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THE THUNDERSTORM ON JANUARY 23RD.

A SHORT, sharp thunderstorm, causing several accidents, occurred at various stations nearly along the meridian of Greenwich, in the forenoon of January 23rd. It was spoken of in *The Standard* as a "quick travelling secondary," and it was stated that "the nucleus of the thunderstorm was travelling S.S.E. wards at the rate of about 50 miles an hour." The rate *seems* to have been even higher than this, if there be no confusion as to the phenomena with which we are dealing, and we do not think that there can be, because, with the exception of the York record, the differences between the computed and observed times are rarely large.

STATIONS.	Distance measured along a line from Sunderland to Dungeness.	Beginning of Squall.	Computed Time at the Rate of 62 miles an hour.	
			Time. h. m.	Error. h. m.
Sunderland	0	5.55 a.m.	5.55 a.m.	0
Knaresborough	62	7.10 "	6.55 "	+ 15
York	67	5.45 "	7. 0 "	-1.15
Ketton	160	8.15 "	8.30 "	- 15
Kettering	180	8.30 "	8.49 "	- 19
Easton Mauduit	186	8.40? "	8.55 "	- 15
Camden Square	239	9.46 "	9.46 "	0
Maida Vale	240	9.46 "	9.47 "	- 1
London	241	9.50 "	9.48 "	+ 2
Kennington ..	243	10. 2 "	9.50 "	+ 12
Kingston	246	10. 0? "	9.53 "	+ 7
Croydon	251	9.55 "	9.58 "	- 3
Wallington	252	9.57 "	9.59 "	- 2
Crowborough	275	10.20 "	10.21 "	- 1
Ditchling	281	11. 0 "	10.27 "	+ 33
Hythe	282	10.20 "	10.28 "	- 8

We insert this table, not altogether on account of any inherent importance in it, but because we think that observers will see from it that if they are not careful in keeping their clocks and watches

right, it is tolerably certain that that fact will come out. It will be seen that in the following notes the Rev. H. A. Boys, of Easton Mauluit, says, "*about 8.40*"; it is clear, from the table, that 8.55 would harmonize better with the other records.

The point, however, of which we should like to see proof is the *motion* of the nucleus; there is no doubt that the phenomena occurred later, in the south, but that does not prove that *the* storm which was over Kettering about 8.30 a.m. was over London at 9.46 a.m.

These phenomena might be imagined to have something like a decennial period, and a fondness for January—at any rate, the following are the dates of some analogous cases:—

- 1869. Jan. 16th. Quar. Weather Report, 1869, pl. vii., and Quar. Journal Met. Soc., vol. iv., 1876, p. 75.
- 1876. Jan. 30th. Quar. Jour. Met. Soc., vol. iv., 1876, p. 73.
- 1886. Jan. 13th. Quar. Jour. Roy. Met. Soc., vol. xii., 1886, p. 292.
- 1895. Jan. 23rd.

In the discussion upon Mr. Scott's paper on the squall of 1886, Mr. Gaster explained why "care is necessary in deciding whether phenomena occurring in chronological order at a line of stations are the result of one travelling disturbance, or of several independent ones."

The following notes are arranged from N. to S. :—

SUNDERLAND.—The rise on the barogram is at 5.55 a.m.; there had been aurora at 4.35 a.m., but I have no record of the weather at 5.55 a.m., nor were T or L reported.—*T. W. Backhouse.*

CONYNGHAM HALL, KNARESBOROUGH.—There is a slight rise in the barometer curve at 7.10 a.m., but no T or L was observed here, although some of my men were up before 6 a.m. T was said to have been heard at Leeds.—*Basil T. Woodd.*

YORK.—Our barograph was gaining badly (corrected $3\frac{3}{4}$ hours on 25th), but I make the jump to have occurred at 5.45 a.m. Furious wind from N.W. or N.N.W., with sleety S. I did not notice the time. Cannot hear of any T or L.—*J. F. Clark.*

NEWARK.—Violent S and hailstorm in early morning with T and L.

SOUTH LINCOLNSHIRE.—A remarkable storm passed over here. A heavy leaden cloud enveloped the district about 8 a.m., and S fell thickly, accompanied by T and L. The wind blew a hurricane, and for about 15 minutes there was a perfect blizzard. The darkness was so intense that artificial light was necessary. After the cloud had passed, the sun shone out brilliantly, and continued during the remainder of the day; the weather, however, was bitterly cold.

KETTON, RUTLAND.—A very dark cloud passed over at 8.15 a.m.; the birds were frightened, and flew towards the house.—*F. Coventry.*

OUNCLE.—S, H, B, L and T in the morning.

KETTERING.—A violent storm burst over the town about 8.30 a.m. The lightning struck the dome of Rockingham-road Wesleyan Chapel, smashing a

portion of it, and slightly damaging the roof of the main building. At Messrs. Humphries and Barlow's shoe manufactory, the lightning severed a gas pipe and ignited the gas, which in turn set fire to the adjacent woodwork. The outbreak was discovered some time afterwards by the workpeople in an opposite factory, and was soon subdued. Throughout Northamptonshire it became so dark between 8.30 and 9 a.m., that lights were everywhere used.—*Standard*.

EASTON MAUDUIT, NORTHAMPTON.—Sun bright at 8.15 and 8.30 a.m.; about 8.40 I was startled by a long rattle of T, and saw a black cloud coming from N.N.W.; it burst on us, with snow and sleet, from about 8.50 to 9.30 (= .05 in.), wind strong, and increased till noon, when it blew furiously.—*H. A. Boys*.

A WINTER THUNDERSTORM.

To the Editor of the Times.

SIR,—In other countries winter TSS are common; but in this country, when during a S shower there is vivid L and loud T, many persons look upon it as unprecedented. It is unusual, but that is all. If I am not mistaken, there has already been one English house wrecked by L this year; and this morning we had a short, sharp storm in London with H and S. The storm must have been extremely low in the atmosphere and very near this house, for the time-interval (that is, the interval between seeing the L and hearing the T) was extremely short. The times of the L, of the T, the time-interval, and the duration of each peal of T were as follows:—

Lightning.			Thunder.			Time-Interval.	Duration of Thunder.
H.	M.	S.	H.	M.	S.		
9	52	10	9	46	45	—	—
9	53	8	9	52	12	2 secs.	8 secs.
9	53	37	9	53	11	3 secs.	7 secs.
9	53	56	9	53	40	3 secs.	5 secs.
9	54	56	9	54	0	4 secs.	3 secs.
9	54	56	9	55	1	5 secs.	29 secs.
9	56	30	9	56	33	3 secs.	14 secs.

Adopting the usual approximate rule that sound travels a mile in five seconds, we see that all these flashes occurred within a mile of this house, and most of them within half a mile. There was, as usual, a sharp rise of the barometer, .049 in. in about ten minutes, a fall of 5 deg. in temperature, while the H and S when melted yielded just 0.10 in. water. It was very soon over, and by 10.10 a.m. the sun was shining brightly.—Your obedient servant,

62, Camden Square, N.W., Jan. 23rd.

G. J. SYMONS.

MAIDA VALE, LONDON.—First T at 9.46 a.m.; L and T at 9.51 to 9.58; squall commenced 9.53, moderated at 10.7 a.m.—*K. J. Marks*.

WILLESDEN.—The TS was accompanied by a heavy downfall of H and S. One flash of L had the appearance of a huge bomb bursting in the air.

LONDON.—Early yesterday morning a remarkable storm swept over London. It began to rain at about 9.50, with a boisterous wind from the south-west, which suddenly raced to the north, changed the R to sleet, then to H, and finally settled down to a good fall of S. Darkness as of night now prevailed as a sharp thunderstorm passed. Five minutes afterwards the sky presented a clear blue, with a comparatively balmy air and brilliant sunshine, the wind gently blowing from the north-west.—*Daily Graphic*.

LONDON.—Almost simultaneously with one of the severe claps of T, the steeple of St. Clement Danes Church in the Strand was so shaken that the bells were set ringing, and were heard distinctly in one of the rooms in the basement of the Law Courts opposite. The Churchwarden expresses doubt of this, but evidence on the other side is distinct. There is also the confirmatory evidence that another report states that “during the TS, people in the Strand heard a muffled and then a loud peal of bells from the belfry of the church of St. Clement Danes. It was subsequently found that the steeple had been struck by L, and that, with the heavy T, had started the bells. No damage was, however, done.”

WESTMINSTER.—The church of St. Stephen, Rochester Row, was struck by L. The conductor on the spire was first struck, but the conductor crossed a gaspipe, and there the L melted the lead and ignited the gas. This set fire to the organ loft, but the attention of a bellringer was attracted, and he succeeded in extinguishing the flames.

CHISWICK.—A horse attached to a carrier's cart was struck dead by L in the Chiswick High Road on Wednesday morning. The animal was standing outside a public-house, where its master was taking shelter from the storm, when the L, which was very vivid, and followed by a heavy clap of T, struck it behind the left ear.

KENNINGTON.—The storm was very severe. Just after ten o'clock, S and H fell heavily, accompanied by a perfect hurricane, and the L and T which followed were terrific. For a time it was almost impossible to carry on the tram or omnibus traffic, and passengers on the roofs of the omnibuses and trams sought shelter in the shops and other covered ways. There was great delay in the changing of horses at the Kennington terminus, and the road was so slippery that the animals in many instances could not keep their feet. The tram company will be heavy sufferers by the injuries done to their stock.

BRIXTON.—In this neighbourhood much damage was done to glass, and many trees were blown down by the gale.

BLACKHEATH, LONDON, S.E.—Many watches stop in London daily, but the following *may* be of interest.—ED.

THUNDERSTORMS AND WATCHES.

To the Editor of the Standard.

SIR,—During the remarkable thunderstorm which passed over London yesterday morning my watch suddenly stopped. At the time I did not think much of the occurrence, although my watch has never done so before; but I afterwards met no fewer than four persons who told me that the same thing had happened to them. I think this must be something more than a mere coinci-

dence, and it would be interesting to know whether any other of your readers have met with a similar experience.—I am, Sir, your obedient servant,

4, The Grove, Blackheath, S.E., Jan. 25.

G. H. ELDER.

SHEERNESS.—An interval of darkness, followed by S, with T and L, and a N.W. gale.

SHEPPEY, LEYSDOWN.—Squall with H, T, L, and a N. gale, then sunshine.—*A. Farbrother.*

HERNE BAY.—The storm broke here with considerable fury about 10 a.m., and was accompanied by sleet and S, and the tide was unusually high.

KINGSTON-ON-THAMES.—About 10 a.m. the sky suddenly became overcast, and a torrent of large hailstones, accompanied by T and L, swept over Kingston-on-Thames. So violent was the wind that 6 large trees in Lower Ham Road were levelled with the ground in an instant. Several windows in the houses in Lower King's-road were blown in, a chimney and part of the roof of one house were blown away, and a large tree in the grounds of the residence of the Mayor, Alderman Sherrif, was blown against the house and did much damage. At the infants' school in Richmond-road slates were dislodged, and in London-street tiles were blown off several houses. At the railway station, several large boards were hurled down, and the bookstall was cleared of its papers, which were scattered about. The L rang the fire alarms in Kingston, and the Brigade quickly turned out, only to find that their services were not required.

LOWER ADDISCOMBE ROAD, CROYDON.—Two claps of T at 9.55 a.m., squall at 10 a.m., R, then dark, then sleet, changing to H, then lighter, with S till 10.20 a.m.—*H. Newby.*

WALLINGTON.—According to the trace of my barograph, the TS passed here at 9.57 a.m.—*F. C. Bayard.*

HYPHE, KENT.—At 9 a.m. R, at 10.20 a.m. dense darkness and S blizzard, which lasted for a few minutes.—*H. Mackeson.*

CROWBOROUGH OBSERVATORY, SUSSEX.—Sky became suddenly overcast about 10.15 a.m. by a dense mass of cloud from N.W.; S soon began, and in less than five minutes quite a hurricane came on, and a regular blizzard, which continued till about 10.35, when it ceased as suddenly as it had begun. At 10.25 a.m. there was a brilliant flash of L, and a very loud and *prolonged* peal of T; the spire of Rotherfield Church was struck, but the conductor proved equal to the occasion, and scarcely any damage was done.—*C. L. Prince.*

DITCHLING, SUSSEX.—Heavy S squall at 11 a.m.—*F. H. Phillips.*

We are glad to be able to state that this subject will be treated of in a paper by Mr. W. Marriott at the meeting of the Royal Meteorological Society on February 20th.

CLASSIFICATION AND DEFINITION OF CLOUDS.

To the Editor of the Meteorological Magazine.

SIR,—In the January number of your Magazine, Mr. Scott's report to the Royal Meteorological Society on the "Classification and Definition of Clouds," adopted by the International Meteorological Committee last August, differs somewhat from my own report on this subject, published in the *American Meteorological Journal* for December, 1894, and reprinted in *Nature* of December 20th.

As a member of the Special Committee appointed at Munich in 1891 to report on a new Cloud Atlas to the Permanent Committee, of which Mr. Scott has so long been the indefatigable and efficient secretary. I should like to explain my interpretation of the official *procès-verbaux*, which Mr. Scott has evidently translated. The cloud classification recommended is substantially that of Abercromby and Hildebrandsson, for which the Atlas, with its text in four languages, published in 1890 by Drs. Hildebrandsson, Köppen, and Neumayer, has been generally accepted hitherto by Meteorological institutions as an authoritative exposition. This Atlas formed the basis of the Cloud Committee's discussion at Upsala, and I have, therefore, preferred to follow closely its English text, except so far as modifications introduced by us in its French text (which alone was considered) affected the former.

The differences between Mr. Scott's version and my own are, in general, immaterial, but I should like to substitute for his definition of Alto-Cumulus (dense fleecy cloud), "largish globular masses"—my definition of "larger . . . balls"—as being a better rendering of the French text, and also as showing this cloud's relation to Cirro-cumulus (fleecy cloud), which is defined as "small white balls," or, according to Scott, "small globular masses. . . ."

Regarding cloud heights, I would call attention to the note in my report pertaining to the altitude of the Nimbus and Cumulo-nimbus, as measured at Blue Hill. It was here found that the bases of the Nimbus frequently fell below 1,000 metres (3,280 feet) while the tops of the Cumulo-nimbus often attained 8,000 metres (26,240 feet). Prof. Hildebrandsson, the Chairman of the Publication Committee for the Cloud Atlas, has promised to modify the altitudes stated in this Atlas, so that low clouds shall include those below 2,000 metres, and the superior limit of the Cumulo-nimbus shall be raised to 8,000 metres. With these changes, the heights of the clouds measured in Sweden are in fair agreement with the same clouds measured by identical methods in America.

The importance of an exact statement of definitions in the first announcement of what will doubtless soon come into current use in meteorology is my excuse for occupying your space with such details. Our Committee has sought to secure accuracy by requiring

that translations of the French, English, or German text into other languages shall be made under the supervision of the Publication Committee, consisting of Prof. Hildebrandsson, M. Teisserenc de Bort, and Prof. Riggenbach.—Yours faithfully,

A. LAWRENCE ROTCH, F.R.Met.Soc.

Blue Hill Observatory, Readville, Mass., Jan. 30th, 1895.

[The responsibility for the account of the Meeting of the *Roy. Met. Soc.* rests entirely with us, we believe the report of Mr. Scott's paper to be substantially correct.—ED. *Met. Mag.*]

REVIEWS.

Cloudland. A Study on the Structure and Characters of Clouds, by Rev. W. CLEMENT LEY, M.A., F.R.Met.Soc. London: Stanford, 1894. large 8vo. ix.—208 pages, 6 coloured plates, 8 photo prints, 4 charts, and 10 diagrams.

It is with a feeling of sadness that we begin our notice of this work, for the preface is signed, not by the author, W. Clement Ley, but C. H. Ley. Mr. Clement Ley has devoted years to the study of clouds; probably since man first trod this earth, no one, not even Luke Howard, watched the clouds more carefully, or for a longer period. For years he has been collecting facts for, and looking forward to the publication of, this work, but he was too enthusiastic, and as the result he has been unable to complete it. We are sure that he and his family will have the sympathy of all our readers.

We, however, have to report upon the book, not on the author; and we can begin by saying that the get-up of the book is faultless, and that the reproductions of Mr. Clayden's cloud photographs are the best we have ever seen. Years ago (in 1872) we had to review Mr. Clement Ley's *Laws of the Winds in Western Europe* (Part I.). Part II never appeared; but it seems to us that the latter portion of the present work, with its isobaric charts, &c., would be nearly equally appropriate as a sequel to *Laws of the Winds* as it is to *Cloudland*.

However, it is with *Cloudland* that we have to do; and we cannot say that we like it. The nomenclature is founded upon Howard's (whose name, strange to say, we have not seen anywhere in the volume), but split up into no fewer than 26 varieties, and some of them with nearly that number of letters in their name, *e.g.*, Cumulonimbus Grandineus. If clouds, like plants, had definite forms, it would be easy to adopt 26 or 260 names just as botanists do, but, unfortunately no two clouds are alike, and every cloud is constantly changing in appearance, both from its own change of structure, and

from the varying angle which its motion causes it to make with the eye of the observer. We, therefore, think that to attempt to provide a nomenclature to suit all times and climes is to attempt the impossible.

We think, however, that the publication of this book is singularly opportune, because, if we understand aright the proceedings of the International Meteorological Committee, that body is going to issue "an authoritative cloud atlas"—the appearance of which we await with interest—and it is evidently advantageous that the members of that Committee have had the opportunity of considering the outcome of Mr. Clement Ley's researches before issuing their report.

It is, perhaps, desirable that we should mention that Mr. Ley has two classes of clouds, one of less importance than the other; and that each class is divided into four varieties:—clouds of (1) radiation, (2) interrefret, (3) inversion, (4) inclination. For the precise meaning which he attaches to the above words we must refer the reader to the work itself.

Mr. Ley tells one bright little story which well illustrates the remarkable personal utility of his life-long study.

"47. Occasionally when the area of high barometric pressure at the [earth's] surface is gaining the victory, and the advancing cyclonic disturbances are dying out, this form of cloud disappears, or is superseded by Stratus Quietus, or by other cloud varieties of less interesting type. But rather more frequently the ulterior development into Cumulo-nimbus occurs here and there as the cyclonic disturbances approach. The possibility of hazarding a prognostic of this development, even when the direction of the movement of the cloud is totally unknown, may permissibly be illustrated by the following little anecdote, which at the same time indicates the small amount of attention devoted to the form of cloud. An artist, possessed of a keen sympathy with nature, and a most conscientious draughtsman, showed the writer a painting of a sky marked by this cloud in unusually large proportions, occurring over North Britain, and asked what kind of weather was experienced subsequent to the drawing of his sketch. He received the correct answer that a severe thunderstorm occurred within about an hour of the time when the sketch was taken, although in the painting there were no representations of those clouds which are commonly called "thunderclouds." On being asked what certain other painters had remarked about his painting, the artist answered, "they only say 'What a funny cloud.'"

In artistic matters our judgment is probably worth little, but we have not yet seen any coloured plates of clouds which, in our opinion, approach success. As reproductions of the originals, and as specimens of colour printing, we do not doubt the excellence of plates i. to vi. in *Cloudland*, but we infinitely prefer the photo-prints in the same book: they are very similar to those by Sig. Manucci, published by the Specola Vaticana; we could not give them higher praise, for they are as like nature as any reproduction that we can imagine. The problem before the compilers of the "authoritative cloud atlas" is, we think, neither the obtaining of good photographs, nor their reproduction, but giving names and definitions which shall be better than Howard's, and last in favour as long as his, viz., 91 years.

Annales de l'Observatoire Météorologique du Mont Blanc (altitude 4,365 metres = 14,321 feet), publiées sous la Direction de J. VALLOT, Fondateur et Directeur de l'Observatoire. Paris, Steinheil, 1893, 4to, xvi.-190 pages.

THE first article in the *Meteorological Magazine* for 1889 bore the strange but true title of "Three days on the top of Mont Blanc." That article explained how a French gentleman, entirely at his own cost, had requested Messrs. Richard Frères to construct a remarkable series of meteorological instruments, had a tent, food, fuel, and all the instruments and material required for their installation, carried to the top of Mont Blanc, and how he and M. F. M. Richard jointly erected them, and took the observations.

It was M. J. Vallot who did all that, it is to M. J. Vallot that we are indebted for the sumptuously printed volume which to our regret has had to wait long for the very hearty welcome we are glad to give it.

It is curious that High Level observatories are generally the result of private enterprise. Scotland would never have had Ben Nevis but for Mr. Wragge, France would not have had the Pic du Midi but for General de Nansouty, and there would have been no observatory on Mont Blanc but for M. J. Vallot.

If subsequent volumes resemble the first there will be a large collection of very useful and interesting information ; there is so much in the present volume that it is difficult to do justice to it.

The preface deals with the issue of the Annals, the arrangements of the observatory, which is now a large and comfortable building with eight rooms, besides an annexe with two rooms for tourists and guides. The arrangements for the accommodation of scientific men who desire to carry on experiments at a high altitude are extremely liberal—hospitable would, perhaps, be a better word. We ought, perhaps, to explain that the observatory is not on the absolute summit, but in what is in many respects a better position, viz., on the Roches des Bosses, at 14,321 ft., the highest summit being 15,781 ft.

M. J. Vallot, who is evidently a lover of the mountain, probably knows it even better than the guides, and must have spent several thousand pounds in what has already been done, seems to us to have three primary objects : (1) Meteorological research ; (2) Aiding all branches of scientific work on Mont Blanc ; (3) Producing a rigorously accurate map of it on the scale of 3 inches to the mile by an entirely new triangulation and survey.

The eleven articles in the present volume are extremely interesting, and are mostly by either M. H. or by M. J. Vallot. The first epitomizes the results (and reproduces the curves) of synchronous records of barometers at Chamonix (3,396 ft.), Grands Mulets (9,876 ft.) and Summit (15,781 ft.). Perhaps the most noticeable feature is the excessive thickening of the barometer trace during storms, it might be thought that this was due to the wind shaking the instrument, but in a later article M. J. Vallot shows conclusively

by the records of a statoscope that they are really due to differences of pressure, and by taking the statoscope into the open and sitting on a rock, while holding it and allowing it to make its record, he showed that the cause is a natural one, quite independent of any change produced in a confined space by the passage of a strong air current. He, therefore, holds that the oscillations are due to the passage of a multitude of small disturbances (may we not say to eddies in the general atmospheric stream, which are as imperceptible at low altitudes in the atmosphere as would water eddies be to an observer at the bottom of a river). The use by M. Vallot of the word 'tourbillons' suggested to us that of whirls, but we see no evidence of circular motion; we presume that when a current of air which we should call (say) a strong W. wind flows over the plains of France some parts of the current are going faster than others, when the current reaches Mont Blanc it must escape laterally or rise and flow over the top, and it is to the passage of streams at various velocities and various angles that we should attribute the irregularities in the atmospheric pressure recorded by the barometer and confirmed by the statoscope.

Another interesting article is on the accuracy of the temperature correction of Fortin, Aneroid and Bourdon barometers; and then there is the full story of how M. Eiffel drove a tunnel into Mont Blanc 46 ft. below the summit, which tunnel, originally 97 ft. long, and subsequently lengthened by 75 ft., went all the way through solid ice; but there is no end to the information, there are exciting stories of a death from Mal de Montagne, and of two by an avalanche, we hear how one man secured sleep only by opium and phénacétine, and another was brought round by some of the oxygen which M. Vallot had always in reserve; but we must stop. It is one of the most fascinating books which we have read, copiously illustrated, and one of which any government and *à fortiori* any private gentleman may well be proud.

THE SCIENTIFIC USE OF KITES.

WE believe that the first use of a kite in connection with meteorology was about 1750, when Franklin, in his well-known experiment, obtained electrical discharges from a thunder-cloud by means of a cord carried up to the cloud by a kite. Admiral Back, when in command of the "Terror" in 1836 and 1837, is reported to have used a kite to obtain the temperature of the upper air in the Arctic regions; and Sir Francis Ronalds, at Kew, in 1847, made experiments with kites.

In 1882 Mr. Douglas Archibald carried on a somewhat elaborate series of scientifically conducted experiments with anemometers and thermometers carried by kites up to heights of about 2,000 ft. With the object of obtaining additional power he used a series of

kites flown "*tandem*," i.e., one above the other, and was, we believe, the first to adopt this device. Thus from time to time this comparatively simple and inexpensive apparatus has been tried for meteorological work, but we believe it has never been used by any of the Government services, although the results obtained would, we think, amply justify a more extensive and prolonged series of trials.

After the lapse of another ten years, for we believe Mr. Archibald's observations were the last, we find a fresh series of experiments, this time in America, and the authors in an article in the December number of the *American Meteorological Journal*, speak hopefully of the value of the results to be obtained.

The experiments were made at the Blue Hill Observatory of the well-known meteorological enthusiast, Mr. A. Lawrence Rotch, by Mr. William A. Eddy, of Bayonne, N.J., who, by means of the *tandem* principle, has sent up kites to altitudes exceeding a mile.

A modified Richard thermograph was constructed chiefly of aluminium on a hard rubber base, the total weight being only one pound eight ounces.

On August 4th this thermograph was carried up by six kites, reaching an altitude above the hill-top of 1,000 ft., and again on August 15th, the results obtained being compared with the records of Richard thermographs at the Observatory, 640 ft. above sea-level, and at the Valley Station two miles N. of the observatory and 50 ft. above sea-level.

Rate of Decrease of Temperature per 100 ft., August 4th, 1894.

Time.	2.22 p.m.	2.41 p.m.	3.8 p.m.	3.10 p.m.	4.37 p.m.	5.3 p.m.	5.5 p.m.
Valley to Summit	0°·41	0°·37	0°·34	0°·39	0°·39	0°·49	0°·39
Summit to Kite ...	1°·43	1°·01	0°·90	0°·66	0°·33	0°·36	0°·50

August 15th, 1894.

Time.	1.30 p.m.	1.52 p.m.	3.28 p.m.	3.30 p.m.	4.3 p.m.	4.18 p.m.	4.20 p.m.
Valley to Summit	0°·80	0°·76	0°·46	0°·47	0°·47	0°·41	0°·41
Summit to Kite ...	0°·14	0°·28	0°·36	0°·40	0°·51	0°·18	0°·26

On August 4th the sky had been clouded during the morning with strato-cumulus surmounted by a sheet of alto-stratus, but these began to break away about 2 p.m., and after 3.10 p.m. the sun came out though the sky continued more than half covered. While the kites were in the air the wind was from W. and N.W., with a velocity gradually rising from ten miles at the beginning to twenty miles at the end of the experiment. The barometer was rising, a minimum having occurred during the preceding night.

On August 15th during the experiment the wind blew steadily from the south with a nearly constant velocity of about twenty miles an hour. The barometer was falling slowly. The sky was covered with alto-cumulus and alto-stratus increasing in density, and it became necessary to draw down the kites on account of the approach of a thunder-shower.

The following are among the results furnished by the kites :—

“On July 31st the kites were let up at noon in a sea breeze. When the kites had risen about 400 ft. above the hill the topmost kite veered round from the west, thus giving the depth of the sea breeze as 1,000 ft. above sea level. During the afternoon the sea breeze steadily increased in depth and veered toward the south.”

“On August 6th, during the prevalence of light winds from the west, an effort was being made to elevate the kites which refused to remain permanently in the air since the air movement was not sufficient to sustain the heavy kites employed. But at 2.20 p.m., while a five-foot kite was being maintained at a short distance above the hill by means of sundry jerks and pulls, a rather large cumulus cloud approached the zenith, and suddenly the kite began to ascend almost vertically. Cord was rapidly let out and in a short time the kite was flying directly overhead, and continued to rise until all the available cord had been let out. It followed the cumulus for a short distance beyond the zenith, then rapidly dropped to the earth. Mr. Eddy afterward measured the length of cord out and reported 1,172 ft, which must have been approximately the altitude of the kite since the cord hung almost vertically under it. This seems to furnish striking evidence of the existence of ascending currents under the cumulus clouds.”

“The kites also at times gave evidence of great ærial eddies around and above the hill, which swayed the kites from side to side.”

“It is hoped to continue these experiments at the Blue Hill Observatory, and if possible reach great altitudes. Mr. S. P. Fergusson believes he can construct a meteorograph which will record pressure, temperature, wind velocity, and humidity, and not be beyond the lifting-power of the kites.”

ROYAL METEOROLOGICAL SOCIETY.

THE annual meeting of this Society was held on January 16th, at the Institution of Civil Engineers, Mr. R. Inwards, F.R.A.S., President, in the chair.

The report of the Council was read by Mr. F. C. Bayard, and showed a successful year, and general activity in the various branches of work undertaken by the Society and its Committees. Forty-five Fellows were elected during the year, and the number on the roll increased, although the Society lost by death two Honorary Members and 11 Fellows. The balance-sheet shows an excess of assets over liabilities of nearly £3,000, in addition to the library and instruments, and £1,300 of funds held for special purposes. The following are the officers and council for the ensuing year :—

President, Mr. R. Inwards ; *Vice-Presidents*, Dr. Robert Barnes, Mr. Peregrine Birch, Dr. C. Theodore Williams, Captain Wilson-Barker ; *Treasurer*, Mr. H. Perigal ; *Secretaries*, Mr. F. C. Bayard, Mr. G. J. Symons ; *Foreign Secretary*, Mr. R. H. Scott ; *Council*, Messrs. A.

Brewin, G. Chatterton, R. H. Curtis, W. H. Dines, W. Ellis, C. Harding, Baldwin Latham, Admiral J. P. Maclear, Mr. E. Mawley, Dr. H. R. Mill, Messrs. H. Southall and Sowerby Wallis.

The President delivered an address entitled "Weather Fallacies," being practically a brief history of prophetic weather lore from the times of Hesiod, Theophrastus and Aratus to the present day, grouped under Saints Day fallacies, sun and moon fallacies, and those concerning animals and plants, Almanac makers, weather prophets and impostors. Owing to the vastness of the subject the paper was necessarily condensed, and no abstract can be given.

The usual votes of thanks were accorded to the Officers, Council, Committees, &c., and to the Institution of Civil Engineers for the use of their theatre for the meetings of the Society.

The annual meeting was preceded by an ordinary meeting, at which several new fellows were elected, and a paper was read by Mr. Charles Harding on the gale of December 21st-22nd. He said that this storm was one of exceptional severity, especially over the northern portions of England and Ireland, and in the south of Scotland. It developed energy very quickly and travelled with great rapidity, the centre of the disturbance traversing the north of Scotland. The self-registering anemometers show that the greatest violence of the wind occurred at Fleetwood, where the velocity of the wind was 107 miles in the hour, recorded at nine o'clock on the morning of the 22nd, and for four consecutive hours the velocity of the wind exceeded 100 miles. This is the greatest force of wind ever registered in the British Isles, and the maximum velocity is eleven miles an hour in excess of the highest recorded in the "great storm" of November 16th-20th, 1893. At Holyhead the wind in squalls attained the hourly velocity of 150 miles between 10 a.m. and noon on the 22nd, and at Liverpool the wind travelled 89 miles between 10.30 and 11.30 a.m. The strongest force of the wind was generally from the north-westward. Exceptionally violent gusts of wind were experienced during the gale in nearly all parts of the United Kingdom, and at Greenwich a pressure of 28 lbs. on the square foot was registered at about 6 a.m. on the 22nd. A precisely similar squall was registered a few minutes earlier at Kew, while two hours earlier a squall passed over Falmouth, in which the changes of wind, barometer, and temperature justify the opinion that it was due to this same disturbance, travelling at the rate of about 120 miles an hour. The storm was of comparatively short duration, but at Fleetwood the velocity of the wind was 85 miles an hour, or above, for eleven hours, and the average wind velocity for twenty-three hours was 77 miles. Much destruction was wrought both on sea and land, and there was a very heavy loss of life. The Board of Trade returns received up to January 16th show that 167 lives were lost at sea on our coasts within the limit of the wreck chart, and there was also great loss of life in the North Sea. One hundred and ten casualties were posted on the Loss Book at

Lloyd's, mostly due to the gale. The Lifeboats of the Royal National Lifeboat Institution were launched forty-three times during the gale, and they were the means of saving 103 lives and two vessels. The storm appears to have traversed the Atlantic, and was situated to the south of Bermuda on December 19th.

In the discussion which followed, Mr. Symons quoted from a letter addressed to Mr. H. S. Eaton, giving observations of the deflection of the Blackpool Tower (500 feet in height) obtained by Messrs. Ashley and Bell, who remained in the room at the top during the gale. The maximum deflection was about $2\frac{1}{4}$ inches. Mr. Symons also summarised observations of the deposit of salt on window panes and foliage during the gale, showing that it was recorded at Settle, 24 miles from the sea, Sowerby Bridge, 40 miles, Bolton Abbey (42 miles), Meltham (45 miles), Harrogate (50 miles), East Ardsley, Wakefield (57 miles), Bramhope (60 miles), Masham (65 miles), and Birmingham, 55 miles from the Bristol Channel, and nearly 100 miles from Cardigan Bay.

Admiral Maclear remarked that the velocities given by Mr. Harding exceed by 50 per cent. hurricane force of Beaufort Scale, and yet the effects of the wind bear no comparison to what he had himself seen in hurricanes in the China Sea.

Mr. Curtis spoke on the bearing of the factor used in graduating anemometers on the results given by Mr. Harding, and explained that the bridled anemometer at Holyhead was graduated by direct experiments made by Mr. Dines on his whirling machine at Hershham.

Mr. Harding, in his reply, said that as there was no case in which an anemometer had survived a tropical hurricane, there was no information as to what the velocity in them really was.

THE WEATHER OF JANUARY : A RECORD ?

To the Editor of the Meteorological Magazine.

SIR,—There have, of course, been colder Januarys than the last, but not one, so far as my observations go, in which there has been such a uniform dead-level of low temperature from beginning to end. There was not a single day in the whole month which could be called "mild" even for the time of the year. The absolute maximum in the shade, $41^{\circ}8$, is not only the lowest that I have registered in any January, but in any month of any year covered by my observations. The nearest approach to such a low maximum, in the 23 years during which I have carried on regular observations in the Midland district, was in January 1879, when the maximum was $44^{\circ}5$, and the next nearest was in January 1881, when it was $46^{\circ}4$. There was only one other instance during the 23 years when the maximum was below 50° , viz., in 1891, when it was $49^{\circ}2$. The mean of the

absolute maxima for the whole period being $52^{\circ}3$; more than 10 degrees above the highest point reached by the thermometer in January 1895. I shall be interested to hear whether so low a maximum has been registered by any observer in the Midland district either in last January or in any month of any previous year.

GEORGE T. RYVES, F.R.Met.Soc.

*Team Vicarage, Stoke-on-Trent,
February 4th, 1895.*

THE FROST OF FEBRUARY, 1895.

As the frost still (13th) continues, it would be impossible to deal with it satisfactorily in this number; we therefore hold over until next month all communications received. Exceptionally low temperatures have been recorded in many parts of the kingdom, especially about Leicester, where, owing to its central position, the climate approximates more nearly to Continental conditions.

At Camden Square, the frost—considering both intensity and duration—is clearly unprecedented since observations commenced in 1858; from a cursory examination of the Greenwich values, it appears to be similar to that of 1855.

UNUSUAL SNOW CRYSTALS.

To the Editor of the Meteorological Magazine.

SIR,—During the recent cold and snowy weather, I have been constantly on the look-out for remarkable snow crystals, but without success until this morning, when at 8.30 a.m., with the temp. about 10° , snow was falling in single crystals, varying considerably in size, and many of them exceptionally large. With the same pocket scale referred to in my letter of January 6th, 1894, I measured about a dozen, and succeeded in finding two even larger than the largest recorded in that letter. One measured exactly $\frac{1}{12}$ inch, and the other a shade under $\frac{2}{24}$ inch. I have not seen any spherical crystals, but found several with an additional limb starting from the centre at the usual angle of crystallisation.

Yours very truly,

H. SOWERBY WALLIS.

25, Northwood Road, Highgate, February 7th, 1895.

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, JULY, 1894.

STATIONS. (Those in italics are South of the Equator.)	Absolute.				Average.				Absolute.		Total Rain.		Aver.
	Maximum.		Minimum.		Max.	Min.	Dew Point.	Humidity.	Max. in Sun.	Min. on Grass.	Depth.	Days.	
	Temp.	Date.	Temp.	Date.									
°		°		°	°	°	0-100	°	°	inches			
England, London	88·2	6	48·9	14	73·0	54·8	53·7	74	128·2	42·6	3·25	17	6·9
Malta.....	96·3	12	64·7	3	87·6	69·0	67·1	69	150·0	58·3	·00	0	1·9
<i>Cape of Good Hope</i> ...	...	...	...	...	...	...	...	...	...	...	...	...	...
<i>Mauritius</i>	77·6	11	59·7	21	74·9	64·8	61·6	77	124·7	48·6	2·29	19	5·0
Calcutta.....	90·8	14	75·7	11	86·9	78·0	78·2	88	159·7	74·6	11·34	18	8·3
Bombay.....	87·5	2	74·1	17	84·2	77·0	76·3	86	134·5	72·0	26·16	31	8·6
Ceylon, Colombo	86·7	1	73·3	...	84·4	77·0	71·6	78	145·5	70·0	1·72	13	5·6
<i>Melbourne</i>.....	...	...	...	...	...	...	...	...	...	...	...	...	...
<i>Adelaide</i>	68·1	27	37·2	8	58·0	45·5	44·0	78	123·8	30·7	3·50	17	7·1
<i>Sydney</i>	68·9	28	40·4	11	58·7	45·4	40·0	74	111·9	27·9	1·35	7	3·1
<i>Wellington</i>	59·0	26	34·5	28	53·4	44·4	41·4	76	98·0	24·0	6·49	21	5·5
<i>Auckland</i>	62·0	3	39·5	28	58·6	46·6	45·0	75	116·0	37·0	4·35	19	5·6
Jamaica, Kingston.....	92·9	17	66·3	25	89·2	72·1	71·0	73	...	...	1·21	6	3·6
Grenada.....	87·0	29	72·0	1, 6	83·8	74·5	68·9	72	157·0	...	3·53	22	4·3
Trinidad	92·0	6	66·0	25	88·5	69·4	70·2	77	172·0	62·0	4·53	15	...
Toronto.....	89·9	12	46·6	9	79·5	58·7	57·8	69	...	41·5	1·61	13	4·5
New Brunswick, Fredericton .....	...	...	...	...	...	...	...	...	...	...	...	...	...
Manitoba, Winnipeg... }	95·8	16	40·0	4	81·3	54·9	...	...	...	...	·63	12	4·6
British Columbia, Esquimalt..... }	84·0	12	45·2	31	69·1	49·6	51·7	81	...	...	·21	6	2·8

REMARKS.

MALTA.—Adopted mean temp. 77°·6. Mean hourly velocity of wind 6·2 miles. Sea temp. rose to 81°·3. The dew point temp. ranged between 49°·7 on 12th and 73° 8 on 30th. J. F. DOBSON.

Mauritius.—Mean temp. of air 0°·7 above, of dew point 2°·2 above, and rainfall ·09 in. below, their respective averages. Mean hourly velocity of wind 11·1 miles below average; extremes, 26·1 on 2nd, and 1·7 on 21st and 22nd; prevailing direction, E.S.E. C. MELDRUM, F.R.S.

Adelaide.—Mean temp. 0°·2 above, and rainfall ·88 in. above, the average of 37 years. A very cloudy month, the mean amount being 1·5 above the average of 25 years. Good rains fell over the agricultural districts, mostly in excess of the average, especially in the South-Eastern district; but in the Northern, North-East and North-West is was for the most part light and deficient. C. TODD, F.R.S.

Sydney.—Temp. 0°·4 below, humidity 3°·1 below, and rainfall 3·11 in. below, their respective averages. H. C. RUSSELL, F.R.S.

Wellington.—Showery, unpleasant weather during this month, with occasional intervals of fine days; prevailing S.E. and N.W. winds, generally moderate in force. On the 20th, severe TS, with heavy rain and hail; also hail on 26th. Mean temp. 1°·3 above, and rainfall ·16 in. above the average. Aurora on 20th and 21st. R. B. GORE.

Auckland.—Showery and unsettled, but not more so than is usual in July. Mean temp. slightly above, rainfall just under, the average. T. F. CHEESEMAN.

JAMAICA.—Mean hourly velocity of wind 4·3 miles. In Kingston the rainfall was about one-half the average, but the mean for every division was a little over the average. R. JOHNSTONE.

TRINIDAD.—Rainfall 4·92 in. below the average of 30 years. J. H. HART.

SUPPLEMENTARY TABLE OF RAINFALL,
JANUARY, 1895.

[For the Counties, Latitudes, and Longitudes of most of these Stations,
see *Met. Mag.*, Vol. XIV., pp. 10 & 11.]

Div.	STATION.	Total Rain.	Div.	STATION.	Total Rain.
		in.			
II.	Dorking, Abinger Hall.	2.45	XI.	Lake Vyrnwy	4.85
„	Birchington, Thor	3.17	„	Corwen, Rhug	3.35
„	Hailsham	2.85	„	Carnarvon, Cocksida ..	2.81
„	Ryde, Thornbrough	4.00	„	I. of Man, Douglas	2.61
„	Emsworth, Redlands ...	2.69	XII.	Stoneykirk, Ardwell Ho.	2.66
„	Alton, Ashdell	2.79	„	New Galloway, Glenlee	2.18
III.	Oxford, Magdalen Col...	2.48	„	Melrose, Abbey Gate ...	3.47
„	Banbury, Bloxham	2.90	XIII.	N. Esk Res. [Penicuik]	3.75
„	Northampton, Sedgebrook	2.74	„	Edinburgh, Blacket Pl..	1.77
„	Alconbury	2.49	XIV.	Glasgow, Queen's Park.	58‡
„	Wisbech, Bank House..	2.67	XV.	Inverary, Newtown	2.18
IV.	Southend	1.66	„	Islay, Gruinart School..	1.30
„	Harlow, Sheering ...	2.09	XVI.	Dollar	2.07
„	Colchester, Lexden	1.98	„	Balquhidder, Stronvar..	3.31
„	Rendlesham Hall	4.24	„	Ballinluig	3.75
„	Diss	3.07	„	Dalnaspidal H.R.S. ...	3.94
„	Swaffham	3.21	XVII.	Keith H.R.S.	1.95
V.	Salisbury, Alderbury ...	3.51	„	Forres H.R.S.	3.14
„	Bishop's Cannings	3.53	XVIII.	Fearn, Lower Pitkerrie.	2.74
„	Blandford, Whatcombe ..	3.77	„	Loch Shiel, Glenaladale	4.51
„	Ashburton, Holne Vic....	5.31	„	N. Uist, Loch Maddy ...	2.92
„	Okehampton, Oaklands.	4.69	„	Invergarry	1.75
„	Hartland Abbey	3.77	„	Aviemore H.R.S.	3.83
„	Lynmouth, Glenthorne.	3.80	„	Loch Ness, Drumnadrochit	2.46
„	Probus, Lamellyn	6.13	XIX.	Invershin	2.19
„	Wellington, Sunnyside..	3.94	„	Scourie	2.86
„	Wincanton, Stowell Rec.	4.11	„	Watten H.R.S.	2.75
VI.	Clifton, Pembroke Road	3.93	XX.	Dunmanway, Coolkelure	5.61
„	Ross, The Graig	4.40	„	Fermoy, Gas Works ...	2.91
„	Wem, Clive Vicarage ...	3.53	„	Killarney, Woodlawn ...	5.11
„	Cheadle, The Heath Ho.	4.82	„	Caher, Duneske	4.23
„	Worcester, Diglis Lock	3.32	„	Ballingarry, Hazelfort...	2.30
„	Coventry, Coundon	4.12	„	Limerick, Kilcornan•
VII.	Ketton Hall [Stamford]	2.70	„	Ennis	2.29
„	Grantham, Stainby	3.62	„	Miltown Malbay	2.55
„	Horncastle, Bucknall ...	3.18	XXI.	Gorey, Courtown House	5.04
„	Worksop, Hodsck Priory	3.54	„	Athlone, Twyford	1.92
VIII.	Neston, Hinderton	3.45	„	Mullingar, Belvedere ...	1.87
„	Preston, Haighton	1.94	„	Longford, Currygrane...	2.07
„	Broughton-in-Furness..	3.45	XXII.	Woodlawn	3.31
IX.	Ripon, Mickley	4.69	„	Crossmolina, Enniscoe..	3.87
„	Melmerly, Baldersby ...	4.10	„	Collooney, Markree Obs.	4.06
„	Scarborough, South Cliff	4.98	„	Ballinamore, Lawderdale	2.77
„	Middleton, Mickleton ...	2.39	XXIII.	Lough Sheelin, Arley ..	2.29
X.	Haltwhistle, Unthank..	2.43	„	Warrenpoint	2.50
„	Bamburgh	3.28	„	Seaforde	3.57
„	Keswick, The Beeches...	4.65	„	Belfast, Springfield	3.10
XI.	Llanfrehfa Grange	5.25	„	Bushmills, Dunderave...	2.68
„	Llandovery	4.58	„	Stewartstown	3.27
„	Castle Malgwyn .....	...	„	Buncrana	3.50
„	Builth, Abergwessin Vic.	7.01	„	Lough Swilly, Carrablagh	3.43
„	Rhayader, Nantgwilt..	6.79			

‡ Snow probably blown out of the gauge.

JANUARY, 1895.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL.					Days on which 40 or more fell.	TEMPERATURE.						No. of Nights below 32°.
		Total Fall.	Difference from average 1880-9.	Greatest Fall in 24 hours		In shade.		Max.		Min.		On grass.		
				Dpth	Date			Deg.	Date	Deg.	Date.			
inches.	inches.	in.				Deg.	Date	Deg.	Date.					
I.	London (Camden Square) ...	1.96	+	.34	.75	19	16	51.9	20	20.2	30	21	26	
II.	Maidstone (Hunton Court)...	2.16	+	.61	.30	19	23	...	...	...	...	...	...
III.	Strathfield Turgiss	2.55	+	.74	.68	19	18	52.2	20	19.1	29	18	29	
IV.	Hitchin	2.69	+	1.15	.85	19	21	48.0	20	14.0	28	23	...	
V.	Winslow (Addington)	2.51	+	.70	.73	19	21	44.0	18	11.0	29	24	27	
VI.	Bury St. Edmunds (Westley) ..	2.87	+	1.40	.84	19	23	48.0	20	7.0	26	...	...
VII.	Norwich (Brundall)	3.44	...	...	.54	19	27	45.0	16	9.5	27	20	27
VIII.	Weymouth (Langton Herring) ..	4.07	+	1.73	1.44	12	16	50.0	16	20.0	27	21	...	
IX.	Torquay (Cary Green)	4.10	...	...	1.27	12	20	51.6	20	23.2	28	16	24
X.	Polapit Tamar [Launceston]..	4.09	+	1.07	.59	19	19	52.5	18	18.0	29	14	25	
XI.	Stroud (Upfield)	3.22	+	1.02	.65	19	18	45.0	17	19.0	10	26	...	
XII.	Church Stretton (Woolstaston) ..	4.51	+	2.35	.67	20	22	40.5	18	12.0	12	26	30	
XIII.	Tenbury (Orleton)	4.37	+	2.23	1.05	20	18	45.0	24	12.0	30	24	28	
XIV.	Leicester (Barkby)	3.08	+	1.32	.99	20	24	45.0	19	4.0	28	27	31	
XV.	Boston	3.07	+	1.68	.61	20	24	47.0	18	13.0	12	23	...	
XVI.	Hesley Hall [Tickhill]	3.00	+	1.23	.67	20	20	38.0	20	0.9	12	26	...	
XVII.	Manchester (Plymouth Grove) ..	2.64	+	.18	.48	16	16	44.0	23 ^c	18.0	29	23	...	
XVIII.	Wetherby (Ribston Hall)	2.94	+	1.05	.56	20	15	...	...	...	...	...	...
XIX.	Skipton (Arneliffe)	4.51	—	1.13	.65	16	23	...	...	...	...	...	...
XX.	Hull (Pearson Park)	4.62	+	2.85	.83	6	26	41.0	^b	12.0	11 ^d	27	28	
XXI.	Newcastle (Town Moor)	5.28	+	3.47	.77	7	22	...	...	...	...	...	...
XXII.	Borrowdale (Seathwaite)	5.89	—	6.29	.83	23	17	...	...	...	...	...	...
XXIII.	Cardiff (Ely)	4.74	+	1.45	.68	19 ^a	19	...	...	...	...	...	...
XXIV.	Haverfordwest	5.46	+	1.04	.91	20	24	46.2	19	14.3	29	13	23	
XXV.	Aberystwith (Gogerddan)	3.40	—	.13	.53	2	14	47.0	16	10.0	27	28	...	
XXVI.	Llandudno	2.51	+	.23	.43	20	22	45.0	16	24.8	27	...	...
XXVII.	Cargen [Dumfries]	2.27	—	1.50	.38	16	14	42.2	23	12.0	28	26	...	
XXVIII.	Jedburgh (Sunnyside)	2.79	+	1.07	.99	14	...	41.0	22	0.0	11	30	...	
XXIX.	Colmonell	2.00	...	...	.31	23	15	48.0	23	10.0	27	23	...
XXX.	Lochgilthead (Kilmory)	1.85	—	4.29	.42	22	11	...	...	14.0	27	28	...
XXXI.	Mull (Quinish)	1.70	—	3.97	.41	6	8	...	...	...	...	...	...
XXXII.	Loch Leven Sluices	2.70	—	.20	1.20	15	9	...	...	...	...	...	...
XXXIII.	Dundee (Eastern Necropolis) ..	2.90	+	.93	.85	13	19	42.4	23	13.1	11	26	...	
XXXIV.	Braemar	3.34	+	.65	.60	13	22	38.0	23	—5.0	9	29	31	
XXXV.	Aberdeen (Cranford)	5.13	...	...	1.45	17	25	42.0	14 ^g	5.0	10	24	...
XXXVI.	Strathconan [Beaully]	4.58	—	.30	1.60	1	...	...	...	...	...	...	...
XXXVII.	Glencarron Lodge	5.70	...	...	.85	1	17	42.1	23	9.1	28	30	...
XXXVIII.	Cawdor [Nairn]	2.85	+	.68	.59	18	22	...	...	...	...	...	...
XXXIX.	Dunrobin	3.28	+	.82	.95	16	19	44.2	19	18.5	8 ^e	21	...	
XL.	S. Ronaldsay (Roeberry)	3.04	+	.09	.34	6	28	47.0	18	23.0	27	20	...	
XLI.	Darrynane Abbey	5.45	...	...	.76	12	23	...	...	...	...	...	...
XLII.	Waterford (Brook Lodge)	5.76	+	2.20	1.16	15	18	48.0	14	21.0	9 ^f	19	...	
XLIII.	O'Briensbridge (Ross)	3.11	...	...	.58	5	16	...	...	...	...	...	...
XLIV.	Carlow (Browne's Hill)	4.34	+	1.44	.89	12	19	...	...	...	...	...	...
XLV.	Dublin (Fitz William Square) ..	5.71	+	3.85	1.80	12	24	44.8	22	16.9	9	18	29	
XLVI.	Ballinasloe	2.38	—	.70	.56	5	23	43.0	12 ^c	14.0	10	29	...	
XLVII.	Clifden (Kylemore)	6.23	...	...	1.32	11	24	...	...	...	...	...	...
XLVIII.	Waringstown	2.87	+	.22	.90	12	23	45.0	22	12.0	27	26	30	
XLIX.	Londonderry (Creggan Res.) ..	3.99	+	.57	.61	2	23	...	...	...	...	...	...
L.	Omagh (Edenfel)	2.86	—	.16	.60	12	19	44.0	22	19.0	26	23	30	

^a And 20. ^b Various. ^c And 24. ^d And 12. ^e And 9, 11. ^f And 26. ^g And 16, 19.

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

METEOROLOGICAL NOTES ON JANUARY, 1895.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; T S for Thunderstorm; R for Rain; H for Hail; S for Snow.

ENGLAND.

STRATHFIELD TURGISS.—At the beginning of the month the temp. was considerably below the mean with slight falls of R or S, and this continued during the second week, but with rather more sunshine. The end of the month was very cold and snowy. Gales on 12th and 23rd.

ADDINGTON.—January opened with a sharp frost, and frost was registered in the shade on twenty-four days, very sharp on the 10th, 11th and 12th, and again from the 26th to the end. From the 12th until the 18th the bar. was very low, particularly on the 13th, 14th and 16th. Dense fog on the 10th; a large flood on the 20th.

BURY ST. EDMUNDS.—A month of real winter, only six days without frost. S on 17 days, mostly in small quantities. A blizzard on 31st, with distant thunder.

NORWICH, BRUNDALL.—A very wintery month; not one mild day, and S recorded on 18 days. Some very rough, coarse weather at times. Mean temp. $32^{\circ}\cdot 8$, the lowest since 1881, except 1891, which was $0^{\circ}\cdot 4$ lower. The ground was completely covered with S from December 30th to January 15th, and from January 22nd to 31st. T at 4 p.m. on 17th.

LANGTON HERRING.—A bitterly cold month. Mean 9 a.m. temp. $32^{\circ}\cdot 7$; only two months in the last 23 years have had a lower 9 a.m. mean, January 1881 $29^{\circ}\cdot 9$, December 1890 $31^{\circ}\cdot 0$. On 19 nights temp. fell to or below 30° , and on the last six nights to or below 23° . The heavy R on 12th was followed by 5 days of very low bar. On the 14th there were two very loud sharp claps of T with vivid L. At the end the ground was covered with about 3 inches of S; there was very little drift.

TORQUAY, CARY GREEN.—Rainfall $\cdot 70$ in. above, mean temp. $37^{\circ}\cdot 0$ or $4^{\circ}\cdot 0$ below, and duration of sunshine 19 hours above, the average; six sunless days.

POLAPIT TAMAR.—Wetter than usual and very cold, the mean min. in shade being $32^{\circ}\cdot 2$, and on grass $25^{\circ}\cdot 1$. From the 13th to the 17th inclusive the bar. remained below 29 in., an unusual length of time to remain so low and remarkable for being free from gales. T on 27th.

STROUD, UPFIELD.—S drifted much on the 12th and some roads were impassible.

WOOLSTASTON.—A very severe month. S fell heavily on 13 days, blocking the roads, and the cold was intense. There was a furious gale on the 12th, causing huge drifts, in one of which a woman was lost on 24th and frozen to death. No such fall of S has occurred since 1865. Mean temp. $30^{\circ}\cdot 3$.

TENBURY, ORLETON.—The coldest January since 1881. Great gale and S storm on the night of 12th, the depth being about 1 foot, and in drifts from 6 ft. to 10 ft. Very wet with floods between 12th and 20th, $3\cdot 91$ in. of R and S falling in the 9 days. Intense frost set in on 26th and continued to the end of the month.

LEICESTER, BARKBY.—A very cold, wintery, wet and boisterous month. It seems to have been colder here than anywhere else in England. Mean max. temp. $36^{\circ}\cdot 7$, mean min. temp. $22^{\circ}\cdot 4$. From 7th to 11th inclusive the min. temp. was never above 15° . The Leicester water famine is at an end. (I expect the cold weather to continue for some time, at least 10 days.—E. N. POCHIN, Feb. 1st, 1895.)

WALES.

HAVERFORDWEST.—January commenced with wet weather, and some S and sleet on the 3rd; the weather became more wintry on the 5th, with N.E. wind. S fell at night, and heavily next day, followed by keen frost and changeable cold weather. On the 11th very stormy, cold weather set in, wind E., rising

to a gale at night, with heavy S, the gale and S continuing till 13th. A rapid thaw occurred on 15th, and cold E, freezing as it fell, on 16th, the weather remaining variable till 20th. The remainder was most winterly, with several deep falls of S, and gales on 24th and 25th, and 27th and 28th. The Precelly range was covered with S nearly the whole month.

ABERYSTWITH, GOGERDDAN.—Severe frost set in on 26th, with about a foot of S on that and the two following days.

SCOTLAND.

CARGEN.—The mean temp. of the month, $30^{\circ}\cdot8$, is $7^{\circ}\cdot3$ below the average, and the lowest recorded in January since observations commenced 35 years since. With the exception of December, 1878, when the mean temp. was $29^{\circ}\cdot2$ this is the coldest month recorded. The first and latter parts of the month were extremely cold; from the 13th to the 23rd was somewhat milder, the mean temp. being $34^{\circ}\cdot6$. The rainfall of this period was about an inch, the rest of the fall for the month being nearly all S, which was 6 inches deep on 28th. N. to E. winds prevailed for 29 days. The duration of sunshine was much above the average, and there was little fog.

JEDBURGH, SUNNYSIDE.—The temp. was extremely low throughout, and all outdoor work was suspended. S fell more or less almost every day, but there was little drifting, and the trains arrived at the normal times.

COLMONELL.—Rainfall $2\cdot94$ in. below the average, 1876-94. Mean temp. $32^{\circ}\cdot6$, $3^{\circ}\cdot9$ below the average. Falls of S were frequent at the beginning and end of the month, about 2 inches falling on 13th, and $2\frac{3}{4}$ inches on 26th.

BRAEMAR.—A month to be remembered for intensity of frost and almost incessant S and drifts. All traffic by sleigh only.

GLENCARRON.—A very severe month, with wind, S, and hard frost.

ROEBERRY.—A very coarse, cold month. Mean temp. $35^{\circ}\cdot2$.

IRELAND.

O'BRIENSBRIDGE, ROSS.—Sharp frost, with light S showers in the first week; a gale from S.E. on 11th, followed by dull and cold weather up to the 19th, the cold increasing in intensity from that date to the end.

DUBLIN.—A very severe month, with much S and frost, alternating with frequent thaws. The coldest January since 1881, and as regards rainfall a record month. The precipitation was chiefly S, sleet, or H, the total being more than double the average, and $1\cdot39$ in. in excess of the fall in January, 1877, the next wettest. The mean temp., $35^{\circ}\cdot4$, is $6^{\circ}\cdot0$ below the average.

WARINGSTOWN.—An unusually severe month; roads blocked in many places on 12th and 13th.

EDENFEL.—January, 1895, has been marked by every unpleasant characteristic. Polar and easterly winds blew on 29 days, sometimes with the force of a gale, accompanied by light drifting S, with which the ground was more or less covered on every day of the month. Although it froze more or less keenly on every night but one, and the mean temp. was very low, but few days passed without a temporary thaw setting in for an hour or two. The R for the month, $2\cdot86$ in., is almost all melted S, of which the heaviest fall since January, 1881, took place on the 12th.