

SYMONS'S METEOROLOGICAL MAGAZINE.

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THE GREAT DUSTFALL OF FEBRUARY, 1903.

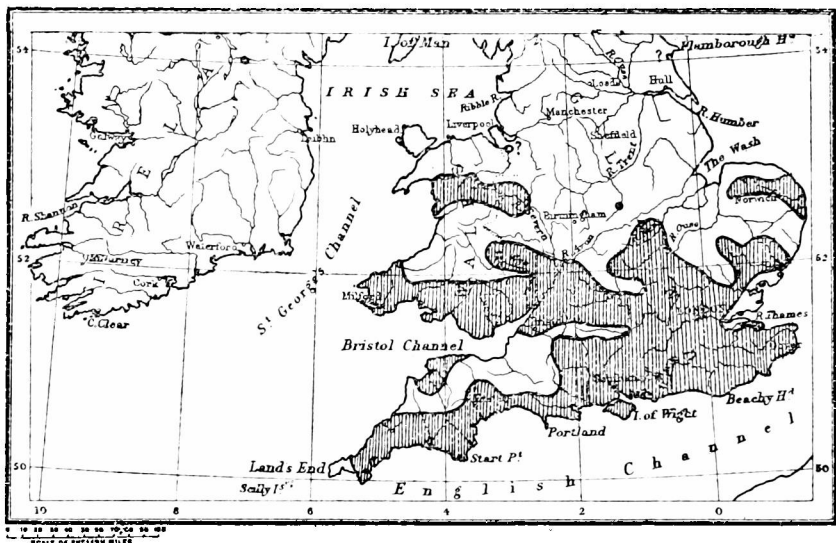
BETWEEN the 21st and 23rd of February observers in nearly all parts of Wales and southern England reported a fall of atmospheric dust, or muddy rain, similar to that which occurred in the south-west of England and Wales on January 22nd, 1902. This together with the abnormally steep barometric gradients, the severe gales and the remarkable mildness, makes the month of February just past more than usually interesting from a meteorological point of view, and makes us feel the restricted space at our disposal despite the enlargement of this number. The fall of dust is remarkable in several ways. It was far more extensive in its distribution than that of last year, and at most places considerably more intense, for it was quite as frequently observed in the form of a dense dry fog as in that of muddy rain.

We are greatly obliged to many correspondents for their kindness in forwarding particulars of the phenomenon and samples of the dust, and we have endeavoured to acknowledge this kindness by preparing a preliminary report on the distribution of the dustfall at the earliest possible opportunity. A complete discussion has been undertaken, and will be carried out by collaboration between the Meteorological Office, the Royal Meteorological Society and the British Rainfall Organization. This will necessarily be a work of time, and at present, pending the microscopic examination of the numerous samples received, we express no opinion as to the origin of the dust beyond stating that, until the contrary is proved, this dustfall, like those of 1901 and 1902, may be assumed to come from the deserts of northern Africa. The similarity in appearance of dust collected on the same day at points hundreds of miles apart disproves the possibility of any local origin, and the simultaneous fall over England, Holland, Belgium, Germany, Switzerland and Austria, suggests that the origin lay somewhere beyond the borders of Europe.

We have received from correspondents, and through the newspapers, reports of more than 200 cases of the fall of dust in 32 counties in England and Wales, and one in Ireland, a list of which is appended, and although the names of the observers are omitted on

account of exigencies of space, we have pleasure in repeating to all the expression of our hearty thanks, which we have already sent to each.

The accompanying map shows the observed distribution of the dustfall over the British Isles. The scale does not admit of the stations being shown by separate dots, but it may be assumed that dust fell over the whole of the shaded area. The outline of that area was drawn on a large-scale map, where the position of each station reporting dust was marked, by drawing the line so that it was always within 10 miles of one of the stations. In other words, no part of the shaded area is more than 10 miles distant from a recorded case of dustfall on one of the days in question. Isolated instances (Leicester and Cavan) are shown by dots, and two cases where the date did not correspond with the majority of instances are marked with a query.



THE DUST FALL OF FEBRUARY, 1903.

It must be remembered that absence of information does not necessarily mean that no dust fell; although in some places, such as Somersetshire, where there are many careful rainfall observers who state definitely that they noticed nothing, it is very probable that the fall did not take place. In mid-Wales, on the other hand, where there is a very sparse population and extremely few observers, it is quite likely that the phenomenon might occur without attracting attention. It may be stated with confidence that dust fell over the greater part, if not quite over the whole, of the country from Falmouth to the South Foreland and from North Wales to Norfolk, the total extent being 300 miles from west to east and 200 miles from north to south. It appears that the dust fell most thickly in two areas, South Wales and the Weald district of Kent, Surrey and Sussex.

As to the nature of the actual fall, we have only space to cite the following typical descriptions which are samples of many :—

Mrs. Foster writes from Witley, Godalming :—"On Saturday, February 21st, we had a remarkable dust-storm, worst about midday. The wind was very high at 7 a.m. and continued so all day, there was also a great "fog," which is unusual with a high wind, though we do sometimes get "sea-fret" with a southerly wind. Several people who went out of doors complained of the dreadful dust in their eyes and nostrils, and on interrogating our gardener, who has lived here for over 30 years, I learned that the supposed fog was not damp but dry, very fine dust, and he had never seen anything like it before. On Monday morning, after the rain of Sunday, the 22nd, I saw yellow dust on the south and west window sills, but it was like cement and could not be swept up, so it had to be washed off."

Dr. Edwin Freshfield states that at Juniper Hill, near Reigate :—"On Saturday, February 21st. the wind from 9 to 11 a.m. was W.S.W. to S.S.W., and increased in severity to sundown when it shifted to W., fell later, and calmed by 9 p.m. From 9 a.m. till 2 p.m. the sun was shining brightly through a haze similar to the Khamsin haze in Egypt, then the semi-obscurd sky cleared of mist about 4 p.m. Evergreen trees were noticed to be covered with chocolate-coloured dust at 11 a.m., and by 4 p.m. the trees were all of one uniform colour. The dust was silky to the touch, slightly iridescent and must have fallen between sunrise and 4 p.m. No rain fell till 9 p.m."

Mrs. Silver writes from Highfield Vicarage, Southampton :—"On Sunday, February 22nd, between 11 a.m. and noon the sky was completely covered with a thick yellow cloud exactly like a London fog, too thick for sufficient light to penetrate to read by. The darkness lasted about an hour, and when it had passed the windows which had, I suppose, been damp were covered with yellow sand. North, east and south were equally covered, and the upper storeys were as dirty as the lower ones. The backs of the chairs in the garden were also covered with a layer of yellow sand, which adhered to the wood where it was damp."

Mr. G. D. Hope writes from Havering Grange, near Romford :—"On Saturday, 21st February, a great amount of gray dust fell at Havering, and owing to the previous showers adhered to the branches and stems of the trees, hedges, buildings, etc. The conifers collected most, and looked as if they had been powdered with flour. The dust did not fall with the rain, but before it. It came from the west and south-west in all cases and adhered only to that side of the trees, etc."

Mr. E. E. Glyde writes from Whitchurch, Tavistock :—"On Sunday morning, February 22nd, at 9 a.m., I found the water in my rain-gauges very discoloured, especially that registered since 9 p.m. on the 21st. A buff or reddish-yellow sediment lay at the bottom of

the rain-bottles and a similar sediment on window ledges facing S.W., on the edges of roofs, and on cabbages, etc., in the garden."

Mr. F. H. Perkins writes from Tonn, Llandovery:—"Rain commenced falling slightly before 9 a.m. on February 22nd, and soon after that hour very heavy clouds of a peculiar dark yellowish appearance came over from the S.W. and rain fell heavily for a few minutes. After the storm passed I happened to notice that the water in a collecting cask, which before the storm was quite clear, had become a deep yellow clay-colour, and on examining the rain-gauge, which had been emptied shortly before the storm commenced, I found that the water in it was of the same colour."

It would be a favour if any reader who has noted the occurrence of a similar phenomenon at any place not included in the following list, would send particulars of it to Dr. H. R. Mill, 62, Camden Square, London, N.W.; but to save unnecessary trouble it is well to state that unless the date of the occurrence can be definitely fixed the observations are not required.

LIST OF PLACES RECORDING DUSTFALLS.

(The date is almost everywhere the 22nd, except in the south-east of England, where the dust fell dry on the 21st and with rain on the 22nd.)

Middlesex.—New Barnet, Enfield, Ealing.

Surrey.—Hindhead, Shottermill, Witley, Ewhurst, Guildford, Farnham, Holmwood, Reigate, Merstham, Leatherhead, Woking, Cheam, Sutton, Bagshot, Chertsey, Wimbledon.

Kent.—Hawkhurst, Tenterden, Biddenden, Hythe (3 stations), Folkestone, Dover (3 stations), St. Margaret's, South Foreland, Groombridge, Tunbridge Wells, Rusthall, Southborough, Pembury, Tonbridge (3 stations), Edenbridge, Hildenborough, Ashford, Watlington, Upper Deal, Canterbury, Sevenoaks, Beckenham, Westgate-on-Sea, Sheerness.

Sussex, West.—Bosham Creek, Chichester, Compton, Rogate, Slinfold, Horsham (3 stations).

Sussex, East.—Lancing, Falmer, Lewes, Henfield, Burgess Hill, Udimore, Horeham Road, Battle, Etchingham, Crowborough (3 stations), Wadhurst, Three Bridges, Steel Cross, East Grinstead.

Hampshire.—Yarmouth (Isle of Wight), Brockenhurst, Ringwood, Emsworth, Southampton, Bitterne, Botley, Swarraton, Alton, Hartford Bridge, Andover.

Berkshire.—Wokingham, Ashbury, Wantage, Lockinge, Denchworth.

Hertfordshire.—Watford, Welwyn.

Buckinghamshire.—Slough, Hulcote, Bulbourne, Bletchley.

Oxfordshire.—Henley, Culham, Banbury.

Northamptonshire.—Wellingborough.

Essex.—Havering, Romford, Witham.

Suffolk.—Ipswich, Stansfield, Fritton.

Norfolk.—Dereham, Wroxham.

Wiltshire.—Salisbury, Donhead St. Mary, Westbury, Market Lavington.

Dorsetshire.—Portland, Swanage, Wareham, Dorchester, Bridport, Beaminster, Wimborne.

Devonshire.—Brixton, Stoke Damerel, Ivybridge, South Brent, Staverton, Delamore, Plympton (2 stations), Bere Ferrers, Torquay (2 stations), Teignmouth, Whitchurch, Marystow, Newton Abbot (3 stations), Dawlish (2 stations), Sidmouth, Rousdon, Tiverton, Torrington (2 stations), Fremington, Arlington Court, Lynmouth.

Cornwall.—Penzance, Falmouth, Gunnislake, Ponsanooth, Scorrier, Menheniot, Merrymeet, Liskeard, Altarnon, Trewint.

Somersetshire.—Milverton (on 25th).

Gloucestershire.—Avonmouth, Lydney, Cirencester, Stroud (2 stations), Stonehouse, Coleford, Langleaves, Ruardean, Brockworth, Gloucester, Tewkesbury.

Herefordshire.—Dilwyn, Kington.

Shropshire.—Nantmawr, Petton, Oswestry.

Worcestershire.—Malvern.

Leicestershire.—Leicester.

Monmouthshire.—Magor, Llanfrechfa Grange, Abersychan, Abergillery, Monmouth, Llantilio Court.

Glamorganshire.—Llantwit Major, Barry, Dinas Powis, Porthcawl, Treharris, Swansea, Neath, Pontardulais, Ammanford.

Cardiganshire.—Kidwelly, Laugharne, St. Clears, Whitland, Llandilo, Llandovery.

Pembrokeshire.—Haverfordwest, Clynderwen, Treffgarne, Newport.

Cardiganshire.—St. Dogmaels.

Breconshire.—Crickhowell.

Radnorshire.—Llandrindod Wells.

Montgomeryshire.—Llansaintffraid, Llanffyllin.

Merioneth.—Dinas Mawddwy, Llanbedr.

IRELAND.—*Cavan*.—Cavan.

REVIEW.

Elementary Physical Geography. By WILLIAM MORRIS DAVIS. Boston, U.S.A., and London: Ginn and Company. 1902. Size $7\frac{1}{2} \times 5$. Pp. xviii. + 402, Plates.

THIS is a simplified edition of the somewhat larger "Physical Geography" of the same author, and the chapter on the atmosphere deserves some attention, because it is designed for a purpose which must excite some surprise in this country—for use in schools. It has been enlarged in some parts compared with the original. To give in a single chapter a clear and simple statement of the general principles of meteorology is about as difficult a problem as could be set to any man. Success cannot be expected; but Professor Davis comes within sight of it, for he avoids error, and many points which are so lightly touched on as to remain obscure in the text will become clear when they are thought over, and could easily be expounded by a teacher. An excellent general account is given of the prevailing winds of the Earth's surface.

FIVE MONTHS WINTER RAINFALL, OCTOBER, 1902— FEBRUARY, 1903.

Stations.	Diff. from Aver.	Per cent. of Aver.	Stations.	Diff. from Aver.	Per cent. of Aver.	Station.	Diff. from Aver.	Per cent. of Aver.
	in.			in.			in.	
London	-2.17	78	Arncliffe	+4.62	115	Braemar	+6.92	143
Tenterden	-1.52	87	Hull	-1.51	86	Aberdeen	+ .31	102
Hartley Wintney	-1.18	89	Newcastle	- .27	98	Cawdor	+2.04	116
Hitchin	-2.00	80	Seathwaite ..	+5.01	107	Glencarron ..	+6.37	113
Winslow	-2.71	74	Cardiff	+1.43	108	Dunrobin	-1.67	89
Westley	-4.00	62	Haverfordwest ..	+1.62	107	Darrynane ..	-2.52	90
Brundall	-3.95	62	Gogerddan ..	- .49	98	Waterford ..	+3.63	120
Alderbury	-1.54	89	Llandudno ..	+ .41	103	Broadford ..	+1.81	112
Ashburton	+ .03	100	Dumfries	+3.68	117	Carlow	+2.67	117
Polapit Tamar ..	+2.83	116	Lilliesleaf	+4.16	131	Dublin	+1.43	112
Stroud	- .42	96	Colmonell	+2.13	110	Mullingar	+3.99	125
Woolstaston	- .46	97	Glasgow	+6.54	138	Ballinasloe ..	+2.11	113
Boston	-1.79	79	Inveraray	+3.61	110	Clifden ..	- .59	98
Hesley Hall	- .81	91	Islay	+ .33	101	Crossmolina ..	+2.38	109
Derby	- .43	95	Mull	+2.71	110	Seaforde	+3.63	121
Bolton	+1.14	107	Loch Leven ..	+5.90	135	Londonderry ..	- .04	100
Wetherby	+2.17	122	Dundee	+1.41	111	Omagh	+2.95	117

With exceptions that hardly require notice the rainfall in February (see Table on p. 36) was well below the average in south and central England, where Camden Square and Addington, Winslow, had little more than half the average fall of the month, while Boston had just about one-third and Westley, near Bury St. Edmunds, and Brundall, near Norwich, had barely one-fifth. On the other hand, the rainfall of Ireland, the north of England and Scotland was far above the average, at Seathwaite the fall for the shortest month of the year reached the enormous total of almost 21 inches, or one and three quarters of the average, while Arncliffe, near Skipton, had nearly twice its average fall. These figures, however, become insignificant compared with the enormous excesses of rainfall in Scotland, where Braemar had more than two and a half times, and Loch Leven two and three quarter times their usual February fall.

The result of this condition of things (which is fully explained by the barometrical conditions described in Mr. Brodie's letter) is that the irregularity of the cumulative winter's rainfall referred to last month, has been rendered more remarkable. Speaking generally, the winter's rainfall has been below the average over the whole of eastern and central England, and above the average in Cornwall, Devon, Somerset, Wales, the north of England, Scotland and Ireland. The centre of greatest deficiency is in East Anglia, where less than two-thirds of the normal supply of the ten years, 1890-99 (a period in itself very dry), has been received. The centre of greatest excess is in the centre and south of Scotland, where the rainfall for the five winter months exceeds the ten years' average by one-third, and in that part of the country the ten year period in question had a normal rainfall.

THE FORCE OF THE WIND DURING THE GALE OF
FEBRUARY 26TH-27TH.

THE maximum wind forces recorded during the gale of the 26th and 27th of February, 1903, were such as to justify us in regarding it as one of the most severe storms which has visited the British Isles for several years.

As is usually the case with gales which reach us from the south-west or west, the strongest forces were felt almost exclusively in the districts adjacent to our western littoral, and a quite remarkable agreement is shown in the maximum wind velocities registered over that part of the kingdom by pressure-tube anemometers, which are the only instruments by which at present this feature of wind-force can be satisfactorily measured.

At Pendennis Castle, which faces the sea at the entrance to Falmouth harbour, a maximum rate of 88 miles per hour was reached just before midnight of the 26th, and the rate exceeded 80 miles per hour many times between 9 p.m. on the 26th and 1 a.m. on the 27th, when the gale began to subside. At Holyhead the maximum rate was 87 miles per hour, recorded five hours later than the extreme at Falmouth, and here the force began to decrease at 6 a.m. At Bidston the maximum velocity of the gale probably missed registration owing to the supply of ink in the pen of the pressure-tube anemometer failing, and the highest velocity recorded was only 78 miles per hour, at 5.20 a.m. At Southport the extreme rate reached was 92 miles per hour, at about 6 a.m. on the 27th.

These very high velocities correspond to a wind-pressure of from 23 lbs. to 25 lbs. per square foot; and the actual pressures recorded at Holyhead and at Southport, by pressure-plate anemometers constructed to eliminate the large inertia errors, which there is good reason for believing always exist in the Osler instrument, were 23 lbs. and 28 lbs. respectively, thus agreeing very closely with the pressure-tube results. At Bidston, however, a pressure of 47 lbs. was registered by the Osler plate, and this, although a high record, is considerably below many pressures which have been registered there in previous gales apparently not more severe than this.

Along the south coast the recorded velocities were considerably lower. At Rousdon the maximum was only 61 miles, which is less than might have been expected seeing that at Shoeburyness it reached a rate of 73 miles per hour, which is equal to a pressure of 16 lbs. per square foot. At Greenwich the Osler plate recorded 33 lbs. per square foot, or four pounds less than it did two days earlier, in a gale which at Shoeburyness and at Kew was much less severe than that under discussion. The explanation of this anomaly is found in the fact that the extent to which the records of such instruments as that still used at Greenwich are exaggerated, depends a good deal upon the way in which, after having been struck by a gust, the vibrating plate is "followed up" by other gusts immediately succeeding the first.

A few years ago a portion of a train passing along an exposed part of a "light" railway on the Kerry coast was overturned by the wind; but so far as we know—with the exception of the Tay Bridge accident in 1879, when the wind was only one contributing cause amongst others—that is the only instance in which such an accident has occurred on any railway in the British Islands since 1867, when a brake van and a Post Office van were blown over upon their sides, after the train of which they formed a part had been brought to a standstill by the wind, upon an exposed bank not far from Aber in North Wales.

In the present gale, however, the wind was able to surpass that feat and to overturn ten passenger coaches and vans, whilst a train was on the Leven viaduct, near Ulverston. The force required to overturn an ordinary railway carriage may be taken as about 30 lbs. per square foot, so that a squall not much stronger than the strongest recorded at Southport was probably all that was needed to do the damage on this occasion, especially as the train was not heavily laden.

The Robinson cup anemometers do not record the extreme force of the wind; but the mean hourly velocities they registered during the gale were from 60 to 66 miles per hour (true), the latter amount being the record at Kingstown, in which neighbourhood, and in Dublin, much damage was wrought by the gale. On the east coast of England the force recorded was much less, and in the Orkneys the gale was by no means severe.

R. H. C.

Correspondence.

THE GALE OF FEBRUARY 27TH.

To the Editor of Symons's Meteorological Magazine.

As the Marshside anemograph station of this observatory appears to have been exposed to the full force of the recent "storm" (force 11), the following hourly velocities of the wind, deduced from the traces of the Dine's pressure tube recording anemometer, may possibly be of interest to some of your readers. Following the Meteorological Office system, the values are in each case the means for the period from 30 minutes before until 30 minutes after the exact hour. The directions have been obtained in the same way from the traces of my recording anemoscope.

February 27th, 1903.

	1 a.m.	2 a.m.	3 a.m.	4 a.m.	5 a.m.
Velocity in miles..	37	36	38	47	50
Direction	S.S.E.	S. by E.	S. by W.	S.W.	S.W.
	6 a.m.	7 a.m.	8 a.m.	9 a.m.	10 a.m.
Velocity in miles...	63	67.5	66	59	53
Direction	S.W. by W.	S.W. by W.	S.W. by W.	W.S.W.	W.S.W.
	11 a.m.	Noon.	1 p.m.	2 p.m.	3 p.m.
Velocity in miles...	50	44	39	36	31
Direction	W.S.W.	W.S.W.	W.S.W.	W.S.W.	W.S.W.

By midnight the velocity had fallen to 13 miles, and the direction had veered to W. by N. The rate of movement during the strongest momentary gust was 92 miles per hour, there being, in all, four gusts of 90 miles or upwards.

The maximum pressure registered by Dine's non-oscillating pressure plate anemometer was 28·8 lbs. per square foot. This is higher than the 92 miles would represent, though the maxima from our improved forms of the two instruments now usually agree very closely. The probability would appear to be that the plate, although mounted somewhat below the "head" of the tube, was struck by a stronger gust than any encountered by the latter.

JOSEPH BAXENDELL.

The Fernley Observatory, Southport, March 3rd, 1903.

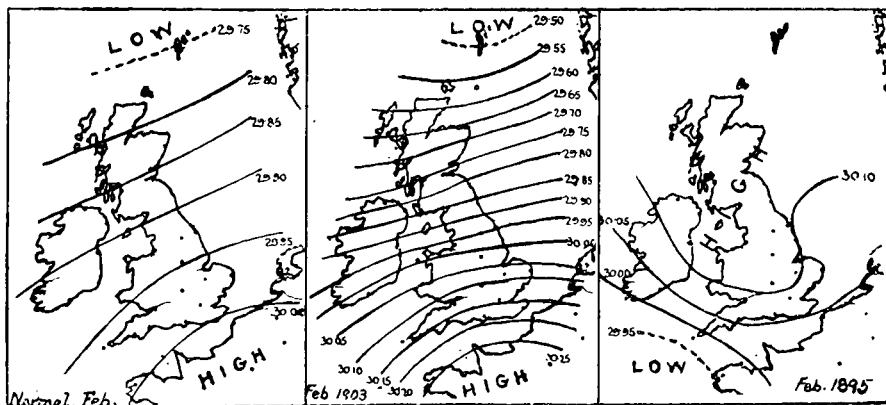
ATMOSPHERIC PRESSURE IN FEBRUARY.

To the Editor of Symons's Meteorological Magazine.

IN connection with the very exceptional weather of last month the accompanying little maps may, perhaps, be of some interest. Each map shows by isobars, drawn for every half-tenth of an inch, the monthly mean distribution of barometrical pressure over the United Kingdom at 8 a.m.

Map 1 gives the normal distribution in February, and is based upon the 30 years' average 1871-1900. It will be seen that in an average February the mean pressure ranges from a little above 30·00 inches over the eastern part of the English Channel to about 29·75 inches in the Shetlands, the distribution being favourable for moderate breezes from the south-westward.

Map 2 shows the distribution of mean pressure as it existed last month. In this case the values ranged from about 30·25 inches over the southern part of the Channel to about 29·90 inches in the Shetlands. The general trend of the isobars was very similar to that shown in the normal map; but as the actual values in the extreme



FEBRUARY ISOBARS.

south were nearly a quarter of an inch above the average, while those in the extreme north were just as much below it, the barometrical gradient for south-westerly winds was immensely steeper in 1903 than in the normal February. In the normal map only six isobars are shown, while in that for February, 1903, there are no fewer than sixteen, the actual difference in pressure from south to north being nearly three times as great as usual. So striking a result was due to the fact that in the course of the month an almost constant succession of cyclonic systems swept past our north-western and northern coasts, each disturbance causing a great depression of the barometer in those regions and thus leading, in a cumulative way, to the reduction shown by the monthly mean values. According to the map the south-westerly winds should have blown last month with three times their usual strength; and, if they did not quite do this, their constant presence was sufficient to give us an exceptionally high mean temperature, with frequent heavy rains in the west and north, and especially along the Atlantic seaboard.

As a matter of curiosity I reproduce in Map 3 the pressure conditions existing in February, 1895—a month, it will be remembered, of intense frost and burst water-pipes, but of little rain. In that case the mean distribution was distinctly anticyclonic, the area of lowest pressure having been shifted from its usual place in the north to the neighbourhood of our south-west coasts. Maps 2 and 3 afford a striking example of the weather possibilities our changeable climate is capable of affording.

FREDK. J. BRODIE.

*12, Patten Road, Wandsworth Common, S. W.,
9th March, 1903.*

THE HIGH TEMPERATURE OF FEBRUARY, 1903, IN LONDON.

THE persistently mild character of the past month is strikingly brought out by an examination of the records of temperature at Camden Square, as shown in the following table:—

	Mean temp.	Maximum.		Minimum.		Earth temp. 1 foot. Mean.
		Mean.	Highest.	Mean.	Highest.	
Average (1858-97)...	39°·8	45°·5	55°·2	34°·7	45°·4	38°·9
February, 1903.....	45·1	50·8	59·0	40·0	52·0	42·4
Difference	+ 5·3	+ 5·3	+ 3·8	+ 5·3	+ 6·6	+ 3·5

The month of February is probably liable to a greater range of temperature than any of the other winter months; and, as February, 1895, was the coldest, February, 1903, seems to have

been almost, if not quite, the warmest winter month since observations were commenced in 1858. The mean temperature, $45^{\circ}\cdot1$, has only been exceeded in 1867 with $45^{\circ}\cdot3$, and in 1869 with $45^{\circ}\cdot9$, during the 45 years. The mean shade maximum, $50^{\circ}\cdot8$, was passed in 1869 with $51^{\circ}\cdot7$, and in 1872 with $51^{\circ}\cdot1$; but the absolute maximum, $59^{\circ}\cdot0$, has been surpassed on six occasions, the highest being the remarkable reading of $64^{\circ}\cdot8$ on February 10th, 1899. The most notable figures in 1903, however, occur among the shade minima; for although the mean, $40^{\circ}\cdot0$, was very slightly exceeded in February, 1867, with $40^{\circ}\cdot2$, and in 1869 with $40^{\circ}\cdot6$, it has not once been reached in March, and is $0^{\circ}\cdot3$ higher than the average for April. The highest minimum reading, $52^{\circ}\cdot0$, on 21st, has never been approached in February or March, and is a figure rarely attained in April. The earth temperatures supply a good indication of protracted warmth, particularly with respect to its effect on vegetation, and though the mean, at 1 foot below the surface, $42^{\circ}\cdot4$, was no higher than in 1872 ($43^{\circ}\cdot1$) and 1877 ($42^{\circ}\cdot4$), the figure exceeded the average for March by $1^{\circ}\cdot7$.

Coupled with the almost rainless weather of the first three weeks, the high temperature imparted to the month a prematurely spring-like aspect, to be rudely dispelled by the storms and rain of the last week.

THE CANADIAN CLIMATE.

By R. F. STUPART, Director Meteorological Service, Dominion of Canada.

(Continued from p. 4.)

THE summers of western Quebec are as warm as in western Ontario; in July the 70° isotherm passes not far south of Montreal, the 65° line passes through Quebec City, and most of the Gaspé Peninsula has a mean temperature somewhat below 60° . The winters are cold, but dry and bracing, and may very fairly be compared with those of St. Petersburg and Moscow. Zero temperatures, while not infrequent, are not the rule, and it is only on a few occasions in each winter that exceedingly cold dips are experienced. The third week in April sees the trees along the St. Lawrence budding, and it is not until late in November that the last red sars leaves fall.

The opening of spring in the maritime provinces is usually a little later than in southern and western Ontario and the North-West Territories, and somewhat earlier than in the lower St. Lawrence Valley; on the other hand, the summer lingers longer, especially in the Annapolis Valley. The summers are, as a rule, not quite so warm as in western Canada, great heat being seldom experienced, except very occasionally in the inland stations of New Brunswick.

The average precipitation of these provinces is between forty and forty-five inches, except along the southern coast-line of Nova Scotia, where it is nearly ten inches greater.

A trip through the Annapolis Valley in Nova Scotia in October

will amply repay the tourist, as nothing can be conceived more beautiful than the gorgeous autumn tints which everywhere enhance the loveliness of the landscape; but whether in the land of Evangeline or in the region of the great fresh water seas which lave Ontario's shores, the unbiassed individual must allow that in truth the most salient feature of Canada's climate is not the cold of winter, but the perfection of the summer and autumn.

The whole of Canada, with the exception of near the coast in British Columbia, is favoured with more sunshine than any portion of Great Britain, Germany, Holland or northern France. Nearly all parts of the Dominion have an annual percentage of over 40, and a summer percentage of between 53 and 59, whereas it is only in the more southern parts of England that a normal annual percentage of 36 is reached, and the summer figures, while in a few instances up to 50, are more generally between 35 and 45. At German stations the August maximum averages under 50 per cent., and in a few cases reaches 52. In the south of Europe much higher values are obtained: Vienna 54, Zurich 57, Trieste 66, Lugano 67, Rome 75, Madrid 84. These figures show that it is only the southern parts of Europe that have more sunshine than Canada.

A few facts regarding the climate of the "Golden" Klondyke may, perhaps, be acceptable to some persons. Its geographical position is as follows:—Yukon Territory has nearly the shape of a right-angled triangle, of which the base is an arc of the 60th parallel, the perpendicular an arc of the 141st meridian, and the hypotenuse the Rocky Mountains. To reach the Klondyke the traveller now lands at Skagway on the Pacific coast, crosses the coast range of mountains by railway, passing through superb scenery, and then has a trip of 430 miles by steamer down the Yukon River. The distance from Toronto to Dawson City is 2700 miles as the crow flies.

A somewhat broken series of observations at Dawson and various other places in Yukon Territory between 1895 and 1898, and a continuous series at Dawson during the past three years, afford data for estimating with a fair degree of accuracy the average climatic conditions of the Klondyke. The average annual mean temperature is about 22° ; the mean of the three summer months is about 57° , July being 61° ; and of the three winter months, -16° , with January, -23° . Spring may be said to open towards the end of April, the last zero temperature of the winter usually occurring about the 5th of that month. May, with an average temperature of 44° , is by no means an unpleasant month, and the 23rd is the average date of the last frost of spring. Daily observations during five summers indicate that, on the average, the temperature rises to 70° or higher on 46 days, and to 80° or higher on 14 days; 90° was recorded in Dawson in June, 1899, and 95° in July of the same year. These temperatures, with much bright sunshine and an absence of frost

during three months, together with the long days of a latitude within a few degrees of the Arctic Circle amply account for the success so far achieved by market gardeners near Dawson in growing a large variety of garden produce, including lettuce, radish, cabbage, cauliflower and potatoes, and warrant the belief that the hardier cereals might possibly be a successful crop, both in parts of the Yukon Territory and in the far northern districts of the MacKenzie Basin. August 23rd would appear to be the average date of the first autumnal frost, the temperature rapidly declining towards the close of that month. Although night frosts are not infrequent in September, the month as a whole is mild with a mean temperature of 42° . October may be fairly termed a winter month, the mean temperature being but $22^{\circ}\cdot5$, and the first zero of the winter is recorded on the average about the 18th. Ice usually begins to run in the Yukon about the second week of October, but it is not until quite the end of the month, or early in November, that the river is frozen fast. The temperature on the average during a winter falls to 20° below zero or lower on 72 days, to 40° below or lower on 21 days, to 50° below or lower on 7 days, and to 60° below or lower on 2 days. In January, 1896, 65° below zero was registered at Fort Constantine, and in January, 1901, -68° was recorded at Dawson.

Observations of rain and snow have until the close of last summer been very fragmentary, but it is probable that the summer rainfall near Dawson is usually between seven and nine inches, and that the total snowfall of autumn and winter is between fifty and sixty inches.

Dawson being situated near the river, with high hills or mountains on all sides, is well protected from the winds, and a feature of the town, and, indeed, of the neighbouring country, is the occurrence of long periods of calm weather.

(To be continued.)

ROYAL METEOROLOGICAL SOCIETY.

THE usual monthly meeting was held on Wednesday evening, February 18th, at the Society's rooms, 70, Victoria Street, Westminster. Capt. D. Wilson-Barker, President, in the chair.

The following gentlemen were elected Fellows of the Society:—Mr. Hari D. Das, Mr. H. E. Goldsmith, Mr. W. G. Groves, Khan Bahadur A. Lateef, Dr. G. Oliver, and Dr. P. Horton Smith.

The President announced the death of Mr. J. Glaisher, F.R.S., on February 7th, and spoke of the valuable services which he had rendered to English meteorology.

Mr. A. Brewin, as one of the oldest Fellows in the Society, and a personal friend of Mr. Glaisher, moved the following resolution:—

“The Council and Fellows of the Royal Meteorological Society have heard with regret of the death of Mr. James Glaisher, F.R.S., who was one of the founders of the society. He held the office of

Secretary from 1850 until 1872, excepting for the two years 1867-8, when he was President, and he was a member of Council in 1873. The Council and Fellows desire to record their high sense of the valuable assistance which Mr. Glaisher rendered to the society in the early years of its existence, and of his great and long continued service in the promotion of the science of meteorology. The Council and Fellows desire to express their sympathy with his son, Dr. J. W. L. Glaisher, F.R.S."

The resolution was seconded by Mr. R. Inwards, supported by Mr. H. Southall and Mr. W. Marriott, and unanimously agreed to.

Mr. E. Mawley read his "Report on the Phenological Observations for 1902." In all parts of the British Isles the phenological year ending November 30th was generally cold and sunless. Rain fell at unusually frequent intervals, so that although the total quantity proved deficient, there were no periods of drought. Wild plants were everywhere behind their mean date in coming into flower, but the departures from the average were as a rule slight, until about the middle of May. After that time until the end of the flowering season the dates of the blossoming were later than in any other year since the present series of records was instituted except 1891 and 1900, as will be seen from the accompanying table.

Mean results for 13 plants.

ENGLAND.										
Year.	S.W.		South.		Midlands.		East.		N.W.	
	Day of year.	Diff. from average.	Day of year.	Diff. from average.	Day of year.	Diff. from average.	Day of year.	Diff. from average.	Day of year.	Diff. from average.
		Days.		Days.		Days.		Days.		Days.
1891...	144	+10	144	+9	150	+11	147	+11	150	+7
1892...	139	+5	138	+3	144	+5	143	+7	147	+4
1893...	118	-16	122	-13	125	-14	123	-13	128	-15
1894...	126	-8	130	-5	135	-4	127	-9	137	-6
1895...	139	+5	138	+3	141	+2	138	+2	144	+1
1896...	125	-9	128	-7	132	-7	130	-6	134	-9
1897...	130	-4	132	-3	136	-3	132	-4	142	-1
1898...	133	-1	135	0	138	-1	136	0	141	-2
1899...	136	+2	136	+1	141	+2	138	+2	145	+2
1900...	142	+8	141	+6	144	+5	143	+7	152	+9
1901...	138	+4	139	+4	141	+2	139	+3	144	+1
1902...	139	+5	140	+5	145	+6	142	+6	152	+9
Mean	134	...	135	...	139	...	136	...	143	...

— signifies *early*, and + *late*.

The swallow, cuckoo, and nightingale were a few days earlier than usual in making their appearance.

The most remarkable feature as regards the weather and its effect on vegetation was the way in which it favoured the growth of all farm crops, except potatoes and hops, for it is seldom that in the same year the yield of wheat, barley, oats, beans, peas, turnips, mangolds and grass, is alike abundant, even in a single district, much less in all parts of the kingdom, as was the case in 1902. On the other hand, all the fruit crops were more or less deficient, with the exception of strawberries, which yielded well, but were, like most other fruits, lacking in flavour.

The President, Mr. R. G. K. Lempfert, Mr. H. Southall, Mr. R. H. Curtis, Mr. C. Harding, and Mr. W. Marriott, took part in the discussion, and Mr. E. Mawley replied.

METEOROLOGICAL NEWS AND NOTES.

THE SCOTTISH ANTARCTIC EXPEDITION will, contrary to the original plan, endeavour to find a safe wintering place as far south as possible in the Antarctic regions south of South America, and spend the next six months in a high latitude. Mr. Mossman writes that he is looking forward to this opportunity for securing a unique series of records of polar weather. As yet he has been able to reduce and discuss his observations on the voyage out, month by month, and this he hopes to continue to do, so that they will be ready for immediate publication on his return.

THE INTERNATIONAL COUNCIL FOR THE STUDY OF THE SEA met for the second time at Copenhagen in the last week of February. The question of meteorological observations, with special reference to kite-work at sea, was discussed by an informal committee consisting of the representatives interested in physical work, which included Dr. Nansen (Christiania), Professor Pettersson (Stockholm), Professor Homén (Helsingfors), Dr. Knudsen (Copenhagen), Professor Krümmel (Kiel), Dr. Wind (de Bilt), Professor Gilson (Louvain), and Dr. H. R. Mill (London). It is understood that a great deal of information as to the surface temperature of the North Sea has already been obtained by means of observations carried out on board the regular trading steamers, which will continue to supplement the quarterly cruises of the ten special research steamers of the associated countries.

CYCLES OF RAINFALL IN UTAH are discussed by Mr. L. H. Murdoch in the *Monthly Weather Review* for October, 1902. He carries back the curve of rainfall fluctuations to 1827, by utilizing the relation between the level of Great Salt Lake and the amount of rainfall, which is very intimate and sympathetic. An extremely dry period prevailed from 1827 to 1863, in the latter year the fall was as little as 7 in., the lowest recorded; in 1867 it was 28 in., the highest recorded, and until 1879 it never fell so low as 16 in.; since that time it has never been so high as 20 in., and twice has been as low as 11 in. In view of the immense money value of a knowledge as to how long the present dry period may last, the author endeavoured to trace a relation between sunspot and other natural cycles and the rainfall, but without success.

RAINFALL AND TEMPERATURE, FEBRUARY, 1903.

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 1890-9.	Greatest Fall in 24 hours.		Max.		Min.					
				inches.	inches.			in.	Dpth	Date	Deg.	Date	Deg.	Date	In shade.	On grass.
I.	London (Camden Square) ...	.83	—	.64	.30	27	10	59.0	20	25.7	18	4	8
II.	Tenterden	1.39	—	.31	.77	27	8	59.8	20	27.0	2	4	11
III.	Hartley Wintney	1.37	—	.26	.37	27	14	58.0	20	27.0	2	7	9
III.	Hitchin	1.03	—	.43	.24	24	12	59.0	9	25.0	17	6	...
IV.	Winslow (Addington) .....	.76	—	.70	.28	24	9	60.0	19	26.0	18	4	6
IV.	Bury St. Edmunds (Westley) .....	.28	—	1.26	.04	22a	10	59.5	9	25.0	18	6	...
V.	Norwich (Brundall) .....	.34	—	1.18	.10	21	8	58.6	9	24.8	17	6	10
V.	Winterborne Steepleton	1.78	...	...	.56	27	14	52.0	12	23.0	18	3	8
VI.	Torquay	2.61	...	...	.63	27	14	57.1	9	34.6	2	0	5
VI.	Polapit Tamar [Launceston]..	2.60	—	.01	.62	26	17	58.8	19	26.1	14	3	7
VI.	Stroud (Upfield)	1.47	—	.45	.39	24	12	55.0	9b	28.0	17	4	...
VII.	Church Stretton (Woolstaston)	2.19	+	.19	.95	23	13	54.5	9	30.0	2	3	...
VII.	Worcester (Diglis Lock)	1.92	+	.41	.56	24	13	...	...	...	...	...	...
VII.	Boston .....	.47	—	.88	.16	24	5	58.0	8	26.0	18	...	...
VIII.	Hesley Hall [Tickhill].....	.98	—	.47	.20	22	11	59.0	8, 19	29.0	18f	3	...
VIII.	Derby (Midland Railway).....	1.15	—	.30	.34	24	10	60.0	9	28.0	18	5	...
IX.	Bolton (The Park).....	3.85	+	1.41	.88	21	22	53.5	20	31.2	2	2	...
IX.	Wetherby (Ribston Hall) ...	2.20	+	.76	.65	21	13	...	...	...	...	...	...
X.	Skipton (Arncliffe)	9.15	+	4.33	1.64	21	21	...	...	...	...	...	...
X.	Hull (Pearson Park) ...	.97	—	.75	.26	21	10	60.0	8	30.0	2	5	13
X.	Newcastle (Town Moor)	1.26	—	.21	.32	26	13	...	...	...	...	...	...
XI.	Borrowdale (Seathwaite).....	20.85	+	9.08	3.47	4	24	52.5	8	30.3	28	3	...
XI.	Cardiff (Ely).....	2.51	—	.38	.53	25	22	...	...	...	...	...	...
XI.	Haverfordwest	3.09	—	.25	.62	24	19	53.7	19	32.5	13	0	12
XI.	Aberystwith (Gogerddan) ...	3.52	+	.37	.65	25	17	55.0	19c	22.0	17	7	...
XII.	Llandudno	3.43	+	1.48	.74	21	18	57.0	20	34.8	28	0	...
XII.	Cargen [Dumfries]	5.70	+	2.04	1.18	24	18	53.0	8d	29.0	28	1	...
XIII.	Edinburgh (Royal Observatory)	3.99	...	...	1.43	8	16	54.5	19	31.3	2	4	10
XIV.	Colmonell	3.35	—	.06	.80	26	18	56.0	19	32.0	27	1	...
XV.	Tighnabruaich	8.41	...	...	1.96	7	21	49.0	9	29.0	1	5	...
XV.	Mull (Quinish)	7.92	+	3.53	1.11	25	27	...	...	...	...	...	...
XVI.	Loch Leven Sluices	6.96	+	4.18	1.96	9	17	...	...	...	...	...	...
XVI.	Dundee (Eastern Necropolis)	3.30	+	1.17	1.30	8	16	55.3	19	29.3	13	4	...
XVII.	Braemar	6.74	+	4.16	1.45	24	19	52.7	19	28.2	28	9	18
XVII.	Aberdeen (Cranford) ...	2.47	+	.06	1.15	8	17	57.0	19	30.0	12g	9	...
XVIII.	Cawdor (Budgate)	3.47	+	1.53	.63	8, 25	19	...	...	...	...	...	...
XVIII.	Strathconan [Beaul]	7.05	+	2.86	1.25	28	14	...	...	...	...	...	...
XIX.	Glencarron Lodge	13.54	+	6.22	1.41	3	27	54.7	20	29.5	28	9	...
XIX.	Dunrobin	3.08	+	.66	.90	8	16	55.0	10	31.0	24	...	2
XX.	S. Ronaldshay (Roeberry) ...	3.14	+	.58	.42	25	23	53.0	19	28.0	1	7	...
XX.	Darrynane Abbey.....	3.31	—	.71	.60	26	22	...	...	...	...	...	...
XXI.	Waterford (Brook Lodge) ...	2.75	—	.16	.52	26	14	54.5	9	30.0	28	2	...
XXI.	Broadford (Hurdlestown) ...	2.71	+	.49	.54	21	20	54.0	9e	30.0	1	4	...
XXII.	Carlow (Browne's Hill)	3.03	+	.48	.55	26	15	...	...	...	...	...	...
XXII.	Dublin (Fitz William Square)	2.23	+	.28	.64	26	15	59.0	8	31.7	28	1	3
XXIII.	Ballinasloe	4.21	+	1.78	.51	26	18	55.0	8, 9	26.0	27	10	...
XXIII.	Clifden (Kylemore)	7.21	+	1.30	1.12	27	22	...	...	...	...	...	...
XXIII.	Seaforde	3.15	+	.36	.77	26	20	55.0	8, 22	25.0	27	6	7
XXIII.	Londonderry (Creggan Res.)	3.93	+	1.22	.68	26	19	...	...	...	...	...	...
XXIII.	Omagh (Edenfel)	4.00	+	1.40	.65	7	19	57.0	19	28.0	27	4	9

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

a and 24, 25, 26. b and 19, 20. c and 20. d and 9, 10. e and 10, 19. f and 28. g and 15, 23, 26, 27.

SUPPLEMENTARY RAINFALL, FEBRUARY, 1903.

Div.	STATION.	Total Rain.	Div.	STATION.	Total Rain.
		in.			in.
I.	Uxbridge, Harefield Pk..	·75	XI.	Llandefaelog-fach.....	3·59
II.	Dorking, Abinger Hall ..	2·18	„	New Radnor, Ednol.....	4·27
„	Sheppey, Leysdown	1·26	„	Rhayader, Nantgwillt ...	5·82
„	Hailsham	1·50	„	Lake Vyrnwy	5·51
„	Crowborough.....	2·02	„	Ruthin, Plâs Drâw	2·60
„	Ryde, Beldornie Tower..	1·42	„	Criccieth, Talarvor	1·95
„	Bournemouth, Kempsey ..	1·95	„	I. of Anglesey, Lligwy..	4·40
„	Emsworth, Redlands ...	1·57	„	Douglas, Woodville.....	3·06
„	Alton, Ashdell	2·34	XII.	Stoneykirk, Ardwell Ho.	2·17
„	Newbury, Welford Park ..	1·77	„	Dalry, Old Garroch	10·24
III.	Oxford, Magdalen Coll..	·75	„	Moniaive, Maxwellton Ho.	6·44
„	Banbury, Bloxham	1·15	„	Lilliesleaf, Riddell	3·79
„	Pitsford, Sedgebrook ...	·96	XIII.	N. Esk Res. [Penicuick]	6·25
„	Huntingdon, Brampton ..	·75	XIV.	Dalry, Blair	6·59
„	Wisbech, Bank House....	·66	„	Glasgow, Queen's Park..	7·27
IV.	Southend	1·12	XV.	Inveraray, Newtown ...	11·17
„	Colchester, Lexden	·45	„	Ballachulish, Ardsheal...	12·89
„	Saffron Waldon, Newport ..	·68	„	Campbeltown, Redknowe ..	3·64
„	Rendlesham Hall	·26	„	Islay, Eallabus	5·57
„	Swaffham	·44	XVI.	Dollar.....	3·38
V.	Salisbury, Alderbury ...	1·60	„	Balquhider, Stronvar...	15·13
„	Bishop's Cannings	1·93	„	Coupar Angus Station...	3·69
„	Ashburton, Druid House ..	4·38	„	Blair Atholl ...	5·91
„	Okehampton, Oaklands..	4·43	„	Montrose, Sunnyside ...	2·93
„	Hartland Abbey	2·32	XVII.	Alford, Lynturk Manse..	3·06
„	Lynmouth, Rock House ..	3·12	„	Keith H.R.S.....	2·45
„	Probus, Lamellyn	1·82	XVIII.	Fearn, Lower Pitkerrie..	1·97
„	Wellington, The Avenue ..	1·96	„	S. Uist, Askernish	5·01
„	North Cadbury Rectory ..	1·53	„	Invergarry	16·88
VI.	Clifton, Pembroke Road ..	2·01	„	Aviemore, Alvie Manse ..	4·20
„	Ross, The Graig	2·15	„	Loch Ness, Drumnadrochit	6·59
„	Shifnal, Hatton Grange ..	1·27	XIX.	Invershin	3·94
„	Wem, Clive Vicarage	1·41	„	Bettyhill	4·45
„	Cheadle, The Heath Ho. ...	1·17	„	Watten H.R.S.....	2·21
„	Coventry, Kingswood ...	1·21	XX.	Cork, Wellesley Terrace ..	3·37
VII.	Market Overton	·97	„	Killarney, District Asyl.	5·17
„	Grantham, Stainby	·97	„	Glenam [Clonmel]	3·89
„	Horncastle, Bucknall ...	·47	„	Ballingarry, Hazelfort...	3·35
„	Worksop, Hodsck Priory ..	·95	„	Miltown Malbay	5·17
VIII.	Neston, Hinderton	1·45	XXI.	Gorey, Courtown House ..	2·38
„	Southport, Hesketh Park ..	2·18	„	Moynalty, Westland ...	4·19
„	Chatburn, Middlewood ..	5·23	„	Athlone, Twyford	3·42
„	Duddon Val., Seathwaite Vic.	8·41	„	Mullingar, Belvedere ...	4·45
IX.	Langsett Moor, Up. Midhope	4·97	XXII.	Woodlawn	4·58
„	Baldershy	1·82	„	Westport, Murrisk Abbey ..	6·10
„	Scalby, Silverdale	1·73	„	Crossmolina, Enniscoe ..	6·36
„	Ingleby Greenhow Vic..	1·83	„	Collooney, Markree Obs.	5·19
„	Middleton, Mickleton ...	3·93	XXIII.	Enniskillen, Portora ...	3·74
X.	Beltingham	4·98	„	Warrenpoint.....	3·17
„	Bamburgh	1·40	„	Banbridge, Milltown ...	1·84
„	Keswick, The Bank	9·45	„	Belfast, Springfield	3·02
„	Melmerby Rectory	4·21	„	Bushmills, Dundarave..	3·11
XI.	Llanfrehfa Grange	2·84	„	Stewartstown	1·75
„	Treherbert, Tyn-y-waun ..	7·11	„	Killybegs	6·09
„	Castle Malgwyn	4·10	„	Horn Head	5·29

METEOROLOGICAL NOTES ON FEBRUARY, 1903.

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

ENGLAND.

LONDON, CAMDEN SQUARE.—See as to temperature p. 30. The first three weeks were practically rainless but mostly dull. Frost on 17th and 18th. Frequent R and squalls in the last week.

TENTERDEN.—The first three weeks were very dry. A succession of gales from 20th to 28th.

SHEPPEY, LEYSDOWN.—Remarkably fine for the first three weeks. On 21st the wind blew with terrific force from S.W., and a succession of S. and S.W. gales culminated on the night of 23th in a perfect hurricane.

CROWBOROUGH.—On the whole fine and sunny, and except for the first three days remarkably mild. Till 21st the R was scanty, but the heavy R of the last week brought the total to nearly the average. Heavy gales on 7th and 26th.

COLCHESTER, LEXDEN.—Very mild and spring flowers well forward. Several beautiful days. Gales from W. or S.W. during the last 10 days.

BURY ST. EDMUNDS, WESTLEY.—Very dry, windy and mild; only 3 drier Februaries in 46 years.

NORWICH, BRUNDALL.—Mean temp. $44^{\circ}3$, the highest in February since observations commenced in 1883. Very early start of vegetation; an apricot tree in bloom in the open before the close and many spring flowers a month earlier than usual. Great gale on the night of 26th with terrific gusts.

TORQUAY, CARY GREEN.—R .08 in. below the average. Mean temp. $4^{\circ}6$ above the average. Duration of sunshine 78.4 hours, or 3.4 hours below the average, with 9 sunless days. Mean amount of ozone 6.7; max. 9.0 on 1st with W. wind and 8th with S.W. wind; min. 4.0 on 16th with N.N.W. wind.

LYNMOUTH, ROCK HOUSE.—Cold at the beginning, then mild, and the last 8 days stormy with H, S, R and colder nights, and T and L on 25th. Vegetation was at least a fortnight earlier than last year.

NORTH CADBURY RECTORY.—Till 21st very pleasant and dry, but the last week was so excessively stormy as to make the wind average the highest for 7 years, and to bring the R near to the normal.

ROSS, THE GRAIG.—The 25 days ending on 21st were exceptionally fine with only .16 in. of R; the five days ending on 26th yielded 2.08 in. Almost constant gales from 20th to 28th, the force in some of the gusts being very great, especially on the morning of 27th, recalling 28th February, 1860, and 21st February, 1861.

CHURCH STRETTON, WOOLSTASTON.—Very mild on the whole, but most exceptionally windy and with remarkably little S.

BOLTON, THE PARK.—On 25th, during a brief TS, one concussion was sufficient to shake the buildings of the town, and at Ainsworth a tall mill chimney was destroyed. On 27th occurred the severest gale for many years, its force being almost equal to that of the memorable gale of December 9th, 1886. Mean temp. $42^{\circ}9$, or $5^{\circ}4$ above average and $2^{\circ}2$ above previous highest.

MELMERBY, BALDERSBY.—Violent S.W. gale on 26th and 27th. Many trees uprooted and houses unroofed.

HULL, PEARSON PARK.—A few bright days, but generally dull and cold. Gales on 24th and 27th. H on 21st. Sunshine $44\frac{1}{2}$ hours.

WALES AND THE ISLANDS.

HAVERFORDWEST.—Mild, wet and very stormy. Continuous gales from 18th to 27th, reaching hurricane force on 26th. The most stormy February for 50 years. Sunshine 26.8 hours.

ABERYSTWITH, GOGERDDAN.—Again wet, but mild until the last week, when the great storm did some damage. No S, but heavy H at times.

DOUGLAS, WOODVILLE.—Wet and very stormy with much deficiency of sun. Though the temp. was unusually high throughout vegetation was extremely backward. A storm of probably almost unprecedented violence on 26th and 27th did much damage to churches, houses, trees and gardens, and had the season been less backward the injury would have been most serious.

SCOTLAND.

CARGEN [DUMFRIES].—The mean temp., 44° , was the highest since observations commenced in 1860. The gale on 27th caused considerable damage to timber and houses.

LILLIESLEAF, RIDDELL.—R excessive, being the highest since 1864 except 1894. Unprecedentedly rough and stormy, with wind velocity of 55 miles an hour day after day. Remarkably high temp.

MULL, QUINISH.—The wettest and stormiest February ever known here.

COUPAR ANGUS.—The fourth month in succession with abnormally heavy R, the total being about 2 inches above the average. All rivers, particularly the Tay, were in the highest flood for very many years. Mean temp. $41^{\circ}6$, the highest for 22 years.

S. UIST, ASKERNISH.—The stormiest month experienced within general recollection. Winds mostly from S.S.W. and S.E., rising to a full gale almost every day, and sometimes to hurricane force. Very little S.

WATTEN, H.R.S.—A series of storms of wind and R, often blowing a gale, with some intervals of fine weather.

IRELAND.

CORK, WELLESLEY TERRACE.—Chiefly remarkable for great storms. That on 26th, judging by its disastrous results both on land and sea, was the greatest for many years. R 0.07 in. below the average. Mean temp. $42^{\circ}2$, or $0^{\circ}5$ above the average.

DARRYNANE ABBEY.—Mild with much mist. The gale on 26th was said to be the worst remembered.

BROADFORD, HURDLESTOWN.—The gale on 26th was the worst since "the night of the big wind" on January 6th, 1839. Much damage was done, some very old trees were blown down, large ricks of hay were blown clean away and lost, and cattle were killed by the houses falling on them. The iron roof of a large cow-house was carried 200 yards.

MILTOWN MALBAY.—Cold, wet and stormy, the last 10 days being as bad as ever experienced, with H, S, sleet and storm. A great storm doing incalculable damage to houses, trees and farm produce on the night of 26th.

DUBLIN, FITZWILLIAM SQUARE.—Mean temp. $47^{\circ}5$, or 5° above the average; a record month for warmth. A hurricane on the night of 26th-27th unequalled since the "big wind" of January 6th, 1839. In Phoenix Park the storm uprooted nearly 3,000 trees, chiefly elms, and much havoc was wrought in Dublin amongst buildings, roofs and chimneys. Duration of bright sunshine for month 63.5 hours.

ATHLONE, TWYFORD.—The greatest storm since "the night of the big wind" on January 6th, 1839, raged on 26th. Trees were laid low all over the country, and in some cases almost whole woods.

BALLINASLOE.—Generally very stormy. Violent gale on 26th. Houses were unroofed and thousands of trees blown down all over the district. TS on 27th. Floods very high.

MARKREE OBSERVATORY.—The early part was mild and gloomy, with very heavy showers at times. Very bad weather from 18th, with T and L very often at night. Heavy gale on 26th, doing a lot of harm in the district.

BELFAST, SPRINGFIELD.—Dull and wet, and on the whole disappointing for farmers. Very destructive hurricane on the morning of 27th.

OMAGH, EDENFEL.—Generally fine and seasonable until 20th, with high mean temp., especially about 8th and 19th. The remainder was extremely unsettled and inclement, with a violent gale on the night of the 26th, doing, however, less damage than further south.

Other reports from Ireland describe the devastation wrought by the storm of February 26th-27th as of the most serious kind. On one estate near Birr 2,000 trees were uprooted and 4,000 on an estate in Kilkenny. Prof. C. J. Joly, Dunsink Observatory, Dublin, asks for a loan of any barograph records of the storm in Ireland.

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, SEPTEMBER, 1902.

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.									
London, Camden Square	76.0	22	38.3	19	67.0	48.7	50.8	80	121.3	35.2	1.00	9	5.7
Malta	91.6	4	63.2	...	84.1	70.6	67.2	75	141.0	58.9	2.58	4	2.8
Cape Town	72.0	19	44.2	26	64.1	52.2	49.7	75	...	...	5.98	16	5.7
Durban, Natal	105.6	23	51.5	3	77.3	57.9	...	...	156.1	...	2.54	13	6.0
Mauritius	81.8	19	55.4	16	79.5	63.4	61.0	71	146.5	46.1	1.25	15	5.0
Calcutta	92.2	4	75.2	30	89.5	78.9	77.7	83	158.8	71.4	6.98	12	7.8
Bombay	87.1	12	73.3	17	84.6	76.9	76.0	86	137.5	69.7	27.11	21	6.9
Madras	98.7	3	72.1	18	92.3	76.9	74.5	79	151.3	70.7	4.65	16	6.1
Kodaikanal	67.2	4	51.1	7	64.0	52.8	51.8	82	141.9	42.3	3.07	16	7.2
Colombo, Ceylon	90.0	28	72.0	4	86.8	75.4	74.2	83	150.0	71.0	8.18	20	6.9
Hongkong	91.2	22	69.6	28	87.3	76.2	68.3	65	146.5	...	.64	6	4.0
Melbourne	80.0	25	35.0	17	62.1	44.8	44.2	72	138.9	27.1	3.30	10	6.4
Adelaide	86.5	30	38.8	14	68.1	48.5	46.0	64	139.7	32.6	1.64	16	5.3
Coolgardie	83.6	4	38.0	13	71.5	48.3	45.6	60	152.2	33.0	1.92	6	3.2
Sydney	78.1	7	44.4	13	65.9	52.2	48.2	70	118.0	33.7	2.10	16	4.1
Wellington	60.0	2, 6	34.0	23 ^a	54.7	42.1	39.6	73	112.0	26.0	3.11	21	6.9
Auckland	63.5	19	41.0	10	56.9	45.4	41.1	69	128.0	38.0	6.21	22	5.2
Jamaica, Negril Point.	89.8	16	69.8	24	88.1	73.2	73.6	78	...	...	7.14	18	...
Trinidad	...	...	...	...	...	...	...	...	...	...	...	...	...
Grenada	88.8	13	72.2	1	85.1	75.0	68.7	57	158.2	...	7.08	23	2.0
Toronto	79.0	23	38.0	15	68.9	51.8	54.7	92	101.2	31.9	3.35	14	6.3
Fredericton, N.B.	79.3	2	31.0	26	68.3	46.8	47.9	67	...	...	3.83	9	5.2
Winnipeg	80.0	7	28.0	12	65.0	40.6	...	...	...	...	2.01	9	5.3
Victoria, B.C.	79.0	11	38.7	28	63.9	49.1	48.3	75	...	...	2.31	8	4.0
Dawson	62.0	8	26.4	28	50.4	35.5	...	...	...	...	1.17	9	5.5

^a—and 24.

MALTA.—Mean temp. of air 76°·1, or 1°·0, above average. Mean hourly velocity of wind 6.5 miles or 1.2 below average. Mean temp. of sea 76°·7. TSS on 6 days, L on 3 days, H on 28th. J. F. DOBSON.

MAURITIUS.—Mean temp. of air 1°·1, dew point 1°·0 above; rainfall .13 in. and mean hourly velocity of wind 1.1 mile below their averages. T. F. CLAXTON.

MADRAS.—Temp. below normal generally. L on 11 days, T on 9 days, and a TS on one day. Sunshine 113.6 hours, or 31.2 per cent. of possible. A. MOFFAT.

KODAIKANAL.—Bright sunshine 106 hours. A very cloudy month. C. MICHIE SMITH.

COLOMBO.—Mean temp. of air 80°·9, or 0°·1 above, of dew point 1°·0 above, and R 2.24 in. above, their respective averages. Mean hourly velocity of wind 8.3 miles, prevailing direction, S.W. TSS on 3 days. H. O. BARNARD.

HONGKONG.—Mean temp. 80°·8. Sunshine 225 hours, or 25 hours above average. R 12.01 in. below average. Mean hourly velocity of wind 8.0 miles. F. G. FIGG.

ADELAIDE.—Mean temp. 58°·3 or 1°·2 above, and R .08 in. below, average. C. TODD.

SYDNEY.—Mean temp. 0°·2 above, humidity 0°·4 below, and R .88 in. below averages. H. C. RUSSELL, F.R.S.

WELLINGTON.—Mean temp. 2°·5 below, and R 1.15 in. below, averages. A. H. GORE.

AUCKLAND.—Mean temp. 3°·5 below average, R nearly 3 in. above the average. Unusually wet and stormy. T. F. CHEESEMAN.