

KG
11366
v. 716

No. 12.
MICROMETER LEVEL.

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30 Local standard parts

1

2

3 Constants of level

4

5 Table for level

6 Effect of refraction

7

8

9 Obs. Blue Hill from H.C.O.

40

"

1 Results

2

3 Obs. Blue Hill from H.C.O.

4

"

5

"

6

"

7

8 Carpenter's theodolites

9

50 Interchangeability of principal parts

1

2 Dist. points observed 1876

3

4

"

5

6

"

7

8

9

60

1

2

3

4

5

6

7

8

9

70

1

2

3

4

5

6

7

8

9

80

1

2

3

4

5

6

7

8

9

Stars suitable for meridian observation

Equipment & Wachtelt

Various distances on map.

Burns photo of a Wachtelt

Orig. photo. of Wachtelt

again later.

90 Original Obs. in Washburn

- 1 " "
- 2 " "
- 3 " "
- 4 " "
- 5 " "
- 6 " "
- 7 " "
- 8 " "
- 9 " "

100 Profile from Int. Washburn

- 1 " "
- 2 " "
- 3 " "
- 4 " "
- 5 " "
- 6 Orig. Obs. from Washburn

- 7 " " "
- 8 Calc. & Orig. " "
- 9 " " "

110 Locata State

- 1 " "
- 2 Orig. Obs.

3 " "

4 " "

5 " "

6 " "

7 " "

8 " "

9 Comput. Addit. any

- 120 Difficulties of altim. corrections made by
 1 List of unmounted lunar tables June 28th
 2 Form of observations
 3 Proposed plan
 4 Azimuths from Mt.
 5 Effect of refraction from Wschewitt
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 5
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 7 " " " "
 8
 9 Coll. and lunar tables

140

- 1
 2
 3 Az. and alt. from Mineral Mt. Haver
 4 " " " " " " July 3d
 5 " " " "
 6 " " " "
 7 " " " "
 8 " " " "
 9 " " " "

150 Profile from Mount

1

2 Level C. into lines $3'39''$ ^{prob. error 73.43} $3'29''$ 1 div. 3.65

3

4 Obs. 2152

5

6 July 6th '77. Level C dis. in terms of level B. $808 = 1$ C in terms

7

8 Angle A, mag. dis. by ^{photo. meas.} $113' 57.8$

9

10 Results A & B

11

12 Accuracy of C also in true $42.39 = 1.4$

13

14 " " " " in true alt. 86

15

16 Angle plane A = $73' 47.3$ B = $47' 14.6$ ^{85' 39.7} $113' 57.8$

160 Count of peaks at Mount Mt. Haver

1

2 Mag. dis. = 227.70

3

4 Form of level 1 div. $395 = .4$

5

6 Obs. " " "

7

8 Accuracy with relation of B 1.2 69 base of B

9

10 See fine motion.

11

12 Phot. Kater's dir. location of Orson.

170 Results base B 147.96

1

2 Comput. " "

3

4 Expenses E. C. P.

5

6 " Humphreys Committee

7

8 Collin and level of B.

9

10 Internal lines in terms of Screen. ^{10 cases int = 62.74 Prob \pm 216} 62.735 8

11

12 Angle plane A $73' 55.5$

13

14 " " B $80' 46.9$ Internal lines 227.46

15

16 Adjust of level to per. & axis. effecting mag. ^{refining alt.}

17

18 Collin's

180

1. *Megastote disc cyprine*

2

"

3

"

summy

4

Intertidal lines 2. collim. part 4. level C.

5

"

part by Rogers

6

7

8

9

190

1

2

Micrometer Level. (B)
June 6th 1877. Determination of base.

$$b = 146 \pm$$

$$\text{Sens : } a = 1 : 146. \quad \kappa = 730 \text{ cms}$$

$$\begin{array}{r} 146 \\ 6 \\ \hline 5.84 \end{array}$$

Scale in hinge
for a. 1.8 mms. long
365.3 Cor. + 1.8

$$365.35$$

$$11.9 \quad 11.992$$

$$11.9 \quad 11.992$$

$$365.25$$

$$\Sigma 12.119$$

$$\Sigma 12.117$$

$$f \text{ a. } 365.3 + 4.22$$

$$f \text{ a. } 392.45 + 4.24$$

$$\Sigma \text{ " } 397.59 - .8$$

$$365.52 + 4.24$$

$$369.36 - .08$$

end tape. thick
th. ends
for cm. $365.3 + 4.22 - .32$

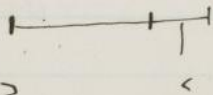
$$\text{ad. } 11.992 + 4.24$$

$$\Sigma 12.117 - .08$$

Medial Chord

$$368.9 \text{ cms.}$$

$$\begin{array}{r} 797.8 \\ 147.56 \\ \hline \end{array}$$



$$\begin{array}{r} \text{scale } 1.625 + .8 \times .0625 \\ .05 \quad .05000 \\ \hline 1.675 = 42.4 \text{ mms. } + \\ 254 \\ \hline 6400 \quad 328 \\ 8375 \quad 31.9 \text{ mms. } \Sigma \\ 3350 \\ \hline 425450 \\ 1 \end{array}$$

$$\begin{array}{r} 3.281 \\ .11.992 \end{array}$$

$$\text{Thickness scale} = 3.2$$

$$\begin{array}{r} 65.62 \\ 29.529 \\ 29.527 \\ 3281 \\ \hline 3281 \\ 393.45552 \\ 3281 \\ 12118 \\ 26248 \\ 3281 \\ 3281 \\ 65.62 \\ 3281 \\ \hline 39759158 \end{array}$$

$$\begin{array}{r} 254 \\ 12118 \\ \hline 2032 \\ 254 \\ 254 \\ 508 \\ \hline 3078972 \\ 12 \\ \hline 369.36 \end{array}$$

$$\begin{array}{r} 11.992 \\ 254 \\ \hline 508 \\ 2286 \\ 2286 \\ 254 \\ 254 \\ \hline 3046968 \\ 12 \\ \hline 365.52 \end{array}$$

$$\begin{array}{r} 143.9 \\ 254 \\ \hline 57.56 \\ 71.95 \\ 2874 \\ \hline 365.506 \end{array}$$

$$\begin{array}{r} 12118 / 3281 \\ 9843 \quad 369.36 \\ 22758 \\ 19686 \\ \hline 30720 \\ 29529 \\ \hline 111910 \end{array}$$

7 M obs. lev. 139	I					
red dash	Salm.	1.370				
	.73					
0.0	0.719	.717	13			
5	2.74	.723	7	.734	.718	.724 .721
10	4.738	.721	17			
15	6.732	.712	20			
20	8.724	.698	26			
25	10.710	.699	11			
30	12.708	.686	22			
35	14.700	.679	21			
40	16.688	.681	9			
45	.687	.672	15			
50	.679	.684	-5			
55	too little					
60	light					

65

70

floor too unsteady

75

Mound level & W. side of Francis Circle

80

85

730 ans.

90

3881

2395

95

730

21555

100

884

21486 =

distance

$$\begin{array}{r} 146 \\ 219 \\ \hline 239513 \end{array}$$

$$\begin{array}{r} 8 \\ \hline 19.160 \end{array}$$

$$\begin{array}{r} 73 \\ 657 \end{array}$$

$$\begin{array}{r} 23000 \\ 1513 \\ \hline 21487 \end{array}$$

$$\begin{array}{r} 22950 \\ 1469 \\ \hline 689 \end{array}$$

$$\begin{array}{r} 21486 \\ 12 \\ \hline 257.432 \\ 254 \\ \hline 1031328 \\ 1282160 \\ \hline 515664 \\ 654.87328 \end{array}$$

654.9 = base

	2		3		
base	1.530		1.530	.546	1
0	.791	0	0.786	.793	-0.7
5	1.983	9	2.839	.812	+2.7
10	3.060	18	4.872	.852	20
15	4.183	27	6.900	.878	22
20	5.325	36	8.927	.908	19
25	6.443	45	10.951	.933	1.8
30	7.567	54	12.977	.983	-3.2
35	8.693	63	15.009	.963	1.6
40	9.822	72	17.046	.994	1.5
45	10.953	81	19.083	.028	1.8
50	11.849	90	21.130	.065	1.8
55	12.747	99	23.171	.114	1.6
63				.174	1.5
82					
81					

$$\begin{array}{r}
 90 \quad 23.172 \\
 99 \quad \underline{.79} \\
 22.38
 \end{array}$$

$$\begin{array}{l}
 90 : 654.9 = 20.347 : \pi \\
 99 : 654.9 = 22.38 : \pi \\
 48 : 368.9 = \frac{15.961}{17.95}
 \end{array}$$

$$\begin{array}{r}
 23.172 \\
 \underline{2.825} \\
 .347 \\
 20349 \\
 \underline{2261} \\
 6549 \\
 \underline{6549} \\
 39294 \\
 \underline{13098} \\
 13098 \\
 \underline{148.07289} \\
 148.02 \\
 \underline{148.05}
 \end{array}$$

$$\begin{array}{r}
 6549 \\
 \underline{65} \\
 6614 \\
 \underline{2238} \\
 6608 \\
 \underline{224} \\
 26432 \\
 \underline{13216} \\
 13216 \\
 \underline{148.0192}
 \end{array}$$

$$\begin{array}{r}
 20624 \\
 \underline{2.732} \\
 17.95 \quad 17.95 \quad 147.2 \\
 \underline{205} \\
 410 \quad 8975 \\
 \underline{35960} \\
 367975 \\
 \underline{147.17}
 \end{array}$$

$$\begin{array}{r}
 6549/9 \\
 \underline{72766} \\
 145.533
 \end{array}$$

June 6th P.M. 1st distant backlash, and pressure between

⁴ taken		⁵ down	
28.0	25	28.05	2
28.05	10	28.1	1
28.3	5	28.4	2
28.3	5	28.7	5
28.5	5	28.2	0
28.4	15	28.25	0
28.3	5	28.4	2
28.2	5	27.9	3
28.3	5	28.2	0
28.4	15	28.0	2

$$28.25 \pm .095 \quad 28.21 \pm .17 \quad 2.1$$

prob. $\pm .135$ and 2.1 backlash if any .04 dis = ".6

81.8

83.2

83.1

83.5

83.4

83.7

83.8

83.8

83.9

84.0

84.0

83.72

$$\pm .21 \text{ or } 3''$$

Setting for back & distance between
for level.

Prob. error setting level = 3"

from 7th

Deter base plane level in which

E.	G.	R.	I	
41' 10" 35	41.7	52.0	1.500	31.4
55 0 2.7	29.3	✓	3.500	26.6
5 8 31.1	15	32.6	5.500	30.4
20 1 58.8	27.3	146.1	7.500	28.5
35 0 17.8	45.2		9.500	27.4

Microscope used in telescope, ready - some
microscope used by W.A.R.

M. Lev.

E

Screen.	Ap.			
1.500	41' 26.0	3	41' 26.0	46' 50.0
3.500	55' 16.0	2	55' 16.0	46' 59.7
5.500	13.0	2	8 16.3	47' 3.3
7.500	35 31.5	1	21 13.0	45 41.5
9.500			35 31.5	

from 7th 2.20 test level. line 10.1 39.6

Sen	low	low	0-2			
146.8	0.8	33.7	32.9	34.5	34.5	
148.0	4.3	35.2	30.9	39.5	39.5	0.0
149	6.1	37.0	30.9	43.1	43.25	+1.15
150	7.7	38.7	31.0	46.4	47.0	-.6
151	9.8	40.5	30.7	50.3	50.75	-.45
152	12.4	43.0	30.6	55.4	54.50	+.9
153	13.8	44.4	30.6	58.2	58.25	-.25
154	15.2	45.9	30.7	60.1	62.0	-.09
155	16.2	46.8	30.6	63.0	65.75	-2.75

chucks.

147.9	4.4	35.2	30.8	39.6	
153.6	14.6	45.3	30.7	59.9	
150.8	9.2	40.1	30.8	49.4	
"	12.3	43.0	30.7	55.3	Whitest turned about
150.0	11.0	41.7	30.7	52.7	its axis
150.0	6.8	37.8	31.0	44.6	
151.0	9.4	40.2	30.9	49.7	under reading of level
"	9.4	40.2	30.8	49.6	
"	10.0	40.8	30.8	50.8	
"	10.0	40.9	30.9	50.9	
"	9.2	39.9	30.7	49.1	
"	9.6	40.4	30.8	50.0	at zero.
151.2	9.6	40.5	30.9	50.1	
151.2	9.4	40.3	30.9	49.7	
151.2	9.6	40.3	30.9	49.7	
151.15	9.6	40.5	30.9	50.1	
151.2	9.6	40.4	30.8	50.0	
150.9	9.4	40.2	30.8	49.6	

Screen		level											
+51		n	S	E		G							
1.510	40.5	9.6											
49.4	6.51	40.2	9.2	4	0	16.0	47.1	1.5	63.1	31.5	6"		
49.7	6.51	40.4	9.3										
49.2	6.51	40.1	9.1	6	3	58.8	4	27.1	1.7	85.9	130	71	
49.4	11.51	40.2	9.2										
49.9	11.51	40.4	9.5	8	7	26.5	54.6	1.1	81.1	40.6	11		
49.9		40.5	9.4										
49.0	16.51	40.0	9.0	33	11	43.9	14	12	14.1	1.5?	58.0	59.0	6"
51.0		41.0	10.0										
50.1	21.51	40.6	9.5	16	55.4		17	23.1	1.0	6.3	15.5	9.2	4
50.0		40.6	9.4										
50.5	26.51	40.8	9.7	23	20.2		23	46.9	.5	8.1	67.1	33.5	2
50.6	31.51	40.9	9.7	32	9.0		32	35.9	.4	100.0	44.9	22.4	2
50.6		40.8	9.8										
50.7	26.51	40.9	9.8	23	40.1		24	58.2		8.1	105.9	52.9	1
50.9		40.9	10.0										
51.2	21.51	41.1	10.1	16	47.2		17	15.0	2	6.8		17	3.1 1
51.3		41.1	10.2										
49.5	16.51	40.3	9.2	33	11	17.6	11	44.9	1.2	4.4	62.5	31.2	5
50.0		40.5	9.5										
50.1	11.51	40.6	9.5	8	7	1.8	7	27.1	1.0	92.4	28.8	14.4	4
49.8		40.4	9.4										
50.5	6.51	40.8	9.7	6	3	30.4	3	57.5	.4	90.3	27.9	43.9	2
50.6		40.8	9.8										
49.8	1.51	40.5	9.3	4	0	2.4	0	33.7	1.3	8.5	36.1	18.1	5
49.6		40.3	9.3										

Circle Reading = 84.8

Screw level

		W.	S.	E.				G.						
49.7	1.51	40.4	9.3	1.3	4	0	5.1	0	34.9	88.4	40	0'	20.0	5
49.6		40.4	9.2											
49.0	6.51	40.0	9.0	2.0	6	4	4.0	4	31.2	90.3	35.2	4	17.6	8
49.1		40.1	9.0											
50.3	11.51	40.7	9.6	7	8	7	34.9	8	1.9	92.3	36.8	7	48.4	3
51.4		41.2	10.2?											
49.6	16.51	40.3	9.3	33	11	49.3	14	12	17.9	94.3	7.2	12	3.6	
50.5	16.51	40.8	9.7	.5	33	11	46.8	14	12	13.4	94.3	0.2	0.1	2
50.5		40.8	9.7											
48.9	21.51	40.0	8.9	2.1		57.9		17	25.8	96.2	23.7	17	11.8	8
48.9		40.0	8.9											
49.5	26.51	40.3	9.2	1.5		23	28.7	23	53.8	98.1	82.5	23'	41.2	6
49.5		40.3	9.2											
49.9	31.51	40.5	9.4	1.1		31	43.7	32	10.5	100.0	154.2		57.1	4
49.9		40.5	9.4					X 23						
50.8	26.51	40.9	9.9	.1		23	31.9	24	58.1	98.1	90.0	23-24	45.0	0
51.0		41.0	10.0											
50.3	21.51	40.7	9.6	.5		16	43.3	17	10.9	96.2	154.2	16	57.1	2
50.6		40.8	9.8											
50.0	16.51	40.5	9.5	10	33	11	38.8	14	12	5.8	94.2	104.6	11	52.6
50.1		40.6	9.5											
49.9	11.51	40.5	9.4	1.0	8	6	57.9	7	25.3	92.3	23.2	7	11.6	4
50.1		40.6	9.5											
50.7	6.51	40.9	9.8	6	3	59.9	4	28.4	lu. changed	283	4	14.1		
50.4	6.51	40.8	9.6	.6	6	3	51.9	4	18.9	90.3	108	4	5.4	0
50.3		40.7	9.6											
(50.8)	1.51	40.9	9.9	3	59	55.9	4	0	23.9	88.4	198		9.9	1
52.3		41.6	10.7											
50.2														
50.2														

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40.7 9.6

Circle Reading 85.2

Centre of Bolt " 85.3

$$2^{\circ} 3'.5 = 123'.5 = 500 \text{ div.}$$

$$\begin{array}{r} 60 \\ 7410.0 \\ 1482 \end{array}$$

$$8 \text{ div. lat.} = 65.4 - 35.4 = 30 \text{ mm}$$

$$1 \text{ mm} = .267 = \frac{8}{30}$$

$$1 \text{ mm} = \frac{8}{30} \text{ div.}$$

$$5.7 = 20 \text{ mm.}$$

$$\begin{array}{r} 285 \\ 85.5 / 20 \end{array} \quad 1 \text{ mm} = 4.2$$

$$\begin{array}{r} 1482 \\ 494 \\ 3952 \end{array}$$

$$123'.36$$

$$\begin{array}{r} 6 \\ 7380 \\ 336 \\ 7416 \end{array}$$

$$1 \text{ div} = 14".832$$



$$t_1 = 1500 \text{ h}$$

$$t = 500 \text{ ct}$$

5 =

$$\begin{array}{r} 679 \quad 14848 \\ 6722 \quad 148 \\ 48 \\ 192 \\ 192 \end{array}$$

$$\begin{array}{r} 1395 \\ 11160 \quad 3 \\ 3720 \end{array}$$

$$\begin{array}{r} 24 \\ 56/3 \\ .19 \text{ div} \end{array}$$

$$\begin{array}{r} 7 \\ .4 \\ 15 \end{array}$$

1.51

6	0'	31.5	4'	13.0	7'	40.6	11'	59.0	17'	9.2	23'	33.5	31'	22.4
	0'	18.1	3'	43.9	7'	14.4	11'	31.2	17'	1.1	23'	52.9		
	20.		18		48		12	4	12.		41.	31	57.	
	+0.		+4.		11.6		11	52.6	16	57		45		
	7.		5.											

1 77/19

1.51 4° 0' 19"

1.51	6.57	11.57	16.57	21.57	26.57	31.57
0' 25"	4' 6"	7' 37"	11' 53"	17' 5"	23' 31"	32' 20"
13	3	42	10	26	0	52
15	4	10	45	58	3'	35 31' 53
<u>4</u>	3	59	8	49	16 48	49
57		287	100	1816		167

1.51	4° 0	14"	123' 45"	2° 3' 45"	6	.03601	2745	.00001
6° 3	59"	123' 25"	4	7	11	.07202		2
8	7	25"	124' 21"	6	11	32	.10848	48
10	11	46"	125' 11"	8	16	44	.14552	152
16	58"	126' 46"	10	23	28	.18337		337
23	42"	128' 54"	12	32	24	.22243		00643
32'	36"							

$$E = d \times [0.00725 + n]$$

5	0.1	03	-3	50	123' 45"	7425"	7425	0"
10	0.3	23	-20	105	247' 11	14831	14850	-19"
15	6.7	90	-23	150	371 32	22292	22275	+17"
20	21.0	213	-3	205	496 44	29804	29700	+104"
25	46.8	447	+5.1	250	623 28	37408	37125	+283"
30	72.0	72		302	752 24	45744	44550	+574"

				0.00678 $-(34-0)$		6.00678 $-(334-0)$		m
0								
5	1° 56' 15"	.03383	34	-17	+3			-7
3	52 49"	.06783	68	-17	+23			+3
5	48 28"	.10172	102	-28	+32			+2
7	43 16	.13558	136	-42	+38			-2
9	36 32	.16930	170	-70	+10			-20
11	27 36	.20272	204	-128				-68

$$\varepsilon = (.00678 \text{ } \ell + m) / \ell$$

$$1 \text{ div.} = .0000678 \text{ } \ell \text{ } \mu\text{arc} = 147.492 \approx 147.5$$

$$1 \text{ div.} = 24.000 \text{ } 1395$$

				1395	G-C
5	116' 15"	6975	6975	0"	
10	232 49	13969	13950	+19	
15	348 28	20908	20925	-17	
20	463 16	27796	27900	-104	
25	576 32	34592	34870	-278	
30	687 36	41256	41850	-594	

June 8th 1877. Determination of equatorial point
center of transit circle and collimation
of micrometer lens.

N coll		
Sec.	n	s
1.520	40.5	10.3
1.520	41.2	11.1
1.520	41.0	11.0
1.520	40.8	10.5
1.520	41.1	10.9
1.702		
1.701		
1.698		
1.703		
1.700		

N coll		
Sec.	n	s
1.490	40.1	10.2
1.490	39.8	9.9
1.490	40.0	9.6
1.490	39.4	9.0
1.490	38.7	9.0
1.301		
1.304		
1.306		
1.304		
1.302		

S coll.		
Sec.	n	s
1.390	40.9	10.1
1.390	40.3	10.4
1.390	40.4	10.2
1.290	40.5	10.6
1.391	40.4	10.5
1.390	40.50	10.36
1.598		
1.594		
1.595		
1.597		
1.591		
25		

N coll.

$$4.16/30 = 139$$

$$116/8/3 = 324/3$$

S. len.	len.	S. Cde.	ms.	lw. Cm.	lw. Cm. d.		
1.520	51.7	1.7010	+2.0	533	⁷⁰¹⁰ 1.5147	18.63	18.63
1.490	49.18	1.3034	-.52	.139	²⁰³⁶ 1.4914	18.78	18.80
1.390	50.86	1.5956	+1.96	.309	¹³⁸⁶⁹ 1.3931	20.25	20.93
					⁵⁹⁵⁶	39.03	39.73

$$\begin{array}{r}
 19.51 \\
 \underline{.14} \\
 7804 \\
 1951 \\
 \hline
 2731 \\
 4'33.1
 \end{array}$$

$$\text{cell error} = .73 \text{ div. } 147$$

$$\begin{array}{r}
 .15 \\
 \underline{.14} \\
 2.1
 \end{array}
 \quad \text{eg. } \text{M.Cm} = 19.51 = 4'33.1$$

$$\begin{array}{r}
 2.13 \\
 1.065
 \end{array}$$

$$\begin{array}{r}
 19.865 \\
 \underline{.14} \\
 79460 \\
 19865 \\
 \hline
 278110 \\
 4'38.1
 \end{array}$$

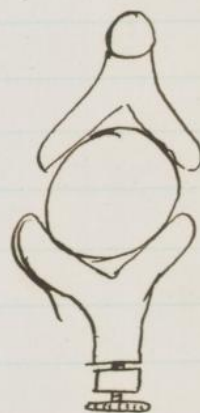
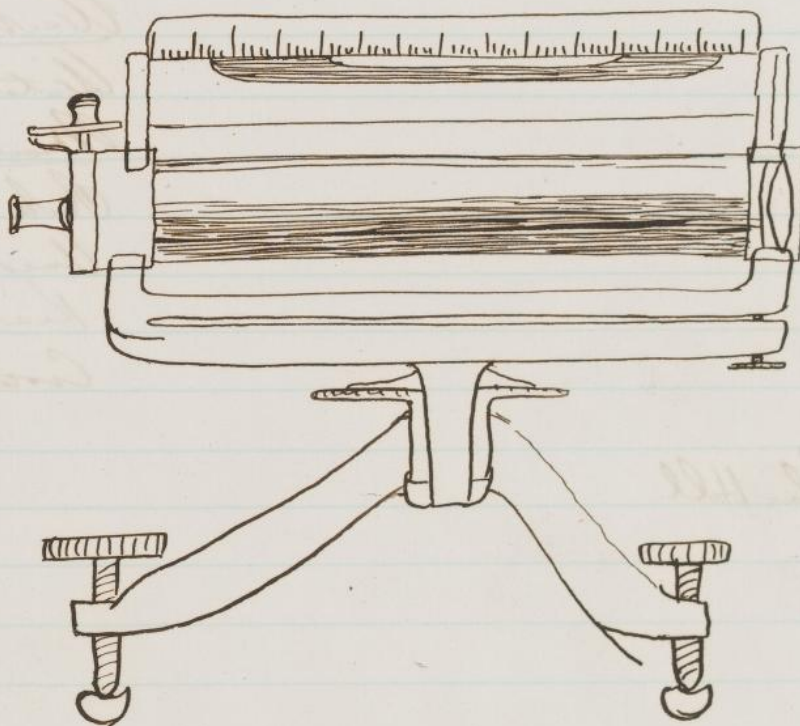
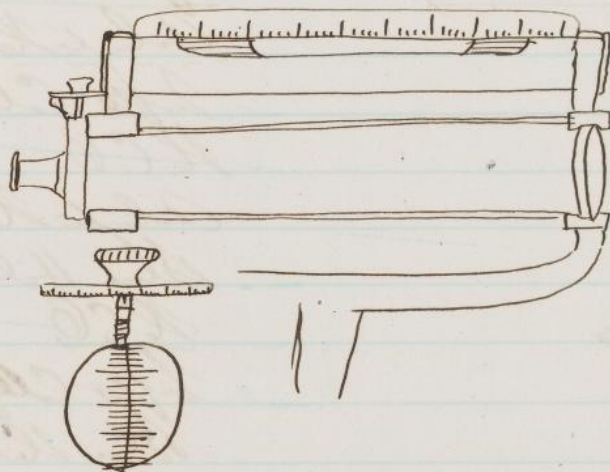
June Oct 21st, 1877. Equator pair constant
 constant circle

Scr.	n	s	Scr.
1530	41.4	10.1	172.1
	40.3	8.9	172.6
	40.2	8.8	172.7
	39.7	8.1	172.4
	39.4	8.0	172.3
	<u>10</u>	<u>39</u>	<u>31</u>
153.0	40.20	8.78	172.62
<hr/>			
158.0	41.1	10.1	140.7
	41.5	10.6	140.2
	41.5	10.7	141.2
	41.4	10.3	140.8
	41.7	10.5	141.0
	<u>22</u>	<u>22</u>	<u>29</u>
	41.44	10.44	140.78
156.0	41.4	10.1	138.9
	41.2	10.1	139.5
	41.4	10.3	139.2
	40.9	9.5	139.1
	41.3	10.1	139.3
	<u>12</u>	<u>10</u>	<u>10</u>
	41.24	10.02	139.20
151.0	41.6	10.8	171.6
	41.8	11.0	171.8
	42.1	10.9	171.3
	41.9	11.2	171.3
	41.9	11.0	171.5
	<u>43</u>	<u>49</u>	<u>25</u>
	41.86	10.96	171.50

1.5300	⁹⁷ 48.98	172.62	19.62	-72	.192	<u>153.72</u> X
1.580	51.88	140.78	17.22	2.18	.581	<u>157.42</u>
1.560	51.26	139.20	16.80	1.56	.416	<u>155.58</u>
1.570	52.84	171.50	20.50	3.14	.837	<u>150.16</u>

18.90	16.38
<u>16.64</u>	<u>21.34</u>
2.26	4.96
35.54	37.72
17.77	18.86
<u>14</u>	<u>14</u>
7108	7544
<u>1777</u>	<u>1886</u>
24878	26404
4' 8.4	4' 24.0

18.035
<u>14</u>
72140
<u>18035</u>
252.49



Harvard College Observatory.

Tufts College

Ashtice Heights

Blue Hill.

Blue Hill.

Ashtice Heights.

Tufts College.

H.C.O.

Ashtice Heights

Blue Hill.

H.C.O.

Tufts College

Blue Hill.

Wachusett.

Watatic.

Monadnock.

Rock Monadnock.

Uxbridge. 70.0

Keeney. 119.6

Crookst.

Wachsmuth

If objective is well known

Constants of Michelson Level.

Base of level.	144:50.
Magnit 1 div is seconds	13".95
" 1 mm. in len of level reads $\frac{4}{15}$ div = .267 div = 3.72	
Len of reading of marks a tube	49.7
Refraction per mile =	.2800 div 3".906
" " Km	.1876 div 2".627

1 mm. in len of scale of bubble = $\frac{4}{15}$ divisions of scale
 See page 16. \therefore ~~1 mm. in len of~~ 1 div. = 3.75 mm.

Wachusett.	Blue Hill.	70,700	295.5 ⁸
"	Unkonomen.	60,092	203.9
Blue Hill	"	94,076	155.7
Wachusett.	Pattuceawa	90,008	218.6

Sum of ends of bubble		Level Table Comets in divs.
49.7	49.7	0.0
.6	.8	.03 .0267
5	.9	.05
4	50.0	.08
3	1	.11
2	.2	.13
.1	.3	.16
49.0	.4	.19
48.8	.6	.24
.6	.8	.30
4	51.0	.35
2	.2	.40
48.0	.4	.45
47.8	.6	.50
6	.8	.56
4	52.0	.61
2	.2	.66
47.0	.4	.71
46.8	.6	.76
.6	.8	.82
4	53.0	.88
2	52.8	.93
46.0	.4	.98
	.6	1.04
	.8	1.09

Computation of Effect of Refraction

$$10 \text{ miles} = \text{refract} = 10 \text{ ft} = \frac{1}{5180} = 39''.06$$

$$= 3''.906 \text{ per mile} = .2800 \text{ dia. per mile}$$

$$2''.627 \text{ per Kilom.} = .1876 \text{ " " Km.}$$

$$10 \text{ ft} = 10 \text{ miles} = 1000 \text{ ft} = 100 \text{ miles}$$

$$\begin{array}{r} 2062.65 \\ \hline 1584 \\ \hline 4786 \\ \hline 4752 \\ \hline 3450 \end{array}$$

$$\begin{array}{r} 39.06 \\ \hline 6214 \\ \hline 15624 \\ \hline 3906 \end{array}$$

$$\begin{array}{r} 3906 \\ \hline 25 \\ \hline 110 \\ \hline 112 \end{array}$$

$$\begin{array}{r} 25436 \\ \hline 26271884 \\ \hline 14 \\ \hline 122 \\ \hline 112 \\ \hline 107 \\ \hline 91 \end{array}$$

$$\begin{array}{r} 3906 \\ \hline 3919 \\ \hline 25 \\ \hline 1117 \\ \hline 112 \end{array}$$

$$\begin{array}{r} 1395 \\ \hline 14 \\ \hline 28 \\ \hline 005 \end{array}$$

Year	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099
1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	

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5.15 Barom. 30.135 Ther. 80.0
level. 1.650 38.5 11.0 49.5

37.6 10.2 47.8

37.4 10.2 47.6
148.13

Blue Hill

2.766

.756

.752

.755

.754

37

2.75.74 at 348.22 = ~~127.52~~

38.4 11.2 49.6 148.31
142

37.6 10.5 48.1

37.0 10.0 47.0

Clear hot

7.25 AM
June 15th 1877 Barom. 30.134 Ther. 74.5

level. 1.65.0 10.0 37.4 47.4 17.62

10.1 37.5 47.6 76.6

-1.6 9.6 37.1 46.7 76.1

233 11.0 38.8 49.8 76.3

32 10.2 38.6 49.0 76.4

53 10.2 38.1 48.3 176.32

.3733

48.4
48.1
165

Cloudy rather dark.

26

Oglethorpe Hill from H.C.O. 49.7						
Book	Date	Bar	Ther	Alr	Sw	Cor Alt
11.30	June 8th 6	29.962	74°	112.06 112.3	50.7 50.4	112.7 111.7 113.1
	June 15th 4.15	30.140	80.4	110.75	50.4	110.94 110.56
	5.15	.136	80.0	110.74	48.22	110.54 111.14
	7.20	1.34	74.5	111.32	48.1	110.95 111.69
15	21.45	29.928	70.4	111.68	48.6	111.39
"	21.55	"	"	111.88	48.67	111.61
"	22.05	"	"	111.95	48.4	111.29
16	2.40	29.838	78.6	112.38	48.3	111.63
17	2.40	29.964	76.8	111.18	48.95	110.78
"	6.10	30.004	74.9	112.30	49.25	112.06
"	7.40	30.030	70.0	113.76 113.44	49.45 50.81	113.63 113.74
17	21.00	30.170	72.8	111.94	52.1	109.76 148.22
	21.15			111.78	48.43	111.08 148.22
18	5.00		76.2			
		30.064				
19	6.35	29.820	84.6			

Jan 15th 1877. 24h 35 Min 70.4 Barom. 29.928
 Cloudy. raining at intervals.

level.	265.0	9.3	38.4	47.7	276.4
	265.0	10.0	39.1	49.1	6.8
	265.0	9.6	39.0	48.6	6.5
"	"	9.5	38.8	48.3	6.8
"	"	10.1	39.4	49.5	6.9
"	"	9.6	9.0	48.6	24
	111.68 - 29			48.6	276.58

265.0	9.6	38.8	48.4	276.8
	9.7	9.1	8.8	6.3
	9.8	9.4	9.2	7.2
	9.2	8.6	7.8	7.4
	9.6	9.2	8.4	6.7
	9.8	9.4	9.0	44
111.88 - 27 = 111.61			40	276.88
			48.67	

9.3	8.9	48.2	7.4
9.4	9.1	8.5	7.2
9.8	9.6	6.4	
9.3	9.0	8.3	7.2
9.6	9.4	9.0	6.7
9.8	9.6	9.4	6.4
9.6	9.4	9.0	47
111.98 - .69 = 111.29		28	276.98
	1.3	58.8	
	16.4/15	48.4	
	69		

June 16th 240. ~~175.0~~ 175.0 10.5 38.7 48.7 285.4
 10.5 8.2 48.7 5.8
 10.6 8.0 8.6 5.2
 10.6 8.2 8.8 5.4
 9.8 7.4 7.2 5.3
 10.2 7.8 8.0 19
 54 20 285.38
 48.3 7.5
 112.38

17th 240 176.0 10.9 38.4 49.3 287.4
 10.6 8.2 8.8 7.1
 10.5 8.3 8.8 6.8
 10.6 8.4 9.0 7.4
 10.7 8.5 9.2 7.2
 10.4 8.2 8.6 9
 3 48.75 287.18

6.11 ~~10.3 8.2 189.8~~

178.0 11.2 38.0 49.2 90.3
 11.4 8.4 49.8 90.3
 11.2 8.3 49.5 90.4
 11.2 8.3 49.5 90.1
 10.4 7.7 48.1 90.4
 11.0 8.4 49.4 15
 112.80-24 178.0 " 49.25 290.30

45
 24

Jan 17th 1877. 7 40
rather dark.

25 20/15 7.43
133

17.8 7 47

52

Jan 17th 1877. 21 little
hazy

74

175

148.42

111.04

1.28

109.76

24
17.2/1.1
1.28

level uncertain

10.5	38.0	48.5	291.6
10.8	2.7	50.5	91.8
11.0	8.5	95	91.4
10.5	8.4	89	91.9
11.0	8.6	9.6	2.1
11.0	8.7	9.7	
		6/27	38

49.45 91.76

11.3	2.0	50.3	91.5
11.4	9.4	50.8	91.1
11.2	9.4	50.6	91.4
10.9	9.3	51.2	91.8
11.6	9.7	51.3	91.4
11.2	9.5	50.7	91.4
10.0	9.4	50.81	91.4

ham

10.0	9.4	50.8	37.2
7.4	39.0	48.4	37.4
11.5	41.0	52.5	37.6
11.3	40.6	51.9	7.7
11.4	40.8	52.2	8.0
13.3	42.5	52.6	7.4
11.2	0.6	51.8	3.1
		52.1	37.62
		49.7	

Jun 17 at 21h 15 m. 274	9.3	38.6	47.9	37.3	85.4
	9.7	9.3	8.9	7.6	5.8
149.28	9.6	9.0	8.6	7.3	5.8
111.78	9.5	8.8	8.3	7.3	5.8
	9.6	9.0	8.6	7.5	6.1
	9.5	8.8	8.3	137.50	245.78
			48.43		

$$\frac{13}{10 \frac{6}{15}} = .7$$

Jun 19 at 0 30 R2 1520

Comparison of the
 Cent. Dist. Inst. Inst.
 1/2 1/2 1/2 1/2

Time
 100 5 L 35

A	B	C	D	In center.
269	26.8	26.4	26.6	

	Wach.	Mod.	N. Kear.	S. Kear.	Wach.
Wachin	⊕	+	+	+	+ 120 ^{126.5}
Moos	+	⊕	+	+	+ 120
M. Kear.	+	+	⊕	+	+
S. Kear.	+ 70	+	+	⊕	+ 70
Wachit	+ 126.5	+	+	+	⊕
Stacy M.	+	?	-	-	-
Star King	+	+	-	-	-
Marshall	+ 78	-	-	?	-
Whiteface N.Y.	+ 130	?	-	-	-
Stratton	?	+	-	-	+
Monard	+ 104.5	-	+	+	+
Agassiz	+ 80	-	+	-	+
Engle	? 147	-	-	-	+ 80
Arden H.	-	-	-	+	+
Minne	+	-	-	+	+
Grindich	+	+	-	+	+ 76
do					

Distant points observed 1876

State	Obj.	Ref.	Ang.	Elev.	Dist.
Rock-Hall			233.0	.47	
			282.2	.36	
			310.7	1.74	
			318.4	2.56	
			321.6	2.18	
Bright Hill	11		270.1	2.42	
	12		28.4	2.08	
	"		58.8	1.74	
	"		60.4	2.00	
	"		66.1	1.88	
Rock above R.H.	"		69.6	2.07	
	15		358.3	-.09	
	"		358.6	-.06	
	"		359.7	-.09	
	"		19.8	.79	
	"		25.9	1.32	
	"		27.6	1.23	
	"		36.8	1.18	
Quail Hill	16		12.7	-.02	
	Chocoma	34	4.0	-.25	
	"		3.9	-.252	
Mt. Adams		38	214.9	-2.46	
			215.6	-2.23	
			220.6	-2.32	
	Min.		45.5	-2.24	
Gossage Blue?			52.5	3.11	
			50.3	2.20	

1877

		Ref.	Ang.	Elev.	Dist.
Saguarito	Monadnock	56a	345.7	-1.65	
			345.8	-1.65	
	Kearsarge		352.4	-1.17	
			352.5	-1.17	
				-1.17	
Washington	Katahdin (not)	63	251.2	-2.33	
	Goosey		256.4	2.59	
	Blue		272.6	2.42	
	not "		277.4	2.89	
	Camels Hunt		163.6	2.06	
Jefferson	Katahdin (not)	67	133.2	-2.18	
			134.8	2.27	
	not - Alton		136.0	2.08	
			137.0	1.97	
	Blue		156.0	2.16	
			160.9	2.61	
			162.0	2.57	
	Goosey?		154.7	2.78	
	Kearsarge		300.7	2.25	
	Katahdin		311.2	2.20	
"	Katahdin approx		122.5	1.76	
Liberty	William ^{Hill} Thist		134.5	1.94	
	Ammanon		135.6	1.76	
	Gunstock?		288.3	2.47	
	my dist.		309.7	2.57	
			313.1	3.16	
	Camels Hunt		11.6	1.75	
	Kearsarge dist		21.4	1.87	
	Carr?		24.5	1.65	

	Ref.	Ang.	Elv.	Dist.
Doubledend.	102	126.0	+65	
		134.2	+137	
M. West - Cropper Com ?	107	143.4		
Hearsey.	"	166.8	-1.08	
		166.8	-1.15	
	108	327.6	-16	
Ingers		329.9	+01	
Essey		330.8	+09	
Bald Riv. W. Co.		333.4	-29	

Comparison of Horizontal Angles around c 1876

Mr. J. J. J. J.

	B. 76.	2	Sta.	a-b		Sta after a-c	
Chelacommey	285°	6'	285 01	-5	-7	02'	-1'
Whitford	287	24	287 31	+7	+5	30	+1
Mossilauk	330	36	330 36	0	-2	36	0
Safayette	336	18	336 24	+6	+4	23	+1
				+ 13	+9		
				- 5	-9		
				<u>8'</u>	<u>18'</u>		
				+ 2	4.5		

Mr. Shearant.

						c	
Chelacommey	251	39	251 41	+2	+4	45	-4
Whitford	267	06	267 59	-7	-5	59	0
Mossilauk	270	62	270 09	-3	-1	12	-3
Safayette	320	48	320 46	-2	0	47	-1
	332	09	332 09	0	+2	11	-2
				+ 2	+6		0
				- 12	-6		-10
				-10	12		-10
				-2'	2.4		-2

Mr. Adams

	P_{76}	P_{76}	$a-b$	$\frac{a-b}{c}$	$\frac{a-b}{c}$
Olney	210° 30	210 32	+2	32	0
Mossland	235° 30	234 28	-2	29	-1
Leafyette	239 33	239 35	+2	35	0
Agassiz	260 36	260 43	[+7]*	18	0
Sequoyia	148 12	148 7	-5	94	-2
M. Mont.	170 18	170 24	+6	22	+2
			+10	+10	+2
			-7	-7	-3
			3	17	-1
			0	3.4	-

* Houde not equal (?)

Mr. Willy

			P_{76}	$a-b$		Dist. after.	
Mossland	7° 55'	54	+1	0	53	+2	
Whitaker	303 49	45	+4	+3	47	+2	
Chocoma	281 15	12	+3	+2	12	+3	
Kearney R.	234 22	24	-2	-3	22	0	
Starr King	124 18	18	0	-1	13	+5	
			$\frac{6}{5} = 1.2$	$\frac{9}{5} = 1.8$			

M. Mont.

Dec. 13, 1879

	P_{76}	P_{76}	$a-b$	$\frac{a-b}{c}$
L. Whitaker	183 0	55	-5	-2
Mossland	219 0	56	-4	-1
Leafyette	242 18	19	+1	+4
Chocoma	285 06	04	+2	+1
Montrose	291 24	25	+1	+4
Adams	300 06	57	-9	-6
Marich	322 42	26	(-16)	(-16)

+2
-20
-18
-3

9
18
± 3.0

Readings 139.6 to 241.3 plotted

Too large by 58' a plot, except those plotted later which are readily distinguished

Orientation from Mt. Adams.

Orcus	210°30'	210°32'	-2'	+5
Moosilauke	235°30'	234°29'	(1°)+2	-1
Lafayette	239 33	239 35	-2	-5
C. S. Star King	260 36	260 43	-7?	+4
Peguanuk	148 12	148 7	+5	+2
N. Mont.	170 18	170 24	+6	+3
				+7
				-10
				20
				±3'
				-2
				.6

diff. day, norm.

		before Protractor	ECP	diff	after Protractor	
Moosilauke	367	56' + 54'			53' 45"	1
		55'	54'	+1	53'	-2 53
Whitaker	303	55' + 43'			54' 40"	
		49'	45'	+4	47'	-2 46
Chawcorover	281	16 4 14			14 4 11	4
[? Did W.H.P. sell this right. 1 pg]						
[Did J.P.E. remain in the right. 15- W.H.P.]			12	+3	12	-3 12
Piggy { Record made by W.H.P. } 234		20 4 24			22 4 22	±1
(Peguanuk)		22	24	-2	22	0 21
Star King	124	18	18	+0	13	-5 13
				5/16	5/12	-2

$$\begin{array}{r} 130.6 \\ 246.0 \\ \hline 84.6 \end{array}$$

$$\begin{array}{r} 99.57 \\ 35 \\ \hline 30 \\ \hline 32.5 \end{array}$$

$$\begin{array}{r} 189 \quad 55 \quad 50 \\ \hline 50 \\ \hline 50 \end{array}$$

$$\begin{array}{r} 15 \quad 42 \quad 75 \\ \hline 50 \\ \hline 62.5 \end{array}$$

$$\begin{array}{r} 105 \quad 42 \quad 40 \\ \hline 60 \\ \hline 50 \end{array}$$

$$84 \quad 14 \quad 30$$

$$84 \quad 13 \quad 00$$

$$\begin{array}{r} 100 \quad 58 \\ 330 \quad 72 \\ \hline 432 \quad 10 \\ \hline 72 \end{array}$$

$$\begin{array}{r} 279 - 57 - 15 \\ \hline 25 \\ \hline 20 \end{array}$$

$$\begin{array}{r} -56 - 40 \\ \hline 30 \\ \hline 35 \end{array}$$

$$\begin{array}{r} 195 - 42 - 55 \\ \hline 40 \\ \hline 47.5 \end{array}$$

$$\begin{array}{r} -42 - 35 \\ \hline 35 \\ \hline 35 \end{array}$$

$$84 - 14 - 32.5$$

$$84 - 14 - 00$$

$$\begin{array}{r} 84 - 13 \\ 92.5 \\ 60. \\ 77.5 \\ 66.25 \\ \hline 296.25 \\ \hline 74. \end{array}$$

$$84^{\circ} 14.2$$

$$\begin{array}{r} 2 \overline{) 114} \\ 57 \end{array}$$

$$+5 \quad -2$$

$$1.5$$

$$1.0$$

$$* \quad +3 \quad -6$$

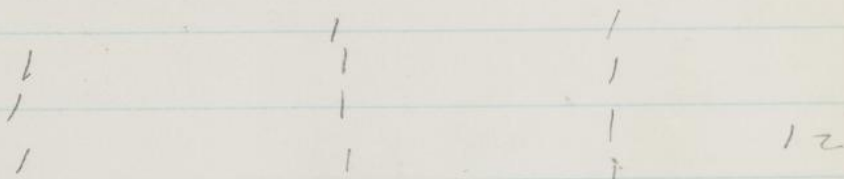
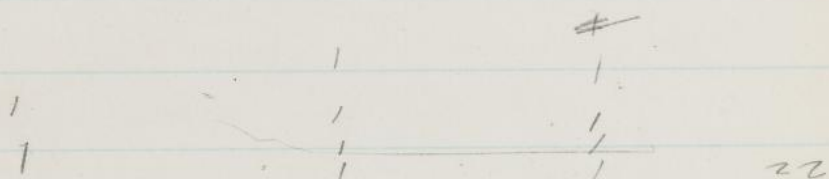
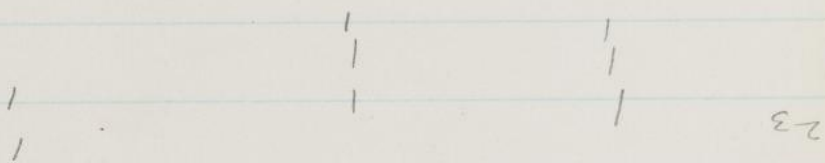
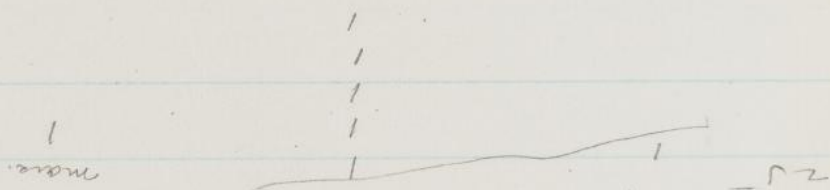
$$.0$$

$$.0$$

$$295$$

N. Moat-000 00
70 0740

8



Black

red

blue

$$\begin{array}{r} 14 \\ 15.50 \\ \hline 29.50 \end{array}$$

$$\begin{array}{r} 8 \\ 15.5 \\ \hline 23.5 \end{array}$$

$$10 \quad \frac{6.5}{10} \text{ au low.}$$

$$\begin{array}{r} 14 \\ 9 \\ \hline 23 \end{array}$$

$$\begin{array}{r} 3 \\ 29.5 \\ \hline 26.5 \end{array}$$

From Mt. Dec 13, 1899.

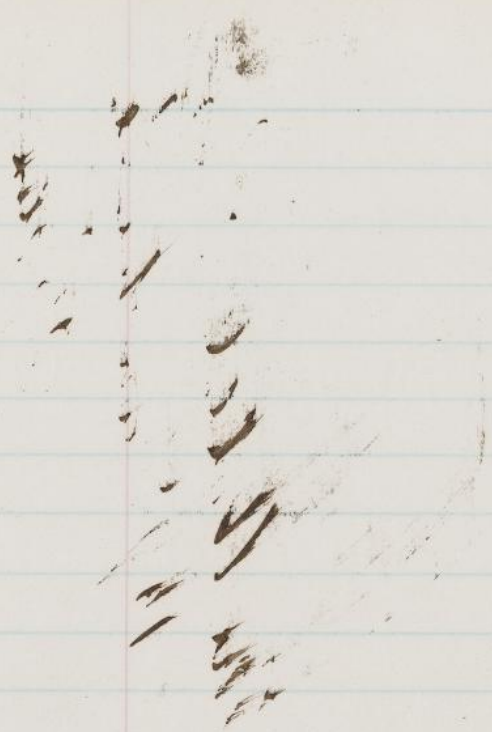
	P 76	Wetzel	
Chocoma	179 36	179 32	-4
Kalbeconoy	201 24	201 8	-16
Whitefan	202 36	202 45	+9
Cleusa	230 0	230 7	+7
			+16
			-20
			-4

	Thorn Mt. N.W.	
L. Mont.	318 30 318 43	+13
M. Mont.	330 36 330 41	+5
Kalbeconoy*	347 54 347 50	-4
Cleusa*	10 18 10 16	-2
Pleasant*	73 30 73 31	+1
Monsie*	81 36 81 38	+2
Adams	98 18 98 16	-2
Murich	130 36 130 25	-11 (MCS.)

	Thorn Mt. N.E.S.	
L. Mont.	318 30 319 4	+34
M. Mont.	330 36 331 2	+26
Pleasant*	73 30 73 31	+1
Murich	130 42 130 13	-29

} observed from station III (S)
 } observed from station II (N)

* No back light for these photographs needed



Stars suitable for measuring Refraction at H.C.O.

<i>Star Name.</i>	<i>R.A.</i>	<i>Dec.</i>	<i>Alt.</i>	<i>Mg.</i>
α Cass.	0 33	55° 51'	8° 14'	var.
α Persei	3 15	49 25	1° 48'	2
δ "	3 34	47 23	-10'	3
α Antares	5 7	45 52	-1° 45'	1
ϵ Ursa. Mj.	8 50	48 32	58'	3
θ " "	9 24	52 15	4° 38'	3
γ " "	11 47	54 24	6° 47'	2.3
η " "	13 43	49 57	2° 20'	2
θ Rostes	14 21	52 26	4° 49'	4.3
β Draconis	17 28	52 24	4° 47'	3.3
γ " "	17 54	51 30	3° 53'	2.3

β Cass.	3	58 28		2.3
ϵ Cass.	30	53 13		4
α Cass.	33	55 51		4.3
η Cass.	42	57 10		2.
γ "	49	60 3		3
δ "	1 18	59 36		4.3
ν Persei	1 30	48 0		4
ρ Persei	1 36	50 4		4
δ "	2 36	48 42		4.3
η "	2 42	55 23		4
τ "	2 46	52 15		3
γ "	2 54	53 1		4
ϵ "	3 0	49 9		2
α "	3 16	49 25		4
ϵ 1"	4 0	47 23		4
10 Camel.	4 52	60 16		

Name	My.	R.A.	Dec.	Alt.
α Urs. May.	3.4	8 55	47 38	
ν " "	4.3	9 42	57 37	
β " "	2.3	10 54	57 2	
χ " "	4	11 40	48 28	
γ " "	2.3	11 47	54 23	
δ " "	3.4	12 9	57 43	
ϵ " "	2	12 48	56 38	
ζ " "	2.3	13 59	55 31	
η " "	2	13 43	49 56	
ι Bootis	4.5	14 12	51 56	
δ " "	4.3	14 21	52 25	
ϵ Draconis	3	15 22	59 24	
δ " "	4.3	16 0	58 54	
β " "	3.2	17 28	52 24	
ν Lyr.	4.5	17 30	55 16	
ν Lyr.	4.5	17 30	55 15	
ξ " "	3.4	17 51	56 54	
γ " "	2.3	17 54	57 30	
θ " Reg.	5.4	18 49	59 14	
α Cygni	4	19 14	53 8	
ϵ " "	4	19 27	51 28	
ϕ " "	5	19 52	52 7	
ζ Cephei	4.3	22 7	57 36	
δ " "	4	22 25	57 47	
γ Cassiopeiæ	4	22 26	49 39	

Equipment

Micrometer screw.

Barometer (Green 624)

Thermometer divided - glass.

" chert brass scale

" very sensitive

China glass

Steel tape 10 m.

Rumford Bar.

" (Kash)

New C.S. scales 2 E. 10000

Ruler 8"

Scale brass cardboard

Table top. 2

R.R. gauge.

Scale brass paper

Black paper

Red paper

Pencil

Pens. Various

Distances measured - Map

	0	C	C-0
Blue Hill - Maroon	1347	5388	5384.2
Esopus	907	2656	3676
Esopus			54694
Thompson Manor	1904	77.16	76864
Unknown Blue Hill	2339	93.56	94076
Esopus	1709	68.44	65657
Wachusett Blue Hill	1758	70.32	70700
Esopus	2616	66.4	6664
Thompson Hill	1417	56.68	9599.0
Unknown	1580	60.00	60093
Palucciana	2254	90.16	90006
Esopus Mt Independence			97179
Unknown	1550	62.00	61990
Thompson Hill	2836	113.44	113351
Wachusett Mountain	309.6	123.96	247.8
Esopus	132.4	52.96	
Albany	143.9	57.56	
Thompson	167.4	66.96	
Agamont	319.1	127.64	
Palucciana	2256	90.24	
Esopus	304.7	121.88	
Esopus	477.6		
Esopus	4200	16800	
Chocoma	4248		
Esopus	742		
Esopus	4680		
S. Kear	2484	99.36	
Esopus	4268	170.72	
Cuba	3892		
Esopus	2276		
Esopus	3098		

~~221.6~~

326° 32'

(221.6) 295° 32'

261° 27'

312.2 203° 54'

218° 35'

217.8 298.3

225.6 280.6

240.0 276.1

255.5 260.6

286.3 229.8

297.5 218.6

316.5 200.3

316.6 199.5

322.2 193.9

319.6 196.5

330.0 186.1

334.9 182.2

"

340.1 176.0

345.5 170.6

309.8 206.3

Scenaper	2838		
Monmouth	1127	45.88	
Candis Hut	5270		
Killipier	3642	1456.8	
Eymison	3142		
Graylock	2667		
Rockwell	1888		
Asenbush	524		
Washigton	5706	204.24	
Cardigan	3215	128.60	
High Hill & Westchester		NE. 40 18	82286
Watatish & Westchester		SE. 1 19	75707
Wachusett - Bear Mt.		NW 76 0	149473
Brunswick H.		SW. 2 11	68447
Charlton H.		SE 19 4	84039
Chenil.		SW. 45 20	131287
Fry Mt.		SE. 37 50	114595
Homes Hill		SW. 79 26	63497
Put Green		NW. 59 41	146125
Thompson Hill		SW. 8 13	130803
Richards Mt.		SW. 85 24	126078
Reppel Lead		NE. 45 45	112450
Uncertain	205.9	205.9	1561 03.9
Hearings	181.3	181.0	26.0
Monmouth			
Mered	155.9	156.0	51.0
Choroma	1965	196.7	10.3

345.9	170.2
0.3	
0.3	155.9 -
357.0	1591
7.8	148.3 -
29.4	126.7 -
58.1	98.0 -
53.8	102.3
154.4	11.7
323.0	193.1
	178.6

(Atmospheric Temp. C.)

		<u>Bureau</u>	<u>Air M</u>	<u>S.T.</u>			
	22-10-20	27.692 691	63.1		-085	27.61	
59	22-1-10	27.700	63.0	16.4	27.62	Wind very high	62
71	2-20	27.704	61.2	16.0	27.62	Many heavy clouds	61
10.1	5-20	27.760	60.1	14.9	27.65	Clear with clouds & 59	
						Phenomena N. W.	
						Wind subsiding -	
10.5	5 ^h 45	27.762	59.4	14.2	-8	27.68	58
10.6	6 ^h 54	27.806	57.2	12.2	-7	27.73	54
12.4	7.37	27.814	54.6	11.4	6	27.75	53.4
12.6	7.50	27.818	53.7	12.2	-6	27.76	54
21.0	16 12	27.904	46.2	7.6	-4	27.86	46
0.9	20 ^h 07	28.015	60.0	14.0	-8	27.94	57
2.6	21 ^h 51	28.030	61.6	12.8		27.95	55
4.2	23 ^h 24	28.012	60.8	13.9		27.93	57
4.9 (25.9)	0 ^h 09	27.996	62.4	15.0	-8	27.92	57
6.1	1 23	27.958				27.89	

Observations from Mr. Washburn
June 22d 1877 Ohio

Time	deg.	Sec.	Summit
Monmouth.	1410	422 100	720
		428 11.5	720
		435 12.0	728
		435 11.5	723
		433 128	729
		438 11.6	
		1 1 34.4	2.0
		437 11.8	72.40
		18 56	

Aug 9.9
8

Mr S. Kear	1410	8.7 40.2	276.0
			278.6

Mr S. Kear	Base of House 1390	9.3 41.2	228.1
			228.6
		8.2 40.8	227.6
			227.8
		8.8 41.2	227.6
			227.9
		8.5 40.4	227.6
		8.8 41.0	228.1
		³⁶ 8.72 40.92	227.91 7.3

Monmouth 1390

Dinner

1^h 10^mMonadnock.

1,490

9.0

41.0

0.800

angle 9° 8'

11.5

43.2

0.808

156.4

10.0

42.2

0.806

11.8

43.4

0.806

12.6

43.8

0.816

10.9⁴⁹42.7¹³⁶807³⁶1^h 17^m Keamsauge (2°)

1,480

9.8

41.4

2.374

angle 30.5'

11.0

43.0

2.380

177.1

9.4

41.3

2.366

8.5

40.6

2.369

8.3

40.6

2.372

7.0

6.8

36.1

9.40

41.36

237.22

1^h 22^m Sunstock & Unconocoig

G. angle 53° 4' 200.0

1,470

9.6

41.5

2.593

2.626

U. angle 53° 2' 197.8

8.2

40.3

2.594

2.615

G. " 53° 6' 200.2

8.5

40.8

2.588

2.616

8.8

41.0

2.596

2.610

8.6

40.6

2.587

2.618

37

4.2

874

40.84

49.58

58

259.16

37

261.74

259.16

2.58

1^h 30^m (2) Killington Peak

angle 2° 2'

1,500

9.6

41.4

2.304

2.556

10.0

42.3

2.309

2.566

10.3

42.4

2.314

2.564

9.0

41.2

2.304

2.562

9.5

41.6

2.308

2.560

5.4

39

9.68

41.78

39

8

23078

25616

1^h 35# =

<u>2 K.P.</u>		<u>Q. dim</u>	<u>W</u>	
2.88	5.52	5.63	5.82	19
2.89	5.51	5.58	5.79	21
2.94	5.48	5.46	5.86	40
2.92	5.44	5.76	5.92	16
2.88	5.48	5.58	5.98	40
2.89	5.56	30.1	37	13.6
2.98	5.55	56.02	58.74	2.72
2.86	5.48		2.72	
{2.96}				
{2.80}	5.47			
2.88				
2.84	5.52			
28.9.6	5.501			

1^h 45 Hoosac?

Peak No. 1,

Peak " 2

Saddle " 2

near Mt,

Saddle " 1

Level
1.510

Equinox

Monadnock * 3

Killington Peak

Monadnock * 2

1^h 55

Monadnock 1 1.500

Mt. a little beyond

Distant Mt. Sunapee?

Temple (?)

Barnett

3 P angles

312.6 899.2 1.54

327.1 1138 2.02

328.1 1147 2.015

332.9 1195 1.84

333.8 1204 2.39

335.4 1220 1.79

342.4 129.0 1.57

355.4 142.0 2.08

2.4 149.0 2.29

4.3 150.9 2.06

9.8 156.4 0.80

16.4 163.0 2.61

24.4 171.0 2.06

27.9 174.5 2.07

Level

2 ^h 00 ^m	Temple #2		28.6	175.2	2.00
	Kearsage So	level 1.46	30.6	177.2	2.35
	nearer Mt		32.3	178.9	2.09
	Pack Monadnock		34.3	180.9	1.91
2 ^h 03	Mtn beyond	1.47	39.0	185.6	2.62
	nearer Mt		42.4	189.0	2.29
	Unconscous #3		53.2	199.8	2.61
	Gunstock		53.4	200.0	2.57
	Unconscous #2		55.8	202.4	2.57
2 ^h 05	" #1	1.46	57.3	203.9	2.59
	Distant Mt		65.2	211.8	2.68
	Do do		69.3	215.9	2.83
	do Peak		73.0	219.6	2.87
	do Right hand		73.4	220.0	2.97

2 ^h 22	K.P. (?) Hec cloudy			G dim	U.	
2 27	Kearsage So.			2.544	2.588	44
	2.310	2.443		2.564	2.589	2.5
	16	46		2.566	2.592	2.6
	09	46		2.559	2.589	30
	07	49		2.552	2.586	34
	11	38				
		22		35	44	159
	3 53	2.444		2.5570	2.5888	3.18
	2.10.6					
	09	39		2.563	2.591	2.8
	18	39		2.557	2.589	3.2
	14	41		2.564	2.585	1.9
	10	36		2.556	2.598	4.1
2 30	08	36		2.558 ²	2.596	3.29
	59	41		2.576 ²		2.0
	118	382		67		150
				57		
				256.4	259.8	3.04

h
5-20

Minalroche

Level
1,540

9.0	41.6	0.852
10.5	42.8	.848
10.8	43.3	.854
10.8	43.4	.848
11.0	43.4	.848
21 1042	42.90	50 85.00

h
5-30 Kearsarge So.

1,510

10.0	41.8	2.641
8.0	40.5	2.648
8.0	40.5	2.648
8.5	40.6	.650
9.0	41.0	.650
3.5 8.70	40.88	37 264.74

Top of Treesh
5-35 Kearsarge SoTop of
MtnTop of
HouseBot of
HouseTrees

2.648	2.661	2.669	2.761	.98
.608	.624	.636	.726	.12
.610	.618	.630	.716	.12
.605	.616	.627	.716	.11
.602	.616	.624	.716	.08
73 26146	135 26270	186 26372	135 27270	

h
5-37

Gunstock & Lyndeborn

G

2.567

I

2.603 36

.557

.602 45

.558

.601 43

.561

.602 41

.559

.597

52
256.045
260.10 406

90

5^h 41 - Not Kearsarge

2-345

2,478

2.346

.479

.336

.476

.336

.476

.336

.476

49

35

13.72

2329⁸2,477⁰

hms.

seconds

6 In Lays C.W. 7 obs.

2.620

2.670

5.0

Chinese Island.

2.608

2.650

4.2

~~2.629~~

2.645

1.6

2.600

2.651

5.1

2.611

2.645

2.4

261.18⁵⁹260.98³⁹

261

19.3

3.86

E.C.P.

2.596

2.637

.041

2.599

2.636

.037

2.602

2.635

.033

2.603

2.642

.039

2.601

2.637

.036

Very brilliant
Green inter

1,440

10.5

2600¹267³⁷

3.72

2.190

6^h 50

angle

358.6

Munawach

9.5

Kearsarge

38.7

another one

357.4

6^h 52^m

Gunstock Lyndebors	2.5.48	25.92	44
	.5.45	.585	40
	.535	.582	47
	.527	.578	51
	.536	.576	40
	<u>191</u>	<u>413</u>	<u>22</u>
	253.82	258.26	444

6.57 Kearsarge

.568	.684
.572	.683
.566	.684
.578	.702 .679
.568	.687
<u>52</u>	<u>17</u>
57.02	68.34

7.00 Wash^m

.530
 548
 538
 535
 543
44
 253.88

Pinnacle

.571
 .571
 .570

2

~~757~~
~~757~~
~~759~~

Wash^m

.558
 .564
 .535
 .542
 .549
38
 55.76

Pinnacle

.701
 .698
 .700
 .701
 .696
46
 69.92

7 04

7.05 ? Addams .552 ? Madism .725
 ? Passacumaugus .483

7.10 ^{C.W. 2} Guinstock Lyndeboro 7th North Pennacook
 254.6 259.3 4.7
 255.3 259.2 4.9
 55.5 59.2 4.7
 55.3 59.4 4.1
 54.3
 56.0 59.6 4.5
 52
 51.7
 55.78 259.34 4.58

7.20 Guinstock Lyndeboro
 .493 .535 43
 .492 .535 43
 .495 .541 46
 .488 .542 54
 .486 .536 50
 49.08 53.80 36
 472

Guinstock Lyndeboro
 .488 .540 52
 .493 .533 40
 .500 .537 37
 .491 .547 56
 .517 .563 46
 489 120 231
 49.78 54.40 462

7 25	Gunstock	Lynde	
	54.6	59.8	5.2
	5.2	60.2	5.0
	5.4	60.2	4.8
	4.8	59.9	5.1
	5.4	59.6	4.2
	55.0 ⁴⁸	60.6 ^{57.94}	3.3
		63	4.66
		60.05	
1	Dome cln	Parm.	
	63.2	171.9	

	Pinnacles	Wash	Dome cloud
7.32	.672	.510	.628
	.672	.503	.624
	.668	.503	.661
	.671	.502	.698
	.663	.498	.748
	.671	.507 ⁶	.738
	57	23	497
	66.95	50.38	68.2

7.35	Gunstock	Lynde	
	514	563	49
	514	561	47
	516	559	43
	517	560	43
	512	559	47
	23	2	21
	51.46	56.04	45.8

Gunnstock Synchrotron

53.4	58.0	4.6
53.1	57.8	4.7
52.5	57.0	4.5
52.4	58.0	5.6
52.5	56.9	4.4
^{3.9} 52.76	²⁷ 57.54	^{3.5} 4.76

7 43

7 45

Pine Coash

722	584
731	577
718	576
714	568
718	556
⁵³ 72.06	⁷⁶ 57.22

7.47

Gunnstock Synchrotron

5.12	56.0	48
5.14	56.2	48
5.14	55.9	45
5.18	55.7	39
5.18		46
5.13	55.9	

21
51.42

47
55.94

26
45.2

Saturday Jan 22^d 6.6°C 4 very clear.
 16.15 hr 159.0 7.0 41.5 wind high
 S.C.D. L. very clear.
 do. 62.8 67.8 7.0 birds much.
 me. 62.6 69.4 6.8
 61.9 69.4 7.5
 62.5 69.1 6.6
 62.3 68.8 6.5 6.88
^{2.1} 62.42 ^{1.5} 69.30 5.8 41.0
 H. dim

11621 159.0 7.5 42.4
 Wash Ad. dim
 62.9 64.6 8.19
 62.2 63.8 8.14
 62.1 63.4 8.13
 62.1 63.4 8.12
 62.1 63.6 8.13
^{1.4} 62.28 ^{3.8} 63.76 8.21
 S. L.
 61.7 68.6 6.9
 61.8 68.4 6.6
 61.8 68.5 6.7
 61.7 68.6 6.9
 62.4.2 68.8 6.6
 61.9.2 ^{2.9} 68.58 6.74
 61.84

96

4.48
1.66

60.6	67.6
60.8	67.2
61.3	67.8
61.4	67.7
60.6	67.6

60.94	67.98	6.64
W.	Ad	Pin

4.54 ±

7 7.2

1540	7.5	42.3
61.6	62.9	79.9
61.1	62.6	80.1
60.4	62.7	79.8
59.7	62.4	79.3
60.8	62.1	80.3

60.72	62.54	79.88
K	mus	mus

65.6	52.9	78.6
------	------	------

5.6	52.8	9.3
-----	------	-----

5.4	76.1	9.1
-----	------	-----

5.3	76.2	9.2
-----	------	-----

5.6	82.2	9.2
-----	------	-----

2.5	12.5	79.08
-----	------	-------

65.50	56.14	
-------	-------	--

158.0	75	42.0	29.968
-------	----	------	--------

50.5	moned		ag 9.6
------	-------	--	--------

157.0	90	43.6	087.9
-------	----	------	-------

159.0	80	42.0	88.4
-------	----	------	------

	85	42.4	88.3
--	----	------	------

	85	42.7	88.2
--	----	------	------

	85	42.6	88.2
--	----	------	------

	85	42.5	88.6
--	----	------	------

8.30	18	42.36	88.34
------	----	-------	-------

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

~~537~~ 8. Union
 1580 6.1 41.0 53.2
 61.2 68.4
 61.2 68.0
 60.8 67.5
 60.9 67.6
 60.7 67.7
 60.76 67.84 6.88
 1580 6.4 41.2 74 27.962 537ⁿ
 walk

6.14 8.4 look 312.4 27970 10.2
 1520 7.4 41.6 192.4
 70 41.2 91.9
 6.5 40.6 92.6
 70 41.0 92.6
 8.0 42.4 92.4
 71.8 41.86 192.38
 Equinox look 41.86
 150 9.0 42.9 75.6 341.4 70.2
 7.5 42.5 76.1
 8.5 42.5 75.4
 8.5 42.5 75.7
 8.5 42.5 75.7
 8.5 42.5 75.7
 9.0 42.60 75.70
 9.6 42.60 75.70

Walk Air Rain
 1580 75 41.5 46.7
 59.6 59.76 63.6 61.88 78.2
 59.8 62.7 78.7
 60.2 60.6 78.7
 59.6 61.2 78.8
 59.6 61.4 79.3 78.74
 62 41.0

6.35
angle
38.9
1580

Moschillook

7 ne. P. to.
Kearsarge

Trees

8.0 42.3

576

582

612

585

608

607

618

594

603

572

1580

8.5^{59.57}

42.5

658
65.16

787²³
784.6

angle 38.9

Micronomer

angle 53.2

level 1560 9.5 44.0

617

614

615

612

618

1560

6^a 45

6²⁶
61.52

9.0

Synode

672

676

676

666

670

6¹⁰
67.20
5.64

43.0 27.984 Thence 7.8

Mond.

at least
 (7 miles or distant, as
 (16 miles or 30 miles))

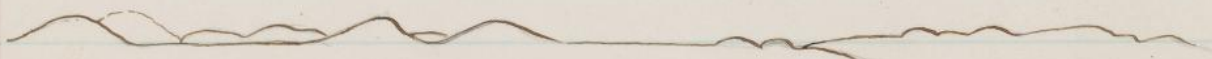


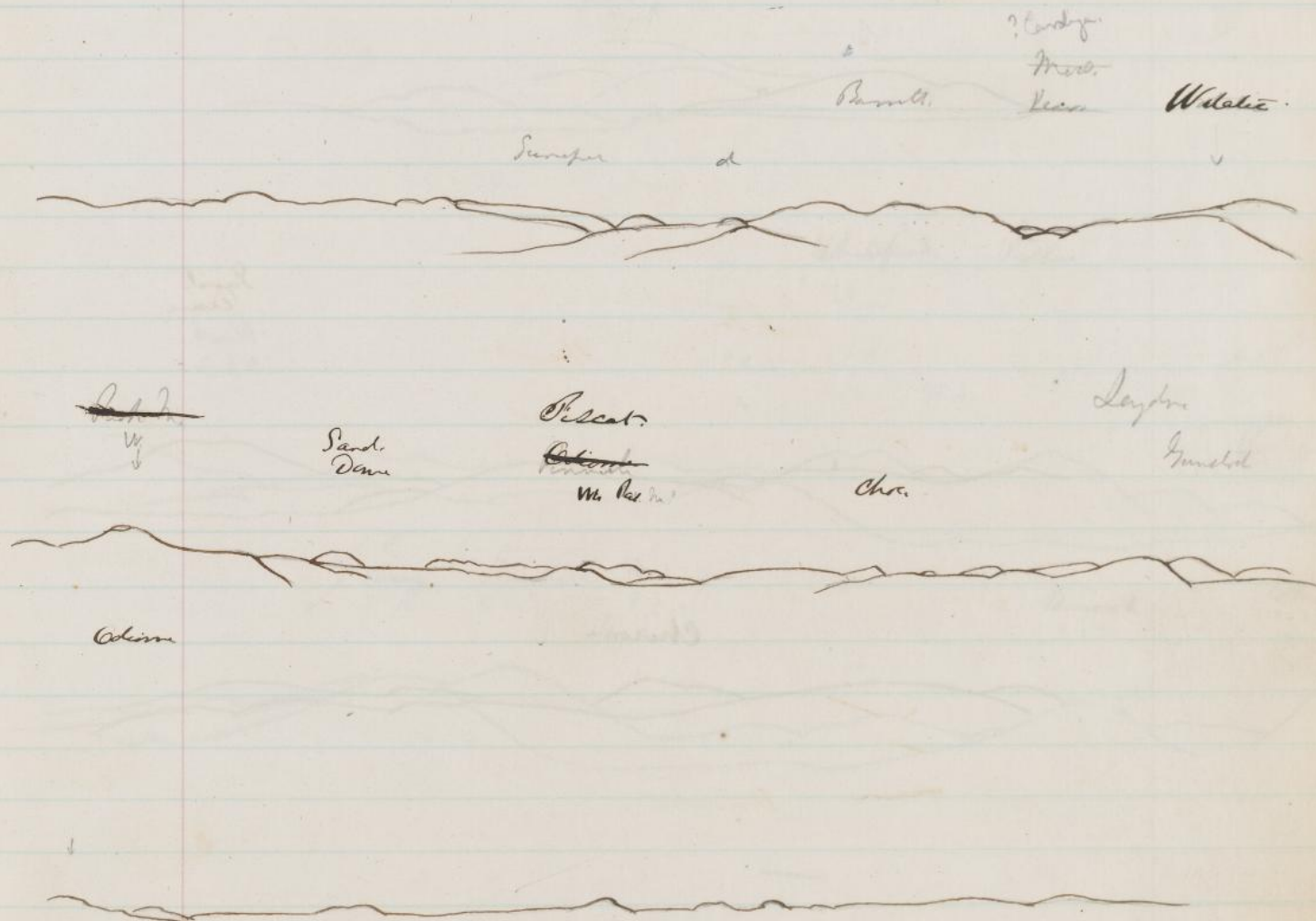
Wether Hiller Purple Rock M. Mod. beyond
 S. Keas Rock M.



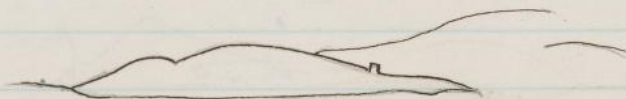
Wether Hiller Purple Rock M.

1st Pk.
 2nd Pk.
 3rd Pk.
 4th Pk.
 5th Pk.
 6th Pk.
 7th Pk.
 8th Pk.
 9th Pk.
 10th Pk.





Cloud
Mass.



Kear.

Sagel.
Cone
Pine
443

430

434

4



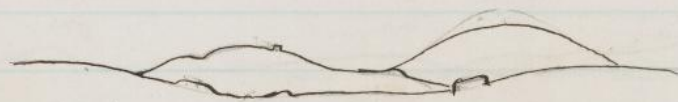
peaks

49.8

Chicopee

430





Top of line

Whiteface Pass

Pass

Was

666

676

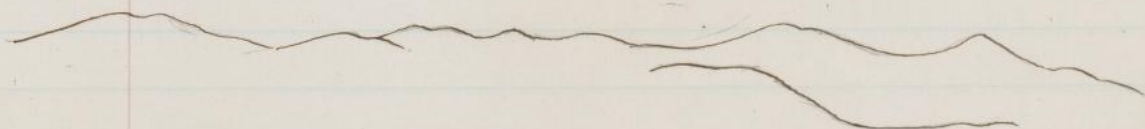
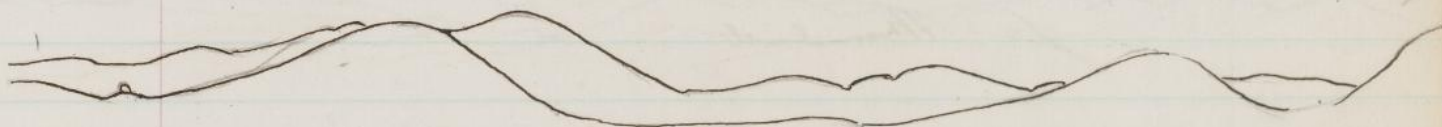
Pangua

J. E. 526

Handbook 522

Uncon 2
55.8

Uncon 1
203.9
56.9



Long.

Englehardt (idem)

Englehardt

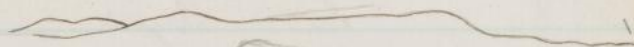
near

(not identical with
preceding J.R.E.)

Englehardt (idem)

Little Moon
(J.R.E.)

Therodant



(mean)

Equina (idem)

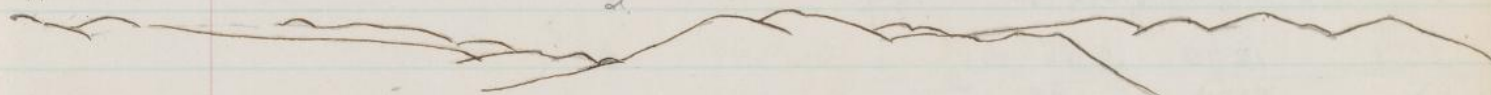
12 Ph.

Gap (G. R. E.)



Killey & Rh. (idem)

Sander



Scorpio

Ustata

A. Obs. P. Obs.

6148

457.3 07.9 41.7

Sun. Logdd.

62.5 67.5 5.3

62.5? 67.5 5.0

61.7 68.0 6.3

63.7 69.0 5.5

62.3 68.1 5.9

6 55	27	4	5.0
	62.54	68.08	5.60

57.0

P. Obs.

7.55

28.014

13.7

1.570

80

41.6

2.55

* 65.4

67.8

4.4

5.3

9.2

3.9

6.9

9.4

4.5

5.2

8.5

3.3

5.4

9.2

3.8

65.22

9.22

3.98

Sun

10.1

66.4

58.5

65.4

66.3

~~Observation~~

Mandual

1.580

8.0

41.4

17

8.478 41.82

2 871

.817

20^h 08

8.7

42.1

2 871

.870

8.4

41.6

2 871

.817

8.8

42.2

2 871

.869

5.7

39.5

2 871

.867

4.6

6.8

2 871

.869

4.36

41.36

2 871

.869

Manaducok

8 ^h 12	1580	8.5	41.7	.872
		8.3	41.6	.871
		8.3	41.7	.869
		7.8	41.2	.873
		7.4	40.8	.873
		8.0 ³	41.40 ²⁰	.871 ⁹⁶

Washⁿ Adams. Pinn.

Wash. Adams. Pinn.

8 ^h 16	1570	8.8	41.6	.666	.704	.810
				.655	.685	.808
				.657	.692	.808
				.654	.687	.814
		7.4	41.0	.672	.688	.822
				54 66.08	69.12	62 81.24

~~Manaducok~~ Gunstock & Lyndeboro

Gunstock Lynde.

8 ^h 20	1570	7.2	40.8	.655	.690	35
				.646	.684	38
				.646	.688	42
				.658	.688	30
	1570	6.2	40.0	.652	.687	35
				<u>65.14</u>	<u>687.437</u>	<u>360</u>
8.24	7.00	110	1560	8.0	41.0	down
						wt
						down
						wt

			Lo.	U ₂	U ₁
	Lo 155.0	10.0	42.7	69.2	66.7
	"	7.8	41.0	68.9	66.2
8.40	Lo "	10.0	42.9	69.3	67.2
	"	9.0	42.5	69.1	66.3
	Lo "	9.0	42.0	69.5	66.2
	"	8.9	41.9	69.4	66.6
	Lo "	9.0	42.0	69.2	66.7
	"	10.5	43.0	69.2	66.5
	Lo "	9.0	41.5	69.3	66.5
	"	9.5	42.5	69.3	66.7
	Lo "	9.2	42.2	69.04	66.49
	9.7	42.9	42.2		

	Lo	U ₂	U ₁
	52°50'	52.8+	52.9
	53°15'	53.1	53.1
	55°25'	55.4	55.4
	57°0'	57.0	57.0

9 ^h 15	Graylock	1,506	312.4	99.1	1.954
	Peak		326.6	113.3	1.994
	Peak		327.6	114.3	1.989
	Mt. beyond		330.8	117.5	2.057
	Ladder #2		332.5	119.2	1.823
	nearer Mtn.		333.6	120.3	2.378
	Ladder #1	1,508	335.2	121.9	1.786
	Equinox		341.5	128.2	1.786
	" #2				1.825
	Near Mt.		355.2	141.9	2.102
	Killington	1,532	1.8	148.5	2.316
	Little Monadnock		3.8	150.6	2.111

9 ^h 25	Grand Monadnock	1.555	9.6	156.3	0.848
	East and dods		11.3	158.0	1.237
	Dome " "		10.9	157.6	1.134
	Summit		16.2	162.9	1.972
	Sunapee		24.1	170.8	2.434
	Barrett		28.2	174.9	2.069
	Sunapee *2		25.6	172.3	2.427
	Nov. Keamsago		30.4	177.1	2.423
	Temple		34.1	180.8	2.674
	Temple R		35.3	182.0	2.754
	Keamsago (So)		38.7	185.4	2.683
	Mooselauke (dim)	1.544	39.2	185.9	2.658
	Pack Monadnock L		40.8	187.5	2.328
	" " R		42.1	188.8	2.362
	Ann				
	(Ann on Sill)	1.495			
	Passaconaway		44.6	191.3	2.573
	Tripyramis left		45.6	192.3	2.627
	Washington	1.486	46.7	193.4	2.608
	Pinnacle		46.6	193.3	2.749
	Adams		47.3	194.05	2.623
	Lyndeboro	1.497	53.0	199.7	2.633
	Lincolnton		53.4	200.1	2.594
	? beatamont *2		54.3	201.0	2.779
	" 1		54.8	201.5	2.732
	Unconscousc 2		55.7	202.4	2.603
	" 1		57.2	203.9	2.608
	Distant (?) Saddle		69.0	215.7	2.831

110

h
9.44

Distant

u wooded

u

Wataatic

near Hill

71.8

2.932

72.8

3.020

73.3

2.981

32.0

2.148

40.3

2.876

1.516

Gunstock
+
Leydeboers

1.530

10.0

43.0

G

L

2.651

2.682

2.642

2.679

2.639

.681

.640

.679

.639

.678

Therm 12.8

10.0

43.0

Ch. 7 ds.

2.642

26.78 376

10h 0

Gunstock

1.530

9.5

41.5

64.7

66.9

Leydeboers

64.3

67.1

wind rising

63.0

67.0

64.2

66.9

13.1

63.0

67.0

63.5

63.5

63.5

39

66.78

Location Station

N. Window all Room 19 N.E. corner as one flight

Axis all to cell 17. ans. - 14.5 + 2.5

" dist to E. side of window 28

" " corner room 163 ans

Cell to 319 ans

10/11 5 1/4

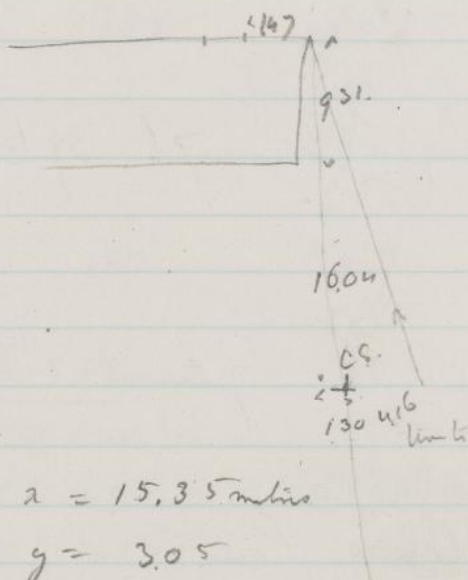
E edge window to corner 147

Width House

93.1

16.04

RA 130



$$\begin{array}{r}
 17 \\
 319 \\
 \text{C.S. } 16.04 \\
 \hline
 4.04
 \end{array}$$

Inet to C.S. $z = 15.35 \text{ miles}$
 $y = 3.05$
 $z = 4.04$

4.6 miles from change came to C.S.

to 2100 to corner of house, houses 10000 ft from C.S. to E.

				<u>G</u>	<u>L</u>	
11 ^h 24'	Gunstock } Lyndeboro. } 1560	7.6	39.6	.658	.689	31
				.654	.691	37
				.658	.684	26
				.648	.689	41
		7.5	39.8	.654	.687	33
				²² 65.44	⁴⁰ 68.80	¹⁸ 336
					336	

				Wash	Adams	Pui
11 ^h 2.8'	Wash. Adams. Pui. 1560	8.0	40.3	.679	.698	.814
				.677	.684	.813
				.682	.691	.808
				.676	.698	.813
				⁶⁶⁷ .668	.692	.816
		6.2	38.8	⁶⁷³² 67.64	⁶⁹¹⁵⁶ 69.26	⁸¹²⁸ 81.28

				<u>G</u>	<u>L</u>	
11 ^h 33'	Gunstock x Lyndeboro					
	(2) 1560 (2)	8.7	41.0	.651	.687	36
				.646	.684	38
				.646	.686	40
				.645	.682	35
	Therm 14.7			.636	.682	46
	1540	9.6	41.6	²⁶ 64.52	²¹ 68.42	¹⁹⁵ 290
					4.57	

					G	Δ.	
11	39	1550	0.70	38.8	64.5	68.6	4.1
					65.1	67.9	2.8
		<i>Quint. Logue</i>			65.1	68.0	2.9
					66.4	68.1	1.7
		1550	0.80	38.9	65.7	67.7	2.0
					65.36	5.3	13.5
						68.06	2.90
						5.36	
						2.70	

Abt. March.

1550	080	400	286.5
	097	413	286.4
	098	415	86.4
	92	412	86.7
	110	424	86.0
	477	24	86.20
	9.54	41.48	86.40

11.54

~~1540~~

154.0	09.7	40.4	67.9	64.4	65.5
	7.7	38.5	67.5	64.7	65.2
	8.0	39.0	67.4	64.9	65.2
	9.0	40.0	66.0	65.0	67.7
	7.0	38.0	8	30	36
153.0	64	39.9	67.20	64.75	65.90
	8.28	39.18	$\frac{6.72}{2.45}$		

1520

7.0 39.0

G

L

64.3	67.3	30
64.0	67.7	27
64.6	67.5	29
64.1	67.3	32
64.6	67.6	30

1540

7.4 38.2

16
64.32

2.4
67.48
3.6

114

				<u>G</u>	<u>M</u>
0 ^h 06	1540	6.0	38.0	.635	.670
				.634	.673
				.635	.667
				.638	.668
				.628	.664
				²⁰ 63.40	⁴² 66.84

Therm 15.0

curvus clouds ~~begin~~ to collect - 4.8 37.0

0 42	1800	7.4	38.8	Cupls Barn. 365.9
		8.5	39.6	67.8
		8.8	40.0	65.9
		9.8	40.8	66.0
		7.2	38.4	66.6
		6.4	38.0	66.44
		31	76	
		7.62	39.52	
			5.5	
			3.5	

Calc. H₂O

0h 49.	2450	9.0	40.4	55.7	59.7
				5.5	9.7
				5.2	9.8
				5.4	9.8
				5.6	9.8
				²⁷ 55.54	59.76
					⁴²²

16.9

27984 63.3

8.4 40.4

Snustock & Lyndeboro.

h
1.25

1.490

9.0 - 40.6

G.

T.

2.618

2.634

.604

.638

.601

.635

.606

.639

.597

.636

26
260.52

32
263.64
0.52
312

Snustock 1.510

9.6 - 40.8

.813

9.8 - 40.8

.812

9.8 - 40.6

.807

9.5 - 40.5

.816

8.5 - 40.5

.812

22
9.64 32
40.64

81.20

Kearsarge (Southern)
not Pequawket

1490

10.4 - 41.3

K.

Trees

2.634

2.742

.633

.744

.627

.736

.635

.737

.635

.738

h
1.35

8.0 - 39.5

Wash. Adams, Pin.

1490

9.0 40.2

W dim 63.28

Adimmer

P 73.94

2.624

.631

.644

.750

.626

.653

.749

.617

.645

.748

.612

.637

.746

.622

.673

.752

62.01

62.78

139

7090.45

Very dim

Hillington.

$$\begin{array}{r} 1^h 42 \\ 1.500 \end{array} \quad 8.5 \quad 39.8$$
KBare hill
nearer

$$\begin{array}{r} 2.298 \\ 2.285 \\ .284 \\ .283 \\ .272 \\ \hline 28.44 \end{array} \quad \begin{array}{r} 2.544 \\ .542 \\ .543 \\ .539 \\ .543 \\ \hline 54.22 \end{array}$$
Gunstock + Lyndeboro.

$$\begin{array}{r} 1^h 45 \\ 1490 \end{array} \quad 9.0 \quad 40.3$$
G.L.

$$\begin{array}{r} .602 \\ .600 \\ .596 \\ .592 \\ .590 \\ \hline 59.60 \end{array} \quad \begin{array}{r} .634 \\ .631 \\ .632 \\ .634 \\ .632 \\ \hline 63.26 \end{array} \quad \begin{array}{r} 32 \\ 31 \\ 36 \\ 42 \\ 42 \\ \hline 33 \\ 366 \end{array}$$
Roof of Barn to
Right of Field

27° 9

inclination of wire for L.I.

= .6 per 1:1 =

me which level etc.

center

$$\begin{array}{r} 27.9 \\ \hline 305 \\ \hline 304 \end{array}$$

.298

.299

.299

.298

.298

$$\begin{array}{r} 2984 \\ 2926 \\ \hline 58 \end{array}$$
L.I. of field
29.0~~304~~

.290

.296

.295

.291

.290

2924

.293

			B.	L.	
1153	h	Leynd	61.7	63.8	2.1
149.0	11.0	42.2	62.0	64.1	2.1
			61.2	64.0	2.8
			61.3	64.7	3.4
149.0	10.0	40.5	60.7	64.0	3.3
			61.398	64.12	13.7
				61.32	2.74
				2.74	

157² Then 17.0 27.964 63.5

Dismounted Barometer
& turned Screw 26 $\frac{1}{2}$ turns

Additional Azimuths.

Moored.	99	156.4
not S. Kear.	30.6	177.1
Moored	9.8	156.4
not S. Kear.	30.5	177.1
Genl.	53.4	200.0
"	53.6	200.2
Logist. J. E.	53.2	199.8
Kill. Hk.	22	148.8
v. d. E. H.	358.6	145.5
Moored	9.5	156.4
Kear.	38.7	185.6
amstr.	377.4	144.3
Moored	9.6	156.4
K. Ph	1.8	148.6
Equin. C. Ph.	341.4	128.2
How. H.	387	185.5
"	389	185.7
Logist. J. E.	53.2	200.0
	430	190.0
	43.4	190.4
Sand Dune	44.3	191.3
Whitfane	46.6	193.6
	47.6	194.6
Chocoma	49.8	196.8
	52.8	199.8
Gunstock	53.2	200.2
Union. 2	55.5	202.5
" 1	56.9	203.9

28
27
24
27
27
13
150

Discussion of ^{alternative} curvature radii at two points
 $a_1, b_1, a_2, b_2, a_3, b_3 = \text{observed}$

What is $a - b$?

$$a_1 - b_1 + a_2 - b_2 + a_3 - b_3 +$$

$$\frac{a_1 + 2a_2 - 2b_1 +}{2n-1}$$

$$= \frac{(a_1 + a_2 + b_1) - (b_1 + b_2 + b_3) - (a_3 - b_3)}{2n-1}$$

$$\frac{\frac{\sum a}{n} - \frac{\sum b}{n} - \frac{a_3 - b_3}{n}}{1.8}$$

list of unmounted level table.
 Jan 25th 5.35

Secm	lv.				
- 85.0	15.4	111.4	126.8	96.0	
90.	41.0	137.2	178.2	96.2	
95.	51.8	148.4	200.2	96.6	
100.	61.0	163.5	224.5	102.5	
5	91.8	188.0	279.8	96.2	
- 10	103.4	199.4	302.8	96.0	
5	91.0	187.4	278.4	96.4	
0	65.6	164.0	229.6	98.4	
- 95	51.3	148.8	200.1	97.5	
90	37.9	138.3	178.2	98.4	
85	12.4	111.3	123.7	98.9	
90	40.8	139.4	180.2	98.6	
95	49.4	149.3	199.1	99.5	
0	65.9	165.8	231.7	97.9	
5	85.2	158.1	243.5		
0	64.3	164.8	229.1	100.5	
95	48.8	149.0	197.9	100.3	
90	38.7	138.8	177.5	100.1	
5	88.3	187.8	276.1	99.5	

85	90	95	100	5	10
126.8	178.2	200.2	224.5	279.8	302.8
123.7	178.2	200.1	229.6	278.4	
	180.2	199.1	231.7	243.5	
	177.5	197.9	229.1	276.1	
10.5	34.1	37.3	35.9	24.3	
125.2	178.5	199.3	228.7	278.1	
53.3	208	29.4	19.4		

Form for Observations
 Time (Name of Object) (Paras) (Values)
 (Sitting level) End A End B Phot. Red

(Sitting level) End A End B
 E.
 Mean

1453m	Sunset for English	27.964	17.0
149.0	110	42.2	61.7
		62.0	64.1
		61.2	64.0
		61.3	64.7
149.0	10.0	40.5	60.7
		9	6
1490	10.5	41.35	61.18
			64.12

July 14th - 23d

Mrs. Hatch on S. Kearsarge

Washington

Wendover.

Wachusett.

Moscow.

E. S. on Washington.

Aug 4th - 13th.

Mrs. Edwards & Moscow.

Wachusett, Kearsarge

Kinsman, Starr King.

Cuba Hancock

E. S. & S. Kearsarge

Mrs. Hatch on Wachusett.

Wachusett, Joe English.

Washington, Whitman, Odessa.

Moscow, S. Kearsarge.

English.

Azimuths from Map.

Mound G.S. Kear. N 310.2
 " " N West 301.0
 " " N Kear. 299.2
 Saw hatch 295

Wachsett G

Mossilack	41.8	181.0
S. Kear	109.2	180.88
Prospect	34.4	188.4
See Bear	338	189.0
Sad Dam	318.4	190.96
Camp	320	190.8
Int. mud	30.9	191.9
White	296.4	193.16
Pass.	29.1	193.7
Wick	300	192.8
Jiff	305	192.3
Cham.	263	196.5
Cart Dam	272	195.6
Regenack	237	199.1
Union	18.9	203.9

for English	199.4	135.1 = 54.04
Union. 1		149.4 = 59.76
Gunclark		303.9 = 121.56

Kear

below 30 km ±

Kill 144 km

below 48 ±

White

below of Odessa 149.6

Guntst	121.56	1.477.5	1.185
Joc English	52.04	.2926	
		<u>1.1855</u>	
Whitef.	165.3	2.7340	
Odium	59.6	.3552	2.379
		<u>2.3788</u>	
Kearney	99.4	.9880	
	30.	.0900	.898
		<u>.898</u>	
Hallif	145.7	2.1025	
	48	2304	1.872
		<u>1.8721</u>	
Parr.	168.0	2.8224	
	59.6	.3552	2.467
		<u>2.4672</u>	
Moss.	170.7	2.9140	
	30	.900	
		<u>2.824</u>	2.824
Wash	204.24	4.1713	
Odium	59.6	.3552	3.816
		<u>3.8161</u>	
Wash Hear	27.2	128.8	1659

Proposed Hints from Mr. Ws

Whitaker
Camel's Head)

Carmel)
Adamb.)

Katehedin)

+ Sunset.)
Rangus)

Unear.)
Rass.)
Joe Long)
Wachusalt)

+ Phomed.)
S. Hear.)
H. Hear.)

Haring.

Greylock

Estimated Cost of Research.

Large land C.	125
Medium land. D. E. G.	35
B. G. G.	40
Landings near & Washington	5
Washington, E. G. S.	10
" J. D. E.	15
Kearney, H. G.	15
" " G. G.	10
Wash. E. G.	10
" " G. G.	15
Kearney, D. G.	5
Wash. H. G.	10
" " G. G.	15
Landings	50
	<hr/>
	\$360.

45.0

2

4

6

8

46.0

2

4

6

8

47.0

1

2

3

4

5

6

7

8

9

48.0

1

2

3

4

5

6

7

8

48.9

79

49.0

81

1

.84

2

.87

3

.89

4

.92

5

.95

6

.97

7

.00

8

.03

9

.05

50.0

.08

1

.11

2

.13

3

.16

4

.19

5

.21

6

.24

7

.27

8

.29

9

.32

51.0

.35

1

.37

2

.40

3

.43

4

.45

5

.48

6

.51

7

.53

51.8

56

.9

.59

52.0

61

1

64

2

67

3

69

4

72

5

75

6

77

7

.80

8

.83

9

.85

53.0

.88

1

.91

2

.93

3

.96

4

.99

5

1.01

6

1.04

7

1.07

8

1.09

9

1.12

54.0

1.15

1

1.17

2

1.20

3

1.23

4

1.25

5

1.28

6

1.31

Baran 30.010 10.02 22. June 2

26.5

25 inches air bulb

26	32.6	.88
25	31.72	.600
24	31.124	.484
23	30.740	.446
22	30.294	.074
21	30.120	.016
20	30.204	.070
15	30.134	.080
10	30.054	.084
5	29.970	.068
0	29.02	
10	30.040	
Com Bar	30.026	

S. Kearsarge

Artigli	29.65	118.60
Blum Hill	35.81	143.24
Ungon	12.40	49.60
J. Eng.	12.64	50.56
Wachusett	24.81	99.24
	17.5	70.0
Menadrock	15.36	61.44
Winglock	33.86	135.44
Egwin	25.75	103.00
Lumpsee	4.86	19.44
Killgill	20.44	81.76
Alumby	12.25	49.00
Croydon	27.90	111.60
Marcy	46.78	187.12
Whitford	49.68	198.72
Cemeli Hill	33.30	133.20
Marsfield	371.5	148.60
Moor	113.8	45.52
Ciba	14.37	57.48
Cardiga	74.4	29.76
Morabank	17.80	71.20
Leipzig	22.11	88.44
Washingt	27.20	108.80
Wagman	25.32	101.28
Blue	481.4	192.56
Heard	27.47	109.96
Humboldt	10.56	42.24
Agament	24.14	69.56

	Analytic	Hes.
Acad. H.	144.0	57.6
Acad. H.		
Mineral	2236	89.44
Crofted	2130	85.20
J. Eng.	17.58	70.32
Uran	17.56	70.24
Kear	29.95	119.80
Quelch	30.63	122.52
Blue Hill	594	23.76

Int. Air and Wind Cells.
Jan 27th, 1877.

Int. Air	19.7			20.0	
one cell				16.2	
chart	17.8			16.4	15.8
	17.0	16.6	16.4	16.8	
	15.3				
	14.6			14.3	

$15^{\circ} = 59^{\circ}$ $20^{\circ} = 36^{\circ}$ 68°

Proposed Plan from Monmouth

(Moose Lake	9.9	131.20
Cardigan	10.6	88.96
(Hearst	19.8	61.44
(Wichita	23.0	170.24
Sad Dam	23.8	125.64
Parr	26.0	135.08
Carters Dam	25.9	173.72
(Candlish	39.7	94.52
Blencat Inc.	38.8	166.36
(Agamonticus	70.6	122.56
Unconscum	72.4	44.48
Ashby	122.7	89.76
- Blum Hill	130.6	108.48
- Washburn	156.0	45.00
- Gryphon	256.5	90.56
Eggs	294.0	88.44
(Killingworth	324.8	101.2
Levin	324.2	47.2
Whitman	318.9	222.44
Ascent	336.0	70.76

Comput. Report

$$\begin{array}{r}
 596 \overline{) 675} \\
 \underline{540} \\
 88
 \end{array}$$

$$- 3.1 \quad 1.55 \quad 1.38$$

$$- 2.90 \quad 1.45 \quad 1.30$$

$$- 1.13 \quad .56$$

$$+ 3.10 \quad 1.55 \quad 1.39$$

$$+ 3.10 \quad 1.55$$

$$- .50 \quad .25$$

$$- .50 \quad .25$$

$$- .57 \quad .28$$

$$- 1.87 \quad .93$$

$$67.5$$

$$- .14 \quad .35$$

$$+ .07 \quad .17$$

$$+ .16 \quad .40$$

$$+ 2.24 \quad 5.60$$

$$+ 2.14 \quad 5.03$$

$$+ 1.96 \quad 4.40$$

$$+ 1.31 \quad 3.28$$

$$- .34 \quad .85$$

$$- 1.18 \quad 2.95$$

$$- 1.27 \quad 3.18$$

$$165.3$$

$$\begin{array}{r}
 168.0 \overline{) 675} \\
 \underline{1350} \\
 3300 \\
 \underline{3375} \\
 750 \\
 \underline{675} \\
 75
 \end{array}$$

$$1215$$

$$13504$$

$$\begin{array}{r}
 12156 \overline{) 6752} \\
 \underline{6752} \\
 54040 \\
 \underline{54016} \\
 24
 \end{array}$$

$$+ 1.9$$

$$1.92$$

$$1.07$$

$$.96$$

$$- .33$$

$$- .59$$

$$- .61$$

$$- 1.06$$

$$- 2.07$$

$$2.70 \quad -1.90-348$$

$$6.85 \quad +2.25+405$$

$$1.55 \quad 1.95 \quad 381$$

$$5.68 \quad 1.08 \quad 195$$

$$5.60 \quad +1.00 \quad +180$$

$$4.25 \quad -35 \quad -63$$

$$4.00 \quad -60 \quad 108$$

$$4.00 \quad -60 \quad 108$$

$$3.56 \quad -104 \quad 187$$

$$3.55 \quad -105 \quad 189$$

$$3.42 \quad -1.18 \quad 213$$

$$3.37 \quad 1.21 \quad 109$$

$$6 \quad 1.24 \quad 112$$

$$5 \quad 1.25 \quad 112$$

$$4 \quad 1.26 \quad 113$$

$$3 \quad 1.27 \quad 124$$

$$2 \quad 1.28 \quad 115$$

Leaves from Mend.

Agnew	336.8	177.5	71.00
Abels	334.2		
Camb. Harp	(338.8 338.8)	435.2	174.08
Mansfield	343.0	484.7	193.88
Brooklyn	352.0	173.6	69.44
Cuba	33 3.8	285.3	114.12
San Jose	4.0	121.4	48.56
Moscow	9.9	328.0	131.20
Cardigan	10.6	222.4	88.96
Hinsden	12.2	362.1	144.84
Leffington	14.8	374.2	149.68
Reggie	18.1	176.8	70.72
Kensarge	19.8	153.6	61.44
	1.8		
Jiff	21.8	433.1	173.24
Wash	23.0	425.6	170.24
Aden	22.6	438.9	175.56
Bristol	21.1	229.0	91.60
Rooster	22.0	274.4	109.76
Sand. Dome	23.8	314.1	125.64
Trif.		337	134.8
Stewart	24.4	118.8	47.52
Whitman	25.9	330.5	132.20
Roller	26.0	337.7	135.08
Bald. Mith	27.4	122.4	48.96
Carter Dome	25.9	434.3	173.72
Red Hill	28.0	282.5	113.00
Moab	9.6	375.2	150.08
Choc.	9.2	346.5	138.60

Liquor betum	24.5	4	
	27.3		
P.I. 1	30.9	402.6 ^m	161.04
T.D. Disk.	34.8	240.6	96.24
Apple Co.	35.9	232.4	92.96
Beantell	37.6	187.1	74.84
Gustick	39.7	236.3	94.52
Healst.	38.8	415.9	166.36
Silvaton	43.4	212.3	84.92
Catant	55.1	200.6	80.24
Tot	60.9	183.9	73.56
Rutwace	68.9	199.8	79.92
Agamit	70.8	306.4	122.56
Unconom	72.4	101.2	44.48
King Weynt	95.5	"	
Alison Bay	48.0		
Arly	122.7	224.9	89.96
Stall Har.	122.3	254.0	101.60
Borput	128.1	218.4	87.36
Blum	130.6	271.2	108.48
Wichusett	156.6	162.8	65.12
		112.5	45.00
Longfark.	254.5	226.4	90.56
Egumore	294.0	221.1	88.44
Willby Ph.	324.8	253.	101.2
Donnells	324.2	118	47.2
Asuntay	336.0	177.4	70.96
Marcy (Yahawis)	313.4	511.3	204.52
Whiteface	318.9	556.1	222.44

49.7

.00

497

6

5

4

3

2

1

Collimation & Level Error

1.38
 164

 30.2 151

104.4

39.5	9.7	150	Obj. no
150.0	29.7	39.5	
	$.8$	9.6	
	9.6	9.5	
	9.7	9.4	
	9.7	9.5	

150.0 97 39.7

150.0 120 41.1 bubble runs at thickness
 is balanced...

155.4

$.4$

$.3$

$.4$

155.5

0.32 rotating telescope

Monadnock July 3d 77
Bar.

0 52
4 37

26.805

79.8

223

228

222

Half way House.		102	
	level	avg.	clw.
Flat Mt.	1	331.1	3.45
" "	2	335.4	3.28
Little Monisnock	1.34	349.8	2.32
Graylock	1.36	166.0	1.61
"	1.36	16	1.60
Equinox (left)	1.08	380.	1.08
" right	1.41	422.	0.99
? Equinox Bay.		522	1.24
? Stratton left		534	0.89
Arvon.	1.40	617	1.71

Secumini Memaduck

^{3.03}					
S. Hearley.	140.0	10.0	38.5	Ske	
	140.0	10.0	38.6	226.4	437.8
				437.8	
				16.2	
	147.0	10.4	38.7	227.4	437.8
				19.4	
	147.0	9.1	37.4	26.8	
				26.0	<u>26.96</u>
				26.6	
				26.6	
				27.3	
trunk from lumen		9.6	38.3	27.1	
	147.0	9.7	38.6	26.6	438.5
			35	27.2	38.1
	147.0	10.6	40.0	27.7	<u>27.60</u>
				27.4	
				27.3	
				27.9	
3 25	147.0	10.3	39.8	27.7	
	147.0	10.2	39.0	27.6	38.3
			39.2	2.9	38.2
				2.6	38.2
				7.2	38.4
		10.6	39.3	7.6	38.8
				<u>27.60</u>	<u>38.50</u>

3.37 Silvan. 83.6
 Encl. 146.0 11.1 40.1 380.6
 833
 79.6
 80.3
 80.8
 10.4 39.3 78.6
 80.60

3.57 Crochet 317.1 146.0 9.6 38.1 381.4
 145.0 11.03 39.9 Agam? Unc. 2
 352.6 376.1
 54.6 76.3
 52.9 75.6
 54.6 75.6
 54.9 75.6
 53.32 375.84

4.03 145.0 11.4 4.03 3742
 3741
 3743
 3732+
 3739
 145.0 12.0 4.08 3741 374.12
 6

for English
 3049 305.06
 3047
 3053
 3052
 3052

4.08
angle 3394

146

4.09

150.0 9.0 38.3
angle 60.7

150.0

9.6 38.5
9.3 38.4
47.7

Wachusett (gr.)

3124

3125

3118

3120

3119312.12

Ascuteer

2222

2216

2225

2222

2215221.00

4.14

150.0

13.2

41.6

12.3

41.0

4.18

146.0

13.3

42.0

any 283.3 C. & by do
Cloud cover

227.5

227.6

227.5

27.4

26.8

? S. Kearsley

4.28

146.0

13.0

43.0

27.0

13
227.26

Near 83.6 19.8

283.6

~~83.6~~ 39.411.1

294.7

30.9

Near 83.6 72.4

39.7

also from
 500 sdy 283.6 Dan 26.7 86 720 18.4
 1500 86 37.6 229.7
 9.4
 9.4
 9.6
 8.9
 9.3
 23
 229.46

504 Incident 303.6 148.0 10.3 40.1 81.3
 0.6
 2.3 81.14
 0.8
 448.0 10.0 40.0 0.7

very heavy
 clouds threatening

for Eng 339.4
 Odium? 341.6

5.11 Agamemnonians Agam? Anom. 2
 146.0 9.7 39.9 354.0 376.2
 angle 334.7 354.7 376.3
 354.4 376.3
 355.4 376.4
 146.1 9.6 39.8 354.1 376.3
 354.52 376.30

Wachusett.

5.16 148.0 10.5 40.6 311.0 311.06
 angle 60.6 310.7 53 318.6
 311.1
 310.8
 10.6 40.5 311.7

S. Kearsarge 288.6
 ? Mousilauke (approx) 273.6 ^{given} ^{line}
 Pack Monadnock (?) 3462 371 145
 Peterboro? ? 3541 376 145
 Temple ? 62 ~~428~~ 428 145
 Barret. gr. ? ^{partly} ^{wooded} 191 466 145

5.37

Graylock?

~~1536~~ 154.0 10.4 40.8 2288

angle 158.6

Barns. 540

26 ins 772.

at other 68.6

dist " 17.4

Barns 26.76 64.0 16.2

lat lev.	40
nat mds	29
ang.	47
width	100
	<hr/> 216

S Kearsary	19.8 17.8	283.6 283.6 283.6 243.6 317.1	+53.6	19.8	0
Crotchet	53.3	317.1	154.1		
Unea 1	72.7 2.4	336.5 336.2		72.4	+1.5
Pagan?	70.5	334.6			
Palae.	70.9	352.6 334.7		70.6	+2.5
Unea 2		376.1			
f. Eay	75.6	339.4			
Urah	158.9 66.8	60.7 60.6	156.0		+8.5
Accut	337.2	241.0	336.0		+1.2
Ins.	29.8	303.6	39.7		-1
Thues appu	279.8	273.5	9.9		-1
hry.	154.8	158.6	154.5		+3

$$\begin{array}{r} 421 \\ 264 \\ \hline 157 \end{array}$$

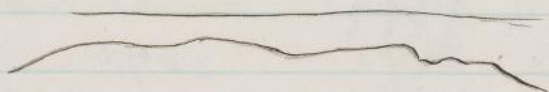
$$\begin{array}{r} 701.0 \\ 262 \\ \hline 439 \end{array}$$

$$\begin{array}{r} 241 \\ 260 \\ \hline 600 \\ 260 \\ \hline 338 \end{array}$$

$$\begin{array}{r} 303.6 \\ 218 \\ \hline 396 \end{array}$$

$$\begin{array}{r} 158.6 \\ 36 \\ \hline 51.88 \\ 260 \\ \hline 254.6 \end{array}$$

Crochet



Ag.

unl

J. Ag

Colin



1 (25910
 51910
 51910
 51910
 51910
 51910



Serial C.

Scale divisions later of eyepiece.

Four measures of comb gave approx. .01928) A

.01917

.01919

.01919

.0192

A

B

Serial length = 18 in \pm

$$219 \quad 18.00 : 0.192 = 206264 : x$$

1066

20626

128

2190

= 63 div. ser.

112

1 div

interval lines = 219" = 3' 39"

1 turn screw = 209" = 3' 29"

1 div " = 3.65

prob. error 1 div = .73" and .43"

3.437

365

1.460

Miranda Level C.

153

July 6th 1877. 6.30 P.M.~~form of level~~

Reading of barometer by lower An.

53.0

level.

13.6

64.8

52.6

53.1 2

52.9 3

53.6 3

53.6 3

53.2 1

13.6

64.8

next do

53.28 $\pm .21$

next line

56.6 3

12.6

63.8

56.4 1

56.3 0

55.8 5

56.4 1

12.6

63.9 $\pm .12$

15

56.30 $\pm .12$

July 6 to 18 77, 22h.

Sound in W. River.

level 9.66 92

9.69 = zero for level.

form of level angle 120°

Scm. B

A

level B

log h. l. l.

A + B

9.69

26.8

77.0

52.3

101.8

65

10.1

61.

51.

71.0

63

14

43.4

42.0

55

44.8

16.6

65

9.6

61.8

52.2

70

71.4

15.9

67

17.5

69.8

52.3

86

87.3

14.5

69

24.8

77.0

52.2

102

101.8

16.9

71

33.3

85.4

52.1

118

118.7

65

10.1

62.4

52.3

72.5

63.9

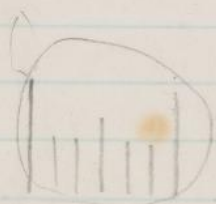
8

8 mm. = 1 div.

3563

2368

1195



Angle of Prism A.

3 28 13.3 21' 25.8

14.5

14.1

14.4

13.9

4.2

21 13.84

prism not yet enough 4

given image of lens.
Distance 21.266

21.264

255.168

2.54

1020672

1275840

510336

648.12672

Angle 325°.4

level 11.5 + 63.5

Screw B 9.697

28	356.3	6.5	7	250.1	6.6	356.3
22	349.8	6.7	6	243.3	6.8	262.3
21	343.1	6.8	5	236.8	6.5	94.0/14
20	336.3	6.5	4			84
19	329.8	6.7	3			100
18	323.1	6.5	2			98
17	316.6	6.7				20
16	309.9	6.6				
15	303.3	6.7				
14	296.6	6.6				
13	290.0	6.8				
12	283.2	6.5				
11	276.7	6.7				
10	270.0	7.7				
9	262.3	5.6				
8	256.7					

156

Prism A.

$$\begin{array}{r} \text{true } 10 = 283.0 \\ \text{line } 10 = 183.0 \quad d = 87 \\ 270.0 \end{array}$$

$$\begin{array}{r} 165.5 \\ 82.9 \end{array}$$

$$\begin{array}{r} 210.0 \quad d = 78.8 \\ 288.8 \end{array}$$

Prism B

$$\begin{array}{r} 3000 \quad 1626 \\ 4343 \\ \hline 1383 \quad 3000 \\ 1374 \end{array}$$

1380

$$\begin{array}{r} 3000 \quad 4380 \\ 1618 \\ \hline 1382 \quad 3000 \\ 1380 \text{ cm} \end{array}$$

13725

1381

$$\begin{array}{r} 3000 \quad 3810 \\ 2140 \\ \hline 860 \quad 3000 \\ 810 \quad 83.5 \end{array}$$

$$\begin{array}{r} 1 \text{ mm} = 34.24 \\ 185 \\ 27392 \\ 10272 \\ 2424 \\ \hline 4725.12 \quad \text{ag. B} \\ 78' 45'' \end{array}$$

$$\begin{array}{r} 3424 \\ 83 \\ 27392 \\ 1027 \\ \hline 6 \quad 2841.9 \\ 47' 21'' \end{array}$$

Accuracy of setting on tree tops

Lens on tree

Roof of Houses.

38.6 5

8.2

38.5 4

9.4

37.4 7

10.2

37.6 5

37.9 2

image during P.E. az 1.4

38.2 1

38.3 2

38.9 8

37.8 3

37.4 7

38.06 ± .39

.39

E

G.

No. 5= 21 46.8

19 2.3

21 0.7 18 58.4 16

No. 10 2 44.5

19 4.4

~~2 2.3~~ 18 58.6 14

No. 15 43 40.1

19 6.8

43 3.7 14 16.0

20 24 33.3

24 ~~5.7~~

July 24 1877

W. Divisions on plate in cyphers.
 mic 30 57.5

57.0	39.6	5
56.9	39.6	5
57.1	39.9	2
56.9	40.1	0
56.9	40.3	2
57.6	40.2	1
57.2	40.3	2
57.5	40.2	1
56.6	40.6	5
115	40.6	5
57.15	40.14	±.24

$$\frac{36}{24} = 1.5$$

PE = ".86

5th
 Data

5	57	56.9	19	2.7
10	11	59.8	18	57.3
15	30	57.1	18	55.4
20	49	52.5		

20	53.5	53.8	18	55.4
	54.2			
15	57.8	57.4	18	58.7
	57.0			
10	58.7	58.7	19	0.4
	58.8			
5	58.4	58.3		
	58.2			

Angle of plate

B

15.	10° 30'	54.0	}	10° 30'	53.5	}	73'	57.2	
		53.0							
9	16	55.6							
		55.9	}	9° 16'	55.3	}	73'	37.5	
11	44	31.2							
		30.7							
				11	44	30.0			

A

1	30'	53.2	}	90	53.0	}	48'	21.1
		52.7						
0	42	31.9		42	31.9			
2	17	1.2		137	1.2		46'	8.2
							47'	14.6

Diameter of field. system B.

2	14	57.5	}	85'	39.7
	13	57.9			
0	49	18.0			

Diameter of field system A

0	25	44.1	180.6
2	18	51.3	178.12
1	53'	57.8	10 54'
			114'
	113'	57.8	

33	29.8
25	33.8
2°	7'
	54.0

177.58
180.06
20 4'

Local Mount. Mt. Haver.				Local Best. Gen		
Date	N.H.	Best- Gen.	Gen.			
May 26 '76	41	45		75.		
29	2			July 20	12	
June 1			3	21	24	
18	6	7	7	22	37	
27	17		2	24	39	
July 10	3		2	27	17	
19	7			28	20	
20	15	11	11	29	96	
24	5	6	15	31	50	
26	16	17	9	Aug 2	28	
27	22	1	4	3	22	
29	4	1	30	5	22	
Aug 3	3	1	12	6	5	
" 4	3	11	6	7	25	
" 5	1	1	1	8	4	
" 7	10	2	8	9	97	
" 9	2	1	11	10	58	
12	-	2	4	11	86	
15	1	9	8	13	17	
18	3	1	2	14	41	
24	2	-	1	15	4	
29	4	2	5	16	39	
Sept 1	-	1	2	17	27	
10	1	-	2	19	58	
12	42	7	9	20	35	
23	1	-	2	22	58	
				24	14	
				25	32	
				25	50	
Estimated total 470.						

1875
 Aug 26 118.
 " 28 39.
 " 29 46.
 " 31 17.

Sept 1 11
 2 42
 3 18
 4 23
 5 36
 6 4
 7 32
 8 23

9 49
 11 26
 12 33
 13 14
 14 20
 15 32
 17 5
 18 8
 19 7
 21 13
 23 2

24 28
 25 14
 27 1

Oct 28 18
 " 5

9 11
 10 9
 19 2
 20 16
 24 4
 25 1

Nov 9 1

Phosphorus diis in cuphine

5	53	14.2 14.0	14.1	18	59.6
10	12	14.0 13.5	13.7		
15	31	11.9 11.9	11.9	18	58.8
20	50	8.5 8.3	8.4	18	56.5
20	50	10.4 10.5	10.4	18	59.2
15	31	11.0 11.5	11.2	18	56.9
	12	14.6 14.1	14.2		
	53	15.6 13.0 12.2 10	14.8 13.6	19	6.7

5-10	62.9	60.4	59.6	60.7
10-15	57.3	58.7	58.8	56.9
15-20	55.4	55.4	56.5	59.2
	6) 509		51.7	

18' 58.35

18' 58.62

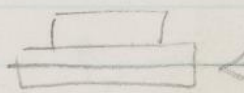
18' 58.62

$$18' 58.5 = 1138.5 \text{ or } 227.70 \mu \text{m div.}$$

$$\frac{18.2}{10.60} = 21.6$$

line 7	0	52.9	10.4	3'	49.6	
18	4	42.5	14.3		45.7	
9	8	28.2	12.7		47.3	3° 46"
10	12	15.5	12.2		47.8	
	16	3.3				

Collimation & Level Error of Mic. L. B.

17.0	151.0	11.0	40.2	2 m. su.	51.2	
	158.0	10.7	40.3	0 m. su.	51.0	

$$\begin{array}{r} 132.2 \\ 113.6 \end{array} \Bigg) 18.6 \quad \text{all.}$$

Level of level C. p. 165

$$8.3 \text{ to } 47.8 = 39.5 \quad 1 \text{ div. } .395 = .4''$$

$$1 \text{ div.} = .4''$$

probably level nearly too great owing to level
being moved up telescope by tapping

$$1 \text{ in. run of div} = .4'', \quad 1 \text{ div.} = .8''$$

July 9th 1877 Sun of level of Mic. C

E.C.P. Reader of Pub. M. Read micro.

Readings of Pub.

Circulo Readings.

A	B		
13.9	67.7	15' 30".6	30".5
31.6	85.2	16".2	16.4
18.2	71.5	27.7	27.7
4.6	57.8	38.0	38.3
7.8	61.4	36.0	35.0
- 0.4	52.6	43.0	42.0
1.5	54.7	42.0	41.9
10.5	83.8	35.0	35.1
7.5	60.9	38.5	36.5 38.5
19.6	72.8	29.0	29.9
24.8	77.9	23.4	23.0
31.1	84.3	19.5	19.6
42.0	90.4	12.0	11.2
- 1.3	52.0	44.8	45.5

	A+B	A-B		mean	
1	81.6	53.8	3.2	15' 30".55	32.64
2	116.8	58.6	3.0	16".3	46.72
3	89.7	53.3	3.6	27.7	35.88
4	62.4	53.2	3.1	38.15	24.96
5	69.2	53.6	3.2	35.5	27.68
6	52.2 ^(a)	53.0	3.4	42.5	20.88
7	56.2	53.2	4.4	41.95	22.48
8	94.3	53.3	4.8	35.05	29.72
9	68.4	53.4	5.4	38.00	27.36
10	92.4	53.2	6.4	29.45	36.96
11	102.7	53.1	4.3	23.20	41.08
12	115.4	53.2	5.7	18.25	46.16
13	(137.0)	48.0	4.5	11.60	52.92
14	50.7	53.3	5.4	45.15	20.28

Probable error of setting telescope of Microm. B.

.4	44.5	41.0	45.4	1.3
1.5	42.6	42.7	46.9	2
1.9	42.2		45.9	8
2.9	47.0		46.8	1
5.7	46.3	± 1.2	48.3	1.6
12.2	56.8	too high	32.3	± 1.8
	43.9		46.6	± 1.9

27.0

Microm. B.

	0.0	0	18'	22.7	45.0	22.7	
	500.0	2	13'	48.8	11.0	22.7	8.17
	1000.0	4	9'	51.8	14.5	22.7	6.21
	1500.0	6	5'	19.0	40.6	21.6	4.25
	2000.0	7	59'	49.3	10.2	20.9	2.31
etm. m.	2500.0	9	51'	51.7	15.7	24.0	0.38
	20000	7	59'	56.3	19.7	23.4	
	15	6	5'	33.0	56.3	23.3	
	10	4	10	2.1	24.8	22.7	
	5	2	14	20	23.5	21.5	
	0	0	17	44.9	8.5	22.4	
	1.500	0	51	57.8	20.3	22.5	9.28
	6.50	2	48	1.1	22.7	21.6	
	11.50	4	44	5.7	27.6	21.7	5.46
	6.50	2	48	52.5	14.4	21.7	
	1.50	0	52	33.7	55.0	21.3	

0	18'	33.8	115	26.1	-1.50	34' 53".2
5	133'	59.9	116	3.2	+3.50	81' 32".9
10	250'	3.1	115	26.7	8.50	197' 36.1
15	365'	29.8	114	29.9	13.50	313' 2.8
20	479'	59.7	112	6.0	18.50	427' 32.7
25	592'	3.7	111	55.7	23.50	539' 36.7
20	450'	8.0	114	24.3	18.50	427' 41.0
15	365'	43.7	115	30.3	13.50	313' 16.7
10	250'	13.4	116	0.7	8.50	197' 46.4
5	134'	12.7	116	16.1	+3.50	81' 45.7
0	17'	56.6			-1.50	34' 30.4
15	52'	9.1	116	2.8	0	
6.5	168'	11.9	116	4.8	5.00	116' 2.8"
11.5	284'	16.7	115	13.3	10.00	232' 7".6
6.5	169'	03.4	116	19.1	5.00	231' 5".4
1.5	52'	44.3				116' 19.1

May below fine work

54' 30.3	3	23.4
57' 53.7	3	21.7
1 15.4	3	15.6
4 31.0	2	18.9
2' 17.1	3	16.7
59 0.4	3	20.4
55 40.0		

$$1 \text{ inch} = 6.4$$

$$\begin{array}{r}
 206264 \overline{) 6.4} \\
 \underline{192} \\
 142 \\
 \underline{128} \\
 146 \\
 \underline{128} \\
 186
 \end{array}$$

5	(.17044	148.06
	.16943	147.72
10	(.16989	147.87
	.17099	148.25
15	(.16968	147.80
	.17445	149.43
35	(.16885	147.52
	.16774	147.14
85	(.16942	147.71
	.16905	147.59
135	(.16979	147.84
	.16947	147.73
185	(.17021	147.98
	.17007	147.93
235	(.17267	148.82
		<hr/>
		15 1439
		9.51
	147.96	

log. alt.	.17609	.17609	.17609	.69897	.69897
log. log. alt.	7.99376	.00623	.99357	.471475	.470460
log. base	.18238	.18238	.16968	.170445	.16943
base			147.80		

				³⁵
			.17609	.54406
log. alt.	.069655	.169888	.17099	.81291
log. base			.99836	.62479
base			<u>.17445</u>	1.16885
		⁸⁵ 66.5		¹³⁵

.54406	.92942	.92942	.13033	.13033
.81291	.06070	.06070	.31748	.31748
.62368	.240005	.249627	.039462	.039139
1.16774	¹⁸⁵ .16942	.16905	.16979	.16947
.26717	.26717	²³⁵		
.33244	.33244	.37107		
.903044	.902903	.801605		
.17921	.17007	.17267		

David G. E. S.

June 22d.	Fare to Mt. Washburn.	1.67
" "	Board in V. "	2.00
" "	R. R. Fare	3.20
" "	Fare to Mr. Merrill (pass)	1.25
	Board at " "	2.00
	Alm. to Mr. W. + 550 + 2.00	7.50
	Fare to & fr. Mt. W.	11.80
	Red Limit Mt. W.	<u>20.00</u>
		49.42

Summit Committee.

June 20th	Amos. Picture Bureau.	
	2 Paper Seals	.40
	1 Thelma. Glass seals	1.75
	1 " Lenticles	2.00
	22d Transport with to Mt. Wash.	1.66
July 4	" " to for Mt. Mansfield.	
	10 Thelma. for Mr. C. on Mass.	.75
	10 " Lenticles	2.00
	12th Hammer.	.67
	" Old Christ.	.20
	" Lecture for lunch.	.45
	12th to Wash. books	3.00
	15th. David C. Hoban to Summit	2.50
	16th. " D and Chest to Summit.	1.50
	23d. Bill. of J. R. C. at Summit	15.00
	30th. Bill of J. R. H. at Mt. Mansfield	20.00
	30th. R. R. fare J. R. C.	4.00
		<hr/> 55.88
	Emily Leland	35.00
	Agent of Mt. W.	4.00
	Embroidery	1.00
	A. Clark	150.00

Coll. of land of Miss Leno B.
July 11th 1877
res. of land 190.0 ~~13.25~~ 140.2
25.10

Vol. of Lib. 1900 ~~1335~~ 1402
2510

$$\begin{array}{r} 2510 \\ 1850 \\ \hline 760 \\ 240 \\ \hline 2230 \\ 2095 \\ \hline 135 \\ 67 \\ \hline 2162 \end{array}$$

22.65 level by run B.

level error. Then 28.5

lost.	17.5	67.8) A one B.
replaced.	13.5	63.5	
rotent.	15	65.0	

Water	29	29) A and one B
	34	84	
After no.	10	60	A and B

vol of house. 13308 Lth - 27.3
 .302 27.1

$$\begin{array}{r} \text{Coll.} = 15 \text{ } \cancel{55.5} \\ 14 \text{ } \cancel{58.5} \\ \hline 62.7 \end{array}$$

1508.6	14	43.3
9.3		3.2
8.7		2.8
8.0		1.8
<u>9.3</u>		2.9
89		u

181,58
55,79

15 08.7.8

15- 42.80

15	58.4	26
4	1.0	2.8
3	3.8	2.1
2	5.9	3.4
1	9.2	3.2
10	12.4	2.2
9	14.6	1.7
8	16.3	3.3
7	19.6	2.6
6	22.2	3.6
5	25.8	27.4



0		5		10		15		20
39.2	1	26.5	7	11.4	3	58.0	2	44.6
39.6	5	25.8	0	10.9	2	57.4	4	44.8
39.1	0	25.6	2	11.2	1	57.6	2	44.5
38.8	3	25.7	1	11.1	0	58.4	6	44.3
38.8	0	25.2	6	11.1	0	57.7	1	43.8
5	12	38	16	7	10	41	15	20
39.10	±21	25.78 ±.27		11.14		57.82		44.40

At 23.6 div. line runs into tube held at abut. 55.0 of A

Per

62,664	0	39.10	13.32	.21
62,928	5	25.78	14.64	.27
62,664	10	11.14	13.32	.10
62,684	15	57.82	13.42	.26
	20	44.40		.24

106
1335
13,353
2,6706

270
13,675
27.35

.216 = .8"

Just after
1. Shiro.

Internal line. 62.735
omit 5-10 62.67

$$\begin{array}{r}
 227.7 = 1627 \\
 1881 \quad 363 \\
 \hline
 3960 \quad 726 \\
 3762 \quad 726 \\
 \hline
 1780 \quad .8"
 \end{array}$$

July 12th 1877.
Angle of *measures*.

5° 10' 16.1 47.0

269.2

21'	31.9	22'	5.2
40	57.7		20.6
19	26.		15.4

189° 10'
197 51
1 19

1° 19' 20"

180.29

2 35' 10

3 3.8 X

1° 19'

18

Angle of B.

19	25.8
19	15.4
18	56.9
19	1.4
	118.3

19' 20"
18' 59"

79' 10"

Angle A.

7	49.5	10.8
35	40.4	1.9
27'	50.9	50.1
27	51.1	

180° 24'
7 56
2° 28'

2°

27' 51.0

1°

13" 55.5 = true angle = 73' 55.5"

α_B

2 45.0
2 29.0 38.0

3 5.4
2 68.0 56.7

180° 29'
180° 30'

4.4 3.9

24.2

7.51

2 38'

2 41 34.1

2 42 32.5

2 41 33.8

1° 20' 46.9 = true α_B = 80' 46.9

Time

Σ

G

5	46	40.0	1.4	179	46
5	46	42.5	5.0	179	57
10	5	43.6	7.0	179	27
15	24	39.5	2.5	179	8
20	43	39.0	59.4	178	48
25	2	34.1	55.3	8	29
20		37.3	57.0		
15		40.0	2.8		
10		46.2	9.0		
5		46.7	8.3		

July 30th 77 Adjustment level C per 5 mins.

5.3	-4.8 26.7	+4.8 14.5
74.6	66.5	83.5
79.9	63.5	98.0
	-2	10.5
	67.	79.5
	69	90.0

5.5	1
74	70
79.5	71
6	-1
75	68

20	81	69
40	4.6	3.6
71.0	72.9	72.8
73.0	77.5	76.6

moving and replacing

11.6	30.2	11.9	11.3	10.6	19.6	19.1
80.5		80.7	80.0	79.5	88.2	87.6
92.1		92.6	91.3	90.1	107.8	106.7

12.4	noted	16.6	little	17.4	22.	16.6	18.3
81.2	cc.	84.9		85.5	99.12	84.7	86.5
93.6		101.5		103.9	113.	13	104.8

87.4	89.5
15.6	21.2
103.0	

July 31st 1877.

12.4 ^{red.} 18.4 ^{low} 18.6
 83.6 89.3 89.4

9444 Ht. ~~12.6~~ Red capda low.
 12.6 82.6 13 36.1
 36.5
 36.5
 36.7
 35.9
 17
 36.34
 11.6 82.0
 12.1 82.3
 94.4
 11.5 81.9
 6.4
 6.8
 6.2
 5.6
 6.1
 1.6
 1.1 81.4 92.5 36.32

10 10 *Obs. 7.10.*92.0
10.0

82.0

35.4
~~44.6~~

35.5

35.4

34.5

35.3

17
35.3411.9

81.9

93.9

10 15

11.9

81.9

36.0

35.8

35.8

35.5

36.0

12.0

82.0

93.941
35.82

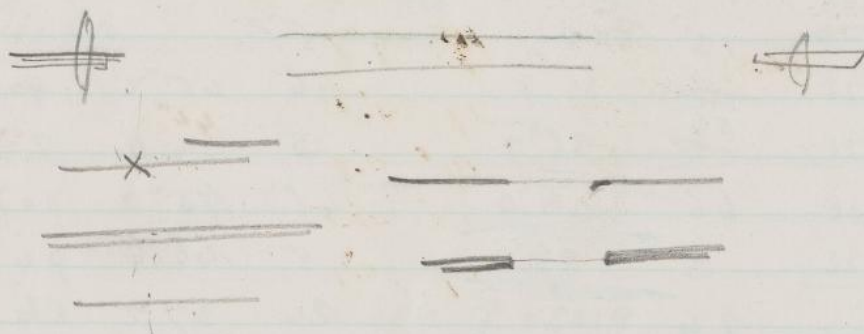
Magnitudes der Egyptian Mural. Ep. B.

line	13'	6.	6.	46'	45"2	90	179	36
5	46	36"2		46'	45"2	90	179	36
10	54	36"7		5	54"0	73		17
5	46	36"0		46'	45"0	90	179	28
10	5	37"2		5	46.6	94		09
15	24	30.8		24	37.2	64		
20	43	27.4		43	35.2	78		

more 20 div.

~~25 0' 30.7 39.4~~

	line	the. hour	G	G-B	E+G	
15.	22'	23.7	34.8	8.1	27.75	37' 56.5
5	44	28.0	34.5	6.5	31.25	37 57.4
15	22	24.8	32.5	7.7	28.65	38 0.05
25 div.	0.	25.2	34.2	9.0	29.7	38 0.95
15	22	24.5	33.0	8.5	28.75	38 0.75
5	44	25.0	31.0	6.0	28.00	19' 4.3
10	3	27.6	37.0	9.4	32.3	18 56.55
15	22	25.5	32.8	7.3	29.15	18 56.85
20	41	21.3	30.6	9.3	26.45	18' 57.30
25	0	18.8	26.9	8.1	24.85	18' 58.40
15		24.4	32.5	8.1	28.45	37' 56.40



$$\frac{19}{16}$$

$$\frac{1140}{16}$$

15 5 12.72

10 24 18.05

10 24 9.90

14 8 4.52 * 502

15 5 15.40

10 24 12.05

15 5 18.37

20 46 19.3

15 5 16.63

19 5.33

15 4.88

3 49.62

3 27.8

19 56.65

19

19 5.33

15 24.7

3 27.8

18 56.65

18 53.64

18 59.07

18 57.33

18 54.5

5	Means 40.6	4.65	18' 59" 75	1139.75	227.9.5
10	40.35 45.35	5.15	19' 59" 85	1139.85	227.97
5	40.5		19' 0" 9	1140.9	228.18
10	41.9	1.4	18' 48.5	1128.5x	228.70x
15	30.4	11.5	19' 0" 9	1140.9	228.18
20	31.3	0.9			

15	2276.5	$\begin{array}{r} 14 \overline{) 112.8} \\ 11 \quad 2 \end{array}$	227.65
5	2277.4	$\begin{array}{r} 14 \overline{) 85.6} \\ 84 \end{array}$	227.74
15	2280.05		228.00
25	2280.95		228.00
15	2280.75		228.07
5	1144.3		228.86
10	1136.85		227.37
15	1137.30		227.46
20	1138.40		227.68
25	2276.40		227.64
			112.85

1 division = 3.638

$$\begin{array}{r} 62.7 \overline{) 228.06} \\ 1881 \\ \hline 3996 \\ 3762 \\ \hline 2340 \\ 1881 \\ \hline 4590 \end{array}$$

1145.33	229.07
906.55	226.21
908.5	226.21
924.7	226.21
1134.5	226.90
209.8	229.62
1136.65	227.33
1133.65	226.73
1139.07	227.81
1137.33	227.47

Phacelant interval lines N. Collin
Lower Upper Lower Upper

59.2							
59.0	0	45.3	7	58.6	26	45.0	2
59.0	0	45.35	12	59.2	34	45.0	2
59.15	15	45.05	18	58.95	9	44.9	8
59.0	0	45.30	7	58.85	1	44.8	18
58.8	20	45.15	8	58.70	16	44.9	8
59.05	5	45.15	52	58.8	86	44.9	38
59.0	0	45.23	104	58.86	172	44.9	065 = 1.8
59.0	0	45.23	104	44.98	172	58.86	365
62.23	0.071			13.88		46.08	1825
13.77							2190
13.84							22715
13.84							
253							
13.85							

Means

$$1385 : 62.7 = 22806 :$$

$$\begin{array}{r} 627 \\ 159642 \\ 45612 \\ 136836 \\ 14299362 / 1385 \\ 1385 \\ \hline 4493 \\ 4155 \\ 3386 \\ 27 \end{array}$$

36

46.23

46.09

4

39

$$62.7 : 46.13 = 22806 :$$

$$\begin{array}{r} 4613 \\ 68418 \\ 22806 \\ 136836 \\ 91224 \end{array}$$

$$62.7 \mid 10520.4078 \mid 167.79$$

$$\begin{array}{r} 627 \\ 4250 \\ 3762 \\ 4884 \\ 4389 \\ 4950 \\ 4389 \\ 5617 \\ 5643 \end{array}$$

$$\begin{array}{r} 6 \\ 95 \\ 85 \\ 70 \\ 310 \\ 77 \end{array} \quad \begin{array}{r} 17 \\ 18 \\ 8 \\ 7 \\ 50 \\ 125 \\ 14 \\ 107 \end{array}$$

$$\begin{array}{r} .071 \quad .26 \\ .089 \quad .32 \\ .147 \quad .107 \quad .54 \quad .38 \\ .065 \quad .24 \\ 372 = .34 \quad .30 \\ .093 \\ 365 \\ 465 \\ 558 \\ 279 \\ 33945 \end{array}$$

$$\begin{array}{r} 147 \\ 305 \\ 725 \\ 582 \\ 136 \\ 34 \end{array}$$

$$\begin{array}{r}
 \text{lower} \\
 5' 3' 16.1 \\
 16.4 \\
 15.8 \\
 15.8 \\
 16.1 \\
 \hline
 52 \\
 16.02 \\
 43.2 \\
 \hline
 59.2
 \end{array}$$

$$\begin{array}{r}
 10' 1' 4.0 \\
 3.5 \\
 4.1 \\
 3.8 \\
 4.5 \\
 \hline
 5.1 \\
 4.9 \\
 3.98
 \end{array}$$

$$\begin{array}{r}
 11' 3.98 \\
 8' 16.02 \\
 \hline
 2' 47.96 \\
 167.96
 \end{array}$$

5' 3' 16.0

10'

July 31st - 1877



