

Monthly Meteorological Register, at Her Majesty's Magnetical Observatory, Toronto, Canada West.—February, 1853.

Latitude 43 deg. 39.4 min. North. Longitude, 79 deg. 21 min. West. Elevation above Lake Ontario: 108 ft. 4.

Magnet Day	Barom. at tem. of 32 deg.				Temperature of the air.				Tension of Vapour.				Humidity of Air.				Wind.			Rain S'w in in.	
	6 A.M.	2 P.M.	10 P.M.	MEAN.	6 A.M.	2 P.M.	10 P.M.	M'S.	6 A.M.	2 P.M.	10 P.M.	M'S.	6 A.M.	2 P.M.	10 P.M.	M'S.	6 A.M.	2 P.M.	10 P.M.	Inch.	Inch.
c 1	29.806	29.696	29.656	29.715	30.2	33.4	30.5	31.33	0.147	0.171	0.155	0.155	88	90	91	91	ESE	E	E b N	--	--
b 2	.578	.355	.610	.536	35.2	40.1	35.9	37.07	.186	.214	.189	.196	91	87	86	87	E	S	W b S	inap	--
a 3	.820	.598	.805	.739	39.9	35.7	31.1	33.33	.113	.160	.176	.16	92	79	91	85	W	S	E	0.325	--
c 4	.459	.616	.831	.666	35.5	43.4	35.2	37.58	.291	.299	.167	.191	97	99	82	81	E	W S W	SW b W	--	--
b 5	.874	.821	.658	.782	33.2	31.5	21.6	28.65	.182	.197	.114	.113	89	90	81	89	SW b W	N	N	--	60
a 6	.741	.937		.829	18.2	23.9			.087	.167			83	83	83	83	N N W	NW b N	N N W	--	--
c 7	.925	.823	.870	.873	3.6	20.6	8.6	11.20	.016	.032	.055	.060	82	81	80	82	N b E	NN W	NN W	--	--
b 8	.873	.772	.803	.815	-0.6	20.2	20.6	17.22	.038	.098	.097	.07	83	60	84	75	N	SW b S	NN W	--	0.1
a 9	.859	.833	.717	.804	10.8	13.8	13.2	12.67	.07	.047	.034	.05	88	54	76	72	W b N	W b S	W S W	--	0.2
c 10	.317	.074	.102	.160	20.0	27.1	30.9	26.37	.035	.135	.130	.126	84	97	76	82	SS W	S W	S W	--	0.2
b 11	.102	.137	.486	.269	33.4	38.8	20.0	23.73	.154	.177	.097	.140	80	75	87	82	S W	S W	NW b W	0.050	0.1
a 12	.756	.804	.698	.748	8.8	16.5	11.1	12.72	.078	.071	.039	.061	83	73	78	74	N	NE b N	NNE	--	0.2
c 13	.350	.297		.323	19.4	27.1			.096	.121			83	74			E	W	W	--	0.3
b 14	.654	.727	.819	.761	15.1	19.0	9.5	11.38	.072	.077	.056	.063	80	71	78	73	NW b W	NN W	W N W	--	0.5
a 15	.723	.721	.651	.650	23.3	31.5	24.3	27.22	.103	.165	.167	.127	82	86	81	83	S	S W b S	SS W	--	1.6
c 16	.480	.245	.560	.433	32.3	35.0	26.2	30.62	.163	.193	.129	.15	93	95	88	90	S b W	NE	W b N	--	1.0
b 17	.810	.832	.797	.815	19.0	21.1	17.5	19.59	.077	.038	.035	.087	75	74	91	79	W	W	Calm.	--	0.2
a 18	.713	.625	.656	.651	12.9	19.0	7.9	12.15	.093	.085	.047	.063	76	80	69	76	NE b N	ENE	NN W	--	--
c 19	.630	.468	.357	.481	10.4	23.0	15.1	15.13	.030	.091	.073	.076	80	81	80	81	W b N	NNE	NNE	--	--
b 20	.275	.302		.288	19.0	19.3			.095	.087			90	80			W S W	NW b N	W b S	--	--
a 21	.473	.413	.398	.430	6.5	27.4	26.9	19.90	.055	.122	.131	.104	87	81	88	86	W	S W b S	SW	--	1.5
c 22	.189	.197	.286	.231	32.7	37.7	22.9	32.97	.174	.195	.133	.160	91	87	80	88	S E b S	Calm.	N b W	inap	0.2
b 23	.210	.185	.351	.251	22.3	19.0	16.8	18.80	.093	.075	.079	.085	75	69	81	79	N N W	NW b N	NW	--	--
a 24	.493	.473	.570	.522	12.3	26.2	21.9	19.90	.061	.082	.088	.077	75	56	73	68	NW b N	NW b W	W S W	--	0.2
c 25	.594	.582	.631	.607	21.8	31.6	27.4	23.82	.101	.111	.115	.118	81	80	75	79	W b S	NN b N	NE	--	--
b 26	.686	.686	.727	.701	19.7	35.9	27.3	25.97	.093	.145	.133	.126	84	69	88	89	N b E	SS W	NNE	--	--
a 27	.757	.629		.692	24.8	35.7			.127	.189			91	91			NE b N	E	E b N	0.510	0.3
c 28	.337	.149	.330	.235	35.0	36.6	34.8	35.15	.192	.203	.191	.194	95	93	95	95	E b N	ENE	Calm	0.143	--

Sum of the Atmospheric Current, in miles, resolved into the four Cardinal directions. North. 2031.65 West. 2215.79 South. 924.32 East. 941.18

Mean velocity of the wind - - - 7.29 miles per hour.
 Maximum velocity - - - - 23.9 mi's per h'r, from 8 to 9 p.m. on 5th.
 Most windy day - - - - 23rd: Mean velocity, 16.75 miles per hour.
 Least windy day - - - - 19th: Mean velocity, 3.02 ditto.
 Most windy hour - - - - noon: Mean velocity, 9.13 ditto.
 Least windy hour - - - - midnt: Mean velocity, 5.87 ditto.
 Mean diurnal variation - - - - 3.26 miles.

The column headed "Magnet" is an attempt to distinguish the character of each day, as regards the frequency or extent of the fluctuations of the Magnetic declination, indicated by the self-registering instruments at Toronto. The classification is, to some extent, arbitrary, and may require future modification, but has been found tolerably definite as far as applied. It is as follows:—
 (a) A marked absence of Magnetical disturbance.
 (b) Unimportant movements, not to be called disturbance.
 (c) Marked disturbance—whether shown by frequency or amount of deviation from the normal curve—but of no great importance.
 (d) A greater degree of disturbance—but not of long continuance.
 (e) Considerable disturbance—lasting more or less the whole day.
 (f) A Magnetical disturbance of the first class.

The day is reckoned from noon to noon. If two letters are placed, the first applies to the earlier, the latter to the later part of the trace. Although the Declination is particularly referred to, it rarely happens that the same terms are not applicable to the changes of the Horizontal Force also.

Highest Barometer - - 29.937, at 2 P. M., on 6th } Monthly range:
 Lowest Barometer - - 29.074, at 2 P. M., on 10th } 0.863 inches.

Royal Institution, January 21.

"OBSERVATIONS ON THE MAGNETIC FORCE," BY PROF. FARADAY.

Inasmuch as the general considerations to be brought forward had respect to those great forces of the globe exerted by it, both as a mass and through its particles, namely, Magnetism and Gravitation, the attention was first recalled briefly to certain relations and differences of the two which had been insisted upon on former occasions. Both can act at a distance, and doubtless at any distance; but whilst gravitation may be considered as simple and unipolar in its relations, magnetism is dual and polar. Hence, one gravitating particle or system cannot be conceived to act by gravitation, as a particle or system, on itself; whereas a magnetic particle or system, because of the dual nature of its force, can have such a self-relation. Again, either polarity

Year	Temperature.				D'ys	Ram. Inches.	Snow. D'ys In h.	Wind. Mean Velocity.
	Mean.	Max.	Min.	Range.				
1810	28.03	49.1	- 8.3	57.4	8	1.475	6	Miles.
1811	22.61	43.4	- 0.3	43.7	1	inapp.	9	14.4
1812	27.54	48.7	2.5	46.2	8	3.625	9	10.0
1813	14.97	37.5	-10.2	47.7	1	0.475	21	19.0
1814	27.34	47.1	- 0.4	47.5	4	0.433	7	46.1
1815	26.81	46.6	- 3.9	50.5	5	imperfect	9	27.3
1846	20.80	41.4	-16.2	57.6	0	0.007	13	10.8
1817	22.49	41.2	- 1.0	42.2	2	0.550	13	19.2
1818	25.95	46.9	- 0.6	47.5	4	0.775	8	7.61
1849	20.04	41.1	- 9.2	50.3	2	0.210	13	6.94
1850	26.38	49.2	4.3	41.9	9	1.225	9	6.42
1851	23.27	50.2	1.3	48.9	7	2.030	4	6.42
1852	23.82	41.2	- 3.2	44.4	3	0.650	11	12.6
1853	24.06	43.4	- 0.6	44.0	4	1.030	15	7.29
Mean	24.30	44.79	- 3.27	48.06	4.1	1.007	10.5	6.75

of the magnet's force can act both by attraction and repulsion; and not merely so, but the joint or dual action of a magnet can act also either by attraction or repulsion, as in the case of paramagnetic and diamagnetic bodies: the action of gravity is always that of attraction. As some further relations of the sun and the earth would have finally to be submitted, the audience were reminded, by the use of Arago's idea, of the relative magnitude of the two; for, supposing that the centres of the two globes were made to coincide, the sun's body would not only extend as far as the moon, but nearly as far again, its bulk being about seven times that of a globe which should be girdled by the moon's orbit. For the more careful study of the magnetic power a torsion balance had been constructed, which was shown, and its mode of operation explained. The torsion wire was of hard drawn platinum, 24 inches in length, and of such diameter that 28.5 inches weighed one grain. It was attached as usual to a torsion head and index. The