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THE HIGH BAROMETER OF JANUARY, 1907.

By R. G. K. Lempfert, M.A.

The month of January, 1907, has established a record for high barometric readings which is probably, in its way, unprecedented in the annals of meteorology. The Daily Weather Report issued by the Russian Meteorological Office for Wednesday, January 23rd, records the reading 799·8 mm. at Pernau, on the Gulf of Riga, at the hour of evening observation on the previous day and a reading of like magnitude at Riga on the morning of the 23rd. 799·8 mm. is equivalent to 31·49 English inches, and if, as seems probable, the correction for reducing to latitude 45° has not been applied in the Russian Report, the finally corrected pressure value would be **31·51 in.**, the reading adopted in the report issued by the Bureau Central Météorologique of Paris.

The highest pressure, reduced to sea level, which has been observed on the face of the globe is, we believe, 31·72 in. recorded at Irkutsk in December, 1896. The present readings are thus less than the "record" by about 0·2 in. It should, however, be borne in mind that the Siberian station is several thousand feet above the level of the sea, so that the unreduced pressure value, as read off by the observer, was less than 31·7 in. by several inches. Both Pernau and Riga are on the shores of the Baltic, and the corrections for reduction to sea level are very small. We may therefore regard the readings quoted above as pressures actually experienced. From this point of view 31·51 in. probably establishes a new "record" in meteorological data.*

The distribution of pressure from the evening of January 21st to the morning of January 23rd is shown on the accompanying maps (see Plate facing p. 1). In each a large area is included within the space bounded by the isobar of 31·0 in. At 8 a.m. on the 23rd the pressure exceeded this limit over a large portion of Great Britain and a small district in the north-east of Ireland. The highest reading in the British Isles was reached at Aberdeen, at 10.15 a.m. on January 23rd. At this hour the Observatory barometer showed 30·957 in. at station level, which corresponds with 31·06 in. at mean

* See also this Magazine, Vol. **34** (1899), p. 81.

sea level. This falls short of Aberdeen's previous record, which happens also to be the record for the British Isles, by only ·05 in.*

The history of the advance and development of the anticyclonic system shows some interesting features. Pressure had been over 31 in. over the north-west of Russia since the morning of the 20th, and during the following days it continued to increase steadily. On the evening of January 21st the highest reading was 31·46 in. in the centre of Finland, and the anticyclone had extended westward to the shores of the North Sea. Fresh or strong south-easterly winds were blowing on the Dutch, German and Danish coasts. The British Isles and the west of France were under the influence of an independent anticyclone, in which the highest readings were over the Bay of Biscay. The wind at the British stations was westerly or north-westerly. A trough of low pressure, extending in a south-east to north-west direction across the North Sea, separated the two opposing wind circulations. During the night the situation underwent a complete change. At 8 a.m. on January 22nd the oceanic anticyclone had receded beyond the west coast of Ireland, while the continental system had spread westward and set up easterly winds at all our east coast stations. A "depression," with a minimum reading of 30·24 in., covered the mouth of the English Channel.

The distribution of pressure on the evening of January 22nd and the morning of the 23rd, when the anticyclone attained its greatest intensity, may be seen in the accompanying maps. Steep gradients established themselves to the north and south of the region of highest pressure. A plentiful supply of warm air was accordingly carried from mid-Atlantic, past the north of Scotland, to the coast of Norway, while cold air, passing along the southern slope of the anticyclone, was brought from central to western and southern Europe. A most striking distribution of temperature resulted. At 8 a.m. on January 23rd the reading in the Färoe Islands was 46°, identical with that at Palermo. At Riga the thermometer stood at −22° F. and sharp frost prevailed over the greater part of southern Europe. At Rome the reading was 33°, or 6° lower than that at Bodoe, within the Arctic circle.

A south-westerly gale in the extreme north-west brought very warm air from southern latitudes to the neighbourhood of Iceland. The reading reported from Seydisfjord was as high as 59°, which is 1° higher than the simultaneous reading at the Azores, where the wind was northerly, and more than 10° higher than the readings on the coast of Algeria and Tunis. The possibility of telegraphic errors in the reports must be borne in mind, but equally high winter temperatures have been observed in Iceland under similar conditions in previous years. On the following day (January 24th) the wind veered to the north of west and the temperature fell rapidly to 29°.

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* See also this Magazine, Vol. **37** (1902), pp. 5, 27.

Towards the end of the week the anticyclone moved slowly to the south-eastward and decreased in intensity. On the evening of Friday, January 25th, the region of highest pressure had been transferred to Asia Minor; the highest readings were still above 31 in.

WEATHER WHIMS.—I.

THE BUTTERFLY-HYGROSCOPE.

By Richard Inwards.

This philosophic toy is made from the seed of the Egyptian wild oat, see fig. 1. It will be observed that the seed is furnished with long awns, and that the thicker portion, or what may be termed the thigh, is twisted, and is in all probability a modified leaf. But this part of the plant is highly hygroscopic and twists or untwists with the changes in the dampness of the air, so that it can be used to actuate the wings of the butterfly, see fig. 2, where the awn is seen fastened down by passing through the head of a small screw fitted with a shallow wing-nut in a recess cut in the wooden support. The left wing only is shown, and it is obvious that the awn which works the right wing must be placed in the opposite direction, or pointing towards the head.

Fig. 1.

The wings are of paper, painted in water colours, and the hinges, which must work with very little friction, consist of holes through which pieces of fine wire pass freely—each wing must be a separate piece of paper. It is best to set the wings on a very damp day, when, after loosening the screws, the wings may be pressed together in a vertical position, and the screws lightly turned so as to hold them there. They will then open as soon as a drier state of the air sets in, and generally indicate by their position the moisture of the atmosphere. The butterfly should be hung on the wall in a passage, where there is no fire and where there is access to the open air. It is too fragile to work out of doors.

The hygroscopic property is doubtless a provision of nature to enable the seed to plant itself, for the action of the changes of

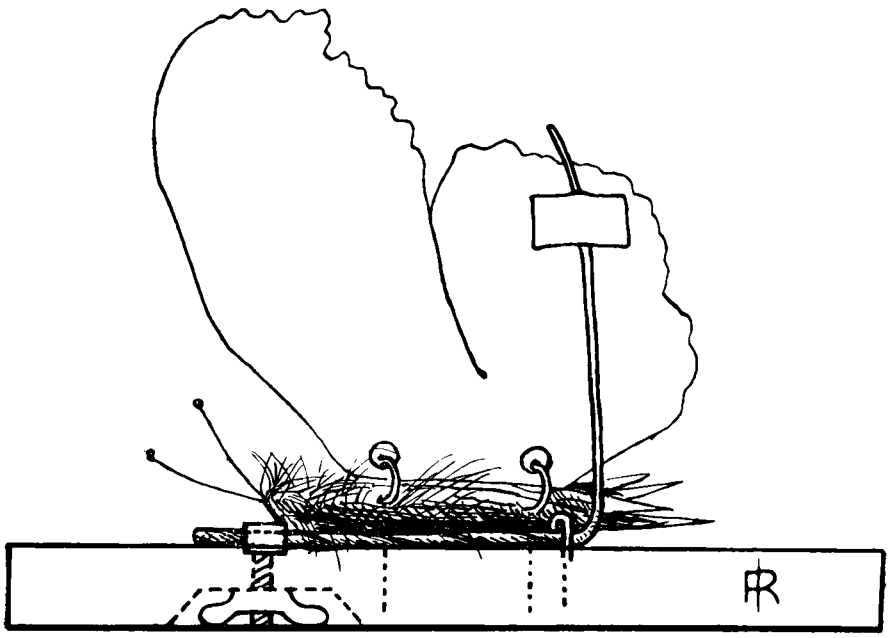


FIG. 2.

moisture being to twist and untwist the awn, and as the hairs and minute spines on the seed prevent it ever going backwards ; as soon as it gets its pointed end in any sort of moist hole or crevice, the turning about of the legs by pressing against any objects such as stones, or straws, or even against the ground itself, effectually plants the seed. If a number of the seeds are placed in a paper box with holes near the bottom it will not be long before half a dozen of the seeds are making attempts to get through the holes. It is diverting to see the behaviour of the seeds when the thighs are wetted. They twist slowly, and roll over and sometimes when the legs get entangled the seeds leap several times their own length, from the sudden releasing of the touching parts. The hygroscopic substance seems to be a grayish matter rolled up in the interior of the awn. Perhaps some chemist will tell us what it is.

THE LANDER RECORDING RAIN GAUGE.

A LANDER self-recording rain gauge has been tested at Camden Square during the greater part of the past year. The results have been compared with those of other automatic gauges of approved patterns and have generally been found to accord closely. There were few

opportunities of observing the gauge in conditions of real difficulty such as are presented in torrential rain of short duration and great amount. The one heavy rain was that of June 28th, 1906, but though 2·21 in. fell on that occasion it was spread over $8\frac{1}{2}$ hours.

The instrument is of simple construction, having a funnel of the Snowdon pattern connected with a chamber containing a float which carries a recording pen moving upward between vertical guides. A continuous record is made upon a drum which may rotate daily or weekly. When an inch of rain has fallen the water reaches the bend of an open syphon, which starts without any mechanical device and empties the chamber in about 15 seconds. Although the objections to syphon action in recording gauges are numerous, we observed no instance of failure with the Lander gauge, though it must be stated that there was no opportunity of observing a discharge during torrential rain. A distinct advantage of this gauge is that it records the fall of a whole inch of rain before discharging and the liability to failure is thus greatly reduced, as rains of such an amount as to require more than one discharge are rare. There is an efficient heating arrangement for preventing damage in frost.

Our only real difficulty was with the clock, the time-keeping of which left something to desire, and the gearing was not altogether satisfactory. We should prefer to pay more for the instrument and have a clock of superior quality, for the condition of exposure to the variations of temperature and humidity is a very severe one. It is probably difficult to get a clock that can stand the test of a week's run in the open air without going seriously wrong, and for this reason we very strongly recommend the use of a drum which revolves in twenty-four hours instead of seven days. It is not necessary to change the paper daily, but the pen should be set to the correct time each morning. We can recommend the gauge when fitted with a daily drum to any observer who will not grudge a little care in setting and regulating the clock. The extremely moderate price brings this gauge within the reach of many to whom the cost of such gauges has hitherto been prohibitive.

It cannot, however, be too strongly pointed out that recording gauges of whatever pattern should never supersede the ordinary gauge for the measurement of amount, as however carefully attended to the liability to a failure of the mechanism always exists and the continuity of a record may be broken unless the observations are supplemented by those of an ordinary gauge.

A READERSHIP IN DYNAMICAL METEOROLOGY.

WE have much pleasure in giving publicity to the following important communication from the Meteorological Office :—

The Meteorological Committee are enabled by a private donation to appoint a Reader in Dynamical Meteorology, to hold office from October 1st, 1907, or such earlier date as may be arranged, under the following general conditions :—

1.—The Readership will be of the annual value of £350, and will be tenable for three years at any British University that may be approved for the purpose, and affords the required facilities.

2.—Candidates must produce evidence of being able to carry out original investigation of a mathematical character.

3.—The duty of the Reader will be primarily to promote the Science of Meteorology by mathematical investigation, and he will be expected to give annually a short course of about twelve lectures.

Further details may be obtained from the Director of the Meteorological Office, 63, Victoria Street, London, S.W.

Applications should be sent to the Director not later than 1st March, 1907, and should be accompanied by references, but no testimonials should be sent.

The further details referred to above are as follows :—

1.—The Readership is to be of the value of £350 per year, for three years, payable quarterly, and to be awarded by the Meteorological Committee. The appointment will date from the 1st October, 1907, or such earlier date as may be arranged by the Committee.

2.—The Readership is to be tenable at the University of Manchester, or such other University in the United Kingdom as may be approved by the Meteorological Committee, and may be willing to recognise the Reader as a Reader or Lecturer of the University.

3.—One term's residence during each academic year shall be required at the University concerned. The Reader will be expected to give one course of not more than twelve lectures, suitable for students of Physical Science, during each of the three years, provided that during the first year of his tenure he may be excused from the duty by the Meteorological Committee.

4.—The Reader is to devote the remainder of his time to study and research. He shall make himself acquainted with the work of the British Meteorological Office, and if possible with that of the meteorological establisements of one or more of the British colonies or dependencies, or of foreign countries. He may give at his option a course of post-graduate lectures on the subject of his research, provided that the total number of lectures given by him shall not exceed thirty in any one year. He may be called upon from time to time to furnish reports on the progress of his work.

5.—The readership is to be tenable simultaneously with any University or College Scholarship or Fellowship, provided that the duties attached to the emolument are not such as to interfere with the duties of the readership.

6.—The reader shall at the end of his term of office furnish a report to the Meteorological Office on the present methods of conducting and reducing meteorological observations.

7.—He shall also furnish during his tenure, or within a reasonable time

after the conclusion of his tenure, papers embodying the results of his researches. Such papers shall be submitted in the first instance to the Royal Society of London for publication.

8.—The following are suggested as subjects of investigation, but the Reader may submit any other subjects for approval of the Committee :—

The extension of Lord Rayleigh's investigation of the free vibration of the atmosphere (Scientific Papers, Vol. III., page 335) and its connection with the general theory of the diurnal variation of the barometer.

The dynamics of the motion of air represented by the trajectories of air in travelling storms. (See "Life History of Surface Air Currents," Meteorological Office Publication, No. 174).

The physical processes which may account for the sudden and almost discontinuous changes of pressure propagated with the velocities observed in the case of "line squalls."

Vortex motion in a uniformly rotating basin, treated with a view to possible application to the physics of the atmosphere.

9.—The Meteorological Committee reserve the right of making no appointment in default of suitable candidates.

10.—The Readership shall be vacated by (1) three months' notice by the holder of the office; (2) three months' notice by the Committee on the ground that the duties of the readership are not being duly performed; (3) by the acceptance of an appointment which in the opinion of the Committee interferes with the duties of the readership.

Adam F. W. Paulsen.

(1833–1907).

PROFESSOR A. F. W. PAULSEN, director of the Danish Meteorological Institute, died at Copenhagen on January 11th, at the age of 74. After winning a reputation as a physicist he devoted the latter part of his life to meteorology, in which sphere his talents were rendered the more useful by the wide area of ocean and polar sea embraced by the operations of the Danish Meteorological Institute. Among his important work in connection with the meteorology of the sub-polar regions may be mentioned his study of the aurora borealis. As recently as 1899 he took command of an expedition sent out by the Danish Government with the object of studying this interesting phenomenon, and an account of this was laid before the British Association at Southport in 1903.

A monument to the life-work of Professor Paulsen is the permanent telegraphic communication now established between Iceland and the mainland of Europe, by means of which vast service has been, and will doubtless yet be, rendered to meteorological knowledge. He also devoted much attention to the connection between the meteorological conditions of Greenland and those of Europe.

Professor Paulsen was a member of the International Meteorological Committee, and was frequently in attendance at international and other scientific gatherings. We owe a tribute also to his genial kindness in receiving foreign visitors at the Institute over which he presided in Copenhagen.

ROYAL METEOROLOGICAL SOCIETY.

THE annual general meeting of this Society was held on Wednesday evening, January 16th, at the Institution of Civil Engineers, Westminster, Mr. Richard Bentley, President, in the chair.

The Council in their Report referred with satisfaction to the marked and increasing interest in Meteorology which has been apparent throughout the country. The scheme of lectures to local societies has proved successful, and there is reason to hope that it will lead to a substantial advance in the study of those scientific principles which it is the duty as well as the privilege of the Society to promote. The number of Fellows on the roll has been well maintained.

The Report having been adopted, the thanks of the Society were given to the Council and to the Auditors for their services, and also to the President and Council of the Institution of Civil Engineers for permitting the Society to hold its meetings at the Institution.

The President delivered an Address touching on the effects of "Weather in Warfare," in the course of which a large number of campaigns, sieges and battles were reviewed, and the influence of wind upon weapons and vessels in the early days of war dwelt upon. Many invasions in the days of small craft were frustrated by stormy weather from the time of Xerxes to those of the various Spanish Armadas sailing in succession to these shores; but now, with large vessels, good charts and instruments, storm warnings, and, above all, steam, this disability has passed away, and wind has ceased to be of as much importance as formerly, unless indeed hostile operations are transferred to the air itself. Restrictions of seasons were also illustrated in the attack on the Bocca Chica, on Buenos Ayres, in the siege of Louisberg, the terrible retreat from Russia, and in the operations on the Gold Coast. Fog has constantly been present during the operations of war, most frequently perhaps on land, though the sailors had their share at Barfleur, Cape St. Vincent, and before Tsushima. Indeed, on one memorable occasion, the *Centurion*, with Lord Anson on board, sailed through the French fleet undetected. Three great men lost their lives through fog, Sir Philip Sidney at Zutphen, Gustavus Adolphus, the Lion of the North, at Lützen, and the hard-fighting Scot, Marshal Keith, in the Seven Years' War. The result of the battle of Barnet was also due to fog, and Frederick the Great was misled by it at the battle of Lowositz. The part played by rain, too, is an important one in history, from the loss of Varus's legions in Westphalia down to the destruction of the Duke of Tarentum's army in Silesia. The siege of Vienna by Solyman failed through rain. Napoleon was defeated at Caldiero from the same cause, and General Lee's operations in 1863 during the American Civil War were hampered by it. Reference was also made to the passages of the Alps in snow from Hannibal's time to that of Napoleon, to the march of the Sikhs to relieve Chitral, and to

the snowstorms at the battles of Hohenlinden and Eylau, and during the French retreat from Russia. Ice appeared favourable to military operations, though it was employed for the defence of the Balkan passes, and in 1800 in the Tonale Pass on the Italian frontier the Austrians made use of it in cubes to build forts, which turned out to be impregnable. Charles the Tenth crossed from Sweden on the frozen Baltic to invade Denmark, and General Pichegru overran Holland in 1795 when its rivers and canals were frozen, and even captured the Batavian navy by sending his cavalry to sea—when their horses' feet were roughed—over the ice. Illustrations of campaigning under the difficulty of great heat were given from the time of the great Captain Gonsalvo de Cordova to Sir Charles Napier in Sind, and Lord Strathnairn in India, or to the recent battle of Yosherei in 1904. The destruction of Cambyses in a simoon and of the Emperor Julian in his Persian campaign were also alluded to. Two earthquakes during the last century occurred in sieges (at Patras, and at Jellalabad), and one happened during the battle of Trasimene. Several engagements took place in the height of gales, such as Admiral Hawke's victory at Quiberon and Admiral Rodney's off the Spanish coast. Towton, a snowstorm; Falkirk, rain; Culloden, wind; and Solferino, a whirlwind and thunderstorm, were further instances. Other interventions of the weather were noticed —the mirages which haunted the exhausted French troops in the desert, the lowering of the Baltic and of the Sea of Azof in special winds, which permitted the fortress of Stralsund and the celebrated lines of Perekop to be captured, and also the Isle of Ely in drought.

A hearty vote of thanks was given to Mr. Bentley for his services as President and also for his address.

The following were elected the Officers and Council for 1907 :—*President*, Dr. H. R. Mill; *Vice-Presidents*, Mr. R. Bentley, Capt. W. F. Caborne, C.B., Mr. E. Mawley, and Sir J. W. Moore, M.D.; *Treasurer*, Dr. C. T. Williams; *Secretaries*, Mr. F. C. Bayard and Mr. H. Mellish; *Foreign Secretary*, Dr. R. H. Scott, F.R.S.; *Council*, Col. J. E. Capper, C.B., Mr. J. E. Clark, Capt. M. H. Clarke, Mr. R. H. Curtis, Dr. H. N. Dickson, Mr. W. H. Dines, F.R.S., Mr. F. Druce, Mr. W. Ellis, F.R.S., Capt. M. W. C. Hepworth, C.B., Mr. R. Inwards, Mr. B. Latham and Dr. W. N. Shaw, F.R.S.

Mr. Bentley having vacated the chair, it was taken by Dr. H. R. Mill, the newly-elected President, who thanked the Fellows.

During the evening the following gentlemen were elected Fellows of the Society :—Col. A. Bibby, Mr. C. S. Bilham, Mr. B. L. Bradley, Col. H. Burton, Mr. K. Chowdry, Mr. E. G. Crocker, Capt. C. Etti, Mr. R. Falcon, Mr. W. C. George, Mr. H. T. Gibson, Mr. E. O. Gilbert, Mr. H. F. Kingdon, Gen. H. Le Cocq, Mr. J. W. Lovibond, Mr. C. W. Mallins, Mr. L. Miles, Lord Montagu of Beaulieu, Mr. M. Morgan, Mr. D. L. Richardson, Mr. E. S. A. Smith and Mr. M. W. Zambra.

Correspondence.

To the Editor of Symons's Meteorological Magazine.

AUDIBLE METEORS.

THE observations of audible or detonating meteors present some difficulties, but these disappear when we consider the circumstances involved and put a fair and natural construction upon the facts.

Ordinary detonating fireballs are not very rare, and a good many instances have been recorded in scientific journals. The sound usually comes several minutes after the meteoric explosions (the time-intervals varying, of course, with the distance), the velocity being about 12 miles per minute.

The noise accompanying the actual descent of meteorites to the earth is different, for in many cases it precedes or accompanies the observed object when the latter falls near the spectator. We should expect this, because these celestial stones have a comparatively slow rate of speed. Descending vertically, or nearly so, and penetrating the soil to the extent of only 12 or 18 inches, it is certain the velocity cannot have exceeded that of terrestrial bodies, and it has been computed in several well-known instances that it amounted to only a few hundred feet per second. The planetary speed of these objects is effectually checked by atmospheric resistance, and they fall to the ground in nearly perpendicular directions, the Earth's attraction upon them having a great influence in the closing stages of their careers. In cases, therefore, of meteorites, the falls of which are actually witnessed, we naturally infer that the noise attending them will reach the observer's ear before the objects attract his eye, because sound travels faster than the bodies themselves.

But in regard to the hissing and similar noises often alleged to have been heard *simultaneously* with the passage of *ordinary* shooting stars and fireballs athwart the sky, these may be dismissed as imaginary. It is true that some of the observations appear to be of a remarkable and significant character. But when we reflect upon the mistakes often made by inexperienced persons in recording cosmical phenomena of unexpected and startling kind, it becomes easy to explain the anomalies presented. Some people have averred that on hearing a peculiar hissing sound, and looking up to ascertain the cause, they have seen a bright meteor rushing across the sky. In such cases the hissing must either have proceeded from a terrestrial source or have been a false sensation, the objects having been more than 100 miles distant from the observers according to reliable calculations subsequently made. Others have distinctly heard the residual particles of exploded meteors pattering on the trees close to them, while others again in various cases have detected a strong smell of sulphur instantly after meteoric disruptions, yet it has been proved by ample data that the spectators who received

such curious impressions were between 100 and 200 miles distant from the objects supposed to have caused them.

We have to allow a wide scope for observational illusions, not only in meteoric but in many branches of astronomy. And one of the most palpable of these illusions is the supposed hissing sometimes stated to accompany ordinary meteor-flights.

W. F. DENNING.

Bristol, Jan. 19, 1907.

MR. BROOK asks me (on page 231 of the January number) to explain how Mr. Huntley heard the sound before he saw the meteor. The answer is tolerably obvious if Mr. Huntley's language is attended to. He was not looking up until his attention was attracted by the sound. Then looking up he saw it still moving on. The sound had reached him from the nearest point in its path; but he did not see it until it had passed that point. The explanation suggested in the second paragraph of Mr. Brook's letter is inconsistent with the fact he recalls; for Mr. Huntley was startled, not by the sight of the phenomenon, but by the sound of it; and therefore could not have imagined the latter. The duration of the incandescence of the particles left by the meteor was sufficiently long to permit it to be looked for after the cause of the sound had passed away.

Mr. Brook, after admitting that meteors do emit sound, quotes Mr. Denning as if he had denied that they do. I do not so read the extracts; nor would I attribute such an opinion to him in the face of the conclusive evidence in the extracts I referred to in my last letter. Nor, apparently, has Mr. Brook seen Mr. Fordham's paper to which I referred as to the meteor of 1887, or he would have found that Hertford lay outside the area of shock as well as of sound, and 20 miles from the point of the explosion seen from there and heard near Brackley.

My own belief is that the sound of many more meteors would be noticed if observers would have the patience to wait at least two minutes before starting to discuss what they have seen.

JAMES G. WOOD.

January 22, 1907.

DIURNAL VARIATIONS OF PRESSURE.

IN the January number of your Magazine (Vol. **41**, p. 233) you speak of "The regular diurnal variation in atmospheric pressure, in and near the Tropics." Is it *only* in and near the Tropics?

I remember in the long drought of 1887, we daily hoped for rain, from noticing a slight daily fall of the glass. It rose as regularly. I remarked on our disappointment to a sailor visiting us. He replied, "Oh, that is the tidal motion of the air; air has tides like water." I gathered that it was only in still weather we could observe

this slight movement, and that our latitudes have too stormy an atmosphere, in general, for the tidal movement to show.

On p. 227 of your Magazine it is said: "The oscillations (of the barometer) in high latitudes are much greater than those in the Tropics," where diurnal variation is observed.

I should like to know if air tides really exist. There seems no reason why the fluid air should not respond to the attraction of the sun and moon, as fluid water does, only air is more easily moved by local disturbances, which might obscure the daily rise and fall. Would there be two daily tides?

L. J. B. G.

18th Jan., 1907.

[The writer of the above letter is quite right in laying a questioning finger on the sentence quoted. Diurnal pressure changes may be detected in settled weather in any part of the world; but in the Tropics they form the most striking feature of the barometric curve except in the rarest cases. The constancy of the hours of the daily maximum and minimum point to the phenomenon in question being a result of thermal changes; were they due to gravitational causes the hour would change from day to day in accordance with the lunar phases, as hours of high and low water do. No doubt the differential attraction of the sun and moon raises tides in the air as in the ocean; but the amount of the tidal range in the atmosphere is so small and the incidental variations of pressure, due, *e.g.*, to the passing of clouds influencing temperature, are so great that the tidal effect is masked.—ED., *S.M.M.*]

HIGH BAROMETER—HALO.

ON January 23rd the reading of the barometer at 9 a.m. was 31·008 inches, and was probably a few thousandths higher between 10 a.m. and noon. This is the highest since 1878 except that of January 9th, 1896, and the sixth during the same period above 30·900. How is it that these extreme pressures have been so much more frequent in recent years?

On January 26th, from 2.40 p.m. for about 20 minutes, I saw a fine example of the circumzenithal halo; it extended for about one-sixth of the circumference of a circle of radius from 15° to 20° with the zenith as centre. The prismatic colours were fully developed, the red being nearest the sun. At the same time appeared a coloured parhelion, on the east side of the sun and about 22° distant, with a faint white tail directed from the sun for about 5°. There was no trace of any other halo, and clouds obscured the whole phenomenon at 3 p.m.

CHARLES L. BROOK.

Harewood Lodge, Meltham, Huddersfield, Jan. 31, 1907.

SUNSHINE RECORDER.

I HAVE read the letters *re* above on pages 168 and 188 of this Magazine in last year's volume.

I should attach special weight to Mr. Jordan's words as he is perhaps the pioneer of Photographic Sunshine Recorders, and speaks with undoubted authority. I have always understood that the primary objection to the Jordan Recorder has been the want of uniformity in the sensitiveness of the paper employed, and hence of the relative values of sunshine records taken at different periods. If this has been overcome it is a distinct step in advance.

Mr. Lander's statement that he has found a perfectly reliable paper, of uniform sensitiveness and of good keeping qualities, will be received with satisfaction by all who are interested in sunshine records; and it should lead to a fresh series of comparisons of records made with the Jordan, Lander, or other photographic instruments, and the Campbell-Stokes pattern. The results should go far to settle the question of the relative merits of the various instruments, and lead to general adoption of the instrument which appears to give the most accurate results.

I cannot, without confirmation, accept Mr. Lander's statement that a summer mid-day exposure of the chart in a Campbell-Stokes instrument for ten seconds will give a record of nearly ten minutes. On either side of the position of intensity one might find an elongated brown trace, but no one used to the Meteorological Office method of measurement would regard such as a measure of bright sunshine; allowance is always made in measuring the daily curves, whether of continuous, or intermittent sunshine, for lateral extension of trace.

Mr. Lander's reproduction of sun trace for April 27th is scarcely one that I should accept for the determination of the question. Unless it is a very poor reproduction it suggests an instrument out of focus. The lack of uniformity in the width of the trace and the blurring are such as I have not experienced with the Campbell-Stokes instrument, and would tend to an uncertainty in the time value of sunshine such as I should not expect to meet with.

From the experience of Mr. Jordan and Mr Lander, together with that of gentlemen long used to the Campbell-Stokes instruments, one is led to hope that at no very distant date we may in the matter of sunshine measurement attain to *uniformity with accuracy.*

Falmouth Observatory, 12th February, 1907. EDWD. KITTO.

SOLAR HALO ON JANUARY 4th.

A REMARKABLE halo was seen here during the afternoon of January 4th. I first noticed it at 2 p.m., when arcs of prismatic colour appeared on each side of the sun, the height of the sun above the horizon being then nearly equal to the distance of the arcs from the sun. These arcs gradually lengthened, the coloured portions remaining as they were, till about 3 p.m. there was a circle, complete

except close to the horizon, of white light, with a third patch of colour towards the zenith. The circle was barely visible after 3.30, but the patch of colour to the W. of the sun remained till close to sunset.

There was also a particularly brilliant and perfect lunar halo for several hours on the evening of December 29th.

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

North Cadbury Rectory, Somerset, Jan. 5, 1907.

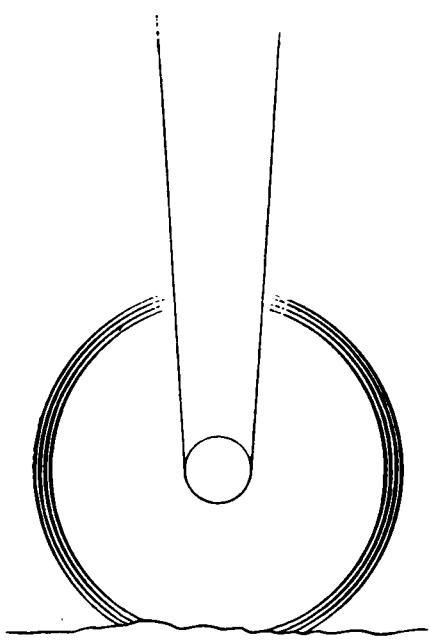
THIS afternoon I saw a very fine halo round the sun. I saw it first at 1.30 p.m. and off and on until 3.30, when it was very distinct, but disappeared about 3.45, when the clouds hid the sun. It was coloured like a rainbow, the colours being much more distinct at the highest point and at the extreme right and left; I could not see the lowest point.

When the lowest point was about on the horizon the highest would be nearly halfway to the zenith. There was no appearance of false suns in the halo, the points I have spoken of being merely brighter in colour than the rest of the halo.

I spend a good part of my time out of doors, and I notice most things that are to be seen, but I have only once before seen a solar halo, about seven or eight years ago, in the winter and late in the afternoon.

T. LAMBERT HALL.

Dilwyn, January 4th, 1907.



Solar Halo January 4th 1907.

THERE was a magnificent halo round the sun here to-day. I noticed it first at 2.30 p.m. At that hour the circle seemed about 33° from the sun's disc, and was red on the inner side, light yellow in the middle, and violet-blue on the outside. What struck me most was a very light, I might almost say white, streak from the sun's disc upwards, quite hiding the ring, apparently 3 or 4 degrees. This remained until about 3.45 p.m., when the bright streak died out and left the circle above the horizon complete. At 4 p.m. all had disappeared. It was bright sunshine all day. Wind S.W., light. Thermometer at 9 a.m. showed a minimum of 30° and a maximum of 43°.

JESSE REEVES.

Heathfield, Purlieu, Southampton, January 4th, 1907.

METEOROLOGICAL NEWS AND NOTES.

DR. W. N. SHAW, Director of the Meteorological Office, has been appointed Reader in Meteorology in the University of London.

SIR CHARLES TODD, for fifty years the head of the Meteorological Service of South Australia, has retired, still well and hearty, at the age of eighty, and has been succeeded, we understand, by Mr. R. F. Griffith, who has long taken a leading part in the meteorological work at Adelaide Observatory.

AN OCEANOGRAPHICAL LABORATORY, under the direction of Mr. W. S. Bruce, was opened on January 16th in Edinburgh by the Prince of Monaco. The laboratory is united with a museum of polar and marine natural history, and will be occupied in the first instance, we understand, in preparing the results of the Antarctic expedition in the *Scotia* for publication.

THE IMPERIAL-ROYAL GEOGRAPHICAL SOCIETY OF VIENNA celebrated the fiftieth anniversary of its foundation on December 4th in a special meeting presided over by H.I.H. the Archduke Rainer, at which the Honorary Membership of the Society was conferred on representatives of various departments of Geography, amongst whom the following have been associated mainly with meteorological or oceanographical work: Prof. F. A. Forel of Geneva, Prof. G. Hellmann of Berlin, Dr. H. R. Mill of London, Sir John Murray of Edinburgh and Dr. A. Voiekoff of St. Petersburg.

MR. WILLIAM MARRIOTT was presented at the Annual General Meeting of the Royal Meteorological Society with an illuminated Address in recognition of his services as Lecturer for the Society. The Address, which was signed by the individual members of the Council of the Society, ran as follows:—

"The first course of lectures and exhibitions given on behalf of the Royal Meteorological Society having proved so popular as to lead to a further continuance, the Council of the Society avail themselves of the opportunity of placing on record their appreciation of the able manner in which MR. WILLIAM MARRIOTT performed the duties of Lecturer and Demonstrator, which contributed greatly to the success of the scheme. The Council desire at the same time to acknowledge the zeal and interest Mr. Marriott has shown at all times in the affairs of the Society, his many valuable contributions to the Journal and to the other publications of the Society during so many years, and also the courteous manner with which he has placed his knowledge and long experience at the service of observers in all parts of the country."

"THERMOMETER READINGS BELOW ZERO have been the order of the day and night," observed a local paper of the winter of 1906–7, while a meteorological observer in the same town writes to us:—"How little frost we have had this winter; it must be almost a record for the absence of severe cold." It is a relief to find by reading farther that the journalist treated "32° F." and "zero" as synonyms, and an apparent example of appalling mendacity is reduced to an instinctive feeling of the appropriateness of the point of departure of the thermometer scales not used in England.

TEMPERATURE FOR JANUARY, 1907.

STATION.	COUNTY.	Lat. N.	Long. W. [*E.]	Height above Sea. ft.	TEMPERATURE. Max. °	Max. Date.	Min. °	Min. Date.	No. of Nights at or below 32 Shade.	Gra
		° ′	° ′							
Camden Square	*London*	51 32	0 8	111	51·4	1	22·1	24	11	20
Tenterden	*Kent*	51 4	*0 41	190	50·0	1, 17	16·5	24	11	21
West Dean	*Hampshire*	51 3	1 38	137	50·0	1	19·0	24	15	21
Hartley Wintney	,,	51 18	0 53	222	52·0	12†	20·0	18, 27	17	21
Hitchin	*Hertfordshire*	51 57	0 17	238	50·0	1	20·0	25	15	...
Winslow (Addington)	*Buckinghamshr.*	51 58	0 53	309	51·0	13	17·0	25	17	23
Bury St. Edmunds (Westley)	*Suffolk*	52 15	*0 40	226	50·5	15	20·0	24‡	14	...
Brundall	*Norfolk*	52 37	*1 26	66	48·8	12	14·8	27	14	16
Winterbourne Steepleton	*Dorset*	50 42	2 31	316	50·2	1	16·0	25	10	15
Torquay (Cary Green)	*Devon*	50 28	3 32	12	52·1	1	24·7	25	5	9
Polapit Tamar [Launceston]	,,	50 40	4 22	315	51·8	1	22·0	24	6	14
Bath	*Somerset*	51 23	2 21	67	52·8	1	20·1	25	12	...
Stroud (Upfield)	*Gloucestershire*	51 44	2 13	226	48·0	1, 8	21·0	24, 25	15	...
Church Stretton (Woolstaston)	*Shropshire*	52 35	2 48	800	49·0	1	7·0	25	31	...
Bromsgrove (Stoke Reformatory)	*Worcestershire*	52 19	2 4	225	51·0	12	10·0	24	22	...
Boston	*Lincolnshire*	52 58	0 1	25	48·0	12	15·0	25	16	...
Worksop (Hodsock Priory)	*Nottinghamshire*	53 22	1 5	56	51·5	12	14·7	25	17	29
Derby (Midland Railway)	*Derbyshire*	52 55	1 28	156	51·0	12	13·0	24	16	...
Bolton (Queen's Park)	*Lancashire*	53 35	2 28	390	49·7	1	17·0	25	9	18
Wetherby (Ribston Hall)	*Yorkshire, W.R.*	53 59	1 24	130	...	...	...	...	...	...
Arncliffe Vicarage	,, ,,	54 8	2 6	732	...	...	...	...	...	...
Hull (Pearson Park)	,, *E.R.*	53 45	0 20	6	50·0	12	19·0	25	15	29
Newcastle (Town Moor)	*Northumberland*	54 59	1 38	201	...	...	...	...	...	...
Borrowdale (Seathwaite)	*Cumberland*	54 30	3 10	423	49·6	12	19·4	24	11	...
Cardiff (Ely)	*Glamorgan*	51 29	3 13	53	...	...	...	...	...	...
Haverfordwest (High Street)	*Pembroke*	51 48	4 58	95	51·6	7	14·7	25	5	8
Aberystwyth (Gogerddan)	*Cardigan*	52 26	4 1	83	49·0	1	11·0	23, 24	...	...
Llandudno	*Carnarvon*	53 20	3 50	72	53·0	2, 12	20·0	25	5	...
Cargen [Dumfries]	*Kirkcudbright*	55 2	3 37	80	51·0	12	22·0	24§	11	...
Lilliesleaf (Riddell House)	*Roxburgh*	55 31	2 46	550	48·0	12	17·0	30	17	26
Edinburgh (Royal Observy.)	*Midlothian*	55 55	3 11	442	50·1	5	20·7	24	11	15
Colmonell (Clachanton)	*Ayr*	55 8	4 54	140	...	...	...	...	...	...
Glasgow (Queen's Park)	*Renfrew*	55 53	4 18	144	48·0	5, 7, 12	18·0	24	11	19
Tighnabruaich	*Argyll*	55 55	5 14	50	44·0	7, 17	20·0	23, 31	15	16
Mull (Quinish)	,,	56 36	6 13	35	47·0	7, 14, 28	...	...	...	...
Dundee (Eastern Necropolis)	*Forfar*	56 28	2 57	199	53·4	12	21·3	1	14	...
Braemar	*Aberdeen*	57 0	3 24	1114	...	...	...	...	...	...
Aberdeen (Cranford)	,,	57 8	2 7	120	52·0	15	20·0	25§	24	...
Cawdor (Budgate)	*Nairn*	57 31	3 57	250	...	...	...	...	...	...
Invergarry	*E. Inverness*	57 4	4 47	13c?	...	...	...	...	...	...
Loch Torridon (Bendamph)	*W. Ross*	57 32	5 32	20	...	...	...	...	...	...
Dunrobin Castle	*Sutherland*	57 59	3 56	14	53·0	8	22·5	26	14	...
Castletown	*Caithness*	58 35	3 23	100	51·0	16	23·0	25, 26	18	19
Killarney (District Asylum)	*Kerry*	52 4	9 31	178	56·0	6	17·5	24	...	...
Waterford (Brook Lodge)	*Waterford*	52 15	7 7	104	54·0	12, 28	19·0	25	8	...
Broadford (Hurdlestown)	*Clare*	52 48	8 38	167	52·0	1	22·0	23	14	...
Carlow (Browne's Hill)	*Carlow*	52 50	6 53	291	...	...	...	...	...	..
Dublin (FitzWilliam Square)	*Dublin*	53 21	6 14	54	53·5	28	27·5	25	4	16
Ballinasloe	*Galway*	53 20	8 15	160	...	..	...	...	...	...
Clifden (Kylemore House)	,,	53 32	9 52	105	...	..	...	...	...	...
Crossmolina (Enniscoe)	*Mayo*	54 4	9 18	74	...	...	...	...	...	...
Seaforde	*Down*	54 19	5 50	180	50·0	5	24·0	22	12	16
Londonderry (Creggan Res.)	*Londonderry*	54 59	7 19	320	...	...	...	...	...	...
Omagh (Edenfel)	*Tyrone*	54 36	7 18	280	51·0	5	20·0	23	1	14

† and 13, 14. ‡ and 25, 26. § and 26, 31

RAINFALL FOR JANUARY, 1907.

RAINFALL OF MONTH.							RAINFALL FROM JAN. 1.					
ver. '0-99.	1906.	Diff. from Av.	% of Av.	Max. in 24 hours.		No. of Days	Aver. 1870-99.	1906.	Diff. from Aver.	% of Av.	Mean Annual 1870-1899.	STATION.
in.	in.	in.		in.	Date.		in.	in.	in.		in.	
·89	·91	— ·98	48	·46	1	8	...	...	...	...	25·16	Camden Square
·36	1·00	—1·36	42	·48	1	10	...	...	...	...	28·36	Tenterden
·68	·85	—1·83	32	·56	1	9	...	...	...	...	29·93	West Dean
·39	·66	—1·73	28	·31	1	8	...	...	...	...	27·10	Hartley Wintney
·81	·97	— ·84	54	·42	1	11	...	...	...	...	24·66	Hitchin
·05	·96	—1·09	47	·54	1	8	...	...	...	...	26·75	Addington
·70	1·29	— ·41	76	·38	1	11	...	...	...	...	25·39	Westley
·67	1·72	+ ·05	103	·36	26	17	...	...	...	...	25·40	Brundall
·90	2·17	—1·73	56	·77	1	16	...	...	...	...	39·00	Winterbourne Stpltn
·19	1·73	—1·46	54	·76	1	13	...	...	...	...	35·00	Torquay
·87	2·73	—1·14	71	·72	2	19	...	...	...	...	38·85	Polapit Tamar
·52	1·23	—1·29	49	·47	1	12	...	...	...	...	30·75	Bath
·46	1·30	—1·16	53	·58	1	11	...	...	...	...	29·85	Stroud
·81	1·76	—1·05	63	·50	2	12	...	...	...	...	33·04	Woolstaston
·91	·83	—1·08	43	·23	2	10	...	...	...	..	24·50	Bromsgrove
·59	·78	— ·81	49	·25	1	5	...	...	...	...	23·30	Boston
1·74	·75	— ·99	43	·19	1	8	...	...	...	...	24·70	Hodsock Priory
1·95	1·15	— ·80	59	·37	2	12	...	...	...	...	26·18	Derby
3·38	2·30	—1·08	68	·49	1	20	...	...	...	...	42·43	Bolton
1·89	1·30	— ·59	69	·60	28	7	...	...	...	...	26·96	Ribston Hall
6·33	3·46	—2·87	55	·96	28	14	...	...	...	...	60·96	Arncliffe Vic.
1·80	1·01	— ·79	56	·31	30	12	...	...	...	...	27·02	Hull
1·96	·48	—1·48	24	·15	1	11	...	..	...	...	27·99	Newcastle
4·71	6·01	—8·70	41	1·00	28	20	...	...	...	...	132·68	Seathwaite
3·85	2·79	—1·06	72	·88	1	19	..	...	...	...	42·81	Cardiff
5·13	2·28	—2·85	44	·60	1	20	...	...	...	...	47·88	Haverfordwest
3·87	3·34	— ·53	86	·64	2	19	...	...	..	...	45·41	Gogerddan
2·57	1·42	—1·15	55	·36	1	15	...	...	...	...	30·98	Llandudno
2·54	2·02	—2·52	44	·49	29	9	...	...	...	...	43·43	Cargen
2·60	1·04	—1·56	40	·48	1	12	...	...	...	...	33·04	Riddell House
...	·84	...	...	·29	28	10	...	...	...	...	...	Edinburgh
4·52	2·50	—2·02	55	...	...	...	...	...	...	...	44·85	Colmonell
3·25	1·86	—1·39	57	·40	27	17	...	...	...	...	35·80	Glasgow
5·86	4·10	—1·76	70	·52	27	18	...	...	...	...	57·90	Tighnabruaich
5·85	4·59	—1·26	78	·58	4	26	...	...	...	...	57·53	Quinish
2·10	·95	—1·15	45	·45	1	12	...	...	...	...	28·95	Dundee
2·91	1·61	—1·30	55	...	...	...	...	...	...	...	36·07	Braemar
2·32	1·89	— ·43	81	·51	1	17	...	...	...	...	33·01	Aberdeen
2·14	1·70	— ·44	79	·27	28	16	...	...	...	...	29·37	Cawdor
6·63	6·36	— ·27	96	1·20	28	12	...	...	...	...	56·00	Invergarry
8·75	9·48	+ ·73	108	1·10	26	28	...	...	...	..	86·50	Bendamph
2·62	4·12	+1·50	157	1·06	2	17	...	...	...	...	31·60	Dunrobin Castle
...	3·89	...	...	·65	1	24	...	...	...	...	...	Castletown
6·57	2·38	—4·19	36	·63	1	15	...	...	...	...	58·11	Killarney
4·06	·79	—3·27	19	·19	1	17	...	...	...	...	39·30	Waterford
2·98	1·44	—1·54	48	·38	1	20	...	...	...	...	33·47	Hurdlestown
3·15	...	...	...	...	...	...	...	...	...	...	34·44	Carlow
2·16	·43	—1·73	20	·19	1	9	...	...	...	...	27·75	Dublin
3·49	...	...	...	...	...	...	...	...	...	...	37·04	Ballinasloe
7·86	3·83	—4·03	49	·60	3	19	...	...	...	...	80·23	Kylemore House
5·00	3·30	—1·70	66	·64	1	23	...	...	...	...	50·50	Enniscoe
3·63	1·39	—2·24	38	·55	1	12	...	...	...	...	38·61	Seaforde
3·56	3·47	— ·09	97	·72	1	20	...	...	...	...	41·20	Londonderry
3·34	2·25	—1·09	67	·40	1	20	...	...	...	...	37·85	Omagh

SUPPLEMENTARY RAINFALL, JANUARY, 1907.

Div.	STATION.	Rain. inches	Div.	STATION.	Rain. inches
II.	Abinger Hall	1·02	XI.	Rhayader, Tyrmynydd	...
,,	Ramsgate, West Cliff Villas	·87	,,	Lake Vyrnwy	3·47
,,	Hailsham	1·09	,,	Llangyhanfal, Plâs Draw	1·21
,,	Crowborough, Uckfield Lodge	1·58	,,	Criccieth, Talarvor	2·40
,,	Osborne, Newbarn Cottage.	·85	,,	Llanberis, Pen-y-pass	7·20
,,	Emsworth, Redlands	·92	,,	Lligwy	1·61
,,	Alton, Ashdell	1·27	,,	Douglas, Woodville	1·79
,,	Newbury, Welford Park	·71	XII.	Stoneykirk, Ardwell House	1·96
III.	Harrow Weald, Hill House.	1·00	,,	Dalry, The Old Garroch	4·41
,,	Oxford, Magdalen College	·54	,,	Langholm, Drove Road	2·46
,,	Bloxham Grove	·85	,,	Moniaive, Maxwelton House	2·26
,,	Pitsford, Sedgebrook	1·04	XIII.	N. Esk Reservoir [Penicuick]	2·45
,,	Huntingdon, Brampton	1·03	XIV.	Maybole, Knockdon Farm	1·95
,,	Wisbech, Bank House	1·09	XV.	Campbeltown, Witchburn	2·55
IV.	Southend Water Works	1·15	,,	Inveraray, Newtown	6·65
,,	Colchester, Lexden	·87	,,	Ballachulish House	7·52
,,	Newport, The Vicarage	·97	,,	Islay, Eallabus	3·62
,,	Rendlesham	1·13	XVI.	Dollar Academy	2·76
,,	Swaffham	1·10	,,	Loch Leven Sluice	2·44
,,	Blakeney	...	,,	Balquhidder, Stronvar	4·09
V.	Bishops Cannings	1·04	,,	Perth, Pitcullen House	1·19
,,	Ashburton, Druid House	2·16	,,	Coupar Angus Station	1·16
,,	Okehampton, Oaklands	2·69	,,	Blair Atholl	2·46
,,	Hartland Abbey	1·84	,,	Montrose, Sunnyside Asylum	1·09
,,	Lynmouth, Rock House	2·40	XVII.	Alford, Lynturk Manse	1·50
,,	Probus, Lamellyn	1·78	,,	Keith Station	2·05
,,	Wellington, The Avenue	1·36	XVIII.	N. Uist, Lochmaddy	4·12
,,	North Cadbury Rectory	·83	,,	Alvey Manse	2·65
VI.	Clifton, Pembroke Road	2·11	,,	Loch Ness, Drumnadrochit.	2·40
,,	Ross, The Graig	2·18	,,	Glencarron Lodge	13·11
,,	Shifnal, Hatton Grange	1·43	,,	Fearn, Lower Pitkerrie	1·64
,,	Cheadle, The Heath House.	1·14	XIX.	Invershin	4·22
,,	Blockley, Upton Wold	1·35	,,	Altnaharra	5·25
,,	Coventry, Kingswood	1·04	,,	Bettyhill	3·72
VII.	Market Overton	·87	,,	Watten Station	2·83
,,	Market Rasen	1·11	XX.	Dunmanway, The Rectory	2·70
,,	Bawtry, Hesley Hall	·61	,,	Cork	1·07
VIII.	Neston, Hinderton Lodge	·92	,,	Darrynane Abbey	2·92
,,	Southport, Hesketh Park	1·28	,,	Glenam [Clonmel]	·88
,,	Chatburn, Middlewood	2·35	,,	Ballingarry, Gurteen	1·38
,,	Cartmel, Flookburgh	2·41	,,	Miltown Malbay	2·25
IX.	Langsett Moor, Up. Midhope	2·25	XXI.	Gorey, Courtown House	·42
,,	Scarborough, Scalby	1·55	,,	Moynalty, Westland	1·39
,,	Ingleby Greenhow	·82	,,	Athlone, Twyford	1·59
,,	Mickleton	1·62	,,	Mullingar, Belvedere	1·07
X.	Bardon Mill, Beltingham	·83	XXII.	Woodlawn	2·45
,,	Ewesley, Fallowlees	1·09	,,	Westport, Murrisk Abbey	1·94
,,	Ilderton, Lilburn Cottage	·79	,,	Collooney, Markree Obsy.	3·07
,,	Keswick, York Bank	2·28	XXIII.	Enniskillen, Portora	2·08
XI.	Llanfrechfa Grange	2·97	,,	Warrenpoint, Summer Hill.	...
,,	Treherbert, Tyn-y-waun	5·22	,,	Banbridge, Milltown	1·02
,,	Carmarthen, The Friary	2·76	,,	Belfast, Springfield	2·54
,,	Castle Malgwyn [Llechryd].	2·34	,,	Bushmills, Dundarave	2·97
,,	Plynlimon	8·05	,,	Stewartstown, The Square	1·90
,,	Tall-y-llyn	2·00	,,	Killybegs	5·76
,,	New Radnor, Ednol	2·47	,,	Horn Head	2·83

METEOROLOGICAL NOTES ON JANUARY, 1907.

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.

LONDON, CAMDEN SQUARE.—After a wet day on 1st, followed by a westerly gale on 2nd, the first half of the month proved mild and very dry but rather dull. Frost set in on 18th, and from 22nd to the end it was cold with little R and bitter winds at times. Mean temp. 38°·8, or 0°·7 above the average. Duration of sunshine 40·1* hours and of R 18·1 hours.

CROWBOROUGH.—The first 17 days were mild and entirely free from frost, but from 18th wintry weather set in with continuous frost. Min. temp. in screen 16°·4, on 24th. R 1·70 in. below the average of 35 years.

HARTLEY WINTNEY.—The driest January since 1892. The first fortnight was warm and spring-like with several sunny days, the latter more wintry with slight S, frost and keen N. and N.E. winds and cloudy days. Ozone occurred on every day, with a mean of 4·3.

TORQUAY.—Duration of sunshine 85·4* hours, or 21·5 above the average. Mean temp. 42°·6, or 0°·1 above the average.

NORTH CADBURY.—The driest January in 11 years and the coolest since 1897. The first two-thirds of the month were mild, but the last ten days cold, especially 23rd and 24th, which were both colder than any other day in 11 years.

SOUTHPORT.—Dry and exceptionally sunny. Very mild generally until 17th, but afterwards more wintry. Mean temp. 39°·4, or 0°·4 above the average. R 1·42 in. below the average. Duration of sunshine 53·7* hours, or 10·3 hours above the average. Duration of R 26·9 hours.

BOLTON.—The first part was comparatively mild, but on 23rd the temp. fell 9°·0 and the weather was afterwards severe. The 25th was the coldest day since 1894. Duration of sunshine 25·0* hours, or 3·5 hours above the average.

HAVERFORDWEST.—Cold at times and very changeable. Hard frost from 22nd to 25th. Duration of sunshine 73·6* hours.

DOUGLAS.—The mouth opened with cold R and strong W. gales, and H on 4th, followed by a mild fortnight with many sunny days. Real winter set in on 20th with hard frost to the end. On 23rd the bar. reached 30·98 in.

COUPAR ANGUS.—Mean temp. 1°·0 below and R about 50 per cent. below the average. A noteworthy feature of the month was the high pressure and great range and fluctuation of the bar.

BLAIR ATHOLL.—Seasonable till 5th, then remarkably mild till 17th, after which frost was continuous to the end, with S during the last week.

DRUMNADROCHIT.—R 1·44, and rain days 3, below the average of 21 years. Gale on 28th accompanied by distant T.

CASTLETOWN.—The first part was rather wet and on the whole mild. From 15th to 23rd was remarkably fine and dry; on 23rd the bar. reached 31·15 in. On 28th there was a heavy westerly gale with S storm and the bar. fell to 28·87 in. soon rising again. The last few days were stormy, with S and H.

DUNMANWAY.—On the whole cold and dry, especially from 21st to 30th, with skating on 25th and 26th; this occurs only about once in five years here.

CORK.—R 3·13 in. below, or only about one-fourth of, the average. Mean temp. 2°·1 below the average.

CLONMEL.—The driest January recorded since 1865.

MILTOWN MALBAY.—The first week was cold, blustry and "dropping", then to 21st mild, after which sharp frost intervened for three or four days. Stormy weather with squalls, H, S and R from 29th.

DUBLIN.—Remarkable for the high mean bar., 30·303 in., the scanty R falling only during 20 hours, the warm anticyclonic winds from 5th to 18th, and the biting easterly anticyclonic winds from 19th to 25th. The mean temp. was 42°·7, or 1°·1 above the average.

OMAGH.—The temp. of the month was above the average, but the R below. The month varied little from the normal in other respects.

* Campbell-Stokes.

Climatological Table for the British Empire, August, 1906.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Absolute. Maximum. Date.	Absolute. Minimum. Temp.	Absolute. Minimum. Date.	Average. Max.	Average. Min.	Average. Dew Point.	Average. Humidity.	Absolute. Max. in Sun.	Absolute. Min. on Grass.	Total Rain. Depth.	Total Rain. Days.	Aver. Cloud.
	°		°		°	°	°	0-100	°	°	inches		
London, Camden Square	93·2	31	45·7	29	77·1	55·3	56·8	74	130·5	42·4	·87	8	...
Malta	98·0	6	67·3	25	88·3	72·6	68·3	69	...	62·4	1·76	3	0·7
Lagos	85·0	5*a*	71·0	18	82·6	73·8	71·7	80	137·0	68·0	1·68	13	7·9
Cape Town	76·0	3	33·1	8	59·8	44·3	44·4	74	...	...	2·86	14	5·5
Durban, Natal	95·9	14	47·0	3, 4	75·6	54·1	...	...	138·4	...	·27	5	3·0
Johannesburg	78·0	24	27·9	2	64·2	40·8	35·6	59	138·0	23·2	·00	0	0·4
Mauritius	77·4	14	51·6	15	74·9	61·0	58·9	74	139·7	43·9	1·84	17	5·7
Calcutta	91·7	31	75·9	15	88·4	78·7	77·7	85	157·0	74·5	8·14	18	8·2
Bombay	87·8	16	75·4	20	84·6	77·9	76·0	85	131·7	71·0	20·91	25	8·4
Madras	97·9	30*b*	73·5	20	92·0	77·3	75·2	80	144·3	72·7	4·45	12	5·2
Kodaikanal	67·1	16	50·3	14	62·5	52·5	53·3	89	140·4	42·5	12·44	27	7·9
Colombo, Ceylon	87·2	30	71·8	15	85·2	77·2	74·0	83	149·2	70·2	5·86	14	7·2
Hongkong	93·7	28	74·6	30	88·8	79·1	75·8	79	143·9	...	3·97	10	5·3
Melbourne	67·6	9	31·1	30	57·0	43·0	42·8	78	122·4	24·8	1·73	13	7·5
Adelaide	67·0	23	36·1	28	60·2	45·8	45·0	76	124·5	32·1	3·97	16	7·0
Coolgardie	70·6	21	36·4	1, 25	59·5	43·7	40·0	71	139·0	30·1	3·27	8	5·6
Sydney	73·0	25	40·7	28	61·5	47·7	43·8	75	104·1	31·8	5·64	18	5·0
Wellington	65·5	20	33·5	3, 8	53·3	43·2	42·0	76	115·0	23·0	2·80	10	5·0
Auckland	62·0	30	38·0	8	56·9	47·3	44·6	76	120·0	33·0	1·76	11	5·6
Jamaica, Negril Point	91·0	20	66·1	18	87·3	72·7	73·0	77	...	...	4·87	11	...
Trinidad	90·0	13*c*	69·0	scv.	86·1	70·9	74·2	86	166·0	67·0	8·55	24	...
Grenada	88·4	29	70·2	6, 7	84·6	74·3	72·4	80	145·0	...	11·87	25	4·1
Toronto	89·0	5	52·0	29	81·1	62·6	62·3	75	113·5	45·4	1·83	11	4·5
Fredericton	92·8	17	31·8	31	77·1	53·1	...	...	...	...	1·33	6	4·5
St. John's, N.B.	81·6	7	50·5	25	70·7	56·1	...	...	...	...	1·29	12	5·0
Victoria, B.C.	80·5	26	45·4	16	72·9	51·7	...	74	...	...	·53	4	2·6
Dawson	78·0	4	30·0	23	67·9	40·2	...	...	...	...	1·46	11	5·3

a and 6, 21. *b* and 31. *c* and 14.

MALTA.—Mean temp. of air 79°·3, or 1°·2 above the average. Mean hourly velocity of wind 8·5 miles, or 1·2 above average. Mean temp. of sea 79°·8.

Mauritius.—Mean temp. of air 0°·4, dew point 0°·5, and R ·40 in. below, averages. Mean hourly velocity of wind 9·9 miles, or 2·4 below average.

KODAIKANAL.—Abnormally wet and cloudy month. Bright sunshine 90 hours.

COLOMBO.—Mean temp. of air 80°·8 (average), of dew point 0°·8 above, and R 2·21 in. above, averages. Mean hourly velocity of wind 8·5 miles.

HONGKONG.—Mean temp. of air 83°·2. Bright sunshine 281·2 hours, or 85·2 hours above average. R 10·25 in. below average. Mean hourly velocity of wind 6·7 miles.

Adelaide.—Mean temp. of air 53°·0, or 0°·8 below, and R 1·63 in. above, averages. Most cloudy August on record. Sunshine ·41 hours less than average.

Sydney.—Mean temp. of air 0°·2 below, and R 2·42 in. above, averages.

Wellington.—Mean temp. of air 0°·3 below, and R 2·20 in. below, averages. Bright sunshine 137 hours.

TRINIDAD.—R 1·48 in. below 43 years average.