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MONTHLY
METEOROLOGICAL MAGAZINE.

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BRITISH LOCAL METEOROLOGICAL PUBLICATIONS.

It is quite impossible for us to review all the pamphlets of this class which we receive—and are glad to receive—because we always check the rainfall values against those supplied to us in MS., and so not infrequently detect mistakes. But, as we have just said, we have neither time nor space to review them regularly year after year, though many of them are interesting as well as useful, and merit a much larger circulation than they obtain.

We intend to give a list of those we have received referring to 1897, arranging them in the sequence of Divisions, Counties, and Stations adopted in *British Rainfall*, but we must in the first place define what we intend to catalogue—viz. books, pamphlets, and broadsheets referring to the weather of 1897 in the British Isles. We do not intend as a rule to include articles, letters or tables in newspapers, even though a few separate copies may be pulled and supplied to the author—if we did this article would itself become almost a volume. Before starting with our county list it may be well to mention some of the *general* publications of the country. By far the oldest are the Quarterly Reports prepared by Mr. Glaisher, F.R.S., for the “Registrar General of Births, Deaths and Marriages of England and Wales,” then similar ones for Scotland, and still later we believe (but have not seen) the like for Ireland. There are the *daily, weekly, monthly* and *yearly* reports of the Meteorological Office; there are the *Quarterly Journal* and *Quarterly Record* of the Royal Meteorological Society, and the *Journal* of the Scottish Meteorological Society. There is also a section on Meteorology, giving remarks and a tabular summary, in the “Natural History Journal,” epitomizing the work done at the various schools belonging to the Society of Friends.

MIDDLESEX.

London (Old Street).—An abstract is given in the “Report of the M.O.H.* for Hackney.”

London (Roy.Bot.Soc., Regent's Park).—Daily observations published in the “Quarterly Record of the Roy. Botanic Soc.”

* Medical Officer of Health.

London (Camden Square).—Daily observations printed weekly in the "Journal of Horticulture."

SURREY.

For part of this county and of Kent, the daily rainfall at about 70 stations is tabulated by Mr. F. C. Bayard, Pres. R.Met.Soc., printed monthly by the Croydon Microscopical and Natural History Club, and reprinted in full in its annual "Report."

Redhill (Oxford Road).—Summary with remarks in 12-page 8vo. pamphlet privately printed by the observer, Mr. W. H. Tyndall, F.R.Met.Soc., entitled "Meteorology, Oxford Road, Redhill."

Horsell (Lindisaye).—Abstract in "Report of M.O.H., Guildford."

KENT.

Margate (Apsley House).—Report by the observer (Mr. Stokes, F.R.Met.Soc.) is printed with the "Report of the M.O.H., Margate."

Greenwich (Royal Observatory).—Daily observations published in the "Weekly Return of the Registrar General" and a complete volume a year or two after date.

SUSSEX.

Eastbourne (Wilmington Square).—Summaries and remarks by Mr. Sheward, F.R.Met.Soc. (in, we believe, two editions annually, one 16mo. for the pocket, and the other 8vo.) entitled "Annual Report of Meteorological observations."

Crowborough (The Observatory).—Summary and table privately printed in foolscap folio by Mr. C. L. Prince, F.R.A.S., F.R.Met.Soc. A very important series going back, at Uckfield, with, we think, few exceptions, for half a century. "The Summary" for 1897 is accompanied by a beautiful process block representing the Seaford hailstones of May 30th.

HAMPSHIRE.

Old Lodge [Salisbury].—The observer (Mr. E. Lamb) prints privately a compact broadsheet table of "Climatological Observations," i.e. a tabular statement of extremes and means.

HERTFORDSHIRE.

The monthly rainfall at stations in this county and a few outside is collected by Mr. J. Hopkinson, F.L.S., F.R.Met.Soc., and published in the "Transactions of the Hertfordshire Natural History Society," in which publication is also given a summary of Mr. Hopkinson's own observations at *The Grange, St. Albans*.

Great Berkhamstead (Rose Bank).—Mr. E. Mawley, Sec. R.Met.Soc., has for many years published a summary of his observations under the title "The Rose Year" in the annual volume "The Rosarian's Year Book."

OXFORD.

Oxford (Radcliffe Observatory).—Daily observations are printed *in extenso* in an 8vo volume, part of the “Radcliffe Observations.”

NORTHAMPTON.

Here again we have a county organisation, under the personal care of Mr. Christopher Markham, F.S.A., F.R.Met.Soc., who collects the returns and publishes them in the Trans. of the Northamptonshire N.H.Soc.

HUNTINGDON AND CAMBRIDGE.

Many of the rain returns for these counties (and a few just outside them) are collected and edited by Mr. H. G. Fordham, and published monthly in a 4to table.

NORFOLK.

Although published only in a newspaper, we cannot pass without mention the very valuable series of monthly tables of daily rainfall at about 40 stations which for more than a quarter of a century have been compiled by the Rev. Canon Du Port and published in the “Norfolk Chronicle.”

Norwich (Brundall).—Remarks upon each month and a tabular statement for the year are contributed yearly under the title “Meteorological Notes,” by Mr. A. W. Preston, F.R.Met.Soc., and published in the “Trans. of the Norfolk and Norwich Naturalists’ Society.”

DORSET.

The rainfall of Dorset has been discussed with great care by Mr. H. Storks Eaton, M.A., F.R.Met.Soc., and several valuable reports have been published by him in the “Proceedings of the Dorset Nat. His. and Field Club.” We have an impression that monthly tables also are now being prepared under the Club’s auspices, and published in the local papers, but we do not receive them.

DEVONSHIRE.

Respecting what is being done in this county, we are not fully aware. In the early years of the Devonshire Association there used to be a Meteorological Committee, which reported to the annual meeting. At that time Mr. Pengelly, F.R.S., of Torquay, was in full activity, and he communicated two or three papers per annum, so that a considerable amount of meteorological publication took place, and there were long rainfall tables published by the “Western Morning News.” We have seen none of these for a long time, and therefore do not know whether or not they are being continued.

Plymouth (The Hoe).—The results for this and other stations established by the Corporation are issued annually (but we have not had 1897) as a pamphlet (8vo, 26 pp.), "Meteorological Report," by Mr. H. Victor Prigg, A.M.I.C.E., Borough Meteorologist.

Rousdon [Lyme Regis].—For, and since, 1884 the observations at this station have been published yearly in 4to under the care and at the cost of Mr. Cuthbert E. Peek, M.A., F.R.A.S., F.R.Met.Soc., under the title "Rousdon Observatory, Devon. Meteorological Observations." The observatory is fully equipped, and the results are well worked out, the last received (1896) has a fine general view of the station, but a ground plan, drawn to scale, is much needed; without one it is almost impossible to follow the arguments on pages 19 to 21 of the 1896 volume.

Barnstaple Athenæum.—Mr. Wainwright started the compilation of a monthly table of rainfall for stations in N. Devon; it is, we hope, going on, and being published in the local press, but we have not seen a copy for many months.

CORNWALL.

This county has long been represented in current meteorological publications—the names of Barham, Dymond, Fox, Jordan, Liddell, Moyle, Richards, Squire, Whitley, at once occur to us, but we have to deal with present workers only. Cornwall is (as far as we are aware) alone in having a County Council which takes the slightest notice of its climate. Originated we believe by Mr. Treveil, a fcap. folio monthly summary of statistics of meteorology and diseases has for some years been issued at the cost of the County Council.

Falmouth Observatory.—For twenty years at least the Annual Reports of the "Roy. Cornwall Polytechnic Soc.," prepared by Mr. W. L. Fox, F.R.Met.Soc., have contained summaries of the observations at Falmouth, and of these, separate copies are printed for gratuitous distribution. Originally these reports included data for other stations in West Cornwall and Scilly, but since 1892 have dealt with Falmouth alone.

Truro (Roy. Inst.)—In bygone years we used to receive copies of the "Reports of the Roy. Inst.," which contained abstracts of the observations made at the Institute; we do not know whether they are continued.

Liskeard (Dean Terrace).—For more years than (without a long search) we can tell, but certainly for more than a quarter of a century, an interesting broadsheet has been issued by Mr. S. W. Jenkin, C.E., giving an abstract of his observations for the year, and a comparison with those of previous years. As we see that the values for 1897 are compared with those for the "previous 34 years," it is not improbable that the series extends over that long period.

SOMERSET.

Bath Royal Institute.—In the time of the late Rev. L. Blomfield various abstracts of these observations were published, and they may be continued, but we have nothing later than “The 68th Report of the Bath Roy. Lit. and Sci. Inst. for 1892,” 8vo. 1893.

GLOUCESTER.

Cheltenham (Naunton Park Villas)—W. Ll. Evans, Esq. }
 ,, *(Southam Villa)*—R. Tyrer, Esq. } Each of
 these gentlemen contributes to local newspapers, and Mr. Tyrer collects the rainfall at many stations in the county, and publishes the monthly totals, but as far as we are aware there is no separate publication issued by either.

Tewkesbury (Beckford).—Mr. F. Slade, C.E., F.R.Met.Soc., prepares and issues annually a very full tabular summary of his observations, remarks and notes as a large broadsheet.

HEREFORD.

A county rainfall table is prepared by, and published monthly in, the “Hereford Times,” but we are not aware of any separate local publication in this county. Mr. Southall, F.R.Met.Soc., occasionally contributes important papers to the “Transactions of the Woolhope Club,” but we do not see that publication and therefore cannot state what is being done.

STAFFORD.

Burton (St. Paul's St.)—These observations are, we believe, published in the Reports of the Burton Nat. Hist. and Antiq. Soc., but we do not see them, and for 1897 did not receive the returns at all.

WORCESTER.

Kidderminster (Prospect Hill).—Abstract tables published annually in the “Report of the M.O.H. and the Chief Sanitary Inspector.”

WARWICK.

Rugby School.—An abstract of these observations is published in the yearly “Report of the Rugby School Nat. Hist. Soc.”

Coventry (City Hospital).—Abstract in the Annual Report of the M.O.H.

Coventry (Priory Row).—The daily rainfall and chatty notes on the weather and on phenological phenomena are reported monthly by Alderman Gulson, and printed in the “Coventry Herald.”

Birmingham (Edgbaston).—Daily observations *in extenso* with diagrams printed in several colours published annually in the “Proc. Birmingham Nat. Hist. and Phil. Soc.,” also with another excellent diagram in the “Report on the health of the City of Birmingham,” by Dr. Alfred Hill, M.O.H.

LINCOLNSHIRE.

As this is the first of the seven counties (Lincoln, Notts., Derby, Chester, Lancashire, Yorkshire and Flint) in which are stations of the Great Central Railway Company, we have to mention here that, from 1855 onwards the Manchester, Sheffield and Lincolnshire Railway Company (now called the Great Central) has maintained, in connection with its canals, a gradually increasing number of rain-gauges (now 50), and prints annually the monthly totals, and a comparison of the yearly total with the mean for previous years.

NOTTINGHAM.

Nottingham (The Castle).—Under the title "City of Nottingham. The Meteorology of Nottingham," the Corporation issue annually in folscap folio a summary of The Castle observations, and monthly rainfall at several stations in the Trent valley, illustrated by the best meteorological diagram for the year of which we are aware, it is about $2\frac{1}{2}$ feet square, and gives *daily* values of all the principal meteorological elements, and also statistics as to disease. Nine different colours are employed in this beautiful diagram.

Worksop (Hodssock Priory).—A compact table of results (with several 8vo pages of remarks) is privately printed by Mr. H. Mellish, F.R.Met.Soc., under the title of "The Weather of 1897 at Hodssock Priory."

DERBYSHIRE.

We do not know of any separate publication for this county, but Mr. Hunter, C.E., F.R.Met.Soc., supplies a monthly and an annual summary to one of the local newspapers.

CHESHIRE.

For certain stations in this county, also in Lancashire, Yorkshire, Cumberland and parts of Scotland, rain returns from various water works (of which Messrs. G. H. Hill and Sons, M.M.I.C.E., are consulting engineers) are given in a privately printed 4to pamphlet issued by them.

Birkenhead (Bidstone Observatory).—This establishment, under the care of Mr. W. E. Plummer, F.R.A.S., is recovering the position which it held under its original superintendent, and the results are published by the Mersey Harbour Board in an annual 8vo "Report."

LANCASHIRE.

Heaton Moor [Stockport].—Dr. Jordan, M.O.H. for Heaton Norris, published in his annual report for 1895 a summary of his observations. He probably does so annually, but that is the only year which we have seen.

St. Anne's-on-Sea.—Dr. Booth, M.O.H. for this health resort, publishes in his annual report a summary of meteorological observa-

tions, but they are hopelessly wrong. To quote one point only, the mean yearly rainfall for the four years 1893-96 is given as 17·82 in. ! an outrageous value for the Lancashire coast, as is shown by Southport 10 miles S. with 29·42 in., and by Blackpool 5 miles N. with 31·39 in. for the same four years. We have not the report for 1897 or would have dealt with it. Either the records should be trustworthy or they should be given up. Dr. Booth is not wholly to blame, for he appealed in March, 1897, for a proper equipment, whether successfully or not we do not know, but we should have left the report without any returns rather than have given bad ones.

Manchester (Oldham Road).—The daily observations are published in extenso in the “Weekly Reports” of Dr. Niven, M.O.H., Manchester.

Bolton (The Park).—A tabular summary and a few pages of remarks by the observer, Mr. W. W. Midgley, F.R.Met.Soc., are published annually in 8vo by the Bolton Corporation as “Borough of Bolton. Annual report of the Museums and Meteorological Observatory.”

Southport (Hesketh Park).—This is one of the best of the “Health Resort” stations, but as we have previously* described one of the “Borough of Southport Meteorological Department’s Reports,” we need say only that Mr. Baxendell, F.R.Met.Soc., is yearly improving them. The Fearnley Trustees are supplying excellent instruments, and we do not think that there will be a fault to find with the equipment when Mr. Baxendell has thrown away his evaporator, which he says is “In a Stevenson screen, painted white, and erected upon the roof of the observatory.”

Over Darwen (Hoddlesden).—For this and 14 other stations in Lancashire and Yorkshire maintained by the Waterworks Department of the Blackburn Corporation, an annual table is issued by the Engineer, Mr. W. Stubbs, C.E.

Stonyhurst College.—A very interesting little volume of the “Results of Meteorological Observations” has been issued by the Stonyhurst authorities annually from 1860 to 1897†; they have been noticed on three occasions in these pages, and therefore need not be further described.

Skelwith Fold [Ambleside].—Mr. S. A. Marshall issues privately a monthly card giving the total fall of rain for the month at his own stations, and at others in the S.W. portion of the Lake district.

* *Met. Mag.*, Vol. XXVIII., p. 75.

† We should be very thankful for copies for 1861, 62, 63 and 64 if anyone possesses a spare set.

YORKSHIRE.

In the "Annual Reports" of the M.O.H. for the West Riding there is a general table of rainfall, which as it is derived from *British Rainfall* it need not be described; but there is another table on an earlier page which suggests other publications, and which seems to indicate one or two unknown observers. The various M.O.H.'s in the Riding have, we believe, to forward to Dr. Kaye a copy of their reports, and Dr. Kaye acknowledges receipt of 121 such printed documents, in 15 of which more or less meteorological information was given. This will be looked into.

Halifax (Albert).—For this and 9 other stations belonging to the Halifax Corporation Water Works, a small annual table is printed by Mr. J. A. Paskin, C.E.

Bradford (Brayshaw Res.).—For this and 36 other stations belonging to the Bradford Corporation Water Works a table is annually printed by Mr. J. Watson, C.E.

Bradford (The Exchange).—We believe that abstracts of these observations are sometimes published by the Yorkshire Naturalists' Union, but have not seen them.

York (Phil. Soc.).—We do not know what has happened here. For some years Mr. J. E. Clark, B.A., has prepared an interesting report on the meteorology of the district, but he has left York, and we have seen no report for either 1896 or 1897.

Scarborough (Observatory).—For 1896 Mr. E. W. Ellerbeck, F.R.A.S., Meteorologist to the Corporation, published an 8vo "Meteorological Report," consisting of four pages, chiefly tables. We presume that there is a similar (or larger) one for 1897, but we have not seen it.

MONMOUTH.

Marshfield (Llwynarthan).—Here again we are not sure as to what is being done.—For many years Mr. F. G. Evans, F.R.Met.Soc., compiled very valuable reports on the rainfall of the district, which were published in the "Transactions of the Cardiff Naturalists' Society," but we have not seen a copy for several years.

Chepstow (Shirenewton Hall).—Mr. E. J. Lowe, F.R.S., who, thirty or forty years ago, worked very hard at the meteorology of Nottinghamshire, still devotes much time to the subject, and though he does not publish anything separately, compiles an elaborate report on the meteorology and especially on the rainfall of the district around his new residence, and has it inserted in the local newspapers.

GLAMORGAN.

Penarth (Cwrt-y-Vil).—This and several other returns from the county are published regularly in the "Western Mail" and also this year (1898) in "The Cambrian Natural Observer."

I. OF MAN.

We are not aware of any special publication on the meteorology of the Island, but Mr. A. W. Moore prepares an annual summary which is published in the local papers.

DUMFRIES.

Dumfries (Ivy Bank).—A full report is prepared annually by the Rev. W. Andson and published in the "Report of the Dumfries and Galloway Nat. Hist. and Antiq. Soc."

EDINBURGH.

Edinburgh (Blacket Place).—For 1897 (also for 1895, so probably annually) a carefully compiled summary has been prepared by Mr. Mossman, F.R.S.E., F.R.Met.Soc., and published in the "Proceedings of the Roy. Phys. Soc. of Edinburgh."

LANARK AND RENFREW.

Glasgow, as is well known, is partly in both these counties. Glasgow, as is not so well known, has an exceptional number of parks, and Glasgow is unique in the fact that every park has a thermometer stand, thermometers and a rain gauge, and the Superintendent, Mr. J. Whitton, publishes the results annually in an 8vo. pamphlet "Meteorological Notes and Remarks upon the Weather during the year —, with its general effects upon vegetation." Glasgow fetches the bulk of its water from Loch Katrine, but there are altogether 15 rain gauges connected with the Water Works, and an abstract of their results is privately printed annually by the engineer, Mr. J. M. Gale, C.E.

RENFREW.

Paisley (The Coats Obs.).—Some years since, there used to be useful summaries of these observations in the "Reports of the Coats Observatory," but we have no recent ones.

STIRLING.

Gargunnoch.—Col. Stirling, of Gargunnoch, prepares annually for some local society, and favours us with a reprint of, a table giving the monthly rainfall at his own and 14 other stations in the county.

DUBLIN.

Dublin (FitzWilliam Square).—Dr. J. W. Moore, F.R.Met.Soc., prepares a very full abstract of, and remarks upon, his observations, but we do not know in what periodical they appear.

Balbriggan (Ardgillan).—Although Captain Taylor, F.R.Met.Soc., has not carried on his observations for many years, he has made rapid strides in improving his privately printed 4to. pamphlets "Report and Results of Met. Obs. made at Ardgillan" until the last, for 1897, with its excellent view of the instruments in his beautiful garden, is thoroughly well done.

Obviously the above list has many imperfections; we invite everyone to help us to remove them.

RESULTS OF METEOROLOGICAL OBSERVATIONS AT CAMDEN SQUARE FOR 40 YEARS, 1858-97.

JULY.

ELEMENTS.	MONTHLY MEANS OR TOTALS.						ABSOLUTE READINGS.								
	Mean, 40 years	Highest Month and Date.	Lowest Month and Date.	MEANS 9 A.M. AND 9 P.M.			EXTREMES AT 9 A.M. AND 9 P.M.			Mean of all Highest	Mean of all Lowest.				
				Mean.	Highest Month.		Lowest Month.		Highest.			Lowest.			
					Value.	Date.	Value.	Date.					Value.	Date.	
Barometer (cor. & red.)	1 29.961	2 30.193 1885	3 29.767 1861	4 9 a.m. 9 p.m.	5 29.963 29.959	6 30.197 30.189	7 1885 1885	8 29.766 29.769	9 1861 1861	10 30.469 30.450	11 27th, 1882 26th, 1882	12 29.210 29.247	13 15th, 1877 14th, 1877	14 30.302 30.283	15 29.553 29.547
(Dry Bulb.....)	62.5	68.1 1868	58.1 1888	9 a.m. 9 p.m.	64.1 60.9	70.4 67.1	1868 1859	59.2 56.9	'79, '88 1888	80.3 79.7	21st, 1868 15th, 1881	45.4 49.4	11th, 1888 15th, 1883	73.6 69.7	55.8 53.5
Max.	74.1	..	..	..	..	82.4	1868	67.1	1888	94.6	15th, 1881	55.5	17th, 1892	85.2	63.3
Min.	54.0	..	..	..	..	58.4	1859	50.2	1863	66.3	26th, 1872	40.3	19th, 1863	61.5	45.4
(Wet Bulb.....)	57.8	62.9 1859	55.3 1892	9 a.m. 9 p.m.	58.5 57.1	63.7 62.1	1859 1859	55.5 54.1	'88, '92 1862	72.6 70.2	23rd, 1873 22nd, 1873	43.5 46.9	11th, 1888 18th, 1863	66.1 64.4	51.6 50.2
Solar Rad., black	116.2	..	..	..	..	123.4	1874	105.9	1888	137.7	19th, 1881	65.1	15th, 1875	130.6	84.5
Solar Rad., bright.	84.6	..	..	..	..	91.4	1887	75.6	1879	105.4	15th, 1881	58.4	21st, 1879	96.3	69.1
Grass Minimum	50.4	..	..	..	..	54.6	1872	45.4	1863	63.8	26th, 1872	32.0	4th, 1877	59.2	40.6
Soil, 1 foot	62.1	..	..	..	..	66.5	1876	57.2	1879	70.3	20th, 1881	54.5	13th, 1888	65.6	58.9
Cloud	5.7	7.9 1879	4.0 '87, '97	9 a.m. 9 p.m.	5.9 5.4	8.6 7.6	1879 1888	3.8 2.8	1865 1867	10 10	Every year Every year	0 0	Various Various	10.0 10.0	0.3 0.1
Rainfall	2.39	5.10 1880	.45 1868	9 a.m. 9 p.m.	1.01 1.38	3.03 3.59	1867 1888	.04 .02	1863 1868	1.82 1.39	26th, 1867 14th, 1883	.00 .00	Every year Every year	.41 .49	.00 .00

Max. Rainfall in 24 hours, 1.82 in., 25th, 1867. Mean max. daily fall, .71 in.

ROYAL METEOROLOGICAL SOCIETY.

THE monthly Meeting of this Society was held on Wednesday afternoon, June the 15th, at the rooms of the Royal Astronomical Society, Burlington House, Mr. F. C. Bayard, LL.M., President, in the chair.

Matthew William Dunscombe and Robert Stokes-Beagley were duly elected Fellows of the Society.

A paper by Mr. R. C. Mossman, F.R.S.E., was read on the "Frequency of the Non-Instrumental Meteorological Phenomena in London with different winds from 1763-1897." In previous papers, the author has discussed the secular and seasonal variation of various phenomena, and he now gives the results of an analysis of the direction of the surface winds observed during the occurrence of snow, hail, gales, thunderstorms, lightning, fog and aurora. Snow is of most frequent occurrence with north and east winds, and least common with S.W. winds. Hail showers occur most often with W., N.W. and N. winds. Gales are most frequent with W. and S. winds. The greatest number of both summer and winter thunderstorms occurs with W. winds, although the values in summer are high with E., S.E. and S. winds. The greatest number of fogs are recorded on calm days, closely followed by days on which the wind blew from the east.

A paper by Mr. A. L. Rotch also was read, on "The Exploration of the free air by means of Kites, at Blue Hill Observatory, Mass., U.S.A." After giving a brief account of the use of kites for scientific purposes from 1749 to the present time, the author described the various forms of kites which have been employed at Blue Hill Observatory, viz., the Eddy, or Malay tailless kite; the Hargrave cellular, or box kite; and the Lamson aéro-curve kite. The highest flight was on October 15th, 1897, when by means of four kites, having a combined lifting surface of 150 square feet, the meteorograph, at the end of 20,100 feet of wire, was raised vertically 11,080 feet above the hill. About 200 records from kites have been obtained in the free air at heights from 100 to 11,000 feet in all kinds of weather. Mr. Rotch maintains that the kite can be made of the greatest importance for meteorological investigation. At the recent meeting of the International Aeronautical Committee, at Strassburg, it was recommended that all central observatories should employ kites as being of prime importance for the advancement of meteorological knowledge.

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, FEBRUARY, 1898.

STATIONS. <i>(Those in italics are South of the Equator.)</i>	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.										
England, London	56·2	1	24·3	21	46·9	35·6	36·0	82	92·1	22·6	inches	1·08	15	6·1
Malta.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
<i>Cape of Good Hope</i> ...	95·7	22	50·6	2	79·4	60·1	57·5	69	...	...	·92	4	1·5	
<i>Mauritius</i>	86·8	9	67·4	13	84·5	74·2	70·4	77	142·1	61·1	3·70	17	5·6	
Calcutta	89·1	19	50·2	23	81·5	60·3	55·1	59	144·0	39·2	·00	0	2·3	
Bombay.....	88·4	26	63·9	20	82·6	69·6	64·9	69	135·3	52·9	·17	2	0·9	
Ceylon, Colombo	91·4	24	67·5	18	89·6	73·1	70·4	75	154·0	64·0	1·98	8	4·0	
Melbourne.....	107·5	4	47·1	18	86·4	61·9	54·7	51	158·5	35·9	1·06	2	4·8	
Adelaide	109·6	1	52·4	17	90·9	67·4	52·2	41	163·9	42·2	·55	4	3·0	
Sydney	94·8	9	59·8	20	78·6	65·9	62·6	70	162·1	50·9	4·92	8	5·2	
Wellington	75·0	1	44·0	2	67·3	52·2	52·8	79	133·0	36·0	1·85	8	4·0	
Auckland	78·5	18	47·5	2	71·2	56·1	53·9	71	140·0	44·0	·78	3	4·3	
Jamaica, Kingston.....	87·3	17	63·2	7	84·3	66·4	64·5	74	...	...	2·66	8	3·0	
Trinidad .....	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Grenada.....	86·8	11a	69·6	21	82·5	71·2	67·2	71	155·2	...	2·16	13	3·1	
Toronto	46·9	11	— 5·6	1	30·9	17·2	23·2	86	63·0	—10·8	3·06	17	7·2	
New Brunswick, Fredericton	46·9	25	—20·5	...	31·4	12·1	15·0	75	...	...	3·71	11	6·7	
Manitoba, Winnipeg	37·5	12	— 26·6	18	17·4	—7·5	...	...	...	...	1·07	7	4·9	
British Columbia, Esquimalt.....	54·6	27	31·8	19	48·0	38·5	39·5	89	...	...	5·19	19	8·3	

a—and 12.

REMARKS.

Mauritius.—Mean temp. of air 0°·1 above, of dew point 0°·3 above, and rainfall 3·14 in. below, their respective averages. Mean hourly velocity of wind 10·2 miles, or 1·2 below the average; extremes, 26·6 on 4th and 1·6 on 20th. Prevailing direction E.S.E. L on 3rd, T on 20th, and L and T on 21st and 22nd. T. F. CLAXTON.

CEYLON, COLOMBO.—Mean temp. of air 80°·8 or 0°·7 above, of dew point 0°·2 above, and rainfall ·07 in. above, their respective averages. TSS on 7 days. L on 3 days. H. O. BARNARD.

Adelaide.—Good rains in the interior and far N. district in the early part of the month, and over the colony generally at the close, breaking up the drought. Mean temp. 5°·4 above the average for 41 years, only two Februarys having had higher temp. C. TODD, F.R.S.

Sydney.—Temp. 1°·4 above, humidity 3·7 below, and rainfall ·43 in. below, their respective averages. A monsoonal rainstorm passed over the colony from 10th to 14th, causing heavy floods on the Hunter and Hawkesbury Rivers. H. C. RUSSELL, F.R.S.

Wellington.—On 1st a sudden storm from S. caused a severe dust-storm, with rain and hail and the bar. fell to 29·3; rain and hail also on 2nd, then showery to the 7th. The remainder of the month was tolerably fine, but generally strong N.W. winds; fog on 17th and 18th. Slight earthquake before midnight on 13th. Mean temp. 2°·8, and rainfall 1·69 in., below their respective averages. R. B. GORE.

Auckland.—An unusually dry and cool month, the rainfall being little more than one-fifth of the average of 31 years, and the temp. 4° lower than the average. T. F. CHEESEMAN.

JAMAICA, KINGSTON.—Mean hourly velocity of wind 1·5 miles. Rainfall for the two months of the year one-third over the average. Hailstorm at King's Valley in the lowlands on 24th. R. JOHNSTONE.

SUPPLEMENTARY TABLE OF RAINFALL,
JULY, 1898.

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.
I.	Uxbridge, Harefield Pk..	·51	XI.	Builth, Abergwesyn Vic.	1·36
II.	Dorking, Abinger Hall ..	·51	„	Rhayader, Nantgwilt ...	1·04
„	Birchington, Thor	1·26	„	Lake Vyrnwy	1·20
„	Hailsham	·53	„	Corwen, Rhug	1·65
„	Ryde, Thornbrough	·27	„	Criccieth, Talarvor	·73
„	Emsworth, Redlands ...	·46	„	I. of Man, Douglas	·28
„	Alton, Ashdell	·49	XII.	Stoneykirk, Ardwell Ho.	·54
III.	Oxford, Magdalen Col..	·47	„	New Galloway, Glenlee	·89
„	Banbury, Bloxham	·85	„	Moniaive, Maxwelton Ho.	·49
„	Northampton, Sedgebrook	·80	„	Lilliesleaf, Riddell	·85
„	Duddington [Stamford].	·91	XIII.	N. Esk Res. [Penicuik]	1·60
„	Alconbury	·83	XIV.	Glasgow, Queen's Park..	1·46
„	Wisbech, Bank House...	1·17	XV.	Inverary, Newtown	2·97
IV.	Southend	·65	„	Ballachulish, Ardsheal ...	3·42
„	Harlow, Sheering.....	1·58	„	Islay, Gruinart School ...	·96
„	Colchester, Lexden	·98	XVI.	Dollar.....	2·06
„	Rendlesham Hall	1·73	„	Balquhiddier, Stronvar...	1·67
„	Scole Rectory	1·52	„	Coupar Angus Station...	·63
„	Swaffham	1·22	„	Dalnaspidal H. R. S.....	...
V.	Salisbury, Alderbury ...	·44	XVII.	Keith H. R. S.....	2·30
„	Bishop's Cannings	·53	„	Forres H. R. S.	1·57
„	Blandford, Whatcombe .	·42	XVIII.	Fearn, Lower Pitkerrie..	1·51
„	Ashburton, Holne Vic...	·56	„	N. Uist, Loch Maddy ...	...
„	Okehampton, Oaklands.	·64	„	Invergarry	1·10
„	Hartland Abbey	·79	„	Aviemore H. R. S.	1·43
„	Lynton, Glenthorne ...	·52	„	Loch Ness, Drumnadrochit	2·22
„	Probus, Lamellyn	·80	XIX.	Invershin	2·43
„	Wellington, The Avenue	·25	„	Durness	3·27
„	North Cadbury Rectory	·59	„	Watten H. R. S.....	1·28
VI.	Clifton, Pembroke Road	·66	XX.	Dunmanway, Coolkelure	1·15
„	Ross, The Graig	·55	„	Cork, Wellesley Terrace	1·07
„	Wem, Clive Vicarage ...	·83	„	Killarney, Woodlawn ..	1·29
„	Wolverhampton, Tettenhall	...	„	Caher, Duneske	1·58
„	Cheadle, The Heath Ho.	1·32	„	Ballingarry, Hazelfort...	1·55
„	Coventry, Priory Row ..	1·10	„	Limerick, Kilcornan ...	1·46
VII.	Grantham, Stainby	1·46	„	Broadford, Hurdlestown	...
„	Horncastle, Bucknall ...	·48	„	Milton Malbay	1·51
„	Worksop, Hodack Priory	1·61	XXI.	Gorey, Courtown House	1·77
VIII.	Neston, Hinderton	·93	„	Athlone, Twyford	1·29
„	Southport, Hesketh Park	·35	„	Mullingar, Belvedere ...	1·85
„	Chatburn, Middlewood.	·71	„	Longford, Currygrane...	·80
IX.	Melmerby, Baldersby ...	1·01	XXII.	Woodlawn	1·11
„	Scarborough, Observat'y	1·19	„	Crossmolina, Enniscoe ..	1·26
„	Middleton, Mickleton ...	·83	„	Collooney, Markree Obs.	1·45
X.	Haltwhistle, Unthank...	1·56	„	Ballinamore, Lawderdale	2·02
„	Bamburgh	·82	XXIII.	Warrenpoint.....	·48
„	Duddon Valley, Ulpha School	2·16	„	Seaforde.....	·70
„	Keswick, The Bank	1·13	„	Belfast, Springfield	·74
XI.	Llanfrechfa Grange	·96	„	Bushmills, Dundarave..	·75
„	Llandoverly	1·10	„	Stewartstown	·50
„	Castle Malgwyn	1·43	„	Killybegs	1·28
„	Brecknock, The Barracks	·95	„	Horn Head	1·06

JULY, 1898.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL.					Days on which "01 or more fell.	TEMPERATURE.				No. of Nights below 32°.	
		Total Fall.	Differ- ence from average 1880-9.	Greatest Fall in 24 hours		Max.		Min.		In shade.	On Grass.		
				Dpth	Date			Deg.	Date			Deg.	Date
I.	London (Camden Square) ...	1·09	— 1·59	·46	27	7	82·9	15	43·9	11	0	0	0
II.	Tenterden	·25	— 2·10	·10	22	5	78·5	16	42·0	14	0	0	0
III.	Hartley Wintney	·49	...	·13	1, 22	6	86·0	16	...	...	...	1	0
IV.	Hitchin	·93	— 1·79	·37	28	7	77·0	16	42·0	10	0	0	0
V.	Winslow (Addington)	·95	— 2·34	·44	1	7	81·0	15	40·0	11	0	0	0
VI.	Bury St. Edmunds (Westley)	1·72	— ·85	·61	28	8	73·0	16	45·0	14	0	...	0
VII.	Norwich (Brundall)	2·00	...	1·00	28	8	76·0	18	40·0	21	0	0	0
VIII.	Winterbourne Steepleton ...	·28	...	·11	1	6	80·2	16	39·0	30	0	2	0
IX.	Torquay (Cary Green)	·24	...	·07	19	6	78·2	16	49·0	4	0	0	0
X.	Polapit Tamar [Launceston]..	·38	— 3·03	·09	22	6	75·9	16	37·7	5	0	0	0
XI.	Stroud (Upfield)	·77	— 2·80	·37	1	8	82·0	15	45·0	29	0	...	0
XII.	Church Stretton (Woolstaston) ..	·80	— 2·17	·61	1	7	75·5	16	43·0	30	0	0	0
XIII.	Worcester (Diglis Lock)	·74	— 2·13	·40	1	5	...	...	...	...	...	...	...
XIV.	Leicester (Rotherby Hall) ...	·98	...	·61	1	5	...	...	...	...	...	...	...
XV.	Boston	·78	— 2·01	·52	1	6	85·0	15	44·0	14	0	0	0
XVI.	Hesley Hall [Tickhill].....	2·45	— ·22	2·15	22	7	79·0	15	41·0	30	0	0	0
XVII.	Manchester (Plymouth Grove) ..	·62	— 3·17	·20	1	9	77·0	10a	42·0	29	0	0	0
XVIII.	Wetherby (Ribston Hall) ..	·87	— 2·31	·52	22	6	...	...	...	...	...	...	...
XIX.	Skipton (Arneliffe)	1·83	— 3·81	·77	17	9	...	...	...	...	...	...	...
XX.	Hull (Pearson Park)	·50	— 2·09	·22	1	8	74·0	21	40·0	20	0	0	0
XXI.	Newcastle (Town Moor)	·67	— 2·85	·28	28	7	...	...	...	...	...	...	...
XXII.	Borrowdale (Seathwaite).....	3·66	— 7·33	1·49	17	13	...	...	...	...	...	...	...
XXIII.	Cardiff (Ely).....	·69	— 3·37	·33	22	3	...	...	...	...	...	...	...
XXIV.	Haverfordwest	1·06	— 3·15	·42	1	5	75·8	16	40·2	31	0	0	0
XXV.	Aberystwith (Gogerddan)	3·78	— ·22	2·15	22	7	77·0	8	...	...	...	...	...
XXVI.	Llandudno	·83	— 2·17	·35	1	9	71·2	16	48·0	9, 26	0	...	0
XXVII.	Cargen [Dumfries]	·56	— 3·37	·32	2	3	75·0	11	40·0	25d	0	0	0
XXVIII.	Edinburgh (Blacket Place)...	1·28	...	·28	17	10	74·1	21	42·9	30	0	0	0
XXIX.	Colmonell	1·09	...	·33	17	10	78·0	21	35·0	24	0	...	0
XXX.	Tighnabruaich	3·13	...	1·19	5	10	69·0	9, 10	43·0	24	0	0	0
XXXI.	Mull (Quinish)	2·91	— 1·14	·72	5	18	...	...	...	...	...	...	...
XXXII.	Loch Leven Sluices	·90	— 2·72	·20	4, 17	7	...	...	...	...	...	...	...
XXXIII.	Dundee (Eastern Necropolis) ..	·85	— 2·61	·25	28	8	78·5	10	44·1	2, 20	0	0	0
XXXIV.	Braemar	·87	— 2·34	·29	5	12	73·5	11	32·7	21	0	5	0
XXXV.	Aberdeen (Cranford)	·78	...	·19	17	16	75·0	6	35·0	19	0	...	0
XXXVI.	Cawdor (Budgate)	1·90	— 1·40	·42	17	13	...	...	...	...	...	...	...
XXXVII.	Strathconan [Beaul]	2·38	— 1·12	·86	18	8	...	...	...	...	...	...	...
XXXVIII.	Glencarron Lodge.....	5·66	...	1·72	17	19	71·1	9	37·6	25	0	...	0
XXXIX.	Dunrobin	1·07	— 1·78	·47	17	10	73·0	11	41·0	25	0	...	0
XL.	S. Ronaldshay (Roeberry) ...	2·83	+ ·47	·73	27	17	67·0	22	44·0	7	0	...	0
XLI.	Darrynane Abbey.....	1·39	...	·42	27	12	...	...	...	...	...	...	...
XLII.	Waterford (Brook Lodge) ...	1·55	— 1·98	·71	21	8	73·0	11b	40·0	30	0	...	0
XLIII.	O'Briensbridge (Ross)	1·82	...	·53	22	8	...	...	...	...	...	...	...
XLIV.	Carlow (Browne's Hill)	1·05	— 2·47	·69	1	5	...	...	...	...	...	...	...
XLV.	Dublin (Fitz William Square) ..	·94	— 1·74	·34	22	8	75·2	11	44·9	4	0	0	0
XLVI.	Ballinasloe	1·81	— 1·74	·68	22	10	74·0	10c	43·0	4	0	...	0
XLVII.	Clifden (Kylemore)	2·58	...	1·30	21	11	...	...	...	...	...	...	...
XLVIII.	Waringstown	·60	— 2·92	·44	21	5	80·0	11	39·0	2	0	0	0
XLIX.	Londonderry (Creggan Res.) ..	·70	— 3·42	·16	27	16	...	...	...	...	...	...	...
L.	Omagh (Edenfel)	·61	— 3·11	·30	21	7	74·0	9	38·0	4	0	...	0

+ Shows that the fall was above the average ; — that it was below it.
a—and 21. b—and 16. c—and 12. d—and 30.

METEOROLOGICAL NOTES ON JULY, 1898.

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.—Rainfall even less than in 1896 and 1897; the record showing only two drier Julys, viz. .21 in. in 1869, and .19 in. in 1885, and no other instance of three Julys in succession with less than an inch. Mean temp. two or three degrees lower than in the two previous years. Duration of sunshine 217 hours 40 mins. T in distance on 28th. Max. temp. on 10th only 58°·5.

HARTLEY WINTNEY.—The driest July registered in 12 years; the rainfall being 2·50 in. below the average. In the first three weeks N. winds were prevalent. Ozone was recorded on 17 days. TSS on 27th and 28th; L on 26th. Rainfall of the first 7 months of the year 6·16 in. below the average.

ADDINGTON.—A month of fine weather; nearly half of the small rainfall falling on the first day, followed by absolute drought until the 18th. A fine time for securing the hay crop, which was heavy in this part of the country. The last two mornings were very cold for the season. T on 27th and 28th.

BURY ST. EDMUNDS, WESTLEY.—A cold month with little sunshine, the max. temp. being below 62° on 7 days. TS on 28th.

NORWICH, BRUNDALL.—Generally dry and somewhat cool, the mean temp. being about 2° below the average. No days of excessive heat. Great R with T and L in the early morning on 29th.

WINTERBOURNE STEEPLTON.—Remarkably dry with a complete succession of bright and fine days from the 2nd to the 9th inclusive. The max. temp. reached 80° on only one day, and on the 30th and 31st frost on grass was recorded. Mean temp. 59°·3, being exactly the average of 5 years. No TSS. Fog on 1st and 22nd; distant T on 27th.

TORQUAY, CARY GREEN.—R 2·41 in. below the average of 22 years. Mean temp. 62°·2 or 0°·9 above the average. Duration of sunshine 255 hours 45 mins., being 60 hours 25 mins. above the average. No sunless day.

POLAPIT TAMAR.—The driest July for 18 years, with absolute drought from 2nd to 21st inclusive. Thick fog on 16th; T on 22nd.

WOOLSTASTON.—A very dry month; the country much burnt up, but the hay crop excellent and well gathered in. Mean temp. 59°·4.

HESLEY HALL [TICKHILL].—A very severe TS occurred on the night of 22nd.

MANCHESTER, PLYMOUTH GROVE.—The driest July in 31 years excepting the year of drought, 1868, when the rainfall was .48 in. Mean temp. 61°·5.

ARNCLIFFE VIC.—A very dry month; the third dry July in succession following the very wet July of 1895.

WALES.

HAVERFORDWEST.—One of the finest Julys on record; it commenced with heavy R on the 1st, after which absolute drought prevailed until the 21st when R fell, and also in the forenoon of the 22nd, followed by fine bright weather again, until the 28th when a little R fell, with a strong wind. Fine weather prevailed on the last three days. Low temp. on grass on 30th, 34°·0.

GOGERDDAN.—A very heavy TS occurred on 22nd, with the greatest R in so short a time for more than 20 years.

LLANDUDNO.—A fine month throughout. Duration of sunshine 247 hours.

SCOTLAND.

CARGEN [DUMFRIES].—High pressure, low temp. and light rainfall were the features of the month. The mean temp. 57°·8 has been lower in eight years since 1860, but only in 1878 was a smaller rainfall recorded. Low night temp. was generally prevalent, and the range on several days exceeded 30° being 33°·2 on 15th. More than half the R fell during a TS on 2nd, only ·24 in. falling during the remaining 30 days. W. winds prevailed on 13 days and N. on 14; it is somewhat remarkable that the wind was N.E. on the warmest day of the month. Owing to the dry sunny weather the hay crop was secured in excellent condition, and, owing to the heavy rainfall of the late spring and early summer, it proved of exceptional bulk. Pastures and turnips are suffering severely from the long continued drought.

EDINBURGH, BLACKET PLACE.—A dry month with a good deal of sunshine but no great heat. Mean temp. 0°·2 below the average. R only 38 per cent. of the normal. Mean pressure the highest in July since 1863. TS with heavy R at 2.15 p.m. on 28th.

COLMONELL.—R 2·50 in. and mean temp. 1°·0, below the average of 22 years.

TIGHNABRUACH.—Everyone satisfied with the weather during the month.

S. RONALDSHAY, ROEBERRY.—Upon the whole a pretty fine month. Mean temp. 53°·2, or 1°·5 below the average of 8 years.

IRELAND.

DARRYNANE ABBEY.—A very dry, fine, hot month. Of the total R, 1·09 in. or nearly four-fifths of the whole, fell on three days.

O'BRIENSBRIDGE, ROSS.—The finest July since 1878, when 1·42 in. of R fell. Frequent T and L on 22nd.

DUBLIN, FITZWILLIAM SQUARE.—Strangely, like July, 1897, this month was very fine and dry with mean temp. 61°·1, or 0·5 above the average. Of the total R more than 60 per cent. fell on 21st and 22nd, the R and number of rainy days being much below the average. High winds occurred on 9 days, reaching the force of a gale on the 18th. The temp. in shade reached or exceeded 70° on 7 days. T on 22nd; solar halo on 20th.

WARINGSTOWN.—A very dry month, but not without precedent in the 36 years recorded, only ·52 in. falling in July, 1863, and ·57 in. in July, 1878.

OMAGH, EDENFEL.—The driest and finest July since the record commenced in 1864, for although there were no very high temperatures (74° being reached only twice), there was warmth enough for the maturing of all crops, which are the finest for years. An abundant hay crop being saved "literally" without a shower.

ERRATA IN "METEOROLOGICAL MAGAZINE," 1897.

REGULAR TABLES.

Waringstown Mar. Total rain *should be* 5·35 in., *not* 5·38 in.

SUPPLEMENTARY TABLES.

Stoneykirk, Ardwell House...	Jan.	Total rain <i>should be</i> 1·94 in., <i>not</i> 1·65 in.
Scarborough, Observatory ...	Mar.	" " " " 2·69 " " 2·66 "
" " " " " " " " " "	May	" " " " 1·22 " " ·88 "
Cheadle, The Heath House ...	June	" " " " 3·18 " " 3·13 "
Bushmills, Dundarave	Oct.	" " " " 2·34 " " 2·24 "
Lough Swilly, Carrablagh ...	Nov.	" " " " 2·87 " " 2·74 "