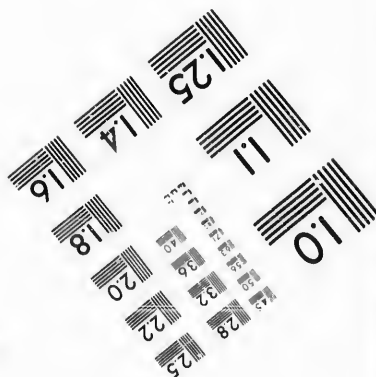
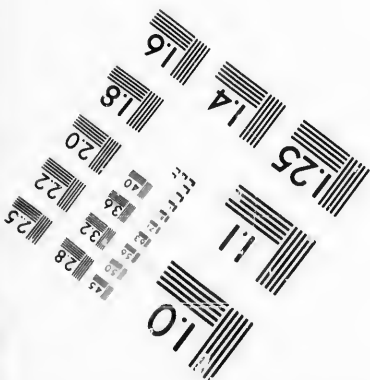
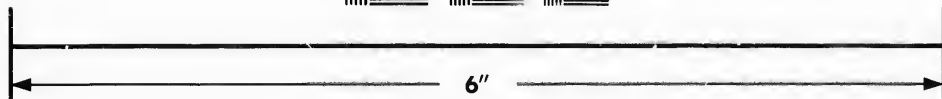
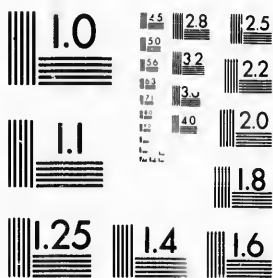


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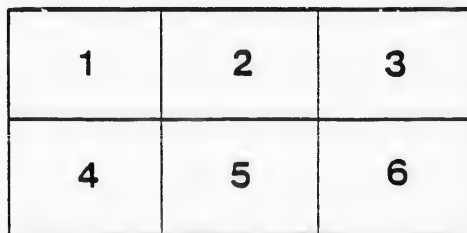
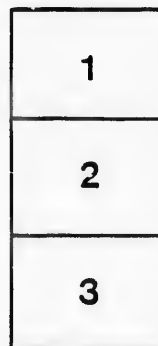
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OF

METEOROLOGICAL OBSERVATIONS

MADE ON THE

ISLAND OF ST. HELEN,

IN THE RIVER ST. LAWRENCE, OPPOSITE THE CITY OF MONTREAL,

PROVINCE OF CANADA,

Situate in  $45^{\circ} 35' N.$  Lat. and  $73^{\circ} 23' W.$  Longitude, in the years 1839-43, and 1845-47

FOR THE

NATURAL HISTORY SOCIETY OF MONTREAL,

BY THE MILITARY GUARD THERE STATIONED,

UNDER THE SUPERINTENDANCE AND DIRECTION OF

**JOHN S. McCORD,**

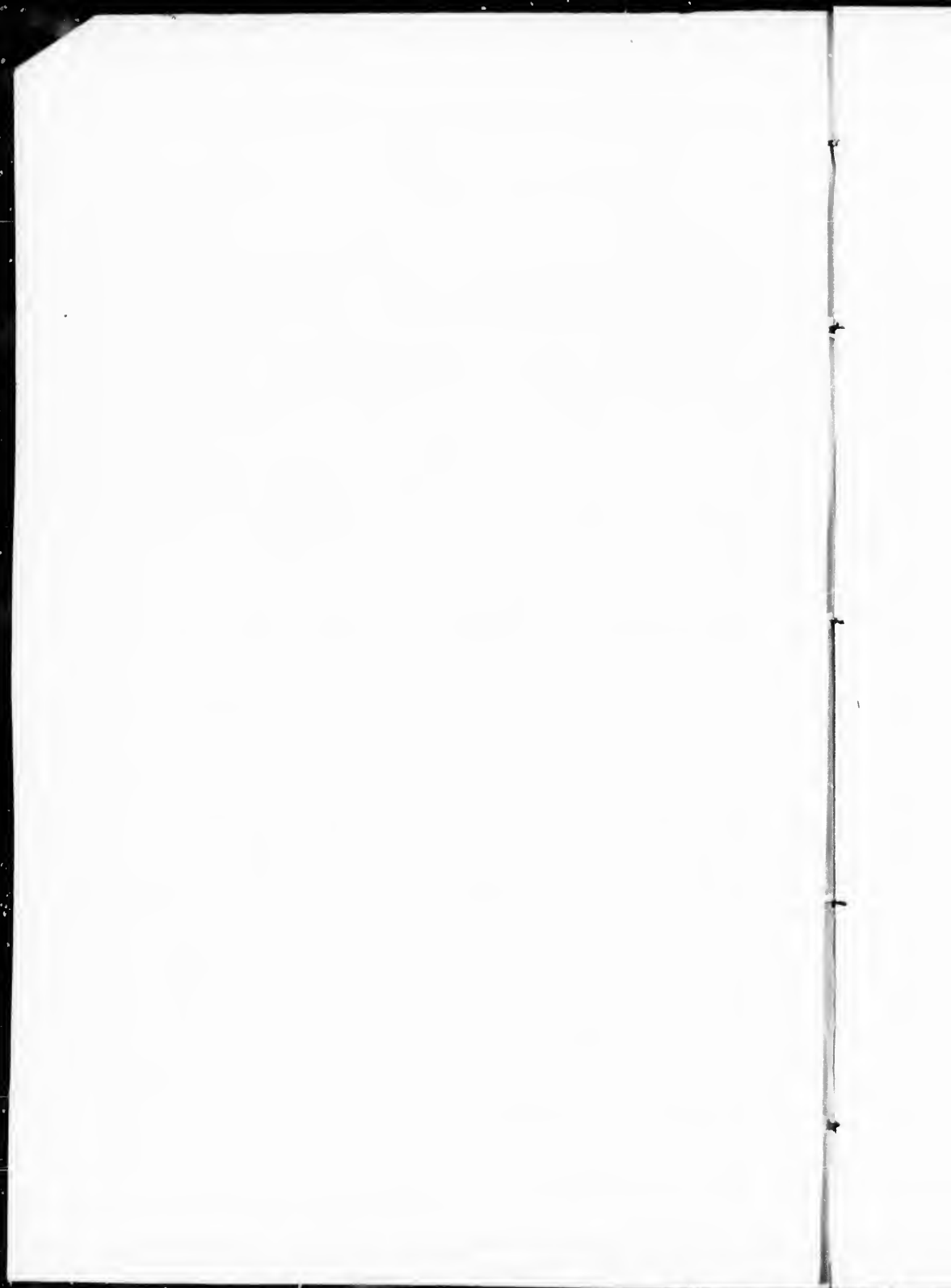
Associate Member of the London Meteorological Society, Member of the Natural History Society of Montreal, Corresponding Member of the Literary and Historical Society of Quebec, and of the Albany Institute, State of New York.

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MONTREAL:

PRINTED FOR THE NATURAL HISTORY SOCIETY, BY JOHN LOVELL:

1842.



## REPORT.

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THE valuable results obtained from the Hourly Meteorological observations made in the years 1824 and 1825 at Leith, and subsequently at Plymouth, by W. S. Harris, Esq. F. R. S. &c. for the purpose of determining the laws of diurnal variation of temperature, induced me as far back as 1836, to apply on behalf of this Society to the then Commander of the Forces in Canada, His Excellency Sir John Colborne, (now Lord Seaton,) for the co-operation of the Military Guard stationed at the Island of St. Helen, opposite this city, to carry into effect a series of observations similar to those executed in Britain. With that readiness which ever distinguished His Excellency, where any public benefit was to be conferred, the requisite general order was immediately obtained, but the unfortunate troubles which broke out in 1837 and 1838, put an end for some time to the peaceful arts—and it was not therefore till July, 1839, that I was enabled to commence the present series of observations.

The general order obtained, directed the recording of *hourly* observations, but upon enquiry I found that as the relief of sentinels took place at every *second* hour, I should be compelled to trust the accuracy of the intermediate observation to the attention and punctuality of the non-commissioned officer of the guard, (a person daily changing,) without any check upon him. I therefore preferred limiting my observations to every second hour, with the certainty of these being regularly and punctually executed, rather than

require *hourly* observations, the faithfulness of which I might not be able so surely to rely on.

The first series of these observations was consequently made at the *even* hours by day and night, from the first day of August, 1839, to the thirty-first day of July, 1840. The Commanding Officer of the Royal Artillery in the Canadas, Colonel Campbell, most kindly placed at my disposal, the services of Corporal (now Serjeant) Tweedale, of that corps, to superintend the due execution of the work by the guard daily mounted. Serjeant Tweedale I found an efficient assistant, having had some experience in meteorological observations when stationed at Halifax, Nova Scotia.

For the position of my instrument, and its protection from reflected heat, &c. I selected the northern angle of the rampart surrounding the barracks at the Island of St. Helen, a spot I consider well adapted for these purposes, freely exposed to the north, and about sixty feet above the St. Lawrence, and overhanging the same. The thermometer is suspended in a cage or screen, built precisely after the one described by Mr. Harris in the Fifth Report of the British Association, placed on a single vertical pillar, in every respect conformable to that gentleman's instructions. The instrument used is one long in my possession, and carefully compared with good instruments, made by Messrs. Newman, of London, and Adie & Son, of Edinburgh, the accuracy of its graduation, especially below the zero point (Fahrenheit's scale) I can depend upon. The non-commissioned officers in command of the reliefs, enter the observations in a form prepared by me, and to them every acknowledgment is due for the care and attention bestowed upon this duty.

At the expiration of the first year of these observations, by the kindness of General Clitherow, commanding in the District of Montreal, I obtained an order that the observations for the ensuing year should be recorded at the *odd hours*, or 1, 3, 5, &c. so that now at the expiration of the second year, a complete series of hourly observations has been obtained.

When these observations were commenced, I was not aware of



the contemplated establishment of an observatory at Toronto, for the purpose of recording meteorological as well as magnetic phenomena—for in that case it might have been deemed presumption to attempt, with the means at my command, a similar undertaking, although limited to meteorology, but as the present observations were undertaken previously, and as it was found their accuracy could be depended upon, I determined to continue them, if only for the purpose of comparison, particularly as that comparison would be rendered additionally useful by the distance between the places of observation, (nearly 400 miles.)

The plan adopted in the following Tables, is the same as that of Mr. Snow Harris in his able paper, published in the Fifth Report of the Transactions of the British Association, and I have as closely as possible adhered to that gentleman's instructions throughout.

The divisions of the year into quarterly periods of Spring, Summer, Autumn and Winter, as used in Britain, cannot be strictly applied to this latitude in America. In that part of the Province of Canada, hitherto known as Lower Canada, we have, truly speaking, no Spring, and but few weeks of Autumn; in the former, the transition from snow to the intense heat of summer is almost instantaneous, and from the latter to the winter's frost, we have only a short interval of two or three weeks, and again all is winter. The quarterly division therefore, used by Mr. Harris, and adopted by me, is, with regard to this country, purely arbitrary, and useful only for the purpose of comparison with the tables made in England.

The same may be said of the divisions of summer and winter, here we have actually above seven months of winter, and less than five months of summer, but for the above mentioned reason I have followed the same subdivision of the year.

When I commenced the present task, the only observations of a similar nature undertaken in America, that I was acquainted with, were those instituted in the year 1835-'6 at Frankford arsenal, Pennsylvania, by Captain Mordicai, of the U. S. Ordnance Department, and published in the Journal of the Franklin Institute, and from the great care and attention bestowed by that gentleman in

these observations, it is only to be regretted that they were not continued beyond the first twelve months.

It will be seen in the results obtained by me, that the scale of diurnal variation of temperature, in Table XIV. for the pairs of hours, in this latitude, (with one exception which will be noticed,) corresponds perfectly with that obtained by Captain Mordecai, allowing for the difference of mean-temperature of the two places of observation.

The recent resolution of this Society to continue these observations, adding thereto a record of the Barometer, will add greatly to their interest and enable me to verify and correct, if necessary, the results now attained.

The labour thrown away, even in this Colony, in compiling Meteorological Tables, is almost incredible, from the want of system and concert in the times and manner of observation, no two observers among the mass of tables submitted to me having recorded at similar hours. In future this need not be the case, the observer may select any hour or pair of hours of the twenty-four which may suit his personal convenience, and by applying the correction set forth in the Tables XIII or XIV, obtain the true mean-temperature of the year at the place of observation.

TABLE I.—Daily and Monthly Mean Temperature from 1st August 1839, to 31st July 1840, recorded at the even hours.

Day	1839.					1840.						
	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	July
1	63.33	61.75	43.66	38.45	35.33	-4.75	12.83	23.41	38.41	17.08	55.50	60.75
2	65.41	69.16	50.58	35.08	30.41	-1.04	13.01	36.25	37.37	11.54	56.20	64.91
3	62.83	71.37	51.95	31.00	29.91	-1.05	10.01	38.12	37.70	17.50	56.08	65.58
4	67.91	71.70	44.33	29.50	29.75	7.60	-7.79	44.45	39.00	42.00	68.20	67.75
5	70.70	66.37	37.50	29.16	24.99	18.81	1.66	31.45	31.62	40.01	62.50	73.16
6	72.00	65.70	45.30	30.16	28.83	16.23	-21.25	30.58	20.83	41.54	69.70	72.10
7	68.30	65.45	52.04	32.00	30.33	14.68	35.54	13.62	26.04	16.37	57.37	74.58
8	67.16	66.75	57.16	31.50	35.25	19.58	36.37	14.33	30.92	46.33	58.00	73.87
9	65.58	70.20	59.41	30.66	36.00	26.66	36.91	24.50	38.16	47.50	67.45	72.00
10	62.20	62.95	51.50	30.66	35.08	27.41	31.16	11.12	17.58	47.20	72.95	67.62
11	65.80	55.00	45.54	29.33	33.00	4.95	13.00	10.41	33.50	50.70	72.08	63.87
12	64.62	50.00	45.83	25.33	30.70	3.75	15.91	16.29	48.00	52.87	66.54	73.45
13	64.87	53.00	52.66	27.33	29.00	8.50	22.62	24.33	39.58	56.41	62.16	72.41
14	67.62	55.58	42.88	35.66	24.00	4.16	10.50	7.83	41.33	61.16	59.58	75.20
15	66.74	61.32	43.30	43.83	22.75	-3.50	15.58	26.00	39.58	55.00	54.54	77.62
16	67.33	62.00	52.5			-12.45	6.08	33.08	46.46	53.16	60.29	81.33
17	66.33	63.66	54.		9	-9.66	19.20	32.50	51.25	69.25	63.08	74.08
18	70.41	63.75	60.			-0.45	16.58	36.83	47.83	65.08	61.58	75.83
19	74.66	60.62	38.5			17.83	35.91	35.45	41.50	55.75	57.62	69.70
20	77.91	62.33	31.66			25.70	41.25	41.04	39.04	61.08	57.00	62.62
21	78.60	52.58	32.12	18.83	12.83	13.12	27.50	27.41	41.58	62.91	64.00	67.54
22	78.00	62.20	41.75	49.16	11.70	-0.91	27.12	17.50	41.87	61.41	64.12	73.76
23	69.20	52.54	50.08	26.58	18.75	6.58	37.00	23.50	55.66	65.41	68.75	72.16
24	70.95	50.00	55.33	33.50	20.70	3.62	21.12	25.83	51.33	63.41	70.01	64.04
25	69.16	47.83	48.25	31.75	23.12	-1.79	16.75	27.25	59.66	70.50	64.95	70.00
26	61.12	45.91	56.58	17.12	25.75	-1.29	25.83	25.16	47.58	74.54	67.50	69.79
27	66.75	42.54	60.88	23.87	23.12	-1.62	7.75	35.50	36.60	73.79	68.16	70.12
28	54.29	39.91	55.51	30.16	25.08	6.20	21.17	31.04	46.87	71.54	73.83	76.75
29	53.91	42.91	48.25	31.20	20.37	17.00	29.75	35.79	47.50	61.70	78.04	68.78
30	54.94	40.04	46.58	36.66	6.20	29.58		36.00	51.37	62.92	69.66	69.95
31	60.00		40.75		3.75	17.66		33.36		56.29		73.87
Means	66.40	57.70	48.31	30.39	23.42	8.10	20.81	27.31	42.27	56.61	64.38	70.39

Mean temperature of the whole year from 4380 observations, 43.01.

TABLE II.—Mean Temperature for each Alternate even hour for each month.

1839.												1840.												Min Annl Temp of each hour.														
Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	July															
2 A. M.	61.01	53.36	44.30	38.80	32.42	27.1	18.15	21.22	37.90	49.66	56.96	63.22	61.01	53.36	44.30	38.80	32.42	27.1	18.15	21.22	37.90	49.66	56.96	63.22	61.01	53.36	44.30	38.80	32.42	27.1	18.15	21.22	37.90	49.66	56.96	63.22	38.811	
4 "	60.03	52.10	43.47	38.58	32.04	26.22	17.48	22.75	35.13	49.66	57.20	62.82	60.41	52.10	43.47	38.58	32.04	26.22	17.48	22.75	35.13	49.66	57.20	62.82	60.41	52.10	43.47	38.58	32.04	26.22	17.48	22.75	35.13	49.66	57.20	62.82	38.046	
6 "	60.41	53.11	43.45	39.03	32.10	26.10	16.91	22.09	36.71	50.09	58.83	64.53	63.61	55.51	45.79	39.61	32.50	26.50	17.62	24.01	38.83	53.55	63.50	69.79	67.61	59.15	49.30	40.80	33.21	26.21	18.31	21.65	27.31	43.05	57.58	66.13	73.24	43.915
8 "	63.61	55.51	45.79	39.61	32.50	26.50	17.62	24.01	38.83	53.55	63.50	69.79	68.14	59.15	49.30	40.80	33.21	26.21	18.31	21.65	27.31	43.05	57.58	66.13	73.24	68.14	59.15	49.30	40.80	33.21	26.21	18.31	21.65	27.31	43.05	47.315		
10 "	68.14	59.15	49.30	40.80	33.21	26.21	18.31	21.65	27.31	43.05	57.58	66.13	73.24	72.03	63.13	52.53	42.25	32.25	23.25	14.21	20.27	33.80	48.26	63.71	69.55	75.85	72.03	63.13	52.53	42.25	32.25	23.25	14.21	20.27	33.80	47.315		
Noon.	72.03	63.13	52.53	42.25	32.25	23.25	14.21	20.27	33.80	48.26	63.71	69.55	75.85	72.03	63.13	52.53	42.25	32.25	23.25	14.21	20.27	33.80	48.26	63.71	69.55	75.85	72.03	63.13	52.53	42.25	32.25	23.25	14.21	20.27	33.80	49.028		
2 P. M.	71.33	61.39	55.27	42.76	35.96	29.61	19.88	24.41	33.27	48.06	61.96	71.38	77.90	71.33	61.40	51.19	41.13	31.13	21.13	12.11	18.11	30.57	46.15	61.96	69.40	75.79	71.33	61.40	51.19	41.13	31.13	21.13	12.11	18.11	30.57	48.665		
4 "	71.12	61.40	53.93	42.91	36.61	30.61	20.88	24.41	33.27	48.06	61.96	71.38	77.90	71.12	61.40	51.19	41.13	31.13	21.13	12.11	18.11	30.57	46.15	61.96	69.40	75.79	71.12	61.40	51.19	41.13	31.13	21.13	12.11	18.11	30.57	48.212		
6 "	72.03	66.50	51.19	41.13	31.13	21.13	12.11	18.11	30.57	46.15	61.96	69.40	75.79	72.03	66.50	51.19	41.13	31.13	21.13	12.11	18.11	30.57	46.15	61.96	69.40	75.79	72.03	66.50	51.19	41.13	31.13	21.13	12.11	18.11	30.57	48.652		
8 "	67.10	57.60	48.56	39.33	33.19	27.19	17.43	22.31	30.74	46.15	60.48	65.45	71.06	67.10	57.60	48.56	39.33	33.19	27.19	17.43	22.31	30.74	46.15	60.48	65.45	71.06	67.10	57.60	48.56	39.33	33.19	27.19	17.43	22.31	30.74	46.15	43.652	
10 "	64.41	55.21	46.89	39.21	32.53	26.53	17.93	20.62	27.61	41.63	51.74	61.91	67.55	64.41	55.21	46.89	39.21	32.53	26.53	17.93	20.62	27.61	41.63	51.74	61.91	67.55	64.41	55.21	46.89	39.21	32.53	26.53	17.93	20.62	27.61	41.711		
Midnight	62.19	53.81	45.13	39.03	32.71	26.71	19.56	26.09	39.75	52.06	59.13	66.00	70.50	62.19	53.81	45.13	39.03	32.71	26.71	19.56	26.09	39.75	52.06	59.13	66.00	70.50	62.19	53.81	45.13	39.03	32.71	26.71	19.56	26.09	39.75	40.163		
Means	66.83	57.69	48.21	39.39	33.19	26.14	18.14	20.90	27.65	42.15	53.66	61.29	70.50	66.83	57.69	48.21	39.39	33.19	26.14	18.14	20.90	27.65	42.15	53.66	61.29	70.50	66.83	57.69	48.21	39.39	33.19	26.14	18.14	20.90	27.65	43.689		

Mean Temperature of the whole year from 1389 Observations, 43.059.

TABLE III. Shewing the Mean Temperature for each of the seasons of Spring, Summer, Autumn and Winter, from 1st August, 1839, to 31st July, 1840.

Hours	Spring	Summer	Autumn	Winter
2 A. M.	37.26	60.39	41.82	15.43
4 "	35.86	60.02	41.38	14.91
6 "	36.26	61.39	41.87	14.53
8 "	38.78	65.63	43.63	15.04
10 "	42.66	69.17	46.42	17.72
Noon.	47.51	72.47	49.30	13.96
2 P. M.	49.14	74.72	50.81	21.16
4 "	48.76	74.47	50.41	21.02
6 "	45.79	72.40	47.67	18.97
8 "	43.28	67.88	45.50	17.94
10 "	41.02	64.69	43.66	17.02
Midnight	39.27	62.51	42.77	16.10
Means	42.13	67.14	44.44	17.50

Mean Temperature by this table 43.03.

TABLE IV. Shewing the Mean Temperature for the six Summer Months, April to September inclusive, and six Winter Months, October to March inclusive, from 1st August, 1839, to 31st July, 1840.

Hours	Summer	Winter
2 A. M.	54.18	23.88
4 "	52.83	23.25
6 "	53.96	23.03
8 "	57.13	24.08
10 "	61.22	26.76
Noon.	65.26	29.37
2 P. M.	67.01	31.03
4 "	66.80	30.52
6 "	64.06	28.36
8 "	60.42	26.88
10 "	57.62	25.78
Midnight	55.52	24.80
Means	59.667	26.478

Mean Temperature by this table 43.072.

TABLE V. Daily and Monthly Mean Temperature from 1st August 1840 to 31st July 1841, recorded at the odd hours.

Day	1840.					1841.						
	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	July
1	71.67	62.16	16.41	39.92	6.67	6.16	-4.00	30.83	35.42	11.08	56.83	68.91
2	76.50	59.41	51.67	42.83	16.00	14.92	2.50	14.91	30.04	39.08	59.91	59.17
3	75.50	55.41	56.00	44.00	13.01	8.17	13.17	9.66	29.17	37.50	56.83	60.00
4	69.42	58.04	52.25	42.25	8.61	-9.00	12.33	13.75	27.16	34.33	63.42	64.50
5	65.92	59.33	59.08	38.08	8.25	-7.04	13.58	8.92	31.58	38.75	61.16	67.67
6	63.16	65.50	51.50	37.91	7.58	27.58	21.91	8.58	30.67	15.83	64.42	65.75
7	61.92	67.17	47.66	34.30	17.42	38.16	26.67	24.58	36.08	18.00	73.75	65.08
8	62.58	65.33	53.01	37.08	22.16	25.16	22.33	27.50	32.58	18.25	72.75	64.50
9	64.00	69.08	40.75	39.58	30.16	16.92	15.58	26.33	26.75	53.75	67.83	65.42
10	68.50	62.58	38.08	39.83	35.42	17.66	21.17	23.33	22.00	19.91	69.25	62.17
11	63.08	55.16	48.66	37.17	18.58	19.58	9.92	15.50	16.83	11.41	67.50	62.16
12	66.83	50.66	45.33	37.08	17.58	23.50	6.42	4.75	23.25	42.33	62.75	63.67
13	70.00	54.50	41.25	39.08	29.58	7.41	8.08	16.17	27.53	17.75	65.41	72.75
14	67.66	59.16	43.04	33.25	31.92	6.33	7.50	17.75	32.58	15.04	61.58	72.08
15	63.75	60.08	37.33	32.00	30.75	13.50	8.91	5.75	32.58	13.75	59.50	72.25
16	66.58	63.50	34.92	31.67	28.08	21.00	15.25	5.50	11.01	19.75	63.08	66.50
17	70.25	67.08	37.75	30.75	21.25	35.58	5.25	7.83	40.17	16.25	65.50	68.50
18	75.83	57.33	45.25	30.04	7.08	9.04	5.25	23.75	32.17	44.42	60.58	69.83
19	75.50	55.33	57.50	26.83	13.16	8.50	20.67	39.92	29.16	18.33	57.83	70.67
20	76.08	51.08	52.92	25.92	14.33	10.32	23.91	41.00	29.93	60.04	57.42	73.25
21	79.17	42.83	49.41	24.75	12.16	21.08	19.75	30.25	31.58	62.91	62.92	75.83
22	77.50	43.67	42.33	18.17	10.83	23.00	13.25	25.25	36.04	62.25	69.91	76.67
23	76.58	51.08	45.08	24.25	10.04	24.92	8.04	38.33	38.50	67.00	73.50	73.75
24	68.25	48.04	39.75	28.00	6.04	29.33	3.83	37.67	42.75	58.25	62.92	76.66
25	61.58	53.25	38.33	27.58	-5.75	27.42	18.75	39.41	44.75	63.08	61.75	73.33
26	67.00	59.41	35.17	22.50	-3.58	29.83	25.50	32.50	51.58	63.17	64.83	65.33
27	70.41	54.75	31.25	24.50	8.17	33.08	31.16	31.17	44.67	68.83	73.04	59.75
28	72.08	50.08	35.25	29.83	17.16	27.08	25.92	31.17	48.83	70.33	70.58	58.33
29	72.83	55.92	43.58	36.25	26.75	23.42		26.33	57.75	55.50	74.66	64.17
30	68.50	56.25	41.67	30.91	20.75	26.00		12.91	37.16	56.58	71.08	66.25
31	68.41		38.67		13.83	28.25		21.25		57.91		65.25
Means	69.67	57.53	41.70	32.76	15.91	18.96	14.52	22.56	31.17	51.33	65.08	67.42

Mean temperature of the year, from 4380 Observations, 41.239

TABLE VI. Mean Temperature for each Alternate odd hour for each month.

1840.												1841.											
	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	July	Min Annl Temp of each hour.										
1 A.M.	61.66	52.61	42.17	31.60	15.03	17.53	12.91	18.12	31.35	46.48	60.53	62.35	37.91										
3 "	63.70	52.33	41.09	31.18	14.12	17.66	11.80	17.32	29.33	44.82	59.98	60.62	36.99										
5 "	63.25	52.10	40.25	30.68	13.62	17.09	10.57	15.66	27.93	44.77	58.78	59.66	36.19										
7 "	67.59	51.06	41.09	30.75	13.85	16.98	9.30	15.43	30.63	47.77	60.36	64.38	27.68										
9 "	70.27	56.80	43.83	32.13	14.77	17.80	10.53	19.51	33.76	50.83	65.10	67.20	40.22										
11 "	73.30	59.73	47.43	34.11	16.40	20.01	14.69	25.01	36.95	54.12	68.50	70.63	43.41										
1 P.M.	76.30	62.65	50.11	36.25	18.29	20.45	19.32	29.91	39.40	57.11	71.05	73.50	46.19										
3 "	77.03	64.18	50.50	35.98	18.69	21.32	20.60	31.53	40.80	57.79	72.01	75.43	47.15										
5 "	75.16	63.36	47.85	33.95	17.35	19.59	18.64	28.98	40.10	57.95	71.26	73.95	45.67										
7 "	71.14	58.15	45.70	33.59	16.61	19.56	15.75	21.90	37.40	54.83	68.25	70.30	42.98										
9 "	68.11	56.21	41.38	32.63	16.62	19.62	15.48	23.25	34.03	50.72	63.50	66.25	40.90										
11 "	66.59	54.51	42.33	31.98	15.69	18.35	14.28	20.82	32.41	48.91	61.53	64.03	39.22										
Means	69.75	57.22	41.73	32.81	15.92	18.83	14.48	22.54	31.50	51.34	65.07	67.35	41.21										

Mean Temperature of the whole year from 4350 Observations, 41.211.

TABLE VII. Shewing the Mean Temperature of each of the seasons, Spring, Summer, Autumn and Winter, from 1st August, 1840, to 31st July, 1841.

Hours	Spring	Summer	Autumn	Winter
1 A. M.	31.97	62.50	42.12	15.14
3 "	30.48	61.42	41.49	15.41
5 "	29.44	60.55	41.00	13.79
7 "	30.27	64.10	41.96	13.36
9 "	34.71	67.51	44.28	14.36
11 "	38.68	70.80	47.01	17.03
1 P. M.	42.13	73.60	49.76	19.35
3 "	43.36	74.81	50.20	20.19
5 "	41.25	73.45	48.37	18.52
7 "	39.04	69.88	45.67	17.30
9 "	35.99	65.94	44.40	17.22
11 "	34.03	64.04	42.69	16.10
Means	35.94	67.38	44.91	16.40

Mean Temperature by this table 41.157.

TABLE VIII. Shewing the Mean Temperature of the six summer months, April to September inclusive, and six winter months, October to March inclusive, from 1st August, 1839, to 31st July, 1841.

Hours	Summer	Winter
1 A. M.	52.98	22.88
3 "	51.78	22.18
5 "	51.07	21.25
7 "	53.63	21.22
9 "	57.92	23.11
11 "	60.53	26.23
1 P. M.	63.32	29.10
3 "	64.19	29.75
5 "	63.62	27.17
7 "	60.00	25.95
9 "	56.46	25.32
11 "	54.65	23.78
Means	57.46	24.82

Mean Temperature by this table 41.140.



TABLE IX. Shewing the relation between the Mean Temperature of each alternate even hour, with that of the whole day or Mean Annual Temperature for 1839-'40.

A. M.		2	4	6	8	10	12
	Temperature	38.81	38.04	38.51	40.77	43.94	47.31
	Deviation	-4.22	-4.99	-4.52	-2.26	+0.91	+4.28
P. M.		2	4	6	8	10	12
	Temperature	49.02	48.66	46.21	43.65	41.71	40.16
	Deviation	+5.99	+5.63	+3.18	+0.62	-1.32	-2.87

TABLE X. Shewing the relation of the Mean Temperature of every similar pair of alternate even hours, to that of the whole day or Mean Annual Temperature for 1839-'40.

A. M. & P. M.	2	4	6	8	10	12
Temperature	43.91	43.35	42.36	42.21	42.82	43.73
Deviation	+0.88	+0.32	-0.67	-0.82	-0.21	+0.70

TABLE XI. Shewing the relation between the Mean Temperature of each alternate odd hour, with that of the whole day or Mean Annual Temperature for 1810-'41.

A. M.		1	3	5	7	9	11
	Temperature	37.94	36.99	36.19	37.68	40.22	43.41
	Deviation	-3.28	-4.23	-5.03	-3.54	-1.00	+2.19
P. M.		1	3	5	7	9	11
	Temperature	46.19	47.15	45.67	42.98	40.90	39.22
	Deviation	+4.97	+5.93	+4.45	+1.76	-0.32	-2.00

TABLE XII. Shewing the relation of the Mean Temperature of every similar pair of alternate odd hours, to that of the whole day, or Mean Annual Temperature for 1840-'41.

A. M. & P. M.	1	3	5	7	9	11
Temperature	42.06	42.07	40.93	40.33	40.56	41.31
Deviation	+1.84	+0.85	-0.29	-0.89	-0.66	+0.09

TABLE XIII. Shewing the corrections to be made for each hourly observation taken from Tables IX and XI.

A. M.	Hour	1	2	3	4	5	6
	Correction	-3.28	-4.22	-4.23	-4.99	-5.03	-4.52
	Hour	7	8	9	10	11	12
	Correction	-3.51	-2.26	-1.00	+0.91	+2.19	+4.28

P. M.	Hour	1	2	3	4	5	6
	Correction	+4.97	+5.99	+5.93	+5.63	+4.45	+3.18
	Hour	7	8	9	10	11	12
	Correction	+1.76	+0.62	-0.32	-1.32	-2.00	-2.87

From this table it will be seen that the mean annual temperature of any hour never differs more than about six degrees from the mean annual temperature of the twenty four hours. Thus the mean temperature for Montreal, may be attained from a register made at only one hour of the day, applying the correction in the table, observing its sign. Thus if the observed mean temperature of 10 A. M., taken from the observations of the whole year was 43.94, then the mean temperature of the whole twenty-four hours, for the year would be  $43.94 - 0.91$  since the mean temperature of 10 A. M. exceeds the mean temperature of the twenty-four hours, by 0.91; that is, in applying the respective corrections the signs are to be reversed.

TABLE XIV. Shewing the corrections for each pair of hours of the twenty-four, from Table X and XII.

Hour A. M. & P. M.	1	2	3	4	5	6
Correction	+1.84	+0.88	+0.85	+0.32	-0.29	-0.67
Hour A. M. & P. M.	7	8	9	10	11	12
Correction	-0.89	-0.82	-0.66	-0.21	+0.09	+0.70

From table XIV. it will appear that the greatest deviation of any similar pair of hours from the mean of the twenty-four, or mean annual temperature is less than two degrees. That the mean temperature of the six pair of hours from eleven to four inclusive, exceeds the mean temperature of the year, the greatest difference being 1.84, and the mean temperature of the six pair, from five to ten inclusive, is less than the mean temperature of the year, the greatest difference being 0.89.

From all the above results it appears that in the observations made at the odd hours, the mean of observations made at 5 A. M. and 5 P. M., and 11 A. M. and 11 P. M. approached nearest the mean temperature of the 24 hours; and that of those made at the even hours, the mean of 4 A. M. and 4 P. M., and 10 A. M. and 10 P. M. approach nearest.

Notwithstanding the close approximation of the observations made at 11 and 11, (as shewn by table XIV to the mean of the twenty-four hours, I am inclined to believe that 10 A. M. and 10 P. M. are the best hours of observation; and in this I am borne out by the results obtained at the observatory at Toronto (Canada West) where the even hours only are recorded, with which I have been most obligingly furnished since this report was in press by Lieut. Younghusband, R. A.

TABLE XV. Extracted from the results obtained at the observatory at Toronto, shewing the relation of the mean temperature of every similar pair of alternate even hours, to that of the whole day, or mean annual temperature, from 1st August, 1840, to 31st July, 1841.

A. M. & P. M.	2	4	6	8	10	12
Temperature	44.32	43.93	42.96	42.83	43.70	44.16
Deviation	+0.66	+0.27	-0.70	-0.83	+0.04	+0.50

On comparing this table with table X it will be seen how closely correspond the results attained at the two stations. The observations made at St. Helen during the current year are recorded at the odd hours, their results will determine the question of the merits of the observations at 11.

In conclusion, the mean temperature in this latitude may be *very closely* determined by two observations in the day, made throughout the year, at 4 A. M., and 4 P. M., or at 10 A. M. and 10 P. M.; or more accurately at those, or any other similar pair of hours by attending to the corrections in the manner laid down in the remarks following Table XIII. attention being paid to the respective signs.

Although in no manner affecting the correctness of the results obtained in the foregoing observations, it is nevertheless to be regretted that the mean temperature of the year '39-'40, and '40-'41 should have differed nearly 2 degrees (1.81) owing to the spring of 1841 being so much colder than that of the preceding year.

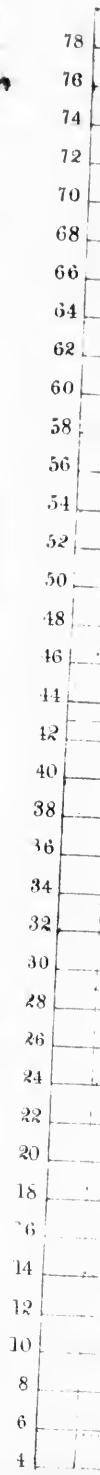
Montreal, 1842.

*Results deducible from the foregoing Tables for the year beginning 1st August, 1839, ending 31st July, 1840.*

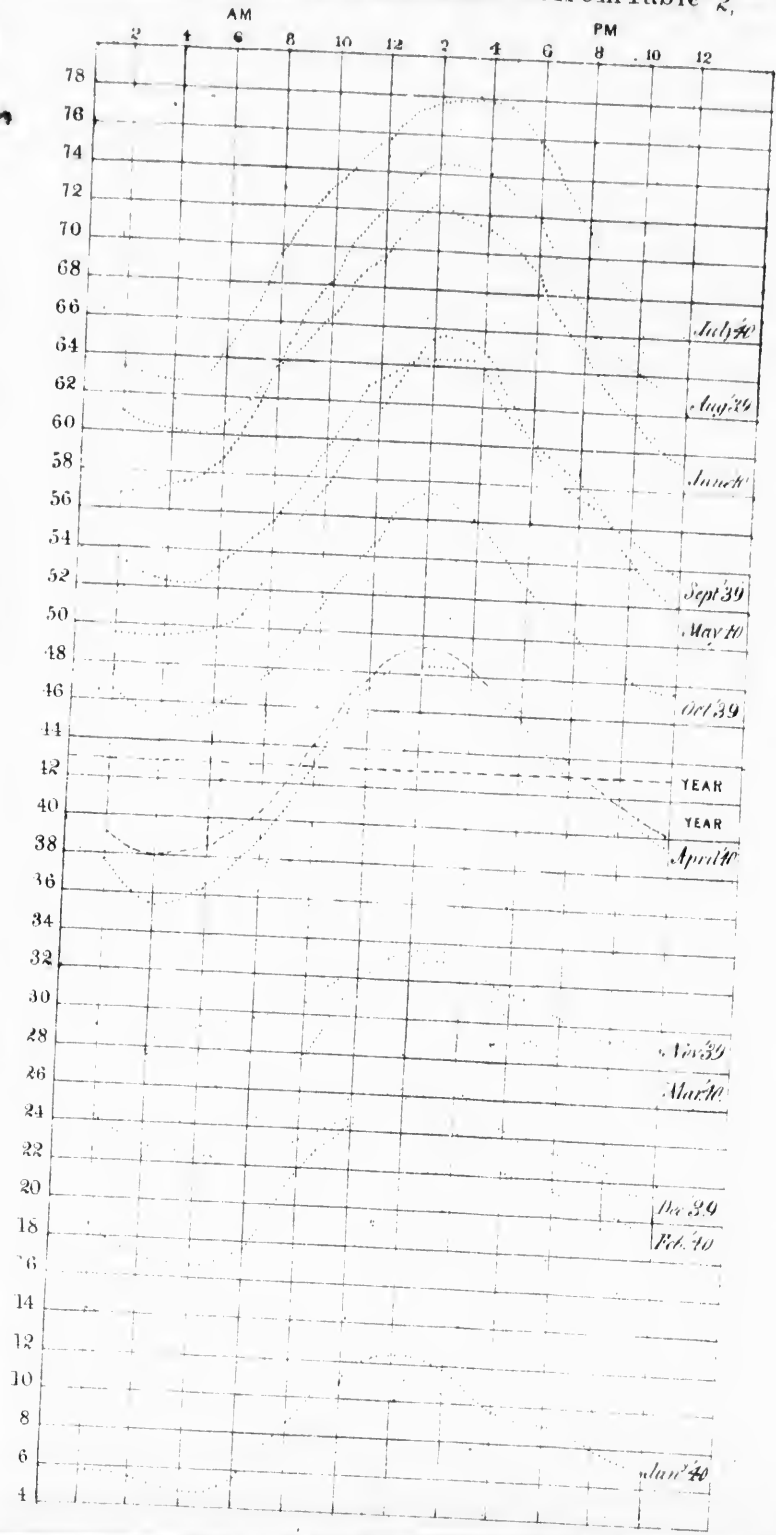
Maximum 91.5 took place on 16th July, 1840, at 2 P. M.		
Minimum -18 do 16th January, 1840, at 8 A. M.		
Mean temperature of 10 days about the <i>summer solstice</i> , viz. from June 15 to June 25, inclusive, 1840. . . . .	} 63.44	
Mean temperature of 10 days about the <i>winter solstice</i> , viz. from 15th to 25th December, inclusive, 1839. . . . .		
Mean temperature of the four seasons, from Table III., including 3 months each.	} 15.96	
{ Winter, Dec. Jan. Feb. . . . .		17.50
{ Spring, March, April, May. . . . .		42.13
{ Summer, June, July, August, . . . . .		67.14
Mean temperature of winter and summer, from Table IV., including 6 months each.	} 26.47	
{ Winter, Jan., Feb., March, Oct., Nov., Dec., . . . . .		26.47
{ Summer, April, May, June, . . . . .		59.66
{ July, Aug., Sept., . . . . .	59.66	
Mean temperature of the whole year, from 4380 observations, mean of Tables I. and II., . . . . .	} 43.03	
Extreme range of temperature, . . . . .		109.5

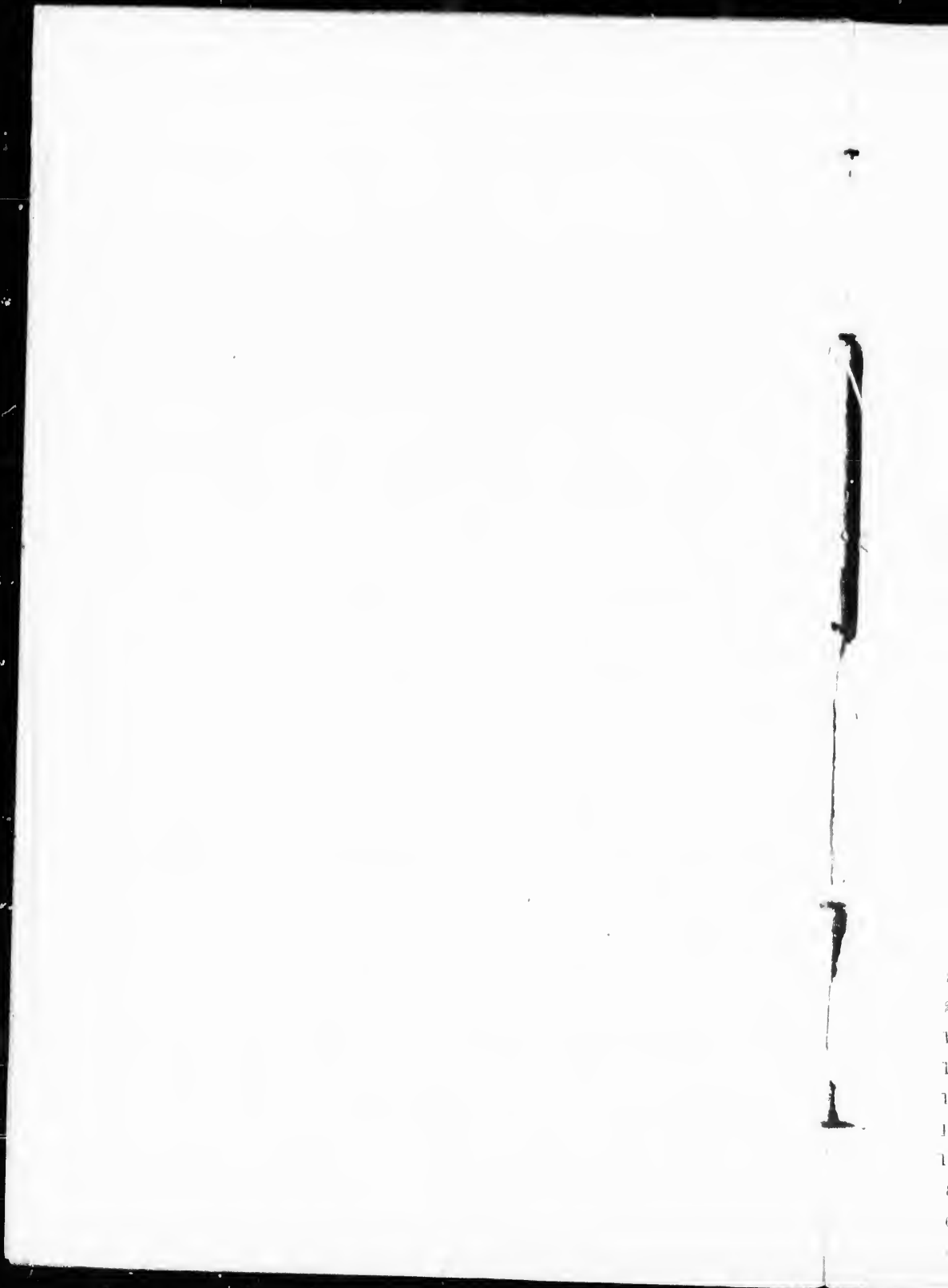
*Results deducible from the foregoing Tables, for the year beginning 1st August, 1840, ending 31st July, 1841.*

Maximum 89.5, took place 22d August, 1840, at 3 P. M.		
Minimum -15.5, took place 4th January, 1841, at 7 A. M.		
Mean temperature of 10 days about the <i>summer solstice</i> , from 15th to 25th June 1841. . . . .	} 63.54	
Mean temperature of 10 days about the <i>winter solstice</i> , from 15th to 25th December, 1840. . . . .		
Mean temperature of the four seasons by Table VII., 3 months each. . . . .	} 11.72	
{ Winter, Dec., Jan., Feb., . . . . .		16.40
{ Spring, March, April, May, . . . . .		35.94
{ Summer, June, July, August, . . . . .		67.38
Mean temperature of winter and summer, from Table VIII., 6 months each, . . . . .	} 44.91	
{ Autumn, Sept., Oct., Nov., . . . . .		44.91
{ Winter, Oct., Nov., Dec., . . . . .		24.82
{ Jan., Feb., March, . . . . .	24.82	
{ Summer, April, May June, . . . . .	57.46	
{ July, Aug., Sept., . . . . .	57.46	
Mean temperature of the whole year, from 4380 observations, mean of Tables V. VI., . . . . .	} 41.22	
Extreme range of temperature, : . . . . .		105.0



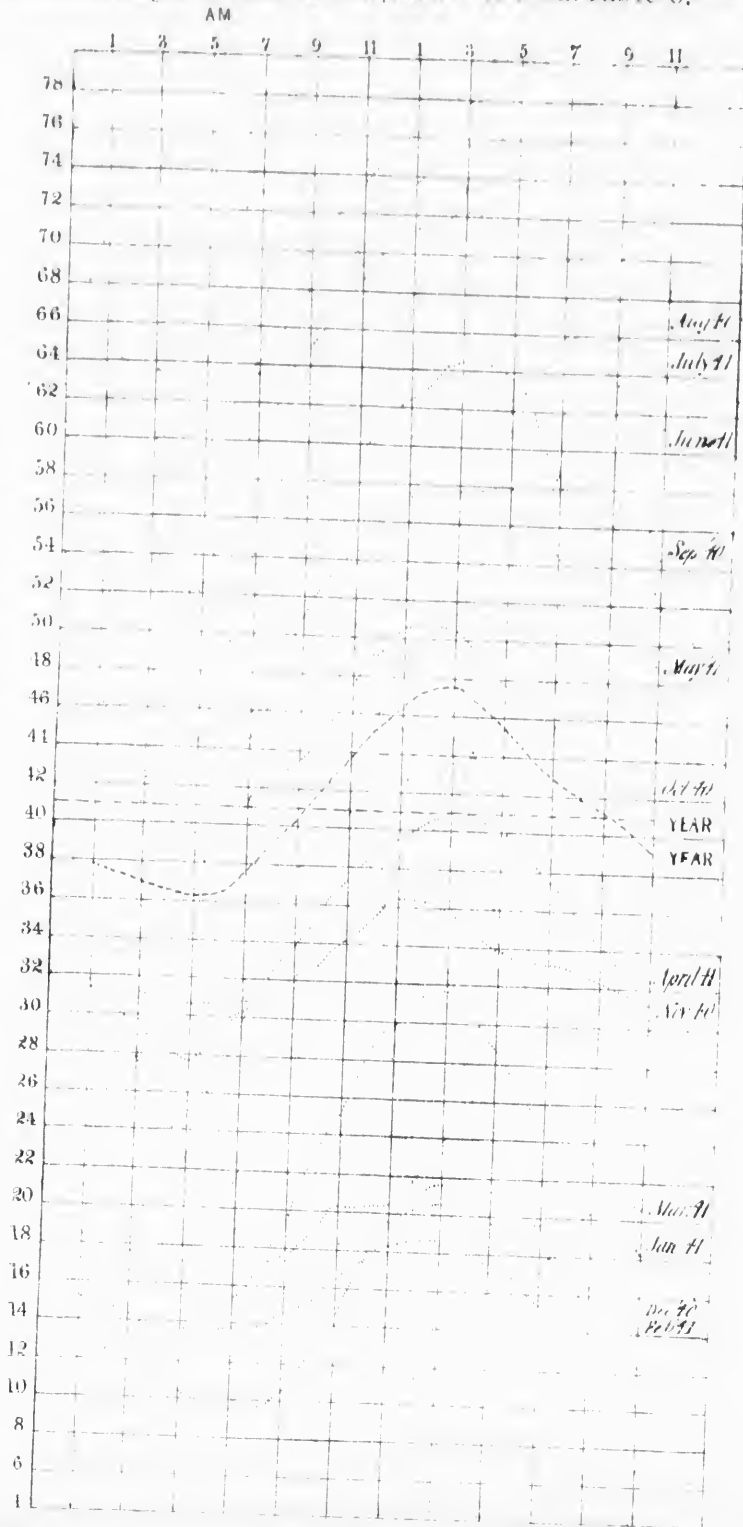
changes of each Month, 1839 - 40 from Table 2,





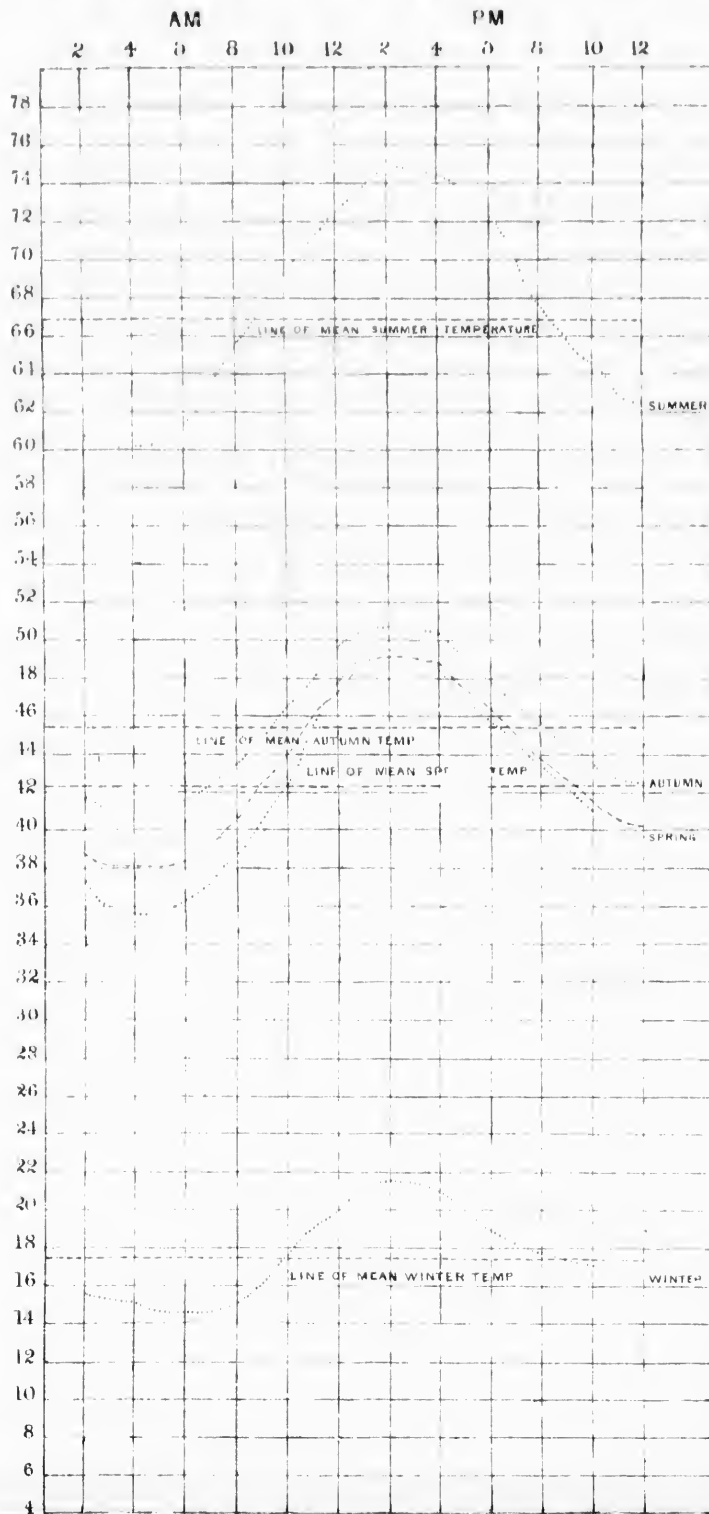


changes of each Month, 1840-41 from Table 6.

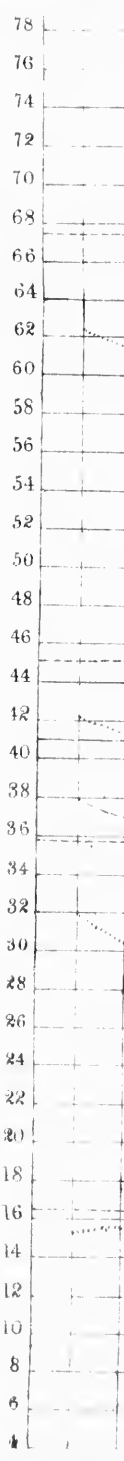


11

PLATE 3. Showing the curves of the four seasons of 1839-40 from Table 3.



1



of 1816-41 from Table 7.

