KG
11366
v.522

1990phae.proj.1526

Flexure A24
Colimation
Runs
From Sept. 1, 1880 to Feb. 10, 1881

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

1880phae.proj.1526.

Sept 1, 1880

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

1880phae.proj.1526.

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

1880phae.proj.1526.

Σ 4 = Sept 1 1880 To Feb 10, 81

Level p
17

---

p
Σ4 89 – 100
Description of new level-ele

Σ4 123 note -
133 "
137
139
155
157
159
161
162 – 166

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

1880phae.proj.1526.

Σ4

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

1999phae.proj..152G.

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

1880phae.proj.1526.

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

1880phae.proj.1526.

2

Sept. 2, 1880

Long Colimator

$9^h\ 0^m$ O.K. $10^h\ 40^m$

45	56.2	23.0	59.0	24.2	56.8	28.2	~~34.8~~	28.2
	58.3	32.1	60.0	32.4	55.8	34.3	24.2	34.8
	57.0	32.0	59.7	32.2	54.0	37.2	34.9	37.0
	57.2	32.1	58.1	33.7	54.0	38.0	35.6	37.8
	56.2		56.5	1225	54.9		35.8	
	34.9	1192	436		275	197	125	198
	56.98	29.80	58.72	30.62	55.10	34.92	~~32.12~~ 33.12	34.95

Seeing very bad

~~Seeing~~

Sept. 3, 1880

$14^h\ 0^m$

59.5	21.2
56.8	32.3
58.2	37.4
56.5	34.0
55.8	
368	49
57.36	31.22

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

1880phae.proj.1526.

Sept. 2, 1880

7^h 5^s-5^m

	E		F		G		H		
5-0	20.8	19.4	25.8	24.1	27.4	27.1	28.8	29.7	28.3
	20.7	19.8	24.2	26.0	27.7	26.8	28.8	29.6	28.2
	20.3	19.5	24.0	26.3	27.4	26.0	29.0	29.3	28.4
	20.7	19.8	26.1	24.3	27.2	26.0	28.3	29.8	28.7
	20.4	19.2	26.3	24.1	27.6	25.9	28	29.2	28.3
	29	27	4	8	23	18		26	19
	20.58	19.54	26.08	26.16	27.46	26.36		29.52	28.38

8^h 0^m

	E	F	G	H	E	F	G	H
0 2	52.3	58.2	58.1	1.0	43.2	56.1	4.8	0.6
	52.2	58.3	58.2	0.9	43.2	56.8	4.7	0.0
	52.1	58.4	58.2	0.8	42.8	56.8	4.3	0.0
	52.0	57.8	58.3	0.6	43.1	57.1	4.2	0.0
	52.0	58.2	58.4	0.7	43.3	56.7	4.2	0.0
	6	9	12	40	6	35	22	
	52.12	58.18	58.24	0.80	43.12	56.70	4.44	0.1 6/2

N.C. S.C

Set at 45° 13.4'

8^h 0^m

30.5	94.7
31.4	94.9
31.1	95.2
32.1	94.8
33.0	94.1
*8 1	3 2 7
31.62	94.74
	31.62
	26 8 6
	13.18

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

1960phac.proj..152S.

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

1880phae.proj:1526.

Sept. 1, 1880

Long Colimator —

~~N.C~~	$10^h 40^m$		$13\ 30$		$18^h 0^m$		$19^h 0^m$	
45	55.1	22.9	55.2	20.7	55.1	22.3	45 57.0	23.4
	54.8	32.3	55.8	36.4	53.7	33.2	55.8	33.0
	57.0	31.1	53.4	36.8	53.9	33.5	57.0	34.0
	55.3	32.1	53.0	36.0	52.6	33.1	57.8	34.0
	56.4		53.1		55.0		56.0	
	286	1184	205	143	203	21	336	44
	55.72	29.6	54.10	33.57	54.06	30.52	56.72	31.10

	N.C.	S.C.
45	35.9	44 93.0
	37.2	93.6
	37.9	93.2
	34.9	93.4
	36.6	93.1
		13
	~~45~~	
	~~36.90~~	44 93.26
		45 36.90
		10 30.36
		45 15.1

Set at 45 16.6

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

1880phae.proj.1526.

Sept. 4, 1880

Long Colimator.

	18h 0m		6h 50m		11h 0m		11h 10m
45°	53.1	22.7	51.4	21.4	52.2	23.9	22.5
	51.6	31.8	54.3	29.3	52.5	32.7	30.6
	50.8	36.2	51.4	32.2	52.6	38.8	36.3
	52.7	34.0	54.3	30.8	52.3	36.0	34.0
	51.5		54.8		52.2	13.14	12.34
	2586	1247	126	113	118		
	51.72	31.17	52.52	28.45	52.36	32.85	30.85

13h 30m

490	231	227
495	342	332
505	407	397
503		
493	365	353
2488	1345	1309
497.6	536.2	32.72

6h 50

M. C.

45	27.0	45	4.8
	27.2		4.4
	25.4		5.2
	46.0		4.4
	25.4		4.5
	310		34
	2620		4.68
	4.68		
	3086		
	15.44		

Del of 45 = 13.2

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

1880phae.proj.1526.

Sept-5 1880

Long. Coll

16h 0m		16h 38m		4h 0m	
45 46.4	20.0	44.9	~~45.0~~ 19.3	47.0	23.3
46.6	31.8	43.9	~~41~~ 31.3	46.1	34.4
44.8	41.3	45.0	40.2	48.8	38.1
44.0	36.7	41.2	35.2	48.9	36.0
46.0	1298	45.1	1260	47.3	
278		239		381	1318
45.56	32.45	44.78	31.50	47.62	32.95

Seeing very bad
Lamp

4h 20m		6h 0m	
52.0	23.4	48.2	19.7
50.8	34.8	48.0	29.7
55.0	38.0	48.0	32.6
55.0	34.8	48.2	31.8
55.0		50.2	
1801	1330	2426	1138
53.72	33.25	48.52	28.45

Seeing very bad.
~~Set the [illegible]~~
Lamp

Sky.

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

1880phae.proj.1526.

Sept. 5, 1880

	N.C.	S.C
	$6^h\ 0^m$	
45	19.7	1.2
	20.3	1.0
	19.6	1.0
	21.2	0.4
	23.0	1.0
	1038	4.6
	20.76	0.92
	0.92	
	2168	
	10.84	Set at 10.8

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

1880phae.proj.1526.

Sept. ~~5~~ 6, 1880

Long Collimator.

$11^h\ 0^m$		$14^h\ 0^m$	
57.2	20.9	46.3	18.0
50.8	33.5	47.2	32.5
60.0	37.7	46.2	39.8
50.2	36.4	45.4	34.0
51.8	~~20.9~~	46.8	
2540	1285	319	1268
50.80	32.12	46.38	32.57

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

1880phae.proj.1526.

8

Sept. 11, 1880 ~~C = 45~~

Long Collimator

$19^h\ 0^m$		$21^h\ 0^m$		
		~~dark field~~ ~~bright~~		
45 ~~63~~ ~~62~~.7	24.5	59.0	63.7	23.4
61.3	34.8	60.0	64.0	32.9
64.0	34.7	59.7	63.4	31.8
63.0	35.9	59.8	64.0	33.8
61.0		59.8	61.3	
13.0	12.99	2983	164	19
62.60	32.48	59.66	63.28	30.47
		bright field	dark field	

$7^h\ 30^m$		$11^h\ 0^m$			2^h	
62.2	—	59.9	26.7	26.2	58.1	26.4
62.7	—	59.5	38.0	37.0	59.4	38.4
63.0	—	69.1	37.1	36.8	60.5	40.1
60.5	—	58.6	39.3	38.7	57.0	40.1
63.8	—	60.2	19.11	138.7	59.7	
		Seeing 3.5-2.5			34.68	

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

1880phae.proj.1526.

Dep-11 1880

N.C. S.C.

	N	NW	SE
45	332	808	872
	332	810	813
	332	812	~~816~~
	330	820	
	347	810	
	173	840	
	3346	8160	
	87.60		
	₹1506		
	₹7,53		

Set at 45 – 7.5

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

1880phae.proj.1526.

Sept. 13, 1880
Song Collimator.
$11^h\ 30^m$

~~I 6 2,3~~	II	III	IV	
56.1	59.9	62.2	63.0	21.8
54.0	59.9	58.8	59.7	32.2
57.8	61.8	58.9	59.2	32.2
58.4	55.0	59.0	42.8	34.7
59.7	55.8	60.9	61.8	
360	424	498	65	09
57.20	58.48	59.96	61.30	30.22

Began to read L. C. in 4 positions.
I = East, II = up, III = W, IV = down.

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

1880phae.proj.1526.

Sept. 13, 1880

$11^h\ 30^m$

	N.C.	S.C.
45	30.1	85.1
	30.6	87.1
	30.7	88.2
	30.2	87.8
	28.7	88.0
	03	364
45	30.06	87.28
44	87.28	
10	87.34	Set at 45° 7.5'
	88.67	

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

1880phae.proj.1526.

Sept. 15, 1880

Long Colimator

5h 45m

	E	I	
45°	69.3	24.0	65.0
	67.0	32.2	66.0
	67.0	28.0	
	67.0	33.0	
	67.0		
	373	1172	
	6746	29.30	

Seeing too poor for observation

45° ~~63.3~~
~~62.9~~
~~59.0~~

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

1880phae.proj.1526.

Sept. 15, 1880

5h 55m

Runs

	E		Z		B		H	
5h 0	44.7	42.8	48.8	49.1	45.9	45.2	53.2	57.3
	43.8	42.9	49.7	49.4	45.8	45.0	53.0	57.7
	44.2	43.2	49.1	49.2	46.0	45.0	53.0	57.4
	44.5	43.0	49.6	49.0	46.0	45.0	53.0	57.7
	44.6	43.0	49.7	48.8	46.4	45.0	53.2	57.7
	18	49	19	5	1	2	4	28
	44.36	42.98	49.38	49.10	46.02	45.04	53.08	57.56

6h 40m

	N.C.	S.C.
45	36.2	44 71.7
	35.2	70.2
	37.2	70.8
	34.5	69.8
	38.0	69.0
	331	15
45	36.62	70.30
44	70.30	
	16.92	
	8.46	

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

1880phae.proj.1526.

Sept. 16, 1880

Long Colimator

h m
13 30

	I		II		III		IV	
45"	63.3	23.1	62.8	23.4	64.9	25.0	67.8	23.1
	62.9	32.5	64.9	32.8	61.9	34.1	64.9	31.8
	59.0	31.2	64.7	30.7	61.0	32.7	64.8	30.8
	58.4	33.7	62.8	33.7	61.0	35.5	66.0	33.7
	61.7		63.2		63.0		64.4	
	53	05	184	06	118	73	249	1194
	61.06	30.12	63.68	30.15	62.36	31.82	64.98	29.85
	63.68	30.15						
	62.36	31.82						
	64.98	29.85						
	208	121.94						
	63.02	30.48						

h m
20 30

	59.0	248	I 62.1	23.3
	59.2	33.1	62.4	32.0
	59.6	32.0	60.8	30.2
	59.3	33.1	61.8	32.6
	59.9	1230	59.2	1181
	45.0		3063	
	59.00	30.75	61.26	29.52
	61.26	29.52		
	120.26	60.27		
	60.13	30.13		

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

1880phae.proj.1526.

Sept. 16, 1880

h m

13 30

6h 35m

N.C	S.C	N.C.	S.C.
28.3	79.2	32.2	76.0
30.1	78.8	32.1	76.2
29.8	78.2	32.9	76.8
30.4	79.0	33.0	76.0
30.3	78.4	32.6	76.0
1489	436	128	31.0
45 29.78	78.76	32.56	76.20
44 78.76		76 20	
8.54		8.76	
4.27		4.38	
Set at 45 7.5		Set at 45 4.4	

Telephone

	C	F	G	H	E	F	G	H
0 2	52.7	59.2	56.0	0.8	44.2	57.2	2.0	0.3
	52.7	59.6	56.7	1.2	44.1	57.4	2.1	0.2
	52.9	58.8	55.3	0.9	44.1	57.1	1.8	0.3
	52.7	58.8	55.4	0.7	44.2	56.9	1.9	0.0
	52.6	58.7	55.6	0.6	44.4	57.3	1.7	0.0
	136	51	30	42	10	359	95	8
	52.72	59.02	55.60	0.84	44.70	57.18	1.90	0.16
	59.02				57.18			
	55.60				1.90			
	0.84				0.16			
	22818				22344			
	5704				55.86			
	55.86							
	1.18							
	+.69							

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

1880phae.proj.1526.

Sept, 16, 1880
Long Colimator

$6^h\ 30^m$

	I		II		III		IV	
45	58.7	23.2	60.8	23.7	61.1	23.1	62.2	23.6
	56.2	31.2	63.9	31.5	60.5	31.0	59.7	31.5
	59.2	28.3	61.1	29.1	59.8	28.2	63.0	28.6
	59.9	31.0	59.0	31.7	61.0	31.1	59.0	31.3
	59.1		61.0		62.2		59.9	
	43	1037	58	1160	46	1134	38	1160
	58.62	28.42	61.16	29.00	60.92	28.35	60.76	28.75
	61.16	29.40						
	60.92	28.35						
	60.76	28.75						
	241.46	345.52						
	60.36	28.63						

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

1880phae.proj.1526.

Sept 16 1880

Level $10^h\ 30^m$ A.M.

W	E	W	E	W	E	W	E
54.8	44.7	54.0	45.6	48.6	48.7	51.8	44.6
53.8	46.1	~~49.2~~	48.8	52.1	44.7	51.2	44.3
86	106	103.2	144	1007	134	10	9
54.3	45.4	51.6	47.20	50.35	46.70	51.50	44.45
45.7		47.20		46.70		44.45	
8.9		396		365		705	
~~4.45~~		+1.98		+1.82		+3.52	
+1.98							
+1.82							
+3.52							
11.77							
+2.94							
~~1.84~~	= .05 6						
1176							
235 2							
~~+.24 7 7~~	= ~~+.37 0~~	+.165					

2.54
.056
1764
147 0
.16464

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

1880phae.proj.1526.

Sept. 17, 1880

$11^h\ 50^m$

	I		II		III		IV	
45	62.4	24.0	54.0	24.3	55.3	25.6	61.4	25.8
	58.7	36.1	56.7	34.7	57.1	35.4	58.8	34.4
	59.6	35.6	57.3	34.0	58.7	34.8	61.6	34.1
	58.8	38.0	56.3	35.9	56.2	37.1	60.8	34.4
	57.7		57.0		59.8		64.0	
	472	1357	313	1289	371	329	66	107
	59.44	~~38.92~~	56.26	32.22	57.42	33.22	61.32	32.67
	56.24	~~33.85~~		32.92				
	57.42			33.22				
	61.32	mean		32.67	mean			
	234 44	58.61		142.03	33.01			

~~5 3 6~~

14 45

I

45 612 220
598 350
610 373
617 360
580 1303
3017
6034 3258

1880phae.proj.1526.

Sept. 18, 1880

Long Colimator

$19^h\ 35^m$

	I		I repeat.		III	
45°	50.2	20.9	54.8	26.7	56.3	21.2
	49.8	31.1	57.4	31.6	52.6	31.4
	57.8	30.5	56.3	30.4	55.0	31.1
	49.8	32.0	53.5	32.2	59.0	32.8
	57.8		57.1		60.8	~~H65~~
	334	1148	291	1149	337	1165
	50.68	28.70	55.82	28.72	56.74	29.12
	55.82	28.72				
	56.74	29.12				
	1324	254				
	54.41	28.85				

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

1880phae.proj.1526.

Sept-19. 1880
12h 10m
N.C. S.C.

45 27.5 44 83.8
27.6 85.0
29.0 85.0
29.2 85.2
26.7 24.1
45 28.00 84.82

45 28.0
44 84.8
10 128
45 6.4

Sept-21 45 44

Long Coll.
12h 0m

I		II		III		IV	
45 59.6	22.5	60.2	22.7	56.8	23.8	62.8	24.0
57.7	32.9	58.7	32.8	59.9	33.7	58.7	33.7
57.7	32.6	61.0	32.4	59.0	33.6	58.4	32.8
60.8	33.9	63.0	34.3	57.8	35.1	59.8	35.1
59.2		59.5		56.8		58.0	
450	1222	302.4	122.2	403	176.2	477	125.6
59.00	30.55	60.48	30.55	58.06	31.55	59.54	31.40
60.48	30.55						
58.06	31.55						
59.54	31.40						
237.08	125						
59.27	31.25						

Zenith

W.	E.						
35.3	48.9	41.8	41.7	47.8	35.9		
51.8	32.2	47.8	35.8	43.2	45.0		
57.1	81.1	8.8	7.75	13.1	5.9		
435	405	444.0	387.5	465	379.5		
405		387.5		387.5			
30.0		56.5		66.0			
+1.50		+2.83		+3.30			

252
126.0
142.2

Diff-v

3.30
2.83
1.50
7.63
+2.5-4

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

1880phae.proj.1526.

Sept. 20, 1880

Long Colimator.

$12^h\ 5^m$

	I		II		III		IV	
4 5	57.4	20.1	58.7	21.7	56.2	21.0	62.0	21.1
	58.2	29.5	56.9	31.2	58.0	30.2	60.8	31.2
	55.5	29.9	56.0	30.0	56.4	29.7	58.2	29.3
	58.0	31.7	57.7	32.7	55.9	31.8	42.2	31.6
	57.9		57.8		56.4		57.3	
	370	1112	371	1156	331	1127	05	1132
	57.40	27.80	57.42	~~26.40~~ 28.90	56.62	28.17	60.10	28.30
	57.42	28.90						
	56.62	28.17						
	60.10	28.30						
	31 54	3317						
	57.88	28.29						

Level $12^h\ 20^m$

W	E	W.	E	W	E	
38.8	49.7	47.4	41.8	53.9	34.5	21°
54.7	33.8	55.6	32.8	34.2	53.3	7 25
93.5	83.5	1030	73.8	88.1	87.8	0.75
4675	4175	5150	3650	4405	4390	105.0
500		1451		+15		+35.0
+2.50		+7.25		0.75		

b = +20

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

1880phae.proj.1526.

Sept. 20, 1880

$12^h\ 10^m$

	N.C.	S.C
45°	27.9	44 84.8
	28.8	85.6
	27.3	84.8
	28.6	85.1
	27.3	85.3
	399	256
45°	27.98	85.12
44	85.12	
	1310	
45°	6.55	

Set at 45° 4.4

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

1880phae.proj.1526.

Sept. 21, 1880

12 15 Long Colimator.

I		II		III		IV	
56.9	23.3	54.0	22.2	53.3	22.9	54.0	22.2
56.3	32.1	52.0	31.0	55.3	31.8	54.0	31.7
54.7	33.3	54.0	32.3	52.0	33.0	59.5	32.0
54.0	32.1	54.0	31.0	54.1	31.9	57.2	32.0
53.8		54.8		57.0		56.8	
257	08	208	1165	217	1196	355	1179
55.14	30.20	54.16	29.12	54.34	29.90	57.10	29.47
64.12			30.20				
54.34			29.90				
57.10			29.47				
20.70	55.17		38.69	29.67			

17 ~~3~~ 5

I		III	
49.3	20.3	51.2	20.2
51.8	32.2	48.8	32.3
50.0	33.3	47.7	33.5
49.9	32.6	48.0	32.0
49.2		48.2	
02	1184	2439	1180
50.04	29.60	48.78	29.50

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

1880phae.proj.1526.

Sept. 21, 1880

	12 20		7 45	
	N.C	S.C	N.C.	S.C
45°	30.8	80.0	32.2	69.8
	31.0	80.6	33.0	71.2
	30.9	80.0	33.2	71.0
	30.9	79.8	32.1	71.2
	31.4	80.2	31.2	70.8
	50	06	117	40
	31.00	80.12	32.34	70.80
	80.12		70.80	
	11.12		3.14	
	5.56		1.57	
	Set at 45° 5.6		Set at 5.5°	

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

1880phae.proj.1526.

Sept. 21, 1880

Long colimator

$4^h\ 10^m$

	I		III	
45′	45.3	23.7	52.4	23.7
	46.1	34.1	49.0	34.7
	49.6	31.8	51.2	32.1
	46.4	31.4	51.6	32.0
	49.9		49.5	
	373	10	17	25′
	47.46	30.25	50.34	30.62

Lamps illumination — Seeing Very bad

$7^h\ 15^m$

I		III	
55.0	21.8	53.4	22.4
52.3	32.0	57.2	32.3
53.8	27.2	53.2	28.6
54.8	29.9	49.8	30.8
54.2		51.4	
201	309	170	1141
54.02	27.72	53.40	28.52

Lamps illumination — Seeing very bad

5340

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

1880phae.proj.1526.

Sept. 22, 1880

12 45 Long Colimator.

I		II		III		IV	
57.3	21.8	57.7	22.1	55.9	22.3	62.0	22.0
57.0	32.3	56.6	32.3	56.8	32.7	59.9	31.9
55.2	28.2	59.1	29.3	57.4	29.4	61.2	29.2
57.2	30.2	58.2	31.4	57.5	31.7	58.8	30.8
57.4		57.4		55.6		59.9	
341	1125	390	1151	332	1161	518	1129
56.82	28.12	57.80	28.77	56.64	29.02	60.36	
56.64			28.12				
57.80			29.02				

9h 50

I		II		III		IV	
45. 66.2	10.0	23.8 66.2	23.8	63.8	9.0	62.9	23.2
65.9	20.6	32.9 63.1	33.0	64.7	19.0	62.0	33.0
65.9	13.7	27.2 63.3	26.6	64.9	11.6	62.8	26.6
66.7	18.1	32.9 63.0	32.0	64.4	17.0	64.0	32.2
64.6		63.3		65.4		63.3	
293	624	189	1164	232	566	150	1150
65.86	15.60	63.78	28.85	64.64	14.15	63.00	28.75
64.64							
63.78							
63.00							

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

1880phae.proj.1526.

Sept. 22, 1880

$12^h\ 25^m$

N.C.	S.C
33.7	69.0
34.8	67.1
34.9	67.4
34.9	67.0
33.2	66.7
21 5	37 2
34.30	67.44
67.44	Set at 0.9
1.74	Flexure — $12^h\ 25^m$
0.87	

	E	F	G	H
0 2	53.1	0.2	57.6	2.2
	53.2	1.1	57.8	1.3
	53.3	0.4	57.2	1.7
	53.0	0.5	57.9	1.9
	53.0	0.3	57.8	2.1

Seeing 25 good.

6		33	92
53.12	0.50	57.66	1.84
0.50			
57.66			
1.84			
23 312			
58.28			
1.17			
+.68			

$9\ 55^m$

N.C.	S.C
~~37.2~~ 42.6	74.8
39.0	76.2
39.1	74.8
39.3	74.9
39.9	74.8
44 5	36
38.90	74.70
74.70	
15.60	7.80

Set at 7.8

The reading for this was probably 6.4 + which gives a value of 2.80

E	F	G	H
44.4	59.6	3.8	1.4
44.3	59.4	3.6	1.0
44.5	59.7	3.7	1.0
44.3	59.0	3.5	1.0
44.1	58.9	4.0	0.8

18	466	186	42
44.36	59.32	3.72	1.04
59.32			
3.72			
1.04			
22844			
57.11			

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

1880phae.proj.1526.

Sept. 23, 1880

Long Colimator

12 50

~~12 56~~ I		II		III		IV	
66.3	23.2	62.5	23.2	64.8	23.3	64.3	24.2
66.1	33.2	63.8	33.2	61.3	33.0	64.2	34.3
67.0	28.6	61.0	28.2	61.6	27.9	66.6	29.0
64.0	33.8	64.4	33.7	58.2	33.5	63.3	33.2
63.0		66.4		61.0		62.3	
264	1188	171	1183	69	1177	207	1207
65.28	29.70	63.42	29.57	61.38	29.42	64.14	30.17

seeing pretty fair

19 20

I		II		III		IV	
59.6	2 (3) 4.6	63.3	25.6	62.2	25.3	58.2	24.8
56.3	36.0	59.3	34.9	62.3	35.0	67.2	34.2
63.4	31.7	63.3	30.9	61.3	30.2	63.0	30.2
62.0	36.0	60.8	34.8	62.3	34.9	61.0	33.9
61.7		62.2		61.5		60.8	
30	2039	89	62	96	54	102	31
60.60	35.07	61.78	31.55	61.92	31.35	62.04	30.77
61.78	31.55						
61.92	31.35						
62.04							
634							
61.58							

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

1880phae.proj.1526.

Sept. 23, 1880

$3^h\ 0^m$

N.C.	S.C.
39.0	65.8
39.5	64.4
39.9	64.8
38.7	65.0
38.0	65.3
451	253
39.02	65.06
65.06	
408	
2.04	

Set at ~~2.0~~ 45 2.0

$9^h\ 55^m$

N.C.	S.C.
42.2	52.4
42.0	52.6
41.2	53.0
42.2	52.1
42.1	52.8
97	129
45 41.94	52.58
~~44~~ 52.58	
~~44~~ 94.52	44 97.76

~~Set at~~ 45 2.0

Seeing bad

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

1880phae.proj.1526.

Sept. 23, 1880

Long Colimator

$9^h 50^m$

I		II		III		IV	
67.8	27.3	67.0	26.1	68.1	26.1	67.2	25.8
69.3	36.0	64.7	34.9	67.4	34.8	66.4	34.3
69.4	27.3	66.1	26.2	64.3	26.5	66.0	26.0
68.2	34.9	68.4	33.2	63.0	33.7	63.8	33.3
69.7		68.3		63.4		64.1	
444	55	345	04	262	11	275	1194
68.88	31.37	66.90	30.10	65.24	30.27	65.50	29.85
66.60	30.00	Seeing bad					
65.24	30.27						
65.50	29.85						
265.2	121.59						
66.63	30.40						

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

1880phae.proj.1526.

Sept. 24, 1880

$15^h 20^m$ Long Colimator

I		II		III		IV		
67.7	26.2	64.9	25.1	62.4	24.5	65.9	26.8	24.8
65.9	38.0	64.3	36.0	65.0	36.5	63.7	38.9	38.9
68.0	37.3	65.7	34.6	68.3	35.0	64.4	37.4	37.4
64.2	39.4	62.4	37.6	66.0	37.7	64.7	39.3	39.3
64.7		68.2		67.2		65.8		
305	209	275	133	289	137	245		224
66.10	35.22	65.50	33.32	65.78	33.42	64.90		35.60
65.50	33.32							
65.78	33.42							
64.90	35.60							
2228	17.56							
65.57	34.39							

Seeing very bad.

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

1880phae.proj.1526.

Sept. 24, 1880

12 15

	N.C.	S.C
45	38.2	57.8
	37.8	54.6
	38.9	52.8
	37.6	52.0
	39.8	52.8
	423	140
45	38.46	5280
44	52.80	
	91.26	
	95.63	

Set at 4 96.0

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

1880phae.proj.1526.

Sept. 25

$19^h\ 20^m$

I		II		III		IV	
59.8	21.8	60.4	31.6	58.9	22.8	57.9	22.2
60.7	32.7	60.0	32.2	60.8	33.9	60.5	32.7
59.5	32.2	59.3	31.3	60.4	33.0	56.4	31.8
59.0	34.1	57.9	33.6	58.0	35.6	60.0	34.1
60.4		60.2		58.4		57.8	
299 4	08	297 8	87	296 5	53	291 6	08
59.88	30.20	59.56	32.17	59.30	31.32	58.32	30.20

~~19^h~~ ~~20^m~~ 5^s

20^m

I		II		III		$21^h\ 20^m$ I	
59.4	22.7	57.9	22.0	56.2	22.9	55.5	23.0
60.4	33.1	61.0	31.7	56.8	32.9	58.0	32.9
59.8	29.8	58.2	29.0	58.3	29.7	57.8	30.4
59.9	30.2	60.0	29.5	59.9	30.1	56.6	31.8
59.9		61.3		58.7		57.2	
494	1158	298 5	1122	399	1156	351	1181
59.88	28.95	59.70	28.05	57.98	28.90	57.02	29.52
59.70	28.05						
57.8	28.0						
57.02	29.52						
345 8	342						
58.64	28.86						

20^m

W. R. B. Robinson describes of the telescope a mass below

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

1880phae.proj.1526.

Sept 25 1880

Long Cole.

10h 20m

	II		III	
45	593	248	613	224
	560	330	602	312
	578	296	628	280
	576	316	592	301
	160	1190	570	1117
	367		2005	
	5734	2975	6010	2792
	6010	2752		
	11744	1167		
	5872	2683		

10h 30m

NB

45	376	572
	378	576
	376	574
	378	560
	380	570
	390	232
45	3780	5664

45 3780
44 5664
9444
4 9972

Rel of 49 960

1880phae.proj.1526.

Sept 26 18h

Long Coll $15^h\ 10^m$

	I		II		III		IV	
40	57.0	24.9	64.8	24.3	58.8	25.0	59.1	24.7
	57.0	35.8	62.2	35.3	57.9	35.8	59.2	34.3
	55.2	37.2	61.8	35.4	58.3	36.6	59.0	34.9
	56.1	33.8	61.8	38.6	56.0	39.0	59.1	32.9
	55.0		60.3		59.0		60.0	

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

1880phae.proj.1526.

Sept. 27, 1880

Long Colimator.

$12^h 30^m$

I		II		III		IV	
59.9	21.4	59.9	21.6	60.2	21.2	57.1	21.9
61.1	30.0	57.8	29.7	59.8	29.1	57.7	29.8
60.8	30.3	60.3	29.9	61.8	29.9	61.1	30.6
57.0	29.6	62.0	28.7	59.5	33.4	58.1	29.3
57.8		61.3		58.0		57.8	
466	1113	13	299	493	1136	478	1116
59.32	27.82	60.26	27.75	59.86	28.40	58.36	27.90

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

1880phae.proj.1526.

Sept. 27. 1880

$12^h\ 35^m$

	N.C	S.C
	34.0	73.1
	35.2	72.4
	33.7	72.8
	33.7	73.2
	34.0	73.8
	206	153
45	34.12	73.06
44	73.04	
	07.18	
	3.59	

Set at 45° 3.6

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

1880phae.proj.1526.

Sept. 28, 1880

$15^h\ 0^m$

I		III	
55.3	21.4	58.7	21.7
52.0	28.8	56.2	28.7
54.9	30.3	54.9	29.8
56.2	27.2	56.3	27.6
54.8		57.3	
232	1177	334	278
54.64	29.42	56.68	26.95

$9^h\ 30^m$

I		II		III		IV	
60.8	22.1	62.8	22.8	62.3	22.2	58.6	22.6
60.8	29.0	59.9	28.7	60.0	28.4	57.8	29.2
59.2	25.9	61.3	26.4	58.2	25.4	60.3	25.9
59.0	25.6	60.2	25.4	58.5	25.2	58.3	25.7
60.8		60.6		59.4		60.3	
306	226	48	233	484	212	453	234
60.12	25.65	6096	25.82	59.68	25.30	59.06	25.85

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

1880phae.proj.1526.

Sept. 28, 1880

$15^h\ 15^m$ $10^h\ 0^m$

N.C	S.C	N.C	S.C
~~27.7~~	72.7	32.2	61.2
~~28.3~~	73.0	32.7	61.0
31.3	72.8	32.3	61.0
30.2	73.2	32.8	61.8
31.7	73.0	31.5	61.1
31.0	147	115	61
30.8	4472.94	3230	61.22
50	45 31.00	61.22	
31.00	3.94	93.52	
45	1.97	96.74	Set at 44 96.8

Set at 45 2.0

Plejone $15^h\ 15^m$

~~E~~ 0.2	F	G	H	E	F	G	H
5.0	58.4	0.0	0.0	46.0	56.1	6.3	59.0
4.7	58.4	0.6	0.2	46.4	56.5	6.1	59.0
4.7	58.4	0.5	0.3	46.0	56.6	5.9	59.1
4.9	58.0	0.3	0.0	46.1	56.7	6.0	59.1
4.9	58.3	0.7	0.3	46.1	56.6	6.0	59.1
4.84	58.42	0.42	0.16	46.16	56.50	6.06	59.06

4.84	~~0~~6.16
58.42	56.50
0.42	6.06
0.16	59.06
24384	23778
6096	~~5784~~ 59.45
~~5845~~	
~~400~~ 1.51	
~~+344~~ +.76	

Plejone $10^h\ 0^m$

E	F	G	H	E	F	G	H
57.0	0.4	57.2	59.9	47.3	58.8	3.3	57.8
57.3	0.5	57.2	59.9	47.3	58.7	3.1	57.7
57.3	0.8	57.0	0.2	47.7	58.4	3.1	57.2
57.2	1.0	57.3	59.7	47.8	58.1	3.1	57.4
57.2	0.7	57.3	59.5	47.7	58.8	3.2	57.6
10	34		29 92	28	38	8	24
57.20	0.68	57.20	59.84	47.56	58.76	2.16	57.54

57.20	57.56
0.68	58.76
57.20	3.16
59.84	57.54
~~23492~~ 4373	23702 5

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

1880phae.proj.1526.

Sept. 29, 1880

$18^h\ 15^m$ B Observer.

I		
59.2	57.0	23.5
58.7	57.2	32.0
57.5	53.2	31.8
59.1	54.9	30.9
58.5	55.0	
	1 5 3	1 1 8 2
	56.06	29.55

Light insufficient

$9^h\ 57^m$

I		II		III		IV	
59.7	24.6	57.2	22.5	59.5	24.2	59.9	22.8
57.8	~~32.2~~ ~~24.1~~ 26.8	59.3	30.2	61.9	31.3	60.0	30.7
56.0	~~24.~~	61.0	24.3	61.7	26.8	62.5	24.2
57.5	26.6	61.0	24.2	61.0	26.1	59.3	24.7
56.1		60.9		59.4		59.7	
3 7 1	1 1 0 2	2 9 9	4 1 0 1 2	3 5	1 0 8 4	1 4	1 0 2 4
57.42	27.55	59.88	25.30	60.70	27.10	60.28	26.60

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

1880phae.proj.1526.

Sept. 29, 1880

$9^h\ 55^m$

	N.C.	S.C.
	29.6	57.0
	29.1	58.8
	29.4	61.1
	28.5	59.4
	28.1	60.4
	447	467
45	28.94	59.34
44	59.34	
	8828	
44	94.14	

J. W. Bel-N.C. and S.C.

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

1880phae.proj.1526.

Sept. 30, 1880

$12^h\ 40^m$

I		II		III		IV	
61.4	24.3	61.7	23.1	59.5	23.8	58.5	23.7
60.5	33.2	59.0	31.8	58.2	32.1	57.5	32.2
61.3	27.6	61.0	27.3	60.0	27.3	58.7	27.0
61.1	27.0	61.2	26.5	61.0	26.3	61.0	26.3
62.4		60.4		58.0		60.2	
67	1121	33	1087	467	1095	2959	1092
61.34	28.25	60.66	27.17	59.34	27.37	59.18	27.30

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

1880phae.proj.1526.

Sept. 30, 1880

$12^h 45^m$

N.C.	S.C.
26.3	62.1
27.0	63.1
26.4	64.1
27.8	62.9
27.4	63.0
349	152
45 26.98	63.04
44 63.04	
90.02	
95.01	

Set at 44 95.0 ~~45.0~~

$10^h 30^m$

N.C.	S.C.
33.0	54.1
32.0	54.3
32.5	54.7
33.0	55.1
32.0	54.7
125	229
45 32.50	54.58
44 54.58	
87.08	
93.54	

Set at 44 95.0

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

1880phae.proj.1526.

Oct. 1, 1880

12h 30m

Seeing too bad

for Long Colimator.

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

1880phae.proj.1526.

Oct-21 1880

$20^h\ 58^m$

	I		II	III	
45	63.2	27.6	60.0	59.0	27.7
	61.1	35.2	59.1	61.0	35.1
	63.1	30.8	58.9	58.0	30.9
	59.9	30.2	58.2	58.0	30.2
	63.0		60.0	59.3	
	103	38	462	453	39
	62.06	30.95	59.24	59.06	30.97
	59.24	30.97			
	59.06				
	3036				
	60.12	30.96			

$8^h\ 0^m$

N. C. 86.

45 – 31.5 44 48.0
30.2 50.0
31.0 50.8
31.4 51.3
31.7 50.0
58 27.1
41 – 31.6 50.22
44 50.22
9 8138
49 90.7 Tel-al-45-90.7

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

1880phae.proj.1526.

Oct 3 18h

$\delta = 4'$

VC.

41	30.7	44	57.4
	31.9		58.8
	32.6		58.4
	32.1		58.4
	31.4		58.2
	21		32
41	31,62		58,24
41	58,64		
9	8226		
44	91,1		

Ref 41 44 90,7

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

1880phae.proj.1526.

Oct. 4, 1880

$13^h 45^m$	I		II		III		IV	
45	56.1	23.8	58.7	22.9	56.0	24.6	55.8	24.8
	57.2	32.8	58.7	32.2	56.3	33.7	55.9	34.2
	57.3	29.9	57.2	29.4	62.0	30.9	56.0	30.2
	53.3	28.0	57.8	27.4	59.9	29.0	57.8	29.6
	55.0		60.2		59.7		60.3	
	309	345	426	321	439	1182	358	1188
	56.18	28.62	58.52	28.02	58.78	29.55	57.16	29.70

Seeing very bad.

$20^h 0^m$	I		III	
45	57.3	22.2	57.0	22.2
	57.1	30.8	58.3	30.2
	58.3	29.6	57.3	29.7
	56.2	28.0	56.0	27.7
	55.8		56.5	
	347	306	351	298
	56.94	27.65	57.02	27.45

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

1880phae.proj.1526.

Oct. 4, 1880

$13^h\ 50^m$	N.C.	S.C
	30.0	54.8
	29.4	54.9
	28.8	53.7
	29.3	53.7
	28.9	53.2
	464	203
45	29.28	54.06
44	54.06	
	83.34	
	91.67	Set at 44 90.7

$13^h\ 50^m$ N.C. Flexure S.C.

	E	F	G	H	E	F	G	H.
0 2	56.1	2.2	58.9	59.8	44.5	58.0	3.7	58.4
	56.0	2.0	58.7	59.3	44.9	57.8	3.4	58.0
	56.0	1.9	58.6	59.3	44.9	58.4	3.7	58.0
	55.7	2.0	58.5	59.1	45.0	58.5	3.3	57.8
	55.8	2.0	58.7	59.2	45.0	58.7	3.7	57.8
	296	10	34	17	243	14	28	40
	5592	2.02	58.68	59.34	44.86	58.28	3.56	58.00
	2.02				58.28			
	58.68				3.56			
	59.34				58.02			
	2 3596				22472			
	58.99				56.18			
	281							
	+1.40							

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

1880phae.proj.1526.

Oct. 6, 1880

$14^h 0^m$	I	II	III	IV
	57.3 23.0	59.9 23.3	55.6 22.3	57.3 23.9
	54.8 31.8	57.8 32.2	54.3 30.6	56.8 32.6
	56.6 28.9	57.9 29.0	57.0 27.7	56.4 29.2
	56.8 27.3	59.0 27.7	57.1 29.6	55.0 28.2
	56.4	58.8	56.8	58.0
	319 1110	434 1122	308 1102	335 1139
	56.38 27.75	58.68 28.05	57.16 27.55	56.70 28.47

$21^h 0^m$ B. Obs

I	III
~~57.1~~ 59.0 28.1	58.5 25.0
~~50.8~~ 58.0 35.5	56.2 33.2
55.2 33.0	57.9 29.0
57.6 30.1	58.3 27.8
57.3	56.6

$13^h 30^m$	I	II	III
	55.2 24.7		57.9 25.0
	57.0 32.8		59.7 33.0
	56.2 26.1		57.9 26.9
	59.0 27.5		56.0 28.0
	58.0		56.0
	354 311		365 329
	57.08 27.77		57.30 28.22

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

1880phae.proj.1526.

50

QQ1-6 1dN

Runs

	E		A		G		26	
Bols.	18.2	17.1	220	220	217	200	20.4	193
	18.5	16.6	218	222	214	198	21.0	196
	18.6	17.2	228	222	211	189	20.5	197
	18.3	17.5	225	219	212	199	20.5	194
	18.4	16.9	227	223	216	200	208	195
	20	13	38	6	20	486	32	25
	18.40	17.06	22.76	22.12	21.40	19.72	20.64	19.50

14h 10m

N.C	S.C
30.8	51.8
31.8	52.5
30.0	52.8
30.0	52.6
30.2	52.0
28	117
30.56	52.34
52.34	
82.90	
91.45	

Set at 44 90.7

11h 0m ~~N.C.~~

~~30.6~~	
29.3	
29.8	
30.7	
32.2	

11h 0m

N.C.	S.C
30.6	48.5
29.3	48.8
29.8	49.5
30.7	47.4
32.2	48.0
20	422
30.40	48.44
48.44	
78.84	
89.42	

Set at 44 89.4

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

1880phae.proj.1526.

Oct. 7, 1880

20 55 ~~Thin~~ 1
Tried Long Colimator
Seeing too bad for Obs.

10 30 Seeing too bad for Long Col.

	N. C.	S. C
41	36.8	44 39.7
	37.8	39.8
	37.0	39.2
	36.7	39.9
	37.0	39.9
	35.3	48.5
45	37.06	39.70
44	39.70	
	76.76	
	88.38	

Set at 44 89.4

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

1880phae.proj 1526.

Oct. 9, 1880

21h 0m

I B.obs.		I R.obs.		III B.obs.		III R.obs.	
53.0	25.1	56.8	25.8	57.0	25.4	56.3	26.0
56.2	33.0	56.0	33.3	58.9	32.1	55.0	34.0
55.5	30.5	55.5	30.1	57.0	29.6	57.0	30.2
55.1	27.0	58.2	27.7	58.6	26.6	55.4	28.0
56.2		58.0		57.0		55.4	
250	1156	345	1169	385	1137	281	1182
56.00	28.90	56.90	29.21	57.70	28.42	55.62	29.55
57.70	28.42	55.62	29.55	~~56.90~~			
56.35	28.66	56.26	29.38				

10h 40m

R

57.1	27.8
57.3	35.7
56.7	28.6
57.5	29.8
57.5	

R

55.2	27.4
59.5	35.4
57.0	27.9
56.0	30.0
58.5	

At 10h 0m

NC SC.

45	31.9	44	37.0
	32.2		36.0
	31.9		36.8
	31.8		36.7
	30.7		36.1
	45		326
	3170		36.52

45 - 3170
44 36.52
9 6822
44 84.1

Set 01 44 84

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

1880phae.proj.1526.

Oct 10 1880

13h 35m — Seeing too bad for Obs.

I II III IV

13h 40m

N.C.

45	30.5	37.8
	30.8	37.0
	29.0	37.4
	30.7	38.9
	29.9	38.2
	150.9	189.3
HS	301.8	378.6
4	378.6	
	680.4	

4 84.0 Rel A 4 84.1

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

1880phae.proj.1526.

Oct. 11, 1880

$11^h\ 20^m$ I		III	
51.5	25.7	52.4	24.1
50.0	34.1	51.0	32.0
52.1	29.6	52.1	28.1
51.9	32.1	53.1	30.8
50.6		53.0	
61	1215	116	1150
51.22	30.37	52.32	28.75

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

1880phae.proj.1526.

Oct. 12, 1880

I		III	
47.0	24.8	48.8	25.4
48.0	33.3	48.8	34.8
48.8	34.5	50.8	32.4
50.0	33.0	50.0	33.5
48.4		50.5	
422	56	2489	61
4844	31.40	49.78	31.52

Seeing very bad

20h15m

I	B	III	B
51.9	22.0	57.0	23.8
52.0	29.3	58.0	30.8
51.9	28.5	54.3	30.0
54.2	28.8	55.2	30.1
51.0		55.9	

Seeing extremely bad.

11h15m

I		III	
60.8	25.3	63.0	24.3
64.2	32.1	61.8	31.9
60.5	22.6	60.7	22.5
61.1	28.0	58.6	27.3
61.0		60.9	
76	1080	44	1060
61.52	27.00	60.88	26.50

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

1880phae.proj.1526.

Oct. 11, 1880

$3^h 40^m$

I		III	
57.1	28.2	55.0	27.3
55.0	37.2	55.2	37.0
59.4	33.7	58.3	32.4
56.1	34.9	62.0	34.1
55.0		55.0	
326	1340	295	1308
56.52	33.50	58.90	32.70

$20^h 25^m$

I R		I B		III R		III B.	
52.0	22.7	50.0	24.0	48.4	22.3	50.0	22.9
50.4	32.0	54.0	31.8	51.0	31.7	50.4	30.7
49.0	29.3	59.3	29.5	49.9	29.1	49.8	28.3
50.7	30.8	51.8	30.4	50.0	30.8	52.2	29.8
53.1		53.5		50.1		51.8	
52	1148	106	1157	2494	1139	42	1117
51.04	28.70	52.12	28.92	49.88	28.47	50.84	27.92

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

1880phae.proj.1526.

Oct, 11, 1880

$13^h 45^m$	N.C.	S.C
	28.0	46.8
	29.9	45.1
	29.1	45.5
	28.2	44.2
	29.0	45.5
	442	271
45	28.84	45.42
44	45.42	
	7326	
	86.63	

$11^h 25^m$	N.C.	S.C
	24.0	44.4
	23.7	44.8
	25.7	45.0
	23.3	44.8
	25.0	44.8
	217	238
45	24.34	44.76
44	44.76	
	6910	
	84.55	Set at 44 84.1

Flexure

$11^h 25^m$

	E	F	G	H
0 2	55.8	1.7	57.8	2.0
	55.3	1.4	57.1	2.0
	55.8	1.0	57.2	2.0
	55.6	1.0	57.1	2.1
	56.0	0.8	57.5	2.2
	28 5	59	17	3
	55.70	1.18	57.31	2.06
	1.18			
	57.31			
	2.06			
	22628			
	5906			
	105			
	5.59			

	E	F	G	H
	46.0	59.7	4.7	2.0
	46.1	0.0	4.8	2.1
	46.2	59.6	4.7	1.5
	46.0	59.3	4.7	1.7
	45.7	59.4	4.7	1.4
	300	480	36	37
	46.00	59.60	4.72	1.74
	59.60			
	4.72			
	1.74			
	23206			
	58.01			

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

1880phae.proj.1526.

Oct 12 1880

B Obs.

	N.C	S.C	R obs.		N.C.	S.C.
45	34.9	44, 35.8		45	33.1	44 34.0
	32.5	35.2			31.7	34.0
	34.3	35.2			31.3	34.4
	34.5	36.5			33.2	34.2
	33.0	36.0			31.0	33.0
					103	196
					32.06	3392
					3392	
					6598	
					82.99	Set at 83.0

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

1880phae.proj.1526.

Oct. 13, 1880

13 30

I		II	
58.0	26.0	62.3	25.6
62.8	32.6	60.0	31.7
62.8	23.9	59.3	23.7
59.0	25.3	63.5	24.8
60.0		64.0	
26	278	91	2358
60.52	26.95	61.82	26.45

$22^h\ 15^m$
Seeing too bad for observation.

From this date two readings will be taken. The one on the right is I, the one on the left II.

$11^h\ 15^m$

I		II	
57.8	27.5	60.2	25.6
59.1	34.1	60.4	33.3
59.0	22.7	63.0	22.0
58.8	25.0	59.9	23.9
59.0		59.9	
437	1093	34	1048
58.74	27.32	60.68	26.20

~~$13^h\ 35^m$~~

~~Unable to se~~

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

1880phae.proj.1526.

Oct. 13, 1880

$1^h 15^m$

N.C.	S.C
34.8	30.2
33.0	30.0
34.3	29.8
35.2	29.1
34.8	30.2
221	1493
34.42	29.86
29.86	
6428	
82.14	

Set at 44 83.0

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

1880phae.proj.1526.

Oct. 14, 1880

$13^h\ 35^m$

Unable to see

Long Colimator.

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

1880phae.proj.1526.

Oct. 17, 1880

11 15 Seeing too bad for
Long Colimator

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

1880phae.proj.1526.

Oct 17, 1880

11 15	N.C.	S.C
	28.7	38.2
	28.0	37.3
	27.2	36.4
	27.6	35.8
	27.9	37.3
	394	370
	27.88	37.00
	37.00	
	6488	
	8244	
	Set at 44	83.0

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

1880phae.proj.1526.

Oct. 18, 1880

13 45

I		II	
54.3	25.6	48.7	25.1
55.3	32.1	58.8	31.8
54.0	26.8	59.0	26.7
55.5	24.8	59.2	25.2
50.2		58.1	
193	1093	338	1088
53.86	27.32	56.76	27.20

Seeing very bad indeed

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

1880phae.proj.1526.

Oct. 19, 1880

$13^h 45^m$ Seeing too bad for Long Colimator.

11 25	1		2		
	57.4	27.0	57.3	25.1	27.1
	58.7	33.2	60.3	31.3	33.0
	58.8	22.7	60.7	21.0	23.1
	59.9	28.2	60.0	26.6	29.0
	59.9		59.4		
	447	1111	2977		1122
	58,94	27.77	59.54		28.05

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

1880phae.proj.1526.

Oct 19, 1880

11h 30m

13 45	N.C.	S.C.	N.C.	S.C.
	31.7	24.0	30.5	23.8
	31.0	23.8	30.2	22.8
	31.8	24.8	30.2	22.0
	31.5	24.4	30.8	23.0
	31.4	24.0	30.1	23.1
	74	210	18	147
	31.48	24.20	30.36	22.94
	24.20		22.94	
	5568		53.30	
	7784		76.65	
	Set at 44 83.0		Set at 44 76.7	

Flexure

5 3	E	F	G	H
	0.0	2.8	33.9	1.7
	0.1	3.3	34.0	1.2
	0.0	3.2	33.7	0.8
	59.8	2.9	33.7	0.9
	0.0	2.7	33.9	1.1

11h 30m	E	F	G	H
58	2.6	5.2	56.8	3.8
	2.3	5.7	56.5	3.5
	2.2	6.0	56.2	3.7
	2.4	5.9	56.2	3.2
	2.2	5.7	56.3	3.2
	17			
	2.34	5.70	56.40	3.48
	2.34			
	5.70			
	56.40			
	3.48			
	24092			
	61.98	123		
	60.75	+.62		

Flexure

	E	F	G	H
	53.2	4.8	3.0	2.5
	53.2	4.7	3.1	2.2
	53.0	4.9	2.7	2.2
	53.1	4.8	3.0	2.0
	53.1	4.9	2.7	2.0
	5.6			
	53.12	4.82	2.90	2.18
	4.82			
	2.90			
	2.18			
	24302			
	60.78			

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

1900phae.proj.1526.

Oct. 20, 1880

23 15 Seeing too bad for Long Colimator.

	I		II		
11 25	56.7	30.1	57.4	28.4	29.7
	57.0	35.3	58.2	34.4	35.8
	55.5	24.1	57.8	22.9	24.3
	57.2	26.3	56.8	25.1	26.6
	58.2		56.9		
	346	1158	371	1148	1164
	56.92	28.95	57.42	28.70	29.10

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

1880phae.proj.1526.

Oct. 20, 1880

$1^h 30^m$

N.C.	S.C.
32.2	~~23.7~~
32.7	22.9
33.6	23.1
33.2	23.1
31.9	23.1
136	159
3272	23.18
2318	
5590	77.95

0 3 → Set at 4476.7

$11^h 35^m$

Flexure

	E	F	G	H	E	F	G	H
0 3	4.4	6.8	55.8	1.0	52.1	4.8	1.7	58.0
	8.7	6.7	56.0	1.3	52.2	4.7	1.7	57.9
	3.3	7.2	55.6	0.4	52.2	4.2	2.0	57.9
	3.5	7.1	55.9	0.4	52.7	4.8	1.8	58.5
	2.0	7.0	56.2	0.2	52.7	4.8	1.8	57.8
	16.9	34.8	295	3.3	19	33	90	401
	3.38	6.96	55.90	0.66	52.38	4.66	1.80	58.02

3.38
6.96
55.80
0.66
24690
6172
59.21
251
+1.26

52.38
4.66
1.80
58.02
23686
59.21

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

1999phae.proj.1526.

Oct. 23, 1880

22h 25m	I B		I R		II R		II B	
	45.0	26.5	46.5	26.9	47.7	26.1	45.3	26.8
	45.2	34.0	46.4	33.6	45.8	32.7	45.3	34.2
	45.0	29.0	45.1	28.7	46.0	27.4	47.5	28.5
	45.0	28.2	45.1	28.8	45.0	28.0	46.8	27.9
	44.8		47.2		47.0		47.5	

13h 40m

R	R
52.8	27.1
58.8	33.8
58.8	24.2
58.2	32.2
55.1	

R	R
52.0	26.3
52.5	32.9
55.5	23.3
59.3	31.2
62.2	

N.e. 8.e.

45-3	27 44	30.1
	32.3	30.1
	32.0	30.3
	33.0	48.8
	34.0	28.7
	150	480
45	3300	44 2960
		41-3300
		9 6260
		44 8130

Oct-01-44 41.3

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

1880phae.proj.1526.

Oct. 24, 1880

Long Colimator

$11^h 15^m$	I		II	
	59.9	31.0	58.2	30.8
	60.1	34.8	60.2	35.1
	59.2	20.2	58.3	20.3
	60.1	24.9	61.8	25.9
	56.8		61.4	
	4 61	1109	2999	1121
	59.22	27.72	59.98	28.02

$11^h 30^m$	N.C		S.C	
	45 37.9	44	17.8	
	39.1		16.1	
	38.2		16.0	
	38.0		14.0	
	38.0		15.0	
	412		289	
	38.24		15.78	
	15.78			
	54 02			
44	77.01	Set at 44	81.3	

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

1000phae.proj.1526.

Oct. 24, 1880

Flexure

11 20	E	F	G	H	E	F	G	H
0 3	5.0	6.8	52.1	0.0	56.7	5.8	58.9	58.3
	5.2	6.6	52.6	59.6	56.9	5.4	58.9	58.2
	5.4	6.1	52.8	59.9	56.3	5.8	59.1	58.1
	5.5	7.0	53.1	59.9	56.1	5.9	58.4	58.1
	5.0	6.3	52.9	59.5	56.0	5.7	58.6	58.0
	.13	28	135	39	20	36	439	
	5.26	6.56	52.70	59.78	56.40	5.72	58.78	58.14
	6.56				5.72			
	52.70				58.78			
	59.78				58.14			
	61.07				59.76			

Runs

11 25	E 131/166		F		G		H	
5 0	9.6	8.8	10.9	9.3	57.6	54.9	3.7	2.3
	9.9	8.7	10.1	9.2	57.7	54.8	3.4	2.1
	9.8	8.1	10.4	9.5	58.1	55.1	4.1	2.7
	10.0	7.8	10.6	10.3	57.6	55.2	3.3	2.2
	9.8	8.1	10.3	9.9	58.4	55.2	4.1	2.6
	41	15	23	32	44	2	38	19
	9.82	8.30	10.46	9.64	57.88	55.04	3.76	2.38

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

1880phae.proj.1526.

Oct. 25, 1880

$11^h\ 30^m$	I		II	
	56.0	32.0	56.1	31.5
	57.2	35.2	59.8	35.8
	58.5	21.8	58.5	22.3
	57.0	27.0	56.1	27.2
	57.4		56.9	
	361	1180	374	1168
	57.22	29.50	57.48	29.20

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

1000phae.proj.1526.

Oct. 25. 1880

11^h 40^m Same as preceding repeated.

11^h 35^m	N.C	S.C.
45	41.3	~~31~~ 1.2
	41.2	~~29~~.6
	40.3	~~30~~.0
	40.0	~~29~~.8
	41.1	~~29~~.9
	39	05
	40.78	~~30~~.10
	~~30~~.10	
	~~50~~88	
	~~85~~.44	

N.C	S.C
39.8	11.2
39.4	12.2
39.0	12.0
39.0	11.9
38.4	12.2
456	
39.12	95
1190	11.90
5102	
75.51	

44

Sel-d-75.0

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

1880phae.proj.1526.

Oct. 31, 1880

9 50 Seeing too bad for Long Colimator.

9 55

	N.C	S.C
45	~~32.5~~	44 12.8
	33.5	11.2
	33.8	10.5
	34.0	12.0
	33.3	11.6
	34.0	
	186	81
	33.72	11.62
	11.62	
	4534	
44	72.67	

See at 44 72.7

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

1880phae.proj.1526.

Nov. 1, 1880

$11^h 55^m$	I		II	
45	45.3	28.7	46.8	30.0
	46.0	33.3	46.2	33.2
	46.8	21.2	47.2	22.0
	46.8	31.2	46.3	31.2
	46.1		45.2	
	310	1144		
	46.20	28.60		

$12^h 0^m$ N. C.

46.8
46.2
47.2
46.3
45.2

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

1880phae.proj.1526.

Nov. 1. 1880

$12^h\ 0^m$	E	I	G	H	Flexure E	I	G	H
0 2	5.0	4.8	34.8	5.5	54.7	2.9	0.8	3.8
	4.9	4.7	34.2	6.0	54.3	3.2	0.9	3.2
	5.0	5.2	34.3	6.3	54.2	3.3	0.3	3.3
	5.1	6.1	34.9	5.8	54.0	2.7	0.3	3.0
	4.7	5.7	35.0	5.9	54.6	3.0	0.4	3.4
	24.7	26.5	23 2	29.5	18	15.1	2.9	17
	4.94	5.30	24.64	5.90	54.36	3.02	0.54	3.34
	4.30				3.02			
	34.64				0.54			
	5.90				3.34			
	2098				24126			
	~~1269~~				6031			
	~~1175~~							
	25078							
	6269							
	6031							
	238							
	1.19							

$12^h\ 5^m$	N.C.	S.C.
	35.3	16.7
	34.3	16.1
	33.0	16.1
	38.8	16.2
	33.7	16.3
	201	314
45	34.02	16.28
44	16.28	
	50.30	
	75.15	

Set at 44 75.2

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

1880phae.proj.1526.

Nov. 2, 1880

$11^h 50^m$	I		II	
	46.2	34.7	54.2	35.6
	50.8	37.5	45.0	37.8
	48.3	23.2	44.7	24.0
	50.5	31.2	52.3	32.9
	49.8		50.8	
	456	1266	2470	1303
	49.12	31.65	49.40	32.57

$12^h 10^m$	I		II	
	52.0	35.8	47.3	36.4
	51.0	39.0	45.0	38.2
	51.5	25.2	45.0	25.0
	51.6	33.8	44.5	34.0
	51.8		52.2	
	79	138	340	136
	51.58	33.45	46.80	33.40

Same repeated

12 0	N.C.	S.C
	35.9	10.5
	34.9	9.0
	34.8	8.9
	36.1	8.8
	33.4	9.5
	251	467
	35.02	9.34
	9.34	
	44.36	
	72.18	

$12^h 5^m$	N.C	S.C
	37.1	9.4
	36.0	9.9
	35.0	10.0
	34.8	10.9
	34.2	9.0
	271	492
	35.42	9.84
	9.84	
	4526	
44	72.43	

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

1880phae.proj.1526.

Nov. 2, 1880

$12^h\ 20^m$ Adjusted N. Colimator for zero line of Colimation.

$12^h\ 25^m$	I		II	
45	43.9	37.8	52.0	37.2
	44.8	39.2	49.4	39.2
	51.8	28.2	51.0	26.9
	51.8	35.9	49.9	35.0
	44.8		49.8	
	371	211	21	183
	47.42	35.27	50.42	34.57

$12^h\ 30^m$	N.C	S.C.
44	74.3	72.7
	74.0	71.7
	76.1	72.4
	78.2	71.9
	76.3	72.8
	289	115
	75.78	72.30
	72.30	
	148 08	
44	74.04	

Set at 44 74.0

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

1880phae.proj.1526.

Nov. 2, 1880

12 40 Adjusted Long Colimator for line of Zero colimation, nearly.

12h 45m

	I		II	
44.	72.2	36.0	74.9	37.5
	74.5	38.1	72.7	39.6
	72.5	35.4	71.0	26.8
	76.6	34.4	74.7	36.0
	75.5		72.3	
	213	139	156	189
	74.26	33.47	73.12	34.72

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

1880phae.proj.1526.

80

Nov. 3, 1880

13 40

	I		II		
44	68.5	34.7	69.0	33.8	34.0
	67.8	38.0	70.8	37.1	37.2
	69.0	26.7	70.2	25.2	25.8
	68.0	34.0	70.0	32.8	33.0
	68.7		70.0		
	420	134	00		100
	68.40	33.35	70.00		32.50

13 45

	N.C		S.C	
44	74.7	44	72.1	73.2
	75.2		90.9	72.8
	75.7		91.9	72.3
	76.0			72.7
	76.2			72.9
	278			139
	75.56			7278
	72.78			
	834			
	74.17			

Set at 44 74.0

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

1880phae.proj.1526.

1880 Phae

N.C. S.C.

13h 50m

44	23 3628	44,948			
	24 7218	948			
	24 1690	931			
	24 0064	949			
	24 1693	919			
	24 8563	223			
	24 9726	44 5446	44.9446		
	24 6	2446	44 6726	Set of 44 80.8	
		1162	76172		
		89.	44 80.8		

B 14h 45m

I		II	
44 55 4	27 8	54,3	27 4
13 4	30.9	40	30.8
57 0	24 0	6.0	26.7
56 0	31.9	7.2	31.8
55.7		5.0	

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

1880phae.proj.1526.

Nov. 7, 1880

$13^h\ 35^m$	I		II	
44	61.3	31.3	64.1	30.8
	62.8	33.8	65.0	33.2
	64.2	24.3	65.2	24.3
	65.1	30.8	64.9	30.7
	65.1		64.0	
	185	02	232	1190
	63.70	30.05	64.64	29.75

Flexure

$13^h\ 40^m$	E	F	G	H	E	F	G	H
0 3	6.1	5.6	56.2	4.9	55.4	3.9	3.0	2.6
	6.0	5.7	56.3	4.8	55.8	3.7	3.2	2.6
	6.0	6.1	56.7	5.1	55.9	4.0	2.8	2.6
	6.3	6.9	56.3	5.1	55.6	4.0	2.8	2.3
	6.0	5.7	56.1	5.1	55.7	3.8	2.6	2.2
	6.08	5.80	163	5.00	55.68	3.88	2.88	2.46
				16.32	3.88			
				5.80	2.88			
				6.08	2.46			
				25320	24490			
				6380	61.22			
				61.22				
				2.08				
				1.04				

$13^h\ 50^m$	N.C	S.C
	74.0	76.4
	73.2	76.8
	73.0	75.2
	74.8	75.8
	73.8	75.2
	188	34
	73.76	75.68
	75.68	
44	74.66 77	Set at 44 74.8

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

1880phae.proj.1526.

Nov. 7, 1880

Runs

	E		F			G		H	
$13^h\ 45^-$									
$5^-\ 0$	31.0	29.4	30.0	21.6	29.7	21.4	20.6	29.7	28.4
	31.2	29.4	30.0	21.9	29.9	21.9	20.2	29.2	28.9
	31.7	29.4	29.8	22.0	29.0	22.0	20.7	29.9	28.7
	31.0	29.9	30.0	22.1	29.0	22.1	20.2	29.6	28.8
	30.9	29.8	30.2	22.0	29.1	22.0	20.8	29.8	28.2
	8	31	0		17	46	25	32	30
	31.16	29.62	30.00		29.34	21.92	20.50	29.64	28.60

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

1880phae.proj.1526.

84

Nov. 8. 1880

$23^h\ 25^m$

	I		II	
44	56.7	33.2	58.8	32.3
	57.3	37.0	59.8	34.2
	57.3	29.1	59.9	28.7
	56.1	34.1	58.7	33.2
	56.2		58.0	
	336	134	452	104
	56.72	33.35	59.04	32.60

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

1880phae.proj.1526.

Nov. 9, 1880

12h 30m

I		II	
64.0	34.2	63.4	32.9
63.4	36.4	62.4	35.3
62.4	25.9	63.1	24.8
64.1	32.6	61.7	32.2
64.8		62.2	
187	91	128	52
63.74	32.27	62.56	31.30

Flexure

12 35

E	F	G	H
7.8	6.8	56.4	5.5
7.9	7.2	56.7	5.9
8.0	7.1	56.8	5.3
7.7	7.3	56.8	5.2
7.3	7.3	56.8	5.0
7.74	7.14	56.70	5.38

7.14
56.70
5.38
2 69.96
64.24
63.38
.86
+.43

E	E	F	G	H
~~15.0~~	58.9	7.2	4.0	4.1
~~15.2~~	58.7	6.3	3.8	4.3
~~15.5~~	58.2	6.8	3.8	4.3
~~15.2~~	58.2	7.2	4.0	4.2
~~5.2~~	58.7	7.3	3.3	4.3
	58.54	6.96	3.78	4.24

6.96
3.78
4.24
2 53.52
63.80

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

1880phae.proj.1526.

Nov. 9, 1880

$12^h\ 40^m$	N.C.	S.C
	70.2	76.3
	69.7	76.8
	68.8	75.2
	70.5	75.9
	71.2	75.9
	04	301
	70.08	76.02
	76.02	
	6.10	
44	73.05	

Set at 44 73.0

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

1990phae.proj.1526.

Mr 10 1880

Description of new level mounted on the cube of the Meridian Circle ~~for~~ north and south.

At the suggestion of Y.O.R. the reserve level of the Russian Transit, was this day mounted on the cube of the Meridian Circle for the purpose of measuring the ~~Equator point-correction~~ relation between the readings of the Circle for the new reading of the level and the readings the circle derived from the observations of Polaris. If this relation proved ~~prove to~~ be a constant, the value of the equator point-correction can be found at any time by simply setting the bubble at zero, reading the circle and applying the constant. The first thing to be done therefore is to determine whether this constant relation can be maintained

Description of mounting of level.

(a) A ring, with one outside shoulder, ~~was~~ fastened securely to the glass tube at one end

(b) Two brass pieces are screwed firmly to the cube, near the east edge (for Circle W) and symmetrically with the edges north and south.

The upper surface of one of these pieces is plane, and the ring is pressed down upon it by a cross ~~spring~~ piece of thin spring brass. This end of the tube is free to move in any direction, under the action of a change of temperature. For moving a part of the other piece is a ~~V~~ fork which the other end of the glass tube rests. It is held in position by a cross piece of spring brass. The mounting was done by Mr. Geo. Clark in accordance with plans suggested by him.

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

1880phae.proj.1526.

Nov. 10 '88

Reserve Russian Branch.

Value of 1 division of level.

Level N 5.8 div 5.6 5.8

S 23.3 23.2 22.8

N-S -17.5 -17.6 -17.0 = 17.37

Circle 2 50 1 39.3 39.7 39.7

R 43.1 41.1 41.3

G 34.1 34.8 34.5

L 41.6 41.5 42.0

39.52 39.28 39.68 = 51 39.38

Level II

N 25.7 25.8

S 3.0 3.2

+22.7 +22.6 = +22.65

1 div = 16.0

Circle 2 50 2 12.3 12.8

R 13.8 13.7

G 5.8 6.1

L 14.0 14.0

52 11.48 11.65 = 52 11.56

I N-S = -17.37 Circle 51 39.38

II N'-S' = +22.65 61 52 11.56

N-S-[N'-S'] = -40.02 32.18

$1\,div = \frac{32.18}{40.02} = 0.80'' = 1.60$

This level will be designated Level No 3

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

1000phae.proj.1526.

Nov. 10 1880

R. Sewell

9h 42m

Δ Time	18 32 m div	1436	1440	1458	193	
N	14.7	14.8	14.6	14.9	14.9	
S	14.4	14.2	14.0	14.2	14.2	
N-S	+.3	+.6	+.6	+.7	+.7	= .58 .46"
Σ	50 1 534	532	536	548	550	
R	55.7	55.2	55.2	56.4	56.2	
G	48.7	49.0	48.7	49.0	48.7	
H	55.1	55.2	55.7	56.6	56.7	
	2123	2136	2134			
	53.08	53.40	53.20	54.90	54.15	= 53.59 − .46 = 53.13

Adopt ½ sum to add the correction ½(N-S)X½ div
instead of ½(N-S)X 1 div. This will be done
in this manner hereafter

Nov 10. 1880

Time 13h 17m

	13 20	1323	1325	1328	1330	1331	1335	
N	15.4	15.4	16.0	15.8	15.1	14.9	14.8	15.0
S	15.3	14.7	14.6	15.4	15.6	15.6	15.8	15.6
N-S	+.01	+.7	+1.4	−0.1	−.5	−0.7	−1.0	−.6
								−.02
Σ #	50 1 57.2	57.6	57.3	56.8	56.7	56.3	56.1	56.0
R	56.4	57.1	56.9	56.0	55.9	55.7	55.7	55.7
G	48.9	49.2	49.0	48.2	47.7	47.6	47.7	47.5
H	57.1	57.7	57.1	56.5	55.6	55.8	56.0	56.0
	2198	2216	2203	2175	2159	2154	2155	2152
	54.95	55.40	55.08	54.38	53.98	53.85	53.88	53.80

54.41
+.02
54.43

Here slitty for even readings

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

1880phae.proj.1526.

Nov. 10, 1880

I

60.4	33.0	32.7	32.2	32.5	32.3
57.8	36.2	36.2	36.3	36.4	35.8
58.2	25.8	25.7	26.0	25.7	25.6
58.1	32.8	32.6	32.8	32.7	32.3
61.1	7.8	7.2	7.3	7.3	60
295.6	31.95	31.80	31.82	31.82	31.50
59.12		31.~~85~~78			

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

1880phae.proj.1526.

Nov 11

I

II

~~50 1 553~~

	h m		23 2m
Time	23.14	23.23	23.29
N	15.0	13.6	15.2
S	14.1	15.3	14.0
N+	0.9	−1.7	+1.2
1	B	B	B
50	1 55.3	530	559
	55.7	532	559
	502	497	499
	56.2	539	562
	2174	2078	2179
	54.35	51.95	54.48
		53.59	
		10	
		53.49	

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

1880phae.proj..1526.

Nov. 11, 1880

23 30

I

58.6	31.6	31.7	31.1	31.2
57.1	35.7	36.0	35.1	35.7
57.3	28.0	27.6	27.2	27.7
56.1	32.0	31.6	30.8	31.7
56.5	73	69	42	63
356	31.82	31.72	31.05	31.57
57.12		31.54		

10 25

I 10h 50m I

	R	R	B	B	R	R
58.8	31.2	31.3	31.4	31.8	31.0	31.2
59.8	35.2	34.5	34.5	35.0	34.7	35.7
58.4	26.7	26.2	26.5	26.1	25.4	26.3
59.0	31.1	31.0	31.3	31.0	30.9	32.0
59.0	42	30	37	39	20	52
450	31.05	30.75	30.92	30.97	30.50	31.30
59.00	31.2	30.92			30.90	

10 40

N	157	153	169	123	154	142
S	154	157	139	146	158	168
N-S	+3	−4	+30	+17	−4	−26
50	529	523	557	532	522	500
	521	519	545	530	518	496
	450	450	480	456	443	425
	520	521	545	528	512	499
	2020	2013	2127	2046	1995	1920

50.50 50.32 53.19 51.15 49.88 48.00

− .24 + .32 − 2.40 − 1.36 + .32 + 2.08

50.26 50.64 50.79 49.79 50.20 50.08

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

1880phae.proj.1526.

Nov. 11, 1880

	I				13h 30m	I		
12 40	61.8	32.2	32.3	31.9		60.1	31.2	31.2
	61.6	35.5	35.7	35.7		58.2	35.3	34.8
	62.7	27.1	27.3	26.6		58.2	25.7	25.8
	60.7	31.0	32.3	31.7		59.0	31.8	31.2
	61.8	1.45	76	59		58.4	40	30
	86	38.15	31.90	31.47		439	31.00	30.75
	61.72		31.61			58.78	30.88	

12h 45m, dw = .982 — 13h 45, dw = .965

N	154	154	110	163	107	157	147	61	280	
S	152	152	118	142	199	143	152	238	21	
n-S	+.2	+.2	-.8	+2.1	-9.2	+1.4	-.5	-17.7	+25.9	
50	1 56.5	56.1	5.9	58.5	5.4	56.7	55.1	1 38.0	2 20.1	
	56.1	55.6	5.2	58.1	4.8	56.2	55.1	38.1	20.2	
	49.0	48.6	58.3	51.7	56.7	48.6	47.5	30.5	13.3	
	56.5	56.2	4.2	57.7	4.5	54.2	55.1	38.1	19.9	
	2181	2165	136	260	134	2480	2128	247		
	54.52	54.12	3.40	56.50	3.35	54.52	53.20	36.18	18.38	
	-.16	-.16	1.66	8.52		-1.12	+.40	+17.17	-25.02	
	54.36	53.96	54.82	54.43		53.36	53.60	53.35	53.36	
			54.86							
			54.49					53.42		

.982
.965
.947
.913

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

1880phae.proj.1526.

Nov. 11, 1880

	N.C.	S.C
12 55	69.0	76.4
	68.9	77.0
	70.2	77.0
	71.2	76.0
	71.4	76.0
	07	324
44	70.14	76.48
	76.48	
	6.62	
44	73.31	

Set at 44 73.3

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

1880phae.proj.1526.

Nov. 12, 1880

I

15h 20m

15h 40m

57.3	32.7	32.2	32.5	31.7	31.7	31.1
58.8	37.7	37.0	37.0	35.8	35.2	36.7
57.3	29.3	28.2	29.1	26.8	26.9	27.0
57.7	33.8	32.8	32.8	31.3	31.8	32.0
58.4	135	102	114	56	56	58
396	33.37	32.55	32.85	31.40	31.40	31.45
57.90		32.92			31.402	

div = 90

N	14.7	147	139	224	39	147	
S	14.2	142	150	63	252	142	
N-S	+.5	+5	−1.1	+16.1	−21.3	+5	
30.1	53.9	54.5	53.8	2' 9.2	1 35.5	55.1	
	53.7	54.6	53.9	9.2	35.6	55.4	
	48.3	47.9	46.9	2.2	28.7	48.9	
	55.2	54.8	53.7	9.3	35.6	55.4	
	213.5	211.8	206.3	29.9	195.4	214.1	
[	53.38	52.95	52.05	7.48	[33.85	53.52	]
−	.48	−.48	+1.07	15.30	−20.23	.48	
	52.90	52.47	53.15	52.18	54.08	53.02	

52.97

S

16.1) 1468 (.91
144 9
190

21.8) 1967 (.90
1962

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

1880phae.proj.1526.

98

Nov 13 188

$\mathcal{F}$

$\mathcal{F}$

$10^h\ 40^m$

					$10^h 45^m$	$10^h 51^m$
N	160	208	182	119	27.0	27.1
S	17.6	13.2	18.8	22.3	7.3	7.2
N-S	-1.6	-5.0	-3.6	-10.4	+19.7	+19.9
E	51.0	55.8	49.1	43.1	5.3	
T	50.3	55.8	48.8	42.1	5.2	
G	40.0	45.3	38.2	31.5	54.2	
K	47.8	52.9	45.1	39.2	1.8	
	18.91	20.98	18.12	15.62	24.65	
	47.28	52.45	45.30	39.05	61.62	
	+1.52	-9.32	+3.42	+7.80	14.82	
	48.80	43.13	48.72	46.83	46.8	

Diff in observations

More Precautions

Mem - The eyelid

I dim decimal part

for the minute part

I minute is divided

eventually into

decimal parts

Scale Mark

47.78

2.03 | 14.34 | .75

1.42

13c

15.05 | 14.34 | .75

1 div = 1.50

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

1880phae.proj.1526.

Nov 13

I

13h 50m

68.1	35.0	35.8	35.8
47.2	38.0	38.2	38.2
66.1	25.1	26.0	25.8
64.2	30.8	31.3	31.8
66.3		1313	116
	89		
319			
6638	32.25	32.85	32.90

32.67

Reingold

Nov 14

h —

18 20

627	347	346
62.5	36.9	37.6
41.4	25.6	26.1
59.4	31.0	31.2
59.3	12.82	129.5
30 53	3205	32.38
61.26		

Reingold

14 0

W	16.6	16.6
S	16.2	16.3
0	+.4	+.3
52 1	59.2	59.8
	58.3	58.3
	48.0	47.4
	54.2	55.0
	2197	2205
	54.92	55.12
	−.38	.29
	54.54	54.83

54.67

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

1880phae.proj.1526.

Nov 13/14 1880

1 open shutter.

N	167	228	229	223	208	16	−.7	
S	15.7	9.1	9.0	9.4	11.7	13.6	32.3	
N−S	+1.0	13.7	13.9	12.9	9.7	4.7	33.0	
½(N−S)	+0.50	6.85	6.95	6.45				
E	594 587	121 123	127	113	8.2	33	80	335 332
F	584 584	122 120	120	10.7	7.7	26		325 329
G	482 482	17 19	23	0.8	5.8	52.2		221 223
H	557 553	8.8 9.0	8.7	7.7	4.9	59.7		300 301
	2217 2216	348 352	357	305	2586	2378		1184 1185
	5542 5540	870 880	892	7.65	6465	5941		2960 2962
	5541	1366 +7.5						2961
	−.39	−13.97	13.90	1263	9.63	4.43		3459
	.65	13.35	13.55	12.55	4.35	4.35		3265
½ dio =	.60	1.03	1.03	1.01	1.08	1.02		1.05

Note

There is obviously a change due to opening the shutter.

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

1880phae.proj.1526.

$16^h 40^m$ #

17 52

11	~~-7~~	168	151	166	06	110	110	208	208
308	330	157	170	158	318	212	211	112	112
-259	+337	+11	-19	+8	-312	-102	-101	+96	+97
			00						

11									
1243	52 248	08	572	00	51 266	510	511	82	81
238	242	02	563	598	264	501	501	79	72
137	143	496	466	499	163	402	402	573	573
207	214	571	539	567	242	474	480	48	53
625	847	2277	2140	2264	935	1887	1854	2582	2583
2062	2522	5692	5350	5660	2338	4718	4731	6455	6458
			51	5568					
3440	31.77		2.		27.70	850	833	887	890
3005	35				31.2	10.2		9.6	97.
1.14	.95				.89	.83	.82	.93	.92

$16^h 40^m$

Left-south shutter open.

$18^h 32^m$

opened west-door

& circle room in order to

ascertain the effect of a sudden

change of temperature upon the bubble

to-morrow morning

.95
.89
.83
.82
.93
.92
.890 = ½ div.

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

1880phae.proj.1526.

Nov 13 1880

N&S

Investigation of value of 1 division in 2 levels

Beginning observations about 9 A.M.

From 0 division to 33 div South and 33 div North

Constant $\frac{1}{2}(N-S)$ = 10,30 Circle 51' 55,02"

N	-03	14	24	39	55	69	88	105	127	141
S	331	313	303	292	273	260	241	223	202	189
N-S	-334	-299	-279	-253	-218	-191	-153	-118	-75	-48
$\frac{1}{2}(N-S)$	-1670	-1495	-1395	-1265	-1090	-955	-765	-590	-375	-240
Σ 50	1182	216	268	303	340	372	418	455	513	542
I	179	212	262	298	332	368	419	452	508	540
G	#71	109	156	188	228	266	311	343	402	432
h	149	182	230	262	299	339	384	418	477	506
	581	719	916	1051	1199	1345	1532	1668	1900	2070
	1795	2290	2628	2915	3362	3830	4170	4752	5050	

+4024	3707	3212	2874	2507	2140	1672	1332	752	452
33.75	30.25	28.25	25.65	22.15	19.45	15.25	12.15	7.85	5.15

$\frac{1}{2}$ Diw = 1,19" 1,22" 1,14" 1,12" 1,13" 1,10" 1,07" 1,09" 0,96" ,88"

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

1880phae.proj:1526.

	#		#					
157	141	140	196	228	210	193	185	179
170	143	134	128	53	111	128	138	142
1.3	-0.2	+1.6	6.8	135	99	6.5	+4.7	+3.7
0.65	-0.10	+.80	+3.45	6.75	4.95	3.25	2.35	1.85
571 578	582 582	599 03	4041	9498	6867	3837	2623	1109
568 566	580 580	595 597	3130	8784	5960	2931	2218	0907
460 461	470 473	490 496	528 532	589 590	559 560	531 536	514 515	507 507
536 533	543 547	586 582	02 00	5863	33 34	04 03	584 586	572 580
2185 2130	2175 2182	2250 2251	2401 2403	2628 2630	2179 2252	2405 2407	2346 2344	2299 2303
5338 5325	5438 5455	5625 5626	6002	6590 6600	6295 6302	6012	5865 5860	5746 5758
5331	5446	5627	6004	6585	6258	6010	5863	5753
184 +0.56		-12.2	-5.02	-10.83	-7.96	-5.13	-3.61	-2.57
1.65 .55		1.25	6.10	13.15	9.15	6.15	4.35	3.35
1.04 1.02		0.98	.82	.83	.83	.83	.79	.75

Open door Shutter for days of rain

Closed door Shutter

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

1880phae.proj.1526.

104

Nov 14 18 N

$10^h\ 40^m$

N				$21^h\ 50^m$			$22^h\ 10^m$	350	-09		
S							50.1	-3.2	323		
N-S		162		338	21		16.0	38.2	33.2		
½(N-S)		141		19	332		16.2				
		+2.1		+21.9	-31.0		-.2				
Σ	50	157.3	2	215	1	15.8	521	2	216	1	284
F		58.1		21.8		15.3	45.8		22.0		28.2
G		49.7		13.6		7.8	49.3		12.8		20.1
No		56.4		20.0		16.3	49.1		20.1		27.7
		2215		769		532	1902		765		1046
		55.38	2	1922	1	1330	47.55	2	19.12		2615
		-2.1		2384		4208	+2		3257		2140
		53.3		148		33.2	47.8		384		33.2
				1.20		1.27			.83		.65

*Spend shutter after this reading

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

1880phae.proj.1526.

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

1880phae.proj.1526.

Nov 15 1882

West door of circle room open

since morning.

$16^h\ 20^m - 25^m$, $16^h\ 28^m$

N	16.8	16.0	15.2	29.9	29.1	21.7	8.0
S	14.7	15.7	16.1	29.6	1.8	9.7	23.3
N−S	+2.1	+.3	−.9	−27.7	+27.3	+12.0	−15.3
½(N−S)	+.50						

2	52.2	57.3	55.2	25.7	24.0	8.9	41.1
1	57.8	56.8	55.1	25.3	24.1	8.8	40.0
9	48.7	48.6	46.1	16.7	15.2	58.8	30.9
16	55.7	55.2	53.3	23.2	21.8	6.1	38.0
	144	179	97	109	51	2626	1500
	53.60	54.47	52.42	22.72	21.27	5.65	37.50
							+16.0

535.0 3 3078 2777

−.53 2820 2650

~~55.00~~

53.0 ✓

Mean 53.98

Idio = .106

53.0 2.12 52.4 2.06 53.5

Opened shutters at $16^h\ 28^m\ 10^s$ & shut door.

Shut shutters at 16 31 10

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

1880phae.proj.1526.

	$16^h\ 33^m$						$16^h\ 42^m$
N	15.9	16.1	15.8	31.2	1.6	20.9	8.3
S	15.9	15.7	16.0	0.1	30.1	10.9	23.4
N−S	0.0	+.4	−.2	+31.1	−28.5	+10.0	−15.1
½(N−S)		+07					

E	58.3	58.9	57.6	2 24.9	1 31.8	2 7.6	46.0
F	57.9	57.5	57.0	24.0	31.1	6.8	44.8
G	47.8	47.9	47.0	15.0	20.9	56.8	35.0
H	53.3	53.8	54.9	21.7	28.4	5.7	43.3
	193	201	165	56	1122	2569	91
	54.82	55.02	54.12	21.40	28.05	4.22	42.27
		5465		2675	2654	8.9	+13.6
		54.59		31.03	28.54	553	55.9

537 ½ dio = .89 / 53.4 = 47.0 = 36.3

dio = 1.45

54.6
53.7
53.4
53.3
55.5
54.58

attached therm. No. 4

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

1880phae.proj.1526.

Nov. 15, 1880

73 30

	N.C	S.C.
44	77.3	80.7
	77.2	80.9
	77.2	80.7
	77.2	81.1
	77.3	81.3
	12	47
	77.24	80.94
	80.94	
	158 18	
	79.09	

Set at 44 79.1
Didn't use this,
probably set on wrong wire.

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

1880phae.proj.1526.

Nov. 15 1880

In order to furnish data necessary for the Annual report - Herein regard to the variability of the Pleiades, the results of the observations prior to the following series from Sept 1878 to Nov 1880 are given herewith.

Date	Mn. Reflex.
1878 Sept. 9	+1.24
9	+2.93
12	+1.68
16	+3.12
	+2.24
Oct 1878 Oct 13	+1.32
" 10	−.16
Nov. 4	+3.18
" 4	+2.62
" 19	+2.31
	+1.85
1879 Feb. 12	+2.02
13	+1.93
18	+.88
21	+.30
22	+.88
24	+1.73
26	+.47
	+1.18

Date	Hor. Reflexion
1879 Mar. 1	+.85
2	+1.34
2	+1.21
4	+1.26
11	+.93
12	+1.26
18	+1.42
23	+1.58
24	+1.80
	+1.29
Mch. 1	+.65
6	+.96
7	+1.59
8	+1.92
8	+.84
9	+1.81
12	+.48
19	+.73
30	+2.17
30	+1.08
	+1.13

Date	Hor. Reflexion
1879 May 13	+.101
13	+1.08
29	+.35
	+.88
June 1	+.20
4	+1.18
12	+.07
16	+.48
18	+.49
18	+.32
19	+.91
21	+.28
22	+.48
23	+.58
24	+.11
25	+.12
30	+.47
	+.44

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

1880phae.proj.1526.

Results of Observations for Nor. Plexaur continued.

Date	Nor Plexaur	
1879 July 1	+.80"	
2	+.87	July 4
10	−.20	
	+.40	
Sept 5	+.73	
9	+.22	
12	−.57	
14	+.88	Sept 14
16	+.80	
26	+.19	
27	+.64	
	+.43	
Oct 1	+.92	
4	+1.14	
7	+.87	
13	+.38	Oct 13
14	+.75	
26	+.12	
29	+.57	
	+.61	
Nov 5	+1.42	
6	+.96	
10	+1.12	Nov 12
15	+.98	
25	+1.00	
	+1.10	
Dec 4	+1.13	
15	+.47	
18	+2.15	
	+1.25	

Date	Nor. Plexaur	
1880 March 23	−.09"	
31	+2.25	March 27
	+1.08	
Apr. 7	+.80	
10	+2.34	
18	+.79	
21	+.77	April 17
27	+.88	
	+1.12	
May 2	+.34	
13	+.65	May 8
	+.50	
June 10	+.14	
12	+.52	
16	+.89	June 16
27	+.43	
27	+.11	
	+.44	
July 4	+.16	
5	+.23	
6	+.28	July 6
29	+1.22	
31	+.55	
	+.57	

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

1880phae.proj.1526.

Date	Nor. Ptepan.	
1880 Aug 10	+.39"	
14	+.18	Aug 14
	+.28	
Sept-16	+.59	
22	+.58	Sept-22
28	+2.01	
	+1.06	
Oct-4	+1.40	
11	+.53	
19	+.62	Oct-16
23	+1.26	
24	+.66	
	+.89	

Means by months .. 80 Nfe.

1878	Sept: 11	Nfe.	+2.29"	+1.75"	1880. Mar 23	Nfe = +1.05" +.86
	Oct-26		+1.45	+1.48	Apr 17	+1.12 +.90
					May 8	+.50 +.40
1879	Feb. 19		+1.18	+.89	June 16	+.44 +.35
	Mar 11		+1.29	+1.03	July 15	+.57 +.46
	Apr 13		+1.13	+.90	Aug 14	+.28 +.22
	May 18		+.88	+.70	Sept-22	+1.06 +.85
	June 18		+.44	+.36	Oct-16	+.89 +.71
	July 4		+.40	+.32		
	Sept. 14		+.43	+.34		
	Oct-13		+.61	+.49		
	Nov. 5		+1.10	+.88		
	Dec 16		+1.25	+1.00		

See page 114

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

1880phae.proj.1526.

see page 114

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

1880phae.proj.1526.

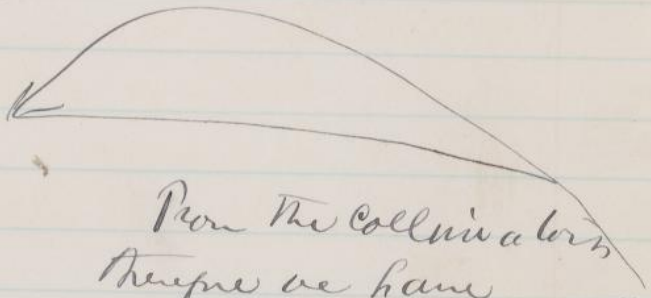
John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1880phae.proj.1526.

It is at once obvious from the curve given on page 113 that the Zenith distance flexure is smaller in July than in January.

The following are the values of R for Δz = 80 derived from the curves. The values for Sept-Oct 1878 are some what doubtful on account of the paucity of the observations as well as from the fact that I was not at this time well accustomed to the method of reductions

1878	Sept 1	Rfl. = +1.40"		Aug 1	+.33"
	Oct 1	1.40		Sept 1	.47
	Nov 1	1.32		Oct 1	.66
	Dec 1	1.27		Nov 1	.81
1879	Jan 1	1.14	1.16"		
	Feb. 1	1.08			
	Mar 1	1.00			
	Apr 1	.93			
	May 1	.80			
	June 1	.60	.43"		
	July 1	.40			
	Aug 1	.30			
	Sept 1	.31			
	Oct 1	.38			
	Nov 1	.70			
	Dec 1	.93			
			.93		
1880	Mar 1	.93			
	Apr 1	.92			
	May 1	.64			
	June 1	.41			
	July 1	.37	+.37		



From the collimation terms therefore we have

$$\frac{Dec + Jan}{2} - July = +0.64"$$

From the observations of fundamental stars we have

$$\frac{Dec. + Jan.}{2} - July = +0.70"$$

The variation of the flexure is therefore certainly established.

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

1880phae.proj.1526.

the results for

Comparing Dec. 1878 and Jan and Feb. for 1879 with those for June July and August 1879 we have

$+1.16 - .43 = +.73$

Comparing the ~~corresp~~ results for the corresponding months in 1879 and 1880 we have

$+.93 - .37 = +.56$

We may therefore conclude that $\sin^2 z = .80$ the flexure for the ~~winter~~ months is about 0.64" greater than for the mid summer months.

I now compare this value with that derived from the stars of the fundamental system.

From the flexure tables constructed from the observations we have for $\sin^2 z = .80$

	Jan. —		mean	~~July~~		Jan + Dec − July / 2
1872	Dec 31	+1.80	+1.80	July	+1.16	+.64
1873	Jan.	+1.50				
	Dec.	+2.06	+1.78	July	+1.39	+.39
1874	Jan	+2.40				
	Dec	+2.77	+2.58	July.	+1.49	+1.09
1875	Jan	+2.47				
	Dec	+3.01	+2.73	July.	+2.00	+.73
1876						
1877	Reductions not complete					
1878	Jan	+1.45	+1.43	July	+0.81	+.63
		+1.42				

Mean +.70"

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

1880phae.proj.1526.

Nov. 15, 1880

	N. C.	S. C.
14 25 44	78.0	61.0
	78.0	61.2
	78.3	60.2
	78.5	60.2
	78.0	60.2
	8	28
	78.16	60.56
	60.56	
	138.72	
	69.36	

Set at 44 73.3

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

1880phae.proj.1526.

Nov. 18, 1880

13 0	N.C.	S.C
	82.1	56.2
	82.3	57.8
	82.3	55.2
	82.3	56.8
	82.0	56.3
	1 0	323
	82.20	56.46
44	56.46	
	13844	
44	69.33	

Set at 44 69.3

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

1880phae.proj.1526.

Nov. 20 1880

W 6.

12 40 ℰ.

44 601	44 5-58
5954	5571
9813	61
7910	524
9847	5-9
39 65-	283
9.30	5566
	25.30
	13496
	67.48

Del-4-44 67.6-

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

1880phae.proj.1526.

Nov. 21, 1880

13 53

I		
~~66.8~~	43.8	44.1
70.0	43.7	42.8
71.8	25.1	25.7
75.3	34.7	34.7
77.3	1473	1473
195	36.82	36.82
73.90	36.82	

Seeing very bad indeed

14h 5m

N.C	S.C
79.9	47.6
81.8	48.0
81.0	48.1
82.1	48.8
83.0	49.0
78	41 5
81.56	48.30
48.30	
12986	
44 64.93	

Set at 44 64.9

Flexure

	E	F	G	H	E	F	G	H
14 8	16.2	13.0	55.8	6.1	5.3	10.9	0.1	3.1
	16.5	12.8	56.2	5.8	6.0	10.3	0.0	2.8
	16.3	13.1	55.9	6.0	5.9	10.2	0.0	3.0
	16.3	12.7	56.0	7.0	5.1	10.1	0.2	3.0
	16.8	13.0	56.0	5.8	5.8	10.6	0.2	2.8
	21	146	299	7	281	21	5	147
	16.42	129	55.98	6.14	5.62	10.42	0.10	2.94
	12.92				10.42			
	55.98				0.10			
	6.14				2.94			
27	31.46				19.08			
	7.86		−		4.77	=	2)3.09	
							1.55	

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

1880phae.proj.1526.

Nov. 21, 1880

Ryus

14 00

E		F		G		H	
33.0	32.2	29.9	28.8	12.7	11.1	23.2	31.2
33.2	32.1	29.3	28.8	12.0	10.9	22.8	31.8
34.1	32.2	29.8	28.9	13.2	10.2	23.0	31.3
33.8	32.4	29.5	28.2	12.8	10.0	23.7	31.7
34.0	32.3	29.7	28.8	12.0	10.5	22.7	31.0
181	112	32	35	27	27	4	20
3.6 34.52	32.24	29.64	28.70	12.54	10.54	23.08	31.40

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

1880phae.proj.1526.

Nov. 22, 1880

	I		
13 55	74.0	19.8	18.7
	71.7	24.3	23.9
	76.3	23.8	23.4
	76.8	28.1	28.6
	74.8		
	236	160	146
	74.72	24.00	23.65

	N.C	S.C
14 0		
44	87.1	42.8
	86.3	42.2
	84.8	42.8
	85.0	42.8
	87.2	43.1
	304	137
44	86.08	42.74
	42.74	
	128.82	
44	64.41	

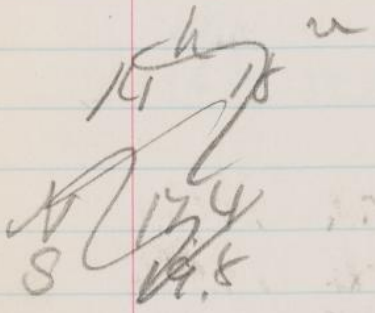
Set at 44 64.9

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

1880phae.proj.1526.

122

Nov. 22, 1880



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

1880phae.proj.1526.

Nov 22 1880

With new setting of bevel tube
Ball in centre of tube.

	14	18					
N	17.3	22.8	17.3	19.7	16.3	20.3	19.0
S	19.6	16.1	21.8	14.7	22.2	18.4	19.1
N-S	-2.6	6.7	-4.5	+5.	-5.9	+1.9	-.1
				16h 9m			
E	25 4	11.4	20.9	6.8	11.9	6.8	15.4	14.0
E		14.0	20.3	12.4	14.8	9.2	17.6	15.9
E		14.0	23.0	12.2	14.9	9.0	17.5	16.8
Ne		20.9	30.9	20.0	16.8	16.8	25.3	23.9
		60.3	98.1	64.4	22.2	41.8	35.8	30.6
		240	245	136.0	14.8	10.45	18.95	17.65
		150.8	-6.4	+3.6	15.65	-4.7	-1.86	+1
		+2.6	5.14		-5			
		17.7	17.8	16.1	5.0	6.4	17.03	17.7
		17.0	19.1	17.2		15.7		
			17.7					

16.9
17.7
14.6
17.30

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

1880phae.proj.1526.

Nov 23 1880

1h 50m

Shutters closed

N	202	31.1	22.8	31.3
S	18.9	8.1	31.3	7.7
N-S	+1.3	+23.0	-28.5	+23.6
				13 3
ξ 254	16 6 4	3 55.1	3 55.3	4 36.0
ξ	17.5	36.1	56.9	37.8
ξ	18.0	36.8	57.2	37.3
ζ	25.0	43.8	5.0	44.0
	271	318	2344	351
	19.28	37.95	3 58.60	38.77
	-1.0	-18.4	18.8	18.88
	18.3	19.5	17.4	19.9 = 18.87

1867/217 = .84''

1949/223 = .88

2068/248 = .84

+.85

Shutters opened at 13h 3m

7h 0m

N	202	34.1	0.1
S	18.9	-0.4	33.9
N-S	+1.3	+34.5	-33.8
ξ 25	4 16.0	4 42.1	3 49.0
ξ	17.8	44.7	51.6
ξ	18.2	45.0	52.9
ζ	25.0	52.1	57.7
	77.0	239	312
	19.25	45.97	52.80
	2.0	27.6	27.0
	18.2	18.4	19.8 = 18.8

2642/332 = +.81

2645/351 = +.75

+.78

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

1880phae.proj.1526.

Nov. 23, 1880

	I		
14 0	72.0	20.3	20.0
	75.4	25.4	24.9
	75.9	25.4	25.0
	78.2	29.3	28.7
	77.8	20 4	18 6
	29 3	25.10	24.65
	75.86	24.87	

14 10	N.C	S.C
44	88.8	45.0
	87.7	43.0
	85.4	43.3
	86.8	44.4
	86.4	43.0
	351	187
	87.02	43.74
	43.74	
	13076	
	45.38	

Set at 44 64.9

Runs

14 5	~~E.~~		J1		G		H	
5 0	6.8	5.9	8.0	7.7	9.9	8.0	15.7	14.3
	6.7	5.9	8.0	7.4	10.1	7.3	15.0	13.7
	7.2	6.0	8.2	7.7	9.9	7.7	15.0	13.9
	7.2	5.3	8.7	8.0	9.8	7.3	15.0	13.2
	7.3	5.8	9.0	7.8	9.8	7.7	15.0	13.3
	2	39	19	36	45	30	7	34
	7.04	5.78	8.38	7.72	9.90	7.60	15.14	13.68
	298.64		299.34		297.70		298.34	
	299.39							
	297.70							
	298.34							
	298.60							

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

1880phae.proj.1526.

Nov. 23, 1880

Flexure

14 8	E	F	G	H	E	F	G	H
0 2	51.5	53.2	53.3	59.8	41.3	53.0	0.9	58.2
	51.3	53.4	53.7	59.2	40.8	53.2	1.7	58.0
	51.7	53.0	53.8	58.7	41.8	52.9	0.4	58.0
	51.5	53.7	53.1	59.0	41.5	52.3	1.3	57.8
	51.6	53.0	53.7	59.4	41.2	52.1	0.3	57.7
	26	13	26	11	16	135	46	397
	51.52	53.26	53.52	59.22	41.32	52.70	0.92	57.94

53.24
53.52
59.22
17.52
54.38
53.22
1.16
.58

52.70
0.92
57.94
21288
53.22

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

1880phae.proj.1526.

Nov 25 1880

12h 30m Shutter closed. Opened shutter at 12h 41m

25 – 4 16.1

				12h 42m	12h 45m
N	196	8~~8~~	298	290	309
S	189	298	8.9	293	78
N–S	+7	–21.0	+20.9	–20.3	23.1
25 – 4	16.2"	3 55.2	4 34.9	3 54.2	4 39.8
E	166	560	362	55.1	404
S	169	559	364	55.9	410
N	241	3.0	413.3	2.4	483
	434	2301	1508	2276	1698
	1645	3 57.52	4 3770	3 5690	4 4245
	~~–156~~	+20.12	–20.1	21.3	–24.3
	~~1752~~	2092	1925	2155	2400
	~~1.~~	21.7	20.2	21.00	22.4
	177	0.~~96~~ 96"	0.95"	1.03	1.07
	177	17.7	17.6	18.2 – 18.1 = 18.15	
			17.67	17h 0	

192
190
206
2.14

13h 30m

N	200	90	298	long. Coils
S	188	248	92	Noted during
N–S	+1.2	–208	206	to Observer.
25 – 4	154	290 533	358	
E	180	~~288~~ 535	386	
S	182	~~283~~ 545	390	
N	250	~~530~~ 501	460	
	769	2219	1594	
4	1922	8 5548	3985	
	1.2	23.74	2060	
	180	220	15.4	
		1.08 2.14	1.06 2.02	

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

1880phae.proj.1526.

Nov 25 - 1880

14h 0m

	N6	8 e.
44	80.0	43.6
	91.1	43.8
	80.0	40.9
	88.7	43.3
	88.4	43.9
	448.2	35
	89.64	43.70
	43.70	
	1333.4	
	66.7	

Let-01-649

	14h 15m	15h 15m	16h 10m
N	19.7	19.0	18.9
S	18.8	19.1	19.0
N-S	+.9	-.1	-0.1
E	25-4 15.8	15.6	15.2
F	+17.8	17.1	16.8
G	17.6	17.9	17.6
N6	23.8	24.1	24.2
	7.50	7.47	7.38
	18.75	18.68	18.45
			17.63

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

1880phae.proj.1526.

Nov 28 1880

14h 0m

14 10

	I	II			NE	SE
c	718	178	178	44	87.2	42.1
	704	230	23.0		877	426
	708	232	233		87.2	42.1
	72.4	29.7	29.9		86.2	42.3
	71.8	9317	940		868	42.8
	72	2342	23.50		874	19
	7144				8702	4238
					4238	
					12940	
					64.7	Sel-al 64,7

	14 30	1433	1450	15-35	1650	0 15
N	189	172	168	183	182	171
S	189	183	192	172	167	171
N-S	+1.0	-1.1	-2.4	+1.1	-1.5	0.0
E	11.3	9.8	10.7	134	13.2	11.2
F	13.8	12.8	13.0	15.9	16.1	15.2
G	15.8	15.2	14.9	19.2	18.2	18.2
No	23.0	22.0	21.8	25.8	25.7	25.1
	639	598	604	743	732	697
	15.95	1490	15.10	1858	1830	17.45
	+0.9	-1.0	+2.4	11	14	02
	~~+1.0~~ 15.8	15.9	17.5	17.5	16.9	17.4
						17.00

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

1880phae.proj.1526.

Nov 28

Fleming

G		R		G			
52.2	40.7	52.5	50.8	53.6	0.2	2.3	59.9
50.5	40.0	51.8	50.3	54.1	0.9	2.0	59.9
50.1	40.2	51.6	51.3	54.1	0.6	2.3	59.3
50.8	40.1	52.3	51.8	53.8	0.2	1.8	59.4
52.1	40.0	52.3	50.6	54.1	0.4	2.0	59.6
50.10	40.20	52.30	50.86	53.94	0.46	2.08	59.62

40.20
52.30
50.86
48.36

0.46
2.08
59.62
57.02

50.10
52.30
53.94
2.08
57.10

40.20
50.86
0.46
59.62
52.81

429
+2.14

1880phae.proj.1526.

Nov 29 1880

	13 45	14 0	14 10	+6 40	18 00	19 0	h m 23 30
N	190	197	200	163	140	135	201
S	181	173	168	149	213	214	154
N-S	+0.9	−2.4	3.2	−3.6	−7.3	−7.9	+4.7
	25−4 157	161	165	172	172	170	178
	194	178	197	193	197	192	198
	196	208	229	163	113	114	233
	26.7	27.8	28.4	19.0	28.8	28.8	30.4
	787	825	872	678	670	564	913
	19.65	20.65	21.80	11.95	14.25	14.10	27.85
	9	−2.3	−3.1	+3.2	+7.1	+7.3	−4.7
	[#1 16.7	18.3	18.7]	+4.6	−~~18.8~~ 21.2	21.4	23.1 = 20.23
		18.57					

14h.0 −
NE SC.

44.677	43.4
87.2	42.0
86.4	42.1
86.5	44.2
86.6	44.0
344	157
86.88	4314
	86.88
	13002
	650

Sel 01-64.4

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

1880phae.proj.1526.

Aug. 2 1880

17h 0m

I	II	
71.6	19.4	19.2
74.4	25.1	25.7
74.0	25.4	25.2
71.3	31.7	31.4
74.3	101.3	101.7
	253.8	254.2

N	17.6
N	19.0
N–S	14
S	10.0
F	12.3
9	14.0
10	22.4
	58.7
	14.68
	14
	16.1

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

1880phae.proj.1526.

Dec 7 1880

17h 5m

~~#C.T.~~ " I

44	723	17.2	18.2
	715	22.8	23.1
	741	24.9	26.3
	715	31.0	31.8
	721	95.9	99.4
	125		
	7250	23.98	24.85

17h 10m

#N	~~8 3=4 18.6~~ "	18.5	17.8
S		17.8	18.0
N-S		+.2	-.2
Q	21-4	18.6	19.3
T		22.5	22.3
G		26.1	26.3
Ho		33.9	34.0
		1021	1019
		25.52	25.48
		25.32	

The cutter was cleaned Dec 6. Probably the level tube was disturbed.

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

1880phae.proj.1526.

Dec 7

N C S. C.

44 824 44 439
821 461
818 451
841 450
841 457
155 256
8310 4516
4516
12826
64,1

Sel-01-446 4,1

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

1880phae.proj.1526.

Dec. 8 1880

Long Coll.

$2^h\ 30^m$	44 77.1	23.7	23.2
	75.4	25.6	25.8
	74.0	24.9	25.0
	77.0	33.4	34.0
	77.5		
	310		
	76.20		

Seeing very bad

$3^h 10^m$ N.C S.C

44	84.4	39.7
	84.2	39.1
	83.1	40.7
	84.1	40.2
	83.0	40.1
	188	1998.
	83.76	39.96
	39.96	
	12372	
44	61.86	

Set at 44 61.9

1 div = 1.00

	$2^h\ 35^m$	$2^h\ 39^m$	$2^h\ 58^m$		$2^h\ 58^m$
N	21.2	21.0	19.2	14.8	21.2
S	18.4	19.0	19.4	24.3	18.2
N-S	+2.8	+2.0	-.2	-9.5	+3.0
E	27.0	26.0	0 2 40.0	2 51.0 46.2	2 43.0
F	27.1	26.1	38.8	50.8 46.1	42.0
G	28.0	26.8	40.8	51.1 46.4	43.3
H	39.3	38.1	51.6	3.0 58.8	54.7
	14	370	112	6.9 375	230
	30.35	29.25	42.80	49.37	45.75
	-2.8	-2.0	2	+9.5	-3.0
	27.5	27.2	43.0		

$2^h\ 45^m$

Screwed the level more firmly to the cube, & put in a thicker piece of paper between the cap & the ball.

2.

Rij

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

1880phae.proj.1526.

Dec. 8, 1880

Runs

	E		F		G		H	
3h 0m								
5 0	13.3	11.7	12.0	12.1	13.8	12.7	24.1	22.7
	12.8	11.0	12.7	11.7	13.3	12.1	24.0	22.9
	13.8	11.2	12.3	12.0	14.1	12.8	24.0	23.1
	12.9	11.0	11.8	12.1	13.5	12.2	24.0	22.8
	13.0	11.7	12.1	11.8	13.8	12.7	24.4	22.8
	8	16	9	47	35	25	5	43
	13.16	11.32	12.18	11.94	13.70	12.50	24.10	22.86

Flexure

	E	F	G	H	E	F	G	H
3h 5m								
0 2	52.5	52.6	52.7	4.0	42.2	51.7	58.8	2.1
	52.1	51.8	52.8	3.0	41.9	52.0	58.9	1.3
	52.0	51.6	52.7	3.7	42.3	51.9	58.9	1.1
	52.9	51.3	52.4	3.7	42.1	52.4	59.0	1.7
	52.5	52.2	52.7	3.1	41.9	51.2	59.3	2.1
	20	45	33	2.5	4	92	449	8.3
	52.40	51.90	52.66	3.50	42.08	51.84	58.98	1.66
	51.90				51.84			
	52.66				58.98			
	3.50				1.66			
	2046				14.56			
	55.11				53.64			
	53.64							
	1.47							
	0.73							

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

1880phae.proj.1526.

Dec 13, 1880

Long Coll.

$15^h\ 5^m$	72.0	19.3	19.7	20.0
	73.0	24.3	24.0	24.7
	72.2	25.3	24.8	25.3
	72.9	35.8	35.7	36.0
	73.1	1047	1042	1060
	132	26.17	26.05	26.50
	72.64		26.24	

Level

	$15^h\ 7^m$		$15^h\ 12^m$	$15^h\ 25^m$
N	18.9	18.7	15.7	16.8
S	16.8	17.0	20.3	18.1
N-S	+2.1	+1.7	−4.6	−1.3
E	26.2	26.7	22.3	24.7
F	27.2	27.6	23.7	25.8
G	29.8	30.2	26.2	28.0
H	43.0	43.0	38.1	41.1
	1262	1275	1103	1196
	31.55	31.87	27.57	29.75

$15^h\ 25^m$	N.C.	S.C
44	88.4	34.8
	88.3	36.0
	88.1	34.3
	89.1	34.1
	89.0	34.0
	429	222
	88.58	34.44
	34.44	
	12302	
44	61.51	

Set at 44 61.9.

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

1880phae.proj.1526.

Dec. 13, 1880

Runs

15h 15m	E		F		G		H	
5h 0	14.8	13.7	15.0	15.0	17.2	16.7	31.0	29.2
	14.7	13.0	15.2	15.3	17.5	16.6	30.8	29.1
	14.8	13.6	15.3	14.7	18.1	17.2	30.1	29.0
	14.8	13.7	15.3	15.0	18.4	16.7	30.7	29.1
	14.8	13.7	14.8	15.4	18.1	17.4	30.0	29.1
	39	27	6	4	43	46	26	5
	14.78	13.54	15.12	15.08	17.86	16.92	30.52	29.10

Flexure

15h 20m	E	F	G	H	E	F	G	H
0 2	50.1	52.3	52.8	16.7	38.0	48.9	58.2	2.2
	49.8	52.8	52.3	16.7	38.1	48.8	58.4	2.0
	50.3	52.4	53.3	16.3	38.6	48.7	58.2	2.3
	49.9	52.6	53.7	16.4	37.8	49.7	58.0	2.3
	50.2	52.2	53.7	16.7	38.3	49.4	58.2	2.8
	03	23	8	28	398	5	12	16
	50.06	52.46	53.16	16.56	37.96	49.10	58.24	2.32

52.46
53.16
16.56
16224
40.56
36.91
3.65
1.81

49.10
58.24
2.32
14762
36.91

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

1880phae.proj.1526.

Dec. 14, 1880

Long. Coll.

I

15h 15m	69.3	16.4	17.6	17.7
	69.9	22.7	23.6	23.9
	71.0	24.8	25.7	25.7
	72.3	36.0	36.4	36.6
	71.0	199	233	239
	3 5	24.97	25.82	25.97
	70.70			

Level

15h 30m	Clamp tight.		Clamp loose			15h 50m	17 30
N	24.1	36.0	16.3	19.2	16.6	18.8	17.8
S	10.1	5.0	17.6	14.8	17.6	15.2	15.7
N-S	+14.0	+31.0	- 1.3	+4.4	-1.0	+3.6	+ 2.1
E	23.5	16.8	35.9	42.1	36.6	38.4	
F	26.2	19.3	39.0	44.8	39.8	41.8	
G	30.3	22.7	42.1	48.0	43.0	45.6	
H	42.3	35.0	54.7	0.6	55.3	58.0	
	1223	938	1717	1955	1747	235	
	30.57	23.45	42.92	48.88	43.68	45.87	
			44.2	44.5	44.7	43.6	

Found that the tension of the Clamp produced a strain on the level tube. Loosened the clamping screws so that the bulb is simply held in place.

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

1880phae.proj.1526.

Dec. 14, 1880

15h 40m	N.C	S.C
	86.3	37.6
	87.0	37.1
	87.2	37.0
	86.6	37.9
	86.9	38.3
	34.0	29
	86.80	37.58
	37.58	
	124.38	
44	62.19	

Set at 44 61.9

Flexure

15h 35m	E	F	G	H	E	F	G	H
	47.3	51.0	52.1	6.1	36.4	49.7	59.7	4.1
	47.3	50.8	52.8	5.7	36.6	49.5	59.4	4.0
	47.9	50.8	53.2	5.4	36.3	49.3	59.5	4.0
	47.2	51.0	53.2	5.7	36.1	49.5	59.8	3.7
	47.6	50.8	53.3	5.6	36.1	49.6	59.9	3.8
	23	44	46	35	15	26	33	46
	47.46	50.88	52.92	5.70	36.30	49.52	59.66	3.92
	50.88				49.52			
	52.92				59.66			
	5.70				3.92			
	16.96				209.40			
	54.24				52.35			
	52.35							
	2) 1.89 = 0.94							

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

1880phae.proj.1526.

Dec. 15, 1880

	Long	Coll.		
$15^h\ 0^m$	49.3	18.″2	18.″8	18.″7
	49.0	23.4	24.0	24.1
	50.0	26.7	26.7	26.2
	48.7	35.9	35.3	36.2
	49.1	1032	1048	1052
	46.1	25.80	26.20	26.30
	49.22			

$15^h 10^m$	N.C.	S.C.
	83.1	44.9
	83.7	43.8
	83.3	44.3
	84.7	43.9
	84.0	44.3
	188	212
	83.76	44.24
	44.24	
	12800	
44	64.00	
	Set at 44	61.9

$\lambda - 4\bar{\nu}$

N 21.0
S 14.3
N−S 6.7

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

1880phae.proj.1526.

Dec. 15, 1880

	15h 45m	16h 30m	17h 15m
N	21.0	17.6	18.2
S.	14.3	17.4	16.8
N-S	+6.7	+0.4	+ 1.4
E	5 3 41.8	42.8	36.7
F	44.3	43.6	38.7
G	47.8	46.8	42.8
H	59.8	57.0	54.9
	1937	1982	1731
	48.42	49.55	43.28
	−6.7	−0.4	−1.4
	41.7	49.1	41.9

41.80

Flexure

	E	F	G	H	E	F	G	H
15h 5m	48.0	51.5	52.8	5.7	37.8	50.4	0.8	3.9
	47.8	51.3	52.8	5.1	37.7	50.7	0.5	3.6
	48.2	50.7	53.2	5.4	37.9	50.9	0.0	3.5
	48.0	50.5	53.1	5.1	38.0	50.9	0.0	4.0
	48.3	51.2	53.0	5.0	37.6	50.7	0.0	3.9
	403	52	149	13	390	36	13	189
	48.06	51.04	52.98	5.26	37.80	50.72	0.26	3.78

51.04
52.98
5.26
217.34
54.33
53.14
~~7.47~~
2) 1.19
0.59

37.80	
50.72	
0.26	
3.78	
212.56	
53.14	

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

1880phae.proj.1526.

Dec. 16, 1880

Long Coll,

16h 20m	55.0	23.8	24.1
	55.3	26.4	27.2
	52.8	26.1	26.4
	54.1	35.0	35.2
	55.0	333	329
	222	28.32	28.22
	54.44	28.27	

15h 25m	N.C	S.C
44	88.3	38.1
	87.8	36.8
	86.0	38.0
	89.1	37.0
	88.1	38.0
	393	379
	87.86	3758
	37.58	
	12544	
44	62.72	

Set at 44 61.9

	h m	
	15 45	16 20
N	19.6	191
S	~~19.8~~	19.9
N-S	-0.2	-0.8
E	5 3 40.8	—
F	40.1	—
G	41.7	—
H	52.0	—
	174 6	
	436.5	

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

1880phae.proj.1526.

Dec 18 1880

16h 15m

4	491	20	287	278	282
	498		310	291	306
	490		290	278	276
	510		292	328	386
	513				

h m

16 20

N.C.

44	550	430
	546	437
	861	431
	882	437
	871	440
	310	175
44	862	4350
		8620
		12970
		6485

Sel-ot 648

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

1880phae.proj.1526.

Dec 18 1880

	h m	
	16 22	17 43
N	116	16,3
S	210	221
N–S	– 2,4	4,2
Σ	5 38,6	—
T	36,9	—
4	36,3	—
Mo	48,8	—
	1606	—
	40,5	—

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

1880phae.proj.1526.

Dec. 19. 1880

15h 5m

44

Long Col.

50.8	26.6	26.5	26.0
51.8	28.2	29.4	28.9
50.2	29.0	28.1	28.2
53.1	37.6	37.8	37.8
51.1	12	14	18 09
70	30.35	30.45	30.22

51.40

15h 10m

	N.C	S.C
44	83.1	43.8
	84.0	44.0
	84.0	42.3
	84.0	43.8
	83.7	42.8
	188	167
	83.76	43.34
	43.34	
	12710	
44	63.55	
	Set at 44	64.9

Flexure

15h 15m

E	F	G	H
53.5	53.3	53.7	5.0
53.4	53.7	53.3	4.7
53.0	53.7	53.0	4.4
53.4	53.2	53.7	4.3
53.6	53.2	53.6	4.2
19	21	23	24
53.38	53.42	53.46	4.52
53.42			
53.46			
4.52			
2478			
56.19			
54.00			

2) 2.19 = 1.10

E	F	G	H
42.8	57.8	59.6	2.4
42.7	52.0	59.1	1.7
43.0	52.3	58.7	1.6
42.9	52.3	59.1	2.1
42.9	52.1	59.1	1.8
43	5	6	46
42.84	52.10	59.12	1.92
52.10			
59.12			
1.92			
16.00			
54.00			

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

1880phae.proj.1526.

Dec. 19, 1880

	$15^h 40^m$	$17^h 45^m$
N	18.6	18.3
S	19.9	19.1
N-S	−1.3	
E	39.1	39.1
F	38.8	38.3
G	39.8	39.3
H	51.0	50.7

1687
42.18

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

1880phae.proj.1526.

Dec. 21, 1880

15h 15m Long Coll

4 51.3	20 2	24.3	24.9	25.1
49.7		28.7	29.1	28.8
50.2		27.1	27.8	27.7
52.8		37.0	37.7	37.5
50.6		371	395	391
46		29.27	29.87	29.77
50.92				

	N.C.	S.C.
15h 25m	84.8	38.7
	84.8	39.1
	85.3	40.0
	84.3	39.1
	86.0	39.8
	252	467
	85.04	39.34
	39.34	
	124 38	
	44 62.19	
	Set at 44 62.2	

Flexure

15h 20m

E	F	G	H	E	F	G	H
53.8	53.6	54.1	6.0	41.2	51.8	59.1	2.4
53.0	54.1	53.3	5.8	41.3	52.0	59.3	2.7
53.1	54.0	54.2	5.7	41.8	52.2	59.5	2.0
52.8	53.7	54.5	5.5	41.6	52.3	59.6	2.0
53.2	53.8	54.1	5.7	41.3	52.2	59.5	2.0
9	42	2	37	22	5	20	11
53.18	53.84	54.04	5.74	41.44	52.10	59.40	2.22

53.84
54.04
5.74
26.80
56.70
53.79
2) 2.91
1.45

52.10
59.40
2.22
15.16
53.79

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

1880phae.proj.1526.

Dec. 21, 1880

	16^h	$17^h 5^m 5^m$
N	18.3	18.5
S	19.2	18.3
N - S	-0.9	+0.2
E	5 1 3	38.1
F		37.0
G		39.0
H		50.5
		1646
		41.1 5

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

1880phae.proj.1526.

Dec. 22, 1880

15h 35m Long Coll.

44	57.0	28.2	28.7	28.2	28.7
	52.2		31.0	31.2	32.1
	51.3		29.8	29.9	30.7
	52.7		39.8	40.2	40.8
	51.1		93	95	123
	83		32.32	32.37	33.07
	51.66		32.59		

15h 45m N.C S.C.

44	81.0	41.8
	78.0	41.0
	79.1	40.2
	78.8	40.8
	81.0	40.0
	479	38
44	79.58	40.76
	40.76	
	12034	
44	60.17	

Set at 44 62.2

Flexure

15 43

	E	F	G	H	E	F	G	H
0 2	53.5	53.9	52.8	4.8	42.8	53.0	59.8	2.2
	53.3	54.0	52.5	4.2	42.9	53.2	0.0	1.9
	53.1	53.8	52.8	4.2	43.2	53.2	59.9	1.8
	53.3	53.8	53.1	4.1	43.2	52.7	0.1	2.3
	53.3	53.8	53.0	3.8	42.8	53.3	59.8	1.7
	15							
	53.30	53.86	52.84	4.22	42.98	53.08	59.92	1.98

53.86
52.84
4.22
224422
~~844~~
5605
54.49
1.56
+.78

53.08
59.92
1.98
21096
5449

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

1880phae.proj.1526.

Dec. 22, 1880

Runs

	E		F		G		H	
15h 40m								
0 4	15.1	14.0	14.7	14.3	15.1	13.8	26.6	25.1
	15.0	13.6	14.8	15.0	15.1	14.1	26.1	24.9
	14.8	14.1	14.8	15.0	15.7	13.8	26.6	25.0
	14.9	13.7	14.7	14.7	15.8	14.3	26.2	25.3
	14.8	13.3	14.3	15.0	15.8	14.2	26.0	25.1
	46	37	33	40	25	2	15	4
	14.92	13.74	14.66	14.880	15.50	14.04	26.30	25.08

	h m 17 30	18 0
N	17.3	17.0
S	19.7	19.9
N-S	−2.4	−2.9
E	39.1	38.4
F	38.8	38.4
G	38.2	38.7
H	50.0	50.8
	166	167
	41.5	41.82
		41.67

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

1880phae.proj.1526.

Dec. 27. 1880

15h 50m Long Coll.

44	47.3	25.3	24.6	24.6
	~~46.2~~	28.8	28.1	27.8
	48.2	28.7	27.7	28.6
	50.1	38.8	37.5	38.8
	51.6	16	379	398
	51.8	30.40	29.47	29.95
	490		29.94	
	49.80			

15h 55m

	N.C.	S.C
44	81.8	41.8
	81.5	43.1
	81.2	42.0
	81.3	42.0
	83.1	43.3
	89	122
	81.78	42.44
	42.44	
	12422	
44	62.11	
Let at 44		62.2

16 0

N	20.1	21.0
S	18.0	17.7
N-S	+2.1	+3.3
E	38.0	40.1
F	38.9	40.3
G	40.2	41.1
H	52.0	52.4
	1791	434
	447.5	43.48
	-2.1	-.33
	42.6	40.2
	41.40	

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

1880phae.proj.1526.

Dec. 29, 1880

15h 50m ~~Long~~ Coll.

44	~~51.1~~ ~~50.8~~	29.0	29.0	29.6
	53.1	31.0	31.8	31.8
	51.8	30.3	30.0	30.0
	51.0	35.3	36.3	37.8
	50.8	56	71	92
	78	31.40	31.77	32.30
	51.56		31.82	

15h 55m

	N.C	S.C
44	79.4	~~56.8~~ ~~61.0~~
	78.3	57.3
	78.5	55.0
	78.9	55.6
	77.3	57.8
	424	326
	78.48	56.50

Rej. above

Adjusted ~~long~~ S.C. for focus & took new reading!

16h 0m

N.C.	S.C		Level 16h 5m
78.0	37.0	N	21.9 21.3
79.0	35.0	S	22.2 21.8
79.0	37.0	N-S	− 0.3 −.5
79.0	35.8	E	5 3 41.8
79.0	36.5	Ti	39.7
440	313	G	40.2
78.80	36.26	H	48.6
36.24			103
115 04			42.57
44 57.53			+ 3
			42.50

Set at 44. 62.2

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

1880phae.proj.1526.

Dec. 30, 1880
31

Long Coll.

$18^h 40^m$ N.C	S.C	$18^h 50^m$				
44 91.8	44 21.1	44	60.7	42.2	31.8	30.7 29.8
93.0	21.0		59.8		32.9	31.8 32.2
92.0	22.8		60.3		32.3	31.8 30.9
92.2	21.8		61.8		40.5	39.9 40.2
92.1	22.1		59.0		176	142 131
111	88		16		34.37	33.55 33.27
92.22	21.76		60.32			
2174						
11398						
56.99						

Set at 44 57.0

Runs

$18^h 55^m$ E		F		G		H	
5 40 21.3	20.2	20.7	19.8	19.9	18.5	31.1	29.8
21.0	19.9	20.9	19.0	19.9	18.2	30.0	29.0
21.2	20.0	19.7	19.0	20.4	18.0	31.0	29.5
21.2	20.3	19.8	20.1	20.2	18.9	30.8	29.2
21.1	20.3	20.0	20.0	20.3	18.8	30.8	29.8
21.16	20.14	20.22	19.58	20.14	18.48	30.74	29.46

298.8
299.36
298.34
298.92
3540
29885

299.36

298.34

298.72

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

1880phae.proj.1526.

Dec. 31, 1880

Flexure

19h 0m	E	F	G	H	E	F	G	H
0 2	54.8	53.1	52.7	1.8	45.1	55.0	59.9	~~3.6~~ 2.2
	54.4	53.2	52.3	1.4	45.2	53.8	0.1	2.0
	55.0	52.3	52.8	1.5	45.0	54.0	0.0	2.0
	55.1	52.8	51.8	1.3	45.1	53.8	59.9	2.0
	54.4	52.8	52.5	1.8	44.8	53.7	59.7	1.8
	54.39	52.84	52.42	1.60	45.04	54.06	59.92	2.50

52.84
52.42
1.60 22145
55.36

54.06
59.92
2.50
22152
55.38 2
.03

Level

1910

N	20.0
S	21.8
N-S	−1.8
E	5 3 37.2
F	35.7
G	36.3
H	46.6
	1558
	38.95
	+1.8
	40.8

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

1880phae.proj.1526.

156 Jan 2 1884

Lewis

	1h 10m	16h 20m 19° 0	
N	20,7	18,2	18,1
S	15,7	22,1	21,9
N-S	+1,0	+3,9	~~+3,5~~
	40,4		36,0
	35,2		32,8
	35,5		32,7
	45,2		46,0
	41		145
	41,7		3638
	-1,0		+38
	40,7		40,2

40.45

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

1880phae.proj.1526.

Jan. 3, 1881

Level

Time	$14^h\ 55^m$	$18^h\ 40^m$	$18^h\ 53^m$ N.C.	S.C
N	16.1	21.7	44 86.6	44 32.0
S	21.8	18.1	86.1	31.0
N-S	− 5.7	+ 3.6	85.2	32.7
E	5 3 32.0	5 3 42.6 42.7	85.9	32.2
F	31.9	39.8 40.5	86.3	32.0
G	32.4	39.8 41.4	301	99
H	47.6	51.1 51.4	86.02	31,98
	1439	1733 1760	31.98	
	3598	43.32 44.00	11800	
	35.98	4366	44 59.00	
	+ 5.7	3.6		
	41.7	40.06	Set at 44 59.0	

40.80

Long Coll.

18^h 45		
44	52.0	28.4
	55.0	29.3
	55.0	28.6
	64.0	37.3
	66.1	39
	29 21	30.97
	58.42	

Seeing very bad indeed

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

1880phae.proj.1526.

Jan. 3, 1881

Flexure

h	50	E	Ti	G	H	E	Ti	G	H
0	3	5.0	53.8	52.0	4.0	44.6	52.6	59.2	2.2
		4.3	53.3	52.3	4.0	45.0	52.5	59.8	2.0
		4.3	54.0	53.0	4.0	45.1	52.7	59.1	2.2
		5.0	53.7	52.2	4.1	44.8	53.3	59.2	2.3
		5.0	53.7	52.5	4.5	44.4	53.0	59.1	1.7
		236	35	20	6	39	41	14	4
		4.72	53.70	52.40	4.12	44.78	53.82	59.28	2.08

53.70
52.40
4.12
234.94
58.73
54.99
3.74
1.87

53.82
59.28
2.08
19.96
54.99

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

1880phae.proj.1526.

Jan 5, 1881

$19^h\ 15^m$	Long	Coll.		
44	51.8	20 2 ~~28.6~~	27.8	28.6
	52.8	30.2	30.0	30.7
	53.8	29.7	29.3	29.6
	51.8	38.7	38.6	39.0
	52.0	~~37~~ 2	57	79
	122	~~34.80~~	31.42	31.98
	52.44	31.80		

$19^h\ 25^m$	N.C	S.C
44	83.0	~~33~~.8
	~~82~~.1	34.1
	83.8	33.8
	84.1	34.0
	~~83.0~~3	33.1
	1~~2~~0	188
	~~8300~~	33.76
	83.25	
	33.74	
	11701	
44	58.50	
Set at 44		59.0

Level.

Dime

N	189
S	191
N-S	-0.2
E	5 3 36.0
F	34.2
G	35.0
H	47.3
	381
	+ 2
	+383

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

1880nae.proj.1526.

Jan. 5, 1881

$1^h 4^m$ 20^m	E	F	G	H	Flexure	E	F	G_0	H
0 2	53.6	52.4	52.8	4.7		43.6	53.0	0.8	3.8
	53.8	53.3	52.2	4.3		43.8	52.8	0.8	3.3
	53.3	53.0	52.4	4.4		44.0	53.0	1.2	3.0
	53.3	53.0	52.3	4.2		43.9	53.2	0.9	3.2
	53.3	53.0	52.9	4.2		44.2	53.2	0.4	3.8
	23	47	26	18		45	2	41	21
	53.46	52.94	52.52	4.36		43.90	53.04	0.82	3.42
	52.94					53.04			
	52.52					0.82			
	4.36					3.42			
	3328					2418	2118		
	56.82	58.32				56.04	55.29		
	55.29	55.29							
	1.53	3.03							
	0.26	1.51							

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

1880phae.proj.1526.

Jan 7, 1881

Long Coll.

$19^h 25^m$	52.2	26.0	25.8
	51.3	31.2	30.9
	52.0	32.6	32.2
	51.0	43.0	42.6
	47.6	128	115
	41	33.20	32.87
	50.82	33.04	

	N.C	S.C
$19^h 30^m$	82.8	34.6
	83.8	33.0
	83.8	34.9
	83.8	33.3
	84.7	33.7
	189	195
	83.78	33.90
	33.90	
	11768	
	4458.84	

Set at 44 59.0

No. 1 Level. No. 2

Prime

N		16.0
S		19.0
N-S		∓3.0
E	5 3	26.3
F		28.7
G		31.2
H		43.2
		94
		32.35
		+3.0
		35.3

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

1880phae.proj.1526.

Jan. 7, 1881

Level No. 1 = the naked bulb
" No. 2 = the old wheel level.

		(1)	(2)		
19h 45m				20h 10m	
N		170	783	17.4	81.2
S		16.1	7.3	16.1	~~8.4~~
N − S		~~+0.9~~	+3.0	+1.3	+2.5
55	2	49.2			
		51.0			
		52.6			
		5.4			
		2162			
		5455			
		~~09~~			
		5365			

Reject all observations with No 2. levels between 1881

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

1880phae.proj.1526.

Jan 8

Level No 1 $20^h 25^m$ Level No 2

73	181	788	802
313	200	1044	905
−240	−19	−256	−103
15° 28.51	55.2		
34.0	54.3		
33.4	52.8		
45.3	5.0		
1478	2273		
3695	5682	div = 90	
21.6	21.7		
58.5	58.5		

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

1880phae.proj.1526.

Jan. 10, 1881

$19^h\ 10^m$ Long Coll.

64.3	30.7	31.3	31.3
62.2	33.8	30.6	34.1
60.0	33.0	33.2	33.0
62.2	43.7	44.5	44.3
62.3	212	196	227
110	35.30	34.90	35.67
622.0		35.29	

$19^h\ 15^m$

	N.C	S.C
44	87.8	37.8
	88.4	36.6
	88.0	36.0
	88.4	35.7
	89.1	36.0
	417	321
	88.84	36.42
	36.42	
	124.76	
44	62.38	

Set at 44 62.4

Last.

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

1880phae.proj.1526.

Jan. 10, 1881

Level

			No. 1	No. 2
19h 30m		49.6		
N		50.6	18.8	87.2
S		50.2	18.8	88.8
N-S		3.0	0.0	- 1.6
E	55	2	49.6	
			50.4	
			50.3	
			3.0	
			135	
			53.37	
			0.0	

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

1880phae.proj.1526.

Jan. 12, 1881

Long Coll.

$19^h 30^m$				
44	62.2	39.8	39.1	40.9
	63.0	42.7	42.1	42.7
	62.4	41.0	40.7	41.7
	62.0	61.0	51.0	52.3
	61.0	145	129	176
	136	43.62	43.22	44.40
	62.72		43.75	

$19^h 35^m$	N.C	S.C
	88.7	34.8
	88.9	35.3
	89.3	36.1
	89.0	36.0
	88.2	36.0
	41	28 2
44	88.82	3564
	35.64	
	124.46	
44	62.23	

Level

	$19^h 50^m$	20 25
N	18.9	188
S	25.0	150
N-S	-13.1	+08
E	55 2 39.1	538
F	39.3	529
G	40.1	528
H	51.8	46
	103	2241
	42.57	56.02
	+127	8
	55.3	55.2

1 div = 97

55.25

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

1880phae.proj.1526.

Jan 16 1881

Thong Coll.

2h 10m

44	67.0	40.2	40.2	38.1
	65.1	42.2	42.0	41.3
	64.1	41.2	41.6	39.5
	64.0	50.2	49.7	47.5
	64.1	138	135	166.7
		43.45	43.38	41.68

2h 45m

	2245	1 10
~~44 78.1~~		
N	178	163	162
S	201	202	202
N-S	-23	-39	-40
	5.36	5.29	
	5.34	5.29	
	5.28	5.21	
	37	30	
	2233	209	
	5-5-82	5-5-22	
	+23	+40	
	58.1	59.2	
		58.65	

2h 20m

	Vc.	Sc.
44	82.7	~~39.8~~
	82.0	39.9
	83.1	39.8
	83.1	40.8
	83.0	39.9
	13.9	20.2
	827.8	40.04
	40.04	
	1628.2	
	61.9	

Set 01 - 61.9

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

1880phae.proj.1526.

1168

Feb. 10 1881

	N.C	S.C
44	78.1	49.2
	78.0	49.2
	78.1	49.0
	78.5	50.0
	78.1	49.7
	.8	.7
	78.16	49.42
	49.42	
	127.58	
44	63.8	

Set at 44 63.8

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

1880phae.proj.1526.

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

1880phae.proj.1526.

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

1880phae.proj.1526.

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

1880phae.proj.1526.

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

1880phae.proj.1526.

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

1880phae.proj.1526.

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

1880phae.proj.1526.

374) 33.63 (.90

96
96
90

.95

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

astroph.proj.1526.

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