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METEOROLOGY AT THE HEALTH EXHIBITION.

IN a previous number we gave a brief abstract of the papers read at the Conference held at this Exhibition, but as regards the exhibition itself, we have been restrained from comment at an earlier date by our determination to write nothing upon the subject until the awards of the Juries were announced.

The day has not yet come when scientific instruments are considered worthy of as good a position as a wax model of a big turnip, or when thermometers are regarded as having as much to do with health as the design on the outside of a cup. Music and daintily dressed dairymaids draw great crowds, and therefore get the best positions; while Meteorology and Mr. Francis Galton's important Anthropometric laboratory are honoured with the use of an iron shed which nobody else would have.

We leave our readers to consider whether Health or Profit has been the primary consideration.

However, late as the publication of the awards has driven us, we have to tell our readers as tersely as possible what to look for in the short interval yet remaining; and there are several objects of considerable interest.

We need not stop long in the meteorological section itself. Our readers will find that the leading London firms, Casella, Hicks, and Negretti & Zambra, maintain their high position. The following are among the chief novelties:—

Casella.—Six's thermometer with adjustable electric contacts so that a bell can be rung on the temperature rising above or falling below any desired temperature; this is, we believe, the only hermetically sealed thermometer with which this can be done.

Denton shows the set of thermometers exhibited by him at the Royal Meteorological Society, and, as upon the Jury requiring them to be reverified at Kew, the errors remain the same as they were in 1881, this maker must be congratulated on having effected one of the greatest improvements in mercurial thermometers yet made.*

Hicks.—An air meter, with sand glass attached; this is very

* *Met. Mag.*, Vol. xvii. (1882), p. 168.

handy for ventilation measurements. Extremely delicate and sensitive clinical thermometers.

Negretti & Zambra.—A dry and wet bulb thermometer, ringing a bell on any required temperature being reached; and a large dial electrically recording anemometer; this firm also shows a set of its turnover thermometers.*

Watson.—We may also mention an ingenious but not rigorously accurate thermometer shown by Watson; it is a mercurial thermometer, with a rather large bulb, and divided on the stem; at about three inches from the bulb a wire is coiled round the tube and the two ends of the wire project and rest on a little double bracket, the position of these centres is such that when the temperature rises the upper part of the thermometer becomes heavier, and the thermometer takes a position more nearly horizontal than before; when the temperature falls, the density of the mercury in the bulb increases, the length of the column becomes less and the thermometer becomes more nearly vertical. The temperature is, therefore, shown not merely accurately on the tube itself, but also approximately, and at a distance of many feet, by the inclination of the tube of the thermometer, which points to a very boldly engraved metallic arc, with the degrees in large figures. For hospitals, and many other purposes, these thermometers, if durable, will be useful.

In the grounds will be found a complete climatological station, equipped and worked under the superintendence of the Royal Meteorological Society, with Stevenson's stand, sunshine recorder, &c. A very useful little "Memorandum on Climatological Observations and their relation to Public Health," has been distributed gratuitously by the Society.

At the back of the dairies are a Montsouris thermometer stand, rain gauge, &c., as used at the normal schools of France.

In the Belgian Court will be found the publications, &c., of the *Société Royale de Médecine Publique de Belgique*, a body which is studying with great care the relations between meteorology and disease. Some details of the climate of Carlsbourg, Paliseul, will also be found, exhibited by The Christian Brothers' Institute.

Richard Frères.—In a dark corner of the French Court will be found an exhibit of the highest interest, that of Messrs. Richard Frères, which contains a collection of self-recording meteorological instruments, which, considering both quality and price together, are unequalled. Messrs. Richard, with wisdom and justice, do not claim that their instruments should be regarded as absolute standards, but they work very well (*e.g.*, it is quite exceptional for the thermograph to be 1° F. in error, and yet it only requires five minutes' attention once a week) and are an indescribable comfort to observers who wish their records to be beyond suspicion. The barograph is well-known, having been imported into this country and sold by hundreds, although not with Messrs. Richard's name. The firm also exhibits

* See *Met. Mag.*, Vol. xviii. (1883), p. 150.

recording hygrometers, rain gauges, &c. As we hope ere long to describe these instruments fully, and to engrave them, we do not now enter into details.

M. Marie Davy, Director of the Montsouris Observatory, Paris, shows patterns of some of the instruments used there, also engravings and views of the observatory and of all the instruments, as well as a series of the publications.

Among the Japanese exhibits will be found a very interesting collection of tables and diagrams relating to the climate of that country.

THE THUNDERSTORMS OF AUGUST, 1884.

SATURDAY, AUGUST 9th.

SURREY.

Addlestone.—Woburn Park Hotel struck.

Chertsey.—Rick on Mr. Vincent's land in Staines Lane struck and burnt.

Hatchlands, Addlestone.—The house of Mr. R. Roake, chimney struck, and ornaments in room damaged.

Ripley, near Woking.—G. H. Mitchell sheltered under a tree and was killed by a flash of L; the tree was much damaged.

LEICESTER.

Melton.—Offices at cattle market struck and much damaged.

LINCOLN.

Stamford.—St. Michael's Rectory struck, and curtains ignited.

NOTTINGHAM

Sneinton.—A child named Spinks killed in bed.

DERBY.

Charlesworth, Glossop.—Two cows killed and a house wrecked.

Hayfield.—Two houses struck, a girl injured, and several trees split.

CHESHIRE.

Armhill.—Pig struck, and horse belonging to Mr. J. Clayton killed.

Staleybridge.—A chapel, farmhouse, and other buildings struck.

LANCASHIRE.

Ashton-under-Lyne.—Several buildings damaged and flooded.

Burnley.—Man and woman killed. Several houses struck and a man rendered insensible.

Darwen.—A young man named Marsden, living in Duckworth-street, was killed by the L while playing at football; another young man named R. Farnworth was seriously injured.

Padiham, Burnley.—Farm-house struck, and a girl badly burnt.

Rochdale.—The petroleum works of Mr. Andrew Scott were set on fire by the lightning, and destroyed.

Rossendale Valley, Lancashire.—Good deal of damage by H and R; hailstones three inches long, and one inch thick, frequent; 186 squares of glass broken in the Catholic school, Newchurch.

Royton.—Lightning struck, and set fire to the Royton Cotton Mills, but the damage was confined to a portion of two rooms.

YORKSHIRE.

Barnsley.—S. Carrington, stoker at Messrs. Craikes's Collieries, struck, and seriously hurt.

Cheapside.—Two houses much damaged.

Hayton.—Cow killed.

Helmsley.—An ash tree near the station was struck.

Norwood, Beverley.—House struck and injured.

Queensgate Road, Beverley.—Haystack set on fire.

DURHAM.

Billingham, Stockton.—Cow killed.

Preston, Stockton.—A cow belong to Mr. R. H. Appleton was killed.

Spennymoor, Hartlepool.—Chimney of a house in South-street struck and split; Mrs. Wheatley sitting in the kitchen with a child, was covered with soot from the chimney, but not injured.

Stockton.—Lightning struck a house in Finkle-street, fused a gas pipe, and set the premises on fire. A horse, belonging to Mr. Pearson, in a field behind St. Peter's Church, was struck.

ROSS.

Lochalsh District.—Four sheep killed near Auchtertyre.

SUNDAY, AUGUST 10th.

YORK.

Mickleton-in-Teesdale.—Several sheep killed in the higher parts.

Moorhouses, Pateley Bridge.—A barn, occupied by Mr. Joseph Hall, was struck and set on fire, and the building and contents destroyed.

Thoralby Hawes.—Cow killed belonging to Mrs. Scott.

Whitbrigs, Mickleton-in-Teesdale.—The house of Mr. John Burney was struck by lightning, which descended the chimney into the parlour, knocked a hole through the wall, and ignited some hay.

ISLE OF MAN.

Kirkmichael.—A hotel was partially destroyed.

MONDAY, AUGUST 11th.

WARWICK.

Camphill, Birmingham.—Tenement in Abbey Green shattered, the occupant (J. Burton) escaped unhurt.

Higham.—House struck and greatly damaged.

LANCASHIRE.

Bury.—Theatre and Free School struck, but not much damaged.

YORK.

Bedale District.—Many trees struck and considerable damage to stock and buildings, a valuable dog killed.

Easingwold.—Gable end of a warehouse struck.

Hawes Junction.—Horse killed belonging to Mr. Metcalfe of Moorcock Inn.

Little Langton, Northallerton.—A stonemason named Taylor took his little girl in his arms to carry her to shelter but was struck by L and killed on the spot, the child being uninjured.

Low Hawkhills, Easingwold.—A wall knocked down.

Masham.—A few trees struck.

Park House Farm, Newburgh, near Easingwold.—Thirty-one lambs belonging to Mr. Brown were killed under a tree.

South Moors, Easingwold.—A cow killed.

Thirsk.—L very destructive on the east side of the town.

MONMOUTH.

Newport.—L played about the waggons on the goods bank for some time. Three men employed about them were struck, but not seriously injured.

MONTGOMERY.

Berriew.—A farmhouse called Cefn Rallt was struck, ignited, and burnt to the ground.

ISLE OF MAN.

Ramsey.—House struck (Mr. Kellow Lucas's) the roof and furniture in more than one room much damaged. A nurse and children had marvellous escapes. Another house was struck, the furniture damaged, and a young man temporarily stunned.

ABERDEEN

Braemar.—Some trees struck, and a short distance beyond the Linn of Dee on the N. side of the river, the face of the hill was serrated, and scores of tons of rock, &c., dislodged; at the close of the storm rain fell for about five minutes very like a waterspout.

BANFF.

Glenrinnnes.—Parish church struck and set on fire.

TUESDAY, AUGUST 12th.

MIDDLESEX.

London.—Stack of chimneys thrown down at house in Mile End-road, and one of the telegraph wires crossing Mile End-road, near Leslie-street, was severed. A chimney-stack was struck at a public-house in Sandringham-road, West Hackney.

ESSEX.

Chingford.—Two trees opposite the Royal Forest Hotel were shivered.

Waltham Abbey.—Two horses were killed on Waltham Marsh.

NORFOLK.

Bacton.—Mrs. Little, coming down stairs with a child in her arms, was killed ; the child was only slightly scorched.

Congham, Lynn.—Two horses, working in a harvest-field, killed.

Dilham.—A bullock killed.

Honing.—Stack of hay burnt.

Ludham.—Two cottages set on fire by L and destroyed.

Worstead.—Two stacks of hay ignited, and partially consumed.

Yarmouth.—Lightning passed through the roof and two floors of a house in Albert-square, doing much damage to furniture.

LINCOLN.

Grimsby Docks Railway Station.—Signal-post struck, and a piece broken off, and an old carriage at the G.N.R. goods-yard was struck.

Waltham.—Corner of a house thrown down.

West Marsh, Grimsby.—Chimney-stack struck in Ayscough-street, and the brickwork, the roof, and a fireplace damaged.

YORK.

Alne, Helmsley.—Cow killed while grazing in a field.

Lartington Station, Barnard Castle.—Chimney about 9 ft. high knocked down, damaging roof.

Levisham, Whitby.—Hailstones fell one inch and a half in circumference.

North Ormesby, Middlesborough.—A milk-woman was struck, and rendered insensible.

Old Ormsby, Middlesborough.—A labourer was killed by the electric fluid while at work in a field.

Scalby.—A ball of lightning went down a chimney, destroying much furniture.

Scarborough.—Stack fired by L in Filey-road.

Yedingham, Scarborough.—Three horses killed, and some sheep killed on the wolds.

DURHAM.

Barnard Castle Moor.—Three brothers named Stoddart were struck, but not much hurt.

Stockton.—The works of the Tees Scoriæ Company were struck. A house in Tilery-terrace was struck, and the roof almost stripped, and a house in Teesdale-street, South Stockton, had the roof and windows damaged.

Westholm, Barnard Castle.—Oak tree cleft from top to bottom.

WESTMORELAND.

Kendal.—A large barn containing hay was destroyed.

Old Hutton, Kendal.—The church was struck, and the spire partially demolished.

SCOTLAND.

WIGTOWN.

Little Hills, Kirkcinner.—Two cows killed.

Wigtown.—The L struck the chimney of Rochdale House, split it, entered the kitchen, melted the gas pipe and lighted the gas.

KIRKCUDBRIGHT.

Bettyknowes.—Two horses killed.

Market Hill, Castle Douglas.—Photographic studio partially wrecked.

Netherthird.—Foal killed.

Queen Street, Castle Douglas.—Gable of a house struck, and the chimney wrecked.

South Park.—Five calves killed.

DUMFRIES.

Corrie Knowe, Annan.—Farmhouse struck, the L passing down the chimney, knocking out a grate and disarranging the furniture.

Gottesbie, Applegarth.—Two cows killed while grazing.

Halldykes.—Eight lambs on the way to Lockerbie for sale, were struck at Halldykes and killed.

Solway Cottage, Annan.—Chimney struck.

Tundergarth Mains, Lockerbie.—Barn struck and damaged.

Wamphraygate, Annandale.—Nine cattle struck, eight of them being killed outright.

BERWICK.

Lauder, Burnfoot.—Three sheep killed.

Lauder.—The Earl of Lauderdale, riding a pony on the moors, was struck and only lived a few hours, the pony was killed instantly. Two keepers attending him were unhurt, though dazzled by the L.

HADDINGTON.

Prestonpans.—Chimney of the Free Church Manse struck and split, and the chimney of Mrs. Copeland's house also struck.

Tranent.—Two houses in the village struck, and a dog killed.

EDINBURGH.

Broomhills, Burdiehouse.—Haystack set on fire and burnt, the L was seen to roll along the ground like a ball of fire for a considerable distance before striking the stack.

Dalkeith.—A sheep in a field by Bonnyrigg-road was killed, and a tree in the same neighbourhood was struck.

Edinburgh.—A house in Bristo-street was set on fire, and the Clarendon Hotel was struck. At the Caledonian Station, West Princes Street, the gas was ignited near the roof, but practically no harm was done ; a chimney stack in Dalkeith-road was damaged, a chimney struck at Bruntsfield-crescent, and at Quarry Holes, Easter-road two telephone wires were destroyed. The gable over the east window of the Chapel Royal at Holyrood was struck and a quantity of stone dislodged. The lightning conductor at St. Giles' was three times struck about noon. A gentleman passing along Easter-road "observed dropping from the clouds an immense ball of fire, on nearing the ground it burst with a terrific crash, leaving a cloud of smoke."

Gilmerton.—A girl at West Edge was kneeling beside her father in the cottage, when she was struck by L and killed, one of the father's arms was scorched, but he was not seriously injured.

Granton Pier.—A signalman at the North British Railway loading slip had his flag struck from his hand and his arm was affected for some time. Another railway official standing on the line experienced a slight shock.

Harden Green, Dalkeith.—A man struck by L and severely injured.

Leith.—North Trinity House was set on fire and considerable damage done, and Grecian Cottage, Trinity, was also struck. A tenement in Mitchell-street was struck and two of the fire grates forced out, and the gas ignited ; the roof of Bonnington sugar refinery was struck, and it is reported that at the premises of a wine merchant in Constitution-street, the L struck a bottle that was being washed by a lad, though he was unhurt.

Little Catpair Farm, Stow.—A man named John Mackay, going up to the farm about 3 p.m. with a water cart was killed by the L, the horse was also killed.

Newbattle.—A sheep killed and a hay stack set on fire and burnt.

Newhaven Police Station.—Gas ignited and telegraphic communication destroyed.

LINLITHGOW.

West Benhar.—Two women working near the pits were struck and severely scorched.

Whitburn.—The house occupied by the manager of the gas works was struck and the roof set on fire ; the grate in the parlour was thrown into the middle of the room.

(To be continued).

HEAVY RAIN DURING GALE OF OCTOBER 13TH, 1881.

To the Editor of the Meteorological Magazine.

SIR,—Your letter of Feb. 23rd last has been mislaid during my change of residence, so please excuse so late a reply. I have looked up the notes I have on rainfall on Plynlimmon, in October, 1881, when I was engaged in securing a water supply for the town of Aberystwith from Llyn-Llygad-Rheidol, which is situated on the north-west of the Plynlimmon range. The Llyn is 1,650 feet above the sea—the water area on completion of the work was 12 acres—the area of gathering ground, 133 acres. In order to secure storage of water for Aberystwith, the Llyn was *tapped* 15 feet under its natural overflow; consequently, the water was run off to this depth by opening out the ground to the north of the Llyn, which work was carried out during the months of August, September, and October of the year 1881.

When the embankment was completed and the outlet valve closed, it was found that between 4 p.m. on the 13th and 8 a.m. on the 14th of October, 1881, the lake filled 6 feet, over a mean area of 10½ acres, being equal to a rainfall of 5·6 inches, in 16 hours.

It would be valuable and interesting if a record of the quantity of water carried at certain points of our rivers was tabled in connection with the rainfall on the contributory watershed. A gauge is now placed to one of our Severn Bridges here, which may be of help in recording for the Upper Severn and Vyrnwy.

I am, yours faithfully,

THOS. S. STOOKE.

31, St. John's Hill, Shrewsbury. 20th Sept., 1884.

[This, from both a meteorological and an engineering standpoint, seems one of the most important records that we have met with. Meteorologists will not soon forget the gale which prevailed during the day mentioned by Mr. Stooke. According to Mr. Harding's maps,* the centre of the storm passed during the hours mentioned, from about 300 miles W. of Ireland to the vicinity of Edinburgh. This rainfall must, however, have been very local, for (though there was a heavy fall in the north of Glamorganshire) the stations nearest to Plynlimmon had an unusually *small* fall, the totals for the whole month being :—

	in.		in.
Cardiganshire, Goginan ...	2·50	Radnorshire, Nantgwillt ...	5·54
„ Gogerddan ..	2·67	Montgomery, Llangurig ..	2·80
„ Cwmsymlog. 3·05		„ Llanidloes ...	3·50

The nearest of these stations is, however, 7 miles from Llyn-Lygad-Rheidol.—ED.]

* Quarterly Journal Met. Soc., Vol. VIII., p. 17.

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE FOR 1883.

STATIONS.	ABSOLUTE.				AVERAGE.				ABSOLUTE.		TOTAL RAIN.		AVER- AGE.	
	Maximum.		Minimum.		Max.	Min.	Mean.	Dew Point.	Humi- dity.	Max. in sun.	Min. on grass.	Depth.		Days.
	Temp.	Date.	Temp.	Date.										
London	85·6	June 29	22·4	March 24	58·2	42·7	50·5	43·1	81	125·5	19·3	24·40	164	6·2
Mauritius	86·1	Mar. 14 & 18	58·0	July 25	78·7	69·2	74·0	64·8	74	...	...	47·69	180	5·9
Calcutta	100·2	May 24	46·2	February 8	85·7	69·6	77·7	68·8	77	163·0	32·3	52·58	122	4·7
Bombay	92·5	April 17	61·0	February 2	85·2	73·9	79·6	71·1	76	149·4	46·2	90·18	123	4·1
Ceylon, Colombo.	92·0	April 4	67·8	February 10	86·0	75·3	80·7	71·4	74	156·0	60·0	103·61	162	7·0
Melbourne	104·9	January 15	31·7	July 23	68·1	49·7	58·9	47·4	70	165·0	26·2	23·70	130	5·9
Adelaide	109·5	January 15	34·2	July 20	71·7	52·9	62·3	47·0	59	174·0	25·1	26·76	159	4·8
Wellington	85·0	February 21	32·0	July 6	61·2	48·8	55·0	...	...	148·0	30·0	52·00	168	...
Auckland	85·1	January 19	36·0	July 23	65·2	53·3	59·3	50·8	74	147·0	30·5	52·22	216	6·5
Falkland Isles ...	68·0	January 28	11·8	June 19	47·9	36·8	42·4	38·9	85	134·0	13·6	29·39	233	7·1
Jamaica ..	93·3	July 28	63·6	Dec. 10	86·8	71·5	79·2	70·7	79	...	56·3	30·10	...	4·9
Barbados	86·0	Aug. 24 & 25	66·0	January 11	80·5	71·6	76·1	72·8	83	154·0	62·0	68·50	194	6·0
Toronto	83·4	July 4	—10·5	February 10	50·1	33·0	41·6	36·4	76	146·4	—14·5	34·13	181	6·4

ON THE CLIMATE OF THE BRITISH EMPIRE DURING 1883.

THE accompanying Climatological Table for 1883 is precisely similar in arrangement to that for the preceding year printed in the Magazine for September, 1883, and the stations quoted are the same, but unfortunately the total number has decreased by three. The observations at Winnipeg, which for so many years maintained its unenviable distinction for extreme climate, have been discontinued, and so have those for the somewhat similar station of Sydney, Cape Breton. The place filled heretofore in the summary of extremes by Winnipeg is now occupied by Toronto, which experienced the absolutely lowest temperature in shade, $-10^{\circ}5$; the lowest on grass, $-14^{\circ}5$; the lowest mean daily temperature, and the greatest total range.

The extremes at the other end of the scale are distributed much the same as they were last year. Adelaide again had the highest shade temperature (but it was $109^{\circ}5$ instead of $112^{\circ}0$) the highest temperature in sun, and the lowest mean humidity; it also had the greatest mean daily range, which last year occurred at the Cape of Good Hope, the third station which is absent from the table this year. Barbados again appears with the smallest total range (20°) a value precisely similar to that for the preceding year, in fact a comparison of the two tables will show that in almost every element the climate of this station was remarkably similar during the two years, the greatest difference being in the amount of rain. This station also gives the least mean daily range, the value being $0^{\circ}6$ less than that for Mauritius, which last year had the most equable temperature.

Ceylon again had the highest mean temperature and the greatest rainfall. Falkland Isles was once more the most humid and the most cloudy station, and Bombay the least cloudy.

SUMMARY.

Highest temperature in shade, $109^{\circ}5$, at Adelaide on January 15th.

Lowest temperature in shade, $-10^{\circ}5$, at Toronto, February 10th.

Greatest range in year, $93^{\circ}9$, at Toronto.

Least range in year, 20° , at Barbados.

Greatest mean daily range, $18^{\circ}8$, at Adelaide.

Least mean daily range, $8^{\circ}9$, at Barbados.

Highest mean daily temperature, $80^{\circ}7$, at Colombo, Ceylon.

Lowest mean daily temperature, $41^{\circ}6$, at Toronto.

Driest station, Adelaide; mean humidity, 59.

Dampest station, Falkland Isles; mean humidity, 85.

Highest temperature in sun, $174^{\circ}0$, at Adelaide.

Lowest temperature on grass, $-14^{\circ}5$, at Toronto.

Greatest rainfall, 103.61 inches, at Colombo, Ceylon.

Least rainfall, 23.70 inches, at Melbourne.

Most cloudy station, Falkland Isles; average amount, 7.1.

Least cloudy station, Bombay; average amount, 4.1.

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, FEB., 1884.

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		0-10
England, London	56·3	13	28·2	3	48·2	37·2	37·5	85	81·7	25·0	1·40	14	7·1
Malta	67·0	9	41·2	23	61·2	49·2	48·6	81	124·5	36·0	·67	6	4·1
<i>Mauritius</i>	85·5	6	67·9	10	83·4	72·9	69·6	78	137·7	63·3	3·78	18	6·2
Calcutta	87·1	28	50·0	11	80·9	59·1	58·4	71	147·3	50·6	·29	2	2·0
Bombay	86·1	3	61·6	1	81·3	67·1	64·9	71	141·0	50·1	·00	0	0·9
Ceylon, Colombo	93·4	19	68·8	4	88·0	72·1	68·2	67	145·0	60·0	·90	2	2·8
<i>Melbourne</i>	100·7	13	45·0	5	74·3	55·7	53·2	70	158·0	38·7	1·95	9	6·4
<i>Adelaide</i>	104·8	20	47·7	27	86·4	62·3	49·9	42	167·0	38·7	·12	3	3·9
<i>Wellington</i>	79·0	23	44·0	10	67·7	52·3	...	...	136·0	41·0	1·29	9	...
<i>Auckland</i>	74·0	8	48·5	10	69·2	56·8	52·3	68	148·0	42·5	1·61	10	6·7
Jamaica	88·0	9	62·3	7	83·6	67·0	66·4	79	...	55·9	·11	...	3·3
Barbados	79·0	var.	67·0	var.	78·0	70·0	70·0	82	141·0	64·0	1·42	8	6·0
Toronto	43·4	19	—7·2	29	30·7	15·7	21·2	83	115·0	—14·0	2·81	23	8·6
New Brunswick, Fredericton	46·4	14	—18·0	11	27·6	3·1	15·0	86	...	...	5·12	17	7·3
Manitoba, Winnipeg ...	21·8	25	—42·7	7	2·3	—29·6	—8·0	95	...	...	1·34	8	5·2
British Columbia, Spence's Bridge ...	61·0	25	—14·0	20	22·2	5·8	...	...	...	...	·00	0	...

REMARKS, FEBRUARY, 1884.

MALTA.—Mean temp. $54^{\circ}\cdot 2$; mean hourly velocity of wind 8·5 miles, for four hours on the 19th the velocity averaged 31·5 miles; the temp. of the sea varied from 59° to 61° . J. SCOLES.

Mauritius.—Rainfall 1·62 in., mean temp. $0^{\circ}\cdot 9$, and mean hourly velocity of wind 2·1 miles below their respective averages. Prevailing wind E.S.E. to E. by N. T and L on 12 days. TS on 18th with H (a rare thing here), and several houses struck. C. MELDRUM, F.R.S.

COLOMBO.—TSS on 27th, 28th, and 29th. T on 26th. J. H. SYMONDS.

Melbourne.—Mean temp. $1^{\circ}\cdot 9$ below average; temp. of dew point, pressure, and rainfall average; humidity 4, and cloud 1·2 above average. Prevailing winds S. and S.W., strong on 3rd, 23rd, and 26th, hot wind on 13th; heavy dew on 4 days, fog on 2 days. R. L. J. ELLERY, F.R.S.

Adelaide.—Dew deposited on 11 nights—a most unusual number. Bar. remarkably unsteady, and the max. reading 30·441 in., the highest on record in February. Mean temp. average, but hot weather prevailed from 8th to 21st; the max. temp. was above 90° on 15 days, the average number being 10, and the absolute min. was within $0^{\circ}\cdot 2$ of the lowest on record. C. TODD.

Wellington.—On the whole, fine, bright and warm, with light showers at intervals, at times very warm. Prevailing wind N.W., strong on 4 days. Earthquakes on 1st and 6th. Mean temp. $2^{\circ}\cdot 7$ below average; pressure above it. R. B. GORE.

Auckland.—Pressure unusually high throughout the month. Mean temp. $4^{\circ}\cdot 6$ below the average; rainfall less than half the average. T. F. CHEESEMAN.

BARBADOS.—Pressure steady, and slightly below the average. Mean temp. $73^{\circ}\cdot 7$, $0^{\circ}\cdot 4$ above the average. The wind was N.E., except for part of one day; average velocity 13·6 miles, extremes 20 miles, and 4·7 miles. Rainfall below the average; evaporation 30 per cent. above the average; only one day overcast. R. BOWIE WALCOTT.

SUPPLEMENTARY TABLE OF RAINFALL, SEPTEMBER, 1884.

[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.			in.
II.	Dorking, Abinger	2·74	XI.	Carno, Tybrith	3·05
"	Margate, Birchington...	4·80	"	Corwen, Rhug	1·88
"	Littlehampton	3·94	"	Port Madoc	6·87
"	Hailsham	4·42	"	I. of Man, Douglas .....	...
"	I. of W., St. Lawrence.	3·25	XII.	Stoneykirk, Ardwell Ho.	2·66
"	Alton, Ashdell.....	2·57	"	Melrose, Abbey Gate...	3·06
III.	Winslow, Addington ...	1·35	XIII.	N. Esk Res. [Penicuik]	2·70
"	Oxford, Magdalen Col...	1·36	XIV.	Ayr, Cassillis House ...	4·46
"	Northampton	1·14	"	Glasgow, Queen's Park.	2·29
"	Cambridge, Beech Ho...	1·60	XV.	Islay, Gruinart School..	...
IV.	Southend .....	...	XVI.	St. Andrews, Newton Bk	2·28
"	Harlow, Sheering	1·59	"	Balquhider, Stronvar..	6·41
"	Diss	3·44	"	Dunkeld, Inver Braan..	2·66
"	Swaffham	2·13	"	Dalnaspidal H.R.S. ...	5·48
"	Hindringham .....	...	XVII.	Keith H.R.S.	·57
V.	Salisbury, Alderbury ...	1·32	"	Forres H.R.S.	·54
"	Warminster	1·56	XVIII.	Strome Ferry H.R.S...	5·29
"	Calne, Compton Bassett	1·91	"	Lochbroom	4·24
"	Ashburton, Holne Vic..	3·11	"	Tain, Springfield.....	...
"	Holsworthy, Clawton ...	2·30	"	Loch Shiel, Glenaladale	9·33
"	Lynmouth, Glenthorne.	1·92	"	Invergarry	5·79
"	Probus, Lamellyn	2·58	XIX.	Lairg H.R.S. ....	...
"	Wincanton, Stowell Rec.	1·91	"	Forsinard H.R.S.	1·49
"	Taunton, Fullands	1·39	"	Watten H.R.S.	·85
VI.	Bristol, Clifton	2·00	XX.	Dunmanway, Coolkelure	5·88
"	Ross	1·24	"	Fermoy, Gas Works ...	2·26
"	Wem, Sansaw Hall.....	1·44	"	Tralee, Castlemorris ...	2·76
"	Cheadle, The Heath Ho.	2·41	"	Tipperary, Henry Street	2·04
"	Worcester, Diglis Lock	1·30	"	Newcastle West	3·09
"	Coventry, Coundon	1·02	"	Miltown Malbay.....	3·94
VII.	Melton, Coston	·98	"	Corofin .....	...
"	Ketton Hall [Stamford]	1·33	XXI.	Carlow, Browne's Hill..	2·12
"	Horncastle, Bucknall ...	1·22	"	Navan, Balrath	1·55
"	Mansfield, St. John's St.	1·18	"	Mullingar, Belvedere ...	2·92
VIII.	Macclesfield, The Park.	4·18	"	Athlone, Twyford	2·27
"	Walton-on-the-Hill.....	2·62	XXII.	Galway, Queen's Col...	2·68
"	Lancaster, South Road.	3·87	"	Clifden, Kylemore	7·97
"	Broughton-in-Furness ..	...	"	Crossmolina, Enniscoe..	...
IX.	Wakefield, Stanley Vic.	·74	"	Carrick-on-Shannon ...	2·81
"	Ripon, Mickley	1·39	XXIII.	Dowra .....	...
"	Scarborough	1·30	"	Rockcorry.....	2·60
"	East Layton [Darlington]	1·56	"	Warrenpoint	2·25
"	Middleton, Mickleton ..	2·11	"	Newtownards	2·13
X.	Haltwhistle, Unthank..	2·44	"	Belfast, New Barnsley .	3·43
"	Shap, Copy Hill	5·40	"	Cushendun	4·23
XI.	Llanfrechfa Grange	2·05	"	Bushmills	4·53
"	Llandovery	4·99	"	Stewartstown	3·30
"	Lower Solva	2·26	"	Donegal, Revelin Ho...	...
"	Castle Malgwyn	2·81	"	Buncrana	3·40
"	Rhayader, Nantgwillt..	4·48	"	Carndonagh	3·68

SEPTEMBER, 1884.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Table to which each station belongs.]	RAINFALL.						Days on which ·01 or more fell.	TEMPERATURE.				No. of Nights below 32°	
		Total Fall.	Difference from average 1870-9	Greatest Fall in 24 hours.		Dpth.	Date.		Max.		Min.			
				Inches.	in.				Deg.	Date.	Deg.	Date.		
													inches	in.	Dpth.	Date.	Deg.	Date.	Inshade	On grass
I.	London (Camden Square) ...	1.77	— .73	.57	3	15	81.5	18	40.6	30	0	0		
II.	Maidstone (Hunton Court)...	3.52	+ 1.21	1.36	3	12	...	...	...	...	...	...
III.	Strathfield Turgiss .....	...	...	...	...	...	82.0	17	39.0	25	0	0
IV.	Hitchin	2.00	— .48	.88	3	12	76.0	17	36.0	29	0	...		
V.	Banbury	1.21	— 1.60	.39	21	11	78.0	17	36.0	30	0	...		
VI.	Bury St. Edmunds (Culford) ...	2.49	— .29	1.12	5	12	76.0	17	32.0	29	1	...		
VII.	Norwich (Cossey)	2.69	— .39	1.43	4	14	76.5	16	35.0	30	0	1		
VIII.	Weymouth (Langton Herring) ...	1.27	...	.29	21	15	...	...	...	...	...	...
IX.	Barnstaple	2.24	— 2.04	.31	21	18	78.5	19	46.0	27	0	...		
X.	Bodmin	2.71	— 2.53	.87	15	18	76.0	17	42.0	30	0	0		
XI.	Cirencester	1.36	— 1.78	...	...	...	...	...	...	...	...	...
XII.	Church Stretton (Woolstaston) ...	1.39	— 2.08	.33	6	14	71.5	17	45.0	22d	0	0		
XIII.	Tenbury (Orleton)	2.07	— 1.28	.86	21	13	79.8	17	32.0	30	1	1		
XIV.	Leicester	1.30	...	.25	6	13	83.5	17	34.9	30	0	3
XV.	Boston	1.34	— 1.27	.31	4	12	75.0	16	37.0	30	0	...		
XVI.	Grimsby (Killingholme)	1.15	— 1.92	.26	6	11	72.5	16a	41.0	30	0	...		
XVII.	Hesley Hall [Tickhill] .....	.81	...	.26	8	11	82.0	17	39.0	3	0	...
XVIII.	Manchester (Ardwick)	3.01	— .76	.48	6	16	72.0	13e	45.0	27f	0	...		
XIX.	Wetherby (Ribston Hall) ...	2.21	— .87	1.06	22	8	...	...	...	...	...	...
XX.	Skipton (Arncliffe)	2.64	— 2.94	.70	6	18	74.0	18	38.0	3	0	...		
XXI.	North Shields .....	.64	— 1.68	.21	21	13	72.2	20	41.0	6	0	0	
XXII.	Borrowdale (Seathwaite)	11.97	— 1.25	1.90	30	19	...	...	...	...	...	...
XXIII.	Cardiff (Ely)	2.17	— 2.63	.60	21	13	...	...	...	...	...	...
XXIV.	Haverfordwest	3.68	— 1.37	.77	6	15	76.4	18	39.0	4, 29	0	...		
XXV.	Plinlimmon (Cwmsymlog) ...	4.99	...	1.03	21	16	...	...	...	...	...	...
XXVI.	Llandudno	1.67	— 2.08	.45	6	16	72.0	19	46.0	4	0	4		
XXVII.	Cargen [Dumfries]	3.39	— 1.02	.78	30	17	73.4	17	39.6	5	0	...		
XXVIII.	Hawick (Wilton Hill)	3.89	...	1.40	6	13	...	...	...	...	...	...
XXIX.	Douglas Castle (Newmains) ...	3.18	— 1.22	.75	6	16	...	...	...	...	...	...
XXX.	Lochgilphed (Kilmory)	5.87	+ .11	.84	28	20	...	...	...	...	...	...
XXXI.	Oban (Craigvarren)	5.61	...	1.06	30	18	79.0	15	42.0	1	0	...		
XXXII.	Mull (Quinish)	4.41	...	.53	30	20	...	...	...	...	...	...
XXXIII.	Loch Leven Sluices	2.50	— .73	.90	29	11	...	...	...	...	...	...
XXXIV.	Arbroath	1.68	— 1.39	.53	6	13	66.0	9, 10	40.0	6	0	...		
XXXV.	Braemar	1.93	— 2.01	.35	6, 30	15	68.2	12	27.0	5	2	5		
XXXVI.	Aberdeen	1.50	...	.38	6	15	70.0	20	37.0	3	0	...
XXXVII.	Skye (Sligachan)	15.26	...	3.70	30	18	...	...	...	...	...	...
XXXVIII.	Culloden .....	.74	— 2.16	.26	30	4	75.0	11	37.0	4	0	2	
XXXIX.	Dunrobin .....	.93	...	.20	28	9	70.0	11	41.0	1	0	...
XL.	Orkney (Sandwick)	1.69	— 1.80	.33	24	16	67.5	10	44.9	29	0	0		
XLI.	Cork (Blackrock)	2.07	— 2.08	.62	15	16	80.0	18b	37.0	2	0	...		
XLII.	Dromore Castle	2.79	...	.80	9	13	71.0	21	44.0	29	0	...
XLIII.	Waterford (Brook Lodge) ...	2.08	...	.29	25	15	75.5	17	36.0	3	0	3
XLIV.	Killaloe	3.15	...	.50	6, 7	17	74.0	18b	40.0	2	0	...
XLV.	Portarlinton	1.97	— 1.21	.42	7	19	74.0	19	41.0	2	0	...		
XLVI.	Dublin (Fitz William Square) ...	1.21	— 1.20	.31	7	14	73.7	9	45.1	5	0	...		
XLVII.	Ballinasloe	2.31	— 1.65	.36	7	20	69.0	19	40.0	5	0	...		
XLVIII.	Waringstown	2.73	— .62	1.20	6	16	76.0	10c	40.0	2, 3	0	...		
XLIX.	Londonderry (Creggan Res.) ...	3.82	...	.96	6	21	...	...	...	...	...	...
L.	Omagh (Edenfel)	3.17	— .87	1.08	6	19	71.0	19	40.0	30	0	...		

a And 17. b And 19. c And 11, 19. d And 23, 30. e And 15, 17. f And 30.

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

METEOROLOGICAL NOTES ON SEPTEMBER.

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

ENGLAND.

BANBURY.—Harvest work was a little hindered in the first week, but the weather afterwards was very favourable, and all crops were well secured. Mean temp., $58^{\circ}2$; T and L on 2nd and 10th; T on 9th.

CULFORD.—The R in the early part of the month did much to improve the root crops, and to revive the parched up pastures, supplying plenty of food for cattle, which had become very scarce on this light soil.

LANGTON HERRING.—A fine, warm month, favourable for the ingathering of the harvest. From the 9th to the 21st, the weather was very hot; the mean temp. was $2^{\circ}7$ above the average of the preceding 12 years.

BODMIN.—A remarkably fine month.

WOOLSTASTON.—A pleasant genial month; mean temp. $57^{\circ}0$.

ORLETON.—A very pleasant month, with much sunshine, and a mean temp. about $1^{\circ}3$ above the average of 23 years. The middle of the month was very warm, the temp. rising above 70° on 8 days. The bar. was generally high and steady, and the rainfall was less than the average. A sharp storm of L T and R passed over between 10 and 10.30 a.m. on the 21st, and there was a thick fog all the morning. T was heard also on the 2nd and 15th. The first frost of the season occurred on the morning of the 30th. Fog occurred on several mornings; and there was a great gale of wind on the evening of the 6th, and the morning of the 7th.

LEICESTER.—The month was very fine and dry, suitable for the close of harvest, and for the preparation of the land for autumn sowing.

KILLINGHOLME.—The month was remarkably fine, with a very small rainfall. T and L on 21st.

ARDWICK.—There was a considerable change in the weather this month. At the beginning it rained nearly every day; it was fine in the middle, and became wet again towards the end. The temp. also fell considerably. T on 1st and 21st.

NORTH SHIELDS.—TSS on 1st, 2nd, 3rd and 21st.

SEATHWAITE.—From 21st to 30th was very wet (9.37 in. of R falling in the 10 days) and at times stormy. T on 2nd and 21st.

WALES.

HAVERFORDWEST.—One of the finest Septembers remembered. During the first 8 days the temp. seldom rose above 60° and considerable amounts of R fell, principally at night, the days being mostly fine but cloudy. After the 9th the temp. rose, and on 10 days 70° or upwards was registered. No such late and great heat occurred during the preceding 35 years, though in 1868 the max. for the month was higher, and the weather was similar, but it did not last until such a late date. The max. temp. in September, 1868, was $78^{\circ}8$, but there were only six days on which 70° was reached. A great fall of temp., and a severe TS occurred on the morning of the 21st, causing damage and loss of life; the storm lasted 90 minutes, and $.30$ in. of R fell in 20 minutes.

LLANDUDNO.—A month of splendid weather, the mean temp. being one degree above, and the rainfall much below the average. Though the number of days on which R fell was about the average, the falls were often very slight. There was but little wind, and a fair amount of sunshine. The range of temp., both diurnal and monthly, was considerably below the average, the former being $10^{\circ}7$, and the latter $26^{\circ}0$.

SCOTLAND.

CARGEN.—T and L on 1st; T on 2nd and 6th.

HAWICK.—Very stormy on the 6th, 26th, 27th and 28th; T on the 21st and 23rd. The middle of the month was fine, the latter half very wet. Very stormy and windy on night of 6th.

CRAIGVARREN.—The month was very dry until the 21st, and all early crops were well secured. On the 13th and following days there were gorgeous sunsets with strong colours, resembling those of last year, but pink predominated, and there was considerable refraction. After the 21st, the weather was exceptionally stormy, with heavy R. T and L on 2nd and 29th.

BRAEMAR.—A very excellent month, crops all secured in fine condition; T and L on 2nd; L on 21st.

ABERDEEN.—The month was characterized by fine weather, with the exception of some days of fog and mist. Rainfall nearly two inches below the average. T and L on 2nd and 4th; L on 1st and 21st. Brilliant aurora on 17th.

CULLODEN.—The month was remarkable for the small rainfall and for the long intervals without R. From the 1st to 24th clear, sunny weather prevailed, some days, particularly the 9th, 10th and 11th, being very warm. The weather generally was calm and very favourable for harvesting the crops.

SANDWICK.—The rainfall in September was only about half the average. The temp. was mild, and there was no gale until the 28th, when it blew 50 miles an hour from noon until 2 p.m., so the crops were cut in the finest harvest weather remembered; T on 4th.

IRELAND.

DROMORE.—A fair month, but there were one or two severe storms.

WATERFORD.—The driest September since 1865, rainfall little more than half the average; most favourable for getting in the harvest.

KILLALOE.—With sufficient rainfall, though rather less than the average, there were many fine warm days, enabling harvest work to be completed in a very satisfactory manner. Mean temp. $57^{\circ} \cdot 5$.

DUBLIN.—In keeping with the summer months of 1884, September was in all respects favourable, towards the end, indeed, the weather was somewhat changeable and showery, but in the middle of the month beautiful autumnal or even summerlike weather prevailed. The mean temp. was $56^{\circ} \cdot 9$, $1^{\circ} \cdot 8$ above the average of 20 years. The rainfall was little more than one half the average for the same period, and in only two Septembers has the fall been smaller. L was seen on the evening of the 1st; solar halos appeared on the 25th and 29th, and a lunar halo on the 7th. There was a bright aurora on the 17th; fog on the 8th, 10th, 11th, 12th, 17th and 19th, and very heavy dews about the middle of the month. The mean humidity was 83, and the mean amount of cloud, 4·8; prevailing wind westerly.

WARINGTOWN.—A very fine month with temp. above 70° on 9 days. On the whole this has been the most favourable harvest time for very many years. Grain yielding well, though straw somewhat short. Some second crops of hay were saved in good order.

EDENFEL, OMAGH.—With the exception of a few days at the beginning of the month, and the last week, the weather was really magnificent, resulting in a bountiful and well-saved harvest.