

STONYHURST COLLEGE
OBSERVATORY.

RESULTS

OF

METEOROLOGICAL AND MAGNETICAL
OBSERVATIONS,

BY THE

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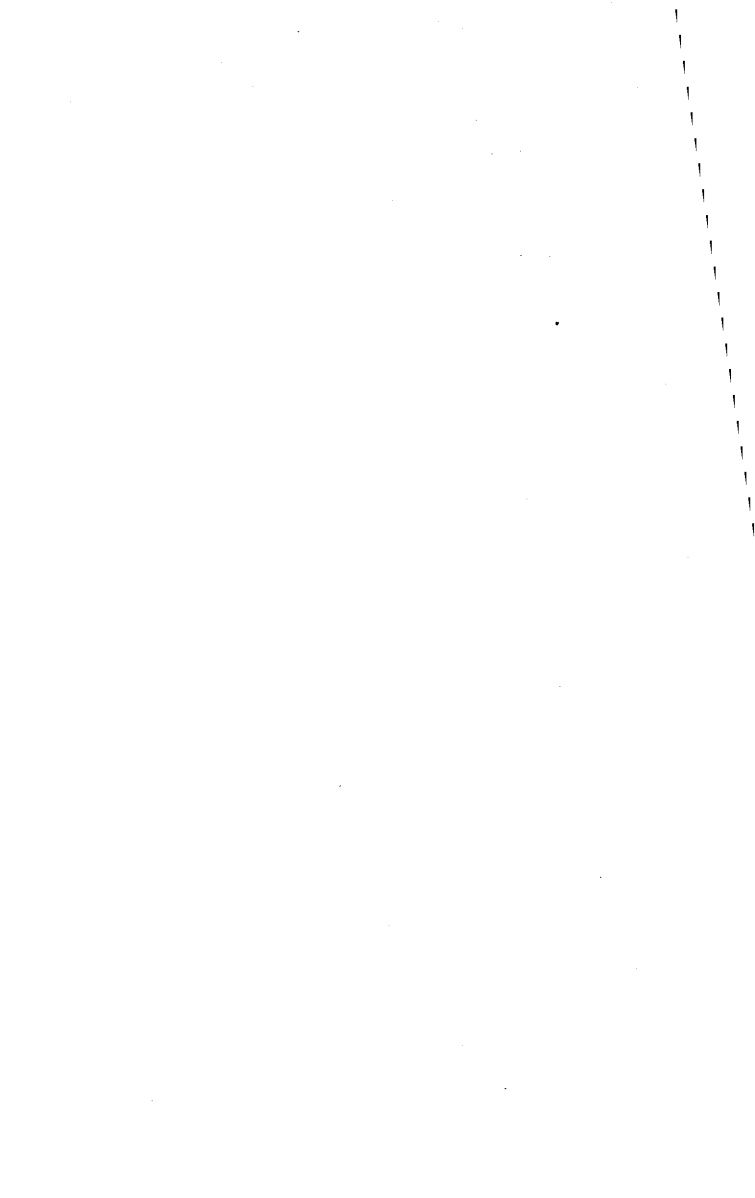
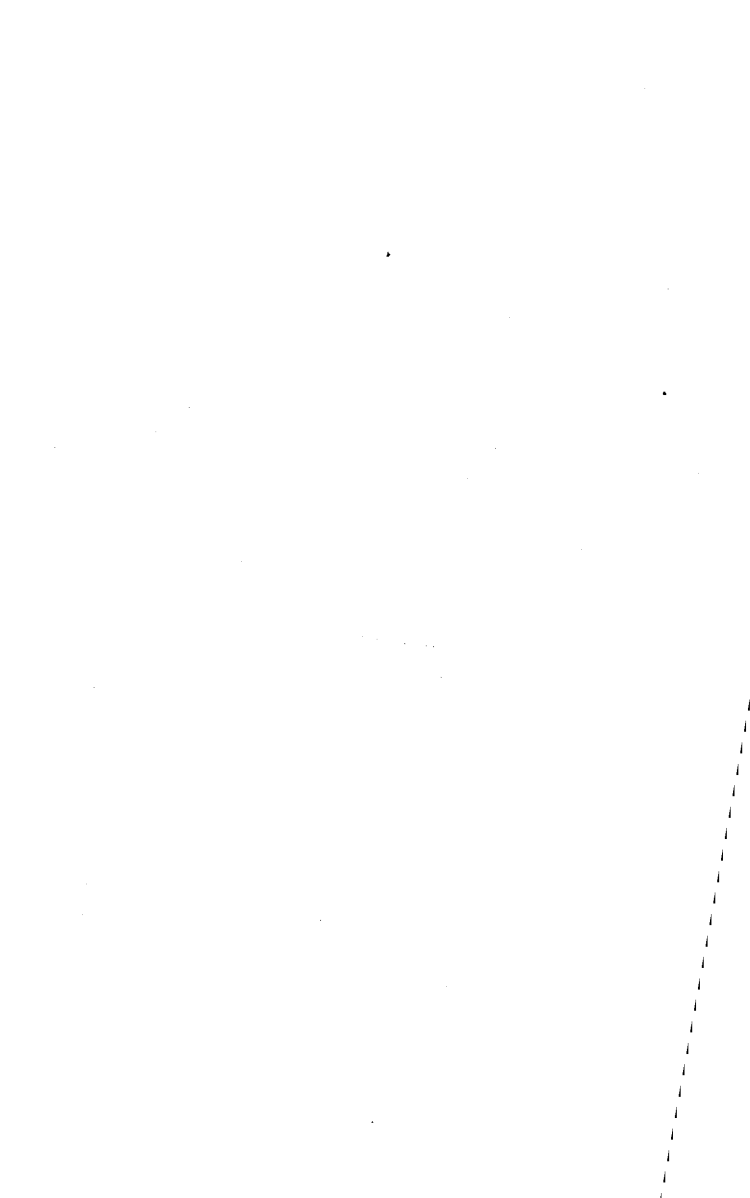


TABLE OF CONTENTS.

	<i>Page</i>
Introduction	5
Monthly Meteorological Reports	9
Yearly Meteorological Summary	33
Dates of Occasional Phenomena	35
Sun Observations	36
Duration of Sunshine	37
Observations of Upper Clouds (Cirrus).....	40
Agricultural Notes	43
Observations of Crops	45
Observations of Trees and Shrubs.....	46
Dates of the Flowering of Plants	47
The Upper Glow preceding Sunrise and following Sunset	54
Dates of Solar Drawings and of Observations of the Chromosphere and of Spot Spectra.....	55
Magnetic Report—	
1. Absolute Values of the Elements of Terrestrial Magnetism	56
2. Magnetic Disturbances	63
Lists of Presents received	69
Appendix. Observations taken at St. Ignatius' College, Malta.....	70



INTRODUCTION.

THE meteorological and magnetic work was continued here as usual during the past twelve months, and requires no special notice. The self-recording instruments are all in good condition, but the curve of the Vertical Force Magnetograph is never entirely satisfactory. Results were furnished as formerly to the Meteorological Office, to the French Meteorological Society, &c. Our principal astronomical work was the daily solar observations, which consist :

1. Of a drawing of the sun's whole disk on a scale of $10\frac{1}{2}$ inches to the diameter, and this includes the most careful delineation of all the spots and faculæ visible.
2. A spectroscopic measurement with a radial slit of the height of the chromosphere and of all the gaseous prominences.
3. A study of the general surface of the sun whenever the definition is unusually good.
4. A sketch of the chromospheric flames with a wide tangential slit, the direction in which they are inclined being most carefully noted.
5. That portion of the spectrum of the solar spots which extends from B to D.

During the year the sun was visible on 235 days and observations were made each day, but the whole disc was drawn only 224 times. The chromosphere was completely measured on 101 days, and partially on two others. Dr. Jansen's magnificent photographs formed an excellent guide to the study of the general surface, and it was always noticed that the appearances in any one portion of the surface were undergoing ceaseless changes. The fourth class of observations, which was started for the first time this year, can only be made when the sky is exceptionally clear, but useful results were obtained on 21 different days. On the same number of days a satisfactory examination was made of spot spectra, and on six of these occasions bands were observed in the spectrum. A short paper on these bands was read at the November meeting of the R.A.S. It may be well to mention here that the lines most affected in the spots in 1886 were the ordinary Fraunhofer lines, the contrary being the case during the period of maximum sun spots.

The observations of lunar occultations and of the phenomena of Jupiter's satellites have been made as before, and a number of positions of the comets Fabry, Brooks, Barnard, and Finlay were obtained, which will be reduced when the stars of comparison have been accurately determined. Preparations were made to observe positions of Sappho, but the wretched weather at the time of opposition prevented any useful work being done.

The upper glow is still watched with care, and the days on which it was observed are noted in this report. A great part of the spring and early summer was devoted to preparations for the Total Solar Eclipse to be observed in the West Indies on August the 29th. For the observation of the eclipse the College authorities most generously purchased a splendid

5½ inch Equatorial by Alvan Clark, an instrument which had done much useful work in the hands of the Rev. Mr. Webbe by furnishing the data for his well known book on Celestial Objects. The definition of the glass is wonderfully good, and when the image of the eclipsed sun was seen on the white enamelled cap of the spectroscope at Carriacou, it conveyed the impression of a perfect picture, the minutest details standing out with remarkable sharpness. The equatorial was fitted by Cooke of York with slow motion gear for the Declination, Mr. Webbe having been contented with slow motion in Right Ascension only; and two spectroscopes were adapted to it, one with two beautiful direct-vision prisms mounted by Hilger expressly for this eclipse, and the other with a Rowland grating of 14438 lines to the inch. A special stand had to be made for the 5½ inch Equatorial, and another for the 4 inch by Jones, which was taken as a companion instrument and fitted in consequence with a good direct-vision spectroscope by Browning. Scales had to be photographed for determining the position of the spectral lines of the Solar Corona; white enamelled caps had to be graduated and adjusted to the slits of the spectroscopes, for readily observing the exact distance from the centre of the sun of the light passing through the spectroscope; and many other modifications of the instruments completed, before the telescopes passed out of the hands of the assistants of the observatory. The Report of the Expedition will shortly appear in the transactions of the R.S.



Stonyhurst Observatory.

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

METEOROLOGICAL REPORT.

January, 1886.

Results of Observations taken during the month.	Mean for the last 39 years.	
Mean Reading of the Barometer	29'197	29'417
Highest " on the 11th.....	29'714	30'019
Lowest " on the 18th.....	28'571	28'566
Range of Barometer Readings.....	1'143	1'453
Highest Reading of a Max. Therm. on the 3rd	51'2	51'6
Lowest Reading of a Min. Therm. on the 18th	15'3	21'1
Range of Thermometer Readings	35'9	30'5
Mean of all the Highest Readings	39'7	42'1
Mean of all the Lowest.....	28'2	32'6
Mean Daily Range	11'5	9'5
Deduced Monthly Mean (from Mean of Max. and Min.)	33'8	37'2
Mean Temperature from dry bulb	34'7	37'2
Adopted Mean Temperature	34'3	37'2
Mean Temperature of Evaporation	32'9	35'9
Mean Temperature of Dew Point	30'6	33'9
Mean elastic force of Vapour	0'171 in	0'196 in
Mean weight of Vapour in a cubic foot of air	2'1 gr	2'3 gr
Mean additional weight required for saturation.....	0'4 gr	0'4 gr
Mean degree of Humidity (saturation 1'00)	0'85	0'86
Mean weight of a cubic foot of air	548'6 gr	549'0 gr
Fall of Rain	7'254 in	4'292 in
Number of days on which Rain fell	22	16'5
Amount of Evaporation	1'378 in	0'862 in

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
		1	8	2	2	0	2	11
Mean Velocity in miles per hour	11.2	8.7	6.0	10.5	0	11.7	15.5	10.9
Total No. of miles for each Direct on	269	1665	287	506	0	564	4097	1304

The total number of miles registered during the month was 8692.

The max. Velocity of the wind was 36 miles per hour ; direction S.S.W. on the 16th at 6 p.m.

Mean amount of Cloud (an overcast sky being indicated by 10.0) 8.3

In the month of January, the highest reading of the Barometer

during 39 years, was on the 18th, in 1882, and was 30.480

The lowest ,, ,, 26th, 1884 27.803

The highest Temperature ,, 7th, 1877 59.9

The lowest ,, ,, 15th, 1881 4.6

The highest adopted mean temperature of the month, 1875 42.5

The lowest ,, ,, 1881 29.2

Barometer readings were low, and the range of Barometer readings small. Temperature low, and range of Temperature large. Rainfall three inches in excess of the mean for January during the 39 years. The prevailing wind was West.

February, 1886.

Results of Observations taken during the month.	Mean for the last 39 years.	
Mean Reading of the Barometer.....	29·723	29·482
Highest „ on the 8th	30·218	30·052
Lowest „ on the 1st	28·729	28·654
Range of Barometer Readings.....	1·489	1·398
Highest Reading of a Max. Therm. on the 13th... ..	49·1	51·9
Lowest Reading of a Min. Therm. on the 25th.....	19·2	23·0
Range of Thermometer Readings.....	29·9	28·9
Mean of all the Highest Readings	39·4	44·2
Mean of all the Lowest.....	28·7	34·0
Mean Daily Range	10·7	10·2
Deduced Monthly Mean(from Mean of Max. and Min.)	33·7	38·9
Mean Temperature from dry bulb	34·2	38·8
Adopted Mean Temperature	34·0	38·9
Mean Temperature of Evaporation.....	32·9	37·0
Mean Temperature of Dew Point	31·0	35·0
Mean elastic force of Vapour	0·174 in	0·193 in
Mean weight of Vapour in a cubic foot of air	2·1gr	2·4gr
Mean additional weight required for saturation.....	0·3gr	0·4gr
Mean degree of Humidity (saturation 1·00)	0·86	0·87
Mean weight of a cubic foot of air	558·3gr	54·3gr
Fall of Rain	1·066 in	3·681 in
Number of days on which Rain fell.....	13	17·6
Amount of Evaporation	0·890 in	0·981 in

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
		0	10	6	1	2	4	5
Mean Velocity in miles per hour	0	3·4	8·6	3·0	8·2	4·6	10·8	0
Total No. of miles for each Direction	0	818	1236	72	393	439	1293	0

The total number of miles registered during the month was 4251.
 The max. Velocity of the wind was 38 miles per hour ; direction S., at 6 a.m., on the 14th.

Mean amount of Cloud (an overcast sky being indicated by 10·0)...	7·5
In the month of February, the highest reading of the Barometer during 39 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

Barometer readings were slightly in excess of the mean for 39 years. The Temperature was low, and the Rainfall was more than $2\frac{1}{2}$ inches below the average. The prevailing wind was from N.E., but the strongest winds were from South and West.

March, 1886.

Results of Observations taken during the month.	Mean for the last 39 years.	
Mean Reading of the Barometer.....	29'501	29'473
Highest ,, on the 11th.....	30'090	30'079
Lowest ,, on the 2nd	28'821	28'722
Range of Barometer Readings.....	1'269	1'357
Highest Reading of a Max. Therm. on the 24th.....	62'9	56'9
Lowest Reading of a Min. Therm. on the 6th	11'5	23'0
Range of Thermometer Readings	51'4	33'6
Mean of all the Highest Readings	44'7	47'0
Mean of all the Lowest.....	32'1	34'4
Mean Daily Range	12'6	12'6
Deduced Monthly Mean(from Mean of Max. and Min.)	37'4	39'7
Mean Temperature from dry bulb	38'5	40'0
Adopted Mean Temperature	38'0	39'9
Mean Temperature of Evaporation.....	36'0	38'0
Mean Temperature of Dew Point	33'3	35'4
Mean elastic force of Vapour	0'190 in	0'207 in
Mean weight of Vapour in a cubic foot of air	2'2gr	2'4gr
Mean additional weight required for saturation.....	0'5gr	0'5gr
Mean degree of Humidity (saturation 1'00)	0'83	0'85
Mean weight of a cubic foot of air	549'9gr	546'6gr
Fall of Rain.....	3'670 in	3'157 in
Number of days on which Rain fell	16	17'8
Amount of Evaporation	1'803 in	1'738 in

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
	3	3	9	4	1	4	7	0
Mean Velocity in miles per hour	8'1	9'9	9'5	9'0	10'4	16'4	14'1	0
Total No. of miles for each Direction	585	713	2044	866	250	1577	2361	0

The total number of miles registered during the month was 8396.
The max. Velocity of the wind was 49 miles per hour, direction W.S.W., on the 31st, at 11 a.m.

Mean amount of Cloud (an overcast sky being indicated by 10'0)...	8'0
In the month of March, the highest reading of the Barometer during 39 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 ,, ,, 6th, 1886.....	11'5
The highest adopted mean temperature of the month, 1871.....	44'0
The lowest ,, ,, 1855.....	35'6

Barometer readings differed little from the average. The mean Temperature was slightly lower than usual, and the range very great. The minimum on the 6th (11-5), was the lowest ever observed here during March. Rainfall a little above average. The prevailing Wind was N.E., and the heaviest winds from W.S.W.

April, 1886.

Results of Observations taken during the month.	Mean for the last 39 years.	
Mean Reading of the Barometer.....	29'491	29'477
Highest ,, on the 15th.....	29'921	29'962
Lowest ,, on the 8th	28'649	28'770
Range of Barometer Readings.....	1'272	1'192
Highest Reading of a Max. Therm. on the 27th.....	68'1	66'3
Lowest Reading of a Min. Therm. on the 29th	24'7	28'5
Range of Thermometer Readings	43'4	37'8
Mean of all the Highest Readings.....	53'0	54'1
Mean of all the Lowest	36'2	38'0
Mean Daily Range	16'1	16'1
Deduced Monthly Mean (from Mean of Max. and Min.)	43'1	44'6
Mean Temperature from dry bulb.....	43'3	44'7
Adopted Mean Temperature	43'2	44'7
Mean Temperature of Evaporation	40'2	41'8
Mean Temperature of Dew Point	36'6	38'4
Mean elastic force of Vapour	0'217 in	0'238 in
Mean weight of Vapour in a cubic foot of air	2'5 gr	2'7 gr
Mean additional weight required for saturation	0'7 gr	0'7 gr
Mean degree of Humidity (saturation 1'00)	0'78	0'80
Mean weight of a cubic foot of air.....	543'8 gr	541'6 gr
Fall of Rain	3'625 in	2'332 in
Number of days on which Rain fell	18	14'9
Amount of Evaporation	2'575 in	2'468 in

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
	0	11	4	0	1	3	9	2
Mean Velocity in miles per hour	0	9'6	9'5	0	22'8	14'6	15'2	8'7
Total No. of miles for each Direction	0	2533	915	0	548	1052	3275	420

The total number of miles registered during the month was 8743.
 The max. Velocity of the wind was 41 miles per hour, direction W., on the 6th, at 1 p.m.

Mean amount of Cloud (an overcast sky being indicated by 10·0)...	7·9
In the month of April, the highest reading of the Barometer during 39 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 ,, ,, 4th, 1885.....	21·1
The highest adopted mean temperature of the month, 1865.....	48·5
The lowest ,, ,, 1879.....	40·7

Barometer and Thermometer readings were close to average. The range of Temperature was rather great. The Rainfall and number of wet days was in excess of previous years. The prevailing wind was NE, and the strongest from the South and West.

May, 1886.

Results of Observations taken during the month.	Mean for the last 39 years.	
Mean Reading of the Barometer.....	29'498	29'502
Highest ,, on the 5th	30'018	29'960
Lowest ,, on the 13th	28'898	28'935
Range of Barometer Readings	1'120	1'025
Highest Reading of a Max. Therm. on the 7th	70'1	71'8
Lowest Reading of a Min. Therm. on the 1st.....	32'1	31'4
Range of Thermometer Readings	38'0	40'4
Mean of all the Highest Readings.....	56'9	59'7
Mean of all the Lowest	41'5	42'1
Mean Daily Range	15'4	17'6
Deduced Monthly Mean (from Mean of Max. and Min.)	47'5	49'2
Mean Temperature from dry bulb	48'0	49'5
Adopted Mean Temperature	47'8	49'4
Mean Temperature of Evaporation	44'3	46'2
Mean Temperature of Dew Point	40'5	42'7
Mean elastic force of Vapour	0'252 in	0'275 in
Mean weight of Vapour in a cubic foot of air	2'9 gr	3'2 gr
Mean additional weight required for saturation	0'8 gr	0'9 gr
Mean degree of Humidity (saturation 1'00).....	0'76	0'76
Mean weight of a cubic foot of air	538'7 gr	537'0 gr
Fall of Rain.....	6'224 in	2'619 in
Number of days on which Rain fell	22	15'6
Amount of Evaporation.....	1'484 in	3'681 in

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
	1	8	5	1	0	4	10	2
Mean Velocity in miles per hour	16'5	9'5	10'0	9'2	0	12'1	8'4	15'1
Total No. of miles for each Direction	397	1831	1204	221	0	1165	2014	723

The total number of miles registered during the month was 7555.
The max. Velocity of the wind was 39 miles per hour, direction W.N.W., on the 15th, at 3 p.m.

Mean amount of Cloud (an overcast sky being indicated by 10'0)...	8'4
In the month of May, the highest reading of the Barometer during 39 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

Barometer and Thermometer did not differ much from the mean for May; but the Rainfall was more than $3\frac{1}{2}$ inches above the small average for this month. The prevailing wind was W., and the strongest winds from W.N.W.

June, 1886.

Results of Observations taken during the month.		Mean for the last 39 years
Mean Reading of the Barometer	29'573	29'527
Highest ,, on the 30th	29'890	29'876
Lowest ,, on the 12th	29'233	29'015
Range of Barometer Readings	0'657	0'861
Highest Reading of a Max. Therm. on the 19th...	76'7	76'6
Lowest Reading of a Min. Therm. on the 26th.....	38'6	39'1
Range of Thermometer Readings.....	38'1	37'5
Mean of all the Highest Readings ..	64'9	65'2
Mean of all the Lowest	45'9	47'9
Mean Daily Range.....	19'0	17'3
Deduced Monthly Mean (from Mean of Max. and Min.)	53'6	54'8
Mean Temperature from dry bulb	53'8	54'7
Adopted Mean Temperature.....	53'7	54'8
Mean Temperature of Evaporation.....	50'3	52'0
Mean Temperature of Dew Point.....	47'0	48'6
Mean elastic force of Vapour.....	0'322 in	0'357 in
Mean weight of Vapour in a cubic foot of air.....	3'6 gr	3'9 gr
Mean additional weight required for saturation.....	0'9 gr	0'9 gr
Mean degree of Humidity (saturation 1'00)	0'75	0'79
Mean weight of a cubic foot of air	533'4 gr	543'2 gr
Fall of Rain.....	2'962 in	3'759 in
Number of days on which Rain fell.....	8	16'8
Amount of Evaporation.....	3'767 in	3'681 in

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
		0	6	2	1	0	2	14
Mean Velocity in miles per hour	0	5'9	5'9	9'0	0	7'9	10'4	10'7
Total No. of miles for each Direction	0	848	285	215	0	378	3493	1284

The total number of miles registered during the month was 6503.
 The max. Velocity of the wind was 38 miles per hour, direction W.
 on the 15th, at 11 a.m.

Mean amount of Cloud (an overcast sky being indicated by 10·0)...	7·5
In the month of June, the highest reading of the Barometer during 39 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

Barometer and Thermometer readings very close to average. Rainfall light, and number of rainy days small. The prevailing wind was West.

July, 1886.

Results of Observations taken during the month.	Mean for the last 39 years.	
Mean Reading of the Barometer	29'463	29'506
Highest ,, on the 3rd.....	29'918	29'878
Lowest ,, on the 14th	28'922	29'004
Range of Barometer Readings	0'996	0'864
Highest Reading of a Max. Therm. on the 1st	79'5	79'0
Lowest Reading of a Min. Therm. on the 9th	39'8	42'2
Range of Thermometer Readings	39'7	26'8
Mean of all the Highest Readings	66'9	67'9
Mean of all the Lowest	50'1	50'9
Mean Daily Range.....	16'8	17'0
Deduced Monthly Mean (from Mean of Max. and Min.)	56'6	57'5
Mean Temperature from dry bulb	57'6	57'9
Adopted Mean Temperature.....	57'1	57'7
Mean Temperature of Evaporation	53'9	55'0
Mean Temperature of Dew Point.....	50'9	52'4
Mean elastic force of Vapour.....	0'373 in	0'395 in
Mean weight of Vapour in a cubic foot of air.....	4'2 gr	4'5 gr
Mean additional weight required for saturation.....	1'3 gr	1'0 gr
Mean degree of Humidity (saturation 1'00).....	0'80	0'82
Mean weight of a cubic foot of air	527'8 gr	527'2 gr
Fall of Rain	5'047 in	4'256 in
Number of days on which Rain fell	16	18'1
Amount of Evaporation	2'721 in	3'976 in

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
		0	1	1	1	5	3	16
Mean Velocity in miles per hour	0	7'3	3'9	10'4	10'2	8'7	10'2	6'6
Total No. of miles for each Direction	0	175	94	250	1229	626	3926	638

The total number of miles registered during the month was 6938.
 The max. Velocity of the wind was 36 miles per hour ; direction W.
 by N., on the 14th, at noon.

Mean amount of Cloud (an overcast sky being indicated by 10'0)...	7'8
In the month of July, the highest reading of the Barometer during 39 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 Temperature was large. The mean Temperature and Barometer close to average. The Rainfall was rather higher than usual. Prevailing wind West.

August, 1886.

Results of Observations taken during the month		Mean for the last 39 years.
Mean Reading of the Barometer	29'552	29'491
Highest " on the 19th	29'872	29'889
Lowest " on the 13th	29'059	28'958
Range of Barometer Readings	0'813	0'931
Highest Reading of a Max. Therm. on the 30th ...	79'2	77'3
Lowest Reading of a Min. Therm. on the 3rd	38'5	41'7
Range of Thermometer Readings.....	40'7	35'6
Mean of all the Highest Readings	67'8	67'3
Mean of all the Lowest	51'1	50'5
Mean Daily Range.....	16'7	16'8
Deduced Monthly Mean (from Mean of Max. and Min.)	57'7	57'2
Mean Temperature from dry bulb	57'7	57'5
Adopted Mean Temperature.....	57'7	57'4
Mean Temperature of Evaporation	54'9	54'7
Mean Temperature of Dew Point.....	52'4	52'0
Mean elastic force of Vapour.....	0'395 in	0'391 in
Mean weight of Vapour in a cubic foot of air.....	4'4 gr	4'3 gr
Mean additional weight required for saturation.....	1'2 gr	0'9 gr
Mean degree of Humidity (saturation 1'00)	0'82	0'83
Mean weight of a cubic foot of air	528'6 gr	527'3 gr
Fall of Rain	2'347 in	4'731 in
Number of days on which Rain fell	16	18'7
Amount of Evaporation		3.026 in

No of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
		0	0	3	1	0	4	19
Mean Velocity in miles per hour	0	0	5'3	7'7	0	10'9	7'1	8'2
Total No. of miles for each Direction	0	0	379	186	0	1044	3222	788

The total number of miles registered during the month was 5619.
The max. Velocity of the wind was 26 miles per hour ; direction W.
by N., 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 August, the highest reading of the Barometer during 39 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 & 1884	61'0
The lowest ,, ,, 1848.....	52'5

Barometer and Thermometer close to average. Range of Thermometer rather large. Rainfall more than two inches below average. Prevailing wind West.

Evaporation dish out of order during the month.

September, 1886.

Results of Observations taken during the month.	Mean for the last 39 years.	
Mean Reading of the Barometer	29'591	29'503
Highest ,, on the 15th	30'167	30'027
Lowest ,, on the 9th	29'186	28'838
Range of Barometer Readings	0'981	1'189
Highest Reading of a Max. Therm. on the 4th.....	74'8	72'1
Lowest Reading of a Min. Therm. on the 15th.....	36'1	36'7
Range of Thermometer Readings.....	38'7	35'4
Mean of all the Highest Readings	63'3	62'3
Mean of all the Lowest	47'7	47'0
Mean Daily Range.....	15'6	15'3
Deduced Monthly Mean (from Mean of Max. and Min.)	54'2	53'4
Mean Temperature from dry bulb	54'9	54'1
Adopted Mean Temperature.....	54'6	53'8
Mean Temperature of Evaporation	51'1	51'1
Mean Temperature of Dew Point.....	47'8	48'5
Mean elastic force of Vapour.....	0'332 in	0'341 in
Mean weight of Vapour in a cubic foot of air	3'7 gr	3'9 gr
Mean additional weight required for saturation.....	0'8 gr	0'8 gr
Mean degree of Humidity (saturation 1'00)	0'78	0'82
Mean weight of a cubic foot of air	532'7 gr	532'2 gr
Fall of Rain	4'969 in	4'585 in
Number of days on which Rain fell.....	14	18'3
Amount of Evaporation.....	2'523 in	2'339 in

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
		2	7	3	0	3	7	6
Mean Velocity in miles per hour	6'2	8'9	8'0	0	8'8	13'5	10'9	3'2
Total No. of miles for each Direction	298	1502	578	0	631	2272	1566	154

The total number of miles registered during the month was 7001.
The max. Velocity of the wind was 35 miles per hour ; direction S. by W., on the 9th, at 8 p.m.

Mean amount of Cloud (an overcast sky being indicated by 10·0)...	7·6
In the month of September, the highest reading of the Barometer during 39 years, was on the 15th, in 1851, and was.....	30·274
The lowest ,, ,, 2nd, 1883	28·323
The highest Temperature ,, 6th, 1868.....	85·0
The lowest ,, ,, 25th, 1885	29·8
The highest adopted mean temperature of the month, 1865.....	59·1
The lowest ,, ,, 1863.....	50·9

The mean reading of the Barometer was almost identical with that of former years. Thermometer readings slightly higher than average. Rainfall close to average. Prevailing wind S.W.

October, 1886.

Results of Observations taken during the month.	Mean for the last 39 years.	
Mean Reading of the Barometer.....	29'369	29'416
Highest „ on the 24th.....	30'004	30'001
Lowest „ on the 21st.....	28'688	28'648
Range of Barometer Readings.....	1'316	1'353
Highest Reading of a Max. Therm. on the 5th	67'3	64'3
Lowest Reading of a Min. Therm. on the 21st.....	36'1	29'7
Range of Thermometer Readings	31'2	34'6
Mean of all the Highest Readings	57'4	54'7
Mean of all the Lowest.....	45'1	42'0
Mean Daily Range	12'3	12'7
Deduced Monthly Mean(from Mean of Max. and Min.)	50'3	47'4
Mean Temperature from dry bulb	51'0	48'0
Adopted Mean Temperature	50'7	47'7
Mean Temperature of Evaporation.....	48'3	45'4
Mean Temperature of Dew Point	45'8	43'0
Mean elastic force of Vapour	0'310 in	0'279 in
Mean weight of Vapour in a cubic foot of air	3'2gr	3'0gr
Mean additional weight required for saturation.....	0'8gr	0'6gr
Mean degree of Humidity (saturation 1'00)	0'84	0'84
Mean weight of a cubic foot of air	534'7gr	542'9gr
Fall of Rain.....	5'155 in	5'218 in
Number of days on which Rain fell	21	21'4
Amount of Evaporation	2'102 in	1'743 in

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
	1	9	6	3	2	6	4	0
Mean Velocity in miles per hour	4'4	7'5	12'3	10'4	3'8	8'4	8'2	0
Total No. of miles for each Direction	105	1630	1766	749	182	1211	784	0

The total number of miles registered during the month was 6427.
 The max. Velocity of the wind was 33 miles per hour; direction S., on the 12th, at noon.

Mean amount of Cloud (an overcast sky being indicated by 10'0)...	8'2
In the month of October, the highest reading of the Barometer during 39 years, was on the 5th, in 1884, and was	30'306
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

The Temperature was rather high, and its range small. Barometer close to average. The Rainfall and number of rainy days were also close to the mean of previous years. Prevailing wind N. E.

November, 1886.

Results of Observations taken during the month.	Mean for the last 39 years.	
Mean Reading of the Barometer.....	29'44I	29'452
Highest „ on the 24th	30'292	30'055
Lowest „ on the 6th	28'487	28'584
Range of Barometer Readings	1'805	1'47I
Highest Reading of a Max. Therm. on the 1st	57'1	55'7
Lowest Reading of a Min. Therm. on the 30th	29'3	25'7
Range of Thermometer Readings	27'8	30'0
Mean of all the Highest Readings.....	48'0	46'9
Mean of all the Lowest	37'1	36'1
Mean Daily Range	10'9	10'8
Deducted Monthly Mean (from Mean of Max. and Min.)	42'2	41'5
Mean Temperature from dry bulb	43'1	41'4
Adopted Mean Temperature	42'7	41'5
Mean Temperature of Evaporation	41'1	39'0
Mean Temperature of Dew Point	39'2	37'6
Mean elastic force of Vapour	0'239 in	0'225 in
Mean weight of Vapour in a cubic foot of air	2'7 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	0'87
Mean weight of a cubic foot of air.....	543'0 gr	544'9 gr
Fall of Rain	3'967 in	4'150 in
Number of days on which Rain fell	25	19'1
Amount of Evaporation	1'627 in	1'463 in

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
		2	3	2	1	2	10	9
Mean Velocity in miles per hour	11'5	5'2	7'8	5'1	11'3	8'7	9'0	14'0
Total No. of miles for each Direction	551	377	374	122	540	2099	1944	336

The total number of miles registered during the month was 6343.
The max. Velocity of the wind was 43 miles per hour ; direction S. by E.

Mean amount of Cloud (an overcast sky being indicated by 10·0)...	8·7
In the month of November, the highest reading of the Barometer during 39 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, 1881.....	47·0
The lowest ,, ,, 1851.....	36·7

The range of Barometer readings was rather large. The Temperature was high, and the range of Thermometer readings small. The fall of rain did not differ much from the average, but the number of wet days was large. The prevailing wind was from S. W.

December, 1886.

Results of Observations taken during the month.	Mean for the last 39 years.	
Mean Reading of the Barometer.....	29·247	29·448
Highest ,, on the 31st.....	30·145	30·061
Lowest ,, on the 8th	27·350	28·593
Range of Barometer Readings.....	2·795	1·468
Highest Reading of a Max. Therm. on the 5th	50·2	53·0
Lowest Reading of a Min. Therm. on the 19th.....	12·2	20·2
Range of Thermometer Readings.....	38·0	32·8
Mean of all the Highest Readings	39·6	42·9
Mean of all the Lowest.....	27·5	33·1
Mean Daily Range	12·1	9·8
Deduced Monthly Mean(from Mean of Max.and Min.)	33·6	38·0
Mean Temperature from dry bulb	34·9	38·7
Adopted Mean Temperature	34·3	38·4
Mean Temperature of Evaporation.....	32·7	37·1
Mean Temperature of Dew Point	30·0	35·1
Mean elastic force of Vapour	0·167 in	0·206 in
Mean weight of Vapour in a cubic foot of air	2·0gr	2·4gr
Mean additional weight required for saturation.....	0·4gr	0·4gr
Mean degree of Humidity (saturation 1·00)	0·84	0·87
Mean weight of a cubic foot of air	549·3gr	547·9gr
Fall of Rain	6·591 in	5·495 in
Number of days on which Rain fell.....	22	20·0
Amount of Evaporation	1·865 in	1·053 in

No. of days in the month on which the prevailing wind was	N	NE	E	SE	S	SW	W	NW
		3	5	0	0	4	1	12
Mean Velocity in miles per hour	3·5	5·8	0	0	13·9	29·3	14·6	7·4
Total No. of miles for each Direction	252	701	0	0	1331	704	4204	1066

The total number of miles registered during the month was 8258.
 The max. Velocity of the wind was 48 miles per hour ; direction S. E.
 by E. at 7 a.m., on the 8th.

Mean amount of Cloud (an overcast sky being indicated by 10'0)...			7'0
In the month of December, the highest reading of the Barometer			
during 39 years, was on the 22nd in 1849, and was			30'378
The lowest	„	„	8th, 1886.....
			27'350
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 Barometer readings were low, and the range of readings very large. The Temperature was low, and the Rainfall heavy. The prevailing wind was West.

Summary of the Observations FOR 1886.

		Mean for the last 39 years
Mean Reading of the Barometer	29'449	29'482
Highest ,, on November 24th	30'292	30'288
Lowest ,, on December 8th	27'850	28'252
Range of Barometer Readings	2'442	2'036
Highest Reading of a Max. Therm. on July 1st ...	79'5	81'5
Lowest Reading of a Min. Therm. on March 6th...	11'5	15'8
Range of Thermometer Readings.....	68'0	65'7
Mean of all the Highest Readings ..	53'5	54'7
Mean of all the Lowest	39'3	40'8
Mean Daily Range.....	14'2	13'9
Deduced Yearly Mean (from Mean of Max. and Min.)	45'3	46'8
Mean Temperature of dry bulb.....	46'0	46'9
Adopted Mean Temperature.....	45'7	46'9
Mean Temperature of Evaporation.....	43'2	44'5
Mean Temperature of Dew Point.....	40'4	42'0
Mean elastic force of Vapour.....	0'262 in	0'275 in
Mean weight of Vapour in a cubic foot of air.....	3'0gr	3'3 gr
Mean additional weight required for saturation.....	0'7gr	0'7 gr
Mean degree of Humidity (saturation 1'00)	0'82	0'84
Mean weight of a cubic foot of air	540'7gr	539'2 gr
Total Fall of Rain in the Year.....	52'877 in	47'695 in
Number of days per Month on which Rain fell.....	17'8	18'3
Amount of Evaporation.....		

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 January, 1844, and was	2'409
The least ,, ,, in July, 1852, and was	0'505
The highest reading of the Barometer, during 39 years, was on January 18th, 1882, and was	30'480
The lowest ,, ,, on December 8th, 1886, and was...	27'350
Extreme range	3'130
The highest temperature was on July 15th, 1868, and was	88'2
The lowest ,, ,, January 15th, 1881	4'6
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	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 ,, ,, ,, ,, March, 1852	0'047
The greatest number of days on } which rain fell in one month } July, 1861, December, 1868	31
The least ,, ,, March, 1852.....	3

DATES OF OCCASIONAL PHENOMENA.

1886.	Frost.	Hoar frost only.	Snow.	Hail.
January	1-27, 29-31	19	6, 10, 17, 18, 20, 23, 24, 25, 27, 31	5, 15, 16, 31
February	1-7, 12-28	4, 24, 25, 26, 27	14, 15, 20, 21, 23, 28	1
March	1-18, 31	7, 8, 9, 12, 13, 15	1, 2, 6, 15, 16, 17	31
April	6, 7, 9-11, 16, 20, 24, 28-30		10, 11	6, 8
May	1, 12, 14, 15		12	14, 15, 28
June				23
July				
August	23			
September	22, 23	22		13
October	2, 3, 7-9, 11, 13, 16, 18, 19, 22	12	14, 18, 19, 27	30
November	1-11, 13-31	3, 13, 16, 17, 20, 21, 27, 30, 31		1, 4, 7, 8, 9,
December				24, 27, 28

1886.	Heavy Rain.	Fog.	Thunder.	Lightning.	Lunar Halo.	Solar Halo.
January		8, 9, 10, 11	30	30		
February		22	31	27, 31		
March		14		27	15	7-12
April	8		30			7
May	20		1, 9	1, 9		7
June	1, 9, 23		21, 25	21, 25		
July	21		13			
August		19, 24	4	4		
September	8, 26, 27		10, 19	19, 21		
October	10	22				
November	29, 30	23, 24, 25, 26, 27	8, 12	12, 18	3, 6, 13, 24	
December	11					

SUN OBSERVATIONS AT STONYHURST IN 1886.

Number of Days on which each Observation was made.

	Sunshine Record.	Amount of Sun-shine expressed in hours.	Drawings of Sun $\frac{1}{2}$ inches to diameter.	Other drawings of Sun and Solar notes.	Entire Chromosphere measured.	Chromosphere partially measured.	Spot spectra observations.
January	15	37.6	14	3	9		3
February.....	16	48.9	16		8		2
March.....	21	82.5	18	1	10		11
April	27	145.5	24	2	11	1	18
May.....	22	127.0	21	1	6	1	3
June.....	27	161.1	23	1	8		3
July.....	26	175.1	22	1	10		3
August	31	146.6	24	1	5		
September	25	123.8	17		7		
October	26	71.7	17	1	10		
November	15	55.5	10	2	6		2
December	18	60.1	17	1	11		3
Totals	269	1235.4	223	14	101	2	48

TOTAL AMOUNT OF SUNSHINE RECORDED ON EACH DAY.

MONTH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
January	0	0	0	1.1	0	1.9	0	0	5.2	0	4.1	0	3.9	4.3	0.1	0.4	0.2
February.....	0.5	1.6	0.8	7.1	3.2	4.3	0	0	0	0	0	3.7	0.3	4.2	3.6	0	0
March	0	0.1	4.0	0	7.7	8.0	7.4	5.8	7.8	2.8	9.2	3.5	1.7	0.1	1.4	0.2	0
April	1.9	5.2	8.4	1.2	1.4	6.6	0	0.9	3.2	1.8	6.2	9.5	0.1	0.6	2.9	4.2	4.9
May.....	6.5	8.0	0	7.2	10.0	11.0	6.9	0	0	2.2	0	0	0	5.9	10.1	4.5	0
June.....	0	3.6	6.8	7.3	10.4	12.2	4.2	2.5	1.0	1.0	4.7	5.8	8.7	0	9.9	1.1	1.3
July.....	12.9	13.9	12.4	9.9	5.1	1.4	12.7	6.5	3.3	8.9	0	4.6	1.5	8.4	4.6	9.1	0
August	11.8	9.8	11.8	8.9	3.0	0.5	4.9	6.1	5.4	5.4	7.7	2.0	2.7	8.6	3.8	4.0	7.4
September	6.2	0.6	8.0	3.5	1.9	2.4	8.8	0.8	4.0	5.4	0	0	0.1	6.8	10.0	9.7	8.0
October	0	7.3	7.6	0.6	3.4	0	0.6	0.2	2.0	6.3	2.2	0.2	2.6	4.4	0	0.5	1.9
November	4.0	6.2	0	4.7	0	0	6.4	0	3.9	5.3	1.6	0	0	1.1	0.4	4.2	1.7
December	4.3	6.3	0	4.3	0	0	1.7	0.8	0.3	4.2	0	0	2.7	0	0	5.2	3.3

TOTAL AMOUNT OF SUNSHINE RECORDED ON EACH DAY.

(Continued.)

MONTH.	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Monthly Total.	Approximate per centage each Month.
January.....	3'0	0	4'4	0	5'5	0	0	0	0	0	0'1	0	1'6	1'8	37'6	20'2
February.....	0'4	0	0	0	0	3'7	0	2'0	7'1	5'0	1'4	0	0	0	48'9	21'8
March.....	0	0	0	0	1'7	0	5'3	2'0	0'1	0	7'4	4'5	0	1'8	82'5	26'6
April.....	0	8'1	10'9	12'5	0'4	6'6	1'0	1'3	11'1	11'9	0	9'9	12'8	0	145'5	40'4
May.....	2'2	6'8	0'4	5'6	5'2	0'7	1'1	0	10'0	0	3'5	7'9	7'0	4'3	127'0	29'3
June.....	1'8	11'1	6'5	2'2	0	5'2	5'0	0'4	7'9	12'9	14'1	9'1	4'4	0	161'1	30'6
July.....	4'9	4'8	11'2	4'3	5'5	0'1	6'3	1'5	0	2'7	8'5	0	0	10'1	175'1	30'9
August.....	2'2	1'6	4'7	0'1	1'0	4'5	5'0	0'4	3'2	1'7	6'7	1'5	6'5	3'7	146'6	36'4
September.....	8'4	7'0	2'8	7'1	7'2	0'2	0	0	7'5	0	6'1	0'8	0'5	0	123'8	39'3
October.....	0'4	0'4	3'7	0'2	1'8	6'4	4'6	5'1	5'9	2'2	0	0	0'2	1'0	71'7	25'4
November.....	6'9	0	0	4'5	0	0	0	0	0	0	0	0'8	3'8	0	55'5	26'4
December.....	3'8	0	5'2	0	0	2'9	0'2	4'4	0	5'6	0	0'2	4'7	0	60'1	32'3

MONTHLY TABLES FOR EACH HOUR OF RECORDED SUNSHINE.

Local apparent time.	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9
January.....	0	0	0	0	0.1	3.4	6.4	8.3	7.2	6.7	4.9	0.6	0	0	0	0	0
February	0	0	0	0	2.9	5.7	7.8	10.3	6.3	7.4	5.9	2.3	0.9	0	0	0	0
March	0	0	0	1.4	6.6	8.9	11.5	10.8	8.9	8.2	8.9	10.5	6.6	0.1	0	0	0
April	0	2.3	6.5	9.5	12.9	11.1	11.6	12.8	13.8	13.9	13.8	14.2	11.6	8.5	3.0	0	0
May	0	1.9	6.9	9.1	9.8	9.6	10.4	10.5	11.9	12.8	11.5	9.8	7.9	5.6	7.2	2.0	0
June	1.6	4.0	7.0	9.9	10.1	12.3	10.9	12.6	12.3	14.3	14.1	13.3	14.6	12.4	9.4	3.3	0
July	1.5	7.4	8.4	10.0	13.3	12.0	11.9	13.4	12.9	15.0	14.9	15.6	14.9	12.8	8.9	2.4	0
August	0	1.2	4.1	6.2	10.0	10.7	13.5	14.0	14.7	16.1	15.2	12.4	11.1	10.0	6.8	0.6	0
September	0	0	1.3	7.2	12.0	14.5	13.0	11.0	10.8	13.0	11.2	12.4	8.7	8.7	0	0	0
October.....	0	0	0	0.9	6.3	10.1	7.5	10.6	12.3	9.8	7.5	5.4	1.3	0	0	0	0
November.....	0	0	0	0	1.2	6.7	8.3	7.7	9.5	9.6	8.8	3.6	0.1	0	0	0	0
December.....	0	0	0	0	0.2	5.4	11.8	12.8	12.3	9.8	7.8	0	0	0	0	0	0
Total	3.1	16.8	34.2	54.2	85.4	110.4	124.6	134.8	132.9	136.6	124.5	100.1	77.7	58.1	35.3	8.3	0

OBSERVATIONS OF UPPER CLOUDS (CIRRUS).

Date.	G. M. T.	Cloud Direction.	Velocity. (0-6).	Wind.		Direction of Lr. Cls.
				Direction.	Force. (0-12)	
January 7	4 p.m.	N.E.	2	S.W.	2	N.E.
" 11	11 a.m.	W.	1	N.	1	N.N.E.
" 19	2 p.m.	N.	1	N.E.	1	N.
" 22	1.30 p.m.	E.	2	E.	1	E.
February 3	2 p.m.	N.N.E.	2	E.	1	N.N.E.
" 12	9.30 a.m.	W.S.W.	3	W.	0	...
" 12	Noon.	S.W.	3	W.	0	...
" 12	2 p.m.	S.W.	2	S.S.W.	1	...
" 15	2 p.m.	S.S.E.	2	E.	1	...
" 15	3 p.m.	S.S.E.	3	E.	1	S.S.E.
" 20	9.30 a.m.	W.	2	E.	0	N.E.
" 26	9 a.m.	E.N.E.	1	N.E.	0	...
" 27	9 a.m.	N.W.	2	N.E.	1	...
" 27	10 a.m.	N.W.	3	N.E.	1	E.S.E.
" 27	Noon.	W.N.W.	4	E.	1	S.E.
March 3	10 a.m.	E.S.E.	2	N.E.	3	N.W.
" 6	10 a.m.	E.N.E.	3	N.	3	E.N.E.
" 10	4.30 p.m.	N.W.	3	E.	3	S.S.E.
" 13	10 a.m.	N.E.	3	N.E.	1	...
" 15	5 p.m.	E.N.E.	2	E.	1	E.N.E.
" 22	10 a.m.	N.N.E.	1	N.E.	0	W.
" 24	7 a.m.	W.	3	E.S.E.	1	W.S.W.
" 24	9 a.m.	S.S.E.	1	N.E.	1	S.S.E.
" 24	4 p.m.	S.S.E.	2	E.S.E.	2	S.S.E.
" 28	Noon.	S.	3	W.S.W.	1	W.
" 29	4 p.m.	N.	1	W.N.W.	5	S.W.
" 30	7.10 p.m.	W.	2	W.S.W.	3	S.W.
April 2	8 a.m.	S. by W.	1	S.	2	S.S.W.
" 3	8 a.m.	S.S.W.	2	W.S.W.	2	S.S.W.
" 8	5.45 a.m.	W.	3	W.	1	W.
" 9	4 p.m.	W.S.W.	2	W.	5	W.S.W.
" 12	2 p.m.	N.E.	2	W.	4	W.
" 12	4 p.m.	N.N.E.	2	W.	3	W.
" 17	Noon.	N.W.	2	N.E.	3	E.
" 19	4 p.m.	N.N.E.	2	N.E.	2	...
" 20	10 a.m.	S. E. by E.	2	E.	4	...
" 20	Noon.	E.S.E.	2	E.N.E.	4	...
" 20	2 p.m.	E.S.E.	1	N.E.	4	E.S.E.
" 20	4 p.m.	E.	2	E.N.E.	2	E.
May 4	9 a.m.	W.	3	S.	1	W.
" 4	10 a.m.	W.S.W.	2	S.S.E.	2	W.S.W.
" 4	2 p.m.	W.	2	S.W.	2	W.
" 4	6 p.m.	W.S.W.	3	W.	2	W.S.W.
" 5	2 p.m.	S.E.	2	W.	2	W.N.W.
" 5	4 p.m.	S.S.E.	2	W.	2	W.N.W.

OBSERVATIONS OF UPPER CLOUDS (*Continued*).

Date.	G. M. T.	Cloud Direction.	Velocity. (0-6).	Wind.		Direction of Lr. Clds.
				Direction.	Force. (0-12).	
May 6	4 p.m.	W.	2	W.N.W.	1	W.
" 6	6 p.m.	W.	2	W.N.W.	1	W.
" 7	Noon.	S.	1	S.W.	2	N.W.
" 7	2 p.m.	S.S.E.	2	W.N.W.	1	N.W.
" 21	4 p.m.	W.	3	W.	2	W.
" 22	9 a.m.	E.	2	N.E.	1	E.
" 26	3.30 p.m.	S. by E.	2	W.	1	W.
June 4	9.30 a.m.	N.N.E.	3	S.E.	1	N.E.
" 5	9 a.m.	N.	2	E.N.E.	1	N.
" 5	9.30 a.m.	E.	2	S.E.	1	E.
" 6	6 p.m.	N.E.	2	W.N.W.	2	N.W.
" 7	6 p.m.	N.E.	1	W. by S.	1	N.E.
" 13	7 p.m.	S.	2	W.	2	N.W.
" 19	1 p.m.	N.N.W.	1	N.	1	N.W.
" 26	4 p.m.	N.N.E.	2	W. by N.	2	W.
" 28	Noon.	N.E.	1	W. by N.	1	W.
" 28	2 p.m.	N.N.E.	1	W. by N.	1	N.W.
" 28	4 p.m.	N.	1	W.N.W.	1	N.W.
July 4	2.30 p.m.	W.S.W.	1	W.	3	...
" 7	4 p.m.	N.W.	2	W. by N.	2	...
" 10	6.30 p.m.	S.S.W.	2	W.N.W.	1	W.
" 15	11.15 a.m.	W.	1	W. by N.	4	W.
" 15	3 p.m.	N.N.E.	1	W.	5	W.
" 18	11 a.m.	W. by S.	2	S.	2	S.
" 19	1.30 p.m.	N.	2	W. by S.	1	W.S.W.
" 20	7.30 a.m.	E.N.E.	2	S.	1	S.W.
" 22	9 a.m.	S.S.W.	3	S.	6	S.S.W.
" 28	8 a.m.	S.S.E.	2	W.S.W.	1	N.W.
August 2	1.30 p.m.	W. by S.	2	W.N.W.	4	W.S.W.
" 2	6 p.m.	S.	1	N.W. by W.	3	W.S.W.
" 3	11 a.m.	W.	1	W.	2	W.
" 4	2 p.m.	N.W.	1	N.E.	0	N.W.
" 7	3.30 p.m.	S.E.	2	W.	4	W.S.W.
" 15	Noon.	W.	1	S.S.W.	3	W.
" 17	8 a.m.	S. by E.	2	N.W.	3	W.
" 24	6.30 p.m.	N.N.E.	1	N.E. by N.	1	W.
Sept. 3	11 a.m.	S.	2	E. by N.	1	N.W.
" 9	8 a.m.	N.N.E.	1	S.S.W.	3	S.W.
" 10	5.30 p.m.	W.N.W.	1	W. by S.	1	W.N.W.
" 14	2 p.m.	N.E.	2	W. by N.	1	W.
" 14	4 p.m.	E.N.E.	3	N.	2	...
" 16	4 p.m.	N.W.	2	E. by S.	1	E.
" 22	3 p.m.	W.S.W.	3	N.E.	1	N.E.
Oct. 2	8 a.m.	W.	2	W.S.W.	1	N.W.
" 14	4 p.m.	N. by E.	2	W.S.W.	1	S.E.

OBSERVATIONS OF UPPER CLOUDS (*Continued*).

Date.	G. M. T.	Cloud Direction.	Velocity. (0-6).	Wind.		Direction of Lr. Clds.
				Direction.	Force. (0-12).	
Oct. 22	7.30 a.m.	E. S. E.	2	W. S. W.	0	S. W.
" 22	9 a.m.	E.	1	N. N. W.	0	E.
" 23	11 a.m.	E. by S.	3	E. N. E.	0	S. E.
" 27	4.35 p.m.	N.	2	E.	0	N. N. E.
" 28	4 p.m.	S.	2	N. E.	.1	E.
Nov. 7	9 a.m.	W. by S.	2	W.	1	W. by S.
" 11	2 p.m.	E. N. E.	3	N. by E.	1	E. N. E.
" 17	7.30 a.m.	S. by E.	1	S. by W.	0	W.
" 30	1 p.m.	S. S. W.	1	N. W. by W.	2	N.
Dec. 2	3 p.m.	N. E.	1	N. W.	1	...
" 4	11.30 a.m.	N. N. W.	2	N. W. by N.	1	N. W.
" 6	10 a.m.	N. W.	1	S. W.	2	...
" 13	2 p.m.	E.	2	N. E. by N.	1	...
" 16	2.30 p.m.	E. S. E.	3	N. N. E.	1	N. W.

AGRICULTURAL NOTES.

JANUARY was dull, wet and cold. No flowers were in blossom during the month. And the ground was too heavy for working.

FEBRUARY: Cold, with very little sun. A little ploughing was done towards the close in some places. Very few flowers were out.

MARCH.—The first half of the month was cold and the ground covered with snow. The latter portion was wet and dull. Agricultural operations were very much interrupted by rain towards the close of the month.

APRIL.—The weather was rather unsettled, but bright and sunny. Vegetation was late, yet things were looking better at the end of the month. Oats were sown in most places by the end of the third week, and a few of the green crops were in the ground before the close of the month.

MAY.—Although the first few days were fine and warm, the month generally was a bad one for farming, owing to wet and cold. Owing to the broken weather, some of the green crops were not sown before the last few days.

JUNE was at the commencement cold and growth was retarded. The last two weeks were warmer and brighter. Fruit was very late, yet the prospect was better than could have been expected after the unpromising character of the previous month. With the exception of apples and pears there was a good quantity of blossom on the trees.

JULY opened with fine bright weather, and hay looked well. Oats were very poor. Potatoes showed no sign of disease. The latter part of this month was wet and retarded hay-making.

AUGUST was dull and cloudy during the greater part of the month. Hay was got in by about the middle of the month. A few oats were cut towards the close of the last week.

SEPTEMBER.—A warmer month. Wheat was cut about the 14th, and housed by the 29th generally. Oats were all gathered by the 23rd, but only yielded a poor crop.

OCTOBER.—The commencement of the month was fine, but the middle stormy. Apples were gathered towards the end of the month. Pears were almost a failure. Potatoes were begun on the 6th and yielded a fair crop with very little disease. Barley was cut about the 20th. Crops looked well.

NOVEMBER was mild and rather rainy. A great number of wild flowers were in blossom until the end of the third week. Some wheat was sown early in the month, but was not quite all in the ground at the end. All the green crops were gathered in by about the 25th.

DECEMBER was very cold with much snow. Very little work could be done, and in one or two places the wheat was not quite in the ground by the end of the year.

OBSERVATIONS OF CROPS.

GRAIN, ETC.						GREEN CROPS.			
Name.	When Sown.	In Flower.	In Ear.	When Cut.	Name.	When Sown.	Above Ground.	Stored.	
Wheat	Nov.	June	July 13th	Sept.	Potatoes	April—May	May 20th	Sept.—Oct.	
Oats	Mar.—Apl.	June	July 12th	Sept.	Turnips	May	May 20th	September	
Beans	March	June		Sept.	Beet	May	May 25th	October	
					Mangel	May	May 22nd	Oct.—Nov.	

OBSERVATIONS OF TREES AND SHRUBS.

FOREST TREES, ETC.				FRUIT TREES, ETC.			SHRUBS.	
Name.	In Bud.	In Leaf.	Name.	In Blossom.	Ripe,	Name.	In Blossom.	
Field Elm	May 10th	May 27th	Apple	May 9th	Aug. 20th	Lilac	May 25th	
Oak	May 17th	May 28th	Pear	Mar. 29th	Aug. 28th	Laburnum	May 29th	
Sycamore	Ap. 25th	May 17th	Red Currant	Ap. 25th	July 23rd	Red Flowering Currant	Ap. 17th	
Lime	Ap. 19th	May 18th	Black Currant	Ap. 31st	July 25th	Dog Rose	June 28th	
Ash	May 10th	May 28th	Strawberry	May 10th	July 14th	Guelder-Rose	June 21st	
Beech	Ap. 29th	May 16th	Gooseberry	Ap. 20th	Aug. 25th	Woodbine	June 14th	
Horse Chestnut	Ap. 21st	May 4th				Elder	June 17th	
						Yellow Azalea	May 15th	

DATES OF THE FLOWERING OF PLANTS AT STONYHURST
IN 1886.

RANUNCULACEÆ.

Anemone nemorosa	Wood anemone	April 8
Ranunculus Ficaria	Lesser celandine	March 28
R. acris	Meadow crowfoot	May 9
R. repens	Creeping buttercup	May 23
R. bulbosus	Bulbous buttercup	May 20
R. auricomus	Wood crowfoot	April 22
R. lingua	Great spearwort	June 8
R. hederaceus	Ivy-leaved crowfoot	May 29
Caltha palustris	Marsh marigold	April 20
Trollius Europæus	Globe flower	May 20
Aquilegia vulgaris	Columbine	June 22

NYMPHÆACEÆ.

Nymphæa alba	White water lily	June 27
Nuphar lutea	Yellow water lily	June 26

PAPAVERACEÆ.

Papaver rhæas	Red poppy	July 4
Chelidonium majus	Common celandine	June 17

CRUCIFERÆ.

Nasturtium officinale	Common watercress	May 23
Arabis hirsuta	Hairy rock cress	April 21
Cardamine amara	Large bitter cress	May 20
C. pratensis	May flower	May 5
C. hirsuta	Hairy bitter cress	April 10
Sisymbrium officinale	Hedge mustard	May 18
Alliaria officinalis	Garlic mustard	May 9
Brassica campestris	Common wild navel	May 9
Cochlearia Armoracia	Horse radish	June 25
C. officinalis	Scurvy grass	April 24

RESEDACEÆ.

Reseda luteola	Dyer's rocket	June 10
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VIOLACEÆ.

Viola canina	Dog violet	April 14
V. odorata	Sweet violet	March 30
V. palustris	Marsh violet	May 13

POLYGALACEÆ.

Polygala vulgaris	Milkwort	May 30
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CARYOPHYLLACEÆ.

Lychnis vespertina	Evening campion	June 8
L. diurna	Red robin	May 5

DATES OF THE FLOWERING OF PLANTS AT STONYHURST
IN 1886 (*continued*).

L. Githago	Corn cockle	July 11
L. Flos cuculi	Ragged robin	June 15
Sagina procumbens	Procumbent pearlwort	May 30
Silene inflata	Bladder campion	July 3
Arenaria serpyllifolia	Thyme-leaved sandwort	June 7
A. trinervis	Three-nerved sandwort	May 16
Cerastium vulgatum	Mouse-ear chickweed	April 15
Stellaria aquatica	Water starwort	May 22
S. nemorum	Wood starwort	May 15
S. graminea	Lesser starwort	May 26
S. holostea	Great starwort	April 29
S. media	Chickweed	March 15
S. uliginosa	Bog starwort	May 23
HYPERICACEÆ.		
Hypericum perforatum	Common St. John's wort	July 11
H. quadrangulum	Square-stalked St. John's wort	July 14
H. humifusum	Trailing St. John's wort	July 17
H. pulchrum	Slender St. John's wort	July 19
H. hirsutum	Hairy St. John's wort	July 13
LINACEÆ.		
Linum catharticum	Cathartic flax	June 13
MALVACEÆ.		
Malva sylvestris	Common mallow	June 10
GERANIACEÆ.		
G. Phœum	Dusky crane's-bill	May 16
G. sylvaticum	Wood crane's-bill	May 18
G. pratense	Meadow crane's-bill	June 17
G. Robertianum	Herb Robert	May 24
G. lucidum	Shining crane's-bill	May 16
Oxalis acetosella	Wood sorrel	April 19
PAPILIONACEÆ.		
Ononis arvensis	Rest harrow	July 20
Medicago lupulina	Black medic	June 10
Trifolium pratense	Purple clover	May 27
T. repens	White clover	June 10
T. procumbens	Lesser clover	June 8
Lotus corniculatus	Bird's-foot trefoil	June 8
Vicia cracca	Tufted vetch	June 2

DATES OF THE FLOWERING OF PLANTS AT STONYHURST
IN 1886 (*continued*).

V. sepium	Bush vetch	May 23
V. sativa	Common vetch	May 26
Lathyrus pratensis	Meadow pea	June 18
ROSACEÆ.		
Spiræa ulmaria	Meadow sweet	July 1
Geum urbanum	Wood avens	June 8
G. rivale	Water avens	May 4
G. intermedium	Intermediate avens	May 19
Fragaria vesca	Wood strawberry	May 13
Potentilla fragariastrum	Barren strawberry	March 7
P. reptans	Creeping cinque-foil	June 8
P. tormentilla	Tormentil cinque-foil	May 19
P. verna	Spring cinque-foil	May 27
P. Comarum	Marsh cinque-foil	June 28
P. anserina	Silver weed cinque-foil	June 4
Alchemilla vulgaris	Lady's mantle	April 30
A. arvensis	Parsley piert	May 25
Sanguisorba officinalis	Great burnet	July 8
Agrimonia eupatoria	Common agrimony	July 23
Pyrus communis	Pear	April
ONAGRACEÆ.		
Epilobium montanum	Common willow-herb	June 21
E. palustre	Marsh willow-herb	June 20
E. parviflorum	Hoary willow-herb	June 17
E. tetragonum	Square willow-herb	June 22
Circeæ lutetiana	Enchanter's nightshade	July 2
SAXIFRAGACEÆ.		
S. umbrosa	London pride	May 10
Chrysosplenium oppositifolium	{Opposite leaved}	March 28
C. alternifolium	{golden saxifrage}	March 28
	Alternate leaved	
UMBELLIFERÆ.		
Sanicula europæa	Wood sanicle	June 12
Pimpinella magna	Greater sanicle	July 4
Caucalis anthriscus	Hedge parsley	July 12
CAPRIFOLIACEÆ.		
Adoxa moschatellina	Tuberous moscatel	April 22
Lonicera periclymenum	Honeysuckle	July 6
ARALIACEÆ.		
Hedera Helix	Common ivy	Oct. 7

DATES OF THE FLOWERING OF PLANTS AT STONYHURST
IN 1886 (*continued*).

STELLATÆ.		
Galium cruciatum	Crosswort	May 8
G. verum	Yellow bedstraw	
G. palustre	Marsh bedstraw	
G. uliginosum	Swamp bedstraw	May 20
G. saxatile	Heath bedstraw	June 14
G. aparine	Cleavers	June 15
Asperula adorata	Sweet woodruff	May 15
VALERIANÆÆ.		
Valeriana dioica	Marsh valerian	May 15
V. officinalis	Common valerian	July 6
DIPSACÆÆ.		
Scabiosa arvensis	Field scabious	June 27
COMPOSITÆÆ.		
Eupatorium cannabinum	Hemp agrimony	
Tussilago farfara	Common colt's-foot	March 22
Tussilago petasites	Butterbur	April 5
Chrysanthemum leucanthemum	Ox-eye daisy	June 21
A. millefolium	Common yarrow	June 29
Gnaphalium uliginosum	Marsh cudweed	July 22
Senecio vulgaris	Groundsel	Feb. 13
S. jacobæa	Ragwort	July 20
Arctium lappa	Common burdock	July 28
Carduus lanceolatus	Spear thistle	July 17
A. acanthoides	Wetted thistle	June 29
C. palustris	Marsh thistle	June 29
Centaurea nigra	Black knapweed	July 5
Leontodon hispidus	Common hawkbit	June 17
Hypochæris radicata	Cat's-ear	June 10
Sonchus oleraceus	Common sow thistle	June 28
Taraxacum dens-leonis	Common dandelion	April 19
Hieracium pilosella	Mouse-ear hawkweed	June 6
H. murorum	Wall hawkweed	June 20
H. umbellatum	Smooth-leaved hawkweed	July 20
Crepis virens	Smooth crepis	June 28
C. paludosa	Marsh crepis	June 21
Lapsana communis	Nipplewort	June 25
CAMPANULACÆÆ.		
Campanula latifolia	Giant bell-flower	July 29
C. rapunculoides	Creeping bell-flower	July 28
C. rotundifolia	Harebell	July 17

DATES OF THE FLOWERING OF PLANTS AT STONYHURST
IN 1886 (*continued*).

ERICACEÆ.		
Vaccinium myrtillus	Bilberry	April 30
Erica tetralix	Cross-leaved heath	July 1
PRIMULACEÆ.		
Primula vulgaris	Common primrose	Mar. 28
P. veris	Cowslip	May 9
Lysimachia vulgaris	Great yellow loosestrife	May 25
L. nemorum	Yellow pimpernel	May 16
Anagallis arvensis	Pimpernel	July 5
LENTIBULARIACEÆ.		
Pinguicula vulgaris	Common butterwort	June 27
APOCYNACEÆ.		
Vinca minor	Lesser periwinkle	April 6
GENTIANACEÆ.		
Menyanthes trifoliata	Common buckbean	June 26
POLEMONIACEÆ.		
Polemonium cœruleum	Jacob's ladder	June 3
CONVOLVULACEÆ.		
Convolvulus sepium	Large convolvulus	July 25
BORAGINACEÆ.		
Myosotis sylvatica	Forget-me-not	April 24
M. arvensis	Field myosote	May 25
Symphytum officinale	Common comfrey	June 8
Borago officinalis	Common borage	June 17
SOLANACEÆ.		
Solanum dulcamara	Bittersweet	June 23
OROBANCHACEÆ.		
Lathræa squamaria	Toothwort	April 22
SCROPHULARINEÆ.		
Verbascum thapsus	Great mullein	June 29
Scrophularia nodosa	Common figwort	June 17
S. aquatica	Water figwort	June 28
Mimulus luteus	Yellow mimulus	June 15
Linaria cymbalaria	Ivy-leaved toadflax	May 18

DATES OF THE FLOWERING OF PLANTS AT STONYHURST
IN 1886 (*continued*).

Digitalis purpurea	Foxglove	June 21
Veronica serpyllifolia	Thyme-leaved speedwell	May 10
V. officinalis	Common speedwell	June 22
V. anagallis	Water speedwell	June 10
V. beccabunga	Brooklime speedwell	June 4
V. montana	Mountain speedwell	May 20
V. chamædrys	Germander speedwell	May 22
Bartia odontites	Red bartia	July 22
Euphrasia officinalis	Eyebright	July 20
Rhinanthus crista galli	Yellow rattle	June 8
Pedicularis sylvatica	Lousewort	May 22
Melampyrum pratense	Cow-wheat	July 1
LABIATÆ.		
Calamintha Clinopodium	Wild basil	July 13
Nepeta Glechoma	Ground ivy	April 24
Prunella vulgaris	Self-heal	June 20
S. sylvatica	Hedge woundwort	June 21
Lamium purpureum	Purple dead-nettle	April 29
Ajuga reptans	Bugle	May 20
PLANTAGINACEÆ.		
Plantago major	Greater plantain	June 15
P. lanceolata	Ribwort	May 9
CHENOPODIACIÆ.		
Chenopodium bonus Henricus	Good King Henry	June 10
Atriplex patula	Common orache	July 18
POLYGONACEÆ.		
Rumex obtusifolius	Broad dock	June 11
R. crispus	Curled dock	June 28
R. conglomeratus	Clustered dock	July 17
R. acetosa	Sorrel	May 23
Polygonum aviculare	Knotgrass	July 2
P. bistorta	Snakeweed	June 8
P. persicaria	Common persicaria	July 7
P. convolvulus	Black bindweed	July 19
EUPHORBIACEÆ.		
Mercurialis perennis	Dog's mercury	March 28
URTICACEÆ.		
Urtica dioica	Common nettle	June 17
AROIDEÆ.		
Arum maculatum	Common arum	May 20

DATES OF THE FLOWERING OF PLANTS AT STONYHURST
IN 1886 (*continued*).

NAIADACEÆ. Potamogeton natans	Broad pondweed	July 9
ALISMACEÆ. Alisma plantago	Water plantain	June 25
ORCHIDACEÆ. Epipactis latifolia Listera ovata Orchis mascula O. maculata	Helleborine Twayblade Early orchis Spotted orchis	July 22 June 1 May 11 June 8
IRIDACEÆ. Iris pseudacorus	Yellow iris	June 24
AMARYLLIDÆÆ. Narcissus pseudonarcissus Galanthus nivalis	Daffodil Snowdrop	March 29 Feb. 10
LILIACEÆ. Paris quadrifolia Scilla nutans Allium ursinum	Herb Paris Bluebell Broad-leaved garlic	May 12 May 6 May 22

THE UPPER GLOWS IN 1886.

THE glow encircling the sun, which has been described in previous reports, diminished very much in intensity during the year. It was often so faint that no trace could be detected, except when the sun was near the horizon.

The fore and after glows were almost as frequent as in 1885, and very similar in every respect. The following are the dates on which they were observed:—

January 7, 8, 9, 11, 13, 22.

February 4, 6, 7.

March 5, 6, 11, 12, 17, 18.

April 3, 8, 15, 17, 19.

May 14, 15, 16, 18, 19, 21, 22, 31.

June 4, 5, 6, 7, 16, 18, 20, 26, 29, 30.

July 1, 8, 9, 12, 15.

August 15, 24, 28.

September 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 27, 28.

October 23, 24, 25, 26.

November, one or two days not noted, 30.

December " " " 31.

On July 15 and 16 the moon was encircled by a similar glow.

The edges of the clouds in the vicinity of the sun were strongly tinted with the colours of the spectrum on many occasions throughout the year.

DATES OF SOLAR DRAWINGS AND OF OBSERVATIONS OF CHROMOSPHERE AND OF SPOT-SPECTRA.

1886.	January.	February.	March.	April.	May.	June.	July.	August.	Sept.	October.	Nov.	Dec.
1				.37	.38		.40,c	.45	.41		.46,c	.44,c
2	n	.44	.52	.37	.35,c,s	.49	.52,c,s	.53		.35,c,s	.46,c	.48
3		.53	.43	.41,c,s	.74	.43	.42,c	.43	.39,c	.41,c,s		
4	.40	.42,c		.46	.37	.36,c	.41,c,s		.46	.67	.37	.47,c
5		.41,c,s	.46,c,s	.44	.43,c	.40,c,s	.71,c	.75	.39	.50		
6		.45,c,s	.44,c,s	.37,c,s	.41,c			.63	.63		.42,c	.50
7	.41,c,s	.48	.42,c,s	c,s	.44,c	.68	.42,c,s	.50	.39,c	.53		.53
8	.46,c,s		.42,c,s			.36	.60	.60		.38,c		
9	.45,c		.49,c	.67,s		.41	.49	.55	.37	.36,c	.50	.53
10			.50	.51,n	.46	.41	.43,c	.39	.66	.36,c	.48,c	.47,c
11	.46,c		.38,c,s	.44,c,s		.40,c		.39		.36,c	n	
12		.38,c	.65,c,s	.40,c,s		.48	.44	.35		.36		.44
13	.42,c	.47	.65,c			.51	n	.60	.44	.43		
14	.43,c,s	.62	.66	.72	.38	.41	.45	.40	.41,c			
15	n	.40,c		.38	.65		.40	.39	.42,c		.38,c	.41,c,s
16				.52	.64		.50,c	.43				.48,c
17	.40			.37		.46		.39,c	.43		.41,c	.61
18	.48				.36		.42	c	.65			
19	.50			.46,c,s	.40,c		.43	.35	.38,c	.37,c		.48,c
20	.46,c	.41		.43,c,s		.76	.37	.60	c		.41	.53
21				.50,c,s	.67,c	.39	.41					
22	.45,c		.40	n	.38		.38		.51		.41	
23		.48		.47,c,s		.40		.49,c		.52		.41,c,s
24		.39,c	.41,c,s	.74	.78,n	.54	.52	.70,c		.41,c		
25		.38	.67,s	.53						.40,c		.44,c
26		.37,c		.39,c,s	.44,c,s	.42	.36	.50	.36	.40,c		.46,c,s
27		.41,c		.51,c,s		.44,c,s	.37,c	.54		.51		
28	n		.44,c,s	.61	.44	.50,c,s	.42,c	.45			.46	
29			.41	.42,c,s	.39	.42,c			.38	.48,c		
30	.43,c				.80		.58,c	.38,c				.49,c
31			.37		.61			.67				.51,c

n are notes, c chromosphere, s spectra.

Monthly Magnetical Observations taken at the College Observatory, Stonyhurst, 1886.

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 0.0001128 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 200 vibrations.

The angles of deflection are each the mean of two sets or 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 under 2s. 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 7.5 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 0'002508.

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.	Tem- pera- ture.	Observed Deflection.	$\frac{m}{X}$
January ...	D. H. M. 17th...11 20 a.m.	FOOT. 1'0	46'4	13 20 10	9'06369
	„ ...11 50 a.m.	1'3	46'3	6 1 40	9'06243
February...	20th...11 21 a.m.	1'0	44'2	13 20 35	9'06373
	„ ...11 40 a.m.	1'3	45'0	6 1 48	9'06321
March	19th...11 55 a.m.	1'0	47'5	13 20 20	9'06385
	„ ... 0 36 a.m.	1'3	47'6	6 1 35	9'06316
April	18th... 0 15 a.m.	1'0	54'6	13 19 47	9'06410
	„ ... 0 40 a.m.	1'3	55'6	6 1 20	9'06336
May.....	22nd... 0 10 a.m.	1'0	53'4	13 19 55	9'06399
	„ ... 0 41 a.m.	1'3	54'0	6 1 30	9'06347
June.....	20th...11 20 a.m.	1'0	66'1	13 20 17	9'06513
	„ ...11 41 a.m.	1'3	68'4	6 1 28	9'06454
July	17th...10 52 a.m.	1'0	65'2	13 21 44	9'06580
	„ ...11 14 a.m.	1'3	65'0	6 2 26	9'06537
August ...	22nd...11 25 a.m.	1'0	55'7	13 20 17	9'06442
	„ ...11 41 a.m.	1'3	56'3	6 1 38	9'06376
September	24th...10 49 a.m.	1'0	58'2	13 18 10	9'06344
	„ ...11 16 a.m.	1'3	58'6	6 0 59	9'06320
October ...	20th...11 15 a.m.	1'0	54'7	13 19 25	9'06384
	„ ...11 40 a.m.	1'3	55'4	6 0 47	9'06276
November	15th...11 3 a.m.	1'0	50'6	13 18 44	9'06318
	„ ... 0 26 a.m.	1'3	50'8	6 0 39	9'06225
December.	19th...11 20 a.m.	1'0	48'0	13 18 2	9'06263
	„ ...11 42 a.m.	1'3	48'3	6 1 7	9'06267

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.	Tempera- ture.	Time of one Vibra- tion.	Log m X	Value of m.
January ...	D. H. M. 17th...10 20 a.m.	° 45'1	5'74321	0'19592	0'42564
February...	20th...10 29 a.m.	41'0	5'74295	0'19680	0'42635
March	19th...10 44 a.m.	46'6	5'74300	0'19782	0'42682
April	18th...10 45 a.m.	54'4	5'74315	0'19747	0'4267
May..	22nd...11 29 a.m.	51'1	5'74425	0'19726	0'42658
June.....	20th...10 18 a.m.	66'5	5'74325	0'19843	0'42668
July	17th...10 20 a.m.	63'9	5'74316	0'19681	0'42735
August ...	22nd...10 30 a.m.	54'6	5'75292	0'19624	0'42633
September.	24th...10 14 a.m.	57'0	5'74820	0'19691	0'42580
October ...	20th...10 35 a.m.	54'5	5'74409	0'19751	0'42657
November.	15th...10 44 a.m.	50'5	5'75312	0'19590	0'42550
December.	19th...10 52 a.m.	47'2	5'74950	0'19668	0'42584

DIP OBSERVATIONS.				MAGNETIC INTENSITY.		
Month.	G. M. T.	Needle	Dip.	X. or Horizontal Force.	Y. or Vertical Force.	Total Force.
January.	D. H. M. 18th...10 35 a.m.	1	69 12 8	3·6873	9·7031	10·3810
	,, ...10 46 a.m.	3	69 10 47			
February	21st...10 20 a.m.	1	69 11 0	3·6842	9·6950	10·3691
	,, ...10 51 a.m.	3	69 12 24			
March ...	20th...10 35 a.m.	1	69 11 10	3·6889	9·7072	10·3847
	,, ...10 54 a.m.	3	69 11 50			
April ...	19th...11 5 a.m.	1	69 12 15	3·6879	9·7158	10·3916
	,, ...11 35 a.m.	3	69 13 23			
May.....	23rd...10 41 a.m.	1	69 9 22	3·6914	9·7072	10·3870
	,, ...10 59 a.m.	3	69 12 17			
June.....	21st ...11 20 a.m.	1	69 13 20	3·6862	9·7002	10·3748
	,, ...11 47 a.m.	3	69 10 8			
July.....	18th...10 39 a.m.	1	69 12 10	3·6814	9·6897	10·3660
	,, ...10 57 a.m.	3	69 11 37			
August. .	23rd...11 15 a.m.	1	69 11 30	3·6841	9·7096	10·3911
	,, ...11 40 a.m.	3	69 9 8			
Sept. ...	28th...10 59 a.m.	1	69 10 22	3·6884	9·6904	10·3690
	,, ...11 20 a.m.	3	69 9 15			
October.	20th...11 48 a.m.	1	69 9 15	3·6948	9·7161	10·3766
	,, ... 0 10 a.m.	3	69 11 13			
Nov. ...	16th...10 23 a.m.	1	69 10 55	3·6964	9·7136	10·3939
	,, ...10 48 a.m.	3	69 9 10			
Dec. ...	20th...11 10 a.m.	1	69 10 8	3·6927	9·6993	10·3882
	,, ...11 55 a.m.	3	69 9 45			
Means...	69 11 5	3·6886	9·7126	10·3828

DECLINATION OBSERVATIONS.

		Uncorrected.			Corrected.		
Month.	G. M. T.	Observation.	Monthly Mean.		Observation.	Monthly Mean.	
	D. H. M.	° ' "	° ' "		° ' "	° ' "	
January ..	4th... 9 6 a.m.	19 41 19	° ' "		19 42 2	° ' "	
	11th... 8 59 a.m.	41 10			43 10		
	18th... 9 15 a.m.	42 25			42 42		
February.	25th... 9 3 a.m.	40 7	19 41 15		43 16	19 42 48	
	1st... 8 56 a.m.	41 16			41 50		
	8th... 9 5 a.m.	40 18			42 18		
March ...	16th... 9 3 a.m.	40 10			44 11		
	22nd... 9 11 a.m.	42 9	19 40 58		43 1	19 42 50	
	1st... 9 6 a.m.	42 0			44 52		
April	9th... 9 9 a.m.	39 15			43 35		
	15th... 9 10 a.m.	41 39			44 31		
	23rd... 8 51 a.m.	40 18			42 36		
May	29th... 9 1 a.m.	40 22	19 40 43		45 24	19 44 12	
	5th... 9 3 a.m.	41 12			45 6		
	12th... 9 7 a.m.	43 50			46 58		
June	19th... 9 2 a.m.	43 31			44 57		
	26th... 9 5 a.m.	42 15	19 42 27		45 7	19 45 32	
	3rd... 9 6 a.m.	40 50			43 42		
July	11th... 8 59 a.m.	42 51			43 25		
	18th... 9 2 a.m.	43 11			45 29		
	24th... 9 2 a.m.	41 29			43 28		
August	31st... 9 9 a.m.	44 15	19 43 9		43 50	19 43 56	
	7th... 9 16 a.m.	40 20			43 55		
	14th... 9 5 a.m.	43 29			39 37		
September	21st... 9 0 a.m.	42 55			40 55		
	29th... 9 11 a.m.	40 59	19 41 58		43 1	19 41 52	
	5th... 9 2 a.m.	39 19			41 10		
October	12th... 9 6 a.m.	40 10			41 16		
	19th... 9 1 a.m.	39 56			42 0		

DECLINATION OBSERVATIONS (Continued.)

		Uncorrected.		Corrected.	
Month.	G. M. T.	Observation.	Monthly Mean.	Observation.	Monthly Mean.
	D. H. M.	° ' "	° ' "	° ' "	° ' "
July	26th ... 9 6 a.m.	19 38 3	19 39 23	19 41 26	19 41 43
August ...	2nd ... 9 5 a.m.	37 18		39 35	
	9th ... 9 15 a.m.	40 20		41 46	
	17th ... 8 57 a.m.	39 19		41 19	
	23rd ... 8 52 a.m.	40 15		42 10	
	30th ... 9 7 a.m.	39 37	19 39 22	41 51	19 41 38
September	6th ... 8 30 a.m.	38 29		39 28	
	13th ... 8 42 a.m.	38 30		40 50	
	21st ... 8 54 a.m.	39 15		40 46	
	27th ... 9 8 a.m.	38 25	19 38 40	41 10	19 40 34
October...	4th ... 9 3 a.m.	37 0		42 50	
	12th ... 9 0 a.m.	38 17		40 17	
	18th ... 9 7 a.m.	37 16		41 0	
	25th ... 9 11 a.m.	36 31	19 37 16	39 22	19 40 52
November	1st ... 8 58 a.m.	38 17		38 17	
	9th ... 9 2 a.m.	37 30		38 4	
	15th ... 9 3 a.m.	37 25		39 8	
	22nd .. 9 6 a.m.	38 36		38 43	
	29th ... 9 10 a.m.	37 19	19 37 25	39 29	19 38 50
December	6th ... 9 7 a.m.	36 6		38 31	
	13th ... 9 10 a.m.	37 32		39 13	
	21st ... 9 13 a.m.	36 10		40 28	
	27th ... 9 8 a.m.	37 28	19 36 49	39 14	19 39 22
Yearly mean			19 39 5		19 41 41

MAGNETIC DISTURBANCES.

JANUARY.—The first movement of any importance was a decrease of W. Declination between 10.45 and 11.48 p.m. on the 1st, immediately followed by a similar increase, and the magnets were continually disturbed, but not to any great extent, between noon of the 2nd and midnight of the 4th. The similarity in the oscillations of the Declination magnet at about 6 p.m. on three successive days, namely on Jan. 3, 4, and 5, is rather striking. A short but violent magnetic storm began on the morning of the 9th, and was at its height between 6 and 10 p.m. the same day. An increase of more than $1^{\circ}11'37''\cdot2$ in the W. Declination took place between 8.35 and 8.43 p.m. The Horizontal Force Magnet was very much disturbed by this storm. A considerable diminution occurred between 9 and 10 a.m., but the most rapid change was in the evening between 6 and 7, the intensity of this component of the magnet force increasing by 0.01527 (British units) from 6.36 to 6.45, and then decreasing 0.02326 before 7 o'clock. Another rather important movement occurred about two hours later. The Vertical component was scarcely affected before 6 p.m., but the change then became very rapid. The disturbance recorded on the V.F. curve consisted almost entirely of an increase of intensity. The maximum was reached at 6.52 p.m. and the minimum at 8.38 p.m., the total range being 0.00490 (British units). On the 15th from 2 p.m. until 2 a.m. the following day there was a slight increase of the V.F., and similarly on the 19th, but in a less degree. Between 3 p.m. on the 19th and the evening of the 22nd the Declination disturbances were

frequent and well marked. The mornings of the 29th and 30th, and the night of the 30th, were rather unsettled periods, but nothing occurred calling for special notice.

FEBRUARY.—This month commenced quietly, but the curves became somewhat irregular from 8 a.m. on the 5th until the following midnight. An Easterly movement of $23^{\circ}52'4''$ commenced at 7.10 p.m. on the 11th, whilst the H.F. was rather abnormal from 7 to 11 p.m., and the V.F. diminished slightly early the next morning, and then increasing, remained above its mean value during the greater part of the following afternoon. Both Declination and H.F. were disturbed during the night of the 16th, and the V.F. was rather higher than the mean in the course of the afternoon. The 18th and 19th showed signs of disturbance both during the afternoon and at night. The irregular movements during the late hours of the 21st were exaggerated on the 22nd in both Declination and H.F., and this could be traced, though in a less degree, on the V.F. Curve. The month ended with a long steady period.

MARCH.—The absence of all disturbances was very marked until the afternoon of the 15th, and no movements of any great magnitude occurred previous to the evenings of the 18th and 19th. Between 8.40 and 9.8 p.m. on the 19th the needle moved Westward through an arc of $35^{\circ}15'4''$, which was the most rapid movement during the disturbance. The H.F. Magnet was similarly affected, being most disturbed on the 19th, but the V.F. does not seem to have felt the action of the disturbing force on either the 18th or 19th. On the 20th the needle trembled a good deal in the middle of the day, and the two succeeding nights were rather stormy. The position of the needle was considerably West of its normal position during the early afternoon of the 23rd, and somewhat East during the night of the 26th. During the afternoon of the 27th the V.F. Curve was a little irregular, and there was a slight diminution of the component of the magnetic intensity towards midnight: this latter change was repeated in an exaggerated form on the 29th at 2 a.m. The great storm of the year commenced very suddenly at 7.58 a.m. on the 30th with an irregular movement of the V.F. needle, but there had previously been a series of small oscillations of the Declination Magnet, which developed shortly after 8 a.m. into a violent and protracted

storm. The swing of the needle was very extended and very rapid, moving Westward through an arc of $1^{\circ}13'24''.6$ between 10.12 a.m. and 10.22. The total range was more than $1^{\circ}34'18''$ between 8.21 and 9.30, when the point of light left the sensitized paper whilst moving Eastward. The oscillations were very extended and rapid during the afternoon and night of the same day, the increase of West Declination from 10.14 p.m. to 10.20 being $44'45''.7$, and this was immediately preceded and followed by other oscillatory movements rather less in extent but equal in rapidity. The H.F. Magnet was not much affected till 8.22 a.m. on the 30th; but then it began to swing backwards and forwards very violently, the total range between 9.5 and 10.20 a.m. being $0^{\circ}04'14.3$, and again the same day $0^{\circ}03'35.2$ between 6.8 and 10.8 p.m. The V.F. increased very rapidly at 5 p.m. on the 30th, and between 5.43 and 7.22 the ordinate was too great to be recorded on the cylinder. Between 9.45 and 10.0 p.m. the Vertical Intensity diminished by $0^{\circ}00'46.7$, and this was followed by a very rapid but not very extended oscillation. At 5 a.m. on the 31st the magnet was returning quietly to its normal position, but it was again greatly disturbed during the whole of the afternoon. The Total Range of the V.F. during the storm was more than $0^{\circ}00'80.1$, the minimum occurring just before midnight, and the maximum probably at about 6.33 p.m. on the 30th.

APRIL.—The great storm gradually abated on the 1st. The magnet then remained quiet until the night of the 11th, when irregularities began to appear about 8 p.m. The disturbing force continued at work until noon on the 15th, but no very marked change of the Declination occurred except between 11.43 p.m. and 1.15 a.m. on the night of the 14th, when the magnet moved $40'35''.1$ towards the East in a double oscillation. The Declination needle was again disturbed during the afternoon of the 16th and the four following nights, being more quiet during the day hours. The H.F. and V.F. curves shewed signs of the presence of a disturbing force for the four days following the 11th, and were in general rather irregular until the 21st, the H.F. being most affected during the afternoons. A rather rapid but tremulous motion of the Declination was observed on the morning of the 25th, and a marked oscillation of the needle between 1 a.m. and 2 on the 30th.

MAY.—The movement of the needle on April 30th was repeated

about two hours later on May 1st. From about noon on the 8th until noon of the 12th the magnet was never at rest, but the oscillations were seldom of any great extent. The H.F. was however much more irregular than usual on the first morning of the disturbance, and the V.F. was decreasing very rapidly at 2 a.m. The total range of the V.F. during the night of the 8th was 0.01869, the maximum occurring at 8 a.m., and the minimum at 2.9 the next morning. The following days were generally somewhat disturbed, and between 2 and 5 a.m. on the 18th the value of the V.F. was considerably below the average. From the 24th until the end of the month the magnets were very quiet, with the exception of the afternoon of the 27th, when the H.F. shewed signs of the presence of a disturbing force.

JUNE.—The quiet period continued until the 12th when some signs of a disturbance appeared on the curves. On the morning of the 17th there was some irregularity, and again on the 18th. About 11 p.m. on the 21st a disturbance began which lasted for a day and a half. The V.F. gradually increased from noon until about 7 p.m. on the 22nd, and then quietly resumed its normal value. During the night of the 24th there were some large irregular movements of the magnetic needle, but the remainder of the month was quiet.

JULY.—The morning of the 7th was a little irregular, and this continued for three days, after which the Declination Needle became remarkably quiet, and remained undisturbed to any considerable extent until the afternoon of the 27th. The H.F. manifested the presence of a slight disturbing force during the afternoons of the 14th, 19th, 20th and 21st; and the V.F. magnet oscillated slowly once during the afternoon of the 14th, and showed an increase of force on the 19th, 20th and 21st. A very unusual oscillation, consisting of a single rapid movement towards the West, followed almost immediately by a return Eastward, occurred during the slight storm of the 27th and 28th, the needle moving through an arc of $55^{\circ}30'3''$ between 10.24 and 10.35 p.m. on the 27th. This was accompanied by a considerable decrease of the H.F., and the V.F. decreased so much as to throw the recording dot of light entirely off the recording cylinder, though not sufficiently to destroy the balance of the magnet.

AUGUST.—The first disturbance worth recording in this month was a rather rapid Easterly movement of the magnet between 10 and 11 p.m. on the 7th. On the 11th at about 10 p.m. a disturbance began which lasted with very little interruption until the evening of the 20th, but there was no very unusual oscillation during this long period. The slight storm, which began about 8 p.m. on the 23rd, was most marked by the movements of the Declination magnet during the early hours of the 24th; the V.F. was diminished, but not to any considerable extent.

SEPTEMBER.—The similarity between the magnetic curves during the late hours of the 9th, 10th, 11th, and 12th, is too striking to pass as accidental, but the movements of the Declination needle were not very extended. The V.F. increased considerably on each day at the same hours, and an increase was still perceptible on the 14th. During the remainder of this period the Declination needle was trembling continuously, and only came to rest about noon on the 15th. On the 20th disturbing forces were again at work, and the oscillations of the magnet during the night of the 21st were rather large and accompanied by an increase of V.F. The month closed with a slight disturbance, well shown on the V.F. curve.

OCTOBER.—From noon on the 6th the vibrations of the needle were unusually large, especially as night came on, the H.F. and V.F. being also strongly affected. This continued until the morning of the 11th, being especially noticeable during the late hours of each day. The night of the 18th and the afternoon of the 21st were abnormal periods. An unusual movement towards the East took place between 7 and 9 p.m. on the 26th, and the disturbing forces were active during the afternoons of the three following days.

NOVEMBER.—A storm commenced during the afternoon of the 2nd, which lasted until the morning of the 9th, although it was gradually subsiding on the 7th and 8th. The H.F. was most disturbed during the late hours of each day, and the V.F. moved more irregularly on the night of the 2nd than on any of the following days. The Declination curves between 4 and 7 p.m. on the 9th and between 3 and 6 p.m. on the 11th were remarkably similar, the same movement being exaggerated in form on the 12th. The curves on the 12th and 13th were rather irregular, and

there was an Easterly movement between 11 p.m. and 1 a.m. on the 14th, and another at about 8 p.m. on the 15th. A slight storm began on the 23rd, and continued until the morning of the 26th. During the afternoon of the 29th the movements of the Declination magnet became very irregular, and this continued until the end of the month. The most rapid change was an Easterly movement of $32' 32'' 0$ between 6.7 and 7.25 p.m. on the 30th.

DECEMBER.—The November storm was prolonged through the first week of December, and suffered little interruption until about noon on the 8th. The H.F. was a good deal affected. From the night of the 11th until the morning of the 25th there was no day without considerable irregularity in the Declination, but none of a very unusual extent. The afternoons from the 26th to the 29th were also much disturbed, but the year ended quietly.

PRESENTS RECEIVED.

Greenwich Observations, 1884	from The Royal Observatory.
Greenwich Spectroscopic and Photographic Results, 1884	” ”
Measures of Positions and Areas of spots and Faculæ upon the sun's disk, 1884	” ”
Report of the Astronomer Royal, 1885	” ”
Assumed mean R. A. of clock stars	” ”
Edinburgh Astronomical Observations 1877 to 1886	Royal Obs. Edinburgh.
The Visual Solar Spectrum in 1884 by C. Piazzi Smyth	” ”
Micrometrical Measurements of Gaseous Spectra by C. Piazzi Smyth	” ”
Daily Weather Report	Meteorological Office.
Weekly Weather Report	” ”
Monthly Weather Report	” ”
Quarterly Weather Reports	” ”
Hourly Readings, 1883	” ”
Report of the Meteorological Council of the Royal Society, 1885	” ”
Instructions in the use of Meteorological Instruments by R. Scott, 1885.	” ”
Meteorological Observations at Stations of the 2nd order, 1881	” ”
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APPENDIX.

RESULTS
OF
Meteorological Observations

TAKEN AT

ST. IGNATIUS' COLLEGE,
MALTA,

BY THE

REV. J. SCHOLES, S.J.

1886.

ST. IGNATIUS' COLLEGE, MALTA.

Lat. 35° 55' N. Long. 14° 29' E. Barometer Readings reduced to
32° F. at sea level.

METEOROLOGICAL REPORT.

January—February.

Results of Observations taken during the Month.	January.	February.
Mean Reading of Barometerinches	29·844	29·972
Highest „ „ „ „	30·356	30·181
Lowest „ „ „ „	29·155	29·589
Range of Barometer Readings „	1·201	0·592
Highest Reading of Max. Therm	65·1°	63·2°
Lowest Reading of Min. Therm	41·1°	43·1°
Range of Thermometer Readings.....	24·0°	20·1°
Greatest Range in 24 hours	19·0°	16·7°
Mean of all the Highest Readings	59·7°	59·8°
Mean of all the Lowest Readings	48·8°	48·8°
Mean Daily Range	10·9°	11·0°
Mean Temperature (deduced from Max. and Min.)	53·5°	53·3°
Mean Temperature (deduced from Dry Bulb.).....	53·1°	54·1°
Adopted Mean Temperature	53·3°	53·7°
Mean Temperature of Evaporation.....	49·0°	49·8°
Mean Temperature of Dew-point	46·2°	47·2°
Mean elastic force of Vapour.....inches	0·313	0·325
Mean weight of Vapour in a cubic foot of air grains	3·5	3·7
Mean additional weight required for saturation „	0·8	0·8
Mean degree of Humidity.....	81	83
Mean weight of a cubic foot of airgrains	538·3	540·1
Fall of Raininches	5·237	3·387
Number of days on which Rain fell	16	11
Mean amount of Cloud (an overcast sky = 10) ...	4·8	4·8
Total number of miles of Wind indicated	10269	7571
Mean Velocity of Wind per hour	13·8	11·3

March—April.

Results of Observations taken during the Month.	March.	April.
Mean Reading of Barometer.....inches	30·040	30·000
Highest „ „ „	30·466	30·483
Lowest „ „ „	29·479	29·573
Range of Barometer Readings..... „	0·987	0·910
Highest Reading of Max. Therm.	66·2°	71·7°
Lowest Reading of Min. Therm.	40·2°	46·0°
Range of Thermometer Readings	26·0°	25·7°
Greatest Range in 24 hours	20·5°	20·2°
Mean of all the Highest Readings	61·1°	65·7°
Mean of all the Lowest Readings	49·0	53·4°
Mean Daily Range	12·1°	12·3°
Mean Temperature (deduced from Max. and Min.)	54·3°	58·6°
Mean Temperature (deduced from Dry Bulb)	54·1°	59·1°
Adopted Mean Temperature	54·2°	58·8°
Mean Temperature of Evaporation.....	50·6°	55·9°
Mean Temperature of Dew-point'	47·5°	53·0°
Mean elastic force of Vapour	0·329	0·403
Mean weight of Vapour in a cubic foot of air...grains	3·7	4·7
Mean additional weight required for saturation „	1·0	1·1
Mean degree of Humidity	79	81
Mean weight of a cubic foot of air	539·6	532·9
Fall of Rain	0·834	0·828
Number of days on which Rain fell	6	8
Mean amount of Cloud (an overcast sky = 10)	5·0	5·0
Total number of miles of Wind indicated	7654	6849
Mean Velocity of Wind per hour	10·3	9·5

May—June.

Results of Observations taken during the Month.	May.	June.
Mean Reading of Barometer.....inches	30'075	29'965
Highest „ „ „	30'300	30'193
Lowest „ „ „	29'611	29'743
Range of Barometer Readings „	0'689	0'450
Highest Reading of Max. Therm.	87'0°	91'2°
Lowest Reading of Min. Therm.	48'0°	60'1°
Range of Thermometer Readings	39'0°	31'1°
Greatest Range in 24 hours	24'6°	23'9°
Mean of all the Highest Readings.....	71'9°	78'7°
Mean of all the Lowest Readings	56'9°	63'7°
Mean Daily Range	15'0°	15'0°
Mean Temperature (deduced from Max. and Min.)	63'4°	70'5°
Mean Temperature (deduced from Dry Bulb)	63'3°	69'9°
Adopted Mean Temperature	63'4°	70'2°
Mean Temperature of Evaporation	59'4°	65'0°
Mean Temperature of Dew-point	55'6°	60'9°
Mean elastic force of Vapour.....inches	0'443	0'535
Mean weight of Vapour in a cubic foot of air...grains	4'9	5'8
Mean additional weight required for saturation „	1'7	2'3
Mean degree of Humidity.....	75	72
Mean weight of a cubic foot of air grains	529'1	519'8
Fall of Rain..... inches	0'545	0'075
Number of days on which Rain fell.....	3	2
Mean amount of Cloud (an overcast sky = 10) ...	3'4	2'4
Total number of miles of Wind indicated... ..	6326	7212
Mean Velocity of Wind per hour	8'5	10'0

July—August.

Results of Observations taken during the Month.	July.	August.
Mean Reading of Barometerinches	30·023	29·990
Highest „ „ „	30·160	30·238
Lowest „ „ „	29·887	29·862
Range of Barometer Readings..... „	0·273	0·376
Highest Reading of Max. Therm.	94·4°	92·3°
Lowest Reading of Min. Therm.	63·2°	65·4°
Range of Thermometer Readings	31·2°	26·9°
Greatest Range in 24 hours	28·2°	26·8°
Mean of all the Highest Readings	85·8°	84·1°
Mean of all the Lowest Readings	68·8°	69·5°
Mean Daily Range	17·0°	14·6°
Mean Temperature (deduced from Max. and Min.)	76·8°	76·0°
Mean Temperature (deduced from Dry Bulb.).....	76·1°	76·4°
Adopted Mean Temperature	76·4°	76·2°
Mean Temperature of Evaporation.....	69·4°	70·0°
Mean Temperature of Dew-point	64·3°	65·4°
Mean elastic force of Vapour..... inches	0·603	0·626
Mean weight of Vapour in a cubic foot of air ...grains	6·5	6·7
Mean additional weight required for saturation „	3·4	3·1
Mean degree of Humidity... ..	66	69
Mean weight of a cubic foot of airgrains	514·3	513·8
Fall of Rain		
Number of days on which Rain fell.....		
Mean amount of Cloud (an overcast sky=10)	0·7	1·6
Total number of miles of Wind indicated	5421	6180
Mean Velocity of Wind per hour	7·3	8·3

September—October.

Results of Observations taken during the Month.	September.	October.
Mean Reading of Barometer..... inches	30'084	30'070
Highest „ „ „	30'366	30'278
Lowest „ „ „	29'897	29'723
Range of Barometer Readings	0'469	0'555
Highest Reading of Max. Therm.	89'7°	88'4°
Lowest „ Min. Therm.	64'5°	62'3°
Range of Thermometer Readings	25'2°	26'1°
Greatest Range in 24 hours	21'4°	17'1°
Mean of all the highest Readings	81'9°	78'5°
Mean of all the lowest Readings	69'2°	67'8°
Mean Daily Range.....	12'7°	10'7°
Mean Temperature (deduced from Max. and Min.)	74'6°	72'2°
Mean Temperature (deduced from Dry Bulb)	74'8°	71'9°
Adopted Mean Temperature.....	74'7°	72'1°
Mean Temperature of Evaporation.....	70'0°	67'2°
Mean Temperature of Dew-point	66'5°	63'7°
Mean Elastic force of Vapour	0'650	0'590
Mean Weight of Vapour in a cubic foot of air...grains	7'0	6'4
Mean additional weight required for saturation „	2'4	2'0
Mean degree of Humidity.....	75	75
Mean Weight of a cubic foot of air	516'8	519'9
Fall of Rain..... inches	4'087	0'641
Number of days on which Rain fell.....	11	4
Mean amount of Cloud (an overcast sky = 10)	3'1	4'9
Total number of miles of Wind indicated	5334	7441
Mean Velocity of Wind per hour	7'4	10'0

November—December.

Results of Observations taken during the Month.	November.	December.	Year.
Mean Reading of Barometer..... inches	30·070	30·039	30·014
Highest „ „ „	30·341	30·255	30·483
Lowest „ „ „	29·774	29·655	29·155
Range of Barometer Readings..... „	0·567	0·600	1·328
Highest Reading of Max. Therm.	76·8°	67·8°	94·4°
Lowest „ Min. Therm.	48·0°	45·5°	40·2°
Range of Thermometer Readings	28·8°	22·3°	54·2°
Greatest Range in 24 hours	17·9°	17·2°	28·2°
Mean of all the highest Readings	68·6°	62·3°	71·5°
Mean of all the Lowest Readings.....	56·9°	50·8°	58·6°
Mean Daily Range.....	11·7°	11·5°	12·9°
Mean Temperature (deduced from Max. and Min.)	61·6°	55·8°	64·2°
Mean Temperature (deduced from Dry Bulb)	61·2°	55·0°	64·1°
Adopted Mean Temperature	61·4°	55·4°	64·2°
Mean Temperature of Evaporation	56·9°	51·3°	59·5°
Mean Temperature of Dew-point	53·8°	48·5°	56·1°
Mean Elastic force of Vapour	0·415	0·342	0·451
Mean Weight of Vapour in a cubic foot of air.....grains	4·6	3·9	5·1
Mean additional weight required for saturation.....grains	1·3	0·9	1·7
Mean degree of Humidity	79	81	76
Mean Weight of a cubic foot of air...grs.	532·6	539·1	528·0
Fall of Rain.....	4·067	3·979	23·680
Number of days on which Rain fell.....	13	15	89
Mean amount of Cloud (an overcast sky = 10).....	5·2	5·1	3·8
Total number of miles of Wind indicated	6013	7882	84152
Mean Velocity of Wind per hour...miles	8·4	10·6	9·6

NOTES FOR THE SEPARATE MONTHS.

JANUARY.

DEW-POINT, the highest $58^{\circ}0'$ on the 16th, the lowest $36^{\circ}4'$ on the 11th.

The Wind reached 34 miles per hour on the 1st noon to 3 p.m.

Sunshine, $116^{\circ}9'$ on the 25th.

On ground, $37^{\circ}2'$ on the 15th and 22nd.

Thunderstorm on the 11th.

Hail fell on the 11th, 13th and 21st.

The mean hourly velocity of the wind is unusually high, and the mean reading of the barometer is unusually low.

FEBRUARY.

The Dew-point ranged from $39^{\circ}3'$ on the 9th to $53^{\circ}9'$ on the 17th.

The Wind averaged 36 miles per hour from 4 p.m. on the 8th to 8 a.m. on the 9th. A very heavy sea followed for three days.

In Sunshine, $121^{\circ}0'$ was reached on the 25th.

On ground, the lowest was $37^{\circ}5'$ on the 10th.

Thunderstorms passed on the 5th and 6th, and on the 10th.

Hail fell on the 6th.

MARCH.

The Dew-point has ranged from $35^{\circ}0'$ on the 8th to $56^{\circ}5'$ on the 15th; and vegetation suffered severely from the cold parching wind of the 7th and 8th.

The Wind rose to 33 miles per hour on the 7th from 8 a.m. to noon.

In Sunshine, $128^{\circ}9'$ was recorded on the 21st.

On ground, $35^{\circ}5'$ on the 12th.

A Waterspout was seen on the 21st at 11 a.m., and halos and parhelia on the 27th at 5 p.m.

The sea-level was unusually low at the end of the month, the barometer standing very high at the same time.

APRIL.

The Dew-point ranged between $58^{\circ}9'$ on the 8th, and $44^{\circ}5'$ on the 13th.

The Wind averaged 30.5 miles per hour on the 10th from 8 a. m. to 4 p. m.

In Sunshine, $134^{\circ}3'$ on the 28th.

On ground, $41^{\circ}8'$ on the 3rd.

Thunderstorm on the 29th.

MAY.

Dew-point varied between $45^{\circ}4'$ on the 5th, and $64^{\circ}8'$ on the 31st.

Wind averaged 24 miles per hour from 8 a. m. to noon on the 3rd.

Highest in Sunshine, $140^{\circ}5'$ on the 11th and 29th.

Lowest on ground, $42^{\circ}7'$ on the 21st.

Thunderstorm passed on the 1st.

JUNE.

The Dew-point has ranged from $52^{\circ}3'$ on the 21st to $67^{\circ}7'$ on the 7th.

The Wind averaged 37 miles per hour from 8 a. m. to noon on the 9th.

In Sunshine, $138^{\circ}9'$ on the 4th.

On ground, $54^{\circ}1'$ on the 27th.

JULY.

Dew-point varied between $71^{\circ}0'$ on the 10th, and $55^{\circ}9'$ on the 11th.

In Sunshine, $146^{\circ}9'$ was reached on the 9th.

On ground, the minimum reached was $58^{\circ}3'$ on the 14th.

AUGUST.

The Dew-point has ranged between $53^{\circ}5'$ on the 20th, and $74^{\circ}7'$ on the 24th.

In Sunshine, the maximum was $149^{\circ}0'$ on the 12th.

SEPTEMBER.

Dew-point, highest $75^{\circ}1'$ on the 24th, lowest $55^{\circ}8'$ on the 20th.

In Sunshine, highest $140^{\circ}7'$ on the 11th.

Thunderstorms passed on the 14th, 15th, 16th and 19th.

Lightning was seen also on the 11th, 20th and 25th.

The Rainfall has been unusually heavy.

OCTOBER.

The Dew-point ranged between $55\cdot2^{\circ}$ on the 30th, and $70\cdot5^{\circ}$ on the 18th, but was in general very steady and above the average.

In Sunshine, the highest was $145\cdot7^{\circ}$ on the 20th.

On ground, the lowest was $58\cdot0^{\circ}$ on the 16th.

The sea fell from 78° to 68° .

Thunderstorms on 2nd and 29th.

Lightning on 1st, 4th, 5th and 6th.

NOVEMBER.

The Dew-point has varied between $41\cdot8^{\circ}$ on the 20th, and $64\cdot3^{\circ}$ on the 3rd.

In Sunshine, the highest was $125\cdot7^{\circ}$ on the 3rd.

On ground the lowest was $42\cdot3^{\circ}$ on the 26th.

The sea fell from 71° to 66° .

Thunderstorms passed on the 9th, 16th and 21st.

Hail fell on the 21st.

The total Rainfall since June amounts to $8\cdot795$ inches : last year it amounted to $7\cdot763$ inches.

DECEMBER.

The Dew-point has ranged from $39\cdot0^{\circ}$ on the 23rd to $58\cdot8^{\circ}$ on the 2nd.

In Sunshine, the highest was $114\cdot8^{\circ}$ on the 2nd.

On ground the lowest was $40\cdot0^{\circ}$ on the 6th.

The sea fell from $66\cdot3^{\circ}$ to $59\cdot5^{\circ}$.

Thunderstorms passed on the 7th and 31st.

Hail fell on the 2nd, 30th and 31st.

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