STONYHURST COLLEGE

OBSERVATORY.

RESULTS

OF

METEOROLOGICAL AND MAGNETICAL OBSERVATIONS.

1880.

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1881.

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INTRODUCTION.

An important addition was made in April 1880, by the Meteorological Office, to the self-recording instruments, a sunshine recorder having been placed on the S.E. side of the Observatory. This new instrument, besides the direct value of its indications, has afforded ample proof that the sky may often be apparently clear, and admit freely the passage of heat rays, and yet contain vapour that suffices to put a stop entirely to all observations of the chromosphere.

A magnificent fire-ball, and another fine meteor were seen during the year, and short notices of the observations appeared in *Nature*.

The magnetic work was continued as usual, and the results of twelve years' records of the H.F. magnet are appended to this report.

More attention was given this year to routine astronomical work. The height of the chromosphere at every part of the solar limb was daily measured when possible, and many drawings were made of the solar spots and faculæ. The spectroscope was improved by the addition of a Christie-Hilger half-prism, the maximum dispersion being now equal to 36 prisms of 60°. Observations of the whole chromosphere were made on 45 days, and it was partially examined on nineteen other occasions. The greatest height of any prominence recorded was 2′ 28″. A second slit was made for the collimator, as the former slit was not long enough to measure the highest prominences.

A few end-on tubes were also procured for the spectroscopic room.

No occasion was missed of taking the usual observations of Jupiter's satellites and of lunar occultations.

The indication of the probable existence of an ultra-Neptunian planet from the researches of G. Forbes and D. P. Todd, led to a search for the planet on every fine night. This careful examination of a very restricted portion of the heavens may become of considerable indirect service in detecting the proper motion of stars, and probably adding to the number of variables, &c.

Clouds prevented this year the watch for November meteors, and also interfered with the observation of the partial solar eclipse, for which preparations had been made for observing chromospheric contacts, and for obtaining a series of photographic pictures of the successive phases.

A 4 in. equatoreal has been mounted this year for the use of students.

In the course of the year instruments were forwarded to the observatories of Manila, Zikawei, Kalosca, and Tarnopol.

Papers appeared this year in the R.A.S notices on the November meteors, Jupiter's satellites, and lunar occulations, and in *Nature* on comparative curves in terrestrial magnetism, and on Aurora Borealis and magnetic storms. A lecture on the observatory was printed in the *Annales de la Société Scientifique de Bruxelles* and the *Zeitschrift der österrechischen Gesellschaft für Meteorologie* contained notices of the Report of the Meteorology of Kerguelen Island, and of the rainfall at Stonyhurst.

S. J. PERRY.

Stonyhurst Observatory.

Lat. 53° 50′ 40″ N. Long. 9m. 52s. 68. W. Height of the Barometer above the sea, 381 ft.

METEOROLOGICAL REPORT.

January, 1880.

Results of Observations taken during the month.		Mean for the last 33 years.
Mean Reading of the Barometer	29·928	29·436
Highest ,, on the 7th	30·237	30·014
Lowest ,, on the 1st	29·304	28·590
Range of Barometer Readings	0·933	1·424
Highest Reading of a Max. Therm. on the 31st	55·0	51·7
Lowest Reading of a Min. Therm. on the 19th	17·0	21·1
Range of Thermometer Readings	38·0	30·6
Mean of all the Highest Readings	39·3	42·2
Mean of all the Lowest	29·0	32·9
Mean Daily Range	10·3	9·3
Deduced Monthly Mean (from Mean of Max. and Min.)	34·5	37·4
Mean Temperature from dry bulb	34·4	37·9
Adopted Mean Temperature	34·5	37·7
Mean Temperature of Evaporation	32·6	36·0
Mean Temperature of Dew Point	29·4	34·0
Mean elastic force of Vapour	0·162 in	0·196 in
Mean weight of Vapour in a cubic foot of air	1·5gr	2·2gr
Mean additional weight required for saturation	0·4gr	0·4gr
Mean degree of Humidity (saturation 1·00)	0·81	0·86
Mean weight of a cubic foot of air	569·0gr	5·490gr
Fall of Rain	0·881 in	4·183 in
Number of days on which Rain fell	9	20·4
Amount of Evaporation	0·091 in	0·777 in

	N	NE	E	SE	S	SW	W	NW
No. of days in the month on which the prevailing wind was	0	4	5	0	9	7	3	3
Mean Velocity in miles per hour	0	2·8	4·2	0	5·3	10·3	8·1	4·9
Total No. of miles for each Direction	0	267	501	0	1158	1731	578	353

The total number of miles registered during the month was 4588.

The max. Velocity of the wind was 34 miles per hour; direction S.W. by S. on the 1st at midnight.

Mean amount of Cloud (an overcast sky being indicated by 10·0)	7·1
In the month of January, the highest reading of the Barometer during 33 years, was on the 8th, in 1859, and was	30·310
The lowest ,, ,, 15th, 1865	27·939
The highest Temperature ,, 7th, 1877	59·9
The lowest ,, ,, 13th, 1867	9·2
The highest adopted mean temperature of the month, 1875	42·5
The lowest ,, ,, 1879	30·2

The Barometer is exceedingly high, and its range remarkably small owing to the high reading 29·3 for the minimum for the month.

The adopted mean Temperature is more than 3° below the mean for January.

The Rainfall is only one-fifth of the average, and the evaporation less than 0·1 in.

The general direction of the wind is S.W. by S. and not strong.

February, 1880.

Results of Observations taken during the month.		Mean for the last 33 years.
Mean Reading of the Barometer	29·284	29·480
Highest ,, on the 24th	30·022	30·077
Lowest ,, on the 16th	28·434	28·673
Range of Barometer Readings	1·588	1·404
Highest Reading of a Max. Therm. on the 17th	55·3	51·7
Lowest Reading of a Min. Therm. on the 5th	26·8	22·9
Range of Thermometer Readings	28·5	28·8
Mean of all the Highest Readings	47·8	44·1
Mean of all the Lowest	36·1	34·0
Mean Daily Range	11·7	10·1
Deduced Monthly Mean (from Mean of Max. and Min.)	41·6	38·7
Mean Temperature from dry bulb	41·0	38·7
Adopted Mean Temperature	41·3	38·7
Mean Temperature of Evaporation	39·9	36·8
Mean Temperature of Dew Point	38·1	35·0
Mean elastic force of Vapour	0·231 in	0·199 in
Mean weight of Vapour in a cubic foot of air	2·7 gr	2·4 gr
Mean additional weight required for saturation	0·4 gr	0·4 gr
Mean degree of Humidity (saturation 1·00)	0·89	0·87
Mean weight of a cubic foot of air	548·9 gr	548·3 gr
Fall of Rain	3·756 in	3·663 in
Number of days on which Rain fell	26	18·2
Amount of Evaporation	2·444 in	0·853 in

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
	0	1	1	2	7	12	6	0
Mean Velocity in miles per hour	0	4·2	11·4	17·1	13·1	10·3	15·7	0
Total No. of miles for each Direction	0	100	274	843	2193	2954	2266	0

The total number of miles registered during the month was 8630.

The max. Velocity of the wind was 42 miles per hour; at midnight on the 6th, and 5 p.m. on the 16th; direction S. and S.E.

Mean amount of Cloud (an overcast sky being indicated by 10·0)...	8·2
In the month of February, the highest reading of the Barometer during 33 years, was on the 11th, in 1849, and was	30·452
The lowest ,, ,, 6th, 1867	28·208
The highest Temperature ,, 8th, 1877	58·3
The lowest ,, ,, 1st, 1855	10·1
The highest adopted mean temperature of the month, 1869	44·0
The lowest ,, ,, 1855	28·6

The Barometer is 0·2 in. below the mean.

Temperature rather higher than in previous years, and evaporation considerable.

Wind S.W.; W. and S. less frequent but stronger.

March, 1880.

Results of Observations taken during the month.		Mean for the last 33 years.
Mean Reading of the Barometer	29·627	29·466
Highest ,, on the 8th	30·153	30·073
Lowest ,, on the 2nd	28·613	28·702
Range of Barometer Readings	1·520	1·371
Highest Reading of a Max. Therm. on the 7th	55·9	56·5
Lowest Reading of a Min. Therm. on the 19th	27·8	23·4
Range of Thermometer Readings	28·1	33·1
Mean of all the Highest Readings	50·8	46·9
Mean of all the Lowest	34·7	34·4
Mean Daily Range	16·1	12·5
Deduced Monthly Mean (from Mean of Max. and Min.)	41·7	39·7
Mean Temperature from dry bulb	40·5	40·0
Adopted Mean Temperature	41·1	39·9
Mean Temperature of Evaporation	39·8	38·0
Mean Temperature of Dew Point	38·1	35·6
Mean elastic force of Vapour	0·230 in	0·206 in
Mean weight of Vapour in a cubic foot of air	2·7 gr	2·4 gr
Mean additional weight required for saturation	0·5 gr	0·5 gr
Mean degree of Humidity (saturation 1·00)	0·88	0·85
Mean weight of a cubic foot of air	547·9 gr	546·3 gr
Fall of Rain	3·174 in	3·152 in
Number of days on which Rain fell	15	18·0
Amount of Evaporation	1·780 in	1·663 in

	N	NE	E	SE	S	SW	W	NW
No. of days in the month on which the prevailing wind was	0	8	11	0	2	8	2	0
Mean Velocity in miles per hour	0	7·1	9·5	0	9·7	15·1	14·2	0
Total No. of miles for each Direction	0	1370	2510	0	466	2998	702	0

The total number of miles registered during the month was 8046.

The max. Velocity of the wind was 41 miles per hour; direction S.W. on the 3rd at 6 a.m.; W. on the 14th at 1 p.m.

Mean amount of Cloud (an overcast sky being indicated by 10·0)...	6·6
In the month of March, the highest reading of the Barometer during 33 years, was on the 6th, in 1852, and was	30·401
The lowest ,, ,, 31st, 1860	28·199
The highest Temperature ,, 25th, 1871	68·0
The lowest ,, ,, 4th, 1866	14·5
The highest adopted mean temperature of the month, 1871	44·0
The lowest ,, ,, 1855	35·6

The mercury stands rather high, and range large.
Temperature slightly in excess of former years.
Wind from S.W. and E. by N.

April, 1880.

Results of Observations taken during the month.		Mean for the last 33 years.
Mean Reading of the Barometer	29·422	29·479
Highest ,, on the 30th	30·110	29·966
Lowest ,, on the 4th and 5th	28·818	28·761
Range of Barometer Readings	1·292	1·205
Highest Reading of a Max. Therm. on the 17th	60·3	66·8
Lowest Reading of a Min. Therm. on the 29th	31·0	28·9
Range of Thermometer Readings	29·3	37·9
Mean of all the Highest Readings	54·2	54·1
Mean of all the Lowest	37·4	38·2
Mean Daily Range	16·8	15·9
Deduced Monthly Mean (from Mean of Max. and Min.)	44·3	44·7
Mean Temperature from dry bulb	45·1	44·8
Adopted Mean Temperature	44·5	44·8
Mean Temperature of Evaporation	40·8	41·9
Mean Temperature of Dew Point	35·5	38·7
Mean elastic force of Vapour	0·216 in	0·237 in
Mean weight of Vapour in a cubic foot of air	2·4gr	2·7gr
Mean additional weight required for saturation	0·8gr	0·7gr
Mean degree of Humidity (saturation 1·00)	0·73	0·80
Mean weight of a cubic foot of air	539·4gr	541·5gr
Fall of Rain	2·015 in	2·356 in
Number of days on which Rain fell	18	15·4
Amount of Evaporation	1·500 in	2·602 in

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
	1	8	3	0	5	6	6	1
Mean Velocity in miles per hour	9·3	8·8	6·5	0	20·0	9·1	14·6	12·8
Total No. of miles for each Direction	222	1702	468	0	2400	1298	2102	307

The total number of miles registered during the month was 8499.

The max. Velocity of the wind was 42 miles per hour; direction S. on the 22nd, at 2 a.m.

Mean amount of Cloud (an overcast sky being indicated by 10·0)...			6·5
In the month of April, the highest reading of the Barometer during 33 years, was on the	22nd,	in 1855, and was	30·191
The lowest ,,	,,	20th, 1868	28·358
The highest Temperature ,,	,,	14th, 1852	74·1
The lowest ,,	,,	12th, 1862	24·7
The highest adopted mean temperature of the month,		1865	48·5
The lowest ,,	,,	1879	40·7

The Barometer differs little from the mean for former years.

The range of the Thermometer has been small, and the mean temperature very slightly below the average for April.

There has been a falling off in the evaporation.

The S.W. was the windy quarter, but the strongest winds came from the S.

May, 1880.

Results of Observations taken during the month.		Mean for the last 33 years.
Mean Reading of the Barometer	29·694	29·527
Highest ,, on the 30th	30·043	29·947
Lowest ,, on the 23rd	29·257	28·975
Range of Barometer Readings	0·786	0·972
Highest Reading of a Max. Therm. on the 20th	69·4	71·6
Lowest Reading of a Min. Therm. on the 6th	31·1	31·4
Range of Thermometer Readings	38·3	40·2
Mean of all the Highest Readings	59·5	59·6
Mean of all the Lowest	40·6	42·2
Mean Daily Range	18·9	17·4
Deduced Monthly Mean (from Mean of Max. and Min.)	48·3	49·2
Mean Temperature from dry bulb	48·0	49·5
Adopted Mean Temperature	48·2	49·4
Mean Temperature of Evaporation	45·0	46·2
Mean Temperature of Dew Point	42·1	42·8
Mean elastic force of Vapour	0·267 in	0·276 in
Mean weight of Vapour in a cubic foot of air	3·1 gr	3·1 gr
Mean additional weight required for saturation	0·9 gr	0·9 gr
Mean degree of Humidity (saturation 1·00)	0·78	0·77
Mean weight of a cubic foot of air	539·2 gr	536·9 gr
Fall of Rain	2·844 in	2·488 in
Number of days on which Rain fell	10	15·3
Amount of Evaporation	4·324 in	3·580 in

	N	NE	E	SE	S	SW	W	NW
No. of days in the month on which the prevailing wind was	0	13	2	0	1	8	7	0
Mean Velocity in miles per hour	0	6·9	13·0	0	9·5	8·2	12·8	0
Total No. of miles for each Direction	0	2143	624	0	227	1566	2150	0

The total number of miles registered during the month was 6710.

The max. Velocity of the wind was 32 miles per hour; direction W. on the 22nd at noon, and W. by N. on the 24th at 2 p.m.

Mean amount of Cloud (an overcast sky being indicated by 10·0)...			8·0
In the month of May, the highest reading of the Barometer during 33 years, was on the 22nd, in 1855, and was			30·124
The lowest	,,	,, 28th, 1877	28·559
The highest Temperature		,, 19th, 1864	82·5
The lowest	,,	,, 4th, 1855	23·5
The highest adopted mean temperature of the month, 1848			55·1
The lowest	,,	,, 1855	45·0

The Barometer generally stood higher than in previous years, and the range is small.

Temperature and Rainfall about the average.

The strongest winds came from the W., but the most frequent from the N.E.

June, 1880.

Results of Observations taken during the month.		Mean for the last 33 years.
Mean Reading of the Barometer	29·501	29·521
Highest ,, on the 1st	29·928	29·895
Lowest ,, on the 7th	29·124	29·004
Range of Barometer Readings	0·804	0·891
Highest Reading of a Max. Therm. on the 2nd	73·6	76·8
Lowest Reading of a Min. Therm. on the 4th	37·3	39·1
Range of Thermometer Readings	36·3	37·7
Mean of all the Highest Readings	66·1	65·3
Mean of all the Lowest	48·0	48·1
Mean Daily Range	18·1	17·2
Deduced Monthly Mean (from Mean of Max. and Min.)	55·3	54·9
Mean Temperature from dry bulb	55·2	54·8
Adopted Mean Temperature	55·3	54·9
Mean Temperature of Evaporation	52·1	52·2
Mean Temperature of Dew Point	49·0	49·0
Mean elastic force of Vapour	0·348 in	0·357 in
Mean weight of Vapour in a cubic foot of air	3·9gr	3·9gr
Mean additional weight required for saturation	1·1 gr	0·9gr
Mean degree of Humidity (saturation 1·00)	0·86	0·79
Mean weight of a cubic foot of air	529·7gr	530·8gr
Fall of Rain	4·787 in	3·803 in
Number of Days on which Rain fell	18	17·4
Amount of Evaporation	3·667 in	3·788 in

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
	1	6	6	0	2	3	12	0
Mean Velocity in miles per hour	10·0	9·7	9·6	0	6·7	11·5	7·7	0
Total No. of miles for each Direction	265	1377	1357	0	322	824	2410	0

The total number of miles registered during the month was 6555.

The max. Velocity of the wind was 28 miles per hour; direction W. at 2 p.m. on the 6th and 5 p.m. on the 7th.

Mean amount of Cloud (an overcast sky being indicated by 10·0)...			8·0
In the month of June, the highest reading of the Barometer during 33 years, was on the 15th, in 1874, and was			30·219
The lowest	,,	12th, 1862	28·632
The highest Temperature	,,	27th, 1878	87·2
The lowest	,,	30th, 1856	34·2
The highest adopted mean temperature of the month, 1858			59·0
The lowest	,,	1856 and 1860	52·2

The Barometer and Thermometer differ but slightly from the mean, but the Rainfall is almost an inch above the average for June.

The W. wind is the most frequent, but the S.W. the strongest.

July, 1880.

Results of Observations taken during the month.		Mean for the last 33 years.
Mean Reading of the Barometer	29·437	29·508
Highest ,, on the 5th	29·751	29·847
Lowest ,, on the 29th	29·106	29·004
Range of Barometer Readings	0·645	0·843
Highest Reading of a Max. Therm. on the 23rd	75·0	78·7
Lowest Reading of a Min. Therm. on the 31st	46·5	42·6
Range of Thermometer Readings	28·5	36·1
Mean of all the Highest Readings	66·3	68·0
Mean of all the Lowest	51·0	51·0
Mean Daily Range	15·3	17·0
Deduced Monthly Mean (from Mean of Max. and Min.)	56·8	57·6
Mean Temperature from dry bulb	56·8	58·0
Adopted Mean Temperature	56·8	57·8
Mean Temperature of Evaporation	54·6	55·1
Mean Temperature of Dew Point	52·6	52·5
Mean elastic force of Vapour	0·417 in	0·397 in
Mean weight of Vapour in a cubic foot of air	4·4gr	4·5gr
Mean additional weight required for saturation	0·7gr	1·0gr
Mean degree of Humidity (saturation 1·00)	0·86	0·82
Mean weight of a cubic foot of air	526·9gr	527·1gr
Fall of Rain	7·005 in	4·140 in
Number of days on which Rain fell	26	17·6
Amount of Evaporation	4·002 in	4·060 in

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
	0	7	1	0	0	7	15	1
Mean Velocity in miles per hour	0	6·7	8·5	0	0	7·1	9·4	13·7
Total No. of miles for each Direction	0	1120	205	0	0	1188	3368	329

The total number of miles registered during the month was 6210.

The max. Velocity of the wind was 27 miles per hour; direction S.S.W. at noon on the 28th.

Mean amount of Cloud (an overcast sky being indicated by 10·0)...		8·7
In the month of July, the highest reading of the Barometer during 33 years, was on the 24th, in 1868, and was		30·112
The lowest ,, ,,	15th, 1877	28·564
The highest Temperature ,,	22nd, 1873	88·2
The lowest ,, ,,	1st, 1857	36·0
The highest adopted mean temperature of the month,	1852	63·0
The lowest ,, ,, ,,	1879	54·7

The range of the Barometer and Thermometer are both small.

The Rainfall is very heavy, being almost 3 in. in excess of the mean; the number of days on which Rain fell was also very large.

The prevailing wind was W. by S., but the N.W. breezes were the stiffest.

August, 1880.

Results of Observations taken during the month.		Mean for the last 33 years.
Mean Reading of the Barometer	29·604	29·488
Highest ,, on the 11th	29·906	29·889
Lowest ,, on the 7th	29·000	28·954
Range of Barometer Readings	0·906	0·935
Highest Reading of a Max. Therm. on the 14th	80·2	77·2
Lowest Reading of a Min. Therm. on the 9th	46·0	41·7
Range of Thermometer Readings	34·2	35·5
Mean of all the Highest Readings	70·6	67·3
Mean of all the Lowest	52·1	50·9
Mean Daily Range	18·5	16·4
Deduced Monthly Mean (from Mean of Max. and Min.)	59·6	57·4
Mean Temperature from dry bulb	60·0	57·6
Adopted Mean Temperature	59·8	57·5
Mean Temperature of Evaporation	56·5	54·7
Mean Temperature of Dew Point	53·6	52·3
Mean elastic force of Vapour	0·412 in	0·394 in
Mean weight of Vapour in a cubic foot of air	4·6gr	4·3gr
Mean additional weight required for saturation	0·8gr	0·9gr
Mean degree of Humidity (saturation 1·00)	0·81	0·83
Mean weight of a cubic foot of air	526·5gr	527·1 gr
Fall of Rain	2·244 in	4·906 in
Number of days on which Rain fell	6	19·4
Amount of Evaporation	2·420 in	3·406 in

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
	0	15	6	0	0	2	7	1
Mean Velocity in miles per hour	0	5·9	7·8	0	0	8·1	6·3	13·3
Total No. of miles for each Direction	0	2124	1119	0	0	389	1066	320

The total number of miles registered during the month was 5018.

The max. Velocity of the wind was 26 miles per hour; direction S. by W. on the 5th at noon.

Mean amount of Cloud (an overcast sky being indicated by 10·0)...			6·9
In the month of August, the highest reading of the Barometer during 33 years, was on the 21st, in 1874, and was			30·114
The lowest	,,	,, 31st, 1876	28·555
The highest Temperature		,, 2nd, 1868	88·0
The lowest	,,	,, 21st, 1864 & 1869	36·0
The highest adopted mean temperature of the month, 1857			61·0
The lowest	,,	,, 1848	52·5

Both Barometer and Thermometer were somewhat in excess of the mean.

The Rainfall was remarkably small, being considerably less than half the mean of the last 33 years, and thus balancing the excess of the preceding month.

The wind came mostly from N.E. by E., but there was a strong breeze from the N.W.

September, 1880.

Results of Observations taken during the month.		Mean for the last 33 years.
Mean Reading of the Barometer	29·530	29·506
Highest ,, on the 28th	30·106	30·034
Lowest ,, on the 15th	28·897	28·834
Range of Barometer Readings	1·209	1·200
Highest Reading of a Max. Therm. on the 4th	82·0	72·4
Lowest Reading of a Min. Therm. on the 19th	42·0	36·9
Range of Thermometer Readings	40·0	35·5
Mean of all the Highest Readings	64·8	62·3
Mean of all the Lowest	49·5	47·1
Mean Daily Range	15·3	15·2
Deduced Monthly Mean (from Mean of Max. and Min.)	55·9	53·4
Mean Temperature from dry bulb	56·6	54·0
Adopted Mean Temperature	56·3	53·7
Mean Temperature of Evaporation	53·5	51·1
Mean Temperature of Dew Point	50·9	48·5
Mean elastic force of Vapour	0·374 in	0·343 in
Mean weight of Vapour in a cubic foot of air	4·2gr	3·9gr
Mean additional weight required for saturation	0·8gr	0·8gr
Mean degree of Humidity (saturation 1·00)	0·82	0·82
Mean weight of a cubic foot of air	528·4gr	531·8gr
Fall of Rain	3·969 in	4·645 in
Number of days on which Rain fell	19	18·6
Amount of Evaporation	1·889 in	2·337 in

	N	NE	E	SE	S	SW	W	NW
No. of days in the month on which the prevailing wind was	3	0	3	1	2	8	13	0
Mean Velocity in miles per hour	10·8	0	8·1	5·0	7·4	5·4	7·2	0
Total No. of miles for each Direction	778	0	628	121	357	1047	2241	0

The total number of miles registered during the month was 5172.

The max. Velocity of the wind was 28 miles per hour; direction W. by S. at 8 a.m. on the 22nd.

Mean amount of Cloud (an overcast sky being indicated by 10·0)...				7·9
In the month of September, the highest reading of the Barometer during 33 years, was on the 15th, in 1851, and was				30·274
The lowest	,,	,,	22nd, 1863	28·371
The highest Temperature		,,	6th, 1868	85·0
The lowest	,,	,,	6th, 1855	30·7
The highest adopted mean temperature of the month, 1865				59·1
The lowest	,,	,,	1863	50·9

The Barometer is almost identical throughout with the mean for the month.

The maximum of the Thermometer is nearly 10° above that of previous years, but the mean temperature of the month is only 2°·6 in excess of the mean for September.

The Rainfall is an exact average for the year, but is small for this month.

October, 1880.

Results of Observations taken during the month.		Mean for the last 33 years.
Mean Reading of the Barometer	29·506	29·416
Highest ,, on the 14th	30·003	29·987
Lowest ,, on the 28th	28·496	28·653
Range of Barometer Readings	1·507	1·334
Highest Reading of a Max. Therm. on the 1st	62·9	64·6
Lowest Reading of a Min. Therm. on the 21st	23·1	29·7
Range of Thermometer Readings	39·8	34·9
Mean of all the Highest Readings	50·9	54·6
Mean of all the Lowest	36·6	42·2
Mean Daily Range	14·3	12·4
Deduced Monthly Mean (from Mean of Max. and Min.)	42·8	47·5
Mean Temperature from dry bulb	43·3	48·0
Adopted Mean Temperature	43·1	47·8
Mean Temperature of Evaporation	41·0	45·6
Mean Temperature of Dew Point	38·5	43·2
Mean elastic force of Vapour	0·233 in	0·281 in
Mean weight of Vapour in a cubic foot of air	2·7gr	2·3gr
Mean additional weight required for saturation	0·5gr	0·6gr
Mean degree of Humidity (saturation 1·00)	0·83	0·85
Mean weight of a cubic foot of air	5·446gr	536·4gr
Fall of Rain	3·007 in	5·297 in
Number of days on which Rain fell	14	21·4
Amount of Evaporation	2·482 in	1·653 in

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
	3	17	2	0	0	2	4	3
Mean Velocity in miles per hour	3·4	8·2	14·3	0	.0	10·2	11·6	12·1
Total No. of miles for each Direction	248	3290	688	0	0	489	1115	865

The total number of miles registered during the month was 1695.

The max. Velocity of the wind was 33 miles per hour; direction N.N.E. at 5 p.m. on the 28th.

Mean amount of Cloud (an overcast sky being indicated by 10·0)...			7·4
In the month of October, the highest reading of the Barometer during 33 years, was on the 6th, in 1877, and was			30·282
The lowest	,,	,, 19th, 1862	28·139
The highest Temperature		,, 9th, 1869	72·8
The lowest	,,	,, 21st, 1880	23·1
The highest adopted mean temperature of the month, 1861 and 1876			51·6
The lowest	,,	,, 1880	43·1

Both the mean Barometer and the range are somewhat in excess of the average.

The Temperature for the month is the lowest on record for October, and the minimum reading of the Thermometer is 2° lower than that of previous years. The Rain deficit is over two inches.

Wind mostly from the N.E., the E. sending the stiffest breezes.

November, 1880.

Results of Observations taken during the month.		Mean for the last 33 years.
Mean Reading of the Barometer	29·469	29·458
Highest ,, on the 3rd and 20th	30·078	30·060
Lowest ,, on the 16th	28·185	28·594
Range of Barometer Readings	1·893	1·466
Highest Reading of a Max. Therm. on the 10th	59·1	55·5
Lowest Reading of a Min. Therm. on the 21st	21·0	25·3
Range of Thermometer Readings	38·1	30·2
Mean of all the Highest Readings	47·4	46·7
Mean of all the Lowest	34·6	36·0
Mean Daily Range	12·8	10·7
Deduced Monthly Mean (from Mean of Max. and Min.)	40·6	41·0
Mean Temperature from dry bulb	40·6	41·1
Adopted Mean Temperature	40·6	41·1
Mean Temperature of Evaporation	38·9	38·7
Mean Temperature of Dew Point	36·7	37·4
Mean elastic force of Vapour	0·218 in	0·223 in
Mean weight of Vapour in a cubic foot of air	2·5 gr	2·6 gr
Mean additional weight required for saturation	0·4 gr	0·4 gr
Mean degree of Humidity (saturation 1·00)	0·87	0·86
Mean weight of a cubic foot of air	545·7 gr	544·5 gr
Fall of Rain	7·368 in	4·108 in
Number of days on which Rain fell	18	19·0
Amount of Evaporation	3·280 in	1·353 in

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
	2	6	1	0	3	11	6	1
Mean Velocity in miles per hour	6·6	3·3	5·6	0	12·4	15·7	6·7	5·2
Total No. of miles for each Direction	318	473	134	0	893	4132	962	124

The total number of miles registered during the month was 5036.

The max. Velocity of the wind was 42 miles per hour; direction S.S.E. on the 26th at 6 a.m.

Mean amount of Cloud (an overcast sky being indicated by 10·0)...			6·9
In the month of November, the highest reading of the Barometer during 33 years, was on the 12th, in 1857, and was			30·350
The lowest	,,	,, 1st, 1859	28·007
The highest Temperature	,,	6th, 1872	61·9
The lowest	,,	,, 17th, 1861	19·1
The highest adopted mean temperature of the month, 1877.....			44·2
The lowest	,,	,, 1851.....	36·7

The range of both Barometer and Thermometer are large, but their mean values differ little from the average.

The Rainfall more than balances the deficit of the previous month, being 3 inches in excess of the mean for November.

The S.W. is the prevailing wind, being considerably more than half the total.

December, 1880.

Results of Observations taken during the month.		Mean for the last 33 years.
Mean Reading of the Barometer	29·426	29·449
Highest ,, on the 7th	30·170	30·059
Lowest ,, on the 29th	28·501	28·611
Range of Barometer Readings	1·669	1·448
Highest Reading of a Max. Therm. on the 6th	51·1	52·8
Lowest Reading of a Min. Therm. on the 30th	26·0	20·3
Range of Thermometer Readings	25·1	32·5
Mean of all the Highest Readings	44·4	42·8
Mean of all the Lowest	34·9	33·4
Mean Daily Range	9·5	9·4
Deduced Monthly Mean (from Mean of Max. and Min.)	39·7	38·1
Mean Temperature from dry bulb	39·4	38·8
Adopted Mean Temperature	39·6	38·5
Mean Temperature of Evaporation	38·2	37·4
Mean Temperature of Dew Point	36·4	35·4
Mean elastic force of Vapour	0·215 in	0·209 in
Mean weight of Vapour in a cubic foot of air	2·5gr	2·4gr
Mean additional weight required for saturation	0·4gr	0·4gr
Mean degree of Humidity (saturation 1·00)	0·89	0·88
Mean weight of a cubic foot of air	546·4gr	547·6gr
Fall of Rain	9·211 in	4·552 in
Number of days on which Rain fell	25	20·4
Amount of Evaporation	1·911 in	0·957 in

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
	1	5	1	0	1	6	14	3
Mean Velocity in miles per hour	2·3	7·6	7·3	0	12·5	9·5	15·2	9·3
Total No. of miles for each Direction	56	916	174	0	299	1364	5126	9·3

The total number of miles registered during the month was 8592.

The max. Velocity of the wind was 38 miles per hour; direction W. by S. and W. by N. at 8 p.m. on the 11th and 11 a.m. on the 12th.

Mean amount of Cloud (an overcast sky being indicated by 10·0)...				6·9
In the month of December, the highest reading of the Barometer during 33 years, was on the 22nd, in 1849, and was				30·378
The lowest	,,	,,	5th, 1876	28·028
The highest Temperature		,,	9th, 1876	58·1
The lowest	,,	,,	24th, 1860	6·7
The highest adopted mean temperature of the month,			1857	44·6
The lowest	,,	,,	1878	30·3

The range of the Barometer is rather large, and the Temperature somewhat high.

The Rainfall is enormous, being more than double the high average of the month.

The wind from the W. by S. was very strong during the month, scarcely one-seventh of the total coming from any other quarter.

Summary of the Observations

FOR 1880.

		Mean for the last 33 years.
Mean Reading of the Barometer	29·537	29·480
Highest ,, on January 7th	30·237	30·281
Lowest ,, on November 6th	28·185	28·273
Range of Barometer Readings	2·052	2·008
Highest Reading of a Max. Therm. on September 4th	82·0	81·7
Lowest Reading of a Min. Therm. on January 19th	17·0	15·8
Range of Thermometer Readings	65·0	65·9
Mean of all the Highest Readings	55·2	54·7
Mean of all the Lowest	40·4	40·9
Mean Daily Range	14·8	13·8
Deduced Yearly Mean (from Mean of Max. and Min.)	46·8	46·7
Mean Temperature of dry bulb	46·7	46·9
Adopted Mean Temperature	46·8	46·8
Mean Temperature of Evaporation	44·4	44·6
Mean Temperature of Dew Point	41·7	42·1
Mean elastic force of Vapour	0·277 in	0·276 in
Mean weight of Vapour in a cubic foot of air	3·1 gr	3·2 gr
Mean additional weight required for saturation	0·6 gr	0·7 gr
Mean degree of Humidity (saturation 1·00)	0·84	0·84
Mean weight of a cubic foot of air	541·1 gr	539·1 gr
Total Fall of Rain in the Year	50·261 in	47·517 in
Number of days per Month on which Rain fell	17·0	18·4
Amount of Evaporation	29·790 in	27·142 in

The Maximum monthly mean height of the Barometer was in January, 1880, and was	29·928
The Minimum ,, ,, in December 1868, and was	28·984
The Maximum yearly mean height of the Barometer was in 1858, and was	29·544
The Minimum ,, ,, ,, ,, in 1866, and was	29·389

The greatest monthly range of the Barometer was in November, 1859, and was		2·290
The least ,, ,,	in July, 1852, and was	0·505
The highest reading of the Barometer, during 33 years, was on February 11th, 1849, and on March 4th, 1854, and was		30·452
The lowest ,, ,,	on July 22nd, 1873, and was	27·939
Extreme range		2·513
The highest temperature was on July 15th, 1868, and was		88·2
The lowest ,, ,,	December 24th, 1860	6·7
The highest adopted mean temperature of a month, July 1868		62·4
The lowest ,, ,,	February, 1855	28·6
The highest adopted mean temperature of a year, 1868		49·1
The lowest ,, ,, ,, ,,	1879	44·1
The greatest monthly mean weight of vapour, in a cubic foot of air	July, 1852	5·1
The least ,, ,, ,,	February, 1855	1·4
The greatest fall of rain in a month, was in October, 1870, and was		13·437 in
The least ,, ,,	May, 1853, and May, 1859	0·3
The greatest number of days on which rain fell in one month	July, 1861, December, 1868	31
The least ,, ,,	March, 1852	3

The heavy Rainfall of the year is principally due to the fall in December.

DATES OF OCCASIONAL PHENOMENA.

1880.	Frost.	Hoar frost only.	Snow.
January	8—29, 31	12—15, 17, 19, 20—23, 27—30	15
February	1, 4—6, 8—13, 21—24, 26	1, 6, 11, 24	...
March	1, 8, 13, 16—28	9, 18—20, 22, 24—26, 29	2
April	11, 30, 31	30	...
May	6, 17	6	...
June	...	...	...
July	...	...	...
August	...	...	...
September	...	...	...
October	3, 18—23, 27, 29, 30	3, 20—23, 29	20, 27
November	1—4, 8, 14—23	1—4, 9, 15, 17, 20—22	18, 19, 23
December	2, 14—22, 24—27, 29—31	18	15, 18, 19, 22, 27, 30, 31

1880.	Hail.	Heavy Rain.	Fog.	Lightning.	Thunder	Lunar Halo.	Solar Halo.
January	...	...	6, 7, 16	...	...	...	...
February	26	26	2, 3, 5, 11, 22, 25	...	...	...	...
March	1	...	13, 20, 30	3	...	...	...
April	7 (soft), 25, 26	16	14, 16	7	7, 13, 21, 25	17, 23	...
May	...	...	...	...	...	22	13, 18
June	4	4, 7, 8, 19	...	10, 22	10, 11, 19, 22	...	1
July	...	2, 6, 17, 23, 24	...	13, 17, 23	13, 17, 23	...	...
August	...	5, 6	...	5, 6	5, 6	25	...
September	19	18, 19, 22	23, 28, 29	4, 18	14, 18, 19	...	...
October	...	...	17, 18	...	...	22	...
November	...	12, 13, 14	22	26	...	8	...
December	18, 19, 20	...	2, 15, 28	...	...	...	...

An Aurora was seen on August 13. The Zodiacal Light was observed on January 23 and March 18.

TOTAL AMOUNT OF SUNSHINE IN HOURS RECORDED ON EACH DAY.

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
April	9·0	0	3·5	5·6	7·5	5·9	0·4	6·2	5·2	7·3	1·3	0	3·7	5·2	1·1	3·7	7·1	0·3
May	10·3	9·8	2·7	5·9	8·7	11·1	7·8	7·2	8·6	0·9	7·2	11·0	13·6	11·6	14·2	11·1	13·8	11·6
June	7·5	4·3	5·1	6·6	6·6	8·2	5·2	0·4	9·1	10·2	6·0	10·3	4·0	0	4·8	0·1	8·2	12·8
July	5·7	0·2	1·1	7·6	4·5	0	9·9	2·9	5·7	11·5	6·3	5·0	2·5	1·0	0·4	4·9	5·7	0·2
August	9·5	10·4	6·0	6·0	0·7	0·8	1·3	9.3	14·4	2·4	8·7	12·6	10·7	13·6	9·1	5·1	2·1	0·9
September...	0	0·4	9·2	9·1	1·7	7·8	9·6	7·0	9·0	0·3	1·0	3·8	7·5	1·0	0·2	3·3	6·8	3·7
October ...	2·3	2·2	10·3	0·6	0	0	0·2	0·5	6·0	7·0	3·6	1·4	0	8·0	0·1	0	0·2	0·8
November...	5·5	6·8	6·9	4·2	0	0	0	7·4	0	5·1	0	0	0	0·1	1·0	0	2·6	4·6
December...	0	4·9	0	0	0	0·1	0	0	0	0·9	0	3·8	0	0	0	2·1	4·6	0

TOTAL AMOUNT OF SUNSHINE IN HOURS RECORDED ON EACH DAY (*continued*).

Day	19	20	21	22	23	24	25	26	27	28	29	30	31	Monthly Total.	Approximate per cent. each month.
April	3·4	7·1	0	11·5	6·0	0·2	10·6	9·5	11·6	4·7	7·6	13·8	...	159·0	37·8
May	3·5	13·7	0·2	7·9	0	7·0	8·8	4·2	2·6	12·7	11·4	6·4	0·3	245·8	53·2
June	2·7	2·3	6·7	5·7	0	5·2	2·6	5·8	2·5	0	0·7	1·7	...	145·3	29·7
July	2·2	13·5	5·8	7·4	2·2	0·1	9·5	0	4·6	1·8	5·0	8·6	11·6	147·5	30·8
August	5·0	7·5	4·0	6·9	1·3	1·1	5·0	1·8	10·8	11·3	9·5	5·2	8·9	205·9	45·9
September	4·8	10·0	2·3	0·1	0	0	0	2·4	6·9	4·7	4·5	1·5	...	118·6	35·3
October	6·1	5·4	8·0	3·6	6·0	3·9	1·6	0	0	4·3	6·9	1·9	0	90·9	28·8
November	4·0	6·6	5·6	4·6	3·0	0·1	2·7	0·4	5·5	0	0	0	...	76·9	30·9
December	3·4	0	4·4	0	0·4	0·3	5·6	2.3	0	0	0	3·5	3·4	36·6	18·4

MONTHLY TOTALS, FOR EACH HOUR, OF RECORDED SUNSHINE.

Local Apparent Time.	h h 4—5	h h 5—6	h h 6—7	h h 7—8	h h 8—9	h h 9—10	h h 10 11	h h 11 12	h h 12—1	h h 1—2	h h 2—3	h h 3—4	h h 4—5	h h 5—6	h h 6—7	h h 7—8	h h 8—9
April	0·1	2·9	5·6	9·1	10·3	11·9	14·6	16·1	16·4	14·9	16·3	14·1	13·9	9·2	3·6	0	0
May	1·4	10·2	14·8	17·2	17·6	17·9	19·5	20·5	19·6	19·2	18·1	18·7	18·4	15·7	13·5	3·8	0
June	3·1	8·0	11·4	11·2	12·7	12·6	12·3	11·2	9·0	8·7	8·6	10·2	10·0	7·2	5·8	3·1	0·3
July	0	4·2	7·3	8·5	8·6	8·7	10·8	10·2	13·6	14·2	13·6	10·5	10·9	10·4	6·7	1·8	0
August	0	3·8	10·0	10·8	11·9	14·5	15·8	16·9	18·9	18·5	20·3	19·3	16·9	11·5	6·4	0·4	0
September	0	0	2·9	6·1	10·3	9·0	11·2	13·5	13·3	11·8	12·5	13·4	9·2	4·3	0·5	0	0
October.....	0	0	0·3	2·8	4·5	10·6	9·8	9·5	11·6	12·8	10·8	10·5	6·8	0·5	0	0	0
November.....	0	0	0	0·2	3·8	10·5	11·9	13·9	12·3	10·8	9·6	3·5	0·2	0	0	0	0
December.....	0	0	0	0	0	0·5	3·3	8·7	8·9	7·0	5·2	3·0	0	0	0	0	0
Total	4·6	29·1	52·3	65·9	79·7	96·2	109 2	120·5	123·6	117·9	115·0	103·2	86·3	58·8	36·5	9·1	0·3

AGRICULTURAL NOTES.

JANUARY.—No out-door work could be carried on, owing to the severe frost.

FEBRUARY.—During the first week the ploughing in preparation for oats was commenced, and lasted during the greater part of the month. The snowdrop and a few early flowers were in blossom in sheltered sunny spots towards the end of the month.

MARCH.—Rather cold, but often cloudless. The prevalency of E. and N.E. winds was excellent for ploughing, but did not favour growth.

APRIL.—Commencement of month rather wet, but not generally unfavourable. At the end of the month most of the potatoes were in, and prospects were satisfactory.

MAY.—Ploughing finished early; potatoes all in by the end of the first week, and green crops by the 20th. Rain much needed towards the close of the month.

JUNE.—Much rain, vegetation backward. The fruit trees, especially the apple and pear trees, promised badly. The small amount of blossom was very conspicuous. Currants and gooseberries were the only fruit that looked well.

JULY.—Very wet and stormy. Hay cut on the 3rd, and mostly housed by the 20th; quantity fair. Clover very poor. Corn beaten down by heavy rain. Apples and pears few and small. Sun much wanted.

AUGUST.—Exceedingly fine. Corn more promising. Good crop of currants and gooseberries, but other fruit failed, except cherries which fell only slightly below the average.

SEPTEMBER.—Wheat and oats cut in the first week, and all housed by the 14th. Oats very good; wheat average in quantity. Green crops looking well. Potatoes very good, crop heavy and very little disease; a fair quantity housed by the end of the month.

OCTOBER.—Most of the green crops were taken up. Turnips abundant and excellent. Mangel rather below the average. Some wheat sown during the last week.

NOVEMBER.—All green crops housed towards beginning of month. Nearly all the wheat was sown.

DECEMBER.—Too cold for any agricultural out-door labour.

OBSERVATIONS OF CROPS AND FLOWERS.

GRAIN, ETC.					GREEN CROPS.				FLOWERS.	
Name.	When Sown.	In Flower.	In Ear.	When Cut.	Name.	When Sown.	Above Grnd.	Stored.	Name.	In Blossom.
Wheat	Nov.	June 25th	July 15th	Sep. 3rd	Potatoes	April	May 20th	Sep.-Oct.	Anemone	Ap. 5th
Oats	Mar.-Apl.	June 20th	July 10th	Sep. 8th	Turnips	May	May 30th	Oct.	Wild Hyacinth	May 10th
Peas	Mar. 10th	June 21st		Aug. 10th	Beet	May	May 29th	Oct.	Primrose	Mar. 8th
Beans	Mar. 12th	June 15th		July 16th	Mangel	May	May 29th	Oct.	Renunculus	Mar. 18th
									Wood Violet	Ap. 19th
									May Flower	May 5th
									Jonquil	May 15th
									Snowdrop	Feb. 18th
									Crocus	Mar. 3rd
									Daffodil	Mar. 25th
									Forget-me-not	May 3rd
									Monkshood	June 30th
									Sweet William	July 5th
									Polyanthus	Mar. 8th

OBSERVATIONS OF TREES AND SHRUBS.

FOREST TREES, ETC.				FRUIT TREES, ETC.			SHRUBS.		
Name.	In Bud.	In Leaf.	Divested of Leaves.	Name.	In Blossom.	Ripe.	Name.	In Blossom.	Divested of Leaves.
Field Elm	Ap. 18th	May 1st	Oct. 30th	Apple	May 11th	Sep. 5th	Lilac	May 20th	Oct. 28th
Oak	May 9th	May 25th	Nov. 10th	Pear	Ap. 30th	Aug. 15th	Privet	Aug. 11th	Oct. 28th
Sycamore	Ap. 6th	Ap. 14th	Oct. 23rd	Cherry	Ap. 20th	July 31st	Syringa	May 20th	Oct. 25th
Plane	Ap. 7th	Ap. 14th	Oct. 23rd	Peach	Ap. 3rd	none	Laburnum	May 22nd	Nov. 2nd
Lime	Ap. 12th	Ap. 21st	Oct. 26th	Red Currant	Ap. 2nd	July 26th	Red Flowering Currant	Ap. 18th	Nov. 18th
Hawthorn	Ap. 29th	June 5th	Nov. 10th	White Currant	Ap. 2nd	July 25th			
Hazel	Ap. 10th	Ap. 25th	Oct. 30th	Black Currant	Ap. 4th	Aug. 4th			
Ash	May 8th	May 4th	Oct. 26th	Strawberry	Ap. 2nd	July 18th			
Beech	Ap. 20th	May 1st	Nov. 8th	Gooseberry	Ap. 2nd	Aug. 15th			
Horse Chesnut	Ap. 5th	Ap. 22nd	Oct. 23rd	Plum	May 2nd	Oct. 16th			
				Apricot	Ap. 5th	none			

OBSERVATIONS OF UPPER CLOUDS (CIRRUS).

Date.	G. M. T.	Cloud Direction.	Velocity.	Wind.	
				Direction.	Force (0 to 12).
January 2	9.30 a.m.	S.S.W.	4	S.W.	3
,, 2	10 a.m.	S.W.	3	S.W.	2
,, 17	10.30 a.m.	W.N.W.	3	N.E.	0
,, 17	2 p.m.	N.W.	2	W.	1
,, 27	2 p.m.	S. by E.	1	S.	0
,, 29	9 a.m.	W.S.W.	1	S.W.	1
,, 29	10 a.m.	W.	1	S.S.W.	1
,, 29	Noon.	W.S.W.	2	S.	0
February 7	Noon.	S. by E.	2	S.W.	3
,, 28	10 a.m.	W.	2	W.	6
,, 28	Noon.	W.N.W.	2	W.	5
March 1	10 a.m.	W.	2	S.W.	6
,, 2	11.20 a.m.	W.N.W.	1	W.S.W.	0
,, 3	Noon.	N.W.	1	W.S.W.	6
,, 11	2 p.m.	S.W.	1	E.	2
,, 16	6 p.m.	N.W.	2	E.	3
,, 17	8 a.m.	W.	2	E.N.E.	3
,, 17	10 a.m.	W.	2	E.	2
,, 17	2 p.m.	N.W.	3	E.	3
,, 17	4 p.m.	W.N.W.	2	E.	4
,, 20	9 a.m.	N.W.	1	N.N.E.	1
,, 26	5 p.m.	S.	1	E.N.E.	2
,, 27	*8 a.m.	S.S.W.	1	E.N.E.	2
,, 27	10 a.m.	S.W.	1	N.E.	2
,, 27	Noon.	S.W.	1	E.N.E.	2
,, 27	2 p.m.	W.S.W.	1	E.N.E.	2
,, 27	5.15 p.m.	W.	1	E.	2
,, 27	6 p.m.	W. by S.	1	E.	2
,, 29	4 p.m.	N.W.	2	S.W.	2
,, 30	4 p.m.	W.	2	S.S.W.	2
April 1	5.30 p.m.	N.N.W.	3	W.	2
,, 13	3 p.m.	S.E.	1	N.N.E.	1
,, 14	8.40 a.m.	S.S.W.	4	N.N.E.	0
,, 14	10 a.m.	S.W.	4	N.N.E.	0
,, 14	Noon.	S.W.	3	N.N.E.	1
,, 14	2 p.m.	W.S.W.	3	E.N.E.	3
May 4	9 a.m.	E	2	N.E.	2
,, 5	5.20 a.m.	N. by E.	3	E.	0
,, 6	Noon.	W.	2	W.	1
,, 13	1 p.m.	S.S.W.	3	E.N.E.	2

OBSERVATIONS OF UPPER CLOUDS (*Continued*).

Date.	G. M. T.	Cloud Direction.	Velocity.	Wind. Direction.	Wind. Force (0 to 12).
May 13	2 p.m.	S.W. by W.	3	E.	2
,, 13	4 p.m.	S.W.	4	E.N.E.	2
,, 17	6 a.m.	N.	2	N.N.E.	1
,, 18	10 a.m.	N. by W.	4	E.	1
,, 19	3.30 p.m.	W.N.W.	4	W.	3
,, 24	2.30 p.m.	W.S.W.	4	W.	5
,, 24	4 p.m.	W.	4	W.	4
,, 24	5 p.m.	W.	5	W.S.W.	4
,, 24	7.25 p.m.	W. by S.	4	W.S.W.	2
,, 25	10.15 a.m.	W. by S.	3	S.W.	3
,, 25	11 a.m.	W.S.W.	3	W.S.W.	3
June 1	11 a.m.	S.E. by S.	2	N.E.	2
,, 1	Noon.	E.	1	N.E.	2
,, 2	9.30 a.m.	E.N.E.	1	E.N.E.	3
,, 2	10 a.m.	E.	2	E.N.E.	3
,, 2	4 p.m.	E. by N.	1	N.E.	3
,, 5	9 a.m.	N.E.	1	N.N.W.	2
,, 5	10 a.m.	N.E.	2	W.	2
,, 18	9.30 a.m.	E.S.E.	2	N.E.	1
,, 18	Noon.	S.E.	1	N.E.	1
,, 18	2 p.m.	S.E.	1	N.E.	1
,, 26	10 a.m.	W.	3	W.	2
July 9	4 p.m.	S.W.	2	W.	2
,, 13	4 p.m.	S.W.	1	N.E.	1
,, 13	5 p.m.	W.S.W.	1	E.	1
,, 13	6 p.m.	S. by W.	2	N.E.	1
,, 16	4 p.m.	S.W.	3	N.E.	1
,, 19	2 p.m.	S.W.	1	W.	2
,, 28	5 p.m.	W.	3	S.W.	3
,, 28	7 p.m.	W. by S.	2	W.S.W.	1
,, 31	4 p.m.	W. by S.	1	W.	3
August 1	2 p.m.	W.S.W.	2	W.	2
,, 1	3 p.m.	S.W.	2	W.	3
,, 1	4 p.m.	W.	2	W.N.W.	2
,, 13	9 a.m.	E. by S.	1	N.E.	1
,, 13	10 a.m.	E.S.E.	3	E.	1
,, 15	9.30 a.m.	N.	2	E.	1
,, 15	Noon.	E. by N.	1	N.E.	1
,, 19	3.30 p.m.	N.E.	2	N.E.	1
,, 22	10 a.m.	N.W.	3	N.E.	1

OBSERVATIONS OF UPPER CLOUDS (*Continued*).

Date.	G. M. T.	Cloud Direction.	Velocity.	Wind. Direction.	Wind. Force (0 to 12).
August 27	11.30 a.m.	N.N.W.	2	W.	1
,, 29	Noon.	S.E.	1	E.	2
,, 30	2 p.m.	E. by S.	1	E.S.E.	2
,, 30	4 p.m.	E.S.E.	2	E.	2
Sept. 3	10.30 a.m.	S. by E.	2	S.W.	1
,, 3	11 a.m.	S.S.E.	1	S.W.	0
,, 4	2.30 p.m.	S.W.	2	S.	1
,, 6	9.30 a.m.	S.S.W.	1	S.W.	3
,, 9	2.30 p.m.	S.	3	E.	3
,, 17	6 p.m.	S.S.W.	1	W.S.W.	1
,, 28	4 p.m.	N.	1	W.N.W.	1
October 14	4.30 p.m.	W. by N.	2	N.W.	1
,, 19	7 a.m.	W.	3	N.N.E.	1
,, 19	10 a.m.	W.	4	N.N.E.	1
,, 19	Noon.	W.	3	N.E.	0
,, 20	9 a.m.	W.	1	N.	1
,, 20	10 a.m.	W.S.W.	1	N.E.	1
,, 22	7 a.m.	W.S.W.	3	N.N.E.	1
,, 22	9 a.m.	S.W. by W.	2	N.	2
,, 22	10 a.m.	W.S.W.	2	N.E.	1
,, 22	Noon.	W.S.W.	3	E.N.E.	3
,, 29	10 a.m.	N.E.	2	N.W.	3
,, 29	Noon.	E.N.E.	1	N.N.W.	3
Nov. 1	10.30 p.m.	S.E.	1	N.	1
,, 3	1.15 p.m.	E.	1	N.E.	1
,, 10	10 a.m.	W.	1	S.	0
,, 10	Noon.	W.	2	S.	0
Dec. 2	7.30 a.m.	S.	3	W.	1
,, 2	2 p.m.	W.S.W.	2	W.	1
,, 2	4 p.m.	S.W.	2	W.S.W.	0
,, 10	11.30 a.m.	W. by S.	2	W.	3
,, 12	Noon.	W.	2	W.	6
,, 16	1 p.m.	E.N.E.	1	N.E.	2
,, 21	10.30 a.m.	W.	1	N.	0
,, 30	0.30 p.m.	N.E.	3	N.W.	1

Monthly Magnetical Observations taken at the College Observatory, Stonyhurst. 1880.

THE Horizontal, Vertical, and Total forces are calculated to English measure; one foot, one second of mean solar time, and one grain being assumed as the units of space, of time, and of mass.

The Vertical and Total forces are obtained from the absolute measures of the Horizontal force and of the Dip.

In the observations of Deflection and Vibration, taken each month for absolute measure of Horizontal force, the same magnet has always been employed.

The moment of inertia of the magnet with its stirrup, for different degrees of temperature, and the co-efficients in the corrections required for the effects of temperature and of terrestrial magnetic induction on the magnetic moment of the magnet, were determined at the Kew Observatory by the late Mr. Welsh.

The moment of inertia of the magnet with its stirrup, using the grain and foot as the units of mass and of linear measure, is 5·27303. Its rate of increase for increase of temperature is 0·00073 for every 10° of Fahr.

The weight of the magnet with its stirrup is approximately 825 grains, and the length of the magnet is nearly 3·94 inches. The moment of inertia was determined, independently of the weight and dimensions, by the method of vibration, with and without a known increase of the moment of inertia.

The temperature corrections have always been obtained from the formula $q(t°-35°)+q'(t°-35°)^2$, where t° is the observed temperature and 35° Fahr. the adopted standard temperature. The values of the co-efficients q and q' are respectively ·0001128 and 0·0000000436.

The induction co-efficient μ is 0·000244.

The correction for error of graduation of the Deflection bar at 1·0 foot is +0·00004 ft., at 1·3 + 0·000064 ft.

The observed times of vibration are entered in the Table without corrections.

The time of one vibration has been obtained each month from the mean of twelve determinations of the time of 100 or of 200 vibrations.

The angles of deflection are each the mean of two sets of readings.

In deducing from these observations the ratio and product of the magnetic moment m of the magnet, and the earth's horizontal magnetic intensity X, the induction and temperature corrections have always been applied, and the observed time of vibration has been corrected for the effect of torsion of the suspending thread; but no correction has been required for the rate of the chronometer, or for the arc of vibration, the maximum value of the former having been $3^{s}\cdot51$, and the latter never over 50′.

The average deflection of the magnet caused by a twist of the torsion circle through 90°, has been about 8′·6 of arc.

In the calculations of the ratio $\frac{m}{X}$, the third and subsequent terms of the series $1 + \frac{P}{r^2} + \frac{Q}{r^4}$ + &c., have always been omitted.

The adopted value of the constant P is 0·004116.

The Declination observations have been taken once a week. Each reading has been corrected by the photographic curves for all irregular disturbances, as well as for daily and monthly range.

OBSERVATIONS OF DEFLECTION FOR ABSOLUTE MEASURE OF HORIZONTAL FORCE.

Month.	G. M. T.		Distances of centres of Magnets.	Temperature.	Observed Deflection.	$\log \frac{m}{X}$
	D.	H. M.	FOOT.	°	° ′ ″	
January ...	21st	10 58 a.m.	1·0	36·8	13 45 11	9·07688
	,,	11 29 a.m.	1·3	42·9	6 13 45	9·07762
February...	24th	0 1 p.m.	1·0	45·2	13 45 13	9·07743
	,,	0 21 p.m.	1·3	46·8	6 14 11	9·07838
March ...	19th	0 23 p.m.	1·0	51·0	13 44 29	9·07745
	,,	0 42 p.m.	1·3	52·7	6 13 6	9·07752
April	25th	0 1 p.m.	1·0	53·1	13 44 2	9·07737
	,,	0 25 p.m.	1·3	54·0	6 12 35	9·07701
May	24th	11 2 a.m.	1·0	53·2	13 43 25	9·07705
	,,	11 23 a.m.	1·3	54·7	6 12 24	9·07684
June	26th	11 28 a.m.	1·0	56·4	13 43 28	9·07728
	,,	0 15 p.m.	1·3	56·8	6 12 50	9·07750
July.....	29th	11 6 a.m.	1·0	62·3	13 42 1	9·07695
	,,	11 29 a.m.	1·3	62·8	6 11 34	9·07658
August ...	13th	0 5 p.m.	1·0	72·4	13 45 1	9·07926
	,,	0 25 p.m.	1·3	73·7	6 11 52	9·07762
September.	28th	8 51 a.m.	1·0	57·6	13 43 47	9·07754
	,,	9 14 a.m.	1·3	58·1	6 12 30	9·07719
October ...	20th	0 18 p.m.	1·0	53·2	13 42 23	9·07651
	,,	0 38 p.m.	1·3	53·6	6 11 38	9·07588
November.	22nd	11 27 a.m.	1·0	42·3	13 41 47	9·07547
	,,	11 49 a.m.	1·3	42·6	6 12 25	9·07605
December.	23rd	0 59 p.m.	1·0	50·2	13 41 40	9·07593
	,,	1 19 p.m.	1·3	50·3	6 11 25	9·07540

m represents the Magnetic moment of the Deflecting Magnet.
X represents the Earth's Horizontal Magnetic Intensity.

VIBRATION OBSERVATIONS FOR ABSOLUTE MEASURE OF HORIZONTAL FORCE.

Month.	G. M. T.	Temperature.	Time of one vibration.	Log m X	Value of m.
	D. H. M.	°			
January ...	21st... 8 56 a.m.	33·9	5·68092	0·20577	0·43804
February...	24th...11 18 a.m.	40·6	5·68502	0·20550	0·43823
March	19th...11 25 a.m.	47·0	5·68612	0·20578	0·43817
April	27th...11 9 a.m.	50·3	5·69477	0·20465	0·43744
May.....	24th... 9 55 a.m.	51·7	5·69026	0·20557	0·43778
June	26th...10 43 a.m.	53·9	5·68994	0·20540	0·43793
July.....	29th...10 19 a.m.	61·0	5·70000	0·20419	0·43700
August ...	13th...11 14 a.m.	70·6	5·70500	0·20406	0·43778
September.	27th...11 42 a.m.	60·7	5·69510	0·20477	0·43759
October ...	20th...10 50 a.m.	47·8	5·69479	0·20455	0·43690
November.	22nd... 9 48 a.m.	47·5	5·68942	0·20544	0·43712
December.	23rd... 0 17 p.m.	49·4	5·69508	0·20469	0·43670

Dip Observations.				Magnetic Intensity.		
Month.	G. M. T.	Needle.	Dip.	X, or Horizontal Force.	Y, or Vertical Force.	Total Force.
	D. H. M.		° ′ ″			
January ...	22nd..10 59 a.m.	1	69 18 51	3·6667	9·7124	10·3815
	,, ...11 38 a.m.	3	69 19 15			
February .	27th...11 32 a.m.	1	69 21 2	3·6627	9·7114	10·3790
	,, ... 0 2 p.m.	3	69 19 15			
March ...	20th...11 10 a.m.	1	69 19 14	3·6657	9·7006	10·3700
	,, ...11 40 a.m.	3	69 16 45			
April	28th...10 32 a.m.	1	69 18 0	3·6621	9·6935	10·3621
	,, ...11 15 a.m.	3	69 18 27			
May	25th...11 42 a.m.	1	69 20 19	3·6671	9·7066	10·3762
	,, ... 0 5 p.m.	3	69 16 10			
June	27th...10 50 a.m.	1	69 14 20	3·6644	9·6700	10·3410
	,, ...11 23 a.m.	3	69 15 10			
July	30th...11 0 a.m.	1	69 12 51	3·6620	9·6714	10·3414
	,, ... 0 13 p.m.	3	69 18 30			
August ...	11th...11 50 a.m.	3	69 11 10	3·6544	9·6672	10·3348
	16th...10 28 a.m.	1	69 23 56			
September	29th... 0 7 p.m.	1	69 15 21	3·6619	9·6859	10·3549
	,, ... 0 40 p.m.	3	69 19 26			
October...	23rd...11 17 a.m.	1	69 16 5	3·6660	9·6763	10·3424
	,, ...11 40 a.m.	3	69 14 0			
November	23rd...11 30 a.m.	1	69 16 5	3·6716	9·6954	10·3673
	,, ... 0 5 p.m.	3	69 15 0			
December	24th...10 45 a.m.	1	69 19 45	3·6687	9·7044	10·3985
	,, ...11 50 a.m.	3	69 15 10			
	Means		69 17 16	3·6644	9·6913	10·3624

DECLINATION OBSERVATIONS.

Month.	G. M T.	Uncorrected. Observation.	Uncorrected. Monthly Mean.	Corrected. Observation.	Corrected. Monthly Mean.
	D. H. M.	° ′ ″	° ′ ″	° ′ ″	° ′ ″
January ...	5th... 8 58 a.m.	20 17 32		20 18 24	
	12th... 8 54	18 55		20 4	
	20th... 9 4	17 46		18 20	
	26th... 8 59	16 45	20 17 45	19 3	20 18 53
February..	3rd .. 9 6	18 29		17 21	
	9th... 8 49	21 48		22 0	
	16th... 9 4	21 54		23 37	
	23rd... 9 3	21 17	20 20 53	23 17	20 21 34
March ...	1st... 9 6	15 42		17 8	
	8th... 9 0	17 17		20 43	
	16th... 9 2	13 32		18 23	
	22nd .. 9 8	16 6		19 55	
	31st... 8 56	17 1	20 15 56	20 44	20 19 23
April	6th... 8 57	11 22		14 13	
	12th... 9 4	13 32		19 6	
	20th... 8 55	17 39		20 31	
	26th... 9 5	16 32	20 14 46	19 24	20 18 19
May	3rd... 9 3	12 22		13 14	
	11th... 8 51	19 32		17 49	
	17th... 8 59	13 59		17 0	
	24th... 8 51	18 17	20 16 3	(18 17)	20 16 33
June	1st... 9 6	17 52		19 35	
	7th... 9 0	19 29		21 21	
	15th... 9 5	17 17		22 1	
	21st... 8 59	15 7		17 59	
	28th... 8 52	13 27	20 16 26	15 45	20 19 20

DECLINATION OBSERVATIONS (*Continued*).

Month.	G. M. T.	Uncorrected. Observation.	Uncorrected. Monthly Mean.	Corrected. Observation.	Corrected. Monthly Mean.
	D. H. M.	° ′ ″	° ′ ″	° ′ ″	° ′ ″
July	5th... 9 6 a.m.	20 19 5		20 19 5	
	12th... 9 1	10 31		14 49	
	21st... 9 0	10 48		13 23	
	28th... 9 5	7 50	20 12 4	10 42	20 14 30
August ...	9th... 9 10	21 44		23 45	
	16th... 9 9	8 50		11 8	
	23rd... 9 7	9 32		14 7	
	30th... 9 4	16 32	20 14 10	19 41	20 17 10
September	7th... 9 9	18 43		20 4	
	13th... 9 1	14 11		20 47	
	27th... 8 59	14 13	20 15 42	14 13	20 18 21
October ...	4th... 9 15	19 49		19 49	
	11th... 9 0	18 43		20 9	
	26th... 9 3	12 34	20 17 2	15 2	20 18 20
November	1st... 9 14	16 36		18 27	
	8th... 9 1	12 48		13 57	
	17th... 9 4	18 21		20 38	
	22nd.. 9 0	14 29	20 15 34	16 12	20 17 19
December .	1st... 9 4	14 54		(14 54)	
	7th... 9 5	12 6		14 7	
	13th... 9 3	10 42		11 9	
	20th... 8 54	15 54		15 3	
	28th... 9 4	14 10	20 13 29	15 28	20 14 8
Yearly mean			20 15 54		20 17 39

MAGNETIC DISTURBANCES.

JANUARY.—The year commenced with a quiet month. No disturbance worthy of record occurred before 5 p.m. on the 7th; and from 10 p.m. on that day the Declination magnet varied little from its mean position until the 23rd, when a rather rapid Easterly movement of the needle took place at 8 p.m., which was, however, of no very great extent. The irregularity at 5 p.m. on the 7th was reproduced at 6.50 p.m. on the 8th, and at 8.55 p.m. on the 9th. The Horizontal Force decreased slightly at 5 p.m. on the 7th, and increased at 9 p.m., whilst the Vertical Force was greatest at about 6 p.m.

FEBRUARY.—On the 6th, 8th, and 11th, slightly perturbations were registered towards evening, but the normal state was regained in a few hours. The next disturbed period occurred about midnight of the 22nd, but without any great departure from the mean.

MARCH.—During the evening of the 2nd the Declination magnet was considerably disturbed, and the other magnets only slightly. The range was large during the afternoon of the 7th. From 9.40 p.m. on the 13th until 8 o'clock the next morning the needle remained constantly East of its mean position.

The first magnetic storm of the year commenced about noon on the 17th, but there was no very rapid movement before 5.20 p.m., when the magnet moved Eastward through 42′ 17″ in 30 minutes. The most marked features of the storm were grouped into the seven hours preceding midnight. The Horizontal Force magnet was very irregular in its movements during this storm, but it never departed much from its mean value. The Vertical Force magnet, on the contrary, increased rapidly from 5 p.m., and attained a high maximum at 5.45: the minimum, which was less remarkable, was reached only at 4 a.m. on the following day.

During the remainder of the month there were occasional departures from the mean, but none of any moment. The most exceptional time

during the latter portion of the month was from the evening of the 26th to the morning of the 28th, during which time the magnet was seldom at rest.

APRIL.—The early hours of the 2nd were rather unsteady, but the first half of the month was remarkably free from all disturbing influence, the exaggerated daily range of this season becoming thus more strongly marked than usual. There was some irregular motion on the 16th and 19th, and the disturbance amounted almost to a storm between 8 p.m. on the 21st and 8 a.m. on the 22nd. The whole of the afternoon of the 28th was again stormy, and the magnet remained unsteady until 10 a.m. on the 29th. During this interval the Vertical Force increased gradually, attaining its maximum at 7.50 p.m. on the 28th, and then returning quietly to its mean value.

MAY.—The month began with a tremulous movement shortly before 6 a.m. on the 1st, and the needle was much disturbed until noon of the 3rd. The oscillation of the Declination magnet was most rapid between midnight and 1.15 a.m. on the 2nd, but the irregularities were most frequent from 4 p.m. to 11 o'clock on the same day. The chief perturbation of the Horizontal Force magnet happened somewhat earlier than that of the Declination. The Vertical Force curve indicated twice a very strong action of the disturbing force, the first culminating in a minimum at 1 a.m. on the 2nd, and the other producing a maximum at 5.5 p.m. the same day. These were the most remarkable deviations of the V.F. magnet from its mean position since the beginning of the year. The Declination magnet was disturbed again at 3 p.m. on the 14th, and the disturbance lasted 29 hours. At 3 a.m. on the 26th the irregular movements began anew and continued uninterruptedly until the close of the month, but no very rapid or extensive oscillations were recorded on either the Declination or Horizontal Force curves. The Vertical Force magnet shows three very decided minima at about 2 a.m. on the 27th, 28th, and 29th.

JUNE.—The magnets were very quiet until 10 p.m. on the 14th, but the next four days were rather unsteady. The 23rd was the next abnormal day, the Easterly movements, which commenced at 5.50 p.m. and at 9.25, being rather rapid. A considerable increase of the Vertical Force was recorded the same afternoon, the maximum occurring at 6.32.

JULY.—With the exception of a slight increase of the Vertical Force on the evening of the 2nd, and some irregularities on the morning of the 6th, the magnet was very steady until 9.25 p.m. on the 12th. Then followed two days of ordinary perturbations, and the nights of the 18th, 19th, and 21st were similarly disturbed. From this date to the end of the month the Declination needle remained fairly quiet, but during this month the Vertical Force was in general less regular than usual.

AUGUST.—During the first nine days of the month the magnet was seldom at rest, especially in the early hours of the morning. The Vertical Force magnet showed an increase of force on the afternoon of the 5th, and a decrease about midnight on the 6th.

At 10.20 a.m. on the 11th, the great storm began with a tremulous movement of the Declination needle, accompanied by a gradual tendency towards the West. The most rapid movement on this afternoon was an increase of 34′ 23″ in the W. Declination between 8.45 and 9.5. At the same time the Horizontal Force magnet was much disturbed, and remained in an unquiet state during the whole of the afternoon of the 11th. The Vertical Force was at first increased, reaching its maximum a few minutes before 7 p.m., and then diminishing, with a slight interruption and a secondary minimum at 9.15, until 11.30 when the ordinate of the curve was 1·1 inch below the reading at 7 p.m. Shortly after midnight the normal position was again regained. There was a lull in the storm in the early hours of the 12th, but this was only a prelude to greater violence. At 2.30 a.m. the Declination magnet again began its tremulous motion, but the storm was at its height only from noon of the 12th until 6 a.m. on the 13th. From noon until 4 p.m. the magnets were vibrating most violently, and the Horizontal Force increased considerably, the absolute maximum occurring shortly before 4 p.m. This increase was not steady, but accompanied by very rapid oscillations. The Vertical Force magnet travelled very much, and at the same time showed an increased force from noon to 0.36 p.m., and then a decrease for an hour. This was followed by a quick rise until the V.F. attained its maximum at 4 p.m. Between 7.10 and 7.25 the North end of the needle moved 58′ 44″ towards the East, and then returned with a double sweep Westward, the reading at 8.14 being 1° 26′ 5″ higher than at 7.25. From 10 p.m. to 3 a.m. on the 13th the Vertical Force was on three separate occasions too much below the mean to be recorded on the photographic

sheet, and the motion was most rapid between 10 p.m. and midnight. The variation of the V.F. actually recorded was represented by an ordinate more than 4·7 inches in length. The changes on all the Curves during the evening of the 13th and the early morning of the 14th were very similar to those of the preceding day, and occurred almost at the same hours, but were generally not so extensive. 5 a.m. on the 14th was the middle of the last important movement on all the Curves. This was the most violent magnetic storm recorded at this Observatory since the year 1868.

On the evening of the 14th, and the early morning of the 15th, and throughout the 16th, the needle was unsteady. On the 19th the disturbance was very considerable, having commenced at about 5.15 a.m. It was well marked on all the Curves, and during the afternoon both of the Components of the magnetic force were much increased, and the Declination needle was generally to the Westward of its normal position. On the previous evening there had been strong indications of a coming storm. At 6 a.m. on the 26th another slight perturbation began, and lasted until noon of the 27th. The month closed with a disturbance commencing at about 9.20 p.m.

SEPTEMBER.—The disturbance of August 31st lasted until the afternoon of September 1st, and then the magnets remained very steady until 0.30 on the morning of the 15th, when a considerable perturbation began. At 4 p.m. the Declination swept over an arc of more than 40′ in 12 minutes, the Horizontal Force was very irregular and the Vertical Force ordinate varied 1·4 inches, the maximum being at 4.8 p.m., and the minimum at 2.37 the following morning. A few irregularities of some extent occurred between 9 p.m. of the 21st and midnight of the 22nd, and the afternoon of the 27th was stormy, but the Components of the magnetic intensity showed greater inequalities on the following morning.

OCTOBER.—There was some unsteadiness in the magnet on the morning of the 13th, and the afternoon of the 15th, and during the night of the 16th. From 6 p.m. until midnight of the 22nd the Declination was considerably below the mean, and at about 11 a.m. on the 23rd a disturbance began which lasted for 24 hours. This was followed by a day of rest, and then the disturbing forces were again at work, and the magnet oscillated almost continuously for about four days. Some 8 minutes after midnight on the 31st a slight storm began, but the needle was almost at

rest at 4 p.m. The Horizontal Component of the intensity was rather more affected than the Vertical Component.

NOVEMBER.—The second most important storm of the year commenced at 10 p.m. on the 2nd, but the most rapid oscillations occurred only from 4.52 p.m. on the 3rd to 2 a.m. on the 4th. At 6.20 p.m. on the 3rd an increase of 37′ 15″ took place in 5 minutes. The Vertical Component of the force was much more disturbed than the Horizontal; a most decided maximum of the former was recorded at 5.40 p.m., and the lowest readings followed at 9.48 and 11.22 on the 3rd.

A quick Easterly movement was observed at 9.27 p.m. on the 9th, and there were some irregular oscillations between 9.17 p.m. and midnight of the 18th, but the magnet was generally quiet until the morning of the 20th. Throughout the whole of the 20th and 21st the needle was never quiet, but there was no excursion of any great extent. The movements of the three magnets were very similar on the afternoons of the two days. The afternoon of the 27th and the morning of the 28th were also disturbed, the Vertical Force being much increased on the 27th. The month ended during an unquiet period, and the Vertical Force again rose above its normal value.

DECEMBER.—The magnet remained rather unsteady until the morning of the 2nd. From noon on the 2nd it was very quiet for 24 hours, but afterwards no day was free from irregularities until the 15th. Between 4 p.m. and 4.18 on the 19th there was a sudden decrease of 24′ 21″ in the W. Declination. Throughout the 29th the magnet was a great deal disturbed, but the end of the year was very quiet. During December the irregularities of the Vertical Force consisted almost entirely in tendencies to rise for a short time above the normal value.

DAILY RANGE OF THE HORIZONTAL COMPONENT OF THE EARTH'S MAGNETIC INTENSITY FROM 1868 TO 1879.

In the Report for last year a description was given of the self-recording magnetographs, followed by a discussion of the Declination curves from 1868 to 1879. The Horizontal Force magnetograms have been reduced this year, and the results are contained in the following tables. The method adopted in the reduction is similar to that for the Declination. From about 100,000 hourly measures of the photographic curves, the disturbed days, and readings differing 0·12 from the hourly mean, have first been eliminated, and then the differences of the hourly means from the monthly mean tabulated for each month. The means of the values thus obtained are given in the annexed tables, according to years and months, and these are graphically represented in plates 1 and 2.

The general character of the yearly curves differs very litttle from that of the Declination magnetograms, there being only one inflexion in the daily curve, and the annual results presenting only slight irregularities from year to year. The H.F. curves indicate as clearly as those of the Declination the undisturbed condition of the night hours, and that this is not due to greater equality of temperature during the night than during the day, is clearly shown by the constant temperature of the subterranean magnetic chamber throughout the twenty-four hours. The hours of maximum and minimum occur respectively at 7 p.m. and 10 a.m.

If we compare each yearly curve with the mean of the whole period, we perceive a marked change at the date 1873, 4. Previous to this epoch the curves were more developed than the mean, the maximum being higher and the mininum lower. These were followed by the values of 1873 and 1874, which alter the mean only slightly, and then came five years in which the curves were less open, both maxima and minima being less exaggerated. The years 1868 and 1869 represent a stage intermediate between 1870—3 and the mean, and are therefore represented by a curve apart in the third plate. The cycle of changes indicated in these results is probably considerably in excess of the period which these observations embrace.

The annual change in the daily range of the Horizontal Force is more clearly marked than the secular variation, but it is somewhat less regular than in the case of the Declination. The range in the winter is small, and large in the summer, and no month coincides at all closely with the mean for the year. March and October approach a little nearer the mean than the other months, but even these are both decidedly of the winter type. The semi-annual inequality is graphically shown in plate 4.

Table III. would be incomplete without a special notice of the winter curves, which present more than one inflexion. Besides the principal times given in the table, the curve for January passes through its mean value at 3h. 26m. a.m. and at 9h. 40m. p.m. In February it remains near the mean from 2h. to 3h. am.; and in December it not only remains at the mean from 3h. to 4h. a.m., but again passes through it at 8h. 12m. p.m.

The figures in the tables give the differences of ordinates, but the value in British units may be deduced, if necessary, from the value of the coefficient, which is 0·031747 for an inch of the ordinate for the twelve years over which the observations extend.

TABLE I.—YEARLY MEANS OF THE DAILY RANGE OF THE H.F. MAGNET

(GIVEN IN THOUSANDTHS OF AN INCH).

	1	2	3	4	5	6	7	8	9	10	11	Noon.	
1868	+ 5	+ 3	+ 1	+ 7	+ 1	+ 4	− 6	− 18	− 33	− 56	− 54	− 34	
1869	+ 8	+ 5	+ 1	+ 3	+ 8	+ 3	− 9	− 24	− 49	− 55	− 57	− 40	
1870	+ 19	+ 13	+ 12	+ 12	+ 13	+ 4	− 4	− 22	− 47	− 67	− 67	− 55	
1871	+ 14	+ 10	+ 10	+ 9	+ 12	+ 3	− 7	− 22	− 50	− 73	− 68	− 54	
1872	+ 12	+ 11	+ 11	+ 6	+ 6	+ 2	− 10	− 23	− 47	− 67	− 58	− 41	
1873	+ 7	+ 2	+ 3	+ 1	+ 2	0	− 6	− 19	− 39	− 54	− 48	− 35	
1874	+ 7	+ 5	+ 4	+ 4	+ 7	+ 3	− 4	− 15	− 34	− 51	− 44	− 31	
1875	+ 7	+ 4	+ 4	+ 2	+ 5	+ 1	− 3	− 11	− 25	− 42	− 34	− 24	
1876	+ 5	+ 3	+ 2	+ 3	+ 4	+ 2	− 2	− 11	− 23	− 33	− 26	− 20	
1877	+ 5	+ 3	+ 2	+ 1	+ 2	+ 1	− 6	− 12	− 25	− 36	− 29	− 19	
1878	+ 5	+ 4	+ 4	+ 2	+ 5	+ 3	0	− 9	− 19	− 28	− 26	− 16	
1879	+ 6	+ 4	+ 4	+ 2	+ 3	0	− 7	− 13	− 24	− 32	− 29	− 18	

TABLE I. (*continued*).—YEARLY MEANS OF THE DAILY RANGE OF THE H.F. MAGNET (GIVEN IN THOUSANDTHS OF AN INCH).

	1	2	3	4	5	6	7	8	9	10	11	Midn.	Range.
1868	− 20	− 3	+ 7	+ 25	+ 31	+ 35	+ 32	+ 34	+ 32	+ 13	+ 8	+ 14	91
1869	− 26	− 1	+ 7	+ 20	+ 36	+ 41	+ 41	+ 30	+ 24	+ 17	+ 14	+ 10	98
1870	− 32	− 10	+ 6	+ 19	+ 29	+ 43	+ 46	+ 44	+ 26	+ 22	+ 15	+ 4	113
1871	− 32	− 11	+ 5	+ 14	+ 26	+ 26	+ 39	+ 33	+ 33	+ 26	+ 21	+ 13	112
1872	− 30	− 5	+ 11	+ 23	+ 30	+ 35	+ 36	+ 32	+ 27	+ 20	+ 14	+ 9	103
1873	− 18	− 3	+ 6	+ 19	+ 25	+ 33	+ 29	+ 30	+ 21	+ 13	+ 12	+ 8	87
1874	− 15	+ 2	+ 8	+ 12	+ 20	+ 25	+ 24	+ 21	+ 17	+ 14	+ 11	+ 10	76
1875	− 9	+ 1	+ 6	+ 8	+ 12	+ 15	+ 18	+ 15	+ 13	+ 11	+ 9	+ 9	60
1876	− 7	+ 2	+ 5	+ 8	+ 10	+ 14	+ 16	+ 15	+ 13	+ 9	+ 7	+ 6	49
1877	− 8	+ 2	+ 9	+ 11	+ 14	+ 16	+ 17	+ 16	+ 12	+ 10	+ 8	+ 6	53
1878	− 4	+ 3	+ 6	+ 7	+ 8	+ 8	+ 12	+ 10	+ 9	+ 7	+ 8	+ 5	40
1879	− 5	+ 3	+ 8	+ 8	+ 12	+ 14	+ 13	+ 13	+ 11	+ 8	+ 9	+ 5	46

TABLE II.—MONTHLY MEANS OF THE DAILY RANGE OF THE H.F. MAGNET

(GIVEN IN THOUSANDTHS OF AN INCH).

	1	2	3	4	5	6	7	8	9	10	11	Noon.
January	− 3	− 3	− 3	+ 1	+ 7	+ 9	+ 11	+ 8	− 4	− 14	− 15	− 13
Feby.	+ 2	0	0	+ 3	+ 7	+ 10	+ 11	+ 6	+ 10	− 25	− 29	− 21
March	+ 11	+ 7	+ 3	+ 4	+ 9	+ 8	+ 6	− 3	− 28	− 49	− 49	− 37
April	+ 14	+ 13	+ 9	+ 5	+ 5	+ 5	− 5	− 22	− 51	− 79	− 71	− 55
May	+ 12	+ 10	+ 3	0	− 4	− 12	− 26	− 42	− 55	− 69	− 57	− 41
June	+ 10	+ 8	+ 6	+ 2	− 3	− 15	− 30	− 46	− 61	− 71	− 51	− 37
July	+ 10	+ 6	+ 3	+ 4	− 2	− 15	− 27	− 35	− 60	− 69	− 69	− 49
August	+ 22	+ 16	+ 11	+ 8	+ 7	+ 6	− 19	− 38	− 55	− 67	− 51	− 37
Septem.	+ 15	+ 14	+ 12	+ 10	+ 12	+ 6	− 5	− 27	− 49	− 61	− 57	− 41
October	+ 11	+ 8	+ 8	+ 7	+ 9	+ 13	+ 4	− 7	− 26	− 44	− 47	− 31
Novem.	+ 2	+ 2	+ 5	+ 7	+ 12	+ 14	+ 10	+ 1	− 14	− 31	− 32	− 21
Decem.	− 4	− 3	0	0	+ 6	+ 10	+ 8	+ 6	− 1	− 13	− 12	− 6
Means	+ 9	+ 7	+ 5	+ 4	+ 5	+ 3	− 5	− 17	− 33	− 49	− 45	− 32

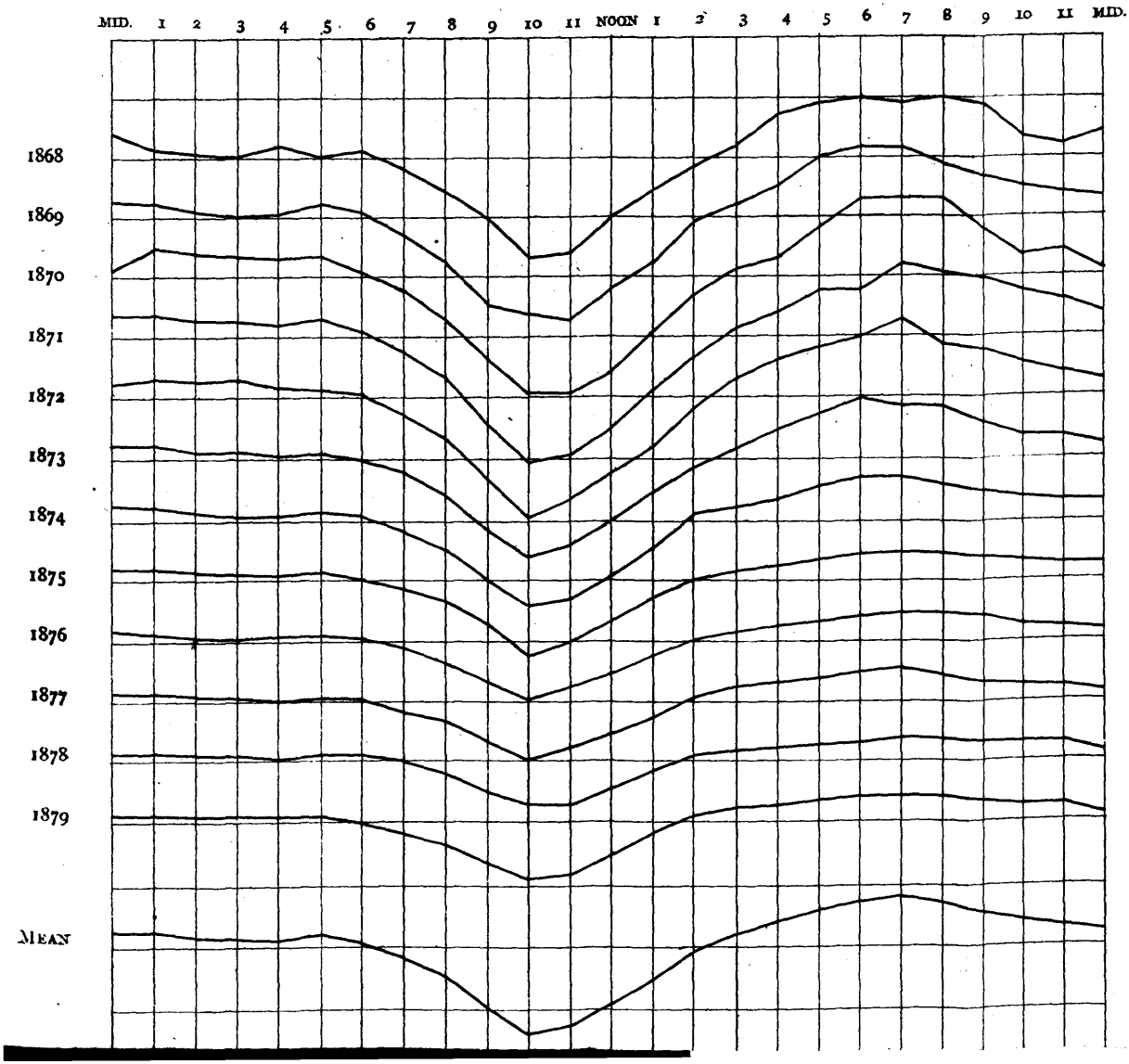
TABLE II. (*continued*).—MONTHLY MEANS OF THE DAILY RANGE OF THE H.F. MAGNET (GIVEN IN THOUSANDTHS OF AN INCH).

	1	2	3	4	5	6	7	8	9	10	11	Midn.	Range.
January	− 6	− 2	+ 7	+ 4	+ 8	+ 7	+ 5	+ 2	+ 1	− 1	− 4	− 3	26
Feby.	− 14	− 9	+ 3	+ 5	+ 6	+ 9	+ 10	+ 8	+ 6	+ 4	+ 4	+ 2	40
March	− 22	− 7	+ 8	+ 10	+ 13	+ 19	+ 18	+ 19	+ 14	+ 14	+ 14	+ 10	68
April	− 36	− 5	+ 10	+ 25	+ 36	+ 45	+ 40	+ 30	+ 28	+ 18	+ 19	+ 17	124
May	− 18	− 4	+ 13	+ 23	+ 42	+ 50	+ 53	+ 40	+ 36	+ 23	+ 18	+ 14	122
June	− 21	− 4	+ 9	+ 27	+ 39	+ 55	+ 58	+ 46	+ 36	+ 27	+ 19	+ 17	129
July	− 25	− 1	+ 18	+ 31	+ 47	+ 48	+ 48	+ 48	+ 39	+ 27	+ 18	+ 9	117
August	− 17	− 3	+ 13	+ 22	+ 28	+ 33	+ 37	+ 39	+ 31	+ 26	+ 22	+ 17	106
Septem.	− 18	+ 1	+ 6	+ 15	+ 19	+ 20	+ 26	+ 27	+ 22	+ 18	+ 18	+ 13	88
October	− 16	− 4	− 4	+ 5	− 5	+ 16	+ 12	+ 17	+ 19	+ 13	+ 16	+ 8	66
Novem.	− 10	− 1	+ 1	+ 2	+ 4	+ 7	+ 10	+ 14	+ 6	+ 3	+ 2	0	46
Decem.	− 1	+ 2	+ 4	+ 4	+ 4	+ 3	+ 4	+ 2	− 2	− 3	− 3	− 5	23
Means	− 17	− 3	+ 7	+ 14	+ 21	+ 26	+ 27	+ 24	+ 20	+ 14	+ 12	+ 8	

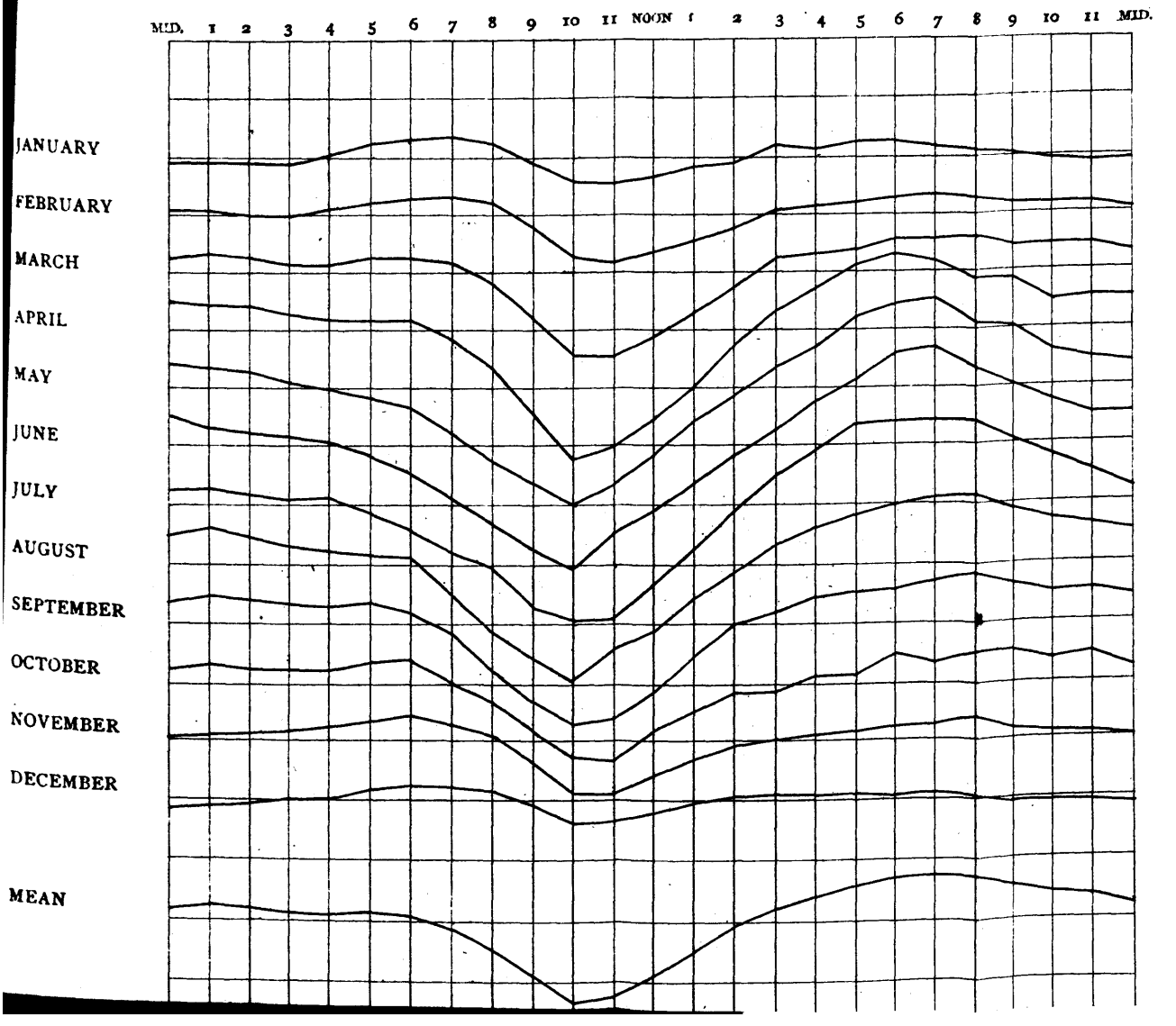
TABLE III.—MONTHLY MAXIMA AND MINIMA.

	Greatest Daily Range.	Least Daily Range.	L.M.T. of Mean Position. a.m.	p.m.
January	53 in 1871	8 in 1876	8 50	2 12
February	71 ,, 1871	20 ,, 1878	8 36	2 42
March	126 ,, 1870	25 ,, 1878	7 33	2 24
April	193 ,, 1871	65 ,, 1878	6 48	2 18
May	188 ,, 1870	63 ,, 1878	4 0	2 12
June	204 ,, 1870	76 ,, 1878	4 28	2 18
July	186 ,, 1870	66 ,, 1878	4 42	2 5
August	189 ,, 1871	60 ,, 1878	6 10	2 12
September	162 ,, 1870	56 ,, 1878	6 42	1 58
October	115 ,, 1870	39 ,, 1878	7 10	3 18
November	162 ,, 1870	22 ,, 1878	8 12	2 26
December	61 ,, 1870	16 ,, 1878	8 56	1 15

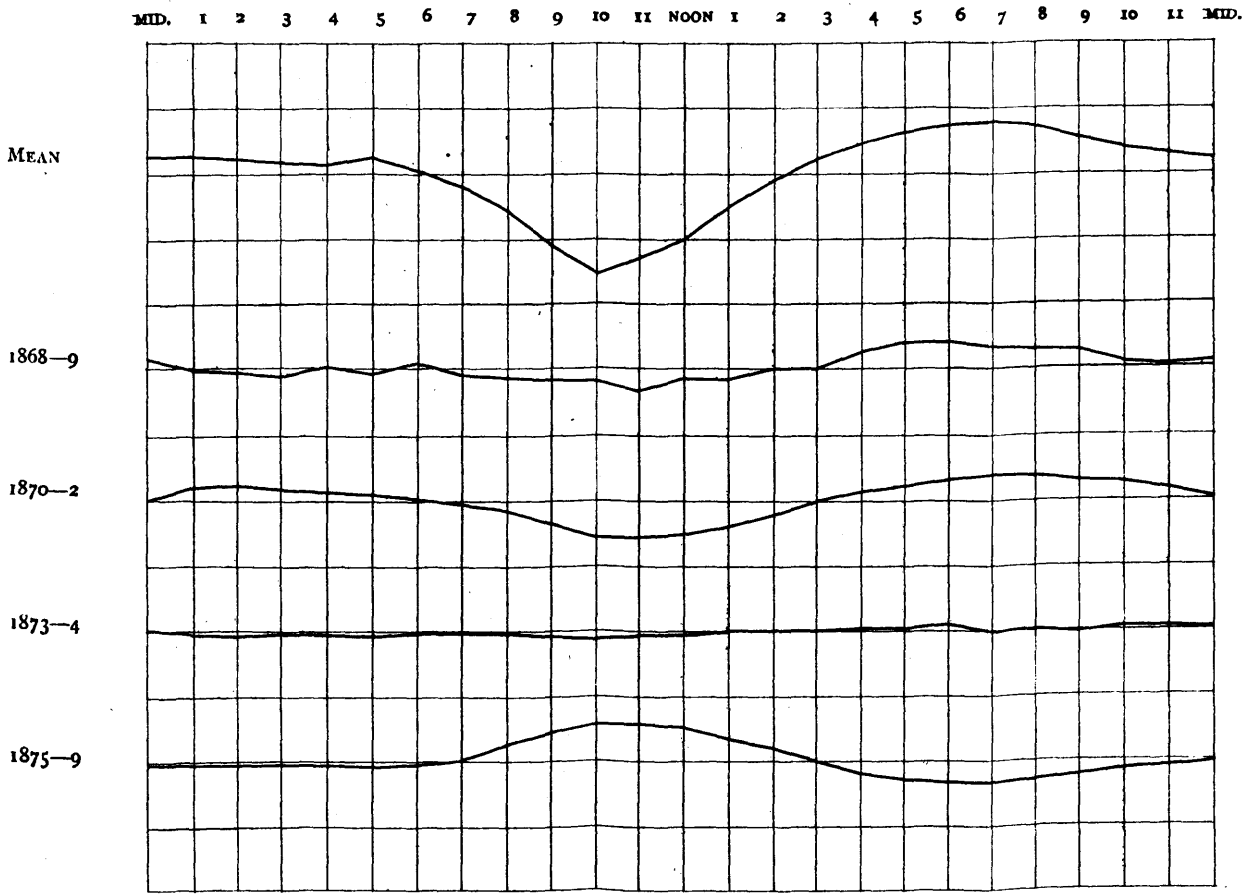
MEAN DAILY RANGE OF THE H.F. MAGNET AT STONYHURST (1868—1879).



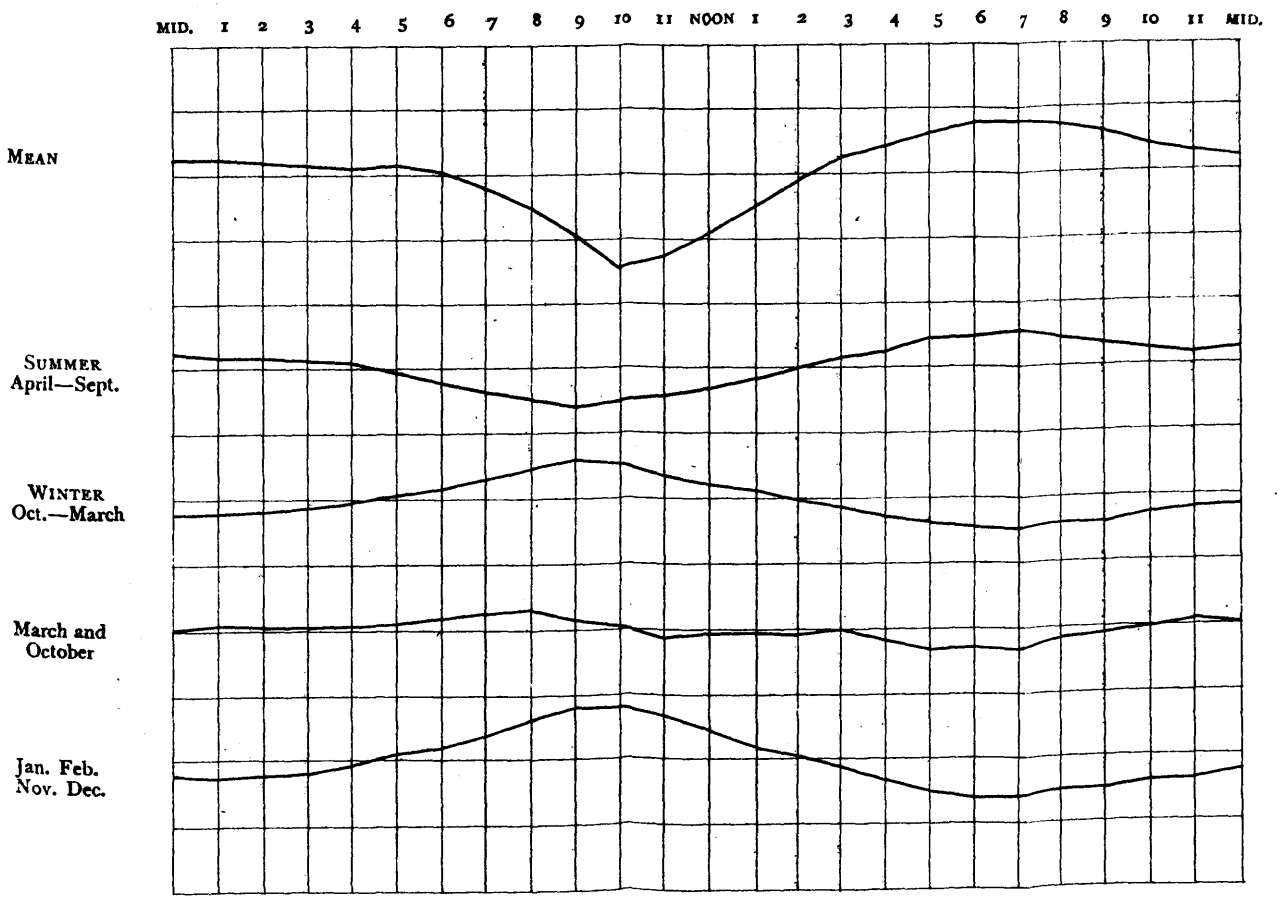
MEAN DAILY RANGE OF THE H.F. MAGNET AT STONYHURST (1868—1879).



SECULAR INEQUALITY OF THE DAILY RANGE OF THE H.F. MAGNET.



SEMI-ANNUAL INEQUALITY OF THE DAILY RANGE OF THE H.F. MAGNET.



PRESENTS RECEIVED.

Greenwich Observations, 1877, 1878. . .	*from* The Royal Observatory.
Report of the Astronomer Royal to the Board of Visitors of the Royal Observatory, Greenwich, 1880	,, ,,
Greenwich Spectroscopic and Photographic Results	,, ,,
Extracts from the Introduction to the Greenwich Astronomical Observations, 1878-9 .	,, ,,
Results of Astronomical Observations, Cape of Good Hope, 1876	,, ,
Quarterly Returns of the Registrar General .	Registrar General.
Report of the Meteorological Council to the Royal Society, 1879	Meteorological Office.
Daily Weather Reports	,, ,,
State of Weather and Forecasts . . .	,, ,,
Weekly Weather Report	,
Hourly Readings of the Instruments of the Meteorological Committee	, ,,
Quarterly Summary of Rainfall and Temperature in the British Islands	, ,,
Report on the Meteorology of Kerguelen Island, by S. J. Perry	,
Contributions to our Knowledge of the Meteorology of the Arctic Regions. Part 2. .	, ,,
Meteorological Observations at Stations of the Second Order, 1878	,, ,,
Description of the Card Supporter for Sunshine Recorders, by G. G. Stokes	, ,,
Aids to the Study and Forecast of Weather, by W. C. Ley	,, ,
Results of Astronomical Observations made at the Radcliffe Observatory, Oxford, 1876 .	Radcliffe Trustees.
Proceedings of the Royal Society . . .	Royal Society.
Monthly Notices of the Royal Astronomical Society	Astronomica Society.

Memoirs of the Royal Astronomical Society, vol. 41, 45	*from* Astronomical Society.
Report of the British Association, Swansea, 1879	British Association.
Report of the Kew Committee, 1879, 1880 .	Kew Observatory.
Journal and Transactions of the Photographic Society of Great Britain, iv. 4.	
Journal of the Scottish Meteorological Society .	Scottish Met. Society.
Daily Bulletin of Weather Reports . . .	U.S. War Department.
Bulletin of International Meteorological Observations, Washington	Chief Signal Office.
Monthly Weather Review, War Department U.S. Chief Signal Office	. ,, ,,
Reports on Telescopic Observations of the Transit of Mercury, 1878	U.S. Naval Observatory.
A Subject-index to the Publication of the U.S. Naval Observatory, 1845—75, by E. S. Holden	,, ,,
Astronomical Papers for the use of the American Ephemeris and Nautical Almanac, vol. 1, p. 2. Transformation of Hansen's Lunar Theory by S. Newcomb	U.S. Bureau of Navigation.
Catalogue of the Mean Declination of 2018 Stars, by T. H. Safford, under the direction of Captain G. M. Wheeler	U.S. Engineer Office.
Smithsonian Report for 1878	Smithsonian Institution.
Meteorological Service, Dominion of Canada, Monthly Weather Review	Met. Office, Toronto.
Report of the Meteorological Service of the Dominion of Canada, by G. T. Kingston, 1878	,, ,,
New York Meteorological Observatory, Abstract of Registers from Self-recording Instruments, 1879, 1880, D. Draper . . .	The Observatory.
Report to the Trustees of the "James Lick Trust" of Observations made on Mount Hamilton, by S. W. Burnham . . .	,, ,,
Reports of the Comptroller of the Currency U.S., 1878-9	The Author.
Measures of the Polar and Equatorial Diameters of Mars made at Princeton, New Jersey, U.S., by C. A. Young	,,
The Color Correction of certain Achromatic Object-glasses, by C. A. Young . . .	,,
Notes of Experiments upon Mr. Edison's Dynamometer, Dynamo-Machine, and Lamp, by C. F. Brackett and C. A. Young . . .	,,
Solar Parallax from the Velocity of Light, by D. P. Todd	,,
Science Observer	The Editor.

Report on the Administration of the Meteorological Department in Western India, 1879-80, by F. Chambers	*from* Met. Office, Bombay.
Abnormal Variations of the Barometric Pressure in the Tropics, and their relation to Sunspots, Rainfall, and Famines, by F. Chambers	Colaba Observatory.
Brief Sketch of the Meteorology of the Bombay Presidency in 1878, by F. Chambers .	,, ,,
Meteorology of the Bombay Presidency in 1879, by F. Chambers	,, ,,
Report on the Condition and Proceedings of the Government Observatory, Colaba, 1880, by C. Chambers	,, ,,
Indian Meteorological Memoirs. The Winds of Kurrachee, by F. Chambers	Meteorological Office.
Indian Meteorological Memoirs. February and March, 1878	,, ,,
Indian Meteorological Memoirs, by H. F. Blanford, vol. 1, p. 3, 1879	,, ,,
Report on the Administration of the Meteorological Department of the Government of India in 1878-79	,, ,,
Report on the Meteorology of India in 1877, by J. Eliot	,, ,,
Report on the Madras Cyclone of May, 1877, by J. Eliot	,, ,,
Registers of Original Observations in 1879, Calcutta	,, ,,
St. Xavier's College Observatory, Calcutta. Meteorological Report, by F. Bruhl . .	The Observatory.
Monthly Record, Melbourne Observatory, 1879	H. M. Govt., Victoria.
Results of Observations in Meteorology, &c., Melbourne Observatory, 1876, by R. Ellery .	,, ,,
Results of Astronomical Observations made at the Melbourne Observatory, 1871-5, by R. L. J. Ellery	,, ,,
Longitude of the Sydney Observatory, by J. Tebbutt.	The Author.
Opposition Magnitudes of Uranus and Jupiter, by J. Tebbutt	,,
Orbit Elements of Comet I. 1880, by J. Tebbutt	,,
The Typhoon of July, 1879, by M. Dechevrens	,,
Monthly Notices, Meteorological Society, Mauritius, Sun-spots and Rainfall, by C. Meldrum	The Observatory.
Observations made at the Magnetical and Meteorological Observatory at Batavia, by Dr. P. A. Bergsma, vol. 4	,,
Improved form of Thermometer for observing Earth Temperature, by G. J. Symons . .	The Author.

On the relation existing between the duration of Sunshine, the amount of Solar Radiation, and the Temperature, by G. M. Whipple . .	*from* The Author.
On the relation existing between the height of the Barometer, the duration of Sunshine, and the amount of Cloud, by G. M. Whipple .	,,
Meteorology of Bradford for 1879, by J. M'Laudsborough	,,
The British Journal and Photographic Almanac for 1880	,,
Preliminary Report to the Committee on Solar Physics on a method of detecting the unknown inequalities of a series of observations by B. Stewart	,,
Preliminary Report to the Committee on Solar Physics on the evidence in favour of the existence of certain short periods common to solar and terrestrial phenomenon, by B. Stewart	,,
Meteor Showers, by W. F. Denning . .	,,
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On the Frost of December, 1879, by W. Marriott	,,
Returns of the Rainfall for 1879, by J. F. Bateman	,,
The Cobham Journals, by E. A. Ormerod .	,,
On Comets and Ultra-Neptunian Planets, by G. Forbes	,,
On some recent improvements made in the mountings of the Telescopes at Birr Castle, by the Earl of Rosse	,,
Quinquennial Report of proceedings in the Health Department, Burnley, by C. Slater .	,,
Symon's British Rainfall, 1879	,,
Observations of Nebulæ and Clusters of Stars made with the six-foot and three-foot Reflectors at Birr Castle, 1848—1878, by the Earl of Rosse	,,
On the Observations of Rainfall made at the Royal Observatory, Greenwich, 1841 to 1879, by W. C. Nash	,,
Results of Meteorological Observations, Vizagapatam, by A. V. Nursingrow, 1879 . .	,,

On the Photographic Spectra of Stars, by W. Huggins	*from* The Author.
On the Spectrum of the Flame of Hydrogen, by W. Huggins	,,
On the Relation between the Diurnal Range of Magnetic Declination and Horizontal Force, and the period of Solar-spot frequency, by W. Ellis	,,
Statistics of Rainfall, Lancaster, Caton, and Hest Bank, by W. Roper	,,
The Coming Drought, by E. J. Lowe . .	W. Roper.
Report on the present state of Knowledge of the application of Quadratures and interpolation to actual data, by C. W. Merrifield .	The Author.
The Attraction of Simple Gravity, by G. T. Carruthers	,,
Comparison of Curves of Declination Magnetographs, by W. G. Adams . . .	,,
Address to the Mathematical and Physical Section of the British Association, by W. G. Adams	,,
Results of an inquiry into the periodicity of Rainfall, by G. M. Whipple	,,
On the rate at which barometric changes traverse the British Isles, by G. M. Whipple	,,
Annales Météorologiques de l'Observatoire Royal de Bruxelles, 1879	L'Obs. Royal.
Observations Mét. faites aux stations internationales de la Belgique et des Pays Bas, par J. C. Houzeau et C. H. D. Buys-Ballot, 1879	,,
Annuaire de la Société Météorologique de France, 1879	La Soc. Mét.
Association Française, Compte rendu de la 8me session	Assoc. Franc.
Bulletin Mensuel de l'Observatoire Météorologique de l'Université d'Upsal, par Dr. H. H. Hildebrandsson	L'Observatoire.
Bulletin Mensuel de l'Observatoire de Zi-ka-wei, 1879	,,
Bulletin Mensuel de l'Observatoire Météorologique à Tchang-Kia-Tchouang près Hien-Hien, Province de Tchely, 1879 . . .	,,
Annales de la Société Scientifique de Bruxelles.	La Société Scientif.
Note sur la tache rouge observée sur la planète Jupiter, par L. Niestens	L'Auteur.
Conchiliologie Fluviatile, par le R. P. Heude .	,,
Note sur la formule d'Addition dans les fonctions elliptiques par Ph. Gilbert . . .	,,
Publications récentes sur Galilée, par Ph. Gilbert	,,

Le Typhon on 31 Juillet, 1879, par M. Dechevrens . . . . . *from* L'Auteur.
Sur la loi de Force de M. Clausius entre courants élémentaires, par J. Delsaulx . . . ,,
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Etudes sur la planète Mars, 12me notice, par M. F. Terby . . . . . ,,
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Notices sur le progrès de la Physique, par le R. P. Van Tricht . . . . . ,,
Recherches sur le spectre du Magnétism, par Ch. Fievez . . . . . ,,
Perturbations Magnétiques du 11 au 14, et 18 au 19 Aout 1880, par. M. Dechevrens . . ,,
Astronomie, par J. Thirion . . . . ,,
Resultate ans den Meteorologischen Beobachtungen von 25 K. Sächsischen Stationen 1874, 1875, von Dr. C. Bruhns . . . . . Der Verfasser.
Monatliche Berichte über die Resultate aus den Meteorologischen Beobachtungen angestellt an den K. Sächsischen Stationen 1878 von Dr. C. Bruhns . . . . . ,,
Resultate der Meteorologischen Beobachtungen in Leipsig 1878-9, von Prof. C. Bruhns . ,,
Bericht über das Meteorologische Bureau für Wetterprognosen in Königreich Sachsen für 1879, von Prof. Dr. C. Bruhns . . . ,,

Die organisation des meteorologischen Dienstes in den Hauptstaaten Europa's, von Dr. Gustav Hellmann	,,
Zeitschrift der österreichischen Gesellschaft für Meteorologie redigirt von Dr. J. Hann . .	*from* Der Verfasser.
Das Geburtsjahr Christi, von F. Riess . .	,,
Jahrbücher der K. K. Central-Anstalt für Meteorologie und Erdmagnetismus, 1878-9, Wien	Das Observatorium.
Publicationen des Astrophysikalischen Observatoriums zu Potsdam	,,
Der neue Kometensucher de Wiener Sternwarte, von E. Schneider	Der Verfasser.
Regenwaarnemingen in Nederlandsch-Indië, 1879, door Dr. P. Bergsma	,,
Iagttagelser over Nordlys af Sophus Tromholt .	,,
Bullettino Met. dell' Oss. del Real Coll. Carlo Alberto in Moncalieri	L'Osservatorio.
Bulletino Met. della Pontificia Università Gregoriana	,,
Richerche Fisico-Astronomiche intorno all' uranolito caduto nell' agro Romano il 31 di Augusto, 1872, del P. G. S. Ferrari . . .	,,
Observaciones Meteorologicas del Colegio Catolico del Sacrado Corazon de Jesus en Puebla, 1879	L'Observatorio.
Almanaque Nautico para 1881, 1882, Observatorio de San Fernando	,,
Crónica Científica	Roig y Torres.