

Remarks on the Weather during the Quarter ending March 31, 1849. By JAMES GLAISHER, Esq., of the Royal Observatory, Greenwich.

THE meteorological returns for the past quarter furnished to the Registrar-General and myself have been received from thirty-four different places, whose returns have passed the necessary examination. The observations generally indicate a decided improvement, having been made for the most part by experienced observers, who have generally paid more attention to their instruments than hitherto. The results are therefore found to be more accordant with each other than any previously received.

Till January 7 and after March 18, the temperature of the air was below its average value; the mean amount of the deficiency of daily temperature in the former period was $6^{\circ}9$, and in the latter it was $3^{\circ}7$.

The interval of time between January 8 and March 17 was distinguished by very unusual warmth for the season. The average daily excess of temperature within this period was $6^{\circ}1$; on four of the days this exceeded 12° , on three days it exceeded 13° , and on two days it was greater than 14° .

The mean temperature of the three months ending February, constituting, in fact, the three winter months, was $42^{\circ}5$, being no less than $4^{\circ}7$ above the average temperature of the same time for seventy years. The warmest winters within this period were those ending February 1796, 1822, 1834 and 1846, and which were $43^{\circ}2$, $42^{\circ}4$, $43^{\circ}0$ and $43^{\circ}2$ respectively.

The pressure of the atmosphere during the month of February was very unusual. The average reading of the barometer from the 1st of February till the 18th was 30.36 inches at the height of 160 feet: this was fully half an inch above its average value. This denotes an increase in the volume of air of about one-sixtieth part above the usual quantity. On the 11th day the very unusual reading of 30.715 inches took place. The true reading for the whole day, reduced and corrected to 32° Fahrenheit, was 30.695 inches, showing that about one-thirtieth more than the usual quantity of air was over England on this day. The reading of the barometer on the 11th day, reduced to the level of the sea, was 30.91 inches. In December 1778 the reduced reading was 30.90 inches; in January 1825 it was 30.92 inches \pm .

The condition of the atmosphere, therefore, during the greater part of the past quarter, both with respect to pressure and heat, has been very unusual.

From the discussion of the observations which have been made at the Apartments of the Royal Society since 1774, there appears to be no foundation for the opinion that a hot summer either precedes or follows a cold winter; on the contrary, the hot summers have for the most part been accompanied by warm winters.

From the long continuance of high temperatures, it would seem that for some time past causes have been in operation which have raised the temperature: these causes probably still exist, and therefore there seems to be every probability of a fine and warm summer.

I proceed now to detail the results of the several subjects of research in the past quarter.

The mean temperature of the air—

For the month of January was $40^{\circ}1$, exceeding the average of seventy years by $4^{\circ}3$. The temperatures in this month in the years 1775, 1796, 1804, 1806, 1819 and 1834, were those only which exceeded that of this year. In the year 1796 it was $45^{\circ}4$, being the warmest on record;

For the month of February was $43^{\circ}2$, exceeding the average of the preceding seventy years by $4^{\circ}7$. The temperature of this month in the year 1779 was $45^{\circ}2$, being the only instance within the period of seventy years in which the temperature exceeded that of this year;

For the month of March was $42^{\circ}5$, exceeding the average of seventy years by $1^{\circ}2$.

The mean for the quarter was $41^{\circ}9$. The average value for seventy years is $38^{\circ}6$. In the year 1779 the mean was $42^{\circ}0$; in 1822 it was $43^{\circ}4$; in 1834 it was $42^{\circ}8$; and in the year 1846 it was $43^{\circ}6$: in all the remaining years it was less than $42^{\circ}0$.

The excess of temperature above the average of the preceding eight years was in January $3^{\circ}0$; in February was $5^{\circ}4$; in March was $0^{\circ}1$; and for the quarter was $2^{\circ}9$.

The mean temperature of evaporation at Greenwich—

For the month of January was $38^{\circ}6$; for February was $41^{\circ}4$; and for March was $39^{\circ}8$. These values are $2^{\circ}0$ above, $6^{\circ}2$ above, and $0^{\circ}3$ below, respectively, the averages of the preceding eight years.

The mean value for the quarter was $39^{\circ}9$, which is $2^{\circ}6$ above that of the average of eight years.

The mean temperature of the dew-point at Greenwich—

For the months of January, February and March, were $36^{\circ}4$, $38^{\circ}8$, and $36^{\circ}5$. The average values for the preceding eight years were $35^{\circ}1$, $34^{\circ}5$, and $36^{\circ}6$.

The mean value for the quarter was $37^{\circ}2$, which is $1^{\circ}8$ above the average for the preceding eight years.

The mean elastic force of vapour for the quarter was 0.239

inch, which is 0.012 inch greater than the average for the preceding seven years.

The mean weight of water in a cubic foot of air for the quarter was 2.8 grains, which is 0.1 grain greater than the average of the preceding seven years.

The mean additional weight of water required to saturate a cubic foot of air was 0.6 grain. This value for the preceding seven years was 0.38 grain.

The mean degree of humidity in January was 0.883 , in February was 0.863 , and in March was 0.801 . The averages for the seven preceding years were 0.903 , 0.888 , and 0.841 . The mean value for the quarter was 0.849 , which is 0.028 less than the average for these years. These values denote a considerable degree of dryness in these months.

The mean reading of the barometer at Greenwich in January was 29.771 inches, in February was 30.106 inches, and in March was 29.915 inches; these values are 0.005 inch above, 0.415 inch above, and 0.186 inch above respectively the averages of the same months for the preceding eight years.

The reading for the month of February, exceeding 30.1 inches at the height of 160 feet, is very remarkable. Since the year 1774 there have been eight such instances only: these occurred in July 1800, April 1801, November 1805, April 1817, February 1821, January 1825, December 1834, and December 1843.

The average weight of a cubic foot of air under the average temperature, humidity, and pressure, was 549 grains; the average for the seven preceding years was 546 grains.

The rain fallen at Greenwich in January was 1.6 inch; in February was 2.2 inches; and in March was 0.5 inch. The amount for the quarter was 4.24 inches. The average amount for the preceding eight years was 5.14 inches.

The temperature of the water of the Thames was $43^{\circ}8$ by day, and $42^{\circ}1$ by night. The water, on an average, was 1° warmer than the air.

The direction of the wind at Greenwich from January 1 to 6 was N.E.; from January 7 to 28 was S.W.; on January 29 was N.N.W.; from January 30 to March 7 was at times variable, but chiefly S.W.; from March 8 to 17 was mostly N.W.; from March 18 to 28 was chiefly N.E.; and afterwards it was mostly S.S.W. to the end of the month.

At Leicester the direction of the wind was S.W. during seventy-six days within the quarter.

The daily horizontal movement of the air from January 1 to 6 was about 90 miles; the greatest value was 200 miles; from January 7 to 28 was 240 miles; the greatest was 500 miles; and from January 30 to March 28 it was 110 miles; the great-

est was 320 miles. The movement of the air in the month of March was small.

The average daily ranges of the thermometer in air at the height of four feet, were $10^{\circ}8$ in January, $12^{\circ}9$ in February, and $13^{\circ}8$ in March. The average ranges for these three months, from the observations of the eight preceding years, were $8^{\circ}1$, $9^{\circ}6$, and $13^{\circ}4$ respectively.

The readings of the thermometer on grass in January were below 20° on three nights, the lowest was 17° ; at and below 32° on fourteen nights; between 32° and 40° on six nights; above 40° on six nights; and on one night it was 50° .

In February the lowest reading was 20° , and the readings were below 32° on eleven nights; between 32° and 40° on eight nights, and above 40° on seven nights. In March the lowest reading was 21° ; and the readings were below 32° on sixteen nights; between 32° and 40° on twelve nights; and above 40° on three nights.

The mean amount of cloud was 7.5, being the same as the average for the preceding eight years.

There were nine exhibitions of the *aurora borealis* during the quarter ending March 31, 1849, which occurred on January 14, and were seen at Aylesbury, Whitehaven and Maidenstone Hill; on January 15 at Hartwell; on February 18 at Wakefield; on the 19th at Stone, Whitehaven and Wakefield; on the 20th at Whitehaven, Hartwell and Greenwich; on the 21st at Hartwell; on the 22nd at Holkham, Aylesbury, Stone, Norwich, Newcastle and Greenwich; on the 23rd at Whitehaven and Hartwell; and on March 18 at Stone.

Thunder-storms occurred on January 10 at Whitehaven; on January 14 at Norwich; on February 25 at Truro; and on March 31 at Uckfield.

Hail fell at Norwich and Hartwell on January 14; at Newcastle on February 22; at Wakefield on February 23; at Saffron Walden on March 8.

Snow fell at Saffron Walden on January 4; at Leicester, Saffron Walden, Highfield House, and Southampton on January 5; at Saffron Walden on January 29; at Stone, Hartwell, Norwich, and Saffron Walden on February 28; at Stone and Saffron Walden on March 24 and 25; at Stone on the 28th; and at Norwich on the 31st.

Solar halos were seen at Greenwich on February 26 and on March 30.

Lunar halos were seen at Greenwich on January 6, and at Stone on February 27, March 7, 8 and 31.

Zodiacal light was seen at Whitehaven on February 11.

The reading of the barometer was above 30 inches on the 1st of January; it decreased to 29.58 by the 3rd, and in-

creased to 29.93 by the 6th. During the evening of the 7th it decreased quickly, and was 29.4 on the 8th and 9th. On the 10th the lowest reading in the month took place, and was 28.83; on the 11th it increased rapidly, and was 29.85 at midnight, and passed the point 30 early on the morning of the 12th. On the 13th and 14th the readings decreased, and were 29.31 on the latter day, and then it increased with slight exceptions till the evening of the 23rd, when the reading was 30.328, being the highest during the month; it then decreased, slowly at first, and rapidly during the afternoon of the 27th. The reading was 29.26 on the evening of the 28th, after which it increased, and was 30.16 at the end of the month. In February the average reading from the 1st to the 18th was 30.36. On the 11th, in the evening, the very extraordinary reading of 30.715 took place. On the 19th the reading descended below 30 inches; on the 20th the decrease was 0.4; on the 21st and 22nd the reading was about 29.7; on the 24th and 25th the decrease both days was about 0.25, and the reading was 29.21 on the evening of the 25th; it increased 0.5 on the 26th, and still further increased 0.25 on the 27th. The reading at this time was 29.91 at midnight. On the 28th it decreased rapidly, and was 29.20 at midnight, being the lowest in the month. The range within this month was 2.52 inches.

On the 2nd of March the reading passed the point 30 inches, and on the 6th the highest reading in the month took place, viz. 30.48; after this the changes were small till the 26th, the reading being above its average value. On the 27th the reading decreased half an inch, and on the 28th the lowest reading took place in the month, 29.18, and it remained low till the end of the month.

The reading of the barometer on February 11 at Aylesbury was 30.369; at Leicester was 30.800; at Durham was 30.440; at Whitehaven 30.62; at Newcastle was 30.764; at Exeter was 30.838; at Liverpool was 30.861; at Truro was 30.74; at Norwich was 30.910; and at Cardington was 30.846.

The monthly mean values of the several subjects of investigation are shown in the Registrar-General's report.

The observations have been corrected for diurnal ranges, and the results are all comparable with each other.

The observer at Southampton has kindly furnished me with the following agricultural report for Hampshire, the particulars having been supplied by John Clark, Esq., of Finsbury Farm, near Romsey.

"The weather during the quarter has been most propitious for cropping. The fine dry March, followed by the gentle showers of April, have benefited to a great degree both the

Names of the places.	Mean pressure of the atmosphere of dry air reduced to the level of the sea.	Mean temperature of the air.	Highest reading of the thermometer.	Lowest reading of the thermometer.	Mean daily range of temperature.	Mean monthly range.	Range of temperature in the quarter.	Mean the dew-point.	Mean estimated strength.	General direction.	Mean amount of cloud.	Number of days on which it fell.	Amount collected.	Mean weight of vapour in a cubic foot of air.	Mean additional weight of vapour required to saturate a cubic foot of air.	Mean degree of humidity.	Mean whole amount of water in a vertical column of atmosphere.	Mean cubic foot of air.	Height of station above the barometer above the level of the sea.
Guernsey	29.937	45.6	58.0	29.5	8.2	20.0	28.5	40.1	1.6	W. & N.	6.7	41	7.2	3.1	0.5	0.854	3.7	549	123
Helston	29.863	45.7	58.0	30.0	10.5	24.3	28.0	43.0	1.6	S.W.	7.3	48	7.7	3.4	0.4	0.926	4.1	545	106
Falmouth	29.868	44.7	55.0	33.0	11.0	25.3	29.0	43.0	1.4	W.S.W.	7.6	51	8.0	3.1	0.5	0.854	3.7	545	140
Truro	29.868	43.9	58.0	25.0	13.2	29.8	33.0	40.2	1.7	W.	5.9	39	4.6	3.1	0.5	0.854	3.7	545	140
Exeter	29.875	41.0	59.0	26.0	10.2	26.7	33.0	35.4	1.6	S.W.	7.3	39	5.3	2.6	0.4	0.783	3.1	551	180
Chichester	29.814	42.8	61.6	27.5	11.2	30.1	35.1	38.4	0.6	W.	7.3	36	5.9	2.9	0.4	0.869	3.5	549	55
Uckfield	29.814	42.8	61.6	27.5	11.2	30.1	35.1	38.4	0.6	W.	7.3	36	5.9	2.9	0.4	0.869	3.5	549	55
Southern	29.814	42.8	61.6	27.5	11.2	30.1	35.1	38.4	0.6	W.	7.3	36	5.9	2.9	0.4	0.869	3.5	549	55
Beckington	29.814	42.8	61.6	27.5	11.2	30.1	35.1	38.4	0.6	W.	7.3	36	5.9	2.9	0.4	0.869	3.5	549	55
Maidenstone Hill, Greenwich	29.885	41.7	57.0	20.6	9.6	30.3	36.5	38.1	1.1	S.W.	7.1	34	4.4	2.9	0.6	0.883	3.4	551	107
Royal Observatory, Greenwich	29.888	42.0	60.0	19.9	12.5	34.4	40.1	37.1	1.1	S.W.	7.5	35	4.2	2.8	0.5	0.826	3.3	549	159
Lewisham	29.888	42.0	60.0	19.9	12.5	34.4	40.1	37.1	1.1	S.W.	7.5	35	4.2	2.8	0.5	0.826	3.3	549	159
St. John's Wood	29.888	42.0	60.0	19.9	12.5	34.4	40.1	37.1	1.1	S.W.	7.5	35	4.2	2.8	0.5	0.826	3.3	549	159
Walworth	29.888	42.0	60.0	19.9	12.5	34.4	40.1	37.1	1.1	S.W.	7.5	35	4.2	2.8	0.5	0.826	3.3	549	159
Latimer Rectory	29.868	40.7	63.5	19.5	13.4	34.7	44.0	37.3	1.6	S.W.	8.3	41	5.5	2.8	0.3	0.895	3.4	543	32
Aylesbury	29.735	40.9	63.0	19.0	13.8	35.7	44.0	36.4	0.7	S. & W.	7.0	31	4.9	2.7	0.5	0.849	3.2	546	335
Hartwell House	29.841	41.1	63.7	12.0	15.8	39.9	51.7	37.7	0.5	S.S.W.	7.3	46	3.4	2.9	0.4	0.885	3.4	546	280
Saffron Walden	29.841	41.1	63.7	12.0	15.8	39.9	51.7	37.7	0.5	S.S.W.	7.3	46	3.4	2.9	0.4	0.885	3.4	546	280
Oxford	29.841	41.1	63.7	12.0	15.8	39.9	51.7	37.7	0.5	S.S.W.	7.3	46	3.4	2.9	0.4	0.885	3.4	546	280
Hereford	29.841	41.1	63.7	12.0	15.8	39.9	51.7	37.7	0.5	S.S.W.	7.3	46	3.4	2.9	0.4	0.885	3.4	546	280
Cardington	29.815	40.8	57.0	16.8	12.5	33.9	40.2	37.5	1.9	S.W.	7.1	39	4.2	2.8	0.4	0.883	3.4	550	70
Norwich	29.797	40.9	59.0	20.0	11.5	32.0	39.0	36.3	1.0	W.S.W.	7.1	39	4.2	2.8	0.4	0.883	3.4	550	70
Holkham	29.718	40.3	57.5	16.2	11.5	31.6	41.3	36.3	1.0	W.S.W.	7.1	39	4.2	2.8	0.4	0.883	3.4	550	70
Leicester	29.904	40.2	62.0	17.0	12.5	35.7	45.0	36.1	1.8	W.	6.1	30	4.8	2.7	0.5	0.842	3.2	550	156
Derby	29.831	40.3	58.0	20.0	12.2	34.7	38.0	37.1	0.7	W.	7.2	38	4.0	2.8	0.4	0.864	3.3	548	39
Highfield House, Notts	29.863	40.3	58.0	20.0	12.2	34.7	38.0	37.1	0.7	W.	7.2	38	4.0	2.8	0.4	0.864	3.3	548	39
Liverpool Observatory	29.830	41.9	55.5	23.8	7.0	25.9	31.7	35.3	1.6	N.W.	6.8	45	3.9	2.6	0.6	0.834	3.1	542	37
Leeds	29.908	39.8	59.0	11.0	11.6	35.0	48.0	36.8	1.4	N.W.	6.2	42	8.2	2.7	0.4	0.889	3.3	541	148
Wakefield Prison	29.826	40.2	63.0	14.5	11.3	36.8	48.5	37.2	1.4	N.W.	6.2	42	8.2	2.7	0.4	0.889	3.3	541	148
Stonyhurst Observatory	29.830	39.7	54.8	20.1	10.1	28.8	34.7	36.1	1.4	W.	7.7	60	11.5	2.7	0.4	0.875	3.2	547	381
York	29.778	39.3	59.0	18.0	12.1	33.0	41.0	40.9	1.4	W.	7.7	60	11.5	2.7	0.4	0.875	3.2	547	381
Whitehaven	29.752	40.5	54.0	18.7	6.3	26.3	35.3	37.9	2.5	S.W.	5.7	30	5.3	2.9	0.2	0.940	3.4	549	50
Durham	29.752	40.0	56.0	15.0	10.5	33.9	41.0	35.5	1.9	S.W.	5.7	30	5.3	2.9	0.2	0.940	3.4	549	50
Newcastle	29.718	41.0	56.5	19.0	12.4	32.0	37.5	37.5	1.9	S.W.	5.7	30	5.3	2.9	0.2	0.940	3.4	549	50
Number of columns	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

soil and cattle. Sowing is in a forward state, and young wheat looks well.

"The lambing season is over, and it is believed will prove to be an average. Some strange anomalies have been prevalent. On adjacent farms no loss has been experienced in one, whilst the loss both of ewes and lambs have been great in the other."

The mean of the numbers in the first column of the subjoined table is 29.837 inches, and this value may be considered as the pressure of dry air for England during the quarter ending March 31, 1849. The differences between this number and the separate results contained in the first column show the probable sums of the errors of observation and reduction; the latter arising partly from erroneously assumed altitudes, and partly from the index errors of the instruments not having been determined. In most cases the sums of these errors are small.

The mean of the numbers in the second column, for Guernsey and those places situated in the counties of Cornwall and Devonshire, is $45^{\circ}2$; for those places situated south of latitude of 52° , including Chichester and Hartwell, is $41^{\circ}4$; for those places situated between the latitudes of 52° and 53° , including Saffron Walden and Leicester, is $40^{\circ}7$; for those places situated between the latitudes of 53° and 54° , including Derby and York, is $40^{\circ}2$; and for Whitehaven, Durham and Newcastle is $40^{\circ}5$. These values may be considered as those of the mean temperatures of the air for those parallels of latitude during the quarter ending March 31, 1849.

The average daily range of temperature in Cornwall and Devonshire was $10^{\circ}4$; at Liverpool and Whitehaven was $6^{\circ}7$; south of latitude 52° was $12^{\circ}6$; between the latitudes of 52° and 54° was $11^{\circ}5$; and at Durham and Newcastle was $11^{\circ}5$.

The greatest mean daily ranges of the temperature of the air took place at Hartwell, Aylesbury, and Latimer; in fact, in and near the vale of Aylesbury; and the least occurred at Whitehaven, Liverpool and Guernsey.

The highest thermometer readings during the quarter were 65° at Highfield House, $63^{\circ}7$ at Hartwell, and $63^{\circ}5$ at Latimer. The lowest thermometer readings were $10^{\circ}0$ at Saffron Walden, $11^{\circ}0$ at Leeds, and $12^{\circ}0$ at Hartwell. The extreme range of temperature of the air during the quarter in England was therefore about 55° , most likely somewhat less than this value.

The average quarterly range of the reading of the thermometer in Cornwall and Devonshire was $28^{\circ}1$; at Liverpool and Whitehaven was $33^{\circ}5$; south of latitude 52° was $40^{\circ}3$; and north of 52° was $42^{\circ}1$.

The mean temperature of the dew-point in Cornwall and

Devonshire was $41^{\circ}1$; south of latitude 52° was $37^{\circ}6$; between the latitudes of 52° and 53° was $36^{\circ}5$, and north of 53° was $37^{\circ}2$.

The direction of the wind has been mostly south-west; at some few places it seems to have prevailed for some time from the north-west.

From the numbers in the tenth column the distribution of clouds has been such as to cover about three-fifths of the whole sky.

Rain has fallen on the greatest number of days at Wakefield, Falmouth, Truro and Helston. The average number at these places was 53. It fell on the least number of days at Oxford, Saffron Walden, Durham and Leicester, and the average number at these places was 35. The stations at which the largest falls have taken place were Stonyhurst, Falmouth, Whitehaven and Leeds. The falls were smallest in amount at Durham particularly, York, Holkham and Oxford. The average fall in the counties of Cornwall and Devonshire was 7.2 inches; south of latitude 52° was 5.1 inches; between latitudes 52° and 53° was 4 inches; and south of 53° , omitting Stonyhurst, was 4.3 inches.

The smallness of the fall at Durham is remarkable; between January 31 and March 28 only 0.14 inch fell.

The numbers in column 14 to 18 show the mean values of the hygrometrical results at every station; from which we find that—

The mean weight of vapour in a cubic foot of air for all places (excepting Cornwall and Devonshire) in the quarter ending March 31, 1849, was 2.8 grains.

The mean additional weight required to saturate a cubic foot of air in the quarter ending March 31, 1849, was 0.4 grain.

The mean degree of humidity (complete saturation = 1) in the quarter ending March 31, 1849, was 0.860.

The mean amount of vapour mixed with the air would have produced water, if all had been precipitated at one time on the surface of the earth, to the depth of 3.3 inches.

The mean weight of a cubic foot of air at the mean height of 160 feet under the mean pressure, temperature and humidity, was 547 grains.

And these values for Cornwall and Devonshire were 3.2 grains; 0.5 grain; 0.878; 3.8 inches; 547 grains, at the mean height of 120 feet.

Errata.—In the formula for calculating the pressure of dry air, in the last Number of the Magazine, *for + read -*; and *for 82 inches read 820 feet*.

For the formula for calculating the weight of a cubic foot of air, substitute the following:

$$541 \text{ grains} - \left(\frac{\text{height of place in feet above the level of the sea}}{820 \text{ feet}} \times 18 \right).$$

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Glaisher

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On the Weather during the Quarter ending June 30, 1849.
By JAMES GLAISHER, Esq., F.R.S., and of the Royal Obser-
vatory, Greenwich.

DURING the past quarter I have inspected the locality
and the instruments at Exeter, Southampton, Latimer,
Aylesbury, Stone, Hartwell House, Hartwell Rectory, Ox-
ford, Cardington, Liverpool, Leeds, Stonyhurst, York, White-
haven and Newcastle.

The results furnished to the Registrar-General for the past

quarter are mostly satisfactory; these I have as usual examined and reduced.

The daily temperatures of the air till April 28 and after June 6 were for the most part below their average values; the mean amount of deficiency in the former period was $3^{\circ}7$, and in the latter it was $2^{\circ}7$. The daily temperatures between April 29 and June 5 were alternately in excess and defect; the mean temperature of the interval was somewhat above its average value. The days whose mean temperatures departed the most from their averages were April 17, 19, 20, 21; May 10 and June 12; the defect in these cases were $11^{\circ}2$; $14^{\circ}5$; $10^{\circ}4$; $11^{\circ}1$; $10^{\circ}2$; and $10^{\circ}7$ respectively. The mean temperature of the three months ending May, constituting the three spring months, was $46^{\circ}6$, and that of the average of the seventy preceding springs is $46^{\circ}7$. The several subjects of research in the past quarter are detailed below.

The mean temperature of the air for the month of April was $43^{\circ}2$, being less than the average of seventy years by $2^{\circ}7$, and less than the average of the preceding eight years by $5^{\circ}0$.

For the month of May was $54^{\circ}0$, exceeding the average for seventy years by $1^{\circ}2$, and being less than the average of the preceding eight years by $0^{\circ}4$. The mean of the quarter was $51^{\circ}7$, being $0^{\circ}5$ less than the average of seventy years, and $2^{\circ}1$ less than the average of the preceding eight years.

For the month of June was $57^{\circ}9$, being of the same value as that of the average from seventy years, and being less than that of the preceding eight years by $1^{\circ}9$.

Generally the differences of temperature at one place from the average values for that place sufficiently indicate the departures from the means for all other places; but in the past three months this has not been the case, the northern part of the country having been subjected to a longer continuance of low temperature than usual, and the departures from the mean temperatures in the northern parallels of latitude have been greater than in the southern. This will be more clearly seen in the following table.

Year.	Mean Temperature of the Air in the Quarter ending June 30.				
	In Cornwall and Devonshire.	South of Latitude 52° .	Between the Latitudes of 52° and 53° .	Between the Latitudes of 53° and 54° .	North of 54° .
1847	$51^{\circ}3$	$51^{\circ}9$	$51^{\circ}2$	$52^{\circ}0$	$48^{\circ}4$
1848	$54^{\circ}1$	$54^{\circ}0$	$53^{\circ}6$	$52^{\circ}0$	$50^{\circ}7$
1849	$52^{\circ}0$	$52^{\circ}1$	$50^{\circ}0$	$49^{\circ}9$	$49^{\circ}8$

The mean temperature of evaporation at Greenwich—

For the month of April was $41^{\circ}5$; for May was $49^{\circ}0$; and for June was $48^{\circ}7$. These values are $2^{\circ}6$, $1^{\circ}7$ and $6^{\circ}7$ below, respectively, the averages of the same months in the preceding eight years.

The mean value for the quarter was $46^{\circ}4$, which is $3^{\circ}6$ below the average of corresponding quarters of eight years.

The mean temperature of the dew-point at Greenwich—

For the months of April, May and June, were $39^{\circ}1$, $43^{\circ}9$, and $48^{\circ}4$ respectively. These values are $1^{\circ}8$, $3^{\circ}9$ and $4^{\circ}0$ below, respectively, the averages of the same months in the preceding eight years.

The mean value for the quarter was $43^{\circ}8$, which is $3^{\circ}2$ below the average from the preceding eight years.

The mean elastic force of vapour for the quarter was 0.342 inch, which is 0.038 inch less than the average for the preceding eight years.

The mean weight of water in a cubic foot of air for the quarter was 3.5 grains, which is 0.3 grain less than the average for the preceding eight years.

The mean additional weight of water required to saturate a cubic foot of air was 1.2 grain.

This value for the preceding eight years was 1.1 grain.

The mean degree of humidity in April was 0.864 , in May was 0.703 , and in March was 0.715 . The averages for the eight preceding years were 0.802 , 0.797 , and 0.778 .

The mean reading of the barometer at Greenwich in January was 29.517 inches, in February was 29.766 inches, and in March was 29.868 inches. These values are respectively 0.215 inch less, 0.022 inch less, and 0.080 inch greater than the averages of the same months for the preceding eight years.

The average weight of a cubic foot of air under the average temperature, humidity and pressure, was 534 grains; the average for the eight preceding years was 535.4 grains.

The rain fallen at Greenwich in April was 2.2 inches; in May was 3.9 inches; and in June was 0.2 inch. The amount for the quarter was 6.3 inches; the average amount for the preceding eight years was 4.74 inches. This excess of rain was experienced only in the southern part of England. The fall of rain between the latitudes of 52° and 53° was about the average for this parallel. North of 53° the fall has been small, and but little more than half the usual amount.

The horizontal movement of the air has been less than usual; its direction is uncertain; observers in the same locality have deduced the average direction differently*.

* Within the last few weeks a system of daily returns of the direction of the wind, taken simultaneously at many different places in England, the

The average daily ranges of the thermometer in air, at the height of four feet, were $16^{\circ}0$, $16^{\circ}3$, and $20^{\circ}6$. The average ranges of these three months from the observations of the eight preceding years, were $16^{\circ}8$, $19^{\circ}2$, and $19^{\circ}2$ respectively.

The readings of the thermometer on grass in April was at and below 32° on nineteen nights, the lowest was 19° ; between 32° and 40° on eight nights, and above 40° on three nights. In May the lowest reading was $26^{\circ}7$; and the readings were below 32° on four nights; between 32° and 40° on seven nights; and above 40° on twenty nights. In June the reading was 32° on one night; at and below 40° on nine nights; between 40° and 50° on eighteen nights; and above 50° on one night.

At St. John's Wood the lowest reading of a thermometer with its bulb placed in a parabolic reflector and fully exposed to the sky, was $20^{\circ}2$ in April, $27^{\circ}2$ in May, and 31° in June.

At Cardington the reading of a thermometer on grass was less than 32° on eight nights in June; the lowest reading was $26^{\circ}5$.

At Wakefield, on June 12 and 13, water exposed to the sky was frozen on both nights.

At Whitehaven the month of June was unusually cold, and vegetation was subjected to very low temperatures at night; a thermometer placed on grass on a layer of wool frequently fell many degrees below the freezing-point, and on two nights it fell to 25° . Ice was seen on several mornings, and snow fell amongst the mountains on the 3rd, a phenomenon which has not been witnessed in June since the year 1827.

During the month of June the readings at night were unusually low, even the temperature of the air in many places nearly fell to 32° , and actually did so in York, which was a point lower than the observer Mr. Ford had ever before seen in June.

There were four exhibitions of the *aurora borealis* during the quarter ending June 30, 1849; it occurred on May 31, and was seen at Stone; on June 15 at Stone; on June 26 at Latimer, auroral streamers passed from S.W. nearly across the zenith to the horizon in the N.E.; and on June 30, at Latimer, some beautiful auroral flashes were seen at 10^h 30^m P.M.

Thunder-storms occurred on April 28 and on May 2 at Stone; on May 3 at Uckfield, Stone, Saffron Walden, and Nottingham; on May 4 at Uckfield; on May 14 at Saffron Walden, and which it is to be hoped will soon embrace some portions of Ireland, have been organized. All the stations from which returns are now sent, I have visited and given instructions to the observers so as to ensure accuracy. The observations are published daily in the *Daily News* newspaper. If this system be continued some time valuable information will be collected.

from Walden, Holkham, and Nottingham; on May 17 and 18 at Leicester and Nottingham; on May 22 at Nottingham; on June 4 at Uckfield and Nottingham; on June 5 at Norwich; on June 6 at Holkham; on June 7 at Helston; on June 9 at Helston; on June 16 at Hartwell; and on June 17, 18 and 19, at Helston.

Lightning was seen but thunder was not heard on May 3, at Uckfield; on May 4 at Uckfield, Nottingham and Stone; on May 14 at Leicester; on June 3 at Uckfield; on June 4 at Wakefield; on June 5, 7 and 9, at Helston; and on June 12 at Nottingham.

Thunder was heard but lightning was not seen at Wakefield on April 6; at Exeter on May 5; at Uckfield on June 4 and 8; at Hartwell on May 3, 14, 15, 18, and June 6; and at Norwich on June 28.

Hail fell at Hartwell on April 2; at Manchester on April 11; at Truro and Saffron Walden on April 13; at Hartwell on April 14; at Truro and Saffron Walden on April 17 and 18; at Truro on the 19th; at Truro, Saffron Walden, Hartwell and Holkham on April 20; at Holkham on April 21; at Exeter on May 5; at Holkham on May 14; at Helston on June 7 and 9; at Hartwell on June 16; and at Helston on June 17 and 19.

Snow fell at various places on April 13, 16, 17, 18, 19, 20, and 21.

Solar halos were seen at different places on April 2, 8, 25, 27; May 12, 13, 19, 29, 30, 31; June 15, 18, 23 and 24. This unusual number of solar halos indicates a very unusual prevalence of the cirrostratus cloud during the day. A lunar halo was seen at Hartwell on May 31.

The reading of the barometer on April 1 was 29.4 inches; it decreased to 29.3 inches on the 2nd, and increased to 29.55 on the 3rd. On the 4th it decreased quickly, and was 29.28 on the morning of the 5th. From this time to the 8th the change of reading was small. On the 9th the reading was 29.34; it began to increase, and was 29.71 on the morning of the 12th, when it began to decrease rapidly, and it was 29.09 during the afternoon of the 13th. On the 14th it increased slowly, and on the 15th it was 29.6. The reading continued about this value till the morning of the 18th, when it was 29.77; it then began to decrease quickly, and on the morning of the 19th was 29.08, which was the lowest during the month. During the remainder of the 19th and till the evening of the 21st the reading increased, and was 29.83 at the latter time. The reading decreased on the 22nd, and was 29.48 on the 23rd. From the 24th to the 28th it was about 29.6, and then increased to 30.15 on the 29th, and to 30.18 on the morning

of the 30th. This reading was the highest in the month; but it soon again decreased, and before midnight descended below 30 inches. The range during this month was 1·09 inch.

On May 1 the reading was 29·92, which decreased to 29·63 on the 5th; increased to 29·86 on the 9th; it then decreased to 29·72 by the evening of the 11th, increased to 30·09 by the 12th, and decreased to 29·18 on the 17th; this was the lowest reading during the month. The reading, with slight exceptions, increased till the 24th, when it was 30·07; it then decreased and increased alternately, but the changes were small till the end of the month. The highest reading was 30·08, and it took place on the 29th. The range within this month was 0·90 inch.

During the month of June the changes of reading were small. The lowest reading was 29·63 on the 16th, and the highest was 30·06 on the 22nd. The range therefore within the month was 0·43 inch only.

The following are the agricultural reports with which I have been favoured.

At Guernsey, the particulars having been furnished by Dr. Hoskins, F.R.S.

In April, from the 10th to the 20th, there were cold winds with showers of hail and sleet which checked the forward vegetation and destroyed crops of early potatoes. In May, fogs with high temperatures were prevalent, and there were frequent light gales and heavy showers of rain. Vegetation generally recovered from the checks it received in April; grass and other crops were luxuriant, asparagus fine and abundant; walk-fruit, horse-chestnuts, sycamores, and other trees of early foliage, in exposed situations were much injured by blight.

In the early part of June there were frequent thunder-storms, with fine sultry weather. Towards the end of the month fogs were prevalent; there was an unusual prevalence of easterly winds; strawberries were abundant and well-flavoured, crops of grass luxuriant, as well as other vegetation, notwithstanding the paucity of rain.

At Uckfield, the particulars having been furnished by C. L. Prince, Esq.

On April 19 very heavy rain fell early in the morning; at 3 P.M. on this day the wind shifted suddenly to N.E., and a severe gale and heavy snow continued for eight hours; as the temperature of the air at the time fell to 32°, it almost destroyed the gooseberry bloom, as well as that of the early cherries. The wall-fruit was much injured, and in some places the trees were killed, being cased with ice during the night, and thawed suddenly by the sun on the 20th.

At Leeds, by Charles Charnock, Esq.

The cold and dry parching winds are seriously affecting spring-sown crops on dry soils. The Swedish turnips are a very patchy crop and have been resown in many places. Barley and oats are short. Beans are affected with the Aphis. Wheat on strong soils is very deficient, but on light soils it is better. Potatoes have been much cut down by the white frosts. On the whole the country is suffering much from the want of rain. Cattle and sheep are healthy. Employment for agricultural labourers is scarce, and as a body they are suffering severely.

Hampshire, the particulars having been furnished by John Clark, Esq. of Timsbury Farm, near Romsey.

The prospect for those farmers who have been in positions to do justice to their operations, is cheering; every crop promises to be abundant. The hay harvest is nearly completed, and in the most satisfactory manner. There have however been many instances of the truth of the old saying, that more hay is spoiled in fine weather than in catching seasons. The vigorous and thick growth of the grass has required more time to perfect than many farmers have allowed, and injury has resulted.

The crops on badly-farmed lands are thin and poor, oats are generally indifferent. The season for turnip tillage has been all that could be desired, excepting on neglected stiff lands, and there the needful pulverization of the land has not been obtained for want of moisture. Now, July 6, every description of root-crop is languishing for want of rain. The turnip-fly has not been so troublesome as in past seasons. Potatoes appear generally healthy. There is every prospect of a full average yield of wheat, and should there be a continuance of fine weather, it will be gathered much earlier than usual.

At Stonyhurst, the particulars having been furnished by the Rev. Alfred Weld, F.R.A.S.

The lambing season began in this neighbourhood on the 23rd of March, and continued three weeks; there were several losses in the country owing to the severity of the weather. During April and the early part of May the weather was remarkably dry and unfavourable to the growth of grass; this, added to the general dryness of the season, has caused the hay crop to be very late. The season for sowing was very favourable; oats were sown first on March 23, and now make a fine show. Early potatoes planted before April 1 are growing well and without any signs of disease. The crop is very abundant, frequently producing 20 to 30 to a root. Later potatoes planted in April escaped the effects of the frosts, which are said to have destroyed a considerable portion of the crops

in the neighbourhood of Manchester and Liverpool. Oats have been infested with charlock to a great degree. The sowing of beet began May 5; the crop is healthy and forward. Turnips planted about May 10 are very luxuriant and promising; no fly has appeared. Sheep-washing took place about May 21, which is about the usual time in this part of the country. Some ewes shorn on June 14 died from cold. On June 9 vegetation appeared to stop from the cold weather, which continued till the 15th. The showers which brought on the green crops so well were not sufficient for the grass, which is still very short, though full in the root. The hay season generally begins in this part about June 26, whereas this year (now July 8) none is cut except one or two small patches; the grass is still growing fast, and promises to be an abundant crop. Wheat has been in ear about twelve days; oats are just opening out.

Nottingham, the particulars furnished by E. J. Lowe, Esq., F.R.A.S.

Wheat, barley and oats look well; the grass crops are heavy, and potatoes promise well. The frost of April 18 did great injury to fruit.

The monthly values of the several subjects of research appear in the Registrar-General's Quarterly Report; the quarterly values are shown in the subjoined table:—

The mean of the numbers in the first column of this table is 29.618 inches, and this value may be considered as the pressure of dry air for England during the quarter ending June 30, 1849.

The mean of the numbers in the second column, for Guernsey and those places situated in the counties of Cornwall and Devonshire, is $52^{\circ}0$; for those places situated south of latitude of 52° , including Chichester and Hartwell, is $52^{\circ}1$; for those places situated between the latitudes of 52° and 53° , including Saffron Walden and Leicester, is $50^{\circ}0$; for those places situated between the latitudes of 53° and 54° , including Derby and York, is $49^{\circ}9$; and for Whitehaven and Newcastle is $49^{\circ}8$. These values may be considered as those of the mean temperatures of the air for these parallels of latitude during the quarter ending June 30, 1849.

The average daily range of temperature in Cornwall and Devonshire was $14^{\circ}8$; at Liverpool and Whitehaven was $12^{\circ}1$; south of latitude 52° was $19^{\circ}9$; between the latitudes of 52° and 54° was $17^{\circ}6$; and at Whitehaven and Newcastle was $17^{\circ}6$.

The greatest mean daily ranges of the temperature of the air took place at St. John's Wood, Latimer, Aylesbury, and Beckington: that at St. John's Wood is very large; is it right?

and the least occurred at Truro, Liverpool, Guernsey, and Whitehaven.

The highest thermometer readings during the quarter were 88° at Southampton, 86° at Walworth, 85° at St. John's Wood and at Latimer. The lowest thermometer readings were 24° at Leicester, $24^{\circ}3$ at Highfield House, and 25° at Uckfield and at Aylesbury. The extreme range of temperature of the air during the quarter in England was therefore about 61° , considering the true extremes as 24° and 85° .

The average quarterly range of the reading of the thermometer in Cornwall and Devonshire was $43^{\circ}0$; at Liverpool and Whitehaven was $41^{\circ}5$; south of latitude 52° was $55^{\circ}5$, and north of 52° was $51^{\circ}1$.

The mean temperature of the dew-point in Cornwall and Devonshire was $43^{\circ}7$; south of latitude 52° was $43^{\circ}5$; between 52° and 53° was $42^{\circ}2$, and north of 53° was $43^{\circ}6$.

The amount of cloud seems to have been less than usual.

Rain has fallen on the greatest number of days at Hartwell, Wakefield, and Cardington. The average number at these places was 54. It fell on the least number of days at Maidenstone Hill, Hereford and Beckington, and the average number at these places was 33. The stations at which the largest falls have taken place are Truro, Newcastle and Helston. The smallest falls occurred at York, and generally in the north of England. The average fall in the counties of Cornwall and Devonshire was 8.1 inches; south of latitude 52° was 6.4 inches; between the latitude of 52° and 53° was 7.4 inches; between 53° and 54° was 5.5 inches; and at Newcastle and Whitehaven was 7.8 inches.

The numbers in the columns 15 to 18 show the mean values of the hygrometrical results; from which we find that—

The mean weight of vapour in a cubic foot of air at all places (excepting Cornwall and Devonshire) in the quarter ending June 30, 1849, was 3.5 grains.

The mean additional weight required to saturate a cubic foot of air in the quarter ending June 30, 1849, was 0.9 grain.

The mean degree of humidity (complete saturation = 1) in the quarter ending June 30, 1849, was 0.776.

The mean amount of vapour mixed with the air would have produced water, if all had been precipitated at one time on the surface of the earth, to the depth of 4.2 inches.

The mean weight of a cubic foot of air under the mean pressure, temperature and humidity, was 532 grains at the average height of 170 feet.

And these values for Cornwall and Devonshire were 3.5 grains; 0.9 grain; 0.749; 4.3 inches; and 534 grains, at the average height of 120 feet.

Meteorological Table for the Quarter ending June 30, 1849.

Names of the places.	Mean pressure of dry air reduced to the level of the sea.	Mean temperature of the air.	Highest reading of the thermometer.	Lowest reading of the thermometer.	Mean daily range of temperature.	Mean monthly range.	Range of temperature in the quarter.	Mean temperature of the dew-point.	Wind.		Mean amount of cloud.	Rain.		Mean weight of vapour poured in a cubic foot of air.	Mean additional weight of vapour required to saturate a cubic foot of air.	Mean humidity.	Mean whole amount of water in a vertical column of atmosphere.	Mean weight of a cubic foot of air.	Height of cistern of the barometer above the level of the sea.
									Strength.	General direction.		Number of days on which it fell.	Amount collected.						
Guernsey	in. 29.501	53.9	75.0	36.0	11.5	23.2	39.0	43.0	e. by n.	1.4	..	36	7.2	3.5	gr. 0.4	0.705	4.0	533	123
Helston	29.501	51.6	76.0	39.0	14.6	36.7	40.0	46.0	s.w.	1.6	..	38	9.2	3.8	0.8	0.831	4.0	535	106
Falmouth	29.501	51.7	79.0	32.0	18.4	37.3	46.0	..	n. & var.	1.6	..	43	8.1	3.8	..	..	4.0	535	106
Truro	29.501	50.6	69.0	33.0	11.1	26.3	34.0	..	n.	1.9	..	39	10.2	3.3	1.4	0.711	4.0	535	140
Exeter	29.708	52.3	75.0	28.0	15.4	35.0	48.0	42.2	e. & w.	1.8	..	37	5.9	3.3	..	..	4.0	535	140
Chichester	29.737	51.8	76.0	28.0	15.4	35.0	48.0	41.5	s.	1.9	..	37	5.9	3.3	..	..	4.0	535	140
Uckfield	29.737	51.8	76.0	28.0	15.4	35.0	48.0	41.5	s.	1.9	..	37	5.9	3.3	..	..	4.0	535	140
Southampton	29.737	51.8	76.0	28.0	15.4	35.0	48.0	41.5	s.	1.9	..	37	5.9	3.3	..	..	4.0	535	140
Beckington	29.747	51.5	79.0	25.0	21.0	44.0	54.0	47.2	s.w.	0.5	..	38	7.3	3.3	1.7	0.666	4.0	533	180
Madingley Hill, Greenwich	29.747	51.5	79.0	25.0	21.0	44.0	54.0	47.2	s.w.	0.5	..	38	7.3	3.3	1.7	0.666	4.0	533	180
Royal Observatory, Greenwich.	29.747	51.5	79.0	25.0	21.0	44.0	54.0	47.2	s.w.	0.5	..	38	7.3	3.3	1.7	0.666	4.0	533	180
St. John's Wood	29.695	51.0	80.7	26.8	17.6	39.4	53.9	43.8	n.	1.0	..	32	7.0	3.8	0.9	0.822	4.0	541	107
Walworth	29.511	53.2	85.0	27.0	29.0	44.8	58.0	48.6	Variable.	1.2	..	31	5.9	4.1	0.7	0.859	4.0	535	32
Latimer Rectory, Bucks	29.389	52.6	86.0	27.0	17.3	39.6	59.0	..	s.w.	2.6	..	46	5.5	3.6	0.9	0.798	4.0	530	335
Aylesbury	29.389	51.3	85.0	26.0	21.5	44.8	59.0	44.5	n.	1.5	..	48	7.1	3.6	0.9	0.798	4.0	530	335
Stone Observatory	29.557	52.3	82.0	25.0	21.1	40.7	57.0	42.7	s.e.	0.5	..	48	7.3	3.4	1.3	0.723	4.0	529	280
Hartwell House, Bucks	29.658	50.3	77.7	26.5	18.1	41.0	51.2	42.6	n.e.	1.0	..	51	7.5	3.4	1.1	0.771	4.0	532	320
Hartwell Rectory	29.658	51.2	86.0	29.0	20.9	40.0	51.0	42.5	n.	0.8	..	57	6.3	3.5	1.0	0.759	4.0	531	200
Saunders Walden	29.658	50.9	86.0	29.0	20.9	40.0	51.0	42.5	Variable.	0.8	..	57	6.3	3.5	1.0	0.759	4.0	531	200
Radclyffe Observatory, Oxford	29.658	50.7	76.0	28.0	16.5	35.3	48.0	..	Variable.	2.1	..	33	4.9	3.4	..	0.763	4.0	531	200
Hereford	29.658	51.5	86.0	29.0	20.9	40.0	51.0	42.5	n.e.	0.8	..	57	6.3	3.5	1.0	0.759	4.0	531	200
Cardington	29.558	48.5	77.0	28.6	17.9	39.6	48.4	43.8	n.e.	2.1	..	33	4.9	3.4	..	..	..	250	..
Norwich	29.589	49.9	78.0	22.0	17.7	37.3	50.0	45.0	Variable.	..	..	52	5.3	3.5	1.0	0.782	4.0	536	70
Holkham	29.589	49.6	74.6	25.8	14.5	35.7	48.8	43.2	Variable.	..	..	48	8.0	3.9	0.7	0.830	4.0	538	39
Leicester	29.755	48.5	81.0	24.0	19.8	46.0	57.0	36.9	n.e.	..	..	54	8.2	2.9	1.3	0.834	4.0	538	31
Derby	29.755	49.5	73.0	25.0	17.0	39.0	48.0	44.8	Variable.	..	..	53	7.7	3.6	0.6	0.703	4.0	538	156
Highfield House, Notts.	29.653	50.5	79.0	24.3	19.0	43.4	54.7	44.9	n.w.	1.3	..	50	7.2	3.7	0.8	0.855	4.0	533	39
Manchester	29.653	50.5	79.0	24.3	19.0	43.4	54.7	44.9	n.w.	1.3	..	50	7.2	3.7	0.8	0.811	4.0	536	103
Liverpool	29.602	50.5	74.6	32.6	11.2	31.7	42.0	43.8	n.w.	..	..	41	5.4	3.5	0.9	0.798	4.0	538	37
Wakefield Prison	29.602	50.5	74.6	32.6	11.2	31.7	42.0	43.8	n.w.	..	..	41	5.4	3.5	0.9	0.798	4.0	538	37
Holmfild House	29.608	50.6	79.0	27.0	19.5	46.0	52.0	42.3	w.	..	..	54	4.3	3.4	0.9	0.773	4.0	536	113
Stourthorpe Lodge, Leeds.	29.633	50.6	79.0	27.0	19.5	46.0	52.0	42.3	w.	..	..	47	3.7	3.3	1.1	0.738	4.0	537	148
Stourthorpe Observatory	29.633	50.6	79.0	27.0	19.5	46.0	52.0	42.3	n.e. & s.w.	1.3	..	50	5.7	3.5	0.8	0.811	4.0	537	148
York	29.555	48.6	73.0	27.0	15.7	39.0	46.0	41.9	n.e. & s.w.	1.0	..	48	5.8	3.2	0.8	0.809	4.0	536	381
Whitehaven	29.555	51.1	70.0	29.0	13.0	31.2	41.0	41.7	n.e.	2.1	..	39	5.7	3.2	1.2	..	..	50	..
Newcastle.	29.553	48.4	71.0	26.0	13.5	32.5	45.0	42.9	s.w.	39	5.7	3.2	1.2	0.722	4.0	535	80
Number of columns	1	2	3	4	5	6	7	8	s.e. & n.e.	9	13	14	15	16	17	18	19

Glaisher.

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REMARKS ON THE WEATHER

DURING THE

QUARTER ENDING SEPTEMBER 30, 1849.

BY

JAMES GLAISHER, Esq., F.R.S., F.R.A.S.,

AND OF THE ROYAL OBSERVATORY, GREENWICH.

A MORE than ordinary interest is attached to the meteorology of the present year, and in particular to that part of the year just passed, owing to the presence of cholera as an epidemic complaint. This disease has been fatal during the last quarter to a great number of persons. The number of deaths in London and in its vicinity, according to the weekly Reports of the Registrar-General, exceeded the average number of deaths in July by 2515, in August by 4464, and in

September by 4322, out of a population of 2,206,076; a mortality unprecedentedly great.

I have no means of judging of the amount of illness, but it must have been great.

If epidemics be due to atmospheric causes acting upon local circumstances, it is to the successful cultivation of medical meteorology that we can hope to contend with them with success.

Those causes of sickness which depend upon temperature, humidity, pressure or movement of the air, admit of measurement; and it must be considered as a most valuable circumstance, that nearly forty educated gentlemen—known and trustworthy observers, with good instruments—were daily engaged, long before the epidemic came, in collecting this information. Without this organization our knowledge of the meteorological particulars of the period would have been as deficient as it is of the year 1832, when the cholera was before prevalent.

The results thus collected may now be compared with those of former years, as far as the previous years will furnish the materials of comparison, with those for instance when epidemics prevailed, as in 1832, and with those of non-epidemic years, as in 1842, a year which was unusually free from epidemic diseases. Those gentlemen who may wish to investigate the connexion which may have existed between the sickness and mortality of the seasons, with their meteorological particulars, will find the monthly values of the subjects of meteorological research in the Quarterly Reports of the Registrar-General, with the names of the gentlemen who have furnished the observations; and most of those gentlemen would be happy to furnish detailed copies from their registers for short periods to any gentleman who would use them in connexion with sickness or mortality.

The quarterly meteorological returns for the past quarter, furnished to the Registrar-General and myself, have been received from thirty-eight different places, whose returns have been found on examination to be good. These have all been examined and reduced by myself.

At Greenwich the mean daily temperatures of the air from July 1 to July 17 were above their average values; the mean excess was $3^{\circ}2$. From July 18 to August 5 they were below their average values; the mean deficiency was $2^{\circ}2$. From August 6 to August 12 the temperature was high; its mean daily excess was $6^{\circ}0$. From August 13 to August 19 the mean deficiency was $1^{\circ}9$. From August 20 to September 15

the temperature was high; its mean excess was 4° ; and this period was distinguished by a thick and stagnant atmosphere, and the air was for the most part very close and oppressive. The temperature was $3^{\circ}3$ below its average from September 11 to September 21; and it was $5^{\circ}5$ in excess from September 22 to the end of the quarter. The summer has been warm and dry, without great heat. Thunder-storms have been very frequent during the quarter. The air has been for the most part unusually dry. The amount of rain has been less than usual in latitudes south of 53° , and north of this parallel it has been greater. The magnets have been seldom disturbed during the quarter; and the amount of electricity, though less than usual, seems to have been so in consequence of the less amount of humidity of the air.

The weather has been much finer in the southern than in the northern parts of the country.

The mean temperature of the three months ending August, constituting the three summer months, was $61^{\circ}0$; and that of the average of seventy summers is $60^{\circ}0$.

The several subjects of research in the past quarter are as follows:—

*The mean temperature of the air** for the month of July was $62^{\circ}1$, which is $4^{\circ}3$, $1^{\circ}9$, $1^{\circ}2$, $0^{\circ}7$, $2^{\circ}3$ and $0^{\circ}6$ above those of the years 1841, 1842, 1843, 1844, 1845 and 1848 respectively; and is $2^{\circ}4$ and $3^{\circ}3$ below those of the years 1846 and 1847 respectively. The temperature of this month exceeded its average from seventy years by $0^{\circ}7$.

For the month of August was $62^{\circ}9$, which is $2^{\circ}4$, $0^{\circ}8$, $5^{\circ}2$, $5^{\circ}6$, $0^{\circ}8$ and $4^{\circ}4$ above those of the years 1841, 1843, 1844, 1845, 1847 and 1848 respectively; and is $2^{\circ}5$ and $0^{\circ}3$ below those of the years 1842 and 1846 respectively. The temperature of this month exceeded its average from seventy years by $2^{\circ}1$.

For the month of September was $58^{\circ}8$, which is $0^{\circ}7$, $2^{\circ}4$, $1^{\circ}9$, $5^{\circ}2$, $4^{\circ}5$ and $3^{\circ}0$ above those of the same month in the years 1841, 1842, 1844, 1845, 1847 and 1848 respectively; and is $0^{\circ}7$ and $1^{\circ}3$ below that in 1843 and 1846. The temperature of this month exceeded that of the same month on an average of seventy years by $2^{\circ}1$.

The mean temperature of evaporation at Greenwich—

For the month of July was $56^{\circ}2$; for August was $57^{\circ}3$;

* For the monthly, quarterly and yearly mean temperature of the air from 1786 to 1843, see my paper in the Philosophical Transactions, part ii. 1849; and for the mean monthly values of several meteorological elements, see my paper on Meteorology in the Illustrated London Almanac for 1850.

and for September was $54^{\circ}6$. These values are $1^{\circ}3$ less, $0^{\circ}4$ less and $0^{\circ}1$ greater, respectively, than the averages of the same months in the preceding eight years. The mean value for the quarter was $56^{\circ}0$, which is $0^{\circ}5$ below the average of the corresponding quarters of the eight preceding years.

The mean temperature of the dew-point at Greenwich—

For the months of July, August and September, were $51^{\circ}1$, $53^{\circ}0$ and $51^{\circ}0$ respectively. These values are $3^{\circ}6$, $2^{\circ}4$ and $1^{\circ}6$ below the average of the same months in the preceding eight years. The mean value for the quarter was $51^{\circ}7$, being of less value than in the same quarter of each of the eight preceding years, and less than their average by $2^{\circ}5$. This implies that less water has been mixed with the air during this period than in any of the corresponding quarters for eight years.

The mean elastic force of vapour at Greenwich for the quarter balanced a column of mercury 0.400 inch in height. Its average value for the corresponding quarter of the eight preceding years was 0.433 inch. The difference implies great dryness of the air.

The mean weight of vapour in a cubic foot of air for the quarter was 4.5 grains. The average from the eight preceding years was 4.9 grains.

The mean additional weight of water required to saturate a cubic foot of air was 1.6 grain. This value, from the eight preceding years, was 1.1 grain.

The mean degree of humidity in July was 0.711 , in August was 0.772 , and in September was 0.772 . The averages for the eight preceding years were 0.798 , 0.837 , and 0.858 respectively.

The mean reading of the barometer at Greenwich in July was 29.789 inches, in August was 29.841 , and in September was 29.767 . These values are respectively 0.011 less, 0.060 greater, and 0.048 less than the averages of the same months for the preceding eight years.

The reading of the barometer was 30.03 inches at the beginning of July. It decreased to 29.56 on the evening of the 4th, when it began to increase, and passed the point 30 inches during the afternoon hours of the 8th, and was 30.25 on the 11th at 9 A.M. This was the highest reading in the month. The reading decreased below 30 inches on the 15th, and to 29.40 by the morning of the 20th; it then increased to 29.94 by noon on the 23rd; it then decreased to 29.31 on the 25th, and this was the lowest reading in the month; it then increased to 29.80 by the evening of the 28th; then decreased to 29.52 at 3 P.M. on the 30th; and after this increased to 29.80 at

the end of the month. The range of readings during the month was 0.94 inch.

In August the reading increased to 30.02 inches on the morning of the 2nd at 9 A.M.; decreased to 29.78 on the 5th at 10 A.M.; increased to 29.95 on the 7th at 9 A.M.; decreased to 29.56 by the 9th at 9 P.M.; increased to 29.95 on the 7th at 9 A.M.; decreased to 29.56 by the 9th at 9 P.M.; increased to 29.79 on the 11th at 9 A.M.; decreased to 29.46 by the 13th at 3 P.M.; increased to 29.74 by 3 P.M. on the 15th; decreased to 29.54 on the 16th at 3 P.M.; it then increased and passed the point 30 inches about midnight on the 18th, and was 30.22 on the 21st; at which reading it continued almost all the day, and then decreased, slowly passing below 30 inches after noon on the 25th, to 29.69 on the 30th at 9 P.M., and then increased to 29.74 by the 31st. The range of readings in the month was 0.66 inch.

The reading decreased on September 1st to 29.50 inches at 9 P.M.; then increased slowly till the 7th at midnight, when it was 30.05 ; the decrease on the 8th was slow; it was rapid on the 9th and 10th; and the reading on the 11th was 29 inches nearly all the day; on the 12th at noon the reading was 28.88 , being the lowest in the quarter; after this time the reading increased, and passed the point 30 inches before noon on the 14th; and continued to increase till the 19th at noon, when it was 30.36 , being the highest in the quarter; after this time it decreased, and passed below 30 inches before noon on the 22nd, and continued to decrease till the 27th at 3 P.M., when it was 29.61 ; it then decreased slightly to 29.73 of the morning of the 28th; and then decreased to 29.08 by the end of the month. The range in the month was 1.48 inch, being greater than usual.

The average weight of a cubic foot of air, under the average temperature, humidity and pressure, was 524.6 grains. The average for the preceding eight years was 525.8 grains.

The rain fallen at Greenwich in July was 2.9 inches, in August was 0.45 , and in September was 3.3 . The amount for the quarter was 6.6 . The average for this quarter in the preceding eight years was 7.2 .

The fall of rain in August was less than has fallen in August since the year 1819. The average fall of rain at Greenwich, from thirty-three years' observations, in July is 2.5 , in August 2.4 , and in September 2.4 inches. The fall was less than its average at places south of latitude 53° , exclusive of Cornwall and Devonshire; it was about its average fall between 53° and 54° of latitude; and north of 54° the fall was greater than usual.

The excess of rain in the quarter in the counties of Cornwall and Devonshire is owing to two remarkable falls which occurred in Cornwall on September 22 and on September 26. The observer at Helston mentions the falls on the nights of those days as very remarkable. The observer at Falmouth says, "a greater quantity of rain fell on the nights of the 22nd and 26th of September than I have measured in the same time for twelve years, viz. 1.925 and 1.964 inches respectively." The observer at Truro says, "the quantity of rain for September is most extraordinary, amounting to 9.25 inches, particularly the amount which fell on the 22nd, viz. 4.24 inches. On the 26th a large quantity also fell, viz. 3.00 inches. The total for the month exceeded that registered in any previous month during the period of our observations (eleven years), except in one instance, which, in the same month of September, slightly exceeds the present amount. The largest fall in any one day previously noted was 2.10 inches (in December 1848); so that the quantity on the 22nd of September is double that on any former occasion, and is rendered more remarkable by being followed in four days by another far exceeding all except itself." These remarkable falls seem to have been confined almost entirely to the county of Cornwall.

The directions of the wind at Greenwich were S.W. and N.W. till July 8; was N.E. from the 10th to the 16th; and it was mostly S.W. from the 17th to the end of the month. From August 2 to 6 was N.W. and N.E.; it was S.W. from the 8th to the 17th; and was chiefly N.W. till the end of August. It was mostly N. from September 1 to the 8th; S.W. from the 10th to the 16th; and N. and N.E. after this time. From the observations of the direction of the wind which have been taken daily at most of the principal railway stations, and published in the "Daily News" on the following day during the whole of the past quarter, it appears that the general direction was the same all over the country when the air has been in quick motion; but that at other times its direction has been variable, and very frequently in a calm state at places whose elevation is inconsiderable.

The daily horizontal movement of the air in July was 120 miles; from August 1 to 11th was 50 miles; from August 12 to 16th was 170 miles; and from August 17 to the end of the quarter was about 55 miles, except on September 11 and 12th, when it amounted to 190 miles daily. The average daily horizontal movement of the air during the quarter is about 120 miles. Therefore during the months of August and September the movement of the air was about one-half the usual amount.

This remark applies to the place at which Osler's anemometer is placed at Greenwich, viz. at an elevation of upwards of 200 feet above the level of the sea, and near the northern extremity of the table-land forming Blackheath. At places at a less elevation, the movement of the air was very much less than the above; on many days, when a strong breeze was blowing on the top of the observatory and over Blackheath, there was not the slightest motion in the air near the banks of the Thames; and this remarkable calm continued for some days together, particularly from August 19 to the 24th, on the 29th, from September 1 to the 10th, and after September 15. On September 11 and 12 the whole mass of air at all places was in motion, and the first time for nearly three weeks, the hills at Hampstead and Highgate were seen distinctly from Greenwich.

From the published observations of the strength of the wind daily at all parts of the country, it would seem that the air has been for days together in a stagnant state at all places whose elevation above the sea is small.

The readings of the thermometer on grass in July were below 40° on four nights; the lowest was $32^{\circ}.8$; between 40° and 50° on twenty nights, and above 50° on seven nights. In August the readings were below 40° on five nights; the lowest reading was $34^{\circ}.5$; between 40° and 50° on ten nights, and between 50° and 60° on twelve nights. In September the readings were below 40° on six nights; between 30° and 40° on twelve nights, and about 50° on ten nights.

At Cardington the lowest reading on grass in July was $31^{\circ}.8$, in August was 32° , and in September was 27° . The mean of all the lowest readings was $45^{\circ}.5$ in July, $47^{\circ}.6$ in August, and was $44^{\circ}.1$ in September, as observed by Samuel Charles Whitbread, Esq.

There were three exhibitions of the *aurora borealis*. The first was seen on August 18 at Whitehaven; the second was seen at Latimer on September 3 at 8 P.M., when a rose-coloured auroral arch was seen extending from south-west to north-east across the zenith; and on Sept. 16 an aurora was seen at Stonyhurst.

Thunder-storms occurred on July 18 at Nottingham and Leicester; on July 19 at Camberwell, Saffron Walden, Uckfield and Greenwich; on July 20 at Nottingham, Camberwell, Saffron Walden, Leicester, Uckfield and Greenwich; on July 23 at Hartwell Rectory, Stone and Leicester; on July 24 at Camberwell; on July 25 at Hartwell Rectory, Stone and Camberwell; on July 26 at Camberwell, Leicester and Greenwich; on July 29 at Nottingham and Leicester; on

August 1, 2 and 3, at Nottingham; on August 4 and 6 at Helston; on August 7 at Helston and Leicester; on August 8 at Hartwell Rectory, Stone, and severe at Uckfield; on August 9 at Nottingham, Cardington, Liverpool and Leicester: that at Nottingham is described as being violent. On August 10 at Liverpool and Leicester; on August 11 at Cardington, Hartwell Rectory, Stone and Uckfield; on August 12 at Nottingham, Saffron Walden and Leicester; on August 13 at Saffron Walden; on August 17 at Leicester and Uckfield; on August 30 at Nottingham; on September 1 at Stone, Uckfield very severe, and Leicester; on September 2 at Hartwell Rectory, Uckfield and Saffron Walden: at this place the storm was very violent. On September 3 at Stone, Uckfield and Leicester; and at Uckfield on September 4 and 10.

Lightning was seen but thunder was not heard on July 19 and 20 at Saffron Walden; on July 20 and 23 at Hartwell Rectory and Stone; on August 4 and 6 at Helston; on August 7 at Helston, Uckfield and Greenwich; on August 8 at Hartwell Rectory and Stone; on August 9 at Cardington, Liverpool and Stonyhurst; on August 10 at Liverpool; on August 11 at Cardington, Hartwell Rectory, Stone, Southampton and Greenwich; on August 12 at Uckfield, Southampton and Saffron Walden; on August 13 at Saffron Walden; on August 17 at Cardington; on August 18 at Cardington and Greenwich; on August 19 at Cardington; on August 20 at Greenwich; and on August 24 at Uckfield.

Thunder was heard but lightning was not seen on July 18 at Cardington and Holkham; on July 19 at Helston, Cardington, Hartwell and Stone; on July 20 at Hartwell Rectory and Stone; on July 22 at Helston; on July 23 at Helston, Cardington and Holkham; on July 25 very heavy thunder was heard at Latimer; on July 26 at Cardington, Hartwell, Stone, Southampton and Nottingham; on July 27 at Latimer; on July 31 at Cardington and Newcastle; on August 8 at Holkham, Norwich and Newcastle; on August 9 at Holkham, Latimer, Newcastle and Stonyhurst; on August 10 at Newcastle; on August 11 at Latimer and Newcastle; on August 12 at Holkham; on August 13 at Cardington, Hartwell and Stone; on September 1 at Holkham, Hartwell Rectory, Latimer and Southampton; on September 2 at Helston and Latimer; on September 3 at Holkham and Hartwell; on September 5 at Holkham and Wakefield; on September 6 at Wakefield; on September 10 at Wakefield and Liverpool; on September 20 at Helston; on September 28 at Newcastle; and on September 30 at Nottingham.

Hail fell on August 8 at Uckfield: the observer mentions that the hailstones were as large as beans. Hail also fell on August 12 at Saffron Walden.

Solar halos were seen at the following places:—On July 1 at Maidenstone Hill, Stone and Nottingham; on July 2 at Stone; on July 3, 19 and 21 at Maidenstone Hill; on July 25 and August 1 at Stone; on August 9 at Hartwell and Stone; on September 1 at Maidenstone Hill; on September 22 at Stone; and on September 26 and 28 at Maidenstone Hill.

Lunar halos were seen at Cardington on July 5, and at Maidenstone Hill on September 2 and 28.

I have been favoured with the following agricultural reports. At Guernsey, by Dr. Hoskins, F.R.S.

The weather during July was uniformly fine; the quantity of rain rather above the average, distributed in equable showers from the 18th to the end of the month. There was less thunder and lightning than usual.

The crops without exception luxuriant. The mean temperature of August was high, which, added to rain much below the usual average, enabled the farmers to secure the harvest speedily and profitably. The earlier half of September was warm and dry, the latter wet and windy. Potatoes small, but good and abundant; wall-fruit scanty, but figs in large quantities, and thoroughly ripened. Cider apples scanty.

About the beginning of August cholera appeared in ill-drained districts as an epidemic; it spread erratically in almost every part of the town and suburbs, and afterwards appeared in isolated country houses, in which no morbid cause could be traced. It declined towards the end of September.

Small-pox was also very general during this and the previous quarter, as well in the country-places as in town. Vaccination had been much neglected, owing to indifference and prejudice on the part of the lower orders.

At Uckfield, by C. L. Prince, Esq., Surgeon.

The weather during the months of July, August and September, has been very fine, warm, dry, and remarkably healthy, the mortality having been lower during this quarter than in the corresponding quarter for several years past. The temperature has been upon the whole very equable, and without that *excessive* heat which usually characterizes a warm and dry summer in the southern counties. The crops of hay and of every species of grain has been abundant, very good in quality, and secured in excellent condition. The hop plant has been much diseased, and the crop far below the average.

The failure of this crop is a great loss to the poor in this district; as from their earnings in hop-picking they are generally enabled to buy a certain amount of clothing, as well as sundry other necessities for the winter. The potatoe haulm has been diseased in some situations, but I do not find that the tuber has been in any way injured. The crop of apples is good, and above the average; but that of the pear, plum, and wall-fruit generally, is almost entirely deficient, the blossom and trees having been much injured by the heavy snow which fell in April.

At Stonyhurst, by the Rev. Alfred Weld, F.R.A.S.

Potatoes were first got up about June 30; it was then found that about 1 lb. out of 20 lbs. was diseased: still there were no signs of decay in the leaves, which looked strong and healthy. About August 20 the tops of the potatoes seemed struck by a general blight, which spread with such rapidity that in two or three days from that period the fields were quite black. The roots suffered at the same time in a greater or less degree; frequently the proportion of decayed to sound potatoes was as two to one. Potatoes planted on damp soil always suffered most, while others planted in sheltered spots escaped with comparative immunity. It was found that in one case, where clay and black bog soil existed in the same field, potatoes planted on the former suffered severely, while those on the latter remained untouched. The smell of the decaying tops was offensive, and so strong as to be perceptible at a considerable distance. After July 15 the weather became very unfavourable for hay, and a great deal remained out until August. The crop was far below the average. A distemper broke out amongst horses about the middle of July, and was followed by another which attacked the cattle; both were in some instances fatal. Reaping of wheat began August 25th; of oats, August 31st. The crops were far above the average, and generally well-housed. The average length of oat-straw grown on a field of six acres, which had not been ploughed before for more than twenty years, was six feet, whilst in some places it was above seven feet. The grain was with few exceptions all housed by the end of September.

For the West Riding of Yorkshire, by Charles Charnock, Esq., of Leeds.

The past quarter has consisted of one wet and of two dry months. The growth of turnips and potatoes were retarded during the dry months, and progressed rapidly during that which was wet. The harvest was very protracted on the early soils, but secured in very good condition. On late soils corn is still exposed to the weather. On the 2nd of October

I saw corn, both reaped and unreaped, covered with snow in some districts.

The potatoe crop is not heavy, but on the whole nearly free from the disease which has been so fatal for several years. Much alarm was caused by the tops of many fields being discoloured by the frost about the middle of September; but on examination, the tubers are found to be not much affected.

Wheat is a bulky crop, but does not yield well. Barley and oats are much below an average bulk.

Live stock is generally healthy, except cattle imported from Ireland, which are mostly affected with diseases of the lungs.

The heavy rains which fell on the 28th and 29th of September will no doubt be of much use in many ways. The river Aire, which passes through Leeds, was much swollen, and its waters gave evident proof of some of the causes of cholera. At Castleford, whose distance from Leeds is ten miles, their stench was greater than can be imagined; whilst their deleterious contents were such that all the fish were almost destroyed or taken in a stupefied state, and large quantities floated upon the surface of the water.

At Finsbury Farm, near Romsey, by J. Clark, Esq.

The harvest was well saved, and generally an average crop. The season has been, and is still, all that could be desired. Grass and turnips are growing beautifully, and agricultural operations are proceeding satisfactorily. Some wheat has been sown on heavy lands in fine order. The early tares, rye, and clover, are doing well.

To the Report of the Registrar-General are appended the monthly values at every station, from which the average values for the quarter have been determined, and which are contained in the following table:—

The mean of the numbers in the first column is 29·576 inches, and this value may be considered as the pressure of dry air for England during the quarter ending September 30, 1849.

The mean of the numbers in the second column, for Guernsey and those places situated in the counties of Cornwall and Devonshire, is 59°·5; for those places situated south of latitude of 52°, including Chichester and Hartwell, is 60°·1; for those places situated between the latitudes of 52° and 53°, including Saffron Walden and Leicester, is 58°·4; for those places situated between the latitudes of 53° and 54°, including Derby and York, is 57°·1; at Liverpool and Whitehaven is 57°·7; and at Durham and Newcastle is 55°·8.

The average daily range of temperature in Cornwall and Devonshire was 12°·9; south of latitude 52° was 19°·3; between the latitudes of 52° and 53° was 19°·3; between the

Meteorological Table for the Quarter ending September 30, 1849.

Names of the places.	Mean pressure of dry air reduced to the level of the sea.	Mean temperature of the air.	Highest reading of the thermometer.	Lowest reading of the thermometer.	Mean daily range of temperature.	Mean monthly range.	Range of temperature in the quarter.	Mean temperature of the dew-point.	Wind.		Mean amount of cloud.	Rain.		Mean degree of humidity.	Mean whole amount of water in a vertical column of atmosphere.	Mean weight of a cubic foot of air.	Height of column of air above the level of the sea.
									General direction.	Strength.		Number of days on which it fell.	Amount collected.				
Guernsey	29.609	61.0	79.5	53.0	10.0	21.3	26.5	52.8	Variable.	1.6	5.6	31	5.2	0.783	5.7	597	123
Helston	29.547	50.7	80.0	41.0	14.0	30.3	39.0	56.2	Variable.	1.4	6.9	38	10.5	0.879	6.4	597	100
Falmouth	29.547	50.7	80.0	41.0	14.0	30.3	39.0	56.2	Variable.	1.4	6.9	38	10.5	0.879	6.4	597	100
Truro	29.547	50.7	80.0	41.0	14.0	30.3	39.0	56.2	Variable.	1.4	6.9	38	10.5	0.879	6.4	597	100
Torquay	29.547	50.7	80.0	41.0	14.0	30.3	39.0	56.2	Variable.	1.4	6.9	38	10.5	0.879	6.4	597	100
Exeter	29.643	60.2	75.0	40.0	9.9	24.0	29.0	52.6	w. & e.	1.9	3.7	48	7.0	0.775	5.8	598	140
Chichester	29.643	60.2	75.0	40.0	9.9	24.0	29.0	52.6	w. & e.	1.9	3.7	48	7.0	0.775	5.8	598	140
Uckfield	29.605	59.7	78.0	41.0	13.9	31.7	37.0	53.1	Variable.	1.6	6.9	41	6.6	0.792	6.0	594	100
Southampton	29.605	59.7	78.0	41.0	13.9	31.7	37.0	53.1	Variable.	1.6	6.9	41	6.6	0.792	6.0	594	100
Beckington	29.706	58.6	82.0	38.0	16.1	38.4	45.2	53.2	w. & e.	1.0	5.5	31	5.9	0.685	5.3	519	335
Royal Observatory, Greenwich	29.706	58.6	82.0	38.0	16.1	38.4	45.2	53.2	w. & e.	1.0	5.5	31	5.9	0.685	5.3	519	335
Maldenstone Hill, Greenwich	29.588	61.3	84.1	39.5	20.1	43.3	53.0	50.1	s.w. & n.w.	1.0	5.5	27	8.1	0.801	5.8	594	180
Chiswell Street, London	29.588	61.3	84.1	39.5	20.1	43.3	53.0	50.1	s.w. & n.w.	1.0	5.5	27	8.1	0.801	5.8	594	180
St. John's Wood	29.587	60.2	81.0	42.9	15.8	35.2	41.2	53.6	Variable.	1.6	6.9	41	6.6	0.792	6.0	594	100
Canterbury	29.587	60.2	81.0	42.9	15.8	35.2	41.2	53.6	Variable.	1.6	6.9	41	6.6	0.792	6.0	594	100
Latimer Rectory	29.587	60.2	81.0	42.9	15.8	35.2	41.2	53.6	Variable.	1.6	6.9	41	6.6	0.792	6.0	594	100
Aylesbury	29.587	60.2	81.0	42.9	15.8	35.2	41.2	53.6	Variable.	1.6	6.9	41	6.6	0.792	6.0	594	100
Stone Observatory	29.571	60.3	83.0	36.0	24.9	43.3	50.0	50.8	s.w. & n.e.	0.7	6.3	42	8.3	0.726	5.3	523	280
Hartwell (near Aylesbury)	29.571	60.3	83.0	36.0	24.9	43.3	50.0	50.8	s.w. & n.e.	0.7	6.3	42	8.3	0.726	5.3	523	280
Hartwell Rectory	29.545	59.7	81.6	36.4	19.6	42.4	45.2	49.7	s.w. & n.e.	0.9	6.6	46	8.5	0.730	5.1	524	320
Saffron Walden	29.545	59.7	81.6	36.4	19.6	42.4	45.2	49.7	s.w. & n.e.	0.9	6.6	46	8.5	0.730	5.1	524	320
Raddiffe Observatory, Oxford	29.541	59.2	81.0	38.0	17.3	37.3	43.0	50.7	n.w. & n.e.	0.9	6.6	46	8.5	0.736	5.3	526	200
Hereford	29.541	59.2	81.0	38.0	17.3	37.3	43.0	50.7	n.w. & n.e.	0.9	6.6	46	8.5	0.736	5.3	526	200
Cardington, near Bedford	29.530	59.0	83.4	37.3	17.3	40.9	46.1	52.3	Variable.	1.9	7.2	39	6.5	0.788	6.4	527	70
Norwich	29.530	59.0	83.4	37.3	17.3	40.9	46.1	52.3	Variable.	1.9	7.2	39	6.5	0.788	6.4	527	70
Holkham	29.508	58.7	81.0	40.0	16.3	35.7	41.0	52.3	w. & n.e.	0.6	6.4	36	8.2	0.765	5.6	527	70
Leicester	29.508	58.7	81.0	40.0	16.3	35.7	41.0	52.3	w. & n.e.	0.6	6.4	36	8.2	0.765	5.6	527	70
Derby	29.508	58.7	81.0	40.0	16.3	35.7	41.0	52.3	w. & n.e.	0.6	6.4	36	8.2	0.765	5.6	527	70
Highfield House, Notts.	29.509	58.4	80.0	35.0	13.0	37.0	45.0	51.7	Variable.	1.2	6.1	50	9.0	0.802	5.8	529	156
Wakefield	29.509	58.4	80.0	35.0	13.0	37.0	45.0	51.7	Variable.	1.2	6.1	50	9.0	0.802	5.8	529	156
Stourton Lodge (near Leeds)	29.574	57.9	81.0	33.0	21.8	47.0	58.0	50.2	n.w. & n.e.	1.5	6.3	46	4.2	0.812	5.3	533	37
Stonyhurst Observatory	29.589	55.3	80.5	34.3	15.5	37.2	46.2	50.6	n.w. & n.e.	1.2	6.1	50	9.0	0.802	5.8	529	156
York	29.589	55.3	80.5	34.3	15.5	37.2	46.2	50.6	n.w. & n.e.	1.2	6.1	50	9.0	0.802	5.8	529	156
Whitehaven	29.589	55.3	80.5	34.3	15.5	37.2	46.2	50.6	n.w. & n.e.	1.2	6.1	50	9.0	0.802	5.8	529	156
Durham	29.589	55.3	80.5	34.3	15.5	37.2	46.2	50.6	n.w. & n.e.	1.2	6.1	50	9.0	0.802	5.8	529	156
Newcastle	29.589	55.3	80.5	34.3	15.5	37.2	46.2	50.6	n.w. & n.e.	1.2	6.1	50	9.0	0.802	5.8	529	156
Number of columns	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17

Mr. J. Glaisher's Remarks on the Weather.

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latitudes of 53° and 54° was $17^{\circ}.6$; at Liverpool and Whitehaven was $10^{\circ}.3$; and at Durham and Newcastle was $13^{\circ}.3$.

The greatest mean daily ranges of the temperature of the air took place at Hartwell, Cardington, Highfield House, Notts, and Latimer Rectory; and the least occurred at Torquay, Guernsey, Liverpool, and Truro.

The highest thermometer readings during the quarter were 91° at Wakefield; 87° at Chiswell Street, London; $86^{\circ}.2$ at St. John's Wood; 86° at Leicester. The lowest thermometer readings were 29° at Beckington, 33° at Wakefield and at Leicester, and $33^{\circ}.8$ at Highfield House, Notts. The extreme range of temperature of the air during the quarter in England was therefore about 56° , considering the two extremes as 86° and 30° .

Rain has fallen on the greatest number of days at Stonyhurst, Highfield House, Notts, Wakefield and Stone. The average number at these places was 51. It fell on the least number of days at Southampton, Oxford, Beckington and Greenwich, and the average number at these places was 29. The stations at which the largest falls have taken place are Stonyhurst, Newcastle, Whitehaven and Helston. The smallest falls occurred at Beckington, Wakefield, Holkham and Norwich. The average fall in the counties of Cornwall and Devonshire was 9.8 inches; south of latitude 52° was 6.9 inches; between the latitudes of 52° and 53° was 6.9 inches; between 53° and 54° was 9.3 inches; at Liverpool and Whitehaven was 11.5 inches; and at Durham and Newcastle was 10.3 inches.

The numbers in the columns 15 to 19 show the mean values of the hygrometrical results; from which we find that—

The mean weight of vapour in a cubic foot of air at all places (excepting Cornwall and Devonshire) in the quarter ending June 30, 1849, was 4.5 grains.

The mean additional weight required to saturate a cubic foot of air in the quarter ending June 30, 1849, was 1.1 grain.

The mean degree of humidity (complete saturation = 1) in the quarter ending June 30, 1849, was 0.802.

The mean amount of vapour mixed with the air would have produced water, if it had been precipitated at one time on the surface of the earth, to the depth of 5.5 inches.

The mean weight of a cubic foot of air under the mean pressure, temperature and humidity, was 526 grains at the average height of 155 feet.

And these values for Cornwall and Devonshire were 4.8 grains; 1.2 grain; 0.808; 6.0 inches; and 528 grains, at the average height of 123 feet.

The following table exhibits the meteorological particulars of the first three quarters of the years 1847, 1848 and 1849.

Comparison of Meteorological Particulars of the Quarters ending March 31, June 30, and September 30, in the Years 1847, 1848 and 1849, in different Parallels of Latitude.

... 2 miles of Latitude.

For the Counties of Cornwall and Devonshire.

For the quarter ending	Mean pressure of dry air reduced to the level of the sea.	Mean elastic force of vapour.	Mean temperature of the air.	Mean highest readings of the thermometer.	Mean lowest readings of the thermometer.	Mean daily range of temperature.	Mean monthly range of temperature.	Mean quarterly range of temperature.	Mean dew-point.	Mean estimated strength.	Wind.	Mean amount of cloud.	Mean number of days on which it fell.	Rain.	Mean weight of a cubic foot of vapour.	Mean additional weight of a cubic foot of vapour.	Mean degree of humidity.	Mean whole amount of water in a vertical column of atmosphere.	Mean weight of a cubic foot of air.	Mean height of stations above the level of the sea.
	in.	in.												in.	grs.	grs.		in.	grs.	feet.
March 31.	29-706		41-6	56-6	25-0	.....	.....	31-6	.....	1-8	n.e.	6-4	41	9-0	2-6	0-8	0-763	3-0	545	123
1847.	29-512	.....	42-1	59-9	24-4	9-2	.....	35-5	.....	1-6	s.w.	7-0	59	12-0	3-1	0-5	0-863	3-7	541	122
1848.	29-837	0-275	45-1	57-8	29-7	10-4	23-8	28-1	41-1	1-3	s.w.	6-5	47	7-2	3-2	0-5	0-878	3-8	546	123
1849.																				

South of latitude 52°, exclusive of Cornwall and Devonshire.

1847.	29-706	.....	36-9	62-6	8-5	.....	.....	54-1	.....	.....	n.e.	6-9	30	4-5	2-4	0-4	0-867	2-8	553	.....
1848.	29-512	.....	39-3	66-5	15-5	10-2	.....	50-9	.....	1-7	s.w.	7-6	52	7-1	2-8	0-4	0-896	3-3	544	158
1849.	29-837	0-243	41-5	60-9	20-5	13-5	32-4	40-3	37-6	1-3	s.w.	7-2	37	5-1	2-7	0-4	0-863	3-3	547	165

Between the latitudes of 52° and 53°.

1847.	29-706	.....	37-2	61-0	20-1	.....	.....	40-9	.....	1-6	e.	6-9	35	5-0	.....	.....	.....	.....	.....	.....
1848.	29-512	.....	39-0	63-5	17-7	11-0	.....	45-6	.....	1-9	s.w.	6-8	46	7-3	2-7	0-4	0-882	3-2	544	179
1849.	29-837	0-235	40-8	58-9	16-0	11-8	34-0	42-9	36-6	1-6	s.w.	6-7	31	4-0	2-6	0-5	0-863	3-2	550	109

Between the latitudes of 53° and 54°.

1847.	29-706	.....	37-3	61-7	19-0	.....	.....	42-7	.....	1-3	e.	6-2	44	5-5	2-6	0-6	0-842	3-0	548	165
1848.	29-512	.....	38-3	62-3	11-8	10-7	.....	50-4	.....	1-0	s.w.	7-7	59	12-0	2-7	0-3	0-911	3-2	542	163
1849.	29-837	0-242	39-9	59-8	17-3	11-1	34-1	42-4	37-5	1-7	w.	7-0	43	5-9	2-8	0-4	0-846	3-4	548	139

Near the sea coast on the West of England, between the latitudes of 53½° and 54½°.

1847.	29-706	.....	38-4	59-6	24-9	.....	.....	34-7	.....	1-4	s.e.	.....	40	4-9	2-6	0-7	0-838	3-0	547	37
1848.	29-512	.....	40-7	55-0	17-9	7-4	.....	37-2	.....	1-7	w.s.w.	6-3	56	12-0	2-7	0-3	0-878	3-2	546	37
1849.	29-837	0-235	41-2	54-8	21-3	6-7	26-1	33-5	36-6	2-1	s.w. & n.w.	6-8	45	6-2	2-8	0-4	0-887	3-3	550	37

North of latitude 54°.

1847.	29-706	.....	36-6	61-7	19-1	.....	.....	42-6	.....	1-7	variable.	.....	28	2-8	2-4	0-5	0-844	2-7	547	230
1848.	29-512	.....	38-1	57-8	6-6	9-4	.....	51-2	.....	1-9	s.w.	6-4	39	9-7	2-7	0-2	0-957	3-0	544	230
1849.	29-837	0-234	40-5	56-3	17-0	11-5	33-0	39-3	36-5	1-9	s.w.	5-7	27	3-4	2-7	0-4	0-860	3-2	545	231

For the Counties of Cornwall and Devonshire.

June 30.	29-603	.....	51-3	72-8	31-2	.....	.....	41-4	.....	1-6	s.w.	6-2	37	7-7	4-8	0-6	0-816	4-7	530	122
1847.	29-554	.....	54-1	74-9	32-4	18-4	.....	42-5	.....	1-7	n.e.	4-4	40	8-7	3-8	1-2	0-765	4-7	534	123
1848.	29-541	0-301	52-0	75-2	32-2	14-8	32-8	43-0	43-7	1-6	n.	5-4	41	8-1	3-5	0-9	0-749	4-3	534	123
1849.																				

South of latitude 52°, exclusive of Cornwall and Devonshire.

1847.	29-603	.....	51-7	83-1	24-4	.....	.....	59-4	.....	2-3	s.w.	5-7	40	4-3	3-7	0-6	0-775	4-5	531	172
1848.	29-544	.....	54-2	80-5	28-9	20-2	.....	51-6	.....	1-5	e.	5-5	43	7-8	3-9	1-2	0-768	4-5	531	172
1849.	29-541	0-298	52-1	82-4	26-8	19-9	42-4	45-1	43-4	1-1	n.n.e.	6-6	44	6-7	3-8	1-2	0-760	4-3	536	205

Between the latitudes of 52° and 53°.

1847.	29-603	.....	51-1	78-9	26-9	.....	.....	52-1	.....	0-9	s.w. & n.w.	6-0	45	6-3	3-8	0-8	0-825	4-6	531	125
1848.	29-544	.....	53-7	81-5	32-5	20-1	.....	50-9	.....	1-4	s.w.	5-7	43	7-3	4-0	1-1	0-804	4-8	537	109
1849.	29-541	0-285	49-9	77-3	25-7	17-3	38-8	51-6	42-2	2-1	n.e.	6-2	44	7-4	3-6	0-9	0-792	4-1	537	109

TABLE (continued).

Between the latitudes of 53° and 54° .

For the quarter ending	Mean pressure of dry air reduced to the level of the sea.	Mean elastic force of vapour.	Mean temperature of the air.	Mean highest readings of the thermometer.	Mean lowest readings of the thermometer.	Mean daily range of temperature.	Mean monthly range of temperature.	Mean quarterly range of temperature.	Mean temperature of the dew-point.	Mean estimated strength.	Wind.	Rain.	Mean degree of humidity.	Mean whole amount of water in a vertical column of atmosphere.	Mean weight of a cubic foot of air.	Mean height of stations above the level of the sea.
une 30.	in.	in.	51.4	82.7	26.0	.....	.....	56.8	.....	2.8	w.	in.	0.786	4.6	grs.	feet.
1847.	29.603	.....	.....	81.2	25.8	.....	.....	55.4	.....	1.1	w.	8.7	0.780	4.4	533	139
1848.	29.544	.....	52.3	77.0	25.9	.....	42.5	51.1	43.4	1.2	w.	7.8	0.803	4.2	536	139
1849.	29.541	0.298	50.0	.....	17.9	19.7	.....	.....	.....	.....	.....	5.5	.....	.....	.....	.....

Near the sea coast in the West of England, between the latitudes of 53° and 54° .

[illegible]

North of latitude 54° .

[illegible]

For the Counties of Cornwall and Devonshire.

Sept. 30.	29-568	588	783	430	129	.....	35.5	1.4	n.e. & n.w.	6.1	25	4.3	4.9	0.9	0.822	6.3	529
1847.	.....	.....	783	430	129	.....	35.5	.....	.....	5.5	51	10.9	4.9	0.9	0.843	6.0	527
1848.	.....	581	76.5	42.0	14.2	.....	34.5	.....	1.5	s.w.	.....	.....	.....	.....	.....	.....	122
1849.	29-576	595	77.3	43.2	12.9	27.8	32.5	53.8	1.8	w. & e.	5.6	39	9.8	1.2	0.807	5.9	528
1849.	29-576	0.425	595	77.3	12.9	27.8	32.5	53.8	1.8	w. & e.	5.6	39	9.8	1.2	0.807	5.9	528

South of latitude 52°, exclusive of Cornwall and Devonshire.

1847.	29.568	0.428	58.5	86.6	33.1	18.7	.....	53.4	2.2	s.w.	5.6	31	3.9	4.8	1.0	0.937	6.1	525	121
1848.	29.541	0.411	57.8	84.3	34.4	19.5	.....	50.0	0.7	s.w.	6.4	51	10.1	4.6	1.1	0.811	5.7	525	186
1849.	29.576	0.402	60.1	83.5	38.8	19.3	39.7	45.4	52.2	1.2	s.w.	5.9	36	6.9	1.5	0.748	5.5	524	210

Between the latitudes of 52° and 53° .

1847.	29-568	587	857	339	188	.....	51-8	.....	0-9	s.w.	63	30	4-3	4-6	1-0	0-839	61	530
1848.	29-541	568	865	34-8	18-9	.....	51-9	.....	2-2	s.w.	53	44	9-9	4-4	1-1	0-804	5-4	529
1849.	29-576	0-396	58-4	83-8	37-8	19-3	40-2	45-1	51-7	1-5	s.w.	62	55	6-9	4-4	1-3	0-775	5-4	528

Between the latitudes of 53° and 54° .

1847.	29-568	.....	587	84-0	34-3	17-3	.....	49-8	.....	1-6	w.	5-3	35	4-5	4-5	1-1	0-787	5-9	527	20
1848.	29-541	.....	55-7	84-6	34-6	17-1	.....	50-0	.....	1-2	s.w.	6-7	55	11-6	4-5	1-4	0-843	5-3	528	13
1849.	29-576	0-402	56-1	83-4	35-5	17-6	40-7	50-6	52-2	1-2	w.s.w.	6-6	47	9-3	4-3	0-9	0-834	5-4	528	15

Near the sea coast in the West of England, between the latitudes of $53^{\circ}1'$ and $54^{\circ}1'$.

1847.	29-568	.....	57-9	76-2	41-3	.....	34-9	.....	1-1	s.w. & n.w.	5-6	45	9-2	4-4	1-4	0-823	5-8	
1848.	29-541	.....	56-7	74-4	41-8	10-2	.....	32-6	.....	1-7	n.w.	6-7	52	10-0	4-3	1-1	0-796	5-3
1849.	29-576	0-382	57-7	76-6	44-2	10-3	27-4	32-3	50-7	1-5	s.w.	6-3	47	11-5	4-4	0-7	0-854	5-4

North of latitude 54° .

1847.	29-568	.....	54-9	80-1	31-4	14-8	.....	487	.....	1-7	5-6	28	3-4	4-6	0-4	0-882	5-9
1848.	29-541	.....	55-7	79-6	34-6	14-3	.....	44-9	.....	1-3	5-8	35	7-4	4-3	1-2	0-794	5-2
1849.	29-576	0-388	55-8	76-3	39-3	13-3	32-7	37-1	51-1	1-2	6-7	36	10-3	4-4	0-9	0-814	5-3

Fletcher

Remarks on Weather

ending Dec 31. 1849

In my paper upon the meteorological particulars of the quarter ending September 30, 1849, and published in the Philosophical Magazine, I spoke of the great mortality which had existed throughout that quarter in London and its environs. This excess of mortality demanded notice; and not less remarkable had been the decrease in the weekly and monthly rate of mortality in the past quarter; the mortality having been, in three successive weeks in November, 255, 284, and 270 below the estimated number; and the mortality in October was 227, in November was 1160, and in December was 254 less than the calculated number. This decrease is extraordinary; and it moves the epidemic of cholera carried off many of the sickly and weakly, whose deaths would otherwise have been made up the average number in the past quarter. The meteorological returns for the past quarter have been furnished to the Registrar-General from the same places, and which have passed my usual examination and reduction. During the past quarter there has been an unusual prevalence of fog, particularly in the month of November. Snow has fallen more frequently than usual, but in small quantities only. The daily temperatures of the air till October 18 and after November 20, with the under-mentioned exceptions, were below their average values; in the former period the mean defect was 4.2°, and in the latter it was 4.0°. Between October 17 and November 14 the temperature was above the

[From the LONDON, EDINBURGH AND DUBLIN PHILOSOPHICAL MAGAZINE
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XIV. *Remarks on the Weather during the Quarter ending December 31, 1849.* By JAMES GLAISHER, Esq., F.R.S., F.R.A.S., and of the Royal Observatory, Greenwich.

IN my paper upon the meteorological particulars of the quarter ending September 30, 1849, and published in the Philosophical Magazine, I spoke of the great mortality which had existed throughout that quarter in London and its environs. This excess of mortality decreased rapidly; and not less remarkable has been the decrease in the weekly and monthly rate of mortality in the past quarter; the mortality having been, in three successive weeks in November, 269, 284, and 270 below the estimated number. The mortality in October was 557, in November was 1160, and in December was 564 less than the calculated numbers. This decrease is extraordinary; and it proves that the epidemic of cholera carried off many of the sickly and weakly, whose deaths would otherwise have made up the average numbers in the past quarter.

The meteorological returns for the past quarter have been furnished to the Registrar-General from the usual places, and which have passed my usual examination and reduction.

During the past quarter there has been an unusual prevalence of fog, particularly in the month of November. Snow has fallen more frequently than usual, but in small quantities only. The daily temperatures of the air till October 16 and after November 20, with the under-mentioned exceptions, were below their average values; in the former period the mean defect was $4^{\circ}2$, and in the latter it was $4^{\circ}0$. Between October 17 and November 14 the temperature was above the

average for the season; its mean daily excess was $6^{\circ}3$. From December 5 to 8 the mean daily excess of temperature was 4° , and between December 14 and 19 the average excess was $6^{\circ}9$. This warm period of six days was remarkable, as occurring between two very cold periods. The temperature in December was variable; on the 15th day it exceeded the average by $13^{\circ}4$, and on the 28th it was 13° below.

The mean temperature of the air at Greenwich for the three months ending November, constituting the three autumnal months, was $51^{\circ}3$; and that of the average from the seventy-nine preceding autumns was $49^{\circ}3$.

For the month of October was $51^{\circ}1$, exceeding the average of the seventy-nine preceding years by $1^{\circ}8$, and that of the preceding eight years by $1^{\circ}5$.

For the month of November was $44^{\circ}1$, exceeding the average of the seventy-nine preceding years by $1^{\circ}7$, and less than that of the preceding eight years by $0^{\circ}4$.

For the month of December was $39^{\circ}1$, exceeding that of the average of the preceding seventy-nine years by $0^{\circ}3$, and being less than the average of the preceding eight years by $1^{\circ}3$.

The mean for the quarter was $44^{\circ}8$, exceeding the average of seventy-nine years by $1^{\circ}3$, and being of the same value as that of the preceding eight years.

The mean temperature of evaporation at Greenwich—

For the month of October was $48^{\circ}2$; for the month of November was $42^{\circ}2$; and for the month of December was $37^{\circ}9$. These values are $0^{\circ}8$, $0^{\circ}9$, and $1^{\circ}3$ below those of the averages of the same months respectively in the preceding eight years.

The mean temperature of the dew-point at Greenwich—

For the months of October, November and December, were $45^{\circ}1$, $39^{\circ}8$ and $35^{\circ}1$ respectively. These values are $1^{\circ}0$, $1^{\circ}7$ and $2^{\circ}1$ below respectively the averages of the same months in the preceding eight years. The mean value for the quarter was $40^{\circ}0$, and that of the preceding eight years was $41^{\circ}6$. The difference of these numbers shows that the air has been less humid than usual.

The mean elastic force of vapour at Greenwich for the quarter was 0.267 inch, being less than the average from the preceding eight years by 0.017 inch.

The mean weight of water in a cubic foot of air for the quarter was 3.1 grains, being of the same value as that of the average from the eight preceding years.

The mean additional weight of water required to saturate a cubic foot of air was 0.5 grain. The average from the eight preceding years was 0.4 grain.

The mean degree of humidity in October was 0·815, in November was 0·860, and in December was 0·903. The averages for the eight preceding years were 0·883, 0·901, and 0·896.

The mean reading of the barometer at Greenwich in October was 29·744 inches, in November was 29·743, and in December was 29·795. These readings are 0·086 greater, 0·012 greater, and 0·036 less respectively than the averages of the same months in the preceding eight years.

The reading of the barometer at Greenwich was 29·33 inches on October 1; increased to 29·64 by 2^d at 9^h P.M.; it then decreased and passed below the point 29 inches on the morning of the 4th to 28·93 by 9^h A.M., which was the lowest reading in the month. The reading then increased to 29·67 by noon on the 7th, decreased to 29·13 by next morning, and then increased to 29·91 by 9 A.M. on the 9th; decreased to 29·37 by 3^h P.M. on the 11th; increased to 29·98 by the evening of the 15th, and with slight fluctuations to 30·54 by noon on the 29th; and this was the highest reading during the month; after this it decreased to 29·42 by the end of the month. The range of readings during the month was 1·61 inch.

In November, the reading, with slight variation, decreased to 28·98 by the evening hours of the 4th; it increased to 30·26 by the morning of the 9th; and these readings were the lowest and highest respectively during the month. It decreased to 29·47 by the 14th; increased to 30·19 by the 17th; decreased with slight exception to 29·21 on the 24th; increased to 30·02 by the 27th; and decreased to 29·69 by the last day. The range of readings during the month was 1·28.

In December the reading increased to 30·01 inches on the 1st; it decreased to 29·30 by the evening of the 2nd; increased to 29·44 by the 4th; decreased to 29·17 by the 5th; increased to 29·70 by the 6th; decreased to 29·29 by the 8th; increased to 30·07 by the 10th; decreased with slight exception to 29·33 by the 18th at 9^h P.M.; on the 19th at 9^h P.M. the reading had increased by 0·80 inch; and on the 26th at 10^h A.M. it was 30·48, which was the highest reading during the month; the reading then decreased to 29·29 by noon on the 28th, and increased to 30·22 by the end of the month. The range of readings during the month was 1·31 inch.

At Stone, on October 1, at 9^h A.M., the reading of the barometer was 29·168 inches, and increasing; it was 29·440 at 6^h P.M. on the 2nd, when it began to decrease; on the 4th at 9^h A.M. it was 28·756; and on the 6th at 9^h A.M. it had increased to 29·451, when it was depressed again, and read

28·940 on the 7th at 6^h P.M.: this reading increased to 29·600 on the 9th at 9^h A.M.; it was 29·179 on the 11th at 6^h P.M.; on the 15th at 6^h P.M. it was 29·796; and it was depressed to 29·561 on the 17th at 9^h A.M.; then it increased to 29·861 on the 18th at 6^h P.M.; on the 26th at 9^h A.M. it was 29·481, when it began to increase to 30·028 on the 28th at 9^h A.M., still increasing; on the 29th at 9^h A.M. it was 30·360; then it decreased to 30·250 on the same day at 9^h P.M., still decreasing; it was depressed to 29·180 on the 31st at 9^h P.M. (which makes a fall of 1·070 inch in forty-eight hours), still decreasing.

On November 1 at 9^h A.M. it was 29·114 inches: this reading increased to 29·314 on the 2nd at 9^h A.M., when it decreased again, and was depressed to 28·730 on the 4th at 9^h P.M.; on the 8th at 3^h P.M. it was 29·996, and it increased to 30·030 on the same day at 9^h P.M., then it began to decrease; it was 30·020 on the 9th at 9^h A.M., still decreasing; it was 29·247 on the 14th at 9^h P.M.; then it increased to 29·953 on the 17th at 9^h P.M.; this decreased to 29·696 on the 18th at 9^h P.M.; on the 20th at 9^h A.M. it was 29·802, when it decreased again; on the 23rd at 9^h P.M. it was 29·000; and on the 27th at 3^h P.M. it was 29·825: this reading decreased to 29·468 on the 30th at 9^h A.M.; then it increased again.

On December 1 at 9^h A.M. it was 29·779 inches; on the 2nd at 9^h P.M. it was 29·020; it increased to 29·248 on the 3rd at 9^h P.M.; then it decreased to 28·986 on the 5th at 9^h A.M.; on the 6th at 9^h P.M. it was 29·451: this reading decreased to 29·025 on the 7th at 9^h P.M., then increased again, and was 29·868 on the 10th at 9 P.M.; on the 13th at 9^h P.M. it was 29·488; it increased to 29·520 on the 14th at 9^h A.M.: this reading decreased to 29·464 on the same day at 9^h P.M. (the dry-bulb thermometer was 53°·8; on the same evening a gale of wind blew from the S.W. to W.); it increased again, and was 29·660 on the 15th at 9^h P.M.; then it decreased, and was 29·149 at 9^h P.M. on the 18th; it was 29·952 on the 19th at 9^h P.M., still increasing; it was 29·971 on the 20th at 12^h A.M.; at 1^h P.M. on the same day it was 29·954; then it increased to 30·002 at 8^h P.M. on the same day, still increasing; it was 30·243 at 11^h A.M. on the 22nd day: from that day the observations were discontinued.

The average weight of a cubic foot of air, under the average temperature, humidity and pressure, was 542 grains; agreeing with the average from the eight preceding years.

The rain fallen at Greenwich in October was 2·7 inches, in November was 1·5, and in December was 2·4. The falls for these three months on an average of thirty-four years, are 3·5, 2·7 and 1·5 respectively.

The average daily ranges of the readings of the thermometer in air at the height of four feet above the soil, for October, November and December, were $15^{\circ}1$, $11^{\circ}7$, and $9^{\circ}1$ respectively. The averages for these three months from the preceding eight years are $13^{\circ}0$, $10^{\circ}3$ and $9^{\circ}0$.

The readings of the thermometer on grass in October was at and below 32° on five nights; the lowest was $25^{\circ}5$; between 32° and 40° on eleven nights, and exceeded 40° on fifteen nights. In November it was at and below 32° on nineteen nights; the lowest reading was 15° , and above 32° on eleven nights. In December the lowest reading was $10^{\circ}8$; the readings were below 32° on twenty-three nights, and above 32° on seven only.

At Cardington the mean of all the lowest readings of a thermometer on grass in October was $34^{\circ}6$, in November was $25^{\circ}9$, and in December was 26° . The lowest readings in these three months were $19^{\circ}5$, $8^{\circ}0$ and $8^{\circ}0$ respectively. At Nottingham the lowest reading on short grass was 16° .

Fog at Dundee on October 1; at Greenwich on October 2; at Sunderland on October 10; at Darlington and Sunderland on October 16; at Hartlepool and Sunderland on the 17th; at Exeter, Tunbridge and Moffatt, on the 22nd; at Berwick on the 24th; at Dundee on the 25th and 27th; at Dundee, Poole, Reading and Sunderland, on the 29th; at Basingstoke, Plymouth, Greenwich, Oxford and Stone, on the 31st. In November on the 1st at Sunderland; on the 2nd at Greenwich, Birmingham and Edinburgh; on the 3rd all over the country at the same time; on the 4th at Stone; on the 7th at Sunderland; on the 8th at Dundee; on the 11th at London and Stone; on the 12th general over that part of the country south of Stone; on the 13th at Folkestone and Birmingham; on the 17th at Bristol, Southampton, Crewe, Lancaster, Whitehaven and Edinburgh; on the 19th it was general all over the country; on the 20th it was general in the north and at London; on the 21st at Sunderland, Whitehaven, York and Southampton; on the 22nd at Portsmouth and Sunderland; on the 23rd at Folkestone, Conway, Sunderland and Hartlepool; on the 24th all over the country, extending to Glasgow; on the 25th at Greenwich, Stone and London; on the 26th general from Plymouth to Glasgow; on the 27th at Greenwich, Oxford, Gloucester, Southampton, Cambridge, Birmingham, Liverpool and Whitehaven; on the 29th at Edinburgh and Dundee; and on the 30th at London, Birmingham, Moffatt, Hartlepool and Berwick. In December on the 1st at many places in the north, extending to Dundee; in the south at Plymouth, Bridgewater, and at Birmingham;

on the 3rd at Southampton and Swindon; on the 4th at Plymouth and Southampton; on the 6th at Exeter, Southampton and Darlington; on the 8th at Berwick; on the 9th at Greenwich; on the 10th general from Plymouth to Glasgow; on the 11th and 12th at Southampton; on the 13th at Southampton and Hartlepool; on the 14th at a few places in the north and in the south; on the 15th at a few places situated in the north; on the 17th and 18th at Dundee; on the 20th at Glasgow and Lanark; on the 21st at Glasgow, Southampton and Oxford; on the 24th at Oxford and Reading; on the 25th at Southampton; on the 26th it was general in the south; and on the 31st at a few places in extremes north and south. Thus fog has been more or less prevalent on fifty-three days in the quarter.

Meteors were seen on October 3, 8, 9, 10, 12, 13, 14, and November 2 at Nottingham; on November 5 at Nottingham, Cardington and Stone; on November 10 at Nottingham and Cardington; on November 11 and 12 at Nottingham and Latimer; on November 15 at Nottingham; on November 16 at Latimer; on November 25 and December 3 and 4 at Nottingham; on December 5, 8 and 14 at Stone; on December 17 at Cardington; on December 19 at Whitehaven, Nottingham and Durham; on December 20 and 23 at Nottingham; and on December 30 at Hartwell Rectory.

The meteor seen at Nottingham on November 2, at $5^h 23^m$ P.M., was about $4'$ of arc in diameter; it was visible for half a minute, and was seen by many persons. That seen on November 5, at $6^h 20^m$ P.M., was of the size of a star of the first magnitude, and described a path of 50° in length, which was visible during its whole extent for five minutes; at first its motion was straight, and then curved.

At Stone, on November 5, Mr. Fasel saw a brilliant meteor at $6^h 8^m$ P.M.; it started from about 3° above Alpha Ursæ Majoris, and moved to a point at about 8° above Beta Bootis.

On December 19 the meteor seen at Whitehaven was large and brilliant.

At Durham, on December 19, a remarkable meteor was seen in the north, which moved slowly from north-north-west to north-east in a horizontal path, accompanied by a tail; it was in sight about twenty seconds. This meteor was also seen at Edinburgh.

On December 30, at Latimer, the Rev. S. King, at about $5^h 45^m$ P.M., saw a very brilliant meteor, which, after travelling with great velocity a space between the Pleiades and Alpha Ceti, burst like a rocket into a multitude of bright fragments, which continued visible some seconds.

At Hartwell Rectory, on December 30, at 5^h 45^m P.M., the Rev. C. Lowndes saw a very splendid meteor or globe of bright light. When first seen it was situated south-west of Andromeda. Mr. Lowndes' attention was first attracted to it by the light it gave. Its apparent diameter was about 4' of arc. It immediately burst, and emitted a knotted streak of red light, the length of which was from 5° to 6°, and the direction of its motion was north by east at an angle of 20° from a vertical line to the zenith.

Solar halos were seen at Greenwich on October 5; at Greenwich and at Nottingham on October 12, with a bright mock-sun at both places; on the 20th at Nottingham, with a bright mock-sun; on the 22nd at Greenwich and at Nottingham; on the 31st at Stone and at Nottingham. In November, on the 3rd and 24th at Greenwich; and on the 28th, December 1 and 25 at Nottingham.

Lunar halos were seen at Greenwich on October 29; at Stone and Cardington on October 30; at Greenwich, Cardington, Norwich and Nottingham on October 31; at Nottingham on November 1; at Greenwich on November 5; at Stone on November 29; and a lunar bow was seen at Exeter on November 30; on December 23 a lunar halo was seen at Greenwich and at Nottingham; and on December 25 at Nottingham.

Lunar coronæ were seen at Stone on October 27 and November 25; and at Greenwich on November 29 and 30.

Aurora were seen at Cambridge and Stonyhurst on October 15; and on October 22 at Greenwich and at Cardington. The magnets were disturbed on both days.

Thunder was heard, but lightning was not seen, at Cardington and at Nottingham on November 15; and at Cardington on December 16.

Lightning was seen, but thunder was not heard, at Hartwell Rectory on October 7; at Nottingham on October 21; at Cardington on November 6, 9 and 20; and at Norwich on December 12.

Thunder and Lightning at Stonyhurst on November 6; and at Liverpool on November 14.

First frost at Darlington on October 6; Hartwell Rectory on October 9; and in London on November 27.

Sleet fell at Stonyhurst on November 6; at Crewe and Stonyhurst on November 7; at Stone on November 26; at Liverpool on November 29; and at Darlington on December 24.

Hail fell at Nottingham on October 12; at Hartwell, Nottingham and Liverpool on October 13; at Manchester on

November 5; at Stonyhurst on November 6; at Greenwich and Stone on November 7; at Nottingham and Saffron Walden on November 15; at Nottingham on November 27 and December 20; and at Greenwich on December 21.

Snow fell at Stonyhurst and Darlington on October 3; at Shap on October 4; at Lancaster, Darlington, Whitby, Manchester and Stonyhurst on November 6; at Lanark, Edinburgh, Stonyhurst, Stone and Saffron Walden on November 7; on the mountains near Whitehaven on November 15; at Yarmouth, Lynn and Manchester on November 27; at Yarmouth, Lynn and Whitby on November 28; at Lynn, Moffatt and Glasgow on November 29. In December, on the 4th at Stone, Cardington, Nottingham and Saffron Walden; on the 5th at Stone, Cardington and Nottingham; on the 12th at Stone; on the 19th at Greenwich; on the 21st at many places; on the 22nd it was falling all over the country; on the 24th at Basingstoke and Exeter; on the 27th at Yarmouth, Greenwich, Stone, Liverpool (the only instance), at Cardington, Saffron Walden and Chiswell Street, London (the first snow this season); on the 28th it was falling all over the country; on the 29th at Greenwich, Stone and Nottingham; and on the 30th at Greenwich.

The following abstract of the weather at Guernsey has been furnished by Dr. Hoskins, F.R.S. :—

October :—The mean temperature agrees with the average for five years. The rain above the average both in quantity and number of days: the dew-point below the average. This month was on the whole windy and rainy, but not cold.

November :—A finer month than the former: less wind and more sunshine: the temperature about the usual average. Dew-point high: much humidity.

December :—From the 1st to the 10th much rain: towards the end slight sleet and snow showers: wind variable in force. Although the temperature was never below 33°, partial frosts occurred in exposed situations. Nevertheless orange trees, geraniums, and other exotics out of doors, were only slightly injured. Out-of-door grapes are still to be seen in paper bags on the walls of houses. On the whole, the weather, though keen, was not cold. The snow did not lie more than a few hours. Rain fell with greater continuance than usual; as much as 1.505 inch was measured in twenty-four hours. Generally rain occurs in heavy showers, the interval being fine with sunshine, and the surface readily dries.

The direction of the wind at Greenwich was north-east till October 16, passing at the rate of 107 miles daily; it was south-west from October 17 to November 18, with an average

daily motion of 110 miles; it was north-east from November 18 to November 30; its motion was about 60 miles daily; it was then north-east and south-east till December 14, with a daily motion of 100 miles; and it was after this south-west and north-west till the end of the year, passing on the average at the rate of 130 miles daily.

The daily horizontal movement of the air in October and November was 95 miles, and in December it was 110 miles.

During the whole of last quarter an observation at 9^h A.M. Greenwich time has been taken daily at many of the railway stations by the station-masters, and forwarded to London free of expense by the several railway companies, and published on the following day in the 'Daily News,' the proprietors of which paper have incurred the expense of collecting the several returns from the London railway termini and printing them. The several stations for observation were selected by the Astronomer Royal. I visited every station before observations were made, fixed a compass-card, and remained at the station till I felt certain the observations would be made with accuracy. It is evident that much valuable information may be obtained by these means, with reference to the extent and passage of storms over the country, the extent of sky covered by cloud, and the extent of country over which any particular weather prevails.

With the full set of meteorological instruments possessed by the regular observers, who furnish the observations for the Quarterly Meteorological Reports, many of whom have promised co-operation with the above system, by taking a similar set of observations at the same time, whereby other simultaneous meteorological particulars not included in the daily returns will be supplied, I hope in the course of this year to increase the number of stations by the addition of some in Ireland. At all times, I should hope, that on the course of storms being indicated, gentlemen resident in their apparent course before reaching this country, and after leaving it, will supply the wanting particulars, so as to help to trace it from its source to its termination.

The stations included in the returns to the 'Daily News' extend from Plymouth to the south, to Dundee to the north, to Holyhead to the west, and to Yarmouth to the east.

Daily I lay all the particulars as published on a map, from which I extract the following:—

October 1849.	Direction of the Wind.						General Remarks.
	On the south coast.	On the south-east coast.	On the north-east coast.	On the north-west coast.	In the southern counties.	In the midland counties.	
1	calm.	n.	n.e.	w.	variable.	n.e.	Overcast. Rain falling in many places.
2	n.	w.	w.	w.	n.e.	calm.	Overcast. Fog. Rain.
3	s. & s.w.	calm.	s.w.	calm.	e.	s.e.	Rain general. Frost at Lanark.
4	calm.	w.	light airs.	light airs.	n.w.	n.w.	Rain. Snow at Shap.
5	calm.	w.	w.	w.	calm.	calm.	Partially cloudy. Frost at Darlington.
6	n.	n.w.	calm.	light airs.	calm.	calm.	Clear and partially cloudy. Fog.
7	Sunday.						
8	n.	n.	n.	n.	n.	n.	Strong wind on East Coast. Overcast.
9	variable.	n.w.	w.	n.	calm.	n.w.	Clear and cloudy.
10	calm.	calm.	calm.	calm.	calm.	calm.	Fog general.
11	n.	e.	e.	n.	n.e.	variable.	Chiefly cloudless.
12	n.e.	n.e.	n.	n. & e.	n.e.	n.e.	Partially cloudy.
13	n.	n.e.	n.	n. & e.	n.e.	n.	Overcast. Rain.
14	Sunday.						
15	n.e.	n.e.	n.e.	calm.	n.e.	n.	Strong wind on East Coast.
16	n.e.	variable.	light airs.	s.e.	e.	w.	A little rain. Frost at Holyhead.
17	s.	s.	s.	s.	s.	s.	Principally calm. Fog to North.
18	s.	s.w.	s.w.	s.	s.	s.w.	Hard wind on North-west and North-east Coasts.
19	s.e.	calm.	variable.	s.	variable.	variable.	Light airs general.
20	s.w.	w.	w.	s.	calm.	s.w.	Calm in many places to the South.
21	Sunday.						
22	calm.	w.	n.w.	variable.	calm.	s.	Fog prevalent.
23	s.w.	s.w.	w.	w.	s.	w.	Calm at many places. Rain in the North.
24	s.w.	s.w.	s.	s.	s.	s.	Light airs and calm. Rain in the North.
25	s.	s.w.	s.w.	s.	s.w.	s.	Rain general.
26	calm.	s.w.	s.w.	w.	s.w.	s.w.	Light airs and calm. Rain at a few places in the South.
27	calm.	s.w.	s.	s.	s.w.	calm.	Rain general.
28	Sunday.						
29	calm.	calm.	calm.	variable.	light airs.	s.	Calm and fog.
30	s.e.	s.	s.	s.	s.	s.	Gentle breeze. Overcast.
31	s.w.	s.w.	w.	variable.	s.w.	variable.	Light airs. Calm. Fog.

November 1849.	Direction of the Wind.						General Remarks.	
	On the south coast.	On the south-east coast.	On the north-east coast.	On the north-west coast.	In the southern counties.	In the midland counties.		In the northern counties.
1	s.e.	s.e.	s.e. & e.	s.	s.e.	s.e.	s. & e.	Rain scattered over the country. Fog at Sunderland.
2	s. & s.e.	s.e.	s.	variable.	s.e.	s.	variable.	Gentle breeze and calm.
3	variable.	e.	calm.	s.e.	s.e.	calm.	calm.	Fog general, including Scotland.
5	w.	s.w.	s.w.	w.	s.w.	s.w.	w. & s.w.	Calm and rain in the S. Gale with sleet and snow in the N.
6	variable.	w. & s.w.	variable.	variable.	light airs.	light airs.	light airs.	Calm at many places.
7	s.w.	s.w.	s.w.	variable.	calm.	s.	s.e.	Snow in the North. Rain in the South.
8	s.w.	s.w.	s.w.	w.	calm.	s.w.	w.	Rain to the North. Fog at many places.
9	s.	s.w.	s.w.	s.w.	s.w.	s.w.	s.w.	Calm to the S. Strong breeze in the Midland Counties. Gentle
10	s.w.	w.	s.w.	s.	s.	s.	s. & w.	calm generally.
12	calm.	w.	w.	s.	s.	s.	s.w.	Calm and gentle breezes. Frost at Brighton.
13		s.	s.	s.e.	s.s.w.	s.s.w.	s. & w.	Rain at many places.
14	s.w.	s.w.	s.w.	w.	s.s.w.	s.s.w.	variable.	Light airs. Rain at many places.
15	n.w.	w.	n.w.	n.w.	n.w.	n.w.	calm.	Gentle breeze to the S. Gale in the Midland. Calm to the N.
16	n.w.	n.	variable.	variable.	light airs.	variable.	variable.	Calm and light breezes. On the coast, strong breeze.
17	n.	n.	calm.	calm.	calm.	calm.	calm.	Fog prevalent.
19	n.	n.	calm.	calm.	calm.	calm.	calm.	Fog general. Rain to the North.
20	calm.	calm.	calm.	variable.	calm.	calm.	calm.	Fog and rain.
21		e.	s.	variable.	calm.	calm.	calm.	Calm generally. Rain and fog at a few places.
22	s.e.	s.e.	s.	s.	s.e.	s.	s.	Light airs and calm. Rain everywhere.
23	s.w.	s.w.	s.	s.w.	s.	s.	s.	Fog prevalent.
24	calm.	calm.	calm.	calm.	calm.	calm.	calm.	Fog at many places. Gale at Yarmouth.
26	calm.	e.	s.e.	s.e.	calm.	calm.	calm.	Fog and frost general.
27	light airs.	variable.	variable.	variable.	variable.	variable.	variable.	Fog and sharp frost everywhere.
28	variable.	variable.	variable.	variable.	variable.	variable.	variable.	Light airs. Snow to the North.
29	s.e.	s.e.	variable.	variable.	s.e.	calm.	calm.	Calm with rain to the South. Calm and fog to the North.
30	s.w.	s.w.	w.	s.	calm.	s.	s. & s.w.	

December 1849.	Direction of the Wind.					General Remarks.
	On the south coast.	On the south-east coast.	On the north-west coast.	In the midland counties.	In the northern counties.	
1	variable.	n.w.	variable.	calm.	variable.	Light airs and calm. Fog in many places.
3	calm.	e.	e.	calm.	e.	Calm in South, a gale in North : see remarks.
4	n.	n.w.	n.	calm.	n.	Calm generally. Fog. Frost. Snow.
5	s.	s.e.	s.w.	s.e.	s.e.	Calm. Rain. Snow. Frost.
6	s.	s.e.	variable.	s.e.	s.	Variable. No frost.
7	s.e.	s.e.	s.e.	s.e.	e.	Strong breeze on the coast. Heavy rain at many places.
8	w.	w.	e.	w.	e.	Rain general.
10	calm.	calm.	calm.	calm.	calm.	Fog all over the country.
11	e.	e.	variable.	variable.	variable.	Light fog. Slight rain.
12	n.e.	s.e.	s.e.	e.	e.	Generally overcast.
13	s.e.	s.e.	s.e.	s.e.	s.e.	Slight rain. Frost. Hail.
14	s.w.	s.w.	s.	s.w.	s.w.	Rain to the South. Light airs to the North.
15	s.w.	s.w.	s.w.	s.	w.	Rain to the South. Calm and fog to the North.
17	w.	w.	w.	w.	w.	Strong breeze to the South. Gentle airs to the North.
18	s.w.	s.w.	s.e.	s.	variable.	Rain falling at many places.
19	n.w.	n.w.	s.e.	s.	variable.	Strong wind generally.
20	n.w.	n.w.	n.w.	n.w.	n.w.	Sharp frost and snow.
21	n.e.	n.e.	n.w.	n.w.	n.w.	Snow on the East Coast. Fog near the S. coast. Hard wind in [Midland Counties.
22	n.e.	n.e.	e.	variable.	n.e.	Snow everywhere.
24	n.w.	n.w.	e.	variable.	variable.	Calm general. Snow and sleet.
25	n.e.	n.e.	variable.	calm.	variable.	Hard frost at Shap.
26	n.w.	w.	n.	n.e.	n.w.	Calm general. Fog prevalent.
27	n.w.	n.w.	n.w.	n.w.	n.w.	Frost and snow at some places.
28	n.	n.w.	n.	n.w.	n.w.	Hard frost and snow everywhere.
29	n.w.	n.w.	n.w.	n.w.	n.w.	Hard frost and snow.
31	n.	n.w.	variable.	calm.	variable.	Fog prevalent and frost.

On November 6 a stream of air was passing from the Irish Sea, described as a strong breeze at Holyhead, Liverpool and Manchester; as a storm at Lancaster, a heavy gale at Whitehaven, and a gale at Durham: the breadth of this stream was about 2° . It was not felt on the eastern side of the Cumberland mountains.

On November 15, in latitude $53\frac{1}{2}^{\circ}$ on the west coast, a hard wind blew from the Irish Sea, described as a hard wind at Holyhead, a gale at Crewe, and merely as a strong breeze at Birmingham, and as a gentle breeze only before it reached Northampton or Oxford, towards which places the air was travelling. At the same time it was described as a calm at Liverpool.

On December 3 a hard wind was blowing over that part of the country extending from Dundee to Manchester, and which was described as a storm at Hartlepool, as a heavy gale at Sunderland and at Yarmouth, and as a gale at Crewe. At all places situated south of Birmingham the air was described to have been either in very gentle motion, or calm, with rain falling at some places, and fog prevalent at others. Tracing the course of this storm, it seems to have reached England at Yarmouth, and from thence passed in a south-east direction up the country, it being most severe on the eastern coast, and so on to Dundee; this storm was probably felt in Belgium; and observations at Brussels, and at other places in its apparent course, would be valuable.

On December 8 a strong wind was blowing from the Irish Sea, affecting Holyhead, Liverpool, and described as a storm at Lancaster; in the line continued which joins Holyhead and Lancaster, viz. at Darlington and at Hartlepool, the wind was blowing strongly; its direction however at these places was from the east, or towards the Irish Sea. The whole mass of air north of this storm was moving from east to west, and at places south of the storm it was moving from west to east. On this day Irish observations are necessary to follow this storm.

In this way data may be collected for very important additions to our knowledge of meteorological phenomena.

I have been favoured with the following reports upon agriculture.

From Stonyhurst, by the Rev. A. Weld.

The potatoe disease made no further progress after about the middle of October; even those that were tainted in the getting-up have remained nearly in the same state, except that the disease seems to have taken rather the form of a dry rot, without however extending any further.

The crop of Swedes was very abundant, averaging upwards

of fifty tons per acre. Mangel-wurzel was also a very good crop.

In general the season has been favourable for the usual winter occupations, as draining, felling timber, hedging, leading manure, &c. The late severe weather has for the most part interrupted out-door work.

From South Hampshire, by John Clark, Esq. near Romsey.

The seed-time for turnips was dry. The crop was in many instances light and uneven. The subsequent fine rains and weather have caused all kinds of root and grass to grow vigorously. There has been an abundance of food for cattle, which have thriven well.

The seed-time for wheat was all that could be desired. A large breadth of land is sown, and the plant is looking well. There has been a good deal of employment for labourers, and consequently there has been a far less number unemployed than in many seasons past.

The monthly mean values of the several subjects of investigation are published in the Registrar-General's Quarterly Report, and subjoined are the mean values for the quarter. The observations have been corrected for diurnal ranges, and the hygrometrical results have been deduced from my tables, and the results are all comparable with each other.

The mean of the numbers in the first column is $29\cdot680$ inches, and this value may be considered as the pressure of dry air for England during the quarter ending December 31, 1849.

The mean of the numbers in the second column for Guernsey and those places situated in the counties of Cornwall and Devonshire, is $48^{\circ}\cdot3$; at Liverpool and Whitehaven is $44^{\circ}\cdot2$; for those places situated south of latitude of 52° , including Chichester and Hartwell, is $44^{\circ}\cdot3$; for those places situated between the latitudes of 52° and 53° , including Saffron Walden and Holkham, is $43^{\circ}\cdot2$; for those places situated between the latitudes of 53° and 54° , including Derby and Stonyhurst, $42^{\circ}\cdot1$; and for Durham and Newcastle is $42^{\circ}\cdot2$. These values may be considered as those of the mean temperatures of the air for those parallels of latitude during the quarter ending December 31, 1849.

The average daily range of temperature in Cornwall and Devonshire was $9^{\circ}\cdot5$; at Liverpool and Whitehaven was $7^{\circ}\cdot0$, south of latitude 52° was $11^{\circ}\cdot6$; between latitudes 52° and 53° was $11^{\circ}\cdot4$; between 53° and 54° was $11^{\circ}\cdot6$; and north of 54° was $10^{\circ}\cdot0$.

The greatest mean daily ranges of the temperature of the air took place at Nottingham, Aylesbury, Exeter, Beckington and Latimer; and the least occurred at Guernsey, Whitehaven, Liverpool and Torquay.

Meteorological Table for the Quarter ending December 31, 1849.

Names of the places.	Mean pressure of dry air reduced to the level of the sea.	Mean temperature of the air.	Highest reading of the thermometer.	Lowest reading of the thermometer.	Mean daily range of temperature.	Mean monthly range.	Range of temperature in the quarter.	Mean temperature of the dew-point.	Wind.		Mean amount of cloud.	Number of days on which it fell.	Rain.		Mean weight of vapour in a cubic foot.	Mean additional weight of vapour required to saturate a cubic foot of air.	Mean degree of humidity.	Mean whole amount of water in a vertical column of atmosphere.	Mean weight of a cubic foot of air.	Height of station above the level of the sea.
									General direction.	Mean strength.			Amount collected.	in.						
Guernsey	29.703	49.2	65.0	33.0	6.1	21.6	32.0	46.1	s.w.	2.2	6.6	50	10.9	3.8	3.8	0.4	0.906	3.6	538	122
Helston	29.687	48.5	69.0	37.0	11.1	28.7	42.0	45.1	s.w.	1.6	6.8	48	4.8	3.2	3.7	0.6	0.869	3.6	539	106
Falmouth	49.1	63.0	36.0	10.3	10.3	28.3	43.0	..	Variable.	1.4	7.2	53	11.3	..	..	..	..	4.4	..	..
Truro	48.0	63.0	36.0	8.3	8.3	21.3	37.0	..	s.	0.8	7.2	56	15.0	..	..	..	..	..	..	..
Torquay	48.0	60.0	36.0	8.2	8.2	26.7	43.0	42.3	s. & e.	2.1	5.4	45	9.3	3.3	3.3	0.9	0.807	3.5	542	120
Exeter	46.2	63.5	30.0	13.3	13.3	36.0	48.5	42.8	s. & n.w.	1.7	..	47	8.6	3.4	3.4	0.5	0.874	4.1	542	140
Chichester	44.3	63.0	15.0	10.3	10.3	34.3	50.0	44.9	s.w. & n.w.	0.2	5.8	..	..	..	..	..	0.866	3.9	545	55
Southampton	44.9	64.2	11.0	10.3	10.3	38.2	53.2	44.9	s.w. & n.w.	..	6.4	..	..	..	..	..	0.766	3.3	543	265
Beckington	43.3	67.0	13.0	13.1	13.1	40.0	52.0	40.0	s.w. & n.e.	..	6.4	41	0.3	3.1	3.1	0.8	0.859	3.7	542	189
Royal Observatory, Greenwich	29.687	44.8	69.7	18.8	12.0	38.0	50.9	40.0	s.w. & n.e.	..	6.8	49	0.7	3.1	3.1	0.5	0.866	3.7	544	107
Middlestone Hill, Greenwich	29.710	44.4	64.3	18.8	9.1	34.7	45.5	44.4	..	..	..	..	..	..	..	..	0.744	3.6	540	..
Chiswell Street, London	47.3	67.0	22.5	9.0	9.0	30.2	44.5	39.2	s.w.	1.7	8.1	36	4.5	3.3	3.3	0.5	0.883	3.7	542	250
St. John's Wood	29.709	44.8	69.0	18.0	13.0	38.3	51.0	41.1	s.w. & n.e.	..	8.7	44	7.2	3.1	3.1	0.5	0.873	3.6	539	335
Isle of Wight	29.694	43.6	65.5	17.0	13.1	38.8	48.5	39.6	n.w.	1.3	7.0	41	6.0	3.0	3.0	0.5	0.865	3.6	541	280
Aylesbury	29.625	43.5	67.0	18.0	14.0	38.7	49.0	39.3	s. & n.w.	0.4	6.8	43	5.2	3.1	3.1	0.4	0.877	3.7	539	320
Stone Observatory	29.613	43.8	66.6	17.0	11.5	38.0	49.6	43.4	s.w. & n.e.	..	..	55	7.3	3.2	3.2	0.4	0.883	3.8	541	260
Hartwell (near Aylesbury)	29.651	43.7	..	17.0	..	..	46.5	38.1	s.w.	..	4.4	37	..	2.9	2.9	0.5	0.840	3.5	541	260
Harwell Rectory	29.651	43.4	65.5	19.0	12.1	41.5	46.5	38.1	s.	..	..	25	..	..	..	..	0.840	3.5	541	260
Sutton Walden	43.2	65.0	20.0	11.9	11.9	36.0	45.0	..	s.	..	7.1	38	4.9	3.2	3.2	0.4	0.902	3.8	542	250
Oxford	43.9	..	15.3	..	..	..	..	41.2	Variable.	..	..	..	..	..	..	..	..	..	..	..
Hertford	42.2	..	..	..	..	..	..	..	Variable.	..	6.8	47	5.9	3.2	3.2	0.4	0.909	3.8	545	200
Cardington	42.8	63.6	20.0	12.3	12.3	35.3	43.6	40.6	Variable.	..	6.8	47	5.9	3.2	3.2	0.4	0.909	3.8	545	200
Cardington	42.8	63.6	20.0	12.3	12.3	35.3	43.6	40.6	Variable.	..	6.8	47	5.9	3.2	3.2	0.4	0.909	3.8	545	200
Norwich	43.5	63.0	21.0	10.1	10.1	32.0	42.0	40.0	s.w.	..	6.9	44	9.2	3.1	3.1	0.5	0.873	3.7	544	39
Holkham	29.638	43.4	65.0	18.3	10.9	34.6	46.7	38.4	s.w.	0.9	7.0	62	9.3	2.9	2.9	0.6	0.835	3.5	546	31
Derby	42.1	64.0	18.0	11.4	11.4	35.7	46.0	37.5	s.w.	..	..	56	8.4	2.8	2.8	0.7	0.827	3.3	544	103
Highfield House, Notts.	29.628	40.8	69.0	17.5	14.4	38.3	51.5	38.3	s.w. & n.w. & n.e.	0.8	6.5	60	8.4	2.8	2.8	0.7	0.827	3.3	544	103
Manchester	29.666	43.5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Liverpool Observatory	29.666	43.5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Wakefield Prison	29.680	44.5	64.8	22.8	7.5	29.5	42.0	38.7	s.e.	1.2	6.0	..	..	..	..	..	0.855	3.7	541	110
Stourton Lodge (near Leeds)	29.701	41.8	64.0	20.0	12.5	37.2	47.5	37.6	s.w.	..	..	..	..	..	..	..	0.832	3.6	544	37
Stonyhurst Observatory	29.693	41.8	64.0	20.0	11.7	34.0	44.0	39.5	..	1.4	7.8	57	10.7	2.9	2.9	0.3	0.932	3.4	545	113
Whitehaven	29.574	43.9	64.0	25.0	11.9	35.1	45.1	37.5	s.w. & n.e.	1.1	6.7	48	13.9	2.8	2.8	0.4	0.852	3.6	545	148
Durham	29.655	41.6	62.1	19.8	9.2	31.3	42.3	38.3	s.w.	3.1	5.9	50	..	3.2	3.2	0.5	0.892	3.8	542	80
Newcastle	29.648	42.7	65.5	23.0	10.7	30.8	42.5	38.9	s.e. & n.w.	1.3	..	..	..	..	..	..	0.853	3.5	540	347
Number of columns	1	2	3	4	5	6	7	8	10	9	11	12	13	14	15	16	17	18	19	..

The highest temperature of the air was about 69° at several places; the lowest readings were 11° at Southampton, 15° at Beckington and Chichester, and 15.3 at Oxford. The extreme range of temperature of the air during the quarter in England was therefore about 58°.

The average quarterly range of the reading of the thermometer in Cornwall and Devonshire was 40.7; at Liverpool and Whitehaven was 48.5; south of latitude 52° was 49.2; and north of this parallel was 45.1.

The mean temperature of the dew-point in Cornwall and Devonshire was 44.1; south of latitude 52° was 41.3; between the latitudes 52° and 53° was 40.1; and north of 53° was 38.7.

The amount of cloud was such as to cover about three-fourths of the sky nearly.

Rain has fallen on the greatest number of days at Wakefield, Holkham, Nottingham and Guernsey; the average number at these places was 61. It fell on the least number of days at Saffron Walden, St. John's Wood, Hartwell Rectory and Oxford; and the average number at these places was 34. The stations at which the largest falls have taken place are Guernsey, Stonyhurst, Helston and Southampton. The smallest falls occurred at St. John's Wood, Oxford, Stone and London. The average fall in Guernsey, Cornwall and Devonshire was 12.4 inches; south of latitude 52° was 6.9 inches; between latitudes 52° and 53° was 7.6 inches; between 53° and 54° was 10.2 inches; at Liverpool and Whitehaven was 11.6 inches; and at Newcastle was 7.9 inches.

The numbers in the columns 14 to 18 show the mean values of the hygrometrical results; from which we find that—

The mean weight of vapour in a cubic foot of air at all places (excepting Cornwall and Devonshire) in the quarter ending December 31, 1849, was 3.0 grains.

The mean additional weight required to saturate a cubic foot of air was 0.5 grain.

The mean degree of humidity (complete saturation = 1) was 0.857.

The mean amount of vapour mixed with the air would have produced water, if all had been precipitated at one time on the surface of the earth, to the depth of 3.6 inches.

The mean weight of a cubic foot of air under the mean pressure, temperature and humidity, was 543 grains at the mean height of 132 feet.

And these values for Cornwall and Devonshire were 3.5 grains; 0.6 grain; 0.864; 3.9 inches; and 540 grains, at the average height of 122 feet.

Comparison of the Meteorological Particulars of the Quarters ending December 31, in the Years 1847, 1848 and 1849, in four different Parallels of Latitude.

For the Counties of Cornwall and Devonshire.														
For the quarter ending Dec. 31.	Mean pressure of dry air reduced to the level of the sea.	Mean temperature of the air.	Mean highest readings of the thermometer: 3 observations.	Mean lowest readings of the thermometer: 3 observations.	Mean daily range of temperature.	Mean monthly range of temperature.	Mean quarterly range of temperature.	Mean temperature of the dew-point.	Wind.		Mean amount of cloud.	Rain.		Mean degree of humidity.
									Mean estimated strength.	General direction.		Mean number of days on which it fell.	Mean amount collected.	
1847.	in. 29.599	48.8	64.5	28.7	8.6	27.7	35.7	° 41.3	1.3	s.w.	7.3	54	16.1	in. 0.914
1848.	29.676	48.5	67.6	30.0	7.5	27.7	37.5	43.3	1.3	s.w.	6.6	56	12.9	0.839
1849.	29.693	48.3	67.1	26.3	9.5	27.7	40.7	44.1	1.6	s.w.	6.5	50	12.4	0.864
South of latitude 52°, exclusive of Cornwall and Devonshire.														
1847.	29.658	46.5	68.9	24.2	11.3	37.3	45.1	41.5	1.5	s.w.	7.1	44	7.4	0.909
1848.	29.662	44.7	71.8	23.0	12.1	37.3	48.0	41.5	1.1	s.w.	6.7	50	8.6	0.892
1849.	29.691	44.3	66.4	17.3	11.6	37.3	49.2	41.3	0.9	s.w.	6.5	44	7.0	0.848
1847.	29.696	45.2	68.3	32.8	10.7	34.5	41.0	41.8	1.4	s.w.	6.8	38	7.5	0.888
1848.	29.617	44.7	72.3	23.2	10.0	34.5	49.2	41.8	1.1	s.w.	6.1	50	8.4	0.883
1849.	29.704	43.2	64.2	18.9	11.3	34.5	44.3	40.1	1.4	s.w.	6.9	43	7.6	0.879
1847.	29.608	45.9	61.8	27.5	9.9	36.1	37.3	38.2	1.4	s.w.	7.4	47	8.1	0.881
1848.	29.610	43.3	69.5	21.0	10.6	36.1	48.3	38.4	1.1	s.w.	7.3	61	9.0	0.868
1849.	29.674	42.1	66.1	19.3	12.4	36.1	44.8	38.4	1.1	s.w.	7.0	57	10.2	0.878
Between the latitudes of 53° and 54°.														
1847.	29.575	47.7	64.6	32.4	6.6	28.9	39.2	39.7	1.1	variable.	7.1	47	10.7	0.855
1848.	29.593	44.9	65.2	28.2	6.9	28.9	36.7	40.1	1.9	s.w.	7.0	55	10.5	0.869
1849.	29.616	44.2	64.4	23.9	7.0	28.9	40.5	39.7	2.2	s.w. & s.e.	6.0	56	11.6	0.873
Near the sea coast in the West of England, between the latitudes of 53° and 54°.														
1847.	29.599	48.8	64.5	28.7	8.6	27.7	35.7	41.3	1.3	s.w.	7.3	54	16.1	0.914
1848.	29.676	48.5	67.6	30.0	7.5	27.7	37.5	43.3	1.3	s.w.	6.6	56	12.9	0.839
1849.	29.693	48.3	67.1	26.3	9.5	27.7	40.7	44.1	1.6	s.w.	6.5	50	12.4	0.864
North of latitude of 54°.														
1847.	29.605	47.7	62.2	26.1	9.8	31.0	36.1	39.6	1.2	s.s.w.	7.2	35	9.6	0.943
1848.	29.593	43.0	68.8	23.2	9.9	31.0	45.6	39.6	1.7	s.s.w.	6.1	47	8.8	0.882
1849.	29.652	42.2	63.8	21.4	9.9	31.0	42.4	38.6	1.3	.....	5.9	46	7.9	0.844

For similar Tables for the Quarters ending March 31, June 30, and September 30, see the Philosophical Magazine for November 1849.