

SYMONS'S

MONTHLY

METEOROLOGICAL MAGAZINE.

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AUGUST, 1900.

AUGUST, 1900, has been, speaking of the United Kingdom generally, decidedly wet, with a considerable number of rainy days in addition to the heavy thunderstorm rains which usually make up the larger part of the total in a wet August. When we consider not only that it is the great holiday month, but also that it was preceded by a long spell of dry weather with intense heat in July to intensify the contrast, the amount of condemnation in the newspaper press is fully explained if not justified.

From the 50 stations in the Regular Table, 31 for which the average is available have been received up to the time of writing, and of these no fewer than 21 show an excess of 50 per cent. In the following table these returns are arranged in the order of excess :—

Rainfall in August, 1900, expressed as a percentage of the average.

Div.	County.	Station.	Per cent. of average.
XI.	Carnarvon	Llandudno	263
XVII.	Nairn	Cawdor, Budgate	246
X.	Northumberland ...	Newcastle, Town Moor.....	242
IX.	York	Wetherby, Ribston Hall	235
XX.	Dublin	Dublin, FitzWilliam Square	232
VII.	Lincoln	Boston	215
"	Notts.....	Bawtrey, Hesley Hall	202
XXII.	Galway	Ballinasloe	200
XXI.	Carlow	Carlow, Browne Hill	192
III.	Herts.....	Hitchin	184
IX.	York	Arncliffe Vicarage	182
"	"	Hull, Pearson Park	178
XI.	Pembroke	Haverfordwest	174
XVII.	Forfar	Dundee, Eastern Necropolis.....	171
XXIII.	Down	Waringtown	170
VI.	Gloucester	Stroud, Upfield	166
XV.	Argyll	Mull, Quinish ...	161
VI.	Shropshire	Church Stretton, Woolstaston.....	155
VIII.	Lancashire	Manchester, Plymouth Grove.....	153
III.	Buckingham	Winslow, Addington.....	153
XVII.	Kinross	Kinross, Loh Leven Sluice.....	150

The distribution of these stations is naturally rather irregular, but the table shows a very large excess over nearly all parts of the kingdoms except the South of England.

The first week was very wet, and at many stations rain fell daily until the 9th; but for a wet week the total amounts were not exceptional, for out of more than 200 stations only a dozen recorded more than 4.00 in. in the seven days, and these stations were all in comparatively wet districts. Again, the falls on individual days, though frequently exceeding an inch, were, as a rule, far from remarkable for thunderstorm rains, but the following records exceed the limit of 2.50 in. adopted in *British Rainfall* :—

5.03 in.	on 11th	at Strathaird,	Skye.
3.50 „ „	3rd „	Carn, Trefnant,	Denbighshire.
3.39 „ „	3rd „	Middleton-on-the-Wolds,	Driffield, Yorks.
3.13 „ „	3rd „	Ingleby Greenhow Vicarage,	Yorks.
3.05 „ „	21st „	Oakley Quarries, Ffestiniog,	N. Wales.
2.95 „ „	3rd „	Scalby, near Scarborough,	Yorks.
2.60 „ „	3rd „	East Layton, near Darlington,	Yorks.
2.52 „ „	3rd „	Hurworth Grange, Croft,	Darlington, Yorks.

The 11th produced heavy falls at many stations in the West of Scotland, while the rain of the 3rd was very heavy in North and East Yorkshire.

OBSERVERS' NOTES.

New Park Road, Clapham Park, Surrey.—On the 17th shortly before 5 o'clock in the afternoon, a thunderstorm occurred which was remarkable alike for its short duration, the small area affected, the energy of electric discharges, and the volume of rainfall precipitated.

The storm approached from an unusual quarter—i.e., E.S.E. (such phenomena generally advancing in this district from the S.W.)—in fact, it travelled *with* the wind, instead of, as more usually, *against* it.

At 4.50 p.m. rain commenced and continued without intermission until 5.50, and so heavy was the fall that on measuring at the end of the storm 1.50 in. was recorded.

With regard to the electrical disturbance itself, the lightning and thunder were simultaneous between 5.5 and 5.15, whilst from 5.15 to 5.25 the time interval was about 3 seconds.

Much damage was caused by the flooding of basements in the Brixton Hill and Streatham Hill districts.

At so short a distance as Kennington and Clapham Road there was scarcely any rain.

Ridgmount, Frimley Green, Surrey.—One tremendous flash of L at 10 a.m. on 23rd struck a mare in a field at Cove, killing her and her foal, which was more than 30 yards distant from her.

Wallington, Surrey.—Great gale and damage to trees on 3rd. Gale on 6th, and a tent at Beddington Flower Show blown down. Terrific TS between 4.10 p.m. and 5.10 p.m. on 17th; more than 3 ft. of water under the railway bridge.

North Cadbury Rectory, Somerset.—A strong gale on 3rd, breaking limbs from trees.

Parkside, Wilmslow, Cheshire.—On 3rd a TS began about 2.40 p.m. and lasted almost without break till 4.30 p.m., the R continuing till about 5.30 p.m., when .70 in. was measured.

Park Corner, Blundellsands.—In the seven days ending on 6th, 4.38 in. of R fell, the greatest amount in seven consecutive days since the record began in 1876, and exceeding any other similar period by more than half an inch.

Goldsborough Hall, Yorkshire.—The 3rd was very rough and stormy, with heavy R during the greater part of the day, and a N.E. gale with torrents of R and H in the afternoon.

Beverley Asylum, Yorks.—On the 3rd 1.07 in. of R fell here, but on Scarborough racecourse the fall must have been nearer four inches. There was steady R in the early part of the day; about 4 p.m. T very near, with very heavy R, and after 7 p.m. a S.E. gale. Tents were blown down and flooded at the Camp.

Middleton-on-the-Wolds, Yorkshire.—The R on 3rd was 3.39 in., the greatest fall ever recorded in 24 hours. Between 9 a.m. and 5 p.m. 2.44 in. fell.

Hurworth Grange, Darlington, Durham.—It began to rain about 3 a.m. on 3rd, and by 9 a.m. .42 in. had fallen. In the 24 hours ending 9 a.m. on 4th 2.52 in. fell, but the whole 2.94 in. fell within 24 hours.

Garn, Trefnant, Denbighshire.—In the first seven days 6.22 in. of R fell, 3.50 in. being recorded for the 3rd, of which 3.25 in. fell between 9 a.m. and 6 p.m.

Miltown Malbay, Clare.—A month of disastrous floods, the first eight days giving about 5 inches of rain, while there were four falls exceeding an inch in 24 hours.

Twyford, Westmeath.—R 7.38 in., exceeded only in four months in a record of 25 years.

Strathaird, Skye.—In 8½ hours on 11th 4.53 in. of R fell.

REVIEW.

Les Bases de la Météorologie Dynamique Historique—Etat de nos Connaissances. Par M. le Dr. H. HILDEBRAND HILDEBRANDSSON, Upsala, et M. LÉON TEISSERENC DE BORT, Paris. Paris: Gauthier-Villars et Fils. Parts 1 and 2. 1898—1900. Royal 8vo, 184 pp. Plates and diagrams.

THE distinguished authors of this historical summary have compiled it in the belief that a new era in the study of the movements of the atmosphere has been entered upon, and that the time is appropriate to consider the development of the older phase. Recent mathematical investigations have shown that it is possible to apply rigidly accurate methods to the treatment of atmospheric physics, and it

appears probable that meteorology is emerging from the preparatory period of empirical observations which characterises the infancy of all sciences. It is claimed by the authors that this period in the case of meteorology has been remarkably short. Although Aristotle wrote on meteorology, they consider that the scientific study of atmospheric movements can hardly be said to have commenced until the second half of the eighteenth century. This opinion we think it would be difficult to justify; we are inclined to put back the beginning of scientific meteorology to the period of the invention of the barometer and thermometer—the former an instrument unique in the history of science, for its earliest form was perfect and it has never been improved. The question as to the commencement of scientific meteorology is, however, not of practical importance in this connection, as the work before us deals almost exclusively with the last hundred years. It is a history of the growth of meteorological observations and of the deductions which have been drawn from them, touching lightly on theories, but going pretty fully into the bases of the great principles of climatology and weather forecasting. The object is, in fact, to investigate the building of that foundation of observed meteorological facts on which all theories of atmospheric movements must be built.

We cannot but think with the profoundest regret of the manner in which the founder of this Magazine would have reviewed this work of his French and Swedish colleagues. He probably was the only man in this country—indeed, it would hardly be too much to say in the world—who had mastered the history of observational meteorology from the beginning, and knew how to appreciate the work of the historians, and to supplement it where it fell short. Our authors acknowledge their indebtedness to Mr. Symons' work in more places than one.

The whole work, as planned, consists of eight chapters, of which six are already published. They begin with the old researches of Halley, Hadley, Dove and Maury on the grand circulation of the winds of the globe; and go on to consider, in considerable detail and with great clearness, the growth of knowledge regarding tropical cyclones and the discovery of "the law of storms." The researches of Brandes in Germany, and of Espy and Loomis in America, on the storms of the temperate zone, lead up naturally to the full recognition of the relation of the direction of wind to the distribution of barometric pressure by Leverrier, FitzRoy and Buys Ballot, with the resulting establishment of international meteorological observations and of national meteorological services.

Chapter V. deals with fundamental researches in different countries by Buchan, Jelinek, Mohn, Hildebrandsson, Clement Ley and others, which led, by the year 1872, to the full recognition of the principles of the movements of the atmosphere.

The last chapter as yet published treats of water vapour in the atmosphere and the theory of the formation of rain. After tracing

the development of the theory of rain, the authors point out that the principal and ordinary cause of rain is the cooling of a current of ascending air ; and they adopt the classification of rain into three kinds, as proposed by Mr. G. E. Curtis in the *American Meteorological Journal* for 1893. These are—*Convective Rain*, due to the condensation of vapour in an ascending current of air during the warmest hours of the day ; *Orographic Rain*, produced by a horizontal layer of vapour-laden wind being forced to rise along the slope of an elevated land-mass lying in its path ; and *Cyclonic Rain*, accompanying the low-pressure area of a cyclone. The influence of dust particles in promoting precipitation is also fully considered.

A very interesting feature of the work is the facsimile reproduction of illustrations from the works of the various authors cited. Thus we have the very earliest specimens of synoptic charts, the ingenious system of weather signs devised by Mr. Francis Galton in 1861, and many quaint diagrams by which the natural philosophers of the seventeenth and eighteenth centuries felt out their way.

It is always good to look back towards the beginning of a science if only to see how gradual is the progress it has made, but the retrospect is sometimes difficult on account of the prodigious multitude of the workers whose results have to be considered. Messrs. Hildebrandsson and Teisserenc de Bort have very wisely and skilfully limited the number of names cited to those of the leading pioneers and final exponents of the various branches of meteorology. All through they emphasize the essential principle that the only basis for any theory lies in observation carefully and systematically carried out, and that as accurate observations increase in number the theories deduced from them become more complete and more certain to lead to results of practical utility.

H.R.M.

A "SUN PILLAR."

To the Editor of the Meteorological Magazine.

SIR,—This somewhat rare phenomenon was observed by me last evening from Aylstone Hill, Hereford. The day had been warm, with clear sky, but with haze, not sufficient, however, to obscure the outline of the Black Mountains (20 miles S.W.), or that of the Malverns (19 miles E.).

Immediately after sunset (6.45) the earth shadow was very distinct and dark in the east, with crimson masses of light cumuli above it ; the sky overhead perfectly clear. Over the sunset were streaks of pale golden cirrus, across which rose vertically a beam of light, of darker yellow. This continued, slightly deepening in colour, till 7 o'clock ; between which time and 7.20 it passed through orange and reds to a deep crimson, and resting on the crest of Credenhill it resembled a tongue of fire rising out of the hill.

Towards the end of this period two spots in the beam gradually became brighter, while the rest of the beam (actually or by contrast) became paler, and streaks of light green showed in the sky on either side. These spots, by 7.20, had developed into sharply defined mock-suns, of the same apparent diameter as the sun itself; the lower one resting immediately on the hill, the upper one separated from the lower by the distance of two diameters, the two still connected by the beam (which also passed upwards for some distance above the upper one), and both of deep red, as of the sun setting through smoke. At 7.25 the upper mock sun merged into the band, and at 7.30 the lower one became blurred, while the whole gradually faded; and by 7.33 nothing remained but a strong after-glow along the hills.

One curious point was that the mock sun resting on the hill did not appear to set, or follow the descent of the sun below the horizon.

The night was brilliantly clear and moonlight, but towards dawn a thick fog filled the Wye and Lug valleys, while this hill, 100 feet above them, remained clear.

JAMES G. WOOD, F.R.Met.Soc

September 6th, 1900.

MEAN TEMPERATURE. SOUTHERN COUNTIES.

17-18 YEARS, JANUARY 1883—AUGUST, 1900.

To the Editor of the Meteorological Magazine.

SIR,—Taking the months from the beginning of 1883, and representing them simply as over, under, and average, the results are somewhat curious, if not striking, especially with regard to the train of sequences of heat and cold; a cold spell seems to have lasted for eight years (1885-1892), while for the last seven years (1893-1899), the very opposite conditions have prevailed. Whether we have yet reached the limit of this warm period remains to be seen. The first eight months of the year, 1900, however, do not shew a marked change. But in order to illustrate the position fairly, the observed temperatures in Sussex, Surrey and Hants, will be given, with their bearing afterwards on the years and months of the above period.

	Mean temp.		Mean temp.
January	35·9	August	60·2
February	37·0	September	55·5
March	39·2	October	46·9
April	45·2	November	41·5
May	51·6	December	36·3
June	58·5		
July	60·9	Average	47·4

Synopsis of Months.

+ — and average (...) Temperatures, showing sequences.

Years.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept	Oct.	Nov.	Dec.	Years.
1883	+	+	—	+	...	+	—	+	+	+	...	+	1883
1884	+	+	+	—	...	—	—	+	+	...	—	+	1884
1885	—	+	—	...	—	—	...	—	—	...	—	—	1885
1886	—	—	—	—	...	—	...	...	+	+	...	—	1886
1887	—	—	—	—	—	...	+	—	—	—	—	—	1887
1888	—	—	—	—	—	—	—	—	—	—	+	+	1888
1889	—	—	—	—	+	+	—	—	—	—	...	—	1889
1890	+	—	...	—	...	—	—	—	...	—	—	—	1890
1891	—	—	...	—	—	...	—	—	...	+	—	...	1891
1892	—	...	—	—	...	—	—	—	—	—	+	—	1892
1893	—	+	+	+	+	...	+	+	—	...	—	—	1893
1894	—	...	+	+	—	...	...	—	—	+	+	+	1894
1895	—	—	+	+	+	+	+	+	+	+	+	+	1895
1896	+	+	+	+	+	+	+	+	+	...	—	+	1896
1897	—	+	+	+	+	+	+	+	...	+	+	+	1897
1898	+	+	...	+	...	...	...	+	+	+	+	+	1898
1899	+	+	...	+	...	+	+	+	+	...	+	—	1899
1900	+	—	—	+	...	+	+	+	+	...	+	—	1900
+	7	8	6	9	5	7	8	9	7	6	7	8	Total months.
—	11	8	8	8	5	6	6	8	7	7	7	8	87
...	0	2	4	1	8	5	4	1	3	4	3	1	89
...													36
Total	18	18	18	18	18	18	18	18	17	17	17	17	212

The most consistent returns (sequences) appear to be from December—April, the latter month is indeed quite remarkable. July and August are somewhat similar, the remaining months have no exceptional features. Taking the years with months over average, &c., the cold and warm periods, 1885–92, and 1893–99, respectively, are illustrated as follows :—

Years.	+	—	Aver.	Years.	+	—	Aver.
1883	8	2	2	1893	6	4	2
1884	7	3	2	1894	5	4	3
1885	1	9	2	1895	9	3	0
1886	2	6	4	1896	10	1	1
1887	1	10	1	1897	10	1	1
1888	2	10	0	1898	8	0	4
1889	2	9	1	1899	8	1	3
1890	1	8	3	1900 ... }	5	2	1
1891	1	7	4	(To Aug) }	—	—	—
1892	1	9	2	Total...	87	89	36

Yours faithfully,

ARTHUR F. PARBURY.

Chiddingfold, Godalming, Surrey.

STUDIES OF CYCLONIC AND ANTICYCLONIC PHENOMENA WITH KITES.

THE above title forms the heading of a memoir recently issued from the Blue Hill Observatory, by Mr. Helm Clayton, who is so ably carrying out this novel and valuable means of investigating the meteorological conditions in the free atmosphere, under the liberal patronage of Mr. A. L. Rotch, of Boston.

The history of this new departure in meteorological observation has been alluded to more than once in these columns and regret has often been expressed that, while kites are now extensively used in America, France, Germany, Russia and Sweden, as unique means for raising meteorographs into the free atmosphere, and have been proposed as permanent additions to official observations in connection with weather prevision as well as theory, in England, so far, there appears to be a total absence of any further experiments or progress in scientific kite flying. And yet it was in this country that the idea of using these tethered *aërostats* as a means for sounding the inaccessible regions of the atmosphere over our heads was first conceived, and at a date when even balloons were not yet invented.

When, after a period of nearly forty years of oblivion, the kite was resuscitated by Mr. Douglas Archibald in 1883, and employed by him to raise anemometers to heights of 1,500 feet, various historical records were unearthed, which gradually revealed the fact that, as in the case of so many novel applications, the idea had been carried out sporadically and spasmodically as far back as 1749, and that these earliest experiments were made by Dr. Wilson and Mr. Melvill, of Glasgow.

Such ephemeral experiments, however, had left no permanent impression on the world of science, so that, practically speaking, we may date the first serious use of kites for research from that of Archibald's first flight in September, 1883. Indeed, this may be considered to have been the originating point of all the recent development of scientific kite flying and particularly of the work at present carried on at Blue Hill, since it was during the progress of these observations that Mr. Rotch visited England and learnt from Mr. Archibald some of the improvements in kite flying, such as the use of steel wire, tandem suspension, &c., which he has recently adopted in the experiments at Blue Hill.

The use of wire, which was originally suggested by Lord Kelvin, quite apart from more recent improvements in the kite itself, has been a turning point in its history, since by its aid alone it has been possible to raise kites and instruments up to the prodigious elevations of over two miles of late attained at Blue Hill and also in France.

In his first paper on the results of his observations at Tunbridge Wells, read before the British Association at Montreal in 1884, Mr. Archibald says, regarding the wire:—"This I have found a great

improvement on the string. It is double the strength, one-fourth the weight, one-tenth the section."

In his experiments great altitudes were not a main object, since he wished at first to test the velocity at different heights, beginning with 100 feet above the surface, which was that at which Mr. Stevenson's observations, with anemometers attached to a pole, terminated. It is, however, worthy of remark that twelve years after this paper was read and published, the Blue Hill observers, after having tried string for two years, in 1896 took to the steel wire employed by Mr. Archibald, and it has only been since their employment of this wire that altitudes above a mile and upwards have been attained.

The kites used at Blue Hill are chiefly modifications of the tailless Malay kite, which is diamond shaped, but with the cross bar nearer the top than in the orthodox diamond pattern. In addition to these, one or two of the ordinary double-celled Hargrave kites are used, especially in strong winds. These kites are arranged so that either the largest kite or a group of kites are flown at the end of the tether, this being the condition for maximum elevation, and then the remaining kites are successively attached by branch cords at intervals, as the wire is payed out, so as to fly tandem.

The attachments are ingenious aluminium clamps, devised by Mr. Ferguson, one of the assistants. The winched-reel has an oil dropper to keep the wire from rusting; an automatic recorder to register the amount of wire payed out; and a dynamograph to register the pull. The main additional improvement of late has been a small engine, which substitutes artificial for hand labour in paying out and hauling in the wire. The meteorograph employed is a modification of a Richard, invented and constructed by Mr. Ferguson, in which aluminium is freely used where it can be employed, and in which a barograph, thermograph, hygrograph, and anemograph enable all four elements to be recorded continuously, both in ascent and descent.

(To be continued.)

JULY, 1900.

(Continued from p. 106.)

NOTES FROM THE NEWSPAPER PRESS.

JULY 12TH.

Devon.—Barnstaple. The dépôt adjoining the station was struck by L.

Somerset.—At Huntspill Moor, near Highbridge, a woman sheltering under a tree was killed. H the size of walnuts fell in the neighbourhood of Watchet, and much damage was done; in Swain Street alone, several hundred squares of glass were broken.

Gloucester.—In Dean Forest, at Noxen, three horses were killed ; at Newlands, beasts and sheep, and at Poolway, a mare.

Worcester.—Redditch. A house struck in Park Road.

Cheshire.—Northwich. A farmer at Whitegate killed.

York.—A cloud-burst occurred on Rombald's Moor, near the water-parting between the Wharfe and the Aire, destroying roads and bridges. Leeds.—The Hospital at Brighouse, the new Methodist Church at Elland, and the brewery in Kirkstall Road, were all struck. At Halifax a house in Harrow Street was struck ; a man was struck at Oxenhope ; four cows were killed at Wilsden ; a cabin on the Midland Railway, at Apperley Bridge, was also struck.

Glamorgan.—A pony was killed at East Aberthaw.

Brecon.—H the size of marbles, and the Mount Street Board School struck by L.

JULY 16TH.

Buckingham.—Two horses were struck by L at Aylesbury.

Huntingdon.—Godmanchester Church was struck.

Bedford.—H stones 2 inches square fell at Leighton Buzzard, and there was much damage to glass at Woburn, the H was the size of cherries.

Cambridge.—At Willingham, a boy was killed and a man struck by L ; at Cottenham a windmill was struck, and at Boxworth a barn was fired and six calves killed.

Suffolk.—Many windows at Bury St. Edmunds were broken by H, which was said to be the size of plums.

Norfolk.—Prowick Hall, Wymondham, was struck by L ; a horse was struck dead at Knettishall, and damage was done at Wortham.

Lincoln.—At Stamford the "Hit or Miss" inn was struck ; at Holbeach two horses were killed.

JULY 20TH.

Hants.—At Godshill Park ten steers, a bull and a heifer, out in the open, were killed by L. At Bournemouth a house was struck and fired and at Titchfield two houses were struck.

Northampton.—Bozeat. A stack struck ; Horton Hall struck ; Floore, a house struck ; Harpole Hall struck and fired, and cattle and sheep killed ; Lamport Grange struck ; Raunds, three houses struck ; Isham Church struck ; Islip Church struck ; Welford, four bullocks killed. In Northampton H fell for about seven minutes : the first stones were about the size of hazel nuts, but the majority were more than an inch in diameter and a large proportion as large as hen's eggs, stones measuring two inches long being by no means uncommon. Over an area extending for nearly a mile round the Town Hall scarcely a piece of glass exposed to the sky escaped and even slates and tiles were damaged. 550 street lamps were broken. The storm extended from Northampton to Kettering and Market Harborough, but near Northampton, which was about the southern limit of the H, the track of the storm was not two miles wide. At Althorpe, Holdenby and Dallington there was great destruction of glass in the conservatories.

Bedford.—A house in Bedford was struck by L and at Kempston an inn was struck.

Essex.—At Staning Hall 17 lambs were killed, and at Edgefield a stack was fired.

Suffolk.—An inn at Boyton, near Bury St. Edmunds, was struck.

Norfolk.—At Wymondham glass was broken by H.

Cornwall.—At Anganack, near Hayle, a horse was killed.

Stafford.—At Rowley Regis a signal box was struck; at Bradley, near Bilston, a chapel was struck and fired; at Moseley, near Wolverhampton, the Board School was struck.

Warwick.—At Birmingham the Art Gallery at Margaret Street was struck; New Street Station was struck; workshops in Kathlin Road were struck, and at Langley a stable was struck and a horse killed.

Leicester.—At N. Kilworth a boy was struck; at Leicester large H fell; a man was killed at Belgrave Road cricket ground and at Sheepshed a man was seriously injured. At Hugglescote 2 beasts were killed.

Nottingham.—The Board School at Newark was struck.

Derby.—At Clay Cross a horse was killed.

York.—Sheffield. Three houses in Cricket Inn Road were struck, also a house in Derbyshire Lane, and at Tinsley Bank Farm a stack was fired. At Scarborough a tent was struck at the volunteer camp.

Tipperary.—At Nenagh two men were killed by L.

JULY 25TH.

Middlesex.—Kingston-on-Thames post office was struck by L, and Cricklewood Church struck and fired.

Surrey.—A house was struck at East Croydon.

Kent.—In the neighbourhood of Maidstone H the size of walnuts fell, and much glass was broken in the district.

Sussex.—Two houses in Norfolk Square, Bognor, were struck, and also a man outside the railway station. Everfield House, St. Leonards, was struck.

Hants.—Two workmen were killed and others injured, near Ryde, and at Ventnor a house was struck.

Berks.—At West Ilsley 27 ewes were killed under an oak.

Herts.—Royston, L killed a boy riding on a load of hay, and also the horse drawing it.

Northampton.—At Weedon the telephone testing station was fired.

Essex.—The "Blakesley Arms," at Manor Park, was struck.

Wilts.—At Bulford Camp one man was killed and a dozen injured, while at Perham Down, a service corps horse was killed; at Devizes a lad and a horse were killed, and at Stratford, near Salisbury, a mill was struck and fired.

Cheshire.—The "Boot and Shoe" Inn at Nantwich was struck.

Kilkenny.—Kilkenny Castle was struck and fired.

JULY 29TH.

Hereford.—At Pembridge, farm buildings were struck and fired; at Lustor, a mare was killed, and at Yarpole a cow.

Worcester.—Upton-on-Severn Church was struck during service.

Cheshire.—Near Northwich a cottage was struck, and the thatch fired; at Alderley Edge the telephone office was struck; horses and cattle were killed at Mobberley, and two cows were killed at Warford Hall.

Lancashire.—At Salford, the Technical Institute was struck.

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, FEBRUARY, 1900.

STATIONS. (Those in italics are South of the Equator.)	Absolute.				Average.				Absolute.		Total Rain.		Aver. Cloud.
	Maximum.		Minimum.		Max.	Min.	Dew Point.	Humidity.	Max. in Sun.	Min. on Grass.	Depth.	Days.	
	Temp.	Date.	Temp.	Date.									
	°		°		°	°	°	0-100	°	°	inches		°
London, Camden Square	57·0	24	17·7	9	43·9	33·0	35·7	90	84·4	13·0	3·99	20	7·3
Malta	73·3	14	43·5	1	63·0	50·3	48·7	79	131·7	38·6	1·04	8	2·8
Cape of Good Hope ...	88·2	2	55·9	24	79·9	62·1	59·3	72	...	...	·88	3	2·5
Mauritius	86·2	22a	70·2	10	84·4	75·1	72·2	80	153·2	65·1	4·79	20	7·2
Calcutta	89·7	26	58·2	21	85·1	64·5	61·4	65	145·0	51·7	·75	3	3·6
Bombay	83·6	20	64·3	14	81·6	68·0	64·2	69	129·2	54·1	·00	0	1·1
Ceylon, Colombo	93·7	24	72·2	5	91·9	74·4	72·0	75	156·0	68·5	·63	4	1·1
Melbourne	104·0	4	47·0	28	79·0	56·6	51·4	60	156·3	38·3	·46	3	4·0
Adelaide	107·4	4	53·1	27	88·2	61·5	54·4	52	170·5	45·3	·06	1	3·0
Sydney	86·8	20	60·9	19	78·7	66·6	59·8	69	145·0	51·2	1·67	12	5·3
Wellington	79·0	1	44·5	12	67·8	52·6	48·0	64	132·0	37·0	1·92	8	3·8
Auckland	78·5	2	55·5	12b	73·0	59·5	57·2	73	133·0	48·0	1·60	9	3·7
Jamaica, Halfway Tree	87·0	28	64·0	23	84·4	67·4	64·2	74	...	...	·45	2	2·0
Trinidad	92·0	19	63·0	15	88·5	69·4	69·3	76	167·0	59·0	·76	7	...
Grenada	86·2	9	69·2	4	82·9	72·6	69·6	75	160·0	...	4·31	14	2·2
Toronto	48·0	9	-9·6	26	27·4	12·8	19·0	80	55·0	-14·0	5·21	14	5·9
New Brunswick, Fredericton	49·8	25	-29·0	3	29·1	8·0	10·7	72	...	...	4·74	11	5·6
Manitoba, Winnipeg...	30·5	22	-34·8	9	6·3	-16·9	...	...	...	...	·20	3	4·2
Victoria, British Columbia,	52·7	21	18·0	14	45·2	36·5	...	...	...	...	2·75	19	7·7

a—and 24, 25. b—and 23.

REMARKS.

MALTA.—Adopted mean temp. 56°·3, or 2°·3 above average. Mean hourly velocity of wind 13·3 miles, or 1·5 above average. Mean temp. of sea 60°·0. H on 15th and 18th. Dew point ranged from 55°·3 on 2nd to 40°·7 on 22nd. J. F. DOBSON.

Mauritius.—Mean temp. of air 0°·8 above, of dew point 2°·0 above, and rainfall 1·99 in. below, their respective averages. Mean hourly velocity of wind 7·7 miles, or 3·5 below average; extremes, 22·1 on 4th and 0·0 on 17th; prevailing direction, S.E. to E. and variable. L and T on 1st, 6th to 8th, 11th, 20th and 24th. T on 3rd, 13th, 17th and 23rd; and L on 19th, 21st and 22nd. T. F. CLAXTON.

CEYLON, COLOMBO.—Mean temp. of air 82°·2, or 2°·1 above, of dew point 1°·8 above, and rainfall 1·27 in. below, their respective averages. Mean hourly velocity of wind 5·9 miles; prevailing direction, N.E. to N.W. TSS occurred on the 15th and 25th; L on 24th. A slight shock of earthquake was felt all over the Island about 3 a.m. on the 10th; the approximate direction was West to East, and duration 2 or 3 seconds. H. O. BARNARD.

Adelaide.—A very dry month. Mean temp. 74°·8, or 0°·8 above the average for 43 years. C. TODD, F.R.S.

Sydney.—Mean temp. 1°·7 above, humidity 4·7 below, and rainfall 3·50 in. below, their respective averages. H. C. RUSSELL, F.R.S.

Wellington.—Fine weather generally throughout the month, except showers during the middle; prevailing N.W. winds and generally moderate. Earthquake on 10th at 6.40 a.m., short and smart, and on 20th at 4.40 a.m., slight. R. B. GORE.

Auckland.—Fine and dry throughout the greater part of the month, with a more than usual predominance of S.W. winds. Barometrical pressure slightly above, and mean temp. slightly below, the average; rainfall unusually small, less than half the average. T. F. CHEESEMAN.

TRINIDAD.—Rainfall ·93 in. below the average for 30 years. J. H. HART.

SUPPLEMENTARY TABLE OF RAINFALL, AUGUST, 1900.

Div	STATION.	Total Rain.	Div.	STATION.	Total Rain.
		in.			in.
I.	Uxbridge, Harefield Pk..	3.14	XI.	Builth, Abergwesyn Vic.	7.99
II.	Dorking, Abinger Hall.	4.23	„	Rhayader, Nantgwillt...	6.27
„	Birchington, Thor	2.10	„	Lake Vyrnwy	7.66
„	Hailsham	2.37	„	Corwen, Rhug	6.29
„	Ryde, Thornbrough	2.37	„	Criccieth, Talarvor	5.48
„	Emsworth, Redlands ...	2.87	„	I. of Anglesey, Lligwy..	6.95
„	Alton, Ashdell	3.73	„	I. of Man, Douglas	6.66
III.	Oxford, Magdalen Coll..	3.07	XII.	Stoneykirk, Ardwell Ho.	5.02
„	Banbury, Bloxham	4.43	„	New Galloway, Glenlee	7.02
„	Northampton, Sedgbrook	3.35	„	Moniaive, Maxwellton Ho.	6.42
„	Alconbury	2.10	„	Lilliesleaf, Riddell	4.98
„	Wisbech, Bank House...	3.25	XIII.	N. Esk Res. [Penicuick]	...
IV.	Southend	1.89	XIV.	Glasgow, Queen's Park..	4.42
„	Colchester, Lexden	2.42	XV.	Inverary, Newtown	4.13
„	Saffron Waldon, Newport	3.33	„	Ballachulish, Ardsheal...	6.50
„	Rendlesham Hall	2.19	„	Islay	4.73
„	Scole Rectory .....	...	XVI.	Dollar	4.28
„	Swaffham	4.55	„	Balquhider, Stronvar...	5.21
V.	Salisbury, Alderbury ...	...	„	Coupar Angus Station...	4.28
„	Bishop's Cannings	2.60	„	Blair Atholl ...	2.11
„	Blandford, Whatcombe ..	2.78	XVII.	Keith H.R.S.	3.97
„	Ashburton, Holne Vic...	3.03	„	Forres H.R.S.	3.49
„	Okehampton, Oaklands.	2.87	XVIII.	Fearn, Lower Pitkerrie..	3.96
„	Hartland Abbey	2.41	„	S. Uist, Askernish	2.90
„	Lynton, Glenthorne ...	3.55	„	Invergarry	4.28
„	Probus, Lamellyn	2.92	„	Aviemore, Alvie Manse.	3.98
„	Wellington, The Avenue	2.20	„	Loch Ness, Drumnadrochit	3.97
„	North Cadbury Rectory	2.21	XIX.	Invershin	4.29
VI.	Clifton, Pembroke Road	2.34	„	Durness	3.15
„	Ross, The Graig	3.25	„	Watten H.R.S.	2.44
„	Wem, Clive Vicarage ...	4.41	XX.	Dunmanway, Coolkelure	5.54
„	Wolverhampton, Tettenhall	...	„	Cork, Wellesley Terrace	3.73
„	Cheadle, The Heath Ho.	4.25	„	Killarney, Woodlawn ..	5.24
„	Coventry, Priory Row ..	3.12	„	Caher, Duneske	3.94
VII.	Market Overton	4.85	„	Ballingarry, Hazelfort...	...
„	Grantham, Stainby	3.19	„	Limerick, Kilcornan ...	...
„	Horncastle, Bucknall ...	3.58	„	Miltown Malbay	7.43
„	Worksop, Hodgeck Priory	4.57	XXI.	Gorey, Courtown House	...
VIII.	Neston, Hinderton	5.71	„	Moynalty, Westland ...	5.86
„	Southport, Hesketh Park	6.56	„	Athlone, Twyford	7.38
„	Chatburn, Middlewood.	6.06	„	Mullingar, Belvedere ...	7.21
„	Duddon Val., Seathwaite Vic.	10.29	XXII.	Woodlawn	6.46
IX.	Melmerby, Baldersby ...	6.00	„	Crossmolina, Enniscoe ..	5.92
„	Scalby, Silverdale	6.25	„	Collooney, Markree Obs.	4.52
„	Ingleby Greenhow Vic..	7.07	XXIII.	Enniskillen, Model Sch.	...
„	Middleton, Mickleton ...	4.68	„	Warrenpoint	4.32
X.	Haltwhistle, Unthank H.	5.92	„	Seaforde	5.08
„	Bamburgh	5.94	„	Belfast, Springfield	5.59
„	Keswick, The Bank .....	...	„	Bushmills, Dundarave..	4.04
XI.	Llanfrechfa Grange	4.33	„	Stewartstown	4.78
„	Llandovery	6.38	„	Killybegs	4.73
„	Castle Malgwyn	2.73	„	Horn Head	4.90
„	Brecknock, The Barracks	...			

AUGUST, 1900.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL.					TEMPERATURE.				No. of Nights below 32°.	
		Total Fall.	Difference from average 1880-9.	Greatest Fall in 24 hours.		Days on which '01 or more fell.	Max.		Min.		In shade.	On grass.
				Dpth	Date		Deg.	Date	Deg.	Date.		
		inches.	inches.	in.								
I.	London (Camden Square) ...	2·81	+ ·93	·41	31	17	86·7	17	48·1	5	0	0
II.	Tenterden	1·74	— ·12	·44	6	13	83·3	18	45·0	11 <i>d</i>	0	0
"	Hartley Wintney	2·81	...	·54	1	17	84·0	14	47·0	5, 25	0	0
III.	Hitchin	3·35	+ 1·53	·67	1	16	80·0	18	47·0	4	0	...
"	Winslow (Addington)	3·02	+ 1·05	·50	9	17	82·0	18	44·0	5	0	0
IV.	Bury St. Edmunds (Westley) ..	2·49	+ ·29	·62	3	15	77·0	17 <i>a</i>	47·0	5, 11	0	...
"	Norwich (Brundall)	4·35	...	·85	21	18	79·0	13	45·2	31	0	0
V.	Winterbourne Steepleton ...	2·52	...	·73	6	14	82·9	14	43·0	31	0	0
"	Torquay (Cary Green) ...	1·50	...	·46	6	11	74·4	14	48·5	25	0	0
"	Polapit Tamar [Launceston]..	3·00	+ ·52	·47	21	16	82·0	14	40·2	13	0	0
VI.	Stroud (Upfield)	3·47	+ 1·38	1·21	9	14	77·0	14	50·0	5 <i>e</i>	0	...
"	Church Stretton (Woolstaston)	4·28	+ 1·52	·71	3	18	76·5	14	48·0	4 <i>e</i>	0	0
"	Worcester (Diglis Lock)	2·39	+ ·42	·39	6	13	...	...	...	...	...	...
VII.	Boston ...	4·56	+ 2·44	·78	5	16	80·0	18	45·0	11	0	...
"	Hesley Hall [Tickhill].....	4·36	+ 2·20	·75	5	18	78·0	14	42·0	29 <i>f</i>	0	0
"	Breadsall Priory	5·00	...	·88	5	18	...	...	...	...	...	...
VIII.	Manchester (Plymouth Grove)	4·73	+ 1·64	1·48	6	16	79·0	16	41·0	27	0	0
IX.	Wetherby (Ribston Hall) ...	5·52	+ 3·18	2·23	3	16	...	...	...	...	...	...
"	Skipton (Arncliffe)	7·89	+ 3·56	2·42	3	19	...	...	...	...	...	...
"	Hull (Pearson Park)	4·71	+ 2·07	·93	3	15	79·0	13	42·0	29	0	0
X.	Newcastle (Town Moor)	6·56	+ 3·85	2·23	3	18	...	...	...	...	...	...
"	Borrowdale (Seathwaite).....	12·13	+ 3·68	2·76	31	17	77·5	14	39·4	27	0	...
XI.	Cardiff (Ely)	4·32	+ ·71	·79	9	15	...	...	...	...	...	...
"	Haverfordwest	5·54	+ 2·36	·85	23	15	81·0	14	43·2	13	0	0
"	Aberystwith (Gogerddan) ...	7·67	...	1·79	22	14	85·0	15	...	...	0	...
"	Llandudno	6·23	+ 3·87	1·93	6	18	78·0	15	51·0	29	0	...
XII.	Cargen [Dumfries]	6·30	+ 3·31	1·39	6	20	79·0	15	45·0	11 <i>h</i>	0	0
XIII.	Edinburgh (Blacket Place)...	5·68	...	2·00	6	19	76·3	15	43·0	9	0	0
XIV.	Colmonell	4·11	...	·77	6	14	83·0	14	44·0	4	0	...
XV.	Tighnabruich	4·93	...	1·05	11	13	68·0	15	45·0	4, 8	0	...
"	Mull (Quinish)	6·68	+ 2·53	1·51	30	13	...	...	...	...	...	...
XVI.	Loch Leven Sluices	4·40	+ 1·46	1·30	6	10	...	...	...	...	...	...
"	Dundee (Eastern Necropolis)	4·40	+ 1·83	·90	21	14	77·0	14	41·9	9, 26	0	...
XVII.	Braemar	4·06	+ ·73	2·06	22	14	75·4	14	33·5	9	0	2
"	Aberdeen (Cranford)	3·33	...	1·15	22	14	78·0	12	39·0	8	0	...
"	Cawdor (Budgate)	5·54	+ 3·29	1·77	22	18	...	...	...	...	...	...
XVIII.	Strathconan [Beaully]	3·78	+ ·48	1·55	23	12	...	...	...	...	...	...
"	Gleucarron Lodge	7·32	...	1·74	11	18	77·0	15	38·0	28	0	...
XIX.	Dunrobin .....	...	...	...	...	...	...	...	...	...	...	...
"	S. Ronaldshay (Roeberry) ...	2·96	+ ·40	·69	1	13	68·0	14	45·0	28	0	...
XX.	Darrynane Abbey	3·25	...	·63	8	18	...	...	...	...	...	...
"	Waterford (Brook Lodge) ...	4·82	+ 1·40	1·17	8	16	74·0	14 <i>b</i>	44·0	11	0	...
"	Broadford (Hurdlestown) ...	6·69	...	1·45	2	18	...	...	...	...	...	...
XXI.	Carlow (Browne's Hill)	5·70	+ 2·73	1·34	2	17	...	...	...	...	...	...
"	Dublin (Fitz William Square)	5·87	+ 3·35	2·14	2	17	75·0	15	48·1	4	0	0
XXII.	Ballinasloe	6·34	+ 3·16	1·30	2	15	74·0	14	46·0	27	0	...
"	Clifden (Kylemore)	5·24	...	·90	21	12	...	...	...	...	...	...
XXIII.	Waringstown	5·28	+ 2·17	1·30	6	12	85·0	16 <i>c</i>	40·0	9	0	...
"	Londonderry (Creggan Res.)..	4·01	— ·11	·87	22	15	...	...	...	...	...	...
"	Omagh (Edenfel)	4·15	+ ·66	·95	21	18	81·0	15	42·0	26	0	...

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

a—and 18. b—and 15. c—and 17. d—and 31. e—and 10, 26. f—and 30.
g—several days. h—and 26.

METEOROLOGICAL NOTES ON AUGUST, 1900.

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.

TENTERDEN.—Quite autumnal early in August, with several wet days, and much wind on 3rd, 4th, 6th and 9th; but hot summer weather again in the middle of the month, with temp. above 80° on four days. A few slight showers in the last ten days. Pastures nearly as much burnt up as in 1898 and 1899. Duration of sunshine 208 hours.

HARTLEY WINTNEY.—Rainfall normal. Nine rainless days from 11th to 19th. T on 23rd; L on 5th and 24th. Strong S.W. gale on 6th. Fog on 20th and 31st. Ozone on 17 days, with a mean of 3·1. Swifts were last seen on 10th.

WINSLOW, ADDINGTON.—From the 1st to the 10th cool, unsettled weather, prevailed, the max. temp. on 9th being only 58°. From 11th to 22nd it was much warmer, the temp. reaching 80° on three occasions. From 20th to 25th was rainy, and the remainder of the month was dry, but with want of sunshine. T on 5th.

BURY ST. EDMUNDS, WESTLEY.—The first ten days were wet and cold, but from that date to the end fair harvest weather prevailed. Distant T on 5th, 9th, 17th and 23rd.

NORWICH, BRUNDALL.—The wettest August since 1881. R 1·92 in. above the average. TSS on 21st and 23rd. T and L on 5th. L on 1st, 18th and 19th. H on 21st.

POLAPIT TAMAR [LAUNCESTON].—The first ten days were very wet and stormy, but from the 11th to the 20th the weather was very hot and dry. S.E. gale on 9th. Thick fog on 18th.

STROUD, UPFIELD.—TS from 4 to 4.45 p.m. on 9th, with ·57 in. of R in that time from S.E. T and L from 5 to 6 p.m. on 5th. Fog on 17th and 18th.

BREADSALL PRIORY.—A very wet month, with severe TSS. Rainfall almost double the average, and eight times that of August, 1899.

MANCHESTER, PLYMOUTH GROVE.—The weather on the whole was unsettled and cold. A great storm occurred on 6th and 7th; the R on 6th (1·48 in.) being the heaviest fall in 24 hours since July 2nd, 1888, when 1·89 in. fell.

ARNcliffe VICARAGE.—The usual heavy rainfall occurred in the first week of August. In 1897, 2·75 in. fell on 5th, and in 1898, 1·91 in. on 5th.

NEWCASTLE, TOWN MOOR.—The greatest total fall in August since 1878, when 6·58 in. fell on 21 days. In August, 1877, 8·86 in. fell on 28 days.

WALES.

HAVERFORDWEST.—An unsettled month, with a large rainfall. Much damage was done to crops by the strong winds and heavy rains, especially to corn, but the country generally is looking well. A sharp TS occurred on 25th, with very heavy R, ·62 in. falling in three-quarters of an hour. TS on 25th.

ABERYSTWICH, GOGERDDAN.—A very stormy month, with strong wind, heavy R, H and T. Very unusual weather for August.

SCOTLAND.

EDINBURGH, BLACKET PLACE.—R 63 per cent. above the average, and temp. $1^{\circ}2$ below the normal. Sunshine very deficient, the total being 79 hours, which is the lowest in August since 1866, when the non-instrumental record gave 73 hours. Only 13 hours of sunshine were recorded after the 16th. A water-spout was seen at 6 p.m. on 23rd, during a TS, its outlines being clearly defined for about 10 minutes, when the lower portion gradually faded away, the upper part being absorbed into the clouds. Here $\cdot62$ in. of R fell in 18 mins. Very heavy R and distant T on 6th. Dense fog on 15th and 16th.

COLMONELL, CLACHANTON.—R $\cdot09$ in. above, and mean temp. $59^{\circ}4$, or $1^{\circ}2$ above, the average of 24 years. Strong winds on 6 days.

TIGHNABRUAICH, CRAIGANDARAICH.—The atmosphere was in an electrical state throughout the month, and although the discharge of R from the clouds was not too frequent, it was several times heavy.

MULL, QUINISH.—The large total R, and the small number of days on which it fell, are very remarkable features of this month; more than an inch having fallen on three days. Since the gauge was established in 1874 there has been only one month (November, 1884) with more than three falls exceeding 1.00 in. in 24 hours. In that month $9\cdot52$ in. fell on 19 days, of which $8\cdot58$ in. fell in the first 12. In November, 1890, there were three days with more than 1.00 in., but with these exceptions August, 1900, stands alone.

S. RONALDSHAY, ROEBERRY.—A very fine month. Mean temp. $55^{\circ}8$, or $1^{\circ}3$ above, the average of 10 years.

IRELAND.

DARRYNANE ABBEY.—A bad harvest month. Wet, with not much wind, the only really fine weather being a few days in the middle, and a few at the end, of the month.

WATERFORD, BROOK LODGE.—Much T and L. Max. range of temp. in 24 hours $28^{\circ}5$, on 14th. The potato stalks went very early this year on account of the wet and L.

DUBLIN, FITZWILLIAM SQUARE.—August, 1900, was very changeable. Winds from polar points of the compass largely predominated. There were frequent downpours of R, causing a record rainfall of $5\cdot87$ in. for the month. Providentially, for the saving of the harvest, two dry periods occurred, from 11th to 17th, and from 25th to 30th, inclusive. Mean temp. $59^{\circ}1$, or $0^{\circ}2$ below average. High winds on seven days, attaining the force of a gale on 3rd and 31st. T on 5th and 22nd. L on 19th. TSS on 2nd and 21st. The shade temp. reached 70° on only six days, compared with 18 in August, 1899. Solar halo on 11th. Fog on 15th and 16th.

OMAGH, EDENFEL.—The heavy rains and "Lammas" flood in the early part did much damage, which the magnificent weather of the third week did not wholly redress. Short spells of wet and fine weather alternated during the remainder of the month.