt due to errors of estimation on the part of the observer himself, whose ultimate award is certainly arrived at, if he be an intelligent observer, through the agency of more than one of his senses.

Thus, in analysing the observations I used for my equivalents, so

as to find the mean velocity-equivalent for the same estimated force, but for winds blowing from different quarters, I found that the mean velocity for a moderate gale (force 7) from the north-east was 11 per cent. *less* than that got from the same observer's estimates of a moderate gale from the west, and for this result the well-known "feel" of the polar wind must, I think, have been largely responsible.

Now Köppen's method enables us to sort out these over and under-estimates (regarding all the differences as such), and to find the velocity which most frequently agrees with each estimated value. If the over-estimates of a given force are equal in number to the under-estimates, they will balance each other, and the result will be the same mean velocity-equivalent, whether the observations are dealt with by the method I employed, or by that of Köppen, and this is what actually happens as regards the middle values of the scale.

But when we come to the lower numbers of the scale it is found that the under-estimates of force somewhat preponderate, and therefore Köppen's method gives distinctly lower velocities as the equivalents of forces below 3. On the other hand, with force 8 and upwards, the over-estimates are the more numerous, and the result is that for these forces Köppen's method yields higher velocity equivalents than are obtained when the observations are dealt with by the method I followed.

The values yielded by Dr. Köppen's method are given in the following Table II. They are obtained from precisely the same observations as were used for Table I., but they progress rather more symmetrically, and form a smoother curve when presented in that form.

TABLE II.

Values of Beaufort's Scale ...	0	1	2	3	4	5	6	7	8	9	10	11	12
Mean Velocity Equivalents ... In miles per hour. (Köppen's method).	0	1	4	9	14	20	26	33	42	51	62	75	92

It will be seen that up to the force of "7" the differences between the two sets of equivalents are not serious, but that from force "8" upwards they grow rapidly, the values got by Köppen's method being much higher than those got by my own.

Until now I have not published these figures, although Dr. Köppen has, I believe, done so, I having sent them to him in 1897. My opinion is that upon the whole they are the better ones to adopt, and the only reason I have to offer for their non-appearance earlier, and it is probably an insufficient one, is that I hesitated to disturb so soon values which I had reason to suppose had been pretty generally adopted.

To revert again, now, to the objection made by some to Beaufort's scale on the ground that its sub-divisions of wind-force are too

minute, I should like to make a suggestion by way of concluding this article. The suggestion is this: that whilst those who desire to do so should, of course, continue to use the scale without abridgment—and these will probably include most observers at land stations, as well as all seamen—they should adopt as its basis the velocity equivalents given in Table II. as having been determined by a method of calculation which is, upon the whole, preferable to that used for the values given in Table I.

Those, however, who prefer a scale of fewer numbers might divide the scale into groups, as follows:—

Beaufort's Scale.	Description of Wind.	Equivalent Mean Velocity
0	Calm.	0 miles per hour.
1 to 3	Light airs.	1 to 10 ,, ,,
4 ,, 6	Moderate breezes.	11 ,, 30 ,, ,,
7 ,, 8	Gale.	31 ,, 45 ,, ,,
9 ,, 10	Hard gale.	46 ,, 65 ,, ,,
11	Storm.	66 ,, 80 ,, ,,
12	Hurricane.	81 and above ,, ,,

It will be noticed that the velocities corresponding to this classification of wind-force arrange themselves in groups, which are very convenient for remembering. The first group of three figures embraces a velocity of 10 miles, and the second group also of three figures a range of 20 miles; the third and fourth groups are each of two figures, and cover a velocity range of 15 miles and 20 miles respectively, whilst the next number has 15 miles, and the maximum limit of the hurricane is literally, as well as figuratively, "in the air"!

SUMMARY OF THE RESULTS OF BRITISH THUNDERSTORM COMMITTEE, 1888—89.

By L. C. W. Bonacina.

The Committee of British Thunderstorms was appointed by the Council of the Royal Meteorological Society at the end of the year 1887 to organize observations of thunderstorms occurring in the south-east of England. The discussion of these observations, made chiefly in the south-east of England but also in other parts of the country, which was confined to those of the years 1888 and 1889, was undertaken by Mr. W. Marriott (see *Quart. Jour. Roy. Met. Soc.*, January, 1892,) in the absence of the Hon. Ralph Abercromby, the originator of the scheme; and, though the observations only extended over two years, it resulted in the acquisition of some definite knowledge relating to thunderstorms, viz.:—

(1). The hours of maximum frequency of thunderstorms are from 12 noon to 4 p.m.; those of minimum frequency are 1.0 a.m. to 7.0 a.m.

(2). The average rate of travel of thunderstorms in ill-defined low pressure systems is about 18 miles per hour, but the rate of those storms that occur in squally cyclonic weather is greater.

(3). Thunderstorms appear to be unconnected with the absolute height of the barometer, they are connected only with its relative height—*i.e.*, with the distribution of atmospheric pressure.

(4). Thunderstorms usually occur in ill-defined low pressure systems, or in the space, or "col," between two anticyclones.

(5). From synoptic charts showing differences of pressure of ·02 inch, constructed for the month of June, 1888, it was apparent that the seemingly ill-defined areas of low pressure contained a number of small distinct low pressure systems with wind circulation in many respects similar to ordinary cyclones, and that the districts traversed by these small depressions were those which reported thunderstorms; moreover, from these charts it was also evident that storms occurred where the direction of the surface wind differed from that of the upper currents.

(6). Thunderstorms apparently circulate round the area or areas of lowest pressure in these "ill-defined" low pressure systems, and travel in the direction of the prevailing wind.

(7). When thunderstorms accompany large cyclonic depressions they usually occur in the south-eastern quadrant of the latter; (ordinary eastward moving cyclones).

(8). The movements of thunderstorms seem to be controlled less by the configuration of the land and contour of the hills than by the distribution of atmospheric pressure.

(9). A violent whirl of wind at some little distance above the surface of the earth is usually associated with thunderstorm depressions; occasionally this whirl of wind is felt at the surface.

(10). Damage effected by lightning seems to be associated with numerous oscillations of the barographic record; a sudden increase of pressure of three or four hundredths of an inch frequently precedes a heavy fall of rain in thunderstorms.

(11). Thunderstorms probably do not as a rule exceed an altitude of about 5000 feet above the earth's surface.

(12). An upward current of air is apparently an essential constituent of a thunderstorm formation.

Two interesting instances of "line" thunderstorms during the two years 1888 and 1889 were reported (May 18th-19th, 1888, and

June 2nd, 1889.) These storms, which directly traversed England from south to north at the rate of 50 miles per hour, were similar in character, and were associated with a similar type of weather, pressure on both occasions being low over the Atlantic and high over Scandinavia. The important question was raised by Mr. Symons as to whether the thunderstorms themselves travelled or whether the thunderstorm *conditions* were transmitted along the traversed path.

In the above summary of the report of the Thunderstorm Committee published in the *Quarterly Journal of the Royal Meteorological Society* for January, 1892, we have only included those apparent facts which may be considered to be representative of thunderstorms in general, and have omitted those which can only be said to relate to the particular storms of 1888 and 1889 upon which the observations were made; obviously, from two years' observations, no light could be thrown upon such questions as the geographical and seasonal distribution of thunderstorms.

The distribution of thunderstorms over England and Wales for the years 1871 to 1887 has been studied by Mr. Marriott, and appears to have been very irregular, showing no definite relation to latitude (see *Q.J. Roy. Met. Soc.*, Jan., 1890, pp. 1-4). We believe that future study of the distribution of thunderstorms over England will show that it is related to the geographical features of the different districts, and scarcely at all to the geographical positions.

[We are much indebted to Mr. Bonacina for undertaking the task of preparing a summary of the reports of the Thunderstorm Committee, which may be looked upon as an excellent preliminary to the formulation of the scheme suggested in our August issue (p. 118) for a systematic study of British Thunderstorms. We shall look forward with interest to developments in this direction, and hope to be able to give publicity to its results from time to time.—ED. *S.M.M.*]

EXPLORATIONS OF THE ATMOSPHERE.

IN a recent number of *Science* appeared an interesting account of some experiments carried out at St. Louis with *ballons-sondes*, for the purpose of investigating the meteorological conditions at great heights above the American continent. The experiments were a continuation of those described in previous Nos. of the same journal, and were conducted by Mr. Clayton, under the direction of Mr. A. Lawrence Rotch, of the Blue Hill Observatory. The German expanding rubber balloons filled with hydrogen by the vitriolic process were employed, and nine ascents were made during January, February and March, 1905. In all instances but one the balloons and attached instruments were returned, in accordance with the instructions addressed to the finders, and all descended within the eastern half of a circle having its centre at St. Louis and a radius of 285 miles. On January 25th, at an altitude of 48,700 feet, and when a high barometric pressure

prevailed on the earth's surface, a temperature of —111° F. was registered, this being one of the lowest natural temperatures ever recorded. The experiments are to be continued during the present summer, the success hitherto attained having induced the Secretary of the Smithsonian Institution to make a grant of $1,000 for that purpose from the Hodgkins' fund.

The kite experiments at the Blue Hill Observatory, a short account of which we published in our issue of October last, are also being continued; flights being made in each month on the days appointed by the International Committee for Scientific Aeronautics, whilst in addition they are employed to ascertain the conditions prevailing above the Atlantic Ocean in the Trade wind region. In connection with this enquiry the author continues :—

"Thus the investigation which was first proposed by Mr. Rotch, and which has been persistently advocated by him since, is now in progress, and this was rendered possible through the co-operation of the well-known French meteorologist, M. L. Teisserenc de Bort, who placed his steam yacht at the disposal of Mr. Rotch, on condition that the latter should share the expense of the cruise. Accordingly, on June 3rd, Mr. Clayton sailed from Boston for the Mediterranean on board the White Star steamer *Romanic*, equipped for raising self-recording instruments with kites, as was first done in 1901 by Messrs. Rotch and Sweetland on a voyage from Boston to Liverpool. A despatch from Mr. Clayton, at Gibraltar, announced that flights had been made on six days, and a mean height of 3,000 feet attained. The results of aerial soundings in the region of permanent high pressure around the Azores, and near the northern limit of the north-east trades, are expected to prove of special interest. At Gibraltar, Mr. Clayton is to embark on the *Otaria*, a yacht of 350 tons, which its owner has already employed for kite-flying in European inland waters. The boat will proceed south, touching at Madeira, Canary and Cape Verde Islands, and perhaps go as far as St. Paul, near the equator, returning by a more westerly course to the Azores, the whole voyage occupying about six weeks. On this route the north-east trade-winds and doldrums are traversed, and the south-east trades entered. Should there be too little wind, either at the surface or higher up, the speed of the vessel will enable the kites to rise, and, should the wind at any time be too strong, by steaming with it the pull of the kites can be moderated. By this method it is hoped that all the strata up to a height of 15,000 feet or more will be penetrated, so that their condition as regards temperature, moisture and wind may be investigated. Besides determining the depth of the north-east trade-wind, the supposed south-west, or return trade, which has only been observed on the Peak of Teneriffe, will be sought, and its height above the ocean in different latitudes measured, but in case the kites do not reach a sufficient altitude, it is proposed to liberate small balloons from Madeira, and observe their change of direction as they rise. Professor Hergesell, on board the Prince of Monaco's yacht, executed last summer a series of kite-flights in the region between Spain, the Canaries and the Azores, without encountering the upper anti-trade, and the present expedition expects to make similar soundings in these and lower latitudes, and will also attempt to extend them to greater heights."

Correspondence.

THE STUDY OF THUNDERSTORMS.

To the Editor of Symons's Meteorological Magazine.

BEFORE commencing any fresh attempt to record thunderstorms, would it not be well to find out what material already exists in the hands of the Committee of the Royal Meteorological Society? You state, on p. 120 of your August number, that they have not made any report since 1889; but the collection of material went on long after that: in fact, I am still recording particulars of thunderstorms in the little books they have supplied, and it may be that many others are doing the same, although I have ceased sending reports to the Committee.

T. W. BACKHOUSE.

West Hendon House, Sunderland, 2nd October, 1905.

ANOTHER NEGLECTED METEOROLOGICAL ITEM.

Is not the recording of the snow lying on, or covering, the ground neglected in this country, although recorded in others? I always record this item, as well as the average depth when the ground is covered. Is it not of some importance, as affecting districts other than the place of observation? Here in winter the bitterest winds we get are from the south, and I incline to attribute this to the larger distance of snow-covered ground in that direction than any other, but this is merely a guess, as one has no information to go by. I do not know how far the coldness of the south wind applies to other stations, nor whether the suggested explanation would apply elsewhere. It would be interesting to hear whether such were the case.

T. W. BACKHOUSE.

West Hendon House, Sunderland, 3rd October, 1905.

HEAVY RAIN IN INDIA.

MR. J. DOUGLAS MAYNARD, writing from Seoni Malwa, in the Central Provinces of India, writes to Mr. T. P. Newman as under, and Mr. Newman has forwarded the extract to us for publication:—

"We have had excellent rains so far, and a good break of fine weather this week, facilitating ploughing and sowing. It looks as if rain were coming up again in force to-night.

"In thirty-six hours ending 8 a.m. on July 8th, we had 19 inches of rain in Seoni, 13 inches within the latter twenty-four hours. There was a great flood (said to be a record), several houses destroyed and cattle drowned, and a section of our only metalled road washed clean away, leaving only the natural soil. A part of the Orphanage boundary wall, which had been built probably during the missionary's temporary absence, and had its lime facing neatly put on before his return, betrayed its construction by 'flowing down,' as the people put it."

Unfortunately, says Mr. Newman, there are other districts, notably the Native State of Rajputana, where the rainfall is very deficient.

BEN NEVIS OBSERVATORY AND THE ARGENTINE REPUBLIC.

THE following letter appeared in *Nature* of September 14th last:—

News has reached me here from the office of the Scottish National Antarctic Expedition in Edinburgh of the appointment of almost the whole of the Ben Nevis Observatory staff to the Argentine Meteorological Office, including the Superintendent, Mr. Angus Rankin, who has been associated with the observatory for more than twenty years, Mr. Robert Macdougal, for many years assistant, and Mr. Bee.

It may be remembered that in March, 1903, the Scottish National Antarctic Expedition set up a first-class meteorological and magnetical station in the South Orkneys, at Scotia Bay, and that, after the wintering of the *Scotia*, I offered to hand over the station, including Omond House and Cope'and Observatory, to the Argentine Government, with eighteen months' provisions, as well as to give a passage on board the *Scotia* to Argentine men of Science if the Republic would undertake to continue the work and relieve the party the following year. This was carried through by the energy of Mr. Walter G. Davis, director of the Argentine Meteorological Office, and Mr. Robert C. Mossman, the Scottish expedition's meteorologist, was asked to continue in charge. Now Mr. Mossman has returned after two years' valuable work in the Antarctic, and the station is being kept up a third year—the first time in the history of Antarctic exploration that scientific observations have been carried on in one place for more than two years.

But the Republic is not satisfied; it is to continue the work for still another year, and is even going to increase the number of Antarctic stations. Trained men were required, and since Mr. Mossman's return he has been in communication with Mr. Davis, with the result that these three gentlemen have been appointed to carry on this work, as well as Mr. W. R. Bruce, also of Ben Nevis Observatory, who arrived in Buenos Aires three weeks ago.

The Argentine Republic must be congratulated on its enlightened perspective; but surely while doing so we must hang our heads in shame, for, while our Government has discouraged scientific research, we find this rapidly rising Republic eager to encourage it.

WILLIAM S. BRUCE.

Eggishorn, Switzerland, September 8.

NILE FLOODS AND ATMOSPHERIC PRESSURE.*

THE study of the relations existing between the variations of atmospheric pressure in north-east Africa and the fluctuations of the Nile Flood, has hitherto been considerably handicapped by the assumption that the volume of water brought down by the White Nile, rising in the Equatorial Lakes, was not greatly inferior to that supplied by the Blue Nile, which drains the Abyssinian plateau. It is now, however, recognised that the Blue Nile, when in flood, holds back the waters of the White Nile to such an extent that the latter may be practically ignored as a factor in the seasonal inundations.

Few observations of barometric pressure exist for the upper parts of the Nile Valley, and it is necessary to rely entirely on the records at Cairo, Alexandria and Beirut, for information as to normal conditions and seasonal variations over any long period. The rainfall of Abyssinia is due to the monsoon of eastern Africa, and corresponds to pressure variations affecting a very wide area; a certain degree of similarity to the south-west monsoon rainfall of India is evident. The barometric conditions in northern Egypt may, therefore, be relied upon as giving a very fair approximation to those of the districts further to the south.

Practically the whole of the Abyssinian rainfall is deposited between April and September, 90 per cent. of the annual fall taking place from June to September; it is consequently only in these six months that any relation between pressure and flooding can be expected to exist.

If the yearly variations of pressure from April to September are examined, it will be seen that their oscillations are generally inverse to those of the Nile Flood, as indicated by the gaugings at Aswan, years of high pressure corresponding to those of low rainfall, and *vice-versâ*. In 33 years a mean pressure in excess of the normal occurred with 12 low floods and 7 high ones, while a deficient mean pressure accompanied 14 high floods and no low ones. If the curves of the anomalies of the two elements are compared, it is further evident that the divergencies from the normal of the two curves show a marked tendency to move in the same direction. Of 18 years with an increase of pressure, 2 only had an increase in flood, and in 14 years with a decrease in pressure, but 5 had a smaller flood.

In several of the years in which discrepancies occurred, it is noticeable that the pressure conditions in northern Egypt exhibited marked differences from those of India, and accorded closely with those of the Azores, indicating that the Mediterranean system extended into Egypt on these occasions. It is possible, therefore, that the conditions in Abyssinia were not in these instances fairly represented by the Cairo readings.

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* On the Relation between Variations of Atmospheric Pressure in North-East Africa and the Nile Flood. By Capt. H. G. Lyons. Communicated by Dr. W. N. Shaw. *Proc. Roy. Soc.* Vol. **A** 76 (1905), pp. 66–86. Plate.

The coincidence of the two curves is even more clearly shown if the monthly means are plotted, even brief temporary fluctuations being sometimes traceable. Apparent discrepancies, existing in the six-monthly curves, are also in most cases explained by this means.

Taking the 35 years, 1869–1903, Captain Lyons is of the opinion that in six years out of seven a very fairly accurate prediction of the flood from month to month could have been made.

METEOROLOGICAL NEWS AND NOTES.

WE regret to see announced the death, in his sixty-ninth year, of Dr. W. von Bezold, professor of physics and meteorology at the University of Berlin, and director of the German Meteorological Institute. He was also for many years an honorary fellow of the Royal Meteorological Society.

COMPETITIVE METEOROLOGY.—To many curious competitions must be added a French novelty that is the most curious of them all. It was a tourney meteorological, and its conditions were to divine correctly in advance the weather on 15 consecutive days in fickle September. Seven competitors entered, and three achieved, or are stated to have achieved, success, predicting the weather for the successive days with a precision which is described as almost mathematical. It is a pity that we are not told more of these infallible meteorologists.

IN BERWICKSHIRE AND EAST LOTHIAN serious floods have been caused by a remarkable rainstorm of 48 hours' duration—the first for months. Great stretches of land lay under water, and in at least eight instances houses were flooded, causing the inmates to beat a hasty retreat. Turnips and potatoes were practically washed out of the drills, and the outlook caused grave concern to agriculturists. An exceptionally high tide at the same time made considerable encroachment on land on the Haddington coast.

MR. G. B. BUCKTON, F.R.S., F.L.S., well known for his contributions on entomological and other subjects to the Transactions of the Royal Society, died on September 25th, in his eighty-eighth year. Mr. Buckton had kept a record of rainfall at his residence at Weycombe, near Haslemere, for nearly forty years.

THE COUNCIL OF THE ROYAL METEOROLOGICAL SOCIETY have now appointed a lecturer who is prepared to deliver lectures on Meteorological subjects—*e.g.*, How to Observe the Weather; Weather Forecasting; Climate; Rainfall; Thunderstorms; Meteorology in Relation to Agriculture, Health, &c. The lectures will be illustrated by lantern slides from the large collection in the possession of the Society. The Council are willing to arrange for exhibiting at the gatherings of local scientific societies, institutions or schools, a collection of photographs, diagrams and charts illustrating meteorological phenomena, and various patterns of instruments used for meteorological observations.

NEWS was received on September 29th of the death of Rear-Admiral Sir William James Lloyd Wharton, K.C.B., F.R.S., who succumbed to enteric fever and pneumonia, at Capetown, where he remained after the departure of the British Association party. After being engaged many years in marine surveying, he was appointed Hydrographer to the Admiralty in August, 1884, in which position he remained until his retirement in 1904. Sir William Wharton was the author of "Hydrographical Surveying," and edited the "Journal of Captain Cook's First Voyage Round the World." He was also, for some time, a member of the Meteorological Council.

THE DRY WEATHER of the past summer has had the effect of lately rendering it necessary for some of the large towns to practice economy in the matter of water supply. Liverpool had recently to restrict its service to 13 hours a day, its sources of supply, viz., Lake Vyrnwy and the Rivington Reservoirs, both showing a shortage. At Loughborough also, where the reservoirs are stated to be lower than for twenty years, the same course had to be adopted. A glance at the aggregate table of rainfall shows this district to be within the region of the greatest deficiency, and as for 1904 also, it was within an area well below the average, the cumulative deficiency must be very great. The town of Bath and the Cleveland district have also been among the sufferers, and in many rural districts the scarcity of water has been severely felt. The heavy rains of June, which did much to alleviate the effects of the drought in the south, did not apparently extend far beyond the boundaries of the home counties, and in the Midlands and North of England the three months, May, June and July, were all dry, May and July in a particular degree, and these conditions, combined with the active evaporation of those months, are no doubt accountable for the general shortage of water in those districts.

BOOKS RECEIVED.

The Croydon Natural History and Scientific Society. Report of the Meteorological Committee for 1904. Prepared by F. Campbell-Bayard, LL.M., Hon. Sec. Size 8½ × 5½. Pp. 59.

Results of Meteorological Observations in New South Wales during 1900, 1901, and 1902, under the direction of H. C. Russell, B.A., C.M.G., F.R.S. Sydney, 1904. Size 10 × 6. Pp. 216.

Results of Rain, River and Evaporation Observations made in New South Wales during 1901-2, under the direction of H. C. Russell, B.A., C.M.G., F.R.S. Sydney, 1904. Size 9½ × 6. Pp. 423+xc. Maps and diagrams.

Jahrbuch des Norwegischen Meteorologischen Instituts für 1904. Herausgegeben von Dr. H. Mohn. Christiania, 1905. Size 13 × 10. Pp. 138.

Osservatorio di Messina. Annuario per l'anno 1904. Messina, 1905. Size 9½ × 6½. Pp. 87. One plate.

Annual Report of the Central Meteorological Observatory of Japan for the Year 1902. Part I., Meteorological Observations in Japan. Tokio, 1905. Size 12 × 8. Pp. 329.

Annuario publicado pelo Observatorio do Rio de Janeiro, 1905. Anno XXI. Rio de Janeiro, 1905. Size 7 × 5. Pp. 336.

NINE MONTHS' RAINFALL OF 1905.

Aggregate of Rainfall for January—September, 1905.

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	17·74	100	Bolton	28·24	95	Braemar	22·69	91
Tenterden	19·89	106	Wetherby	16·40	85	Aberdeen	19·67	86
Hartley Wintney	17·86	97	Arncliffe	35·06	83	Cawdor	21·09	99
Hitchin	18·59	107	Hull	14·83	78	Invergarry	39·43	104
Winslow	15·90	84	Newcastle	13·47	68	Bendamph	59·34	103
Westley	16·92	93	Seathwaite	79·98	88	Dunrobin	22·26	103
Brundall	15·72	89	Cardiff, Ely	23·67	81	Killarney	32·45	82
Alderbury	19·70	100	Haverfordwest	28·55	90	Waterford	26·50	98
Winterbourne	20·94	81	Gogerddan	32·45	106	Broadford	23·72	100
Torquay	19·18	81	Llandudno	17·68	86	Carlow	22·45	92
Polapit Tamar	23·01	91	Cargen	25·12	84	Dublin	19·28	98
Bath	17·33	80	Lilliesleaf	20·10	86	Mullingar	24·08	92
Stroud, Upfield	19·57	92	Colmonell	26·06	86	Ballinasloe	22·03	84
Woolstaston	20·10	88	Glasgow	20·26	80	Clifden	45·51	83
Bromsgrove	16·14	91	Inveraray	47·81	112	Crossmolina	30·43	89
Boston	16·48	98	Islay, Eallabus	35·37	112	Seaforde	24·18	89
Hodsock Priory	12·75	72	Mull	38·94	101	Londonderry	26·18	93
Derby	13·10	69	Dundee	14·70	71	Omagh	26·74	100

Another month, characterised by pronounced dryness, has had the effect of still further aggravating the widespread deficiency of rainfall which has now become general in almost all parts of the British Isles. The only area of any size which still shows an aggregate fall since January 1st, 1905, in excess of the average, is situated in the west and north of Scotland, but even in this area, nowhere except in the south of Argyllshire, did the fall surpass the average by more than a trifling amount. Here the two relatively wettest stations, Inveraray and Eallabus, had excesses of 12 per cent. A small area still remains in the south-east of England where the fall is somewhat above the normal amount, and Aberystwyth stands by itself with 106 per cent. of the average. Elsewhere the fall has been consistently in defect, most notably in the North Midlands of England and on the east coast from Dundee to Hull. In both of these areas considerable portions have received less than three quarters of their usual rainfall to the end of September.

Speaking generally the distribution remains remarkably similar to that at the end of August, with a falling off which is most marked in the south-west of England, in Wales and the east of Ireland.

RAINFALL AND TEMPERATURE, SEPTEMBER, 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, 1870-99.	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) ...	2·09	— ·20	·70	25	12	76·5	3	42·7	15	0	0
II.	Tenterden ...	2·47	— ·15	·80	9	14	74·0	6	40·0	15, 16	0	0
,,	Hartley Wintney ...	2·16	— ·22	·49	25	12	75·0	4	35·0	21	0	1
III.	Hitchin	2·02	— ·24	·95	26	14	72·0	3	36·0	14	0	...
,,	Winslow (Addington) ...	1·42	— ·90	·62	25	14	75·0	3	32·0	15	1	3
IV.	Bury St. Edmunds (Westley)	1·42	— 1·07	·55	25	10	74·0	3	39·0	21	0	...
,,	Brundall	2·02	— ·55	1·05	24	13	74·0	3	41·0	15, 17	0	0
V.	Alderbury ...	1·31	— 1·22	·44	9	12	76·0	4	...	...	...	...
,,	Winterbourne Steepleton ...	2·76	— ·64	1·22	9	9	72·0	3	35·6	27	0	0
,,	Torquay (Cary Green) ...	1·86	— 1·19	·82	5	11	72·4	3	43·1	22	0	0
,,	Polapit Tamar [Launceston]	1·78	— 1·85	·37	9	17	68·5	4	31·6	22	2	2
,,	Bath	1·66	— 1·23	·59	9	9	69·5	5	36·0	21	0	7
VI.	Stroud (Upfield) ...	·88	— 1·84	·30	6	10	71·0	4, 5	42·0	14	0	..
,,	Church Stretton (Woolstaston)	1·15	— 1·59	·31	9	10	66·0	5	38·0	21, 24	0	...
,,	Bromsgrove (Stoke Reformatory)	·81	— 1·51	·26	8	7	71·0	...	31·0	...	2	...
VII.	Boston ...	2·32	+ ·02	·61	25	11	70·0	3	37·0	21	0	...
,,	Worksop (Hodsock Priory).	1·21	— ·97	·37	9	13	72·4	4	31·7	15	1	8
,,	Derby (Midland Railway)...	1·20	— 1·12	·49	9	13	74·0	4	32·0	26	1	...
VIII.	Bolton (The Park) ...	3·26	— 1·12	·89	9	19	62·5	7	38·5	15	0	1
IX.	Wetherby (Ribston Hall) ...	1·99	— ·54	·52	9	15	...	...	...	...	...	...
,,	Arncliffe Vicarage ...	4·59	— ·54	1·09	9	22	...	...	...	...	...	...
,,	Hull (Pearson Park) ...	1·44	— ·96	·49	9	12	70·0	2	37·0	15	0	3
X.	Newcastle (Town Moor) ...	1·96	— ·40	·29	9	20	...	...	...	...	...	..
,,	Borrowdale (Seathwaite) ...	8·25	— 4·51	1·49	9	18	62·1	3	34·1	21	0	...
XI.	Cardiff (Ely) ...	1·88	— 2·20	·57	9	13	...	...	...	...	...	...
,,	Haverfordwest (High St.)..	2·25	— 1·96	·81	9	11	68·2	13	34·7	15	0	13
,,	Aberystwyth (Gogerddan)...	2·94	— 1·26	1·15	9	12	69·0	5,7,20	31·0	14*a*	3	...
,,	Llandudno ...	1·29	— 1·63	·49	9	15	67·2	5	43·0	21, 27	0	...
XII.	Cargen [Dumfries] ...	1·87	— 1·84	·34	1	11	65·0	4	33·0	21	0	...
,,	Lilliesleaf (Riddell) ...	2·49	— ·28	·55	27	21	69·0	4	29·0	20	1	6
XIII.	Edinburgh (Royal Observy.)	1·24	...	·45	27	13	64·7	5	39·7	30	0	0
XIV.	Colmonell	2·90	— 1·18	·71	1	13	68·0	4	33·0	14, 25	0	...
XV.	Tighnabruaich ...	4·19	— 1·34	·61	2	18	58·0	1,5,16	39·0	25	0	0
,,	Mull (Quinish) ...	5·96	+ ·49	1·26	6	22	...	...	...	...	...	...
XVI.	Dundee (Eastern Necropolis)	1·15	— 1·40	·45	26	16	70·3	3	36·2	21	0	...
XVII.	Braemar ...	1·97	— 1·30	·46	8	16	64·8	18	29·8	21	1	...
,,	Aberdeen (Cranford) ...	2·42	— ·62	·70	26	19	71·0	4	30·0	20	2	...
,,	Cawdor (Budgate)	1·82	— 1·19	·28	25	20	...	...	...	...	...	..
XVIII.	Invergarry ...	4·27	— ·85	1·12	7	9	...	...	...	...	...	...
,,	Bendamph...	8·89	+ ·61	1·10	7	23	...	...	...	...	...	...
XIX.	Dunrobin Castle ...	2·11	— ·60	·30	9	16	66·0	17	38·5	21	0	...
,,	Castletown ...	3·11	...	·89	2	23	68·0	6	37·0	21	0	...
XX.	Killarney ...	2·73	— 1·94	·57	9	21	67·0	1, 5	38·5	15	0	...
,,	Waterford (Brook Lodge)...	1·84	— 1·24	·54	8	13	70·0	3	35·0	15, 26	0	...
,,	Broadford (Hurdlestown) ...	2·16	— ·78	·45	5	20	66·0	5, 6	36·0	12	0	...
XXI.	Carlow (Browne's Hill) ...	1·62	— 1·18	·24	6	15	...	...	...	...	...	...
,,	Dublin (Fitz William Square)	1·23	— ·92	·36	27	14	68·1	4	38·5	26	0	0
XXII.	Ballinasloe	2·11	— 1·06	·39	8	22	67·0	3	33·0	15, 16	0	...
,,	Clifden (Kylemore House)..	5·28	— 1·44	1·11	8	16	...	...	...	...	...	...
XXIII.	Seaforde ...	1·05	— 2·32	·21	4	11	68·0	5	37·0	26	0	1
,,	Londonderry (Creggan Res.)	2·56	— 1·21	·65	9	21	...	...	...	...	...	...
,,	Omagh (Edenfel) ...	2·44	— 1·11	·46	8	21	65·0	4	32·0	25	1	2

+ Shows that the fall was above the average; — that it was below it. *a* and 16, 25.

SUPPLEMENTARY RAINFALL, SEPTEMBER, 1905.

Div.	STATION.	Rain. inches	Div.	STATION.	Rain. inches
II.	Dorking, Abinger Hall	2·02	XI.	New Radnor, Ednol	2·09
,,	Ramsgate, West Cliff	2·48	,,	Rhayader, Nantgwillt	2·38
,,	Hailsham	2·90	,,	Lake Vyrnwy	2·88
,,	Crowborough	2·67	,,	Ruthin, Plâs Drâw	1·52
,,	Osborne	2·59	,,	Criccieth, Talarvor	1·49
,,	Emsworth, Redlands	2·21	,,	Anglesey, Lligwy	1·92
,,	Alton, Ashdell	2·18	,,	Douglas, Woodville	2·10
,,	Newbury, Welford Park	1·80	XII.	Stoneykirk, Ardwell House	2·47
III.	Harrow Weald	1·55	,,	Dalry, Old Garroch	2·11
,,	Oxford, Magdalen College	1·16	,,	Langholm, Drove Road	3·90
,,	Banbury, Bloxham Grove	·99	,,	Moniaive, Maxwelton House	2·10
,,	Pitsford, Sedgebrook	1·35	XIII.	N. Esk Reservoir [Penicuick]	3·10
,,	Huntingdon, Brampton	1·55	XIV.	Maybole, Knockdon Farm	3·07
,,	Wisbech, Bank House	3·40	,,	Glasgow, Queen's Park	2·06
IV.	Southend	1·62	,,	Campbeltown, Redknowe	2·90
,,	Colchester, Lexden	1·07	XV.	Inveraray, Newtown	5·59
,,	Saffron Waldon, Newport	1·35	,,	Ballachulish House	9·76
,,	Rendlesham Hall	2·89	,,	Islay, Eallabus	4·49
,,	Swaffham	2·83	XVI.	Dollar	1·35
,,	Blakeney	2·05	,,	Loch Leven Sluices	1·79
V.	Bishops Cannings	1·39	,,	Balquhidder, Stronvar	...
,,	Ashburton, Druid House	2·43	,,	Coupar Angus Station	1·36
,,	Okehampton, Oaklands	1·71	,,	Blair Atholl	2·03
,,	Hartland Abbey	1·67	,,	Montrose, Sunnyside	1·51
,,	Lynmouth, Rock House	2·79	XVII.	Alford, Lynturk Manse	2·35
,,	Probus, Lamellyn	1·06	,,	Keith	3·07
,,	Wellington, The Avenue	1·59	XVIII.	N. Uist, Lochmaddy	5·26
,,	North Cadbury Rectory	1·45	,,	Aviemore, Alvey Manse	1·92
VI.	Clifton, Pembroke Road	1·33	,,	Loch Ness, Drumnadrochit	1·84
,,	Moreton-in-Marsh, Longboro'	1·18	,,	Glencarron Lodge	11·12
,,	Ross, The Graig	1·47	,,	Fearn, Lower Pitkerrie	1·82
,,	Shifnal, Hatton Grange	1·05	XIX.	Invershin	2·06
,,	Wem Rectory	1·32	,,	Altnaharra	3·05
,,	Cheadle, The Heath House	1·36	,,	Bettyhill	3·11
,,	Coventry, Kingswood	1·83	,,	Watten	2·38
VII.	Market Overton	2·93	XX.	Cork	1·35
,,	Market Rasen	1·79	,,	Darrynane Abbey	3·82
,,	Bawtry, Hesley Hall	1·14	,,	Glenam [Clonmel]	1·66
VIII.	Neston, Hinderton	1·60	,,	Ballingarry, Gurteen	1·83
,,	Southport, Hesketh Park	2·25	,,	Miltown Malbay	3·39
,,	Chatburn, Middlewood	3·59	XXI.	Gorey, Courtown House	1·72
,,	Cartmel, Flookburgh	4·02	,,	Moynalty, Westland	1·56
IX.	Langsett Moor, Up. Midhope	2·14	,,	Athlone, Twyford	1·97
,,	Scalby, Silverdale	2·10	,,	Mullingar, Belvedere	1·26
,,	Ingleby Greenhow	3·64	XXII.	Woodlawn	2·92
,,	Middleton, Mickleton	2·04	,,	Westport, Murrisk Abbey	2·82
X.	Beltingham	2·30	,,	Crossmolina, Enniscoe	2·92
,,	Font Reservoir, Fallowlees	2·69	,,	Collooney, Markree Obsy	2·33
,,	Ilderton, Lilburn Cottage	2·85	XXIII.	Enniskillen, Portora	1·78
,,	Keswick, The Bank	4·32	,,	Warrenpoint	·87
XI.	Llanfrechfa Grange	2·59	,,	Banbridge, Milltown	1·34
,,	Treherbert, Tyn-y-waun	4·60	,,	Belfast, Springfield	1·99
,,	Carmarthen, Friary	3·18	,,	Bushmills, Dundarave	2·76
,,	Castle Malgwyn	2·00	,,	Stewartstown	2·03
,,	Plynlimon	5·50	,,	Killybegs	2·78
,,	Tallyllyn	3·80	,,	Horn Head	3·53

METEOROLOGICAL NOTES ON SEPTEMBER, 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.—More or less mixed weather prevailed until 11th, with not infrequent R but no great deficiency in sunshine. On 12th more settled conditions set in, with lower night temp. and much sunshine. The last week was dull and rainy with greatly reduced range of temp. After the first ten days of the month there was a conspicuous absence of wind movement. Duration of sunshine 104·1* hours and of R 31·7 hours. Of the latter 11·9 hours occurred on 25th. Mean temp. 57°·1. or 0°·6 below the average.

TENTERDEN.—Rather wet generally except in the third week. Sunshine was deficient, amounting to 109† hours only.

CROWBOROUGH.—Cool and pleasant, with several days of brilliant sunshine. R ·18 in. above the average, thus reducing the deficiency for the year to 1·34 in. Prevailing winds S. and W. for the first 13 days and N. and E. for the remainder. Mean temp. 54°·8. TS on 6th.

HARTLEY WINTNEY.—A pleasant month, but rather cool. The first and last weeks were stormy with R, but summer returned from 10th to 25th. Ozone on 25 days with a mean of 3·5. L on 28th.

PITSFORD.—On the whole a pleasant month. R 1·25 in. below the average. Mean temp. 54°·1.

WISBECH.—On 25th 2·20 in. of R fell, the heaviest daily fall since the register was commenced in 1859.

BRUNDALL.—Mean temp. 0°·7 below the average. There were few really warm days and much rough chilly wind. No R fell from 10th to 23rd inclusive.

WINTERBOURNE STEEPLETON.—Another month of deficient R. Of the total, 2·76 in., 2·52 in. fell on 5 days, 5th to 9th, and on 14 consecutive days ending on 27th no R was registered and the weather was generally very fine. Temp. slightly below the average.

TORQUAY.—Duration of sunshine 153·2* hours, or 11·3 hours below the average. Mean temp. 57°·1, being 1°·2 below the average. Mean amount of ozone 4·4; max. 7·0 on 9th with S.W. wind, and min. 2·0 on several days.

POLAPIT TAMAR.—The first 10 days were wet, the remainder dry and seasonable.

NORTH CADBURY.—The day temp. was the lowest in September for nine years, the max. reaching 70° only three times, but the night temp. was about normal. Wet and extremely boisterous during the first ten days, and high wind again in the last eight days; the intervening days being calm and fairly sunny. The wind was from N. or E. almost exclusively after the 10th, and after 13th only ·10 in. of R fell.

CLIFTON.—Fine and dry except for a rainy period from 6th to 10th, with strong S. and S.W. winds. N. or N.E. winds prevailed from 10th to the end, with rather low temp. R nearly two inches below the average.

ROSS.—Fine and warm for the first five days, rainy and cool from 6th to 9th, very fine but cool from 10th to 27th, and afterwards gloomy, cold and showery to the end. R only half the average.

BOLTON.—The first half was mild and wet, with S. and W. winds, and the latter cold and dry, with N. or E. winds. Duration of sunshine 69·4* hours, or 17·7 hours below the average. Mean temp. 52°·4, or 1°·7 below the average. Heavy dews from 14th to 22nd

SOUTHPORT.—Dull and cool throughout, but with S.W. gales and excessive R during the first fortnight, and light N.E. winds and practical absence of R during the remainder. Duration of sunshine 29* hours below the average. R 1·07 in. below the average. Mean temp. 2°·0 below the average.

HULL.—Fine generally, with low R. Duration of sunshine 96* hours. Dense fog on 18th.

LILBURN.—The beginning and end of the month were unsettled, with much R. Warm in the middle and cold later, with frost on 20th, which, however, did little damage. The R was beneficial and much wanted. No gales or TS8.

LLANFRECHFA GRANGE.—A fine month with early harvest, which was mostly housed by 14th. Wheat was good but oats and barley poor. The R in the first nine days improved roots very much.

CARMARTHEN.—Wet and stormy during the first week; afterwards particularly fine with abundant sunshine.

HAVERFORDWEST.—Mild and wet up to 10th, but much colder from that date to the end, it being the driest and coldest September for 50 years. Duration of sunshine 133*·4 hours.

ABERYSTWYTH.—The first fortnight was very wet, but there was grand dry weather for the remainder. The wind was chiefly S.W. and S. early in the month, and later E. and S.E. Cold throughout without much sun, but drying winds, making good weather for getting in crops.

SCOTLAND.

CARGEN.—One of the driest Septembers recorded. Damp, muggy weather during the first half interfered with harvest operations in the earlier districts, but there was splendid harvest weather from 15th to 30th.

LANGHOLM.—R ·39 in. below the average of 29 years.

INVERARAY.—The first half was very wet, the latter fine and dry enabling harvest operations to be carried on successfully.

MULL, QUINISH.—The incessant R of the first half was followed by N. and E. winds and bright sunshine.

COUPAR ANGUS.—R ·75 in. short of the average. There were no extremes of temp., but the maxima were high owing to sunny days. Mean temp. 52°·3.

LYNTURK.—The first three weeks had very fine harvesting weather, farmers remarking that they remembered no better. Continuous rainy days in the last week.

DRUMNADROCHIT.—R ·91 in. below, and rainy days equal to, the average of 19 years. The middle of the month was cold and clear with some frost, which injured foliage.

DUNROBIN CASTLE.—The first fortnight was wet and showery, but there was good harvest weather between 13th and 25th.

WATTEN.—The opening and closing days were wet and cloudy. For the rest fine harvest weather with light winds.

IRELAND.

CORK.—A cold month, the temp. being 2°·3 below the average. Prevailing winds N.W. and N.E.

DARRYNANE.—Although the total R was only 87 per cent. of the average there were but few dry days until the last week.

MILTOWN MALBAY.—Much R in the first half, the second being dry with high easterly winds.

DUBLIN.—A favourable but cool month. Westerly winds prevailed during the first part, north-easterly during the latter, whilst the middle was quiet and dry. The first seven days were warm, the remainder distinctly cool and autumnal. Mean temp. 54°·9, or 1°·0 below the average.

BANBRIDGE.—R 1·46 in. below the average of 40 years.

BELFAST.—The driest September since 1895. Average R in the first half with dull weather. Strong N. or N.E. winds towards the end.

OMAGH.—The first half was unsettled, rainy and humid, doing considerable damage to outstanding crops. The latter half, however, accompanied as it was by strong polar and eastlerly winds, although abnormally ungenial for the time of year, dried the ground and the grain, and resulted in a fairly well saved harvest.

* Campbell-Stokes. † Jordan.

Climatological Table for the British Empire, April, 1905.

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	64·7	13	31·6	8	55·6	41·0	41·2	83	108·3	26·4	1·75	19	7·8
Malta	...	...	...	...	...	...	...	...	...	...	...	...	...
Lagos	92·0	14*a*	72·0	28	89·4	77·6	75·1	72	145·0	65·0	4·88	9	6·8
Cape Town	87·0	27	38·9	23	73·3	55·5	55·1	74	...	...	·05	1	4·0
Durban, Natal	87·8	24	61·0	27	81·3	63·8	...	...	141·3	...	·89	10	3·1
Johannesburg	74·8	2	44·4	14	70·3	52·0	51·2	73	138·9	39·5	1·54	10	1·4
Mauritius	84·4	8	65·7	30	81·4	70·5	68·9	81	147·6	57·1	1·98	16	6·2
Calcutta	98·8	9, 19	60·9	2	91·3	71·7	70·7	73	155·9	55·1	4·98	6	4·0
Bombay	88·3	17	68·1	1	85·9	73·9	71·1	76	136·8	53·9	·00	0	1·9
Madras	94·7	29	75·4	19	91·6	77·7	74·0	76	149·7	73·9	·56	2	4·3
Kodaikanal	72·5	27	51·8	7	67·3	53·6	52·0	77	144·9	41·4	3·79	20	5·3
Colombo, Ceylon	91·7	3	73·6	9	87·8	76·7	74·5	82	152·8	71·8	6·26	16	6·0
Hongkong	84·2	27	51·8	4	72·0	63·7	63·7	85	134·8	...	1·24	13	8·6
Melbourne	88·4	7	38·8	21	69·6	52·4	50·8	72	144·2	31·5	3·02	8	5·5
Adelaide	91·7	6	47·0	3	73·9	55·3	49·9	61	144·0	40·1	3·66	11	4·6
Coolgardie	92·4	16	42·2	6	77·0	53·6	47·7	52	158·0	34·2	·95	6	4·4
Sydney	79·9	19	50·7	21	71·6	60·2	57·9	79	114·2	44·5	5·87	20	6·0
Wellington	73·2	15	40·0	23	63·0	55·7	48·6	74	124·0	35·5	4·26	11	5·8
Auckland	73·0	1	43·5	23	65·3	53·4	51·7	76	131·0	40·0	3·20	12	5·0
Jamaica, Negril Point	86·7	18	67·3	3	85·2	71·8	72·0	78	...	...	3·20	10	...
Trinidad	90·0	sev.	61·0	10	89·1	69·4	70·2	73	162·0	62·0	1·79	7	...
Grenada	89·4	1	71·2	23	83·6	73·9	70·8	75	150·0	...	2·95	15	3·7
Toronto	67·0	29	24·0	17	51·1	33·2	30·8	66	77·0	17·5	1·43	9	5·8
Fredericton	65·7	26	20·1	2	52·8	29·7	21·5	43	...	...	1·24	3	5·5
Winnipeg	78·6	26	12·0	12	49·7	27·0	...	...	...	...	·25	3	4·3
Victoria, B.C.	71·0	23	34·7	8	57·5	43·1	...	...	...	...	·21	4	5·6
Dawson	52·8	29	8·8	3	45·0	21·7	...	...	...	...	·94	4	3·3

a and 15, 17, 22.

Cape Town.—The rainfall was the lowest of any April and 1·88 in. below the average of 63 years.

Mauritius.—Mean temp. of air equal to, dew point 0°·1 above, and R 3·12 in. below, averages. Mean hourly velocity of wind 10·7 miles, or 0·2 above average.

MADRAS.—Persistently low temperature. Bright sunshine 231·6 hours.

KODAIKANAL.—Bright sunshine 164 hours. T and L on 26 days.

COLOMBO.—Mean temp. of air 81°·9 or 0°·6 below, of dew point equal to, and R 4·67 in. below, average. Mean hourly velocity of wind 6·8 miles, prevailing direction S.W. T and L on 5 days; L on 17th.

HONGKONG.—Mean temp. of air 67°·8. Mean direction of wind E.; mean hourly velocity 15·1 miles. Bright sunshine 100·7 hours.

Adelaide.—Mean temp. of air 64°·6 or 1°·2 above, R 1·82 in. above, averages.

Sydney.—Mean temp. of air 1°·3 above, humidity 1·1 above, and R ·24 in. above, averages.

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

TRINIDAD.—Rainfall ·33 in. below 40 years' average.