Symons's
Meteorological Magazine.

No. 506. MARCH, 1908. Vol. XLIII.

Lieut.-Gen. Sir Richard Strachey, G.C.S.I., F.R.S.

24th July, 1817—12th February, 1908.

The death of Sir Richard Strachey removes a veteran in many departments of public activity, and it is impossible in this place to do more than refer to some points in his career, and say a few words about his connection with meteorology. Entering the East India Company's Engineers in 1836, he served in India in military or high civil employment until 1878. During the earlier part of that time he conducted some important journeys of exploration in the Himalayan regions, then very little known, and he was prominently concerned in the great works for the irrigation of the arid regions of India. He served for many years on the Council of India, and it is impossible to enumerate the manifold services he rendered to that Empire.

He was President of the Royal Geographical Society from 1886 to 1889, and when in that position did much to advance the study of physical geography, and to promote the development of geographical teaching at the Universities.

In 1873 he became a member of the Meteorological Council of the Royal Society, the body which at that time controlled the Meteorological Office, and in 1883 he became Chairman of the Council, and continued to hold that position until the Meteorological Office was re-organized in 1905, and the Meteorological Council abolished. He governed the Meteorological Council with great force and ability, and had a very large share in guiding the destinies of official meteorology in the British Isles, as well as in organizing the meteorological service in India.

Sir Richard's own contributions to meteorology were numerous, and he took special interest in the treatment of meteorological statistics by the method of harmonic analysis. In 1906 he received the Symons memorial gold medal of the Royal Meteorological Society, and we may refer to the summary of his work given in Vol. **32**, p. 156, of the *Quarterly Journal* of that Society for the titles of his principal papers, and for an able summary by Dr. W. N. Shaw, of the guiding principles in regard to meteorological work which he inculcated.

A. Albert Lancaster,

24TH MAY, 1849—4TH FEBRUARY, 1908.

MONSIEUR A. LANCASTER, whose recent death we regret to have to record, was born at Mons, in Belgium, and entering the Royal Observatory at Brussels, in 1866, passed through all the lower stages in that institution, until in 1898 he became Director of the Meteorological Department. He remained at work to the last, and was at the Observatory only a few hours before his death. He devoted a great part of his attention to climatological investigations, and dealt very comprehensively with the climate of Belgium, his important rainfall map of that country appearing in 1895. He was engaged at the time of his death on a new cloud atlas; but with this exception, and a study of the climate of the Congo State, his scientific activity was mainly devoted to the conditions of his own country. He compiled a remarkable historic summary of earthquakes in Belgium, and was much interested in the progress of seismology. He was one of the founders of the popular and successful journal *Ciel et Terre*, in 1880, and in it a large number of his original articles appeared.

ROYAL METEOROLOGICAL SOCIETY.

THE monthly meeting of this Society was held on Wednesday evening, February 19th, at the Institution of Civil Engineers, Great George Street, Westminster. Dr. H. R. Mill, President, in the chair.

Mr. C. Browett read a paper describing the formation of "snow rollers," which he observed at Ryton-on-Dunsmore, near Coventry, on January 29th–30th, 1907. There had been some snow showers during the afternoon and evening, amounting to a depth of about $1\frac{1}{2}$ inches. The next morning he noticed that the snow on the lawn to the east of the house was heaped up as though someone had run with a spade in front of him. The snow was cleared away to the bare grass (except for slight bars of snow across) in tadpole-like markings, whose tails all pointed to the direction from which the wind had been blowing all night, viz: north-north-east, and at whose heads was heaped up the snow that had been on the bared grass, all neatly turned over in a roll. A few markings only were seen on the other lawns, and none at all in a field to the north; but on the drive and grass in front of the north side of the house there were markings in the opposite direction, but with little snow actually curled up. These were evidently caused by the deflection of the wind from the sides of the house. The temperature during the night ranged between 32° and 34°.

A number of extracts giving descriptions of similar phenomena observed elsewhere were appended to the paper. It seems that the flakes of a light fluffy layer of surface snow are made adhesive by a

rise in the temperature of the air above the freezing point, while the under snow remains cold and dry, and the particles of damp surface snow are enabled to adhere to each other, but not to the dry under snow. A strong wind may then push over little projections of the surface snow and start them rolling, when, of course, they will travel and grow until the resistances overcome the propelling power of the wind. These "snow-rollers" vary in size, some being only a few inches in diameter, while at times others have been seen two feet or more in length.

Mr. H. Mellish stated that he had observed the phenomenon of "snow-rollers" several times at Hodsock. Last winter he had seen them on three occasions, one of which was on the morning referred to in the paper, although he lived sixty miles from Coventry.

Mr. W. Marriott showed lantern slides of "snow-rollers" seen by Mr. W. A. Bentley at Jericho, Vt., and by Mr. M. L. Fuller at Canton, New York.

Mr. J. E. Clark said that one interesting point about the "snow-rollers" was their extreme lightness when compared with similar rolls made by hand.

A paper, by Mr. Ernest Gold, on a "Comparison of ship's Barometer readings with those deduced from land observations," was also read. This contained the result of a preliminary investigation, undertaken at the Meteorological Office, into the relation between the barometer readings taken on ships during their passage across a line between Falmouth and Brest, and the readings deduced for the ship's position from the observations at these places and the trend of the isobars, on the assumption of regular pressure changes. Mr. Gold concluded by saying that taking into account the various causes which can appreciably influence the height of the barometer on board ship, we are compelled to say that until the two chief elements of disturbance—the wind and the vertical acceleration effects—are eliminated, it will be impossible to draw any satisfactory conclusions regarding the relative values of atmospheric pressure over sea and land. One can say in general that there appears to be a tendency for the barometric pressure to be lower between Falmouth and Brest than would be expected from the land observations.

Capt. Campbell Hepworth said that with regard to the "pumping" of the barometer in a seaway, he thought the observations should be taken when the mercury had touched its lowest level, instead of observing the highest and lowest and taking the mean. If they looked at the wind charts of the great oceans, they would see that the wind had a tendency to cling to the land.

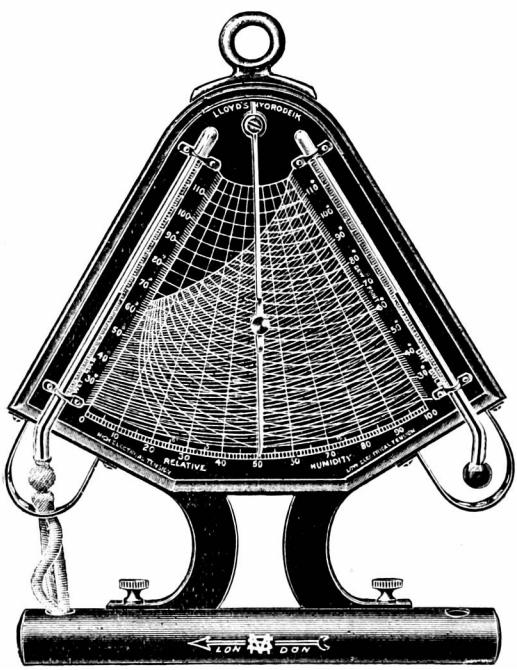
Dr. W. N. Shaw referred to the difficulties experienced at the Ben Nevis Observatory with the reading of the barometer when the wind exceeded force 3 on the Ben Nevis scale. He considered it desirable that a number of observations should be made to enable them to know how to expose a barometer on board the ship in order that it should indicate the proper pressure.

Mr. H. Harries, Mr. R. Inwards and Capt. R. Warden also took part in the discussion.

The following gentlemen were elected Fellows of the Society :— Mr. M. M. Hoosein, Mr. P. R. Jameson, Mr. G. R. Jebb, M.Inst.C.E., Capt. J. R. Rae, Mr. S. V. S. Setti, B.A., Capt. H. Strong, Mr. O. Thomas, M.Inst.C.E., Mr. J. Wrench Towse, Mr. F. Woolnough and Mr. J. H. Wylie.

HYGROMETERS WITHOUT CALCULATION.

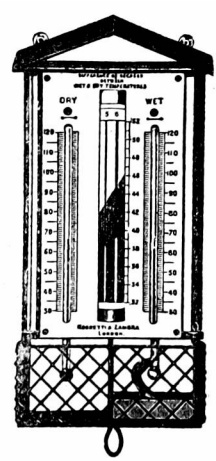
We have received from Messrs. Short and Mason a specimen of the very neat and convenient form of hygrometer known as Lloyd's Hygrodeik—the name indicating, we presume, the fact that the instrument *shows* without calculation the hygrometric conditions of the atmosphere. The instrument consists of a wet and a dry-bub thermometer properly divided on the stem, which is so shaped as to magnify the breadth of the mercury column, making it very easy to read when viewed at the proper angle. The thermometers could, no doubt, be verified at Kew if required. They are mounted, as shown in the illustration, on a triangular brass frame, the base of which is ingeniously adapted as the water-vessel ; but the characteristic feature is the modification of the slide-rule which fills the space between the thermometers. A brass radius is hinged at the top of the frame and provided with a sliding point which can be adjusted so as to coincide with any degree of the thermometer. The mode of ascertaining the relative humidity is to set the sliding point to the wet-bulb temperature on the left hand side of the chart, and then to swing the radius until the sliding point cuts the red line curving down from the actual dry-bulb temperature. At this point the extremity of the radius points to the relative humidity on the arc at the bottom. The dew-point and absolute humidity are observed with equal ease by following the black lines curving up from the dry-bulb scale through the points of intersection. The



relative humidities can be read easily to less than 1 per cent., and the dew-point to within a degree. We have tested the instrument and find is as accurate in use as the ordinary reduction table as given in the "Hints for Meteorological Observers."

The hygrodeik is a handsome instrument, strongly made and neatly finished. While it is just as good as the ordinary wet and dry-bulb thermometer for scientific purposes, it is particularly well suited for the use of the amateur observer, who often wants to know the relative humidity or the dew-point, and seldom cares to turn up a table to compute the figures.

Messrs. Negretti and Zambra have introduced a horticultural hygrometer, which should be of real utility to gardeners by calling their attention to the probability of frost at night. The principle is the fact that when the falling temperature reaches the dew-point and condensation commences, the liberation of heat in this process checks the fall of temperature in such a way that the dew-point may be said to control the minimum temperature. The calculation of the dew-point from the readings of the wet and dry-bulb temperatures is a somewhat tedious process, and is accomplished automatically in the horticultural hygrometer by a modification of the slide rule, as in the hygrodeik; but instead of giving the temperature of the dew-point, the instrument is boldly graduated so as to show at a glance whether frost is highly improbable, doubtful, or very probable. Between the two thermometers there is a vertical cylinder, the lower part of which is black, the middle part shaded, and the upper part white, the lines separating the three areas being spirals on the cylinder. Vertical lines are ruled down the cylinder, and numbered 1, 2, 3, 4, &c. To use the instrument the temperature of the wet and dry bulb is read late in the evening; the cylinder is rotated to bring the line corresponding to the number of degrees' difference between the two readings to the right-hand side of the slit in which it rotates, and the figure on the scale marked on that side of the slit which corresponds to the wet-bulb reading falls opposite the black, the shaded, or the white part of the cylinder according as frost is very probable, doubtful, or highly improbable. The instrument is very strongly constructed, but the thermometers are not divided on the stem. This does not detract from the usefulness of the indications, which could not in any case be taken as an exact forecast; and we consider that it is a useful piece of garden equipment.



The principle on which both instruments are founded is not new, but they are none the less interesting on that account.

ON THE LEARNING OF METEOROLOGY.

By L. C. W. Bonacina.

(Concluded.)

So much then, for the supreme importance of observational meteorology in its completest sense; now for a few words upon the statistical method of learning the science. Meteorological statistics refer, of course, to instrumental and non-instrumental observations. They are of very great importance, for without their aid climates could not be satisfactorily described; and they, moreover, open up hosts of interesting questions in connection with the physical causes of the diverse peculiarities of climates, etc., which they reveal.

It is not wise, however, to entertain as from the peculiar interest of this branch of the subject there is often a temptation to, a too exclusive regard for statistical meteorology. Statistics should be regarded rather as a means to an end than an end in themselves—a means of opening out diverse interesting physical problems bearing upon the cause and effect aspect of meteorological or climatic phenomena. For, on the one hand, they cannot of themselves elevate us to those lofty heights of intellectual sublimity, to attain which is the grand reward that awaits those who investigate the abstruse physical and mathematical problems of the atmosphere; and, on the other hand, they are unable to tell us anything of the characteristic qualities of the various phenomena to which they refer. It is not enough, for instance, to know that the average rainfall of London amounts to 25 inches in the year; the true meteorologist will not be content till he has endeavoured to ascertain the causes of this amount of rainfall; nor will this information as to it be particularly interesting to him, unless he knows by *personal observation* the structure, so to speak, of the rainfall of London—not only the seasonal distribution and quality of the rain considered as a whole, but also those of all the various phenomena which in London go by the generic term of rain, the thunder *rain* and the cyclonic *rain* being as distinct from one another as both are from snow or hail. Before then, we may advantageously burden our memories with all the anomalies of rainfall, temperature, etc., which have occurred during the last fifty years, their departure from means and approximation to extremes, and so on; it would be well to make sure that we have observed accurately the rainbow from time to time and understood it; that we have watched the cumulus clouds banked up along the horizon in their majesty and power, and the cirrus fibres curled, twisted and interwoven; assimilated those reflections of bewitching purple that respond to the winter's sun, touching with faintest flush the expanse of snow-clad mead; wondered at the storm shadows that encroach upon the mountain flanks and steal over the darksome hollows where lie the sullen tarns; delighted in the shades of mellowed pink subduing in softening tones the bared forest-limbs swaying and creaking in November dusk

—even as the sweet fragrance, the chorus of song, and wealth of bloom, and those evanescent phrases of subtle and surpassing beauty which the skies show in fairest May.

With regard to the method of meterological inquiry under heading No. 3 above, namely, atmospheric physics, I need hardly say that the knowledge of this subject—the understanding of causes—is the height to which every meteorologist should aspire. Our knowledge of the laws of physics is probably well in advance of meteorology; and it is now generally recognised that what we now want is data wherewith to apply that knowledge, particularly in relation to that immensely important practical application of meteorology—the forecasting of weather. So far as can be at present foreseen, the forecasting of weather for long periods in advance will never be possible until simultaneous observations can be obtained from stations well representing each of the four quarters of the globe; moreover, the earnestness with which the meteorological exploration of the upper air, by means of kites and balloons, has been commenced does but testify that the need for data from that upper region also is well recognised.

In conclusion, I may remark, as a matter of interest, that the real nature of the problem at issue was demonstrated a very long time ago, long before ordinary meteorologists had begun to realise it, by John Ruskin, when quite a young man, by a remarkable flash of prophetic genius—remarkable when one remembers that the absorbing nature of the multitudinous duties with which Ruskin's mind was occupied permitted him to cast but an occasional glance at the science of meteorology, passionately devoted to watching the sky and clouds though he was. The following passage, in which this demonstration occurs, I quote from his essay written at Oxford on the founding of the Meteorological Society:—

"The Meteorological Society, therefore, has been formed, not for a city, not for a kingdom, but for the world. It wishes to be the central point, the moving power, of a vast machine, and it feels that unless it can be this it must be powerless; if it cannot do all, it can do nothing. It desires to have at its command, at stated periods, perfect systems of methodical and simultaneous observations; it wishes its influence and its power to be omnipresent over the globe, so that it may be able to know at any given instant the state of the atmosphere at every point on its surface. Let it not be supposed that this is a chimerical imagination—the vain dream of a few philosophical enthusiasts. It is co-operation which we now come forward to request, in full confidence that if our efforts are met with a zeal worthy of the cause, our associates will be astonished, individually, by the result of their labours in a body. Let none be discouraged because they are alone or far distant from their associates. What was formerly useless will now become strength. Let the pastor of the Alps observe the variations of his mountain winds; let the voyager send us notes of their changes on the surface of the sea;

let the solitary dweller in the American prairie observe the passage of the storms and the variations of the climate; and each, who alone would have been powerless, will find himself part of one mighty Mind—a ray of light entering into one vast Eye—a member of a multitudinous Power, contributing to the knowledge and aiding the efforts which will be capable of solving the most deeply hidden problems of Nature, penetrating into the most occult causes, and reducing to principle and order the vast multitude of beautiful and wonderful phenomena, by which the wisdom and benevolence of the Supreme Deity regulates the course of the times and the seasons, robes the globe with verdure and fruitfulness, and adapts it to minister to the wants and contribute to the felicity of the innumerable tribes of animated existence."

METEOROLOGICAL NEWS AND NOTES.

BEN NEVIS OBSERVATORY was the subject of a question in the House of Commons on February 17th, when Major Anstruther-Gray asked the Chancellor of the Exchequer whether he could hold out any prospect of a grant towards the upkeep of the observatory on Ben Nevis, and the Chancellor of the Exchequer replied:—"I explained, in answer to a question by my hon. friend the member for Inverness, on August 1 last, that the only scheme which has up to the present been placed before me is one under which the whole cost of the re-equipment and maintenance of the observatories would be thrown upon public funds, and to this I should not feel justified in assenting. I am, however, quite prepared to consider the question of renewing the Government grant, which was for many years given to these institutions through the Meteorological Council, provided that an adequate contribution towards their re-establishment and maintenance is forthcoming from other sources. So far as I am aware there has been no change in the position since that date."

MR. G. G. CHISHOLM has been appointed Lecturer on Geography in the University of Edinburgh, and it is gratifying to know that so distinguished a geographer has been found to fill the new post. Lectureships on Geography now exist in a good many universities and colleges where there is as yet no systematic teaching in meteorology, and as a properly planned geographical course necessarily involves a good deal of climatology, if it does not require to go further into the science of the atmosphere, they form valuable centres for encouraging a wider interest in meteorology.

DR. H. R. MILL has been elected a Corresponding Member of the Physical Geography Section of the Imperial Russian Geographical Society of St. Petersburg.

THE WEATHER OF FEBRUARY.

By Fred. J. Brodie.

The month of February included two clearly defined periods of weather of a widely different character. For the first twelve days or so a large portion of the United Kingdom lay under the eastern edge of an anticyclone, which extended in from the Atlantic, the western limits of the system being situated, as a rule, beyond the Azores. The barometer was therefore high, especially on the 6th and 7th, when readings above 30·8 in. were recorded in the west and south of Ireland; and the prevailing winds were from the westward or north-westward. The weather, although mainly fair and dry, was less settled than might have been expected with the existing type of pressure distribution, slight falls of rain occurring from time to time in most districts. In the extreme western and northern parts of the kingdom, where the weather was affected by cyclonic disturbances moving from Iceland to northern Europe, rain was more frequent, though seldom heavy. The temperatures registered during this 12-day period were mostly above the average, but keen frosts were occasionally experienced, the sharpest of these occurring respectively on the nights of the 1st and 2nd and of the 11th and 12th. On the former occasion, the sheltered thermometer fell to 23° at Marlborough and Llangammarch Wells, and to 25° at Rounton and Raunds; the readings on the grass being as low as 15° at Llangammarch Wells, 18° at Crathes, and 19° at Newton Rigg. On the latter occasion, the screened thermometer fell to 21° at Nottingham, 22° at Bawtry and Wisley, and 23° at Rothamsted; the exposed instrument sinking to 17° at Greenwich, 18° at Llangammarch Wells, and 19° at Kew, Cambridge and Tunbridge Wells.

In the second period of weather, lasting from about the 13th until very nearly the close of the month, the Atlantic low pressure systems, which had hitherto kept well to the northward of these islands, pursued a more southerly track and occasioned rough wet weather over the entire kingdom. Gales from some westerly quarter were experienced very frequently, the storm of the 22nd being unusually severe in the north-western and extreme northern districts. Temperature was higher than with the previous anticyclonic conditions, the only frost of any note occurring in central Scotland on the night of the 16th, when the thermometer on the grass fell to 19° at Crathes, and to 25° at Balmoral. Between the 27th and 29th of the month, one of the northern low pressure systems passed southwards down the North Sea, and a cold wind from north and north-west set in very generally, with squalls of hail or snow (the latter being heavy in many northern districts), and thunderstorms in several isolated localities.

For the month as a whole the mean temperature was above the average; the excess varying in most districts between two and two and a half degrees. One of the leading features in the weather of

the period was the rarity of frost. In London (at Westminster) the thermometer in the screen reached 32° on four occasions only, as against an average for the previous 37 Februarys of 10·7. At Leith, there were only 2 nights with a screened temperature as low as 32°, the number being the smallest in February for at least 36 years. Further to the northward the number of frosts last month increased to 7 at Aberdeen, to 10 at Wick, and to 14 at Sumburgh Head.

THE RAINFALL OF THE THAMES DISTRICT IN FEBRUARY, 1908.

In accordance with the promise made last month we now present our readers with a rainfall map for February of that portion of England which may, without unduly straining the meaning of words, be termed the Thames District, that is to say it is a map of the valley of the Thames from source to sea filled up so as to occupy a rectangle the size of our page. The groundwork of the map, which is printed in brown, shows by means of two tints the areas occupied by land more than 250 and more than 500 feet above sea level, and in this way it brings the form of the country clearly before the eye. The brown dotted lines mark the boundaries of the drainage areas of the Thames and Lee above Teddington and Feilde's Weir respectively, and so defines those parts of the country the rainfall of which is contributing to the water supply of London derived from surface sources. It will be noticed that the plain of the upper Thames and Cherwell is surrounded by the Cotteswold Hills on the west and north, and barred off from the plain of the lower Thames by the line of the White Horse Downs in Berkshire and the Chiltern Hills, which is broken only by the narrow gorge at Goring through which the river runs. South of London the curved line of the North Downs will be noted stretching from Guildford to Maidstone, and on to the south-east.

The black lines which cross the map are isohyetals or lines of equal rainfall for February, and they are drawn from the rainfall at about 200 stations, records from which were received before the 8th of March. There is not time to transfer these figures neatly from the working map to the copy for reproduction, but a black dot is placed on the site of each station, so that our readers can see from what districts additional records would be most useful.

The map for February is not a particularly interesting one, because the rain was very uniformly distributed. No station recorded so much as 2 inches, and none so little as half an-inch, and we have only been able to draw the lines of 1 inch and of 1·5 inches. The result is to show that a large area in the upper Thames valley and a smaller area in the lower Thames Valley had less than an inch of rain in the month, while there were areas with more than one and a half inches along the south-eastern

RAINFALL OF FEBRUARY 1908.

The Edinburgh Geographical Institute
J.G. Bartholomew.

side of the broad belt of hills which runs across the middle of the valley from south-west to north-east, and it is interesting to note that the north of London was the wettest part of the whole area. The rainfall was on the whole rather below the average, but it fell on a large number of days, most stations reporting rain on about 15. The only day with more than a small fall was the 16th, when between a quarter and half-an-inch was recorded at most stations.

The map as reproduced is a portion of a rainfall map of the British Isles which is supplied to the Meteorological Office, and published in the *Monthly Weather Report*, but which could not be completed in time for publication in this Magazine. Indeed, we cannot guarantee the appearance of this map every month, and unless there is some indication that its monthly appearance is appreciated we may only insert it when it possesses some feature of more than ordinary interest.

Those readers who regret the omission of the temperature figures from the Tables in this Magazine will find that a good many are now added to the remarks in the last page but one, and special attention is given to temperature in Mr. Brodie's article on the Weather of the Month.

Correspondence.

To the Editor of Symons's Meteorological Magazine.

THE WHITE RAINBOW.

THE white rainbow observed in England on February 2nd, and described in the February number of your Magazine, was very probably a halo, since it appeared in cirriform clouds composed apparently of ice crystals. This supposition is confirmed by all the circumstances referred to, particularly the large extent of country from which it was visible and the state of the weather. A halo has already been observed more than once occupying the place of a rainbow, and Dr. Pernter in his *Meteorologische Optik*, p. 393, has given it the name of the Halo of Bouguer, and has endeavoured to explain it by a double reflection of solar light in the interior of hexagonal prisms of ice, terminated by pyramids. I have proposed another explanation, founded on the hypothesis of assemblages of tetrahedric or octohedric prisms. Such assemblages would furnish double mirrors set at 109° 28′ or at 70° 32′, which would give, by external double reflection, a white halo of 141° 4′ radius round the sun, that is to say, of 38° 56′ radius round the point opposite to the sun. (See *Comptes rendus* Academy of Sciences, 27th May, 1907.)

LOUIS BESSON.

Montsouris Meteorological Observatory, Paris, 3rd March, 1908.

THE STORM OF 22nd FEBRUARY AT NORWICH AND NEIGHBOURHOOD.

ONE of the most extraordinary storms of wind, lightning, thunder, hail and rain within the recollection of the writer occurred on the afternoon of Saturday, 22nd February. The morning had been unsettled and stormy; the barometer, which had been steady throughout the night, stood at 8 a.m. (corrected and reduced) at 29·80 in. A sudden fall then set in, and continued steadily till 4.30 p.m., when it had descended to 29·33 in., or at the rate of nearly half an inch in 8 hours. At about 4.30 p.m., without any previous warning, the sky suddenly became inky black, and the wind, which was S.W. or W.S.W., suddenly blew with almost hurricane fury. Brilliant lightning and long peals of thunder accompanied the storm, but the thunder was almost overwhelmed with the noise of the wind. Rain and hail fell furiously, but the storm had commenced but a short time when it became bright in the west, and in about ten minutes the sun, which was low in the sky, shone brightly, and cast a strange lurid light on the landscape and on the receding dark clouds. The lightning went on for some time after the sun had begun to shine, and the effect was most weird. The barometer rose about ·07 in. in a few minutes, then fell slightly, and after being very unsteady for about an hour, commenced a steady rise. The wind blew hard again from the N.W. during the evening, but there was no recurrence of any electrical disturbances. The damage done by the gale was immense; in fact, the devastation wrought to the south of Norwich was the greatest seen in the neighbourhood since the furious gale of 24th March, 1895, but the severity of the recent storm may be imagined when it is recollected that it only lasted ten minutes, whereas in 1895 the gale lasted over two hours. The maximum force of the wind as recorded at the anemometer at the Meteorological Station at Yarmouth was 90 miles an hour (which would equal force 11), which is greater than was recorded there in 1895. Large trees were blown down in all directions, houses stripped of tiles, and chimney stacks blown over, and many stacks of corn or hay were swept across the fields. Many people returning from Norwich (it was market day) had narrow escapes from the trees being blown across the roads, even large oaks being rooted up and falling over like ninepins. Forncett Station of the G.E.R. (on the London main line), which stands in a very exposed position, was completely wrecked by the gale, and the trains had to be brought to a standstill till the wreckage could be removed and the line cleared. Damage was done to several houses by lightning, and in some cases it is thought that this caused injury to trees which was at first attributed to the gale. There was no loss of life in this neighbourhood, but a miller at Torrington, near Lynn, was killed by the mill, which was struck by lightning, falling upon him. The amount of rain registered by me during the day was ·21 in.

I find that St. Mark's Vicarage, Dunham Massey, Cheshire, where my cousin, the Rev. R. K. Preston, had a chimney stack blown over at 2.30 p.m., is 160 miles from Norwich. Consequently if it was the same storm which struck Norwich two hours later, it would have travelled at the rate of 80 miles an hour. Other details of the storm will disclose to you its route, and it will be interesting to see if it was a "line squall," somewhat similar to that of 8th Feb., 1906.

ARTHUR W. PRESTON.

Christchurch Lodge, Eaton, Norwich, 1st March, 1908.

[The squall described above seems to have traversed the whole breadth of England, and we are informed that much damage was done to buildings in course of erection in an exposed position on Snowdon on February 22nd, by a sudden squall lasting for a very short time, and accompanied by a rapid rise of the barometer and sharp change in the direction of the wind.—ED. *S.M.M.*]

SOME OBSERVATIONS ON MIST, FOG AND CLOUD.

To the northward of Epsom the line of demarcation between the clay and the chalk is sharply marked by the distribution of mist. A series of observations I have carried out shows the following facts: The first formation of mist always takes place over the fields situate on the clay deposits, the mist rises steadily in a white stream until it reaches a certain altitude, when a drifting motion is imported to it; on reaching the chalk a descent of the mist takes place, and it settles down in a layer over the chalk at a height of about 2 feet above the ground, but never touching the ground. It is thus easy to distinguish between the clay and the chalk; over the former the mist, so to say, grows, whereas over the latter the mist is suspended in a thin pall. The phenomenon, to be seen at its best, requires a still air and a clear sky. The actual formation of mist over the chalk when in close proximity to the clay, if it occurs, I have so far never observed.

The distribution of fog over the clay and the chalk is equally diverse. Over the clay the fog is much denser, whereas over the chalk the tendency of the fog is to form in patches of variable density. The temperature prevailing in fog over the clay is very much more uniform than that over the chalk. I have frequently recorded a variation of as much as 6° over the latter, whereas over the former the maximum variation has not exceeded 2°. The general tendency is for the fog to be warmer over the clay than over the chalk. These observations on the variability of temperature were of necessity somewhat roughly carried out.

The extreme variability of fog within a very restricted area is well exemplified here; the height of the place of observation is 160 feet

above sea level, to the southward the South Downs lie, attaining a height of about 450 feet above sea level, at a distance of half-a-mile. It is of frequent occurrence during anticyclonic weather accompanied by fog, for a thick grey fog to prevail at the lower station, whereas at the higher (distance half-a-mile) continuous sunshine with a cloudless blue sky is in evidence.

A peculiar formation of mist developing into stratus, was witnessed from Epsom Downs on the 12th inst., brilliant weather prevailed at the time; in the valleys to the westward, which run more or less North and South, mist was observed forming at 11 a.m., by noon the outline of the valleys was lost, being filled with white stratus cloud extending up to, and in places, capping the hills on either side; the phenomena lasted about an hour, when on the sky temporarily clouding over, the cloud in the valleys dispersed.

A certain cloud formation over the lower ground as seen from Epsom Downs, frequently occurs after the passage of a thunderstorm; a ripple or wave-like motion then appears to prevail in the atmosphere, which causes the formation over the low ground of a cloud pallium composed of thin pleated roll stratus, as viewed from above, from the lower station the sky appears uniformly overcast; when once formed this cloud pall lasts, with very slight alterations, for many hours. The formation is intimately connected with the rear of a thunderstorm, as I have never seen its occurrence except under such circumstances.

Epsom, Surrey, Feb. 25th, 1908. SPENCER C. RUSSELL.

SIZE OF HAILSTONES.

THE following extract from the Memoirs of Benvenuto Cellini, of a terrible storm near Lyons, in 1544, may interest your readers. He writes of the storm :—"The hail at length rose to the size of lemons . . . at about half-a-mile's distance all the trees were broken down, and all the cattle were deprived of life; we likewise found a great many shepherds killed; and we saw hailstones which a man would have found it a difficult matter to have grasped in both hands."

Bromley, Kent. CHAS. ALFRED CASE.

BLACK BULB TEMPERATURE.

IN a letter from Dr. W. N. Shaw, which appears in the February number of your Magazine, and contains some interesting and valuable remarks upon observations made with the solar maximum thermometer, he expresses a wish for references, from your readers, relating to the use of the black bulb not in vacuo.

In this connexion. the following passage may be appositely quoted, which occurs in that fascinating book by Sir James Ross, entitled: "Voyage in the Southern and Antarctic Regions":—"At

noon on the 4th (January, 1841), the ships (H.M.S. 'Erebus' and 'Terror') were in latitude 65° 22′ S., longitude 172° 42′ E., and at 9 p.m. the sun's radiation was measured by means of a thermometer, whose bulb was blacked with Indian ink; it rose from 33° to 40°·2, the sun's altitude being at the time four degrees."

From the manner in which the incident is related, the observation may, I think, be regarded as not uncommon; although I must admit that I cannot recall the mention of a similar observation in any other part of the eminent seaman's delightful narrative.

CAMPBELL HEPWORTH.

2, Amherst Road, Ealing, W., Feb. 21st, 1908.

OBSERVATIONS IN THE FALKLAND ISLANDS.

As you have, perhaps, seen by the papers, I am conducting a new scientific expedition round the Falklands and Tierra del Fuego. I have always been very interested in the influence of climate upon the vegetable kingdom, especially on the composition and character of the plant formations, and it is one of the main objects of the present expedition to study this question. But what can one do where no regular meteorological work is carried on? The Falkland Islands are very interesting indeed, from the climatological point of view. Observations are now being made in Stanley, on the east coast of the East Island, but they are not at all complete, especially since the lighthouse-keeper had to give up his meteorological work some eight months ago, when the new light was started, which keeps him too busy to allow him to do anything but look after it. Now I have been round the West Falkland. Everybody there tells me that the climate, *especially on the west coast*, is different from that of the East Falkland. That is certainly very noteworthy, and I am very desirous of getting this question settled, as there are certain differences in the geography and in the distribution of plants on which it should throw light. Could not the Meteorological Office provide one of the farmers with the instruments necessary for observations. There is one spot especially fitted for a station, *West Point Island*, where Mr. A. Felton has made most interesting observations on the weather of that region. He tells me that he would be glad to have the instruments necessary for regular meteorological observations if they could be obtained for him.

Now, can you possibly do anything in this matter? I think that the knowledge would well pay the cost and trouble of sending out a set of instruments with instructions. I should like very much to know if anything can be done.

CARL SKOTTSBERG.

Fort Stanley, Falkland Islands, Dec. 29th, 1907.

RAINFALL TABLE FOR FEBRUARY, 1908.

STATION.	COUNTY.	Lat. N.	Long. W. [*E.]	Height above Sea. ft.	RAINFALL OF MONTH.	
					Aver. 1870-99.	1908.
		° ′	° ′		in.	in.
Camden Square	*London*	51 32	0 8	111	1·62	1·68
Tenterden	*Kent*	51 4	*0 41	190	1·85	1·06
West Dean	*Hampshire*	51 3	1 38	137	2·27	1·15
Hartley Wintney	,,	51 18	0 53	222	2·06	1·14
Hitchin	*Hertfordshire*	51 57	0 17	238	1·54	1·20
Winslow (Addington)	*Buckinghamshr.*	51 58	0 53	309	1·73	·96
Bury St. Edmunds (Westley)	*Suffolk*	52 15	*0 40	226	1·55	1·90
Brundall	*Norfolk*	52 37	*1 26	66	1·49	2·00
Winterbourne Steepleton	*Dorset*	50 42	2 31	316	3·11	2·37
Torquay (Cary Green)	*Devon*	50 28	3 32	12	2·87	1·79
Polapit Tamar [Launceston]	,,	50 40	4 22	315	2·84	3·56
Bath	*Somerset*	51 23	2 21	67	2·12	1·32
Stroud (Upfield)	*Gloucestershire*	51 44	2 13	226	2·13	1·08
Church Stretton (Wolstaston)	*Shropshire*	52 35	2 48	800	2·27	1·77
Coventry (Kingswood)	*Warwickshire*	52 24	1 30	340	1·99	1·04
Boston	*Lincolnshire*	52 58	0 1	25	1·55	1·54
Worksop (Hodsock Priory)	*Nottinghamshire*	53 22	1 5	56	1·58	1·41
Derby (Midland Railway)	*Derbyshire*	52 55	1 28	156	1·66	1·42
Bolton (Queen's Park)	*Lancashire*	53 35	2 28	390	2·67	4·35
Wetherby (Ribston Hall)	*Yorkshire, W.R.*	53 59	1 24	130	1·63	1·69
Arncliffe Vicarage	,, ,,	54 8	2 6	732	4·74	6·07
Hull (Pearson Park)	,, *E.R.*	53 45	0 20	6	1·86	2·18
Newcastle (Town Moor)	*Northumberland*	54 59	1 38	201	1·58	1·75
Borrowdale (Seathwaite)	*Cumberland*	54 30	3 10	423	11·64	9·49
Cardiff (Ely)	*Glamorgan*	51 29	3 13	53	3·13	2·53
Haverfordwest (High Street)	*Pembroke*	51 48	4 58	95	3·70	2·33
Aberystwyth (Gogerddan)	*Cardigan*	52 26	4 1	83	3·03	4·59
Llandudno	*Carnarron*	53 20	3 50	72	1·97	3·42
Cargen [Dumfries]	*Kirkcudbright*	55 2	3 37	80	3·62	3·37
Hawick (Branxholm)	*Roxburgh*	55 24	2 51	457	2·62	2·21
Edinburgh (Royal Observy.)	*Midlothian*	55 55	3 11	442	...	·96
Girvan (Pinmore)	*Ayr*	55 10	4 49	207	4·00	4·28
Glasgow (Queen's Park)	*Renfrew*	55 53	4 18	144	2·53	2·39
Tighnabruaich	*Argyll*	55 55	5 14	50	4·57	6·19
Mull (Quinish)	,,	56 36	6 13	35	4·50	4·79
Dundee (Eastern Necropolis)	*Forfar*	56 28	2 57	199	2·10	·60
Braemar	*Aberdeen*	57 0	3 24	1114	2·70	3·56
Aberdeen (Cranford)	,,	57 8	2 7	120	2·43	1·41
Cawdor	*Nairn*	57 31	3 57	250	1·86	3·06
Fort Augustus (S. Benedict's)	*E. Inverness*	57 9	4 41	68	3·88	5·22
Loch Torridon (Bendamph)	*W. Ross*	57 32	5 32	20	6·77	10·97
Dunrobin Castle	*Sutherland*	57 59	3 56	14	2·39	5·05
Castletown	*Caithness*	58 35	3 23	100	...	4·85
Killarney (District Asylum)	*Kerry*	52 4	9 31	178	5·44	3·08
Waterford (Brook Lodge)	*Waterford*	52 15	7 7	104	3·30	1·63
Broadford (Hurdlestown)	*Clare*	52 48	8 38	167	2·19	1·95
Abbey Leix (Blandsfort)	*Queen's County*	52 56	7 17	532	2·58	1·86
Dublin (Fitz William Square)	*Dublin*	53 21	6 14	54	1·98	1·37
Ballinasloe	*Galway*	53 20	8 15	160	2·48	2·07
Clifden (Kylemore House)	,,	53 32	9 52	105	6·08	5·39
Crossmolina (Enniscoe)	*Mayo*	54 4	9 18	74	4·01	3·85
Collooney (Markree Obsy.)	*Sligo*	54 11	8 27	127	2·84	4·81
Seaforde	*Down*	54 19	5 50	180	2·97	2·51
Londonderry (Creggan Res.)	*Londonderry*	54 59	7 19	320	2·73	4·29

RAINFALL TABLE FOR FEBRUARY, 1908—*continued.*

RAINFALL OF MONTH (*con.*)					RAINFALL FROM JAN. 1.					
Diff. from Av. in.	% of Av.	Max. in 24 hours. in.	Date.	No. of Days	Aver. 1870-99. in.	1908. in.	Diff. from Aver. in.	% of Av.	Mean Annual 1870-1899. in.	STATION.
+ ·06	104	·31	16	15	3·51	3·61	+ ·10	103	25·16	Camden Square
— ·79	57	·18	16	17	4·21	2·70	—1·51	64	28·36	Tenterden
—1·12	51	·49	16	15	4·95	2·56	—2·39	52	29·93	West Dean
— ·92	55	·33	16	15	4·45	2·66	—1·79	60	27·10	Hartley Wintney
— ·34	78	·21	16	16	3·35	2·61	— ·74	78	24·66	Hitchin
— ·77	55	·20	16	15	3·78	2·90	— ·88	77	26·75	Addington
+ ·35	123	·27	16	17	3·25	2·79	— ·46	86	25·39	Westley
+ ·51	134	·25	15	18	3·16	2·98	— ·18	94	25·40	Brundall
— ·74	76	1·05	16	20	7·01	3·87	—3·14	55	39·00	Winterbourne Stpltn
—1·08	62	·53	16	14	6·06	3·05	—3·01	50	35·00	Torquay
+ ·72	125	·68	16	22	6·71	5·80	— ·91	86	38·85	Polapit Tamar
— ·80	62	·41	16	17	4·64	2·56	—2·08	55	30·75	Bath
—1·05	51	·36	16	17	4·59	2·66	—1·93	58	29·85	Stroud
— ·50	78	·36	16	14	5·08	3·18	—1·90	63	33·04	Wolstaston
— ·95	52	·30	16	11	4·33	1·81	—2·52	42	29·21	Coventry
— ·01	99	·20	16	14	3·14	2·51	— ·63	80	23·30	Boston
— ·17	89	·31	27	15	3·32	2·43	— ·89	73	24·70	Hodsock Priory
— ·24	86	·24	16	17	3·61	2·55	—1·06	71	26·18	Derby
+1·68	163	·78	16	21	6·05	8·22	+2·17	136	42·43	Bolton
+ ·06	104	·31	16	15	3·52	2·95	— ·57	84	26·96	Ribston Hall
+1·33	128	1·80	14	19	11·07	12·66	+1·59	114	60·96	Arncliffe Vic.
+ ·32	117	·41	28	17	3·66	3·53	— ·13	96	27·02	Hull
+ ·17	111	·60	29	15	3·54	3·21	— ·33	90	27·99	Newcastle
—2·15	81	1·75	14	24	26·35	26·31	— ·04	100	132·68	Seathwaite
— ·60	81	·88	16	24	6·98	5·26	—1·72	75	42·81	Cardiff
—1·37	63	·83	16	18	8·83	5·40	—3·43	61	47·88	Haverfordwest
+1·56	152	·76	16	25	6·90	8·43	+1·53	122	45·41	Gogerddan
+1·45	173	·53	14	24	4·54	5·95	+1·41	131	30·98	Llandudno
— ·25	93	·76	27	13	8·16	8·39	+ ·23	103	43·43	Cargen
— ·41	84	·33	30	18	5·81	5·66	— ·15	97	34·80	Branxholm
...	...	·23	21	13	...	3·13	...	...	...	Edinburgh
+ ·28	107	·70	28	28	8·92	9·53	+ ·61	107	48·87	Girvan
— ·14	94	·38	22	19	5·78	7·07	+1·29	122	35·80	Glasgow
+1·62	136	·68	27	26	10·43	13·14	+2·71	126	57·90	Tighnabruaich
+ ·29	107	·78	21	26	10·35	10·81	+ ·46	104	57·53	Quinish
—1·50	29	·17	22	14	4·20	2·21	—1·99	53	28·95	Dundee
+ ·86	132	...	...	...	5·61	6·12	+ ·51	109	36·07	Braemar
—1·02	58	·26	29	17	4·75	2·85	—1·90	60	33·01	Aberdeen
+1·20	165	·76	29	18	4·00	5·15	+1·15	129	29·37	Cawdor
+1·34	134	·85	22	24	8·98	10·50	+1·52	117	43·71	Fort Augustus
+4·20	162	1·38	21	29	15·52	22·17	+6·65	143	86·50	Bendamph
+2·66	211	1·32	29	17	5·01	8·42	+3·41	168	31·60	Dunrobin Castle
...	..	·94	26	23	...	7·46	...	...	...	Castletown
—2·36	57	·51	27	25	12·01	7·56	—4·45	63	58·11	Killarney
—1·67	49	·61	16	13	7·36	4·05	—3·31	55	39·30	Waterford
— ·24	89	·30	16	25	5·17	4·81	— ·36	93	33·47	Hurdlestown
— ·72	72	·30	14, 16	20	5·72	5·08	— ·64	89	35·19	Abbey Leix
— ·61	69	·38	14	20	4·14	3·43	— ·71	83	27·75	Dublin
— ·41	83	·47	14	25	5·97	5·43	— ·54	91	37·04	Ballinasloe
— ·69	89	·77	16	23	13·94	12·71	—1·23	91	80·23	Kylemore House
— ·16	96	·39	14	24	9·01	10·98	+1·97	122	50·50	Enniscoe
+1·97	169	·48	29	26	6·45	9·25	+2·80	144	41·83	Markree Obsy.
— ·46	85	·72	16	18	6·60	5·17	—1·43	78	38·61	Seaforde
+1·56	157	·50	27	25	6·29	7·46	+1·17	119	41·20	Londonderry

SUPPLEMENTARY RAINFALL, FEBRUARY, 1908.

Div.	STATION.	Rain inches	Div.	STATION.	Rain. inches
II.	Warlingham, Redvers Road	1·47	XI.	Rhayader, Tyrmynydd	4·06
,,	Ramsgate	1·01	,,	Lake Vyrnwy	4·57
,,	Steyning	1·74	,,	Llangyhanfal, Plâs Draw	2·15
,,	Hailsham	1·40	,,	Criccieth, Talarvor	3·02
,,	Totland Bay, Aston House	1·02	,,	Llanberis, Pen-y-pass	...
,,	Emsworth, Redlands	1·20	,,	Lligwy	2·51
,,	Stockbridge, Ashley	1·17	,,	Douglas, Woodville	2·20
,,	Reading, Calcot Place	·95	XII.	Stoneykirk, Ardwell House	2·27
III.	Harrow Weald, Hill House	1·42	,,	Dalry, The Old Garroch	6·37
,,	Oxford, Magdalen College	·76	,,	Langholm, Drove Road	2·59
,,	Pitsford, Sedgebrook	1·06	,,	Moniaive, Maxwelton House	3·35
,,	Huntingdon, Brampton	...	XIII.	N. Esk Reservoir [Penicuick]	2·40
,,	Woburn, Milton Bryant	·76	XIV.	Maybole, Knockdon Farm	2·10
,,	Wisbech, Bank House	1·32	XV.	Campbeltown, Witchburn	3·36
IV.	Southend Water Works	1·43	,,	Inveraray, Newtown	6·13
,,	Colchester, Lexden	1·29	,,	Ballachulish House	7·81
,,	Newport, The Vicarage	1·22	,,	Islay, Eallabus	4·31
,,	Rendlesham	1·51	XVI.	Dollar Academy	2·02
,,	Swaffham	1·78	,,	Loch Leven Sluice	1·92
,,	Blakeney	1·44	,,	Balquhidder, Stronvar	5·07
V.	Bishops Cannings	1·25	,,	Perth, Pitcullen House	1·28
,,	Ashburton, Druid House	3·21	,,	Coupar Angus Station	1·34
,,	Honiton, Combe Raleigh	2·20	,,	Blair Atholl	2·54
,,	Okehampton, Oaklands	3·57	,,	Montrose, Sunnyside Asylum	1·02
,,	Hartland Abbey	2·60	XVII.	Alford, Lynturk Manse	1·52
,,	Lynmouth, Rock House	2·30	,,	Keith Station	2·54
,,	Probus, Lamellyn	2·32	XVIII.	N. Uist, Lochmaddy	3·16
,,	North Cadbury Rectory	1·15	,,	Alvey Manse	3·20
VI.	Clifton, Pembroke Road	1·80	,,	Loch Ness, Drumnadrochit	4·75
,,	Ross, The Graig	·79	,,	Glencarron Lodge	10·31
,,	Shifnal, Hatton Grange	1·24	,,	Fearn, Lower Pitkerrie	...
,,	Blockley, Upton Wold	1·18	XIX.	Invershin	4·56
,,	Worcester, Boughton Park	1·29	,,	Altnaharra	7·24
VII.	Market Overton	1·27	,,	Bettyhill	4·76
,,	Market Rasen	2·11	XX.	Dunmanway, The Rectory	3·01
,,	Bawtry, Hesley Hall	1·55	,,	Cork	1·15
,,	Buxton, Lismore House	5·20	,,	Darrynane Abbey	4·06
VIII.	Neston, Hinderton Lodge	1·56	,,	Glenam [Clonmel]	2·11
,,	Southport, Hesketh Park	2·15	,,	Ballingarry, Gurteen	2·37
,,	Chatburn, Middlewood	3·60	,,	Miltown Malbay	3·08
,,	Cartmel, Flookburgh	2·55	XXI.	Gorey, Courtown House	·98
IX.	Langsett Moor, Up. Midhope	3·77	,,	Moynalty, Westland	2·66
,,	Scarborough, Scalby	2·19	,,	Athlone, Twyford	1·98
,,	Ingleby Greenhow	2·22	,,	Mullingar, Belvedere	2·17
,,	Mickleton	2·34	XXII.	Woodlawn	2·73
X.	Bardon Mill, Beltingham	3·33	,,	Westport, St. Helens	3·59
,,	Ewesley, Fallowlees	2·05	,,	Mohill	2·85
,,	Ilderton, Lilburn Cottage	1·45	XXIII.	Enniskillen, Portora	3·09
,,	Keswick, York Bank	4·39	,,	Dartrey [Cootehill]	2·93
XI.	Llanfrechfa Grange	1·98	,,	Warrenpoint, Manor House	1·84
,,	Treherbert, Tyn-y-waun	5·55	,,	Banbridge, Milltown	1·67
,,	Carmarthen, The Friary	3·72	,,	Belfast, Springfield	3·28
,,	Castle Malgwyn [Llechryd]	2·78	,,	Bushmills, Dundarave	2·76
,,	Plynlimon	10·35	,,	Stewartstown, The Square	...
,,	Crickhowell, Ffordlas	2·40	,,	Killybegs	6·93
,,	New Radnor, Ednol	2·37	,,	Horn Head	3·78

METEOROLOGICAL NOTES ON FEBRUARY, 1908.

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; F for number of days Frost in Screen; f on Grass.

LONDON, CAMDEN SQUARE.—The first half was dry and fine, with high bar.; the second half cloudy and showery. Mean temp. 41°·7, or 1°·9 above the average; shade max. 54°·5 on 17th, min. 28°·0 on 13th. F 6, f 22. Duration of sunshine 53·1* hours, and of R 28·8 hours.

TENTERDEN.—Duration of sunshine 89·5† hours. Shade max. 53°·5 on 14th, min. 28°·5 on 11th. F 8, f 17.

TOTLAND BAY.—Duration of sunshine 79·3* hours. Shade max. 52°·0 on 19th, min. 30°·2 on 12th. F 3, f 11.

TORQUAY.—Duration of sunshine 71·5* hours. Mean temp. 44°·8, or 1°·8 above the average. Shade max. 55°·1 on 18th, min. 30°·0 on 2nd. F 2, f 11.

NORTH CADBURY.—Shade max. temp. 53°·5 on 19th, min. 26°·0 on 2nd. F 5, f 16.

CLIFTON.—Dry till 12th, with occasional fogs under the influence of anticyclonic conditions. Then more or less R every day till 18th, and afterwards weather of the westerly type. R ·65 in. below the average.

ROSS.—Mean max. in shade 3°·0 above, and mean min. 1°·6 above, the average. Shade max. 55°·3 on 19th, min. 26°·5 on 13th and 14th. F 8, f 15.

BUXTON.—R 1·20 in. above the average of 35 years. Duration of sunshine 30·8* hours. Mean temp. 38°·0, or 1°·9 above the average. Shade max. 45°·6 on 21st, min. 24°·0 on 29th. F 9, f 20.

BOLTON.—Duration of sunshine 39·2* hours, or 0·4 below the average. Mean temp. 40°·5, or 2°·7 above the average. Shade max. 50°·6 on 22nd, min. 29°·2 on 29th.

SOUTHPORT.—Mean temp. 41°·6, or 2°·0 above the average. Shade max. 51°·1 on 22nd, min. 30°·2 on 29th. F 1, f 9. Duration of sunshine 69·0* hours, or 4·0 above the average. R ·09 in. above the average. Duration of R 53·2 hours. Wind movement above the average by 140 miles per day.

HULL.—Max. temp. in shade 52°·0 on 7th, 11th and 18th; min. 26°·0 on 29th. F 5, f 22.

HAVERFORDWEST.—Generally fine and mild, but stormy from 15th to the end. Agricultural operations were well advanced. Shade max. 52°·0 on 19th, min. 35°·6 on 29th. F 0, f 0. Duration of sunshine 55·1* hours.

LLANDUDNO.—Fine and mild, with excessive R. Duration of sunshine 60·0* hours. Shade max. 52°·2 on 22nd, min. 33°·4 on 29th. F 0, f 0.

DUMFRIES.—Fair and calm to 12th, succeeded by a wet stormy period for the remainder. On 22nd a severe N.W. gale did considerable damage to woods and houses. Cold bizzard on 25th terminated in 9 inches of S on 27th.

EDINBURGH.—Max. shade temp. 50°·4 on 8th, min. 27°·9 on 29th. F 4, f 10.

COUPAR ANGUS.—R ·50 in. or 30 per cent. below the average of 30 years. Mean temp. 33°·9, or 3°·5 above the average. Shade max. 53°·0 on several days, min. 28°·0 on 19th. F 19.

ABERDEEN.—Fine till 22nd; afterwards high wind, S and R. Shade max. 55°·0 on 7th, min. 25°·0 on 27th. F 9.

FORT AUGUSTUS.—Max. 50°·0 on 5th, 6th and 11th; min. 27°·0 on 28th. F 8.

CASTLETOWN.—Breezy and fairly dry till 14th, then rough and wet. Shade max. 51°·0 on 12th, min. 20°·0 on 28th. F 14, f 19.

CORK.—Mean temp. 43°·0. Shade max. 53°·0 on 20th, min. 31°·0 on 29th. F 1, f 6. The R was the least since 1891.

MILTOWN MALBAY.—Fog and R till 20th, then keenly cold and stormy.

DUBLIN.—Strong but soft oceanic winds, and frequent showers. An anticyclone of remarkable staying power lay over Ireland in the first half. Mean temp. 44°·8, or 2°·4 above the average. Max. 53°·2 on 22nd, min. 33°·0 on 29th. F 0, f 2.

MARKREE.—Shade max. 51°·4 on 20th, min. 31°·4 on 28th. F 2, f 8.

WARRENPOINT.—Max. 56°·0 on 6th, min. 33°·0 on 27th and 28th. F 0, f 4.

* Campbell-Stokes. † Jordan.

Climatological Table for the British Empire, September, 1907.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Date.	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	80·1	25	39·4	24	70·0	49·7	52·8	86	113·9	35·5	·62	8	6·1
Malta	86·7	2	60·0	18	79·8	69·7	70·9	89	146·0	...	2·30	5	4·8
Lagos	88·0	27	70·0	13	83·6	73·1	72·5	79	159·0	67·0	2·92	15	8·7
Cape Town	91·7	23	37·6	14	67·6	49·0	49·8	69	...	...	1·71	10	3·8
Durban, Natal ...	84·2	2	54·0	15	75·8	59·6	...	...	138·2	...	2·89	13	5·1
Johannesburg	78·9	13	36·0	14	68·9	47·5	46·9	74	143·1	35·4	3·02	5	3·0
Mauritius	81·8	30	55·5	1	78·2	60·9	58·0	68	146·1	46·0	·47	9	5·8
Calcutta...	93·7	18, 30	75·1	20	90·0	78·9	77·4	82	158·5	73·0	4·48	7	6·7
Bombay...	88·3	28	74·4	9	86·0	77·2	74·9	81	134·6	71·5	2·75	13	5·8
Madras	100·6	10	72·6	1, 24	95·0	77·9	74·1	75	149·7	74·0	·29	6	4·6
Kodaikanal	68·5	19	49·4	6	63·6	52·0	51·6	84	139·3	42·4	3·64	14	6·5
Colombo, Ceylon ...	90·0	8	72·1	30	87·0	77·4	73·8	76	157·1	71·0	3·35	12	5·9
Hongkong	88·6	8	73·7	15	85·1	76·6	73·1	78	151·0	...	19·47	18	5·9
Melbourne	82·3	30	31·9	13	64·9	46·5	41·6	62	132·4	24·7	·52	6	5·6
Adelaide	88·5	20	39·7	1	70·3	49·6	46·4	63	140·3	31·2	1·08	11	4·8
Coolgardie	89·0	18	34·0	6	74·4	46·9	40·2	56	152·2	31·2	·51	4	2·5
Sydney	91·1	24	42·8	5	71·2	51·7	41·0	60	130·1	30·9	·27	10	1·7
Wellington ...	63·0	21, 22	37·5	10	54·3	45·2	41·6	73	110·0	27·0	3·01	15	7·0
Auckland	66·0	26	46·0	17	58·8	47·9	45·1	74	124·0	34·0	5·42	24	5·7
Jamaica, Negril Point.	91·0	10	70·4	4	88·2	72·7	73·2	77	...	...	7·39	16	7·3
Trinidad	...	...	...	...	...	...	...	...	...	...	...	...	...
Grenada	88·2	6, 11	71·8	8, 16	86·7	73·6	72·3	78	146·4	...	8·36	27	5·0
Toronto	82·7	20	40·3	26	69·4	54·0	...	...	100·0	36·2	4·80	14	...
Fredericton	78·0	21	31·5	19	64·4	46·9	...	78	...	...	5·12	15	5·8
St. John's, N.B. ...	69·3	9	39·5	19	61·3	50·5	...	...	...	...	4·83	15	...
Victoria, B.C.	84·7	9	40·2	13	66·5	50·3	...	77	...	...	1·17	11	5·3
Dawson	64·0	12	24·0	15	51·6	33·2	...	...	...	...	1·89	9	6·4

MALTA.—Mean temp. of air 74°·5. Average hours bright sunshine 7·7.

JOHANNESBURG.—Bright sunshine 263·4 hours.

Mauritius.—Mean temp. of air 0°·7, of dew point 2°·6, relative humidity 4·4 per cent., and R ·91 in., below, averages. Mean hourly velocity of wind 9·5 miles, or 2·5 miles below average.

MADRAS.—Rainfall 7 per cent. of the average. TSS on 3 days.

KODAIKANAL.—Bright sunshine 129 hours.

COLOMBO.—Mean temp. of air 80°·0 or 0°·4 above, of dew point 0°·5 above, and R 1·66 in. below, averages. Mean hourly velocity of wind 6·5 miles. TS on 29th.

HONGKONG.—Mean temp. of air 80°·6. Bright sunshine 187·9 hours. Mean hourly velocity of wind 11·3 miles. R 11·25 in. above average. Violent E. gale 13th—14th; maximum hourly velocity 75 miles.

Adelaide.—Mean temp. of air 3°·0 above, R ·66 in. below, averages. Warmest September, with one exception (1886) in 50 years.

Sydney.—Mean temp. of air 2°·6 above, and R 2·60 in. below, averages.

Wellington.—Mean temp. of air 1°·8 below, and R 1·49 in. below, averages.

Auckland.—Cold and squally throughout. R nearly 2 inches above, and mean temp. below, averages.

RAINFALL OF THAMES VALLEY, MARCH, 1908.

The Edinburgh Geographical Institute.