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THE VENGEANCE OF THE RAIN GODS.

By the Editor.

Among the latest of the ever-fresh and interesting notes "From an Oxford Note Book," in *The Observatory*, we find a racy sketch of a railway journey in the south-west of the United States, describing how a train dodged the "wash-outs" of August last, on its way to and from the Grand Canyon of Arizona. The travelling astronomer does not venture to assign any occult reason for the cause of his troubles, though a superstitious soul might easily see that the stars in their courses fought against him.

We happened to follow the same route a month later, also paying a visit to the Grand Canyon, a natural feature vaster and more impressive than Niagara itself, and less easy to describe, for Niagara differs only in magnitude from humbler cataracts known to everyone, but the Grand Canyon is altogether unique, and comparison with nothing familiar can help one to realize it. We, too, met with "wash-outs," but putting ourselves in the position of the original dwellers on those arid plains we met also with extremely instructive reasons for their occurrence; reasons which suggest some reflections.

Escaping from the chaos of St. Louis and the noise and heat of the World's Fair in a special train of Pullman cars, a party of about sixty members of the Eighth International Geographical Congress crossed the Mississippi and sped over the rich farming lands of Kansas for a night and a day. That State, larger than England and (this year) as green and fertile, grows gradually drier towards the west, where the diminishing rainfall begins to be supplemented by irrigation. When it is followed by Colorado, New Mexico and Arizona, the aridity increases, until the land no longer bears crops, no longer supports live stock, and finally becomes a nearly waterless desert, the brown surface only starred by patches of cactus-like vegetation with here and there a grove of small pines, which seem to find sufficient moisture in the dew. When we passed, there had been no rain for a month or more, and insufficient rain for several years. The mean annual fall is well under ten inches, and on the edge of the

Grand Canyon the hotels depend for their water supply on tank waggons hauled by rail for 130 miles; the stream on the plateau half-way down to the bottom of the canyon, though only half-a-mile distant horizontally, being less accessible on account of the rough ascent of 3000 feet up which water would have to be carried. As we crossed the great plateau of Arizona, which swells up in monotonous level plains to the height of 7000 feet above the sea, effacing the Rocky Mountains, we met everywhere the same complaints of lack of water, reduction of live-stock and poor harvests.

The arid region has a very thin white population, and beyond the immediate neighbourhood of the railway there is practically none at all. Occasional villages of the Pueblo Indians, built of *adobe*, or unbaked brick, and groups of Navajo and wandering Moki Indians, indicate a considerable survival of the aboriginal peoples, and a little acquaintance with them soon showed us, beneath the veneer of Spanish civilization, the pagan spirit of the past. It is a mistake to suppose that the belief of such primitive peoples in occult powers is entirely unreasonable, for they can usually point to experience of a sort in justification of their faith. It is a mistake also to suppose that the appeal to experience in a pagan spirit is dead in modern civilization, for it is not. We shall first tell our story and then point its moral.

On the hot and cloudless afternoon of September 25th our train stopped on the open plain between Lamy and Albuquerque, in the territory of New Mexico, about a quarter of a mile from a certain Pueblo village, and as we left the cars a few blasts of the whistle brought the children hurrying out towards us like bees from a hive. Each had something to sell: fruit or coarse earthenware, bows and arrows, beads or fragments of ore supposed to be malachite and turquoise. The older people were less demonstrative and for the most part they kept aloof, standing statuesquely on the flat roofs of their huts, or just inside their doors. A little adobe church stood outside the village, but though it was Sunday no one paid it any attention, for this was not the day to expect the visiting priest. In the centre of the village a peculiar circular building, some sort of pre-Christian temple, was the centre of interest. The Indians stood about it in groups and resented any of our party approaching or photographing it.

After some time a villager, who spoke a little English, appeared and asked us to go away as we had intruded upon them at a very inconvenient time; they were about to commence a great rain-dance, which would last for three days and on which no scoffing strangers ought to look. A long palaver ensued, dollars were talked of, and finally a compromise was arrived at. We were to be allowed to see the beginning of the dance, but on no account to photograph it, since it was very sacred, and nothing could be allowed that might interfere with its prompt efficacy, for rain was much needed. The compact was made and the dance began. The

scene was curious and full of interest; most of the men who took part in the dance were striking-looking athletic fellows, their fine russet complexions touched up by red and white paint, their clothes of the brightest colours, and each carrying some symbolic object, such as a stalk of Indian corn or a branch with fruit. One after another they paced and pranced in a wide circle with various mystic movements; all were in dead earnest: they wanted rain badly and meant to get it; and so we left them, after watching until the calls of the engine whistle became too insistent to be disregarded.

Next morning we came to the edge of the Grand Canyon; the dead greyish-green plain broke away in an indescribable series of precipices, buttressed walls and smooth slopes, white, yellow, red, brown and deep purple, as the whole series of geological strata, from Carboniferous to Archæan, lay exposed in the sides of the gorge, a mile deep and ten miles across. We saw only a narrow slice of the wonderful canyon, the full length of which is 250 miles, but we saw enough to fill our minds for the two days' stay and to appreciate the unclouded serenity of the sky, which allowed the high sun to show up every detail of the view.

The sky remained unclouded until sunset on September 28th, when the train on its return journey stopped a few miles to the west of Albuquerque for a visit to another Indian village, this time one of the industrial Navajo tribe. Amongst the possessions of the village there was a pair of rough images of rain gods, male and female, with which the Indians would not willingly have parted. One of the American men of science who were in the party brought back these rain gods to the train as a trophy for the anthropological collection of one of the museums in the east. No doubt this was a gain to science, and it may perhaps enable us to give a photograph and detailed description of the successors of Jupiter Pluvius in a later number of this Magazine; but we fear that such considerations would not console the Navajos for their violated altar, and to the untutored mind the acquisition must have appeared not merely an unwarrantable action but an outrage crying aloud for vengeance.

The train reached Albuquerque at 11 p.m., and there we left it to return to Europe and the cares of British Rainfall, while the majority of the party, with the images of the gods packed irreverently in a "grip," proceeded southward toward Mexico. As they steamed out with laughing farewells a gentle drizzle of rain called attention to the fact that the sky had clouded over, but to this we paid little heed and repaired with a feeling of no small satisfaction to a luxurious bed-room in the beautiful Hotel Alvaredo after five nights spent in the cramped quarters of a Pullman car. Before we slept rain was dashing against the windows and pouring in noisy torrents off the broad eaves of the roof.

On the morning of the 29th of September rain was still falling heavily and old inhabitants dropped in to speak of the twenty years they remembered without anything approaching such a torrent

as was then roaring from the water-pipes of the roof and making the shelter of the broad cloisters round the hotel welcome for another reason than its shade. We breakfasted leisurely because the train we waited for was late, and gloomily because the sleeping cars were all full and we should have to travel in the day car and sleep at Trinidad, Colorado, losing a day and running some risk of missing the steamer at New York. However, when the train came up room was found in the Pullman and we proceeded on our way accompanied by rain as persistent as ever graced Seathwaite or the West Highlands. Rivers which four days earlier had looked like wide and badly-metalled roads were now rushing brown torrents overflowing their banks. The train ventured cautiously along the embankments which the streams were rapidly washing away. At every bridge a group of anxious men stood watching the rising water and we awaited their signal before commencing to creep across. At one point, in passing through a cutting at the base of a sudden volcanic hill, a piece of stone loosened by the wet bounded down the slope and through the last window of the train, dashing the thick plate glass into fragments. A second later it would have gone clear, a second earlier it would have burst like a shell into one of the sleeping berths. We reached Trinidad at midnight, with many stops and jerks, and the cry from an awakened sleeper, "Off the rails at last; I guess we're hung up for three days"; but we jolted on, and at noon next day, when passing in fine weather through fertile Kansas, we learned from the newspapers that three hours after we had left it Trinidad had fallen a victim to the flood. Five hundred feet of the railway had been washed away, the gas and electric works flooded and all lights extinguished, the railway station wrecked, and immense damage done in the town. The train behind had to wait two days, but we reached New York up to time.

Weeks afterwards we heard of the special train which we left bearing the unwilling rain gods towards Mexico. It had not proceeded far on its way to the frontier when a "wash-out" on the line and a broken bridge ahead compelled it to stop, and an attempt was made to return to Albuquerque only to find that another "wash-out" had occurred later, imprisoning it for three dreary and hungry days. There was no dining car on the train, but forty dozen eggs were commandeered from the freight car of a train behind which was caught in the same misfortune. A solitary hut supplied the typical Mexican cakes known as tortillas, to the great profit of the lady in charge but little to the satisfaction of the party. A steak was procured somehow and cooked on the coal shovel over the engine fire, and those passengers were happy who secured a square inch of the tempting delicacy.

So much for the story; the moral is shorter. The Pueblo Indians, when next their priest tries to reason with them in the little church on the futility of their superstitious dances, will think complacently of the unmistakable efficacy of the rain dance of September 25th,

which had produced the memorable rains of the 28th and 29th, and all other arguments will be of no avail. The Navajos, if ever they hear of the fate of the excursion train, will have no hesitation in tracing the rain gods' vengeance for the desecration of their shrine, and they will set up new images with increased confidence in their power to control the elements. They will argue, not without reason, but the reason they give is not scientific and purely fallacious. The Indians will not remember instances of rain dances held in vain. of rain gods stolen or destroyed without a break in the serenity of the sky, nor will they consider the hard fate of the train with the eggs, which was carrying a crowd of innocent visitors returning from St. Louis to their homes without the luxury of sleeping cars.

The Navajo, who attributes the rain to divine vengeance, will never listen patiently to the Pueblo who knows that it was a reward for a particularly meritorious ceremony; nor will the Pueblo tolerate the belief of the Navajo any more than the moon-weather-man, who proves that the waxing moon brings rainy weather and the waning moon brings dry weather, will admit the accuracy of his brother-crank, who demonstrates the drought of the waxing and the drench of the waning phases of that unconscious orb.

We can afford to smile at the Navajos and the Pueblos, and at other illiterate persons, who look on the weather and on life with unscientific eyes. But we must not smile upon any attempts to claim scientific value for unrelated coincidences, however well meaning they may be, or however conscientiously the persons putting them forward may believe in their unproved hypotheses. It is true that the detection of coincidences not infrequently leads to the discovery of a law connecting phenomena, but to the scientific mind the exceptions must be explained before the rule can be proved, and a theory which may be true cannot be assumed or announced as true until it has been rigidly tested. We have convinced ourselves that the Navajo and Pueblo type of mind, in civilized man at least, is incapable of realizing its own limitations, and will persist in its own modes of thought, despite all arguments, and we shall try no more to influence it: but we feel it a duty to urge our readers to beware of forming conclusions, even in meteorology, without full information.

Correspondence.

To the Editor of Symons's Meteorological Magazine.

THE ST. SWITHIN'S DAY TRADITION.

I THINK that one may take it for granted that in all popular traditions and superstitions there is a substratum of truth. It is "unlucky" to pass under a ladder, because there may be a man painting atop. It is "unlucky" in driving to divide a flock of sheep, for just as you are passing, those on one side may run under your wheels to rejoin those on the other side. It is "unlucky" to spill the salt at table, because this shows that your hand is not in the state of steadiness which indicates normal health.

Now the legend of St. Swithin is that if it rains on July 15th it will rain for the 40 days following, and *vice versâ*; *i.e.*, that at that particular period of the year the weather is likely to remain fixed, in one direction or another. It occurred to me some years ago to verify this by dividing the whole year into periods of 40 days, and seeing whether there was a less difference between the daily maximum and minimum rainfall during the period succeeding July 15th than during any other such period. By the courtesy of the Secretary of the Royal Meteorological Society I obtained access to the returns for the previous 20 years, which I carefully tabulated. I have, unfortunately, mislaid my MS., and cannot now put my hand upon it. But I remember that the outcome of my enquiry was that there were two 40-day periods when the weather appeared to be much more constant than in any other such period, and that of these two the St. Swithin period stood clearly first.

W. C. PLENDERLEATH.

Mamhead Rectory, Devon,

We take the liberty of quoting the following interesting letter from *The Observatory*:—

A letter from a Dumfries correspondent in the October number of *Symons's Meteorological Magazine* has suggested an inquiry as to the verdict of the Greenwich records on this subject. I have examined the figures for 64 years (1841 to 1904), counting only the days when 0·005 inch was registered, and it certainly seems that the tradition does not find very strong support.

In some few years (*e.g.*, 1856—1863, when the rain gauges were only examined at 9 p.m.) there is a little doubt as to the day on which rain actually fell, but it is of no great consequence.

In no year were there more than thirty-one or less than four wet days in the forty succeeding July 15, so that the probability of absolute accuracy of the tradition vanishes at once.

In twenty of the years at least half of the forty days were wet, but in only five of these years was St. Swithin's Day wet, and it was dry in the two years showing most wet days in the forty. On the other hand, although in the two driest seasons, with only four and six wet days respectively, in

the period under consideration, St. Swithin's Day was dry, yet in 1887, after a wet July 15, only nine of the forty days were wet.

From another point of view, the heaviest rainfall during the forty days, which was 9·73 inches in 1903, followed a dry St. Swithin's; and of the sixteen years in which that period produced over 4 inches of rain, only two had a wet St. Swithin's.

It would seem, therefore, that the legend does not apply to Dumfries or Greenwich. Perhaps Winchester records might tell a different tale, but it is not likely, even if they allowed for the change of style, which would alter the date by a week.

It is noticeable that there has been no rain at Greenwich on July 15 since 1896, and in the whole period there are 41 dry festivals as against 23 wet ones.

On an average, a wet St. Swithin's entails 17 wet days out of the next 40, with an average total rainfall of 3·13 inches, and a dry one brings the same number of wet days with an average total rainfall of 3·33 inches.

W. W. B.

BALL LIGHTNING.

I HAVE been informed of the two following different cases of ball lightning:—Some years ago, probably in 1887, the station master at Cranleigh was walking along the platform during a heavy thunderstorm with rain; just as he was about to pass under the roofing a fire ball fell on the platform at his feet, bursting with a great flame, but doing no damage. It occurred just in front of the window of his own house, and his wife, who was looking out of the window at the time, saw the fire ball fall and explode, and was greatly alarmed until she saw her husband was safe. The ball was described as being larger than a cricket ball.

In 1891 a fire ball fell in Ampthill-road, Bedford, during a thunderstorm. Captain Tottenham, who saw it fall, told me that the ball came down like a red hot shot, and made a hole into which he thrust his stick the next morning.

J. P. MACLEAR.

Chiddingfold, 17th October, 1904.

THE DRY AUTUMN OF 1904.

I HEREWITH submit the following remarkable figures of rainfall, September and October, 1903 and 1904:—

		Depth. Inches.	Number of rainy days.
1904.	September	0·60	5
,,	October	0·74	8
		1·34 inches in 2 months.	

Total rain from 23rd August—that is 68 days = only 1·41.

Compare this with last year:—

		Depth. Inches.	Number of rainy days.
1903.	September	2·62	17
,,	October	8·07	26
		10·69 inches in 2 months.	

A few miles away in September there fell one or two showers which did not touch me here.

Surely taking September and October together the smallness is a record.

W. F. VINT.

The Cedars, Sunderland, October 31st, 1904.

IT will interest you to know that last month's record of the rainfall at Lockwood Reservoir—on the moorland between Whitby and Guisborough—shows that rain fell on 10 days, but the total fall is only 0.57 in.

This is the lightest rainfall for any month of October since our gauge was fixed in the spring of 1872.

WILLIAM I'ANSON.

Saltburn-by-the Sea, 4th November, 1904.

The following may be reprinted in connection with the above:—

A CONTRAST IN LONDON RAINFALL.

To the Editor of The Times.

SIR,—This day last year I addressed to you a letter recording the fact that the rainfall at this station since January 1 had reached the total of 34·61 in., thus exceeding the total fall of any whole year since the record began in 1858. It may interest some of your readers to know that the rainfall here for the present year since January 1 amounts only to 17·09 in., rather less than half of the fall in the corresponding period of the unprecedentedly wet year 1903. The contrast is striking and cannot fail to attract the attention of all those whose interest in the weather prompts them to keep a rain gauge.

The mean rainfall for the first ten months of the 45 years 1858—1902 is 20·59 in. at this station, thus 1904 has so far had 83 per cent. of the average, while last year to the same date had 168 per cent. Eleven years in the last 46 have been drier for the same period than 1904 has proved, the extreme case for the ten months having been 1898 with 13·21 in., while 1864 and 1887 had also less than 15 in. for the same period,

Unless November and December prove quite exceptionally wet, this year will once more confirm the apparently meaningless "rule" that all years ending in four are dry; since 1814 there has only been the one exception of 1894.

Your obedient servant,

HUGH ROBERT MILL.

62, Camden Square, London, N.W., Oct. 28.

STRUCTURAL DAMAGE BY LIGHTNING.

We are indebted to Mr. F. Rayner, C.E., of Nottingham, for calling attention to the interesting case of damage by lightning, illustrated in the accompanying photograph, for permission to reproduce which we have to thank Mr. Morris, of Bingham.

During a severe thunderstorm on March 29th, 1904, the house shown in the photograph was struck by lightning and wrecked. From the picture it appears that the discharge took place along the chimney, which was split open down to the ground, while almost the whole wall of the upper room was thrown down and the roof above it collapsed. No one was killed, though one person was slightly injured. The house stood in the village of Whatton, in the Vale of Belvoir, about half-a-mile from Aslockton Station on the Great Northern Railway.

Photograph by Mr. Morris. Bingham, Notts.]

EFFECT OF LIGHTNING AT WHATTON.

METEOROLOGICAL NEWS AND NOTES.

HIS MAJESTY THE KING has intimated that it will afford him much pleasure to become an annual subscriber to the funds of the British Rainfall Organization, in the work of which he has already been graciously pleased to participate by supplying records of the fall of rain from Buckingham Palace, Windsor, Sandringham and Balmoral. The conspicuous honour done to this voluntary organization by the King must be profoundly gratifying to all observers.

THE PRINCE OF WALES has honoured the Royal Meteorological Society by accepting the position of Honorary President. This new office, inaugurated under such distinguished auspices, cannot fail to increase the dignity and usefulness of the Society.

THE ASTRONOMER ROYAL, who, in addition to his astronomical duties, is charged with the oversight of what may be called the official meteorological station for London at Greenwich Observatory, has been created a Knight Commander of the Bath, a well-deserved honour, on which we heartily congratulate Sir William Christie.

THE METROPOLITAN BOROUGHS of Holborn and Stepney have followed the excellent example of the City of London, Chelsea and Hackney, in establishing official rain gauges which fill wide gaps in the rainfall system of London. It would not be too much if there was one rain gauge to every square mile of the metropolitan area, where the determination of the exact distribution of heavy rains is often a question of great practical importance, and the examples cited above might well be followed by the other municipalities which are still without observations.

THE ANTARCTIC EXPEDITIONS, under the leadership of Captain R. F. Scott, R.N., C.V.O., on the *Discovery*, and of Mr. W. S. Bruce, on the *Scotia* have returned to this country and the observations and collections are now being worked up. The Royal Society has appointed a committee to co-operate with the Meteorological Council in the reduction and discussion of the meteorological observations of the National Antarctic Expedition.

THE BEN NEVIS OBSERVATORIES ceased work on October 1st, a circumstance which we regard as nothing less than a national calamity. We have in type the report of last year's work at the Observatories, which we hope to publish next month, and we may then have something to say on the unfortunate state of matters which made such a catastrophe possible.

THE SECOND METEOROLOGICAL VOLUME of the International Catalogue of Scientific Literature has just been published. It is a distinct advance on the first volume, but not yet by any means a satisfactory record of the science.

METEOROLOGY AT THE BRITISH ASSOCIATION.

(CONTINUED).

Suggested Uniformity of Units for Meteorological Observations and Measurements.

The following suggestions adopted by a Committee of the Council of the British Association, were presented by DR. W. N. SHAW.

IT should be premised that international uniformity can be regarded as *urgently* desirable only as regards the units adopted for the publication of results, the preparation of weather maps, &c. This purpose can be attained without requiring uniformity as regards the graduation of instruments used by observers. A change of system for the purpose of publication does not therefore necessarily involve an immediate or general change in the instruments now in use. But as the natural tendency would be to adapt the instruments to give readings in the units used for publication, the question is treated in this memorandum upon that understanding.

Uniformity has been obtained for electrical measurements by the adoption of the C.G.S. system, and due weight should be given to the advantage likely to arise from extending a system which has already proved itself successful.

1. Units of temperature and length are required for meteorological measurements of air temperature and humidity, pressure, rainfall, and wind velocity.

2. Units based on the inch or its multiples and the Fahrenheit degree are employed in the official organisations of the United Kingdom (including British ships of all kinds), India, Australian Commonwealth, South African Colonies, the Crown Colonies and dependencies, including, East, Central, and West Africa, the West Indies and Canada, and in the United States.

Units based on the metre and the Centigrade degree are employed in the official organisations of the Continent of Europe, including Asiatic Russia and the Colonies of France, Germany, Portugal, Holland and Belgium, and the Congo State, Egypt and the Sudan, Argentine, Brazil, Mexico and Japan.

The results for the Philippines are issued in both systems.

3. It may be added that British and American writers in scientific publications occasionally use Centigrade and Metric units, but the converse does not occur.

4. In meteorology the measurements of length are for the most part indirect, and although the substitution of millimetres for inches of rainfall, or of metres per second for miles per hour of wind velocity, might be held to turn upon the general adoption of a metric system, yet it is not unreasonable to consider the meteorological units separately from those of a general system.

5. The distribution of instruments in use on either system is so wide that any change could only be recommended upon reasons which appeal to scientific men in general, and especially to those engaged in the practical applications of science.

6. The choice of units may be approached from two points of view—viz., that of the observer and that of the computer or tabulator.

7. From the point of view of the observer that unit is the best which

employs the fewest figures to represent the reading of the instrument to a practical degree of accuracy; which permits the greatest simplicity of graduation; and which makes the process of reading as nearly as possible identical for every position on the scale.

8. From the point of view of the tabulator and computer, that unit is the best which employs the fewest figures, and which makes the process of computation independent of the position of particular readings on the scale.

9. The most appropriate way of arriving at a selection of a suitable unit is, therefore, to consider—(1) The degree of accuracy practically attainable. (2) The appropriate position for the zero of practical measurement. (3) The number of figures required to represent all the values within the practical range. (4) The mode of graduation of the scale or vernier required for reading.

10. *Air Temperature—Degree of accuracy.*—The limit of practical accuracy of a thermometric reading with a mercury in glass thermometer, making appropriate corrections for change of zero, is fairly represented by 0°·1 C. (0°·2 F.). On account of the effect of different methods of exposure and other accidental circumstances, meteorology cannot effectively take account of differences of individual readings of less than 1° F., or 0°·5 C., as regards air temperature; though as regards the application of temperature readings to the measurement of humidity an accuracy of 0°·1 C. (0°·2 F.) is required.

Position of Zero.—The zero should be so chosen that all observed or recorded values are positive. Negative values should be regarded as inadmissible; they introduce very serious danger of error both for the observer and computer. The observer has to adopt a different mode of estimating fractions of a scale division in different parts of the scale, and the computer has to change his mode of operation and to use a + and − notation, which is a serious complication.

Number of Figures.—The Fahrenheit range 0° F. to 100° F. covers nearly all temperature readings in temperate climates, but to include all atmospheric temperatures a range of about 230° F., from −100° F. to + 130° F. would be required; say, 130° C. from −75° C. to + 55° C. Expressing these on scales measured from absolute zero, a comprehensive range in Fahr. degrees would be from 360° to 590°, or in Centigrade degrees from 200° to 330°. With the Centigrade degree, four figures on the absolute scale would give a reading to the practical limit of accuracy; the first figure could almost always be assumed known. In Fahrenheit degrees four figures would go beyond the practical limit of accuracy; the omission of the first figure would be less safe. The freezing point of water would be [2]73° in the one scale, [4]91° in the other.

Mode of Graduation.—For the observer divisions of a scale should correspond to digits in the value expressed. Graduation into fifths is liable to cause errors. Estimation should be to a tenth of a division of whatever scale is adopted.

It may be noted that the Fahrenheit degree corresponds almost exactly with the expansion of mercury by the ten-thousandth part, while the Centigrade degree corresponds very nearly with the communication of the heat equivalent of a Joule (10^7 ergs) to a gramme of dry atmospheric air.

11. *Humidity*—This is generally determined from readings of the temperature of the dry and wet bulbs. If any considerable degree of accuracy is

aimed at, the difference of temperature of the two bulbs should be correct to 0°·1 C. It is, however, only the difference that is required to be known with that accuracy. The measurements as at present carried out in practice are not in any case altogether satisfactory, for reasons which need not be specified here. The International Committee were unable to include tables for the reduction of readings of the dry and wet bulb in their volume of Meteorological tables.

12. *Pressure.—Degree of Accuracy.*—The practical accuracy of the mercury barometer with skilful setting and reading is ·002 inch to ·003 inch (·05 to ·08 mm.). For most purposes in temperate latitudes an accuracy of ·1 mm. (·004 inch) would be sufficient. Telegraphic reports in this country give the nearest hundredth of an inch (·25 mm.), but in tropical countries the third decimal place is reported (·025 mm).

Position of Zero.—The barometer is always graduated from zero pressure, so that negative values never arise.

Number of Figures.—The range at sea level slightly exceeds that between 28 and 31 inches (710 mm. to 790 mm.). The millimetre scale, with the omission of the first figure, complies fairly well with the conditions indicated if a high degree of accuracy is not required.

Mode of Graduation.—In this respect neither system is very appropriate. The usual mode of graduation of the inch barometer is very unsatisfactory; the scale is divided to 20ths of an inch, and the vernier carries the division to the 500th. The observer is expected to add 5 to the figures marked on the vernier, if he is dealing with the higher half of a 10th, and each of his final divisions counts two-thousandths. Errors in barometer readings on these accounts are not infrequent. The system has passed from the laboratory into general practice without sufficient consideration for the fallibility of the observer. On the other hand, a millimetre scale is too crowded for easy reading, and mistakes of a millimetre are occasionally made. Again, a vernier to read to ·1 mm. is too short, and one to read to ·01 mm. is too long. An accuracy equal to that of a thousandth of an inch is obtained with a 40 mm. vernier, but this would give readings in divisions of ·025 mm.

With the decimal notation it is evidently impossible to select a scale and vernier to which no objection can be urged, because, whatever length of division is chosen, verniers used to give 10ths and single 100ths would be too short and too long respectively. Unless some other method than that of the vernier be used, a sub-division of the main scale or of the vernier scale into halves or fifths must be accepted for measurements of the highest accuracy, but it is not necessary for the accuracy of a great number of practical measurements.

If the convenience of the observer alone were taken into account, a scale division somewhat greater than the twentieth of an inch, which is itself a little larger than the millimetre, would give a scale very easy to read. There is no scale in practical use in which this interval corresponds to the successive digits of any decimal place. It is, however, a matter of some interest that the interval corresponds very nearly with 2,000 absolute units of pressure on the C.G.S. system.

Barometric corrections are concerned with temperature, height above sea-level, and latitude. It is in many ways desirable for a reader to be able to

know from the figures themselves whether barometric readings have been corrected for latitude or not. The latitude correction is a small one, and the figures at present give no indication upon the point; but the distinction might easily be made clear if it were understood that pressure data corrected for latitude should be expressed in absolute C.G.S. units. Then if the subject were being approached *de novo* it would be reasonable to suggest the use of what might be called an observer's "degree of pressure,"—viz., a scale of lengths with each division corresponding to 1·5 mm., or about ·06 inch (*i.e.*, to 2,000 C.G.S. absolute units in latitude 45°).

Upon such a scale of "degrees of pressure," a $\frac{1}{10}$th vernier, or preferably a $\frac{1}{20}$th vernier, with alternate divisions omitted, would carry the accuracy of reading to ·006 inch, and would define quite satisfactorily the degree of accuracy required in setting and reading for such practical purposes as telegraphic reporting in temperate climates, while a $\frac{1}{50}$th vernier would reach the extreme practical limit of accuracy of the mercury barometer under meteorological conditions.

This would give as nearly as can be secured an ideal scale for observing. Reduction to absolute measure would be obtained by the application of the gravity correction and the simple process of multiplication by two.

It is hardly necessary to say that if temperature were directly referred to the absolute zero which is practically the zero of the gas thermometer, and pressure were expressed in absolute C.G.S. units, many of the calculations of the thermal and dynamical properties of gases would be immensely simplified. No confusion would be likely to arise between the observer's "degree of pressure" and the corresponding absolute units because the limited range of readings of pressure at sea-level would be sufficient guide.

The proposals indicated would not affect the mode of procedure in determining the fixed points of a thermometer, which would still be the melting point of ice under certain defined conditions, and the boiling point of water under the pressure of a standard atmosphere, but the melting point would be marked [2]73°, the boiling point [3]73°, and the standard atmosphere would be 506·33 "degrees of pressure," latitude of London, or $1{\cdot}01325 \times 10^6$ dynes per sq. cm., which might perhaps be called 1013·25 "kilobars."

13. *Rainfall.*—In this country readings are carried to hundredths, sometimes to thousandths of an inch, but the readings to the higher degree of accuracy have seldom any practical meaning. The range is from ·01 to 3, 4, or even more inches in exceptional cases for a day's rain; the large majority of readings are certainly under 2 inches. In metric units 10 cm. would cover all but very exceptional falls, and ·1 mm. would represent satisfactorily the highest degree of accuracy.

14. *Wind Velocity.*—The degree of effective accuracy of wind measurement depends much more upon the exposure than on the graduation of the instrument. The mile per hour is a good unit of wind velocity, because a real velocity of one hundred miles is hardly ever, if ever, exceeded, and thus two figures are sufficient, while an accuracy defined by one mile per hour is as much as can be expected to express any velocity. The corresponding range in metres per second extends to forty-five metres per second, and as measurements can be easily made to one mile per hour, less than half a metre per second, three figures would be necessary to express wind velocity in metric units.

THE TEN MONTHS' RAINFALL OF 1904.

Aggregate Rainfall for January—October, 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	17·17	92	Arncliffe	44·69	91	Braemar	21·74	78
Tenterden	19·62	91	Hull	18·31	89	Aberdeen	21·92	87
Hartley Wintney	20·07	98	Newcastle.....	18·35	87	Cawdor	18·75	75
Hitchin	18·17	96	Seathwaite ...	102·43	97	Glencarron ...	69·70	95
Winslow	18·98	98	Cardiff	36·39	116	Dunrobin	22·91	94
Westley.....	17·39	84	Haverfordwest	34·31	102	Killarney ...	...	...
Brundall.....	16·95	83	Gogerddan ...	36·88	105	Waterford ...	35·21	113
Alderbury	23·67	108	Llandudno ...	21·13	87	Broadford.....	32·87	123
Ashburton	42·95	113	Dumfries	32·34	93	Carlow	28·29	104
Polapit Tamar ...	35·08	120	Lilliesleaf	23·71	97	Dublin	19·61	88
Stroud	23·12	106	Colmonell	34·20	100	Mullingar.....	29·68	101
Woolstaston	22·93	97	Glasgow	29·10	102	Ballinasloe ...	33·09	112
Boston	17·80	106	Inveraray	57·31	102	Clifden	67·41	106
Hesley Hall	17·38	100	Islay	41·40	115	Crossmolina ...	49·35	121
Derby.....	17·27	91	Mull	49·02	111	Seaforde	29·15	100
Bolton	27·73	81	Loch Leven ...	28·80	101	Londonderry..	33·95	102
Wetherby	21·79	110	Dundee	22·30	102	Omagh	36·63	114

The month of October proved dry generally, and as the correspondence published on another page shows, it was very dry in several localities. With the exception of the South-west of England, South Wales, and the West of Scotland, considerably less than the average rainfall occurred over Great Britain in the first ten months of 1904. The average used in the above Table is that of ten years which were exceptionally dry in most parts of the country, so that the year as far as it had gone promised to be one of unusually low rainfall. The areas where rainfall was most deficient were in the East and North-west of England, and in the North-east of Scotland, and some difficulties as to water supply occurred in these districts, and especially in Manchester. In Ireland the rainfall exceeded the average, except in the immediate vicinity of Dublin. The unprecedentedly wet October of 1903 led to an average excess of 45 per cent. of rainfall for the ten months; the exceptionally dry October this year leads to a deficiency of about 1 per cent. for the ten months, in each case considering the whole area of the British Isles, and taking as a standard the average for the ten years, 1890-99.

RAINFALL AND TEMPERATURE, OCTOBER, 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	Grass
		inches	inches.	in.								
I.	London (Camden Square) ...	1·56	— 1·03	·35	6	11	67·1	18	32·7	15	0	9
II.	Tenterden ...	1·98	— 1·01	·47	6	14	68·0	18	32·2	9	0	4
,,	Hartley Wintney ...	1·73	— 1·16	·53	6	12	66·0	18*a*	26·0	15	4	8
III.	Hitchin	1·13	— 1·44	·25	21	13	65·0	18. 19	28·0	14	6	...
,,	Winslow (Addington) ...	·96	— 1·73	·37	16	10	67·0	18	27·0	13, 15	3	11
IV.	Bury St. Edmunds (Westley)	1·14	— 1·52	·29	16	10	70·5	18	30·0	16	...	...
,,	Brundall	1·20	— 1·42	·24	1	13	66·2	19	29·4	16	1	3
V.	Alderbury ...	1·72	— 1·48	·63	6	8	60·0	11*b*	32·0	12	1	...
,,	Winterborne Steepleton ...	2·77	...	·73	2	15	65·7	18	31·7	13	1	10
,,	Torquay (Cary Green) ...	2·05	...	·81	2	11	64·9	18	40·8	8	0	0
,,	Polapit Tamar [Launceston]	2·32	— 2·22	·74	6	17	61·8	11	30·5	26	2	3
,,	Bath ...	·71	...	·22	6	10	63·4	11	34·0	13	0	10
VI.	Stroud (Upfield) ...	·58	— 2·20	·14	16	...	64·0	18	36·0	28	0	...
,,	Church Stretton (Woolstaston)	·70	— 2·80	·22	15	14	65·5	18	37·5	13	0	...
,,	Bromsgrove (Stoke Reformatory)	·60	— 1·66	·19	16	9	65·0	18	29·0	12	6	...
VII.	Boston ...	·91	— 1·36	·24	23	9	66·0	21	30·0	15	...	...
,,	Bawtry (Hesley Hall) ...	·32	— 2·25	·15	9	7	64·0	17	26·0	17	12	...
,,	Derby (Midland Railway)...	·55	— 1·99	·33	16	10	67·0	18	28·0	12	3	...
VIII.	Bolton (The Park) ...	2·90	— 1·66	1·21	16	...	58·9	4	35·1	3	0	3
IX.	Wetherby (Ribston Hall) ...	·72	— 2·08	·16	9	9	...	...	...	...	...	...
,,	Arncliffe Vicarage ...	2·92	— 3·72	·85	16	13	...	...	...	...	...	...
,,	Hull (Pearson Park) ...	·50	— 2·54	·12	9	11	65·0	11, 18	30·0	9	4	10
X.	Newcastle (Town Moor) ...	·81	— 1·91	·28	5	10	...	...	...	...	...	...
,,	Borrowdale (Seathwaite) ...	9·19	— 4·23	4·03	16	16	59·5	19	32·3	31	1	...
XI.	Cardiff (Ely)	2·69	— 1·74	·84	16	17	...	...	...	...	...	..
,,	Haverfordwest (High St.)..	2·25	— 2·83	·95	16	15	62·5	4	33·3	25	0	7
,,	Aberystwith (Gogerddan)..	3·23	— 2·33	1·61	16	11	71·0	27	32·0	15*d*	3	...
,,	Llandudno ...	1·29	— 2·71	·46	16	13	64·0	18	36·8	15	0	...
XII.	Cargen [Dumfries] ...	2·28	— 2·15	·72	16	10	59·0	3*c*	30·0	13, 14	3	...
XIII.	Edinburgh (Royal Observy.)	·54	...	·22	5	9	57·9	21	36·8	8	0	5
XIV.	Colmonell ...	2·59	— 1·75	·78	16	15	64·6	2	31·0	12*e*	3	...
XV.	Tighnabruaich ...	3·45	...	·76	5	18	55·0	19	32·0	12	1	1
,,	Mull (Quinish) ...	5·30	— ·27	·94	5	23	...	...	...	...	...	...
XVI.	Loch Leven Sluices ...	1·85	— 1·72	·71	6	12	...	...	...	...	...	...
,,	Dundee (Eastern Necropolis)	·70	— 2·06	·40	5	11	59·7	19	29·7	13	1	...
XVII.	Braemar ...	1·29	— 2·59	·50	5	13	58·8	26	22·6	13	7	...
,,	Aberdeen (Cranford) ...	1·03	— 2·33	·30	5	15	63·0	20	27·0	12	3	...
,,	Cawdor (Budgate)	1·33	— 1·61	·43	5	15	...	...	...	...	...	...
XVIII.	Glencarron Lodge ...	7·07	— 2·22	1·42	5	26	57·5	21	31·0	13	...	...
,,	Bendamph ...	7·39	— 1·75	1·11	16	25	...	...	...	...	...	...
XIX.	Dunrobin Castle ...	1·82	— 1·46	·57	5	13	62·0	4	36·5	24	0	...
,,	Castletown ...	3·27	...	·75	5	25	59·0	20	32·0	12, 13	1	...
XX.	Killarney ...	..	...	...	...	..	...	...	...	...	0	...
,,	Waterford (Brook Lodge)...	1·74	— 2·16	·49	15	16	64·5	18	32·0	25	1	...
,,	Broadford (Hurdlestown) ...	3·15	+ ·05	1·08	16	16	60·0	21	33·0	24	0	...
XXI.	Carlow (Browne's Hill) ...	1·51	— 1·89	·57	16	17	...	...	...	...	...	...
,,	Dublin (Fitz William Square)	·45	— 2·58	·22	16	11	64·0	21	34·3	27	0	0
XXII.	Ballinasloe	2·77	— ·63	1·00	16	20	66·0	5	30·0	12	4	...
,,	Clifden (Kylemore House)..	4·92	— 3·02	2·12	16	15	...	...	...	...	...	...
XXIII.	Seaforde ...	·85	— 2·74	·24	15	16	62·0	17	26·0	10*f*	...	...
,,	Londonderry (Creggan Res.)	2·80	— 1·28	·63	22	25	...	...	...	...	...	...
,,	Omagh (Edenfel) ...	3·51	— ·40	·80	27	21	...	...	...	...	...	...

+ Shows that the fall was above the average; — that it was below it. *a* and 19, 21. *b* and 12, 19. *c* and 17, 18. *d* and 24, 26. *e* and 29, 30. *f* and 12 29.

SUPPLEMENTARY RAINFALL, OCTOBER, 1904.

Div.	STATION.	Rain. inches	Div.	STATION.	Rain. inches
II.	Dorking, Abinger Hall	2·50	XI.	New Radnor, Ednol	1·38
,,	Sheppey, Leysdown	1·66	,,	Rhayader, Nantgwillt	2·97
,,	Hailsham	2·08	,,	Lake Vyrnwy	2·13
,,	Crowborough	2·80	,,	Ruthin, Plâs Drâw.....	1·61
,,	Ryde, Beldornie Tower.....	2·15	,,	Criccieth, Talarvor.....	1·58
,,	Emsworth, Redlands.....	2·46	,,	Anglesey, Lligwy	2·17
,,	Alton, Ashdell	2·12	,,	Douglas, Woodville	2·16
,,	Newbury, Welford Park ...	1·60	XII.	Stoneykirk, Ardwell House	2·13
III.	Harrow Weald	1·62	,,	Dalry, Old Garroch	3·70
,,	Oxford, Magdalen College..	·74	,,	Langholm, Drove Road.....	2·57
,,	Banbury, Bloxham...	·61	,,	Moniaive, Maxwelton House	2·24
,,	Pitsford, Sedgebrook.....	·67	,,	Lilliesleaf, Riddell	·96
,,	Huntingdon, Brampton.....	1·14	XIII.	N. Esk Reservoir [Penicuick]	1·40
,,	Wisbech, Bank House	1·35	XIV.	Maybole, Knockdon Farm..	1·67
IV.	Southend	2·04	,,	Glasgow, Queen's Park	1·73
,,	Colchester, Lexden.....	·75	XV.	Inveraray, Newtown	5·69
,,	Saffron Waldon, Newport...	1·13	,,	Ballachulish, Ardsheal	6·45
,,	Rendlesham Hall	1·01	,,	Campbeltown, Redknowe...	2·84
,,	Swaffham	1·14	,,	Islay, Eallabus	4·45
,,	Blakeney	1·25	XVI.	Dollar	1·54
V.	Bishop's Cannings	1·37	,,	Balquhidder, Stronvar	4·29
,,	Ashburton, Druid House ...	2·82	,,	Coupar Angus Station	·96
,,	Okehampton, Oaklands.....	3·09	,,	Blair Atholl.....	·91
,,	Hartland Abbey	3·48	,,	Montrose, Sunnyside.....	·78
,,	Lynmouth, Rock House ...	2·50	XVII.	Alford, Lynturk Manse ...	1·15
,,	Probus, Lamellyn	2·38	,,	Keith, H.R.S..... ..	2·15
,,	Wellington, The Avenue ...	1·55	XVIII.	Fearn, Lower Pitkerrie.....	1·65
,,	North Cadbury Rectory ..	2·77	,,	S. Uist, Askernish	...
VI.	Clifton, Pembroke Road ...	1·37	,,	Invergarry	3·85
,,	Moreton-in-Marsh, Longboro'	·86	,,	Aviemore, Alvie Manse.....	1·83
,,	Ross, The Graig	·55	,,	Loch Ness, Drumnadrochit.	1·74
,,	Shifnal, Hatton Grange.....	·83	XIX.	Invershin	2·38
,,	Wem Rectory	·76	,,	Altnaharra	2·94
,,	Cheadle, The Heath House.	1·16	,,	Bettyhill	3·09
,,	Coventry, Kingswood	·57	,,	Watten, H.R.S.	1·70
VII.	Market Overton	·64	XX.	Cork, Wellesley Terrace ...	3·06
,,	Market Rasen	·69	,,	Darrynane Abbey	5·39
,,	Worksop, Hodsock Priory..	·32	,,	Glenam [Clonmel]	2·30
VIII.	Neston, Hinderton.....	1·27	,,	Ballingarry, Hazelfort	2·26
,,	Southport, Hesketh Park...	1·99	,,	Miltown Malbay.....	4·24
,,	Chatburn, Middlewood	2·46	XXI.	Gorey, Courtown House ...	1·23
,,	Duddon Valley, Seathwaite Vic.	4·64	,,	Moynalty, Westland	1·64
IX.	Langsett Moor, Up. Midhope	1·10	,,	Athlone, Twyford	3·23
,,	Baldersby.....	·57	,,	Mullingar, Belvedere.....	2·50
,,	Scalby, Silverdale	·79	XXII.	Woodlawn	3·47
,,	Ingleby Greenhow	·53	,,	Westport, Murrisk Abbey..	3·65
,,	Middleton, Mickleton	1·03	,,	Crossmolina, Enniscoe	2·98
X.	Beltingham	·67	,,	Collooney, Markree Obsy...	2·68
,,	Bamburgh.....	·93	XXIII.	Enniskillen, Portora	2·57
,,	Keswick, The Bank	3·10	,,	Warrenpoint	·87
,,	Melmerby Rectory.....	1·55	,,	Banbridge, Milltown	·67
XI.	Llanfrechfa Grange.....	1·38	,,	Belfast, Springfield	1·26
,,	Treherbert, Tyn-y-waun ...	5·45	,,	Bushmills, Dundarave	2·56
,,	Llandovery, Tonn	...	,,	Stewartstown	1·55
,,	Castle Malgwyn	1·79	,,	Killybegs	3·42
,,	Llandefaelog-fach	1·98	,,	Horn Head	...

METEOROLOGICAL NOTES ON OCTOBER, 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 weather was generally of an anticyclonic type and fairly free from R, although mostly lacking in sunshine. The first eleven days were dull with some fog, especially the 11th, when it was very dark at times. From 12th to 15th it was fine and bright and cooler, but it became heavy and foggy again from 16th to the last week, which was somewhat finer and cooler. Duration of sunshine 56·2* hours and of R 54·2 hours. Mean temp. 51°·0, or 1°·2 above the average.

TENTERDEN.—Warm, and decidedly dry after the first week. Duration of sunshine only 100·6† hours. Dull from 17th to 24th, with fog all day on 19th.

CROWBOROUGH.—Cool and pleasant on the whole, with gales on 5th and 17th. Mean temp. 50°·0.

HARTLEY WINTNEY.—Extremely pleasant, summer weather continuing into the third week, and unusually high temp. The last week was colder and foggy.

ADDINGTON MANOR.—Very fine, with the smallest R in any October except three during 34 years.

PITSFORD.—Very fine, bright and still. R 2·35 in. below the average. Mean temp. 47°·6.

BURY ST. EDMUNDS.—A lovely mild autumnal month, with R much below the average. Water became scarce and ponds were nearly dry.

BRUNDALL.—A very fine month. Mean temp. 1°·8 above the average, and max. above 60° on ten days.

TORQUAY, CARY GREEN.—R 1·99 in. below the average. Duration of sunshine 90·6* hours, or 23·4 hours below the average. Mean temp. 53°·7 or 1°·8 above the average. Mean amount of ozone 4·4. Max. 9·0 on 3rd with E.N.E. wind, min. 2·0 on several days.

LYNMOUTH.—Mild with an average amount of sunshine till 23rd. No violent gales or extremes of temp. All the heavy R fell in the night.

WELLINGTON.—Remarkably fine and dry, with little rough weather. R only about half the normal.

NORTH CADBURY.—Temp. very equable throughout, the latter half of the month being the warmer. There was no strong wind.

CLIFTON.—Mostly anticyclonic, and with the exception of a rainy spell from 5th to 10th and on 16th and 17th, and of S.W. gales on 5th and 17th, a fine calm and pleasant month. Some fog in the last week. R little more than one-third of the average.

ROSS.—The driest October in 86 years, except in 1830, when ·53 in. fell, and a perfect contrast to 1903, when R fell on every day amounting to 7·40 in. Most tender plants were uninjured at the close and the autumn tints were exceedingly beautiful.

WOOLSTASTON.—Exceptionally warm and dry. On the 22nd there was an earthquake at 10·45 p.m., followed by a slighter shock between 2 and 3 a.m. on the following morning. The noise resembled that made by a heavy dray.

BOLTON.—Fair and mild, with sunshine slightly above the average. Except for a N.W. gale on 5th and 6th the winds were very light. Slight fog occurred on four days and night mists were frequent in the latter part, which probably had much to do with causing the singularly mild weather.

SOUTHPORT.—Dry and sunny with unusually high bar. pressure. Mean temp. 1°·7 above the average. Duration of sunshine 21 hours above the average. R 1·92 in. below the average, and underground water-level unusually low.

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* Campbell-Stokes. † Jordan.

HULL.—Very light R and some fine mild weather. Stormy on 5th and 6th. Fog frequently.

NEWCASTLE.—The lowest R in Octobor since 1868, except ·63 in. in 1879, whereas 1903 had the greatest amount, 9·24 in.

LLANFRECHFA GRANGE.—Calm, with gradually falling temp. and some fog. The R fell chiefly at night, and the weather was very favourable for agriculture.

HAVERFORDWEST.—Fine and mild, with small R and generally high temp. The wind reached the force of a gale on 3 days, but the last 10 days were calm. Duration of sunshine 71·7* hours.

DOUGLAS.—A singularly beautiful month and certainly the best October for 30 years, with moderate R, unusual calmness and excess of sunshine. Temp. above the average in the last two weeks. Gales on 5th and 16th.

SCOTLAND.

CARGEN [DUMFRIES].—One of the driest and warmest Octobers on record. A truly "record" year in matters agricultural.

LILLIESLEAF.—Lovely weather, like a cool summer, with little R, and splendid for getting in potatoes, of which there was a capital crop.

COLMONELL.—The first woek was rather stormy, with a strong gale on 5th and 6th. Mean temp. 48°·8, or 2°·2 above the average of 28 years.

MULL, QUINISH.—The R fell generally at night, and the weather showed a wonderful aptitude for clearing up. Very mild from 18th to 21st and at the end. N.W. gale on 4th.

ABERDEEN.—Fine and dry, with light wind from W. and S.W. and much sunshine.

DRUMNADROCHIT.—The R was less than half the average of 18 years and the lowest in October in that period.

ALTNAHARRA.—Exceptionally fine, mild and dry, and particularly calm, mild and clear towards the end.

CASTLETOWN.—Strong winds from W. till 10th, with heavy showers of R and often H. From 23rd to the end, high bar., overcast skies, damp atmosphere and light variable winds. Much cloud throughout.

IRELAND.

DARRYNANE ABBEY.—Fine on the whole with some very fine days especially in the latter half. R 9·3 per cent. below the average of 25 years. More than half the total fell on 3 days.

DUBLIN.—Dull, yet fine and mild, with high bar., a deficiency of bright sunshine and a damp atmosphere but a singularly scanty R, which established a record drought for October. There was very little cold weather, but transitory cold snaps on 3rd, 13th and 27th, connected with anticyclonic conditions.

MARKREE OBSERVATORY.—A very dry month. The nights were generally cloudy and the weather mild and fine on the whole.

BANBRIDGE.—R 2·33 in. below the average of 40 years, and the least since the gauge was established in 1862.

OMAGH.—Although the R was close to the average it fell mostly at night and was accompanied by anticyclonic conditions and temp. above the average throughout. It therefore left the feeling that for many years so agreeable an autumn month has not been experienced. The natural maturing of the tints, owing to the almost complete absence of frost, resulted in a display of foliage not often equalled.

* Campbell-Stokes.

Climatological Table for the British Empire, May, 1904.

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	76·6	16	34·1	9	63·4	46·7	47·8	80	123·4	28·0	1·96	16	7·3
Malta	90·2	23	52·3	1	78·9	58·4	59·1	78	138·1	48·9	·00	0	1·4
Lagos, W. Africa	...	...	...	...	...	...	...	...	...	...	...	...	...
Cape Town	75·6	4	44·9	15*b*	65·1	51·5	52·6	82	...	...	3·37	14	5·0
Durban, Natal	91·2	7	50·4	10	79·2	58·2	...	...	143·1	...	·44	8	2·0
Mauritius	81·7	1	57·1	31	79·0	64·9	65·1	81	142·1	50·1	3·59	18	4·5
Calcutta	98·1	19	68·1	12	93·3	76·7	74·9	75	156·0	67·6	9·84	7	5·1
Bombay	92·3	30	78·2	1	91·2	81·0	75·9	73	141·0	72·8	·02	1	2·9
Madras	102·7	14	74·6	24	95·9	79·4	74·0	71	147·6	71·6	·92	3	4·0
Kodaikanal	76·3	3	51·6	7	68·4	54·3	51·6	74	146·1	42·6	7·64	26	6·2
Colombo, Ceylon	89·4	8	68·5	23	86·7	78·1	75·2	83	152·8	66·0	9·27	19	7·0
Hongkong	88·7	2	63·1	7	80·8	71·8	70·2	83	137·9	...	7·71	16	7·3
Melbourne	77·8	13	35·9	25	61·4	46·5	47·2	75	132·9	28·9	2·56	16	5·7
Adelaide	81·7	13	36·9	24	67·3	49·9	48·4	71	132·8	29·7	3·00	13	4·0
Coolgardie	83·0	10*a*	33·8	28	67·4	47·2	43·6	61	148·4	25·8	1·51	9	5·2
Sydney	76·2	6	44·4	25	65·2	53·9	51·6	84	112·0	33·0	5·20	28	5·5
Wellington	68·2	10	38·9	4	59·9	46·2	45·0	74	117·0	34·0	4·59	15	6·7
Auckland	66·0	24	42·0	29	61·8	50·3	50·0	72	122·0	29·0	1·01	10	5·0
Jamaica, Negril Point	87·8	31	68·7	27	85·3	73·0	72·1	75	...	...	6·45	8	...
Trinidad	91·0	13	65·9	9	87·8	68·6	71·8	80	163·0	62·0	2·76	13	...
Grenada	86·4	19	71·6	21	83·6	73·8	69·3	73	146·0	...	3·26	15	3·0
Toronto	76·9	25	35·0	11	64·4	46·4	46·7	72	106·2	26·8	3·80	11	5·7
Fredericton	80·8	8	30·0	2	67·1	42·2	40·1	56	...	...	4·16	10	5·6
Winnipeg	84·0	20	22·0	14	67·3	39·7	...	...	...	...	1·77	8	5·0
Victoria, B.C.	73·2	12	40·3	1	59·7	46·0	...	...	...	...	·49	9	6·0
Dawson	67·5	31	25·0	7	55·5	34·7	...	...	...	...	·96	7	4·4

a and 12. *b* and 25.

MALTA.—Mean temp. of air 66°·8 or 2°·8 above the average. Mean hourly velocity of wind 2·9 miles below average. Mean temp. of sea 69°·1.

Mauritius.—Mean temp. of air 0°·7, dew point 0°·2, and R ·11 in. below averages. Mean hourly velocity of wind 8·0 miles, or 2·3 below average.

MADRAS.—Temp. below normal; R below average. Bright sunshine on 197·2 hours, or 51·2 per cent. of possible; TS on 2 days; dust storm on 7th.

KODAIKANAL.—Bright sunshine 162 hours; numerous TSS, many with H.

COLOMBO.—Mean temp. of air 81°·9, or 0°·5 below, of dew point 0°·2 below, R 2·85 in. below, averages. Mean hourly velocity of wind 9 miles, prevailing direction S.W.

HONGKONG.—Mean temp. of air 75°·6. Sunshine 148·0 hours. Mean hourly velocity of wind 12·8 miles, prevailing direction E. by S.

Adelaide.—Mean temp. of air 1°·0 above, R ·26 in. above averages for 47 years.

Wellington.—Mean temp. of air 1°·5 above, and R 4·36 in. below, averages.

TRINIDAD.—R 1·17 in. below the 40 years average.