



STONYHURST COLLEGE

OBSERVATORY.

RESULTS

OF

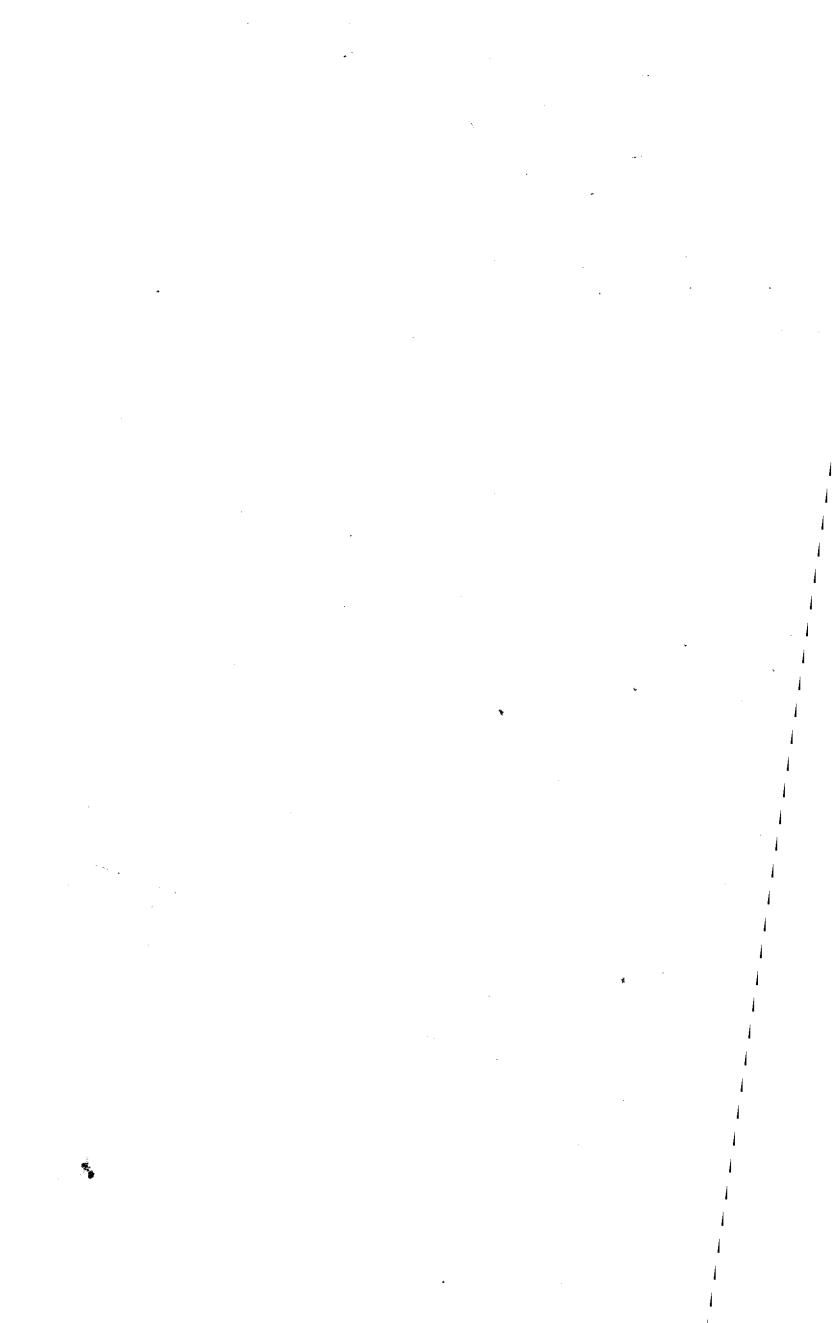
METEOROLOGICAL AND MAGNETICAL

OBSERVATIONS.

1871.

PRESTON :

J. ROBINSON, PRINTER, 17, CANNON-STREET.



No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
		0	12	3	1	4	5	2	2
Mean Velocity in miles per hour	0	6·5	11·3	11·5	22·3	9·5	12·6	5·6
Total No. of miles for each Direction	0	1861	815	277	2138	1139	603	267

The total number of miles registered during the month was 7100.

The max. Velocity was 52 miles per hour. Direction SE on the 16th, at 4 a.m.

Mean amount of Cloud, (an overcast sky being indicated by 10·0) 6·6

In the month of January, the highest reading of the Barometer during 24 years, was on the 8th, in 1859, and was 30·310

The lowest ,, ,, 15th, 1865 27·939

The highest Temperature ,, 16th, 1868 54·4

The lowest ,, ,, 13th, 1867 9·2

The highest adopted mean temperature of the month } 1869 41·3

The lowest ,, ,, 1871 39·0

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The readings of the Barometer are taken from Barrow's Standard, and have been corrected and reduced to the temperature of 32°, but not to Sea level. The max. and min. temperatures are obtained from the patent instruments of Negretti and Zambra, and the other temperatures from the hygrometer by the same Opticians. These instruments have all been compared by MR. GLAISHER with those at Greenwich. Both the direction and velocity of the wind are given by a self-registering Anemometer, by Beck. The Hygrometrical results have been calculated from Glaisher's tables, 2nd Edition.

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There were slight falls of snow on the 2nd, 3rd, 7th, 8th, 9th, 28th, 29th and 30th. Hail fell on the 7th and 8th. There was fog on the 18th. On the 9th a brilliant Meteor was seen at 10-15 p.m. It left a bright blue trail visible for 3 or 4 seconds, and appeared to be at a very low elevation. Its course was from Rigel westward to the earth.

The adopted mean temperature of the month is only slightly below that for 1850.

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
		0	4	2	2	3	12	4	1
Mean Velocity in miles per hour	0	8·0	15·3	9·9	16·3	13·8	18·3	8·9
Total No. of miles for each Direction	0	759	736	473	1177	3970	1752	214

The total number of miles registered during the month was 9081.

The max. Velocity of the wind was 45 miles per hour. Direction W on the 23rd, at 1 p.m.

Mean amount of Cloud, (an overcast sky being indicated by 10·0) 8·6

In the month of February, the highest reading of the Barometer during 24 years, was on the 11th, in 1849, and was 30·452

The lowest " " 6th, 1867 28·208

The highest Temperature " 5th, 1869 57·5

The lowest " " 17th, 1855 10·1

The highest adopted mean temperature of }
the month } 1869 44·0

The lowest " " 1855 28·6

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The readings of the Barometer are taken from Barrow's Standard, and have been corrected and reduced to the temperature of 32°, but not to Sea level. The max. and min. temperatures are obtained from the patent instruments of Negretti and Zambra, and the other temperatures from the hygrometer by the same Opticians. These instruments have all been compared by MR. GLAISHER with those at Greenwich. Both the direction and velocity of the wind are given by a self-registering Anemometer, by Beck. The Hygrometrical results have been calculated from Glaisher's tables, 2nd Edition.

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Lightning was seen on the 5th at 9 p.m. Snow fell on the 10th and 12th. There was a Solar Halo on the 13th, at 4·5 p.m.

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
	2	5	1	2	5	12	3	1
Mean Velocity in miles per hour	8·0	7·2	11·0	8·7	20·2	14·1	11·7	10
Total No. of miles for each Direction	388	865	264	416	2428	4073	842	239

The total number of miles registered during the month was 9515.

The max. Velocity of the wind was 49 miles per hour. Direction W on the 9th, at 5 a.m.

Mean amount of Cloud, (an overcast sky being indicated by 10·0) 6·5

In the month of March, the highest reading of the Barometer during 24 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 } 1871 44·0
the month

The lowest " " 1855 35·6

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The readings of the Barometer are taken from Barrow's Standard, and have been corrected and reduced to the temperature of 32°, but not to Sea level. The max. and min. temperatures are obtained from the patent instruments of Negretti and Zambra, and the other temperatures from the hygrometer by the same Opticians. These instruments have all been compared by MR. GLAISHER with those at Greenwich. Both the direction and velocity of the wind are given by a self-registering Anemometer, by Beck. The Hygrometrical results have been calculated from Glaisher's tables, 2nd Edition.

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Snow fell on the 14th, 15th, and 16th. There were slight showers of Hail on the 8th, 13th, 14th, and 15th. Thunder storms occurred on the 13th and 25th. A Lunar Halo was seen on the 1st at 7·25 p.m. There were displays of Aurora Borealis on the 10th and 16th.

On the 17th, a shock of Earthquake was felt throughout the whole country around. It was more severe than any that had been experienced for many years past in this part of England. Slight shocks appear to have been noticed here at about 6-30 and 10-30 p.m., but the greatest disturbance occurred between 11-5 and 11-10 p.m. The sound preceding the undulatory motion is described by most as resembling that of a strong wind, followed immediately by a noise like that caused by the passage of an express train over a wooden bridge. Then a very distinct rocking of the furniture, beds, and walls took place; the floors seemed to rise; and the rooms swayed backwards and forwards several times. The motion was violent enough to awaken many from their first sleep. Some thought that part of the building had fallen in, and others that something heavy had been upset in a room overhead. The rushing sound and crash was followed by a rumbling noise. The motion appeared to begin suddenly to grow stronger for a time, and then to die away. It was more regular and powerful than the shaking from a heavy waggon in the houses of an old street. The disturbance was however insufficient to produce any decided irregularity in our photographic traces of the barometer, thermometer or suspended magnets, except perhaps a very slight movement of the Declination magnet. But in any case the duration of the whole phenomenon, which must have occupied far less than half a minute, could easily have caused a slight blur in the photographic curve. Between 11-0 and 11-15 p.m. the sky which both before and after the Earthquake was completely overcast, suddenly cleared up for a very short time, and there was a decided rise of the temperature. The direction of the Earthwave was generally supposed to be from E. to W., the wind blowing at the time from W. S. W.

Stonhurst Observatory.

Lat. 53.° 50' 40" N. Long. 9^m 52^s.68. w. Height of the Barometer
above the sea, 381 ft.

METEOROLOGICAL REPORT

For April, 1871.

Results of Observations taken during the month.		Mean for the last 24 Years.
Mean Reading of the Barometer.....	29·337	29·491
Highest „ on the 7th	29·770	29·955
Lowest „ on the 19th	28·650	28·793
Range of Barometer Readings	1·120	1·162
Highest Reading of a Max. Therm. on the 29th	61·4	67·4
Lowest Reading of a Min. Therm. on the 7th	29·7	28·9
Range of Thermometer Readings	31·7	38·5
Mean of all the Highest Readings	54·2	53·9
Mean of all the Lowest.....	39·8	38·2
Mean Daily Range	14·4	15·7
Deduced Monthly Mean (from Mean of Max. { and Min.)	45·5	44·6
Mean Temperature from dry bulb.....	45·2	44·7
Adopted Mean Temperature	45·4	44·7
Mean Temperature of Evaporation.....	42·9	41·8
Mean Temperature of Dew Point.....	40·0	38·8
Mean elastic force of Vapour.....	0·248in	0·237in
Mean weight of Vapour in a cubic foot of air	2·8gr	2·7gr
Mean additional weight required for saturation ...	0·6gr	0·7gr
Mean degree of Humidity, (saturation 1·00).....	0·82	0·80
Mean weight of a cubic foot of air	538·0gr	541·8gr
Fall of Rain	3·602in	2·452in
Number of days on which Rain fell.....	24	15·0
Amount of Evaporation	1·885in	2·845in

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
		1	6	5	0	1	8	9	0
Mean Velocity in miles per hour	5·4	7·2	10·2	0	11·0	9·8	11·3	0
Total No. of miles for each Direction	130	1032	1228	0	267	1889	2441	0

The total number of miles registered during the month was 6987.

The max. Velocity of the wind was 24 miles per hour ; direction E. (on the 11th, at noon.)

Mean amount of Cloud, (an overcast sky being indicated by 10·0) 8·3

In the month of April, the highest reading of the Barometer during 24 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 " " 1841 40·8

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The rainfall exceeds by 1.15 inches the mean for April during the last 24 years, and the days on which rain fell are nine above the average. Thunder storms occurred on the 19th and 29th, and thunder was heard on the 25th. There was a slight fog on the morning of the 13th; and swallows were first seen on the same day.

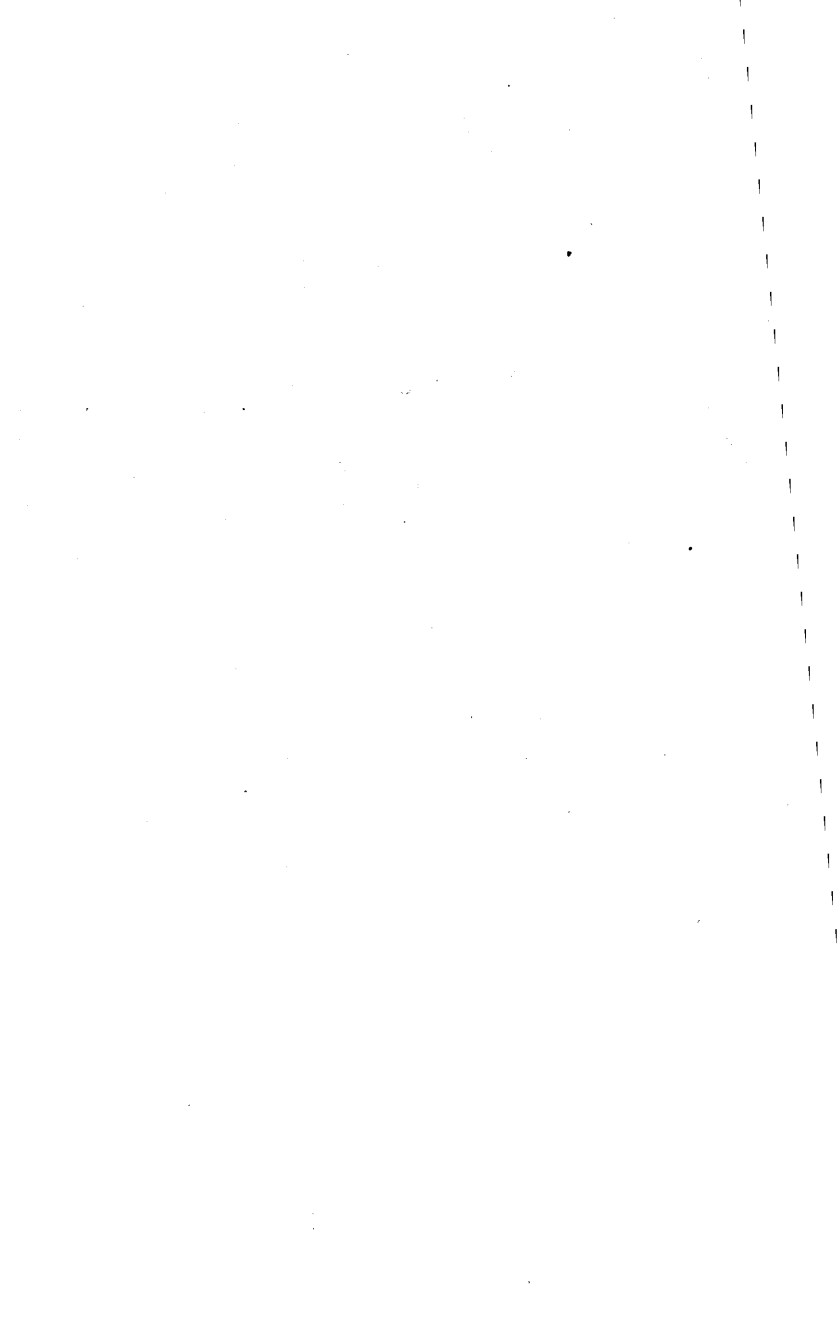
Auroras were of frequent occurrence during the month. The strong moonlight on the evening of the 1st prevented the auroral display from being seen to advantage. At 9^h 35^m p.m. a red cloud suddenly changed into a broad band stretching from horizon to zenith. Its colour was intensely red, but faint stars could be distinctly seen through it. Small cirrous clouds floating over it stood out in bold relief. At 9-45 a second red band was seen to rise slowly from the NNW until it joined the former near the zenith; there was then a complete arch of red light from horizon to horizon. The rest of the display consisted mainly of innumerable streamers of a pale greenish light, with one band of a light orange colour situated almost due N. There was very little motion in the streamers. At 10-15 scarce a trace remained of the Auroral light: but at 10-40 it shone forth again in all its splendour, lasting however for only about five or six minutes.

The Aurora on the 9th could only be seen at intervals through the clouds, which shared the redness of the sky. On the 10th, three streamers were seen at 11 p.m., in the NNW. The Northern lights were also visible at 9-55 p.m. on the 13th, and at 8-10 p.m. on the 18th.

Several striking magnetic disturbances were registered during the month on our photographic curves. At 8 p.m. on the 1st a storm commenced which principally affected the Declination and Vertical Force Magnets, the disturbance lasting about 12 hours. The most rapid change of the Declination was at 2 a.m. on the 2nd, and the V. F. reached its minimum a little after 3 a.m.

The storm on the 9th, was more remarkable than that of the 1st, and the disturbing force equally affected all the three magnets. There are two well marked minima of the Horizontal Force, the 1st at 10^h 54^m a.m., and the 2nd at 2-53 p.m. The movement of the H. F. needle was exceedingly rapid at 10-47 a.m., changing 0.05422 in British units in 7 minutes; thus indicating a diminution of 1÷67 in the total intensity of the earth's horizontal magnetic power in that short space of time. The increase that immediately followed was also sufficiently remarkable, a change taking place of 0.06643 in 24 minutes. At the second minimum the variation of intensity was scarcely less violent, the force altering by 0.04449 in 11 minutes.

There was a slight disturbance on the 13th, commencing at about 9 p.m.; this was principally felt by the V. F. magnet. On the 17th shortly before midnight a sudden and very violent change of the earth's magnetism threw the V.F. magnet completely off its balance, and considerably affected the other two magnets. On the 18th a disturbance commenced very shortly after 8 p.m., affecting principally the Declination and V.F.; it lasted about six hours. On the 24th and 25th the two sets of magnetograms bore a striking resemblance to each other, but the movements were not very extensive.



No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
		1	7	3	1	0	4	15	0
Mean Velocity in miles per hour	4.1	6.8	9.5	11.2	0	7.6	9.3	0
Total No. of miles for each Direction	99	1142	681	268	0	728	3341	0

The total number of miles registered during the month was 6259.

The max. Velocity of the wind was 32 miles per hour ; direction W. on the 4th, at 9 a.m.

Mean amount of Cloud, (an overcast sky being indicated by 10.0) 5.5

In the month of May, the highest reading of the Barometer during 24 years, was on the 22nd, in 1855, and was 30.124

The lowest " " 1st, 1858 28.564

The highest Temperature " 19th, 1864 82.5

The lowest " " 4th, 1855 23.5

The highest adopted mean temperature of } 1848 55.1
the month

The lowest " " 1855 45.0

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The readings of the Barometer are taken from Barrow's Standard, and have been corrected and reduced to the temperature of 32°, but not to Sea level. The max. and min. temperatures are obtained from the patent instruments of Negretti and Zambra, and the other temperatures from the hygrometer by the same Opticians. These instruments have all been compared by MR. GLAISHER with those at Greenwich. Both the direction and velocity of the wind are given by a self-registering Anemometer, by Beck. The Hygrometrical results have been calculated from Glaisher's tables, 2nd Edition.

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Aurora Borealis was seen on the 8th and 20th. Hail fell on the 4th and 27th. A Thunder Storm occurred on the 27th. The Cuckoo was heard on the 1st.

The range of the Barometer for the month is small, and the rainfall considerably below the average. The magnets have been almost wholly undisturbed during May. The Vertical Force magnet has shown the greatest tendency to change, and the maximum perturbation has generally happened towards midnight. Thus there was a slight disturbance just after midnight on the 9th, and also on the 11th, and between the 12th and 13th. There was a striking resemblance between the Vertical Force curves from the 20th to the 24th, the minima occurring at 11-10 p.m. on the 20th, at 1-28 a.m. on the 22nd, and on the 23rd at 1-51 a.m., and 11-37 p.m. The greatest disturbance of the V. F. lasted from about 3 p.m. on the 25th, until 6 a.m. on the following day.

Stonyhurst Observatory.

Lat. 53.^o 50' 40" N. Long. 9.^h 52.^m.68. w. Height of the Barometer
above the sea, 381 ft.

METEOROLOGICAL REPORT

For June, 1871.

Results of Observations taken during the month.	Mean for the last 24 Years.	
Mean Reading of the Barometer.....	29·542	29·533
Highest „ on the 26th	29·900	29·903
Lowest „ on the 18th	29·083	29·014
Range of Barometer Readings	0·817	0·889
Highest Reading of a Max. Therm. on the 14th	70·0	76·7
Lowest Reading of a Min. Therm. on the 4th	36·9	39·4
Range of Thermometer Readings	33·1	37·3
Mean of all the Highest Readings	63·1	65·1
Mean of all the Lowest.....	46·9	48·1
Mean Daily Range	16·2	17·0
Deduced Monthly Mean (from Mean of Max. { and Min.)	53·2	54·8
Mean Temperature from dry bulb.....	52·7	54·6
Adopted Mean Temperature	53·0	54·7
Mean Temperature of Evaporation.....	49·6	52·2
Mean Temperature of Dew Point.....	46·2	48·9
Mean elastic force of Vapour.....	0·313in	0·360in
Mean weight of Vapour in a cubic foot of air	3·5gr	3·9gr
Mean additional weight required for saturation ...	1·0gr	0·9gr
Mean degree of Humidity, (saturation 1·00).....	0·78	0·79
Mean weight of a cubic foot of air	533·2gr	531·2gr
Fall of Rain	3·357in	3·701in
Number of days on which Rain fell.....	18	17·2
Amount of Evaporation	3·147in	3·774in

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
	4	8	5	0	2	4	6	1
Mean Velocity in miles per hour	9.5	6.9	8.3	0	9.3	5.5	6.2	9.3
Total No. of miles for each Direction	915	1334	993	0	447	525	891	223

The total number of miles registered during the month was 5328.

The max. Velocity of the wind was 31 miles per hour ; direction N. on the 7th, at 6 p.m.

Mean amount of Cloud, (an overcast sky being indicated by 10.0) 7.4

In the month of June, the highest reading of the Barometer during 24 years, was on the 27th, in 1867, and was 30.206

The lowest ,, ,, 12th, 1862 28.632

The highest Temperature ,, 28th, 1857 84.6

The lowest ,, ,, 30th, 1856 34.2

The highest adopted mean temperature of }
the month } 1858 59.0

The lowest ,, ,, 1856 & 1860 52.2

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Thunder storms occurred on the 19th and 30th, and Thunder was heard on the 10th, 18th, 20th, and 25th. Hail fell on the 25th.

The temperature for the month is somewhat below the average. The only magnetic disturbance of any note commenced shortly after midnight on the 18th, and lasted for nearly 8 hours. There were two very rapid movements of the V. F. magnet, the minima being reached shortly before 2 a.m., and at about 3-30.

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
	0	0	0	0	0	2	12	16	1
Mean Velocity in miles per hour	0	0	0	0	10·4	9·9	10·0	7·6
Total No. of miles for each Direction	0	0	0	0	501	2842	3853	183

The total number of miles registered during the month was 7379.

The max. Velocity of the wind was 27 miles per hour ; direction S. on the 7th, at 1 p.m.

Mean amount of Cloud, (an overcast sky being indicated by 10·0) 8·2

In the month of June, the highest reading of the Barometer during 24 years, was on the 24th, in 1868, and was 30·112

The lowest ,, ,, 14th, 1853 28·670

The highest Temperature ,, 15th, 1868 88·1

The lowest ,, ,, 1st, 1857 36·0

The highest adopted mean temperature of } 1852 63·0
the month

The lowest ,, ,, 1851 & 1853 55·5

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Thunder storms occurred on the 1st, 4th, 8th, 10th, 14th, 15th, 25th, 28th, and 29th. Hail fell on the 8th. A Solar Halo was seen on the 10th, at 3·50 p.m., its diameter was 45° 22'. Remarkable rain fell on the 8th, 1·2 inch being registered during one hour. The total fall on the 8th was 1·791.

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
		1	2	2	0	1	9	14	2
Mean Velocity in miles per hour	3·8	6·2	5·2	0	7·5	8·7	10·3	3·1
Total No. of miles for each Direction	90	299	251	0	180	1883	3453	149

The total number of miles registered during the month was 6305.

The max. Velocity of the wind was 38 miles per hour ; direction W. on the 24th, at 7 p.m.

Mean amount of Cloud, (an overcast sky being indicated by 10·0) 5·8

In the month of August, the highest reading of the Barometer during 24 years, was on the 28th, in 1854, and was 30·111

The lowest ,, ,, 26th, 1853 28·637

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

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The readings of the Barometer are taken from Barrow's Standard, and have been corrected and reduced to the temperature of 32°, but not to Sea level. The max. and min. temperatures are obtained from the patent instruments of Negretti and Zambra, and the other temperatures from the hygrometer by the same Opticians. These instruments have all been compared by MR. GLAISHER with those at Greenwich. Both the direction and velocity of the wind are given by a self-registering Anemometer, by Beck. The Hygrometrical results have been calculated from Glaisher's tables, 2nd Edition.

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Thunder storms occurred on the 17th, and 25th. Thunder was also heard on the 18th. An Aurora was seen on the 10th, at 11-25 p.m. Fog prevailed on the 9th. There was a heavy shower of hail on the 25th.

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
		2	6	8	1	2	2	8	1
Mean Velocity in miles per hour	7·3	7·1	11·4	5·9	6·2	8·5	7·1	3·1
Total No. of miles for each Direction	349	1023	2189	142	296	407	1362	75

The total number of miles registered during the month was 5843.

The max. Velocity of the wind was 27 miles per hour ; direction W. on the 22nd, at 1 p.m.

Mean amount of Cloud, (an overcast sky being indicated by 10·0) 6·6

In the month of September, the highest reading of the Barometer during 24 years, was on the 15th, in 1851, and was 30·247

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 } 1865 59·1
the month

The lowest ,, ,, 1863 50·9

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The readings of the Barometer are taken from Barrow's Standard, and have been corrected and reduced to the temperature of 32°, but not to Sea level. The max. and min. temperatures are obtained from the patent instruments of Negretti and Zambra, and the other temperatures from the hygrometer by the same Opticians. These instruments have all been compared by MR. GLAISHER with those at Greenwich. Both the direction and velocity of the wind are given by a self-registering Anemometer, by Beck. The Hygrometrical results have been calculated from Glaisher's tables, 2nd Edition.

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Lightning was seen on the evening of the 6th. There was a Thunder storm on the 30th. Very heavy Rain accompanied with Hail, fell on the 24th, 0·5 inch in 34 minutes. This fall was remarkable from the limited area which it covered, and the circular movement of the clouds overhead. The anemometer shewed a sudden shift of wind from S.W. by N. through S. to E.N.E., returning to its former position at the end of the rainfall. An Aurora was seen on the 7th, at 9 p.m. A Lunar Halo was observed at 8·30 p.m., on the 25th. The Swallows departed on the 29th.

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
		1	4	2	1	5	10	8	0
Mean Velocity in miles per hour	3·8	5·0	13·5	13·4	6·3	9·5	7·0	0
Total No. of miles for each Direction	91	489	649	321	761	2268	1345	0

The total number of miles registered during the month was 5924.

The max. Velocity of the wind was 32 miles per hour ; direction S. on the 21st, at 2 p.m.

Mean amount of Cloud, (an overcast sky being indicated by 10·0) 6·8

In the month of November, the highest reading of the Barometer during 24 years, was on the 29th, in 1849, and was 30·238

The lowest " " 19th, 1862 28·139

The highest Temperature " 9th, 1869 72·8

The lowest " " 21st, 1859 25·2

The highest adopted mean temperature of }
the month } 186 51·6

The lowest " " 1850 44·8

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The readings of the Barometer are taken from Barrow's Standard, and have been corrected and reduced to the temperature of 32°, but not to Sea level. The max. and min. temperatures are obtained from the patent instruments of Negretti and Zambra, and the other temperatures from the hygrometer by the same Opticians. These instruments have all been compared by MR. GLAISHER with those at Greenwich. Both the direction and velocity of the wind are given by a self-registering Anemometer, by Beck. The Hygrometrical results have been calculated from Glaisher's tables, 2nd Edition.

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The magnets have been remarkably quiet during the month, slight disturbances however occurred on the 2nd, 13th, 14th, 24th, 25th and 27th. The movements of the Declination needle, from 10 p.m., on the 3rd and 4th, are strikingly similar.

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
		1	9	5	2	1	4	0	8
Mean Velocity in miles per hour	4·0	6·5	12·8	6·7	19·3	8·2	0	9·7
Total No. of miles for each Direction	97	1411	1539	320	462	790	0	1859

The total number of miles registered during the month was 6478.

The max. Velocity of the wind was 34 miles per hour ; direction E. on the 1st, at 9 a.m.

Mean amount of Cloud, (an overcast sky being indicated by 10·0) 6·2

In the month of November, the highest reading of the Barometer during 24 years, was on the 12th, in 1857, and was 30·350

The lowest " " 1st, 1859 28·007

The highest Temperature " 1st, 1868 61·1

The lowest " " 17th, 1861 19·1

The highest adopted mean temperature of }
the month } 1857 & 1863 43·8

The lowest " " 1851 36·7

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The readings of the Barometer are taken from Barrow's Standard, and have been corrected and reduced to the temperature of 32°, but not to Sea level. The max. and min. temperatures are obtained from the patent instruments of Negretti and Zambra, and the other temperatures from the hygrometer by the same Opticians. These instruments have all been compared by MR. GLAISHER with those at Greenwich. Both the direction and velocity of the wind are given by a self-registering Anemometer, by Beck. The Hygrometrical results have been calculated from Glaisher's tables, 2nd Edition.

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Hail fell on the 8th, 9th, and 10th. Thunder and lightning occurred on the 10th. There were light falls of snow on the 9th, 17th, 19th, 21st, and 30th. The morning of the 24th was foggy.

The Aurora of the 10th was first noticed here at about 7-30 G.M.T., the appearance being that of a pale white light, which gradually rose from the N.N.W., until it completely enveloped the Great Bear, but was not sufficiently strong to hide even the faint star near Mizar. Towards 8-40 the Auroral mist assumed the more definite form of three broad white bands, stretching across the sky from E. to W., the uppermost band being just below Vega and Pollux.

At the same time a bank of dense black cloud rose from the N. horizon to the height of γ Ursæ, and shot forth dark streamers as far as the upper arch of light. The streamers E. and W. were brighter than the central part, and waves of light moved slowly and at regular intervals from these brighter parts of the horizon, mingling together at the centre of the arch. At 9-10 a very bright streamer made its appearance.

Up to this time the display had been colourless, but at 9-20 it assumed a greyish tinge, and had extended by 9-25 as far as β Cassiopiæ. At 9-30 the western extremity of the arch was of a bright red colour, whilst only a slight appearance of redness was visible in the E.

The Aurora then became wonderfully brilliant, and the rapidity of the changes surpassed anything that had been seen here for years. Flashes of light were succeeded by waves, and these in their turn by small detached clouds, which travelled rapidly across the sky. At 9-45 the waves and streamers seemed to converge to a point slightly S.E. of β Andromedæ. In the square of Pegasus a curiously-formed cloud, in the shape of an enormous bird, suddenly appeared and disappeared as quickly several times, sending forth each time streams of light both E. and W., as if from its outstretched wings. At 10 the light was strongest, and then the waves, moving rapidly from the N., appeared to return for a short distance on their path when they had passed a few degrees S. of the Zenith, like waves breaking on the sea shore. At 10-30 two distinct arches of light, the upper one passing through β Andromedæ, the lower one near Polaris, intersected each other E. and W. at an altitude of about 20°. At 10-40 all colour had disappeared in the W., but a very brilliant red streamer stretched from the E. nearly to the Twins. About this time a thick cloud of elliptic shape was formed between the points N.W. by N. and W. Beneath this cloud was a pale auroral glare, and from its upper side a mass of broad dark streamers rose towards Polaris. At the E. end of the cloud a very broad streamer moved gradually westward, and shortly afterwards a similar streamer formed near the W., and moved in the same direction. At 10-45 α Arietis was the centre, towards which the new violet coloured streamers and the waves and flashes tended. The last-mentioned cloud was then replaced by another similar in form, but situated further from the E., its outer streamers of a yellowish green colour meeting in Cassiopeia. At 11 the only colour visible was the violet in the W. At 11-5 a point S. of γ Pegasi was the centre of motion. At 11-15 the dark streamers were sharply defined, but extended only a few degrees above the cloud. Ten minutes later the stars below Vega and Ursa minor were completely hidden, and then from 11-25 to 12-15 the Auroral light gradually died away, leaving only a faint white glare over the N.W. horizon. This display of the Northern lights was accompanied as usual by a great disturbance of the suspended magnets, the rapid movements continuing from 6 p.m. until 4 a.m.; the curve of the Vertical Force Magnet was not unlike the auroral curve of May 13th, 1869.

Another Aurora Borealis was seen on the 16th.

During the month the self-recording magnetographs have been much more disturbed than usual, the first abnormal movement being an extensive and rapid change of all the magnets at the close of the first 24 hours. This was followed by a storm on the 2nd, commencing at about 2 p.m. and lasting 10 hours. The character of the disturbance which began about 6 p.m. on the 9th was very peculiar, a rapid vibratory motion being imparted to all the magnets between the hours of midnight and 10 a.m.

The rapid movements of the Declination magnet, which began at 6 p.m. on the 19th, lasted for about 4 days. The similarity between the curves from 4 to 6 p.m. on the 20th, 21st, and 22nd, is worthy of notice. During the remainder of the month the magnets were exceedingly steady.

The clouds prevented the November meteors being observed here in any numbers on the nights of the 13th and 14th, but as the sky cleared shortly after 10 p.m. on the evening of the 12th, a close watch was kept for the meteors until sunrise with the following result.

From 10-30 to 11-0 p.m.	2	meteors.	
“ 11-0 to 12-0 p.m.	2	“	
“ 12-0 to 1-0 a.m.	8	“	
“ 1-0 to 2-0 a.m.	4	“	hazy.
“ 2-0 to 3-0 a.m.	11	“	
“ 3-0 to 4-0 a.m.	3	“	sky quite clear.
“ 4-0 to 5-0 a.m.	7	“	
“ 5-0 to 6-0 a.m.	10	“	
“ 6-0 to 6-31 a.m.	4	“	

The finest were seen between 12 and 1 a.m. and from 4 to 5. The path of each was carefully noted, and afterwards laid down on a star map. Few were found to belong to the well known meteor stream having its radiant point in the constellation of the Lion. No magnetic disturbance happened during the meteor period from the 12th to the 15th.

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
	0	3	0	0	1	10	13	4
Mean Velocity in miles per hour	0	8·5	0	0	20·1	12·3	8·4	6·2
Total No. of miles for each Direction	0	611	0	0	483	2963	2606	595

The total number of miles registered during the month was 7258.

The max. Velocity of the wind was 35 miles per hour ; direction S. on the 28th, from 11 a.m. until noon.

Mean amount of Cloud, (an overcast sky being indicated by 10·0) 7·4

In the month of December, the highest reading of the Barometer during 24 years, was on the 22nd, in 1849, and was 30·376

The lowest ,, ,, 27th, 1852 28·151

The highest Temperature ,, 6th, 1856 58·0

The lowest ,, ,, 24th, 1860 6·7

The highest adopted mean temperature of } 1857 44·6
the month

The lowest ,, ,, 1869 33·3

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The readings of the Barometer are taken from Barrow's Standard, and have been corrected and reduced to the temperature of 32°, but not to Sea level. The max. and min. temperatures are obtained from the patent instruments of Negretti and Zambra, and the other temperatures from the hygrometer by the same Opticians. These instruments have all been compared by MR. GLAISHER with those at Greenwich. Both the direction and velocity of the wind are given by a self-registering Anemometer, by Beck. The Hygrometrical results have been calculated from Glaisher's tables, 2nd Edition.

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Snow fell on the 4th, 7th, and 8th. There was a slight fog on the 11th and 16th, and a Hail storm on the 20th. Lunar Halos were seen on the 19th and 27th.

During the whole of the month the self-recording magnets have been remarkably free from irregular perturbations.

Summary of the Observations

FOR 1871.

		Mean for the last 24 Years.
Mean Reading of the Barometer	29.503	29.485
Highest ,, on March 28th.....	30.087	30.275in
Lowest ,, on October 1st.....	28.576	28.286in
Range of Barometer Readings	1.511	1.989in
Highest Reading of a Max. Therm. on August 10th	83.0	81.3
Lowest Reading of a Min. Therm. on January 3rd	16.6	15.8
Range of Thermometer Readings	66.4	65.5
Mean of all the Highest Readings.....	54.4	54.6
Mean of all the Lowest	41.4	40.9
Mean Daily Range	13.0	13.7
Deduced Yearly Mean (from Mean of Max. and Min.)	46.9	46.7
Mean Temperature of dry bulb	46.9	46.9
Adopted Mean Temperature.....	46.9	46.8
Mean Temperature of Evaporation.....	44.3	44.6
Mean Temperature of Dew Point	41.5	42.1
Mean elastic force of Vapour.....	0.271 in	0.275in
Mean weight of Vapour in a cubic foot of air.....	3.1gr	3.2gr
Mean additional weight required for saturation.....	0.7gr	0.6gr
Mean degree of Humidity, (saturation 1.00)	0.82	0.84
Mean weight of a cubic foot of air.....	539.4gr	538.9gr
Total Fall of Rain in the Year	43.913in	46.247in
Number of days per Month on which Rain fell.....	22.8	17.7
Amount of Evaporation	26.221 in	27.200in

The Maximum monthly mean height of the Barometer was in
March, 1854, and was..... 29.861

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
In 1859, on Nov. 1st, at 1 p.m., the Barometer stood at 28·035, and on Nov. 2nd, at 1 p.m., it stood at 29·263, this was the greatest range of the Barometer, in 24 hours and was.....	1·228
The highest reading of the Barometer, during 24 years, was on February 11th, 1849, and on March 4th, 1854, and was ...	30·452
The lowest " " on Jan. 14th, 1865, and was ...	27·939
Extreme range	2·513
The highest temperature was on July 15th, 1868, and was ...	88·1
The lowest " " Dec. 24th, 1860,	6·7
The highest adopted mean temperature of a month	} July, 1868,
of a month .....		62·4
The lowest " " Feb., 1855,	28·6
The highest adopted mean temperature of a year 1868,	49·1
The lowest " " 1855,	44·6
The greatest monthly mean weight of vapour, in a cubic foot of air.....	} July, 1852,
of a month .....		5·1
The least " " Feb., 1855,	1·4
The greatest fall of rain in a month, was in Oct., 1870, and was..	13·357
The least " " May, 1853, and May, 1859,	0·3
The greatest number of days on which rain fell in one Month	} July, 1861, and Dec. 1868,..
of a month .....		31.
The least " " March, 1852,	3.

Table of the number of days per month on which the Rain-fall was at least 0·01 in.

	Jan.	Feb.	March.	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	
1848	9	23	18	13	4	23	18	12	12	4	6	14	166
1849	21	16	12	12	12	11	19	19	14	15	18	11	180
1850	7	19	11	17	15	9	16	20	10	23	19	19	185
1851	22	10	19	8	11	19	19	17	5	19	15	11	175
1852	21	15	2	3	11	24	11	19	16	18	21	26	187
1853	19	6	9	17	5	15	22	8	12	20	14	7	154
1854	13	17	10	5	15	14	13	15	12	13	20	27	174
1855	8	4	12	8	11	17	16	11	7	24	7	9	134
1856	13	12	4	13	11	17	14	16	17	12	11	19	159
1857	24	12	18	14	10	12	18	11	14	14	13	18	178
1858	15	5	14	13	15	14	16	15	16	22	7	24	176
1859	22	16	24	16	4	15	10	15	22	17	14	14	189
1860	22	14	24	11	20	25	10	26	14	25	15	16	222
1861	13	18	26	8	9	19	25	23	18	13	23	16	211
1862	17	10	19	18	21	25	21	15	16	25	13	23	223
1863	25	21	15	15	16	19	8	24	25	23	19	24	234
1864	14	10	17	11	15	21	11	15	25	10	17	18	184
1865	20	18	10	11	18	4	16	15	10	20	16	11	169
1866	27	22	15	12	8	18	14	22	26	12	22	23	221
1867	15	18	13	22	14	11	14	18	22	22	11	20	200
1868	16	21	22	16	12	9	8	13	10	25	12	27	196
1869	20	23	11	13	13	10	8	12	23	18	26	18	195
1870	19	13	9	11	14	14	8	7	14	23	16	13	161
1871	13	21	12	19	10	14	26	14	16	21	15	24	205
Mean	17·3	15·2	14·4	12·8	12·3	15·8	15·0	16·1	15·7	18·6	15·4	18·0	187

This table has been drawn up for the sake of comparison with similar records. The numbers entered in the Stonyhurst reports refer to all days on which even the least quantity of rain has fallen, and this method will be continued in all future reports, unless otherwise stated.

Comparison of the Meteorological Results

obtained from the two sets of Instruments at present in use at the Stonyhurst Observatory.

For the last four and twenty years, during which meteorological observations have been continuously registered at this observatory, the thermometers, from which the adopted mean temperature has always been obtained, have been suspended, at the height of four feet from the ground, on a suitable wooden frame, known as the Glaisher stand. This stand is situated at a distance of 60 feet, due S., from the observatory building, and no trees are planted in its vicinity. The thermometric observations, forming part of the present series of reports, have invariably been taken with the instruments on the Glaisher stand. The improvements occasionally made in instruments for recording temperature have led to slight changes in our set of thermometers, but those which have now been in use for many years for deducing the adopted mean temperature, were all made by Negretti and Zambra, and consist of a self-recording max. No. 7310, a needle min. No. 39, and the dry bulb of the Hygrometer No. 553.

In 1867 Stonyhurst was chosen as one of the seven meteorological observatories of the Board of Trade, and was in consequence furnished with a complete set of self-recording instruments, similar in every respect to those of the other government observatories. The thermograph by Casella, No. 381, is placed at a distance of 2 feet 3 inches from the wall of the N. transept of the building, and stands 7 feet 5 inches above the ground. It is well protected by a double Venetian blind from the direct rays of the morning or evening summer sun. Four complete years have now elapsed since this second series of observations was started, and this period may be considered sufficiently long to give a fair idea of the closeness of the agreement between the independent results.

The following table will enable us to form an idea of the reliance we can place on results obtained from instruments constructed on such entirely different principles, and mounted in very dissimilar situations.

ADOPTED MEAN TEMPERATURE,

OBTAINED FROM

	Casella's Thermograph.				Negretti & Zambra's Thermometers.			
	1868	1869	1870	1871	1868	1869	1870	1871
January	38·5	40·9	37·6	32·2	39·1	41·3	37·2	32·0
February	41·7	43·9	36·2	41·0	41·9	44·0	36·6*	41·4
March	42·2	37·3	39·2	43·9	43·2	37·8	39·8	44·0
April	47·0	47·5	46·8	45·1	45·6	48·2	46·8	45·4
May.....	53·0	45·8	50·7	50·9	53·8	45·2	51·0	50·5
June	55·8	53·6	56·0	52·8	56·5	53·5	55·7	53·0
July.....	61·3	60·1	59·9	56·8	62·4	60·6	59·9	56·6
August	59·7	57·0	58·1	60·1	60·3	56·9	58·4	60·9
September	55·5	55·2	53·8	52·2	56·1	55·5	53·9	52·7
October	45·5	48·6	47·5	48·2	45·7	48·5	47·6	48·6
November	40·8	42·3	39·7	38·3	40·8	41·8	39·8	38·4
December	43·0	37·0	33·0	39·1	43·4	36·8	33·3	39·1
Yearly means...	48·67	47·43	46·54	46·71	49·07	47·59	46·67	46·68

* 37·4 was entered by mistake in the previous report.

The daily readings of the dry bulb are the means of the 24 hourly measures of the thermograms, and of the 9 a.m. and 9 p.m. observations of the Negretti thermometer. The maxima and minima have in all cases been corrected by Glaisher's tables, and the 9 a.m. and 9 p.m. readings for daily Range. The adopted mean temperature for each month is the mean of the daily results obtained respectively from the dry bulb, and the corrected maximum and minimum.

MONTHLY MEAN READINGS

OF

	Adie's Barograph.				Barrow's Barometer.			
	1868	1869	1870	1871	1868	1869	1870	1871
January	29·383	29·524	29·508	29·270	29·413	29·479	29·509*	29·360
February	29·606	29·434	29·443	29·513	29·570	29·421	29·426	29·500
March	29·514	29·500	29·693	29·580	29·427	29·453	29·728	29·558
April	29·530	29·564	29·753	29·362	29·479	29·551	29·678	29·337
May.....	29·555	29·443	29·586	29·674	29·539	29·431	29·564	29·663
June	29·716	29·655	29·696	29·542	29·789	29·662	29·677	29·542
July.....	29·682	29·643	29·582	29·367	29·677	29·631*	29·575	29·362
August	29·494	29·714	29·589	29·583	29·455	29·797	29·573	29·572
September	29·438	29·340	29·644	29·510	29·450	29·271	29·598	29·495
October	29·481	29·681	29·252	29·481	29·458	29·590	29·236	29·472
November	29·535	29·427	29·348	29·587	29·541	29·428	29·339	29·575
December	29·077	29·342	29·547	29·616	28·984	29·325	29·498	29·595
Means	29·503	29·522	29·553	29·507	29·482	29·503	29·533	29·503

* Entered wrongly in former reports as 29·432 and 29·717.

The readings are all corrected for temperature, index error, and capillarity, but not for sea level.

A correction of $-0\cdot020$ has been applied to the barograph readings for difference of height.

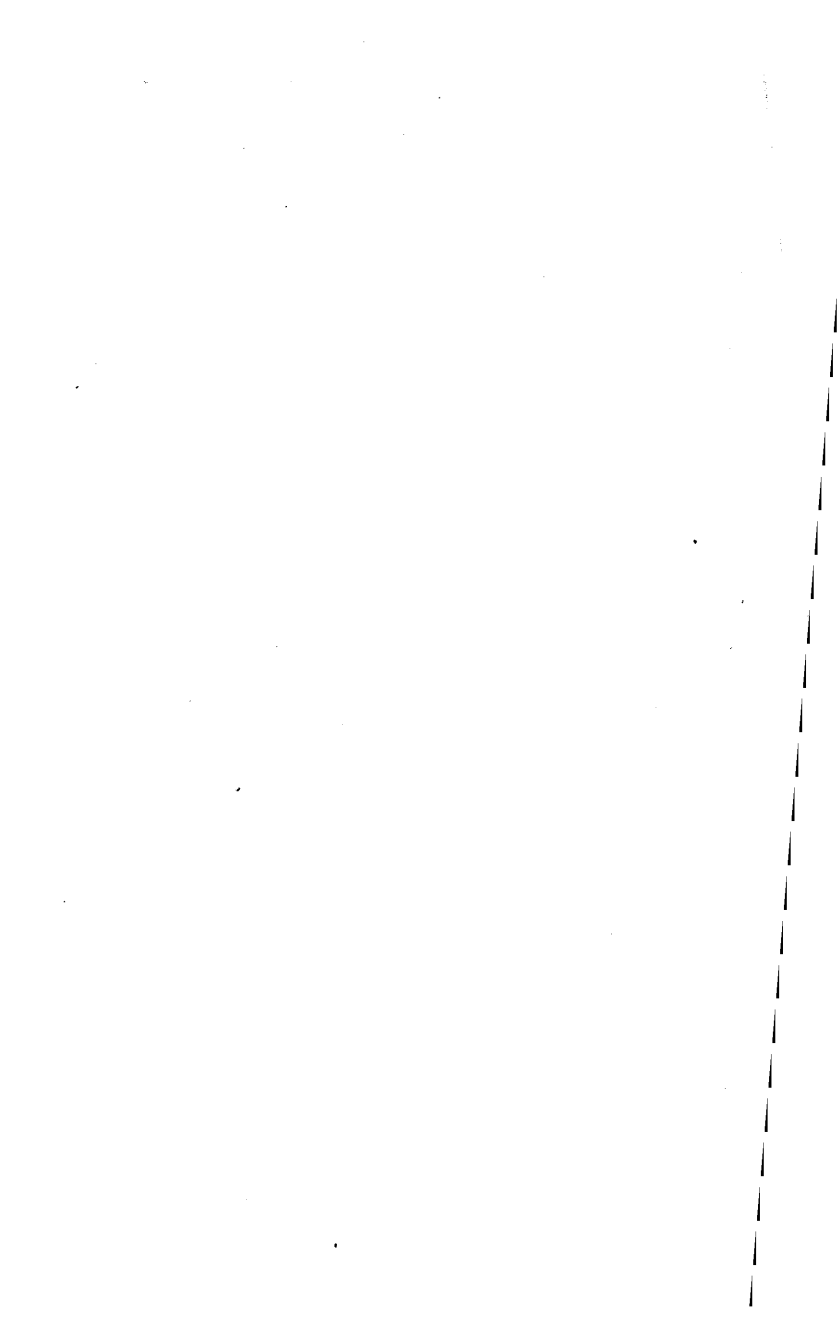
The monthly means are obtained from hourly readings of the barograph, and from the observations of Barrow's instrument at 9 a.m. and 9 p.m. local mean time, the latter being corrected for Daily Range.

The table of differences will show at a glance the results of the comparison of the two series of observations.

	Negretti—Casella.				Adie—Barrow.			
	1868	1869	1870	1871	1868	1869	1870	1871
January	0·6	0·4	—·4	—·2	—·030	·045	—·001	—·090
February	0·2	0·1	0·4	0·4	·036	·013	·017	·013
March	1·0	0·5	0·6	0·1	·087	·047	—·035	·022
April	—1·4	0·7	0·0	0·3	·051	·013	·075	·025
May	0·8	0·4	0·3	—0·4	·016	·012	·022	·011
June	0·7	—0·1	—0·3	0·2	—·073	—·007	·019	·000
July	1·1	0·5	0·0	—0·2	·005	·012	·067	·005
August	0·6	—0·1	0·3	0·8	·039	—·083	·016	·011
September	0·6	0·3	0·1	0·5	·018	·069	·046	·015
October	0·2	—0·1	0·1	0·4	·023	·091	·016	·009
November	0·0	—0·5	0·1	0·2	—·006	—·001	·009	·012
December	0·4	—0·2	0·3	0·0	·093	·017	·049	·021
Means.....	0·40	0·16	0·13	0·18	·022	·019	·020	·005

The correction for daily range would appear to be somewhat too small for the Barometer.

The excess of the readings of the thermometers on the Glaisher stand is only slightly larger in summer than in winter, and the mean is small, so that this form of stand may be considered as affording a fair protection to the instruments.



Monthly Magnetical Observations taken at the College Observatory, Stonyhurst, 1871.

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 $q(t^{\circ}-35^{\circ}) + q'(t^{\circ}-35^{\circ})^2$, where t° is the observed temperature and 35° Fahr the adopted standard temperature. The values of the co-efficients q and q' are respectively 0.0091128 and 0.000000436.

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 former having been always less than 4s, and the latter never greater than 75'.

The average deflection of the magnet caused by a twist of the torsion circle through 90° , has been about $9\cdot2$ 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 value of the constant P was found to be $-0\cdot002806$.

The readings of the Declination needle have been corrected for magnetic disturbance by measurements of the magnetograph curves, and the probable errors have been thus considerably diminished. Both the corrected and uncorrected values are given in the tables.

S. J. PERRY.

TABLE OF THE RESULTS OF THE MONTHLY MAGNETICAL OBSERVATIONS, FOR 1871.

1871.	Abstract of Observations of Deflection and Vibration for Absolute measure of Horizontal Force.											Declination.			Magnetic Dip.			Absolute Measures.		
	Month.	G. M. T.	Distances of centres of Magnets.	Temper-ature.	Observed Deflection.	m Log $\frac{m}{X}$	G. M. T.	Temper-ature.	Time of one vibra-tion.	Log m X	Value of m.	G. M. T.	Declination. Uncorrected.	West Declina-tion. CORRECTED.	G. M. T.	Necle.	Dip.	Value of		
																		X, or Horizontal Force.	Y, or Vertical Force.	Total Force.
January ...	D H M 23rd...12 45 p.m.	FOOT. 1.0	39.5	14 41 52	9.10474	D H M 21st...10 2 a.m.	35.8	S 5.56680	0.22350	0.46145	D H M 21st... 9 59 a.m.	21 50 35	21 48 9	D H M 19th... 10 7 a.m.	1	69 35 46	3.6256	9.7849	10.4350	
	,, ... 1 9 p.m.	1.3	40.8	6 38 15	.....	.....	.....	.....	.....	.....	.....	.....	.....	20th... 3 32 p.m.	3	69 44 30	.....	.....	.....
February ..	25th... 8 51 a.m.	1.0	44.1	14 41 55	9.10506	25th...11 16 a.m.	47.0	5.57675	0.22264	0.46116	27th... 9.16 a.m.	21 59 6	21 59 21	14th...12 0	1	69 37 5	3.6207	9.7308	10.3826	
	,, ... 9 17 a.m.	1.3	45.0	6 38 7	.....	.....	.....	.....	.....	.....	.....	.....	.....	25th...12 22 p.m.	3	69 33 46	.....	.....	.....
March	25th...12 31 p.m.	1.0	65.9	14 38 39	9.10401	25th...11 2 a.m.	62.3	5.58571	0.22213	0.46033	22nd... 9 10 a.m.	21 35 48	21 38 6	21st... 3 29 p.m.	1	69 29 53	3.6229	9.7062	10.3603	
	,, ...12 53p.m.	1.3	66.7	6 36 58	.....	.....	.....	.....	.....	.....	.....	.....	.....	24th... 3 40 p.m.	3	69 33 52	.....	.....	.....
April	24th... 4 25 p.m.	1.0	50.6	14 35 15	9.10228	24th... 3 15 p.m.	49.0	5.57256	0.22337	0.46008	24th... 8 58 a.m.	21 42 9	21 35 35	11th... 4 15 p.m.	1	69 36 31	3.6354	9.7683	10.4228	
	,, ... 4 49 p.m.	1.3	50.9	6 35 35	.....	.....	.....	.....	.....	.....	.....	.....	.....	28th... 4 32 p.m.	3	69 33 53	.....	.....	.....
May.....	16th...11 51 a.m.	1.0	55.8	14 38 52	9.10439	16th...10 12 a.m.	50.2	5.57583	0.22280	0.46089	15th... 9 7 a.m.	21 31 51	21 37 40	15th... 4 25 p.m.	1	69 29 56	3.6242	9.7259	10.3792	
	,, ...12 15 p.m.	1.3	57.4	6 37 13	.....	.....	.....	.....	.....	.....	.....	.....	.....	23rd...11 35 a.m.	3	69 36 37	.....	.....	.....
June.....	24th...12 13 p.m.	1.0	55.9	14 37 31	9.10375	24th... 9 48 a.m.	54.0	5.58058	0.22237	0.46032	20th... 9 1 a.m.	21 32 21	21 37 20	12th...11 38 a.m.	1	69 34 45	3.6250	9.7167	10.3716	
	,, ...12 37 p.m.	1.3	56.8	6 36 34	.....	.....	.....	.....	.....	.....	.....	.....	.....	12th... 6 58 p.m.	3	69 30 21	.....	.....	.....
July.....	19th...12 31 p.m.	1.0	61.6	14 36 58	9.10388	19th...10 3 a.m.	59.0	5.58730	0.22155	0.45996	10th... 9 0 a.m.	21 18 21	21 23 39	11th...11 15 a.m.	1	69 33 30	3.6211	9.7102	10.3634	
	,, ...12 51 p.m.	1.3	61.9	6 36 12	.....	.....	.....	.....	.....	.....	.....	.....	.....	11th... 6 30 p.m.	3	69 32 20	.....	.....	.....
August ...	1st...10 38 a.m.	1.0	63.8	14 28 25	9.10474	1st... 9 28 a.m.	60.4	5.58221	0.22257	0.46096	1st... 7 1 a.m.	21 30 21	21 37 27	1st... 7 53 p.m.	1	69 32 4	3.6218	9.7122	10.3679	
	,, ...11 1 a.m.	1.3	64.7	6 37 3	.....	.....	.....	.....	.....	.....	.....	.....	.....	1st...10 30 a.m.	3	69 33 49	.....	.....	.....
September.	30th... 2 24 p.m.	1.0	66.6	14 28 36	9.10018	30th...12 31 p.m.	63.9	5.58864	0.22166	0.45806	30th... 8 31 a.m.	21 35 43	21 35 43	30th...10 20 a.m.	1	69 28 53	3.6370	9.7357	10.3929	
	,, ... 2 46 p.m.	1.3	66.2	6 33 34	.....	.....	.....	.....	.....	.....	.....	.....	.....	30th...11 10 a.m.	3	69 33 1	.....	.....	.....
October ...	14th... 8 47 a.m.	1.0	46.4	14 35 52	9.10229	14th...11 42 a.m.	50.9	5.58860	0.22087	0.45875	21st... 9 2 a.m.	21 36 27	21 35 32	12th...12 20 p.m.	1	69 26 30	3.6249	9.6768	10.3334	
	,, ... 9 11 a.m.	1.3	48.2	6 35 50	.....	.....	.....	.....	.....	.....	.....	.....	.....	12th... 1 30 p.m.	3	69 29 14	.....	.....	.....
November.	16th...12 50 p.m.	1.0	69.9	14 30 56	9.10156	16th...10 17 a.m.	65.9	5.59250	0.22144	0.45867	18th... 9 0 a.m.	21 31 33	21 32 33	18th...10 33 a.m.	1	69 31 13	3.6303	9.7086	10.3651	
	" ... 1 13 p.m.	1.3	72.8	6 34 28	.....	.....	.....	.....	.....	.....	.....	.....	.....	21st...11 53 a.m.	3	69 28 32	.....	.....	.....
December .	16th...11 17 a.m.	1.0	54.9	14 33 3	9.10150	16th... 1 9 p.m.	68.8	5.58798	0.22227	0.45908	16th... 9 10 a.m.	21 29 58	21 31 5	19th...11 14 a.m.	1	69 32 2	3.6340	9.7239	10.3807	
	,, ...11 39 a.m.	1.3	56.3	6 34 20	.....	.....	.....	.....	.....	.....	.....	.....	.....	19th...12 4 p.m.	3	69 29 55	.....	.....	.....
												Means.....	21 36 11	21 37 41		69 32 50	3.6269	9.7250	10.3797	

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