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July to Dec 1866

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Instruction relative aux thermomètres armés de chambres.

Fig. 1.



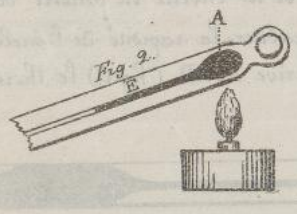
Lorsqu'un thermomètre à mercure est muni d'une chambre supérieure A (fig. 1); il arrive fréquemment, soit par le fait du transport, soit par toute autre cause, que cette chambre se remplit de mercure: 1° complétement 2° seulement en partie.

Il est évident qu'un instrument dans ces conditions ne peut servir.

Pour le remettre en état on exécutera la série d'opérations suivantes:

Chambre complétement remplie de mercure.

Fig. 2.



Présenter la chambre A à la flamme d'une lampe à alcool ou au besoin à celle d'une bougie, tenant l'instrument incliné la cuvette en bas comme l'indique la figure 2, en ayant soin de tourner constamment la tige entre les doigts de façon à chauffer le verre bien également (1).

Lorsque la température est suffisamment élevée, le mercure sort de la chambre et s'engage dans la colonne E (fig. 2); à ce moment, et lorsqu'une quantité de mercure suffisante est engagée, on retire l'instrument de la flamme et, le redressant verticalement, le mercure descend de lui-même en remplissant le vide qui existait en B (fig. 3).

Fig. 3.



Mais, par suite de cette opération, la petite quantité d'air qui existe toujours dans un thermomètre, quelque excellente que soit sa construction, est venue toute entière se réfugier au col de la cuvette C (fig. 3) créant en ce point une petite séparation qui est partout visible quand on incline le thermomètre. Il faut chasser ce globule d'air et faire en sorte que nulle interruption n'existe plus dans la colonne mercurielle; pour obtenir ce résultat on opérera de la manière suivante:

(1) Si l'on ne prend la précaution de tourner constamment le thermomètre, le verre, sous l'influence de la chaleur, se gonfle à l'endroit exposé à la flamme, et si à ce moment on continue à chauffer, on provoque l'explosion de la chambre.

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Fig. 4.

1° Retourner le thermomètre, le mercure se coupe en C (fig. 4) et la partie séparée descend par son propre poids dans la chambre A.

★ 2° Le mercure introduit ainsi dans la chambre supérieure forme un globule que l'on promène en tous sens afin de ramasser les traces de vapeur mercurielle adhérant aux parois; placer ensuite le globule bien exactement au fond de la chambre A (fig. 5).

3° Prendre le thermomètre dans la main droite, la cuvette en haut (fig. 4), et donner une légère secousse à l'instrument en le laissant tomber doucement dans la paume de la main gauche; par suite de l'impulsion le mercure se déloge de la cuvette et s'engage dans la colonne en poussant devant lui la petite bulle d'air existant en C (fig. 4).

C'est à ce moment que l'on doit apporter la plus grande vigilance, car c'est là le point délicat de l'opération: à l'instant même où le mercure commence à se déloger de la cuvette en pénétrer dans le canal, incliner vivement le thermomètre en graduer la rapidité de l'inclinaison de telle sorte que lorsque le mercure arrive en D (fig. 5) le thermomètre se trouve dans la position horizontale

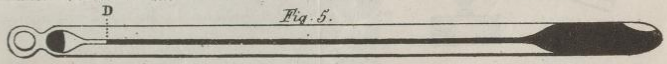


Fig. 5.

C'est alors qu'inclinant le thermomètre comme l'indique la fig. 6 (2) on fait déborder très légèrement le mercure à l'entrée de la chambre (fig. 6) on donne alors une légère secousse en frappant doucement le tube en A (fig. 6) sur l'index de la main gauche de façon à relier le mercure placé au fond de la chambre avec celui de la colonne (fig. 7).

Redresser alors le thermomètre dans la position naturelle en laissant le mercure descendre seul (fig. 8); nulle solution de continuité n'existe plus dans le mercure et le thermomètre est en parfait état.

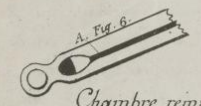
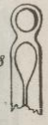



Fig. 7.


Fig. 8

Chambre remplie seulement en partie.

Lorsque la chambre est remplie incomplètement, suivre la série d'opérations ci-dessus en commençant au signe ★.

---

(2) L'angle sous lequel le mercure se met en mouvement dépend naturellement du diamètre intérieur du tube; c'est à l'opérateur à juger lui-même du degré d'inclinaison qu'il convient d'appliquer.

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Comparison with Air Thermometer of Thermometer Casella No 3235 at Harvard Observatory.

By S. W. Holman. Feb. 1879.

The air thermometer used in this comparison was that of Prof. H. A. Rowland at the Johns Hopkins University at Baltimore, Md. At the same time were compared two thermometers belonging to Prof. Rowland, maker Baudin Nos 6163 and 7316 respty.; also two thermometers by ~~Fa~~ Fastré of Paris numbered respty. 368 and 376 and owned by Dr. Wolcott Gibbs of Harvard University. These could be referred to, if in existence, to establish the readings of the Casella 3235 or to reproduce them with some degree of certainty. In making the comparison with the air therm. the steam and bulb were of the mercurial therm. were at same temperature throughout.

The observations upon the Casella ther in all cases have been reduced from the original readings as follows:-

Let t' = direct reading of therm.; t_0 = reading when in ice,

Then true reading is $t = a(t'-t_0)$ for any thermometer, and

$a = \frac{t_1}{t_s - t_0}$ where t_1 = temp. steam when thermometer is tested

t_s = reading of therm. in steam when tested. This value

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of a series direct for a Centigrade thermometer. If however we have a Fahr. therm. and desire $\bar{\tau}$ in Fahr. degrees we must write $\bar{\tau} = 32 + a(t - t_0)$ where $a = \frac{t' - 32}{t_s - t_0}$ where t' is in Fahr. degrees. If however we wish the reading of the Fahr. thermometer in Centigrade degrees as was desired in present case we write $\bar{\tau} = a(t - t_0)$ where $a = \frac{t'}{t_s - t_0}$ where t' is temp. steam in Cent. degs. and all other readings are in Fahr. degrees. This last is the expression used in obtaining $\bar{\tau}$ in table 1st. It should be remembered in accurate reductions of Fahr. to Cent. degrees that 212° F. and 100° C. are not identical as the former is temp. of steam at 30 in. = 762. mm barometer, while the latter is at 760 mm. Hence $1°F = 0.55594\,C$ not $0.5555\,C$ as ordinarily assumed.

Observations –

In ice – Casella 3235 read direct $32.80\,F. = t_0$

In steam – Barom. red. to 0°C = 753.15 mm

Cal. temp steam $t' = 99.743\,C = 211.40\,F = t'$

Casella 3235 read direct – $212.00\,F = t_s$

The comparison with the air thermometer gave the results shown in the following table. Col. 1 gives temp. by air therm. = T; Col. 2 = temp. by Casella 3235 corrected

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as above indicated; Col. 3 = Error of Casella referred to air thermo.

Data from Comparison -

T	$\bar{c}$	Δ	T	$\bar{c}$	Δ	
0°.00	0°.00	0°.00	50°.71	50°.57	−0.14	×
3.67	3.65	−0.02	60.10	60.12	+0.02	
11.55	11.63	+0.08	73.82	73.97	+0.15	×
20.72	20.79	+0.07	86.50	86.56	+0.06	
32.19	32.29	+0.10	86.52	85.51	−0.01	
39.36	39.45	+0.09	100.00	100.00	0.00	

As the thermometer was graduated only to single degrees Fahr. there would be a liability to 0°.05 F in any single reading (or 0°.03 C) ~~made~~ whence the minor variation in the above readings, which are greater than occurred in the readings of the other thermometers compared at same time. The observations at 50°.71 C and 73°.82 C are probably not by at least 0°.1 C each owing to some unaccountable error which appeared only in $\bar{c}$ as determined by this thermometer and not in the other instruments. Whence these observations are justly rejected. I obtain by interpolation upon a curve constructed from the above observations the corrections due to the difference between the air therm. and Casella 3235. For convenience two tables are given, the first giving the corrections for every ten degrees centigrade, the second for every ten degrees Fahrenheit. The columns are headed Δc and Δ'c respectively.

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Capella No 3235.

Table of corrections to reduce readings to Air Thermom.

Centigrade Reading	Correct.	Fahrenheit Reading	Corr.	Reading	Corr.
0.00	−0.00	30.° F	—	130.° F	−0.08 F
10.0	−0.05	32.	0.00 F	140.	−0.06
20.0	−0.09	40.	−0.04	150.	−0.05
30.0	−0.10	50.	−0.09	160.	−0.04
40.0	−0.09	60.	−0.14	170.	−0.03
50.0	−0.06	70.	−0.17	180.	−0.02
60.0	−0.03	80.	−0.18	190.	−0.01
70.0	−0.02	90.	−0.18	200.	0.00
80.0	−0.01	100.	−0.17	210.	0.00
90.0	−0.00	110.	−0.14	212.	0.00
100.0	−0.00	120.	−0.11		

To obtain the air thermometer reading corresponding to any direct reading t of this thermometer determine the freezing point t_0 and if this has changed more than 0.°2 F from the reading given upon p. 2 redetermine the boiling point t' and calculate by the suitable formula of p. 1 or p. 2 the value τ. Look out in the above table τ and interpolate the corresponding value of $\Delta\tau$. Then $T = \tau + \Delta\tau$. If the zero point has not changed more than 0.°2 F it will be sufficiently accurate to use the figures given at p. 2 and add to the final result for τ the change in the zero point. It is absolutely necessary, after heating the instrument to the boiling point or any high temperature, to allow it at least a month or more to regain its former position at low temperatures before making further comparisons.

17.

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Harvard College Observatory.

Meteorological Instruments.

Barometer. J. Newman No. 68. Half inch tube, metal scale, ivory point for making contact with mercury in cistern. Compared in 1873 with Newman 57; appeared to stand 0.005 inches below it (see general remarks on observations for 1873). Newman 57 since broken; (see general remarks on observations for 1877). Newman 68 remains in the place it had in 1873 in the Meridian Circle room, northeast corner, top of mercury in cistern 2 feet 8 inches above floor of room, and considered to be 79 feet above sea level; (see note in record for July, 1877). It is read by a vernier to thousandths of an inch.

Attached thermometer. The thermometer attached to barometer Newman 68 is not known to have been compared with other thermometers. Its scale is graduated to single degrees of Fahrenheit.

Other thermometers (all graduated to single degrees of Fahrenheit).

Bond & Son, No. 4. (Probably not numbered when made, but has a figure 4 scratched upon its scale, and is called No. 4 in records of 1868 and later). Its readings have been used without correction for determining mean temperature for many years. Its bulb is large and round. Scale of metal, flat. No case.

Casella 8236, with Kew certificate pasted in book Q1, containing meteorological record for 1866, 1867, 1868. Cylindrical bulb, long metal scale, no case. See comparisons by S. W. Holman on sheet pasted in on previous page. Freezing point determined Dec. 29, 1872, 32.7; Feb. 24, 1876, 32.9; Feb. 1879, (at Baltimore) 32.8; March 17, 1879, 32.9.

Psychrometer. Two thermometers by J. Green of New York. No cases. Scales, originally of bone, replaced at the beginning of 1877 by metal scales made by Huddleston. (See general remarks on observations for 1877.) Bulbs cylindrical.

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Maximum thermometer, Casella 13399. Mercurial thermometer, column divided by bubble of air, fixed horizontally, set by being taken down and swung in the hand, so that it ordinarily stands too high after setting, but sometimes too low, when the temperature of the room where it is set is low compared with that of the external air. Bulb small, cylindrical.

Minimum thermometer, Green 2205. Alcoholic, with metal index, fixed horizontally, set by lifting the bulb without dismounting it. Bulb round.

These thermometers compared together March 17, 1879. Placed in a glass vessel of water, scales attached (and more or less damaged in the process), the vessel being 8 inches high. When the vessel was nearly full and the thermometers rested on the bottom the water reached to the following degrees of their scales:

No. 4, 65; C. 3235, 50; Sychrometer, uncovered bulb, 90; covered bulb, 85; maximum, 100; minimum, 60.

Water warm at first, and comparisons made in clock-room (east of East Transit Room). Water agitated before and during each comparison so far as practicable; maximum thermometer taken out and replaced after setting just before each reading. Temperature of air indicated during first six comparisons by thermometer Casella 15196 (used with meridian circle observations). This thermometer put into the water and compared with the others in comparisons 7 to 12 inclusive. When used to indicate temperature of the air, it had not been long in the room, and its distance from the water varied at times. First comparison untrustworthy, as a door near by was opened by persons passing about that time. Tenth comparison made in clock-room like those preceding; last two comparisons in East Transit Room. In last comparison the maximum thermometer was not put into the water, which was mixed with a large quantity of snow; its bulb and the lower part of its scale were enclosed in a lump of snow so that it might be set to its freezing point. The temperature of the outside air and of the room was somewhat above freezing.

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No.	Time	Temp.	C. 15196	No. 4	C. 3235	Bychrometer Uncovered bulb	Bychrometer Covered bulb	Maximum C. 13399	Minimum C. 2205
1	11h 30m A.M.	60		99.1	99.0	98.9	97.7	97.7	97.1
2	11 35 A.M.	63		96.5	95.7	96.4	96.2	96.1	96.0
3	11 40 A.M.	67		95.0	94.6	94.8	95.0	94.0	94.8
4	11 45 A.M.	65		93.8	93.4	93.0	93.2	93.0	92.8
5	11 50 A.M.	64		93.0	92.5	92.2	92.3	91.6	92.1
6	12 25 P.M.	70		84.7	84.5	84.1	84.3	84.0	84.0
7	12 35 P.M.		83.3	83.4	83.2	83.0	83.2	83.0	82.8
8	1 25 P.M.		67.0	67.4	67.5	67.3	67.3	66.9	66.6
9	1 38 P.M.		63.3	63.6	63.6	63.4	63.4	62.9	63.0
10	1 44 P.M.		54.0	54.2	53.0	53.3	53.4	53.2	53.3
11	1 55 P.M.		38.8	38.9	39.0	38.5	38.6	38.4	38.2
12	3 0 P.M.		32.4	32.3	32.9	31.9	32.2	32.0	32.0

Corrections of C. 3235, determined by S. W. Holman. (They differ from those of the New certificate in book Q1, but agree with them in so far that both sets are negative below 212 & do not exceed 0.2 anywhere).

The corrections required by C. 3235 were determined in February, 1879, by S. W. Holman at the Johns Hopkins University, Baltimore. See sheet pasted into this book two pages back. The required factor a (see p. 2 of the sheet) is apparently $\frac{179.4}{179.2} = 1.0011$, and hence, for any observed temperature t, $\tau = 32° + 1.0011(t - 32°.8)$ for the years 1872 to 1879 inclusive (see this book, two pages back). The corresponding temperature by the air thermometer is then $\tau + \Delta\tau$, $\Delta\tau$ being found from Mr. Holman's table (p. 4 of the sheet above mentioned), a copy of which is given below. The unit of the table is the degree, Fahrenheit.

τ	$\Delta\tau$	τ	$\Delta\tau$	τ	$\Delta\tau$
32.	0.00	100.	−0.17	170.	−0.03
40.	−0.04	110.	−0.14	180.	−0.02
50.	−0.09	120.	−0.11	190.	−0.01
60.	−0.14	130.	−0.08	200.	0.00
70.	−0.17	140.	−0.06	210.	0.00
80.	−0.18	150.	−0.05	212.	0.00
90.	−0.18	160.	−0.04		

Practically, $\tau = t - 0.8$, as the factor a differs so little from unity. If, for example, C. 3235 reads 53.4, the air thermometer reads 52.6 − 0.1 = 52.5.

Vane — Mounted on mast on north side of west wing of Observatory building.

Anemometer — Mounted on mast with vane; not in use except to assist judgment in estimates of velocity of wind; blown off and not replaced early in 1878 (see note in record for March 1878).

Rain gauge — Copper funnel, 5 inches across, 7 inches above ground, surrounded by small enclosure of 4 iron rods connected by wires, as described in record for May, 1874. About 100 feet west of the Observatory building.

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Meteorological Record

January 1878.

Date	Barometer 8 A.M.	Barometer 2 P.M.	Barometer 8 P.M.	Thermometer attached to barometer 8 A.M.	Thermometer attached to barometer 2 P.M.	Thermometer attached to barometer 8 P.M.	External Thermometer No. 4 8 A.M.	External Thermometer No. 4 2 P.M.	External Thermometer No. 4 8 P.M.	External Thermometer No. 4 Mean, half weight to 2 P.M.	Rainfall in† inches. Gauge C examined at 8 A.M.
1	29.592	29.630	29.667	27.4	42.0	33.7	16.2	30.2	25.5	22.72	0.000
2	29.725	29.677	29.684	31.7	34.8	36.0	23.2	34.9	30.8	28.58	0.000
3	30.116	30.280	30.362	28.1	29.4	25.6	5.0	13.9	7.0	7.58	†0.011
4	30.286	29.900	(29.416)	22.5	25.0	(30.6)	5.6	31.3	(38.6)	23.94	0.000
5	29.510	29.774	29.941	33.0	44.0	28.0	28.7	31.0	17.2	24.56	†1.188
6	30.010	29.978	30.039	24.2	39.0	27.0	10.4	19.3	14.4	13.78	0.000
7	30.196	30.250	30.429	22.2	34.8	19.0	−0.3	12.8	3.0	3.64	0.000
8	30.640	30.596	30.538	‡15.0(?)	26.0	23.8	−8.0	12.8	17.1	6.20	0.000
9	30.410	30.360	30.362	24.0	33.0	29.6	16.3	30.1	26.3	23.06	0.000
10	30.144	29.856	*29.492	30.1	32.0	34.6	28.1	36.5	42.1	35.38	0.000
11	29.043	29.008	29.169	36.2	36.7	37.2	35.7	36.6	34.3	35.32	‡1.710
12	29.736	29.859	30.002	36.7	51.0	41.9	36.4	43.4	39.7	39.12	†0.088
13	30.144	30.124	30.071	38.0	51.2	41.6	30.8	42.1	35.7	35.02	0.000
14	29.790	29.359	29.461	40.0	41.6	40.9	37.4	43.6	34.8	37.60	0.530
15	29.477	29.514	29.650	39.7	43.3	42.0	33.3	39.3	33.0	34.38	†0.365
16	29.874	29.987	30.075	34.0	40.7	16.0	14.7	15.8	10.3	13.16	0.000
17	30.228	30.211	30.174	21.5	42.8	30.1	6.4	22.0	21.9	15.72	0.000
18	30.257	30.276	30.301	31.6	37.8	37.0	16.2	31.3	25.9	23.10	0.000
19	30.172	30.680	30.083	32.7	39.4	39.9	25.8	41.9	37.0	33.50	0.000
20	30.048	30.009	30.023	37.6	39.8	41.9	(32.2)	48.9	42.4	39.62	0.000
21	29.844	29.745	29.683	42.0	42.9	43.0	40.1	43.9	39.0	40.42	0.651
22	29.564	29.537	29.582	41.0	45.9	43.0	37.7	46.1	37.7	39.38	0.011
23	29.488	29.549	29.806	40.8	37.8	‡15.0(?)	35.0	20.0	1.2	18.48	0.099
24	30.285	30.291	30.235	20.8	27.6	26.2	5.3	20.5	20.4	14.38	0.000
25	30.144	30.100	30.163	29.4	36.8	38.1	28.9	43.8	34.4	34.08	0.000
26	29.924	29.734	29.803	36.1	37.3	38.0	36.1	36.6	36.5	36.36	0.395
27	29.941	29.924	29.858	37.2	42.5	42.5	36.4	42.4	37.4	38.00	0.441
28	29.377	29.399	29.624	39.4	39.5	30.7	37.2	36.8	17.5	29.24	0.265
29	29.951	29.999	30.082	20.3	28.0	25.1	7.7	19.7	17.4	13.98	†0.088
30	30.357	30.413	30.441	21.4	27.6	25.0	5.5	17.5	13.9	11.26	0.000
31	30.355	30.222	29.982	24.2	26.3	29.8	(18.2)	30.1	29.1	24.94	0.000
Sums	928.598	927.635	928.198	958.8	1156.5	1012.8	682.2	975.1	821.5	796.50	5.842
Means	29.955	29.924	29.942	30.9	37.3	32.7	22.01	31.45	26.50	25.69	

Barometric means reduced to the freezing point: 8 A.M., 29.948; 2 P.M., 29.900; 8 P.M., 29.931.

Mean temperature for month (mean of 3 means for 8, 2, 8, with double weight given to the morning and evening observations) 25.69 Fahrenheit.

Rainfall for month 5.84 inches.

Highest reading of maximum thermometer during the month (Jan. 21) 48.2 Fahrenheit.

Lowest " " minimum " " " " (Jan. 8) −9.4 " "

Records in parentheses ( ) are those of observations not made at the regular times. The actual times are given below.

Date	Kind of observations	Regular time	Actual time.
4	All usually made	8 P.M.	8¼ P.M.
20	External thermometers	8 A.M.	8¼ A.M.
31	External thermometers	8 A.M.	8¼ A.M.

Comparisons of thermometers, made at times when all the bulbs seemed dry.

Date	Time	Thermometer Uncovered bulb	Thermometer Covered bulb	No. 4	C. & J. 3235
1	7¾ P.M.	15.8	16.2	16.2	16.8
2	7¾ A.M.	22.5	23.1	23.1	23.9

*At 8h 18m P.M. Jan. 10; barometer 29.463; attached thermometer 35.5.

†For remarks on rainfall see page 5.

‡Jan. 8, 8 A.M., and Jan. 23, 8 P.M. {Mercury of attached thermometer out of sight; temperature estimated}

Observer, A. Searle.

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of Harvard College Observatory.

January 1878.

Date	Psychrometer: Dry bulb 8 A.M.	Dry bulb 2 P.M.	Dry bulb 8 P.M.	Wet bulb 8 A.M.	Wet bulb 2 P.M.	Wet bulb 8 P.M.	†Relative humidity, Guyot's Tables: 8 A.M.	2 P.M.	8 P.M.	C. 3235 (wet) 8 A.M.	2 P.M.	8 P.M.	Relative humidity, from No. 4 and C. 3235, Guyot's Tables: 8 A.M.	2 P.M.	8 P.M.
1	15.7	29.9	25.1	14.5	23.3	20.8	70	27	40	14.9	24.0	22.2	66	29	51
2	22.8	33.9	30.0	21.4	31.1	28.0	74	69	74	22.9	32.9	29.2	87	73	75
3	Below graduation	13.4	Below graduation	Below graduation	10.9	Below graduation		44		4.0	11.0	6.2	58	35	66
4	Below graduation	30.7	(37.7)	Below graduation	31.2	(38.3)		100	(100)	5.8	31.8	(39.0)	88	98	(97)
5	28.2	30.4	16.8	26.4	25.9	15.2	64	49	64	27.0	26.7	15.7	75	49	64
6	Below graduation	18.7	14.0	10.3	16.6	13.0		59	71	10.5	17.2	13.4	88	58	70
7	Below graduation	Below graduation	Below graduation	Below graduation	10.4	Below graduation				0.6	10.6	3.0	100	45	80
8	Below graduation	Below graduation	16.3	Below graduation	10.8	16.2			88	−6.9	11.4	17.0	84	60	86
9	15.9	29.8	25.5	16.2	26.5	24.2	95	60	76	16.8	27.7	25.3	97	68	79
10	27.8	35.8	41.4	27.6	35.9	41.9	93	97	100	28.1	36.8	42.6	94	96	98
11	35.3	35.8	33.6	35.4	35.9	33.0	97	97	89	36.2	36.6	33.9	98	93	88
12	35.8	42.9	39.0	32.2	37.4	34.9	61	52	59	33.1	38.3	35.8	61	52	59
13	30.4	41.6	35.3	29.5	37.4	33.9	86	62	82	30.9	38.5	36.0	94	64	96
14	36.4	43.2	33.9	36.6	43.4	34.1	98	99	98	37.9	44.0	35.0	98	97	95
15	32.9	38.8	32.3	31.8	34.5	*27.9	84	57	52	32.9	35.4	*28.6	88	59	52
16	14.1	15.2	Below graduation	13.1	12.1	Below graduation	70	37		13.4	12.9	9.0	65	39	59
17	Below graduation	21.2	21.1	Below graduation	18.0	19.1		47	63	5.9	19.0	21.0	72	49	78
18	15.5	30.4	25.2	14.9	27.9	24.8	80	69	87	15.6	29.8	26.0	78	77	92
19	25.4	41.6	36.1	25.6	37.6	34.2	95	64	77	26.3	38.8	35.4	98	67	78
20	(32.1)	48.3	41.5	(31.9)	44.7	41.1	(94)	72	93	(32.7)	45.7	42.2	(98)	71	92
21	39.6	42.9	38.0	39.9	42.7	38.4	99	96	100	40.8	43.4	39.3	100	90	96
22	34.1	45.6	37.2	31.3	42.5	34.8	98	73	73	38.0	43.6	36.0	96	75	77
23	34.4	19.3	Below graduation	34.4	16.7	Below graduation	96	53		35.2	17.2	1.0	95	49	74
24	Below graduation	20.0	19.8	Below graduation	16.9	18.0		47	65	4.7	17.8	19.0	68	50	69
25	28.4	43.7	33.6	26.6	36.9	*31.4	75	44	75	27.6	38.2	33.2	80	49	80
26	35.4	35.9	36.1	35.8	36.4	36.1	100	100	96	36.8	37.0	37.0	100	97	98
27	35.9	41.8	36.6	32.9	36.3	34.6	67	51	77	33.9	37.4	35.9	69	53	79
28	36.7	35.7	16.7	37.0	33.0	14.1	99	70	48	37.8	33.8	15.0	99	64	49
29	Below graduation	19.1	16.9	Below graduation	16.0	15.0		45	60	6.9	16.7	15.6	66	45	60
30	Below graduation	16.9	13.7	Below graduation	14.0	11.9		44	57	4.8	14.6	12.4	66	42	61
31	(17.7)	29.6	28.7	(17.2)	27.4	28.9	(82)	72	98	(17.7)	28.0	29.4	(81)	72	96
Sums	666.6	956.5	800.8				1877	1856	2062				2607	1965	2393
Means	21.50	30.85	25.83				85	64	76				84	63	77

*Jan. 15, 8 P.M. Neither of the wetted bulbs frozen; they were wetted at 7 P.M.
Jan. 25, 8 P.M. Wetted bulb of psychrometer not frozen.

†For tables used in computing relative humidity see general remarks on observations of 1877; data below collected to test these tables.

Date	Excess of relative humidity shown by No. 4 and C. 3235 over that shown by psychrometer: 8 A.M.	2 P.M.	8 P.M.	No. 4 above dry bulb of psychrometer: 8 A.M.	2 P.M.	8 P.M.	Theoretical excess of No. 4 above dry bulb of psychrometer, by tables used in computing relative humidity: 8 A.M.	2 P.M.	8 P.M.
1	+18	+24	+11	+0.5	+0.3	+0.4	+0.5	+0.5	+0.5
2				+0.2	+1.0	+0.8		+0.5	+0.5
3		−22	− 3		+0.3			+0.5	
4					+0.8	+0.9		+0.5	+0.5
5	+11	− 0	− 1	+0.5	+0.8	+0.4	+0.5	+0.5	+0.5
6					+0.6	+0.4		+0.5	+0.5
7									
8			− 2			+0.8			+0.5
9	+2	+8	+3	+0.4	+0.3	+0.8	+0.5	+0.5	+0.5
10	+1	−14	−2	+0.3	+0.7	+0.7	+0.5	+0.5	+0.4
11	+1	−14	−1	+0.4	+0.8	+0.7	+0.5	+0.5	+0.5
12	0	0	0	+0.6	+0.5	+0.7	+0.5	+0.4	+0.5
13	+8	+2	+14	+0.4	+0.5	+0.4	+0.4	+0.5	+0.5
14	0	−22	− 3	+1.0	+0.4	+0.9	+0.5	+0.4	+0.5
15	+4	+2	0	+0.4	+0.5	+0.7	+0.6	+0.5	+0.5
16	− 3	+22		+0.8	+0.6		+0.5	+0.5	
17		+28	+15		+0.8	+0.8		+0.5	+0.5
18	−2	+39	+5	+0.7	+0.9	+0.7	+0.5	+0.5	+0.5
19	+3	+1	+1	+0.4	+0.3	+0.9	+0.5	+0.4	+0.5
20	+4	−16	−1	+0.1	+0.6	+0.9	+0.5	+0.3	+0.4
21	+1	−26	+4	+0.5	+1.0	+1.0	+0.5	+0.4	+0.5
22	−2	+24		+0.6	+0.3	+0.5	+0.4	+0.5	+0.5
23	−7	+43		+0.6	+0.5		+0.5	+0.5	
24		+38	+ 4		+0.5	+0.6		+0.5	+0.5
25	+5	+55	+5	+0.5	+0.1	+0.8	+0.5	+0.4	+0.5
26	+2	+22	+2	+0.5	+0.7	+0.4	+0.5	+0.5	+0.5
27		−26	+2	+0.5	+1.1	+0.8	+0.5	+0.4	+0.5
28	0		+7		+1.1	+0.8	+0.5	+0.5	+0.5
29		−26	+4		+0.6	+0.5		+0.5	+0.5
30		−2			+0.2			+0.5	+0.5
31	−1	0	− 2	+0.5	+0.5	+0.4	+0.5	+0.5	+0.5
Means	+1.8	+0.4	+2.0	+0.59	+0.60	+0.56	+0.50	+0.47	+0.49

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Meteorological Record

January 1878.

Date	Wind: Estimated velocity in miles per hour, and direction (of approach). 8 A.M.	2 P.M.	8 P.M.	Amount (on scale of 10) and Kind (on Poëy's system). For explanations, see note on this page. 8 A.M.	2 P.M.	8 P.M.
1	4 NW	3 NW	4 W	0	0	0
2	0 W	0 calm	1 NW	1 P Rs Fm	10 P Fm →	10 P
3	14 NNW	7 NNW	0 NW	0 P Fm	0	0
4	2 N	11 E	(7 E)	10 P	10 P; snowing	(10 P; fine rain)
5	8 W	10 W	3 SW	2 P Fm	0 Fm	0
6	1 SW	3 W	2 W	10 Rs	0 Fm	6 P
7	0 calm	6 NW	0 calm	1 P haze	1 Rs Fm	0
8	0 calm	0 calm	1 SE	1 P Rs haze	9 P	10 P; snowing
9	1 W	0 calm	0 calm	5 P Fm →	0	9 P Fm
10	5 N	7 NNE	9 NE	10 P	10 Pm	10 P; raining
11	5 SW	6 SW	8 WNW	10 Pm; mist	10 Pm; raining	10 P; snowing
12	7 NW	13 NW	10 NW	1 P Rs Fm ↘	0	0
13	0 W	1 W	0 W	7 P Rs Fm →	6 Rs Rs Fm	10 P
14	5 E	0 W	1 S	10 Pm; raining	10 Pm fog	0 Rs haze
15	1 WSW	4 WSW	6 NW	0 P Rs Fm	10 Pm Fm →	10 Pm Fm →
16	10 NW	13 NW	7 NW	0	0	2 Rs Rs
17	1 NW	1 W	1 SE	8 Rs Rs Fm	7 Rs Rs	10 P Fm →
18	1 N	2 SE	1 SE	1 P haze	3 haze Fm	0 haze
19	4 SW	4 SW	3 SW	1 P haze	2 P Fm haze	0
20	1 SSW	3 WSW	1 S	6 P Fm haze	10 Pm Fm	10 P; raining
21	0 calm	0 N	0 calm	10 P	10 P; snowing	10 P fog
22	2 WSW	4 WSW	3 W	10 Pm fog	4 Pm Rs Rs Rs Fm	2 P fog
23	3 SW	14 WNW	15 WNW	10 Rs Fm →	5 P Fm ↘	0
24	5 WNW	3 WNW	4 SSW	5 Rs Rs Fm	5 Rs Rs	0 P Rs
25	3 SSW	6 SSW	1 S	5 Rs Rs Fm	4 Rs Rs	1 P haze
26	1 N	2 NNW	2 SW	10 Pm fog; raining	10 Pm fog; fine rain	1 Fm haze
27	6 W	3 W	3 SSE	0 Pm Fm	0 Rs Fm	10 P fog
28	5 N	10 NW	14 NW	10 Pm fog; raining	10 Pm Fm ↘ Fm ↘	0
29	6 NW	8 N	4 SW	0	0	0
30	6 NW	5 NW	4 NW	0	0	0 haze
31	5 N	5 E	14 NE	10 P Fm ←	10 Pm Fm ←	10 P; snowing
Sums	112	154	129	154	156	141
Means	3.6	5.0	4.2	5.0	5.0	4.5

The kinds of cloud recognized in Poëy's system as applied here are as follows: R (cirrus), curved wisps of fibrous cloud; Rs (cirro-stratus) straight wisps or small beds of fibrous cloud; Rm (cirro-cumulus) small compact clouds arranged in rows; M (cumulus) large flocculent clouds with distinct outlines, at least above; Pr (pallio-cirrus) indefinite aggregations of apparently fibrous cloud, such as are called "snowbanks" when seen near the horizon; Pm (pallio-cumulus) indefinite aggregations of apparently flocculent cloud, such as the ordinary rain-cloud or "nimbus"; Fm (practo-cumulus) fragments of Rm or of Pr when not definitely distinguishable as R; finally, the symbol P stands for clouds which may be either Pm or Pr. When several kinds of clouds are recorded together, the predominant kind is ordinarily recorded first; but observations of this kind are somewhat indefinite.

The directions in which clouds near the zenith are moving are recorded by arrow-heads pointing in the observed direction as ordinarily laid down on a geographical map; thus ↓ signifies motion towards the south (before a north wind); → signifies motion towards the east (before a west wind); etc. A repetition of the symbol indicates greater rapidity; thus ↓↓ signifies rapid motion before a southwest wind; ↓↓↓ extremely rapid motion before a southeast wind. When two sets of clouds at different elevations can be made out a line is carried under the symbol for the upper and above that for the lower clouds; thus on Jan. 28 at 2 P.M. the record states that fragments of cloud were moving towards the south-east [illegible]

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of Harvard College Observatory.

January 1878.

Date	Extreme temperatures. Maximum, 8 A.M. Before setting	Maximum, 8 A.M. After setting	Minimum, 8 A.M. Before setting	Minimum, 8 A.M. After setting	Aurora 8 P.M.	Zodiacal light. 8 P.M.	Remarks.
1	32.8	18.8	15.4	15.8	Low faint arch	To Mars; dim	
2	31.0	24.6	15.7	22.9	Cloudy	Cloudy	
3	34.9	8.5	4.5	4.5	None	To Mars; dim	A little snow on the ground this morning;
4	14.4	8.3	0.0	5.1	(Cloudy)	(Cloudy)	Snow began about 11 A.M.; turned to rain before 7 P.M.
5	39.0	29.0	5.1	28.1	None	To Mars	
6	32.2	13.0	6.6	9.8	Cloudy	Cloudy	
7	19.8	3.5	−1.1	−1.1	None	To Mars; perceptible in spite of moon	
8	15.2	−1.0	−9.4	−8.8	Cloudy	Cloudy	A few flakes of snow fell about 8 P.M.
9	18.1	18.5	−8.8	15.9	Cloudy	Cloudy	
10	30.9	28.6	15.7	27.4	Cloudy	Cloudy	Rain beginning about 2½ P.M.
11	43.0	35.6	27.2	35.1	Cloudy	Cloudy	Some rain during the day. At 6¼ P.M. a few flakes of snow; a few more later.
12	37.9	36.2	33.6	35.9	Moonlight	Moonlight	
13	43.4	31.7	29.9	30.5	Cloudy	Cloudy	
14	42.0	37.4	30.3	37.0	*Moonlight	Moonlight	
15	43.4	33.6	32.8	33.1	Cloudy	Cloudy	
16	39.2	17.2	14.1	14.1	Moonlight	Moonlight	Lunar halo 46° across at 10 P.M.
17	19.0	9.0	4.1	5.8	Cloudy	Cloudy	
18	24.6	18.0	5.8	15.6	Moonlight	Moonlight	A few snowflakes on the ground at 8 A.M.
19	31.0	27.2	15.6	25.3	Moonlight	Moonlight	
20	(43.3)	(32.8)	(25.2)	(32.0)	Cloudy	Cloudy	A little rain during the day; more in the evening.
21	48.2	40.0	31.9	39.3	Cloudy	Cloudy	
22	43.2	38.4	36.6	37.1	None; some clouds	Cloudy	
23	45.8	35.4	33.4	34.4	† None	To Mars; zodiacal light	A little snow about 10 A.M.
24	35.6	10.5	0.9	5.0	None; some clouds	Nearly to Mars; within about 2° of sun	
25	30.0	29.4	5.0	28.6	None; some clouds	Perceptible through haze	Clouded over about 11 P.M.; rain later in the night.
26	43.4	36.0	28.8	35.4	None	About to Mars	
27	39.0	36.2	34.2	36.0	Cloudy	Cloudy	Rain after 9 P.M.
28	42.4	37.2	34.2	36.6	None	Distinct to Mars	
29	37.3	10.8	6.9	7.1	None	Distinct to Mars	
30	21.9	8.2	4.9	5.1	None	Perceptible through haze	Cloudiness increasing during the evening.
31	(19.3)	(19.3)	(5.0)	(17.6)	Cloudy	Cloudy	Began snowing about 4 P.M. Much reddish light on clouds at 8 P.M. all over the sky; cause not apparent; it soon disappeared.
	1041.2		483.85				
	33.59		15.60				

*Jan. 14, 6¾ P.M. Prof. Pickering suspected aurora at this time.

†Jan. 23, 9½ P.M. Long low auroral arch, with dark segment beneath.

Notes on rainfall: the snow weighed is in the form of cylinders cut with a lamp-chimney 1 13/16 inches across inside.

Jan. 3, 8 A.M. Too little snow to measure except with the rain-gauge, but apparently more than appears from that.

Jan. 4, 7 P.M. Two cylinders, each of the full height of the snow, cut where it seemed to be of average depth, weighed together 3⅜ ounces. Hence rainfall 1.133 inches. Gauge C cleared out.

Jan. 5, 8 A.M. Rain since 7 P.M. Jan. 4 0.066 inches by gauge C; previous rainfall by measure as above 1.133 inches; total 1.199 inches. Measurements this morning as follows: depth of snow by mean of 3 measures 4½ inches; 14½ inches of this snow weigh 5½ ounces; hence rainfall to 1 inch of snow 0.2547 inches; total rainfall 1.146 inches. Pilot measure preferred, since some snow was probably lost by melting during the night, even if there was snow enough to retain all the rain that fell. Deducting 0.011 for the snow previously on the ground, (see Jan. 3) the rainfall is accordingly 1.188 inches.

Jan. 10, 8 P.M. At this time gauge C gave 7⅞ ounces, equivalent to 0.673 inches. } Total 1.710 inches.
Jan. 11, 8 A.M. " " " " " 11¾ " " " 1.037 " }
Jan. 11, 6¼ P.M. " " " " " 1 ounce, " " 0.088 " } Total 0.088 "
Jan. 12, 8 A.M. " " " " " 0 ounces
Jan. 14, 5½ P.M. " " " " " 4¼ " , " " 0.365 " } Total 0.365 "
Jan. 15, 8 A.M. " " " " " 0 "
Jan. 28, 6 P.M. " " " " " 1 ounce, " " 0.088 " } Total 0.088 "
Jan. 29, 8 A.M. " " " " " 0 ounces

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Meteorological Record

February 1878.

Date	Barometer 8 A.M.	Barometer 2 P.M.	Barometer 8 P.M.	Thermometer attached to barometer 8 A.M.	Thermometer attached to barometer 2 P.M.	Thermometer attached to barometer 8 P.M.	External Thermometer No. 4 8 A.M.	External Thermometer No. 4 2 P.M.	External Thermometer No. 4 8 P.M.	External Thermometer No. 4 Mean, half weight to 2 P.M.	Rainfall in inches. Gauge C, examined at 8 A.M.
1	29.674	29.728	29.840	30.7	30.9	27.7	29.5	19.5	17.4	22.66	
2	30.044	30.082	30.150	25.1	31.0	27.3	10.8	19.2	12.9	13.32	(2.710)*
3	30.171	30.134	30.060	21.0	30.8	31.0	2.3	27.3	21.4	14.94	0.000
4	29.854	29.769	29.778	24.9	33.3	32.9	8.2	(33.8)	23.5	19.44	0.000
5	29.830	29.868	29.922	26.3	34.9	34.9	14.9	34.5	25.9	23.22	0.000
6	30.046	30.057	30.056	31.3	39.8	39.1	19.8	37.5	32.8	28.54	0.000
7	30.004	(29.952)	29.954	35.6	(45.0)	43.8	28.4	(48.0)	40.3	37.08	0.000
8	29.835	29.708	29.546	37.5	43.0	44.3	30.7	52.0	41.2	39.16	0.000
9	29.403	29.600	29.745	41.0	42.0	42.8	36.3	40.0	37.3	37.44	0.342
10	29.619	29.379	29.408	39.4	37.9	36.2	32.7	29.3	22.0	27.74	0.077*
11	29.517	29.577	29.710	32.4	35.8	28.7	21.3	24.0	17.8	20.44	0.491*
12	29.898	29.852	(29.843)	26.0	33.8	(33.5)	11.2	25.9	(24.0)	19.26	0.000
13	29.800	29.750	29.868	31.0	37.6	36.4	23.6	36.3	32.2	29.58	0.000
14	30.032	(29.976)	29.971	27.3	(36.9)	30.0	14.2	(29.7)	22.0	20.42	0.000
15	30.001	29.953	29.934	26.0	38.0	34.5	9.4	33.4	26.8	21.16	0.000
16	29.905	29.896	29.913	31.2	38.3	35.2	24.1	36.6	29.5	28.76	0.000
17	29.974	29.898	29.799	32.8	35.9	37.0	22.8	37.3	33.0	29.78	0.000
18	29.844	29.858	29.926	34.2	37.4	29.9	22.4	25.9	15.6	20.38	0.249*
19	30.124	30.116	30.130	21.8	31.7	28.7	5.8	22.1	19.0	14.34	0.000
20	30.152	30.079	30.001	26.8	30.5	32.6	18.0	34.3	33.8	27.58	0.000
21	30.018	30.071	30.160	34.0	35.0	35.0	32.5	33.1	33.7	33.10	0.011
22	30.168	29.964	29.727	36.0	36.4	37.3	32.8	34.5	38.0	35.22	0.397
23	29.706	29.738	29.747	37.6	39.5	40.0	34.8	40.8	36.3	36.60	2.305*
24	29.710	29.721	29.794	37.1	43.5	41.7	34.8	43.6	35.8	36.96	0.011
25	29.828	29.724	29.750	37.3	40.8	39.4	31.6	36.8	31.8	32.72	0.000
26	29.746	29.722	29.802	34.3	36.0	38.0	27.5	34.7	35.3	32.06	0.000
27	29.878	29.842	29.843	35.7	42.3	45.0	33.9	46.6	40.9	39.24	0.000
28	29.909	29.872	29.888	39.0	45.0	46.4	33.6	48.7	42.6	40.22	0.000
Sums	836.690	835.886	836.265	893.9	1038.0	1009.3	647.9	965.4	822.8	781.36	6.593
Means	29.882	29.853	29.867	31.9	37.1	36.0	23.14	34.48	29.39	27.91	

Barometric means reduced to the freezing point; 8 A.M., 29.873; 2 P.M., 29.830; 8 P.M., 29.847.

Mean temperature for month (mean of 3 means for 8, 2, 8, with double weight given to the morning and evening observations) 27.91 Fahrenheit.

Rainfall for month 6.59 inches.

Highest reading of maximum thermometer during the month (Feb. 9) 53.0 Fahrenheit.

Lowest " " minimum — " — " " " (Feb. 3) 0.9 — " —

Records in parentheses ( ) are those of observations not made at the regular times. The actual times are given below.

Date	Kind of observations	Regular times	Actual times.
2	Rainfall	8 A.M.	10 A.M.
4	External thermometer, wind, clouds	2 P.M.	2¼ P.M.
7	All usually made	2 P.M.	2½ P.M.
12	All usually made	8 P.M.	7⅝ P.M.
14	All usually made	2 P.M.	2¼ P.M.

Comparisons of thermometers, made at times when all the bulbs seemed dry.

Date	Time	Psychrometer Uncovered bulb	Psychrometer Covered bulb	No. 4	C.3235
25	7½ A.M.	30.7	31.1	31.2	31.8
26	7½ A.M.	26.6	27.0	27.0	27.7
26	1½ P.M.	33.5	33.8	34.0	34.4
27	7½ A.M.	33.1	33.5	33.6	34.3

The failure of the wetted bulbs to freeze at temperatures below the freezing point is usually noticed and recorded, but no notice is taken of it in the reductions of the psychrometric observations. Records of this kind were made in February as given below.

Date	Time	Covered bulb of psychrometer	C.3235	Date	Time	Covered bulb of psychrometer	C.3235	Date	Time	Covered bulb of psychrometer	C.3235
4	2 P.M.	Not frozen		11	8 P.M.	Not frozen		25	2 P.M.	Not frozen	
5	2 P.M.	Not frozen	Not frozen	24	8 A.M.	Not frozen	Not frozen	26	2 P.M.	Not frozen	Not frozen
6	8 P.M.	Not frozen	Not frozen	21	2 P.M.	Not frozen	Not frozen	27	8 A.M.	Not frozen	Not frozen
16	2 P.M.	Not frozen						28	8 A.M.	Not frozen	Not frozen

* For remarks on rainfall, see page 8.

Observer A. Searle.

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of Harvard College Observatory.

February 1878.

Date	Psychrometer: Dry bulb 8 A.M.	Dry bulb 2 P.M.	Dry bulb 8 P.M.	Wet bulb 8 A.M.	Wet bulb 2 P.M.	Wet bulb 8 P.M.	*Relative humidity, Guyot's Tables: 8 A.M.	2 P.M.	8 P.M.	C. 3235 (wet) 8 A.M.	2 P.M.	8 P.M.	*Relative humidity, from No. 4 and C. 3235, Guyot's Tables: 8 A.M.	2 P.M.	8 P.M.
1	30.1	19.3	16.8	30.8	19.3	17.5	100	91	100	30.5	19.6	17.9	100	91	97
2	{Below graduation}	18.9	{Below graduation}	10.3	16.4	11.4		54		10.2	17.0	12.0	73	56	69
3	{Below graduation}	27.3	21.2	{Below graduation}	22.9	19.5		45	67	3.0	23.9	20.3	100	52	74
4	{Below graduation}	(33.8)	22.9	{Below graduation}	(27.3)	21.6		(36)	74	8.5	(28.8)	22.0	91	(47)	71
5	14.6	34.0	24.8	14.9	32.0	23.5	95	75	75	15.5	32.0	25.0	98	69	80
6	19.8	36.9	32.0	19.8	31.5	29.0	91	47	66	20.2	32.9	30.4	93	50	69
7	28.7	(47.5)	40.2	26.4	(41.2)	35.5	69	(52)	56	27.1	(43.1)	36.7	79	(59)	62
8	30.2	51.4	40.8	29.5	45.6	39.9	88	60	89	30.9	46.9	40.7	95	63	89
9	35.8	39.4	36.6	35.8	37.4	35.6	96	76	86	36.6	38.1	36.8	96	76	88
10	32.2	28.7	21.3	32.3	28.6	21.7	97	94	97	33.1	29.1	22.2	97	89	93
11	21.1	23.2	17.0	21.4	20.8	14.8	96	61	55	21.8	21.3	15.5	97	56	52
12	{Below graduation}	25.6	(23.5)	10.5	22.0	(21.8)		50	(70)	10.9	22.8	(22.6)	80	54	(74)
13	23.4	36.0	31.9	22.6	31.9	28.9	82	57	66	23.0	32.8	30.0	83	59	70
14	13.9	(28.7)	20.8	13.7	(25.6)	20.6	85	(61)	88	14.0	(26.9)	21.1	83	(64)	78
15	{Below graduation}	31.4	26.0	{Below graduation}	28.0	25.0		59	81	9.3	28.9	26.1	83	51	83
16	23.9	35.8	28.7	23.1	31.2	27.4	82	53	81	23.8	32.2	28.3	87	52	76
17	22.3	35.9	31.9	21.0	31.5	31.9	74	54	96	22.3	33.0	33.0	83	53	92
18	21.8	25.2	14.8	20.6	21.5	12.6	75	48	52	20.8	22.2	13.0	68	47	43
19	{Below graduation}	21.6	18.8	{Below graduation}	17.8	16.0		40	49	6.0	18.2	16.8	88	37	55
20	17.7	33.1	33.2	16.4	30.4	31.9	69	70	82	17.1	32.8	32.8	74	77	82
21	31.9	32.4	32.9	31.6	31.7	32.9	92	88	96	32.5	32.7	33.8	92	88	94
22	32.4	33.9	37.2	32.3	34.3	37.7	95	100	100	33.0	35.0	38.5	95	98	98
23	34.3	39.4	35.5	34.4	38.7	35.7	97	90	98	35.0	39.2	36.8	95	79	98
24	34.2	43.3	35.1	34.4	37.9	32.6	98	54	71	35.0	39.0	33.6	95	57	71
25	31.1	36.0	31.1	27.8	31.4	27.0	62	54	54	28.9	32.0	27.3	66	50	49
26	27.0	34.1	34.8	24.4	29.5	29.0	65	53	43	25.0	30.1	29.7	63	50	42
27	33.6	46.0	40.4	29.0	36.9	36.4	52	31	62	30.0	38.0	35.5	56	31	48
28	33.8	48.3	42.0	30.3	39.6	36.6	63	37	53	32.0	40.5	37.9	77	37	55
av. diff.	.9		.7												
Sums	639.7	947.3	804.4				1823	1690	2007				2387	1692	2052
Means	22.85	33.83	28.73				83	60	74				85	60	73

*For notes on failure of wetted bulbs to freeze see page 6; for tables used in reductions preliminary to computation of relative humidity see general remarks on observations of 1877; data below collected to test these tables.

Date	Excess of relative humidity shown by No. 4 and C. 3235 over that shown by psychrometer: 8 A.M.	2 P.M.	8 P.M.	No. 4 above dry bulb of psychrometer: 8 A.M.	2 P.M.	8 P.M.	Theoretical excess of No. 4 over dry bulb of psychrometer, by tables used in computing relative humidity: 8 A.M.	2 P.M.	8 P.M.
1	0	0	−3	−0.6	+0.2	+0.6	0.5	0.5	0.5
2		+2			+0.3			0.5	
3		+7	+7		0.0	+0.2		0.3	0.5
4		+11	−3		0.0	+0.6		0.3	0.5
5	+3	−6	+5	+0.3	+0.5	+1.1	0.5	0.5	0.5
6	+2	+3	+6	0.0	+0.6	+0.8	0.5	0.5	0.5
7	+10	+3	+6	−0.3	+0.5	+0.1	0.3	0.5	0.4
8	+7		0	+0.5	+0.6	+0.4	0.5	0.4	0.4
9	0	0	+2	+0.5	+0.6	+0.7	0.5	0.5	0.5
10	0	−5	−3	+0.5	+0.6	+0.7	0.5	0.5	0.5
11	+1	+4	+4	+0.2	+0.8	+0.8	0.5	0.5	0.5
12		+2	+4		+0.3	+0.5		0.5	0.5
13	+1	+3	+10	+0.2	+0.3	+0.3	0.5	0.5	0.5
14	−2	−1	+5	+0.3	+1.0	+1.2	0.5	0.5	0.5
15					+1.7	+0.8		0.5	0.5
16	+5	−1	−4	+0.2	+0.8	+0.8	0.5	0.5	0.5
17	+9	−1	+9	+0.5	+1.4	+1.1	0.5	0.5	0.5
18	−7	−3	−6	+0.6	+0.7	+0.8	0.5	0.5	0.5
19	+5	+7	+2		+0.5	+0.2		0.5	0.5
20				+0.3	+1.2	+0.6	0.5	0.5	0.5
21	0	0	−2	+0.6	+0.7	+0.8	0.5	0.5	0.5
22	0	−2	−2	+0.4	+0.6	+0.8	0.5	0.5	0.5
23	−2	−11	0	+0.5	+1.4	+0.8	0.5	0.5	0.5
24	−3	+3	0	+0.6	+0.3	+0.7	0.5	0.4	0.5
25	+4	−4	−5	+0.5	+0.8	+0.7	0.5	0.5	0.5
26	−2	−3	−1	+0.5	+0.9	+0.5	0.3	0.5	0.5
27	+4	0	−14	+0.3	+0.6	+0.5	0.5	0.4	0.4
28	+14	0	+2	−0.2	+0.4	+0.6	0.5	0.3	0.4
Means	+2.2	+0.1	−0.9	+0.29	+0.64	+0.66	0.48	0.47	0.47

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Meteorological Record

February 1878.

Date	Wind: Estimated velocity in miles per hour, and direction (of approach). 8 A.M.	2 P.M.	8 P.M.	Amount on scale of 10, and kind (on Poëy's system). For explanations, see note on page 4. 8 A.M.	2 P.M.	8 P.M.
1	11 NE	10 NNE	10 N	10 P; snowing	10 P; snowing	10 P; snowing
2	5 NNW	4 NNE	1 NW	9 P fm	0	0
3	0 W	1 W	2 SW	0	0	0
4	0 calm	(2 N	0 N	4 R Rs	(0 R)	0 haze
5	0 calm	1 NW	0 W	0	1 R haze fm	0
6	0 W	3 W	2 SW	0 haze	0 Rs fm	0 Rs fm
7	3 SW	(4 W)	3 SW	0 haze	(0)	0
8	3 SSW	3 S	3 E	9 R Rs fm	9 P fm	10 P
9	4 N	6 N	0 calm	10 P; a little rain	10 P fm	10 P
10	6 NE	4 N	6 N	10 P; snowing	10 P; fine sleet	10 P; snowing
11	0 calm	6 NNW	6 WNW	10 P fm	9 R fm	0 R Rs
12	3 W	6 WSW	(5 SSW)	0 Rs fm	4 R Rs	(10 P)
13	3 WSW	3 W	4 WNW	0 haze	0 fm	10 P fm
14	1 NNW	(0 E)	1 NW	0 P Rs	(2 fm)	0 P haze
15	0 NNW	0 calm	0 calm	1 R Rs	10 R	10 R
16	0 W	1 WNW	0 calm	9 P fm	0 fm	10 R; some stars visible
17	0 calm	4 S	0 N	0 R haze	10 P	10 P; snowing
18	6 N	6 N	7 NW	6 R Rs fm	0	0
19	1 NW	0 calm	1 SW	0	0 fm	0
20	0 SW	6 SSW	1 SSW	8 R Rs R fm	10 R; a little snow	10 P
21	1 N	1 NE	6 N	10 P; a few drops of rain	10 P; raining	10 P; a few drops of rain
22	7 E	9 E	8 E	10 P; sleet	10 P; raining	10 P; raining
23	4 N	0 calm	0 calm	10 P	10 P	10 P; fog
24	2 W	4 WNW	6 W	10 P fog	0 fm	0 P Rs
25	3 NW	5 NW	7 NW	8 P Rs R fm	10 P fm	10 P
26	10 NW	12 NW	8 NW	9 R fm	1 R Rs fm	0 P Rs
27	4 WNW	5 W	4 SW	1 R Rs fm	0 R	0
28	0 calm	4 W	4 SSW	2 R Rs	8 R Rs	0
Sums	77	110	95	146	137	140
Means	2.7	3.9	3.4	5.2	4.9	5.0

Notes on rainfall: the snow weighed is in the form of cylinders cut with a tomb's chimney $1\frac{13}{16}$ inches across inside.

Feb. 2, 10 A.M. Snow ceased during preceding night; the amount that fell after dark was trifling. Measures of depth of snow made in 26 places as follows: 20, $10\frac{1}{2}$, 7, 21, $8\frac{1}{2}$, 17, $17\frac{1}{2}$, $17\frac{1}{2}$, 18, 20, $14\frac{1}{2}$, $17\frac{1}{2}$, 12, 11, 7, 14, 11, 12, $10\frac{1}{2}$, 17, 17; mean, 14.15 inches. $11\frac{1}{2}$ inches from one place weigh 3 ounces; $11\frac{1}{2}$ inches from a second place weigh $3\frac{1}{3}$ ounces; $12\frac{1}{2}$ inches from a third place weigh $3\frac{1}{2}$ ounces. Hence rainfall to 1 inch of snow from first place 0.1752 inches; from second place 0.2117 inches; from third place 0.1880 inches; from the three places taking together, 0.1916 inches; total rainfall 2.710 inches. Gauge C cleared out about 5 P.M. Feb. 2.

Feb. 10, 8 A.M. The water collected from the gauge is mainly or wholly from yesterday's rain. The snow in the funnel of the gauge is not included in the 0.077 inches received. About $1\frac{1}{2}$ inches of new snow on the ground.

Feb. 11, 8 A.M. New snow (including all since Feb. 9) apparently about $2\frac{1}{4}$ inches deep; 15 inches weigh $4\frac{1}{2}$ ounces; hence rainfall to 1 inch of snow 0.2182 inches; total rainfall 0.491 inches. This result probably to be preferred to that from gauge C (0.430 inches).

Feb. 18, 8 A.M. Snow 2 inches deep; $13\frac{1}{2}$ inches weigh $2\frac{1}{2}$ ounces; hence rainfall to 1 inch of snow 0.1244 inches; total rainfall 0.249 inches; this measure preferred to that by gauge C (0.232 inches).

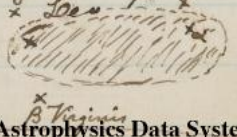
Feb. 22, $6\frac{1}{3}$ P.M. Rainfall since 8 A.M., by gauge C 1.509 inches } total 2.305 inches.
Feb. 23, 8 A.M. Rainfall since Feb. 22, $6\frac{1}{3}$ P.M., by gauge C' 0.796 " }

Notes on zodiacal light and on "Gegenschein" (light spot opposite the sun).

Feb. 18, $7\frac{1}{2}$ P.M. Vertex of zodiacal light near γ Arietis.

Feb. 19, $7\frac{1}{2}$ P.M. Zodiacal light unusually distinct; vertex of cone about 1° below γ Arietis; some appearance of the inner cone described by Jones, the vertex of which was about as high as the South following star in the square of Pegasus.

Feb. 27, 10 P.M. "Gegenschein" suspected in Leo, including Regulus.
Decidedly dark interval between it and Corona.
Appearance as in annexed sketch.



Feb. 28, $10\frac{1}{4}$ P.M. Some appearance of "Gegenschein" a little lower and further east than yesterday. It did not seem to extend west of Regulus.

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February 1878.

Date	Extreme temperatures. Maximum, 8 A.M. Before setting	Maximum, 8 A.M. After setting	Minimum, 8 A.M. Before setting	Minimum, 8 A.M. After setting	Aurora 8 P.M.	Zodiacal light 8 P.M.	Remarks.
1	30.0	30.2	17.5	29.7	Cloudy	Cloudy	Much snow last night, and a good deal during the day.
2	30.8	12.4	10.1	10.1	None	Vertex about 1° below Mars	Snow ceased during preceding night; little fell after dark.
3	20.7	6.0	0.9	2.0	None	To Mars	
4	29.6	10.6	2.0	7.9	None	Vertex about 1° below Mars	
5	34.0	16.6	7.9	14.4	None	Very faint in spite of moon	
6	35.0	21.0	14.4	19.0	Moonlight	Moonlight and clouds	
7	38.0	29.2	19.0	28.2	Moonlight	Moonlight	
8	48.2	31.4	27.0	30.1	Cloudy	Cloudy	Rain in the evening.
9	53.0	36.4	30.0	35.7	Cloudy	Cloudy	A little rain. Snow in the following night.
10	41.0	33.6	32.2	32.2	Cloudy	Cloudy	Snow and sleet during the day.
11	33.7	23.4	15.2	20.8	Moonlight and clouds	Moonlight	
12	27.3	13.3	9.6	10.7	(Cloudy)	(Cloudy)	† Lunar halo 6¾ P.M. 36° across.
13	27.0	25.0	10.7	23.2	Cloudy	Cloudy	
14	36.7	16.8	12.9	13.7	Moonlight	Moonlight	
15	29.8	12.0	7.6	8.8	Cloudy	Cloudy	† Lunar halo 7¼ to 11½ P.M. 46° across.
16	32.4	25.6	8.8	23.8	Cloudy	Cloudy	Lunar halo about 7 to 8 P.M. {Apparently same size as that of yesterday}
17	37.0	24.0	20.7	22.3	Cloudy	Cloudy	Snow in the evening, beginning before 7 P.M.
18	37.4	23.8	21.3	21.7	Moonlight	Moonlight *	
19	26.0	8.3	3.6	5.2	None	Nearly to Mars *	
20	24.5	19.6	5.2	17.2	Cloudy	Cloudy	Snow beginning about 12½ P.M. Very little fell.
21	34.7	32.8	17.2	31.7	Cloudy	Cloudy	
22	35.3	33.0	30.9	32.3	Cloudy	Cloudy	
23	39.3	34.7	32.1	34.1	Cloudy	Cloudy	
24	39.9	36.0	32.9	34.0	None	To Mars	
25	43.7	32.3	29.7	31.1	Cloudy	Cloudy	
26	37.3	28.6	24.9	27.0	None	To Mars	
27	37.4	34.5	26.4	33.6	None	{Bright and narrow; vertex between Mars and the Pleiades} *	
28	47.9	34.4	31.6	33.5	None	Bright; not beyond Mars. *	
	987.6		502.3				
	35.27		17.94				

* For notes on zodiacal light and "Gegenschein" see page 8.

† Note on lunar halos, especially those of Feb. 12 and 15 1878. The question presents itself whether any rings round the moon are necessarily halos, in the sense in which the word can be applied only to rings of certain fixed diameters. The halo of Feb. 15 was undoubtedly one of these, its diameter being 46° as nearly as it could be measured; see statements of measures below. Now this halo was as wide that one span of the thumb and middle finger of the observer (S.), at arm's length, (the right hand and arm being used), was very conspicuously less than the inner radius of the halo (the distance from the moon's centre to the inner edge of the ring), while two spans were of course still more clearly less than the diameter of the entire outside edge of the halo. But on Feb. 12 one of these spans was fully equal to the radius of the outer edge of the halo, and two spans to its outside diameter. It can hardly be supposed that the observer held his hand so much nearer to his eye, or extended it so much more on this first occasion than on Feb. 15 as to account for the whole difference; but unless he did, the halo of Feb. 12 was decidedly less than 46° across, and yet more than 22°. Its diameter seemed to be about 34° to 37° the value of the span being found to be 17° to 18½° by repeated trials (spanning round the horizon) on Feb. 12 and also on Feb. 16.

The measures taken of the halo of Feb. 15 were as follows: at 9h 48m mean time, Castor, Procyon, and γ Leonis were all nearly on the inner edge of the halo, Castor being thought to be most exactly on that edge, γ Leonis being well inside the ring. A reduction of this observation (neglecting the moon's parallax) made on Feb. 16, makes the inner radius of the halo by Castor 21°.4, by Procyon 22°.2, and by γ Leonis 21°.0. The inside diameter of the halo was therefore not far from 43°. The halo was measured directly with the West Equatorial by observers P. and S. between 10h and 11h, the method being to point the telescope at the moon, clamp it in right ascension, read the declination circle, and then point the telescope (by working along the outside of the tube, as was also done in the case of the moon) on the northern and southern edges of the halo, for which the declination circle was read. P. measured only the inside diameter, S. both outside and inside diameters, as follows:

Time	Observer	Reading for moon	Inside north edge	Outside north edge	Inside south edge	Outside south edge
10h 32m	P.	49½	41½		−2°	
	P.	49¼	42		−2½	
	S.	49¼	41¾	43°¾	0	−2°¾

Hence P. makes inside diameter 44°; S. makes inside diameter 41°¾, outside diameter 46°½.

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Meteorological Record

March 1878.

Date	Barometer 8 A.M.	Barometer 2 P.M.	Barometer 8 P.M.	Thermometer attached to barometer. 8 A.M.	2 P.M.	8 P.M.	External Thermometer No. 4 8 A.M.	2 P.M.	8 P.M.	Mean, half weight to 2 P.M.	Rainfall in inches. Gauge C examined at 8 A.M.
1	30.344	30.450	30.449	37.2	41.4	41.0	23.5	30.5	24.4	25.26	0.000
2	30.334	30.147	29.976	34.2	39.0	40.8	29.1	40.8	38.8	35.32	0.000
3	29.495	29.252	29.244	42.1	43.8	45.1	47.3	50.9	46.3	47.62	0.354
4	29.133	29.319	29.598	43.0	45.0	39.2	41.2	40.7	29.3	36.34	0.110
5	30.031	30.018	30.213	33.8	39.2	39.0	24.4	35.7	32.2	29.78	0.011*
6	30.266	30.195	30.149	35.2	40.9	43.1	35.1	46.8	40.8	39.72	0.000
7	29.968	29.850	29.898	41.7	46.8	49.1	39.9	59.8	50.5	48.12	0.000
8	30.142	30.209	30.280	47.7	50.5	52.4	42.6	59.0	50.2	48.92	0.022
9	30.473	30.489	30.458	45.8	49.6	50.8	40.2	47.1	39.8	41.42	0.000
10	30.194	30.065	30.073	43.7	50.7	54.9	42.8	66.2	57.3	53.28	0.000
11	30.263	30.295	30.334	49.0	48.9	46.9	39.7	37.5	33.9	36.94	0.000
12	30.303	30.270	30.175	42.5	43.5	43.7	35.1	36.1	33.1	34.50	0.066
13	29.661	29.528	29.571	43.0	44.7	45.2	37.4	41.2	38.7	38.68	1.401
14	29.646	29.662	29.731	43.8	47.5	48.0	39.2	46.7	41.3	41.54	0.077
15	29.900	29.911	30.000	43.1	47.7	49.0	35.2	46.1	38.6	38.74	0.044
16	30.094	30.069	30.044	41.3	47.0	44.6	31.7	42.4	36.2	35.64	0.000
17	30.000	29.930	29.802	43.3	45.3	45.5	37.9	39.3	40.0	39.02	0.000
18											
19		29.703	29.700		45.2	45.9		48.7	42.5		(1.600)
20	29.695	29.673	29.788	41.9	43.3	38.6	39.2	39.6	33.1	36.84	0.000
21	30.032	30.046	(30.082)	34.0	38.3	(35.8)	22.6	31.5	(28.5)	26.74	0.000
22	30.111	30.024	29.986	32.2	36.8	38.2	27.0	35.9	31.7	30.66	0.000
23	29.749	29.538	29.493	36.8	40.8	45.0	36.9	55.1	47.2	44.66	0.000
24	29.215	28.996	29.168	42.7	46.0	46.0	44.5	50.9	32.6	41.02	0.000
25	29.389	29.437	29.631	32.2	35.0	34.4	14.7	26.7	24.6	21.06	0.077
26	29.791	29.785	29.881	32.7	38.8	42.7	31.0	44.6	37.6	36.36	0.000
27	29.844	29.674	29.671	38.2	40.7	42.4	36.9	48.2	43.9	41.96	0.000
28	29.685	29.608	29.611	44.1	47.0	46.2	43.8	48.5	40.2	43.30	0.000
29	29.708	29.767	29.918	43.0	44.0	45.9	37.9	45.4	44.3	41.96	0.408
30	30.078	30.012	29.999	41.1	45.4	47.2	39.5	52.8	41.7	43.04	0.000
31	29.846	29.736	29.674	42.3	46.5	45.2	39.1	45.2	37.6	39.72	0.000
Sums	867.389	895.658	896.597	1171.6	1319.3	1331.8	1035.4	1339.9	1156.9	1118.16	4.170
Means	29.910	29.855	29.887	40.4	44.0	44.4	35.70	44.66	38.55	38.56	

Barometric means reduced to the freezing point; 8 A.M., 29.878; 2 P.M., 29.813; 8 P.M., 29.844.

Mean temperature for month (mean of 3 means for 8, 2, 8, with double weight given to the morning and evening observations) 38.63 Fahrenheit.

Rainfall for month 4.17 inches.

Highest reading of maximum thermometer during the month (March 11) 66.7 Fahrenheit.
Lowest " " minimum " " " " (March 25) 11.3 "

Rain gauge examined March 19 at 10½ A.M. (no snow then on the ground); and evening observations of March 21 made at 8⅝ P.M. Records of these observations in parentheses ( ).

Comparisons of thermometers, made at times when all the bulbs seemed dry.

Date	Time	Psychrometer Uncovered bulb	Psychrometer Covered bulb	No. 4	6.3235	Date	Time	Psychrometer Uncovered bulb	Psychrometer Covered bulb	No. 4	6.3235
5	7¾ A.M.	23.6	24.1	24.0	24.8	12	7½ A.M.	34.5	34.9	34.9	35.9
5	1 P.M.	33.5	33.7	33.8	34.0	16	7⅝ A.M.	30.8	31.3	31.2	31.9
11	7⅝ A.M.	39.2	39.7	39.7	40.6	16	9⅝ P.M.	41.4	41.8	41.8	43.0

* March 4, 6¼ P.M.; gauge C examined; result 0.011 inches; nothing additional at 8 A.M. March 5. No fall of snow this month of depth sufficient for measurement; records of rainfall all taken from gauge C.

The failure of the wetted bulbs to freeze at temperatures below the freezing point is usually noticed and recorded, but not taken into account in reducing the psychrometric observations. Records of this kind were made in March as given below.

Date	Time	Covered bulb of psychrometer	6.3235	Ditto	Time	Covered bulb of psychrometer	6.3235	Date	Time	Covered bulb of psychrometer	6.3235
1	2 P.M.	Not frozen		12	8 A.M.	Not frozen	Not frozen	24	8 P.M.	Not frozen	Not frozen
5	2½ P.M.	Not frozen	Not frozen	16	8 A.M.	Not frozen	Not frozen				

March 30 and 31, 8 P.M. Both the covered bulb of the psychrometer and 6.3235 were wetted an hour before the observations; both were evidently wet at the time of the observations, and both were carefully read. March 31, 2 P.M. Dry bulb, No. 4 carefully read.

Observers, A. Graham, 1st March 19, 8 P.M.; 20 8 A.M.; 21 2 P.M. 22 8 P.M.; the rest by H. Helm.

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Date	Psychrometer: Dry bulb 8 A.M.	Dry bulb 2 P.M.	Dry bulb 8 P.M.	Wet bulb 8 A.M.	Wet bulb 2 P.M.	Wet bulb 8 P.M.	Relative humidity, Guyot's Tables*: 8 A.M.	2 P.M.	8 P.M.	C. 3235 (wet) 8 A.M.	2 P.M.	8 P.M.	Relative humidity, from No. 4 and C. 3235, Guyot's Tables.* 8 A.M.	2 P.M.	8 P.M.
1	22.9	30.0	23.8	20.3	24.3	21.4	58	36	61	21.2	25.7	23.2	60	44	75
2	28.7	40.4	38.1	27.5	36.4	37.0	82	62	86	28.1	37.5	38.0	83	65	86
3	47.0	50.5	45.6	47.4	50.5	45.4	100	99	96	48.0	51.1	46.2	100	99	95
4	40.8	40.0	28.8	40.4	35.6	25.7	94	59	61	41.1	36.3	26.4	93	55	63
5	24.0	35.2	31.4	21.6	29.8	28.5	62	48	66	22.0	30.5	31.0	61	47	80
6	34.8	46.4	40.0	33.8	42.5	39.1	86	68	89	34.9	43.3	40.0	91	68	87
7	39.5	59.9	49.8	39.9	52.9	47.9	100	59	84	40.9	54.0	49.0	100	65	86
8	42.6	58.8	49.7	40.2	46.3	42.9	77	30	51	41.4	47.0	45.0	84	30	59
9	40.0	47.2	39.2	35.5	40.7	36.4	57	50	71	36.8	41.8	38.0	64	55	77
10	42.6	65.9	57.0	37.7	54.0	49.9	57	40	57	38.8	55.1	52.0	61	44	65
11	39.2	36.8	33.1	34.6	32.0	30.7	55	52	72	35.9	33.6	32.0	60	57	75
12	34.5	35.4	32.3	31.7	33.4	32.7	68	76	100	32.8	34.9	33.3	70	81	95
13	36.7	41.0	38.0	37.2	40.5	37.5	100	93	92	38.0	41.1	38.5	99	93	91
14	38.8	46.1	40.8	36.7	40.4	37.8	77	55	71	37.7	41.1	39.0	80	53	76
15	34.7	45.5	38.0	32.9	38.4	33.3	78	44	53	33.8	39.4	34.2	79	44	53
16	31.4	42.3	35.4	30.0	35.9	32.9	81	45	71	30.9	37.6	34.7	84	54	78
17	37.1	38.7	39.3	35.8	36.7	39.8	84	78	100	37.0	37.9	40.3	85	81	96
18															
19		48.0	41.7		42.8	37.6		61	63		43.6			59	
20	38.6	39.1	32.6	34.6	32.6	26.9	60	39	41	35.4	33.3	27.6	62	39	42
21	22.0	31.6	(28.4)	18.6	23.4	(23.4)	46	16	(40)	19.0	26.0	(30.8)	42	39	(100)
22	26.5	35.4	31.3	22.6	27.7	26.6	47	34	48	23.0	28.8	28.9	50	35	69
23	36.8	54.6	46.4	32.9	44.3	42.0	59	36	64	33.9	45.1	44.0	64	35	71
24	44.0	49.9	31.9	42.4	48.1	28.3	84	86	60	43.0	49.1	29.2	82	84	59
25	14.5	26.3	24.0	11.9	21.7	20.7	44	38	51	12.3	22.3	21.5	45	40	52
26	30.8	44.0	36.9	27.9	36.3	32.6	66	38	56	28.7	37.1	34.0	70	36	59
27	36.5	47.3	43.0	34.1	43.2	42.2	73	66	91	35.1	44.0	43.2	76	63	88
28	43.2	47.5	39.4	42.6	46.7	39.8	92	92	100	43.7	47.9	40.8	93	92	99
29	37.4	44.9	43.7	37.6	41.9	39.6	98	74	64	38.2	42.9	40.3	96	74	62
30	39.2	52.7	40.7	34.0	40.9	36.1	49	25	57	35.0	41.9	39.2	53	27	72
31	38.7	45.6	36.5	35.3	41.2	34.6	65	63	78	36.4	42.0	37.0	69	69	87
Sums	1023.5	1327.0	1136.8				2099	1662	2094				2156	1727	2197
Means	34.12	44.23	37.89				72	55	70				74	58	76

* For notes on psychrometric observations, see page 10; for tables used in reductions preliminary to computation of relative humidity, see general remarks on observations of 1877; data below collated to test these tables. Some differences of relative humidity are omitted because the observations were not made by the regular observer, and it seems likely that the bulbs were not wetted long enough before the time for making the observations.

Date	Excess of relative humidity shown by No. 4 and C. 3235 over that shown by psychrometer: 8 A.M.	2 P.M.	8 P.M.	No. 4 above dry bulb of psychrometer: 8 A.M.	2 P.M.	8 P.M.	Theoretical excess of No. 4 over dry bulb of psychrometer by tables used in computing relative humidity: 8 A.M.	2 P.M.	8 P.M.
1	+ 3	∓ 8	+ 14	+ 0.6	+ 0.5	+ 0.6	+ 0.5	+ 0.5	+ 0.5
2	∓ 3	∓ 3	− 1	+ 0.4	+ 0.4	+ 0.7	+ 0.5	+ 0.4	+ 0.5
3	0	0	+ 1	+ 0.3	+ 0.4	+ 0.7	+ 0.4	+ 0.3	+ 0.4
4	− 1	− 4	+ 2	+ 0.4	+ 0.7	+ 0.5	+ 0.4	+ 0.4	+ 0.5
5	− 1	− 1	+ 14	+ 0.4	+ 0.5	+ 0.8	+ 0.4	+ 0.5	+ 0.5
6	+ 5	0	+ 2	+ 0.3	+ 0.4	+ 0.8	+ 0.5	+ 0.5	+ 0.5
7	0	+ 6	+ 2	+ 0.4	− 0.1	+ 0.7	+ 0.5	+ 0.4	+ 0.4
8	+ 7	0	+ 8	0.0	+ 0.2	+ 0.5	+ 0.4	+ 0.3	+ 0.4
9	+ 4	+ 5	+ 6	+ 0.2	− 0.1	+ 0.6	+ 0.4	+ 0.4	+ 0.5
10	+ 5	+ 5	+ 3	+ 0.2	+ 0.3	+ 0.3	+ 0.4	+ 0.5	+ 0.3
11	+ 2	+ 5	− 5	+ 0.5	+ 0.7	+ 0.8	+ 0.5	+ 0.5	+ 0.5
12	− 1	0	+ 5	+ 0.6	+ 0.7	+ 0.8	+ 0.5	+ 0.5	+ 0.6
13	+ 3	− 2	− 5	+ 0.7	+ 0.2	+ 0.7	+ 0.5	+ 0.4	+ 0.5
14	+ 1	0	+ 7	+ 0.4	+ 0.6	+ 0.5	+ 0.5	+ 0.4	+ 0.4
15	+ 3	+ 9	+ 4	+ 0.5	+ 0.6	+ 0.6	+ 0.5	+ 0.4	+ 0.5
16	+ 1	+ 3	− 4	+ 0.3	+ 0.1	+ 0.8	+ 0.5	+ 0.4	+ 0.5
17		− 2		+ 0.8	+ 0.6	+ 0.7	+ 0.5	+ 0.5	+ 0.5
18									
19					+ 0.7	+ 0.8		+ 0.3	+ 0.4
20	+ 2	0	+ 1	+ 0.6	+ 0.5	+ 0.5	+ 0.5	+ 0.5	+ 0.5
21	− 4			+ 0.6	− 0.1	(+ 0.1)		+ 0.5	(+ 0.5)
22	+ 5	− 1	+ 7	+ 0.5	+ 0.5	+ 0.4	+ 0.5	+ 0.5	+ 0.5
23	− 2	− 2	− 1	+ 0.1	+ 0.5	+ 0.8	+ 0.5	+ 0.3	+ 0.4
24	+ 1	+ 2	+ 1	+ 0.5	+ 1.0	+ 0.7	+ 0.4	+ 0.4	+ 0.5
25	+ 4	− 2	+ 3	+ 0.2	+ 0.4	+ 0.6	+ 0.5	+ 0.5	+ 0.5
26	+ 3	− 3	− 3	+ 0.2	+ 0.6	+ 0.7	+ 0.5	+ 0.4	+ 0.5
27	+ 1	− 1	+ 1	+ 0.4	+ 0.9	+ 0.9	+ 0.5	+ 0.4	+ 0.4
28	− 2	0	∓ 2	+ 0.6	+ 1.0	+ 0.8	+ 0.4	+ 0.4	+ 0.5
29	+ 4	+ 2	∓ 15	+ 0.5	+ 0.5	+ 0.6	+ 0.5	+ 0.4	+ 0.4
30	+ 4	+ 6	+ 9	+ 0.3	+ 0.1	+ 1.0	+ 0.5	+ 0.3	+ 0.4
31	+ 4	+ 5	∓ 31	+ 0.4	− 0.4	+ 1.1	+ 0.6	+ 0.4	+ 0.5
Means	+ 1.2	+ 1.5	+ 3.1	+ 0.46	+ 0.46	+ 0.63	+ 0.48	+ 0.44	+ 0.46

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Meteorological Record
March 1878.

Date	Wind. Estimated velocity in miles per hour, and direction (& approach)			Amount on scale of 10, and kind (on Poëy's system). For explanations, see note on page 4. Clouds.		
	8 A.M.	2 P.M.	8 P.M.	8 A.M.	2 P.M.	8 P. M.
1	6 N	4 NE	3 SE	0	0	0
2	3 SSW	4 SSW	5 S	9 R Rs Fm	9 R Rs Fm	10 P
3	5 SSW	7 S	3 SSW	10 P Fm ↗	10 Pm	5 P
4	4 WSW	11 NW	11 NW	7 Pm Fm	7 Pm M Fm →	5 P
5	6 NW	5 WNW	0 S	0	0	0
6	2 S	10 SSW	3 SSW	9 R	10 R Fm	0 haze
7	0 calm	0 W	0 SW	9 P fog	9 P Fm ↗	9 P 0 Rs
8	1 SW	5 NW	0 S	0 haze	0	
9	0 N	4 E	3 SE	6 R Ry haze	1 haze	0
10	5 SW	0 W	0 W	1 Rs haze	1 P Rs haze	5 P haze
11	5 E	4 ENE	2 NE	10 Pm	10 Pm	10 P; raining
12	6 E	2 E	2 NE	10 P Fm; a few snowflakes	10 Pm Fm; raining	10 P; raining
13	4 NE	0 calm	0 calm	10 Pm; raining	10 Pm	10 P
14	4 W	3 NNW	1 N	2 R Rs Fm	10 Pm Fm →	10 Pm
15	4 NNW	4 NNW	3 NNW	9 Pm R Rs Fm ↘	5 M Fm	0
16	0 N	0 ESE	4 SE	0 haze Rs	0 M Fm haze	0
17	0 calm	1 NE	8 NE	10 Pm	10 Pm Fm	10 P; raining
18						
19		6 W	*3 SW		10 P M Fm	0
20	*5 NW	10 NW	10 NW	5 P M Fm	7 M Fm →	0 P
21	6 NW	*7 NW	(* NW)	10 R Rs Fm	5 R Rs Fm	(3; thick haze)
22	*2 NNW	*6 NW	*0 NW	1 Rs; in south	0 Fm; in horizon	0
23	2 SW	11 SW	7 SSW	9 R Rs Fm →	10 P Fm →	2 P haze
24	3 S	5 S	15 WNW	10 P	10 Pm Fm; raining	9 P
25	15 WNW	13 W	8 W	1 R Fm	4 R Rs Fm	5 P Fm
26	4 W	6 W	0 W	0 R Fm	3 M Fm	0 P Rs
27	3 S	10 S	1 S	10 Pm	10 Pm	10 P; a few stars visible
28	0 ESE	0 E	0 E	10 Pm Fm →	10 Pm fog	10 P; raining
29	5 N	6 NNE	5 NNW	10 Pm Fm; raining	10 Pm Fm ↓	10 P
30	8 N	7 N	0 E	0	0 Fm	0 P
31	0 WNW	3 E	1 SE	9 P Fm	10 R Pm Fm	0 P
Sums	101	141	95	177	191	133
Means	3.7	5.0	3.5	6.1	6.4	4.4

Anemometer blown off during this night following March 24; subsequent estimates of the velocity of the wind not assisted by any notice of the rate at which the cups of the anemometer seemed to turn, as before.

*Observations of wind at 8 P.M. March 19; 8 A.M. March 20; 2 P.M. and 8 P.M., March 21; 8 A.M.; 2 P.M., 8 P.M., March 22; all omitted in taking the means, as they were made by W. Upton not in miles per hour, but on a scale of 10.

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March 1878.

Date	Extreme temperatures Maximum, 8 A.M. Before setting	Maximum, 8 A.M. After setting	Minimum, 8 P.M. Before setting	Minimum, 8 P.M. After setting	Aurora 8 P.M.	Zodiacal light 8 P.M.	Remarks
1	49.0	25.0	22.2	23.0	None	To Mgrs; bright	
2	31.0	30.0	21.2	28.4	Cloudy	Cloudy	
3	47.0	46.4	28.7	46.6	Cloudy	To Mars; among clouds	
4	50.5	41.2	36.8	40.7	Cloudy	Perfectible among clouds	Seeing 5,5,2; see explanations in book R 13.
5	43.0	25.8	22.1	23.9	None	To Mars	" 8,8,8; " " " " " "
6	37.6	35.9	23.8	34.7	None	To Mars	
7	49.0	40.3	34.6	39.2	Cloudy	Cloudy	A little rain in the afternoon. Clear towards midnight.
8	61.2	43.3	39.1	42.2	Moonlight	Moonlight and clouds	Seeing 7,8,5.
9	59.0	41.0	37.2	39.9	Moonlight	Moonlight	Seeing 7,5,5.
10	48.6	43.0	35.2	42.3	Cloudy	Cloudy	Sunray halo at 8 P.M., very indistinct for correct measurement, but about 46° across outside, by rough measure by ring on retort stand. Seeing 2,8,8.
11	66.7	41.0	39.0	39.1	Cloudy	Cloudy	Some rain afternoon and evening, and a little more before next morning.
12	41.0	35.8	32.1	34.8	Cloudy	Cloudy	Rainy.
13	38.2	37.7	32.3	36.9	Cloudy	Cloudy	Some rain.
14	41.0	39.6	35.8	38.7	Cloudy	Cloudy	A little snow in the following night.
15	47.0	35.8	32.2	34.7	Moonlight	Moonlight	Seeing 5,4,4.
16	47.3	32.7	27.8	31.2	Moonlight	Moonlight	Seeing 4,6,3.
17	44.5	38.5	31.2	37.2	Cloudy	Cloudy	Afternoon and evening rainy.
18							Rain and snow.
19					Bright, possibly aurora; moon just risen.	To Pleiades; moon just risen	No snow on the ground at 10½ A.M. Seeing 5,4,4.
20	41.2	37.7	29.2	38.7	None	To Mars; rather bright	Seeing 8,6,5.
21	42.1	24.3	20.0	22.0		(To β Tauri)	Seeing 4,8,8.
22	33.2	27.2	21.5	26.5	None	To Pleiades	
23	37.6	37.0	26.6	36.3	None	About to the Pleiades; hazy	
24	58.6	44.2	36.2	43.8	Cloudy	Cloudy	
25	59.0	18.0	11.3	14.2	Cloudy	To the Pleiades; clouds	Anemometer blown off last night. Seeing 9,6,5.
26	31.7	31.8	14.2	30.8	None	Bright; to the Milky Way	
27	44.7	37.4	30.7	36.3	Cloudy	Cloudy	A few drops of rain.
28	48.7	43.9	36.2	43.0	Cloudy	Cloudy	Evening somewhat rainy.
29	54.9	38.0	36.8	37.2	Cloudy	Cloudy	
30	48.2	40.0	34.6	39.0	None	To the Milky Way	Seeing 5,6,3.
31	54.0	39.5	34.7	38.2	None; some clouds	To the Milky Way	Seeing 6,6,4.
	1355.5		863.3				
	46.74		29.77				

Notes on "Gegenschein"; see also record for February.

March 1, 8 P.M. Leo brighter than Leo Minor or Hydra.
10½ P.M. "Gegenschein" somewhat as Feb. 27, but apparently not west of Regulus.
March 5, 8 P.M. Leo brighter than Leo Minor; perhaps no brighter than Hydra.
March 7, about 11 P.M. Leo decidedly brighter than Virgo.
March 8, 10½ P.M. Some indication of "Gegenschein", reaching eastwards very nearly to β Virginis, westwards not beyond δ Leonis.

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Meteorological Record of April 1878

Date	Barometer			Thermometer attached to barometer			External thermometer No. 4				Rainfall in inches.
	8 A.M.	2 P.M.	8 P.M.	8 A.M.	2 P.M.	8 P.M.	8 A.M.	2 P.M.	8 P.M.	Mean half-way to 2 P.M.	Gauge C examined at 8 A.M.
1	29.590	29.567	29.617	42.0	45.4	46.4	39.6	40.3	40.8	40.22	0.000
2	29.644	29.640	29.701	48.2	49.0	48.7	38.8	46.2	42.2	41.64	0.000
3	29.750	29.752	29.766	44.4	49.8	49.5	43.2	47.8	42.2	43.72	0.000
4	29.659	29.505	29.422	45.0	50.0	50.8	43.5	45.6	38.4	41.88	0.000
5	29.149*	29.129*	29.172	43.3	44.8	45.3	37.3	41.7	40.8	39.58	0.121
6	29.160	29.164	29.237	43.2	45.3	46.8	38.2	45.8	43.5	41.84	0.143
7	29.367	29.394	29.536	44.1	45.6	46.7	37.9	45.6	41.4	40.84	0.177
8	29.742	29.894	30.080	43.9	49.2	49.8	44.5	49.8	42.1	44.60	0.022
9	30.273	30.239	30.258	45.6	50.5	50.9	43.4	50.3	43.7	44.90	0.000
10	30.193	30.112	30.063	46.0	48.8	50.0	45.1	52.7	47.5	47.58	0.000
11	29.896	29.752	29.689	47.8	51.1	52.1	48.2	56.8	47.6	49.68	0.000
12	29.328	29.324	29.389	48.9	49.8	50.3	44.0	50.3	48.1	46.90	0.618
13	29.369	(29.418)	29.563	47.1	(51.4)	52.4	49.5	(55.0)	49.3	50.52	0.132
14	29.689	29.718	29.784	48.3	50.8	51.1	48.3	54.5	47.9	49.38	0.000
15	29.890	29.939	30.058	46.6	53.0	54.7	46.6	55.5	50.4	49.90	0.000
16	30.202	30.218	30.208	50.0	53.3	53.4	46.8	49.2	42.8	45.68	0.000
17	30.206	30.228	30.251	47.8	53.6	52.3	41.0	47.6	44.0	43.52	0.000
18	30.250	30.200	30.173	47.3	53.0	55.4	47.1	55.9	47.0	48.82	0.000
19	29.986	29.867	29.917	48.1	56.0	59.4	48.6	71.6	61.2	58.24	0.000
20	29.975	29.894	29.791	53.0	57.7	58.6	52.4	57.3	55.0	54.42	0.000
21	29.550	29.624	29.794	55.0	59.6	60.6	61.1	66.0	54.1	59.28	0.011
22	30.026	30.024	30.016	52.8	57.3	60.8	50.8	64.7	56.0	55.66	0.000
23	30.126	30.153	30.151	55.4	54.6	54.0	46.2	47.4	45.9	46.32	0.287
24	30.078	(29.990)	29.964	52.2	(53.8)	55.0	45.8	(52.7)	47.5	47.86	0.177
25	29.891	29.848	29.870	55.1	60.1	61.5	62.6	70.8	60.1	63.24	0.000
26	29.850	29.863	29.910	60.6	60.0	60.1	59.6	59.3	54.8	57.62	0.563
27	30.002	30.019	30.000	57.5	58.7	58.1	56.8	55.8	52.1	54.72	0.298
28	29.951	29.908	29.834	55.0	56.1	55.5	49.5	51.8	49.3	49.88	0.739
29	29.800	29.850	29.906	53.9	57.0	56.7	53.9	53.8	47.4	51.28	0.651
30	29.914	29.928	29.968	53.2	54.5	54.6	45.4	50.5	46.2	46.74	1.214
Sums	894.506	894.161	895.088	1481.3	1579.8	1601.5	1415.7	1592.3	1429.3	1456.46	5.153
Means	29.817	29.805	29.836	49.4	52.7	53.4	47.19	53.08	47.64	48.548	

Barometric means reduced to the freezing point: 8 A.M., 29.761; 2 P.M., 29.740; 8 P.M., 29.769.

Mean temperature for month (mean of 3 means for 8, 2, 8, with double weight given to the morning and evening observations) 48.55 Fahrenheit.

Rainfall for month 5.15 inches.

Highest reading of maximum thermometer during the month (April 26) 72.3 Fahrenheit

Lowest " " minimum " " " " (April 5) 33.2 "

Records in parentheses ( ) are those of observations not made at the regular times. On April 13 the midday observations were made at 2¾ P.M., and on April 24 at 3 P.M., instead of at 2 P.M.

*April 5, 12¼ P.M. Barometer 29.128; attached thermometer 44.0.

Observer, A. Searle.

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Harvard College Observatory.

April 1878.

Date	Psychrometer: Dry bulb 8 A.M.	Dry bulb 2 P.M.	Dry bulb 8 P.M.	Wet bulb 8 A.M.	Wet bulb 2 P.M.	Wet bulb 8 P.M.	Relative humidity, Guyot's Tables: 8 A.M.	2 P.M.	8 P.M.	C. 3235 (wet) 8 A.M.	2 P.M.	8 P.M.	Relative humidity from No. 4 and C. 3235, Guyot's Tables: 8 A.M.	2 P.M.	8 P.M.
1	38.9	39.7	39.9	37.5	37.9	36.8	83	80	69	38.1	39.1	38.0	80	83	69
2	38.2	45.4	41.4	35.0	39.6	36.8	67	53	58	36.0	41.0	37.8	68	55	57
3	42.9	47.4	41.8	37.7	40.4	38.1	56	47	66*	38.7	42.1	40.2	57	53	76*
4	43.1	45.1	37.7	39.7	41.1	37.4	72	66	93	40.8	42.1	38.2	72	67	92
5	36.8	40.9	40.3	36.7	40.3	39.9	95	92	94	37.3	41.0	40.8	93	88	94
6	37.4	44.9	42.9	37.4	42.9	40.8	96	82	80	38.3	43.6	41.6	94	77	79
7	36.9	44.9	40.5	36.9	42.1	39.8	96	75	91	37.7	42.9	40.8	92	73	89
8	44.0	49.8	41.1	39.8	44.2	39.2	64	59	81	40.8	45.1	41.1	65	62	85
9	42.9	50.0	43.0	39.8	43.5	40.6	72	53	78	41.0	44.6	42.0	74	56	88
10	44.7	52.0	46.5	42.3	46.3	44.6	78	61	83	43.2	47.5	46.0	79	63	85
11	47.5	56.5	47.0	46.2	52.8	46.3	87	76	92	47.1	53.8	47.2	87	79	93
12	43.4	49.9	47.8	43.6	46.1	45.2	99	72	78	44.1	46.8	46.7	95	72	85
13	49.4	(54.8)	49.0	43.4	(45.9)	42.7	56	(44)	54	44.1	(46.9)	43.8	57	(47)	56
14	47.8	54.0	47.3	42.5	45.5	42.4	59	45	61	43.2	46.2	43.4	58	45	62
15	46.1	55.2	50.0	43.1	47.5	46.3	74	51	73	43.8	48.8	47.3	73	55	76
16	46.3	48.8	42.0	42.3	43.3	41.1	67	59	90	43.2	44.7	43.0	67	63	96
17	40.4	47.6	43.0	39.7	43.6	42.2	91	68	91	40.5	45.0	43.6	89	75	91
18	47.5	55.5	46.2	45.4	49.5	44.4	82	62	84	46.0	50.9	46.0	87	66	88
19	48.7	71.3	60.5	45.0	53.0	50.4	71	28	44	45.9	56.0	52.0	75	30	48
20	51.9	56.7	54.2	47.9	50.5	51.8	72	61	84	49.0	51.7	53.0	74	64	85
21	61.1	65.6	53.5	55.3	53.3	46.9	66	38	57	55.9	53.9	48.1	69	38	58
22	50.7	63.8	55.2	44.7	49.5	51.0	59	27	73	45.8	51.0	52.9	62	30	78
23	45.5	46.8	45.1	45.1	46.2	44.9	95	93	96	46.3	47.0	45.9	97	93	95
24	45.5	(51.7)	46.9	45.3	(49.5)	46.4	96	(84)	94	46.3	(50.9)	47.3	100	(85)	95
25	62.5	70.4	59.5	59.7	64.7	59.2	84	71	98	60.0	65.1	59.8	84	71	96
26	59.4	58.8	54.2	58.5	58.5	53.6	94	97	95	59.0	59.0	54.3	94	96	95
27	56.3	55.3	51.5	56.2	55.2	51.7	99	99	100	56.8	55.8	52.2	98	98	99
28	49.0	51.1	48.7	49.3	51.3	48.9	100	100	100	50.0	52.0	49.5	100	99	98
29	53.4	52.3	46.6	53.3	52.5	47.0	99	100	100	54.0	53.0	47.8	99	93	99
30	44.7	49.8	45.2	45.2	47.9	45.2	100	85	97	45.8	48.8	46.0	97	85	95
Sums	1402.9	1426.0	1408.5				2429	2028	2454				2436	2061	2501
Means	46.76	47.53	46.95				81	68	82				81	69	83

* April 3 8 P.M. Covered bulb of psychrometer and C. 3235 both wetted an hour before this observation; both evidently wet at the time of the observation, and both carefully read.

For tables used in reductions preliminary to computation of relative humidity see general remarks on observations of 1877; data below collected to test these tables.

Date	Excess of relative humidity shown by No. 4 and C. 3235 over that shown by psychrometer: 8 A.M.	2 P.M.	8 P.M.	No. 4 above the dry bulb of the psychrometer: 8 A.M.	2 P.M.	8 P.M.	Theoretical excess of No. 4 over dry bulb of psychrometer, by tables used in computing relative humidity: 8 A.M.	2 P.M.	8 P.M.
1	−3	+3	0	+0.7	+0.6	+0.9	+0.5	+0.5	+0.5
2	+1	+2	−1	+0.8	+0.8	+0.8	+0.5	+0.4	+0.4
3	+1	+6	+10	+0.3	+0.4	+0.4	+0.4	+0.4	+0.4
4	0	+1	−1	+0.4	+0.5	+0.7	+0.4	+0.4	+0.5
5	−2	−4	0	+0.5	+0.8	+0.5	+0.5	+0.4	+0.4
6	−2	−2	−3	+0.8	+0.9	+0.6	+0.5	+0.4	+0.4
7	−1	−2	+4	+1.0	+0.7	+0.9	+0.5	+0.4	+0.4
8	+1	+3	+10	+0.5	0.0	+1.0	+0.4	+0.3	+0.4
9	+2	+3	+2	+0.5	+0.3	+0.7	+0.4	+0.3	+0.4
10	+1	+3	+1	+0.4	+0.7	+1.0	+0.4	+0.3	+0.4
11	0	+1	+7	+0.7	+0.3	+0.8	+0.4	+0.3	+0.4
12	−4	0	+2	+0.6	+0.4	+0.3	+0.4	+0.4	+0.4
13	+1	(+3)	+1	+0.1	(+0.2)	+0.2	+0.3	(+0.3)	+0.3
14	+1	+4	+6	+0.5	+0.5	+0.6	+0.4	+0.3	+0.4
15	−1	+4	0	+0.5	+0.3	+0.4	+0.4	+0.3	+0.3
16	0	+4	+4	+0.6	+0.4	+0.8	+0.4	+0.3	+0.4
17	−2	+7	0	−0.1	0.0	+1.0	+0.4	+0.4	+0.4
18	+5	+4	+4	+0.1	+0.1	+0.8	+0.4	+0.3	+0.4
19	+4	+2	+1	+0.5	+0.3	+0.7	+0.3	+0.3	+0.3
20	+2	+3	+6	+0.5	+0.6	+0.8	+0.3	+0.3	+0.3
21	+3	0	+1	0.0	+0.4	+0.6	+0.3	+0.5	+0.3
22	+3	+3	+8	+0.1	+0.6	+0.8	+0.3	+0.3	+0.3
23	+2	0	+1	+0.6	+0.6	+0.8	+0.4	+0.4	+0.4
24	+4	(+1)	+1	+0.3	(+1.0)	+0.6	+0.4	(+0.3)	+0.4
25	0	+1	−2	+0.1	+0.4	+0.6	+0.3	+0.5	+0.3
26	0	−1	0	+0.2	+0.5	+0.6	+0.3	+0.3	+0.3
27	−1	−1	−2	+0.5	+0.8	+0.6	+0.3	+0.3	+0.3
28	0	−1	−2	+0.5	+0.7	+0.6	+0.3	+0.3	+0.3
29	0	−1	−1	+0.5	+1.5	+0.8	+0.3	+0.3	+0.4
30	−3	0	−2	+0.7	+0.7	+1.0	+0.4	+0.4	+0.4
Means	+0.2	+1.1	+1.5	+0.43	+0.54	+0.69	+0.38	+0.36	+0.37

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Meteorological Record

April 1878.

Date	Wind: estimated velocity in miles per hour, and direction (of approach). 8 A.M.	2 P.M.	8 P.M.	Amount on scale of 10 and Kind of Clouds (on Poëy's system). For explanations, see note on page 4. 8 A.M.	2 P.M.	8 P.M.
1	0 calm	0 calm	3 N E	10 P Fm	10 P Fm	10 P
2	3 N W	3 E S E	3 N W	10 R Rm Fm ↘	10 Rm	2 P
3	6 N W	5 S E	1 S E	0 P Fm	9 Rm Fm	0
4	1 N	4 E	2 N E	10 Rm	10 Rm Fm	10 P mist
5	5 N	3 N	3 N W	10 P mist	10 Rm Fm; a little rain	10 P; a few drops of rain
6	2 N	1 S	2 N W	10 Rm Fm ↘; raining	10 P Fm →; raining	10 P; a little rain
7	1 N W	0 N W	2 N E	10 P; raining	10 P Fm	10 P; raining
8	7 N	6 E	0 calm	5 R Rs Fm	5 Rm Fm ↘ R	1 Rm Fm
9	1 E	5 S E	2 S E	10 P	9 R Rs	9 P Rs Fm
10	2 S E	1 S E	1 S	10 Rm	10 Rm Fm	10 P; a little rain
11	1 S	0 E	2 S E	10 P; a little rain	10 Rm Fm ↑	10 P; a little rain
12	6 N W	12 N W	0 calm	10 Rm; a little rain	10 P Fm; a little rain	9 P Fm
13	6 W	(6 W N W)	6 W	1 Rs haze Fm →	(9 Rm M Fm →)	8 P Fm
14	8 N W	7 N W	6 N W	8 Rm Fm	10 Rm M Fm ↘	0 P Rs
15	5 N W	6 S E	0 S E	9 Rm Fm ↓	7 Rm Fm ↓	10 Rm Fm
16	3 E S E	2 S E	0 S E	10 Rm Fm	6 R M Fm Rs R	6 P Fm
17	0 calm	2 S E	0 N	10 P fog	10 P	2 P Fm
18	1 S W	6 S E	0 S E	1 Rs Fm ↘ haze	0 M Fm	0 P haze
19	3 S W	5 W N W	0 N	0 haze	5 Rm Fm	2 P Fm haze
20	3 N E	5 E	2 S	9 R Rs haze	9 P Fm → haze	10 P; a little rain
21	5 W S W	11 W N W	7 W	0 Fm haze	5 M Fm →	0 Rm Fm
22	4 N W	2 W	2 N W	0 Fm Rs	4 R Rs Fm	10 P fog
23	1 E	4 E	4 E	10 Rm; raining	10 Rm	10 P mist
24	1 E	(1 E)	1 E	10 P fog	(10 P fog)	9 P
25	7 S	14 S S W	4 S E	9 Rm Rm Fm ↑	7 Rm M Fm ↑	10 P
26	5 S	0 calm	5 E	10 Rm	10 Rm	10 P
27	0 calm	0 E	0 E	10 P fog; a little rain	10 P fog; a little rain	10 P fog; raining
28	6 E N E	3 E N E	4 N E	10 P fog	10 P; raining	10 P; raining
29	0 calm	0 N E	2 N	10 P fog	10 Rm; raining	10 P; raining
30	3 N	5 N	3 N	10 Rm Fm ↓; raining	10 Rm Fm ↓	10 P; raining
Sums	96	119	67	232	255	218
Means	3.2	4.0	2.2	7.7	8.5	7.6

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of Harvard College Observatory.

April 1878.

Date	Extreme temperatures: Maximum, 8 A.M. Before setting	Extreme temperatures: Maximum, 8 A.M. After setting	Extreme temperatures: Minimum, 8 A.M. Before setting	Extreme temperatures: Minimum, 8 A.M. After setting	Aurora 8 P.M.	Zodiacal light 8 P.M.	Remarks.
1	49.9	39.9	36.3	38.7	Cloudy	Cloudy	
2	43.5	39.6	34.5	38.0	Cloudy	Cloudy	Seeing 8, 6, 6, to 2, 6, 3. Seeing forenoon; see record.
3	46.8	43.7	37.9	42.7	None	To the Milky Way	
4	50.8	43.8	35.6	42.8	Cloudy	Cloudy	
5	46.8	37.5	33.2	36.8	Cloudy	Cloudy	
6	42.3	38.2	36.7	37.5	Cloudy	Cloudy	
7	46.3	37.8	35.7	37.1	Cloudy	Cloudy	
8	47.6	44.8	37.0	43.9	Moonlight	Moonlight and clouds	Seeing 3, 3, 3.
9	55.0	43.7	37.2	42.7	Cloudy	Cloudy	Seeing 2, 4, 3.
10	51.1	45.0	37.1	44.1	Cloudy	Cloudy	
11	56.2	48.1	43.5	47.2	Cloudy	Cloudy	
12	60.1	44.0	42.4	43.1	Cloudy	Cloudy	Lunar halo 7½ to 8 P.M.*
13	51.0	49.9	42.7	49.0	Cloudy	Cloudy	Seeing 2, 3, 4
14	56.0	48.3	42.0	47.3	Moonlight and clouds	Moonlight	Seeing 3, 6, 5
15	55.8	46.4	38.2	45.6	Cloudy	Cloudy	
16	60.0	46.8	42.1	45.8	Cloudy	Cloudy	Seeing 2, 5, 5
17	51.0	41.4	37.0	39.9	Cloudy	Suspected; Some haze, clouds & moonlight	Seeing 6, 4, 4.
18	55.1	47.8	38.6	46.8	None; some clouds	None; but Milky Way invisible†	Seeing 8, 4, 3.
19	59.5	49.0	39.0	48.2	Cloudy	Perceptible among clouds	Seeing 5, 3, 3.
20	72.0	52.7	43.1	51.7	Cloudy	Cloudy	
21	65.6	60.8	51.3	61.0	Cloudy	Suspected among clouds	Seeing 7, 5, 6.
22	67.6	51.2	42.1	50.1	Cloudy	Cloudy	A little rain in the evening.
23	66.0	46.2	45.3	45.3	Cloudy	Cloudy	
24	47.8	46.7	44.0	45.6	Cloudy	Cloudy	Seeing 2, 8, 8.
25	62.0	61.1	45.0	61.7	Cloudy	Cloudy	A little rain before 5 P.M.; heavy showers later.
26	72.3	59.0	57.9	58.9	Cloudy	Cloudy	Some rain, especially near noon.
27	62.1	56.8	51.3	55.8	Cloudy	Cloudy	Some rain at times.
28	59.0	50.0	48.8	48.8	Cloudy	Cloudy	Frequent showers. Much wind late in the night, noted by U. C. Peirce.
29	53.3	53.3	47.2	53.0	Cloudy	Cloudy	Thunder between 1 and 2 P.M. Lightning and thunder at 2 P.M. Frequent showers. Thundershower after 7 P.M.
30	56.8	45.7	44.3	44.3	Cloudy	Cloudy	
	1669.3		1247.0				
	55,64		41.57				

* April 12, 7½ to 8 P.M. Lunar halo measured with two forms of rough dioptric apparatus; results 48°½ and 50°½. These measures were taken at about the brightest parts of the ring, between its outer and inner edges. It was not distinct enough for closer measures.

† April 18, 8½ P.M. Zodiacal light and Milky Way both visible.

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Meteorological Record

May 1878.

Date	Barometer			Thermometer attached to barometer			External thermometer No. 4				Rainfall in inches.
	8 A.M.	2 P.M.	8 P.M.	8 A.M.	2 P.M.	8 P.M.	8 A.M.	2 P.M.	8 P.M.	Mean half weight to 2 P.M.	Gauge C examined at 8 A.M.
1	29.995	(29.934)	29.928	51.8	(54.3)	47.0	45.8	(54.6)	47.8	48.36	0.177
2	29.886	29.863	29.871	53.0	60.4	65.1	56.5	73.8	60.1	61.40	0.000
3	29.796	29.746	29.781	59.0	67.6	68.3	65.5	84.0	67.3	69.92	0.000
4	29.812	29.785	29.824	62.6	68.2	67.5	66.3	80.1	62.1	67.38	0.000
5	29.766	29.649	29.650	63.6	65.8	64.3	63.9	70.3	59.0	63.22	0.044
6	29.895	29.855	29.886	57.9	63.9	64.9	54.4	67.5	58.2	58.54	0.022
7	29.988	29.908	29.887	56.6	62.7	64.2	56.3	66.0	56.0	58.12	0.000
8	29.832	29.844	(29.861)	57.8	63.6	(65.6)	60.3	63.8	(55.0)	58.88	0.000
9	29.832	29.816	29.809	59.1	59.8	60.2	52.8	55.1	54.1	53.78	0.000
10	29.747	29.687	29.736	58.0	63.3	65.0	59.9	68.7	57.5	60.70	0.011
11	29.692	29.568	29.704	57.0	59.9	59.8	51.7	56.3	49.4	51.70	0.000
12	29.849	29.850	29.913	53.1	55.7	56.3	48.7	52.2	47.8	49.04	0.011
13	29.913	29.886	29.951	51.0	55.0	56.9	46.5	54.0	48.0	48.60	0.000
14	30.028	30.022	30.070	51.8	55.8	56.8	47.1	54.4	49.0	49.32	0.000
15	30.050	29.998	29.946	50.8	55.1	54.8	49.5	49.0	46.2	48.08	0.000
16	29.886	29.902	29.958	51.3	53.9	56.8	47.4	52.4	50.8	49.76	0.000
17	30.026	30.026	30.048	52.0	57.6	59.5	50.6	58.7	52.6	53.02	0.000
18	30.091	30.100	30.164	55.5	59.8	62.0	60.9	65.5	60.0	61.46	0.000
19	30.250	30.305	30.310	55.3	60.8	62.4	58.9	58.8	50.8	55.64	0.000
20	30.266	30.247	(30.170)	55.0	56.7	(56.6)	53.7	57.7	(50.8)	53.34	0.000
21	30.000	29.920	29.894	53.8	55.6	59.0	53.0	59.8	54.2	54.84	0.077
22	29.900	29.875	29.974	55.4	57.8	58.6	55.0	58.6	51.9	54.48	0.088
23	29.936	29.979	30.049	53.8	57.0	59.4	53.1	59.2	56.8	55.80	0.000
24	30.050	29.990	29.955	55.6	59.7	60.9	56.1	57.7	56.3	56.50	0.000
25	29.827	29.702	29.685	56.4	62.9	65.8	61.6	73.6	63.7	64.84	0.000
26	29.618	29.554	29.548	60.0	62.7	66.0	64.1	67.7	63.9	64.74	0.000
27	29.624	29.622	29.700	60.0	65.9	68.3	66.4	73.5	65.0	67.26	0.099
28	29.772	29.760	29.816	61.1	67.7	68.7	65.8	75.6	62.4	66.40	0.000
29	29.878	29.904	29.976	62.4	67.4	68.7	64.4	70.2	62.9	64.96	0.000
30	30.067	30.083	30.066	61.6	62.0	61.7	57.7	58.6	53.8	56.32	0.000
31	30.121	30.157	30.199	58.7	58.0	58.0	52.2	53.1	53.0	52.70	0.342
Sums	923.93	926.537	927.329	1751.0	1876.6	1909.1	1746.1	1950.5	1726.4	1779.10	0.871
Means	29.916	29.888	29.914	56.49	60.54	61.58	56.33	62.92	55.69	57.390	

Barometric means reduced to the freezing point; 8 A.M., 29.841; 2 P.M., 29.803; 8 P.M., 29.825.

Mean temperature for month (mean of 3 means for 8, 2, 8, with double weight given to the morning and evening observations) 57.39 Fahrenheit.

Rainfall for month 0.87 inches.

Highest reading of maximum thermometer during the month (May 4) 83.4 Fahrenheit.

Lowest " " minimum " " " " (May 13) 37.1 " .

Records in parentheses ( ) are those of observations not made at the regular times. The midday observations of May 1 were made at 2¼ P.M.; the evening observations of May 8 at 7 P.M.; those of May 20 at 8⅙ P.M.

Observer A. Searle.

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May 1878.

Date	Psychrometer: Dry bulb 8 A.M.	Dry bulb 2 P.M.	Dry bulb 8 P.M.	Wet bulb 8 A.M.	Wet bulb 2 P.M.	Wet bulb 8 P.M.	Relative humidity, Guyot's Tables: 8 A.M.	2 P.M.	8 P.M.	C. 3235 (wet) 8 A.M.	2 P.M.	8 P.M.	Relative humidity from No. 4 and C. 3235, Guyot's Tables: 8 A.M.	2 P.M.	8 P.M.
1	45.4	(54.3)	47.0	44.2	(51.2)	45.5	88	(79)	86	45.0	(51.9)	46.8	88	(80)	89
2	57.0	73.5	59.9	54.4	58.9	56.2	82	36	77	54.9	60.0	57.2	88	39	75
3	65.5	83.7	66.3	60.4	69.4	61.3	72	45	73	60.9	70.0	62.3	74	47	73
4	66.0	79.7	61.4	61.6	69.3	59.5	76	56	88	62.1	70.0	60.0	77	58	86
5	63.7	69.4	58.5	61.5	62.5	56.5	87	65	87	62.0	63.4	57.2	87	65	87
6	53.8	66.6	57.8	50.2	52.8	50.2	76	33	54						
7	56.4	65.1	55.3	49.7	53.9	50.0	59	43	66	50.8	55.3	53.3	63	45	81
8	60.3	63.2	(53.2)	51.8	57.3	(52.5)	52	67	(94)	52.9	58.3	(54.1)	56	68	(92)
9	52.5	54.3	53.4	51.7	52.2	51.8	94	86	88	52.5	53.1	52.7	96	85	88
10	59.9	68.3	57.0	51.5	53.0	47.4	52	28	42	52.3	54.2	49.1	55	32	47
11	51.4	55.7	48.8	43.6	46.1	43.3	47	35	59	44.7	46.0	44.3	49	36	57
12	48.4	51.8	47.2	41.8	42.5	40.9	58	38	52	42.7	43.8	42.0	52	41	52
13	46.0	53.0	47.2	40.4	42.9	40.8	55	36	51	41.3	43.9	42.4	55	33	54
14	46.2	53.7	48.3	40.8	43.9	42.6	57	38	57	41.5	44.9	46.2	53	37	67
15	49.0	48.5	45.5	45.6	42.5	41.0	74	55	63	46.8	43.7	42.3	76	57	64
16	46.9	52.0	49.7	42.9	46.3	46.8	67	61	78	43.7	47.2	48.4	66	63	80
17	50.0	58.4	51.7	46.3	48.6	44.9	73	44	54	47.2	50.2	46.8	73	49	59
18	60.8	64.8	59.7	51.5	52.6	49.5	48	38	42	52.4	54.0	51.3	51	41	49
19	59.0	58.8	49.5	51.2	49.4	46.9	54	46	80	52.2	50.4	49.0	59	49	84
20	52.9	56.0	(50.2)	50.2	51.2	(46.0)	81	69	(69)	51.2	52.1	(47.2)	81	64	(72)
21	52.6	58.3	53.3	49.7	53.9	51.4	80	73	87	50.7	54.7	52.9	82	68	89
22	54.7	57.9	51.1	47.8	46.5	43.9	56	34	50	48.8	47.2	45.0	58	33	50
23	52.4	58.3	56.2	46.2	52.7	50.3	58	66	63	47.0	53.7	52.6	57	65*	72
24	55.8	57.3	56.0	49.5	52.0	51.9	60	67	74	50.6	53.2	53.2	63	70	78
25	61.1	73.0	62.0	56.4	63.9	56.3	72	57	67	56.8	65.0	57.2	70	59	63
26	62.7	65.5	62.8	58.4	61.6	58.3	75	78	74	59.4	62.6	59.3	73	73	73
27	65.4	73.0	64.3	57.8	58.1	55.1	59	35	51	58.2	58.9	57.0	57	35	57
28	65.0	75.2	61.7	57.0	61.2	55.0	57	40	62	57.5	62.1	56.0	56	42	62
29	63.5	69.4	62.2	55.7	56.6	53.8	58	40	54	56.1	57.5	55.1	55	40	56
30	57.3	57.4	53.2	52.2	55.1	51.8	68	85	90	53.2	56.4	52.9	70	85	92
31	51.8	52.4	52.3	51.2	52.0	51.1	95	96	91	51.9	52.7	51.8	96	95	90
Sums	1734	1928.5	1702.7				2083	1669	2123				2036	1654	2138
Means	55.91	62.21	54.93				67	54	68				68	55	71

* The original record gives 58.7 for the reading of C. 3235 at 2 P.M., May 23; A note made May 24 states that this is pretty clearly an error for 53.7, as the day was not a damp one, although cloudy.

For tables used in reducing preliminary to computation of relative humidity see general remarks on observations of 1877; data below collected to test these tables.

Date	Excess of relative humidity shown by No. 4 and C. 3235 over that shown by psychrometer: 8 A.M.	2 P.M.	8 P.M.	No. 4 above dry bulb of psychrometer: 8 A.M.	2 P.M.	8 P.M.	Theoretical excess of No. 4 over dry bulb of psychrometer by tables used in computing relative humidity: 8 A.M.	2 P.M.	8 P.M.
1	0	(+ 1)	+ 3	+ 0.4	(+ 0.3)	+ 0.8	+ 0.4	(+ 0.3)	+ 0.4
2	+ 6	+ 3	+ 2	− 0.5	+ 0.3	+ 0.2	+ 0.3	+ 0.5	+ 0.3
3	+ 2	+ 2	− 2	+ 0.8	+ 0.3	+ 1.0	+ 0.5	+ 0.5	+ 0.5
4	+ 1	+ 2	0	+ 0.3	+ 0.4	+ 1.0	+ 0.5	+ 0.16	+ 0.3
5	0	0	0	+ 0.2	+ 0.9	+ 0.5	+ 0.3	+ 0.5	+ 0.3
6				± 0.6	+ 0.6	+ 0.4	+ 0.3	+ 0.5	+ 0.3
7	+ 4	+ 2	+ 15	− 0.1	+ 0.2	+ 0.7	+ 0.3	+ 0.5	+ 0.3
8	+ 4	+ 1	− 2	0.0	+ 0.2	(+ 1.8)	+ 0.3	+ 0.5	(+ 0.3)
9	+ 2	−	+ 0	+ 0.3	+ 0.8	+ 0.7	+ 0.3	+ 0.5	+ 0.3
10	+ 3	+ 1	− 5	0.0	+ 0.4	+ 0.5	+ 0.3	+ 0.5	+ 0.3
11	+ 2	+ 4	+ 2	+ 0.3	+ 0.7	+ 0.6	+ 0.3	+ 0.5	+ 0.3
12	+ 1	+ 3	0	+ 0.3	+ 0.4	+ 0.6	+ 0.3	+ 0.3	+ 0.3
13	0	−	+ 3	+ 0.5	+ 1.0	+ 0.8	+ 0.4	+ 0.3	+ 0.4
14	+ 4	+	+ 10	+ 0.5	+ 0.7	+ 0.7	+ 0.4	+ 0.3	+ 0.3
15	+ 2	+	+ 12	+ 0.6	+ 0.4	+ 1.1	+ 0.3	+ 0.3	+ 0.4
16	+ 1	+	+ 5	+ 0.6	+ 0.3	+ 0.9	+ 0.3	+ 0.3	+ 0.3
17	0	+	+ 7	+ 0.1	+ 0.7	+ 0.3	+ 0.3	+ 0.4	+ 0.3
18	+ 3	+	+ 4	+ 0.1	+ 0.6	+ 1.3	+ 0.3	+ 0.3	+ 0.3
19	+ 5	+	+ 5	− 0.8	+ 1.7	(+ 0.6)	+ 0.3	+ 0.4	+ 0.4
20	+ 3	+	(+ 3)	+ 0.4	+ 1.5	+ 0.9	+ 0.3	+ 0.3	(+ 0.3)
21	+ 2	+	+ 2	+ 0.3	+ 0.7	+ 0.8	+ 0.3	+ 0.3	+ 0.3
22	+ 2	+	+ 9	+ 0.3	+ 0.4	+ 0.6	+ 0.3	+ 0.3	+ 0.3
23	+ 1	+	+ 4	+ 0.3	+ 0.4	+ 0.3	+ 0.3	+ 0.3	+ 0.3
24	+ 3	+	+ 4	+ 0.5	+ 0.6	+ 1.7	+ 0.3	+ 0.3	+ 0.3
25	+ 2	−	+ 6	− 1.4	+ 2.2	+ 1.1	+ 0.3	+ 0.5	+ 0.3
26	+ 2	−	+ 6	+ 1.0	+ 0.5	+ 0.7	+ 0.3	+ 0.5	+ 0.3
27	+ 2	−	+ 2	+ 0.8	+ 0.4	+ 0.7	+ 0.3	+ 0.5	+ 0.4
28	+ 1	+	+ 2	+ 0.9	+ 0.8	+ 0.6	+ 0.3	+ 0.5	+ 0.3
29	+ 3	−	+ 2	+ 0.4	+ 1.2	+ 0.6	+ 0.3	+ 0.5	+ 0.3
30	+ 2	+	+ 2		+ 0.7		+ 0.3	+ 0.3	+ 0.3
31	+ 1	−	+ 1		+ 0.7		+ 0.3	+ 0.3	+ 0.3
Means	+ 1.0	+ 0.6	+ 2.3	+ 0.41	+ 0.71	+ 0.76	+ 0.34	+ 0.39	+ 0.33

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Meteorological Record

May 1878.

Date	Wind: Estimated velocity in miles per hour, and direction (if approach). 8 A.M.	2 P.M.	8 P.M.	Clouds. Amount on scale of 10, and kind (on Rüg's system). For explanations, see note on page 4. 8 A.M.	2 P.M.	8 P.M.
1	6 N	(2 E)	2 E	10 Pm	(10 Pm Fm; sun somewhat visible)	9 P Fm
2	1 W	2 W	0 calm	1 Rs Fm haze	2 M Fm P	1 P haze
3	6 S W	7 S S W	7 S	5 P Rs haze	4 P haze Fm	9 P Fm
4	8 S S W	6 S S W	6 S S W	4 P haze	9 P Fm	9 P
5	11 S	16 S	10 S	10 Pm Fm ↑	10 Pm Fm ↑	10 P
6	0 calm	0 N N W	1 N W	10 P haze	10 P (thin) M Fm	2 P Fm →
7	2 N	6 E N E	1 E	0 P Fm	6 P Fm ↓	0
8	3 N	5 S E	(0 E)	1 P Fm haze	0 P haze	(1 Rs Fm)
9	4 E N E	2 E N E	2 N E	10 P; fine rain	10 P	10 Pm
10	5 N	6 N W	4 W	1 Pm Fm	4 M Fm	1 P Rs Fm
11	6 W	8 W	2 W	0 P Rs	9 Pm Fm →	9 Pm Fm →
12	3 W S W	6 W S W	2 W N W	2 Pm M Fm	10 Pm M Fm →	9 Pm Fm →
13	4 N W	4 N W	3 N W	0 P Rs	10 Pm M Fm ↘	7 Pm Fm
14	6 N W	4 W N W	3 E	10 Pm Fm →	10 Pm M Fm →	10 Pm Fm
15	2 E	6 E N E	3 N E	10 Pm M Fm	10 Pm M Fm	10 P
16	13 N	7 N E	0 S	10 Pm M Fm ↓	10 Pm M Fm ↓	10 Pm Fm
17	0 N E	3 E	0 calm	9 P	8 Pm M Fm	5 P Fm ↓
18	2 N W	5 E	0 W	0 haze	9 P Fm ↘ haze	9 Pm Fm ↘
19	4 N E	6 E	0 calm	1 haze	1 P Rs haze	8 P Fm
20	0 S E	3 S	(6 S)	10 P	10 P Fm; a little rain	(10 P)
21	3 S	2 W S W	0 S E	10 Pm Fm ↓	10 P	9 Pm Fm →
22	10 N W	11 N	3 N W	2 Rs M Fm ↘	6 R M Fm ↘	7 Pm Fm ↘
23	9 N W	7 N E	2 N N E	10 P	10 Pm Fm ↘	10 Pm Fm
24	6 N E	4 S E	3 E S E	1 R Rs Fm	10 P Rs	10 Pm Fm ↘
25	4 W S W	4 E	7 N E	4 R Rs Fm haze	9 R Pm Rs M Fm	9 Pm Fm ↘ Rs
26	1 E	3 S E	1 N E	10 Pm Fm →	9 Pm M Fm →	1 Pm Fm
27	6 W S W	7 W N W	1 W N W	1 Pm Fm →	2 M Fm ↘	3 Pm Fm →
28	7 W	6 W N W	1 W N W	0	8 Pm M Fm ↘	7 Pm Fm →
29	7 N W	7 N W	0 N W	0 P Fm	9 Pm M Fm ↘ Rs	7 Pm Fm Rs
30	0 calm	0 calm	0 calm	10 Pm Fm →	10 Pm Fm; raining	10 Pm; raining
31	6 N N E	8 N E	6 N E	10 Pm Fm ↓; raining	10 Pm Fm ↓; a little rain	10 Pm Fm ←
Sums	145	163	76	162	245	220
Means	4.7	5.3	2.5	5.2	7.9	7.1

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May 1878.

Date	Extreme temperatures Maximum, 8 A.M. Before setting	Extreme temperatures Maximum, 8 A.M. After setting	Extreme temperatures Minimum, 8 A.M. Before setting	Extreme temperatures Minimum, 8 A.M. After setting	Aurora 8 P.M.	Zodiacal light 8 P.M.	Remarks	
1	49.4	45.6	42.8	45.0	Cloudy	Cloudy		Seeing 7, 7, 5.
2	56.3	56.3	44.8	56.2	None; clouds	*None (Milky Way invisible)		Seeing 6, 8, 7.
3	74.0	64.5	54.6	64.6	Cloudy	Cloudy		Seeing variable
4	83.4	65.3	57.1	65.3	Cloudy	Cloudy		
5	80.4	63.1	60.1	63.0	Cloudy	Cloudy		
6	72.0	54.2	46.3	57.9	Moonlight	Moonlight		
7	66.9	56.3	45.1	55.7	Moonlight	Moonlight		Seeing 8, 8, 7
8	66.8	60.0	48.3	59.7	(Twilight)	(Twilight)		Seeing 6, 3, 3
9	68.5	53.5	51.2	52.1	Cloudy	Cloudy		
10	59.6	59.6	51.7	59.1	Moonlight	Moonlight	Cloudy about 10 P.M. A few drops of rain late in the evening	Seeing 6, 4, 2.
11	68.8	52.0	44.7	50.7	Cloudy	Cloudy	Broken indefinite lunar halo about 9½ P.M.	Seeing 6, 7, 6
12	57.6	49.5	39.8	47.6	Cloudy	Cloudy		Seeing 6, 5, 5.
13	54.1	47.2	37.1	45.4	Moonlight and clouds	Moonlight and clouds		Seeing 7, 4, 5.
14	54.1	47.3	41.0	45.8	Cloudy	Cloudy		
15	54.2	50.0	39.1	49.0	Cloudy	Cloudy		
16	52.0	48.0	41.4	46.6	Cloudy	Cloudy		
17	54.7	50.5	40.3	49.2	Cloudy	Cloudy	Indistinct fragment of lunar halo about 11 P.M.	
18	61.6	60.0	48.3	59.9	Cloudy	Cloudy	A few drops of rain about 7 P.M.	
19	68.2	58.2	43.7	58.0	Cloudy	Cloudy		Seeing 5, 4, 5.
20	65.8	53.5	42.6	52.4	(Cloudy)	(Cloudy)	Occasional showers	
21	60.2	54.0	46.5	52.0	Cloudy	Cloudy	Shower in the evening.	
22	61.9	55.0	49.0	54.0	Cloudy	Cloudy		
23	60.0	53.0	45.4	52.0	Cloudy	Cloudy		
24	61.2	55.8	46.7	55.1	Cloudy	Cloudy		
25	63.0	60.2	47.6	59.8	Cloudy	Cloudy	Lightning in the evening.	Seeing 5, 6, 2.
26	74.9	63.0	51.8	62.9	Twilight	Twilight	Showers in the forenoon.	Seeing 5, 4, 4.
27	71.0	64.0	53.2	64.3	Twilight and clouds	Cloudy		Seeing 8, 7, 6.
28	74.2	64.0	52.2	63.8	Twilight and clouds	Twilight and clouds		Seeing 6, 5, 2.
29	74.8	63.0	54.6	62.8	Cloudy	Cloudy		Seeing 3, 3, 3.
30	72.2	57.2	52.6	56.4	Cloudy	Cloudy		
31	60.4	52.0	51.1	51.2	Cloudy	Cloudy		
	1942.5		1470.7					
	62.66		47.44					

*May 2, 9 P.M. Zodiacal light plainly visible, reaching nearly to α and β Geminorum.

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Meteorological Record

June 1878

Date	Barometer			Thermometer attached to barometer			External thermometer No. 4				Rainfall in inches.
	8 A.M.	2 P.M.	8 P.M.	8 A.M.	2 P.M.	8 P.M.	8 A.M.	2 P.M.	8 P.M.	Mean, half-weight to 2 P.M.	Gauge C examined at 8 A.M.
1	30.272	30.288	30.254	56.1	61.5	64.0	60.5	61.0	54.5	58.20	0.199
2	30.202	30.154	30.113	56.8	63.3	65.7	61.3	65.2	57.5	60.56	0.000
3	30.073	30.013	29.968	61.1	66.8	66.8	59.2	69.2	60.5	61.72	0.000
4	29.942	29.848	29.814	63.0	68.7	71.3	66.4	80.0	69.2	70.24	0.000
5	29.820	29.794	29.855	66.0	72.5	68.8	70.0	78.2	61.0	68.04	0.000
6	29.906	29.870	29.921	57.4	61.0	62.7	55.0	63.8	57.0	57.56	0.000
7	29.996	29.906	29.905	55.1	61.8	65.0	56.5	69.0	57.7	59.48	0.000
8	29.852	29.763	29.608	58.8	64.8	64.2	63.5	69.7	58.9	62.90	0.000
9	29.499	29.634	29.768	62.0	63.5	62.8	55.9	63.0	57.5	57.96	0.496
10	29.792	29.723	29.687	57.8	58.7	58.2	54.8	52.0	52.9	53.48	0.022
11	29.654	29.692	29.799	55.7	57.3	58.8	51.5	57.1	52.8	53.14	0.143
12	29.892	29.917	29.996	57.2	62.5	64.0	62.2	63.7	55.4	59.78	0.011
13	30.037	30.044	30.102	58.4	64.3	65.3	63.0	65.4	61.6	62.92	0.474
14	30.190	30.168	30.146	59.8	65.9	68.7	65.0	71.0	63.0	65.40	0.011
15	30.129	30.028	30.018	61.1	67.4	69.0	67.0	80.5	63.3	68.22	0.000
16	29.960	29.937	29.935	62.7	68.2	70.4	71.7	80.5	68.8	72.30	0.000
17	29.922	29.904	29.895	65.2	66.1	69.0	63.7	74.7	68.0	67.62	0.000
18	29.958	29.937	29.910	65.8	67.1	67.7	65.7	69.8	62.9	65.40	0.254
19	29.917	29.886	29.886	63.3	69.1	72.2	68.1	75.7	65.9	68.74	0.011
20	29.881	29.850	29.834	64.8	70.8	73.5	69.6	77.1	69.9	71.22	0.000
21	29.850	29.850	29.926	66.8	72.8	73.7	73.3	84.3	67.7	73.26	0.000
22	29.945	29.926	29.822	66.2	68.6	67.1	67.8	62.0	61.6	64.16	0.000
23	29.900	29.887	29.865	66.6	72.7	73.8	70.0	78.1	70.0	71.62	*0.916
24	29.844	29.802	29.780	67.2	71.4	72.3	71.7	76.0	(67.3)	70.80	0.011
25	29.732	29.728	29.790	67.5	72.0	72.8	68.8	75.0	67.7	69.60	0.110
26	29.984	30.003	30.072	64.0	67.8	71.8	60.9	73.3	67.6	66.06	0.000
27	30.128	30.080	30.102	64.6	73.2	77.2	72.3	89.0	77.2	77.60	0.000
28	30.111	30.108	30.126	71.2	77.3	78.6	78.0	83.9	75.2	78.06	0.022
29	30.182	30.168	30.146	72.7	78.3	80.3	78.0	83.6	75.0	77.92	0.000
30	30.148	30.127	30.121	74.0	80.0	83.4	81.8	89.3	81.0	82.98	0.000
Sums	898.718	898.035	898.164	1888.9	2035.4	2079.1	1973.2	2181.1	1928.6	1996.94	2.680
Means	29.957	29.934	29.939	62.96	67.85	69.30	65.77	72.70	64.29	66.56	

Barometric means reduced to the freezing point; 8 A.M., 29.864; 2 P.M., 29.831; 8 P.M., 29.830.

Mean temperature for month (mean of 3 means for 8, 2, 8, with double weight given to the morning and evening observations) 66.56 Fahrenheit.
Rainfall for month 2.68 inches.

Highest reading of maximum thermometer during the month (June 28) 88.6 Fahrenheit.
Lowest " " minimum " " " " (June 7) 41.3 " .

Records in parentheses ( ) are those of observations not made at the regular times. On June 24, the psychrometer, No. 41, and C. 3235, were read at 8¼ instead of at 8 P.M.

*June 22, 6 P.M.; 0.872 inches of rain since 8 A.M.; June 23, 8 A.M., 0.044 inches; total 0.916.

Observer A. Searle, except June 26, 8 P.M.: then W. Upton.

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of Harvard College Observatory.

June 1878.

Date	Psychrometer: Dry bulb 8 A.M.	Dry bulb 2 P.M.	Dry bulb 8 P.M.	Wet bulb 8 A.M.	Wet bulb 2 P.M.	Wet bulb 8 P.M.	Relative humidity Guyot's Tables 8 A.M.	2 P.M.	8 P.M.	C. 3235 (wet) 8 A.M.	2 P.M.	8 P.M.	Relative humidity from No. 4 and C. 3235, Guyot's Tables 8 A.M.	2 P.M.	8 P.M.
1	60.0	60.7	53.9	50.7	51.9	48.9	47	51	67	51.8	52.9	50.0	49	53	70
2	61.2	64.9	56.7	57.3	59.8	56.0	77	72	95	57.8	60.9	57.0	78	76	95
3	58.8	68.5	59.7	57.7	64.2	58.6	93	77	93	58.2	64.9	59.3	92	77	91
4	65.8	79.3	68.4	62.9	68.2	64.2	83	53	77	63.4	68.9	65.2	83	55	78
5	69.4	77.6	60.4	64.1	63.6	53.8	73	42	62	64.7	64.2	55.0	73	45	64
6	53.7	63.6	56.5	46.0	49.4	45.8	50	28	36	46.6	50.3	47.3	45	30	40
7	54.9	68.8	57.2	45.9	53.4	49.2	44	28	51	46.6	54.9	50.7	39	33	56
8	62.3	68.2	58.1	53.6	59.4	57.6	52	56	96	54.9	60.6	58.3	52	55	94
9	55.3	62.9	56.9	54.0	57.8	52.5	90	71	72	54.7	58.3	53.9	90	72	76
10	54.0	51.6	52.3	52.0	50.0	48.8	86	88	76	53.0	50.8	49.7	86	89	76
11	51.2	56.5	51.8	49.1	51.2	50.6	84	66	91	50.0	52.1	52.1	87	67	93
12	60.4	63.4	55.0	54.8	60.8	55.2	67	85	100	55.0	61.1	56.0	59	84	100
13	61.5	64.6	61.3	56.9	57.0	58.2	73	59	81	57.0	58.0	59.0	64	60	83
14	63.0	70.8	62.2	57.8	60.3	57.3	70	50	72	58.2	61.6	59.2	63	54	77
15	65.0	79.1	62.1	60.4	69.0	59.3	74	57	83	60.4	70.3	60.8	65	58	84
16	69.0	79.4	67.7	63.5	66.2	61.3	71	46	66	63.2	67.0	62.7	59	46	68
17	63.0	73.8	67.5	59.7	68.5	65.6	81	74	89	60.6	68.9	66.3	81	73	90
18	65.4	68.3	61.9	60.7	63.3	60.0	74	73	88	61.3	63.7	61.5	75	68	90
19	66.6	75.4	64.9	60.0	61.3	58.4	65	39	65	60.3	63.0	59.9	60	45	67
20	68.7	76.4	69.2	59.5	60.6	60.5	54	35	57	60.1	62.1	63.0	53	38	65
21	72.2	83.3	67.0	64.3	68.1	57.5	62	42	51	65.0	69.3	59.3	61	44	57
22	67.2	61.5	61.2	61.7	59.5	60.8	70	87	97	62.5	60.0	61.4	72	87	97
23	69.2	77.6	69.4	67.6	70.1	66.4	91	66	83	67.9	70.7	68.2	88	68	91
24	69.4	74.9	(66.6)	64.0	65.6	(64.0)	72	58	(85)	64.0	66.6	(65.0)	62	58	(87)
25	67.9	74.4	67.3	64.5	60.1	56.8	80	38	47	64.6	60.8	58.0	77	39	51
26	69.8	72.9	66.8	51.7	56.5	55.6	54	29	44	52.1	57.4	58.0	50	31	51
27	70.0	87.8	76.5	62.7	73.1	66.5	64	46	55	62.9	73.7	67.2	54	47	56
28	76.0	82.7	74.7	69.0	70.7	66.8	68	52	63	69.0	71.7	68.3	62	53	68
29	76.4	82.9	74.3	70.5	69.7	68.4	73	48	72	70.8	71.0	70.0	69	52	77
30	79.8	88.6	79.8	73.9	75.5	74.0	74	52	74	73.9	76.7	75.4	68	56	77
Sums	1937.1°	2160.4°	1907.3°				2116	1668	2188				2016	1713	2269
Means	64.57	72.01	63.58				70.5	56.	73				67	57	76

For tables used in reductions preliminary to computation of relative humidity see general remarks on observations of 1877; data below collected to test these tables.

Date	Excess of relative humidity shown by No. 4 and C. 3235 over that shown by psychrometer: 8 A.M.	2 P.M.	8 P.M.	No. 4 above dry bulb of psychrometer: 8 A.M.	2 P.M.	8 P.M.	Theoretical excess of No. 4 over dry bulb of psychrometer, by tables used in computing relative humidity: 8 A.M.	2 P.M.	8 P.M.
1	+ 21	+ 24	+ 30	+ 0.5	+ 0.3	+ 0.6	+ 0.3	+ 0.3	+ 0.3
2	+ 11	+ 24	+ 27	+ 0.1	+ 0.3	+ 0.8	+ 0.3	+ 0.4	+ 0.3
3	0	+ 23	+ 24	+ 0.4	+ 0.7	+ 0.8	+ 0.3	+ 0.5	+ 0.3
4	− 05	+ 25	+ 25	+ 0.6	+ 0.6	+ 0.8	+ 0.3	+ 0.6	+ 0.3
5	0	+ 11	+ 24	+ 1.3	+ 0.2	+ 0.5	+ 0.3	+ 0.3	+ 0.3
6	0	+ 11	+ 24	+ 1.6	+ 0.2	+ 0.5	+ 0.3	+ 0.5	+ 0.3
7	0	+ 11	+ 24	+ 1.2	+ 1.5	+ 0.8	+ 0.3	+ 0.3	+ 0.3
8	0	+ 11	+ 24	+ 0.8	+ 0.1	+ 0.6	+ 0.3	+ 0.3	+ 0.3
9	0	+ 11	+ 24	+ 0.3	+ 0.4	+ 1.0	+ 0.3	+ 0.3	+ 0.3
10	+ 03	+ 11	+ 24	+ 1.8	+ 0.6	+ 0.4	+ 0.3	+ 0.3	+ 0.3
11	+ 08	+ 11	+ 24	+ 1.5	+ 0.3	+ 0.3	+ 0.3	+ 0.4	+ 0.3
12	+ 09	+ 11	+ 24	+ 2.0	+ 0.8	+ 0.8	+ 0.4	+ 0.5	+ 0.3
13	+ 07	+ 11	+ 24	+ 2.0	+ 0.3	+ 1.2	+ 0.5	+ 0.6	+ 0.3
14	+ 12	+ 11	+ 24	+ 2.7	+ 1.4	+ 1.5	+ 0.5	+ 0.5	+ 0.3
15	0	+ 11	+ 24	+ 0.3	+ 1.1	+ 1.0	+ 0.5	+ 0.5	+ 0.3
16	+ 15	+ 11	+ 24	+ 1.5	+ 0.9	+ 0.7	+ 0.5	+ 0.5	+ 0.3
17	+ 11	+ 11	+ 24	+ 0.9	+ 1.6	+ 0.7	+ 0.5	+ 0.5	+ 0.3
18	+ 13	+ 11	+ 24	+ 1.6	+ 0.5	+ 0.4	+ 0.5	+ 0.5	+ 0.3
19	+ 10	+ 11	+ 24	+ 0.8	+ 1.1	+ 0.7	+ 0.5	+ 0.5	+ 0.3
20	+ 04	+ 11	+ 24	+ 2.3	+ 0.6	+ 0.4	+ 0.5	+ 0.5	+ 0.3
21	+ 04	+ 11	+ 24	+ 0.9	+ 1.2	+ 0.8	+ 0.5	+ 0.5	+ 0.3
22	+ 03	+ 11	+ 24	+ 1.3	+ 2.0	+ 0.5	+ 0.5	+ 0.5	+ 0.3
23	+ 10	+ 11	+ 24	+ 2.0	+ 1.6	+ 0.7	+ 0.5	+ 0.5	+ 0.3
24	+ 03	+ 11	+ 24	+ 1.6	+ 2.0	+ 1.2	+ 0.5	+ 0.5	+ 0.3
25	+ 04	+ 11	+ 24	+ 2.0	+ 1.6	+ 0.7	+ 0.5	+ 0.5	+ 0.3
26	+ 06	+ 11	+ 24	+ 1.6	+ 2.0	+ 1.2	+ 0.5	+ 0.5	+ 0.3
27	+ 10	+ 11	+ 24	+ 2.0	+ 1.6	+ 0.7	+ 0.5	+ 0.5	+ 0.3
28	+ 06	+ 11	+ 24	+ 1.6	+ 2.0	+ 1.2	+ 0.5	+ 0.5	+ 0.3
29	+ 04	+ 11	+ 24	+ 2.0	+ 1.6	+ 0.7	+ 0.5	+ 0.5	+ 0.3
30	+ 06	+ 11	+ 24	+ 1.6	+ 2.0	+ 1.2	+ 0.5	+ 0.5	+ 0.3
Means	− 3.3	+ 1.6	+ 2.8	+ 1.20	+ 0.69	+ 0.71	+ 0.42	+ 0.53	+ 0.40

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Meteorological Record

June, 1878.

Date	Estimated Wind velocity in miles per hour, and direction (of approach)			Amount on scale of 10, and Clouds: kind (on Bëy's system). For explanations, see note on page 4.		
	8 A.M.	2 P.M.	8 P.M.	8 A.M.	2 P.M.	8 P.M.
1	7 E	7 E	2 E	1 Pm Fm	1 R Fm	0 Rs Fm
2	5 E N E	5 E	0 calm	5 P Fm / haze	10 Pm M Fm	10 Pm fog
3	1 N E	5 E	0 calm	10 Pm fog	5 Pe Rs M Fm | R	1 P Rs
4	2 S S W	5 S W	5 S S W	9 Pm Fm haze	5 M Fm /	10 P Rs Fm
5	2 S W	8 W N W	7 W N W	10 P Fm	3 Rs M Fm	1 Pm Fm Rs
6	8 W N W	9 N W	2 W N W	0 Fm	0	0 Rs
7	6 N W	5 W S W	5 S W	0 Rs Fm	0 Rs	10 P
8	5 S W	6 S	6 S E	9 Pm Fm	10 Pm Fm /	10 Pm Fm // ; raining
9	4 N	3 N W	2 N W	10 Pm Fm |	10 Pm Fm >	0 Rs Fm
10	5 E	5 E	5 N E	10 Pm Fm ← ; raining	10 Pm Fm / ; raining	10 Pm
11	6 N	9 N E	1 S E	10 Pm Fm |	10 Pm M Fm |	10 Pm Fm
12	3 W	1 S W	0 calm	4 P Fm Rs	10 Pm M Fm	10 Pm Fm ; raining
13	4 N W	4 N E	2 S W	4 Pe Pm Fm — haze	10 Pm M Fm | ; a little rain	9 Pm M Fm |
14	2 N	5 E	0 calm	0 haze	2 M Fm	0 Rs haze /
15	4 S W	6 S	3 S	1 haze	8 M Fm → haze	0 Rs Fm haze
16	5 S S W	6 S W	3 S W	5 Pe Rs Fm haze	10 P M Fm	8 Pm Fm
17	3 S W	5 S W	5 S S W	10 Pm Fm → ; a few drops rain	9 Pm M Fm /	10 Pm Fm → M
18	3 S W	1 S W	0 S W	10 Pm Fm →	10 Pm Fm /	10 P Fm
19	4 N W	3 N E	0 N E	0 haze	0 Fm haze	1 P Rs haze /
20	6 N	4 E	2 S E	0 haze	0 haze	1 P Rs Fm haze
21	2 S E	7 S	6 S	8 P haze	9 P haze Fm	10 P
22	5 E	4 E	6 E	6 R Pm Rs Fm	10 P ; raining	10 P fog
23	3 S	6 E	0 calm	10 Pm M Fm |	5 M Fm /	10 Pm Fm |
24	4 S W	7 S W	4 S W	1 P Rs Fm	9 Pm M Fm —	3 Pm M Fm
25	6 W	8 W N W	1 W N W	8 Pm Fm →	5 M Fm haze	0 Rs
26	7 N W	6 N W	0 W N W	2 Rs haze /	1 P Rs Fm	1 Rs Pm (in horizon)
27	1 W	9 S W	7 W S W	4 Pm Fm haze	5 P Fm haze	10 Pm Fm /
28	5 W N W	5 N W	0 E	0 P Rs	10 Pm Mc Fm —	6 Pm M Fm |
29	4 N	2 E	0 calm	0 haze /	0 M Fm haze	0 P Rs
30	1 E	6 E	3 S E	1 Rs Fm haze	3 M Rs Fm	0 Pm Fm Rs
Sums	123	162	77	148	180	161
Means	4.1	5.4	2.6	4.9	6.0	5.4

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June 1878.

Date	Extreme temperatures						Remarks.	
	Maximum, 8 A.M.		Minimum, 8 A.M.					
	Before setting	After setting	Before setting	After setting				
1	59.5	59.5	48.8	59.2				Seeing 7, 4, 6.
2	62.4	61.3	44.7	60.5				
3	67.0	59.2	55.2	58.6				Seeing 6, 6, 6.
4	72.2	65.0	56.3	64.9				Seeing 5, 6, 7.
5	80.5	68.6	59.8	68.4				Seeing 6, 6, 7.
6	78.8	54.0	46.9	52.9				Seeing 7, 7, 7.
7	64.6	54.7	41.3	53.9				Seeing 3, 6, 7.
8	69.7	61.8	48.6	61.7			Rain after 2½ P.M.	
9	73.6	55.8	54.2	55.0			A few drops of rain about 12½ P.M.	Seeing 5, 7, 6.
10	64.2	54.4	47.1	54.0			Rain at times.	
11	55.0	51.9	47.8	50.7			A few drops of rain. Fragment of lunar halo 9½ to 10 P.M.	
12	59.3	59.3	46.2	59.0			Shower about 1 P.M., with some thunder. Other showers after 6 P.M.	Seeing 7, 5, 6.
13	70.8	59.3	48.3	60.2			Slight shower about 2 P.M.	Seeing 4, 5, 6.
14	70.2	62.0	49.8	62.0				Seeing 5, 5, 5.
15	71.7	63.6	51.2	63.5				Seeing 5, 4, 3.
16	80.3	67.4	53.3	67.2				Seeing 4, 6, 7.
17	81.0	63.2	60.0	62.9			Showers in the forenoon.	
18	74.6	65.1	60.2	64.4				Seeing 4, 5, 6.
19	70.7	65.8	54.8	65.7				Seeing 5, 3, 3.
20	77.0	67.8	55.2	67.7				Seeing 4, 6, 4.
21	78.8	71.0	57.2	71.0				
22	84.0	67.2	54.7	66.8			Showers after noon, some of them heavy.	
23	70.3	67.5	58.6	67.8			Slight showers after noon.	Seeing 4, 6, 5.
24	78.6	68.3	57.2	67.9			Slight showers after noon.	Seeing 6, 8, 7.
25	77.1	67.2	59.8	66.8			Slight shower early.	Seeing 8, 7, 2.
26	76.0	59.9	52.9	59.0				Seeing 8, 5, 7.
27	74.7	68.8	52.8	68.5			A little rain in the evening; also lightning without thunder.	
28	88.6	75.4	64.0	75.1				
29	83.8	75.7	64.6	75.5				Seeing 8, 7, 6.
30	83.3	78.6	66.6	78.6				Seeing 6, 7, 7.
	2198.3		1618.1					
	73.28		53.94					

June 3, 9½ to 10 P.M.; aurora strongly suspected among clouds in the north and northeast; much light and some slight appearance of streamers; but the moon had not set.

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Meteorological Record of

July 1878.

Date.	Barometer.			Thermometer attached to Barometer			External Thermometer No 4.				Rain fall in inches gauge examined at 8 A.M.
	8. A.M.	2. P.M.	8. P.M.	8 A.M.	2 P.M.	8 P.M.	8 A.M.	2 P.M.	8 P.M.	mean half night to 2 P.M.	
1.	30.166	30.087	30.062	76.8	82.9	84.4	83.0	95.4	80.6	84.52	0.000
2.	30.062	30.044	30.053	77.3	83.8	85.2	83.2	94.0	83.2	85.36	0.000
3.	30.096	30.095	30.109	78.8	84.2	86.3	84.7	94.5	83.1	86.02	0.000
4.	30.171	30.162	30.094	79.3	82.2	81.3	77.2	79.0	73.3	76.00	0.000
5.	29.945	29.882	29.908	76.8	83.5	83.4	80.3	89.3	76.3	80.50	0.000
6.	30.003	29.964	30.026	72.5	75.7	76.6	71.7	72.9	65.2	69.34	0.000
7.	30.061	(30.002)	29.974	68.6	(74.8)	78.0	68.5	(84.0)	74.3	73.92	0.000
8.	29.998	29.980	(29.979)	73.2	80.9	(83.3)	79.3	93.8	(79.8)	82.40	0.000
9.	29.972	29.944	29.984	78.2	83.7	82.0	78.5	92.0	73.7	79.28	0.000
10.	30.001	29.935	29.978	77.0	82.0	80.5	81.6	90.1	72.0	79.46	†2.217
11.	30.185	30.202	30.211	75.4	79.8	80.1	74.5	79.6	73.3	74.84	0.221
12.	30.275	30.214	30.116	75.2	78.7	78.2	71.9	77.0	70.6	72.40	0.375
13.	30.052	30.048	30.028	74.0	78.8	76.8	65.4	73.6	66.4	67.44	0.022
14.	29.967	29.854	29.838	70.6	76.5	78.8	70.2	84.8	77.6	76.08	0.000
15.	29.944	30.043	30.102	75.0	77.0	73.2	72.7	65.0	61.4	66.64	0.022
16.	30.167	30.127	30.102	68.0	73.4	74.4	64.7	72.1	66.9	67.06	0.000
17.	30.064	29.949	29.846	69.1	73.8	74.8	68.5	76.4	73.2	71.96	0.000
18.	29.803	29.807	29.854	74.0	80.7	82.8	81.1	91.6	83.5	84.16	0.055
19.	29.839	29.810	29.887	78.7	82.9	86.7	82.5	91.6	82.0	84.22	0.000
20.	30.004	29.992	29.966	77.0	81.0	79.2	74.8	78.1	68.6	72.98	0.000
21.	(29.784)	29.620	29.560	(75.7)	77.5	77.3	(71.2)	82.9	68.5	72.46	(0.000)
22.	29.488	29.511	29.614	72.5	75.0	74.3	71.5	75.0	67.7	70.68	0.528
23.	29.844	29.921	29.998	66.8	71.0	74.9	65.0	74.7	70.7	69.22	0.000
24.	30.080	30.029	30.014	68.9	75.2	78.7	69.7	84.3	78.6	74.18	0.000
25.	29.965	29.862	29.884	71.2	77.4	79.3	71.9	86.2	76.7	76.68	0.000
26.	29.882	29.820	29.778	73.9	77.0	78.0	72.2	84.4	74.0	75.36	0.000
27.	29.650	29.732	29.838	74.7	77.5	79.8	72.3	83.1	76.2	76.02	0.121
28	30.044	30.088	30.123	73.6	77.4	79.5	72.0	80.4	74.2	74.56	0.022
29.	30.180	30.150	30.130	71.8	77.0	78.6	68.7	74.7	72.2	71.30	0.000
30.	30.118	30.055	30.044	73.6	72.0	70.0	64.4	61.1	59.5	61.78	0.232
31.	30.021	30.025	30.026	66.9	67.6	68.6	59.0	64.1	59.9	60.38	1.004
Sums	929.791	928.949	929.111	2285.1	2417.9	2444.5	2272.2	2525.7	2258.2	2317.20	4.817
Means	29.996	29.973	29.971	73.7	78.0	78.9	73.29	81.47	72.84	74.75	

Barometric means reduced to the freezing point: 8 A.M., 29.875; 2 P.M., 29.810; 8 P.M., 29.836.

Mean temperature for month (mean of 3 means for 8, 2, 8, with double weight given to the morning and evening observations) 74.75 Fahrenheit.

Rainfall for month 4.82 inches.

Highest reading of maximum thermometer during the month (July 2) 94.8 Fahrenheit.

Lowest " " minimum " " " " (July 7) 52.6 "

Records in parentheses ( ) are those of observations not made at the regular times. On July 7, the midday observations were made at 2½ P.M.; on July 8, the evening observations at 8¼ P.M.; on July 21, the morning observations at 8⅛ A.M.

*July 6, 8 P.M. Wet bulb of psychrometer and C. 3235 wetted 20 minutes before observation; both evidently wet when observed.

†July 9, 5½ P.M. Rainfall since 8 A.M. 2.217 inches; none additional up to 8 A.M. July 10.

Observers: F. Waldo 8 P.M. July 20 to 2 P.M. July 23 both inclusive;
A. Searle at other times.

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Harvard College Observatory

July 1878.

Psychrometer

Date	Extreme Temperatures Dry bulb. 8. A.M.	2. P.M.	8. P.M.	Extreme Temperatures wet bulb. 8. A.M.	2. P.M.	8. P.M.	Relative humidity Guyots Tables 8. A.M.	2 P.M.	8. P.M.	C. 3235 (web. 8. A.M.	2. P.M.	8. P.M.	Relative humidity from No. 4 and C 3235 Guyots Tables. 8 A.M.	2. P.M.	8. P.M.	
1.	81.0	94.2	79.3	74.1	75.7	74.0	70	39	76	74.3	77.5	75.2	65	43	77	1
2.	81.8	92.8	82.3	74.8	75.6	75.8	69	42	70	74.5	76.8	77.0	65	48	79	
3.	82.6	93.8	82.3	74.0	75.3	74.7	64	39	68	74.3	76.7	75.5	59	43	69	3
4.	76.6	78.4	72.3	68.2	69.3	68.0	62	60	78	68.8	70.7	69.0	63	65	79	
5.	79.4	88.7	75.9	68.8	70.3	60.0	55	36	34	68.9	70.8	61.0	53	38	33	5
6.	69.9	72.3	64.3	61.1	57.4	*56.2	57	34	*57	61.6	59.0	*59.0	53	37	*64	
7.	67.0	(82.9)	73.4	61.5	(65.6)	66.0	70	(35)	65	61.9	(66.8)	67.9	65	(36)	69	7
8.	78.0	92.7	(78.9)	67.9	74.7	(72.7)	57	40	(72)	68.5	75.6	(73.7)	55	42	(74)	
9.	77.6	91.2	73.7	72.3	78.5	72.7	75	55	94	72.8	79.0	73.2	75	56	97	9
10.	79.9	89.5	71.1	75.4	78.9	69.0	80	60	88	75.5	79.6	69.8	75	64	89	
11.	73.5	78.9	72.5	66.0	67.8	66.4	64	51	70	67.1	68.5	67.5	65	54	71	
12.	71.2	75.2	69.7	63.2	67.0	66.2	61	62	81	64.1	69.0	67.2	62	65	82	
13.	65.0	72.9	65.5	63.8	66.7	62.9	92	70	85	64.3	67.8	64.6	93	72	89	13
14.	69.6	84.4	76.7	66.7	69.8	71.4	84	44	75	67.0	70.2	72.2	83	46	76	
15.	72.0	64.5	60.9	67.3	57.8	57.2	76	63	77	67.8	58.9	58.9	75	66	83	
16.	64.0	71.8	65.9	60.5	62.8	62.1	80	57	79	61.0	64.0	63.1	79	60	78	
17.	67.4	75.4	72.7	63.5	70.3	69.2	79	76	82	64.0	71.0	69.8	76	72	83	17
18.	80.2	90.5	82.8	76.6	77.0	72.3	84	52	54	77.0	77.8	73.6	84	53	61	
19.	81.5	90.8	81.1	74.9	76.7	70.2	71	50	55	76.0	77.8	71.5	74	54	58	
20	74.4	77.1	68.3	66.9	69.2	65.6	68	64	85	67.4	70.7	66.7	65	68	89	
21	(70.3)	82.8	68.0	(67.8)	74.5	66.4	(84)	65	90	(68.2)	75.1	66.9	(85)	68	90	21
22	71.0	74.3	67.3	64.9	64.3	60.1	69	54	62	65.0	65.1	61.0	67	55	64	
23	64.5	74.1	70.0	57.4	60.2	61.6	61	39	58	58.1	60.6	63.7	61	36	65	
24	69.4	83.5	72.7	62.7	66.1	63.8	66	35	58	63.6	66.9	65.4	68	35	61	
25	71.6	85.6	75.9	64.2	69.8	68.4	64	41	65	64.8	70.6	69.6	65	43	68	25
26	71.6	83.4	73.5	68.1	72.8	68.1	82	58	74	68.8	73.5	69.0	83	58	76	
27	72.0	82.1	75.5	70.6	73.7	69.5	92	65	71	71.0	74.3	70.8	93	65	71	
28	71.7	79.4	74.0	64.4	66.1	61.0	65	45	43	65.0	67.0	63.2	65	46	51	
29	68.4	74.3	71.3	64.3	64.5	66.4	78	55	75	64.8	65.5	68.6	79	58	82	29
30	63.4	60.6	59.0	63.5	60.4	58.3	1.00	98	95	64.0	60.9	59.0	96	97	95	
31	58.8	63.5	59.4	57.8	59.4	57.5	94	77	89	58.2	60.0	58.3	94	76	88	
Sums	22448	25016	22362				2273	1661	2225				2240	1714	2311	
Means	72.41	80.70	72.14				73	54	72				72	55	75	

For tables used in reductions preliminary to computation of relative humidity see general remarks on observations of 1877; data below collected to test these tables.

Date.	Excess of relative humidity shown by No. 4 and C 3235 over that shown by Psychrometer. 8. A.M.	2. P.M.	8. P.M.	No. 4. above dry bulb of Psychrometer. 8. A.M.	2. P.M.	8. P.M.	Theoretical excess of No. 4 over dry bulb of Psychrometer, by tables used in computing relative humidity. 8. A.M.	2. P.M.	8. P.M.
1	− 5.	+ 4	+ 1	+ 2.0	+ 1.2	+ 1.3	+ 0.7	+ 1.2	+ 0.6
2	− 4.	+ 1	+ 1	+ 1.9	+ 1.2	+ 0.9	+ 0.7	+ 1.2	+ 0.7
3	− 5	+ 4	+ 1	+ 2.1	+ 0.7	+ 0.8	+ 0.7	+ 1.2	+ 0.7
4	− 1	+ 5	+ 1	+ 1.9	+ 0.6	+ 1.0	+ 0.5	+ 0.6	+ 0.5
5	− 2	+ 2	− 1	+ 0.9	+ 0.6	+ 0.4	+ 0.6	+ 1.2	+ 0.5
6	− 4	+ 3	+ 4	+ 1.8	+ 0.6	+ 0.9	+ 0.5	+ 0.5	+ 0.5
7	− 5	(+ 1	(+ 2	+ 1.5	(+ 1.1	+ 0.9	+ 0.5	(+ 0.7)	+ 0.5
8	− 2	+ 2)	+ 2)	+ 1.3	+ 1.1	(+ 0.9)	+ 0.6	+ 1.2	(+ 0.2)
9	− 0	+ 1	+ 3	+ 0.9	+ 0.8	+ 0.0	+ 0.6	+ 1.2	+ 0.5
10	− 5	+ 4	+ 1	+ 1.7	+ 0.6	+ 0.9	+ 0.7	+ 1.2	+ 0.5
11	+ 1	+ 3	+ 1	+ 1.0	+ 0.7	+ 0.8	+ 0.5	+ 0.6	+ 0.5
12	+ 1	+ 2	+ 1	+ 0.7	+ 1.8	+ 0.9	+ 0.5	+ 0.5	+ 0.5
13	− 1	+ 2	+ 4	+ 0.4	+ 0.7	+ 0.9	+ 0.5	+ 0.5	+ 0.5
14	− 1	+ 3	+ 5	+ 0.6	+ 0.4	+ 0.9	+ 0.5	+ 0.7	+ 0.6
15	− 1	+ 4	− 1	+ 0.7	+ 0.5	+ 0.5	+ 0.5	+ 0.5	+ 0.3
16	− 3	− 1	+ 1	+ 0.7	+ 0.3	+ 1.0	+ 0.3	+ 0.5	+ 0.4
17	+ 0	+ 4	+ 3	+ 1.1	+ 1.0	+ 0.5	+ 0.5	+ 0.5	+ 0.5
18	+ 3	+ 1	+ 1	+ 0.9	+ 1.8	+ 0.7	+ 0.7	+ 1.2	+ 0.7
19	− 3	+ 4	+ 4	+ 1.0	+ 0.8	+ 0.3	+ 0.4	+ 1.2	+ 0.7
20	+ 3	+ 3	+ 4	+ 0.4	+ 1.0	+ 0.3	+ 0.5	+ 0.6	+ 0.5
21	(− 1	+ 1	+ 0	(+ 0.9)	+ 0.1	+ 1.2	(+ 0.5)	+ 0.7	+ 0.5
22	+ 2	+ 3	+ 3	+ 0.5	+ 0.7	+ 0.4	+ 0.5	+ 0.5	+ 0.5
23	+ 2	+ 1	+ 2	+ 0.3	+ 0.6	+ 0.7	+ 0.5	+ 0.5	+ 0.5
24	+ 2	+ 1	+ 3	+ 0.3	+ 0.8	+ 0.9	+ 0.5	+ 0.5	+ 0.5
25	+ 1	+ 2	+ 2	+ 0.6	+ 0.6	+ 0.8	+ 0.5	+ 0.7	+ 0.5
26	+ 1	+ 2	+ 0	+ 0.6	+ 1.0	+ 0.5	+ 0.5	+ 0.7	+ 0.5
27	+ 0	+ 1	+ 1	+ 0.3	+ 1.0	+ 0.7	+ 0.5	+ 0.7	+ 0.5
28	+ 1	+ 1	+ 0	+ 0.3	+ 1.0	+ 0.2	+ 0.5	+ 0.6	+ 0.5
29	− 4	+ 1	+ 1	+ 1.0	+ 0.4	+ 0.9	+ 0.5	+ 0.5	+ 0.5
30	+ 0	− 1	− 1	+ 0.2	+ 0.5	+ 0.5	+ 0.3	+ 0.5	+ 0.3
31					+ 0.6	+ 0.5	+ 0.3	+ 0.3	+ 0.3
	+1.0	+1.7	+2.4	+0.92	+0.78	+0.72	+0.53	+0.74	+0.52

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Meteorological Record

July 1878.

Date	Estimated mixed velocity in miles per hour, and direction (of apparent) 8. A. M.	2. P. M.	8. P. M.	Amount on scale of 10, and kind of clouds (on Poëy's system). For explanations see note on Page 4. 8. A. M.	2. P. M.	8. P. M.
1	0 S.W.	3 S.	2 S.	0 Fm haze	5 Pm M Fm haze	2 P. Fm haze.
2	3 S.W.	2 S.W.	2 S.W.	1 P Fm haze	8 M Fm	7 Pm Fm \
3	2 S.W.	3 S.W.	4 S.W.	0 Fm haze.	1 M. Fm haze	1 P M. Fm.
4	7 N.E.	4 S.E.	0 Calm	4 P Rs Fm haze	9 P haze Fm.	10 P Fm
5	2 N.W.	11 N.W.	9 N.N.W.	1 P Rs Fm	5 PM Fm \ haze	1 P Fm
6	1 N.W.	7 E	0 S.E.	4 haze.	6 haze	3 P Fm haze.
7	4 S.W.	(5 S.W.)	4. S.W.	5 haze	(6 haze)	7 P Fm \
8	2 S.W.	6 S.W.	(2. S.W.)	2 haze	5 P. Fm haze	(4 Pm Fm.)
9	7 S.W.	7. S.W.	6. S.S.W.	8 Pm Fm →	8 Pm M Fm →	9 Pm Fm →
10	5 S.W.	6 SS.W.	6. S.W.	5 Pm Fm → Rs.	8 Pm M. Fm → Rm Rs.	3 Pm M. Fm →
11	1 N.	6 S.E.	7 S.S.W.	7 Pm Fm →	4 Pm M Fm \	10 Pm Fm \
12	3 E N E	1 S E	1 S	4 Pm Fm haze.	10 P Fm haze	10 Pm Fm
13	3 E N E	4 E S E	0 S E	10 Pm fog.	5 Pm M Fm /	0 P Rs haze.
14	6 S W	8 W S W	3 S W	9 Pm Fm /	0 M. Fm	9 Pm Fm \
15	6 N E	7 E	4 E S E	9 Pm Fm /	9 P Fm →	5 P Fm \
16	1 S E	3 S E	5 S	5 Rs M Fm	9 P Rm \	8 P Fm
17	7 S S W	4 S W	7 S W	8 P Fm → haze.	10 P a little rain.	10 P Rs Fm Fm /
18	2 W.	9 N W	0 Calm	4 P Rs haze	6 Pm M Fm → Rs.	10 Pm Fm →
19	0 S.W.	3 W.	4 N	00 Pm Fm →	3 M Fm → Rs	2 Pm Fm Rs M.
20	4 N	4 E	1 E	6 Pr Rm Rs Fm R →	5 Pm Rm Fm M Rs →	3 Rm Pm M Fm \
21	(3 S E. gusts)	4 S	4 W S W	(10 Pm Fm /)	5 M R Rs Fm P /	3 Pm M Fm P →
22	3 W S W	4 W N W	6 W N W	1 Fm M	9 Fm M Pm →	3 M Fm →
23	12 N W.	5 N W	0 N W	8 Pm M \	4 M Fm P /	1 P Rs Fm
24	0 W	6 W S W	0 W S W	5 haze	5 haze M Fm	1 P Fm
25	2 S W	7 S W	6 S W	5 P Rs Fm haze	4 M Fm haze	10 P Fm
26	5 S W	12 S S W	9 S S W	10 Pm Fm	9 Pm M Fm → haze	10 P.
27	6 S W	3 W	1 W S W	10 Pm Fm / slight rain	8 Pm M Fm Rs /	10 P M Fm Rs.
28	6. N W	2 N W	0 Calm.	0	3 M Fm →	9 Pm M Fm /
29	1 N N E	5 E	2 S E	3 M Fm → Rs haze.	5 P M haze Fm	10 P.
30	4 E	7 S E	3 E	10 Pm raining	10 Pm Fm \ raining	10 Pm.
31	5 N E	4 N E	0 Calm	10 Pm	10 Pm M Fm /	1 Pm Fm
Sums	113	162	98	164	189	182
Means	3.6	5.2	3.2	5.3	6.1	5.9

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of Harvard College Observatory.

July 1878.

Date	Extreme temperatures. Maximum 8 A.M.		Minimum 8 A.M.		Remarks.	
	Before setting	After setting	Before setting	after setting		
1	91.0	80.0	68.9	79.9		Seeing 7, 5, 6.
2	94.8	80.2	68.2	80.0		Seeing 6, 5, 6.
3.	94.0	81.9	70.0	81.5		Seeing 7, 6, 7.
4.	93.8	76.4	71.5	76.0		Seeing 7, 4, 6.
5.	80.3	76.5	69.0	77.2		Seeing 7, 6, 5.
6.	89.4	69.5	57.0	68.7		Seeing 5, 4, 4.
7.	77.9	66.6	52.6	66.0		
8	83.2	77.0	66.0	77.1		Seeing 5, 5, 5.
9.	93.8	77.8	73.8	77.2	Heavy thunder shower 3½ to 4¼ P.M.	Seeing 5, 7, 7.
10.	91.4	78.0	70.6	78.8	Shower with a little thunder, beginning 5 1/12 P.M.	Seeing 6, 8, 6.
11.	90.1	73.2	65.3	72.9	Rain in the evening.	
12.	82.9	70.0	65.5	70.9	Slight showers after 3 P.M.	
13.	78.3	66.4	64.3	64.9		Seeing 5, 4, 4.
14.	74.2	69.3	59.5	68.7	A little rain in the evening.	
15	84.6	72.0	66.9	71.4		Seeing 4, 5, 5.
16.	72.1	64.5	53.0	63.3		Seeing 3, 6, 6.
17.	75.3	67.8	61.2	67.0		Seeing 3, 7, 7.
18.	79.7	79.7	67.0	79.4		
19.	91.4	81.0	74.2	80.8		Seeing 7, 6, 6.
20.	91.8	74.3	66.1	73.3		Seeing 2, 5, 5.
21	(82.9)	(74.7)	(67.1)	(70.5)		Seeing 8, 5, 2.
22	82.5	78.3	64.3	70.5		Seeing 8, 5, 5.
23	71.7	68.4	58.6	64.1		Seeing 7, 6, 6.
24	77.0	69.0	58.7	68.2		Seeing 8, 8, 8.
25	83.4	71.0	60.5	70.4		
26	85.3	71.8	67.8	71.0		
27	84.0	72.0	69.1	71.2		
28	84.0	71.7	63.2	70.9		
29	80.0	68.5	58.4	67.8		
30	77.2	64.0	63.9	63.9		
31	64.0	59.0	57.3	58.2		
Sums	2582.0		1999.5			
Means	83.29		64.50			

July 9, 3½ to 4¼ P.M. Heavy thunder shower. Some rain before (as early as 2½ P.M.), and some later. Lightning seen only as a glare in clouds, thunder nearly continuous, so that flashes and claps could seldom be connected. Following times noted.

Lightning		Thunder		
3h	53m 12s	3h	53m 14s	by clock B. 394.
	54 52		54 59	
	56 26		56 31	
	58 41		58 54	
4	5 24	4	5 30	
	6 42		6 44	

Observations rough.

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Meteorological Record of

August 1878.

Date.	Barometer.			Thermometer attached to Barometer.			External Thermometer. No. 4.				Rain fall in inches. gauge examined at 8 A.M.
	8 A.M.	2 P.M.	8 P.M.	8 A.M.	2 P.M.	8 P.M.	8 A.M.	2 P.M.	8 P.M.	Mean half right to 2 P.M.	
1.	30.010	29.963	29.901	66.4	68.5	69.8	63.8	69.2	67.6	66.40	0.000
2.	29.740	29.700	29.698	68.6	72.8	73.2	68.0	70.2	66.3	67.76	0.011
3.	29.750	29.738	29.798	69.1	74.4	77.7	65.5	83.8	70.8	71.28	0.298
4.	29.884	29.912	29.899	72.0	76.3	74.4	72.5	73.1	65.2	69.70	0.000
5.	29.992	29.949	29.970	69.5	75.1	78.1	69.6	83.5	73.2	73.82	0.463
6.	29.896	29.790	29.751	73.5	76.0	74.9	66.7	70.8	65.6	67.08	0.000
7.	29.705	29.684	29.772	71.7	76.2	76.5	69.6	81.2	66.4	70.64	1.148
8.	29.821	29.820	29.808	70.0	74.5	77.3	68.6	78.7	72.2	72.06	0.022
9.	29.722	29.653	29.618	72.2	75.2	74.4	71.8	70.7	67.1	69.70	1.390
10.	29.730	29.758	29.774	71.0	76.1	76.4	71.3	79.2	71.5	72.96	*2.097
11.	29.811	29.796	29.827	72.2	76.0	77.1	70.8	79.7	69.8	72.18	0.000
12.	29.926	29.925	29.936	70.8	75.5	77.6	68.2	79.5	71.2	71.66	0.000
13.	29.978	†29.559	(29.982)	70.8	76.0	(77.3)	69.6	83.2	(72.3)	73.40	0.000
14.	30.030	30.048	30.063	70.9	76.4	78.4	69.8	80.2	71.3	72.48	0.005
15.	30.140	30.179	30.202	70.8	70.8	74.4	67.6	73.1	68.4	69.02	0.000
16.	30.264	30.236	30.205	72.7	76.0	73.4	75.5	77.3	74.5	75.46	0.000
17.	30.114	30.080	30.086	74.4	76.2	77.6	73.7	81.6	71.5	74.40	0.221
18.	29.914	29.854	29.837	73.8	78.0	77.0	73.7	80.9	68.3	72.98	0.055
19.	29.750	(29.677)	29.678	69.5	(74.4)	76.0	66.8	(77.8)	71.0	70.68	0.000
20.	29.619	29.598	29.643	69.7	75.4	74.4	68.5	77.1	70.0	70.82	0.000
21.	29.732	29.787	29.894	70.8	74.3	75.3	69.7	75.2	68.8	70.44	0.011
22.	30.059	30.112	30.141	70.9	70.7	70.2	65.1	64.4	59.3	626.4	0.044
23.	30.215	30.212	30.205	64.8	70.5	72.6	58.5	70.3	61.1	61.90	0.022
24.	30.153	(30.038)	29.974	65.2	(71.7)	72.0	60.8	(75.2)	62.4	64.32	0.000
25.	29.668	29.622	29.773	67.8	69.5	69.0	65.2	66.7	62.9	64.58	0.132
26.	29.958	(29.944)	29.947	63.3	(69.5)	72.0	59.7	(71.2)	62.2	63.00	0.287
27.	29.965	29941	29.958	65.2	71.4	72.2	63.2	76.9	65.2	66.74	0.000
28.	29.999	30.019	30.048	67.1	73.0	74.0	64.5	72.0	62.8	65.32	0.000
29.	30.096	(30.070)	(30.070)	68.0	(74.0)	(69.0)	64.3	(71.6)	(62.9)	65.20	0.000
30.	30.091	30.121	30.180	66.4	76.2	76.2	68.1	80.0	69.1	70.88	0.000
31.	30.239	30.229	(30.208)	70.0	76.0	(74.5)	69.0	83.5	(68.0)	71.50	0.000
Sum	927.971	927.014	927.846	2159.1	2299.6	2312.9	2099.7	2357.8	2098.9	2151.00	6.206
Means	29.935	29.904	29.931	69.6	74.2	74.6	67.73	76.06	67.71	69.39	

Barometric means reduced to the freezing point; 8 A.M., 29.826; 2 P.M., 29.783; 8 P.M., 29.808.

Mean temperature for month (mean of 3 means for 8, 2, 8, with double weight given to the morning and evening observations) 69.39 Fahrenheit.
Rainfall for month 6.21 inches.

Highest reading of maximum thermometer during the month (Aug. 6 & 10) 83.6 Fahrenheit.
Lowest " " minimum " " " " (Aug. 23) 49.2 "

Records in parentheses ( ) are those of observations not made at the regular times. The midday observations were made Aug. 19 at 2½ P.M.; Aug. 24 at 3½ P.M.; Aug. 26 and 29, at 2½ P.M.: the evening observations Aug. 13 at 7½ P.M.; Aug. 29, 31 at 10 P.M.

*Aug. 10, 8 A.M. Of the 2.097 inches of rainfall for the preceding 24 hours, 1.909 fell before 7½ P.M.
†Aug. 18, 2 P.M. Barometer observation supposed to be incorrectly read or recorded. The Signal Service observer in Boston on inquiring by telephone Sept. 4, reported that his record showed no great fluctuation of the barometer Aug. 18.
‡Aug. 23, 8 P.M. Wet bulb of psychrometer and C. 32°5 carefully read; wetted 20 minutes before observation, and evidently not when observed.

Observers: W. Upton, 8 P.M. Aug. 28;
F. Waldo, 2 & 7½ P.M. Aug. 13; 2 P.M. Aug 28; all observations of Aug. 29, 30, 31;
A. Searle at other times.

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August 1878.

Date.	Psychrometer. Dry bulb. 8 A.M.	2 P.M.	8 P.M.	Wet bulb. 8 A.M.	2 P.M.	8 P.M.	Relative humidity Guyot's Tables. 8 A.M.	2 P.M.	8 P.M.	C. 3235 (Wet). 8 A.M.	2 P.M.	8 P.M.	Relative humidity from No. 4 and C 3235 Guyot's Tables. 8 A.M.	2 P.M.	8 P.M.	
1.	63.5	68.0	67.0	61.1	65.3	64.9	85	85	87	61.8	65.9	65.8	87	82	89	1
2.	67.5	69.7	65.4	66.5	66.7	64.9	94	84	96	67.0	67.2	66.0	92	84	97	
3.	64.5	83.2	70.0	63.9	74.3	67.7	96	63	87	64.2	75.0	69.2	92	65	92	
4.	72.4	72.2	64.0	68.5	68.2	64.0	80	79	99	69.0	69.6	65.0	83	80	97	
5.	69.3	83.1	72.3	66.8	73.7	70.1	86	62	88	67.1	74.7	71.0	86	65	89	5
6.	66.3	70.5	65.5	65.1	68.2	65.2	92	87	97	65.7	68.5	65.5	94	88	98	
7.	69.3	80.6	65.9	67.0	70.6	63.0	87	60	83	67.4	71.6	64.8	87	61	90	
8.	68.6	77.5	71.2	62.6	65.7	66.5	69	50	76	63.1	66.8	68.8	71	50	83	
9.	70.7	70.0	66.7	68.4	66.6	66.8	87	81	99	68.7	67.2	67.2	85	81	99	9
10.	70.8	78.2	71.3	65.4	68.5	66.2	72	57	73	66.1	69.1	67.0	73	57	77	
11.	70.3	79.0	68.9	65.7	68.5	65.6	76	55	82	66.2	69.2	66.4	76	57	81	
12.	68.3	78.9	70.2	62.2	66.8	65.8	68	50	81	62.7	67.8	67.2	70	51	79	
13.	69.5	82.4	(71.8)	64.6	70.3	(66.9)	74	52	(75)	65.2	71.3	(67.8)	77	54	(77)	13
14.	69.7	79.7	70.6	65.5	68.2	63.6	78	52	65	66.1	69.3	66.0	80	55	73	
15.	66.8	72.2	67.7	64.9	68.4	66.2	88	80	90	65.2	69.2	67.0	86	81	92	
16.	75.1	76.0	73.4	71.4	71.4	73.3	82	78	98	71.8	72.0	74.0	82	76	97	
17.	73.0	81.4	69.6	71.6	74.8	66.1	92	71	81	72.0	75.4	66.8	91	75	76	17
18.	73.4	80.4	67.6	72.4	69.2	60.8	94	54	65	72.6	69.9	61.4	94	55	68	
19.	66.8	(77.4)	70.4	60.9	(66.2)	64.2	68	(52)	68	61.5	(66.9)	65.2	71	(47)	71	
20.	68.5	76.2	69.5	63.4	67.0	64.0	73	59	71	63.9	67.6	64.7	75	58	73	
21.	69.3	74.7	68.2	65.2	65.4	62.9	78	58	72	65.6	66.1	64.0	78	58	74	21
22.	64.6	63.8	59.1	61.9	57.3	55.6	84	64	79	62.8	58.0	57.0	86	64	84	
23.	58.6	70.1	60.3	57.2	59.5	‡55.1	91	49	‡69	57.8	61.5	‡58.0	94	57	‡80	
24.	61.1	(73.4)	61.5	57.6	(64.5)	57.8	79	(59)	78	58.2	(65.2)	59.3	82	(55)	80	
25.	64.8	65.7	62.7	64.5	64.9	55.3	98	94	59	64.8	65.2	56.2	97	85	61	25
26.	60.0	(70.9)	61.2	55.4	(60.1)	57.6	73	(49)	78	56.0	(61.1)	60.2	76	(55)	87	
27.	63.3	76.2	64.4	60.3	65.8	60.9	83	54	80	60.8	67.0	62.4	85	56	83	
28.	64.5	71.5	62.0	61.8	64.8	60.0	85	67	88	62.4	66.7	61.3	86	73	90	
29.	64.0	(71.2)	(62.0)	61.4	(59.6)	(59.3)	85	(46)	(84)	61.9	(61.9)	(60.8)	85	(54)	(86)	29
30.	68.3	79.4	68.8	64.0	70.9	64.8	77	63	78	64.6	72.2	66.1	80	67	83	
31.	69.1	82.9	(67.2)	66.5	70.9	(65.2)	86	52	(88)	67.0	72.0	(66.1)	88	55	(89)	
Sum	2089.9	2336.4	2066.4				2560	1966	2514				2584	2001	2595	
Means	67.42	75.37	66.66				83	63	81				84	65	84	

For tables used in reductions preliminary to the computation of the relative humidity see general remarks on observations of 1877; data below collected to test these tables.

Date.	Excess of relative humidity shown by No. 4 and C 3235 over that shown by Psychrometer. 8 A.M.	2 P.M.	8 P.M.	No. 4 above Dry bulb of Psychrometer. 8 A.M.	2 P.M.	8 P.M.	Theoretical excess of No. 4 over Dry bulb of Psychrometer, by tables used in computing relative humidity. 8 A.M.	2 P.M.	8 P.M.
1	+2	−3	+2	+0.3	+1.2	+0.6	+0.3	+0.5	+0.5
2	−2	+0	+1	+0.5	+0.5	+0.9	+0.5	+0.5	+0.5
3	+4	+2	+5	+1.0	+0.6	+0.8	+0.4	+0.7	+0.5
4	+3	+1	−2	+0.1	+0.9	+1.2	+0.5	+0.5	+0.3
5	+0	+3	+1	+0.3	+0.4	+0.9	+0.5	+0.7	+0.4
6	+2	+1	+1	+0.4	+0.3	+0.1	+0.5	+0.5	+0.5
7	+0	+1	+7	+0.3	+0.6	+0.5	+0.5	+0.7	+0.5
8	+2	+0	+7	+0.0	+1.2	+1.0	+0.5	+0.6	+0.5
9	−2	+0	+0	+1.1	+0.7	+0.4	+0.5	+0.5	+0.5
10	+1	+0	+4	+0.5	+1.6	+0.2	+0.5	+0.6	+0.5
11	+0	+2	−1	+0.5	+0.7	+0.9	+0.5	+0.6	+0.5
12	+2	+1	−2	−0.1	+0.6	+1.0	+0.5	+0.6	+0.5
13	+3	+2	(+2)	+0.1	+0.8	(+0.5)	+0.5	+0.7	(+0.5)
14	+2	+3	+8	+0.1	+0.5	+0.7	+0.5	+0.6	+0.5
15	−2	+1	+2	+0.8	+0.9	+0.7	+0.5	+0.5	+0.5
16	+0	−2	−1	+0.4	+1.3	+0.1	+0.5	+0.6	+0.5
17	−1	+4	−5	+0.7	+0.2	+1.9	+0.5	+0.7	+0.5
18	+0	+1	+3	+0.3	+0.5	+0.7	+0.5	+0.6	+0.5
19	+3	(−5)	+3	+0.0	(+0.4)	+0.6	+0.5	(+0.6)	+0.5
20	+2	−1	+2	+0.0	+0.9	+0.5	+0.5	+0.6	+0.5
21	+0	+0	+2	+0.4	+0.5	+0.6	+0.5	+0.5	+0.5
22	+2	+0	+5	+0.5	+0.6	+0.7	+0.5	+0.5	+0.3
23	+3	+8	+11	−0.1	+0.6	+0.9	+0.3	+0.5	+0.3
24	+3	(−4)	+2	−0.3	(+1.8)	+0.9	+0.3	(+0.5)	+0.3
25	−1	−9	+2	+0.4	+1.0	+0.2	+0.3	+0.5	+0.3
26	+3	(+6)	+9	−0.3	(+0.3)	+1.0	+0.3	(+0.5)	+0.3
27	+2	+2	−3	−0.1	+0.7	+0.8	+0.3	+0.5	+0.4
28	+1	+6	+2	+0.0	+0.5	+0.5	+0.3	+0.5	+0.5
29	+0	(+8)	(+2)	+0.3	(+0.4)	(+0.9)	+0.3	(+0.5)	(+0.3)
30	+3	+4	+3	−0.2	+0.6	+0.3	+0.3	+0.6	+0.5
31	+2	+3	(+1)	−0.1	+0.6	(+0.8)	+0.5	+0.7	(+0.5)
	+120	+108	+72	+7.5	+16.9	+16.8	+14.5	+15.5	+14.5

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1866phae.proj..383T

Meteorological Record of August 1878.

Date	Wind: Estimated velocity in miles per hour, and direction (of approach)			Clouds: Amount on scale of 10, and kind (on Prof's system). For explanations see note on page 4.		
	8. A. M.	2. P. M.	8. P. M.	8. A. M.	2. P. M.	8. P. M.
1.	1 E S E	1 E	3 S	10 Pm.	10 Pm fog.	10 Pm
2.	0 Calm	3 E	3 S E	10 Pm fog.	8 Pr Pm M Fm → Rs; little rain	6 Pm M Fm
3.	0 Calm	2 S	1 N	10 P fog.	7 M Fm →	2 Pm M Fm →
4.	0 W	1 S E	2 S W	1 P Rs haze	10 Pm M Fm; a little rain	10 Pm Fm, a little rain.
5.	1 S W	4 S W	4 S	2 haze Fm	1 Pm M Rs Fm	10 P Rs Fm
6.	1 S E	5 E	0 Calm	10 Pm fog	10 Pm	10 Pm Fm →
7.	3 W N W	5 S W	2 S W	1 Pm Fm →	4 Pm M Fm ↗	2 Pm Fm
8.	6 W N W	6 W N W	0 S	0 Pm Fm	5 M Fm →	10 Pm Fm raining.
9.	5 S W	3 N E	2. S W	10 Pm	10 Pm M Fm ↗	9 Pm M Fm.
10.	6 W S W	6 W	5 S W	8 Pm Pr R Rw Fm	8 Pm M Fm → Rs.	10 Pm Fm.
11.	1 W	5 S W	3. S W	10 Pm Fm Rs	1 Pm M Fm	0 M Rs
12.	2 W	4 W N W	0 calm	0	5 M Fm →	0 Pm M Fm.
13.	1 S W	2 S W	(4 S W)	3 haze.	5 M Fm Pm →	(9 Fm Pm Pr haze.)
14.	0 W S W	4 E	1 S E	1 haze.	1 haze	0 Pm
15.	2 N N E	0 Calm	0 Calm	10 Pm	10 Pm	10 Pm fog.
16.	4 S	2 S E	0 S	8 Pm Fm ↗	10 Pm	10 Pm raining
17.	3 S W	4 S S W	4 S W	10 Pm Fm →	10 Pm M Fm ↗	10 Pm Fm raining.
18.	2 S W	6 W S W	4 N W	10 Pm Fm ↗	6 Pm M Fm →	1 Pm Fm
19.	5 W N W	(5 N W)	5 W N W	0 P Fm	(6 P M Fm ↘ Rs.)	10 Pm Fm
20.	4 W N W	7 N	5 N W	2 Pr Rs R Fm ↘	6 Pm M Fm →	0 Pm Fm
21.	5 N	2 W	1 N	10 Pm Fm ↓	10 Pm Fm ↓	10 Pm.
22.	2 E N E	6 E	0 Calm	10 Pm Fm M.	7 Pm M Fm ↙	0 Fm.
23.	2 E N E	2 S E	3 S E	0 haze.	0 Fm.	0 Pm Rs.
24.	4 S W	(4 S S W)	5 S S E	0	(9 P Fm.)	9 Pm Fm.
25.	6 S S W	3 N W	5 N W	10 Pm Fm ↓↓	10 Pm Fm ↓ raining.	0
26.	1 N W	(2 W)	1 S E	0	(0 Rs Fm.)	0 P Rs Fm.
27.	2 S W	4 S W	2 S S W	3 P Rs Fm.	7 Pm M Fm ↗	1 Pm Fm.
28.	1 S W	3 E	0	0 Fm	1 Pm M haze.	8 Pm
29.	1 N	(2 E)	—	9 M Pm Fm	(1 M Fm hdge)	(0)
30.	1 W S W	2 S E	0	0 haze.	1 M Fm haze.	0
31.	1 S E	3 S	(4 S W S)	0 haze	5 M Pm Fm haze ↗	(10 Pm Fm)
Sums	73	108	65	158	175	167
Means	2.4	3.5	2.2	5.1	5.6	5.4

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Harvard College Observatory.

August 1878.

Date	Extreme temperatures Maximum 8 A.M. Before setting	Maximum 8 A.M. After setting	Minimum 8 A.M. Before setting	Minimum 8 A.M. After setting	Aurora 8 P.M.	Zodiacal light 8 P.M.	Remarks	
1.	65.2	63.6	58.2	63.1	Cloudy.	Cloudy.		
2.	71.0	67.7	63.0	67.2	Cloudy.	Clouds & twilight.	Showers in the afternoon, with a little thunder.	Seeing 6, 6, 6.
3.	77.3	64.4	61.5	64.4	clouds & twilight.	Clouds & twilight.		Seeing 8, 7, 7.
4.	83.4	72.0	66.2	71.8	Cloudy.	Cloudy.	Thunder showers after noon.	
5.	82.2	68.0	59.7	68.9	Cloudy.	Cloudy.		
6.	83.6	67.5	65.5	66.5	Cloudy.	Cloudy.	Thunder showers after noon.	
7.	72.5	68.0	63.8	68.4	Moonlight.	Moonlight.	Shower with a little thunder about 3 P.M.	
8.	80.8	68.5	59.0	68.0	Cloudy.	Cloudy.	Rain beginning about 8 P.M.; lightning without thunder. Afterwards a heavy thunderstorm,	
9.	78.5	64.3	61.9	70.5	Cloudy.	Cloudy.	heavy rain beginning about 10 P.M.	
10.	83.6	69.5	64.6	70.2	Cloudy	Cloudy	Both thunder & lightning during the forenoon for 3 minutes at 3½ P.M. Large hailstones at 5⅔ P.M. for about 10 minutes; then heavy showers.	
11.	79.0	70.0	65.0	69.4	Moonlight	Moonlight		
12.	79.8	68.0	60.2	67.5	Moonlight	Moonlight & clouds		Seeing 4, 6, 7.
13.	79.0	69.1	60.6	68.8				
14.	82.3	69.3	59.8	68.9	None	None; Milky way invisible.		
15.	80.8	67.0	59.0	66.4	Cloudy.	Cloudy.	A few drops of rain in the afternoon.	
16.	74.3	74.2	66.3	74.1	Cloudy.	Cloudy.		
17.	79.3	72.8	70.1	72.3	Cloudy.	Cloudy.	Some thunder and lightning at 8 P.M, with rain.	
18.	81.0	73.0	66.4	72.6	Cloudy.	Cloudy.		
19.	80.5	67.2	58.2	66.3	Cloudy.	Cloudy.		
20.	77.2	68.6	62.0	67.8	None.	None; Milky way barely visible.	Slight shower about 4 P.M.	
21.	78.2	69.2	63.1	68.5	Cloudy.	Cloudy.		
22	75.6	64.6	61.6	64.6	None	Suspected only.	Rain early.	Seeing 8, 5, 5.
23.	65.8	59.0	49.2	58.1	None; some clouds.	None; milky way invisible.		Seeing 8, 5, 4.
24.	70.2	61.2	50.9	60.5	Cloudy	Cloudy.		
25.	74.5	64.4	59.9	64.3	None	None	Showers till about 3 P.M.	Seeing 5, 1, 2.
26.	71.2	60.4	51.2	59.6	None	None.		Seeing 7, 4, 4.
27.	71.2	63.3	53.7	62.8	Cloudy.	Cloudy.		Seeing 6, 6, 6.
28.	76.8	64.5	56.9	64.3	Cloudy	Cloudy.		
29.	73.7	64.1	59.1	63.7				Seeing 6, 3, 6.
30.	71.7	68.2	57.8	62.7	None.	None.		Seeing 6, 6, 8.
31.	79.4	68.8	61.4	68.5	(Cloudy)	(Cloudy.)		Seeing 4, 6, 7.
Sum	2379.6		1875.8					
Means	76.76		60.51					

Aug. 9, 5⅔ P.M. Large hailstones for about 10 minutes; see book R 45, pp. 156, 157, for weights and dimensions of some of the largest. The largest stone weighed 1¾ ounces, and measured 3 inches by 2.2. Its weight is given as 2.1 ounces on p. 156 of book R 45, but a more accurate measure was afterwards made, (the water having been saved), and recorded on p. 157 of book R 45. Many of the hailstones were 2 inches long and weighed more than an ounce. There was little wind when they fell, so that the damage done was mainly to skylights and greenhouses.

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1866phae.proj.3837

Meteorological Record of

September 1878.

Date	Barometer. 8 A.M.	Barometer. 2 P.M.	Barometer. 8 P.M.	Thermometer attached to Barometer. 8 A.M.	Thermometer attached to Barometer. 2 P.M.	Thermometer attached to Barometer. 8 P.M.	External Thermometer No. 4. 8 A.M.	External Thermometer No. 4. 2 P.M.	External Thermometer No. 4. 8 P.M.	External Thermometer No. 4. Mean half night to 2 P.M.	Rain fall in inches, gauge C examined at 8 A.M.
1.	30.076	(30.009)	30.002	72.7	(77.0)	79.0	73.8	(84.9)	75.8	76.82	0.000
2.	30.002	29.995	29.964	75.4	80.0	78.4	77.0	82.2	73.4	76.60	0.044
3.	30.042	30.052	30.113	74.2	78.0	77.0	72.3	74.7	64.3	69.58	0.276
4.	30.127	30.117	30.116	70.9	70.3	69.8	63.3	63.7	61.6	62.70	0.011
5.	30.039	30.010	30.028	68.4	69.5	69.0	63.2	65.5	62.6	63.42	0.375
6.	30.096	30.103	30.158	67.4	72.1	71.0	63.6	71.4	64.5	65.52	0.000
7.	30.386	30.446	30.472	67.3	66.6	61.7	58.6	62.1	56.0	58.26	0.000
8.	30.450	30.405	30.387	61.5	66.8	65.6	57.7	63.7	57.4	58.78	0.066
9.	30.333	30.298	30.276	61.8	67.0	67.8	55.0	67.6	61.8	60.24	0.000
10.	30.245	30.197	30.172	65.0	71.1	70.3	64.2	70.8	65.2	65.92	0.000
11.	30.083	30.190	30.182	67.8	71.9	70.8	65.8	70.3	65.1	66.42	0.000
12.	30.122	30.061	30.119	68.8	70.4	72.1	65.6	70.3	70.2	68.38	0.243
13.	30.016	29.893	29.836	70.2	74.8	75.6	69.7	83.5	74.2	74.26	0.761
14.	29.952	29.938	29.965	71.2	73.4	70.3	64.1	70.1	61.4	64.22	0.033
15.	30.046	30.097	30.164	65.2	67.7	63.0	57.6	64.3	55.5	58.10	0.000
16.	30.322	30.326	30.309	60.8	66.6	64.5	52.8	64.7	54.9	56.02	0.000
17	30.266	30.190	30.148	60.7	66.6	66.8	54.5	71.9	61.1	60.62	0.000
18.	30.087	30.029	30.063	64.0	71.1	73.8	63.0	78.6	70.9	69.28	0.000
19.	30.200	30.163	30.138	67.2	72.1	69.1	61.5	70.1	62.8	63.74	0.000
20	30.102	30.012	29.999	66.8	73.3	75.0	67.6	81.5	70.3	71.46	0.000
21	29.924	29.890	29.950	70.0	75.7	76.1	70.8	82.6	71.6	73.48	0.000
22	30.158	30.181	30.292	68.0	68.9	61.3	57.7	64.5	53.1	57.22	0.000
23	30.522	30.496	30.477	58.1	63.9	60.1	47.3	58.7	48.8	50.18	0.000
24	30.405	30.293	30.246	57.1	65.0	66.3	49.5	69.5	62.4	58.66	0.000
25	30.207	30.200	30.180	64.1	69.8	69.4	64.5	72.8	61.0	64.76	0.000
26	30.101	30.002	30.104	64.7	69.8	70.4	64.0	77.6	58.1	64.36	0.000
27	30.300	30.281	30.354	61.0	63.0	63.4	50.1	59.6	49.8	51.88	0.430
28	30.467	30.408	30.356	55.7	61.2	57.9	44.2	56.6	47.1	47.84	0.000
29	30.348	30.296	30.256	56.3	60.4	61.9	47.0	64.1	52.7	52.70	0.000
30	30.256	30.206	30.212	59.1	65.0	63.7	52.0	68.8	54.8	56.48	0.000
Sums	905.680	904.784	905.038	1961.4	2089.0	2061.1	1818.0	2106.7	1848.4	1887.90	2.239
Means	30.189	30.159	30.168	65.4	69.6	68.7	60.60	70.22	61.61	62.93	

Barometric means reduced to the freezing point; 8 A.M., 30.089; 2 P.M., 30.048; 8 P.M., 30.060.

Mean temperature for month (mean of 3 means for 8, 2, 8, with double weight given to the morning and evening observations) 62.93 Fahrenheit.
Rain fall for month 2.24 inches.

Highest reading of maximum thermometer during the month (Sept. 3) 87.5 Fahrenheit.
Lowest " " minimum " " " " " (Sept. 28) 38.0 — " —

Records in parentheses ( ) are those of observations not made at the regular times. The midday observations were made on Sept. 1 at 2¼ P.M.

* Sept. 23 and 29, 8 P.M. Readings of wet bulb of psychrometer noticed at time of observation as not in accordance with those of C. 3235. Both bulbs read carefully, wetted 45 minutes before observations, and evidently wet when observed.

Observers: F. Waldo Sept. 1.
A. Searle at other times.

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1866phae.proj..3807

Harvard College Observatory.

September. 1878.

Date.	Psychrometer. Dry bulb. 8 A.M.	Dry bulb. 2 P.M.	Dry bulb. 8 P.M.	Wet bulb. 8 A.M.	Wet bulb. 2 P.M.	Wet bulb. 8 P.M.	Relative humidity Guyots Tables. 8 A.M.	2 P.M.	8 P.M.	C 3235 (Wet). 8 A.M.	2 P.M.	8 P.M.	Relative humidity from No. 4 and C 3235. Guyots Tables. 8 A.M.	2 P.M.	8 P.M.	
1	73.3	(84.3)	75.0	70.8	(77.3)	73.4	87	71	91	71.4	(78.0)	74.0	88	(72)	91	
2.	76.7	80.9	72.8	73.5	73.9	71.8	84	69	94	74.0	74.5	72.3	86	69	97	
3.	71.5	74.5	63.7	69.5	70.6	63.3	89	81	97	70.0	71.0	64.0	87	82	97	
4	62.7	63.3	61.1	62.4	63.0	60.9	98	97	98	62.9	63.5	61.5	96	97	98	
5.	62.9	65.2	62.0	62.9	64.2	61.9	99	93	99	63.4	64.7	62.2	99	94	98	5
6.	68.2	71.0	63.7	61.7	65.5	62.5	91	72	92	62.3	66.2	63.6	91	74	93	
7.	58.0	61.9	55.4	57.1	56.8	53.5	94	70	87	57.8	57.6	54.4	94	73	88	
8.	58.0	63.4	57.3	55.4	56.0	54.7	83	60	84	56.0	57.2	56.0	87	63	89	
9.	54.4	66.9	61.3	54.0	62.7	59.9	97	77	91	54.5	63.6	60.8	95	78	93	9
10.	63.7	70.3	64.7	62.3	66.2	63.8	92	78	94	63.0	67.0	64.5	91	80	95	
11.	65.8	69.8	64.4	64.8	67.0	64.6	94	85	100	65.1	67.7	65.0	95	86	98	
12.	65.2	69.8	69.8	65.2	69.5	69.4	99	97	97	65.5	69.8	70.0	98	97	99	
13.	69.3	82.9	73.3	69.5	76.6	71.6	100	73	91	69.8	77.6	72.1	100	75	90	13
14.	63.9	70.0	61.2	57.8	57.9	55.2	66	42	66	58.6	58.9	56.8	68	46	71	
15.	57.5	63.9	55.1	51.3	55.1	51.2	62	53	74	52.0	55.9	52.1	64	54	71	
16.	52.8	64.4	54.2	49.7	57.0	52.4	78	60	87	50.7	58.6	53.9	83	66	91	
17.	54.8	71.8	60.3	53.7	63.5	58.5	92	60	89	54.1	64.2	60.0	95	63	91	17
18.	63.0	78.3	70.5	61.6	68.9	66.0	91	59	77	62.0	69.7	67.2	92	62	80	
19.	61.5	69.6	62.2	58.0	59.2	59.6	80	50	84	58.8	60.7	61.0	83	54	88	
20.	67.5	81.1	69.5	65.9	70.4	66.9	98	56	86	66.1	71.2	68.0	90	58	88	
21.	70.7	82.0	71.1	68.5	71.6	65.7	88	58	73	68.9	72.0	66.5	90	58	74	21
22.	57.7	64.1	52.7	50.9	51.3	45.2	59	34	50	51.8	52.1	46.1	63	35	51	
23.	47.3	58.4	47.7	43.5	50.4	*45.7	70	53	*83	44.4	51.9	*48.0	73	58	*90	
24.	49.8	68.5	61.7	48.2	59.5	58.9	87	55	83	49.0	61.5	60.2	93	60	85	
25.	64.8	72.7	60.0	62.3	60.8	57.3	85	46	83	62.8	62.0	59.0	89	50	87	25
26.	63.9	76.8	57.3	62.9	69.0	56.0	94	65	91	63.2	69.8	57.0	94	66	91	
27.	49.9	59.6	49.0	44.7	48.9	43.7	62	40	61	45.7	49.8	45.0	65	42	61	
28	43.9	56.5	46.4	40.0	47.0	42.7	66	42	70	40.9	48.9	45.0	68	50	79	
29	46.6	63.6	52.7	44.6	53.2	*48.6	83	45	*72	45.2	54.7	*50.9	81	49	*85	29
30	52.3	67.3	53.6	50.4	60.7	52.3	86	65	90	51.1	61.5	54.0	92	63	93	
Sum	1807.6	2088.8	1828.7				2546	1906	2534				2592	1974	2600	
Means	60.25	69.63	60.96				85	63	84				86	66	87	

For Tables used in reductions preliminary to the computation of the relative humidity see General remarks on Observations of 1877; Data below collected to test these tables.

Date	Excess of relative humidity shown by No. 4 + C 3235, over that shown by Psychrometer. 8 A.M.	2 P.M.	8 P.M.	No 4 above dry bulb of Psychrometer. 8 A.M.	2 P.M.	8 P.M.	Theoretical excess of No. 4 over Dry bulb of Psychrometer, by Tables used in computing relative humidity. 8 A.M.	2 P.M.	8 P.M.
1	+1	(+1)	+0	+0.5	(+0.6)	+0.8	+0.8	(+0.7)	+0.5
2	+2	+0	+3	+0.3	+1.3	+0.6	+0.6	+0.7	+0.5
3	−2	+1	+0	+0.8	+0.2	+0.6	+0.5	+0.5	+0.4
4	−2	+0	+0	+0.6	+0.4	+0.5	+0.3	+0.3	+0.3
5	+0	+1	−1	+0.3	+0.3	+0.6	+0.3	+0.5	+0.8
6	+0	+2	+1	+0.4	+0.4	+0.8	+0.3	+0.5	+0.3
7	+0	+3	+1	+0.6	+0.2	+0.6	+0.3	+0.3	+0.3
8	+4	+3	+3	−0.3	+0.3	+0.1	+0.3	+0.3	+0.3
9	−2	+1	+2	+0.6	+0.7	+0.5	+0.3	+0.5	+0.3
10	−1	+2	+1	+0.5	+0.5	+0.5	+0.3	+0.5	+0.4
11	+1	+1	−2	+0.0	+0.5	+0.7	+0.3	+0.5	+0.4
12	−1	+0	+2	+0.4	+0.5	+0.4	+0.3	+0.5	+0.3
13	+0	+2	−1	+0.4	+0.6	+0.9	+0.5	+0.7	+0.5
14	+2	+4	+5	+0.2	+0.0	+0.2	+0.3	+0.3	+0.3
15	+2	+1	−3	+0.1	+0.4	+0.4	+0.3	+0.3	+0.2
16	+5	+6	+4	+0.0	+0.3	+0.7	+0.3	+0.3	+0.6
17	+3	+3	+2	−0.3	+0.1	+0.8	+0.3	+0.5	+0.3
18	+1	+3	+3	+0.0	+0.3	+0.4	+0.3	+0.6	+0.5
19	+3	+2	+4	+0.0	+0.5	+0.6	+0.5	+0.5	+0.5
20	+0	+2	+0	+0.1	+0.4	+0.8	+0.5	+0.6	+0.5
21	+2	+0	+1	+0.1	+0.6	+0.5	+0.5	+0.7	+0.5
22	+4	+1	+1	+0.0	+0.4	+0.4	+0.3	+0.3	+0.3
23	+3	+5	+7	+0.0	+0.3	+0.1	+0.4	+0.3	+0.4
24	+6	+5	+2	−0.3	+0.0	+0.7	+0.4	+0.5	+0.3
25	+4	+4	+4	−0.3	+0.1	+1.0	+0.3	+0.5	+0.3
26	+0	+1	+0	+0.1	+0.8	+0.8	+0.3	+0.5	+0.3
27	+3	+2	+0	+0.2	+0.0	+0.8	+0.3	+0.6	+0.3
28	+2	+8	+9	+0.3	+0.1	+0.7	+0.4	+0.3	+0.3
29	−2	+4	+1,3	+0.4	+0.5	+0.6	+0.4	+0.3	+0.4
30	−6	−2	+3	−0.3	+1.5	+1.2	+0.3	+0.5	+0.3

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1866phae.proj.0383

Meteorological Record of

September. 1878.

Date.	Wind. Estimated velocity in miles per hour, and direction (of approach)			Clouds. Amount on scale of 10, and kind (on Poey's system). For explanation see note on page 4.		
	8. A. M.	2. P. M.	8. P. M.	8. A. M.	2. P. M.	8. P. M.
1.	3 S S W.	(6 S W.)	2 S E.	10 Pm M f	(6 Pm M Pm – Rs.)	0 Pm.
2.	2 S W.	0 S W.	2 S E.	10 Pm Pm Rs.	10 Pm M Pm little rain	5 Pm Pm →
3.	0 S	4 E	3 N E	4 Pm Pm Rs haze.	8 Pm Pm L	10 Pm fog.
4.	4 N E	5 E N E	5 N E	10 Pm fog	10 Pm fog – fine rain	10 Pm fog – fine rain.
5.	4 N E	6 E N E	4 N E	10 Pm fog.	10 Pm d little rain	10 Pm fog.
6.	1 N	3 E S E	0 Calm	10 Pm Pm L	1 M. Pm haze.	2 Pm Pm ← haze.
7.	6 N E	7 E	6 N E	10 Pm Pm L little rain	10 Pm M Pm.	4 Pm Pm ←
8.	5 N E	5 S E	1 S E	0 Pm Pm	0 Pm Pm	0
9.	1 N E	4 E N E	0 E	10 Pm fog.	5 Pm Rs M Pm → Pm ↖	4 Pm Pm →
10.	1 N N E	4 E	0 E.	10 Pm	6 Pm Pm ↑	10 Pm Pm ↖
11.	0 N N E	6 E N E	6 N E	10 Pm Pm ←	10 Pm fine rain.	10 Pm raining.
12.	4 N E	2 E	2 S S E	10 Pm fog; a little rain	10 Pm raining.	1 Pm Pm Pm ↑
13.	0 Calm	12 S	6 S	10 Pm fog.	8 Pm M Pm M	10 Pm; a little rain.
14.	5 W.	6 S W.	3 S	1 Pm Pm	0 Pm Rs	0 Pm
15.	6 N W.	11 N N W.	3 N N W.	1 Pm Pm	6 M Pm L	0
16.	3 N.	4 S E	0 Calm.	0 haze	0 Pm haze	0 haze.
17.	1 S W.	3 S W	3 S S E	0 haze Pm	6 P Pm – Pm Rs	1 haze.
18	3 W.	4 S W.	0 Calm	2 haze	0 haze	0 haze.
19	3 N	3 S E	1 S E	1 Pm haze	1 Pm haze	0 haze.
20	3 S W	3 S W	3 S W	10 Pm Pm Pm ↑	0 P Pm	0 Pm.
21	4 S W.	2 W S W.	2 S W	1 P Rs Pm haze	6 P Rs M Pm ↑	10 Pm
22	9 N W	9 N N W	2 N	0 P Rs Pm	0 P Pm	0
23	4 N	3 E	2 E.	0	0 Pm	0
24	0 S W.	4 S	4 S	0 Pm haze.	9 Pm M Pm →	10 Pm
25	1 W.	2 W N W	0 Calm	0 Rs Pm	0 Rs M Pm.	0 haze.
26	0 S	10 S S W	2 N W	10 Pm Pm ↑ haze	6 Pm M Pm ↑	10 Pm
27	9 N	10 N N W	6 N	0	0 Pm	0.
28	6 N	1 N	0 N	0	0	0 P haze.
29	0 S W	2 S	2 S E	9 Pm Pm →	7 Pm Pm →	3 Pm Pm haze
30	0 S W	2 S S W	1 S	0 haze	6 Pm M Pm ↑	0.
Sum	88	143	71	149	141	110
Means	2.9	4.6	2.4	5.0	4.7	3.7

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1866phae.proj...3837

September. 1878.

Date.	Extreme temperatures Maximum 8 A.M. Before setting.	Maximum 8 A.M. After setting.	Minimum 8 A.M. Before setting	Minimum 8 A.M. After setting.	Aurora. 8 P.M.	Zodiacal light. 8 P.M.	Remarks.	
1.	83.0	73.1	66.8	73.0				
2.	84.3	76.6	71.2	76.2	Cloudy.	Cloudy.	Thunder shower after 2 P.M.	Seeing 4, 7, 5.
3.	87.5	71.1	67.5	71.3	Cloudy.	Cloudy.		
4.	75.3	63.1	60.4	62.5	Cloudy	Cloudy.		
5.	63.8	63.0	60.7	62.7	Cloudy	Cloudy.		
6.	66.2	63.4	60.9	63.0	Moonlight + clouds	Moonlight.		Seeing 5, 5, 4.
7.	72.8	59.0	57.8	57.8	Cloudy.	Cloudy.		Seeing 4, 6, 4.
8.	62.0	58.0	49.3	57.2	Moonlight	Moonlight.		Seeing 6, 6, 7.
9.	64.3	55.2	47.9	53.8	Moonlight + Clouds	Moonlight + Clouds		Seeing 7, 4, 5.
10.	69.3	63.9	53.8	63.3	Cloudy.	Cloudy		
11.	71.4	65.6	60.8	65.0	Cloudy.	Cloudy.		
12.	74.2	65.0	63.7	64.8	Moonlight + Clouds.	Moonlight + Clouds.		Seeing 5, 3, 4.
13.	74.2	69.0	64.5	68.9	Cloudy.	Cloudy.	Occasional showers.	
14	82.7	64.5	60.5	63.5	Moonlight	Moonlight.		Seeing 4, 4, 3.
15.	70.2	58.3	53.3	57.1	None.	None.		Seeing 4, 5, 4.
16.	64.3	53.7	44.8	52.2	None.	None.		Seeing 4, 5, 5.
17.	64.1	55.2	46.1	54.1	None.	None.		Seeing 4, 5, 5.
18.	71.4	63.0	54.0	62.4	None.	None.		Seeing 7, 7, 7.
19.	78.2	61.7	57.3	61.0	None.	None.		Seeing 7, 7, 8.
20.	70.0	67.2	57.9	66.5	None	Slightly suspected.		
21.	81.0	70.4	63.7	70.1	Cloudy.	Cloudy.		
22.	82.2	58.8	53.8	57.0	None	None		Seeing 7, 5, 3.
23.	65.2	48.3	40.1	46.8	None.	None.		
24.	59.2	50.6	43.9	49.0	Cloudy	Cloudy.		
25	68.8	64.3	49.1	64.0	None.	None.		Seeing 8, 6, 6.
26	72.8	64.0.	53.9	63.2	Cloudy.	Cloudy.	{Heavy shower for a few minutes about 5 P.M.; some rain later.}	
27	77.5	51.0	45.8	49.5	None	None.		Seeing 7, 5, 4.
28.	59.7	45.0	38.0	43.5	None	Cloudy.		Seeing 7, 8, 8.
29	57.0	47.4	38.8	46.0	Cloudy.	Cloudy.		Seeing 5, 7, 6.
30.	63.2	53.0	45.9	51.4	None	None		Seeing 5, 6, 7.
Sum	2133.8		1632.2					
Means	71.13		54.41					

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1866phae.proj.:3837

Meteorological Record of

October, 1878.

Date.	Barometer.			Thermometer attached to Barometer.			External Thermometer No. 4.				Rainfall in inches gauge C. Examined at 8 A.M.
	8 A.M.	2 P.M.	8 P.M.	8 A.M.	2 P.M.	8 P.M.	8 A.M.	2 P.M.	8 P.M.	Mean half night to 2 P.M.	
1.	30.192	30.118	30.066	59.4	65.2	67.0	53.7	71.0	60.5	59.88	0.000
2.	29.975	29.896	29.896	62.4	69.2	70.5	61.8	74.3	65.3	65.70	0.000
3.	29.993	29.969	29.966	66.3	70.0	70.6	62.3	73.3	62.0	64.38	0.000
4.	30.013	(29.948)	29.970	63.0	(69.3)	69.5	57.0	(71.5)	59.9	61.06	0.000
5.	30.033	30.017	30.040	61.5	65.8	66.3	52.6	63.8	54.0	55.40	0.000
6.	(30.030)	30.011	30.115	(60.0)	60.1	61.2	(50.6)	57.9	51.7	52.50	(0.000)
7.	30.280	30.248	30.237	56.0	61.7	61.0	45.8	58.9	52.8	51.22	0.000
8.	30.160	30.109	30.150	58.7	63.6	64.1	55.6	65.8	56.1	58.64	0.022
9.	30.031	29.799	29.748	60.4	63.8	66.3	59.7	70.3	57.8	61.06	0.000
10.	29.822	29.851	(30.002)	60.4	61.3	(57.0)	51.5	59.7	(50.2)	52.62	0.287
11.	30.130	30.105	30.111	56.4	59.0	59.0	46.1	53.6	51.6	49.80	0.000
12.	30.000	29.846	29.741	57.7	56.0	54.2	46.6	48.2	41.7	44.96	0.000
13.	29.785	29.830	30.020	53.5	56.7	57.5	50.2	61.2	52.9	53.48	2.416
14.	30.241	(30.180)	30.179	56.2	(61.3)	58.4	46.3	(59.0)	51.0	50.72	0.000
15.	30.114	30.024	30.076	57.0	62.3	62.8	55.1	71.4	60.2	60.40	0.000
16.	30.112	30.070	(30.053)	59.1	65.8	(64.2)	58.6	73.3	(59.4)	61.86	0.000
17.	30.073	30.025	30.032	60.7	68.3	67.0	62.3	75.7	62.6	65.10	0.000
18.	29.901	29.766	29.650	63.0	67.2	66.9	62.6	72.0	60.8	63.76	0.000
19.	29.518	29.500	29.558	63.0	61.3	59.7	53.9	51.9	45.4	48.10	0.077
20	29.700	29.779	29.900	55.7	59.0	58.9	44.6	54.8	51.2	49.28	0.000
21	30.088	30.080	30.122	57.5	62.3	63.6	48.9	67.5	57.8	56.18	0.000
22	30.201	30.172	30.132	59.0	64.7	57.7	47.0	61.8	51.5	51.76	0.000
23	29.979	29.649	29.502	57.2	57.9	59.3	53.6	55.5	62.5	57.54	0.000
24	29.658	29.793	30.047	62.2	59.3	59.1	54.2	58.6	50.7	53.68	1.688
25	30.222	30.252	30.303	55.4	60.7	59.7	48.2	57.5	50.0	50.78	0.000
26	30.375	30.326	30.297	56.0	60.0	59.5	47.3	58.1	48.8	50.06	0.000
27	30.210	30.068	30.000	55.1	58.9	59.3	51.5	61.8	55.1	55.00	0.000
28	29.993	30.012	30.123	56.4	57.3	55.9	46.5	50.6	42.1	45.56	0.000
29	30.232	30.200	30.212	49.3	54.3	49.7	34.4	47.6	41.0	40.68	0.000
30	30.048	29.817	29.753	49.3	51.6	52.8	47.4	49.8	48.4	48.28	0.044
31	29.653	29.558	29.578	51.8	52.4	53.5	45.7	50.5	47.2	47.26	0.530
Sums	930.768	929.018	929.579	1799.6	1906.3	1892.2	1601.6	1906.9	1662.2	1686.70	5.064
Means	30.025	29.968	29.986	58.1	61.5	61.0	51.66	61.51	53.62	54.41	

Barometric means reduced to the freezing point; 8 A.M., 29.946; 2 P.M., 29.880; 8 P.M., 29.899.

Mean temperature for month (mean of 3 means for 8, 2, 8, with double weight given to the morning and evening observations) 54.48 Fahrenheit.
Rainfall for month 5.06 inches.

Highest reading of maximum thermometer during the month (Oct. 18) 75.1 Fahrenheit.
Lowest " " minimum " " " " (Oct. 29) 31.6 "

Records in parentheses ( ) are those of observations not made at the regular times. The morning observations of Oct. 6 were made at 8½ A.M.; the midday observations of Oct. 4 at 2¼ P.M., and of Oct. 14 at 2½ P.M.; the evening observations of Oct. 10 and 16 at 8½ P.M.

* Oct. 3, 8 P.M. Discordance noticed at time of observation between readings of wetted bulb of psychrometer and C. 3235. Both read carefully, wetted 45 minutes before observation, and evidently wet when observed.

* Observer, A. Searles.

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1866phaa.proj...3837

Harvard College Observatory

October, 1878.

Date.	Psychrometer. Dry bulb. 8 A.M.	Dry bulb. 2 P.M.	Dry bulb. 8 P.M.	Wet bulb. 8 A.M.	Wet bulb. 2 P.M.	Wet bulb. 8 P.M.	Relative humidity Guyots Tables. 8 M.	2 P.M.	8 P.M.	☿ 3235 (Wet). 8 A.M.	2 P.M.	8 P.M.	Relative humidity from No 4, and ☿ 3235 Guyots Tables. 8 A.M.	2 P.M.	8 P.M.
1.	53.9	70.4	60.0	52.6	62.0	57.8	90	59	86	53.4	63.0	58.8	96	60	88
2.	61.9	74.3	64.5	59.8	64.2	62.2	93	54	86	60.2	65.0	63.3	89	57	87
3.	62.2	73.4	61.3	56.5	59.0	*54.6	67	37	*62	57.2	60.8	*57.0	69	44	*70
4.	57.1	(71.2)	59.7	52.7	(56.2)	53.1	72	(32)	61	53.8	(57.0)	54.8	78	(34)	68
5.	52.7	63.6	53.0	48.0	51.9	49.0	67	39	73	48.9	53.4	51.5	72	44	81
6.	(50.3)	57.5	51.2	(47.0)	51.9	49.6	(76)	65	88	(48.0)	52.6	50.8	(79)	66	91
7.	45.8	58.8	53.2	44.4	51.5	49.4	86	56	74	45.3	53.0	51.2	91	63	87
8.	55.4	65.7	54.9	53.9	57.0	52.5	90	55	84	54.7	58.1	54.2	92	59	85
9.	59.7	69.8	56.8	58.3	65.5	56.1	91	77	95	58.8	65.9	56.8	93	77	91
10.	51.4	59.5	(50.0)	45.6	49.2	(45.1)	60	41	(65)	46.6	49.9	(46.5)	63	42	(71)
11.	45.7	53.3	51.0	43.9	47.5	46.3	84	62	65	44.8	48.8	47.4	84	65	67
12.	45.8	47.6	41.2	45.9	47.9	41.4	98	100	100	46.8	48.5	42.2	98	98	98
13.	50.1	61.2	52.6	44.9	47.8	44.2	62	28	45	45.8	48.9	45.2	65	32	45
14.	46.2	(58.8)	50.5	42.5	(49.7)	47.9	70	(+7)	81	44.0	(51.5)	49.4	77	(55)	86
15.	55.3	71.1	60.0	54.1	59.9	55.8	91	47	75	54.7	61.0	56.8	95	51	83
16	58.7	73.4	(58.8)	57.7	63.7	(57.7)	94	55	(93)	58.0	64.7	(58.6)	94	59	(94)
17	62.5	75.1	61.9	61.3	66.8	59.9	92	62	88	61.7	67.7	60.9	95	63	88
18	62.7	71.5	60.5	60.9	64.0	59.5	89	63	94	61.2	65.0	60.2	90	65	95
19	53.6	51.2	45.0	50.6	46.7	40.7	80	68	64	51.2	48.0	41.6	80	70	65
20	44.5	54.7	51.2	39.5	42.3	43.3	58	25	46	40.4	43.4	44.2	61	27	37
21	49.2	67.4	57.8	43.9	55.4	51.6	61	41	63	45.1	56.5	53.2	67	45	70
22	47.3	61.5	51.0	45.3	53.5	50.5	84	55	96	46.2	55.0	51.2	90	61	96
23	53.3	54.9	61.2	51.3	54.6	62.0	86	97	100	52.0	55.1	62.8	87	95	100
24	53.9	58.4	50.2	48.6	49.5	45.2	65	48	64	49.4	50.2	46.0	66	49	64
25	47.7	57.1	49.1	43.4	50.4	47.7	65	59	88	44.2	51.5	48.8	64	62	88
26	47.5	57.8	47.9	46.4	53.2	46.9	89	71	90	47.0	54.5	48.4	94	76	93
27	51.1	61.0	54.7	50.0	55.2	51.8	92	66	80	50.9	56.1	52.9	93	71	84
28	46.2	50.4	41.0	42.0	42.0	37.3	66	42	65	42.9	43.0	39.3	67	44	70
29	34.0	47.0	39.8	32.4	40.4	38.7	80	50	86	33.2	42.5	40.5	72	58	89
30	46.5	49.3	47.6	45.8	49.5	47.8	78	100	99	46.6	50.0	48.3	89	98	96
31	44.8	50.0	46.8	45.0	49.0	44.9	99	91	83	45.8	50.0	46.0	95	94	86
Sum	1597.0°	1896.9°	1644.4°				2475	1792	2439				2545	1884	2513
Means	51.52	61.19	53.05				80	58	79				82	61	81

For Tables used in reductions preliminary to the computation of relative humidity see general remarks on observations of 1877; Data below collected to test these tables.

Date	Excess of relative humidity shown by No 4, and ☿ 3235, over that shown by Psychrometer. 8 A.M.	2 P.M.	8 P.M.	No 4 above Dry bulb of psychrometer. 8 A.M.	2 P.M.	8 P.M.	Hundredths excess of No 4 over Dry bulb of Psychrometer, by tables used in computing relative humidity. 8 A.M.	2 P.M.	8 P.M.
1.	+6	+1	+2	−0.2	−0.4	+0.5	+0.3	+0.5	+0.3
2.	−4	+3	+1	−0.1	+0.0	+0.8	+0.3	+0.5	+0.4
3.	+2	+7	+8	+0.1	−0.1	+0.7	+0.3	+0.5	+0.3
4.	+6	(+2)	+7	−0.1	(+0.3)	+0.2	+0.3	(+0.5)	+0.3
5.	+5	+5	+8	−0.1	+0.2	+1.0	+0.3	+0.3	+0.3
6.	(+3)	+1	+3	(+0.3)	+0.4	+0.5	(+0.3)	+0.3	+0.3
7.	+5	+7	+13	+0.0	+0.1	−0.4	+0.3	+0.3	+0.3
8.	+2	+4	+1	+0.2	+0.1	+1.2	+0.3	+0.5	+0.3
9.	+3	+0	−4	+0.0	+0.5	+1.0	+0.3	+0.4	+0.3
10.	+3	+1	(+6)	+0.1	+0.2	(+0.2)	+0.3	+0.3	(+0.3)
11.	+0	+3	+2	+0.4	+0.3	+0.6	+0.3	+0.3	+0.3
12.	+0	−2	−2	+0.8	+0.6	+0.5	+0.4	+0.3	+0.4
13	+3	+4	+0	+0.1	+0.0	+0.3	+0.3	+0.4	+0.3
14	+7	(+8)	+5	+0.1	(+0.2)	+0.5	+0.4	(+0.5)	+0.5
15	+4	+4	+8	−0.2	+0.3	+0.2	+0.3	+0.5	(+0.5)
16	+0	+4	(+1)	−0.1	−0.1	(+0.6)	+0.3	+0.5	+0.5
17	+3	+1	+0	−0.2	+0.6	+0.7	+0.3	+0.5	+0.5
18	+1	+2	+1	−0.1	+0.5	+0.3	+0.3	+0.5	+0.5
19	+0	+2	+4	+0.3	+0.7	+0.4	+0.3	+0.3	+0.4
20	+3	+2	−1	+0.1	+0.1	+0.0	+0.4	+0.3	+0.3
21	+6	+4	+4	−0.3	+0.1	+0.0	+0.3	+0.4	+0.3
22	+6	+6	+0	−0.3	+0.3	+0.5	+0.4	+0.3	+0.3
23	+1	−2	+0	+0.3	+0.6	+0.3	+0.3	+0.3	+0.3
24	+1	+1	+0	+0.3	+0.7	+0.5	+0.3	+0.3	+0.3
25	−1	+3	+0	+0.5	+0.4	+0.9	+0.3	+0.3	+0.4
26	+5	+5	+3	−0.2	+0.3	+0.4	+0.3	+0.3	+0.4
27	+1	+5	+4	+0.4	+0.8	+0.4	+0.3	+0.3	+0.4
28	+1	+2	+5	+0.3	+0.2	+1.1	+0.3	+0.3	+0.4
29	−8	+8	+3	+0.4	+0.6	+1.2	+0.3	+0.3	+0.3
30	+11	−2	−3	+0.9	+0.5	+0.8	+0.4	+0.3	+0.4
31	−4	+3	+3	+0.9	+0.5	+0.4	+0.4	+0.3	+0.4
	+2.1	+2.84			+.20	+.54	+.34	+.37	+.33

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Meteorological Record of October, 1878.

Date	Wind. Estimated velocity in miles per hour, and direction (of approach). 8 A.M.	2 P.M.	8 P.M.	Clouds. Amount on scale of 10, and kind (on Poëys System). For explanation see note on Page 4. 8 A.M.	2 P.M.	8 P.M.
1.	2 S W	1 S W	2 S	0 Rs Hzw	6 Prw Hzw ↑	0
2.	3 S W	6 S W	3 S	0 haze Hzw	1 P Rs Hzw	1 P Hzw
3.	4 N W	0 W	2 S	0 Pzw	0 Rs Hzw	0
4.	1 N W	(2 N W)	0 S	0 haze Rs.	(1 Pr Hzw)	1 P
5.	6 N N W	6 E N E	0 Calm.	0 Rs Hzw.	1 Pr Mb Hzw	9 Pzw Hzw →
6.	(0 Calm.)	3 N W	0 N W	(10 Pzw Hzw. few drops of rain)	10 Pzw Hzw →	0 Hzw
7.	0 N W.	5 E	3 S	0	5 Pzw Mb Hzw ↑ Rs.	10 Pzw Hzw ↑
8.	2 S	1 S W	1 S	10 Pzw Hzw	5 Pr Rs Mb Hzw →	9 P Rs
9.	6 S S W	8 S W	6 W	8 Pzw Hzw ↑	10 Pzw Hzw ↑	10 Pzw raining
10.	8 W	8 N W	(4 W.)	0 Pzw Rs Hzw	0 Mb Hzw Rs	(0)
11.	4 N	7 E	5 E	9 Pr Rs Pzw Hzw.	10 Pzw Mb Hzw.	10 Pzw Hzw ←
12.	5 N E	13 N	15 N	10 Pzw raining	10 Pzw Hzw ↓ raining	10 Pzw raining
13.	15 N N W	13 N N W	3 N W	3 Pzw Pr Rs Hzw.	0	0
14.	0 W N W	(2 E S E)	3 S	3 Pzw Hzw → Rs	(0 haze)	0
15.	6 S S W	7 S W	6 S W	1 Pr Rs Hzw	7 Pr Rs Hzw →	3 Pzw Hzw →
16.	1 S W	2 S S W	(3 S)	9 Pzw Hzw ↑	1 Pr Rs Hzw	(0 Rs.)
17.	5 S W	7 S S W	4 S S W	4 Pr Rs Hzw	9 Pr Rs	1 P haze
18.	7 S	6 S S E	0 Calm.	1 Pzw Mb Hzw ↑	3 Mb Hzw ↑	9 P
19.	9 S W	8 W S W	7 S W	10 Pzw Mb Hzw ↑	10 Pzw Hzw ↑	10 P
20.	9 W S W	9 W	7 S W	9 Pr Pzw Hzw ↘	0 Rs Hzw	1 P
21.	0 W	1 W	0 Calm	0 haze Hzw	0	0 haze
22.	0 Calm	2 E	1 E	0 haze	0	1 haze
23.	6 E	9 E S E	5 S E	10 Pzw Hzw ←	10 Pzw; raining.	10 Pzw; raining.
24.	11 N W	16 N N W	10 N N W	10 Pzw Hzw ↓	2 Pr Pzw Hzw	8 P
25.	7 N W	5 N E	0 N E	10 Pzw Hzw	6 Pzw Mb Hzw ↓	9 P
26.	0 W	2 S E	1 S E	0 Rs haze.	3 haze Mb Hzw →	0 P
27.	4 S S E	6 S	5 S S E	10 Pzw Hzw ↑	8 Pr R Pzw Hzw ↑	10 P.
28.	7 W N W	6 N W	2 N W	0 P	0 Hzw	0 P Hzw
29.	1 N W	1 S W	1 E	7 P Rs Hzw	1 Hzw	0 haze.
30.	7 S E	6 E	2 N	10 Pzw Hzw ↓ raining	10 Pzw raining	10 Pzw a little rain
31.	0 Calm	0 Calm	0 Calm	10 Pzw Fog.	10 Pzw Hzw ↑	10 Pzw
Sum	134	168	92	154	139	142
Means.	4.4	5.4	3.3	5.0	4.5	4.6

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Harvard College Observatory.

October 1878.

Date.	Extreme temperatures. Maximum 8 A.M. Before setting	Maximum 8 A.M. After setting	Minimum 8 A.M. Before setting	Minimum 8 A.M. After setting	Aurora 8 P.M.	Zodiacal light 8 P.M.	Remarks.	
1.	68.2	54.2	47.4	53.2	Moonlight	Moonlight		Seeing 6, 6, 7.
2	70.7	62.0	53.2	61.3	Moonlight	Moonlight		Seeing 5, 7, 5.
3.	73.8	62.2	58.8	61.8	Moonlight.	Moonlight.		Seeing 7, 5, 5.
4.	73.2	57.7	53.8	56.4	Moonlight.	Moonlight.		Seeing 5, 4, 3.
5.	71.0	53.3	45.9	52.2	Cloudy.	Cloudy.		
6.	(64.2)	(51.2)	(47.0)	(49.8)	Moonlight.	Moonlight.		Seeing 5, 5, 5.
7.	57.8	46.7	40.2	45.2	Cloudy.	Cloudy.	Lunar halo 6¾ P.M. *	
8	59.6	55.7	45.3	54.9	Cloudy	Cloudy	Lunar halo 7¼ P.M. *	Seeing 3, 8, 8.
9.	65.6	59.5	47.0	59.1	Cloudy	Cloudy	Much lightning after 5½ P.M., No thunder. Rain began about 7 P.M.	
10.	70.4	52.4	48.2	50.8	(Moonlight.)	(Moonlight.)		Seeing 5, 6, 5.
11.	59.4	46.5	39.8	45.2	Cloudy.	Cloudy.		
12.	54.2	47.0	45.1	45.8	Cloudy	Cloudy.		
13.	50.0	50.0	40.4	49.8	Moonlight	Moonlight	Lunar halo 9½ P.M. *	Seeing 4, 6, 4.
14.	62.5	47.0	41.8	45.9	Moonlight	Moonlight		Seeing 5, 6, 6.
15.	59.5	55.3	47.5	54.6	Moonlight & Clouds	Moonlight & Clouds		Seeing 6, 7, 5.
16.	70.9	58.6	52.6	57.6	(None)	(None)		Seeing 7, 8, 7.
17.	73.0	62.2	52.8	61.8	None; some clouds.	None.		Seeing 7, 5, 5.
18.	75.1	62.4	56.3	62.0	Cloudy	Cloudy		
19.	72.0	54.9	52.1	53.1	Cloudy.	Cloudy.		
20.	56.9	45.5	39.2	44.0	None	Cloudy.		Seeing 4, 6, 4.
21.	55.2	49.6	43.9	48.5	None	None		Seeing 8, 7, 7.
22.	68.0	47.8	42.6	46.4	Hazy	Hazy.		Seeing 4, 7, 7.
23.	61.3	54.0	46.3	52.9	Cloudy	Cloudy	Rain began about 10¾ A.M.	
24.	62.0	54.3	52.1	53.4	Cloudy	Cloudy.		
25.	58.5	48.8	46.9	47.2	Cloudy	Cloudy.		
26	58.1	48.3	44.4	46.8	None	Suspected		
27.	60.0	52.2	44.2	50.5	Cloudy	Cloudy.		
28.	62.0	48.0	45.2	45.9	None; some clouds	Suspected.		
29.	50.8	35.8	31.6	33.8	None	Suspected.	White frost this morning.	
30.	48.8	48.0	33.6	46.7	Cloudy	Cloudy.		
31.	50.0	45.8	43.0	45.0	Cloudy	Cloudy.	A little rain at times.	
Sum	1942.7		1428.2					
Means	62.67		46.07					

* Lunar halos measured with diopter as follows:

Oct. 7, 6¾ P.M. Inside diameter 23¼; outside 24¼; inside again 23⅜.
Oct. 8, 7¼ P.M. " " 21¼; " 25¼; halo indefinite.
Oct. 13, 9½ P.M. Halo did not continue definite enough for measurement.

See general remarks on observations for 1878, and book R 52, p. 197, for remarks on the diopter. The results of the observations above are as follows:

Halo of Oct. 7. Inside diameter; 1st measure 42°.5
2d " 42.8
Outside " ; 44.7
Halo of Oct. 8 Inside " ; 37.9
Outside " ; 47.0

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Meteorological Record of

November 1878.

Date	Barometer 8 A.M.	Barometer 2 P.M.	Barometer 8 P.M.	Thermometer attached to Barometer 8 A.M.	Thermometer attached to Barometer 2 P.M.	Thermometer attached to Barometer 8 P.M.	External Thermometer No. 4 8 A.M.	External Thermometer No. 4 2 P.M.	External Thermometer No. 4 8 P.M.	External Thermometer No. 4 mean half-night to 2 P.M.	Rain fall in inches gauge C. Examined at 8 A.M.
1.	29.753	29.869	29.973	49.4	53.8	50.7	40.7	45.1	37.5	40.30	0.022
2.	30.050	29.960	29.937	47.0	53.6	51.9	36.9	54.4	46.7	44.32	0.000
3.	30.086	30.149	30.180	50.3	53.0	42.0	44.3	44.0	34.3	40.24	0.000
4.	30.022	29.915	29.990	42.6	46.1	36.8	30.7	39.3	30.4	32.30	0.000
5.	30.020	29.988	30.002	35.0	39.3	37.4	25.0	36.8	31.2	29.84	0.000
6.	29.948	29.802	29.784	38.0	40.7	37.6	29.2	38.7	31.2	31.90	0.000
7.	29.740	29.596	29.550	36.6	44.1	43.8	25.8	41.5	37.2	33.50	0.000
8.	29.491	29.513	29.614	39.8	40.8	39.9	29.6	35.7	30.7	31.26	0.022
9.	29.602	29.548	29.571	38.0	40.1	40.5	34.1	39.8	34.8	35.52	0.000
10.	29.640	29.693	29.806	38.7	42.8	42.1	36.4	43.8	36.4	37.88	0.000
11.	29.761	29.696	29.670	40.8	48.8	49.4	40.5	55.4	46.8	46.00	0.000
12.	29.382	29.420	29.568	48.4	51.8	52.0	52.3	57.2	47.9	51.52	0.121
13.	29.643	29.550	29.795	45.8	47.7	44.9	40.4	45.9	40.5	41.54	0.000
14.	30.134	30.186	30.300	40.6	46.0	39.0	30.5	40.0	33.7	33.48	0.000
15.	30.465	30.450	30.496	37.7	45.0	44.8	26.0	42.1	35.0	32.82	0.000
16.	30.500	30.448	30.390	38.8	44.8	45.0	26.2	44.0	40.1	35.32	0.000
17.	30.324	30.273	30.262	43.3	46.0	46.8	40.0	46.5	43.3	42.62	0.000
18.	30.118	29.963	29.867	45.4	46.0	46.1	42.5	43.6	42.6	42.76	1.158
19.	29.856	29.842	29.902	42.0	43.9	44.8	36.1	44.3	43.2	40.58	2.008
20.	29.826	29.698	29.737	42.8	42.5	42.7	37.5	37.4	37.8	37.60	0.000
21	29.825	29.828	29.870	42.0	50.8	46.2	39.4	48.7	42.3	42.42	0.287
22	29.646	29.175	29.012	46.0	46.7	48.2	44.2	47.0	48.8	46.60	0.088
23	28.957	29.062	(29.269)	47.0	47.7	(46.0)	40.7	44.9	(41.1)	41.70	1.567
24	29.608	29.745	29.892	43.3	48.0	45.0	40.8	46.3	40.4	41.74	0.011
25	29.976	29.881	29.774	41.8	42.5	43.3	33.6	39.7	40.3	37.50	0.000
26	29.988	30.082	30.152	43.0	45.7	38.8	36.2	39.7	32.8	35.54	0.033
27	30.180	30.106	29.888	37.1	43.0	42.2	24.3	37.7	40.4	33.42	0.000
28	29.422	29.378	29.548	46.0	48.1	47.7	50.6	50.4	42.9	47.48	1.147
29	29.935	29.968	30.034	41.7	47.8	45.2	35.1	44.1	39.6	38.70	0.055
30	30.152	30.189	30.338	41.2	48.4	41.3	35.4	45.5	35.2	37.34	0.000
Sum	896.050	894.973	896.171	1270.1	1385.5	1322.1	1085.0	1319.5	1164.6	1163.74	6.519
means	29.868	29.832	29.872	42.3	46.2	44.1	36.17	43.98	38.82	38.79	

Barometric means reduced to the freezing point: 8 A.M., 29.831; 2 P.M., 29.785; 8 P.M., 29.833.

Mean temperature for month (mean of 3 means for 8, 2, 8, with double weight given to the morning and evening observations) 38.79 Fahrenheit.
Rainfall for month 6.52 inches.

Highest reading of maximum thermometer during the month (Nov. 13) 57.0 Fahrenheit.
Lowest " " minimum " " " " (Nov. 7) 22.9 " .

Records in parentheses (,) are those of observations not made at the regular times. The evening observations of Nov. 23 were made at 8¼ P.M.

Additional barometric observations: Nov. 22, 7 P.M., barometer 29.064, attached therm. 48.2 .
" 23, 8 1/6 A.M., " 28.963, " " 47.0 .

Notice occasionally taken of the failure of a wetted bulb to freeze; remarks as follows:
Nov. 3, 8 P.M. Wetted bulb of psychrometer not frozen; 6.3235 not frozen; both wetted at 7 P.M.
5, 2 P.M. " " " " not frozen; —" — frozen.
6, 8 P.M. " " " " not frozen; —" — not frozen; " " " 7 P.M.
14, 8 P.M. " " " " not frozen; —" — not frozen; " " " 9 P.M.

Observer A. Searle.

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Harvard College Observatory.

November. 1878.

Date.	Psychrometer. Dry Bulb 8.A.M.	Dry Bulb 2.P.M.	Dry Bulb 8.P.M.	Wet bulb 8.A.M.	Wet bulb 2.P.M.	Wet bulb 8.P.M.	Relative humidity Guyots Tables 8.A.M.	2.P.M.	8.P.M.	C 3235. (Wet.) 8.A.M.	2.P.M.	8.P.M.	Relative humidity from No.4 and C 3235 Guyots Tables 8.A.M.	2.P.M.	8.P.M.
1.	40.3	44.4	36.9	37.6	38.0	34.0	74	48	69	38.6	39.0	35.5	75	47	74
2.	36.9	54.3	45.8	33.8	43.7	42.2	67	34	70	35.0	44.9	44.2	75	33	75
3.	44.0	43.4	33.8	41.0	36.3	30.4	73	41	64	41.8	37.2	31.5	74	41	67
4.	30.5	38.8	30.0	28.6	32.3	23.9	75	40	32	30.0	33.1	24.9	85	39	37
5.	24.6	36.4	30.8	21.7	29.5	26.8	56	36	54	22.3	31.0	28.0	58	43	61
6.	28.7	38.1	30.3	26.5	34.0	28.7	71	59	78	27.7	35.0	30.8	78	59	88
7.	25.7	41.2	37.0	25.4	34.1	32.5	88	38	54	26.2	35.0	34.0	96	39	62
8.	29.0	35.0	30.2	26.9	29.9	26.7	72	50	59	28.0	30.7	27.7	76	48	63
9.	33.8	39.3	34.3	29.2	31.4	29.9	53	31	55	29.8	32.0	31.0	52	31	58
10.	35.9	43.4	35.9	31.7	36.1	32.6	56	40	64	32.7	37.0	33.8	57	40	68
11.	40.6	55.1	46.3	38.4	47.3	43.5	78	50	76	39.3	48.4	45.0	83	54	81
12.	51.7	56.7	47.5	51.8	49.9	43.5	100	58	68	52.2	50.9	44.4	97	59	69
13.	40.4	45.6	39.9	38.4	41.4	35.5	74	65	57	39.3	42.1	36.6	84	65	60
14.	30.5	39.7	32.6	28.0	32.7	28.8	79	36	59	29.8	33.7	30.6	85	39	67
15.	25.8	41.7	34.0	24.3	34.5	30.7	69	38	65	25.1	36.8	33.4	80	50	77
16.	26.0	43.5	39.0	25.8	39.5	37.8	89	65	85	26.3	40.8	40.0	93	68	93
17.	39.5	45.9	42.7	38.3	43.8	42.6	84	81	96	39.2	44.8	43.2	86	81	93
18.	41.9	43.0	41.9	42.2	43.4	42.4	99	100	100	43.1	44.0	43.0	99	97	97
19.	35.9	43.7	41.6	35.7	41.5	39.9	94	80	83	36.4	42.2	41.0	96	77	76
20.	36.8	36.8	37.0	36.2	37.2	36.9	90	100	95	37.1	37.9	37.8	89	98	93
21.	38.9	48.3	41.6	38.8	46.4	41.5	95	84	96	39.8	47.1	42.3	97	84	94
22.	43.5	46.4	48.2	43.7	46.7	48.4	98	100	100	44.4	47.3	49.0	96	98	98
23.	39.9	44.6	(40.7)	40.1	41.5	(37.7)	96	73	(70)	41.1	42.1	(38.3)	97	72	(69)
24.	40.5	45.8	40.1	37.6	39.8	36.5	71	52	64	38.7	40.8	37.7	75	53	70
25.	33.3	38.8	39.6	32.5	37.9	39.0	87	88	91	33.6	39.1	39.8	93	88	89
26.	35.7	39.3	32.3	32.4	34.1	29.5	64	50	68	33.1	35.0	30.8	63	52	73
27.	23.9	36.8	39.4	23.9	33.5	39.5	92	64	97	24.6	35.0	40.2	95	68	92
28.	50.6	49.9	42.3	50.6	49.1	39.1	99	93	71	50.8	50.0	40.0	99	94	70
29.	34.9	43.7	38.9	31.3	37.9	35.5	62	52	65	32.2	39.0	37.7	66	53	76
30.	35.4	45.2	34.6	32.3	38.5	31.7	66	46	67	33.4	39.4	32.8	73	48	70
Sum	10451	13048	11452				2371	1792	2172				2472	1818	2260
Means	35.84	43.49	38.17				79	60	72				82	61	75

For tables used in reductions to preliminary to computation of relative humidity see general remarks on observations of 1877; data below collected to test these tables.

Date	Excess of relative humidity shown by No. 4 and C 3235, over that shown by psychrometer. 8.A.M.	2.P.M.	8.P.M.	No. 4 above dry bulb of Psychrometer 8.A.M.	2.P.M.	8.P.M.	Theoretical excess of No. 4 over dry bulb of Psychrometer, by tables used in computing relative humidity. 8.A.M.	2.P.M.	8.P.M.
1	+1	−1	+5	+0.4	+0.7	+0.6	+0.4	+0.4	+0.5
2	+8	−1	+5	+0.0	+0.1	+0.9	+0.5	+0.3	+0.4
3	+1	+0	+3	+0.3	+0.6	+0.5	+0.4	+0.4	+0.5
4	+10	−1	+5	+0.2	+0.5	+0.4	+0.5	+0.5	+0.6
5	+2	+7	+7	+0.4	+0.4	+0.4	+0.5	+0.5	+0.5
6	+7	+0	+16	+0.5	+0.6	+0.9	+0.5	+0.5	+0.5
7	+8	+1	+8	+0.1	+0.3	+0.2	+0.5	+0.4	+0.4
8	+4	−2	+4	+0.6	+0.7	+0.5	+0.5	+0.5	+0.5
9	−1	+0	+3	+0.3	+0.5	+0.5	+0.5	+0.5	+0.5
10	+1	+0	+4	+0.5	+0.4	+0.5	+0.5	+0.4	+0.5
11	+5	+4	+5	−0.1	+0.8	+0.8	+0.5	+0.5	+0.4
12	−3	+1	+1	+0.6	+0.5	+0.4	+0.3	+0.3	+0.4
13	+10	+0	+3	+0.0	+0.3	+0.6	+0.4	+0.4	+0.4
14	+6	+3	+8	+0.0	+0.3	+0.6	+0.5	+0.5	+0.5
15	+18	+12	+12	+0.2	+0.4	+1.0	+0.5	+0.4	+0.5
16	+4	+3	+8	+0.2	+0.5	+1.1	+0.5	+0.4	+0.5
17	+2	+0	−3	+0.5	+0.6	+0.6	+0.5	+0.4	+0.4
18	+0	−3	−3	+0.6	+0.6	+0.7	+0.4	+0.4	+0.4
19	+2	−3	−7	+0.2	+0.6	+1.6	+0.4	+0.4	+0.4
20	−1	−2	−2	+0.7	+0.6	+0.8	+0.5	+0.5	+0.5
21	+2	+0	−2	+0.5	+0.4	+0.7	+0.5	+0.4	+0.4
22	−2	−2	−2	+0.4	+0.6	+0.8	+0.4	+0.3	+0.3
23	+1	(−1)	−1	+0.8	(+0.3)	+0.4	+0.5	(+0.4)	+0.4
24	+4	+1	+6	+0.3	+0.5	+0.3	+0.4	+0.4	+0.4
25	+6	+0	−2	+0.3	+0.9	+0.7	+0.5	+0.5	+0.5
26	−1	+2	+5	+0.5	+0.4	+0.5	+0.5	+0.5	+0.5
27	+3	+4	−5	+0.4	+0.9	+1.0	+0.5	+0.5	+0.5
28	+0	+1	−1	+0.0	+0.5	+0.6	+0.4	+0.4	+0.4
29	+4	+1	+1	+0.2	+0.4	+0.7	+0.5	+0.4	+0.5
30	+7	+2	+3	+0.0	+0.3	+0.6	+0.5	+0.4	+0.5
	+2.6	+0.7	+1.0	+0.33	+0.49	+0.65	+0.43	+0.42	+0.46

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Meteorological Record of

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Date.	Estimated velocity in miles per hour, and direction (of approach) of wind.			Clouds. amount on scale of 10, and kind (on Poey's System). For explanations see note on page 4.		
	8. A. M.	2. P. M.	8. P. M.	8. A. M.	2. P. M.	8. P. M.
1.	3 NW.	6 W	2 W	7 Pm Fm ↘	6 Rs Mb Fm →	9 Pm Fm →
2.	1 WSW	7 W	2 S	0 P Fm haze	0 P R Rs	1 Pr Fm
3.	5 NW	7 NNW	2 N	0 Pm Mb Fm	0	9 Pr
4.	1 S W	8 NW	6 NW	1 P Rs Fm	0 Mb Fm	0
5.	6 NW	7 NW	4 W	0	0 Mb Fm	3 Pr Rs Fm
6.	1 S W	5 WSW	0 WSW	10 Pr Fm →	10 Pm Fm ↗	0 P
7.	2 S W	6 NW	2 S W	0 Rs	6 Pm Mb Fm Rs R	10 P
8.	6 NW	14 NW	11 NW	1 P Fm	6 P Mb Fm Rs	9 Pr Rs
9.	10 NW	13 NW	5 W	9 P Rs Fm ↘	10 P Fm	9 P Fm →
10	7 NW	6 NNW	1 NNW	2 Pm Fm ↘	1 Mb Fm ↘	8 Pm Fm →
11.	2 S W	2 S W	2 S	10 P Fm →	9 P Fm	10 Pm Fm a few stars visible
12.	6 S W	4 W	0 Calm	10 Pm Fm ↗ Fm ↗	10 Pm Fm →	3 P Fm
13.	4 SSW	8 W	7 W	10 P Fm ↗	9 P Mb Fm	0 P Fm
14.	1 WSW	7 NW	0	0 P Fm	0	0
15.	0 NW	0 Calm	0 Calm	0 Rs	5 P Rs	5 P haze
16.	0 NNW	5 E	1 SE	8 P Rs Fm ↗	5 Pr Pm Rs Mb Fm	4 P haze
17.	2 N	4 E	4 E	10 Pm Fm →	10 Pm Fm a little rain	10 Pm mist.
18.	5 NE	6 NE	7 NE	10 Pm; raining	10 Pm Fm LL; raining	10 Pm; raining
19	8 NNW	4 N	2 NE	10 Pm Fm ↘	10 Pm Fm ↘	10 P
20.	4 NNE	5 N	3 N	10 P	10 Pm; raining.	10 P
21.	2 S W	1 S W	1 N	10 P	3 P Pm haze	8 P fog.
22.	7 ENE	16 E	5 NE	10 Pm, raining	10 Pm Fm = raining	10 P, a little rain
23.	0 calm	6 WSW	(7 S W)	6 P Fm ↗ fog.	8 P Fm Rs	(1 P Fm haze)
24.	6 W	7 WNW	2 S W	5 Pm Fm Fm ↘	9 Pm Fm →	0
25.	1 W	1 W	2 N W	9 P Fm →	10 Pm Fm ↗	10 P
26.	6 N W	5 N W	3 N W	9 Pr Pm Fm → Fm ↘	1 P Rs Fm	0
27.	1 W	3 S E	5 NE	0 P Rs haze	9 Pm Fm ↗	10 P, raining.
28.	2 SSW	3 S W	6 N W	10 Pm mist.	10 Pm Fm ↗ mist & rain.	10 P
29.	4 N W	4 W	2 S W	0 P Rs Fm	9 Pm Fm →	8 Pm Fm →
30.	0 W	1 W	1 N W	0 P	8 Pr Rs Pm Mb Fm →	8 Pr Rs Fm →
Sums	101	171	95	167	194	185
Means	3.4	5.7	3.2	5.6	6.5	6.2

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Harvard College Observatory.

November, 1878.

Date.	Extreme temperatures. Maximum 8 A.M. Before setting	Maximum 8 A.M. After setting	Minimum 8 P.M. Before setting	Minimum 8 P.M. After setting	Aurora. 8. P. M.	Zodiacal light. 8. P. M.	Remarks.	
1.	51.6	42.0	37.4	39.8	Cloudy	Cloudy.	A little white frost this morning.	Seeing 6,4,4.
2.	46.8	37.9	34.7	36.7	Moonlight & Clouds	Moonlight.		
3.	54.8	45.1	36.6	43.9	Cloudy.	Cloudy.		
4.	45.3	33.0	25.7	30.1	Moonlight.	Moonlight.	White frost this morning.	
5.	44.0	26.7	23.0	24.5	Moonlight & Clouds	Moonlight.	Fragment of lunar halo at 10 P.M.	Seeing 3,7,8.
6.	37.7	30.2	24.3	28.2	Moonlight	Moonlight	A few snow flakes about 10 P.M.	
7.	38.2	28.0	22.9	25.3	Cloudy	Cloudy	White frost this morning.	Seeing 7,8,8.
8.	42.4	30.6	25.4	29.1	Cloudy	Cloudy.	A little snow on the ground this morning (fell about 0.2 inches in depth). Lunar halo about 8 P.M. Nov. 8; measured with dioptre.*	
9.	37.8	34.9	28.9	33.7	Cloudy	Cloudy		
10.	41.3	36.7	32.6	35.8	Cloudy	Moonlight		
11.	43.7	41.2	36.0	40.2	Cloudy	Cloudy.		
12.	55.3	51.2	40.2	51.5	Cloudy	Cloudy.		
13.	57.0	41.5	35.4	39.9	Moonlight	Moonlight	Shower about 1½ P.M.	Seeing 7, 8, 9.
14.	50.9	31.7	28.1	30.2	† Traces	Suspected		Seeing 7, 7, 7.
15.	40.0	27.2	23.6	25.8	Cloudy	Cloudy.	White frost this morning.	
16.	42.3	27.8	23.0	25.9	Cloudy	Cloudy.		
17.	45.0	40.4	25.7	39.3	Cloudy	Cloudy		
18.	48.4	42.8	39.4	41.9	Cloudy	Cloudy.		
19.	43.4	36.5	32.8	36.0	Cloudy.	Cloudy.	A little snow on the ground this morning.	
20.	44.0	38.0	35.7	37.0	Cloudy	Cloudy	Middle of day rainy.	
21.	39.3	39.6	35.8	39.0	Cloudy	Cloudy.		
22.	48.1	44.2	38.9	43.6	Cloudy	Cloudy		
23.	48.7	41.3	39.4	40.0	(Cloudy)	(Suspected)	Some rain in the forenoon.	
24.	45.8	41.3	38.9	40.2	None	‡ Distinct	{ White frost this morning; some rain after 11 A.M. }	Seeing 9, 7, 8.
25.	46.3	35.2	32.1	33.1	Cloudy	Cloudy.		
26.	41.3	37.0	33.0	35.8	None	Distinct as Nov. 24.		Seeing 8, 4, 3.
27.	40.6	25.6	23.2	23.8	Cloudy.	Cloudy.		
28.	54.6	49.4	23.5	49.8	Cloudy	Cloudy.		
29.	53.0	36.0	34.0	34.9				Seeing 8, 5, 5.
30.	44.6	36.7	33.5	35.2	Moonlight & Clouds	Clouds.		Seeing 6, 5, 7.
Sum	1372.2		943.7					
Means	45.74		31.46					

† Nov. 14, 7 P.M. Distinct low auroral arch; zodiacal light strongly suspected.

‡ Nov. 24, 8 P.M. Zodiacal light extending beyond Capricornus to the branch of the Milky Way from the Pleiades to Aquila.

* Nov. 8, 8½ P.M. Lunar halo measured with dioptre as follows:
inside 23¼; outside 26⅜; inside 21⅞ (halo brighter at this measure);
outside 25¾; inside 23¼ (halo fainter again).

See general remarks on observations for 1878, and book R52, p. 197, for remarks on the dioptre. The results of the observations of Nov. 8 are

Inside diameter; 1st measure 42°.5 — Outside diameter; 1st measure 49°.6
2d " 39.6 — 2d " 48.1
3d " 42.5

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Meteorological Record of

December. 1878.

Date	Barometer.			Thermometer attached to Barometer.			External Thermometer No. 4.				Rain fall in inches gauge C examined at 8 A.M.
	8 A.M.	2 P.M.	8 P.M.	8 A.M.	2 P.M.	8 P.M.	8 A.M.	2 P.M.	8 P.M.	Mean half weight to 2 P.M.	
1.	30.472	30.470	30.399	39.0	47.7	37.2	26.6	36.6	29.8	29.88	0.000
2.	30.165	29.783	29.587	41.0	44.7	49.5	42.6	47.2	56.5	49.08	0.000
3.	29.423	29.506	29.609	49.0	52.0	45.7	44.5	45.8	41.2	43.44	0.816
4.	29.500	29.333	29.435	45.2	45.4	49.0	40.3	44.3	37.3	39.90	0.022
5.	29.477	29.508	29.613	42.0	47.0	40.2	34.0	34.8	30.7	32.84	0.110
6.	29.683	29.701	29.770	35.7	46.9	35.3	26.2	32.4	27.5	27.96	0.000
7.	29.928	29.940	30.026	31.7	39.8	27.0	16.8	26.3	20.9	20.34	0.000
8.	30.200	30.249	30.291	29.4	37.4	28.7	17.2	27.5	23.2	21.66	0.000
9.	30.267	(30.108)		29.7	(32.0)		23.3	(29.7)			0.000
10.	29.612	29.317	28.996	36.9	40.0	45.0	38.0	51.5	53.2	46.78	0.708
11.	29.066	29.444	29.704	45.1	45.6	41.7	41.9	41.7	37.0	39.90	*1.424
12.	29.974	30.018	30.119	39.8	42.0	37.5	34.8	37.2	33.2	34.64	0.000
13.	30.148	30.150	30.170	37.6	43.0	37.6	31.0	33.4	29.5	30.88	0.000
14.	30.046	30.077	30.039	35.0	39.5	33.4	23.5	31.7	27.8	26.86	0.000
15.	29.856	29.710	29.668	34.9	37.0	38.3	31.5	33.0	33.3	32.52	0.044
16.	(29.792)	29.874	30.002	(35.0)	48.0	29.0	(23.0)	28.0	21.0	23.20	(0.177)
17.	30.109	30.048	29.999	29.8	46.5	33.4	17.1	27.3	26.2	22.78	0.000
18.		29.888	29.940		35.8	33.2		33.4	(28.8)		(0.000)
19.	30.031	30.136	30.213	32.8	45.2	31.0	26.0	27.8	22.4	24.92	0.000
20.	30.267	30.211	(30.281)	30.3	42.6	(34.0)	21.0	32.3	(23.5)	24.26	0.000
21.	30.210	30.057	29.676	30.5	34.7	33.4	20.3	25.9	34.6	27.14	0.000
22.	29.176	29.324	29.482	39.8	34.5	39.8	39.6	39.0	31.8	36.36	1.037
23.	29.610	29.667	29.744	35.3	41.8	28.2	25.3	29.2	20.5	24.16	0.000
24.	29.661	29.686	29.616	28.6	45.6	27.2	18.2	22.0	17.8	18.80	0.000
25.	(29.582)	(29.578)	29.622	(26.2)	(41.3)	29.3	(13.8)	(27.8)	21.8	19.80	(0.000)
26.	29.686	29.662	29.696	27.8	45.8	30.8	19.2	28.7	21.8	22.14	0.000
27.	29.550	29.472	(29.567)	26.4	29.6	(30.5)	20.2	26.6	(25.0)	23.40	0.000
28.	29.811	29.866	29.976	29.3	35.0	32.2	24.2	27.0	21.9	23.84	0.000
29.	(30.140)	30.136	30.136	(27.0)	37.6	31.3	(14.0)	25.0	21.9	19.36	(0.000)
30.	29.968	29.904	30.008	27.6	44.3	30.5	20.6	28.8	22.5	23.00	0.022
31	30.192	30.163	30.136	27.0	45.7	31.5	15.3	29.8	22.0	20.88	0.033
Sum	895602	924986	895490	10254	12940	10514	7900	1011.7	864.6	830.72	4.393
Means	29.853	29.838	29.850	34.18	41.74	35.05	26.33	32.64	28.82	28.65	

Barometric means reduced to the freezing point: 8 A.M., 29.838; 2 P.M., 29.803; 8 P.M., 29.832.

Mean temperature for month (mean of 3 means for 8, 2, 8, with double weight given to the morning and evening observations) 28.60 Fahrenheit.

Rainfall for month 4.39 inches.

Highest reading of maximum thermometer during the month (Dec. 3) 56.3 Fahrenheit.
Lowest " " minimum " " " " (Dec. 25) 12.0 "

Records in parentheses ( ) are those of observations not made at the regular times. The midday observations of December 9 were made at 2¼ P.M.; those of Dec. 25 at 2⅙ P.M.; the morning observations of Dec. 16, at 8½ A.M., of Dec. 25 at 8⅓ A.M., and of Dec. 29 at 8⅙ A.M.; the evening observations of Dec. 20 at 9½ P.M., and of Dec. 27 at 7¾ P.M. On Dec. 18, the rain gauge was examined at 2 P.M., and the maximum and minimum thermometers observed and set at 2 P.M.; the evening thermometric observations were made at 8½ P.M.

Dec. 10. Additional barometric observations; 8⅔ P.M.; barometer 28.961, attached therm. 46.0.
10¼ P.M.; " 28.955, " " 46.8.

*Dec. 10. Rainfall 8 A.M. to 8¾ P.M. 1.247 inches; 8¾ P.M. Dec. 10 to 8 A.M. Dec. 11, 0.177 inches; total 1.424 inches.

Observers: W. Upton, Dec. 4, 8 P.M.; Dec. 18, 19; Dec. 20, 8 A.M., 2 P.M.; Dec. 23, 2 P.M., 8 P.M.; Dec. 24, 25, 26; Dec. 27, 8 A.M., 2 P.M.; Dec. 31, 8 P.M.
F. Waldo Dec. 20, 8 P.M.; Dec. 21, 22; Dec. 23, 8 A.M.; Dec. 27, 8 P.M.; Dec. 28, 29.

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1866phae.proj..3831

Harvard College Observatory.

December. 1878.

Date	Psychrometer. Dry bulb. 8 A.M.	2 P.M.	8 P.M.	Wet bulb. 8 A.M.	2 P.M.	8 P.M.	Relative humidity. Guyots Tables. 8 A.M.	2 P.M.	8 P.M.	C, 3235 (Wet). 8 A.M.	2 P.M.	8 P.M.	Relative humidity from No. 4 and C 3235 Guyots Tables. 8 A.M.	2 P.M.	8 P.M.
1	26.3	36.0	28.9	25.3	32.2	28.1	81	60	86	26.3	33.0	28.9	88	59	84
2.	42.2	46.5	55.7	40.7	46.3	55.3	85	96	97	41.2	47.0	55.9	82	95	94
3	44.0	45.2	40.5	41.5	39.0	36.8	77	50	65	42.3	40.2	38.3	76	49	68
4.	40.0	43.7	36.5	38.7	43.4	35.8	86	95	89	40.0	44.0	36.9	91	95	89
5.	33.5	34.2	30.3	31.5	30.4	26.7	76	61	58	32.1	32.8	27.8	75	73	73
6.	26.0	32.2	27.0	22.9	27.8	23.8	56	52	58	23.8	28.8	24.8	62	59	60
7.	16.6	26.0	20.3	16.0	22.0	18.8	80	46	70	16.6	22.9	19.7	85	52	72
8.	17.0	26.9	21.9	16.6	23.8	19.8	84	57	63	17.2	24.3	21.9	88	55	73
9.	22.8	(28.8)		21.8	(28.3)		78	(87)		23.0	(29.4)		86	(89)	
10.	37.6	51.0	52.9	37.9	51.2	52.7	99	99	98	38.7	51.6	53.2	100	99	98
11.	41.4	41.2	36.6	40.5	37.5	31.9	90	66	52	41.4	38.4	32.9	90	66	54
12	34.6	36.8	32.9	30.7	31.9	29.1	60	51	59	31.3	32.8	30.0	61	52	62
13	30.7	32.6	28.8	28.0	27.6	25.7	67	47	61	29.0	28.7	27.0	71	49	67
14	23.0	31.1	27.4	21.6	26.3	24.8	73	47	65	22.3	27.0	26.2	74	47	73
15	30.9	32.1	32.6	30.1	32.3	32.8	87	98	98	32.1	33.0	33.5	99	93	95
16	(22.5)	27.5	20.4	(21.6)	24.0	19.0	(78)	55	71	(22.3)	25.0	19.7	(81)	60	71
17	16.9	26.8	25.7	16.5	23.0	23.5	84	49	66	17.1	24.0	24.9	88	53	76
18.		32.3	(28.0)		28.5	(25.8)		58	(71)		29.6	(27.0)		56	(74)
19.	25.5	27.3	21.0	23.2	24.8	19.2	64	61	66	24.0	24.2	21.0	67	61	71
20.	20.6	31.6	(23.0)	19.6	27.2	(21.3)	77	51	(69)	20.5	27.9	(22.2)	83	51	(73)
21.	19.4	25.3	34.0	19.2	24.7	34.2	87	85	98	20.0	26.0	34.8	85	92	95
22.	38.9	38.3	31.4	37.1	32.4	26.6	81	43	47	38.0	33.6	27.6	79	46	52
23.	25.2	28.7	19.9	24.4	24.6	17.7	82	50	60	24.9	25.7	18.5	86	56	61
24.	18.4	21.7	17.3	15.7	18.2	14.8	49	44	51	16.4	19.0	15.6	61	49	54
25.	(13.0)	(27.3)	21.0	(12.5)	(23.2)	19.6	(79)	(48)	72	(13.0)	(24.6)	21.0	(73)	(55)	79
26.	18.8	28.2	20.8	17.7	24.2	19.0	74	50	66	18.6	26.0	20.3	81	64	69
27.	19.4	25.5	(24.5)	18.8	23.8	(24.0)	82	71	(86)	19.4	24.6	(24.6)	78	68	(86)
28.	23.6	26.8	21.4	21.9	23.0	19.3	70	49	62	22.6	23.9	20.0	70	55	64
29.	(14.8)	24.6	21.3	(13.3)	20.9	19.6	(63)	47	68	(14.1)	21.8	20.8	(89)	51	75
30.	19.8	28.2	22.1	20.0	25.5	20.7	94	65	86	20.7	26.2	21.7	91	65	81
31.	15.3	29.5	21.3	15.3	25.1		90	49		15.9	26.7		98	61	
Sums	7787	9939	8454				2333	1887	2058				2438	1965	2143
Means	26.96	32.06	28.18				78	61	71				81	63	74

For tables used in reductions preliminary to computation of relative humidity see general remarks on observations of 1877. Data below collected to test these Tables.

Date	Excess of relative humidity shown by No. 4 and C 3235 over that shown by psychrometer. 8 A.M.	2 P.M.	8 P.M.	No. 4 above dry bull of Psychrometer. 8 A.M.	2 P.M.	8 P.M.	Theoretical excess of No. 4 over dry bulb of Psychrometer, by tables used in computing relative humidity. 8 A.M.	2 P.M.	8 P.M.
1.	+7	−1	−2	+0.3	+0.6	+0.9	+0.5	+0.5	+0.5
2.	−3	−1	−3	+0.4	+0.7	+0.8	+0.4	+0.4	+0.3
3.	−1	−1	+3	+0.5	+0.6	+0.7	+0.4	+0.4	+0.4
4.	+5	−0	+0	+0.3	+0.6	+0.5	+0.4	+0.4	+0.5
5.	−1	+8	+15	+0.5	+0.6	+0.4	+0.5	+0.5	+0.5
6.	+6	+7	+2	+0.2	+0.2	+0.5	+0.5	+0.5	+0.5
7.	+5	+6	+2	+0.2	+0.3	+0.4	+0.5	+0.5	+0.5
8.	+4	+8	+10	+0.2	+0.6	+1.3	+0.5	+0.5	+0.5
9.	+8	(+2)		+0.5	(+0.9)		+0.5	(+0.5)	
10.	+1	+0	+6	+0.4	+0.5	+0.3	+0.5	+0.5	+0.3
11.	+0	+0	+2	+0.5	+0.5	+0.4	+0.4	+0.4	+0.5
12.	+1	+1	+3	+0.2	+0.4	+0.3	+0.5	+0.5	+0.4
13.	+4	+2	+6	+0.3	+0.8	+0.7	+0.5	+0.5	+0.5
14.	+1	+0	+8	+0.5	+0.6	+0.4	+0.5	+0.5	+0.3
15.	+12	−5	−3	+0.6	+0.9	+0.7	+0.5	+0.5	+0.5
16.	(+3)	+5	+0	(+0.5)	+0.5	+0.6	(+0.5)	+0.5	+0.5
17.	+4	+4	+10	+0.2	+0.5	+0.5	+0.5	+0.5	+0.5
18.		−2	(+3)		+1.1	(+0.9)		+0.5	(+0.5)
19.	+3	−10	+5	+0.5	+0.5	+1.4	+0.5	+0.5	+0.5
20.	+6	−0	(+4)	+0.4	+0.7	(+0.5)	+0.5	+0.5	(+0.5)
21.	−2	+7	−3	+0.9	+0.6	+0.6	+0.5	+0.5	
22.	−2	+3	+5	+0.7	+0.7	+0.4	+0.5	+0.5	+0.5
23.	+4	+6	+1	+0.1	+0.5	+0.6	+0.5	+0.5	+0.5
24.	+12	+5	+3	−0.2	+0.3	+0.5	+0.5	+0.5	+0.5
25.	(−6)	(+7)	+7	(+0.8)	(+0.5)	+0.8	(+0.5)	(+0.5)	+0.5
26.	+7	+14	+3	+0.4	+0.5	+1.0	+0.5	+0.5	+0.5
27.	−4	−3	(+0)	+0.8	+1.1	(+0.5)	+0.5	+0.5	(+0.5)
28.	+6	+6	+2	+0.6	+0.2	+0.5	+0.5	+0.5	+0.5
29.	(−3)	+4	+7	(−0.8)	+0.4	+0.6	(+0.5)	+0.5	+0.5
30.	+8	+0	−5	+0.8	+0.6	+0.4	+0.5	+0.5	+0.5
31.		+12		+0.0	+0.3	+0.4	+0.5	+0.5	
	+.73						+0.49		+.47

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Meteorological Record of

December, 1878.

Date	Wind. Estimated velocity in miles per hour, and direction (of approach)			Clouds. Amount on Scale of 10, and kind (on Prep. System). For explanation see note on Page 4.		
	8 A.M.	2 P.M.	8 P.M.	8 A.M.	2 P.M.	8 P.M.
1.	1 S W.	0 W.	1 N W.	5 Pr Rs →	5 Pr Rs Rm Fmo →	6 P Fmo ↗
2.	8 E S E	10 S E	18 S S E	10 Pmo Fmo ↖	10 Pmo Fmo || raining	10 Pmo raining
3.	7 W S W.	7 W.	0 Calm.	5 Pmo Fmo →	3 Pmo Fmo →	9 Pmo Fmo →
4.	3 E	2 E S E	0 (W?).	10 Pmo Fmo ↖	10 Pmo Fmo ↑	10 P Mo.
5.	5 N W.	6 W.	5 W.	10 P Fmo ↓	5 Pmo Fmo →	10 P Fmo ↘
6.	4 W.	7 W.	5 W.	5 P Fmo ↓	5 Mo Fmo → Re	0 Re
7.	1 W.	6 N W.	1 N W.	0 P Re Fmo	1 Fmo	5 P Fmo
8.	1 W.	5 N W.	0 W	0 P	3 Pr Rs R	0 Re
9.	0 E	(2 E)		10 P	(10 P; snowing.)	
10.	0 N E	4 S E	20 S E	10 P fog; raining.	10 Pmo Fmo raining	10 Pmo Fmo || raining
11.	7 S W	6 W S W	7 W	10 Pmo Fmo ↗	9 Pmo Mo Fmo →	8 Pmo Fmo →
12.	3 W	4 W	4 W N W	9 P Fmo →	8 Pmo Mo Fmo → few snow flakes	9 P Fmo
13.	2 W.	9 N	1 N	1 Pmo Fmo	6 Pmo Fmo →	9 P
14.	2 N W	4 N N W	0 S W	0	0	1 P Re
15.	1 S E	3 N	2 N W	10 P fog.	10 P fog; a little rain	10 P fog.
16.	(5 W N W)	6 N W	3 N W	(0 Fmo)	0	0
17.	0 W	4 N W	0 Calm	0	0 Re	9 Pr
18.		2 W.	2 S W		7 Pmo Fmo	5 Fmo
19.	0 N W	8 N W	0 Calm	1 Fmo Re R	0	0
20.	1 W S W	3 N W	(4 S W?)	1 Pmo Fmo Re	9 Pmo Fmo	(0)
21.	4 W S W	1 S E S	6 N E	9 Pmo Fmo	10 Pmo; snowing	10 Pmo; snowing
22.	8 W S W	10 S W	10 W	9 Pmo Fmo →	2 P Fmo ↗	0
23.	2 W S W	2 W	4 S W	4 P Fmo Pr	0 haze near horizon.	0.
24.	5 W	4 W S W	6 S. W.	1 Pmo ↘	0	1 Pmo
25.	(S S W)	(5 W. S. W.)	2 S	(1 Re)	(2 Pr Rs Pmo.)	1 Fmo.
26.	3 W S W	3 W	4 S	3 Pmo Fmo Re	0 Haze in south	1 Pmo
27.	1 N	1 N	( )	10	10 slightly snowing	(10 P)
28.	1 W N W	4 N W	3. N W (?)	8 P Fmo Pmo →	1 Fmo slight haze	8 P Fmo
29.	(0 W.)	1 N W	0	(1 P haze)	5 P haze	1 small cloud, haze.
30.	0 S	5 N W	1 W	10 P snowing	2 Fmo	0
31.	0 W	3 W	0 Calm	1 P Fmo	2 Pmo Mo Fmo	0 Haze in N.
Sum	80	137	42	154	145	143
Means	2.7	4.4	3.1	5.1	4.7	4.6

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Harvard College Observatory.

December. 1878.

Date	Extreme temperatures. Maximum 8 A.M. Before Setting	Maximum 8 A.M. After Setting	Minimum 8 A.M. Before Setting	Minimum 8 A.M. After Setting	Aurora 8 P.M.	Zodiacal light 8 P.M.	Remarks	
1.	45.5	28.6	25.2	25.9	Cloudy.	Cloudy.		
2.	42.7	42.9	25.7	42.0	Cloudy	Cloudy.	Rain beginning about 1 P.M.	
3.	56.3	44.7	42.0	43.9	Cloudy	Cloudy.		
4.	46.3	42.0	38.8	40.2				
5.	44.0	35.3	32.1	33.3	Cloudy	Cloudy.		
6.	36.0	28.0	24.2	25.9	Moonlight	Moonlight		Seeing 5, 5, 5.
7.	32.8	19.6	15.0	16.1	Cloudy.	Cloudy.		
8.	26.7	19.0	14.4	16.8	Moonlight	Moonlight	Lunar halo about 9½ P.M.	
9	28.0	24.3	16.8	22.8			Snow began about 8½ P.M.; turned to rain in the evening.	
10.	40.0	38.4	22.8	37.6	Cloudy	Cloudy.		
11.	53.3	41.9	37.2	41.2	Cloudy	Cloudy.	Wind rose greatly in the afternoon.	
12.	43.5	35.7	33.5	34.5	Moonlight & Clouds	Cloudy.		
13	37.8	31.9	30.4	30.7	Cloudy	Cloudy		
14	34.6	25.0	22.8	23.0	None; some Clouds	† Distinct; very near Saturn		
15	32.0	32.0	23.0	31.3	Cloudy	Cloudy.	A little snow on the ground this morning.	
16	(33.3)	(24.0)	(22.4)	(22.4)	* None	† Distinct; very near Saturn		Seeing 8, 6, 6.
17	28.6	19.0	16.2	16.6	Cloudy.	Cloudy.		Seeing 7, 6, 4.
18	(36.3)	(26.2)	(16.8)	(32.5)	None	Suspected.		
19	35.3	28.0	25.3	26.0	Faint arch to Ursa Maj.	To γ Aquarii		Seeing 8, 6, 6.
20	28.8	24.0	17.8	21.2	(None)	(None)		Seeing 7, 5, 5.
21	32.3		18.4	19.7	Cloudy	Cloudy.	Began snowing about noon. Rain after 8½ P.M.	
22	49.0	39.2	19.5	39.3	None	suspected.	Snow mostly melted this morning.	
23	40.4	27.2	24.5	25.2	* None	To γ Aquarii		
24	30.0	21.0	17.0	17.8	None	Very marked from 6½ to 7½		
25	(24.8)	(17.2)	(12.0)	(13.8)	None	Very bright 6.30 - 7.30		
26	23.6	21.0	13.8	19.2	None	Moonlight		Seeing 8, 6, 6.
27	29.0	21.2	18.2	20.0	(Cloudy)	(Cloudy.)	(Began snowing at 11½ A.M.; snowed a little before 6 P.M., cleared up for an hour, and then clouded over again.)	
28	26.6	25.3	19.6	23.6	Clouds	Clouds & moonlight	Began snowing a little about 7½ A.M.	
29	(27.7)	(17.3)	(12.8)	(13.6)	Moonlight.	Moonlight.	(Moon's Sun seen by E. C. Pickering at 22h 48m sidereal time.)	Seeing 6, 8, 8.
30	25.7	21.4	13.3	19.8	Moonlight	Moonlight		
31	29.0	16.8	13.6	15.1	Moonlight	Moonlight		
Sum	1099.3		685.1					
Means	35.46		22.10					

* Dec. 16. Low auroral arch suspected at 9 P.M., certainly seen later, close to horizon, not reaching to γ Ursæ Maj.; some streamers 9½ to 10 P.M. Little or no dark sky below arch.

Dec. 23. Aurora pretty bright 6½ to 7 P.M.

† Dec. 14 and 16, 8 P.M. The zodiacal light joins the southern branch of the Milky Way, as usual. See note in record for November, 1878.

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General remarks on observations for 1878.

Range of temperature

Highest reading of maximum thermometer in 1878 94.8 Fahrenheit, July 2.
Lowest " " minimum " " 1878 −9.4 " , January 8.

Range of barometer

Highest " " barometer (attached thermometer 15.0) 30.610 inches, January 8, 8 A.M.
Lowest " " " (" " 46.8) 28.955 inches, Dec. 10, 10½ P.M.

Observers Arthur Searle, W. Upton, F. Waldo; see notes in record for each month. Reductions by various hands (A. Searle, F. Waldo, W. Hoxie, Miss R.G. Saunders).

Instruments as described in this volume immediately before record for 1878. Casella 3235 was used as a wet bulb thermometer throughout the year. Its freezing point on Jan. 17, 1878, appeared to be 32.8; see book Q4, end.

Relative humidity. The relative humidity was computed after applying corrections taken from the tables given in the general remarks on the observations for 1877. Below are the means of the data collected to test these tables, which appear in the record for each month.

Month	Excess of relative humidity shown by No. 4 and C. 3235 over that shown by psychrometer			No. 4 above dry bulb of psychrometer			Theoretical excess of No. 4 over dry bulb of psychrometer by tables used in computing relative humidity.		
	8 A.M.	2 P.M.	8 P.M.	8 A.M.	2 P.M.	8 P.M.	8 A.M.	2 P.M.	8 P.M.
January	+1.8	+0.4	+2.0	+0.50	+0.60	+0.66	+0.50	+0.47	+0.49
February	+2.2	+0.1	−0.9	+0.29	+0.64	+0.66	+0.48	+0.47	+0.47
March	+1.9	+1.5	+3.1	+0.41	+0.43	+0.67	+0.48	+0.41	+0.46
April	+0.2	+1.1	+1.5	+0.43	+0.54	+0.69	+0.38	+0.36	+0.37
May	+1.0	+0.6	+2.3	+0.41	+0.71	+0.76	+0.34	+0.39	+0.33
June	−3.3	+1.6	+2.8	+1.20	+0.69	+0.71	+0.42	+0.53	+0.40
July	−1.0	+1.7	+2.4	+0.92	+0.78	+0.73	+0.53	+0.74	+0.52
August	+1.2	+1.1	+2.4	+0.25	+0.69	+0.69	+0.45	+0.56	+0.45
September	+1.1	+2.4	+2.2	+0.18	+0.43	+0.62	+0.38	+0.47	+0.37
October	+2.3	+2.8	+2.4	+0.15	+0.29	+0.54	+0.34	+0.37	+0.33
November	+2.7	+0.9	+2.6	+0.33	+0.49	+0.65	+0.47	+0.42	+0.46
December	+2.4	+2.4	+2.8	+0.36	+0.38	+0.64	+0.49	+0.46	+0.47
Sums	+12.8	+16.6	+25.6	+5.43	+6.67	+8.02	+5.26	+5.65	+5.12
Means	+1.07	+1.38	+2.13	+0.452	+0.556	+0.668	+0.438	+0.471	+0.427

The comparisons of the thermometers in 1877, upon which the reduction tables depend, were chiefly made in the morning (when the covered bulbs were dry) but partly in the middle of days dry enough to secure the thorough drying of the covered bulbs after the morning observations; few or none were made in the evening. The results just obtained, therefore, show no important change in the relative condition of the thermometers.

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In the evening, both No.4 and C.3235, especially the latter, might be expected to stand relatively high on account of their relatively close connection with the woodwork of the shelter under which the thermometers are placed. This would increase the excess of relative humidity shown by thermometers No.4 and C.3235, as well as the excess of No.4 over the dry bulb of the psychrometer. No.4, being on the eastern side of the shelter, is most affected by the morning sun in the summer. This increases its excess over the dry bulb of the psychrometer, but lessens the relative humidity shown by No.4 and C.3235. The actual average excess of this over that shown by the psychrometer, to be attributed to the thickness of the covering of C.3235, seems to be little more than one per cent.

The failure to freeze, at temperatures below 32 Fahrenheit, of the wetted bulbs, has occasionally been recorded in the notes attached to the record, but has been disregarded, as heretofore, in the computation of relative humidity.

Mean temperature and rainfall; aurora and zodiacal light; Lunar halos

The mean temperature and rainfall have been determined as explained in the general remarks on the observations for 1877; a similar remark applies to the observations of aurora and zodiacal light. "Gegenschein" thought to be perceptible in February and March; see record for those months.

Some attention was paid during the year to the diameters of lunar halos; see notes in record. A diopter was constructed and used when opportunities occurred; but its constant was not fully determined, so that the measurements have not yet been reduced to angles. There is a preliminary determination of the constant (15 inches) in book R 45, pages 74 and 75. See also R 52, p. 197, for observations to determine this constant; result adopted 15.5 inches.

Anemometer

Blown off March 24; see record for March.

Phenomena

Remarkable rainstorm Aug 9

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Meteorological Record of

January. 1879.

Date.	Barometer			Thermometer attached to Barometer			External Thermometer No. 4.				Rain fall in inches gauge C.
	8. A.M.	2. P.M.	8. P.M.	8 A.M.	2. P.M.	8. P.M.	8 A.M.	2. P.M.	8. P.M.	mean half-weight to 2. P.M.	Examined at 8 A.M.
1.	30.060	29.978	29.912	26.0	35.8	32.2	17.1	29.9	27.7	23.90	0.000
2.	29.583	29.222	29.149	30.4	31.1	32.7	22.7	33.2	18.3	23.04	0.000
3.	29.184	29.028	29.982	22.4	25.2	22.9	3.9	12.8	14.7	10.00	0.389 *
4.	29.018	29.215	29.393	22.1	36.5	27.7	15.0	22.2	23.7	19.92	0.000
5.	29.553	29.548	29.564	26.0	43.3	29.0	17.2	28.3	21.1	20.98	0.000
6.	29.708	29.783	29900	25.7	40.2	26.1	13.2	20.5	13.2	14.66	0.000
7.	30.132	30.150	30.144	23.2	35.0	28.7	7.9	22.3	20.4	15.78	0.000
8.	29.938	29.848	29.854	28.1	32.2	32.8	28.4	35.9	31.4	31.10	0.000
9.	29.767	29.560	29.222	32.6	33.3	33.8	32.8	32.9	33.3	33.02	0.044
10.	29.904	30.141	30.262	27.8	43.9	30.2	17.7	21.9	16.7	18.14	(0.861) *
11.	30.271	30.187	(30.193)	26.0	28.9	(29.7)	12.9	27.3	(23.6)	20.06	0.000
12.	30.217	30.130	30.060	27.0	31.6	30.0	12.1	27.8	17.8	17.52	0.011
13.	29.962	29.838	29.812	26.5	29.7	31.5	18.3	34.1	28.0	25.34	0.000
14.	29.793	29.768	29.846	30.1	33.6	35.0	23.7	35.0	30.4	28.64	0.000
15.	30.149	30.278	30.334	26.7	21.0	23.6	5.6	8.8	3.7	5.48	0.000
16.	30.050	29.674	29.866	21.0	20.0	20.8	2.8	13.3	11.8	8.50	(0.132) *
17.	30.261	30.236	30.176	22.3	31.6	28.0	10.2	24.8	21.0	17.44	(0.543) *
18.	29.673	29.614	29.760	29.2	42.7	34.7	32.7	36.7	29.0	32.02	0.000
19.	29.786	29.727	29.662	28.2	39.9	31.8	15.4	30.8	18.6	19.76	0.011
20.	29.558	29.595	29.718	27.8	30.5	24.0	19.0	22.4	10.0	16.08	(0.131) *
21.	29.888	29.925	29.848	19.6	31.8	26.8	0.5	14.1	15.3	9.14	0.011
22.	29.685	29.846	29.998	26.6	33.9	33.3	29.0	37.2	30.2	31.12	0.022
23.	29.745	(29.731)	30.026	31.6	(34.0)	33.7	28.2	(35.8)	27.7	29.52	0.000
24.	30.223	30.100	29.961	29.5	39.0	36.3	19.1	34.8	30.0	26.60	0.000
25.	29.671	29.469	29.381	34.8	40.7	40.4	30.2	43.2	38.5	36.12	0.000
26.	30.121	30.189	30.296	19.4	21.8	17.5	3.7	9.7	4.9	5.38	0.000
27.	30.213	29.898	29.760	21.3	25.0	28.8	11.5	28.6	34.8	24.24	0.000
28.	29.774	29.764	29.910	32.4	38.0	40.6	37.2	49.5	42.7	41.86	0.033 *
29.	30.098	30.096	30.114	35.7	39.6	34.5	32.3	29.5	19.0	26.42	0.011
30.	30.060	29.982	29.986	26.0	31.8	32.5	10.1	27.7	24.4	19.84	0.000
31.	29.742	29.596	29.540	29.0	36.3	36.8	25.5	36.3	29.7	29.34	0.000
Sum	925787	924116	925629	8350	10379	9464	5559	8673	7116	6806	2.199
Means	29.864	29.810	29.859	26.93	33.48	30.53	17.93	27.97	22.95	21.95	

Barometric means reduced to the freezing point: 8 A.M., 29.868; 2 P.M., 29.797; 8 P.M., 29.858.

Mean temperature for month (mean of 3 means for 8, 2, 8, with double weight given to the morning and evening observations) 21.95 Fahrenheit.
Rainfall for month 2.20 inches.

Highest reading of maximum thermometer during the month (Jan. 29) 50.5 Fahrenheit.
Lowest " " minimum " " " " (Jan. 24) −1.1 "

Records in parentheses ( ) are those of observations not made at the regular times. The evening observations of Jan. 11 were made at 8½ P.M., and the midday observations of Jan. 23 at 2½ P.M. For the times of observations of rainfall, see notes on snow measures, p. 53.

* See notes on rainfall, p. 53.

Observers: W. Upton Jan. 3, 2 P.M.;
A. Searle at other times.

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January. 1879.

Date	Bychrometer. Dry bulb. 8 A.M.	2 P.M.	8 P.M.	Wet bulb. 8 A.M.	2 P.M.	8 P.M.	Relative humidity Guyots Tables. 8 A.M.	2 P.M.	8 P.M.	C 3235 (Wet). 8 A.M.	2 P.M.	8 P.M.	Relative humidity from No 4 and C 3235 Guyots Tables. 8 A.M.	2 P.M.	8 P.M.
1.	16.8	28.9	26.8	16.3	25.4	24.6	82.	61.	72.	17.0	26.3	26.3			
2.	21.8	32.6	17.5	21.8	32.7	17.6	91.	97.	92.	22.4	33.0	17.9			
3.			14.0		11.8	12.6			64	3.8	12.8	13.2			
4.	14.7	21.7	23.2	13.2	19.1	21.1	63	56	62	13.7	20.0	21.7			
5.	16.7	27.7	20.5	15.2	24.4	19.2	66	58	72	16.7	25.3	20.0			
6.	12.7	20.0	12.7	12.4	17.7	11.9	83	58	74	12.8	18.2	12.2			
7.		21.6	19.7		19.3	18.6		60	75	8.1	20.0	19.8			
8.	28.1	34.9	30.8	25.7	32.7	30.9	68	74	97	26.3	33.4	30.9			
9.	32.8	32.1	32.5	32.2	32.1	32.7	89	96	98	33.0	32.9	33.5			
10.	17.0	21.4	15.9	15.9	18.6	15.2	72	65	78	16.2	19.1	15.9			
11.	12.3	26.6	(22.6)	12.5	23.7	(22.4)	92	59	(89)	12.8	24.7	(23.0)			
12.	11.0	26.7	16.9	12.0	24.9	17.4	70	72	98	12.4	25.5	17.8			
13.	17.6	33.0	27.5	17.7	31.4	26.5	92	80	84	18.5	31.6	27.0			
14.	23.0	34.4	29.4	23.0	30.7	27.4	92	62	73	23.6	32.7	29.1			
15.	bel. gr.	bel. gr.	bel. gr.	bel. gr.	bel. gr.	bel. gr.				4.9	6.9	3.0			
16.	bel. gr.	12.7	11.7	bel. gr.	13.8	11.8			90	3.8	13.8	12.0			
17.	bel. gr.	23.7	20.3	bel. gr.	21.9	20.2		69	90	11.0	22.8	20.8			
18.	32.2	36.0	29.3	32.3	32.9	25.9	97	66	59	32.8	33.8	26.5			
19.	15.0	30.0	17.4	15.2	26.9	17.8	93	63	97	15.6	28.1	18.2			
20.	18.6	21.4	bel. gr.	18.6	21.0	bel. gr.	91	86		18.8	21.2	9.0			
21.	bel. gr.	13.8	14.8	bel. gr.	11.4	13.9		46	74	0.9	11.7	14.6			
22.	28.7	36.3	29.8	27.2	31.7	27.9	79	53	76	28.1	32.3	29.0			
23.	27.5	(35.0)	27.0	27.9	(34.4)	24.4		(90)	64	29.1	(35.0)	25.0			
24.	18.9	34.2	29.5	18.6	29.5	28.7	86	53	87	19.0	Sent to Baltimore.				
25.	29.8	42.6	37.8	27.9	37.5	32.8	76	53	50						
26.	bel. gr.	bel. gr.	bel. gr.	bel. gr.	bel. gr.	bel. gr.									
27.	bel. gr.	27.7	34.0	bel. gr.	25.9	32.4		75	79						
28.	36.7	49.0	42.2	36.0	45.3	39.3	89	71	74						
29.	31.6	29.0	18.2	28.3	26.7	16.2	62	69	60						
30.	bel. gr.	27.0	23.7	bel. gr.	22.8	21.2		47	60						
31.	25.4	35.7	29.1	24.5	30.7	27.2	81	52	74						
Sum	547.5	835.7	691.6				1714	1791	2062						
Means	17.55	26.96	22.31				82	66	74						

Notes on rainfall: the snow weighed is in the form of cylinders cut with a lamp-chimney 1 7/8 inches across inside.

Jan. 3, 8 A.M. Snow measured in 10 places; 4, 1½, 4½, 4½, 5½, 3½, 3½, 2½, 2, 3½; mean depth 3.5 inches. 12 inches weigh 2⅛ ounces. Hence rainfall to 1 inch of snow 0.1111 inches; total rainfall 0.389 inches. Gauge C cleared out without examination.

Jan. 10, 1½ P.M. New snow not readily distinguishable from old; estimated depth of new snow on 5 places 2½, 4½, 4½, 4, 4; mean 3.9 inches; 13½ inches of new snow weigh 4¾ ounces; hence rainfall to 1 inch of snow 0.2208 inches; total rainfall 0.861 inches; result of Jan. 9 by rain gauge (0.044 inches) not subtracted from this total, as it cannot be known whether the estimated depth of new snow covers the snow fallen before Jan. 9, 8 A.M.

Jan. 16, 8 A.M. About 1½ inches of snow had fallen at this time.

Jan. 17, about 5 P.M. Depth of snow measured in 10 places; 6, 5½, 4, 10, 5, 9, 10, 9, 9, 9; mean 7.65 inches above crust, and assumed to be new: of this about 1.50 inches fell before 8 A.M. Jan. 16; 24 inches weigh 3⅜ ounces; hence rainfall to 1 inch of snow 0.0826 inches; rainfall to 8 A.M. Jan. 16, 0.132 inches; to 8 A.M. Jan. 17, 0.543 inches.

Jan. 20, 10 A.M. Gauge examined; result 0¾ ounces (0.066 inches); snow previously measured in 5 places; depth in 3 places 1½, in 2 places 1⅝ inches; mean 1.550 inches; 13 inches weigh 1¾ ounces; hence rainfall to 1 inch of snow 0.0845 inches; total rainfall 0.181 inches; this measure preferred to that by the gauge, as there was wind enough to blow some light snow out of the gauge.

Jan. 28, 8 A.M. The snow contained in which was [illegible] 29 grains, the same containing additional 0⅛ ounces

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Meteorological Record of January 1879.

Date	Wind. Estimated velocity in miles per hour and direction (of approach). 8. A. M.	2. P. M.	8. P. M.	Clouds. Amount on scale of 10, and kind (Poey's System). For explanation see note on Page 4. 8. A. M.	2. P. M.	8. P. M.
1.	1 S W	1 S W	0 S W	6 P Rs Fmn →	6 P Fmn.	10 P Fmn ↗
2.	0 N	1 E SE	10 N W	10 P Snowing.	10 P Snowing.	9 P Fmn →
3.	11 W S W.	10 W.	9 W	0	6 Pm in S. Haze in N.	10 P Fmn ↘
4.	10 W N W.	6 W N W.	3 W.	10 Pr Rs	10 Pr Rs Fmn	10 Pr.
5.	1 W.	3 N W.	3 W.	0 Rs	0 Fmn.	0.
6.	0 W.	5 N W.	2 N W.	0	1 Pr.	3 Pr Fmn ↓
7.	1 N W.	2 N W.	0 W.	0	3 Pr Rs	10 Pr Rs.
8.	7 S W.	3 S W.	3 S W.	10 Pr	10 P	10 P
9.	0 Calm.	1 E NE	4 NE	10 P; snowing.	10 P; snowing.	10 P; snowing.
10.	5 N W.	5 W N W.	2 W S W.	0	0	0
11.	0 S W.	2 W S W.	(0 S W.)	10 Pr	10 Pr	(10 Pr, a little snow.)
12.	0 N W.	1 N W.	0 N	5 Pr Rs	8 P Fmn ↘ Fmn ↘	0 P Rs
13.	0 N E.	5 S W.	2 S W.	10 Pr	10 P Fmn ↗	0 P
14.	1 W.	3 N W.	0 Calm	9 Pr Rs Fmn	9 P Fmn →	9 P
15.	8 N N W.	3 N W.	2 N W.	0 Pr Rs.	6 Pr Rs Fmn ↘	9 P
16.	3 N	7 N N E	7 N N W.	10 P; Snowing	10 Pr; raining	3 P haze.
17.	0 S W.	1 S W.	0 Calm	2 P Rs Fmn ↓	5 Pr Rs	9 P
18.	1 S	6 W.	2 S W.	10 P snowing	1 Fmn	0 haze.
19.	0 W.	0 S W.	0 N W.	1 Pr Rs	2 Pr Rs Fmn ↗	1 P haze
20.	5 N	4 N	3 N W.	10 P Fmn	10 Pr; snowing.	0.
21.	1 W.	0 S W.	1 S W.	9 Pr Rs	8 Pr Rs	10 P
22.	2 S W.	4 W.	0 W.	9 P Fmn ↘	10 P Rs	8 P haze
23.	0 Calm	(1 W.)	4 W N W.	10 P fog.	(10 P Fmn →)	0
24.	1 S W	6 S S W.	4 S	9 Pr Rs Fmn →	1 P Rs	10 P
25.	2 S W	3 S W.	8 S W.	1 P Rs haze	7 P Fmn →	0
26.	10 N W	8 N W	6 N W	0	0 Fmn	0 Rs
27.	2 S S E	1 S W	5 S W	10 P Fmn →	10 P; few drops of rain	10 P; some rain.
28.	0 S	6 W.	1 S W	10 P; a little rain.	9 Pm Fmn →	10 Pm Fmn →
29.	5 N	6 N W.	4 N W.	4 Pm Fmn	0	0
30.	1 N W.	5 N W.	1 W.	0	0 Rs Fmn	0
31.	0 W	4 W N W	0 S W	8 P Fmn →	1 M Fmn →	0
Sum	73	113	86	183	183	161
Means	2.4	3.6	2.8	5.9	5.9	5.2

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Harvard College Observatory.

January 1879

Date.	Extreme temperatures. Maximum. 8 A.M. Before Setting	Maximum. 8 A.M. After Setting	Minimum. 8 A.M. Before Setting	Minimum. 8 A.M. After Setting	Aurora. 8 P.M.	Zodiacal light 8 P.M.	Remarks.
1.	29.9	18.8	13.8	16.6	Cloudy.	Cloudy.	Faint lunar halo about 10 P.M.
2.	29.9	23.6	16.6	21.8	Cloudy.	Cloudy.	
3.	33.1	7.3	3.5	3.5	Cloudy.	Cloudy.	
4.	16.3	16.3	3.1	14.5	Cloudy	Cloudy.	
5.	24.3	18.8	14.2	16.6	Moonlight	Moonlight.	
6.	28.4	15.2	12.2	12.3	Moonlight & Clouds.	Moonlight & clouds.	
7.	21.0	10.0	6.9	7.3	Cloudy.	Cloudy.	Aurora 7, 8, 9.
8.	28.7	28.9	7.3	28.0	Cloudy	Cloudy.	A little snow 8 to 9 A.M. and after 2 P.M.
9.	37.4	32.8	27.4	32.0	Cloudy	Cloudy.	
10.	33.8	19.5	16.2	17.3	Moonlight	Suspected (Moonlight).	
11.	23.0	14.8	8.9	12.1	(Cloudy)	(Cloudy)	
12.	27.7	14.0	11.2	11.2	None	Distinct; enters ring from Saturn to a Aquilæ	† Solar halo at 8 A.M.
13.	27.8	19.2	10.4	17.8	None	Distinct as yesterday.	
14.	34.2	24.5	17.4	23.0	None; some clouds.	* Cloudy	
15.	35.1	8.3	4.9	4.9	Cloudy	Cloudy.	
16.	10.0	6.0	1.8	2.3	None	Visible this haze.	
17.	14.0	12.0	2.3	9.7	Cloudy	Cloudy	
18.	32.3	32.2	9.0	32.1	None	Distinct; enters ½ way from Saturn to a Aquilæ	Began snowing about 7 A.M.; soon ceased.
19.	37.0	16.8	14.2	15.0	None	* Visible among clouds & haze.	
20.	30.7	20.3	13.9	18.3	None	Distinct; enters distinct ½ way from Saturn to a Aquilæ	
21.	32.2	3.0	−1.1	−0.1	Cloudy	Cloudy	A little snow after 8 P.M.
22.	29.0	29.0	−0.5	28.8	Cloudy	Cloudy	
23.	38.0	28.5	20.2	27.3	None.	As on Jan. 20	
24.	39.5	20.3	17.6	18.6	Cloudy	Cloudy.	
25.	35.0	30.7	18.5	29.9	None	Visible; some moonlight.	High wind in the evening and following night.
26.	43.0	6.3	3.2	3.2	Moonlight	Moonlight.	
27.	12.3	13.0	1.4	10.9	Cloudy	Cloudy.	
28.	37.3	36.8	10.9	36.6	Cloudy	Cloudy.	
29.	50.5	32.5	31.1	31.7	Moonlight	Moonlight.	
30.	32.6	11.9	8.4	9.7	Moonlight	Moonlight.	
31.	29.6	26.3	9.7	25.2	Moonlight	Moonlight	
Sum	933.6		334.6				
Means	30.05		10.79				

* Jan. 14, about 6½ P.M. Zodiacal light seen among clouds.
Jan 19, 6 to 7 P.M. Zodiacal light distinct.

† Jan. 12, 8 A.M. Solar halo; some concentration of light at highest point; fragment of an exterior ring, colored; red inside. Too indefinite for satisfactory measurement with diopter; radius of inner ring about 13 (22°.5), of outer about 26 (48°.7).

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Meteorological Record of

February. 1879.

Date.	Barometer			Thermometer attached to Barometer			External Thermometer No. 4.				Rain fall in inches, Gauge C.
	8. A.M.	2. P.M.	8. P.M.	8. A.M.	2. P.M.	8. P.M.	8. A.M.	2. P.M.	8. P.M.	Mean half-night to 2 P.M.	Examined at 8 A.M.
1.	29.483	29.399	29.397	34.1	33.4	29.3	20.4	24.3	13.5	18.42	0.000
2.	29.259	29.269	29.424	21.6	26.8	27.9	14.0	27.8	23.8	20.68	0.000
3.	29.580	29.511	29.544	26.7	33.9	33.8	20.7	33.6	28.8	26.52	0.000
4.	29.661	29.721	29.829	30.6	36.0	34.0	26.8	32.3	27.2	28.06	0.000
5.	29.850	29.749	29.637	29.4	32.5	33.6	20.1	33.0	27.8	25.76	0.000
6.	29.719	29.764	29.809	31.8	35.7	35.3	23.9	32.8	29.0	27.72	0.247 *
7.	29.950	29.962	30.065	29.0	34.7	35.3	17.4	31.7	26.8	24.02	0.000
8.	30.221	30.216	30.297	29.1	33.0	32.8	19.9	27.1	18.8	20.90	0.000
9.	30.054	29.844	30.000	26.0	29.7	30.8	19.8	33.0	23.5	23.92	0.000
10.	30.371	30.344		24.9	27.3		8.6	19.7			0.022
11.	30.117	29.951	(29.800)	29.1	36.1	(37.7)	33.5	46.3	(42.8)	39.78	0.000
12.	29.194	29.126	29.380	40.7	41.3	36.9	43.8	41.0	31.3	38.24	0.927
13.	29.625	29.682	29.850	33.3	35.6	33.0	26.1	30.6	23.3	25.88	0.088
14.	30.017	29.950	30.069	20.5	27.4	28.0	12.3	19.4	14.2	14.48	0.000
15.	30.233	30.250	30.300	22.4	26.3	25.8	8.6	18.8	15.9	13.56	0.000
16.	30.333	30.295	30.325	15.0	29.9	34.3	10.9	30.8	28.7	22.00	0.000
17.	30.361	30.273	30.177	25.4	29.0	31.3	22.3	32.8	29.5	27.28	0.000
18.	29.934	29.980	30.141	29.6	29.4	28.6	20.5	22.8	19.4	20.52	
19.	30.293	30.283	30.251	15.0	24.3	27.6	8.0	21.7	18.8	15.06	
20.	29.970	29.766	29.732	26.4	28.7	28.8	17.3	29.2	16.3	19.28	
21.	29.623	29.626	29.720	25.7	27.4	22.7	12.4	18.4	11.9	13.40	
22.	29.840	29.748	29.678	19.8	25.0	28.5	10.9	24.4	21.8	17.96	(1.078) *
23.	29.623	29.540	29.491	23.9	33.3	34.8	20.3	39.0	32.4	28.88	0.011
24.	29.649	29.669	(29.813)	24.0	29.9	(23.9)	17.5	21.2	(14.2)	16.92	0.011
25.	30.029	30.042	(29.952)	15.0	24.6	(27.2)	10.0	20.9	(23.7)	17.66	0.000
26.	29.828	29.718	29.726	28.2	32.5	41.3	23.1	48.3	46.6	37.54	(0.547) *
27.	30.086	30.208	30.384	35.3	29.3	22.8	24.0	24.1	16.8	21.14	0.496
28.	30.653	30.659	30.679	18.4	26.7	21.5	5.0	16.2	12.5	10.24	0.000
Sum	837.556	836.545	807.470	721.9	859.7	827.5	518.1	801.2	639.3	615.82	3.427
Means	29.913	29.877	29.906	25.8	30.7	30.66	18.50	28.61	23.68	22.81	

Barometric means reduced to the freezing point: 8 A.M., 29.920; 2 P.M., 29.871; 8 P.M., 29.900.

Mean temperature for month (mean of means for 8, 2, 8, with double weight given to the morning and evening observations) 22.59 Fahrenheit.
Rainfall for month 3.43 inches.

Highest reading of maximum thermometer during the month (Feb. 12) 49.0 Fahrenheit.
Lowest " " minimum " " " " " (Feb. 28) 4.5 "

Records in parentheses ( ) are those of observations not made at the regular times. The evening observations of Feb. 11 were made at 7¼ P.M.; those of Feb. 24 at 9¼ P.M.; those of Feb. 25 at 7¼ P.M. The rainfall was determined on Feb. 22 at 2 P.M., and on Feb. 26 about 10 A.M.

See notes on rainfall, p. 57.

Feb. 28, 8 P.M. Barometer 30.699, not 30.679 as o[illegible]ed.

Observer, A. Searle.

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Harvard College Observatory.

February. 1879.

Date.	Psychrometer. Dry bulb. 8 A.M.	Dry bulb. 2 P.M.	Dry bulb. 8 P.M.	Wet bulb. 8 A.M.	Wet bulb. 2 P.M.	Wet bulb. 8 P.M.	Relative humidity Guyot's Tables. 8 A.M.	2 P.M.	8 P.M.	C (3235 (Mt). 8 A.M.	2 P.M.	8 P.M.	Relative humidity from M.A. and C. 3235 Guyot's Tables. 8 A.M.	2 P.M.	8 P.M.
1.	20.2	23.8	12.8	19.2	21.7	11.8	77	66	70						
2.	13.5	27.2	23.3	12.9	24.0	21.6	77	58	69						
3.	20.3	33.0	28.4	19.4	28.4	25.5	78	51	64						
4.	26.4	31.8	26.6	23.6	27.2	24.0	60	50	62						
5.	19.9	31.8	26.9	19.7	27.9	27.0	88	60	94						
6.	23.4	31.9	28.3	23.6	29.0	26.1	95	67	71						
7.	17.2	31.0	26.4	17.2	26.9	23.5	90	54	59						
8.	19.7	26.5	17.8	18.4	22.1	16.4	71	42	68						
9.	20.0	32.3	22.8	19.5	29.4	20.0	84	67	55						
10.	bel. gr.	19.0		bel. gr.	15.9			100							
11.	33.0	45.8	(42.1)	31.0	41.9	(41.1)	76	67	(89)						
12.	42.8	40.4	30.7	43.2	37.2	26.9	100	69	57						
13.	26.0	30.0	22.7	23.9	26.8	19.5	68	62	51						
14.	12.0	18.8	13.8	10.9	15.7	13.0	68	45	74						
15.	bel. gr.	18.4	15.3	bel. gr.	15.3	13.4		43	57						
16.	11.0	30.4	28.0	10.5	25.2	25.6	78	41	68						
17.	21.7	32.0	28.9	20.7	29.6	29.0	78	72	97						
18.	19.9	22.1	18.6	20.2	22.0	18.6	96	90	91						
19.	bel. gr.	20.4	18.0	bel. gr.	19.6	18.3		80	95						
20.	16.7	28.6	15.6	17.3	28.6	16.2	100	96	100						
21.	11.7	17.9	11.5	10.7	16.0	10.4	69	61	67						
22	bel. gr.	23.8	20.8	bel. gr.	19.3	20.7		35	90						
23.	20.1	38.5	31.8	19.9	32.2	29.2	88	41	69						
24.	16.9	20.7	(13.8)	14.8	17.5	(12.4)	57	46	(64)						
25.	bel. gr.	20.5	(23.2)	bel. gr.	17.9	(23.7)		55	(99)						
26.	22.4	47.9	46.0	23.1	45.5	46.2	100	80	99						
27.	23.5	23.8	16.2	23.3	20.7	14.5	89	53	62						
28	bel. gr.	15.5	11.8	bel. gr.	14.3	11.2		69	76						
Sum	50 14/10	78.6 48	62.6 21				1697	1720	2017						
Means	18.11	28.03	23.04				77	61	75						

Notes on rainfall: the snow weighed is in the form of cylinders cut with a lamp chimney 1 7/8 inches across inside.

Feb. 6, 8 A.M. New snow 2 5/8 inches deep, pretty uniform; 15 inches weigh 2 1/4 ounces; hence rainfall to 1 inch of snow 0.0941 inches; total rainfall 0.247 inches. This measure preferred to that by the rain gauge (1 7/8 ounces or 0.165 inches).

Feb. 22, 21 M. Depth of snow measured in 10 places; 5, 6, 7, 4, 7, 8, 5, 4, 4 1/2, 7; means 5.75 inches; 18 inches weigh 5 3/8 ounces; hence rainfall to 1 inch of snow 0.1874 inches; total rainfall 1.078 inches, of which about half fell Feb. 17 and early Feb. 18, the rest Feb. 20. Rain gauge cleared out without examination.

Feb. 26, about 10 A.M. Depth of snow measured in 10 places; 4, 3 1/2, 3 1/2, 3 1/2, 3 3/4, 4, 3 1/2, 3 3/4, 4, 3 3/4; mean 3.725 inches; 15 1/2 inches weigh 3 5/8 ounces; hence rainfall to 1 inch of snow 0.1468 inches; total rainfall 0.547 inches. This measure preferred to that by the rain gauge (3 1/2 ounces or 0.309 inches).

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Meteorological Record of

February. 1879.

Date.	Wind. Estimated velocity in miles per hour, and direction (of approach).			Clouds. Amount on a scale of 10, and kind (on Rio's system). For explanation see note on Page 4.		
	8. A. M.	2. P. M.	8. P. M.	8. A. M.	2. P. M.	8. P. M.
1.	3 N W.	7 N W.	6 N W.	9 P Fmn ↘	3 Mb Fmn →	1 P Fmn
2.	6 N W.	6 N W.	8 N W.	10 P Fmn ↓	10 P Re	2 Pr Fmn ↓
3.	2 W N W.	6 N W.	1 W N W.	0 Re Fmn	0 Re Fmn	9 P Fmn ↘
4.	5 N W.	6 N W.	2 N W.	4 P Fmn ↘	0 Fmn	0
5.	0 S W.	2 S W.	0 Calm	10 P Fmn →	10 P	10 P snowing.
6.	0 N W.	0 N W.	0 Calm	5 P Re Fmn →	5 Pr Re Fmn	10 Pmn Fmn ↗
7.	1 N W.	4 W N W.	1 W.	0 Fmn	0 Fmn	0
8.	4 W N W.	5 N N W.	1 W.	0 P Fmn	0 Re Fmn	0 P
9.	1 S.	9 W.	8 W.	10 Pr	5 P Mb Fmn Fmn →	0
10.	4 N W.	2 N W.		2 Pr Re	0	
11.	10 S W.	5 S S W.	(10 S S W)	8 Pr Rmn Fmn → Fmn ↗	8 P Fmn ↗	(10 P; a little rain.)
12.	5 S.	6 W.	5 W S W.	10 P; raining.	10 Pmn Mb Fmn →	0
13.	1 W.	8 W.	9 W.	0 Pr Fmn	10 P Fmn →	5 P
14.	2 N W.	4 W.	2 N W.	1 Pr Re Fmn ↗	1 Mb Fmn	0
15.	5 W S W.	4 W N W.	0 W.	0	0 Fmn	0
16.	1 S W.	5 W.	2 S W.	0 Pr Re	0	9 P
17.	2 N	4 E N E	7 N E	10 P Re Fmn ↗	10 P Fmn	10 P snowing
18.	8 N E	7 N	5 N	10 P; Snowing.	10 P; a little rain.	10 P
19.	3 N	3 N	2 N	10 P; Snowing.	10 P; snowing.	10 P.
20.	6 N	8 E N E	8 N E	10 P; Snowing	10 P; Snowing	10 P; Snowing.
21.	12 N N W.	16 N N W.	15 N N W.	10 Pr Re Fmn	0	0
22.	3 W N W	4 W N W	5 S W	9 Pr Re	9 Pr Re	10 P
23.	1 S W	3 S W	4 S W	5 Pr Re Fmn ↗	3 Pr Re Fmn	8 P
24.	2 W	5 W	(1 S W)	0 Fmn	3 Re Mb Fmn →	(0)
25.	0 Calm	3 E S E	(3 E)	10 P Fmn →	10 P	(10 P; snowing.)
26.	1 N	7 S	10 S	10 P fog.	4 P Fmn	10 P
27.	3 W N W	6 W N W	4 W	10 P Re Fmn Fmn ↘	0	3 Pr Re Fmn ↗
28.	5 W N W	4 W N W	1 N	5 Pr Re	5 P Mb Fmn ↓	0
Sum	106	150	120	168	136	137
Means	3.8	5.4	4.4	6.0	4.9	5.1

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Harvard College Observatory.

February, 1879.

Date	Extreme temperatures. Maximum 8 P.M. Before Setting	Maximum 8 P.M. After Setting	Minimum 8 A.M. Before Setting	Minimum 8 A.M. After Setting	Aurora. 8 P.M.	Zodiacal Light 8 P.M.	
1.	36.2	21.8	18.5	19.9	Moonlight & Clouds	Moonlight	A few snowflakes last night.
2.	25.2	15.8	8.3	13.3	Moonlight	Moonlight	Lunar halo 7 to 7½ P.M.; measured with dioptra. Observed with a bright lunar corona, with full spectrum. †
3.	28.0	21.7	13.4	20.1	Cloudy	Cloudy.	
4.	33.7	27.2	21.0	26.3	Moonlight	Moonlight	
5.	32.7	21.6	17.9	19.8	Cloudy	Cloudy.	Snow after 2 P.M.
6.	33.3	24.9	19.7	23.3	Cloudy	Cloudy.	
7.	33.9	19.0	15.9	16.9	Moonlight	Moonlight	
8.	33.6	21.8	16.8	19.3	Moonlight	* Moonlight	
9.	27.3	21.4	6.7	19.7	None	Distinct to Aries	
10.	33.4	10.7	7.1	8.1			
11.	~~33.3~~	33.2	~~38.0~~	33.0	(Cloudy)	(Cloudy.)	
12.	49.0	42.8	33.2	43.0	None	Distinct to Aries	
13.	45.0	27.0	24.3	26.0	None; some clouds.	Somewhat visible among clouds.	
14.	31.6	14.0	11.2	11.8	None.	Distinct to Aries	
15.	23.2	11.0	7.2	8.1	None	Distinct to Aries	
16.	20.4	12.5	8.1	10.7	Cloudy.	Cloudy.	
17.	32.9	22.9	10.5	21.5	Cloudy	Cloudy.	Began snowing about 2½ P.M.
18.	33.8	21.4	19.5	19.9	Cloudy.	Cloudy.	
19	23.2	10.0	6.2	7.3	Cloudy.	Cloudy	Little snow fell for 24 hours preceding 8 A.M., but some snowflakes most of the time.
20.	22.0	18.6	7.4	16.6	Cloudy	Cloudy.	Little snow fell yesterday; snow falling faster this morning.
21.	30.1	14.0	11.7	11.7	None	To Aries	
22.	19.2	13.2	7.3	10.2	Cloudy	Cloudy	A little snow about 7 P.M.
23.	27.2	21.2	10.3	20.0	Cloudy	Moonlight & Clouds	Snow squall about 11 P.M.
24.	39.0	20.0	16.0	16.8	(None)	(None; some Moonlight)	
25.	24.0	11.4	6.0	9.3	(Cloudy)	(Cloudy.)	Began snowing about 3 P.M.
26.	29.8	24.0	9.3	22.2	Cloudy.	Cloudy.	Rain in the evening, and a little snow later in the night and next morning.
27.	48.9	25.0	22.2	23.2	Moonlight & Clouds	Moonlight & Clouds	
28.	25.4	7.5	4.5	4.5	Moonlight	Moonlight	
Sums	874.8		368.2				
Means	31.24		13.16				

* Feb. 8. Zodiacal light distinct at 7 P.M.

† Feb. 2, 7 to 7½ P.M. Lunar halo; inside diameter by dioptra $23\frac{3}{4}$ ($43.^{\circ}6$); outside " " " $26\frac{1}{4}$ ($49.^{\circ}3$).

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Meteorological Record of March. 1879.

Date.	Barometer			Thermometer attached to Barometer.			External Thermometer No 4				Rainfall in inches Gauge C
	8 A.M.	2. P. M.	8. P. M.	8 A.M.	2 P.M.	8 P.M.	8 A.M	2 P.M.	8 P.M.	mean half weight 2 to 2 P.M.	Examined at 8 A.M.
1.	30.630	30.448	30.340	21.8	29.6	32.0	13.2	31.6	27.3	22.82	0.000
2*	30.358	30.394	30.401	30.0	33.3	33.0	(28.4)	31.7	29.0	29.30	0.000
3.	30.524	30.577	30.585	30.0	36.8	33.4	23.7	33.5	27.7	27.26	0.000
4.	30.455	30.222	30.087	28.2	36.0	37.5	27.7	42.7	41.4	36.18	0.000
5.	30.183	30.271	30.481	37.6	40.0	31.0	37.8	39.8	22.8	32.20	0.000
6.	(30.482)	30.250	29.900	(37.0)	29.8	31.0	(16.8)	23.8	28.7	22.96	(0.000)
7.	29.954	29.880	30.110	31.7	34.8	27.9	31.6	30.8	19.3	26.52	0.366 †
8.	30.298	30.279	30.283	26.0	32.4	32.0	17.4	29.5	24.9	22.82	0.000
9.	30.262	30.138	(30.102)	30.3	33.0	(34.7)	(29.3)	36.9	(33.3)	32.42	0.055
10.	29.999	29.982	30.010	34.0	40.4	46.4	34.8	48.2	44.4	41.32	0.022
11.	29.780	29.649	29.768	39.0	43.9	46.0	41.0	54.6	40.9	43.68	0.022
12.	29.930	(29.953)	30.058	35.0	(40.0)	39.5	32.5	(39.8)	35.1	35.00	0.011
13.	30.109	29.932	29.868	32.0	38.0	41.1	29.7	42.1	40.4	36.46	0.000
14.	29.958	29.800	29.612	37.7	42.1	42.6	33.6	42.9	40.4	38.18	0.000
15.	29.709	29.759	29.938	38.8	41.8	40.4	32.2	39.1	30.2	32.78	0.143
16.	30.098	30.046	30.111	33.5	38.0	37.0	25.3	36.6	30.3	29.56	0.000
17.	29.973	(29.650)	29.731	34.8	(36.1)	36.7	30.9	(35.0)	34.1	33.00	(0.622) †
18.	29.951	29.962	30.017	29.0	33.0	32.2	22.3	31.1	26.8	25.86	0.276
19.	30.098	30.056	30.102	29.3	35.8	32.9	19.7	35.0			0.000
20	30.122	30.109	30.152	30.9	38.8	38.9	27.7	39.2	33.8	32.44	0.000
21.	29.982	29.808	29.943	37.2	37.7	37.9	33.6	34.9	33.8	33.94	(0.121) †
22.	30.312	30.247	29.999	34.0	39.0	38.8	29.0	35.0	33.1	31.84	0.011
23.	29.798		29.996	36.1		40.0	30.2		36.9		0.904
24.	30.151	30.062	30.027	35.3	40.5	40.6	30.3	39.6	34.7	33.92	0.088
25.	29.927	29.887	29.940	37.8	42.8	42.0	37.8	47.5	38.6	40.06	0.000
26.	30.080	30.106	30.118	38.3	41.8	39.2	31.8	39.9	34.1	34.34	0.000
27.	30.142	30.069	30.062	37.8	38.5	39.4	34.2	36.7	37.3	35.94	0.022
28.	30.099	30.098	30.088	37.6	37.3	38.2	33.2	34.4	35.1	34.20	1.136
29.	29.856	29.675	29.550	37.8	39.8	41.1	36.4	38.6	38.8	37.80	0.000
30.	29.250		29.369	39.6		44.6	36.1		41.9		0.199
31.	29.306	29.052	*28.904	39.0	38.0	36.2	34.3	31.7	26.0	30.46	0.022
Sum	981.776	869.361	929.652	1057.1	1153.5	1164.4	922.5	1082.2	1001.1	912.96	4.020
Means	30.057	29.978	29.989	34.10	39.78	37.56	29.76	37.32	33.37	32.61	

Barometric means reduced to the freezing point; 8 A.M., 30.042; 2 P.M., 29.948; 8 P.M., 29.964.

Mean temperature for month (mean of 3 means for 8, 2, 8, with double weight given to the morning and evening observations) 32.72 Fahrenheit.

Rainfall for month 4.02 inches.

Highest reading of maximum thermometer during the month (March 12) 55.0 Fahrenheit.
Lowest " " minimum " " " " (March 1) 4.3 "

Records in parentheses ( ) are those of observations not made at the regular times. The morning observations of March 6 were made at 8¼ A.M; the evening observations of March 9 at 6½ P.M.; the midday observations of March 12 at 2¼ P.M, and those of March 17 at 3¾ P.M. The rainfall was measured on March 17 at 1 P.M. and on March 21 at 12½ P.M. The external thermometer were observed on the morning of March 2 at 8¼ A.M, and on that of March 9 at 8½ A.M.

*Barometer at 8¼ P.M. March 31 same as at 8 P.M.

† See notes on rainfall, p. 61.

Observers: W. Upton, March 26, 8 P.M.;
A. Searle at other times.

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Harvard College Observatory.

March. 1879.

Date.	Psychrometer. Dry bulb. 8 A.M.	2 P.M.	8 P.M.	Wet bulb. 8 A.M.	2 P.M.	8 P.M.	Relative Humidity Guyot's Tables. 8 A.M.	2 P.M.	8 P.M.	C. 32-35 8 A.M.	2 P.M.	8 P.M.	Relative humidity from No 4 and C 32-35 Guyot's Tables. 8 A.M.	2 P.M.	8 P.M.
1.	12.5	30.8	26.8	11.8	27.5	25.5	76	62	78						
2.	(27.8)	30.9	28.5	(24.2)	25.9	24.6	(54)	45	53						
3.	23.5	32.9	27.0	21.2	28.9	25.4	62	57	76						
4.	27.3	41.8	40.6	26.8	38.6	40.1	89	77	93						
5.	37.8	39.0	21.9	34.9	33.3	19.5	69	46	60						
6.	(16.4)	22.8	28.1	(15.6)	22.8	28.1	(77)	92	93						
7.	31.0	30.2	18.8	29.2	26.6	17.0	77	59	63						
8.	16.9	29.3	24.2	16.1	24.7	22.8	77	47	75						
9.	(28.8)	35.4	(32.5)	(28.1)	33.6	(31.8)	(87)	78	(88)						
10.	34.1	48.0	43.4	34.5	45.8	41.6	92	82	83						
11.	40.5	54.0	40.4	40.6	49.4	34.1	98	69	43						
12.	32.1	(39.3)	34.5	28.5	(32.7)	30.7	60	(39)	61						
13.	29.0	41.6	39.6	26.7	36.4	37.2	70	53	74						
14.	32.9	42.4	39.4	32.7	40.8	39.8	94	84	91						
15.	31.6	38.5	29.5	27.4	31.8	24.7	53	41	44						
16.	25.3	36.6	30.3	22.6	30.9	26.3	59	47	53						
17.	30.3	(34.0)	33.3	30.9	(34.3)	33.6	106	(99)	99						
18.	21.7	30.6	26.4	20.5	25.9	23.3	75	47	56						
19.	19.7	34.6	27.7	18.5	28.3	24.2	73	38	55						
20.	27.3	38.5	32.9	25.7	31.7	28.8	77	36	56						
21.	33.1	34.0	33.2	32.9	34.3	32.8	94	99	91						
22.	28.8	34.5	32.3	25.4	29.6	32.6	58	51	99	30.0	35.6	33.6			
23.	30.0		36.3	29.8		34.4	94		77						
24.	29.4	38.9	33.9	27.3	36.2	32.5	72	72	81						
25.	37.4	46.8	37.9	36.9	40.8	34.7	92	53	67						
26.	31.3	39.6	33.3	29.7	36.0	32.4	79	64	86						
27.	33.8	36.0	36.6	33.6	36.2	36.4	94	92	94						
28.	32.7	34.0	34.5	32.6	33.0	34.1	95	85	92						
29.	35.8	37.9	38.1	35.4	37.6	38.0	92	94	95		39.0	39.2			
30.	35.5		41.3	36.0		38.8	100		76						
31.	33.9	31.3	25.6	31.1	30.8	25.7	69	90	94						
Sum	910.1	1064.2	1008.8				2458	1898	2247						
Means	29.35°	36.70°	32.54°				79	69	72						

Notes on rainfall; the snow weighed is in the form of cylinders cut with a lamp chimney 1 7/8 inches across inside.

March 7, 8 A.M. Depth of snow measured in 3 places; 2 1/4 inches in each; 13 1/2 inches weigh 3 1/2 ounces; hence rainfall to 1 inch of snow 0.1627 inches; total rainfall 0.366 inches. This measure preferred to that by the rain gauge (2 1/2 ounces or 0.221 inches).

March 17, 8 A.M. Snow about 2 inches deep. Ceased snowing towards noon. At 1 P.M., depths of snow measured in 5 places; 3, 4, 3 1/2, 3 1/2, 3 1/2; mean 3.5 inches. 15 inches weigh 4 1/4 ounces; hence rainfall to 1 inch of snow 0.1778 inches; total rainfall 0.622 inches. This measure preferred to that by the rain gauge (3 1/8 ounces or 0.276 inches).

March 21, 12 1/4 P.M. Gauge examined at this time. Snow changing to rain, with light northeast wind. Too little snow on ground for measurement except by gauge.

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Meteorological Record of

March 1879

Date	Wind. Estimated velocity in miles per hour, and direction (of approach).			Amount on scale of 10, and kind (on Prip system) of Clouds. For explanation see note on Page 4.		
	8. A. M.	2. P. M.	8. P. M.	8. A. M.	2. P. M.	8. P. M.
1.	2 NE	2 S	4 S W	10 P Fmn L	3 Pn Rs Fmn ↑	10 P Fmn ↑
2.	5 N W	3 N	0 Calm.	1 P Rs Fmn	1 P Rs Fmn →	10 P
3.	3 N N E	3 E	2 E S E	3 P Rs Fmn	0	0 Rs
4.	3 S S W.	8 S W	6 S W	10 P	9 Pn Rs Fmn →	10 P Fmn ↓1
5.	2 W S W.	8 N N W.	6 N N W	0 Rs	3 Pmn Fmn →	0
6.	(2 N N E)	0 S	2 S	(10 Pn Pmn Fmn)	10 P; snowing	10 P; snowing
7.	5 N W.	11 N N W.	7 N W.	1 Pmn Fmn	5 Pn Rs Fmn ↓	0 Fmn
8	3 N W.	2 N W.	0 Calm.	9 Pn Rs	0	0 P Rs
9.	0. S S E	1 S	(2 S E)	10 P	10 P Fmn ↑	(2 P Rs Fmn)
10.	0 S	0 W	0 Calm	10 P fog.	0	0
11	0 S W	3 W S W	S S W	10 P Fmn ↑; a little rain	4 Pn Rs Fmn →	0
12.	2 W	(7 W)	1 W	5 Pn Pmn Fmn →	(4 M Fmn)	9 P
13.	1 S W	6 S W	4 S W	10 P	9 P Rs Fmn →	1 P haze
14.	0 N	3 E	0 Calm	10 P fog	10 P Fmn ↗	10 P fog; a little rain
15.	4 W	6 W	3 N W	0 Fmn	3 M Fmn →	0
16.	2 S W	S S W	3 N	5 Pmn Fmn ↗	9 Pmn M Fmn ↗	9 P
17.	7 E	(0 Calm)	0 Calm	10 P; snowing	(10 P; fog. raining)	10 P; fog. raining
18.	4 N N W	S N N W	0 N	6 Pmn Rsn Fmn ↗	1 Pn	0
19.	2 N N W	2 W	0 Calm	0 Rs	6 P Fmn →	0
20.	2 S W	5 W	0 Calm.	1 P Rs haze	5 M Fmn →	9 P haze.
21.	4 S E	3 N	0 Calm	10 P; snowing	10 P mist	5 P
22.	0 Calm	5 S E	6 E	2 P Rs	9 P Fmn ↗	10 P raining
23.	3 N		2 W N W	10 P Fmn ↓ raining		10 P
24.	2 N	4 S E	6 S	10 Pmn Fmn ↑	10 P Fmn	9 P Fmn
25.	1 S W	3 W N W	7 W N W	10 P Fmn ↗	10 Pmn M Fmn →	10 P
26.	2 N W	3 E S E	2 S S E	10 P; snowing.	9 P M Fmn →	9 Haze
27.	3 E S E	7 E	4 E	10 P; snowing.	10 P; raining	10 P; raining
28.	9 N N E	9 N N E	2 N	10 P mist.	10 P	10 P
29.	1 E S E	2 E S E	1 E	10 P fog.	10 P	10 P
30.	1 N N W		1 N N W	10 P; raining		9 Pmn Fmn →
31.	S N	13 N	18 N W.	10 P	10 P; Snowing.	10 P; snowing
Sum	80	129	94	213	190	192
Means	2.6	4.4	3.0	6.9	6.6	6.2

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1866phae.proj...3837

Harvard College Observatory.

March, 1879.

Date.	Extreme temperature. Maximum 8 A.M. Before Setting	Maximum 8 A.M. After Setting	Minimum 8 A.M. Before Setting	Minimum 8 A.M. after Setting	Aurora 8 P.M.	Zodiacal Light 8 P.M.	
1.	17.6	15.0	4.3	12.2	Cloudy.	Cloudy.	
2.	(32.2)	(28.4)	(12.2)	(27.6)	Cloudy	Cloudy.	Lunar halo about 7½ P.M. † Small fragment of lunar halo at 8 A.M.
3.	32.6	25.0	21.7	23.2	Moonlight	Moonlight.	
4.	33.8	28.8	20.1	27.0	Cloudy	Cloudy.	
5.	43.7	38.6	27.0	37.3	Moonlight	Moonlight.	
6.	(44.6)	(18.1)	(11.5)	(16.1)	Cloudy	Cloudy	Began snowing about 10 A.M.
7.	33.0	31.8	15.9	31.1	Moonlight	Moonlight.	
8.	33.2	18.9	13.2	16.7	Moonlight	Moonlight	
9.	(31.1)	(30.4)	(16.6)	(28.8)	(Twilight + Clouds)	(Twilight)	
10.	36.8	34.5	28.9	34.1	None	* To the Pleiades.	
11.	52.3	40.6	32.6	40.4	None.	as yesterday.	
12.	55.0	33.3	29.4	32.1	Cloudy	Cloudy.	
13.	40.4	30.0	25.2	28.9	None	To the Pleiades.	
14.	43.3	34.0	28.8	33.0	Cloudy	Cloudy.	
15.	43.2	34.0	31.2	31.5	None	To the Pleiades.	
16.	40.1	27.3	21.7	25.1	None	Cloudy.	
17.	38.5	31.7	25.0	30.2	Cloudy.	Cloudy.	{Thermometers compared; See p. 1 of this book.}
18.	35.0	23.5	21.4	21.4	None	To the Pleiades.	{Rain yesterday afternoon and a little snow before morning.}
19.	31.5	21.3	14.2	19.4	None	To the Pleiades.	A few snowflakes during the day.
20.	35.2	28.3	19.5	27.2	Cloudy	Cloudy.	
21.	39.3	34.4	27.0	33.2	Cloudy	* Cloudy.	
22.	35.0	29.6	24.3	28.6	Cloudy	Cloudy.	
23.	37.5	30.2	28.5	29.9	Cloudy	Cloudy.	
24.	39.5	30.3	26.6	29.5	Cloudy	Cloudy	
25.	42.0	37.8	29.4	37.1	Cloudy	Cloudy	
26.	47.6	32.3	30.2	31.2	Hazy	Hazy	
27.	41.6	35.3	31.2	34.0	Cloudy.	Cloudy.	
28.	37.0	33.0	32.4	33.0	Cloudy	Cloudy	
29.	36.5	36.5	32.4	36.0	Cloudy	Cloudy	
30.	40.8	36.3	35.2	35.4	Cloudy.	Cloudy.	
31	48.0	34.6	33.8	34.1	Cloudy	Cloudy.	Began snowing about noon.
Sum	1197.9		751.4				
Means	38.64		24.24				

* March 10, 8 P.M. Cone of zodiacal light rather well defined, narrow; wholly within β Arietis on the northern and γ Ceti on the southern side.
March 21, 8¼ P.M. Zodiacal light visible to the Pleiades.

Mean

† March 2, about 7½ P.M. Lunar halo measured with diopter; inside diameter $23\frac{1}{4}\ (42°.5)$
" " $23\frac{1}{4}\ (42°.5)$
outside " $25\frac{1}{2}\ (47°.6)$
inside " $23\frac{1}{2}\ (43°.0)$
Halo becoming indistinct at last measure.

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1866phae.proj..383T

April, 1879.

Date.	Barometer.			Thermometer attached to Barometer.			External Thermometer No 4				Rain fall in inches—Gauge C.
	8. A.M.	2. P.M.	8. P.M.	8. A.M.	2. P.M.	8. P.M.	8. A.M.	2. P.M.	8. P.M.	Mean giving half weight to 2 P.M.	Examined at 8. A.M.
1.	28.914	28.979	29.180	33.0	37.2	40.8	30.2	40.0	38.3	35.40	(0.275)*
2.	29.387	29.388	29.463	38.3	43.6	37.9	38.5	42.3	33.0	37.06	0.000
3.	29.467	29.392	29.224	31.8	41.0	41.7	30.2	45.9	34.1	34.90	0.000
4.	29.421	29.504	29.678	34.7	36.6	36.5	22.8	28.9	24.3	24.62	0.232
5.	29.778	29.818	29.881	31.8	37.5	38.5	24.5	34.1	32.1	29.46	0.000
6.	29.926	29.881	29.914	34.0	41.0	40.6	31.5	42.9	34.3	35.10	0.000
7.	29.750	29.697	(29.777)	36.1	44.0	(44.5)	38.3	51.8	(39.8)	41.60	0.000
8.	29.957	(29.983)	29.999	36.9	(42.8)	43.0	36.2	(44.6)	37.5	38.40	0.000
9.	29.940	29.843	(29.866)	38.8	50.8	(52.6)	40.2	58.2	(49.5)	47.52	0.000
10.	29.942	29.807	29.602	44.3	46.0	43.4	38.8	37.8	34.8	37.00	0.000
11	29.430	29.515	29.648	38.2	41.0	41.4	31.7	40.5	36.1	35.22	1.434
12	29.721	29.736	29.847	37.0	41.0	41.6	32.8	41.8	35.1	35.52	0.022
13	29.924	(29.855)	29.814	37.2	(43.8)	47.1	37.7	(47.7)	45.6	42.86	0.000
14	29.676	29.650	29.724	42.4	51.8	49.8	42.8	54.3	44.6	45.82	0.000
15	29.774	29.744	29.704	42.7	46.5	46.1	42.3	43.7	38.1	40.90	0.000
16	29.737	(29.782)	29.875	42.7	(48.0)	49.0	38.8	(53.2)	48.0	44.16	0.331
17	29.973	29.942	29.918	46.0	48.4	48.8	36.5	41.5	38.7	38.38	0.033
18	29.662	(29.380)	29.270	42.1	(42.0)	40.7	37.2	(36.7)	35.6	36.46	0.805
19	29.393	(29.475)	29.578	37.6	(37.8)	38.1	30.9	(32.9)	33.3	32.26	0.971
20	29.726	29.810	29.900	37.4	46.0	48.6	39.0	51.7	45.1	43.98	0.077
21	30.060	30.057	30.144	43.1	50.8	52.0	47.9	58.0	48.8	50.28	0.000
22	30.270	(30.249)	30.246	45.8	(52.2)	54.6	50.7	(60.4)	52.6	53.40	0.000
23	29.940	29.939	(30.156)	49.2	53.3	(50.9)	55.2	58.2	(48.6)	53.16	0.000
24	30.297	30.212	30.200	40.0	50.7	51.5	44.3	56.1	47.4	47.90	0.000
25	30.201	30.100	30.018	47.0	50.7	50.0	46.0	47.7	45.8	46.26	0.000
26	29.992	30.090	30.147	46.8	48.3	49.5	40.7	42.9	40.8	41.18	0.033
27	30.200	30.179	30.176	45.7	54.0	53.6	47.2	55.7	49.4	49.78	0.000
28	30.099	30.002	29.998	49.6	54.0	57.3	52.3	71.7	60.5	59.46	0.000
29	30.008	(29.957)	29.950	64.8	(58.3)	58.2	55.3	(66.2)	54.6	57.20	0.552
30	29.756	29.606	29.653	54.8	55.2	58.2	50.6	58.7	56.3	54.50	0.883
Sum	894.321	893.572	894.150	1248.7	1389.3	1403.5	1191.1	1447.1	1259.7	1269.74	5.648
Means	29.811	29.786	29.805	41.62	46.31	46.78	39.70	48.24	41.99	42.32	

Barometric means reduced to the freezing point; 8 A.M., 29.777; 2 P.M., 29.739; 8 P.M., 29.756

Mean temperature for month (mean of 3 means for 8, 2, 8, with double weight given to the morning and evening observations) 42.32 Fahrenheit.
Rainfall for month 5.65 inches.

Highest reading of maximum thermometer during the month (April 24) 71.4 Fahrenheit.
Lowest " " minimum " " " " (April 5) 19.7 "

Records in parentheses ( ) are those of observations not made at the regular times. The rainfall was estimated on April 1 at about 10½ A.M.; the middle observations of April 8 were made at 2¼ P.M.; those of April 13 at 1¼ P.M.; those of April 16, 18, 19, 29, at 2½ P.M.; those of April 22 at 2¾ P.M.; the evening observations of April 7 and 23 at 8¼ P.M., and those of April 9 at 8½ P.M.

* See notes on rainfall, p. 65.

Observers: W. Upton, April 9, 8½ P.M.;
A. Searle at other times.

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April, 1879.

Date.	Psychrometer. Dry bulb. 8 A.M.	2 P.M.	8 P.M.	Wet bulb. 8 A.M.	2 P.M.	8 P.M.	Relative Humidity Guyots Tables. 8 A.M.	2 P.M.	8 P.M.	C. 3235. 8 A.M.	2 P.M.	8 P.M.	Relative Humidity from No 4 and C 3235 Guyot Tables 8 A.M.	2 P.M.	8 P.M.
1.	29.7	39.4	37.6	26.6	32.9	31.8	62	40	44						
2.	38.1	41.9	32.4	33.0	35.5	28.5	50	44	57						
3.	30.1	45.4	33.3	26.2	37.8	33.1	55	41	94						
4.	22.6	28.3	23.8	20.6	24.0	22.1	65	48	70						
5.	24.0	33.4	31.6	21.4	29.0	28.1	59	54	60		34.1	32.6			
6.	31.0	43.1	33.7	28.5	36.7	30.7	69	47	67						
7.	37.7	51.4	(39.4)	35.4	42.2	(34.8)	74	39	(56)						
8.	35.9	(44.2)	36.7	31.3	(36.0)	32.1	55	(36)	53						
9.	40.0	57.9	(48.8)	35.3	45.8	(41.0)	55	32	(44)						
10.	38.4	37.3	33.9	33.3	34.9	34.1	50	73	66						
11.	31.5	39.7	35.3	30.3	35.2	33.8	83	57	81						
12.	22.4	41.4	34.6	29.9	34.9	31.3	100	43	65	33.2	42.1	35.6			
13.	37.5	(47.3)	45.3	32.7	(38.0)	38.4	52	(32)	45						
14.	42.2	53.5	44.0	40.4	44.9	37.2	82	44	44						
15.	42.4	43.4	37.4	37.1	37.2	36.9	54	48	92						
16.	38.4	(53.6)	44.4	38.0	(44.4)	39.4	93	(43)	58						
17.	35.5	41.1	37.3	35.3	39.1	37.4	94	79	95						
18.	36.1	(36.0)	34.8	36.3	(36.0)	34.9	98	(96)	97						
19.	30.3	(32.4)	32.8	30.4	(32.2)	32.8	97	(94)	96	30.8	33.3	34.0			
20.	38.9	51.2	44.7	34.5	41.7	38.0	56	37	46						
21.	48.0	57.8	48.4	40.3	44.2	40.4	43	23	42						
22.	50.6	(60.0)	52.3	42.4	(43.9)	42.1	43	(14)	95						
23	54.9	57.8	(48.0)	45.4	45.6	(39.7)	41	31	(40)						
24	44.0	55.6	46.8	36.1	41.8	37.8	36	19	33						
25	45.7	47.2	45.2	41.0	38.2	37.6	63	33	42						
26	40.2	42.1	39.8	38.6	40.1	39.3	82	81	92	41.0	43.0	41.0			
27	48.1	55.4	48.8	45.2	48.5	43.0	77	56	57						
28	51.9	71.3	60.0	48.2	62.2	57.7	74	56	92						
29	54.7	(65.3)	54.3	54.6	(69.1)	53.2	99	(100)	92						
30	50.1	58.3	56.2	50.2	56.1	54.4	100	86	88						
Sum	1170.9	1532.1	1241.6				2062	1526	2003						
Means	39.03	51.07	41.39				69	51	67						

Rain or rainfall: the snow weighed is in the form of cylinders cut with a lamp-chimney $1\frac{7}{8}$ inches across inside.

April 1, about $10\frac{1}{2}$ A.M. Snow considerably drifted in some places; ground as much as half bare; no measure possible; by estimate there may have been $1\frac{1}{2}$ inches of snow; 12 inches of this snow weigh $3\frac{1}{2}$ ounces; hence rainfall to 1 inch of snow 0.1835 inches; total rainfall about 0.270 inches.

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April, 1879.

Date.	Winds. Estimated velocity in miles per hour, and direction (of approach).			Clouds. Amount on Scale of 10, and kind (on Forbes system). For explanation see note on Page 4.		
	8. A. M.	2. P. M.	8. P. M.	8. A. M.	2. P. M.	8. P. M.
1.	15 N W	13 N W	15 W	9 Pnu Fnu ↘	9 P Fnu	0
2.	7 W	5 W	6 W	0 Fnu	6 Pnu Fnu →	3 Pnu Fnu →
3.	6 W S W	2 S S W	2 N E	0	8 P Fnu ↗	10 P
4.	7 W	6 W S W	4 W	6 Pr Rs Fnu →	10 P Fnu	10 P
5.	3 N W	2 N W	2 N W	10 Pr	10 P	10 P
6.	2 N W	3 W S W	1 S W	5 P. Rs Rnu Fnu ↘	5 Pr Fnu ↘	0 Fnu
7.	2 S W	6 W	(3 W)	10 P	6 Pr Nb Fnu →	(8 Pnu Fnu.)
8.	6 N W	(6 W)	0 W	0	(0)	0 Fnu
9.	1 W S W	4 W	(3 N E)	5 P Fnu	9 P Rs	(0 Haze in horizon.)
10.	3 E	6 E	7 N E	9 P	10 P	10 P; raining
11.	8 N	7 N	2 N	10 P	10 P	10 P; raining
12.	6 N N W	7 W N W	1 N W	0 Rs Fnu	10 Pnu Fnu ↘	0
13.	3 W	(5 W)	2 W	0 Pr Rs	(10 P)	10 P
14.	2 W	2 W S W	0 N W	10 Pnu	2 Nb Fnu →	1 P. Rs haze
15.	1 N E	3 E S E	2 E	2 P Fnu → Rs haze	10 P	10 P; raining
16.	1 N W	(2 W N W)	0 Calm	10 P	(4 Pnu Nb Fnu ↘)	1 P Rs haze
17.	1 N E	2 E N E	2 N E	10 P; raining	10 Pnu Nb Fnu	10 P; raining
18.	7 N E	(13 N E)	16 N N E	10 P; raining.	(10 P; fine rain.)	10 P; fine rain.
19.	15 N	(12 N)	0 N W.	10 P; Snowing.	(10 P; raining.)	10 P.
20.	3 N N W.	6 N W	1 N W	0	0	0
21.	4 N W	6 N W	1 N W	0 Rs	1 Pr Rs	0
22.	3 N N W	(6 N N W)	0 Calm.	1 Pr Rs	(0 Rs)	0 P Rs
23.	3 W	20 N W	(4 N W)	10 P	1 P Rs Fnu	(0)
24.	3 N	7 N	1 N	0	0 Rs Fnu	2 P Rs Fnu
25.	0 S W	5 E	4 S E	10 P Fnu	10 P Fnu ↘	10 P Fnu
26.	3 E N E	2 E	0 S E	10 Pnu	10 Pnu	8 P Fnu
27.	1 S W	5 E	3 S	7 Pnu Fnu ↗	5 P Rs Fnu	10 P
28.	1 S	3 S	3 S	10 P fog.	6 P haze	10 P
29.	3 S W	(1 W N W)	2 W N W	3 S W	(1 W N W)	2 W N W.
30	3 E	6 N W	0 Calm.	10 Pnu fog; raining	10 Pnu	0 Pnu Rs
Sum	124	173	87	177	190	155
Means	4.1	5.8	2.9	5.9	6.3	5.2

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April, 1879.

Date.	Extreme Temperatures. Maximum 8. A. M. Before Setting	Maximum 8. A. M. After Setting	Minimum 8. P. M. Before Setting	Minimum 8. P. M. After Setting	Aurora. 8. P. M.	Zodiacal light. 8. P. M.	
1.	35.0	30.2	25.0	29.5	Moonlight	Moonlight	
2.	38.9	37.8	29.1	38.0	Moonlight + Clouds	Moonlight + Clouds	
3.	42.0	31.6	26.0	30.0	Cloudy	Cloudy	A little rain and snow in the afternoon.
4.	46.0	24.3	20.0	22.3	Cloudy	Cloudy	
5	30.4	28.3	19.7	23.9	Cloudy	Cloudy.	
6.	34.7	32.2	23.9	31.0	Moonlight	Moonlight	
7.	43.8	38.3	29.4	37.5	(Cloudy)	(Cloudy)	
8.	51.5	36.6	32.2	36.0	None	To Milky way.	
9.	45.0	40.2	32.2	40.0	(None)	(a haze)	
10.	58.0	39.7	37.0	38.5	Cloudy	Cloudy.	Rain with snow and sleet at times after 2 P.M.
11.	41.2	32.0	30.3	31.5	Cloudy	Cloudy	
12.	40.1	33.0	29.6	32.8	None	To the Pleiades	
13.	42.6	38.4	30.0	37.4	Cloudy	Cloudy	
14.	49.6	42.8	37.0	42.2	None; some clouds	Indistinct to the milky way.	
15.	55.0	42.7	32.4	41.8	Cloudy	Cloudy	Rain after 3 P.M.
16.	46.2	39.0	35.7	38.3	None	Cloudy	
17.	54.8	37.0	36.1	36.2	Cloudy	Cloudy	Rain at times, with some snowflakes.
18.	43.5	37.0	35.4	36.6			Rainy, with some snow and sleet at times.
19.	38.8	31.5	30.2	30.2	* Cloudy.	Cloudy.	Some snow and rain.
20.	38.4	38.4	30.0	39.0	* None	† Suspected.	
21.	52.9	47.6	35.4	38.0	None	Suspected.	
22.	58.0	50.6	38.4	50.2	None	Suspected.	
23.	60.8	54.6	45.1	54.5	(None)	(Moonlight)	
24.	61.6	44.8	33.1	44.1	None; some clouds.	Cloudy.	
25.	56.2	45.7	39.6	45.2	Cloudy	Cloudy	A little rain about 10½ P.M.
26.	53.8	41.0	39.1	40.2	Cloudy	Cloudy.	
27.	46.7	46.7	36.6	46.3	Cloudy	Cloudy.	
28.	61.6	51.6	44.4	51.2	Cloudy	Cloudy	{Thunder and lightning, with rain, reported during following night.}
29.	71.4	54.2	51.0	54.2	Cloudy.	Cloudy.	Afternoon rainy.
30.	66.0	50.6	49.7	50.0	Moonlight.	Moonlight	
Sum	1463.9		1013.6				
Means	48.76		33.79				

*April 19. Clearing off between 8 and 9 P.M., and some light among the clouds in the north; at 9h 20m P.M. sudden extension of auroral light, rapidly spreading over dark sky (apparently clouded) near northern horizon, always with a sharp, but irregular and varying, boundary of the lower edge of the light. This settled in a few minutes into the usual arch over dark sky, becoming irregular with streamers about 9½ P.M. Faint low arch visible two hours later.

April 20. Aurora suspected at 9 P.M. †Zodiacal light distinct subsequent to 8 P.M.

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May, 1879.

Date.	Barometer.			Thermometer attached to Barometer.			External Thermometer No. 4.				Rain fall in inches gauge, C.
	8 A.M.	2 P.M.	8 P.M.	8 A.M.	2 P.M.	8 P.M.	8 A.M.	2 P.M.	8 P.M.	Mean giving half a night to 2 P.M.	Examined at 8 A.M.
1.	29.645	(29.628)	29.752	53.0	(58.2)	54.9	52.1	(58.0)	48.0	51.64	0.165
2.	29.842	29.796	29.824	45.8	54.2	55.1	45.8	58.8	49.8	50.00	0.000
3.	29.877	29.867	29.910	49.7	52.7	53.8	46.2	49.5	49.4	48.14	0.000
4.	29.920	29.814	29.782	48.2	53.8	55.0	50.5	67.3	52.0	54.46	0.011
5.	29.675	29.692	29.750	53.2	60.2	61.3	58.9	72.6	60.5	62.28	0.000
6.	29.858	29.855	29.948	57.6	64.8	64.3	61.3	68.9	58.2	61.58	0.011
7.	30.026	30.032	30.114	51.6	57.3	58.9	51.8	62.7	54.9	55.22	0.000
8.	30.234	30.260	(30.350)	53.4	59.8	(58.3)	53.8	*			
9.	30.474	30.497	30.492	50.3	59.6	61.1					0.000
10.	30.500	30.450	30.396	52.6	58.1	59.8			53.2		0.000
11.	30.350	30.296	30.261	52.7	60.3	61.6	54.2	64.2	58.1	55.76	0.000
12.	30.174	30.121	30.108	54.5	62.2	65.2	58.4	79.0	67.3	66.08	0.000
13.	30.083	30.050	30.046	61.7	67.0	70.1	67.3	82.9	70.5	71.70	0.000
14.	30.032	29.969	29.978	64.2	69.1	70.4	67.6	84.7	67.3	70.90	0.000
15.	30.012	(29.962)	29.997	64.0	(69.0)	69.7	67.7	(77.0)	66.8	69.20	0.000
16.	29.975	29.856	29.935	66.4	67.8	67.2	63.4	64.3	67.0	65.02	0.044
17.	30.059	30.050	30.066	65.7	70.2	72.2	70.9	77.4	70.4	72.00	0.178
18.	(30.110)	30.060	30.084	(67.0)	71.3	72.6	(70.6)	78.2	68.7	71.36	(0.000)
19.	30.054	29.562	29.961	68.0	67.4	67.7	64.8	64.6	64.0	64.44	0.000
20.	29.964	29.909	29.866	65.5	69.0	70.5	67.5	67.3	67.8	67.58	0.717
21.	29.706	29.642	29.867	67.2	71.7	70.9	71.3	81.3	62.9	69.94	0.055
22.	30.074	30.092	30.173	60.8	64.4	64.6	56.3	59.7	50.4	54.62	0.066
23.	30.353	30.420	30.390	55.7	58.7	60.6	50.7	51.7	44.7	48.50	0.000
24.	30.237	30.120	(30.044)	52.5	58.9	(61.3)	54.4	54.8	(52.0)	53.52	0.000
25.	29.849	29.758	29.721	56.1	62.0	64.4	59.8	71.0	60.2	62.20	0.000
26.	29.870	(29.940)	30.084	58.8	(59.5)	60.0	54.7	(59.0)	51.7	54.36	0.000
27.	30.279	30.170	30.170	53.7	60.0	61.7	58.7	69.4	53.9	58.92	0.000
28.	30.076	30.063	30.081	57.6	62.7	67.3	56.6	67.4	64.1	61.76	0.033
29	30.186	(30.148)	30.144	61.3	(68.9)	70.0	70.0	(77.8)	67.2	70.44	0.000
30.	30.173	30.070	30.053	63.0	69.0	70.0	70.1	79.7	66.2	70.46	0.000
31.	30.022	29.972	29.926	65.9	72.3	78.3	72.5	89.6	79.3	78.64	0.000
Sum	931.689	930.121	931.273	1808.3	1960.1	1999.0	1747.9	1938.8	1741.5	1740.72	1.280
Means	30.054	30.004	30.041	58.33	63.23	64.48	60.27	69.24	60.05	62.17	

Barometric means reduced to the freezing point: 8 A.M., 29.974; 2 P.M., 29.911; 8 P.M., 29.944.

Mean temperature for month (mean of 3 means for 8, 2, 8, with double weight given to the morning and evening observations) 61.98 Fahrenheit.
Rainfall for month 1.28 inches.

Highest reading of maximum thermometer during the month (May 15) 84.1 Fahrenheit.
Lowest " " minimum " " " " (May 2) 36.6 "

Records in parentheses ( ) are those of observations not made at the regular times. The morning observations of May 18 were made at 8¼ A.M.; the midday observations of May 15 at 2¼ P.M., and those of May 1, 26, 29 at 2½ P.M.; the evening observations of May 24 at 8¼ P.M., and those of May 8 at 9 P.M.

* May 8, 2 P.M. Thermometer No. 4 removed for experiments of W. A. Rogers.

Observers: W. Upton May 7 and 8 throughout, and evenings of May 6 and 14;
A. Searle at other times.

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May, 1879.

Date.	Psychrometer. Dry bulb. 8 A.M.	2 P.M.	8 P.M.	Wet bulb. 8 A.M.	2 P.M.	8 P.M.	Relative Humidity Guyots Tables. 8 A.M.	2 P.M.	8 P.M.	C. 3235. 8 A.M.	2 P.M.	8 P.M.	Relative Humidity from Dry and C 3235 Guyots Tables. 8 A.M.	2 P.M.	8 P.M.
1.	51.9	(57.4)	47.3	47.6	(48.4)	43.0	70	(46)	65						
2.	45.6	57.7	49.0	42.0	49.9	43.6	70	53	61						
3.	45.8	49.4	48.5	39.9	42.7	43.0	53	52	59	46.6	49.9	49.6			
4.	50.9	66.8	51.3	45.1	54.3	47.5	59	38	73						
5.	58.5	72.3	59.9	55.3	58.0	52.3	66	36	61						
6.	61.0	68.3	57.6	55.3	57.1	46.3	80	45	34						
7.	51.2	61.9	54.3	43.6	49.9	45.8	48	36	46						
8.	53.5	60.8	(49.5)	47.5	51.4	(45.8)	61	47	(72)		61.7	(50.4)			
9.	52.9	62.8	53.5	*47.5	48.3	46.2	64	25	52	53.3	63.3	54.0			
10.	55.4	59.9	52.3	49.0	48.0	45.6	59	34	55						
11.	54.2	63.7	52.6	47.5	50.0	45.4	57	30	51						
12.	58.5	78.3	66.8	53.3	65.7	60.8	68	48	68						
13.	66.7	82.0	69.8	62.4	70.5	64.5	75	53	73						
14.	67.1	84.3	66.4	62.7	66.8	60.6	76	51	69						
15.	67.4	(76.6)	65.9	62.8	(65.7)	61.6	75	(53)	76						
16.	63.1	63.7	66.4	61.5	63.3	63.9	90	97	85						
17.	70.0	76.6	69.4	66.5	66.7	66.0	81	56	81	70.1	76.8	70.0			
18.	(69.8)	77.1	67.8	(66.6)	69.4	65.3	(83)	65	85						
19.	64.3	64.0	63.4	63.0	63.5	63.0	92	97	97						
20.	67.0	66.4	66.9	65.3	64.8	65.1	90	90	89						
21.	70.7	80.0	62.2	66.5	71.8	53.1	78	63	54						
22.	56.0	59.1	49.9	47.5	51.3	47.3	48	54	80						
23.	50.3	51.3	43.6	42.1	43.4	39.4	43	46	63						
24.	54.0	54.5	(51.2)	45.8	44.6	(43.2)	47	39	(45)	54.3	55.3	(52.0)			
25.	59.0	69.8	59.4	50.6	56.9	53.8	51	42	66						
26.	54.1	(58.7)	51.3	45.3	(44.2)	42.7	44	(19)	42						
27.	57.9	69.0	53.2	48.1	54.6	49.7	43	33	77						
28.	56.4	67.3	63.3	53.6	58.6	68.3	82	56	99						
29.	69.0	(77.0)	66.5	61.5	(62.3)	57.9	62	(39)	55						
30.	68.9	79.2	65.6	59.2	62.5	57.7	52	34	58						
31.	76.8	89.1	78.3	66.7	76.5	71.5	74	52	66	71.7	89.5	78.8			
Sum	1842.6	2105.0	1818.1				2041	1529	1967						
Means	59.44	67.84	58.65				63	49	63						

*May 9, 8 A.M. Window out of order and cannot be shut; adjusted at 2 P.M.

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Date	Estimated velocity in miles per hour, and direction (of wind arrow).			Amount on scale of ten	Cloud, and Rain (or Fog) symbols. For explanation see page 4.	
	8. A.M.	2. P.M.	8. P.M.	8. A.M.	2. P.M.	8. P.M.
1.	3 W.	(6 S W)	5 S W.	5 Pm Fm →	(5 Pm M Fm →)	0 Pm
2.	2 W.	3 S S E	4 N W.	0 Pm	10 Pm M Fm →	10 Pm Fm.
3.	2 W N W.	2 N W.	0 Calm.	0 Pm M Fm	6 Pm M Fm → R	9 P Fm →
4.	3 S. W.	7 S W	3 S	0	8 Pm M Fm →	10 P
5.	5 W	4 W	3 S W.	6 P haze	2 M. Fm	0 P Fm
6.	2 N W	1 S E	3 N W	5 P haze Fm	10 Pm Fm	8 Pm Fm
7.	4 N W	2 W	4 N N E	0 Fm in W. horizon.	4 Fm Rs	7 Pm Rs
8.	3 N	2 E by S	(1 S)	1 Fm Rs	9 Pm Fm	(0)
9.	1 N	4 S E	1 S E	0 haze	0 P haze	0 Rs Fm
10.	0 N W	3 E	1 S	2 haze	0 Rs haze	0 P Rs
11.	1 S S W	4 E	5 S E	1 P Rs	1 Rs	0 P Rs
12.	6 S S W	9 S W	9 S W	0 Rs	5 P Rs haze	9 P Rs Fm
13.	3 S W	2 S W	4 S W	9 P haze	9 P haze	9 P haze
14.	3 S W	6 S W	1 S W	7 P haze	5 P Rs haze	1 Fm
15.	2 S W.	(9 S S W)	3 S	8 Pm Fm ↗	(5 Pr M Fm)	4 P Fm →
16.	0 S E	0 Calm	6 S W	10 P fog	10 P fog; raining	8 P Fm.
17.	3 S W	3 N W	4 S	10 Pm M Fm →	9 Pm M Fm ↗	9 Pm Fm ↗
18.	(4 S W)	6 S	6 S W	(10 Pm)	10 Pm M Fm	8 Pm Rs Fm
19.	1 S	4 E	0 E	10 P fog, a little rain	10 Pm; a little rain	10 Pm; raining
20.	2 S W	2 E	5 S	10 Pm Fm	10 Pm M Fm → [Fm] ↗	0 Pm
21.	5 S W	5 S W	4 W	5 Pm Fm ↗	9 Pm M Fm →	5 Pm Fm →
22.	6 N E	6 S E	1 E	0	0 M Fm	0 P S
23.	11 N E	10 E N E	0 Calm	0	1 M Fm ↓	0 P S
24.	4 h W	5 E	(3 S S E)	0	6 P S M Fm ↓	(10 P)
25.	2 h W	S S E	0 Calm	1 Pm Fm haze	9 Pm Fm ↘ haze	8 Pm Fm ↘
26.	8 h W	(12 h)	0 Calm	0	(0 R S)	0. P Rs
27.	0 h W	4 S	4 S	1 haze	5 P Fm → haze	10 P
28	6 h W	2 S E	0 Calm	10 Pm Fm ↘	3 haze	1 haze P
29	0 W	(4 S E)	4 S W	3 haze Rs Fm	(5 M Fm → haze)	3 haze Fm
30	4 S W	11 S W	5 S W	4 P Fm haze	2 P Rs Fm haze	7 P Fm haze
31	4 S W	4 S W	3 S W	7 P Fm ↗ haze	4 P Rs M Fm haze	5 P Fm haze
Sum	99	147	92	125	172	151
Means	3.2	3.7	3.0	4.0	5.5	4.9

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May, 1879.

Date	Extreme temperatures. Maximum 8 A.M. Before Setting	Maximum 8 A.M. after Setting	Minimum 8 P.M. Before Setting	Minimum 8 P.M. after Setting	Aurora. 8. P. M.	Zodiacal Light 8. P. M.	
1.	61.0	52.0	46.9	51.8	Moonlight	Moonlight	
2.	60.0	46.4	36.6	45.6	Cloudy	Cloudy.	A few drops of rain towards night.
3.	59.0	46.9	39.9	45.7			A few drops of rain at times.
4.	55.1	50.5	37.4	50.4	Cloudy	Cloudy.	
5.	67.0	57.8	50.1	57.9	Moonlight	Moonlight.	
6.	72.2	60.4	52.7	60.4	Cloudy	Cloudy.	
7.	72.3	54.2	42.7	*51.3	Cloudy	Cloudy	
8.	63.8	54.2	42.5	53.2	(0)	(Beyond Venus)	
9.	63.8	52.8	45.3	52.1	None	None	
10.	66.0	54.8	39.1	54.9	None	None.	
11.	63.0	53.7	40.8	53.2	None	None	
12.	69.0	57.6	44.7	57.8	Cloudy	Cloudy	
13.	78.2	66.2	57.4	66.1	Cloudy	Cloudy	
14.	82.4	66.5	60.2	66.2			
15.	84.1	66.5	57.2	66.6	Twilight	Twilight	
16.	77.0	63.7	60.0	63.0	Cloudy	Cloudy.	Slight showers.
17.	69.3	69.2	66.8	69.3	Cloudy	Cloudy.	
18.	(78.0)	(69.0)	(61.8)	(69.2)	Cloudy	Cloudy	
19.	80.4	65.0	64.2	64.7	Cloudy	Cloudy	Frequent showers.
20.	66.6	66.5	60.3	66.3	Twilight	Twilight	Some rain.
21.	74.4	69.7	63.8	69.9	Twilight	Twilight	Slight thunder-shower about 2¼ P.M.
22.	81.7	56.3	46.8	55.9	Twilight	Twilight	
23.	61.0	50.8	41.8	50.1	Twilight	Twilight	
24.	54.3	54.0	41.1	53.3	(Cloudy)	(Cloudy)	
25.	61.3	58.4	46.5	58.1	Cloudy	Cloudy	A few drops of rain at times.
26.	71.7	54.5	51.3	53.6	Twilight	Twilight	
27.	59.5	57.0	42.6	56.9	Cloudy	Cloudy	A little rain after 6 P.M.
28.	69.4	56.3	49.9	55.8	Twilight	Twilight	
29.	70.8	67.5	53.2	68.0	Twilight	Twilight	
30.	71.8	67.6	54.5	68.0	Cloudy	Cloudy	
31.	84.0	70.3	61.5	70.6	Twilight.	Twilight.	
Sum	2145.1		1559.6				
Means	69.20		50.31				

*May 7, 8 A.M. The minimum thermometer was not set, the reading 51.3 not being made after setting, but from the end of the column of alcohol.

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June 1879

Date	Barometer			Thermometer attached to Barometer			External Thermometer, No. 4.				Rainfall in rain gauge C
	8 A.M.	2 P.M.	8 P.M.	8 A.M.	2 P.M.	8 P.M.	8 Am	2 Pm	8 Pm	Mean giving half weight to 2 P.M.	Examined at 8 a.m.
1.	29.997	29.950	29.944	72.8	81.1	82.8	80.3	91.9	82.1	83.34	0.000
2.	29.888	29.905	29.978	74.8	81.2	78.2	81.0	80.7	73.3	77.86	0.000
3.	30.076	30.080	30.064	62.8	63.8	62.6	52.0	52.6	51.2	51.80	0.243
4.	30.016	29.878	29.833	60.1	62.2	64.4	53.8	64.7	62.1	59.30	0.728
5.	29.845	29.792	29.842	61.4	68.2	70.7	69.6	77.2	66.5	69.88	0.353
6.	29.850	29.684	29.721	66.0	68.5	70.2	66.9	77.0	62.7	67.24	0.474
7.	29.984	29.975	30.018	58.9	61.0	62.4	53.2	59.8	55.7	55.52	0.132
8.	30.094	29.988	29.950	56.4	62.4	66.0	57.2	66.0	61.8	60.80	0.044
9.	30.044	29.978	29.969	58.0	65.9	68.0	61.1	70.9	65.2	64.70	0.000
10.	29.957	29.840	29.910	62.9	69.0	68.0	62.8	82.3	58.8	65.10	0.044
11	29.921	29.938	(29.949)	63.0	66.7	(67.2)	55.9	66.4	(56.4)	58.20	0.022
12.	29.892	29.828	29.757	62.4	65.0	65.5	56.5	61.5	60.3	59.02	0.000
13.	29.739	29.748	29.800	63.9	69.3	71.0	67.1	72.5	65.0	67.34	0.044
14.	29.870	(29.784)	29.745	62.1	(69.8)	71.5	62.0	(76.5)	68.6	67.54	0.000
15.	29.660	*29.599	29.546	66.5	67.8	66.4	61.5	56.8	52.8	56.96	0.088
16.	29.495	29.564	29.710	69.4	59.7	59.6	52.0	53.3	52.1	52.30	1.037
17.	29.816	29.860	29.917	57.4	63.4	64.2	57.2	66.7	56.3	58.74	0.011
18.	30.030	30.081	30.136	58.3	61.9	61.3	55.1	63.1	56.1	57.10	0.022
19.	30.258	30.278	30.243	57.6	63.4	64.3	58.1	62.8	57.2	58.68	0.000
20.	30.234	30.184	30.209	58.0	65.9	67.1	58.7	72.6	60.4	62.16	0.000
21.	30.218	30.158	30.168	61.3	67.7	69.2	62.9	79.6	63.1	66.32	0.000
22.	30.098	30.053	29.999	63.8	69.0	70.0	67.2	74.5	68.0	68.98	0.000
23.	29.985	29.984	30.044	66.6	73.2	76.8	69.1	83.6	76.4	74.92	0.000
24.	30.185	30.219	30.227	70.2	75.2	76.5	70.8	78.1	73.0	73.14	0.000
25.	30.262	30.216	30.188	69.8	76.0	76.5	69.9	79.7	73.2	73.18	0.000
26.	(30.158)	30.079	30.022	(71.2)	74.7	76.0	(70.6)	76.3	72.7	72.58	(0.000)
27.	29.987	29.896	29.894	72.2	78.9	81.0	75.1	90.3	76.2	78.58	0.000
28.	(29.768)	29.715	29.720	(75.9)	79.9	81.1	(81.6)	88.0	75.5	80.44	(0.000)
29.	29.720	29.644	29.779	75.3	78.2	75.5	72.7	83.3	62.2	70.62	0.199
30	29.899	29.966	30.038	69.6	73.3	72.5	67.2	66.5	67.0	66.98	†1.147
Sum	898.837	897.864	898.310	1938.3	2101.8	2125.1	1929.1	2175.2	1931.6	1979.32	4.588
Means	29.961	29.929	29.944	64.61	70.06	70.84	64.30	72.51	64.39	65.98	

Barometric means reduced to the freezing point: 8 A.M., 29.865; 2 P.M., 29.818; 8 P.M., 29.831.

Mean temperature for month (mean of 3 means for 8, 2, 8, with double weight given to the morning and evening observations) 65.98 Fahrenheit.
Rainfall for month 4.59 inches.

Highest reading of maximum thermometer during the month (June 2) 91.7 Fahrenheit.
Lowest " " minimum " " " " " (June 8) 43.6 "

Records in parentheses ( ) are those of observations not made at the regular times. The morning observations of June 26 were made at 9 A.M., and those of June 28 at 10¼ A.M.; the midday observations of June 14 at 3 P.M.; the evening observations of June 11 at 8¼ P.M.

*June 15, 2 P.M. Barometer falling rapidly. At 2⅙ P.M., barometer 29.530; attached thermometer 67.0.

June 10. Thermometers moved from East Transit Room to east window on north side of West Transit Room between 8 A.M. and 2 P.M.

† See note on rainfall, p. 73.

Observer A. Searle.

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June, 1879.

Date	Psychrometer Dry bulb			Wet bull			Relative humidity Guyot's Tables			C 3235.		
	8 a.m.	2 P.m.	8 P.m.	8 a.m.	2 P.m.	8 P.m.	8 a.m.	2 P.m.	8 P.m.	8 a.m.	2 P.m.	8 P.m.
1.	78.6	91.3	81.3	71.9	74.2	72.3	70	41	62			
2.	79.5	80.0	72.4	72.3	71.6	69.6	68	65	85			
3.	51.5	52.0	50.6	51.0	51.1	50.3	95	91	96			
4.	53.7	64.7	61.3	53.7	64.2	60.3	95	96	93			
5.	68.3	76.5	65.8	61.8	67.9	63.8	66	61	88			
6.	66.4	76.1	62.4	61.2	69.3	55.8	72	69	62			
7.	52.0	59.3	55.3	44.8	47.2	48.1	51	32	54	52.5	59.8	56.0
8.	55.6	66.0	61.3	48.3	52.2	51.4	54	32	44			
9.	59.2	70.0	64.7	53.8	59.4	55.5	67	49	52			
10	62.5	81.5	58.0	59.4	73.5	56.1	82	66	88			
11.	55.4	65.7	(55.8)	54.3	60.6	(54.1)	99	72	(88)			
12.	56.0	60.9	59.4	55.1	58.5	57.8	93	86	90			
13.	67.0	72.7	64.4	62.1	64.5	54.6	75	62	49			
14.	62.0	(76.1)	67.9	54.7	(61.6)	58.6	59	(40)	54	62.1	(76.5)	68.4
15.	61.0	55.8	51.9	60.5	55.7	51.6	97	99	97			
16.	51.6	53.0	51.5	51.6	51.6	50.2	99	90	90			
17.	57.2	66.3	55.6	52.8	54.2	52.5	72	40	79			
18.	54.7	62.6	55.0	48.9	56.0	51.6	63	63	78			
19.	58.0	62.7	56.5	54.3	52.5	51.0	77	44	65			
20.	58.8	71.4	60.0	55.9	60.2	53.2	82	48	60			
21.	62.9	79.6	62.3	59.0	67.0	56.9	78	48	64	63.0	79.8	63.0
22.	67.0	74.0	67.4	60.9	65.3	63.1	68	60	77			
23.	69.0	83.4	75.8	64.7	69.5	65.5	77	46	54			
24.	70.4	77.5	71.7	63.4	67.7	67.1	65	57	76			
25.	69.8	79.2	72.3	66.8	69.5	69.7	84	59	86			
26.	(70.1)	75.3	71.8	(66.3)	69.2	68.7	(80)	71	84			
27.	74.8	89.8	75.2	71.2	75.3	69.0	82	48	71			
28.	(81.4)	87.5	74.5	(74.4)	75.3	73.2	(69)	54	93			75.2
29.	72.3	82.3	62.0	70.5	74.9	61.4	52	53	95			
30.	66.8	66.5	66.3	61.0	58.8	59.8	69	60	66			
Sum	19135	21597	19104				2250	1802	2240			
Means	63.78	71.99	63.68				75	60	75			

∴ June 29, 8 P.M. Gauge examined; 1.147 inches had fallen since 8 A.M.; no additional rainfall from this time to 8 A.M. June 30.

Thermometers moved June 10; see note p. 72.

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June, 1879.

Date	Estimated wind velocity in miles per hour & direction (of approach)			Amount on scale of ten & Kind (on Poey's System) For explanation see note on Page 4. Clouds.		
	8 AM.	2 PM.	8 PM	8 AM.	2 PM.	8 PM
1.	0 W	5 WSW	3 SW	1 Rs M Fm haze	1 P Rs M Fm	1 P Fm haze
2.	0 W	5 NW	0 calm	5 Pr Rs	10 Pm Fm M →	10 Pm Fm →
3.	4 ENE	5 NE	3 NE	10 Pm; raining	10 Pm; raining	10 Pm; raining
4	0 E	5 SSW	2 SSW	10 Pm; raining	10 Pm Fm; a little rain	4 Pm M Fm
5	6 SW	5 SW	0 SW	5 Pm Fm	10 Pm M Fm →	1 P M Fm Rs
6.	0 W	4 SW	6 W	10 Pm Fm →	9 Pm M Fm →	10 Pm Fm →
7	6 NW.	8 W	2 NW	5 Pm M Fm ↘	5 Pm M Fm ↘	9 Pm Fm ↘
8	3 NW.	6 NW.	0 W NW	0	0	0 Rs Fm
9	1 NE	3 E	1 SW	1 Rs haze	9 P Fm	10 Pm R m ↘
10	2 S	2 S	3 NE	10 Pm Fm	10 Pm M Fm →	10 Pm Fm ↘
11	1 NE	3 E	(2 E)	10 Pm	9 P haze	(10 PM)
12	1 E	1 SE	1 E	10 P Mist	10 P Fog	10 P fog
13	5 N	2 SE	2 NW	1 Pm Fm	1 M Fm haze	0 Rs
14	2 W	(5 W)	3 SW	1 Rs Fm	(0 Rs Fm.)	10 P Fm
15	2 N	5 N	4 N	10 Pm raining	10 Pm raining	10 Pm.
16	1 NE	6 N	1 N	10 Pm Mist	10 Pm	10 Pm M Fm
17	5 NW	6 NW	0 calm	0	7 Pm M Fm	9 Pm Fm ↘
18	7 NW	2 SE	0 calm	1 M Fm ↘	10 Pm M Fm ↘	1 P Fm
19	2 NE	3 SE	0 calm	8 M Fm ↘	0 M Fm	0 P Rs Fm
20	1 SW	3 SE	2 S	0	3 M Fm → Rs	0 P Rs Fm
21	4 WSW	4 SSW	4 SSW	0	4 M Fm ↑	1 Rs Pm
22	9 SW	4 W	0 SW	5 Pm Fm →	6 R Fm	8 Pm Fm Rs.
23	2 W	4 WSW	0 calm	0	5 M Pr Fm →	0 Rs Fm
24	2 NNE	3 ESE	3 E	0 P Fm	2 Pm Rs haze	0 Rs.
25	4 SSW	3 ESE.	4 S	0 Rs haze	3 Pm Fm	5 Pm Fm ↑ Rs
26	(4 SSW)	6 SW	5 SW	(10 Pm Fm ↑)	9 Pm M Fm a little rain	1 Rs Fm Haze
27	2 W	7 SW	1 WSW	0 Rs Fm haze	5 Pr M Fm haze	10 Pm Fm →
28	(2 WSW)	5 WSW	0 SW	(2 P M Fm Rs haze)	9 P M Fm haze	10 Pm M Fm →
29	1 SW	2 W	4 N	10 Pm	10 Pm M Fm	10 Pm Fm & a little rain
30	6 N	12 N	0 NW	1 Pm	9 Pm M Fm	1 M Fm Rs.
Sum	85	134	56	145	196	171
Means	2.8	4.5	1.9	4.8	6.5	5.7

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June, 1879.

Date	Extremes of Temperature: Maximum 8 A.M. Before Setting	Maximum 8 A.M. After Setting	Minimum 8 A.M. Before Setting	Minimum 8 A.M. After Setting	Aurora * 8 P.M.	Zodiacal light * 8 P.M.	
1	89.8	77.0	67.0	78.0			
2	98.7	78.3	67.3	78.2			A little rain and thunder in the afternoon.
3	87.9	53.0	50.7	51.8			
4	53.8	54.0	50.0	53.0			
5	†66.5	†66.2	53.0	67.0			A few drops of rain in the forenoon; thunder shower about 4 P.M.
6	77.8	66.0	61.0	66.0			A few drops of rain in the forenoon; shower with strong wind about 5 P.M.
7	76.6	52.5	44.4	51.5			
8	61.6	54.7	43.6	54.6			
9	65.5	58.9	46.9	58.9			
10	70.8	62.1	56.3	62.9			
11	81.4	56.6	53.5	55.7			
12	68.7	56.8	53.8	55.8			
13	66.2	66.2	56.0	66.2			
14	74.0	61.5	50.7	61.1			
15	76.3	61.0	60.4	60.9			
16	62.6	52.3	48.1	51.2			
17	56.7	56.8	48.8	56.9	‡		Slight showers after noon.
18	67.0	55.2	48.0	54.7			
19	64.2	57.7	45.8	57.7			
20	64.0	58.3	46.0	58.2			
21	73.3	62.2	53.3	62.2			
22	79.0	66.3	56.6	66.5			
23	78.0	63.5	58.8	68.2			
24	83.0	70.0	62.9	70.0			
25	78.3	69.3	61.1	69.1			
26	(81.2)	(70.3)	(65.0)	(70.2)			A few drops of rain about noon and later.
27	79.0	74.0	65.3	74.2			
28	(90.4)	(80.0)	(68.0)	(80.5)			Slight thunder-showers in the afternoon.
29	88.8	72.4	69.3	71.9			Thunder-showers in the afternoon.
30	83.5	66.0	60.9	66.3			A few drops of rain.
Sum	2246.6		1672.5				
Means	74.89		55.75				

† June 5, 8 A.M. Maximum thermometer and neighboring woodwork probably damp.

‡ June 17, about 10¼ P.M. Auroral light among clouds and some appearance of streamers.

* Aurora and zodiacal light not regularly looked for at 8 P.M. in June and July.

Thermometers moved June 10; see note p. 72.

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July, 1879.

Date	Barometer			Thermometer attached to Barometer			External Thermometer, No 4.				Rain fall in inches gauge C
	8 A.M.	2 P.M.	8 P.M.	8 A.M.	2 P.M.	8 P.M.	8 A.M.	2 P.M.	8 P.M.	Mean giving half weight to 2 P.M.	Examined at 8 A.M.
1	30.218	30.228	30.232	65.3	71.3	70.0	63.4	71.8	65.0	63.72	0.000
2	30.233	30.150	30.086	66.0	74.9	79.0	66.5	82.6	76.3	73.64	0.000
3	30.049		29.943	72.8		82.8	75.0		78.7		0.000
4	29.855	29.783	29.880	77.5	83.3	81.9	79.0	89.7	74.8	79.46	0.000
5	30.199	30.256	30.250	71.0	73.6	72.3	61.7	64.4	58.3	60.92	0.132
6	30.240	30.217	30.190	63.8	69.8	68.0	60.0	73.7	62.0	63.54	0.000
7	30.195	30.165	30.117	66.3	68.8	68.6	62.4	66.4	62.3	63.16	0.000
8	29.918	29.736	29.667	66.7	67.8	70.9	65.0	69.2	70.5	68.04	0.331
9	29.713	29.762	29.762	69.2	74.4	76.4	71.2	79.2	73.3	73.64	0.419
10	29.728	29.723	29.720	70.8	76.0	78.7	70.9	79.4	75.7	74.52	0.000
11	29.727	29.700	29.660	72.1	78.1	78.2	72.4	81.3	72.3	74.14	0.000
12	29.701	29.800	29.879	72.6	76.2	78.9	67.4	75.7	67.6	69.14	0.011
13	29.952	29.970	29.975	68.9	75.0	79.0	67.6	84.3	72.5	72.90	0.000
14	29.988	29.936	29.935	71.8	78.0	82.0	70.0	87.7	78.9	77.10	0.000
15	29.950	29.940	29.874	75.6	80.9	83.6	76.9	82.8	81.2	79.80	0.000
16	29.824	29.785	29.759	78.2	84.0	82.0	79.8	90.2	70.8	78.28	0.000
17	29.700	29.718	29.800	75.5	77.9	78.4	70.4	78.1	70.0	71.78	(0.530)
18	29.970	30.006	30.058	71.1	73.2	73.9	63.8	68.5	61.6	63.86	0.000
19	30.141	30.193	30.218	68.2	72.2	71.3	61.4	68.0	61.2	62.64	0.088
20	30.282	30.266	30.276	65.8	71.7	72.6	63.5	76.6	64.8	66.64	0.000
21	30.271	30.190	30.150	66.9	72.1	73.8	65.5	79.0	66.2	68.48	0.000
22	30.038	29.994	29.969	69.3	74.6	77.5	69.0	82.7	74.3	73.86	0.022
23	29.872	29.774	29.741	72.7	74.0	75.7	71.9	76.4	72.8	73.16	0.154
24	29.896	29.950	30.036	72.0	75.4	77.5	68.7	77.5	71.3	71.50	0.000
25	30.154		(30.142)	68.8		(72.8)	65.5		(64.0)		0.000
26	30.060	29.994	29.902	69.2	70.4	69.3	65.2	62.7	61.8	63.34	0.000
27	(29.758)	29.790	29.848	(67.3)	73.0	77.2	(63.4)	82.0	76.7	72.44	(0.949)
28	29.949	29.962	29.960	72.0	77.3	77.9	73.1	80.0	68.7	72.72	0.000
29	29.984	29.950	29.988	72.6	78.6	81.4	73.3	86.4	77.6	77.64	0.000
30	30.028	30.020	30.038	75.0	80.1	82.0	74.1	88.3	77.4	78.26	0.000
31	30.169	(30.185)	30.168	75.3	(80.6)	80.6	72.4	(80.1)	72.0	73.78	0.000
Sums	929.762	869.243	929.123	2190.3	2183.2	2373.3	2130.4	2264.7	2180.6	2062.10	2.636
Means	29.992	29.939	29.972	70.66	75.28	76.56	68.72	78.09	70.34	71.11	

Barometric means reduced to the freezing point: 8 A.M., 29.879; 2 P.M., 29.816; 8 P.M., 29.843.

Mean temperature for month (mean of 3 means for 8, 2, 8, with double weight given to the morning and evening observations) 71.24 Fahrenheit.

Rainfall for month 2.64 inches.

Highest reading of maximum thermometer during the month (July 17) 91.3 Fahrenheit.

Lowest " " minimum " " " " (July 6) 48.0 "

Records in parentheses ( ) are those of observations not made at the regular times. The morning observation of July 27 was made at 8½ A.M.; the midday observation of July 31 at 2¾ P.M.; the evening observation of July 25 at 9½ P.M. The rainfall 0.530 inches was noted July 16, 7½ P.M.; no more rain fell before 8 A.M. July 17.

Observers: W. Upton July 1, 8 P.M. and July 25 throughout;
A. Searle at other times.

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July, 1879.

Date	Psychrometer: Dry bulb			Wet bulb			Relative Humidity Guyot's Tables			C 3235		
	8 am	2 Pm.	8 Pm.	8 am	2 Pm.	8 Pm.	8 am	2 Pm.	8 Pm.	8 am.	2 Pm.	8 Pm.
1	63.2	71.5	63.5	56.3	60.3	58.8	62	48	73			
2	66.5	82.3	75.3	60.8	67.9	66.7	69	44	61			
3	75.1		77.6	69.5		71.9	74		74			
4	78.9	89.3	74.0	72.1	75.4	72.0	70	49	90			
5	61.4	63.9	57.0	53.8	54.9	51.3	57	52	65			58.0
6	60.4	73.4	61.0	54.7	61.9	55.5	66	49	67			
7	62.3	65.9	61.8	57.8	63.2	59.5	73	85	87			
8	64.4	68.9	69.8	64.0	67.4	68.6	97	92	94			
9	70.8	78.7	72.2	63.3	63.7	64.7	63	39	64			
10	70.7	78.6	74.3	64.5	67.3	67.9	68	53	70			
11	72.1	80.8	71.4	66.3	68.2	66.9	72	49	77			
12	67.0	74.9	66.2	62.5	62.7	60.4	76	47	68	67.7	75.1	67.1
13	67.8	84.1	71.8	63.0	68.8	64.2	75	42	64			
14	69.7	87.2	78.0	64.1	72.7	72.0	72	47	73			
15	76.6	82.0	80.5	71.0	72.2	73.2	75	60	68			
16	79.6	89.9	70.5	72.9	75.6	67.3	71	49	84			
17	70.0	77.9	69.7	62.7	64.8	61.7	64	46	61			
18	63.3	68.2	60.8	58.5	60.3	58.8	74	61	88			
19	61.4	67.5	60.1	58.3	60.6	57.1	82	65	82	61.7	68.0	60.9
20	63.6	76.0	63.7	60.2	64.4	58.9	81	50	74			
21	65.3	78.4	65.6	60.2	67.0	61.1	73	52	76			
22	68.9	81.4	73.7	65.1	73.0	69.0	80	65	78			
23	71.6	76.0	72.2	68.9	72.0	70.7	87	82	92			
24	68.7	76.9	70.8	62.0	67.4	64.0	66	59	67			
25	65.5		(63.2)	57.2		(60.6)	57		(85)			
26	64.9	62.4	61.3	61.3	61.7	61.0	80	96	98	65.2	62.8	62.0
27	(63.6)	81.1	76.1	(61.1)	74.2	71.0	(89)	71	77			
28	72.8	79.4	67.4	65.6	69.8	64.4	66	60	84			
29	73.3	85.8	76.8	70.8	73.0	73.9	88	52	86			
30	74.0	88.0	76.7	71.5	75.5	72.0	88	54	78			
31	72.0	(79.3)	70.7	66.3	(67.8)	65.0	72	(53)	72			
Sums	21248	22497	21537				2287	1671	2380			
Means	68.54°	77.58°	69.47°				74	58	77			

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July, 1879.

Date	Wind Estimated velocity in miles per hour & direction (C for approach) 8 A.M.	2 P.M.	8 P.M.	Clouds Amount on scale of ten & kind (Poey's system) { For explanation see note on page 4. 8 A.M.	2 P.M.	8 P.M.
1	5 NNW	3 ESE	1 ESE	0 Rs	4 Rs	5 Rs
2	1 W	1 W	2 SW	0	0	0
3	1 W		2 SW	4 Pr Fm ↘		4 Pm Fm haze
4	3 SW	7 SW	2 SW	2 P Rs haze	3 P Rs Fm haze	9 Pm M Fm ↗
5	3 E	5 E	0 S	10 Pm 7 mm ↓	0 Fm	0 Rs
6	1 SE	2 S	3 S	3 Pr Pm Fm Rs ↘	3 Pm M Fm	1 Pm Fm
7	5 S	1 S	3 SSW	10 P Pm Fm ↘	10 Pm Fm →	10 Pm Fm ↗
8	5 S	6 SSW	2 S	10 Pm Fm ↑	10 Pm	8 Pm Fm ↘ Fm ↑↑
9	6 NW	6 NW	0 Calm	0 Rs Fm	1 Rs Fm	1 Pm Rs Fm
10	0 W	6 N	0 W	1 Pm Fm	6 Pm M Fm ↓	10 Pm
11	2 N	3 ESE	3 SE	0 Fm haze	5 P M Fm Rs	10 Pm Fm ↗
12	3 NE	4 ESE	0 Calm	9 P	0 M Fm	1 P Rs
13	0 Calm	4 S	4 SSW	10	0 Pm Fm	0 Rs Fm
14	2 SW	3 W	2 SSW	6 Ar Rs R Fm ↘	[redacted] 1 M Fm	0 Pm M Fm
15	3 NNW	4 ESE	3 SW	0 Rs	3 Rs M Fm haze	10 P
16	2 WSW	4 W	7 SW	1 Pm Fm haze	1 Pm M Fm haze	10 Pm Fm →
17	4 NW	8 NNW	2 NW	0 P Rs Fm	5 Pm M Fm ↘	1 P Fm
18	4 ENE	3 E	2 SSE	9 Pm M Fm ↓	0 Pm M Fm	9 Pm M Fm →
19	4 NNW	6 ESE	0 Calm	4 Pm M Fm	1 M Fm	0 Rs Fm
20	0 W	1 SW	4 S	0 haze	9 Pm M Fm ↘	9 Pm Fm
21	5 SW	10 S	6 SSW	1 Pm Fm	8 Pm Fm	9 Pm Fm →
22	4 SW	5 SW	3 SW	10 Pm Fm →	10 Pm Fm →	10 Pm Fm
23	3 SSW	3 SW	2 SW	10 Pm Fm →	10 Pm Fm ↗	6 Pm Fm →
24	7 NW	1 E	1 NE	0 Fm	8 M Fm ↘ Rs	5 Fm
25	1 ENE		(1 NE)	2 Rs in east	Gradually clouded during PM	(10 slightly raining)
26	3 E	3 ENE	4 E	10 Pm	10 Pm fine rain	10 Pm fine rain
27	2 WNW	2 SW	1 SW	9 Pm Rs Fm ↗ Fm ↘	9 Pm M Fm →	9 Pm Fm →
28	3 NW	2 E	0 E	2 Pm Fm	1 M Fm Rs. haze	10 Pm Fm
29	2 SSW	1 WSW	2 SW	2 haze Fm	2 M Fm haze	5 Pm Fm ↗
30	1 SW	1 SW	0 SW	8 PM Fm Rs R haze	9 M Fm haze	9 Pm Fm ↗
31	2 N	(4 SE)	0 Calm	5 P Rs Fm →	(1 M Fm haze)	2 P Fm haze
Sums	87	109	62	127	130	170
Means	2.8	3.6	2.0	4.1	4.2	5.7

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July, 1879.

Date	Extreme Temperatures. Meridian 8 A.M.		Extreme Temperatures. Meridian 8 P.M.		Aurora *	Zodiacal Light *	
	Before Setting	After Setting	Before Setting	After Setting	8 P.M.	8 P.M.	
1	75.2	63.2	54.8	63.0			
2	72.2	66.1	55.0	65.9			
3	83.0	74.2	64.7	74.3			
4	89.8	78.3	72.1	78.2			Slight thundershower about 5 P.M.
5	89.8	62.4	59.0	61.3			
6	65.0	59.8	48.0	59.9			
7	74.9	62.3	55.4	62.2			
8	67.5	65.0	61.2	64.4			Rain at times; distant thunder and lightning towards the east in the evening.
9	75.2	70.7	63.5	70.6			
10	79.7	70.2	64.0	70.3			
11	81.3	71.7	65.1	71.5			
12	80.7	67.3	63.2	67.0			
13	76.2	67.0	56.2	67.0			
14	83.9	69.6	62.6	69.1			
15	87.9	76.2	68.4	76.0			
16	85.2	79.0	71.3	79.0			Thunder shower beginning about 4 P.M., with strong squall from north of west at 4½ P.M., and moderate hail beginning about 4⅝ P.M. ‡
17	91.3	76.2	67.9	69.8			
18	78.3	64.0	60.0	63.2			A little rain about 4 P.M.
19	69.2	61.3	55.3	60.8			
20	68.3	63.2	62.7	63.0			
21	77.3	65.2	57.0	65.0			
22	78.9	68.7	63.0	68.3			Thunder and lightning about 10½ P.M., with a little rain.
23	83.3	71.2	67.0	71.0			
24	77.0	68.3	65.0	68.0	†		
25	78.3	66.4	55.5	64.8			
26	70.7	65.5	61.2	65.0			
27	(67.0)	(63.1)	(59.0)	(62.9)			
28	82.2	72.2	62.4	72.2			
29	81.8	72.6	63.8	72.5			
30	87.1	73.6	67.3	73.2			
31	87.5	72.1	67.0	71.6			
Sums	2513.7		1918.6				
Means	81.09		61.89				

* Aurora and zodiacal light not regularly looked for at 8 P.M. in June and July.

† July 24, about 11 P.M. Some appearance of aurora. Streamers later seen by S. W.

‡ July 16. Several small trees, and one maple 9 inches through, were blown down by the squall. The maple tree was on Concord Avenue near the Common.

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1866phae.proj.3837

August 1879.

Date	Barometer			Thermometer attached to Bar.			External Therm. No. 4.				Rainfall in inches Gauge C.
	8 AM.	2 PM.	8 P.M.	8 AM	2 PM	8 PM	8 am	2 PM	8 PM	mean of half night to 2 PM.	Examined at 8 AM.
1	(30.160)	30.113	30.110	(73.6)	79.8	83.0	(72.8)	87.9	77.1	77.54	(0.000)
2	30.072	30.018	29.977	76.2	83.8	85.3	76.8	91.6	82.3	82.06	0.000
3	29.950	29.922	29.902	79.2	83.0	83.8	77.4	86.4	76.5	78.84	0.000
4	29.952	29.946	29.928	76.3	82.1	74.2	73.4	82.1	74.2	75.46	0.000
5	29.900	29.848	29.850	75.7	81.9	83.6	72.7	87.3	78.2	77.82	0.000
6	29.800	29.775	29.790	77.8	83.7	83.0	72.4	85.5	77.1	76.90	0.000
7	29.930	29.884	29.875	72.2	76.5	78.8	62.6	78.5	67.2	67.62	0.000
8	29.814	29.800	29.842	72.4	72.6	71.8	65.3	66.4	61.3	63.92	0.033
9	29.894	29.896	29.942	68.7	71.0	72.8	62.6	71.8	64.0	65.00	0.011
10	29.962	29.970	30.038	66.9	70.9	73.1	60.0	70.6	63.8	63.64	0.000
11	30.055	30.163	30.121	64.7	72.1	74.6	60.0	75.6	66.1	65.56	0.000
12	30.162	30.139	30.127	65.4	74.8	76.5	64.9	79.1	72.7	70.86	0.000
13	30.100	30.028	30.005	70.6	78.2	78.3	68.0	84.5	71.0	72.50	0.000
14	29.850	29.742	29.794	72.0	78.9	78.3	71.8	84.4	72.0	74.40	0.000
15	30.018	30.077	(30.134)	69.7	73.2	(75.0)	63.1	71.0	(64.5)	65.24	0.000
16	30.204	30.119	29.996	67.7	67.2	65.7	58.6	56.9	56.0	57.22	0.011
17	29.958	29.989	30.037	63.1	63.1	64.2	56.1	58.4	56.6	56.76	0.794
18	30.039	29.970	29.754	63.1	63.2	65.1	59.2	61.5	60.1	60.02	0.165
19	29.740	29.881	30.040	64.1	70.8	71.3	64.7	73.7	65.0	66.62	4.060
20	30.158	30.121	30.111	61.8	69.3	72.7	60.4	73.7	66.4	65.46	0.000
21	30.110		30.002	65.7		75.7	65.2		71.9		0.000
22	29.899	29.818		70.6	81.3		70.7	84.5			0.000
23	(29.668)	29.658		(74.3)	81.0		(73.5)	82.8			
24	(29.748)			(71.6)			(73.4)				
25	29.798	29.826		67.5	73.5		63.2	70.0			
26	29.940	(29.976)	30.002	66.6	(68.2)	67.7	59.6	(62.1)	57.6	59.30	0.618
27	(30.040)	(30.046)	(30.070)	(63.5)	(65.2)	(65.5)	(62.0)	(62.5)	(59.4)	61.06	(0.000)
28	30.100	30.100	30.095	60.2	67.2	67.0	59.5	66.1	56.2	59.50	0.000
29	30.042	29.969	29.920	59.8	68.8	71.8	57.3	75.3	67.8	65.10	0.000
30	29.964	29.978	29.992	65.2	68.8	71.3	62.3	70.2	64.7	64.84	0.099
31	29.984	29.940	29.952	64.9	70.4	72.8	63.6	75.9	69.5	68.42	0.000
Sums	929.011	868.712	809.406	2131.1	2140.3	2002.9	2033.1	2176.3	1819.2	1761.56	5.791
Means	29.968	29.956	29.978	68.7	73.8	74.2	65.58	75.04	69.97	67.75	

Barometric means reduced to the freezing point: 8 A.M., 29.860; 2 P.M., 29.835; 8 P.M., 29.855.

Mean temperature for month (mean of 3 means for 8, 2, 8, with double weight given to the morning and evening observations) 69.23 Fahrenheit.
Rainfall for month 5.79 inches.

Highest reading of maximum thermometer during the month (Aug. 3) 90.7 Fahrenheit.
Lowest " " minimum " " " " (Aug. 29) 50.0 "

Records in parentheses ( ) are those of observations not made at the regular times. The morning observations of Aug. 1 were made at 8¼ A.M.; those of Aug. 23 at 7¾ A.M.; those of Aug. 24 at 8¾ A.M.; those of Aug. 27 at 9¼ A.M.; the midday observations of Aug. 26 at 3½ P.M. and those of Aug. 27 at 2½ P.M.; the evening observations of Aug. 15 at 7 P.M. and those of Aug. 27 at 7¾ P.M.

Observers: W. Upton or F. Waldo Aug. 22, 2 P.M., to Aug. 28, 8 A.M., inclusive; A. Searle at other times.

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1066phae.proj - 3831

August 1879

Date	Psychrometer Dry bulb 8 am	2 pm	8 pm	Wet bulb 8 am	2 pm	8 pm	Relative humidity Guyots Tables. 8 am	2 pm	8 pm	C 3235 8 am	2 pm	8 pm
1	(72.7)	87.7	76.0	(69.3)	70.3	69.0	83	39	68			
2	76.8	91.0	81.3	71.7	75.2	73.2	77	45	66	77.0	91.6	82.3
3	77.0	86.0	75.6	71.5	75.0	68.0	75	58	66			
4	73.2	81.0	73.3	66.6	68.4	67.9	69	49	74			
5	72.4	86.7	77.3	68.2	72.3	70.7	79	47	70			
6	77.2	85.1	76.3	71.9	65.2	64.0	76	29	48			
7	62.3	78.3	66.1	53.3	61.6	60.7	57	34	72			
8	64.7	66.1	60.8	63.5	61.4	60.8	93	75	97			
9	62.3	71.4	62.8	58.7	63.7	61.6	80	63	93	62.8	71.8	64.0
10	59.9	70.4	62.5	52.9	59.5	58.4	60	49	77			
11	60.3	75.7	65.0	56.7	61.3	57.2	79	39	59			
12	64.9	78.2	71.3	61.7	69.1	68.3	82	61	85			
13	68.0	83.9	70.2	65.3	70.7	62.9	85	50	64			
14	58.3	56.3	55.3	56.8	54.9	54.9	91	90	97			
15	55.7	58.1	56.0	55.3	56.9	55.8	97	93	(99)			
16	71.4	84.4	71.0	67.5	71.4	67.1	80	50	80			
17	62.9	70.3	(63.3)	55.0	59.7	(58.6)	57	50	74			
18	58.9	61.1	59.5	59.0	60.3	59.5	100	95	100			
19	64.5	73.3	64.6	60.4	64.3	58.7	78	59	68			
20	60.5	72.5	62.0	55.8	59.8	61.0	73	43	94			
21	68.1		71.3	63.0		66.8	74		78			
22	70.3	84.6		68.0	76.2		88	66				
23	(73.0)	82.2		(69.3)	71.3		(82)	56			85.0	
24	(73.1)			(67.2)			(72)					
25	63.0	69.5		59.3	61.5		79	61				
26	59.4	(61.3)	57.0	57.3	(56.8)	54.2	87	(74)	82			
27	(61.6)	(61.8)	(58.8)	(57.5)	(58.6)	(56.9)	(76)	(82)	(88)			
28	59.4	65.4	55.4	56.2	59.6	54.0	81	69	90			
29	58.1	75.3	67.4	55.3	68.2	65.6	83	68	90			
30	62.0	70.3	64.0	58.1	64.8	58.7	78	73	71			
31	63.2	75.5	69.0	57.9	62.4	63.0	70	44	70			
Sums	20321	21634	17931				2435	1711	2020			
Means	65.55	74.60	66.41				78	59	75			

* In the record on this page, the records of the 14 and 16 have been interchanged in copying, as have also those of the 15 and 17.

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1866phae.proj..383T

August 1879

Date	Wind (Estimated velocity in miles per hour & direction (of approach))			Clouds (Amount on scale of ten & Kind (Poeys System))		{For explanation see note on page 4.
	8 a.m.	2 P.M.	8 P.M.	8 a.m.	2 P.M.	8 P.M.
1	(0 S W)	1 W	1 S W	(0 haze)	0. M 7m	1 m 7m
2	1 W	3 W S W	2 S W	1 haze Rs 7m	4 M 7m → haze	1 Pm 7m →
3	1 W	2 W	1 W	10 Pm 7m →	7 Pm Rs 7m →	2 Rs m 7m
4	1 N N W	3 S E	0 S	9 P Rs 7m	10 Pm 7m →	10 Pm: a few drops of rain
5	1 S W	2 W S W	2 S W	1 Rs 7m	5 M 7m →	5 Pm Rs 7m
6	3 W	10 W N W	3 W	0 haze	1 Rs R 7m	5 Pm 7m →
7	6 N W	1 W	1 S W	6 P Rs 7m →	7 Pm 7m →	1 Rs 7m
8	0 Calm	6 E	1 N E	10 Pm fog	10 Pm	10 Pm: a little fine rain
9	3 N W	0 S E	0 E	10 Pm 7m	10 Pm M 7m	10 Pm 7m \
10	3 N N W	3 E N E	1 S E	1 Pr R 7m /	5 M 7m \	0 Pm M
11	0 Calm	1 E	1 S E	0 haze	1 haze 7m	1 P Rs haze
12	0 Calm	3 E	2 S S E	1 haze	4 M 7m → haze	3 Pm 7m haze
13	2 S W	3 S W	5 S S W	2 haze	5 M 7m → haze	7 P Rs
14	7 S W	7 S S W	2 S W	9 Pm M 7m /	5 M 7m haze	9 Pm 7m →
15	7 N	2 N E	(0 E S E)	7 Pr Rs	6 Pr Rs M 7m → haze	(10 Pm 7m →)
16	1 E N E	3 S E	6 E	10 Pm: raining	10 P 7m \ : raining	10 Pm: raining
17	3 N N E	3 N E	1 N E	10 Pm: mist	10 Pm	10 Pm: mist
18	1 N E	2 N	4 N	10 Pm: fog: raining	10 P	10 P: raining
19	7 N W	6 W N W	3 N W	2 Pm 7m	2 M 7m \	0 Pm
20	1 W	1 N W	0 Calm	1 Pm 7m	0 7m	0 Pm 7m
21	1 W S W		3 S W	1 haze Rs		9 P 7m
22	2 W S W	1 S W		10 Pm 7m →: a little rain	1 Pm: slight haze	
23	(6 W S W)	3 S W b. W		(0 Pm: also slight haze)	4 Cum: Str.	
24	(3 S W S)			(2 Pm)		
25		4 S E			3 Cum: Str.	
26	5 N & E	(7 E N E)	3 N E	10 Pm	(1 Cir. Cum.)	3
27	(0 N E n)	(7 E b S E)	(2 N E)	(10 Pm)	(8 Cum. Str)	(0 Pm)
28	6 N E	3 E S E	0 N E	0	1 M 7m	0 P haze
29	0 Calm	1 S W	0 S W	1 P 7m	6 M 7m → haze	1 P haze
30	6 N	4 S E	0 N	2 Pm 7m	4 M 7m \ haze	0
31	6 N W	3 W N W	0 Calm	0	0	0
Sum	93	95	44	146	150	128
Means	3.1	3.3	1.6	4.9	5.2	4.7

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1966phae.proj..3001

August 1879

Date	Exterior Temperatures Maximum 8 a.m.		Minimum 8 a.m.		Aurora	Zodiacal Light	
	Before Setting	After Setting	Before Setting	After Setting	8 P.M.	8 P.M.	
1	(81.1)	(72.0)	(64.2)	(72.0)	Moonlight & Clouds	Moonlight & Clouds	
2	88.2	76.2	68.8	76.0	Twilight & Clouds	Twilight & Clouds	
3	90.7	77.1	73.5	76.7	Twilight & Clouds	Twilight & Clouds	
4	88.5	73.0	67.4	72.3	Cloudy	Cloudy	
5	83.9	72.0	66.0	71.9	Twilight & Clouds	Cloudy	
6	86.8	76.9	71.4	76.4	Cloudy	Cloudy	
7	85.2	62.9	57.0	62.1	Twilight & Clouds	Twilight & Clouds	{A few drops of rain reported to have fallen about 3 P.M. A little rain previous night.}
8	78.2	65.7	61.3	65.0	Cloudy	Cloudy	
9	67.5	62.8	58.1	62.2	Cloudy	Cloudy	
10	71.9	60.0	55.0	59.5	Twilight & Clouds	Twilight	
11	72.3	59.8	52.0	59.5	Clouds & Haze	Clouds & Haze	
12	75.2	64.4	56.9	64.1	Cloudy	Cloudy	
13	81.3	67.7	61.0	67.1	Cloudy	Cloudy	
14	85.0	71.2	64.7	71.0	Cloudy	Cloudy	
15	84.8	63.2	60.1	62.8	(Cloudy)	(Cloudy)	
16	71.0	69.0	56.6	58.1	Cloudy	Cloudy	
17	63.0	56.0	54.6	55.6	Cloudy	Cloudy	
18	58.8	58.8	55.2	58.8	Cloudy	Cloudy	
19	62.8*	62.7*	58.0	64.0	None	None	
20	73.5	60.0	52.8	59.9	None	None	
21	74.2	64.8	58.1	64.4	Cloudy	Cloudy	
22	82.0	70.1	64.1	70.0			
23	(84.5)	(73.2)	(69.5)	(72.5)			
24	(83.1)	(72.7)	(61.2)	(72.5)			
25	80.8	63.6	59.8	62.3			
26	73.2	59.5	58.6	59.0			
27	(63.6)	(61.7)	(52.7)	(61.3)			
28	63.1	59.3	50.5	58.7	Moonlight	Moonlight	
29	66.0	57.5	50.0	57.1	Moonlight & Clouds	Moonlight & Clouds	{Lightning without thunder in the northeast about 8 P.M.; rain about 10 P.M.}
30	76.0	62.0	57.0	61.6	Moonlight	Moonlight	
31	70.5	63.0	56.0	62.8	Moonlight	Moonlight	
Sum	2366.7		1852.1				
Means	76.34		59.74				

* Aug. 19, 8 A.M. Maximum thermometer wet.

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1866phae.proj..383T

September 1879

Date	Barometer			Thermometer attached to Barometer			External Thermometer No 4				Rainfall in inch Gauge 0
	8 am	2 PM	8 PM	8 am	2 PM	8 PM	8 am	2 PM	8 PM	Mean Given by Weights 8 2 PM	Examined at 8 am
1	29.956	29.935	29.949	67.2	74.8	77.4	65.4	83.3	72.7	71.90	0.000
2	29.975	29.979	30.064	71.9	77.7	79.1	71.8	84.7	75.2	75.74	0.000
3	30.058	30.023	30.012	73.0	74.5	74.7	68.6	75.3	65.4	68.66	0.000
4	29.850	29.774	29.844	70.2	70.7	70.8	63.5	67.3	63.8	64.38	0.629
5	29.962	29.954	30.036	67.0	71.6	71.8	61.7	70.2	61.2	63.20	0.014
6	(30.116)	30.086		(63.2)	68.6		(58.0)	68.6			(0.000)
7	30.110	30.070		65.8	70.8		63.7	73.7			0.000
8	29.822	29.768	(29.805)	70.0	72.2	(71.7)	67.7	74.2	(66.8)*	68.64	0.232
9	29.921	29.962	(30.041)	63.3	67.8	(69.0)	57.6	67.6	(62.3)	61.48	0.099
10	30.212	30.248	30.317	62.8	68.6	69.0	58.0	67.7	60.9	61.10	0.000
11	30.360	30.349	30.337	59.2	67.5	67.8	55.1	61.4	58.8	57.84	0.000
12	30.277	30.214	30.183	58.6	66.8	68.4	53.2	66.9	58.8	58.18	0.110
13	30.116	30.080	30.100	63.0	67.8	67.4	57.3	69.6	61.6	61.48	0.000
14	29.959	29.916	29.912	65.1	66.7	66.2	65.3	66.8	60.6	63.72	0.044
15	30.130	30.164	30.192	59.1	67.4	68.4	55.5	67.4	59.8	59.60	0.221
16	30.068	29.950	29.888	62.8	64.6	64.7	57.9	60.9	58.2	59.02	0.000
17	29.794	29.827	30.006	63.7	70.2	66.6	65.3	70.2	60.0	64.16	0.077
18	30.141	(30.130)	(30.132)	58.1	(66.8)	(67.8)	53.4	(70.3)	(62.2)	60.30	0.000
19	30.162	30.184	30.250	63.8	67.0	65.8	58.6	65.7	56.0	58.98	0.022
20	30.270	30.238	30.315	59.4	64.9	66.0	51.0	66.8	57.4	56.72	0.000
21	30.390	(30.396)	30.427	52.2	(62.3)	63.2	45.8	(61.9)	54.4	52.46	0.000
22	30.364	30.276	30.179	58.3	60.8	60.2	53.0	57.7	54.0	54.34	0.000
23	30.066	(29.988)	30.018	58.5	(65.9)	66.3	53.9	(69.8)	61.7	60.20	0.022
24	29.902	(29.800)	29.910	62.3	(67.1)	64.2	59.7	(57.8)	53.0	56.64	0.000
25	30.151	30.194	30.264	52.3	58.2	57.4	42.3	52.4	44.7	44.88	0.243
26	30.399	30.388	30.417	49.6	58.4	58.3	39.9	55.9	48.0	46.34	0.000
27	30.448	30.387	30.365	52.6	58.8	57.4	42.8	58.3	50.0	48.78	0.000
28	30.364	30.293	30.301	52.0	61.0	61.0	46.9	65.1	56.6	54.42	0.000
29	30.320	30.262	30.245	58.2	65.7	65.8	58.9	71.9	62.3	62.86	0.000
30	30.231	30.192		61.0	71.4		59.6	79.0			0.000
Sums	903894	903.027	813.509	1844.2	2016.6	1806.4	1711.4	2028.4	1606.4	1616.02	1.710
Means	30.130	30.101	30.130	61.5	67.2	66.9	57.05	67.61	59.50	59.85	

Barometric means reduced to the freezing point: 8 A.M., 30.041; 2 P.M., 29.997; 8 P.M., 30.027.

Mean temperature for month (mean of 3 means for 8, 2, 8, with double weight given to the morning and evening observations) 60.14 Fahrenheit.

Rainfall for month 1.71 inches.

Highest reading of maximum thermometer during the month (Sept. 3) 85.2 Fahrenheit.
Lowest " " minimum " " " " (Sept. 26) 34.8 "

Records in parentheses ( ) are those of observations not made at the regular times. The morning observations of Sept. 6 were made at 9 A.M.; the midday observations of Sept. 18, 21, 23, 24, were respectively made at 2¼, 2½, 3, 2¾ P.M.; the evening observations of Sept. 8, 9, 18, were respectively made at 8¼, 7½, 7¼ P.M.

*Sept. 8, 8 P.M. The reading 66.8 is an error in copying for 66.3.

Observers: W. Upton, Sept. 5, 8 P.M.; Sept. 6, 9 A.M.; Sept. 8, 8¼ P.M.;
A. Searle at other times.

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1966phae.proj..3837

September 1879

Date	Psychrometer Dry bulb			Wet bulb			Relative Humidity Guyots Tables			C 3235		
	8 am	2 Pm	8 Pm	8 am	2 Pm	8 Pm	8 am	2 Pm	8 Pm	8 am	2 Pm	8 Pm
1	66.4	83.3	72.7	62.0	74.4	70.0	81	64	87			
2	71.5	84.1	74.3	68.4	76.1	68.7	85	68	74			
3	68.1	74.7	64.6	67.1	70.1	64.2	95	78	98			
4	63.0	66.8	63.0	62.6	66.1	62.9	98	96	99			
5	61.5	69.8	60.7	60.0	59.1	56.5	91	49	76			
6	(58.2)	68.4		(53.0)	59.4		(68)	56				
7	63.4	73.5		61.2	69.5		87	81				
8	67.1	73.9	(65.6)	66.5	67.6	(50.5)	97	71	(27)			
9	57.4	67.4	(61.3)	53.8	59.2	(57.8)	78	59	(80)			
10	57.7	67.5	60.0	53.2	56.0	58.3	73	44	90			
11	55.0	61.1	58.1	52.7	56.0	56.5	85	70	90			
12	53.0	66.8	57.9	52.2	57.6	55.0	94	54	82			
13	57.8	69.0	60.8	56.3	58.0	57.0	91	48	78	58.0	69.7	61.2
14	65.2	66.5	60.2	63.4	63.9	59.4	90	86	95			
15	55.3	67.2	58.8	52.5	60.3	57.7	82	65	94			
16	57.5	60.4	57.7	57.0	57.0	57.8	97	80	100			
17	65.0	69.8	60.0	63.6	58.1	52.5	92	45	57			
18	53.6	(70.0)	(61.8)	49.5	(59.3)	(56.0)	73	(49)	(67)			
19	58.0	65.4	55.0	57.5	55.5	52.9	97	50	86			
20	50.8	66.0	56.9	49.5	58.2	54.0	91	59	82	51.4	66.5	57.9
21	45.2	(61.3)	53.6	44.8	(56.3)	52.2	97	(71)	90			
22	52.6	56.9	53.6	51.8	53.5	52.2	94	78	90			
23	53.6	(69.5)	61.2	51.6	(63.7)	59.8	87	(71)	91			
24	59.5	(56.8)	51.8	59.2	(55.7)	51.7	98	(93)	99			
25	41.8	51.8	44.0	37.0	43.3	40.6	59	44	73			
26	39.7	55.5	47.0	38.2	47.9	44.1	86	53	78			
27	42.7	58.0	49.2	42.5	51.5	46.6	98	61	81	43.9	58.3	50.0
28	47.0	64.5	55.8	46.7	57.9	54.8	98	65	94			
29	58.7	71.6	61.2	57.2	64.6	59.0	91	67	87			
30	59.6	78.5		58.1	68.1		91	56				
Sums	1704.9	2016.0	1586.8				2644	1931	2245			
Means	56.83	67.20	58.77				88	64	83			

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September 1879

Date	Wind Estimated velocity in miles per hour & direction (if apparent) 8 AM	2 PM	8 PM	Clouds Amount on scale of ten & Kind (Poey's system) {For explanation see note on page 4} 8 A.M.	2 P.M.	8 P.M.
1	0 Calm	2 S S W	2 S S W	0 haze	1 haze	4 haze
2	0 S	3 S W	4 N W	10 haze	8 P Rs haze	10 P m
3	2 N E	2 N E	2 N E	10 P m Fog	8 P m fm P haze	10 P m Fog
4	6 E S E	1 E	6 N	10 P m mist	10 P m mist	10 P m
5	3 N W	8 N W	1 N W	6 P m fm →	2 P m fm →	0
6	(1 N)	1 N W		(0)	0	
7	1 S W	1 S W		5 P m fm → haze	10 P m M fm → fm	
8	6 S W	2 W S W	(2 S W)	10 P m fm / some rain	5 P m M fm / Rs	(0)
9	3 W	2 W N W	(0 W)	0	10 P m M fm	(3 P m fm)
10	1 N	5 N	0 Calm	7 P m fm →	2 M fm →	9 P m
11	1 N	1 N N E	0 N	7 P m fm /	9 P m M fm /	5 P m haze
12	0 W	0 Calm	2 S	0	5 P m M fm →	0
13	0 S	2 S S W	2 S	7 Pr Rs fm →	9 P m fm → /	9 P
14	5 S	1 S S W	0 S W	10 P m	10 P m fm /	9 P m
15	1 W S W	1 W	0 S	0 Rs	5 M fm →	1 P m fm haze
16	0 Calm	3 E N E	0 Calm	10 P fog: raining	10 P m fm	10 P mist
17	6 S S W	5 W S W	0 W	9 P m fm /	1 M fm	0
18	2 S W	(4 S)	(3 S)	0 P Rs haze	(1 haze)	(10 P m)
19	1 N W	3 N W	0 N W	10 P m fm /	1 Pr M fm	2 haze
20	1 N W	3 S	3 N E	4 P Rs fm haze	7 P M fm haze	1 P m fm
21	1 N W	(1 E)	0 Calm	6 Pr fm →	(9 Pr fm)	9 P
22	2 N	4 S E	2 N	10 P m fm: a few drops of ½	10 P m fm: a little rain	10 P m
23	3 N W	(1 S S W)	3 S S W	10 P m	(2 haze Rs fm)	3 P Haze
24	0 S S W	(6 N N W)	0 S W	10 P fog	(10 P m: raining)	0 fm →
25	7 N N W	6 N N W	1 N	0	1 fm /	0 Rs
26	2 N N W	2 E S E	2 S E	0 haze	1 haze fm	0
27	0 S W	3 E	2 S	0 haze	0 haze	0
28	1 S W	3 S	2 S	6 P m fm haze	10 P m fm →	5 P m fm haze
29	3 S	5 S S W	3 S S W	8 P m fm	9 P	7 P
30	3 W	4 W		5 P Rs haze	3 P Rs	
Sum	62	95	42	170	169	127
Mean	2.1	3.2	1.6	5.7	5.6	4.7

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September 1879

Date	Extreme Temperatures Maximum & Min. Minimum 9 AM				Aurora	Zodiacal Light	
	Before Setting	after Setting	Before Setting	after Setting	8 P.M.	8 P.M.	
1	76.2	65.0	58.1	64.9	Moonlight & haze	Moonlight & haze	
2	83.7	71.0	64.5	70.8	Cloudy	Cloudy	Some lightning and a little thunder about 8 P.M. A few drops of rain later.
3	85.2	68.5	65.9	67.0	Cloudy	Cloudy	
4	75.0	63.7	62.3	63.0	Cloudy	Cloudy	Rain previous night.
5	67.2	61.9	57.5	61.0	0	0	
6	(70.7)	(60.8)	(50.2)	(57.5)			
7	69.8	63.4	56.1	63.0			
8	74.3	67.3	63.0	67.0	(0)	(0)	Thundershower previous night.
9	74.5	57.7	51.3	56.9	(None; some clouds)	(None; some clouds)	
10	68.0	58.0	54.8	57.6	Cloudy	Cloudy	
11	67.6	56.4	49.5	54.4	Cloudy	Cloudy	A little rain 1 to 2 P.M.
12	66.2	53.5	47.8	52.7	None	None	
13	68.8	57.3	49.2	57.0	Cloudy	Cloudy	
14	69.1	65.0	56.7	64.7	Cloudy	Cloudy	
15	68.2	55.4	51.8	54.9	None	None	
16	68.7	58.0	52.8	57.2	Cloudy	Cloudy	
17	64.7	64.7	56.3	64.5	None	None	
18	71.2	54.0	46.4	52.9	(Cloudy)	(Cloudy)	A little rain about 10 P.M.
19	69.3	58.5	52.7	58.0	None; haze	None; haze	A little rain early.
20	65.1	51.4	45.0	50.1	None; some clouds	Moonlight & clouds	
21	67.0	46.3	42.5	45.0	Cloudy	Cloudy	
22	62.3	53.4	44.9	52.2	Cloudy	Cloudy	
23	58.9	54.2	52.1	53.2	Moonlight & Cloudy	Moonlight & clouds	
24	69.0	59.7	53.1	59.0	Moonlight	Moonlight	
25	73.0	43.0	41.0	41.9	Moonlight	Moonlight	
26	52.5	40.3	34.8	39.2	Moonlight	Moonlight	A little white frost this morning.
27	56.0	43.6	36.3	42.3	Moonlight	Moonlight	A little white frost this morning.
28	58.6	47.2	40.7	46.3	Cloudy	Moonlight & Clouds	
29	65.0	58.3	46.1	58.0	Cloudy	Cloudy	
30	72.0	69.3	55.9	58.9			
Sums	2057.8		1539.3				
Means	68.59		51.31				

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October 1879

Date	Barometer			Thermometer attached to Barometer			External Thermometer No. 4				Rainfall in inches Gauge C
	8 A.M.	2 P.M.	8 P.M.	8 A.M.	2 P.M.	8 P.M.	8 A.M.	2 P.M.	8 P.M.	Mean given by weights	Examined at 8 A.M.
1											
2											
3			(29.957)			(72.5)			(69.8)		
4	(30.014)			(63.0)			(55.0)				(0.000)
5											
6	30.286		30.386	63.0		62.0	53.2		54.0		0.000
7	30.372	30.249	30.236	59.8	66.3	68.1	54.0	71.6	64.4	61.68	0.000
8	30.206	30.122	30.097	64.0	83.0	70.6	64.1	83.0	70.6	70.48	0.000
9	30.098	30.088	30.118	68.1	72.4	71.3	65.9	75.4	65.3	67.56	0.000
10	30.225	30.224	30.284	66.2	66.0	65.2	58.8	61.9	58.0	59.10	0.000
11	30.379	30.350	30.300	61.1	60.6	60.6	52.4	53.8	53.4	53.08	0.066
12	30.228	30.125	30.118	59.1	62.0	63.3	55.0	67.0	56.6	58.04	0.033
13	30.158	30.132	30.133	61.1	67.0	62.8	60.0	64.3	54.7	58.74	0.000
14	30.138	30.091	30.119	53.8	61.2	62.1	50.2	67.7	58.2	56.90	0.000
15	30.067	29.976	30.032	56.3	65.7	66.0	54.4	73.5	59.2	60.14	0.000
16	30.042	30.050	30.123	60.8	69.2	69.7	64.1	77.2	67.0	67.88	0.000
17	30.272	30.238	30.250	65.1	65.1	64.3	60.3	61.9	58.9	60.06	0.000
18	30.150	30.020	29.919	61.0	64.6	65.0	55.7	68.9	62.8	61.18	0.000
19	29.812	29.889	30.027	63.7	62.2	51.0	57.6	53.3	41.9	50.46	0.254
20	30.144	30.106	30.180	46.8	53.4	53.2	34.3	50.7	44.8	42.98	0.000
21	30.184	30.148	30.170	47.0	61.0	61.1	44.6	65.9	57.0	53.82	0.000
22	30.231	30.169	30.159	57.7	60.0	61.4	55.2	65.5	60.0	59.18	0.022
23	29.949	29.847	29.832	61.0	66.8	65.5	63.6	71.8	60.8	64.12	0.022
24	29.928	29.986	30.178	53.5	53.1	49.7	42.8	41.6	34.6	39.36	0.000
25	30.484	30.508	30.630	43.7	44.2	40.6	29.4	37.1	29.4	30.94	0.000
26	(30.685)	30.547	30.500	(41.0)	50.0	51.1	(27.7)	52.4	41.3	38.08	(0.000)
27	30.259	30.096	30.060	45.8	55.9	54.2	42.8	58.0	48.1	47.96	0.000
28	29.796	(29.451)	29.306	50.8	(53.8)	54.2	48.7	(54.1)	48.2	49.58	0.000
29	29.450	29.402	29.526	50.8	58.7	56.1	50.9	57.7	48.3	51.22	0.364
30	29.532)	29.520	29.656	(52.7)	58.1	52.5	(49.7)	56.0	46.3	49.60	(0.000)
31	29.795		29.976	46.0		48.3	40.9		37.9		0.000
Sums	812.684	721.334	812.272	1522.9	1479.8	1622.4	1394.3	1490.3	1451.7	1312.14	0.761
Means	30.099	30.056	30.084	56.4	61.7	60.1	51.64	62.10	53.77	54.67	

Barometric means reduced to the freezing point; 8 A.M., 30.024 ; 2 P.M., 29.967 ; 8 P.M., 29.999 .

Mean temperature for month (mean of 3 means for 8, 2, 8, with double weight given to the morning and evening observations) 54.58 Fahrenheit.

Rainfall for month 0.76 inches.

Highest reading of maximum thermometer during the month (Oct. 4 and 9) 82.2 Fahrenheit.
Lowest " " minimum " " " " (Oct. 26) 22.5 "

Records in parentheses ( ) are those of observations not made at the regular times. The morning observations of Oct. 4, 26, 30, were respectively made at 7¾, 8¼, 8¼ A.M.; the midday observations of Oct. 28 were made at 3 P.M.; the evening observations of Oct. 3 at 7¼ P.M.

Observers: F. Waldo Oct. 1 to 6 inclusive;
A. Searle at other times.

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October 1879

Date	Psychrometer Dry Bulb			Wet Bulb			Relative Humidity Guyot's Tables			C.3235		
	8 a.m.	2 P.m.	8 P.m.	8 a.m.	2 P.m.	8 P.m.	8 a.m.	2 P.m.	8 P.m.	8 a.m.	2 P.m.	8 P.m.
1												
2												
3			(69.3)			(57.0)			(42)			
4	(54.9)			(49.0)			(63)					
5												
6	52.9		53.4	50.2		51.7	82		88			
7	53.5	71.4	63.6	51.1	62.6	60.0	84	59	80			
8	63.9	82.5	69.9	60.8	70.3	64.5	83	52	73			
9	65.7	74.5	64.5	63.0	68.1	64.5	85	70	100			
10	59.1	61.1	57.7	59.2	59.3	57.5	100	89	99			
11	51.8	53.3	52.5	51.9	51.4	51.6	100	87	94	52.7	54.0	53.4
12	54.7	66.5	55.9	54.3	63.3	55.1	97	83	95			
13	60.0	63.8	538	58.4	57.3	44.0	90	65	38			
14	49.9	67.4	57.7	42.7	48.7	46.5	50	14	36			
15	54.3	73.2	58.4	46.5	60.1	54.0	50	42	74			
16	63.9	76.9	66.4	61.0	68.5	66.2	84	63	99			
17	59.7	61.3	58.6	56.4	58.6	55.7	81	84	82			
18	55.4	68.5	62.3	54.9	63.3	61.1	97	73	93			
19	57.3	52.8	41.1	57.2	46.3	36.0	99	57	56			
20	36.7	50.5	43.8	32.8	40.3	39.5	62	32	65			
21	44.3	65.7	56.4	41.7	50.6	48.9	79	27	54			
22	55.0	65.3	59.7	54.4	60.5	58.1	96	74	90			
23	63.3	70.9	60.3	62.9	64.4	54.1	98	68	64			
24	42.3	41.0	34.0	38.0	34.2	29.8	64	42	59			
25	28.8	36.4	28.3	25.5	29.3	24.8	63	37	60			
26	(27.2)	52.6	40.9	(24.9)	40.0	34.2	(73)	21	43			
27	42.4	57.7	47.5	39.0	47.7	44.4	71	42	76			
28	48.9	(53.7)	49.6	47.6	(53.8)	47.6	90	(100)	100			
29	50.6	57.2	47.8	45.1	47.5	44.2	62	42	73			
30	(49.4)	55.6	45.6	(44.5)	44.2	40.7	(64)	32	62			
31	40.3		37.2	35.0		32.3	54		54			
Sums	13962	14798	14342				2121	1355	1949			
Means	51.71	61.66	53.12				78	56	72			

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October 1879

Date	Wind. Estimated velocity in miles per hour & direction of approach. 8 A.M.	2 P.M.	8 P.M.	Clouds. Amount on scale of ten & Kind (Poey's System). 8 a.m.	2 P.M.	8 P.M.
1						
2						
3			(6 S W)			(10 P.M.)
4	(4 N W)			(0 haze)		
5						
6	3 N E			10 P		10 P.M.
7	1 S W	5 W S W	1 S W	10 P m	1 haze	1 haze
8	1 W	1 W S W	0 S W	3 Pr Rs; haze	6 Pr Fm > haze	2 haze
9	1 N N W	1 E	0 E	8 Pr Fm	9 Pr Fm	10 P
10	3 N E	1 E	2 N E	10 P mist	10 P fog	10 P fog
11	5 N E	2 E N E	0 Calm	10 Pr mist; fine rain	10 P m	10 P m
12	0 S E	1 S	2 E	10 P m	10 P m Fm \	5 haze
13	4 N	2 S E	1 N	6 P M Fm \	0 haze	0
14	4 N W	10 N	1 N	0 Pr Rs	0 Rs	0 haze.
15	1 W	2 N W	0 N E	7 P m Fm \ haze	7 P haze.	6 haze.
16	0 W	1 E	2 S	6 P haze.	4 haze	8 P haze
17	4 E S E	3 E	1 S E	10 P	10 P	10 P
18	4 S E	4 S	4 S	10 P fog.	6 P Rs Fm	10 P
19	0 Calm	13 N W	5 N W	10 P m; raining	2 P m Fm	0 Fm
20	6 N N W	5 N W	0 W	0	0 Rs	0
21	3 W	3 W S W	2 S	0	6 P Rs	9 P
22	0 S	3 S	1 S	10 P m Fm; a little mist	10 P m Fm.	10 P m Fm ↗
23	7 S W	5 S W	3 N W	10 P m Fm	9 P m Fm ↗	10 P m Fm →
24	6 N W	14 N W	4 N W	0 P m Fm	10 P m M Fm \	0
25	5 N W	6 N W	0 S W	0	2 M Fm \	0
26	(1 S W)	4 S W	5 S W	(0)	0	0
27	6 S W	8 S S W	4 S W	0 Rs	8 Pr Rs Fm ↗	8 Pr Fm →
28	0 E	(5 S E)	0 Calm	9 P m Fm	(10 P m Fm \ a little rain)	10 P m Fm ↑
29	11 W	9 W	1 S W	9 P m Fm \	3 haze Fm →	0 P.
30	(~~7~~ 5 W)	12 W	6 W	(1 P m Fm)	5 M Fm →	0
31	8 W		10 W	0		0
Sum	91	120	61	149	138	139
Means	3.4	5.0	2.3	5.5	5.8	5.1

For explanation see note on page 4.

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October 1879

Date	Extreme Temperatures. Maximum 8 AM Before Setting	Maximum 8 AM After Setting	Minimum 8 AM Before Setting	Minimum 8 AM After Setting	Aurora 8 P.M.	Zodiacal Light 8. P.M.	
1							
2							
3							
4	(82.2)	(54.9)	(51.8)	(54.2)			
5							
6	74.7	54.5	50.2	52.4			
7	55.4	54.4	52.0	53.1	Suspected; hazy	Hazy	
8	71.8	63.7	53.1	63.3	None; hazy	None; hazy	
9	82.2	65.7	62.3	65.0	Cloudy	Cloudy	
10	76.2	59.0	57.6	58.0	Cloudy	Cloudy	
11	61.6	52.9	51.8	51.8	Cloudy	Cloudy	
12	54.7	54.9	51.3	54.2	Hazy	Hazy	
13	67.1	59.7	54.0	59.0	None	None	
14	67.0	59.0	44.0	49.4	None	Suspected.	
15	67.0	54.2	46.2	53.8	Hazy.	Hazy.	
16	74.0	63.3	53.0	63.1	Cloudy	Cloudy.	
17	77.2	60.0	59.4	59.4	Cloudy	Cloudy.	
18	61.8	55.7	52.2	55.0	Cloudy	Cloudy.	Some rain in the evening.
19	68.7	57.3	55.0	57.0	None	Moonlight	
20	59.4	37.8	33.6	36.8	Moonlight	Moonlight	A little white frost this morning.
21	51.2	44.8	36.6	43.7	Cloudy	Cloudy	Fragment of lunar halo 7 to 8 P.M.
22	65.7	55.0	43.7	54.3	Cloudy	Cloudy	
23	65.0	62.8	54.2	62.7	Cloudy	Cloudy.	
24	71.0	43.3	41.2	42.0	Moonlight	Moonlight.	
25	45.7	30.5	26.2	28.9	Moonlight	Moonlight	A little white frost this morning.
26	(37.8)	(29.0)	(22.3)	(27.1)	Moonlight	Moonlight	A little white frost this morning.
27	52.8	43.2	27.1	42.0	Cloudy	Cloudy.	A little white frost this morning; a few drops of rain after 11 P.M.
28	57.9	48.7	42.1	48.0	Cloudy	Cloudy	
29	58.0	56.0	45.5	49.9	Moonlight	Moonlight.	
30	(57.5)	(50.0)	(46.0)	(49.0)	Moonlight	Moonlight.	
31	56.0	41.2	39.0	40.2	Moonlight	Moonlight.	
Sum	1719.6	1402.5	1251.6				
Means	63.69	51.94	46.36				

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Meteorological Record of

November, 1879.

Date.	Barometer.			Thermometer attached to Barometer.			External Thermometer No. 4				Rainfall in inches Gauge [*]
	8. A. M.	2. P. M.	8. P. M.	8. A. M.	2. P. M.	8. P. M.	8. A. M.	2. P. M.	8. P. M.	Mean giving Half weight to 2 P. M.	Examined at 8. A. M.
1.	30.109	30.114	30.200	43.3	48.0	45.8	33.6	41.5	33.3		0.000
2.	(30.288)	30.166	30.088	(40.0)	45.9	46.2	(29.5)	42.2	37.7		(0.000)
3.	29.862	29.682	29.692	43.0	42.8	42.4	34.9	37.8	32.1		0.165
4.	30.010	30.060	30.192	35.7	40.0	39.1	26.7	30.6	23.8		0.419
5.	(30.386)	30.390	30.393	(32.0)	40.0	31.8	(21.7)	31.8	24.1		0.000
6.	30.344	30.248	30.220	32.8	35.2	36.8	23.0	32.2	30.8		0.055
7.	30.238	30.284	30.330	37.0	40.7	40.9	31.6	38.8	33.2		0.165
8.	30.318	30.260	30.266	34.6	46.8	46.9	34.9	41.0	48.3		0.000
9.	30.242	30.127	30.093	46.7	53.8	54.7	51.3	64.8	58.1		0.000
10.	30.096	(30.110)	30.161	55.5	(60.0)	52.5	57.4	(59.7)	47.4		0.000
11.	30.250	30.176	30.044	45.0	51.0	51.1	40.4	48.8	46.3		0.000
12.	29.789	29.769	29.739	50.8	56.8	58.2	52.0	68.5	61.0		0.022
13.	29.909	30.100	30.212	52.4	50.0	49.2	40.6	43.3	41.8		0.530
14.	30.218	30.069	29.956	47.8	49.9	51.3	44.7	52.1	52.4		0.033
15.	29.716	29.549	29.490	56.0	59.8	62.3	60.6	67.4	63.3		0.011
16.	29.753	29.799	29.965	54.7	58.2	52.8	48.3	57.3	47.4		0.000
17.	30.200	30.200	30.210	48.8	52.5	51.8	41.0	50.9	44.0		0.000
18.	30.068	29.865	29.818	48.1	47.9	43.2	41.7	35.3	30.1		0.044
19.	(29.963)	29.908	29.842	(39.7)	41.7	42.0	(28.3)	34.8	34.1		(0.905) [*]
20.	29.275	29.121	29.244	41.0	40.0	39.0	32.7	32.4	25.9		0.154
21.	(29.634)	29.780	30.004	(29.0)	26.9	27.5	(12.4)	16.5	14.0		(0.221)
22.	30.282	30.249	30.194	26.2	39.2	33.9	11.0	27.0	24.1		0.000
23.	(29.887)	29.721	29.820	(34.2)	37.5	39.0	(33.9)	41.0	35.0		(0.022)
24.	30.115	30.200	30.244	34.3	45.2	31.6	25.9	31.2	23.6		0.000
25.	(30.027)	29.888	30.084	(31.1)	36.7	39.8	(29.2)	44.0	37.1		(0.000)
26.	30.288	30.316	30.401	36.2	40.7	38.2	30.2	39.6	31.7		0.000
27.	(30.449)	30.344	30.271	(36.0)	38.0	39.3	(29.7)	38.4	40.0		(0.000)
28.	30.096	29.958	29.850	40.0	42.9	46.5	42.2	54.6	55.7		0.000
29.	29.604	29.607	29.785	50.1	52.8	42.8	52.8	45.9	33.7		0.375
30.	(30.120)	30.264	(30.370)	(29.0)	36.8	(31.0)	(22.6)	27.9	(24.2)		(0.055)
Sums	901.536	900.324	901.178	1234.0	1358.7	1307.6	1064.2	1287.3	1134.2		3.176
Means	30.051	30.011	30.039	41.1	45.3	43.6	35.47	42.91	37.81		

Barometric means reduced to the freezing point: 8 A.M., 30.017; 2 P.M., 29.994; 8 P.M., 29.998.

Mean temperature for month (mean of 3 means for 8, 2, 8, with double weight given to the morning and evening observations) 37.89 Fahrenheit.

Rainfall for month 3.18 inches.

Highest reading of maximum thermometer during the month (Nov. 13) 68.0 Fahrenheit.
Lowest " " minimum " " " " (Nov. 22) 8.2 "

Records in parentheses ( ) are those of observations not made at the regular times. The morning observations of Nov. 2, 19, 21, 23, 25, 27, were made at 8¼ A.M.; those of Nov. 5 and 30 at 8½ A.M.; the midday observations of Nov. 10 at 2¼ P.M.; the evening observations of Nov. 30 at 6¾ P.M.

[*] Gauge examined Nov. 18, 8 P.M.; result 0.728 inches; again Nov. 19, 8 A.M.; result 0.177 inches; total 0.905 inches.

Observer, A. Searle.

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Harvard College Observatory.

November. 1879.

Date.	Psychrometer. Dry bulb.			Wet bulb.			Relative humidity Guyot			C. 32. 35		
	8. A.M.	2. P.M.	8. P.M.	8. A.M.	2. P.M.	8. P.M.	8 A.M.	2. P.M.	8 P.M.	8. A.M.	2. P.M.	8 P.M.
1.	33.1	49.7	32.7	29.7	32.7	27.9	67	32	52	34.1	41.7	33.8
2.	(29.0)	41.6	36.6	(26.8)	35.0	32.7	(75)	45	62			
3.	34.4	37.0	31.4	34.0	36.8	31.7	96	98	100			
4.	26.3	29.9	23.0	25.2	27.9	21.5	86	78	80			
5.	(21.2)	31.0	23.3	(20.2)	26.5	22.7	(86)	53	92			
6.	22.3	31.4	30.2	22.5	31.1	30.4	100	97	100			
7	30.9	38.0	32.3	31.1	35.9	32.0	100	80	97			
8.	34.4	51.0	47.7	34.6	45.5	45.6	100	62	84	35.3	51.7	48.6
9.	50.9	64.3	57.7	49.8	58.0	55.5	93	66	86			
10.	57.3	(59.2)	47.0	53.8	(49.3)	41.8	78	(44)	61			
11.	39.9	48.2	45.8	36.7	42.3	43.0	71	57	78			
12.	51.7	68.4	60.4	51.1	61.5	59.9	96	65	97			
13.	40.2	45.5	41.2	39.9	40.9	41.5	97	86	100			
14.	44.0	51.6	52.1	44.4	49.1	51.2	100	83	94			
15.	59.7	67.2	63.0	58.8	61.5	60.6	94	70	86		67.3	63.2
16.	48.0	57.2	46.8	46.0	46.0	41.2	85	35	58			
17.	40.6	50.4	43.2	37.9	42.0	39.5	75	43	69			
18.	41.2	34.7	29.5	41.3	34.9	29.6	100	100	100			
19.	(27.5)	34.0	33.7	(26.4)	31.8	32.7	(86)	78	89			
20.	31.9	31.8	25.2	32.3	32.0	23.8	100	100	82			
21.	(12.0)	15.8	13.6	(10.5)	13.5	12.5	(70)	60	80	11.3	27.8	24.7
22.	bl'gr.	26.7	23.5	bl.gr.	23.9	22.3		67	83			
23.	(33.5)	40.3	34.5	(33.7)	37.9	32.3	(100)	78	78			
24.	25.3	30.5	22.8	22.2	25.6	21.4	61	48	81			
25.	(28.8)	43.8	36.5	(27.8)	39.0	33.3	(89)	61	69			
26.	29.7	39.0	30.8	27.7	33.0	29.8	78	46	89			
27.	(29.0)	37.4	39.5	(27.2)	34.4	38.3	(80)	71	89			
28.	41.8	54.3	55.4	41.6	51.3	53.1	98	80	85			
29	52.0	45.3	32.9	52.1	41.3	29.2	100	68	63	58.0	46.1	34.0
30.	(21.7)	27.2	(23.5)	(19.3)	21.2	(19.7)	(66)	30	(50)			
Sums	1047.88	1279.4	1115.8				2527	1981	2434			
Means	34.96	42.65	37.19				87	66	81			

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Meteorological Observations of

November. 1879

Date.	Estimated mind velocity in miles per hour and direction (of approach)			Amount or scale of 10, and kind of Clouds (on Poëy's System). For explanation see note on page 4.		
	8. A. M.	2. P. M.	8. P. M.	8. A. M.	2. P. M.	8. P. M.
1.	5 S W	11 W	3 S W	0 Pm Fmm	3 Ns Fmm →	0
2.	(1 W S W)	2 S W	1 S E	(2 Pn Rs)	10 Pm Fmm →	10 Pm Fmm
3.	6 S E	4 S E	5 N W	10 P, raining	10 P, a little rain	10 P; snowing.
4.	2 N W.	5 N W	4 N W	0 Fmm	0	0
5.	(2 N W)	4 N W	1 N W	(0)	0 Fmm	0 haze
6.	2 N W	1 N	1 N W	10 Pn Snowing.	10 Pn snowing	10 P
7.	3 N	3 N	0 N W	10 Pn Snowing.	9 Pm Fmm	0 fog.
8.	2 S W	5 S W	5 S	9 P Rs Fmm	9 P Fmm →	8 P
9.	2 S W	7 S W	5 S W	10 Pm Fmm → Fmm ↑	8 Pm Fmm ↗	7 P
10.	3 W	(5 N W)	5 N W	0 Rs Fmm	(0 Rs Fmm)	0
11.	1 W	0 N E	5 S E	0 Rs Fmm	9 P Fmm	10 P
12.	0 Calm	5 W	0 Calm	7 Pm Fmm →	10 P Fmm →	8 P
13.	7 N N E	4 N	1 N N E	10 Pm Fmm	10 Pm Fmm	10 P; a little rain.
14.	1 S	5 S	3 S	10 P, mist.	10 Pm Fmm ↑	10 P.
15.	3 S W	9 S W	8 S W	10 Pm Fmm → Fmm ↗	10 Pm Rm Fmm → Fmm ↑	10 Pm
16.	2 S W	7 W N W	4 W	0	2 M Fmm →	0
17.	1 W	3 N W	0 W	0	5 Pn Pm M Fmm →	6 P.
18.	2 N E	6 N E	7 N	10 Pm raining	10 P; rain & snow.	10 P; snowing.
19.	(3 N)	0 W	5 S E	(10 P Fmm V)	10 P Fmm	10 P
20.	3 N	3 N W	8 N W	10 P; snowing.	10 P; snowing.	10 P; a little snow.
21.	(2 N W)	9 N W	0 Calm	(1 Rs Fmm)	0	0
22.	1 W	2 S	2 S S E	0	0 Rs	4 P Rm Fmm ↗
23	(0 S S E)	3 S W	0 S W	(10 P fog)	9 Pm Fmm ↗	0 Fmm
24.	3 W N W	4 N W	0 S W	0 Fmm	0 Rs	0 Rs
25.	(0 S S W)	7 S W	3 S W	(10 Pn Rs Pm Fmm)	9 Pm Fmm ↗	1 P Rs
26.	0 W	5 N N W	0 N	0 P	0	1 P Fmm
27.	(1 N W)	0 Calm	2 S E	(10 Pn Rs M Fmm)	10 P fog.	10 Pm
28.	2 S S W	5 S S W	10 S S W	10 Pm Fmm	10 Pm	10 Pm
29	0 S S W	6 W	6 W	10 Pm; raining	10 Pm Fmm →	0 Fmm
30.	(5 W)	8 N W	(5 N W)	(0 Pn Rs)	0	(0)
Sums	75	138	99	169	193	155
Means	2.5	4.6	3.3	5.6	6.4	5.2

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Harvard College Observatory.

November. 1879.

Date.	Extreme Temperatures. Maximum 8 A.M. Before Setting	Maximum 8 A.M. After Setting	Minimum 8 A.M. Before Setting	Minimum 8 A.M. After Setting	Aurora 8. P. M.	Zodiacal Light 8. P. M.	
1.	47.7	35.9	29.5	33.6	Moonlight	Moonlight.	
2.	(42.0)	(30.5)	(24.8)	(29.0)	Cloudy	Cloudy.	
3.	44.0	36.4	29.0	34.3	Cloudy	Cloudy.	{Snow early, changing to rain; snow again late in the day}
4.	38.2	27.5	24.0	25.7	None	Suspected.	
5.	(30.6)	(23.0)	(17.1)	(21.9)	None	Somewhat visible.	
6.	31.4	24.2	18.7	22.8	Cloudy	Cloudy.	
7.	32.2	32.0	22.2	31.2	None	Indistct.	
8.	39.0	35.2	38.0	34.2	Cloudy	Cloudy.	
9.	50.7	50.3	34.1	50.2	Cloudy	Cloudy.	
10.	64.6	56.9	50.0	56.6	None	Indistinct. Venus near Jupiter	
11.	60.0	40.2	38.0	39.6	Cloudy	Cloudy.	
12.	51.7	51.7	39.3	51.2	Cloudy	Cloudy.	A little rain towards night.
13.	68.0	42.0	40.1	40.1	Cloudy	Cloudy.	
14.	44.4	44.5	40.1	44.0	Cloudy	Cloudy.	
15.	60.2	58.8	44.0	59.2	Cloudy	Cloudy.	
16.	66.9	49.0	46.3	47.8	None	Venus near Jupiter.	
17.	57.0	41.2	37.8	40.3	Cloudy	Cloudy.	A little white frost this morning.
18.	51.0	42.0	39.0	41.2	Cloudy	Cloudy.	A little snow on the ground at 8 P.M.
19.	(42.1)	(29.3)	(25.7)	(27.9)	Cloudy	Cloudy.	
20.	34.8	33.3	27.9	32.2	Cloudy	Cloudy.	Rain early, changing to snow.
21.	(33.5)	(14.0)	(11.3)	(11.9)	Moonlight	Moonlight.	
22.	18.0	13.0	8.2	10.5	Moonlight & Clouds	Moonlight & Clouds	*Lunar halo at 6¼ P.M.
23.	(33.8)	(33.3)	(10.3)	(33.4)	Moonlight	Moonlight	
24.	41.8	26.7	24.6	25.3	Moonlight	Moonlight.	
25.	(31.0)	(29.5)	(21.4)	(28.8)	Moonlight & Clouds	Moonlight.	
26.	44.6	30.4	28.0	29.6	Moonlight	Moonlight	†Lunar halo at 9 P.M.
27.	(39.3)	(30.2)	(26.8)	(29.3)	Cloudy.	Cloudy.	
28.	41.6	41.6	29.1	41.1	Cloudy	Cloudy	
29.	56.0	52.0	41.1	52.0	Moonlight	Moonlight	
30.	(56.0)	(23.0)	(21.1)	(22.0)	(Moonlight)	(Moonlight)	
Sum	1352.1		1887.5				
Means	45.07		62.92				

Nov. 16, 9 P.M. Meteor reported at this time in a letter of Professor W. Everett from Quincy, Mass.; it appeared just below Jupiter and ran southwards over fifteen degrees, ending with a vivid green ball of fire.

*Nov. 22, 6¼ P.M.; lunar halo; Jupiter on inside edge, Saturn ¾ of the distance from the moon to the inside edge.

†Nov. 26, 9 P.M.; lunar halo; α Tauri in the ring, about half a degree outside of inner edge.

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December. 1879.

Date.	Barometer			Thermometer attached to Barometer			External Thermometer No. 4			Mean giving last reading to 2 P.M.	Rain fall in Inches gauge examined at 8 AM.
	8 A.M.	2. P.M.	8. P.M.	8 A.M.	2 P.M.	8 P.M.	8 A.M.	2 P.M.	8 P.M.		
1.	30.328	30.151	30.135	23.9	37.0	37.4	18.1	39.8	34.7		0.000
2.	30.150	30.078	30.068	36.8	51.8	43.8	32.9	48.6	43.5		0.000
3.	(30.100)	30.092	30.088	(42.2)	51.7	46.3	(38.7)	49.1	41.1		(0.000)
4.	30.036	30.156	30.299	43.0	56.9	47.0	36.0	51.7	39.6		0.132
5.	30.413	30.410	30.388	35.7	41.4	41.7	27.2	39.8	36.2		0.000
6.	30.262	30.100	29.910	40.6	42.2	43.3	39.0	42.0	45.5		0.000
7.	29.487	29.710	29.891	49.1	53.7	49.6	53.6	52.7	43.8		0.463
8.	30.050	30.109	(30.204)	45.1	45.8	(46.0)	41.8	44.7	(40.7)		0.000
9.	(30.440)	30.496	30.521	(39.1)	55.4	42.0	(29.9)	36.4	29.9		(0.088)
10.	(30.396)	30.218	(30.098)	(38.1)	40.8	(42.6)	(30.7)	44.2	(44.5)		(0.000)
11.	29.716	29.661	29.796	48.0	51.7	51.3	58.2	61.2	45.6		0.110
12.	29.986	30.091	30.253	45.0	58.7	41.2	36.5	37.6	28.9		0.011
13.	30.552	30.600	30.659	35.1	40.0	38.5	20.7	30.4	27.9		0.000
14.	(30.498)	30.272	29.970	(36.3)	37.9	38.8	(29.9)	37.4	38.1		(0.000)
15.	29.584	29.460	29.511	40.0	41.2	40.9	34.8	41.0	36.4		0.993
16.	(29.822)	29.940	29.945	(35.4)	52.8	38.0	(33.3)	35.6	29.8		(0.000)
17.	(29.789)	29.883	30.000	(37.2)	51.0	37.3	(31.6)	37.3	30.3		(0.000)
18.	(30.273)	30.309	30.348	(21.1)	35.4	30.2	(12.9)	20.3	16.2		(0.000)
19.	(30.306)	30.262	30.263	(30.0)	31.8	32.4	(25.3)	28.0	25.8		
20.	(29.942)	29.830	29.900	(32.0)	44.1	36.9	25.5	36.7	35.9		
21.	(30.311)	30.450	30.581	(18.7)	26.7	20.2	3.2	4.3	1.2		(0.066)*
22.											
23.		(30.339)			(28.3)			(29.7)			
24.	(29.970)	(29.844)	(29.860)	(30.9)	(32.2)	(33.2)	(38.0)	(37.7)	(33.2)		(0.706)*
25.	(29.824)			(34.3)			(36.5)				
26	29.956		30.058	20.0		29.6	0.3		7.3		
27	(30.188)		30.146	(21.5)		27.0	(14.0)		18.5		
28.	(30.164)			(28.2)			(28.5)				
29.	(29.860)			(33.2)			(34.8)				
30.	29.828			39.0			40.6				0.177*
31.	(30.534)			(20.2)			(7.8)				
Sums	872.765	692.461	722.892	999.7	1008.5	929.1	860.3	886.2	774.6		2.746
Means	30.095	30.107	30.120	34.5	43.8	38.7	29.67	38.53	32.28		

Barometric means reduced to the freezing point: 8 A.M., 30.079 ; 2 P.M., 30.066 ; 8 P.M., 30.092 .

Mean temperature for month (mean of 3 means for 8, 2, 8, with double weight given to the morning and evening observations) 32.49 Fahrenheit.
Rainfall for month 2.75 inches.

Highest reading of maximum thermometer during the month (Dec. 12) 61.0 Fahrenheit.
Lowest " " minimum " " " " (Dec. 26) 0.0 "

Records in parentheses ( ) are those of observations not made at the regular times. The morning observations of Dec. 3, 9, 10, 17, 21, were made at 8¼ A.M.; those of Dec. 25, 27, 28, 29, 31, at 9 A.M.; those of Dec. 14, 16, 18, 19, 20, at 9¼ A.M.; those of Dec. 24 at 10½ A.M.; the midday observations of Dec. 23 at 3¼ P.M. and those of Dec. 24 at 1½ P.M.; the evening observations of Dec. 8 and 24 at 8½ P.M. and those of Dec. 10 at 7¼ P.M.

*See notes on rainfall, p. 97.

Observers: F. Waldo after 3¼ P.M. Dec. 23;
A. Searle previously.

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December. 1879.

Date	Psychrometer: Dry bulb. 8 A.M.	2 P.M.	8 P.M.	Wet bulb. 8 A.M.	2 P.M.	8 P.M.	Relative humidity. Guyot's Tables. 8 A.M.	2 P.M.	8 P.M.	C.S.2.3.5. 8 A.M.	2 P.M.	8 P.M.
1.	17.5	39.2	34.0	16.8	31.2	31.0	88	34	71			
2.	32.5	48.4	42.8	29.2	40.0	39.1	67	40	69			
3.	(38.2)	48.6	40.5	(37.0)	42.7	40.5	(88)	57	100			
4.	35.2	51.2	39.0	35.5	45.9	36.9	100	63	81			
6.	26.5	39.0	35.4	26.0	35.9	34.1	94	72	87			
6.	38.4	41.4	44.9	37.5	41.6	45.5	92	100	100			
7.	53.0	52.3	43.2	51.6	45.0	40.3	90	51	76			
8.	41.5	43.9	(40.1)	39.3	43.3	(37.2)	81	95	(74)			
9	(29.2)	35.5	29.1	(27.6)	31.9	27.3	(80)	66	80			
10.	(30.0)	43.7	(43.9)	(29.1)	41.5	(44.2)	(90)	82	(100)			
11.	57.7	61.1	44.9	57.1	58.5	40.1	96	85	62			
12.	35.7	36.9	28.2	31.9	30.7	25.1	64	46	64			
13.	20.0	29.9	27.1	19.1	26.2	24.6	86	60	70	21.4	31.0	28.3
14.	(29.5)	36.6	37.5	(29.1)	36.3	37.9	(96)	97	100			
15.	34.2	40.5	35.7	34.7	39.9	35.0	100	99	93			
16.	(32.8)	34.8	29.0	(28.5)	29.7	26.4	(58)	52	71			
17.	(31.0)	36.4	29.7	(29.8)	31.5	26.6	(82)	55	66			
18.	(12.3)	19.7	15.3	(11.0)	16.1	13.9	(75)	46	75			
19.	(24.5)	27.4	25.1	(24.6)	26.7	23.9	(100)	92	84			
20.	(25.0)	36.1	35.3	(25.0)	34.8	32.4	(100)	87	74			
21.	(hlgr)	hlgr	hlgr	(hlgr)	hlgr	hl.gr.				(3.8)	5.0	2.0
22.												
23.												
24.	(37.6)	(36.5)	(32.0)	(38.4	(37.1)	(32.8)	(100)	(100)	(100)			
25.	(36.2)			(35.0)			(88)					
26.	bl.gr.	blgr.	blgr	bl.gr.		blgr						
27.	(bl.gr.)		18.0	(bl.gr.)		16.5			76			
28.												
29.	(34.0)			(33.4)			(94)					
30.	40.3			39.2			90					
31.	(hl.gr.)			(bl.gr)						(8.7)		
Sums	8436	8428	7583				2099	1419	773			
Means	29.09	38.31	31.60				87	68	35			

Notes on rainfall.

Dec. 19, 9¼ A.M. About ¼ of an inch of snow on the ground.
Dec. 20, 9¼ A.M. 0.066 inches of rainfall by gauge; contents of gauge not thawed out, as sleet was falling at the time.
Dec. 21, 8¼ A.M. No increase of rainfall since yesterday.
Dec. 23, 3¼ P.M. Yesterday cold and snowy; snow now appears to be about 4 inches deep and of about medium weight; rainfall inferred to be about 0.60 inches.
Dec. 24, 10½ A.M. Gauge showed a total rainfall of 0.706 inches; accepted as correct; there may have been rather less than 0.1 inches rain since the snow. Gauge cleared out.
Dec. 29, 7½ A.M. About 0¼ ounces of water in gauge; not removed.
Dec. 30, 8 A.M. Gauge showed a total rainfall of 0.177 inches; presumably including the amount mentioned Dec. 29.

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December. 1879.

Date.	Estimated Wind Velocity in miles per hour, and direction (of approach).			Amount on scale of 10, and kind (on Forry's System). For explanation see note page 4. Clouds.		
	8. A. M.	2. P. M.	8. P. M.	8. A. M.	2. P. M.	8. P. M.
1.	1 S S W	9 S W	3 S W	9 Pa RS Fmn →	8 Pa Fmn ↘	2 Pa RS
2.	0 S W	5 S S W	1 S W	7 Pa RS Fmn ↘	1 Pa RS	10 P
3.	(0 S W)	2 E	0 N	(9 P RS)	3 P RS haze	10 P
4.	0 W	5 N W	1 N W	5 P Fmn	1 M Fmn RS	0 haze.
5.	3 N	2 E	2 E	0 haze	10 Pm Fmn ←	7 R Fmn
6.	3 E S E	4 E	4 E	10 P	10 P mist.	10 P
7.	3 W	5 W	2 W	1 Pm Fmn	0 Fmn	0
8.	1 S W	0 W S W	(2 N W)	10 Pm Fmn →	10 P; raining	(10 P)
9.	(2 N N E)	5 N E	2 N W	(0 0 Fmn RS)	1 Fmn RS	0
10.	(3 N)	2 S S E	(6 S E)	(10 P)	10 P	(10 P)
11.	10 S S W	9 S W	1 W	10 P Fmn ↗ Fmn ↑	10 Pm Fmn ↗	10 P
12.	4 W N W	6 N W	0 N	10 P	10 Rs M Fmn	0
13.	1 N	2 N	1 N	1 P Fmn →	5 P Rs Rm Fmn →	10 P
14.	(1 N.)	7 E S E	6. E	(10 P; Snowing)	10 Pm Fmn ↘; raining	10 P; raining.
15.	0 N W	1 W	2 W	10 P fog.	10 Pm Fmn → Fmn ↗	8 P Fmn.
16.	(7 W)	7 W	1 W	(0 Fmn)	1 M. Fmn ↘	9 P
17.	(1 S W)	6 W	3 N W	(10 P Fmn. →)	2 Pm Fmn	2 Pm Fmn →
18.	(5 N W)	5 N	1 S	(0)	0	0
19.	(3 N W)	4 N E	3 N	(10 Pa; Snowing.)	10 P Fmn L	10 P.
20.	(0 N W)	0 S	1 W	(10 P; a little Sleet)	7 P Rm Fmn →	10 P.
21.	(9 N)	5 N	6 N	(7 P Fmn)	4 P Rs RS	7 Pa Fmn
22.						
23.					(9 P)	
24.	(3)	(5 N)	(0)	(10 P raining)	(10 Pm; a little rain.)	(10 moon visible thro Clds)
25.	(2 W.)			(10 P)		
26.	5 N W		1	0		0
27.	(1 W S W)		1	(10 P haze)		haze in horizon.
28.	(1 S W)			(10 P)		
29.	(3 W S W)			(10 Pm raining.)		clouds
30.	3 W S W			8 M Fmn ↗		
31.	(6 N)			(10 P; a little Snow.)		
Sums	81	96	50	201	142	145
Means	3.0	4.4	2.1	6.9	7.0	6.3

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December 1879.

Date.	Extreme Temperatures. Maximum 8 A.M. Before Setting	Maximum 8 A.M. After Setting	Minimum 8 A.M. Before Setting	Minimum 8 A.M. After Setting	Aurora 8. P. M.	Zodiacal Light 8 P. M.	
1.	28.0	18.8	14.4	17.1	Moonlight & Clouds	Moonlight.	
2.	39.6	33.2	17.2	32.5	Cloudy	Cloudy	
3.	(48.7)	(39.0)	(32.2)	(38.2)	Cloudy	Cloudy	
4.	50.0	36.2	35.6	35.6	None; haze.	Suspected haze.	Rain early in the morning.
5.	53.0	28.0	26.3	26.7	Cloudy	Cloudy.	
6.	39.6	39.0	26.7	38.3	Cloudy.	Cloudy.	Rain towards night.
7.	57.3	53.3	38.2	52.8	Suspected.	Venus, Procyon, Jupiter, Saturn. Indistinct.	
8.	54.0	42.0	36.2	41.1	(Cloudy)	(Cloudy.)	
9.	(45.7)	(30.7)	(28.9)	(29.2)	Suspected.	Somewhat visible.	
10.	(37.3)	(31.7)	(27.0)	(30.2)	(Cloudy)	(Cloudy.)	A little rain.
11.	57.2	54.4	30.2	56.2	Cloudy	Cloudy.	A little rain.
12.	61.0	37.0	36.0	36.0	None	Faint.	
13.	37.4	23.0	20.0	20.6	Cloudy	Cloudy.	{Fragment of solar halo at 3½ P.M., colored, with indefinite parhelion.}
14.	(31.0)	(31.0)	(20.4)	(29.9)	Cloudy	Cloudy.	
15.	41.3	35.3	29.5	34.5	None; some clouds.	Cloudy.	
16.	(40.9)	(33.4)	(31.1)	(32.8)	Cloudy.	Cloudy.	
17.	(35.2)	(32.3)	(28.3)	(31.1)	Moonlight & Clouds	Moonlight & Clouds.	
18.	(39.0)	(14.0)	(10.9)	(12.2)	Moonlight	Moonlight	
19.	(25.4)	(25.7)	(12.2)	(24.8)	Cloudy.	Cloudy.	At 9½ A.M. about 1/10 of an inch of snow on the ground.
20.	(28.1)	(26.0)	(23.0)	(25.0)	Cloudy.	Cloudy.	
21.	(39.0)	(5.5)	(2.7)	(2.7)	Moonlight & Clouds	Moonlight & Clouds.	
22.							
23.							Lunar halo recorded by F. Waldo, 7 P.M.
24.	(37.8)	(37.4)	(0.6)	(37.3)	(Cloudy)	(Cloudy.)	
25.	(38.5)	(36.3)	(32.2)	(36.2)			
26.	37.3	10.2*	0.0	0.3	Moonlight	Moonlight	
27.	(14.8)	(14.8)	(0.3)	(3.8)	Moonlight	Moonlight	
28.	(28.5)	(28.5)	(3.7)	(27.9)			
29.	(40.2)	(34.7)	(27.8)	(34.1)	Cloudy	Cloudy.	
30.	44.0	40.5	33.8	40.0			
31.	(43.7)	(7.5)	(4.8)	(7.2)			
Sum	1173.5		640.5				
Means	40.46		22.09				

*Dec. 26, 8 A.M. Maximum thermometer set with difficulty, and hence held some time in the hand.

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General remarks on observations for 1879.

Range of temperature. Highest reading of maximum thermometer in 1879 91.7 Fahrenheit, June 2.
Lowest " " minimum " " 1879 −1.1 " , January 21.

Range of barometer. Highest reading of barometer (attached thermometer 21.5) 30.699 inches, February 28, 8 P.M.
Lowest " " " (" " 36.2) 28.904 " , March 31, 8 P.M.

Observers. Arthur Searle, W. Upton, F. Waldo; see notes in record for each month. Reductions by various hands (A. Searle, F. Waldo, W. Hoxie, Miss R. G. Saunders).

Instruments as described in this volume immediately before record for 1878. Casella 3235 was used as a wet bulb thermometer till January 24; then sent to Baltimore for the comparisons described in the account of the instruments just mentioned (see p. 1). After its return it was occasionally used as a dry bulb thermometer. The observations made with it were not reduced.

Relative humidity. The relative humidity was computed up to and including July 16 after applying corrections taken from the tables given in the general remarks on the observations for 1877. Up to January 10, 1881, no further computation of relative humidity had been made. The computation was made to the end of 1879 by Mr. C. C. Eaton in 1882.

Change of place of instruments. The East Transit Room was required for observations with the meridian photometer, which began in the summer of 1879. On June 10, between 8 A.M. and 2 P.M., the thermometers, with the shelter which protected them, were removed to the east window on the north side of the West Transit Room, close to the place of the barometer. See note, p. 72. The relative places of the thermometers remained as before.

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Reductions

Up to January 10, 1881, the barometric means had been taken to October, inclusive; those of the attached thermometer to July inclusive; those of the external thermometer throughout the year; the daily mean temperature and its mean had been computed to October inclusive (the mean temperature derived from the three means of the external thermometer being complete for the year); the amount of rainfall had been found for each month; the relative humidity had been computed, as stated on p. 100, to July 16 inclusive, and its mean to June inclusive; the means of estimates of wind and clouds to July inclusive; the means of the maximum and minimum thermometers (before setting) to July inclusive.

Up to February 3, 1881, inclusive, in addition to the above work, the barometric means for May, August, and September had been recomputed, and the means of the attached thermometer for August and September computed. February 4, 1881, barometric means for October recomputed; barometric means for November and December, and means of the attached thermometer for October, November, and December, computed.

The reductions were completed by Mr. C. C. Eaton in 1882 so far as seemed needful for publication.

Lunar halos

See note p. 51. Some additional observations were made with the diopter in 1879; its constant was determined from the observations in book R52, p. 197, (see p. 51 of this book), at 15.5 inches, and all the observations were reduced. They showed that the apparent diameter of a halo (inside as well as outside) is not an invariable quantity. The inside diameter of a distinct halo may be as small as 40°. The result confirmed the supposition which was occasioned by the rough observation of February 12, 1878 (see p. 9). It does not affect the theory of halos, but makes the ordinary statement with regard to them appear too definite.

Phenomena

The barometric fluctuations of the year were large. There was a severe squall July 16, which was somewhat destructive in this vicinity.

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See book R67 for continuation of meteorological record in a form considerably abridged.

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Comparison of results for 1878, 1879, and 1880, requested by Thomas W. Silloway, Esq., 71 Green Street, Boston, in a letter dated January 22, 1881. Continued on p. 104.

Mean temperatures; for 1878 and 1879 this is the mean of observations at 8, 2, 8, with double weight given to the morning and evening observations; for 1880 it is often mean of observations made about 9 h. A.M. on the three days used in the same for the three years (the result called No. 4 in the records). For its correction, see p. 1 of this book. The results are here given uncorrected, in degrees Fahrenheit.

	1878	1879	1880
January	25.69	21.95	30.3
February	27.91	22.59	28.8
March	38.63	32.72	32.9
April	48.55	42.32	46.6
May	57.39	61.98	62.6
June	66.56	65.98	69.2
July	74.75	71.24	72.4
August	69.39	69.23	69.4
September	62.93	60.14	63.2
October	54.41	54.58	49.1
November	38.79	37.89	34.0
December	28.60	32.49	23.1
Mean of all	49.47	47.76	48.47

Barometric means reduced to freezing point; for 1878 and 1879 these are means of observations at 8, 2, 8 h; for 1880 means of observations made about 9 h A.M. on the average. The barometer is considered to be 79 feet above sea-level; the exact height of the instrument and of the attached thermometer are not known. The results here given are not corrected, except by reduction to the freezing point, for the index error, which is appreciable (0.088), the reduction will give for 1878, 29.946; $\frac{79}{907}$, or 0.087, 30.018; for 1879, 30.046.

January	{29.948, 29.900, 29.931}	29.926	{29.868, 29.797, 29.853}	29.839	30.101
February	{29.873, 29.830, 29.847}	29.850	{29.920, 29.871, 29.960}	29.897	29.981
March	{29.878, 29.813, 29.844}	29.845	{30.042, 29.948, 29.964}	29.985	29.899
April	{29.761, 29.740, 29.769}	29.757	{29.777, 29.756, 29.756}	29.757	29.880
May	{29.841, 29.803, 29.825}	29.823	{29.974, 29.911, 29.944}	29.943	29.948
June	{29.864, 29.831, 29.830}	29.842	{29.865, 29.818, 29.831}	29.838	29.883
July	{29.875, 29.840, 29.836}	29.850	{29.879, 29.844, 29.843}	29.846	29.882
August	{29.826, 29.783, 29.808}	29.806	{29.860, 29.835, 29.853}	29.850	29.969
September	{30.089, 30.048, 30.060}	30.066	{30.041, 29.997, 30.027}	30.022	29.941
October	{29.946, 29.880, 29.899}	29.908	{30.024, 29.967, 29.999}	29.997	29.994
November	{29.831, 29.785, 29.833}	29.816	{30.017, 29.994, 29.998}	30.003	30.136
December	{29.838, 29.803, 29.832}	29.824	{30.079, 30.066, 30.092}	30.079	29.889
Mean of all		29.859		29.921	29.959

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Comparison of results for 1878, 1879, 1880, continued from p. 103.

Highest reading of maximum thermometer, in degrees Fahrenheit:

1878	1879	1880
July 2, 94.8	June 2, 91.7	June 29, 93.9

Lowest reading of minimum thermometer, in degrees Fahrenheit.

1878	1879	1880
January 8, −9.4	January 21, −1.1	December 31, −4.5

These readings show the maximum or minimum according to the thermometers employed (Casella 13399 and Green 2205) for the 24 hours preceding the observations, which were made at 8 A.M. in 1878 and 1879, and at about 9.1 A.M. on the average in 1880. No corrections have been applied to the readings.

Highest observed reading of barometer, not reduced for temperature or elevation, in inches.

1878	1879	1880
January 8, 30.610	February 28, 30.699	January 29 (7¼ P.M.) 30.662

Lowest observed reading of barometer, not reduced for temperature or elevation, in inches.

1878	1879	1880
December 10, 28.955	March 31, 28.904	February 3, (6⅓ P.M.) 28.974

Highest observed reading of thermometer No. 4, sun below horizon.

1878	1879	1880.
July 18, 83.5	August 2, 82.3	June 29, 79.4

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Comparison of results for 1878, 1879, 1880, Continued.

Days on which the readings of the maximum and minimum thermometers were at or under 32° Fahrenheit.

	Maximum			Minimum		
	1878	1879	1880	1878	1879	1880
January	{2, 4, 7–10, 17–19, 25, 30, 31}	{1, 2, 4–8, 11–13, 16, 17, 20, 22, 27, 31,}	1, 14, 15, 22, 30,	{1–11, 13, 14, 16–21, 24–26, 29–31}	1–31	1–4, 6–9, 11–17, 20–27, 29–31
February	1–4, 12, 13, 15, 19, 20,	{2, 3, 9, 14–16, 19–23, 25, 26, 28,}	{3–6, 8, 11, 20, 21, 25,}	1–9, 11–22, 25–28	1–10, 13–28	1–12, 15–17, 19–28,
March	2, 26,	1, 9, 19,	10, 12, 26,	1–3, 5, 6, 16–23, 25–27,	1–10, 12–27,	2, 3, 7–12, 20–23, 25–31.
April		5,			1–7, 11–13, 19, 20,	3, 7–9, 12, 13, 25,
May						
June						
September						
October				29,	25–27,	25, 26, 29, 30,
November		5, 6, 22, 25,	22–29	4–9, 14–17, 27, 28,	1–7, 19–28, 30,	1, 3, 14–30
December	15, 17, 20, 24–31,	1, 14, 19, 20, 27, 28,	{1, 3–5, 8–12, 18, 19, 28–31}	1, 2, 6–10, 13–31,	{1, 2, 5, 6, 9–11, 13–24, 26–29, 31,}	1–31
January	12 days	16 days	5 days	25 days	31 days	26 days
February	9 "	14 "	9 "	25 "	26 "	25 "
March	2 "	3 "	3 "	16 "	26 "	19 "
April	0 "	1 "	0 "	0 "	12 "	7 "
October	0 "	0 "	0 "	1 "	3 "	4 "
November	0 "	4 "	8 "	12 "	18 "	19 "
December	11 "	6 "	15 "	26 "	24 "	31 "
Total	34 "	44 "	40 "	105 "	140 "	131 "

Lowest observed reading of thermometer No. 4, sun above horizon.

1878	1879	1880.
January 8, −8.0	December 26, 0.3	December 30, −2.6

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List of some instances of barometric maxima, from a memorandum in pencil made about 1876.

Record book	Date	Time	Place	Barometer	Attached thermometer	External thermometer
Q 1	1866	Jan. 8, $8\frac{5}{6}$ A.M.	Probably the Cambridge office of the American Ephemeris	30.974	54.3	−12.2
"	1866	Feb. 7, $8\frac{1}{3}$ A.M.	"	30.784	51.5	2.8
"	1867	Feb. 11, 10 A.M.	H.C. Observatory	30.871	26.2	14.5
"	1867	Dec. 17, 10 A.M.	"	30.658	26.0	24.0
"	1868	Feb. 24, 10 A.M.	"	30.700	About 20.0	13.0
"	1868	Oct. 30, 4 P.M.	"	30.630	44.8	37.4
Q 2	1869	Dec. 21, 4 P.M.	"	30.668	64.8	30.2
Q 3	1870	Jan. 14, 4 P.M.	"	30.732	62.9	14.6
"	1871	Jan. 26, 10 A.M.	"	30.712	56.1	− 3.1
"	1871	Dec. 22, 10 A.M.	"	30.673	60.7	11.0
Q 4	1872	Jan. 2, 10 A.M.	"	30.622	65.1	25.8
"	1873	March 6, 10 A.M.	"	30.637	57.5	20.0
"	1873	Dec. 2, 10 A.M.	"	30.752	55.4	14.4
"	1874	Feb. 2, 10 A.M.	"	30.780	44.9	2.3
"	1875	Dec. 20, 10 A.M.	"	30.624	About 10.0	−1.3

Other similar cases.

1863	Feb. 5, $9\frac{1}{2}$ A.M.	H.C. Observatory	30.928	12	−1
1857	Feb. 12, 9 A.M.	"	31.032	50	+1
1861	Oct. 25, 9 A.M.	"	30.718		

Oct 31, 1861. Barometer No 57 removed to Transit Room, 78.8 ft. above sea level.

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Notes collected from meteorological record of this Observatory for the years 1840 — 1852 inclusive; see remarks beginning on p. 137!

1840 Feb. 6 Aurora, altitude 2°; diffused steady white light, with long, low, dark wane clouds; southerly storm commenced about midnight.

Feb. 7 Low faint aurora, about 3° [high], with long, dark, pointed wane [clouds].

Feb. 21 Low steady aurora 8 to 9 P.M.

March 2 Zodiacal light reaching nearly to the Pleiades; broader than usual and well defined at 7½ P.M.

March 4 At 9 P.M., lightning flashes in quick succession from ~~northeast to northwest~~ [? record Obscure]; at 11 P.M., vivid lightning and loud thunder at the southwest, with rain.

March 12 Evaporating basin and rain gauge set up at 11 A.M.; the gauge was set with its top one foot from the ground.

March 22 White diffused aurora, apex at 4° [altitude], with wane [clouds] across.

March 29 Aurora, dark wane [clouds] below.

April 24 Aurora.

April 26 Thunder at 7 to 8 P.M.

May 1 Aurora; height of arch 3° at the north; broken and active, with dark wane [clouds] and detached neb [nebulosity].

May 21 Temperature of Charles River at 5 P.M.; at the draw, one foot below the surface, 62; on the east side 61; near the east shore, 62.

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1840 June 3 19h [June 4, 7 A.M.] Temperature of rain, 65½, of air 66.
June 12 16h [June 13, 4 A.M.] Short thunder storm, lightning bright.
June 22 10 P.M. Phosphorescent clouds; 12 P.M., faint aurora.

July 9 Thunder shower at 8 P.M.
July 14 Thunder cloud passed to the southward; distant thunder and a little rain here.
July 23 21h to 24h [July 24, 9 A.M. to noon] rainfall 1.40 inches.
July 29 Aurora.

Aug. 4 Lightning in the northwest at 9 P.M.
Aug. 6 Very sharp lightning for half an hour about 8 P.M.; rain heavy.
Aug. 11 Thunder during the night.
Aug. 14 Thunder cloud low at the northwest, with lightning.
Aug. 23 Lightning and some rain from 5 P.M. to 2 A.M. Aug. 24; the rain heavy at 6 P.M.
Aug. 25 Thunder storm in the afternoon.
Aug. 31 13h [Sept. 1, 1 A.M.]; bright auroral arch, estimated 4° [high].
Sept. 21 Strong aurora with streamers, midnight Sept. 21-22.

Dec. 16 Lightning and snow storm at 10 P.M.

1841 Jan. 5 At sunrise, the temperatures at different places were as follows:

Cambridge Observatory, corner of Harvard and Quincy streets,	— 15
Dr. Holbrook's, Milton Hill	— 1
E. Silsby's, Bradford, Mass., 70 feet above the Merrimac	— 8
Bradford, Mass., near the river and at its level	— 20
R. T. Paine's, Newton Place, Boston	0

Jan. 14 Aurora at 10 P.M., with low warm clouds, temperature 15°.
Jan. 27 Aurora, low and faint, at 9½ P.M.

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1841 Feb. 7 Aurora in the evening. [Not found in original].

Feb. 22 Aurora at 8½ P.M.; masses of white light, chiefly east of north, extending from the eastern horizon to the zenith and passing to the south.

Feb. 23 Low aurora in the evening with streamers; direction of middle north by east.

March 2 -- 8 P.M.; lunar circle [halo?]

March 12, 8 P.M.; auroral arch, altitude of apex 5°; direction 10° east of north; light steady and diffused.

March 14, 7 P.M.; strong aurora, cirro-stratus clouds below, masses of white light detached above.

March 15. Dull aurora, with cirro-stratus cloud.

March 16. Pale aurora, low, without clouds.

March 20. Slight aurora, with wane cloud.

March 21. Faint aurora, with dark wane clouds interspersed.

March 23. Sharp lightning and strong wind, with thunder.

March 24. Bright auroral arch.

March 25. Faint aurora, with wane cloud.

April 2. Brilliant lightning and high wind in the evening.

April 11. Low aurora, with cirro-stratus cloud.

April 14. Aurora in the evening at 10 P.M., with cirro-stratus cloud interspersed.

April 16. Aurora in the evening; altitude 2°.

April 18. Brilliant aurora, with streamers to the height of 50° or 60°.

April 19. Aurora; decided arch with faint streamers.

May 1. First observations with barometer Newman 57. [From comparisons between this and other barometers, made in May and June, and recorded partly in the original (pencil) meteorological record of the Observatory, and partly in some record book belonging to Major Graham and not now traceable (1881), a correction of +0,054 was derived to reduce the readings of barometer Cary 1850 previously used

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at the Observatory to Newman 57. This correction was applied to the means of the observations of January, February, March, and April, 1841; and may be applied to the means for 1840 when these are taken].

1841 May 8 Slight aurora.

June 30 Thunder storm at 6 P.M.; hail stones measured 1 inch in diameter; lightning very vivid.

July 11 Faint and low aurora in the evening at 9 P.M.

July 19 Thunder shower at 5 P.M.

July 19 Bright aurora at 9½ P.M.; double arch, broken, blended, with wane clouds.

Aug. 20 Lightning at 9 P.M.

Aug. 21 Lightning in the evening.

Sept. 18-19 Bright steady auroral arch at midnight. Sept. 25. {Masses of auroral cloud; at 8 P.M., low arch and streamers at this N.N.W.

Sept. 26 Auroral cloud at the northwest; red.

Oct. 9 Aurora, direction of apex nearly in the magnetic meridian, instead of 20° farther east as usual.

Oct. 9 Lightning in the north and south.

Oct. 14 Low and ill-defined aurora at 10 P.M., with wane cloud.

Oct. 15 Slight aurora at 11½ P.M, with clouds, cumulus to wane.

Oct. 21 Low diffused aurora at 9 P.M.; light steady, intermingled with cirro-stratus or wane clouds.

Dec. 8 Parhelia in cirro-stratus cloud at 9 P.M.

Dec. 19 Aurora in the evening; the light much diffused [not found in orig.

Dec. 21 faint traces of aurora at 11½ P.M.

[There are comparisons between barometers and thermometers in the original record for December, 1841; the barometric comparisons may have aided in determining the corrections mentioned at the foot of the last page; the thermometers compared are designated only by the word "Standard" and by letters of the alphabet, so that they cannot now (1881) be identified.]

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[See below for January 8, 11, 12, 15, 16, 24].

1842 Jan. 26 Two parhelia at 8½ A.M., sun's altitude 10°, both north and south radii 22°; southern portion once double, and brightest, with red color next the sun, then yellow, last blue or green; lunar halo at 11 P.M.

Jan. 27 At 1 A.M. double lunar halo and beautiful corona;

Jan. 28 Parhelia remarkably bright at $9\frac{25}{60}$ A.M.; the inner halo just outside them; the northern one most distinct and most highly colored; red next the sun; its distance from the sun was 23°15′, that of the southern one 22°; each distance depends on 3 observations; the sun's altitude was 20°; the appearance vanished 5m after the observations; reappeared at 9¾ A.M., with radius 22°; radius at 12½ P.M. 22°30′; visible till 2 P.M.

Jan. 31 Parhelia, radius 22°30′.

[Observations which should precede the others on this page].

Jan. 8 Halo [solar or lunar?]; diameter 22°30′. [Solar halo by original].

Jan. 11 Aurora at midnight; bright with some clouds; height of arch 5° to 7°.

Jan. 12 Faint aurora at 6½ P.M., with cirrus and some cloud,

Jan. 15 Aurora at night; strong well defined arch at 9 P.M.; low diffused light at midnight.

Jan. 16. Parhelia at 8 A.M.; radius 22°37′; [sun's] altitude 8°.

Jan. 20. Lunar circle [halo?] at 9 P.M.

Jan. 24 Parhelia at $4\frac{35}{60}$ P.M.; radius 22°30′; color dazzling white; [sun's] alt. 6°;

Jan. 24 Faint lunar halo [this note in the original record probably belongs to this date].

Jan. 31 Solar halo, radius 22°30′; zenith half only visible and perfect.

[Comparisons of Newman 57 and 68; Newman 68 highest by 0.004].

In book M 15 there is a record of comparisons between Newman 68 and two standard barometers of the Royal Society in August, 1841;

1841	Flint glass.	Crown glass	Therm.	Newman 68	Therm.
Aug. 12, 9 A.M.	29.908	29.904	66.0	29.954	66.3
3 P.M.	29.976	29.972	64.0	29.970	64.5
Aug. 13, 9 A.M.	29.928	29.924	61.0	29.926	62
3 P.M.	29.878	29.872	62.0	29.874	63
Aug. 14, 9 A.M.	29.646	29.642	62.0	29.640	62

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1842 Feb. 2, 5 A.M.; double lunar corona and faint halo; 9 A.M., segment of solar halo, radius 22°; 10 A.M., a fine solar halo and parhelion to the right.

Feb. 11, 7 P.M.; low aurora, height 3°; diffused brightness on the easterly part.

Feb. 11. Zodiacal light; this has been conspicuous on every clear evening since full moon.

Feb. 15, 8 P.M.; horns of moon blunt, particularly the southeastern.

Feb. 17, 1 A.M.; barometer 28.500, having fallen 1.567 inches since sunrise Feb. 16; phosphorescent light very bright in various parts of the sky, more particularly in the southeast; two balls very bright, resembling two moons, bearing due north; one appeared stationary, the other movable; a tremendous gale from west to south.

Feb. 18 Solar halo.

Feb. 24, 2¼ P.M.; parhelia, distance 22° 30', clouds diagonal.

March 18, 7¼ P.M.; lunar halo, radius 23° 19'.

March 20, 2 P.M.; solar halo, radius 23° 45'; 7¾ P.M., lunar halo, radius 23° 53'.

March 23; aurora in the evening.

April 6, 9 P.M.; phosphoric clouds.

April 10, 9 P.M.; bright and steady aurora, about 3° high.

April 12; bright and steady auroral arch; apex 7° to 10° high.

May 9. Aurora.

May 11. Thunder shower passed off to the north at 1 P.M.; at 8 to 9 P.M. lightning vivid and frequent.

May 21. Extraordinary solar phenomenon, described in a book of phenomena [not now known; it may be boxed up in the cellar].

June 2, 8 P.M.; a curious parhelion after sunset.

June 3, 12½ P.M.; solar halo, colors very bright.

June 7. Frost on the low grounds.

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1842 June 10. Heavy thunder-showers passed to the north in the afternoon.
July 3. Active aurora 9 to 10 P.M.
July 24. Loud thunder and vivid lightning; fire-ball at the southeast; thermometer fell from 91 to 67 in 19 minutes; barometer fell 0.046 in 30 minutes. [Thermometer 91 at 2 P.M., 67 at 3 P.M., which fixes the time].
July 30, 9 P.M.; thunder cloud passing to the north, with vivid lightning.
Sept. 3, 8 to 9½ P.M.; vivid lightning to the north, remarkably colored, purply and greenish blue.
Sept. 12, 10 P.M.; very frequent lightning northwest, east, and southwest.
Sept. 28, night: aurora at the north, low and diffused, with wane [cloud].
Oct. 13, 9 P.M.; lunar halo.
Nov. 21. Bright aurora.
Nov. 28, 11 P.M.; aurora, low at the north.
Dec. 12. Very bright lunar halo.
Dec. 27, 10¼ P.M.; aurora among broken clouds.

1843 Feb. 7. A parhelion at 9 A.M.
Feb. 17. Barometer at noon 28.922; attached therm. 63.
March 25. Solar halo before noon.
May 7. Thunder at sunrise and at intervals later.
May 18. Part of a [solar] halo at 2 P.M.
May 23. Thunder clouds at the north and west-southwest.
May 26. [Solar] halo and bright parhelia [parhelion?] before noon.
June 2. Severe frost [external thermometer 34 at sunrise]. Snow in Jaffrey, N.H.
June 6. Much thunder and lightning during last night; heavy showers.
June 10. Thunder storm at the northwest 5 P.M.; thunder storm 7 P.M.
June 11. Thunder, lightning, and rain last night.
June 16. Began raising about 2m after a discharge of artillery at Roxbury.
June 24. Heavy thunder to the west at 7 P.M.; squall at 8 P.M., sharp lightning, clouds of dust, and large drops of rain.
June 29. Heavy rain and some thunder. Came up at 3 P.M.

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1843 July 2. Thunder shower in the evening.
July 8. Thunder clouds passed to the north in the evening.
Aug. 3, 10 P.M.; strong and lively aurora, with merry dancers.
Aug. 8. Thunder at 2 P.M.; rain. Lunar halo.
Aug. 14. Operations begun on Observatory hill [for construction of new Observatory].
Aug. 27. Thunder shower in the evening.
Sept. 4. Active thunder cloud in the east during the evening.
Sept. 18. Much lightning in the evening at the west.
Sept. 25. Lightning at 7 P.M.
Sept. 27. Bright auroral arch; apex north by east, 5° [high].
Sept. 28. Light among clouds at the north.
Sept. 28. Severe frost at Dorchester; ice formed $0\frac{1}{8}$ inches thick.
Oct. 3. A fire ball (electric) fell in the southwest during a slight shower at 4 P.M. (lightning and brisk wind).
Oct. 14. Strong auroral arch 5° [high] at $6\frac{1}{2}$ P.M.; apex at the north; more diffused at 7 P.M.; diffused light all the evening till moonrise.
Oct. 17. Strong zodiacal light at $4\frac{3}{4}$ A.M.
Nov. 1. Barometer at sunrise 30.502, attached therm. 42; at 9 A.M. 30.515, 41.
Nov. 15. Slight aurora at 5 A.M.; [meteors looked for 3 nights, but few seen].
Nov. 30. Lunar halo at 8 P.M.

1844 Jan. 28. Fine solar halo most of the day.
Jan. 31. [Thermometer below zero at sunrise 10 days this month; 9th, -5; 12th, -9; 20th, -1; 21st, -4; 26th, -5; 27th, -8; 28th, -8; 29th, -2; 30th, -8; 31st, -3. On Feb. 1, it was +7].
Feb. 1. Lunar halo, strong and defined. Large numbers of people on the ice in Boston Harbor, averaging about 8 inches in thickness.
Feb. 21. Bright parhelia at 3 P.M.

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1844 March 25 Aurora.
April 5, 9 to 10 P.M.; well defined auroral arch, bearing of apex 5° east of north at 10 P.M.; altitude 3° to 5°.
April 6. Solar halo at noon.
April 8. Much lightning during the evening.
April 17. Aurora low at the north, with warm cloud.
May 3. Fine thunder shower 7 to 9 P.M.
May 4. Shower in the evening, with thunder and lightning.
May 6. Fine shower in the evening, with thunder and lightning.
May 7. Very heavy squalls of wind; quantities of green leaves blown from the trees; 4 new wooden houses in a row blown down at South Cove, Boston.
May 7, 10 P.M.; aurora with merry dancers.
May 8. Faint and low aurora this evening, 9 P.M.
May 25. Thunder after noon; shower at 6 P.M.
May 27. Thunder after noon.
June 12. Frost at Dorchester and elsewhere this day and the last.
July 3. Bright meteor from 3° above ζ Cassiopeiae, going 20° towards the W.N.W. point of the horizon; white, lasting about two seconds; disappearance gradual.
Aug. 1. Heavy thunderstorm passed to the north at 7 P.M.
Aug. 2. Lightning in the evening.
Aug. 29. Bright auroral arch; altitude 7°; 10 P.M. and all the evening.
Sept. 16. Lightning at the north in the evening.
Sept. 25. [Instruments dismounted for removal to new Observatory]
Oct. 20. 10 P.M.; bright auroral arch, apex due north, about 4° high; detached masses of light above and below; moonlight; cirrus and cirro-stratus cloud.
Oct. 24. [Observations regularly resumed at the new Observatory]

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1844 Nov. 21. Lunar halo, triple, at 8 P.M.
Dec. 14. Aurora at 9 P.M.

1845 Jan. 1. Strong zodiacal light.
Jan. 9. Brilliant aurora.
Jan. 22. Parhelion, strongly colored.
Feb. 5. Heavy snow storm last night; barometer at 6 A.M. 28.786, attached therm. 47.
Feb. 20. Fine halo round the moon.
March 18. Brilliant parhelia [solar halo?] at sunrise; colored; radius 22° 30'.
March 19. Brilliant parhelia [solar halo?] at sunrise; radius 22° 10'; [it may be that the two records both belong to March 18].
April 13. Strong masses of aurora at 10 P.M.; [cloudy earlier].
April 30. Auroral light in the evening, through clouds.
May 12, 3 to 4 P.M.; temperature of deep well 50; of pump water in yard 47; [external temperature 92].
July 3. Thunder and lightning, loud and bright.
July 12. Great heat; old thermometer 101½.
July 17. Old thermometer 99½ at 4 P.M.; at 5 P.M. temperature of deep well 49.8; of outer well 48, 47, 48.5 (same thermometer); thunder and rain at 6 P.M.
July 22. Fine shower, commencing about 3 P.M.; thunder and lightning incessant for 1^{h} 1/2 or 1^{h} 3/4.
July 28. Thunder showers and heavy clouds passing nearly all day.
July 30, 5 P.M.; external thermometer 80; temperature of deep well 50; of outer well 48.
Aug. 5, after noon; external thermometer 81; temperature of deep well 50; of outer well 48½.
Aug. 9. Thunder about 2 P.M.
Aug. 11, 6 P.M.; bright meteor, moving nearly in the prime vertical through 5° to 10°; light white, very brilliant.

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1845 Aug. 23. Thunder shower after noon; much lightning and loud thunder.
Sept. 4. Meteors numerous.
Sept. 18. Thunder shower in the northwest; lightning bright and frequent.
Sept. 24. Aurora.
Sept. 25. Aurora.
Oct. 21. Strong auroral light.
Nov. 11. Lunar halo.
Dec. 3. Parhelion before noon.
Dec. 3. Aurora.
Dec. 5. Auroa low and diffused.
Dec. 21. Brilliant meteor.
Dec. 22. Temperature of deep well 50; of northeast corner well 49.2

1846 Jan. 28. Very strong aurora; apex 3° east of north; 10° high.
Feb. 16. Temperature of deep well 49.7; of outer well 45.8.
Feb. 19. Parhelion about sunset.
Feb. 26. Aurora, dancing.
March 7, 8 to 10 A.M.; external thermometer 28 to 27; temperature of water in deep well 50 at 86 feet below the surface of the ground and 35 feet below the surface of the water; temperature of outer well 44.2.
March 26. Lightning during the night, with heavy rain.
April 15. Aurora 10° high; brightest at the northeast; shooters.
April 16. Aurora.
May 1. Thunder at 3 A.M.
May 2, morning; external thermometer 50; temperature of deep well, 90 feet below surface of ground, 36 feet below surface of water, 49.8; of outer well, 20 feet from surface of ground, 47.8.
May 4. Aurora, shooting and fainting.
May 18. Showers, with thunder and high wind.
June 6. Thunder storm to the north, 9 P.M.
June 12. Solar halo.
June 16. Lightning struck in Cambridge 4 or 5 times this week.

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1866 June 20. Thunder and heavy rain at 5 A.M. and in the evening.
June 21. Thunder shower after noon.
June 29. Two halos [solar] at $10\frac{1}{4}$ [A.M.]; the centre of one on the circumference of the other, above the sun.
July 8. Thunder and lightning at 8 P.M.
July 11, $3\frac{1}{2}$ P.M.; external thermometer in different places 91 to 98; in deep well 49.8, 33 feet below surface of water, 87 feet below surface of ground; in outer well 48. Thunder at the north; much lightning during the evening.
July 12. Thunder shower, 1 to 2 P.M.
July 13. Lightning and thunder.
July 14. Aurora.
July 20. Meteor larger than Jupiter from Delphinus to Cassiopeia at $9\frac{55}{60}$ P.M.
July 23. Severe thunder in the afternoon; the lightning struck ten feet in front of the Observatory barn.
Aug. 10. Thunder shower at 7 P.M.; vivid and frequent lightning during the afternoon and evening.
Aug. 11. Bright aurora, with streamers, 8 to 9 P.M.
Aug. 14. Heavy showers with much thunder after noon.
Aug. 16. A great deal of lightning at the north in the evening
Aug. 17. External thermometer 83; temperature of deep well 49.8 (depth of water 33 feet); external well 50 (depth of water 6 feet).
Aug. 24. Splendid aurora [mentioned only in record of earthquake below]
Aug. 25. Earthquake at $4\frac{58}{60}$ A.M.; duration of shock 2^s or 3^s; it resembled the vibration caused by a heavily loaded cart passing over rough pavement; a rumbling sound was heard some seconds later.
Aug. 30. Thunder and lightning at 4 P.M.
Sept. 5. Frequent lightning at the northwest

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1846 Sept. 8 Between $2\frac{25}{60}$ and $2\frac{55}{60}$ P.M. the thermometer fell 18 degrees; two heavy showers in the afternoon; in second shower, thunder clouds from the east and west met nearly south of the Observatory.

Sept. 10, 8 P.M.; bright white light in the west-northwest, in the form of two streams diverging upwards from a point near the horizon, and presenting the appearance of the tail of an enormous Comet; in the northeast, auroral light formed an arch 10° in breadth; the interior of the arch was darker or deeper blue than the rest of the sky; the lower edge of the arch passed through α Ursae Majoris and α Persei; at $8\frac{1}{3}$ P.M., it was quite bright at times with masses of cloudy light; it faded pathes suddenly, and the peculiar wave clouds which usually accompany an aurora appeared scattered over the north 5° to 10° above the horizon.

Sept. 11. Aurora.

Sept. 12. Frequent lightning at the S.E., S.S.E., W.S.W., and N., with a slight shower

Sept. 22. Aurora 8 to 9 P.M.

Sept. 23. Low aurora.

Oct. 7. Very brilliant and active aurora; from the strong light of the arch, the inner part of which was deep red, the streamers shot upward and then formed in succession, vapory light, very faint, and stronger light in masses; from this, or in the same direction were gradually formed cirrus and cumulus clouds of steady definite outline from which the moonlight was

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1846 strongly reflected; the usual dark wane cloud was formed below.

Oct. 19. Aurora with wane cloud.

Oct. 21. Aurora at 10 P.M.

Oct. 26. Large meteor at 4 A.M.

Oct. 31. Temperature of outer well 51.9.

Nov. 7. Bright meteor in the southeast at 11⅓ P.M.

Nov. 25. Barometer at 10 P.M. 28.536; at the 9 P.M. observation (28.632) the surface of the column of mercury was a little concave.

Dec. 8, $9^h\ 46^m\ 15^s$ [P.M.] a great light seen [meteor above clouds?].

Dec. 9. Bright auroral arch 10° west to east [?]; streamers at the northwest 20° [high?].

Dec. 23. External thermometer 23; temperature of deep well 51, 92 feet below ground, water 32 feet deep; of outer well 49.9.

1847 Jan. 13. Parhelion at sunrise.

Jan. 30. Temperature of deep well at noon 50.4 (depth of water 34 feet); of outer well 48.

Feb. 6. Auroral light, with wane clouds.

Feb. 26. Lunar halo.

Feb. 27. Temperature of deep well at 1 P.M. 50.3 (below surface of ground 95 feet, of water 38 feet); temperature of outer well 47.2.

March 8. Aurora, 8 to 9 P.M.

March 19. Auroral arch 10° [high?] in the evening; apex 3° east of north; the display became one of the most lively and brilliant ever viewed; auroral light as far as 10° south declinating.

March 27, 11 A.M. Barometer 28.534; attached thermom. 59; external thermom. 37.

March 28, 7 to 8 P.M.: lunar halo with parselene and a horizontal circle through the moon.

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1847 March 31. Temperature of deep well 50; of outer well 45; the last is the lowest yet recorded; perhaps due to recent cold rains.

April 7. Strong aurora between dark cumulus clouds.

April 16. Low aurora at 9 P.M.

April 20. Solar halo.

April 22. Between 4 40/60 and 4 57/60 P.M. the temperature fell from 78 to 55½; the wind shifting to northeast with showers and one peal of thunder.

April 30. Temperature of deep well 50.5; of outer well 45.6.

May 15. Auroral arch at 9 P.M.; altitude 50°.

May 29. Thunder shower about sunset.

May 31. Ground frozen at sunrise. Temperature of deep well 50.7; of outer well 46.7.

June 1. Thunder showers beginning about 11 P.M. with vivid lightning and loud rattling thunder; the flashes must have come on the average once in one or two seconds for a long time; the cloud was from the west-northwest. Half an hour after midnight driving hail, the stones said to have been of the size of marbles.

June 26. Temperature of deep well 51 (depth of water 35 feet); of outer well 47.5.

June 28. At 2 A.M. in bright moonlight, with heavy dew on grass and strawberry leaves, the shadows of the observers' heads appeared surrounded by halos.

July 7. Thunder shower 2 to 3 P.M.

July 21. A splendid aurora about midnight, colored deeply with red.

July 22. Thunder shower 3 P.M.

July 29. Temperature of deep well 50.6; of outer well 49.

Aug. 3. Aurora 11 to 12 P.M., 5° [high]; broken by 1 A.M. Aug. 4.

Aug. 18. Thunder shower at 2 P.M.

Aug. 20. A fine meteor between the moon and Antares.

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1847 Aug. 31, 5 P.M.; external temperature 81; temperature of deep well 49.8; of outer well 51; lightning at night.

Sept. 28, 9 P.M.; lightning at the southeast.

Sept. 29, 8 to 9 P.M.; a splendid auroral display; some masses looking like prismatic spectra, others brilliant red or rose color; one sheaf remained stationary for an hour in the southeast, altitude 30°.

Sept. 30. Temperature of deep well 51; of outer well 54.

Oct. 26. Bright parhelion in the west about 5 P.M.

Oct. 31, 4 P.M.; temperature of air 50; of deep well 50.7; of outer well 53.

Nov. 17. Wild violet found in Medford; weather of the first half of this month very mild for the season.

Nov. 25. Fresh grass springing up; grasshoppers seen.

Nov. 30, 11 A.M.; temperature of air 24.0; of deep well 52.2; of outer well 52.2.

Dec. 31 [date doubtful]; temperature of air 51; of deep well 50.6; of outer well 50.5.

1848 Jan. 28. Strong aurora with deep red light, but interrupted and overspread by cirrulo-stratus clouds.

Jan. 29. Temperature of outer well 48.2 [data somewhat doubtful].

Feb. 23. Several brilliant displays of aurora this month.

Feb. 24. } Strong auroral light.
Feb. 25. }

Feb. 29. Temperature of air 39; of deep well 50.7; of outer well 46.6.

March 8, 9 P.M.; aurora, low and diffused.

March 22. Aurora.

March 24. Aurora; at 9 P.M. a fine steady well defined arch; at 10½ P.M. brilliant merry dancers, casting strong shadows.

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1848 March 25. Slight aurora, low and diffused.
March 30, 5 P.M.; temperature of air 60; of lower part of great pier 37; of deep well 50.6; of outer well 45.8.
April 1, 9 P.M.; aurora, streamers at the northeast.
April 5, 11 4/60 P.M.; brilliant active aurora.
April 6, 9 P.M.; aurora; extensive and diffused at 10½ P.M.
April 15, 9 P.M.; aurora with brilliant arch and streamers.
April 29. Temperature of deep well 50.4; of outer well 46.4.
May 6. Thunder storm during the night; lightning at 9 P.M.
May 25. Aurora; a beam shot from a cloud near the horizon directly towards Polaris, not quite reaching it.
May 31. Aurora.
May 31. Temperature of deep well 50.8; of outer well 47.5.
June 1. In Boston, this day was colder than Jan. 1, 1848; [by the Cambridge record, the mean of the observations of the external thermometer is 53.5 for Jan. 1 and for June 1, 50.5, so that the remark will apply also to Cambridge].
June 28. Thunder storm in the north.
July 1. Temperature of deep well 50.3; of outer well 48.4.
July 10. Fine aurora in the morning.
July 11. Splendid aurora to the zenith, extending to the south and east.
July 31, [date doubtful]; temperature of deep well at 90 feet, 50.6; of outer well at 20 feet, 50.
Aug. 18, 3 P.M.; severe thunderstorm, lasting about two or three hours.
July 31. Temperature of deep well 50.0; of outer well (not in use for a fortnight past), 51.9.
Sept. 1. Thunder, beginning at about 9 A.M.; heavy rain 11 A.M. to 12½ P.M. with thunder, lightning, and hail.

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1848 Sept. 29, 4 P.M.; temperature of deep well 93 feet from surface of ground, 39 feet from surface of water, 51; of outer well, 21 feet from surface of ground, 52.6.

Oct. 6, 9 P.M.; a curious and remarkable ridge of light, probably auroral; it resembled a comet's tail, or a light thin cloud, and reached from the horizon to the zenith; it moved slowly southward about 1° a minute, retaining its curved appearance as when first noticed.

Oct. 25. Bright diffused aurora, with wane clouds.

Oct. 31. Temperature of deep well 50.8; of outer well 53.2.

Nov. 17. Bright aurora, shining through the clouds like moonlight.

Nov. 21. Aurora.

Nov. 22. Aurora.

Dec. 17. Heavy shower last night, with thunder; no frost in the ground.

Dec. 23. Diffused aurora, 10° high.

1849 Jan. 11, 10 A.M.; temperature of air 2; of deep well 50.5; of outer well 49.

Jan. 31. Temperature of deep well 50.7; of outer well 48.

Feb. 17, 10 A.M.; upper (cirrus) clouds moving from east of south, (very unusual).

Feb. 19, sunset to midnight; aurora; at midnight, arch bright, apex 15° [high]; broken at the northwest; red columns.

March 6. Temperature of deep well 50.5; of outer well 46.0.

March 17. Strong aurora.

March 31, 3 P.M.; temperature of air 61; of deep well 50.4; of outer well 45.3

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1849 April 18, 11½ P.M.; lightning and distant thunder.
May 12, 9 to 10 P.M.; aurora with broken arch 7° high.
May 23. Moderate shower, with thunder and lightning.
May 31, 6 P.M.; temperature of deep well 50.6; of outer well 46.7.
June 4. Thunder shower after noon.
June 16. Thunder showers passed to the north and south after noon.
June 22. Thunder shower; very little rain.
June 30, [date doubtful]; temperature of deep well 36 feet below surface of water, 50.3; of outer well 47.
July 2. Heavy showers, with thunder, passed from the northeast to the southwest, an unusual direction for thunderclouds.
July 13, 9 to 10 P.M.; slight auroral arch.
July 31, 9 A.M.; temperature of deep well 50.5; of outer well 48.7.
July 31, 3 P.M.; shower with thunder and lightning; thermometer falling during the shower from 90 to 71, and rising again to 73.
Aug. 7, 9 P.M.; lightning to the north and northeast.
Aug. 9, 8½ P.M.; bright meteor.
Aug. 11, 2 to 4 A.M.; copious rain, with thunder and lightning.
Sept. 1. Temperature of deep well 50.5; of outer well 51.0.
Oct. 15. " " " " 50.5; " " " 54.0.
Nov. 1. " " " " 50.5; " " " 54.0.
Nov. 9. Thunder heard during the following night.
Dec. 10. Temperature of outer well 51.5.

1850 Jan. Temperature of outer well 49.3 [date not given].
Feb. 1 " " " " 48.
Feb. 6 " " deep " 50.0.
March 1, 9 A.M.; barometer 28.990; this was the minimum reached on this occasion.
March 4. Strong aurora on this and the two preceding nights.

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1850 March 14. Thunder shower soon after sunset, lasting about half an hour; squall, with hail, soon after 8 P.M., followed by sharp and heavy thunder and lightning; clearing off at 9 P.M.; lightning seen again about 10½ P.M.

March 15. Temperature of deep well 50.7; of outer well 45.7.

March 31, 10 P.M.; bright aurora, with cirro-cumulus and cirro-stratus clouds floating in the north.

April 2. Slight aurora during the night.

April 6, 9 P.M.; aurora; fine arch, with streamers and very bright patches; cirro-stratus clouds below and among them.

April 7. Aurora; streamers, and cirro-stratus clouds among them.

May 2. Temperature of deep well 50.3; of outer well 46.0.

May 3, 9 P.M.; fine auroral arch.

May 7, 2 to 3 A.M.; fine aurora.

May 27. Heavy rain through the night, with lightning and thunder; wind northeast.

June 20, 2 P.M.; temperature 95°; thunder showers all round.

June 27, 5 P.M.; temperature of deep well 51.6; of outer well 47.3.

June 29. Heavy thunder showers during the afternoon and evening, passing south of us, and in the distance north of us; shower at 4½ P.M.

July 11, 9 to 10 P.M.; bright and active aurora, shooting to the zenith.

July 12. Aurora between the clouds; streamers.

July 14. A very beautiful parhelion seen in the east about sunrise; colors very brilliant.

July 29, 9 P.M.; thunder clouds from southwest to southeast; much lightning.

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1850 July 30. A very heavy thunder cloud near us in the south and southeast; after sunset; much thunder and lightning in Weymouth.

Aug. 1. A very heavy thunder Shower 2½ to 3⅙ P.M.; it came up in the face of a strong southeast breeze, seeming to make from the northwest towards the west, and to melt away before going far to the eastward; sky overcast before it came up; the roar of thunder overhead was often Continuous.

Aug. 4, 6 A.M.; thunder shower; showers all about us for the last week.

Aug. 6, 2½ to 4 P.M.; incessant thunder.

Aug. 7. Lightning during the evening in the east south and southwest; slight shower at 6 P.M.

Aug. 9, 9 P.M.; much lightning in the north.

Aug. 10. Aurora about 3° high; curious appearance of the clouds at 11¼ P.M.; stretching exactly from the east to the west; aurora brighter up to 11½ P.M. only 2 meteors seen.

Aug. 13, 6 to 7 P.M.; thunder clouds all around; rain and vivid lightning; sky entirely overcast.

Aug. 16, 9 P.M.; lightning in the east bright and frequent all the evening.

Aug. 29, 9 to 10 P.M.; faint aurora.

Aug 30 9 to 10 P.M.; faint aurora.

Sept. 8, 12 M.; rainfall during a little more than 24 hours preceding, 6.61 inches, the largest on record here; similar results were obtained in various other towns near Boston.

Sept. 28. Thunder storm in the evening.

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1850 Sept. 30, about 9 P.M.; very splendid meteor, leaving a brilliant train, [so-called Jenny Lind meteor]; an account of it was published.

Dec. 27. Aurora.

1851 Jan. 19, 3 P.M.; barometer 30.750; attached thermometer 55; external thermometer 18.

Feb. 1. Barometric maximum at 10 A.M., 30.912; attached thermometer 53.

Feb. 5. Bright aurora.

Feb. 13. Barometer at 7¾ A.M. 30.958; at 9 A.M. 30.962; attached thermometer 59.

Feb. 18. Bright aurora.

March 29. Aurora.

April 15. Thunder distinctly heard early this morning.

April 16, noon; tide higher than ever known before; the greater part of Cambridge port under water; a violent easterly storm, which swept away the light-house on Minot's Ledge; barometric minimum at 12½ P.M. 29.452; attached thermometer 55.

May 13. Thunder shower 4 to 10 P.M.

May 29, 9 P.M.; lightning at the north.

May 23. Lightning seen, but no thunder heard during southerly storm last night.

May 24. Aurora, low and diffused.

June 2, 8 to 9 P.M.; lightning at the northeast.

June 4, 7⅖ P.M.; violent squall from the west-northwest; a thunder cloud at the north.

June 5, 9 P.M.; strong aurora, with streamers.

June 26. Thunder storm passing to the northward; some rain here.

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1851 June 27. Slight aurora.
July 1. Thunder showers in the afternoon.
July 10, about 5 A.M.; sharp lightning and rattling thunder; church in Cambridgeport struck; thunder showers in the afternoon.
July 13. Showers in the afternoon, with occasional thunder and lightning.
July 17, 9 to 10 P.M.; strong, but low, auroral arch; height 3° to 5°.
July 19. Thunder showers during day and following night.
July 25. Lightning in the north in the afternoon; shower at 2½ P.M.; drops large.
July 26, 9 to 10 P.M.; strong irregular aurora, very bright.
July 27. Showers with thunder and lightning.
Aug. 9, 4¾ P.M.; thunder squall from the west-northwest; a second shower with vivid lightning continued to 7 5/6 P.M.; brilliant display of electricity from the south-southwest to the southeast up to 10 P.M.; numerous meteors seen, all radiating from Perseus; some as bright as Sirius.
Aug. 10. Evening overcast; during the clear nights of the last week there have been many more meteors than usual.
Aug. 13. Last night there was a heavy, long, condensed thunder-cloud from the northwest to the northeast, with vivid lightning; little rain here.
Aug. 13. Variable winds, followed by a succession of thunder showers; bright lightning, loud thunder and heavy rain; about 4 P.M. there was a fall of large hailstones, about 1 inch in diameter, in Boston; sparks about 4 inches long from the electric connections at the Observatory.

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1851 Aug. 22, 5h 38m P.M.; a very large and powerful whirlwind seen passing over West Cambridge and Medford, resembling a huge column of black smoke; as it drifted along by the wind, it seemed at times to revolve rapidly, while it kept constantly changing. When near Medford, several pieces [fragments of buildings] were seen flying in the air; wind southwest; lightning almost incessant all the evening.

Aug. 25, 9 P.M.; hail, rain, thunder, and lightning.

Aug. 29, 9 P.M.; low auroral arch, full north.

Sept. 2. Some lightning in Boston this afternoon.

Sept. 4, 2 A.M.; brilliant aurora, with streamers and drifting light; at 2½ A.M. an arch was formed to the southward, apex east of south, about 40° high; the flashes on this side resembled what is called "heat lightning"; to the north, northwest and northeast, there was frequently rosy and green light.

Sept. 6. Auroral arch up to 11 P.M.; apex north to north-northeast; bright moonlight.

Sept. 7, 7¼ P.M.; strong auroral arch, 7° [high], streamers and rosy light, flashing, etc., till 7h 21m, then subsiding with occasional streamers and diffused light; extensive aurora also reported at 4 A.M.

Sept. 8, 3 to 4 A.M.; no aurora.

Sept. 11. Thunder cloud towards night from the west-northwest to the east-northeast; lightning vivid; a sprinkling of rain about 5 P.M.; almost clear at 11 P.M.

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1851 Sept. 13. Clouds of remarkable appearance and great fall in temperature

Sept. 19. Several small tornadoes seen this afternoon, following the track of the August tornado.

Oct. 2, 9 P.M.; a fine auroral arch, apex north by east, about 12° high; clear bright moonlight; the arch is steady with long cirro-stratus clouds below.

Oct. 20, 7 P.M.; fine aurora; began during twilight with a well defined arch, its apex a few degrees east of north, about 15° high; now broken, rolling, billowy, varying every minute; streamers of white light; very dark below; 3m before 9 P.M. a dark cloud below, fringed above with bright white light, and above it a regular arch; no streamers; 9h 10m 30s P.M., a long narrow streamer in the east-northeast, just bisected by Aldebaran; at 9h 12m 5s it had moved about 1° southwardly; well adapted to show parallax, if observed elsewhere; at 9h 18m P.M. short streamers from the northeast to the north-northwest, rising from the dark cloud below; at 9h 20m 35s P.M. a double arch, steady below; the upper one has streamers; at midnight, diffused light, dark below; apex of arch north.

Oct. 23. Bright aurora till midnight; at 6½ P.M. arch well defined and regular; then very strong radiating light, fine, like iron at a white heat; not streamers, but strong short rays or spikes.

Nov. 15, 9 P.M.; low auroral arch, continuous well defined; apex 3° high, 5° or 2° east of north.

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1851 Nov. 15, 11¼ P.M.; meteor, shooting upward from the northeast, across the centre of the square of the Great Bear, passing 10° southeast of Polaris, the path above making an angle of 65° with the horizon; exploding at about ¾ of its course, a portion continuing on and curving downwards; it resembled a rocket, but there was no doubt of its meteoric character.

Dec. 3, Strongly colored lunar corona.

Dec. 29, 6 P.M.; a very bright auroral arch, 5° in width, stretched across the north from northeast to northwest; highest point about 30°; a smaller arch below about 15° high; space between, and also within the lower arch was dark.

Dec. 30, 4 A.M.; aurora in the northern horizon; diffused sheets of light are continually rushing upward toward the zenith, vanishing before they reach the height of 25°.

1852 Jan. 19 Bright aurora at night.

Feb. 9, 1 2/60 P.M.; the sun is surrounded by a halo, faint and ill-defined, except at the point nearest the zenith, where it develops all the beauties of the rainbow. This bright portion of the halo is nearly straight and about 8° long; so that the circle appears truncated at the vertex. In the circumference of the circle, at opposite points, are two very bright mock suns; distance from the sun to the centre of

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each mock sun 25° 40′ by distant measures. Altitudes alike, and the same as that of the sun. There is a faint light, of pyramidal shape, having its base in the mock sun, and proceeding some 6° or 7° beyond the circumference of the halo, in the line joining the mock sun and the sun. This is common to both.

1852 Feb. 18. Bright aurora.

Feb. 19. An aurora of most extraordinary brilliancy began at evening twilight; between 10 and 11 P.M. the corona remained in the declination of Mars [+25° 3′] and as nearly as possible in the meridian.

Feb. 20. The aurora still visible at 6 A.M., and pretty surely seen at 6 $\frac{58}{60}$ A.M., after sunrise.

Feb. 26, evening. Aurora.

March 4, about 10 P.M.; aurora; strong moonlight and haze.

March 15. Showers after noon; at 6 $\frac{1}{3}$ P.M. a single flash of lightning with brief thunder.

March 28, 9 $\frac{1}{2}$ P.M.; double lunar halo, diameters 44° and 90°; the larger having the moon on its circumference and its centre near the zenith; the smaller with its centre at the moon.

April 6. There has not been a more furious snow storm during the winter than is now raging.

April 10, 9 to 10 P.M.; aurora below the clouds.

April 13. Driving snow storm at sunrise; continued till 6 $\frac{1}{2}$ P.M.

May 4, 11 A.M.; wind light and variable; there were three tornadoes, on a small scale, but active, within half an hour; all whirling quickly, moving slowly about a rod in two seconds towards the

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east and southeast; a deep roaring noise was heard while one of them was passing through Mr. J. E. Worcester's willows, south of the Observatory; the dust rose to the height of some 300 feet, to the upper current of air, where it took a westerly course; the diameters of these tornadoes at the surface of the earth may have been from 60 to 100 feet; they appeared to form between two currents of air, one blowing from east to northeast, and the other from southwest to calm.

1852 May 18. Fine steady auroral arch during the evening till midnight.

May 19. Bright and strong aurora, with considerable activity.

May 20. Bright aurora, with some streamers.

May 21, 10 P. M.; low and diffused aurora.

June 3. Showers with thunder.

June 15, 8 A. M.; heavy clouds came over from the north, with lightning, thunder, and rain.

June 15. The night of June 15–16 excessively warm and close; auroral arch and streamers.

June 17. Shower with lightning and thunder after 3 P. M.

June 22. Frequent thunder showers; for several hours in the afternoon the lightning was very frequent and bright, and the thunder incessant, and at times very loud and rattling.

June 30, 4 P. M.; extensive thunder showers, with some vivid lightning, lasting about 45m.

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1852 July 2, 3 A.M.; Shower with vivid lightning and loud thunder.

July 5, 9 to 10 P.M.; aurora, interrupted by cirro-stratus clouds; some streamers; red light to the northeast.

July 6. Slight aurora, brightens at 10 P.M.

July 7. A long thunder cloud from west-southwest to north with frequent lightning.

July 7. Auroral arch.

July 8. Thunder cloud west at 6 P.M.

July 8. Aurora, low and faint.

July 9. Bright aurora over thunder clouds.

July 10. Brilliant aurora.

July 11. Diffused aurora.

July 12. Auroral arch 5° [high], well defined.

July 13. Aurora, faint.

July 14, about 1 P.M.; heavy rain cloud over Boston; a few flashes of lightning with loud thunder.

July 18. Clear at night, but no signs of aurora.

July 29, 10½ P.M.; sudden thunder shower; lightning bright, with loud, brief, rattling thunder; a second shower an hour later.

July 30, 10½ P.M. Thunder shower; double.

Aug. 9. Between 8 5/6 and 9 2/3 P.M. 28 meteors were seen, besides 3 doubtful ones; afterwards 2 more were seen, making 30 in all; 27 of these clearly and decidedly radiated from a place a little north of the cluster in Perseus.

Aug. 10 Evening overcast—[hence no meteors visible].

Aug. 11 Only 2 meteors seen; they radiated from a point about half a degree north of the cluster in Perseus.

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1852 Aug. 12. Only 2 faint meteors seen the whole evening; sky clear both this evening and the last.

Aug. 14. Aurora 3° to 5° high.

Aug. 19. Thunder storms far to the northwest.

Aug. 24. Thermometer in niche of great pier in the basement of the tower 62 Fahrenheit.

Sept. 2. Auroral arch 6° [high].

Sept. 3, 3½ P.M.; a full heavy thunder cloud at the north-northwest to north-northeast.

Sept. 4. Aurora with streamers.

Sept. 5. Aurora with merry-dancers.

Sept. 6. Auroral arch 3° [high].

Sept. 12. Bright aurora 9 to 10 P.M., between cumulo-stratus clouds.

Sept. 13, 9 P.M.; a bunch of meteors seen by G. P. B., who thought from their number that a meteoric shower might be at hand.

Sept. 16. Auroral arch.

Sept. 17, 10 P.M.; low and diffused aurora.

Sept. 18. Bright auroral arch, 3° [high], with streamers.

Sept. 29. Fine aurora, 7 to 9 P.M., with streamers.

Oct. 4. Thunder and lightning during the following night.

Oct. 5. Aurora.

Oct. 7, 9 P.M.; lightning to the westward.

Oct. 9. Flashing of auroral light seen through clouds by R. F. B. between 7 and 8 P.M.

Oct. 13. Indications of auroral light through clouds.

Oct. 19. Lightning at the southeast about 5 A.M.; a little rain; morning warm.

Nov. 10. Low aurora, with streamers, confined to an altitude of 10°.

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1852 Nov. 11. Strong aurora this evening, with streamers seen through the openings of cirro-stratus clouds; a few meteors shooting in different directions.
Nov. 12. Lightning at South by east. Aurora.
Nov. 15. Aurora at 9 P.M.; night clear; few or no meteors.
Nov. 16. Aurora at 9 P.M.
Dec. 2. Bright aurora at 9 P.M.
Dec. 5. Bright aurora among cirro-stratus and cumulus clouds.
Dec. 8. Aurora at 10 P.M.
Dec. 14. Indications of aurora.
Dec. 15. Indications of aurora.
Dec. 29. Aurora in the evening; triple arch.

1881 Sept. 14.

The preceding remarks have been collected from the records for publication after classification, which could not well be attempted until enough material had been collected to enable some judgment to be formed as to what classification and what form of publication should be adopted. The similar entries for the years following 1852 can be written out directly on separate sheets. The classification and form now adopted by Professor Pickering are given below.

1. Aurora.
2. Zodiacal light.
3. Thunder and lightning.
4. Solar halos and parhelia.
5. Lunar halos.
6. Meteors.

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7. Earthquakes.
8. Remarkable storms; unusual falls of rain or hail; unusual frost.
9. Extreme readings of barometer & thermometer.
10. Temperature observed in rain, rivers, wells, or cellars.
11. Notes on instruments.
12. Miscellaneous.

The times are to be given not immediately after the date, as in some cases above, but in the body of the remark, and the hours and minutes are to be indicated; thus, for Sept. 3, 1852, (see fo. 136) we shall have in the copy "A full heavy thunder cloud at $3^h\ 30^m$ P.M. at the north-northwest to north-northeast".

Points of the Compass are to be written out in full as in the example just given.

In the remarks on aurora "wane" cloud is to be expressed by the equivalent term "cirro-stratus" cloud. (See names of cloud in plates accompanying Smithsonian Directions for Meteorological Observations bound with pamphlet marked "Meteorological Instruments")

Negative observations (on the absence of aurora, meteors, etc.) are to be entered with the other observations relating to the same subjects.

Solar and lunar coronas, which exist whenever the sun and moon are seen through a moderate mist, are not to be entered when they can be identified from the description as coronas and not halos; except that if strongly colored, or otherwise remarkable, they may be entered among the halos. This has been already attended to in the preceding pages.

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Remarks in brackets [ ] are not contained in the original record.

The extreme readings of barometer or thermometer here entered are only such as occur incidentally in the record, between the regular times of observation. In preparing the list for publication, the extreme readings at the regular times of observation will be collected and combined with the others.

The notes on instruments will not probably be printed in their present form, but should all be collected for subsequent examination.

Everything is in general to be written out in full; thus the record for Feb. 26, 1852 (see p. 133) will stand "Aurora in the evening".

In copying out, the number of the year is to be put on a separate line, and the separate dates at the left hand: thus, for the beginning of the record of aurora (see p. 107), names of months being abbreviated as below, (May, June, July, in full).

1840.

Feb. 6. Aurora, altitude 2°; diffused steady white light, with long, low, dark cirro-stratus clouds; southerly storm commenced about midnight.

Feb. 7. Low faint aurora, about 3° [high], with long, dark, pointed cirro-stratus [clouds].

Feb. 21. Low steady aurora 8h to 9h P.M.

Mar. 22. White diffused aurora, apex at 4° [altitude], with cirro-stratus [cloud] across.

Mar. 29. Aurora, dark cirro-stratus [cloud] below.

Apr. 24. Aurora.

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Magnetic declination for Cambridge, according to a letter of C. A. Schott, dated Jan. 10, 1873.

The general formula is

$$D = +9^\circ.58 + 2.69 \sin(1.3\,n - 19^\circ.05) + 0.18 \sin(3.2\,n - 20^\circ)$$

in which n denotes the number of years after 1830, and the + sign denotes west declination.

The corresponding formula for the annual variation is

$$V = [8.7856] \sin(1.3\,n + 71^\circ) + [8.0023] \sin(3.2\,n + 70^\circ)$$

in which the brackets denote that the numbers enclosed by them are the logarithms of the actual factors.

Computed values of the declination and annual variation.

Year	West Declination.	Annual variation.
1850	10°.030	+0°.0678
1860	10.672	+0.0598
1870	11.214	+0.0481
1880	11.627	+0.0347

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1666phae.proj - .3001

The following pages, 142 – 163, contain rearrangements of material from old meteorological records.

Pages 142 – 155 contain a rearrangement of the observations July 1866 to January 1867 inclusive; the copy formerly made in book Q 1 having a form which could not be readily used in obtaining general results.

Pages 157 – 162 contain comparisons of thermometers in 1866; the list includes those comparisons in which the standard Fastre thermometer was employed, and also those in which the dry bulb of the psychrometer was compared with the wet bulb supposed to be dry. The thermometers compared with the Fastre thermometer are the "Navy", which seems to have been that used during the first half of 1866, "No. 4," the external thermometer ordinarily used at other times, and the dry bulb. The observations are classified by the readings of the Fastre thermometer when that was used; otherwise by those of the dry bulb.

Page 163 contains similar comparisons between Nos. 2 and 4. (No. 2 was sometimes used as the external thermometer; see note in original records for Sept. 27, 1865).

Book R 78, pages 54 and following, contains notes on the preparation of the meteorological results for publication, of which this rearrangement and comparison is a part.

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July, 1866.

Date	Barometer 7 A.M.	9 A.M.	2.30 P.M.	9 P.M.	Thermometer attached to Barometer 7 A.M.	9 A.M.	2.30 P.M.	9 P.M.	External thermometer No 4 7 A.M.	9 A.M.	2.30 P.M.	9 P.M.	
1	30.146	30.201			*61.5	*68.8			61.5	68.8			
2		30.276				*74.0				74.0			
3		30.100				†78			70.				
4	29.956	30.000			*70.5	*79.5			70.5	79.5			
5	30.000	30.034		30.043	*70.	*78		76.7	70.	78.		74.2	
6	29.996	30.046		‖(29.936)	*74.5	75.		(79.5)	74.5	80.2		(79.9)	
7	29.810	29.988	‖(29.952)	‖(29.944)	*79.	79.	(87.5)	(82.9)	79.	84.5	92.8	(79.0)	
8	29.998	29.950	‖(29.874)	29.927	*79.5	81.	(90.)	81.0	79.5	87.8	(92.2)	72.9	
9	29.954	‖(30.000)	30.030	(30.166)	*75.5	(79.)	81.	(70.5)	75.5	(78.)	79.5	(64.7)	
10	30.266	30.268		30.249	*64	70.		71.7	64.	74.2		65	
11	30.176	30.214		(30.110)	*65.5	70.		(70.)	65.5	77.		(69.5)	
12	30.034	‖(30.084)		29.923	*68.5	(72.)		77.7	68.5	(76.)		74.5	
13	29.794	(29.850)	(29.748)	29.853	*78	(78.)	(83.)	83.	78.	(87.2)	(92.)	78.8	
14	29.968		(30.020)	30.063	*75		(79.)	76.	75.	(78.)	(80.5)	70.9	
15	30.018			(29.999)	*72			(82.)	72.	(88)		(80.9)	
16	30.088		30.072	(30.086)	*81		87.	(77.)	81	91	96.6	(69.3)	
17	30.012	(30.038)	(29.992)		*74	(84.)	(89.)		74	(94.)	(97.2)	(86.5)	
18	29.884		(29.880)	29.822	*78		(*89)	82.	78		(89.)	73.5	
19				(30.102)				(68.)	62			62.7	
20	30.200	(30.228)		(30.155)	*65	(*80)		(70.5)	65	(80)		(67.5)	
21	30.060	(30.111)	(30.036)	30.000	*66	(69.)	(69.)	68.	66	(70.5)	(68.5)	60.4	
22		29.872	(29.867)			66.	(68.5)		60.5	64.5	(65.1)		
23	29.775		(29.760)	(29.835)	64		(66.)	(66.)	61.	60.5	(63.5)	60.)	
24	29.930			29.974	64			71.5	63.5	70.		68.0	
25	30.022				67.5				62.	78			
26	30.091		30.124	30.105	67.		77.	75.	64.5		79.1	70.6	
27	30.080		(30.015)	29.937	70.		(78.)	74.	68.	74	(69.1)	68.5	
28		29.898	(29.816)	(29.795)		‡70	(71.)	(69.)	69.5		(66.0)	(63.7)	
29	29.760			29.785	67.			73.	64.	78.5		68.8	
30	29.817		(29.825)	29.867	68.5		(77.)	71.	66.5	75.5	(78.3)	65.2	
31	29.919			29.968	68.			72.	64.5	70.		66.	
Sums.	779.754	541.158	449.011	719.644	1833.5	1351.31	1192.0	1788.0	2073.5	2017.7	1209.41	1761.0	Therm mean
Means.	29.990	30.064	29.934	29.985	70.5	75.1	79.5	74.5	69.1	77.6	80.6	70.4	74.4

Barometric means reduced to freezing point: 7 A.M. 29,878; 9 A.M. 29,939; 2.30 P.M. 29,798; 9 P.M. 29,862.

Barometer max, 9 A.M., July 2, 30.276; reduced to freezing point, 30.273; (Att. therm assumed 74

" min., 2.00 P.M., " 13, 29.748; " " " " 29.600

Max. No. 4 thermometer, 2 h P.M., July 17, 97.2

Min., " " " 9.50 P.M., " 23, 60.0

July 16 at 3 h A.M. No. 4, therm, 78.
July 16, at 0 h 00m P.M., No. 4 therm., 94.3
" " " 0 45 " " " 95.7
" " " 1 30 " " " 95.9
" " " 1 40 " " " 96.4
" " " 2 00 " " " 97.2
" " " 2 30 " " " 96.6
17 2 0 97.2

* External therm, readings used

† Dry bulb therm, reading used.

‡ Estimated.

‖ Observations in parentheses, not

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1666phae.proj...3691

July, 1866.

Date	Dry Bulb.				Relative Humidity. Guyot's Tables.				Wind.				Clouds.			
	7 A.M.	9 A.M.	2.30 P.M.	9 P.M.	7 A.M.	9 A.M.	2.30 P.M.	9 P.M.	7 A.M.	9 A.M.	2.30 P.M.	9 P.M.	7 A.M.	9 A.M.	2.30 P.M.	9 P.M.
1		67.8				56				2				2		
2		73.2				60				2				1		
3		78.				54				2				3		
4		78.2				65								7		
5		77.		74.0		73		81.				2				2
6		80.		(79.9)		70		(74.)						9		(6)
7		83.8	92.2	(78.2)		68	(47.)	(73)		0				10	(3)	
8		87.	(92.)	71.9		62	(48)	98		2				9		
9		(77.)	78.5	(64.5)		(77)	68	(68)		(2)	6			(10)		(3)
10		73.2		65.0		54		69						4		0
11		75.5				66				2		(4)		2		(0)
12		(76.)		74.0		(71)		76		(0)		2		(10)		0
13		(86.5)	(91.)	78.5		(60)	(51)	74		(2)	(1)	2		(0)		7
14		(77.5)	(79.5)	70.2		(59)	(47)	72		(1)	(2)	2		(3)	(0)	0
15		(87.2)		(80.3)		(58)		(79)		(5)		(5)		(2)		(0)
16			96.2	(69.0)			40	(87)			(0)	(0)			(3)	(0)
17		(93.8)	(97.)				(36)			(2)	(4)			(0)	(6)	
18		81.	(88)	72.				99.			(0)				(8)	
19				62.5				74				(0)				(1)
20		(79.)		(66.9)		(43)		(69.)		(1)		(0)			(8)	(10)
21	65.5	(70.5)	(68.)	60.6		(58)		88.		(1)		1		(10)		10
22	60.	64.	(65.0)				(90)				(1)				(10)	
23	61.	60.	(63.5)	(60.)			(97)	(100.)			(1)	(6)			(10)	(10)
24	63.	69.5		67.8				84				1				0
25	61.	77.		66.5				89								5
26	64.		79.0	70.5			62	86			1	1			1	0
27	67.5	73	(68.5)	67.5			(96)	95			(2)	2			(10)	9
28	69.5		(66.3)	(63.5)			(93)	(98)			(5)	(0)			(10)	(7)
29	63.5	78.		68.5				88				0				0
30	66	74.5	(78.3)	65.4			(57)	92			(1)	0			(8)	10
31	64	69.5		66				74								
Sums	705.0	2067.7	1203.0	1663.2		1054	832	1987		24	24	28		82	77	80
Means	64.1	76.6	80.2	69.3		62	64	83		1.7	2.0	1.6		5.1	6.4	3.8

July 7, 2 P.M., Bar. 29.952, att. therm. 87.5; No. 4, 92.5

" " 3.20 P.M. —————— " " 93.0

" " 7.25 P.M., Bar. 29.927, —————— " " 84.3

" 16, 0h 0m M., " 30.088; att. therm. 85; " " 94.3

Note June 21, 1887. The approximate times of the observations seem by book Q1 to have been as above. In book Q1 the time is given with each observation, and in this copy the observations not made at the regular times are in parentheses. When an observation was made between two regular times, it is considered to belong to that time to which it is nearest. If another observation occurs still nearer to this time, the first is treated as an additional observation, and appears only in the notes, not in the body of the record.

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1866phae.proj..383T

August, 1866.

Date	Barometer. 7 A.M.	9 A.M.	2.30 P.M.	9 P.M.	Thermometer attached to Barometer. 7 A.M.	9 A.M.	2.30 P.M.	9 P.M.	External thermometer No. 4. 7 A.M.	9 A.M.	2.30 P.M.	9 P.M.
1	29.982			29.930	66			73	65	75.5		70.8
2	29.864		(29.787)	(29.780)	71.5		(77)	(76)	73	74	(80.8)	(72.3)
3	29.900			29.999	68			72	66.5	71		67.3
4	29.979			29.907	66			73	63.5	74.5		70.0
5	29.857		(29.879)	29.917	67		(74)	69	61		(76)	62.4
6	29.858			29.916	64			71	61	66		65.3
7	29.899		(29.880)	29.904	66		(74)	72	64.5	70	(75.3)	69.2
8	29.898		(29.880)	29.883	65		(72)	70	64	69	(74.9)	65.8
9	29.739		(29.684)	29.736	66.5		(68)	66	62.5	63.5		57.8
10	29.783		29.880	29.971	63		68	68	60	64	66.8	61.0
11	30.016		(30.089)	30.149	61		(71)	69	60	67.5	(73.5)	63.6
12	30.150		(30.194)	30.197	62.5		(73)	69	59.5		(77)	62.3
13	30.128		(30.128)	(30.078)	63.5		(73)	(66)	58.5	68.5	(76.0)	(60.6)
14	30.020		30.045	(30.026)	63.5		73	(67)	64	68.5	71.3	(64.0)
15	29.955		29.998	30.006	65		70	69	66	68.2	69.6	65.4
16	30.024		30.040	(30.077)	62		64	(63)	55	56	62.9	(56.2)
17	30.030		29.983	29.990	62		65	65	55	56	70.6	61.1
18	29.963		29.973	29.950	59		74	72	58	68	79.6	69.8
19	29.879	29.900			64	66			62	69.2		
20	29.731		29.789	29.872	65		70	65	61.5		70.2	58.2
21	29.950		29.977	29.983	59.5		70	67	58.5		70.1	62.8
22	29.831		29.774	29.858	64.5		75	69	63	70.5	75.0	62.6
23	29.895		29.852	29.784	62.5		63	60	56		53.0	51.6
24	29.778		29.873	29.949	58		67	63	52	59.5	66.1	55.7
25	29.986		30.000	30.015	57		68	65	51	61	67.3	57.0
26	29.976				58.5				52		(70)	
27			30.048	30.091			71	67	60		70.5	61.5
28	30.099		30.087	30.080	62		71	69	61	69.5		
29	30.004		29.970	29.932	63		69	67	60	66	67.8	62.6
30	29.884		29.873	29.956	63.5		71	64	60	67	74.5	60.0
31	30.006		30.006	30.062	*63		71.0	68			74.9	63.2
Sums	898.044		751.979	868.998	1902.0		1762.0	1974.	1814.0	1542.9	1713.7	1760.1
Means	29.935		30.079	29.965	63.4		70.5	68.1	60.5	67.1	71.4	62.9

Therm mean. 65.5

Barometer reduced to freezing point; 7 A.M., 29,841.

" " " 2.30 P.M., 29,966.

" " " 9 P.M., 29,859.

Barometer max., 9 P.M., Aug. 12, 30,197; reduced to freezing point, 30,088.

" min, 2.50 " " 9, 29,684; " " " 29,579.

Max. No 4 thermometer, 2.50 P.M., Aug. 2, 80.8

Min, " " " 7 A.M., Aug. 25, 51.0

*Estimated.

" Observations taken at

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August, 1866.

Date	Dry Bulb.				Relative Humidity Guyot's tables.				Wind.				Clouds.			
	7 A.M.	9 A.M.	2.30 P.M.	9 P.M.	7 A.M.	9 A.M.	2.30 P.M.	9 P.M.	7 A.M.	9 A.M.	2.30 P.M.	9 P.M.	7 A.M.	9 A.M.	2.30 P.M.	9 P.M.
1	64.5	74.5		70.3				83				3				10
2	72.	73.	(80.2)	(72.0)			(77)	(95)			(6)	(2)			(5)	(0)
3	65.5	70.5		67.0				75				0				0
4	63	73.6		69.5				84				2				6
5	60		(75)	61.9				71				3				0
6	60.5	65.5		65.0		100		71				3				0
7	64	69	(75.1)	68.8			(45)	57			(4)	3			(4)	10
8	63	68	(74.3)	65.5			(42)	70			(2)	1			(2)	2
9	61.5	63	(60.4)	57.5			(98)	99			(2)	0			(10)	10
10	59.5	63.5	66.6	60.8			83	85			2	1			7	3
11	60	67	(73.2)	63.2			(45)	78			(1)	0			(1)	0
12	59.5		(76.5)	61.5				83				1				3
13	57.5	68	(75.5)	(59.1)			(53)	(90)			(3)	(1)			(10)	
14	63	68	71.3	(64.0)			70	(86)			7	(1)			3	(0)
15	65.5	68	69.5	65.0			91	98			1	1			10	10
16	54.2	55.5	62.7	(55.8)			79	(72)			2	(2)			10	(0)
17	54.2	55.5	70.4	60.7			33	61			7	0			0	3
18	59	67.5	79.2	69.4			50	73			2				2	9
19	61	68														
20	60.5		69.4	57.8			60	71			4	1			4	0
21	57.5		70.0	62.6			59	85			1	2			5	9
22	62	70	74.8	62.2			60	71			4	1			1	0
23	55.5		52.8	51.3			94	100			1	1			10	10
24	57.5	59	65.6	55.5			48	79			2	3			2	0
25	50	59.5	65.8	56.3			47	82			3	1			4	0
26	51.5		(68.5)													
27	59.5		75.0	61.4			44	80			3	3			1	3
28	60.5	69														
29	60	65.5	67.9	62.0			67	98			1	0			10	10
30	59.5	66.5	74.6	60.4			48	80			3	1			1	1
31			74.6	63.0			58	86			1	0			8	5
Sums	1795.4	1527.5	1768.9	1749.5			1351	2263			62	37			110	101
Means	59.8	66.4	70.8	62.5			61	81			2.8	1.4			5.0	3.7

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September, 1866

Date	Barometer. 7 A.M.	9 A.M.	2.30 P.M.	9 P.M.	Thermometer attached to Barometer. 7 A.M.	9 A.M.	2.30 P.M.	9 P.M.	External thermometer, No. 4. 7 A.M.	9 A.M.	2.30 P.M.	9 P.M.
1	30.082	(30.108) †	30.043	(30.043)	*65	(69)	72	(71)		(78.8)	77.0	(68.9)
2	29.960		29.918	(29.972)	68		77	(73)	70	71	81.9	(71.1)
3	30.012	30.050	(30.050)	30.053	71	71	(80)	74	72	80.5	(85)	68.6
4	30.032	30.044	29.991	29.984	70	70	69	68	66.5	67	65.6	62.4
5	29.950	29.952		(29.950)	64	66		(66)	61	62.8		(62.5)
6	29.964	30.012	(30.010)	30.076	65	66	(72)	63	64	65.9	(73.4)	62.3
7	30.120	(30.154)	(30.362)	29.938	60	(65)	(72)	68	57.5	(69.4)	(69.9)	69.8
8	29.722	29.730		29.872	65.5	72		68		77.0		62.6
9	29.972		30.002	30.140	61.5		67	64	55.5		66.8	54.2
10	30.151		30.115	30.122	58.		67	63	51.	58.	66.7	55.9
11	30.052		(29.982)	29.933	58.		(71)	67	52.	60	(70.0)	62.9
12	29.730	29.733	(29.722)	(29.824)	67	68.5	(76.5)	(72)	69	70.9	(78.6)	(65.5)
13	29.858		29.974	30.020	65		72.	68	62	69	67.9	58.8
14	30.088		(29.958)	29.891	61.5		(67)	67	57		(62.2)	65.0
15	30.058		(30.129)	30.276	61		(64)	59	55		(60.6)	50.0
16	30.400		(30.384)	30.340	54		(62)	58	42		(56.0)	48.3
17	30.169		30.020	(30.016)	55.5		66	(65)	54	61	73.7	(65.3)
18	29.906		29.925	29.987	63		65	64	64	68	61.6	60.3
19	29.916		29.900	29.987	61.5		64	63	69	60.5	63.7	57.3
20	30.081		30.098	30.082	59		59	59	54	53.5	54.9	54.3
21	29.999		(29.904)	29.879	58		(66)	68	51		(78.1)	72.2
22	29.902		30.042	30.238	62		62	57	55.5	56.	58	47.0
23	30.298		(30.325)	30.348	50.5		(60)	55	41		(54.7)	44.3
24	30.312		(30.350)		48.		(59)		41	52.	(57.5)	
25	30.256		(30.173)	(30.124)	57		(62)	(62)	58	61	(64.5)	(62.7)
26	30.030		29.967	29.967	60		64	64	61	66	67.9	59.7
27	29.983		30.058	30.164	53		62	60	52.5	54.5	64.6	54.2
28	30.300		30.317	30.315	55		65	61	45.5	55	66.2	53.7
29	30.278		(30.300)	30.250	55		(68)	62	48	56.5	(70.9)	58.2
30	30.161			30.078	58			64	57			58.9
Sums.	891.682	239.783	812.020	871.869	1810.0	547.5	1810.5	1873.	1586.0	1474.3	1817.9	1736.9
Means.	29.723	29.973	30.075	30.064	60.3	68.4	67.0	64.6	56.6	64.1	67.3	59.9

Thermn. mean 62.0

Barometer reduced, to freezing point, 7 A.M., 29.636.
" " " " " 9 A.M., 29.866.
" " " " " 2 30 P.M., 29.971.
" " " " " 9 P.M., 29.967

Barometer max., 7 A.M., Sept. 16, 30.400; red., to freezing point, 30.331.
" min., 7 A.M., " 8, 29.722; " " " 29.624;
also the same minimum reading, 3.15 P.M., Sept. 12; " " " 29.594.

Max, No. 4. thermometer, 2 P.M., Sept. 3, 85.
Min., " " " 7 A.M., " 23, 41.
also (same minimum reading) 7 A.M., " 24, 41

* Estimated.
† Observations thus enclosed not made at regular times.

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September, 1866.

Date	Dry Bulb.				Relative Humidity Guyot's tables.				Wind.				Clouds.			
	7 A.M.	9 A.M.	2:30 P.M.	9 P.M.	7 A.M.	9 A.M.	2:30 P.M.	9 P.M.	7 A.M.	9 A.M.	2:30 P.M.	9 P.M.	7 A.M.	9 A.M.	2:30 P.M.	9 P.M.
1		(73.2)	76.2	(68.7)		(71)	75	(94)			0	(4)			7	(4)
2	70.5	70.5	81.0	(70.7)			71	(96)			3				7	
3	71	80.0	(83.5)	67.6		67		92			(0)				(8)	
4	66	66.7	65.1	61.8			98	98			4	2		10	10	10
5	60	62.3		(61.8)				(97)				(1)				(9)
6	63.5	65.8	(73.0)	61.8			(47)	75			(2)	1		10	(4)	0
7	58	(68.2)	(69.8)	67.4		(58)	(92)	71			(4)	5			(8)	10
8	66	76.5	62.6	62.6		75		63		1		5		8		0
9	54.5		66.6	54.0			40	68			5	3			2	0
10	50	57	66.6	55.2			41	83			1	0			0	0
11	57.5	60	(69.9)	62.8			(75)	94			(3)	5			(10)	10
12	68.8	70.4	(77.9)	(64.7)			(57)	(73)			(3)	(1)			(4)	(0)
13	61.	68	67.5	58.7			45	70			1	1			0	0
14	56		(62.7)	64.5			(99)	100			(0)	5			(10)	10
15	54.6		(60.5)	49.6			(46)	65			(2)	2			(0)	0
16	41		(55.7)	47.7			(64)	92			(2)	1			(6)	1
17	53	60.5	73.6	(65.3)			55	(84)			3	(1)			6	(8)
18	63.5	67.5	61.3	60.3			91	93			2	0			10	9
19	68?	59.5	62.8	57.0			95	97			1	1			10	10
20	53	53	54.5	54.0			96	98			1	1			10	10
21	50.5		(77.5)	72.1			(82)	93			(3)	3			(7)	10
22	55	55.5	57.2	47.4			50	68			6	1			0	0
23	40	8	(54.5)	43.0			(57)	95			(2)	0			(1)	0
24	39	51	(57.4)				(71)				(2)				(10)	
25	57	59.5	(64.4)	(62.3)			(95)	(98)			(0)	(0)			(10)	(10)
26	60.5	65.5	67.6	60.2			95	98			0	0			10	10
27	51.5	53	64.4	53.6			45	81			2	0			0	0
28	44.5	54.5	66.2	53.1			44	90			1	2			1	1
29	47	56	(70.1)	58.2			(58)	91			(1)	0			(10)	10
30	56			58.6				98				0				8
Sums.	1630.5	1453.1	1807.3	1724.7		271	1784	2510		1	54	45		18	161	137
Means.	56.2	54.5	66.9	59.5		68	69	86		1.0	2.0	1.7		9.0	6.0	5.1

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1866phae.proj:3837

October, 1866.

Date	Barometer				Thermometer attached to Barometer				External thermometer, No. 4			
	7 A.M.	9 A.M.	2:30 P.M.	9 P.M.	7 A.M.	9 A.M.	2:30 P.M.	9 P.M.	7 A.M.	9 A.M.	2:30 P.M.	9 P.M.
1	30.150		*(30.256)	30.246	58		(66.)	59	54.5	(59.5)	62.0	50.4
2	30.141		30.006	29.904	53		64	64	43.	53.5	70.8	61.7
3	29.738		29.851	29.985	61		59	54	59	60	55.7	41.5
4	30.075		30.112	30.256	48		56	49	35	42.5	47.6	36.5
5	30.435		30.450	30.488	43		51	47	32	40	50.3	39.2
6	30.465		(30.372)	30.339	44		(56)	52	33	43	(58.2)	45.9
7	30.250		(30.120)	30.071	43		(58)	58	41		(67.7)	58.7
8	30.025		29.967	30.062	54.5		64	64	54		73.8	65.0
9	30.242		30.341	30.380	57		55	54	52	51.5	60.2	47.1
10	30.377		30.350	30.336	51		56	52.9	43	51	51.3	44.8
11	30.235		30.236	30.190	47.5		56.1	52.7	38	59	52.4	44.0
12	30.081		30.040		49		53.2		44	49	51.9	
13	29.958		29.977	30.000	50.5		54.0	53.0	45		53.0	50.6
14	29.990		29.986	30.059	50		49.0	49.4	42.5		46.0	50.1
15	30.118		30.203	30.260	51.5		55.0	52.5	51.	52	54.9	45.1
16	30.262		30.205	30.084	48		55.8	53.2	42.5	49	55.2	43.9
17	29.896		29.910	30.032	50		64.0	57.4	49	58.5	66.2	49.5
18	30.132		30.167	30.198	50.5		57.7	53.3	38	46	58.5	46.7
19	30.233		30.240	30.249	49		65.1	57.9	41.5		63.1	52.1
20	30.220		30.217	30.225	54		63.7	61.0	48	52.5	70.0	57.0
21	30.184		30.188	30.183	55		66.3	60.9	49.5		70.8	53.4
22	30.061		29.954	29.950	57		63.5	62.2	54.5	63	70.8	63.0
23	29.880		29.830	29.817	61		61.1	59.2	58	58.5	62.2	50.0
24	29.792		29.798	29.876	52		57.2	52.8	42	42.5	53.4	41.8
25	30.050		30.130	30.252	47		49.8	48.3	36	38	43.3	34.0
26	30.288		30.223	30.130	42		49.2	48	32	37	47.0	43.7
27	29.982		30.017	30.148	47		50.5	49.7	40	41.5	47.7	40.3
28	30.300		30.335	30.398	45		50.1	48.0	35		45.1	36.1
29	30.346		30.257	30.184	44		47.0	48.0	35	39.5	47.0	49.1
30	29.784		29.481	29.646	52		56.0	55.7	57.5	59.5	66.0	50.9
31	29.772		29.887	30.054	50		54.6	49.0	41		50.5	40.3
Sums	933.462		933.126	904.002	1564.5		1763.9	1626.1	1366.5	1146.5	1762.6	1432.4
Means	30.112		30.101	30.133	50.5		56.9	54.2	44.1	49.8	56.8	47.7

Therm. mean 49.6

Barometric means red. to freezing point, 7 A.M., 30.053.

" " " " " 2 30 P.M., 30.025.

" " " " " 9 P.M., 30.064.

Barometer max., 9 P.M., Oct. 5, 30.488; reduced to freezing point, 30.437.

" min., 1 30 P.M., " 30, 29.400; " " " 29.309. {63.9 assumed for att. thermom. reading.

Max., No. 4 Thermometer, 2 30 P.M., Oct. 8, 73.8

Min., " " " 7 A.M., " 5, 32.

also same minimum reading) 7 A.M., " 26, 32.

Barometer at 1 P.M., Oct. 30, 29.435

*Observations in parentheses not made at regular times.

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1866phae.proj...383

October, 1866.

Date	Dry Bulb.				Relative Humidity. Guyot's table.				Wind.				Clouds.			
	7 A.M.	9 A.M.	2:30 P.M.	9 P.M.	7 A.M.	9 A.M.	2:30 P.M.	9 P.M.	7 A.M.	9 A.M.	2:30 P.M.	9 P.M.	7 A.M.	9 A.M.	2:30 P.M.	9 P.M.
1	54	59	(62.0)	50.2			(35)	89			(2)	0			(1)	1
2	42	53	70.1	61.3			60	91			1	1			5	5
3	58	59	55.0	41.2			44	61			5	4			0	0
4	34	42	47.1	35.7			33	59			5	3			1	0
5	31	39	50.0	38.7			19	74			3	0			0	0
6	32	43.5	(58.1)	45.3			(20)	65			(2)	2			(0)	0
7	40.5		(68.8)	58.9			(30)	59			(2)	1			(3)	2
8	53.5		74.1	64.6			57	81			0	0			0	9
9	51.5	51	50.0	46.9			68	70			3	2			8	8
10	42.5	50	51.3	44.3			64	88			2	0			2	2
11	37.5	58.5	52.5	43.8			48	93			2	1			1	3
12	43.5	48	51.5	49.5			79	98			2				10	
13	44.5		52.5	50.0			67	80			3	6			10	10
14	42		46.6	49.8			96	78			4	4			10	10
15	50	51.5	54.4	44.3			52	81			4	1			0	0
16	41.5	48	55.1	43.2			58	88			2	0			0	0
17	49	58	66.0	49.2			45	66			4	0			0	0
18	36.5	45.5	58.4	46.1			47	91			1	0			1	0
19	41		63.0	52.1			65	90			1	1			1	0
20	47.5	52	69.6	56.3			59	91			1	0			3	0
21	49		70.4	58.3			64	93			2	3			0	4
22	54	62.5	70.4	62.7			68	89			7	2			10	9
23	57	57.5	61.9	49.4			46	89			0	0			7	0
24	41.5	42	52.7	41.2			35	68			3	1			8	0
25	35.5	37	42.7	33.0			36	59			4	0			2	0
26	31.5	36	47.0	43			49	85			1	2			10	10
27	39	40.5	47.2	39.4			77	78			1	1			10	0
28	34		44.4	35.0			48	79			2	0			10	3
29	34	39	46.7	48.6			75	89			3	1			10	10
30	57	59	64.8	50.2			92	75			6	1			10	10
31	40.5		50.0	39.7			54	68			1	1			5	0
Sums	1345.0	1131.5	1753.3	1468.9			1690	2465			79	38			138	96
Means	43.4	49.2	56.6	47.4			54	80			2.5	1.3			4.4	3.2

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1866phae.proj:3837

November, 1866.

Date	Barometer				Thermometer attached to Barometer.				External thermometer, No. 4			
	7 A.M.	9 A.M.	2.30 P.M.	9 P.M.	7 A.M.	9 A.M.	2.30 P.M.	9 P.M.	7 A.M.	9 A.M.	2.30 P.M.	9 P.M.
1	(30.198)			(30.125)	45			(45.7)	33		44.5	(36.2)
2	30.001		30.001	30.088	45		52.8	51.4	41	48.5	56.8	46.2
3	30.232		30.260	30.323	45		52.5	48.4	33.5		48.6	40.9
4	30.372		30.380	30.498	44		50.7	46.2	31		44.0	30.3
5	30.530		30.468	(30.442)	38		46.4	(44.1)	21.5		37.0	(33.0)
6	30.428		(30.398)	30.371	38		(47.3)	45.2	27.5	33	(41.7)	32.8
7	30.214		30.129	30.062	39		63.0	48.8	30.5	37	55.2	43.7
8	29.985		29.977	30.008	47		53.9	50.6	44.5	50	62.2	48.1
9	30.050		29.991	30.050	46		51.5	52.8	40	44.5	60.8	48.0
10	29.980		29.985	30.100	47		54.0	52.0	44.5	50	57.8	44.1
11	30.140		30.120	(30.061)	47		49.0	(50.8)	38		49.2	(48.4)
12	29.962		30.024	(30.140)	57		53.0	(50.4)	47		51.8	(41.8)
13	30.196		30.243	30.312	46		50.3	43.8	34	37	46.7	35.5
14	30.350		30.342	30.327	42		51.1	47.5	28.5		45.7	37.5
15	30.240	*	30.099	29.897	44	†	47.0	49.2	38	42.5	49.0	50.0
16	29.332	(29.300)	29.400	29.530	55	59	54.7	50.9	57	59.5	54.1	44.9
17	29.611		29.716	(29.850)	46		50.5	(48.1)	31.5	42.	48.3	(39.3)
18	29.916		29.944	30.026	42		50.0	46.0	33.5	38	48.9	41.8
19	30.080		30.025	29.980	46		50.2	51.0	41	44.5	52.6	48.4
20	29.748		29.624	29.600	57		55.0	54.3	56	57	59.8	55.2
21	29.556		29.656	29.784	50		52.3	47.3	41.5	43.5	44.6	37.0
22	29.901		29.901	29.878	43		48.2	46.0	32	37	42.1	34.5
23	29.807		29.765	(29.880)	43		44.2	(41.7)	33	32.5	33.7	(31.8)
24	29.999		29.940	29.950	39		43.7	40.8	28.5	29.5	32.2	31.5
25	29.962		30.132	(30.263)	39		41.5	(36.2)	26.5	26	28.0	(22.5)
26	30.332		(30.267)	30.272	34		(48.8)	42.9	18		(38.9)	33.7
27	30.228		30.224	30.212	37		49.2	45.0	27.5	33	48.5	38.8
28	30.140				42				40	44		
29	29.62				53				59.5	62.5		
30		(29.418)	(29.592)		"	†	54 (56)				(52)	
Sums	871.110	58.718	820.587	812.049	1295	113	1351.8	1277.1	1058.0	891.5	1334.7	1075.9
Means	30.038	29.359	30.392	30.076	44.6	56.5	50.1	47.3	36.5	42.4	47.7	39.8

Therm. mean. 41.6

Barometric means, red. to freezing point; 7 A.M., 29.995

" " " " " " 9 A.M., 29.286

" " " " " " 2.30 P.M., 30.333

" " " " " " 9 P.M., 30.026

Barometer max. 7 A.M., Nov. 5, 30.530; reduced to freezing point, 30.504

" min. 10.30 A.M. " 16 29.300 " " " " 29.220

Max. No. 4, Thermometer, 9 A.M., Nov. 29, 62.5

Min. " " " 7 A.M., " 26, 18.

* Observations in parentheses not made at regular times.

† Estimated.

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November, 1866.

Date	Dry Bulb. 7 A.M.	9 A.M.	2.30 P.M.	9 P.M.	Relative Humidity. Guyot's tables. 7 A.M.	9 A.M.	2.30 P.M.	9 P.M.	Wind 7 A.M.	9 A.M.	2.30 P.M.	9 P.M.	Clouds. 7 A.M.	9 A.M.	2.30 P.M.	9 P.M.
1	32		44	(35.3)				(70)				(1)				(0)
2	41	48.5	57.3	46.0			44	67			1	1			0	0
3	32.5		48.0	40.0			40	54			3	1			4	10
4	30.5		43.4	29.8			46	70			9	1			4	1
5	20.5		36.4	(32.5)			41	(46)			2	(2)			0	(0)
6	26	32.5	(41.3)	31.9			(39)	69			(0)	1			(0)	0
7	30	36.5	55.5	43.5			19	40			1	1			0	0
8	44	50	62.8	47.8			16	43			1	0			8	9
9	39.5	44	61.0	47.4			50	73			1	1			8	0
10	44	50.5	57.6	43.7			27	60			4	1			1	8
11	37.5		49.0	(48.1)			72	(78)			3	(4)			9	(10)
12	46		51.4	(41.0)			55	(72)			3	(2)			9	(1)
13	33.5	37	46.2	34.5			43	67			2	1			0	0
14	27.5		45.2	36.4			61	90			0	1			1	9
15	37	42	48.6	49.5			80	93			1	1			10	10
16	56	59	54.0	44.3			59	72			4	3			5	9
17	31	41.5	47.8	(38.4)			55	(68)			5	(2)			8	(0)
18	32.5	37.5	48.4	41.2			52	74			2	0			9	7
19	40	44	52.2	48.0			65	91			3	1			9	10
20	55.5	56.5	59.5	54.5			88	100			1	0			10	10
21	40.5	43.	44.0	36.2			54	65			6	3			4	0
22	31	36	41.0	34.0			55	100			1	0			9	10
23	32.5	31.5	33.1	(31.0)			94	(79)			1	(1)			10	(3)
24	27.5	28.5	31.7	30.4			99	100			5	2			2	10
25	25.5	25	27.2	(21.3)			50	(77)			7	(0)			1	(0)
26	16.5		(38.5)	33.0			(48)	87			(4)	1			(1)	2
27	26.5	33	49.0	38.3			47	91			1	1			0	0
28	39	43.5														
29	59	62														
30			(51.0)				(70)									
Sums	1034.5	882.0	1325-1	1058.0			1469	1996			71	33			122	119
Means.	35.7	42.0	45.2	39.2			54	74			2.7	1.2			4.7	4.4

Barometer at 12 M, Nov. 16, 29.360

" " 12.30 P.M, " 30, 29.388

" " 12.40 " " " 29.400

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December, 1866.

Date	Barometer 7 A.M.	9 A.M.	2.30 P.M.	9 P.M.	Thermometer attached to Barometer. 7 A.M.	9 A.M.	2.30 P.M.	9 P.M.	External thermometer, No. 4. 7 A.M.	9 A.M.	2.30 P.M.	9 P.M.
1	29.842		*(29.900)	(30.018)	44		(49.3)	(42.8)	34.5	37.5	(36.0)	
2	30.116		30.157	(30.238)	37		46.5	(39.2)	22.5		34.6	(27.6)
3	30.352		(30.349)	(30.346)	36		(45.2)	(42.5)	23.	26.5	(42.8)	(32.9)
4	30.208		(29.894)	(29.749)	39		(45.2)	(46.2)	24		(48.2)	(50.0)
5	30.051		(30.159)	(30.269)	45		(49.2)	(48.0)	40.5	43.5	(50.9)	(40.8)
6	30.322		(30.248)	(30.098)	42		(46.2)	(45.0)	38.5	41	(48.9)	(42.9)
7	29.985		(29.960)	(30.068)	44		(50.3)	(49.5)	36	38	(51.7)	(41.2)
‖ 8	30.036		29.898	29.596	42		47.2	46.0	32	34	46.5	47.2
9	29.667		29.703	29.724	47		51.0	47.1	42		46.9	34.5
10	29.770		29.772	29.928	40		46.2	38.8	27	29	34.0	24.2
11	30.050		30.022	30.050	32		44	36.5	15.5	19	27.9	19.1
12	30.05(3)		30.010	30.049	30		39.3	36.2	14	17	28.2	21.8
13	30.033		30.027	30.027	29		39.0	35.0	16	19	27.5	20.0
14	30.001		30.027	30.169	29		32.8	29.0	15	15	20.3	13.5
15	30.264		30.216	30.268	†11		34.2	30.0	11	14	27.8	15.8
16	30.268		30.120	29.777	†11.5		26.3	30.0	11.5		21.5	32.0
17	29.251		29.298	29.650	33		31.5	†25.0	29	24	26.5	25.0
18	30.018		30.083	30.168	29		37.0	33.2	20	22	28.7	20.3
19	30.079		29.976	29.925	30		33.2	34.0	23.	27	32.9	30.1
20	30.074		30.226	30.390	32		27.9	25 N.B.	18	13	9.4	−0.9
21	30.571		30.549	(30.501)	†−7		25 N.B.	(25 N.B.	−7	−5	11.3	(7.6)
22	30.416			30.178	†9			29.3	9	17	33.	33.8
23	29.918		29.800	29.633	32		35.0	38.	42		40.7	48.0
24	29.502				43				52	51.5		43
25			(29.788)				(41.0)			(36.5)	(38.9)	32.5
26	30.100		30.023	30.027	34		39.0	30.8	25.5	22	32.8	24.4
27	29.766		29.303	28.775	35		38.5	39.8	36	37	37.4	35.0
28	28.978	(29.143)	29.191	29.395	34	(37.7)	(34.0	29.0	22	21	21.1	17.9
29	29.658		29.755	29.929	†13		32.4	28.5	13	14	20.5	16.2
30			(30.140)	30.259			(37.0)	30.5	17		(23.8)	16.1
31	30.222		30.117		†11		25		11	17	18.9	
Sums	869.568		868.711	839.204	886.5		1128.4	1009.9	713.5	630.5	959.6	812.6
Means.	29.985		29.955	29.971	30.6		38.9	** 36.1	23.8	25.2	32.0	28.0

Therm. mean 23.8

mean 38.4

N.B. Att. th. dec. 20 & 21st below 25. Assumed = to 10. The sum of 2.30 P.M. = 1128.4 (see 15) = 1113.4

" 9 P.M. = 1009.9 " 30. = 979.9

mean 35.0

Barometric means red. to freezing point; 7 A.M., 29.979

" " " " " 2.30 P.M., 29.928

" " " " " 9 P.M. 29.953

Barometer max., 7 A.M., Dec. 21, 30.571; reduced to freezing point, 30.649. (Att. thermometer called 0.

" min., 9 P.M., " 27, 28.775; " " " 28.746.

Max., No. 4 thermometer, 7 A.M., Dec. 24, 52.

Min., " " 7 A.M., " 21, −7.

* Observations in parentheses not made at regular times.

† Readings of No. 4 used.

‖ On and after Dec. 8 the third reading of thermometers were is at 1.30 P.M. after Dec. 8th, the third readings in paren-

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December, 1866.

Date	Dry Bulb. 7 A.M.	9 A.M.	2.30 P.M.	9 P.M.	Relative Humidity. Glycerin tables 7 A.M.	9 A.M.	2.30 P.M.	9 P.M.	Wind 7 A.M.	9 A.M.	2.30 P.M.	9 P.M.	Clouds. 7 A.M.	9 A.M.	2.30 P.M.	9 P.M.
1	34	37	(35.4)	(26.5)			(41)	(49)			(5)	(3)			(0)	(0)
2	21		34.1	(26.8)			26	(62)			3	(0)			0	(0)
3	21.5	25	(42.5)	(31.8)			(45)	(94)			(2)	(0)			(1)	(0)
4	23	40	(47.9)	(49.8)			(86)	(85)			(6)	(5)			(10)	(9)
5	40	43.5	(50.9)	(40.3)			(42)	(69)			(3)	(1)			(0)	(0)
6	38	40.5	(48.4)	(42.3)			(46)	(79)			(1)	(1)			(10)	(10)
7	35	37.5	(51.8)	(40.7)			(54)	(82)			(2)	(0)			(1)	(0)
8	31.5	33	46.0	46.4			82	100			3	0			10	10
9	41		46.5	33.7			55	64			3	0			3	5
10	25.5	28	38.5	23.3			41	51			3	2			2	6
11	14	18.5	27.1	17.5			44	79			1	1			0	0
12	13	16.	27.4	20.3			47	71			1	1			0	0
13	15	18	26.7	18.1			44	84			1	0			1	0
14	13.5	14.5	19.4	12.5			48	71			7	5			0	0
15	10	13	27.1	14.8			37	72			0	5			0	0
16	10		20.4	31.8			78	100			1	6			10	10
17	28.5	23.5	25.5	24.0			100	84			3				10	
18	18.5	21	27.7	19.1			73	85			1	0			3	3
19	22.5	26	32.0	29.3			94	72			3	0			10	10
20	17	12	8.4	−2.0			81				6	6			0	0
21			10.1	(6.5)			59	(70)			1	(0)			0	(7)
22	8.5	15.5	32	33.0			87	97				0				10
23	41		40.1	46.7			88	100			2	8			10	10
24	50	51		42												
25		(36)	(38.5)	32			(52)				(1)				(2)	
26	24	21	32.3	28.8			48	81			2	0			0	2
27	35	36	36.8	34.2			100	100			8	4			10	10
28	21	19	19.6	17.1			70	63			7	7			10	1
29	12	13	19.2	15.1			62	82			4	1			1	3
30	15.5		(22.6)	14.7			(61)	87				1				0
31	10	15.5	18.1				84				4				10	
Sums	659.5	654.0	948.0	812.1			1875	2133			84	57			114	106
Means	22.7	26.2	31.6	27.1			62.	79			3.0	2.1			4.1	3.9

Under the entry, "missing" last might occur the 4th. Coming in (1), Dec. 11; Dec. 15; Dec. 12; Dec. 18.7; Dec. 14, 13.4; Dec. 1 (12) 9.8; Dec. 15, 9.7; Dec. 20, −6.3;

Barometer readings in Dec.

Date.	Time.	Bar.	Att. Th.
4	1.45 P.M.	29.972	
"	2.0 "	29.950	
27	3.20 P.M.	29.136	
"	3.30 "	29.130	37.6
"	3.40 "	29.112	
"	4.15 "	29.065	37.8
"	5.45 "	28.972	
"	6.10 "	28.942	
"	6.45 "	28.878	39.3
"	7.5 "	28.855	
"	7.25 "	28.837	40.0
"	7.48 "	28.832	
"	8.20 "	28.805	39.8
"	9.0 "	28.775	39.8
"	9.40 "	28.755	39.5
"	10.40 "	28.713	39.0
"	11.20 "	28.686	
"	11.40 "	28.692	
"	worm gear adjusted		
"	11.45 P.M.	28.646.	

these are neither at $2^h 30^m$ nor $1^h 30^m$ but approximate to these times

Barometer readings in Dec.

Date.	Time.	Bar.	Att No. 4
28	0 5 A.M.	28626	
"	0 27 "	28.638.	28.8
"	1 4 "	28.640	28.0
"	1 20 "	28.650	Att. Th.
"	3.10 P.M.	29.240	33.0

Barometer readings on Dec. 21.

7 A.M., 30.571 −7 No. 4

1.30 P.M., 30.549 25 Att. Th.

9.15 P.M., 30.501 25 " "

External thermometer, No. 4, readings.

Dec. 20.	11.15 A.M.,	11.0
" "	5.45 P.M.,	3.7
" 21	8.0 A.M.,	−6.

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January, 1857.

Date	Barometer 7 A.M.	Barometer 9 A.M.	Barometer 1.30 P.M.	Barometer 9 P.M.	Thermometer attached to Barometer 7 A.M.	Thermometer attached to Barometer 9 A.M.	Thermometer attached to Barometer 1.30 P.M.	Thermometer attached to Barometer 9 P.M.	External thermometer No. 4 7 A.M.	External thermometer No. 4 9 A.M.	External thermometer No. 4 1.30 P.M.	External thermometer No. 4 9 P.M.
1	30.113		30.058	30.100	† 19		28.8	31.8	19.	21	25.8	26.5
2	30.148		30.102	30.066	31		34.8	30.0	22	21.5		22.0
3	30.026		30.085	30.076	† 10		34.1	29.1	10	10.5	22.7	11.2
4	30.015		30.011	30.009	† 5		30.2	29.5	5	6.5	23.1	17.6
5	29.968		29.860	29.650	† 20		30.1	33.0	20.0	23.	32.2	35.5
6	29.430		29.446	29.490	33		31.3	30.0	26.5	27	23.9	22.3
7	29.490		29.449	29.440	29		32.1	28.5	20	21.5	24.1	18.3
8	29.355		29.301	29.320	† 13.5		31.2	29.0	13.5	15	22.2	19.4
9	29.362		29.323	29.380	† 16.5		33.3	32.0	16.5	18	26.1	20.6
10	29.422		29.402	29.426	† 14		31.5	31.0	14	16.5	29.4	23.1
11	29.530		29.605	29.757	† 14		32.5	31.3	14	13	28.9	23.2
12	29.848		29.883	29.968	† 14		31.0	27.5	14	14.5	19.4	13.9
13	29.930		29.768	29.700	† 9		25	*25	9		19.2	18.3
14	29.627		29.648	29.675	† 15.5		28.5	*25	15.5	14.5	22.0	11.6
15	29.697	‡	(29.703)	29.849	† 4.5		(28.0)	*25	4.5	6	(18.4)	10.2
16	30.010		30.018	29.940	† 1		28.3	*25	1	3	16.3	11.3
17	29.572		29.120	29.235	† 16.5		*25	*25	16.5	17.5	18.5	16.5
18	29.234		29.430	(29.486)	† 9.5		*25	(*25)	9.5	9.5	10.1	(3.5)
19	29.497		29.518	29.705	† -2.		*25	*25	-2.	1	7.8	0.5
20	29.886	‖	(29.947)	29.949	† -4.		*(25)	*25	-4		(13.9)	14.7
21	29.602		29.398	29.490	† 31		28.2	26.1	31	32	21.0	19.4
22	29.536		29.513	29.540	† 19.5		31.8	30.2	19.5	20.5	32.0	25.9
23	29.583		29.593	29.736	† 26		31.2	32.7	26	26.5	30.3	27.2
24	29.880		29.923	30.000	† 24		36.2	33.2	24	26	31.1	25.4
25	30.075		29.933	29.842	† 13		34.8	33.0	13	17	27.8	23.3
26	29.513		29.200	29.226	† 31.5		32.2	33.1	31.5	33	36.0	30.4
27	29.339		29.428	29.625	† 23.5		33.2	30.2	23.5		27.5	20.9
28	29.814		29.798	29.884	† 15.5		35.2	28.8	15.5	18	23.9	17.2
29	29.860		29.798	29.923	† 13		32.3	27.0	13	15.5	18.8	11.6
30	30.143		30.251	30.302	† 2		26.0	*25	2	2	7.0	2.2
31	30.240		30.117	(29.980)	-2		*25	(25)	-2	3	26.7	27.5
Sums	921.745		920.629	921.769	473.2		936.8	887.0	448.7	453.0	686.1	571.1
							51	90				
Means	29.734		29.698	29.734	15.3		886.8	797.0	14.5	16.2	22.9	18.4
							28.6	25.7				

Barometric means reduced to freezing point. 7 A.M., 29.769.

" " " " " 1.30 P.M., 29.699.

" " " " " 9 P.M. 29.742.

Barometer max., 9 P.M. Jan. 30th, 30.302; reduced to freezing point, 30.352. (Attt. therm. estimated 10)

" min. 1h 30m P.M. " 17th 29.120; " " " " 29.142 (" " " 20)

Max. No 4, thermometer, 1h 30m P.M. Jan. 26, 36.0

Min., " " " 12 P.M., " 19 -5.6 (Also recorded on 21, a min., of some therm., at -6.5)

* Below 25. Assumed as follows; *20; ±15; ±10. This makes the sum of 2h 30m, 50 less; 9h, 40 less

† No. 4, thermometer readings used.

‡ Observations in parenthesis were not made at regular times.

‖ " " on Jan. 20, made at 1h 30m P.M. Is not, obs. seem to have been made at 1.30 instead of 2.30. See note ‖ on page but one preceding this, under record Dec. 1856.

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January, 1867.

Date	Dry Bulb. 7 A.M.	9 A.M.	1/2 3 P.M.	9 P.M.	Relative Humidity. Guyot's Tables. 7 A.M.	9 P.M.	1/2 3 P.M.	9 P.M.	Wind. 7 A.M.	9 A.M.	1/2 3 P.M.	9 P.M.	Clouds. 7 A.M.	9 A.M.	1/2 3 P.M.	9 P.M.
1	18	19	24.8	25.6			97	100			2	0			10	10
2	21	21.5	26.5	21.1			53	74			2	0			9	10
3	9	8.5	21.5	9.0			72	100				1			0	2
4	3.5	5.	22.1	16.2			68	96				0			0	1
5	19	22.	31.4	35.0			69	85			1	1			9	10
6	25.5	26	23.4	21.5			98	90			3	0			9	10
7	19.	20.5	23.2	17.5			70	74			5	2			9	7
8	13	14	21.3	18.5			51	61			5	3			1	7
9	15.5	17	25.2	19.8			56	63			2	2			1	4
10	13	15.5	27.3	22.2			61	82			0	1			9	10
11	12.5	11.5	27.9	22.4			50	73			1	1			9	10
12	13	14	18.5	12.9			50	77			4	5			0	0
13	8		17.1	17.0			63				1	0			10	10
14	14	13	21.2	10.5			36	54			3	1			1	0
15	3.5	5	(17.3)	9.1			(52)	61			(2)	3			(9)	0
16	0	2	14.0	10.0				78			0	0			7	0
17	15.5	16.5	18.0	15.5			100				8	7			10	10
18	9	9	9.0	(2.5)			91	(100)			6	(4)			6	(1)
19			6.2	−0.8			82	100			3	0			9	1
20			(12.8)	13.9			(73)	84			(0)	1			(1)	10
21	30	31.5	20.1	18.2			100	100			4	0			10	10
22	18.5	19	30.5	25.1			100	78			2	1			5	10
23	25	25.5	29.6	26.2			62	70			4	4			1	0
24	23	25	30.5	24.7			58	66			2	2			1	3
25	11	16	26.9	22.2			55	78			0	0			1	10
26	31	32	35.2	30.0			100	76			1	3			10	10
27	23	26.5	26.5	20.1			64	75			4	4			2	0
28	14	17	23.0	16.4			56	83			5	3			2	0
29	11	14	17.4	10.3			54	80			5	2			1	0
30	0	0.5	6.1	−0.8			68	100			1	0			0	0
31		1	25.3	(27.0)			75	(97)			0.	(0)			10	(10)
Sums	418.5	411.5	679.8	542.0			2079	2355			76	51			162	166
Means.	14.9	15.2	21.9	17.5			69	81			2.8	1.6			5.2	5.4

Barometer readings in Jan.

Date	Time.		Bar.	Att. therm.
17	11.30	A.M.	29.181	below 25
"	12.0	"	29.15	
"	12.30	P.M.,	29.155	
"	1.0	"	29.134	
"	1.30	"	29.120	
"	3.30	"	29.12	
"	5.30	"	29.182	
"	7.0	"	29.206	

External Thermometer, No. 4 readings.

Date	Time.		Therm.
30	10.25	A.M.,	3.0
"	11.20	P.M.,	−1.8

The following entries occur in A!, in relation to some minimum reading.

Jan. 19. Min. of last night, −2.5
" 20. " " " " −7.0
" 30. " " " " −1.0
" 31. " " " " −4.8
" 30. 11h 20m P.M., an entry, "min. −2.5".

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This page rejected; material rearranged pp. 157 and following.

Date.	Time.	Fastre.	Navy.	No. 4	Dry Bulb	Wet Bulb.
Dec. 20	9			-0.9	-2.0	
Dec. 15	7			11	10	10.5
" 16	7			11.5	10	10.5
" 20	7 30	9.4		9.7	8.4	10.5
" 21	1 30	11.1		11.3	10.1	
" "	9 15			7.6	6.5	
" 22	7			9	8.5	9
" 31	7			11	10	10.5
Nov. 5	7			21.5	20.5	21
" 25	9 15			22.5	21.3	
" 26	7			18	16.5	17
Dec. 2	7			22.5	21	22
" 3	7			23	21.5	22.5
" 11	7			15.5	14	15
" "	9			19.	18.5	19
" "	9			19.1	17.5	
" 12	7			14	13	13.5
" "	9			17	16	16
" "	9			21.8	20.3	
" 13	7			16	15	15
" "	9			19	18	18
" "	9			20.0	18.1	
" 14	7			15	13.5	14
" "	9			15	14.5	14.5
" "	1 30	20.1		20.3	19.4	
" "	9			13.5	12.5	
" 15	9			14	13	13.5
" "	9				14.8	15.8
" 16	1 30	21.3		21.5	20.4	
" 18	7			20	18.5	19
" "	9			22	21	21
" "	9			20.3	19.1	18.3
" 20	7			18	17	17.5
" "	9			13	12	12.5
" 22	9	30 9.4		17	15.5	16
" 26	9			22	21	22
" 28	7			22	21	21
" "	9			21	19	19.5
" "	1 30	20.8		21.1	19.6	
" "	9			17.9	17.1	
" 29	7			13	12	13
" "	9			14	13	13
" "	1 30	20.3		20.5	19.2	
" "	9			16.2	15.1	
" 30	7			17	15.5	15.5
" "	9			16.1	14.7	
" 31	9			17	15.5	16
" "	1 30	18.9		18.9	18.1	
Oct. 5	7			32	31	32
" 26	7			32	31.5	32
Nov. 4	7			31	30.5	31
" "	9			30.3	29.8	
" 6	7			27.5	26	27

Date	Time	Fastre	Navy	No. 4	Dry Bulb.	Wet Bulb.
Nov. 6	9			32.8	31.9	
" 7	7			30.5	30	30.5
" 14	7			28.5	27.5	28
" 17	7			31.5	31	31.5
" 22	7			32	31	32
" 23	9			32.5	31.5	32
" "	9 10			31.8	31.0	
" 24	7			28.5	27.5	28
" "	9			29.5	28.5	29
" "	1 30	32.1		32.2	31.7	
" "	9			31.5	30.4	
" 25	7			26.5	25.5	26
" "	9			26	25	25.5
" "	1 30	27.8		28.0	27.2	
" 27	7			27.5	26.5	27
Dec. 1	9 15				26.5	

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Comparison of Fastre with, Navy, No. 4 and Dry Bulb Thermometers, July — Dec. 1866.
" " Dry Bulb with Wet Bulb when dry. " " "
Arranged in groups of ten degrees.

Date	Time		Fastre	Navy No. 4	Dry Bulb	Wet Bulb.
				2.0—11.9		
1866						
Dec. 15	7	*			10	10.5
" 16	7				10	10.5
" 20	1	30	9.4	9.4	8.4	
" 21	1	30	11.1	11.3	10.1	
" 22	7				8.5	9
" 31	7				10	10.5
			20.5	20.7	** 18.5	
			10.2	10.4	9.2	‡ 40.5
					† 38.5	10.1
				12.0—21.9		
1866						
Nov. 5	7				20.5	21
" 26	7				16.5	17
Dec. 2	7				21	22
" 3	7				21.5	22.5
" 11	7				14	15
" "	9				18.5	19
" 12	7				13	13.5
" "	9				16	16
" 13	7				15	15
" "	9				18	18
" 14	7				13.5	14
" "	9				14.5	14.5
" "	1	30	20.1	20.3	19.4	
" 15	9				13	13.5
" 16	1	30	21.3	21.5	20.4	
" 18	7				18.5	19
" "	9				21	21
" 20	7				17	17.5
" "	9				12	12.5
" 22	9				15.5	16
" 26	9				21	22
" 28	7				21	21
" "	9				19	19.5
" "	1	30	20.8	21.1	19.6	
" 29	7				12	13
" "	9				13	13
" "	1	30	20.3	20.5	19.2	
" 30	7				15.5	15.5
" 31	9				15.5	16
" "	1	30	18.9	18.9	18.1	
			101.4	102.3	** 96.7	‡ 427.0
			20.3	20.5	19.3	
					† 416.0	
					16.6	17.1

Date	Time		Fastre	Navy No 4	Dry Bulb	Wet Bulb.
				22.0—31.9		
1866						
Oct. 5	7				31	32
" 26	7				31.5	32
Nov. 4	7				30.5	31
" 6	7				26	27
" 7	7				30	30.5
" 14	7				27.5	28
" 17	7				31	31.5
" 22	7				31	32
" 23	9				31.5	32
" 24	7				27.5	28
" "	9				28.5	29
" 25	7				25.5	26
" "	9				25	25.5
" "	2	30	27.8	28.0	27.2	
" 27	7				26.5	27
Dec. 4	7				23	23.5
" 8	7				31.5	32
" 10	7				25.5	26.5
" "	9				28	29
" 11	7	30	27.7	27.9	27.1	
" 12	1	30	27.9	28.2	27.4	
" 13	1	30	27.3	27.5	26.7	
" 15	1	30	27.5	27.8	27.1	
" 17	7				28.5	30
" "	9				23.5	24
" "	7	30	26.5	26.6	25.5	
" 18	1	30	28.2	28.7	27.7	
" 19	7				22.5	22
" "	9				26	25.5
" 26	7				24	25
			192.9	194.6	** 188.7	‡ 649.0
			27.6	27.8	27.0	
					† 635.5	
					27.6	28.2

* A.M. observations are underlined thus, 7 ; other times are P.M. observations.

** The sum of these observations only that were taken at the same time as Fastre and No. 4.

† " " the " of the Dry Bulb " " " Wet Bulb.

‡ " " " " " " " "

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Date	Time	Faehe	Navy	No.4	Dry Bulb.	Wet Bulb.
			32.0—41.9			
1866						
Sept 16	7				41	41.5
" 23	7				40	40.5
" 24	7				39	39
Oct 4	7				34	34.5
" 5	9				39	40
" 6	7				32	32.5
" 7	7				40.5	41.0
" 11	7				37.5	38
" 16	7				41.5	42
" 18	7				36.5	37.5
" 19	7				41	41.5
" 24	7				41.5	42
" 25	7				35.5	36
" "	9				37.	38
" 26	9				36	37
" 27	7				39	39
" "	9				40.5	41
" 28	7				34	34.5
" 29	7				34	34.5
" "	9				39	39.5
" 31	7				40.5	41
Nov. 1	7				32	32.5
" 2	7				41	41.5
" 3	7				32.5	33
" 5	2	30	35.8	37.0	36.4	
" 6	9				32.5	33
" "	2	45	41.5	41.7	41.3	
" "	9				36.5	37
" 9	7				39.5	40
" 11	7				37.5	38
" 13	7				33.5	34
" "	9				37	37.5
" 15	7				37	37
" 17	9				41.5	42
" 18	7				32.5	33
" "	9				37.5	38
" 19	7				40	40.5
" 21	7				40.5	39
" 22	9				36	37
" 23	7				32.5	33
" "	2	30	33.5	33.7	33.1	
" 24	2	30	32.1	32.2	31.7	
" 26	2	40	38.8	38.9	38.5	
" 27	9				33	32
" 28	7				39	39.5
Dec. 1	9				34	34.5
" "	9				37	37.5
" "	8		35.9	36.0	35.4	
" 2	2	30	34.5	34.6	34.1	
" 4	9				40	40.5
" 5	7				40	41
" 6	7				38	38.5
" "	9				40.5	41
" 7	7				35	35.5
"	9				37.5	37.5

Date	Time	Faehe	Navy	No.4	Dry Bulb.	Wet Bulb.
Dec. 8	9				33	33
" 9	7				41	42
" 10	1	30	33.8	34.0	33.5	
" 19	1	30	32.4	32.9	32.0	
" 23	7	30			41	42
" "	1	30	40.7	40.7	40.1	
" 26	1	30	32.5	32.8	32.3	
" 27	7				35	34
" "	9				36	36
" "	7	30	37.4	37.4	36.8	
			428.9	431.9	425.2	2001.0
			35.7	36.0	35.4	
					1978.5	
					37.3	~~37.8~~

53) 2001.0 (37.8
159
411
371
400

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Date	Time	Faehr.	Navy	No. 4	Dry Bulb.	Wet Bulb.
			42.0—51.9			
1866						
Aug. 24	7				51.5	50
" 25	7				50	50.5
" 26	7				51.5	50.5
Sept. 10	7				50	50.5
" 11	7				51.5	51
" 21	7				50.5	50.5
" 24	9				51.	49
" 27	7				51.5	52
" 28	7				44.5	45
" 29	7				47	47
Oct. 2	7				42	42.5
" 4	9				42	42.5
" "	2	30	47.6	48.4	47.6	47.1
" 5	2	30	50.2	51.0	50.3	50.0
" 6	9				43.5	44
" 9	7				51.5	52
" "	9				51	51.5
" "	2	30	50.3	51.2	50.2	50.0
" 10	7				42.5	43
" "	9				50	50.5
" "	2	30	51.2	52.1	51.3	51.3
" 12	7				43.5	43.5
" "	9				48	48
" 13	7				44.5	45
" 14	7				42	42.5
" "	2	30	45.9		46.0	45.6
" 15	7				50	51
" "	9				51.5	52
" 16	9				48	48.5
" 17	7				49	49.5
" 18	9				45.5	46.5
" 20	7				47.5	48
" 21	7				49.	49.
" 24	9				42	42.5
" 25	2	30	43.3		43.3	42.7
" 26	2	30	47.2		47.0	47.0
" 27	2	30	47.9		47.7	47.2
" 28	2	30	45.1		45.1	44.4
" 29	2	30	47.1		47.0	46.7
" 31	2	30	50.5		50.5	50.0
Nov. 1	2	30				44
" 2	9				48.5	44.5
" 3	2	30	48.6		48.6	49
" 4	2	30	43.9		44.0	48.0
" 8	7				44.	43.4
" "	9				50.	44.5
" 9	9				44	50.5
" 10	7				44	44.5
" "	9				50.5	45
" 11	2	30	49.4		49.2	49.0
" 12	7				46	46.5
" "	2	30	51.8		51.8	51.4
" 13	2	30	46.6		46.7	46.2
" 14	2	30	45.5		46.7	45.2
" 15	9				42	41

Date	Time	Faehr.	Navy	No. 4	Dry Bulb.	Wet Bulb.
Nov. 15	2 30	49.0		49.0	48.6	
" 17	2 30	48.3		48.3	47.8	
" 18	2 30	48.8		48.9	48.4	
" 19	9				44	44.5
" 21	9				43	42.5
" "	2 30	44.8		44.6	44.0	
" 22	2 30	42.0		42.1	41.0	
" 27	2 30	48.5		48.5	49.0	
" 28	9				43.5	44
Dec. 3	2 45	42.6		42.8	42.6	
" 4	3	48.4		48.2	47.9	
" 5	9				43.5	44
" "	2	50.9		50.9	50.9	
" 6	2	48.8		48.9	48.4	
" 7	2	51.7		51.7	51.8	
" 8	1 30	46.8		46.5	46.0	
" 9	1 30	46.9		46.9	46.5	
" 24	7				50	50.5
" "	9				51	51
" "	1 30				42	42
		*199.3	*202.7	*199.4	*198.4	‡2123.0
		49.8	50.7	49.8	49.6	
		†1230.3		†1229.9	†1219.6	
		47.3		47.3	46.9	
					‡2112.0	
					46.9	47.2

	199.3	199.4	198.4
	1230.3	1229.9	1219.6
30)	1429.6	1429.3	1418.0
	47.653	47.64	47.29

* The sums of Faehr., No. 4 and Dry Bulb when taken at the same time as the Navy.

† The sums of Faehr., No. 4 and Dry Bulb taken at the same time, omitting those comparisons in which the "Navy" was also read.

‡ The sums of Dry Bulb observations taken at same time as Wet Bulb.

‡‡ As heretofore stated the Wet Bulb is in three comparisons only compared with the Dry Bulb.

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Date	Time	Fastre	Navy	No. 4	Dry Bulb.	Wet Bulb.
			52.0 — 61.9			
1866						
July 22	7				60	60
" 23	7				61	60
" "	9				60	60.5
" 25	7				61	61.5
" 31	9	61.2	67	66	66	
Aug. 5	7				60	60.5
" 6	7				60.5	61
" 9	7				61.5	62
" 10	7				59.5	57.5
" 11	7				60	60.5
" 12	7				59.5	60
" 13	7				57.5	57
" "	9	15	60.0	60.6	59.1	
" 16	7				54.2	54
" "	9				55.5	56
" 17	7				54.2	54
" "	9				55.5	56
" 18	7				59	57.5
" 19	7				61	61.5
" 20	7				60.5	61
" 21	7				57.5	58
" 23	7				55.5	56
" "	2	30	53.3	53.0	52.8	
" 24	9				59	58.5
" 25	9				59.5	60
" 27	7				59.5	60
" 28	7				60.5	61
" 29	7				60	59.5
" 30	7				59.5	59
" "	9		59.4	60.8	60.0	60.4
Sept. 4	9		61.8	62.8	62.4	61.8
" 5	7				60	60.5
" 7	7				58	57
" 9	7				54.5	55
" 10	9				57	57.5
" 11	9				60	58.5
" 13	7				61	61.5
" "	9		58.9	60.0	58.8	58.7
" 14	7				56	56.5
" 15	7				54.5	55
" "	2		60.5	61.1	60.6	60.5
" 17	7				53	53
" "	9				60.5	59
" 18	2	30	61.5	62.2	61.6	61.3
" 19	9				59.5	60
" 20	7				53	53
" "	2				53	53
" "	2	30	54.9	55.3	54.9	54.5
" 22	7				55	53
" "	9				55.5	56
" 23	2		54.8	55.9	54.7	54.3
" 24	2	55	57.4	58.5	57.5	57.4
" 25	7				57	57.5
" "	9				59.5	60.5
" 26	7				60.5	60.5

Date	Time	Fastre	Navy	No. 4	Dry Bulb.	Wet Bulb.
Sept. 27	9				53	52.5
" 28	9				54.5	55.5
" 29	9				56	56
" 30	7				56	56
Oct. 1	7				54	54.5
" "	9				59	59.5
" "	2	50	61.9	63.0	62.0	62.0
" 2	7				53	52
" 3	7				58	58.5
" "	9				59	59.5
" "	2	30	55.5	56.1	55.7	55.0
" 6	2	35	58.1	59.2	58.2	58.1
" 8	7				58.5	54
" 11	9				58.5	59
" "	2	30	52.6		52.4	52.6
" 12	2	30	52.0		51.9	51.5
" 13	2	30	52.9		53.0	52.5
" 15	2	30	54.7		54.9	54.4
" 16	2	30	55.8		56.2	55.1
" 17	9				58	58.5
" 18	2	30	58.5		58.5	58.4
" 20	9				52	52.5
" 22	7				54	54
" 23	7				57	56
" "	9				57.5	58
" "	2	30	61.9		62.2	61.9
" 24	2	30	53.3		53.4	52.7
" 30	7				57	57.5
" "	9				59	59.5
Nov. 2	2	30	56.9		56.8	57.3
" 7	2	30	55.3		55.2	55.5
" 9	2	30	60.7		60.8	61.0
" 10	2	30	57.8		57.8	57.6
" 16	7				56	56.5
" "	9				59	58
" "	2	30	54.1		54.1	54.0
" 19	2	30	52.8		52.6	52.2
" 20	7				55.5	55
" "	9				56.5	56
" "	2	30	59.8		59.8	59.5
" 29	7				59	59.5
			705.9	721.9	712.4	710.0	985.75
			58.8	60.2	59.4	59.2	
			952.4		952.2	948.0	
			560		560	558	
						3853.7	
						57.5	57.6

705.9 952.4 — 712.4 952.2 — 7100 948.0

29) 16586.3 (57.2 — 16646 (57.4 — 16586 (57.2

145 208 203 53 — 214 203 116 — 145 208 203 50

From p. 161

1716.6 1446.3 — 1723.1 1149.6 — 1712.8 1143.4

43) 2864.9 (66.6 — 2872.7 (66.8 — 2856.2 (66.4

258 384 — 258 292 — 258 276

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Date.	Time.	Fastro.	Navy.	No. 4	Dry Bulb.	Wet Bulb.
			620 — 71.9			
1866.						
July 21	7				65.5	66.
" "	2 9				68	68.5
" 22	9				64	64.5
" 24	7				63	61
" "	9				69.5	68
" 26	7				64	64.5
" 27	7				67.5	68
" 28	7				69.5	68
" 29	7				63.5	63
" 30	7				66	64
" 31	7				64	63.5
" "	9				69.5	69
Aug. 1	7				64.5	65
" 3.	7				65.5	66
" "	9				70.5	70.5
" 4	7				63	63.5
" 7	7				64	64.5
" "	9				69	70
" 8	7				63	63.5
" "	9				68	68.5
" 9	9				63	63.5
" 10	9				63.5	64
" "	2	30	66.0	66.8	66.6	
" 11	9				67	67.5
" 13	9				68	68
" 14	7				63	61
" "	9				68	68.5
" "	2	30	71.2	71.3	71.3	
" 15	7				65.5	63.5
" "	9				68	68.2
" "	2	30	69.8	69.6	69.5	
" 16	2	30	63.0	62.9	62.7	
" 17	2	30	70.5	70.6	70.4	
" 18	9				67.5	67.5
" 19	9				68	68.8
" 20	2	30	70.1	70.2	69.4	
" 21	2	30	70.6	70.1	70.0	
" 22	7				62	62.5
" "	9				70	69
" 24	2	30	65.8	66.1	65.6	
" 25	2	30	67.0	67.3	65.8	
" 26	2				68.5	69
" 28	9				69	69.5
" 29	7				65.5	65.5
" "	2	30	68.0	69.0	67.8	67.9
" "	9		62.5	63.0	62.6	62.0
" 30	9				66.5	66
" 31	9		63.0	64.0	63.2	63.0
Sept. 2	7				70.5	69.5
" "	9				70.5	70.5
" 3	7				71	71.5
" "	9		68.7	69.6	68.6	67.6
" 4	7				66	66
" "	9				66.7	66
" "	2	30	65.2		65.6	65.1

Date.	Time.	Fastro.	Navy.	No. 4	Dry Bulb.	Wet Bulb.
Sept. 5	9	62.3	62.8	62.8	62.3	
" "	10	62.3	63.0	62.5	61.8	
" 6	7				63.5	64
" "	9	65.7	66.8	65.9	65.8	
" "	9	62.1	63.0	62.3	61.8	
" 7	9 50	68.8	69.2	69.4	68.2	
" "	4 30	69.5	70.0	69.9	69.8	
" "	9	67.7	68	69.8	67.4	
" 8	7				66	66.5
" 9	2 30	66.8	67.5	66.8	66.6	
" 10	2 30	66.6	67.5	66.7	66.6	
" 11	4 45	70.1	70.8	70.0	69.9	
" "	9	62.5	63.3	62.9	62.8	
" 12	7				68.5	68
" "	9				70.4	70.7
" "	9 20	64.8	65.6	65.5	64.7	
" 13	9				68	68.5
" "	2 30	67.7	68.4	67.9	67.5	
" 14	3 30	62.7	63.5	62.2	62.7	
" 18	7				63.5	63
" "	9				67.5	67
" 19	7				68?	68.5?
" "	2 30	63.7	64.0	63.7	62.8	
" 25	2 45	64.6	65.3	64.5	64.4	
" 26	9				65.5	64.5
" "	2 30	68.1	69.0	67.9	67.6	
" 27	2 30	64.1	64.5	64.6	64.4	
" 28	2 30	65.7	66.9	66.2	66.2	
" 29	2 20	70.4	71.2	70.9	70.1	
Oct. 2	2 30	70.7	71.1	70.8	70.1	
" 7	2 15	67.5	69.1	67.7	68.8	
" 17	2 30	66.3		66.2	66.0	
" 19	2 30	63.0		63.1	63.0	
" 20	2 30	69.8		70.0	69.6	
" 21	2 30	70.8		70.8	70.4	
" 22	9				62.5	61
" "	2 30	71.0		70.8	70.4	
" 30	2 30	66.1		66.0	64.8	
Nov. 8	2 30	62.1		62.2	62.8	
" 29	9				62	62.5
		1716.6	1736.1	1723.4	1712.8	3449.2
		66.0	66.8	66.3	65.9	
		1148.3		1149.6	1143.4	
See also p. 160		67.5		67.6	67.2	
					3454.6	
					66.4	66.3

If we omit the comparisons of the two bulbs of the psychrometer made at 7 P.M. when the ray is particularly likely to have been dumped or to have delayed the transmission of the rising temperature to the bulb, we have —

68	68.5	68	68.2	68	68.5
64	64.5	67.5	67.5	67.5	67
69.5	68	68	68.8	65.5	64.5
64.5	69	70	69	62.5	61
70.5	70.5	68.5	69	62	62.5
69	70	69	69.5	28 1884.1	1884.7
68	68.5	65.5	65.5	67.29	67.31
63	63.5	66.5	66		
63.5	64	70.5	70.5		
67	67.5	66.7	66		
68	68	70.4	70.7		
68	68.5				

The difference is therefore unimportant. Several of the 9 A.M. comparisons are probably

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Date	Time	Fastre	Navy	No.4	Dry Bulb.	Wet Bulb.
			72.0—81.9			
1866						
July 6	9	80.2		80.2	80	
" 18	9	78.2	73	73.5	72	
" 25	9				77.	77.5
" 27	9				73	73.5
" 29	9				78	78.5
" 30	9				74.5	75
Aug. 1	9				74.5	75
" 2	7				72	72.5
" "	9				73	73.5
" 4	9				73.5	74
" 5	2				75	75.5
" 7	2 40	75.14		75.3	75.1	
" 8	2 40	74.62		74.9	74.3	
" 11	2 15	73.5		73.5	73.2	
" 12	2				76.5	77
" 13	2	75.7		76.0	75.5	
" 18	2 30	79.6		79.6	79.2	
" 22	2 30	74.8		75.0	74.8	
" 27	2 30	75.4		70.5	75.0	
" 30	2 30	74.4	75.5	74.5	74.6	
" 31	2 30	74.9	70.8	74.9	74.6	
Sept. 1	2 30	76.8	77.2	77.0	76.2	
" 6	2 20	73.1	74.0	73.4	73.0	
" 8	9	77.1	78.5	77.0	75.5	
" 12	3 15	78.4	79.3	78.6	77.9	
" 17	2 30	73.4	74.1	73.7	73.6	
" 21	2 45	78.0	78.8	78.1	77.5	
Oct. 8	2 30	73.8	75.0	73.8	74.1	
		758.1	756.2	754.5	749.0	752.0
		75.8	75.6	75.4	74.9	
		608.96		605.0	607.1	
		76.1		75.6	75.9	
					747.0	
					74.7	75.2

Date	Time	Fastre	Navy	No.4	Dry Bulb.	Wet Bulb.
			82.0—91.9			
1866						
July 7	9	84.0		84.5	83.8	
" 8	9	87.0		87.8	87.	
" 13	2	91.2	93	92.	91	
Sept. 2	2 30	82.1	82.8	81.9	81.0	
		173.3	175.8	173.9	172.0	
		86.6	87.9	87.0	86.0	
		171.0		172.3	170.8	
		85.5		86.2	85.4	
		173,3		173.9	172.0	
		171.0		172,3	170.8	
	4	344.3	4	346.2	342.8	
		86.1		86.6	85.7	
		From last column				
		758.1		754.5	749.0	
		609.0		605.0	607.1	
	18	1367.1	18	1359.5	1356.1	
		75.95		75.53	75.34	
		below				
		477.6		477.8	476.6	
		277.3		277.5	276.7	
	8	754.9	8	755.3	753.3	
		94.7		94.8	94.2	
			92.0—101.9			
1866						
July 7	2	92.3		92.5	92.5	
" "	2 30	92.7		92.8	92.2	
" 8	3	92.3		92.2	92	
" 16	0	94.3	95.2	94.3	94	
" "	1 30	95.9	97	95.9	95.8	96
" "	1 40	96.4	97.5	96.4	96	96.2
" 17	11	93.9	95	94	93.8	94
" "	2	97.1	99	97.2	97	97
		477.6	483.7	477.8	476.6	383.2
		95.5	96.7	95.6	95.3	
		277.3		277.5	276.7	
		92.4		92.5	92.2	
					382.6	
					95.6	95.8

°	Fastre	Navy	No.4	Dry Bulb.
42.0–51.9	49.8	50.7	49.8	49.6
52.0–61.9	58.8	60.2	59.4	59.2
62.0–71.9	66.0	66.8	66.3	65.9
72.0–81.9	75.8	75.6	75.4	74.9
82.0–91.9	86.6	87.9	87.0	86.0
92.0–101.9	95.5	96.7	95.6	95.3

°	Fastre	No.4	Dry Bulb.
2.0–11.9	10.2	10.4	9.2
12.0–21.9	20.3	20.5	19.3
22.0–31.9	27.6	27.8	27.0
32.0–41.9	35.7	36.0	35.4
42.0–51.9	47.3	47.3	46.9
52.0–61.9	56.0	56.0	55.8
62.0–71.9	67.5	67.6	67.2
72.0–81.9	76.1	75.6	75.9
82.0–91.9	85.5	86.2	85.4
92.0–101.9	92.4	92.5	92.2

°	Dry Bulb.	Wet Bulb.
2.0–11.9	9.6	10.1
12.0–21.9	16.6	17.1
22.0–31.9	27.6	28.2
32.0–41.9	37.3	37.7
42.0–51.9	46.9	47.2
52.0–61.9	57.5	57.6
62.0–71.9	66.4	66.3
72.0–81.9	74.7	75.2
92.0–101.9	95.6	95.8

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Comparison of No. 4 thermometer with No. 2. 1862–1865.

Arranged in groups of ten degrees.

Date	Time	No. 4	No. 2
	2·0–11·9		
1862			
Dec. 9		4·2	5·4
	12·0–21·9		
1862			
Dec. 7		14	15·4
	22–31·9		
1862			
Nov. 16		27·6	28·6
	32–41·9		
1862			
Nov. 8		37·7	38·7
Nov. 9		37·6	38·7
" 9		37·0	37·9
" 18		38·5	39·0
Oct. 26		41·3	42·3
		192·1	196·6
		38·4	39·3
	42–51·9		
1862			
Nov. 4		45·2	45·6
" 5		47·7	48·3
" 10		49·9	50·4
" 11		51·3	52·1
		194·1	196·4
		48·5	49·1
	52–61·9		
1862			
Sept. 27		57·8	57·7
" 29		53·6	54·4
" 30		56·5	57·5
Oct. 3		56·0	56·7
" 8		55·0	57·0
" 9		53·7	53·6
" 11		61·3	61·9
Nov. 1		55·3	55·7
" 2		57·3	57·8
		506·5	512·3
		56·3	56·9
	62–71·9		
1862			
Sept. 30		62·4	63·3
	72–81·9		
1862			
Oct. 4		74·9	75·7
" 5		73·4	73·6
" 6		76·2	77·4
" 7		72·7	73·2
		297·2	299·9
		74·3	75·0

Date	Time	No. 4.	No. 2.
	2·0–11·9		
1863			
Jan. 18		5·7	6·8
	32·0–41·9		
1863			
Apr. 5		34·2	34·8
Nov. 8		41·0	41·6
		75·2	76·4
		37·6	38·2
	42·0–51·9		
1863			
Apr. 27		50·0	50·5
" 29		48·2	49·6
May 14		45·8	46·9
" 15		45·4	46·6
" 25		47·4	48·5
		236·8	242·1
		47·4	48·4
	52·0–61·9		
1863			
May 12		56·5	58·1
" 13		52·5	53·6
" 16		59·1	59·5
" 17		59·4	60·5
" 18		60·3	61·0
" 19		58·8	59·5
" 23		61·9	63·0
" 24		52·6	54·1
" 26		61·3	62·0
" 27		61·9	62·3
June 6		61·0	62·5
" 8		52·5	58·5
" 16		58·0	59·0
Sept. 1		58·8	59·7
" 8		59·4	60·5
Oct. 2		53·1	54·1
" 4		60·7	61·5
		987·8	1004·3
		58·1	59·1
	62·0–71·9		
1863			
May 20		71·3	72·2
" 28		67·4	68·2
June 2		63·6	64·8
" 4		66·5	67·9
" 10		62·6	63·4
" 12		71·1	73·0
" 14		62·0	62·7
" 18		69·4	70·6
" 22		63·5	65·1
" 24		66·7	67·6
" 29		69·0	70·1
July 5		70·6	72·0
" 9		66·1	67·0
" 10		63·5	64·7
" 12		64·7	65·7
" 14		62·1	62·7
" 15		65·5	66·9
" 19		67·0	67·8
" 22		68·0	68·6
		1260·6	1281·0

Date.	Time.	No. 4.	No. 2.
	72·0–81·9		
1863			
May 21		75·4	76·4
" 22		80·0	80·7
June 1		78·0	74·0
" 30		72·7	73·4
July 1		75·7	76·3
" 2		77·5	78·6
" 3		77·2	78·8
" 4		73·0	74·8
" 6		73·9	75·4
" 7		78·6	79·6
" 8		80·1	81·4
" 11		76·5	75·7
" 16		73·9	74·9
" 18		72·2	73·2
		1059·7	1073·2
		75·7	76·6
	−8·0–1·9		
1864			
Feb. 17		1·3	2·7
" 18		−3·0	−1·4
		−1·7	1·3
		−0·8	0·6
	22·0–31·9		
1864			
Feb. 21		25·4	25·9
" 30		26·3	27·2
Mar. 1		26·3	27·2
		78·0	80·3
		26·0	26·8
	32·0–41·9		
1864			
Apr. 1		35·6	36·7
" 3		39·4	40·3
		75·0	77·0
		37·5	38·5
	82·0–91·9		
1864			
July 20		89·6	90·6
Aug. 11		86·5	87·7
		176·1	178·3
		88·0	89·2
	92·0–101·9		
1864			
Aug. 1		97·4	98·0

Date	Time	No. 4	No. 2
	62·0–71·9		
1865			
May 31		67·8	68·7

Comparison of 1862–1865.

	No. 4	No. 2
1862.		
2·0–11·9	4·2	5·4
12·0–21·9	14	15·4
22·0–31·9	27·6	28·6
32·0–41·9	38·4	39·3
42·0–51·9	48·5	49·1
52·0–61·9	56·3	56·9
62·0–71·9	62·4	63·3
72·0–81·9	74·3	75·0
1863		
2·0–11·9	5·7	6·8
32·0–41·9	37·6	38·2
42·0–51·9	47·4	48·4
52·0–61·9	58·1	59·1
62·0–71·9	66·3	67·4
72·0–81·9	75·7	76·6
1864		
−8·0–1·9	−0·8	0·6
22·0–31·9	26·0	26·8
32·0–41·9	37·5	38·5
82·0–91·9	88·0	89·2
92·0–101·9	97·4	98·0
1865		
62·0–71·9	67·8	68·7

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Comparison of Max. and Min. Huddleston Thermometer with Standard, No. 2, during a portion of 1863.

Date	Max H.	No. 2.
32 – 41.9		
1863		
Nov. 8	40.2	41.6
42 – 51.9		
1863.		
May 14	45.6	46.9
" 15	45.1	46.6
" 24	51.9	54.1
" 25	47.3	48.5
	189.9	196.1
	47.5	49.0
52 – 61.9		
1863.		
May 12	56.1	58.1
" 13	52.3	53.6
" 16	58.0	59.5
" 17	58.0	60.5
" 18	59.3	61.0
" 19	58.2	59.5
" 23	61.3	63.0
" 26	60.4	62.0
" 27	60.9	62.3
June 6	60.0	62.5
" 8	52.6	53.5
" 10	61.8	63.4
" 14	60.8	62.7
" 16	58.0	59.0
" 22	61.2	65.1
July 14	61.9	62.7
Sept. 1	57.9	59.7
" 3	59.0	60.5
Oct. 2	52.6	54.1
" 4	60.1	61.5
	1170.4	1204.2
	58.5	60.2
62 – 71.9		
1863		
May 9	62.0	60.6
" 10	63.1	64.7
" 11	70.9	73.3
" 20	70.0	72.2
" 28	65.9	68.2
June 2	63.0	64.8
" 4	64.3	67.9
" 12	69.4	73.0
" 18	67.6	70.6
" 24	66.2	67.6
" 29	68.5	70.1
July 4	71.3	74.8
" 5	71.2	72.0
" 9	65.7	67.0
" 10	63.2	64.7
" 12	64.2	65.7

Date	Max H.	No. 2
July 15	64.6	66.9
" 18	71.5	73.2
" 19	66.8	67.8
" 22	67.2	68.6
	1336.6	1373.7
	66.8	68.7
72 – 81.9		
1863		
May 21	74.4	76.4
" 22	79.3	80.7
June 1	72.5	74.0
" 30	72.2	73.4
July 1	74.5	76.3
" 2	76.8	78.6
" 3	75.4	78.8
" 6	72.6	75.4
" 7	77.2	79.6
" 8	78.6	81.4
" 11	72.1	75.7
" 16	72.0	74.9
	897.6	925.2
	74.8	77.1

Date	Min H.	No. 2
32 – 41.9		
1863		
Nov. 8	40.1	41.6
42 – 51.9		
1863		
May 13	51.9	53.6
" 14	45.4	46.9
" 15	45.0	46.6
" 25	47.0	48.5
	189.3	195.6
	47.3	48.9
52 – 61.9		
1863		
May 12	55.9	58.1
" 16	57.9	59.5
" 17	58.2	60.5
" 18	57.7	61.0
" 23	61.0	63.0
" 24	52.0	54.1
" 26	60.2	62.0
" 27	60.7	62.3
June 6	59.8	62.5
" 8	52.5	53.5
" 10	61.4	63.4

Date	Min H.	No. 2
June 14	60.5	62.7
" 16	57.8	59.0
" 22	61.0	65.1
July 14	61.8	62.7
Sept. 1	57.7	59.7
" 3	58.8	60.5
Oct. 2	52.6	54.1
" 4	60.1	61.5
	1167.4	1204.7
	58.4	60.2
62 – 71.9		
1863		
May 10	62.8	64.7
" 11	70.6	73.3
" 20	69.9	72.2
" 28	65.6	68.2
June 2	62.8	64.8
" 4	64.0	67.9
" 12	69.2	73.0
" 18	67.4	70.6
" 24	66.1	67.6
" 29	68.2	70.1
" 30	71.9	73.4
July 4	71.0	74.8
" 5	71.3	72.0
" 9	65.7	67.0
" 10	63.0	64.7
" 11	71.7	75.7
" 12	64.1	65.7
" 15	64.2	66.9
" 16	71.8	74.9
" 18	71.3	73.2
" 19	66.7	67.8
" 22	67.0	68.6
	1486.3	1537.1
	67.6	69.9
72 – 81.9		
1863		
May 21	74.2	76.4
" 22	79.0	80.7
June 1	72.2	74.0
July 1	74.5	76.3
" 2	76.7	78.6
" 3	75.4	78.8
" 6	72.4	75.4
" 7	77.1	79.6
" 8	78.5	81.4
	680.0	701.2
	75.6	77.9

Summary of comparisons.

°	Max H.	No. 2
32 – 41.9	40.2	41.6
42 – 51.9	47.5	49.0
52 – 61.9	58.5	60.2
62 – 71.9	66.8	68.7
72 – 81.9	74.8	77.1

°	Min H.	No. 2
32 – 41.9	40.1	41.6
42 – 51.9	47.3	48.9
52 – 61.9	58.4	60.2
62 – 71.9	67.6	69.9
72 – 81.9	75.6	77.9

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Means for obtaining assumed values to complete published record.

Sunrise, October.		9 A.M. January.		9 A.M. October.		3 P.M. January.		3 P.M. October.		9 P.M. January.	
Year.	Bar.	Th.	Bar.	Th.	Bar.	Th.	Bar.	Th.	Bar.	Th.	Bar.	Th.
1841	29.943	38.0	30.026	26.0	29.950	46.3	29.949	32.6	29.897	52.2	29.955	28.5
1842	29.987	39.9	29.955	25.1	29.985	48.2	29.892	33.9	29.945	58.2	29.923	27.1
1843	29.870	41.8	30.061	28.3	29.872	46.5	29.969	35.5	29.806	54.7	29.932	29.7
1844	29.975	40.9	29.895	14.4	29.953	45.3	29.881	21.2	29.861	51.0	29.876	15.1
1845	30.112	46.5	29.954	27.9	30.165	51.8	29.944	31.7	30.114	58.6	29.926	27.5
1846	30.060	43.5	29.938	25.5	30.057	52.6	29.822	31.9	29.985	59.3	29.869	28.2
1847	30.054	40.7	29.945	26.8	30.049	49.2	29.907	30.6	29.978	54.6	29.889	26.6
1848	29.926	47.0	30.109	27.4	29.939	50.6	30.052	33.9	29.869	54.5	30.045	29.6
1849	29.922	43.8	30.060	19.7	29.928	50.8	29.986	25.8	29.890	54.6	29.984	21.4
1850	29.872	45.4	30.063	26.0	29.925	50.8	30.039	32.2	29.857	59.7	30.035	27.6
1851	29.937	46.1	29.961	25.6	29.978	53.7	29.924	30.2	29.957	60.8	29.958	24.0
1852	29.994	44.8	29.881	20.3	29.997	51.4	29.822	26.5	29.943	56.6	29.859	19.2
1853	29.942	42.5	29.988	24.2	29.946	50.4	29.932	31.2	29.906	50.6	29.979	25.6
1854	30.034	46.2	30.023	22.9	30.061	53.1	29.993	29.1	30.001	57.3	30.001	23.8
1855	29.851	46.6	30.056	28.5	29.925	51.5	30.004	33.2	29.890	58.4	30.041	30.0
1856	30.009	43.3	29.916	13.6	29.827	54.0	30.008	23.3	29.929	58.4	29.916	17.8
	15.488	57.0	15.831	382.2	15.557	6.2	15.124	2.8	14.827	101.5	15.188	401.7
16 years	29.968	43.6	29.989	23.9	29.972	50.4	29.945	30.2	29.927	56.3	29.949	25.1

9 P.M. Oct.		9 P.M. Oct.		15.405	125.5
Bar.	Th.	Bar.	Th.	29.963	47.8
1841	29.951	41.8	1849	29.899	47.8
1842	29.972	45.2	1850	29.896	49.9
1843	29.833	46.1	1851	29.973	51.2
1844	29.928	44.7	1852	29.978	48.9
1845	30.138	50.1	1853	29.931	47.5
1846	30.003	49.5	1854	30.032	51.4
1847	30.032	46.2	1855	29.923	49.5
1848	29.896	47.1	1856	30.020	48.6

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Reduction of observations of rainfall answering to 1 inch of snow, 1872 –

Before 1872, the rainfall answering to 1 inch of snow was not noted. The method employed in 1872 and later was to cut out cylinders of snow newly fallen with a glass lamp chimney (such as is used for Argand gas burners, approximately cylindrical in form and of uniform diameter); to measure the length of these cylinders and to weigh them all together, when a sufficient quantity of snow had been collected in this way to reduce the effect of the errors of measuring the separate cylinders, the ends of which were usually irregular. Any compression of the snow as the cylinders are cut out will of course affect the result. Care was always taken in the operation to avoid any considerable error from this source; but the rainfall thus obtained corresponding to 1 inch of snow is likely to be rather too large than too small.

Many of the observations are already reduced in the meteorological record. In other cases, the reduction is made here. The estimated diameters of the glass tubes employed at different times were $1\frac{7}{8}$ inches, $1\frac{8}{10}$ inches, $1\frac{13}{16}$ inches. The corresponding logarithms employed in the reductions are 9.79770, 9.83315, 9.82714. The reduction consists in adding one of these logarithms to the logarithm of the weight of the snow collected in avoirdupois ounces, and to the arithmetical complement of the logarithm of the total length of the cylinders, in inches.

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The formula on which this process depends is that the rainfall in inches is to be expressed by the quotient formed by dividing the weight of the water collected, in avoirdupois ounces, by the product of the number of square inches exposed and the fraction of an avoirdupois ounce expressing the weight of 1 cubic inch of water. This fraction is assumed to be 0.577047, and appears to be calculated for the freezing point; by Rankine's Tables a cubic inch of water at 40° F. should weigh 0.578 ounces and at 60° F. 0.575 ounces.

The formula, as given above, was in use at the Observatory early in 1868, and has been retained.

Log 1.875	0.273001	Log 0.9375		9.971971
Log $(1.875)^2$	0.546002	Log $(0.9375)^2$		9.943942
Ar. co. log 4	9.397940	Log π		0.497150
	9.943942	Log 0.577047		9.761211
				0.202303
Logarithm for glass $1\frac{7}{8}$ inches				9.797697
Log 1.875	0.273001			
Log 1.8	0.255273	0.017728	0.035456	9.823153
Log 1.8125	0.258278	0.014723	0.029446	9.827143

On the following page are given the dates and results of the observations for rainfall due to 1 inch of snow.

The rainfall from the gauge being entered in thousandths of an inch, the results of the measurements of snow were computed with the same number of decimals; hence one additional place is often used in the rainfall answering to 1 inch of snow: but the last two places mean little.

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1872	Feb. 4, 10 A.M.	19	8.72125	9.36405	0.2312	Snow compact.
			9.79770			
		7	0.84510			
	March 3, 10 A.M.	14	8.85387	9.19564	0.1569	
			9.79770			
		3.5	0.54407			
	March 13, 11 A.M.	18.25	8.73874	9.18965	0.1548	
			9.79770			
		4.50	0.65321			
	March 15, 10 A.M.	20.	8.69897	8.87233	0.0745	
			9.79770			
		2.375	0.37566			
	March 24, 11 A.M.	30.	8.52288	8.90885	0.0811	
			9.79770			
		3.875	0.58827			
	March 27, 10 A.M.	16	8.79588	9.03291	0.1079	
			9.79770			
		2.75	0.43933			
	March 31, 10 A.M.	20	8.69897	9.17336	0.1491	
			9.79770			
		4.75	0.67669			
	Dec. 13, 10 A.M.	9	9.04576	9.08650	0.1220	
			9.79770			
		1.75	0.24304			
	Dec. 19, 10 A.M.	15	8.82391	9.18092	0.1517	
			9.79770			
		3.625	0.55931			
	Dec. 20, 4½ P.M.	12	8.92082	9.56362	0.3661	Snow mixed with rain.
			9.79770			
		7	0.84510			
	Dec. 22, 10 A.M.	6	9.22185	9.01955	0.1046	
			9.79770			
		1	0.00000			
	Dec. 24, 10 A.M.	3.5	9.41559	9.25363	0.1793	
			9.79770			
		1	0.00000			
	Dec. 27, 10 A.M.	16.5	8.78252	9.12429	0.1331	
			9.79770			
		3.5	0.54407			
1873	Jan. 1, 10 A.M.	18	8.74473	8.98176	0.0959	
			9.79770			
		2.75	0.43933			
	Jan. 24, 10 A.M.	10.5	8.97881	9.28839	0.1943	Snow mixed with sleet.
			9.79770			
		3.25	0.51488			
					2.3025	
				Means	0.1535	

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1873	Jan. 24, 5 P.M.	12	8.92082	9.41749	0.2615	Snow mixed with sleet.
		5	9.79770 / 0.69897			
	Jan. 25, 10 A.M.	13	8.88606	9.46191	0.2897	Snow of previous day.
		6	9.79770 / 9.77815			
	Jan. 27, 5 P.M.	14	8.85387	9.04951	0.1121	
		2.5	9.79770 / 0.39794			
	Jan. 28, 10 A.M.	13	8.88606	9.08170	0.1207	Partly snow of previous day.
		2.5	9.79770 / 0.39794			
	Feb. 17, 10 A.M.	22.5	8.64782	9.34861	0.2232	
		8	9.79770 / 0.90309			
	Feb. 22, 11 A.M.	17	8.76955	9.28741	0.1938	
		5.25	9.79770 / 0.72016			
	Feb. 28, 10 A.M.	17.5	8.75696	9.12869	0.1345	
		3.75	9.79770 / 0.57403			
	March 4, 10 A.M.	12.5	8.90309	9.14012	0.1381	
		2.75	9.79770 / 0.43933			
	March 10, 10 A.M.	12	8.92082	9.15785	0.1438	
		2.75	9.79770 / 0.43933			
	March 10, 5 P.M.	12	8.92082	9.23040	0.1700	
		3.25	9.79770 / 0.51188			
	March 21, 10 A.M.	19.5	8.70997	9.36801	0.2334	Snow with some rain.
		7.25	9.79770 / 0.86034			
	April 12, 5¼ P.M.	19	8.72125	9.30606	0.2023	Snow with some rain.
		6.125	9.79770 / 0.78711			
	Dec. 3, 10 A.M.	10.	9.00000	9.19564	0.1569	
		2.5	9.79770 / 0.39794			
	Dec. 27, 10 A.M.	10.	9.00000	9.12506	0.1334	
		2.125	9.79770 / 0.32736			
	Dec. 28, 11 A.M.	10	9.00000	9.09873	0.1255	
		2	9.79770 / 0.30163			
				2.6389		
			Mean	0.1759		

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1874 Jan. 14, 10 A.M.	11.5		8.93930	9.17633	0.1501	
	2.75	9.79770	0.43933			
Jan. 15, 10 A.M.	12		8.92082	9.15785	0.1438	
	2.75	9.79770	0.43933			
Jan. 31, 10 A.M.	11		8.95861	8.99935	0.0999	
	1 3/4	9.79770	0.24304			
Jan. 31, 5½ P.M.	14		8.85387	9.11021	0.1289	
	2.875	9.79770	0.45864			
Feb. 3, 10 A.M.	12.5		8.90309	9.14012	0.1381	
	2.75	9.79770	0.43933			
Feb. 3, 11 A.M.	12.5		8.90309	9.15943	0.1444	
	2.875	9.79770	0.45864			
Feb. 4, 10 A.M.	14		8.85387	9.30478	0.2017	Snow comp'act.
	4.5	9.79770	0.65321			
Feb. 7, 10 A.M.	14		8.85387	8.59358	0.0392	
	0.875	9.79770	9.94201			
March 28, 8½ A.M.	result from record				0.078	
April 4, 10 A.M.	— " —				0.078	
April 18, 10 A.M.	— " —				0.232	Snow wet.
April 26, 10 A.M.	— " —				0.423	Snow wet.
Nov. 23, 10 A.M.	11		8.95861	9.35837	0.2282	Snow wet.
	4	9.79770	0.66206			
Dec. 2, 10 A.M.	6		9.22185	9.11646	0.1308	
	1.25	9.79770	0.09691			
1875 Jan. 7, 4 P.M.	result from record				0.149	
					2.3651	
			Mean		0.1577	

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1875	Jan. 22, 10 A.M.	Result from record		0.114
	Jan. 22, 4 P.M.	"		0.126
	Jan. 29, 10 A.M.	"		0.180
	Jan. 30, 10 A.M.	"		0.075
	Feb. 1, 10 A.M.	"		0.0785
	March 1, 10 A.M.	"		0.141
	March 2, 10 A.M.	"		0.235
	March 4, 10½ A.M.	"		0.149
	March 8, 10 A.M.	"		0.141
	March 20, 10 A.M.	"		0.1098
	March 20, 4 P.M.	"		0.204
	March 25, 10 A.M.	"		0.1228
	April 13, 4 P.M.	"		0.127
	April 14, 10 A.M.	"		0.1926
	Dec. 25, 10¼ A.M.	10.5	8.97881 9.59770	0.3960
		6.625	9.79770 0.82119	
				2.3917
			Mean	0.1594

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1876	Feb. 4, 10 A.M.	Result from record	0.0958	
	Feb. 22, 10¼ A.M.	— " —	0.108	
	Feb. 29, 10 A.M.	— " —	0.149	
	March 18, 10¼ A.M.	— " —	0.1362	
	April 5, 11 A.M.	— " —	0.227.	
	Dec. 9, 10 A.M.	— " —	0.167	
	Dec. 11, 10 A.M.	— " —	0.067	
	Dec. 12, 10 A.M.	— " —	0.1083	
	Dec. 19, 10 A.M.	— " —	0.122	
	Dec. 23, 10 A.M.	— " —	0.1343	
	Dec. 30, 4 P.M.	— " —	0.3731	
1877	Jan. 3, 2 P.M.	— " —	0.1329	
	Jan. 13, 8 A.M.	— " —	0.1919	
	Jan. 16, 8 A.M.	— " —	0.3047	
	Feb. 25, 8 A.M.	— " —	0.2325	
	March 15, 8 A.M.	— " —	0.0839	
	March 17, 8 A.M.	— " —	0.0997	
	March 18, 8 A.M.	— " —	0.0992	
	March 19, 8 A.M.	— " —	0.096	
1878	Jan. 5, 8 A.M.	— " —	0.2548	
	Feb. 2, 10 A.M.	— " —	0.1752	} Three different places.
	— " —	— " —	0.2117	
	— " —	— " —	0.1880	
	Feb. 11, 8 A.M.	— " —	0.2182	
	Feb. 18, 8 A.M.	— " —	0.1244	
1879	Jan. 3, 8 A.M.	— " —	0.1111	
	Jan. 10, 1½ P.M.	— " —	0.2208	
	Jan. 17, 5 P.M.	— " —	0.0883	
	Jan. 20, 10 A.M.	— " —	0.0845	
	Feb. 6, 8 A.M.	— " —	0.0941	
			4.6996	
			0.1567	

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1879	Feb. 22, 2 P.M.	Result from record	0.1874
	Feb. 26, 10 A.M.	" "	0.1468
	March 7, 8 A.M.	" "	0.1627
	April 1, 10½ A.M.	" "	0.1835
1880	Jan. 1, 10 A.M.	" "	0.1731
	Jan. 14, 5 P.M.	" "	0.1734
	Feb. 4, 10⅔ A.M.	" "	0.2044
	March 12, 11½ A.M.	" "	0.136
	March 20, 10½ P.M. (A.M.?)	" "	0.1412
	March 28, 10¼ A.M.	" "	0.2262
	Dec. 2, 11¼ A.M.	" "	0.1883
	Dec. 30, 12¾ P.M.	" "	0.1098
1881	Jan. 5, 9½ A.M.	" "	0.1120
	Jan. 6, 1¾ P.M.	" "	0.1719
	Jan. 22, 12¾ P.M.	" "	0.2282
	Jan. 31, 9¼ A.M.	" "	0.0612
	Feb. 16, 1 P.M.	" "	0.1492
	Feb. 22, 9½ A.M.	" "	0.1798
	April 15, 10¼ A.M.	" "	0.2017
			3.1368
		Mean	0.1651

From p.	168	2.3025	15 measures.
	169	2.6389	15 "
	170	2.3651	15 "
	171	2.3917	15 "
	172	4.6996	30 "
	173	3.1368	19 "
		17.5346	109

1.2438959
8.9625736
0.2064694

Mean for ten years 0.1609

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Some instances of large rainfall, collected Feb. 13, 1886, from the record for 1872 and later.

1876	Nov.	20	0.298	
		21	2.758	
		22	0.088	
		23	0.044	3.188
1877	Oct.	4	0.066	
		5	3.398	3.464
1877	Nov.	26	2.493	
		27	1.467	3.960
1878	Feb.	2	2.710 (snow)	
1878	July	10	2.217 (in g.)	
1879	Aug.	16	0.011	
		17	0.794	
		18	0.165	
		19	4.060	5.030
1880	July	21	2.471	
		22	0.011	
		23	0.657	
		24	0.011	3.144
1881	Jan.	22	3.349 (snow)	
1881	March	10	3.343	
		11	0.452	
		12	0.011	
		13	0.188	
		14	0.044	
		15	0.022	4.060
1881	June	8	0.154	
		9	0.011	
		10	0.596	
		11	2.703	
		12	0.011	3.475
1882	Sept.	12	2.890	
		13	0.011	
		14	0.022	
		15	0.117	3.640
1884	June	24	3.067	
1886	Feb.	11	0.088	
		12	2.471	
		13	3.122	

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Table showing Mean Temperature (T) in degrees Fahrenheit,

Year	January T°	January R in.	February T°	February R in.	March T°	March R. in.	April T°	April R in.	May T°	May R in.	June T°	June R. in.	July T°
1878	25.7	~~5.84~~	27.9	6.59	38.6	4.17	48.6	5.15	57.4	0.87	66.6	2.68	74.8
1879	22.0	2.20	22.6	3.43	32.7	4.02	42.3	5.65	62.0	1.28	66.0	4.59	71.2
1880	31.0	3.79	25.6	4.20	36.6	3.28	45.9	2.00	62.5	1.51	67.4	0.80	71.6
1881	17.8	7.43	23.3	4.21	35.7	7.48	42.3	1.74	56.8	3.31	61.1	5.71	70.3
1882	24.0	4.15	27.8	6.40	34.8	2.75	41.4	2.26	49.4	4.95	66.0	1.97	71.6
1883	20.2	2.86	25.0	3.84	27.2	2.05	42.6	2.40	48.8	3.63	69.6	2.73	71.0
1884	21.3	5.20 ~~3.86~~	31.3	6.39	31.1	4.89 ~~4.82~~	43.0	4.36 ~~4.39~~	53.9	3.08 ~~2.92~~	66.5	3.83	68.6
1885	25.4	4.85 ~~0.44~~	18.2	3.26	26.1	1.32	46.5	3.56	53.9				
1886	24.7												
1887	22.7												
1888	17.8												

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– and Total Rainfall (R) in inches, at Harvard College Observatory.

R in	August T°	August R in	September T°	September R in	October T°	October R in	November T°	November R in	December T°	December R in	Whole T°	Year R in
4.82	69.4	6.21	62.9	2.24	54.4	5.06	38.8	6.52	28.6	4.39	49.5	54.54
2.64	69.2	5.79	60.1	1.71	54.6	0.76	37.9	3.18	32.5	2.75	47.8	38.00
6.75	69.0	3.49	63.2	1.71	496	2.78	35.6	2.10	24.1	2.81	46.5	35.22
3.68	69.2	1.35	664	2.89	52.2	1.98	40.4	4.61	35.8	3.14	47.6	47.53
2.35	70.2	1.61	63.0	8.28	53.8	2.01	37.4	1.68	26.0	2.16	47.1	40.57
2.63	67.6	0.43	599	0.98	47.0	5.57	42.2	1.95	28.8	3.58	45.8	32.65
4.06	68.9	~~4.66~~ 4.68	65.0	0.66	52.3	2.54	39.8	2.85	30.4	~~4.86~~ 4.88	47.7	~~45.84~~ 47.42

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Formulae from Mr. C. A. Schott's
letter to Prof. Winlock of Jan. 10, 1873.

West declination of magnetic needle
at Cambridge (n denoting number of years after 1830)

$$+9^\circ.58 + 2.69 \sin(1.3n - 19^\circ.05) + 0.18 \sin(3.2n - 20^\circ)$$

Annual increase of west declination

$$[8.7856] \sin(1.3n + 71^\circ) + [8.0023] \sin(3.2n + 70^\circ)$$

Date	Computed west decl.	Computed annual increase
1850	10°.030	0°.0678
1860	10.672	0.0598
1870	11.214	0.0481
1880	11.627	0.0347

These figures are the result
of observations made at intervals
from 1708 to 1867.

Barometric average for 106
Lowest rainfall for 183
Mean temperature, and rainfall for 190.

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