KG
11365
10

A.10

Transit Circle.

From July 13, 1851
To September 5, 1851.
contains
Measures of the Observatory.

1851phae.proj..

KG-11365.10

360
12
4320

KG 11365,10.

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Instrumental errors of Transit Circle from July 14 to Sept. 5

Illumination West

July 20	Collimation	Azimith	Level
20			$+\overset{s}{0}.108$
22	$+\overset{s}{0}.037$	$+\overset{s}{0}.208$	
24	+0.038	+0.257	+0.147
25	~~+0.029~~	~~+0.146~~	~~+0.110~~
	Illumination East		
bad see. 25	$+\overset{s}{0}.029$	$+\overset{s}{0}.146$	$+\overset{s}{0}.110$
25	$-\overset{s}{0}.092$	+0.271	+0.114
26	$-\overset{s}{0}.048$	+0.202	
	Illumination West		
26	$+\overset{s}{0}.036$	+0.223	
28			+0.160
Aug. 2	+0.019	+0.176	+0.060
	Illumination East		
2	−0.006	+0.105	
5			+0.043
~~5~~	Illumination West		
5	+0.188	+0.145	+0.090
6	+0.205	+0.158	+0.113
8	−0.121	+0.210	
	Illumination East		
8	+0.068	+0.224	+0.120
11	+0.109	+0.174	
12	+0.079	+0.186	
14	+0.079	+0.197	$+0.\overset{140}{143}$
16	+0.082	+0.189	+0.152
	Illumination West		
16	−0.067	+0.109	
18	−0.150	+0.166	
25	−0.132	+0.194	+0.026
Sept. 3	−0.144	+0.070	+0.116
5	+0.058	+0.135	+0.101

	Collim.	Az	Level
July W 22	+.037	+0.208	+0.126
W 23	+0.037	+0.232	+0.135
W 24	+0.038	+0.257	+0.147
E 25	−0,033	+0,208	+0.112
9a ~~W~~ 26	−0.048	+0.212	+0.129
" 27	+0.034	+0.216	+0.144
28	+0.030	+0.209	+0.160
29	+0.027	+0.202	+0.140
30	+0.024	+0.155	+0.120
31	+0.022	+0.188	+0.100
Aug 1	+0.020	+0.181	+0.080
− 2	+0.019	+0.176	+0.060
3	−0.060	+0.188	+0.054
4	−0.120	+0.131	+0.048
− 5	+0.188	+0.145	+0.070
6	+0.205	+0.158	+0.113
7	+0.058	+0.184	+0.116
− 8	+0.068	+0.224	+0.120
9	+.081	+0.208	+0.123
10	+0.094	+0.192	+0.127
11	+0.109	+0.174	+0.130
12	+0.079	+0.186	+0.133
13	+0.079	+0.191	+0.136
14	+0.079	+0.197	+0.140
15	+0.080	+0.193	+0.146
− 16	+0.082	+0.189	+0.152
17	−0.100	+0.138	+0.137
18	−0.150	+0.166	+0.112
19	−0.148	+0.170	+0.087
20	−0.146	+0.174	+0.070
21	−0.143	+0.179	+0.058
22	−0.141	+0.183	+0.045
23	−0.138	+0.187	+0.035
24	−0.135	+0.190	+0.030
25	−0.132	+0.194	+0.026
26	−0.133	+0.181	+ .036

	Coll	Az	Level
Aug 27	−0.134	+0.168	+0.046
28	−0.135	+0.155	+0.056
29	−0.137	+0.142	+0.066
30	−0.138	+0.129	+0.076
31	−0.139	+0.116	+0.086
Sept. 1	−0.140	+0.103	+0.096
2	−0.141	+0.190	+0.106
3	−0.144	+0.070	+0.116
4	−0.040	+0.100	+0.110

Commenced copying July 3d 1852.

1851 July 14/15 Am. (97)

July 16 Pm.

J.G. 2 Ceti	J.G. a Ceti	J.G. Arcturus	J.G. B Libra
2 09.6	1,, 04.2	5,, 19.1	29.3
2 23.3	1,, 18.0	5 33.7	43.3
2 37.0	1,, 31.6	5 48.4	57.0
2 50.9	1,, 45.4	6,, 03.0	10.9
3 04.7	1,, 59.2	6,, 17.4	25.0
3 18.3	2,, 13.0	6,, 32.0	38.9
2,, 33,, 32.0	2,, 52, 26.7	14,, 06,, 46.8	15,, 06,, 52.3
175.8	198.1	201.4	
180	120	180	
7) 355.8	7) 318.1	7) 21.4	
50.83	45.44	03.06	
1.67	1.67	1.67	
2,, 32,, 49.16	2,, 51,, 43.77	14,, 06,, 01.39	
2,, 35,, 35.34	2,, 54,, 29.94	14,, 08,, 52.74	
2,, 46.18	2,, 46.17	2,, 51.35	

July 14/15 Am

M.J.G. 19,, 58,, 00
J.G. 9,, 26,, 55.4
2,, 46.38
9,, 29,, 41.78   7,, 27 01.48
7,, 27,, 48.22   46.74
20,, 01,, 53.56   7,, 27 48 22
19,, 56,, 43.41
00 59.84
52.85
56
19 58 36.66
19,, 58,, 00

(98)

July 16/17 Am.

J.G. γ Ceti	J.G. α Persei	J.G. α Tauri	J.G. α Aurigæ
2„00.0	9„45.4	44.8	1„46.6
2„13.8	0 06.5	59.0	2„06.2
2„27.4	0 27.4	13.0	2„25.9
2„41.3	0 48.6	27.4	2„46.0
2„55.2	1 09.5	41.5	3„05.4
3 09.0	1 30.8	56.0	3„25.0
2„33„22.6	3„11„51.5	4„25„10.5	5„03„45.0
169.3	209.7		209.9
120	120		120
7)289.3	7)339.7		7)320.9
41.33	48.53		45.84
1.67	1.67 = 4 beats of J.G.		1.67
2„32„39.66	3„10„46.86		5.02 44.17
2„35„35.40	3„13„42.89		
2„55.74	2„56 03		

West
W C B. with Tr Simms 46 inch Transit
Mean Time Chro. No 167

1 wire	$9^h..29^m..02.0^s$	-2^s
2	lost	
3	9..29..45.2	-2
mid 4	9..30..06.3	-2
5	9..30..28.4	-2
6	9..30..50.1	-2
7	9..31..11.5	-2
mean 3 middle wires	9..30..06.63	
	2	
	9..30..04.63	
mean of 167 wires -2	9..30..04.75	
	9..30..04.70	
167 fast of J.G. at obs	4..27..21.4	
JG by B's obs.	5..02..43.3	
CJ obs. with JG & Tr. Circle	5..02..44.17	
	.87	

July 16/17 Am.

M.T.C 19..28..00
J.G. 9..04..33.8
2..56.09
3..07..29.80
7..35..41.34
19..31..48.46

7..34.54.60
46.74
7 35 41.34

18..56..53.24
90..54.92
47.89
46
19..28 36.51

July 17/18 Am.

J.G. γ Ceti	J.G. α Ceti
1,,50.6	
2,,04.3	1..58.3
2,,18.0	1..12.0
2,,31.6	1..25.8 –
2,,45.5	1..39.7
2..59.2	1 53.5
2,,33,,13.0	2,,52,,07.2
)222.2	189.3
	60
7)222.2	5)129
31.74	25.80
1.67	1,,67
2,,32,,30.07	2,,51,,24.13
2,,35,,35.49	2,,54,30,03
3,,05.36	3,05,90

July 17/18 Am

N.J.C. 19,,58,,00

J.G. 3,,38,,26.1
3,,05.76
3,,41,31.86 7,,38,,57.15
7,,39,,37.89 46.74
20,,01,,53.57 7,,39 37.89

19,,56,,43.41
59.84
52.85
97
19. 58,,37.07
19 58,,00

(100)

July 19/20 Am

Ill west

B - 2964 - E.C.
α Tauri
4 59.0
5 13.5
5 27.7
5 42.0
5 56.3
6 10.8
4..26..25.2
234.5
60
7)294.5
42.07
-2
4..25..40.07
4..27..22.53
-1..42.46

B - 2964
α Auriga
3 1.3
3 21.2
3 41.1
4 1.0
4 20.5
4 40.1
5..04..59.7
184.9
60
7)244.9
04..00.70
-2
5..03..58.70
5 41.05
1..42.35

EC - 4..19..00
2964 - 4..19..06

EC - 5..7..0
2964 - 5..7..6.3

Dil. July 19^{th} $4^h..45^m$ x_0 = -1..42.10
20 1..24 -1..37.57
20..40 + 4.53
75
2964 Rate daily + $5^s.28$
3× 15.74

19..4..45 x_0 = -1..42.10
Rate for 9^h +1.47
1..40.14

Adopted Rate of 2964 $+4^s.80$ for 20^{th}

PM -

2964. Polaris S.P.
9 A 12..37..35.5
46..22.0
55..10.7
δ 13..03..59.0
12..49.0
21..36.8
30..33.5 Cloud

η Urs. Majoris
57.0
18.8
40.0
0 1.5
0 23.0
0 44.3
13..41..05.6
190.2
180
10.2
01.45
13..39 59.45
40..01
1..40.56

α Bootis
6..30.1
6..44.8
6..59.5
7..14.0
7..28.6
7..43.2
14..07..57.7
277.9
180
7)97.9
13.98
2
14..07..11.98
14..08..52.70
1..40.72

2964 - 13..42..10.3
EC - 13..42..0.0

2964 - 14..15..28.7
M.T.C - 6..24..0
~~1..40~~
14..15..28.7
1..40.72
14..17..09.42
7..51..27.56
6..25..41.86

5..59..01.02
24..35.40
40.84
.86
6..24..38.67

July 20/21 Am

very faint

faint cloudy

2964 μ Piscium	2964 Moon's II limb	2964 α Arietis	2964 α Ceti
0 06.4	0 27.0	6.. 27.3	2.. 12.8
0 20.3	0.. 41.4	6 42.2	2.. 26.7
0 34.1	0. 55.4	6.. 57.0	2.. 40.5
0 48.0	1.. 09.5	7.. 11.9	2.. 54.4
1 01.7	1.. 23.5	7.. 26.8	3.. 08.0
1 15.3	1.. 37.0	7.. 41.7	3.. 21.9
1.. 21.. 25.0	1.. 51.. 51.3	1.. 57.. 56.5	2.. 53.. 35.7
154.8	245.1	263.4	200.0
180	180	180	180
7) 334.8	7) 65.1	7) 83.4	7) 380.0
47.83	09.30	11.91	54.28
−2	−2	2	−2
1.. 20.. 45.83	1.. 51.. 07.30	1.. 57.. 09.91	2.. 52.. 52.28
		1.. 58.. 47.82	2.. 54.. 30.12
		1.. 37.91	1.. 37.84

2964 = 20th $1^h..24^m$ ~~u =~~ 1.. 37.87

+ 30

u_v = − 1.. 37.57

lev + .108

coll + .037

az + .208

July 20/21 Am

Level Ill. West Temp 80°

East	West
48.3	+ 59.4
48.4	+ 59.3
+ 53.8	51.5
+ 56.0	51.2
208.5	221.4
52.12	55.35
	52.12
	3.23
	1.615
	+ .108 lev. = +0.10

20/21

	h m s	
M.T. C.	17.. 44.. 00	
2964	1 .. 37 .. 22.7	
	1 .. 37.91	7.. 50.. 40.82
	1.. 39..00.61	46.74
	7.. 51.. 27.56	7.. 51.. 27.56
	17.. 47.. 33.05	
	2 54 88	
	16.. 57.. 12.90	
	46.. 52. 30	
	32.91	
	.05	
	17 44.. 38.16	
	17.. 44.. 00.	
	38.16	
	16	

July 21. Pm,
2964
Arcturus
6 35.1
6" 49.8
7" 04.6
7" 19.3
7" 33.8
7.. 48.4
14.. 08" 03.0
193.0
60
7) 134.0
19.14
−2
14.. 07.. 17.14
14.. 08" 52,68
1" 35.54

2964
ε Bootis
6.. 09.6
6" 25.2
6. 40.8
6. 56.4
7.. 11.6
7.. 27.0
14.. 37.. 42.4
213,0
180
7) 393.0
56.14
−2
14.. 36, 54.14
14.. 38.. 29, 66
1" 35.52

July 21/22 Am
2964 α Arietis
6" 31.5
6" 46.4
7" 01.3
7" 16.1
7" 31.0
7" 46.0
1 ", 58 " 00.9
173.2
60
7) 113.2
16,17
2
1" 57" 14.17
1.. 58" 47, 84
1" 33.55

2964
γ Ceti
3" 22.9
3" 36.6
3" 50.3
4" 04.0
4" 17.9
4" 31.6
2" 34" 45,2
208.5
180
7) 28.5
04.07
2
2" 34" 02,07
2" 35" 35,36
1" 33 49

21/22 Am.
M T C 18.. 20.. 00
2964 2.. 17 " 30.2
1.. 33.55
2" 19" 03.75
7" 55" 24.12
18" 23.. 39.63

7.. 54.. 37.38
46.74
7" 55" 24,12

17.. 57.. 03.07
22" 56.23
38.85
.63
18 20" 38.82
18.. 20" 00
38.8

Ill. Wr.(94)

July 21/22 Am			22 Pm
2964	24.64	2964	2964
Moons II limb	α Ceti	α Persei	Spica
38 46.7	17.3	08.3	5,,09.7
01.0	31.1	29.5	5,,23.8
15.1	44.9	50.6	5,,37.6
29.5	52 58.6	13,,11.9	5,,51.5
43.8	12.4	33.1	6,,05.6
39 57.8	26.2	54.0	6,,19.5
2,,40,,12.0	2,,53,,39.9	3,,13,,14.9	13,,16,,33.5
7)2059	2304	2023	181.2
29.42	1800	~~180~~	180
2,,~~50~~	7)4104	7)82.3	7)361.2
2,,38,,~~27.75~~	58.63	~~6104~~	51.6
27,,42	~~9.00~~	11.76	2
	2,,52,,56.63	2	13,,15,,49.6
		3,,13,,9.76	

1.37.84
1 33.49
-4.35

lev +0.108
coll +0.037
az +0.208

July 22 P.m.
2964
Arcturus

Ill. West
Meridian Marks

Temp 81°

5 39.0
5 53.7
6 08.2
6 23.0
6 37.6
6 52.0
14 07 06.5
220.0
60
7)160.0
22.85
2
14 06 20.85
14 08 52.66
2 31,81

scarcely vis.

South	North	Zero
1r 024	0r 235	0.017
025	232	.014
024	225	005
018	237	0.010
027	240	0.046
118	1169	0.011
1,024	0.234	
,011	,011	
1,013	0.223	
2,3	23	
3039	669	
2026	446	
2,3299 s	.5129 m	

2.3299 s
1,8170 = s − m
2,8428 = s + m
9085 $\frac{s-m}{2}$
1,4214 $\frac{s+m}{2}$

col = −1,384 + 1,421 = +,037
az = − .700 + .908 = +.208

July 22 Pm.

β Libræ 2964	2964 α Coron Borealis	2964 α Serpentis	22/23 Am. 2964 α Ceti
6.. 49.5	6.. 08.2	4.. 46.0	clouds
7.. 03.4	6.. 23.8	4.. 59.8	
7.. 17.3	6.. 39.0	5.. 13.6	48.7
7.. 31.2	6.. 54.5	5.. 27.5	02.4
7.. 45.0	7.. 10.2	5.. 41.3	2.. 53 16.1
7.. 58.9	7.. 25.5	5 55.1	—
			— clouds
15.. 08.. 12.8	15.. 27.. 40.6	15.. 36.. 09.0	
218.1	201.8	252.3	67.2
600	180	60	60
7)218.	7)381.8	192.3	3)7.2
31.15	54.54		2.4
2	2		−2.0
15.. 07.. 29.15	15.. 26.. 52.54		2.. 53.. 00.40
15.. 09.. 00.95	15.. 28.. 23.96		2.. 54.. 30.19
1.. 31.80	1.. 31.42		1.. 29.79

(1071)

Ill West

col + 0.037
az + 0.230
lev + 0.130

July 22/23

2964	2964	2964	2964
α Persei	α Tauri	α Aurigae	α Canis Min.
+49° 1.. 12.0	+16° 5.. 12.0	+46° 3.. 14.5	+6° 9.. 21.0
1.. 33.1	5.. 26.3	3.. 34.3	9.. 34.5
1 54.3	5.. 40.5	3.. 53.9	9.. 48.3
2 15.5	5.. 54.5	4.. 13.5	0.. 02.1
2 36.6	6.. 09.4	4.. 33.3	0. 16.0
2 57.6	6.. 23.7	4.. 53.0	0.. 29.7
3.. 13.. 18.5	4.. 26.. 38.0	5.. 05.. 12.8	7.. 30.. 43.5
227.6	204.7	215.3	195.1
120	180	120	180
7)107.6	7)384.7	7)95.3	7)15.1
15.37	54.95	13.61	7.. 30.. 02.15
2	2	2	7 31–22 24
3..12..13.37	4.. 25.. 52.95	5.. 04.. 11.61	7.. 30.00.15
3. 13.. 43.15	4.. 27.. 22.58	5.. 05.41.12	7.. 31.. 29.35
1.. 29.78	1.29 63	1.. 29.51	1.. 29.20
col. +.06	col. +.05	col. +.06	col. + .05
az. + .04	az. + .11	az – .02	az. + .14
lev. + .20	lev. + .12	lev. + 19	lev. + .10
1.. 29.56	1.. 29.35	1.. 29.28	1.. 28.91

22/23 Am,

M.T.C. 19.. 16.. 00
2964 3.. 17 40.2
1.. 29.78
3.. 19.. 09.98
7.. 59.. 20.67
19.. 19.. 49.31

7.. 58.. 33.93
46.74
7.. 59 20.67

18.. 56.. 53.24
18.. 56 89
48.86
31
19. 16. 39.30
19. 16. [illegible]

1851phae.proj..

(108)

col + 0.037
az + 0.232
lev + 0.135

July 23 P.m.

29.64	2964	29.64	29.64
−10° α Virginis	+28° ε Bootis	−15° α² Librae	−9 β Librae
5.. 13.8	6.. 17.2	0 30.6	6.. 52.8
5.. 27.0	6.. 32.5	0.. 44.9	7.. 06.5
5.. 41.1	6.. 47.8	0.. 59.0	7.. 20.4
5.. 55.0	7.. 03.2	1.. 13.3	7.. 34.5
6.. 08.9	7.. 18.5	1.. 27.5	7.. 48.0*
6.. 23.0	7.. 34.0	1.. 41.7	8.. 01.8
13.. 16.. 37.3	14.. 37.. 45.5	14.. 41.. 56.0	15.. 08.. 16.0
205.3	198.7	273.0	180.0
180	180	180	60
7)385.3	7)18.7	7)93.0	7)240.0
13.. 15.. 55.04	2.67	14.. 41.. 13.28	34.28
−2	−2	−2	−2
13.. 15.. 53.04	14.. 37.. 00.67	14.. 41.. 11.28	15.. 07.. 32.28
col + .05	col. + .05	col. + .04	15.. 09.. 00.94
az + .18	az. + .07	az. + .19	1.. 28.66
lev + .04	lev. + .16	lev. + .07	col. + .04
13.. 15.. 53.35	14.. 37.. 00.95	14.. 41.. 11.58	az. + .18
13.. 17.. 21.57	14.. 38.. 29.62	14.. 42.. 39.81	lev. + .08
1.. 28.22	1.. 28.67	1.. 28.23	1.. 28.36

July 23 Pm
2964
+27° α Coron Bore
6 11.2
6 26.7
6 42.0
6 57,6
7 13,0
7 28.5
15„ 27„ 43.8
15„ 26„ 57.43
-2
15.26„ 55.43
15 28„ 23.95
1„ 28.52
col. + .05
az. + .07
lev. + .15
1„ 28.25

2964
+7° α Serpentis
4 49.3
5 03.1
5 17.0
5 30.8
5 44.5
5 58.5
15„ 36„ 12.3
215.5
15.35.30.79
2
15„35„28.79
15„ 36„ 57.19
1„ 28.40
col+.04
az.+.14
lev.+.10
1„ 28.12

23/24 Am
2964
α Aurigia
+46°
— clouds
3„ 57.0
4„ 16.8
4„ 36.7
4 56.4
5„ 05„ 16.0
110.5
60
3)50.5
16.83
-2
5„ 04„ 14.83
5„ 05„ 41. 18
1„ 26.35
col + .06
az − .02
lev + .19
1„ 26.12

(110)

July 24/25 Am, Ill West

col +0.038
az +0.257
lev +0.147

2964	2964	2964	2964	
+3° a Ceti	+16° a Tauri	−1° ε Orionis	Procyon	B Geminorum
28.0	19.0	clouds	+6° 9,,28.0	+28° 4,,03.6
41.7	33.5	6,,57.2	9,,41.8	4,,14.6
55.5	47.8	7,,05.0	9,,55.5	4,,35.3
3,,09.3	— clouds	7,,18.7 −	0,,09.4	4,,50.8
3,,23.2	— "	7,,32.2	0,,23.2	5,,06.4
3,,37.0	30.8	7,,46.0	0,,37.0	5,,22.0
2,,53,,50.7	4,,26,,45.0	5,,27,,59.8	7,,30,,50.6	7,,35,,37.4
245.4		153.1	245.5	275.1
180		060	180	180
7) 65.4		5) 93.1	7) 65.5	7) 355.1
2,,53,,09.34		18.62	9.35	50.73
−2		−2	−2	−2
2,,53,,07.34		5,,27,,16.62	7,,30,,07.35	7,,34,,48.73
col +.04		col +.04	7,,31,,29.39	7,,36,,10.40
az +.17		az +.17	1,,22.04	1,,22.17
lev. +.11		lev. +.11	col +.04	col +.05
2,,53,,07.66		5,,27,,16.94	az +.16	az +.07
2,,54,,30.24		5,,28,,39.00	lev. +.12	lev +.17
1,,22.58		1,,22.06	1,,21.72	1,,21.88

2,,53 – 1,,22.58
5,,27 – 1,,22.06
7,,30 – 1,,21.72
7,,34 – 1,,21.88
4)23,,34 4)8.24
5,,53 1,,22.06

July 24/25 Am. Temp 76°

Meridian Marks Ill West

North	South	Level East	Level West	Zero
mistake for 0r 202	1r035	+46.5	52.8	0.007
208	035	+46.5	52.0	.005
214	040	+46.2	51.8	003
209	040	47.0	+50.0	006
0 210	1m045	47.0	+50.0	21
37	195	46.7	+49.8	0.005
0.207	1.039	6)279.9	6)306.4	
,005	005	46.65	251.07	
0,202	1,034		46.65	
2,3	2,3	2,37828	14.42	
606	3102	4646m	2;21	
404	2068	2,84288 s+m	+.147	col. = $+\overset{s}{0}.14$
0,4646m	2,3782s	1.91365−m		
		1.42149 = $\frac{s+m}{2}$		
		9568 $\frac{s-m}{2}$		

col = −1.384 + 1.422 = +.038

az = − .700 + .957 = +.257

July 25 P.m.

Ill West

2964
α Leonis
+13° 8 23.5
6 37.7
8 51.9
9 06.0
9 20.0
9 34.0
9,, 59,, 48.0
221.1
180
7)41.1
05.87
−2
9,, 59,, 03.87
col. + 05
arc. + 13
lev. + 14
9. 59 04.19
10,, 00 25.54
1,, 21 .35

S. P.

Polaris Zero 0.02

h Ill West

1r 12,, 54,, 10.3 ⧅ +1r −2 pts c +1r
55,, 38.5 − ⧅ c

Reversed Ill East

13,, 16,, 08.5 ⧅ +2r c +2r
19,, 06.8 +4r
20,, 32.5 5r
13,, 21,, 55.3 Ā B
,, 23,, 28.7 1r
13,, 30,, 48.2

(113)

July 25 ~~Pos~~, ~~Ill~~ ~~East~~ Ill East

2964

η Urs. Majoris

+50° 16.8
38.4
35 59.5
0 20.8
0 42.4
1 04.0
13,, 41,, 25.3
207.2
60
7)147.2
21.03
−2
13,, 40,, 19.03
col −.07
az −.05
lev. +.17
13,, 40,, 19.08

Temp 85°

Ill East
col −0.033
az +0.208
lev +0.112

Meridian Marks B

North

very bad seeing

0.733	.267
.740	.260
760	.240
0.750	.250

183
.745 .255
.005
.260
2.3
780
520
.5980 m

South
~~0 1,010~~ = 99
0.99 = 1.01
1 02 = 98
~~1.005~~ = .995
1.008
1 013 .487
1.010
1.010
41
1.010
005
0.995
2.3 C. T.
2985
1990
2.2885 s
.5980 m
2,8865 s+n
1,6905 s−n
1.4482 $\frac{s+n}{2}$
.8457 $\frac{s-n}{2}$

Level

East	West
43.0	+43.3
42.4	+43.2
42.3	+43.0
+40.0	45.2
+39.0	46.0
+39.8	45.0
6)246.5	25.7
41.08	44.41

44.41
3.33
1.66
+.110 lev. = +0.11

col = −1.414 + 1.443 = +.029
az = −.700 + 0.846 = + .146

July 25 Pm

cs 2964
Arcturus
+20° 50.0
04.5
7 19.0
7 33.5
7 48.3
8 03.0
14.. 08.. 17.5
175.8
60
7)235.8
33.68
−2
14.. 07.. 31.68
14.. 08.. 52.62
1.. 20.94
cl. −.04
az. +.09
lv. +.11
1.. 20.78

B
α² Libra
−15° —
50.0 − obs
clouds
—
33.0
47.1
14.. 42.. 01.4

2964
cs β Libra
−9° 00.3
7.. 14.4
7.. 28.2
7.. 42.0 −
7 56.0
8 10.1
15.. 08.. 23.9
174.9
120
7)294.9
42.13
−2
15.. 07.. 40.13
cal. −.04
az. +.17
lv. +.07
15.. 07.. 40.33
15.. 09.. 00.92
1.. 20.59

2964
α Herculis
+14° cs 51.9
6.. 06.0
6.. 20.2
6.. 34.5
6.. 48.7
7.. 02.9
17.. 07.. 17.3
181.5
60
7)241.5
34.5
−2
17.. 06.. 32.5
cal −.04
az +.11
lv +.10
17.. 06.. 32.67
17.. 07.. 52.95
1.. 20.28

July 25 P.m.
2964
β Draconis
+52° 40.0 -2
02.4
5 25.0
5 47.6 -
6 10.4
6 33.0
17 26,,55.5
213.9
120
7)333.9
47.7
-2
17,,25,,45.70
col - .07
az - .06
lev + .18
17,,25,,45.75
17,,27,,06.05
1,,20.30

July 25/26 A.m.
2964
α Arietis
+23 45.9 - 2
01.0
16.0
7 31.0 -
7 45.8
8,,00.6
1,,58,,15.5
155.8
60
7)215.8
30.83
-2
1,,57,,28.83
col - .05
az. + .08
lev. + .11
1,,57,,28.97
1,,58,,47.98
1,,19.01

Tr. C. (11/6) Ill. East

Mer marks

July 25/26 Am B Ext Th 67

α Aristis
2964 45.9 − 2
1.0
16.0
B. 31.0
45.8
0.6
1..58..15.5

Intl No1 − 73.2 No2 − 73° No3 − 73

2964 − 2.. 9 .. 20 — 2.. 11 .52
167 − 5.. 56 52 — 5.. 59 .. 23.5

El − 2.. 15 07 — 2.. 18 .. 30
167 − 6.. 01 .. 30.5 — 6 .. 4 .. 53
El − 2.. 21.. 0
2964 − 2.. 19.. 52.2

North	South	B
0.88 = 12	1.00	= 1.00
.84	99	= 1.01
.84	1.02	= 0.98
.85	1.02	= 0.98
.85	1.01	= 0.99

Level Ill East Ther 69.

E	W
+ 49.0	52.0
+ 49.0	52.8
+ 49.2	52.5

γ Ceti
B
37.4 − 2
+3° 57.6
4 4.7
4 18.5
4 32.5
4 46.5
2.. 35 , 60.0
190.6
60
2)130.6
18.65
− 2
2.. 34.. 16.65
col. − .05
az. + .13
lev. + .08
2.. 34.. 16.81
2.. 35.. 35.67
1.. 18.86

moon S.
B uss min S. Pole
B 48 17.0 − 2
+75° 48..10.2
49..02.1
49 . 54.3
50..46.2
51 .. 38.1
2 ..52 ..30.5
198.4
180
2)378.4
54.06
− 2
2.. 49.. 52.06
col. +
az.
lev.

E	W
49.3	+ 53.2
50.0	+ 53.4
50.0	+ 53.5
296.5	17.4
49.41	52.90
	49.41
	3.49
	1.74
	+.114

B
Marks North South

.153 .997
2.3 2.3
459 2991
306 1994
.35190m 2.2931s
.3519m
2.6450 s+m
1.9412 s−m
1.3225 $\frac{s+m}{2}$
.9706 $\frac{s-m}{2}$

North	South
0.880	1.000
840	0 990
840	1 020
850	1 020
.850	1.010
260	5040
0.852	1.008
.005	005
.153	.997

col = − 1.414 + 1.322 = −.092
az = −0.700 + .971 = +.271

July 25/26 Am. Cl East

Cl East
col. −.033
az. +.208
lev. +.172

2964 α Persei T.	2964 α Tauri B.	2964 α Aurigæ T.	2964 β Orionis T
+49° 1,,23.4	+16	+46° 25.8	−8° —
1,,44.5	unsteady 37.5	unsteady 45.4	—
2,,05.5	51.8	4 05.0	52.0
2,,26.6	6 06.0	4 24.8	05.9
2,,47.7	6 20.3	4 44.5	19.8
3,,08.8	6 34.5	5 04.3	33.6
3,,13,,30.0	4,,26,,48.8	5,,05,,24.0	5,,06,,47.8
186.5	150.1	173.8	
00	120	60 0	
7)186.5	5)30.1	7)179.8	
26.64	06.02	24.83	
−2	−2	−2	
3,,12,,24.64	4,,26,,04.02	5,,04,,22.83	
col −.06	col. −.04	5,,05,,41.37	
az −.04	az. +.10	1,,18.54	
lev. +.17	lev. +.09	col −.06	
3,,12,,24.71	4,,26,,04.17	az. −.02	
3,,13,,43.27	4,,27,,22.67	lev. +.16	
1,,18.56	1,,18.50	1,,18.62	

July 25/26 Am

Ill East

2964	2964	2964	2964
β Tauri T.	ε Orionis T	α Orionis T	α Canis Maj T.
+28°	−1° 6,,41.4	+7° 5,, 08.3	−16° 35.3
	6,,55.0	5,, 22.0	6,,49.5
20.5	faint 7,,09.0	5,,36.0	very unsteady 7 03.8
36.0	7,,22.6	5,, 49.7	7'18.0
51.5	7,,36.3	6,, 03.4	7 32.4
07.4	7,,50.0	6,, 17.5	7 46.6
5,, 16,, 23.0	5,, 28,,04.0	5,, 46,,31.5	6,, 38 01.0
	218.3	168.4	186.6
	60	180	60
	7)158.3	7)348.4	7)126.6
	22.61	49.77	18.08
	−2	2	−2
	5,,27,,20.61	5,,45,,47.77	6,,37,,16.08
	al. −.05	5,,47,, 06.14	col −.06
	az. +.14	1,,18.37	az. +.19
	lev. +.08	col. −.05	lev. +.06
	5,,27,,20.78	az. +.16	6,,37,,16.27
	5,,28,,39.02	lev. +.08	6,,38,,34.41
	1,,18.24	1,,18.16	1,,18.14

July 26th P.M.
2964
β Corvi B

-25° 47.5 — obt
02.3
5 17.5 —
5 32.1
5 46.8
12„26„01.7
1462
60
5)86.2
17.24
-0
12„25„17.24
col. — .05
az. + .21
lev. + .06

Ill East
2964 B-
Polaris Sub. polo

	12„37„55.2 — 4	l
	12„46„48.3	
	12„55„38.5	
D	13„04„29.5	
C	13„13„15.5	
B	13„22„05.3	
A	13„30„52.7	

Ex. Thermo 85°

12 Can. ven. C.S. obs.

+39° lost
27.8 — 0 beats
45.5
03.2
20.8
12„48„39.0
136.3

25 17.46
~~33~~ 34 48
1 07 02

α Virginis
B
-10° 5„24.0 — 4 l
5„38.0
5„52.0
6„5.9
6„20.0
6„34.0
13„16„47.9
221.8
180
7)41.8
5.97
2
13„16„03.97
col. — .05
az. + .17
lev. + .08
13„16„04.17
13„17„21.54
1„17.37

β Urs min
Cloudy
B 49„57.2 — 2 mid
50„49.3
51„41.2
14„52„34

Copied thus far 3rd June 1852

July 26 Pm

η Ursae Maj. T.
+50 42.0
0„03.3
0„25.0
0„46.4
1„07.5
13„41„29.0
124.2
60
5) 184.2
24.84
−2
13„40„22.84
col. −.08
az. +.05
lev. +.20
13„40„22.91
13„41„39.94
1„17.03

2964
η Boötis T.
+19° 5„37.3
5„51.8
6„06.4
6„21.0
6„35.4
6„49.8
13„47„04.5
206.2
60
7) 146.2
20.88
−2
13„46„18.88
col. −.05
az. +.09
lev. +.12
13„46„19.04
13„47„35.98
1„16.94

2964
+20° Arcturus
53.8
08.3
7 23.0
7 37.5
7 52.0
8 06.8
14„08„21.4
202.8
60
7) 262.8
37.54
−2
14„07„35.54
14„08„52.60
1„17.06
col −.05
az +.09
lev +.13
1„16.84

col. −0.048
az. + 0.212
lev. + 0.129

Ile East B
Mer marks

South	North
1.030 = .970	0.805 = .195
.020 − 980	.81 − 190
.030 − 970	.805 − 195
.015 − 985	.805 − 195
.015 − 985	.807 − 193
110	32
1.022	0.806
.008	.008
.986 s	.202 m
2.3	Zero .129
2958	606
1972	404
2.2678 s	.4646
.4646 m [illegible]	
2.7324 s+m	
1.8032 s−m	

1.3662 $\frac{s+m}{2}$
.9016 $\frac{s-m}{2}$

July 26 Pm. Ill East Marks
Y

North	South
0.820 = 180	1.010 0.990
810 − 190	.999 = 1.001
810 = 190	1 ~~.009~~ 0.991
820 = 180	1.014 0.986
3260	4.032
815	1.008
1.008	.008
.193	1.000

col. = −1.414 + 1.366 = −.048
az. = −0.700 + .902 = +.202

(121)

July 26/27 Am

Illuminator East

2964
Polaris
0 .. 39 .. 36.2
B 42 .. 29.2

Polaris

B west
0 .. 47 .. 0.0 - 2
0 .. 55 .. 51.2
1 .. 04 .. 38.5
1 .. 13 .. 27.3
1 .. 22 .. 13.7
1 .. 31 .. 12.0

E C Reduced to mean Solar time.
E.C - 5 .. 25 .. 00
167 - 5 .. 25 .. 23.2

West Transit - Illr west
B - 2964 - Polaris
Last wire of mid. group - 1 .. 08 .. 7.5 - 26

mid wire of 6th group - 1 .. 14 .. 30
next foll.g wire - 1 .. 16 .. 08
next foll.g wire - 1 .. 17 .. 41.

Mid wire of 5th group - 1 .. 24 .. 15.2
next foll.g wire - 1 .. 25 .. 49.5
next foll.g wire - 1 .. 27 .. 29.0

Last or 7th wire - 1 .. 33 .. 53.0

α arietis
6 . 49.7
7 .. 4.5
B 7 .. 19.4
7 . 34.5
7 . 49.3
8 . 4.2
1 .. 58 .. 19

E.C. 8 .. 24 .. 0
167 - 8 .. 24 .. 22.3

Reversed Tr. C to Illr west

attached Thermometer
July 27th - 8 .. 30 Am No 1 - 75° No 2 - 74°.5 No 3 - 74°.5

2964 - 4 .. 45 .. 10
167 -- 8 .. 28 .. 18

EC - 12 .. 8 .. 0
167 - 12 .. 8 .. 21.5

EC 2 .. 17 .. 0
167 - 2 .. 17 .. 21 - 20.8

EC 4 .. 21 .. 0
167 - 4 .. 21 .. 20.7

.25
20
100
50
6.00

.35
24
140
70
3,4.0

(122)

July 26/27 Am. Ill West

col +0.036
az +0.223
lev. + .129

	South	North
B	1r035	0,262
	.013	0.220
	.020	.210
	.032	,200
	1,039	0,219
	5,152	1,105
	1,030	0.221
	.049	.005
	1,079s	0.216n

2964 B Tauri

B

52.5 −2

+28° 5 8.3

5 23.8

5 39.6

5 55.0

6 10.6

5 ..16 ..26.2

21 6.0

60

7)276.0

39.43

−2

5.. 15.. 37.43

5.. 16.. 52.32

1.. 15.38

col. + .054

az. + .06

lev. + .16

1.. 15.12

1.079 0,216

1.023 2.3

3.058 .648

2.038 s+n 432

2.3438 s .4968

.4968 n

2.8405 s+n

1.8469 s−n

1.4202 $\frac{s+n}{2}$

.9234 $\frac{s-n}{2}$

col = −1.384 + 1.4202 = +.036

az = −0.700 + 0.9234 = +.223

(123)

July 27/28 Am

(See west?)

	2964		2964		2964		2964
+23°	α Arietis	+3°.	γ Ceti	+3°	α Ceti	+49°	α Persei
	6.. 54.4		3.. 45.7				1.. 31.4
	7.. 09.5		3.. 59.5		54.3		1 52.8
	7 24.3		4.. 13.2		07.8		2.. 13.8
	7.. 39.2		4.. 27.0		3.. 21.4		2.. 35.0
	7 54.8		4 .. 40.7		3.. 35.3		2.. 56.2
	8.. 09.0		4 .. 54.6		3.. 49.3		3.. 17.0
	1.. 58..24.0		2.. 35.. 08.3		2.. 54 03.0		3.. 13.. 38.0
	214.7		249.0		168.1		244.2
	060		60		60		000
	7) 274.7		7) 189		5) 108.1		7) 244.2
	39.24		27.86		21.62		34.89
	−2		−2		−2		−2
	1.. 57.. 37.24		2.. 34.. 25.86		2.. 53.. 19.62		3.. 12 .. 32.89
	col +.03		col +.03		col. +.03		3.. 13 .. 43. 37
	az +.08		az +.13		az. +.13		1.. 10.48
	lev +.16		lev. +.12		lev +.12		col +.05
	1.. 57.. 37.51		2.. 34.. 25.14		2.. 53.. 19.90		az −.04
	1.. 58.. 48.03		2.. 35.. 35.73		2.. 54.. 30.33		lev +.25
	1.. 10.52		1.. 10.59		1.. 10.43		1.. 10.22

7.. 11.. 15
1.. 09.47
7.. 12.. 24.47
8.. 19.. 03.45

8.. 18.. 16.71
46.74
8.. 19 03.45

22 .. 53.. 21.02
3.. 45. 00
22.. 49 .. 36.02
22. 49.. 42. 00
5.98 E.C. fast

col. + 0.036
az. + 0.223
lev. + 0.160

28th

col. + 0.039
az. + 0.209
lev. + 0. 160

(124)
(Ill set ?)

daily rate of 2964 + 4.00 s

2964
α Tauri
+16°
31. 2
46. 0
00. 0
14. 3
clouds
43. 0
4.. 26.. 57. 3

2964
+46° α Aurigæ
34.0
54.0
13.7
4.. 33. 0
4.. 53. 0
5 12.6
much brighter than usual
5.. 05.. 32.0
23.2.3
00
7) 232
33.18
−2
5.. 04.. 31.18
5.. 05.. 41.37
1.. 10.19
col + .06
az + .02
lev + .32
1.. 09.91

+28° β Tauri
5.. 57.5
5.. 13.1
5.. 28.9
5.. 44.5
6.. 00.0
6.. 15.8
5.. 16.. 31.4
191.2
120
2) 311.2
44.46
−2
5.. 15.. 42.46
5.. 16.. 52.57
1.. 10.11
col + .05
az + .07
lev + 18
1.. 09.81

h m 5.. 10 2964 slow m s 1.. 09. 80

9.. 40.. 20
1.. 10.19
9.. 41.. 30.19
8.. 19.. 03.45
22 26.74

8.. 18.. 16.71
46.74
8.. 19 03.45

2964 6.. 01.. 46.5
1.. 10.19
6.. 02.. 56 69
8.. 19.. 03.45
21.. 43.. 59 24
20.. 56.. 33.58
42.. 52.95
52.85
.24
21.. 40.. 19.62
21.. 40.. 00.
19.62

27/28

(125)

July 28 Pm Ex Ther 70° Ill west

			2964		
Level			α Herculis		γ Draconis
		+15°	6..04.8	+51°	1..59.4
East	West		6..19.0		1..21.5
49.3	+51.2		6..33.1		1..43.4
49.3	+51.3		6..47.4		2..05.9
+45.5	54.0		7..01.8		2..27.7
+46.0	53.0		7..15.8		2..49.9
190.1	209.5		17..07..29.9		17..53..11.8
47.5	52.4		151.8		219.0
	47.5		180		180
	4.9		7)331.8		7)39.0
	2.4		47.40		05.57
lev. = +0°.15	+ .16		−2		−2
			17..06..45.40		17..52..03.57
			17..07..52.93		17..53..11.01
			1..07.53		1..07.44
			col. +.03		col. +.05
			az. +.10		az. −.05
			lev. +.15		lev. +.25
			1..07.25		1..07.19

July 28th after obs.

2964–
167–

1851. July 27/28

Eclipse of the Sun.

Time of Begn cal. Am. Almanac - $7^{h}..49^{m}..15^{s}$
R. T. Paine - 7..48..10

Begn Observed at Cambridge by. Sears C Walker, R. T. Paine - W. C. Bond - C W Tuttle and T. H. Safford.

July 28d - W. C. Bond, In the small dome of the western wing observed with the daguerreotype apparatus, consisting of a refracting Telescope of 2¾ inches aperture and 8 ft. 6 inches focal length including the achromatic eye piece; by throwing the image of the sun on a white ground.

Chronometer by Hutton No. 167. beating half seconds

Time of Begn by Hutton 167 — $7^{h}..50^{m}..02^{s}.5$
167 fast of M.S.T. Camb — - 23.53
28th AM - 7..49..38.97

Remarks; Limb undulating but certain within two or three seconds - the contact was probably a second or two earlier.

Daguerreotypes were taken by Mr A. W. Whipple during the progress of the Eclipse up to the time of greatest obscuration, Mr Whipple was assisted by W. C. B who marked the time of taking the impression, and by R. F. Bond who withdrew and returned the slide protecting the prepared metalic plate, Mr Whipple regulating the time of admission of the sun's rays which in no case exceeded half a second, when the sun was clear of clouds the time allowed for the impression was as short as possible.

Am Almanac Begn 7..49..15

Mr Whipples Daguerreotypes of the Eclipse.

The following are the instants of time when the impreſsions were made. Chro No 167. which was fast of mean solar time at Cambridge $\sim 23^s.5$ to .6

No. 1st —— 7^h..55..23.2 quick as poſsible ⊙ clear
2 — 8..01..35.0
3 —— 8..09..05.0
4 —— 8..14..18.0
5 —— 8..20..25.5
6 —— 8..25..11.0
7 —— 8..31..21.3
8 —— 8..37..59.3 middle of the Eclipse, clear.
9 —— 8..46..47.5
10 —— 8..56..11.0

The observations were then interrupted by cumulus clouds which continued till half a minute after the end of the Eclipse — The suns disk was seen clear of the Moon at $9^h..33^m..30^s$ by 167 —

R. T. Paine used State Equatorial - 3 inch aperture, four and a half feet focus, Power about 40 -
Hutton Chro No 228 - Time of Begn - $\overset{12}{0}$..26..20
4..36..44.72
Camb. m.s.t — 7..49..35.28

S. C. Walker. 5 f Equatorial. Pancratic eye tube
Chro. Hutton 220. Power 50.
Begn - $12^h..27^m..47^s.5$
4..38..12.16
Camb. m.s.t 7..49..35.34

C. W. Tuttle. Bowditch Comet seeker 4 inch aperture
Power, Sid. Chro No 2964. half seconds beats
Obs. Time by Chro ~ 4..10..55 - 4 beats = m.s.t. $7^h..49^m..44^s.08$

T. H. Safford. observed with a blue screen without Telescope
Chro. Fletcher No 1699 - Begn $7^h..50^m..35^s$
1699 marked - 12..25..30

July 29 Pm. Ill West

col. +0.027
az. +0.202
lev +0.140

2964 α Virginis	2964 α Herculis	2964 β Draconis	2964 γ Draconis
−10° 5,, 38.7	+14° 6,, 10.3	+52° 58.4	+51° 05.0
5,, 52.7	6,, 24.6	21.2	27.0
6,, 05.5 6.5 ?	6,, 38.8	43.2	1,, 49.1
6 20.5	6,, 53.2	6,, 06.1	2,, 11.2
6,, 34.4	7 07.4	6,, 28.4	2,, 33.5
6,, 48.5	7 21.6	6,, 51.5	2,, 55.5
13,, 17,, 02.4	17,, 07,, 35.8	17,, 27,, 13.5	17,, 53,, 17.4
202.7	191.7	222.3	198.7
60	180	180	120
7) 142.7	7) 371.7	7) 42.3	7) 78.7
20.39	53.1	06.04	11.24
−2	−2	−2	2
13,, 16,, 18.39 .53	17,, 06,, 51.10	17,, 26,, 04.04	17,, 52,, 09.24
13,, 17,, 21.50	col. + 09	col. +.05	col. +.05
1,, 03.29	az. + 10	az. −.05	az. −.05
col. + 09	lev. + 13	lev. +.23	lev. +.22
az. +.16	17,, 06,, 51.36	17,, 26,, 04.27	17,, 52,, 09.46
lev. +.09	17,, 07,, 52.92	17,, 27,, 05.97	17,, 53,, 10.94
1,, ~~03.01~~	1,, 01.56	1,, 01.70	1,, 01.48
1,, 02.87			

July 29 Pm.
2964
+39° α Lyrae
C.S. 0 03.5
0 21.0
0 38.5
0 56.0
1 03.5
1 31.0
18„ 31„ 58.5
212.0
180
7)392.0
56.0
−2
18„ 30„ 54.00
18„ 31„ 55.69
1„ 01.69
col. +.03
az. +.02
E. C lev. +.15 .15
296 1„ 01.49 .46

29/30 Am.
2964
α Orionis
+7°
C.S. 5„ 41.7
5„ 55.6
6„ 09.5
6„ 23.5
6„ 37.3
5.4 6„ 51.0
167.6
120
5)47.6
9.52
−2
5„ 46„ 07.52
5„ 47„ 06.23
58.71
col. +.02
az. +.12
lev. +.09
0„ 58.48

Pm All West
2964
η Bootis
+19 57.5
C.S. 6„ 12.2
6„ 26.5
6„ 41.3
6„ 55.7
7„ 10.3
13„ 47„ 24.7
228.2
60
7)288.2
41.17
−2
13„ 46„ 39.17
col. +.02
az. +.08
lev. +.11
13„ 46„ 39.38
13„ 47„ 33.94
56.56

2964
β Ursae Minoris
+75°
33.0
24.9
0 17.3
1 09.2
2 01.7
14„ 52„ 53.6
86.1
00
5)86.1
17.22
−2
14„ 50„ 15.22
col.
az.
lev.

EC 5„ 26„ 15
2964 13„ 56 46.0

E.C. 22„ 21„ 10
2964 6„ 50„ 31
58.41
6„ 51„ 29.41
8„ 26„ 56.57
22„ 24„ 32.84
3„ 40„ 27
22„ 20„ 52.57
22„ 21„ 10
17.43

8„ 26„ 09.83
46.74
8 26 56.57

(132)

Ill West

July 30 Pm

eol. +0.024
az. +0.195
lev. +0.120

	2964		2964		2964		2964
	β Librae		α Coron Bore		α Serpentis		α Herculis
−9°	7,, 24.7	+27°	6,, 43.2	+7°	5,, 21.3	+13°	6,, 16.4
	7,, 38.6		6,, 58.5		5,, 35.2		6,, 30.5
	7,, 52.5		7,, 14.0		5,, 49.0		6,, 45.0
	8,, 06.9		7,, 29.5		6,, 02.8		6,, 59.0
	8,, 20.2		7,, 45.0		6,, 16.5		7,, 13.4
	8,, 34.1		8 00.4		6,, 30.4		7,, 27.4
	15,, 08,, 48.0		15,, 28,, 16.0		15,, 36,, 44.3		17,, 07,, 41.5
	224.4		206.6		199.5		233.2
	180		00		180		180
	7) 44.4		7) 206.6		7) 19.5		7) 413.2
	06.34		29.51		2.78		59.03
	−2		−2		−2		−2
	15,, 08,, 04.34		15,, 27,, 27.51		15,, 36,, 00.78		17,, 06,, 57.03
	eol +.02		eol +.02		eol +.02		eol. +.02
	az +.16		az +.07		az +.12		az. +.10
	lev +08		lev. +.14		lev +.10		lev. +.11
	15,, 08,, 04.60		15,, 27,, 27.74		15,, 36,, 01.02		17,, 06,, 57.26
	15,, 09,, 01.14		15,, 28,, 23.84		15,, 36,, 57.11		17,, 07,, 52.91
	56.54		56.10		56.09		55.65

July 30 Pm

E.C. 9,, 17 00
2964 17,, 48 08.0

Ice West,

July 30 Pm.	July 30/31 Am.			
2964	2964	2964	2964	2964
+52° γ Draconis	α Persei	α Tauri	β Tauri	ε Orionis
1„11.0	+49° 49.0	+16° 49.0	+28° 5„15.0	−1° 07.2
1„33.0	2 10.3	unsteady 6„03.0	5„30.4	21.0
1„55.1	2 31.1	6„17.5	5„46.0	34.4
2„17.3	2 52.3	6„31.9 44	6„01.8	48.6
2„39.5	3 13.4	6„46.3 44 2	6„17.5	5„28„02.2
3„01.5	3„34.2	7„00.5 41	6„33.0	clouds
17„53„23.5	3„13„55.3	4„27„14.6	5„16„48.5	
180.9	245.6	162.8	192.2	
60	120	60	180	
7)120.9	7)365.6	7)222.8	9)12.2	
17.27	52.23	31.83	5„16„01.74	
−2	−2.	−2	2	
17„52„15.27	3„12„50.23	4„26„29.83	5„15„59.74	
col +.03	col +.03	col +.02	col +.02	
az −.05	az −.04	az +.09	az +.06	
lev +.19	lev +.18	lev +.11	lev +.14	
17„52„15.44	3„12„50.40	4„26„29.62	5„15„59.96	
17„53„10.92	3„13„43.49	4„27„22.81	5„16„52.63	
55.48	53.09	53.19	52.67	

July 30/31 Sm.
2964
α Orionis
+7° 5.. 33.9
5.. 47.7
6.. 01.5
6.. 15.4
6.. 29.3
6.. 43.1
5.. 4 6.. 57.0
227.9
120
7)107.9
15.41
− 2
5.. 46.. 13.41
5.. 47.. 06.25
52.84
col. +.02
at. +.12
lev. +.09
52.67

J 31ª − 52.84
R 1 = +5.1
47.74
1.3
Aug¹ 1ˢᵗ mean − 46.44

Aug² 1ˢᵗ
E.C. 12.. 57.. 0 opened
58.. 0 closed. beat
59.. 0 opened.
1.. 00.. 0 closed
1.. 01.. 0 opened

E.C. 21.. 59.. 50
2964 6.. 33.. 04.5
52.6
6.. 33.. 57.1
8.. 30.. 53.12
22.. 03.. 03.99
3.. 36.76
21 59.. 27.23
21.. 59.. 50
22.77

8.. 30.. 06.38
46.74
8.. 30.. 53.12

(135)

Aug. 1st Pm Ill West

Ill west

Aug. 1/2 Am.

	2964 η Bootis		2964 Arcturus		2964 β Ursa Min.		2964 β Libræ			2964 α Persei
+19°	═	+20°	7.. 25.8	+75°	52.3	−9°	36.4		+49°	8.. 00.9
	6.. 24.0		7.. 40.5		44.3		50.4			8.. 22.0
	6.. 38.4		7.. 55.2		36 5		8 04.3	3.8		8 43.1
	6 53.0		8.. 09.8		0.. 28.9		8 18.1			3.. 04.3
	7 07.4		8.. 24.6		1.. 21.2		8 32.0	3.9		3.. 25.4
	7 22.0		8.. 39.0		2.. 13.4		8 46.0	4		3.. 46.5
	13.. 46.. 36.4		14.. 08.. 53.5		14 .. 53.. 05.0		15.. 08.. 59.8			3.. 14.. 07.4
	13.. 47.. 35.88		248.4		201.6		247.0			149.6
	55.48		180		a		120			120
			7) 68.4		7) 201.6		7) 127.0			7) 29.6
			09.77		28.80		18.14			4.23
			−2		−2		−2			−2
			14.. 08.. 07.77		14.. 50.. 26.80		15.. 08.. 16.14			3.. 13.. 02.23
			14.. 08.. 52.53		al		15.. 09.. 00.85			3.. 13.. 43.53
			44.76		az		44.71			41.30
			col. +02		lev		col. +02			col. +03
			az. +.08				az. +.14			az. −.03
			lev. +.09				lev. +.04			lev. +13
			44.57				44.51			41.17

E.C. 22.. 30.. 40
2964 - 7.. 07.. 55.5
46.76
7.. 08.. 42.26
8.. 34.. 49.68
22.. 33.. 52.58
3.. 41.79
22.. 30 10.79
22 30 40
29.21

Aug 1st Pm

coin

E C 5.. 34 50
2964 14.. 13.. 15

Aug. 1st Pm

E.C. 5.. 34.. 50
2964 - 14.. 13.. 15.0
44.76
14.. 13.. 59.76
8.. 38.. 46.23
5.. 35.. 13.53
54.92
5.. 34.. 18.61
5.. 34.. 50
31.39

Aug. 1/2 Am

~~Al.~~ E.C. 18.. 41.. 00
2964 3.. 21.. 34.5
41.30
3.. 22.. 15.80
8.. 38.. 46.23
18 48.. 29.57
17.. 57.. 03.07
42.. 52.95
28.92
.57
18.. 40.. 25.51
18.. 41.. 00

8.. 37.. 59.49
46.74
8.. 38 46.23

E.C. [illegible] 34.49.

(136.2)
Ile West

Aug 1/2 Am.

col +0.020
az +0.181
lev. +0.080

2964 α Tauri	2964 α Aurigæ	2964 β Orionis	2964 β Tauri	2964 δ Orionis
+16°	+46 unsteady	−8°	+28°	±0° very unsteady
008	03.5	—	5,,26.9	3,037
15.1	23.4	—	5,,42.5	3,,17.5
6 29.4	43.0	6,,30.0	5,,58.0	3,,31.3
6 43.8	5,,02.8	6,,43.9	6,,13.8	3,,45.0
6 58.0	5 22.5	6,,57.5	6,,29.5	3,,58.9
7 12.4	5 42.0	7,,11.4	6,,45.0	4 12.6
4,,27,,26.6	5,,06,,01.5	5,,07,,25.3	5,,17,,00.5	5,,24,,26.0
166.1	138.7		216.2	195.0
120	120		120	120
7)306.1	7)18.7		7)96.2	7)315.0
43.73	2.67		13.74	45.0
−2	−2		−2	−2
4,,26,,41.73	5,,05,,00.67		5,,16,,11.74	5,,23,,43.00
col +02	col +02		col +02	col +.02
az +.08	az −01		az +.06	az +.11
lev. +.08	lev. +.13		lev. +.12	lev. +.06
4,,26,,41.91	5,,05,,00.81		5,,16,,11.94	5,,23,,43.19
4,,27,,22.75	5,,05,,41.51		5,,16,,52.69	5,,24,,23.79
40.84	40.70		40.75	40.60

Sel West (137)

Aug. 1/2 Am. daily rate of 2964 + 6.0

2964	2964	2964
−1° ε Orionis +7°	α Orionis −17°	α Canis Maj.
19.0	—	7,, 13.1
33.0	—	7. 27.4
46.8	13.9	7.. 41 7
8 00.4	6 27.5	7.. 55.9
8 14 ~~2~~	6 41.4	8,, 10.4
8 28.0	6 55.4	8 24.6
5,, 28,, 41.6	5,, 47,, 09.0	6.. 38,, 38.9

mistake

ε Orionis:

183.0
100
7) 3.0
00.43
−2
5,, 27,, 58.43
col + .02
az. + .11
lev + .04
5,, 27,, 58.88
5.. 28,, 39.18
40,30

α Canis Maj.:

212.0
180
7) 392.0
56.00
−2
6.. 37. 54.00
6.. 38. 34. 54
40,54
col. + .02
az + .15
lev. + .03
40,34

Aug. 2nd P.M.
2964
Polaris
— clouds
12,, 47,, 36.5 − 4.15
56,, 23.4
13,, 05,, 12,0
14,, 00.5
13,, 22,, 51.5
— omitted

Aug 1/2 Am
E.C. 22,, 06,, 25
2964 6.. 47. 33.0
40.54
6,, 48 13.54
8,, 38,, 46.23
22.. 09.27.31
3,, 37.43
22,, 05,, 49.88
22.. 06.. 25.00
35.12

8,, 37.. 59.49
46.74
8,, 38,, 46.23

(138c) c +0.019
col +0.176
lev +0.060

Aug. 2nd	Ill West		Ill West	Aug 2nd 8pm Ill East
2964	2964	2964	2964	2964
Spica	η Ursa Majoris	η Bootis	Arcturus	α Cor. Bore
−10° 02.5	+50° 59.0	+19° 15.4	+20° 32.0	+27° 7 01.4
6 16.4	0 20.4	6.. 30.0	46.4	7.. 16.5
6 30.5	0 41.5	6.. 44.5	01.2	7.. 32.0
6 44.6	1 03.0	6.. 59.0	8.. 15.9	7.. 47.5
6 58.4	1 24.5	7.. 13.5	8.. 30.5	8.. 03.0
7.. 12.5	1 43.8	7 28.0	8.. 45.0	8.. 18.4
13.. 17.. 26.4	13.. 42.. 07.0	13.. 47.. 42.5	14.. 08.. 59.4	15.. 28.. 34.. 0
191.3	201.2	232.9	230.4	152.8
120	180	180	120	180
7)311.3	7)21.2	7)412.9	7)110.4	7)332.8
44.47	3.03	58.98	15.77	47.54
−2	−2	−2	−2	−2
13.. 16.. 42.47	13.. 41.. 01.03	13.. 46.. 56.98	14.. 08.. 13.77	15.. 27.. 45.54
col. +.02	col. +.03	col. +.02	col +.02	col. +.02
az. +.14	az. −.04	az. +.08	az +.07	az. +.06
lev. +.03	lev. +.09	lev. +.06	lev +.06	lev. +.07
13.. 16.. 42.66	13.. 41.. 01.25	13.. 46.. 57.14	14.. 08.. 13.82	15.. 27.. 45.69
13.. 17.. 21.45	13.. 41.. 39.78	13.. 47.. 35.86	14.. 08.. 52.52	15.. 28.. 23.78
38.79	38.53	38.72	38.70	38.09

August 2nd P.m.

Ill West

Meridian Marks		Level	
North	South	East	west
0 250	r000	+50	53.4
23.8	1 008	+50	52.3
24.7	0 998	49.9	+51.2
23.9	1 000	50.	+50.0
0r230	1.008	1999	206.9
1204	1.014	.49.9	51.7
0.241	1.003		49.9
.012	.012		1.8
0.229	0.991		.90
2.3	2.3	Lev.= +$\overset{s}{0}$.05	+.060
687	2973		
458	1982		
.5267	2.2799s		

.5267n

2.8060=s+n

1.7526=s−n

1.4080=$\frac{s+n}{2}$

.8763=$\frac{s-n}{2}$

Reverse

Ill East

Marks				Zero
North		South		0.008
very bad 0'74	0.260	0.057	.943	014
76	.240 very bad	060	940	016
75	.250	040	.960	006
0.75	.250	045	.955	0 016
300		0.202		0.060
.750		.0505		0.012
1.012		1.012		
.262		0.962		
2.3		2.3		
786		2886		
524		1924		
.6026n		2.21265		

.6026n

2.8152 s+n

1.6100 s−n

1.4076 $\frac{s+n}{2}$

.8050 $\frac{s-n}{2}$

col = − 1.414 + 1.408 = −006

Az = − .700 + .805 + .105

col = −1.384 + 1.403 = +.019

az = −0.700 + 0.876 = +.176

.5267 2.2799

6026 2.2402

759

(140) East
col −0.006
az +0.105
lev +0.060

Aug. 2nd Pm. P Ill. East.

2964 α Serpentis	2964 β' Scorpii	2964 δ Ophiuchi	2964 ε Ursæ Min	2964 α Herculis
+7° 39.4	−19 5..28.4	−3 16.5	+82° —— lost	+15° 6..34.5
53.0	5..43.0	5..30.0	29.0	6..48.4
07.0	5..57.4	5..44.0	6..59..11.3	7..02.6
6 21.0	6..12.0	5..57.5	17..00..52.2	7..17.0
6 34.5	6..26.5	6..11.3	02..36.0	7..31.0
6 48.5	6..41.0	6..25.3	17..04..17.0	7..45.3
15..37..02.4	15 56..55.8	16..06..39.0	—— lost	17..07..59.6
205.8	264.1	223.6		238.4
60	180	180		120
7)145.8	7)84.1	7)403.6		7)158.4
20.83	12.01	57.66		16.91
−2	−2	−2		−2
15..36..18.83	15..36..10.01	16..05..55.66		17..07..14.91
col −.00	col. −.00	col. −.00		col. −.00
az +.06	az. +.09	az. +.07		az + .05
lev. +.04	lev. +.03	lev. + .04		lev +.05
15..36..18.93	15..56..10.13	16..05..55.77		17..07..15.01
15..36..57.07	15..36..48.34	16..06..33.89		17..07..52.88
38.14	38.21	38.12		37.88

147 1.16

August 2nd Pm.
E.C. 8..33..30
2964 17..16..20

col. – 0.060
az. + 0.188
lev. + 0.054

1851
August 2nd
2964
β Draconis
+52° 23.0
45.3
6 07.6
6 30.5
6 53.0
7 15.5
17„ 27„ 38.0
212.9
00
7)212.9
30.41
– 2
17„26„28.41
col + .00
az – .08
lev. + .08
17„26„28.46
17„27„05.88
37.42

Aug. 3/4 Am.
2964
α Tauri
+16° —
—
very faint 40.5
6 54.9
7 09.0
7 23.4
4„ 27 37.8

2964
α Aurigæ
+46° — clouds
4 34.5
4 54.0
5„ 13.5
5„ 33.4
05„ 53.1
5 05„ — clouds
188.5
120
5) 68.5
13.70
– 2
5„05„11.70
5„05„41.57
29.87
col. + 09
az – .01
lev + .08
29.89

Aug 3/4 Am
ЄӨ 20„31„40
2964 – 5„20„22
29.87
5„20„51.87
8„46„39.34
20„34„12.53
3„22.2
20„30„50.33
20„31„40
49.67

8„45„52.60
46.74
8„46 39.34

col. −0.180
az. +0.145
lev. +0.070

Aug. 5 P.m. Ill. East

2964	2964	2964	2964
X γ Ursa Maj.	Polaris L. Cul.	X η Ursa Maj.	η Bootis
+55° 25.9	12..38..56.5 − 4 bb	+50° 15.8	+19° 32.9
49.5	47..50.5	37.1	46.5
13.4	56.41.0	ρ 58.5	7..01.0
5-37.5		1 19.6	7 15.6 −
6 00.9	14..17.0	1 41.0	7 30.3
6 24.5	23..08.3	2 02.4	7 45.0
11..46..48.3	13..31..58.0	13,42..24.0	13..47..59.5
200.0		198.4	230.2
60		60	120
7) 260.0		7) 138.4	7) 110.2
37.14		19.77	15.74
−2		−2	−2
11..45..35.14		13..41..17.77	13..47..13.74
col. −.32		col. −.26	13..47..35.89
az. −.05		az. −.03	22.09
lev. +.12		lev. +.11	col −.07
11..45..34.89		13..41..17.57	az. +.06
11..45..57.26		13.41..39.71	lev. +.07
22.37		22.14	22.03

Aug. 4/5 Am

E.C. 21..20..45
2964 6..13..30.0
23.0
6..13..53.0 8..49..49.16
8..50..35.90 46.74
21..23..17.10 8,50 35.90
3..30.24
21..19 46.86
21..20..45
58.14

August 5 P.m. Ill East
Temp. 80°

Level East	Level West	Transit Circle	Ill. West Level East	Ill. West Level West
51.6	+50.4	Reversed	+47.0	51.5
51.4	+50.0		+46.1	51.3
50.8	+49.8		+46.7	50.2
+47.3	51.9		46.0	+50.0
+47.1	51.0		46.0	+49.0
+47.0	51.0		45.8	+47.9
295.2	304.1		6) 277.6	6) 299.9
49.3	50.6		46.27	49.98
	49.3			46.27
	1.3			3.74
	.650			1.35
lev. = +$\overset{3}{0}$.05	+.043	lev. = +0.09		+ .090

9
49.98
46.27
3.74
1.86
0.65
1 21

Ill East wind too high 0."65
West " 1.86
1.21

Ill pivot too large 0."60

5th P.m

Marks Ill. West

Very good

North	South	South	North
0r 323	1r 070	1r 055	
332	1 070	063	
320	1 063	050	
325	1 045	065	
0.323	1 050		
1623	298		
.324	1.059		
.008	.008		
.316	1.051		
23	2.3		
948	3153		
632	2102		
.7268 n	2.4173 S		

col = −1.384 + 1.572 + .188
az = −.700 + 0.845 + .145

2.4173 S
.7268 n
3.1441 S+n
1.6905 S−n
1.5720 $\frac{S+n}{2}$
.8452 $\frac{S-n}{2}$

(144)

col. +0.188
az. +0.145
lev. +0.070

Aug. 5 Pm. Ill. West

2964	2964	2964	2964	2964
Arcturus	ε Bootis	α² Libra	β Ursa Min	β Librae
+20° 7 48.5	+28° 22.8	−15° 37.0	+75° 8,, 13.6	−9° 7,, 59.2
8 03.0	38.5	51.3	9 06.5	8,, 13.2
8 17.6	7,, 54.0	05.4	9 58.6	8,, 27.0
8 32.3	8,, 09.5	2 19.5	50,, 51.0	8,, 40.9
8 47.0	8,, 25.0	2 33.8	51,, 43.0	8,, 54.8
9,, 01.4	8,, 40.4	2 48.0	52,, 35.3	9,, 08.7
14,, 09,, 16.0	14,,38,, 55.9	14,,43,, 02.2	14,, 53,, 27.0	15,, 09,, 22.5
165,8	246.1	197.2	235.0	226.3
60	180	60	120	60
7)225,8	7)66.1	7)137.2	7)355.0	7)286.3
32.26	9.43	19.60	50.71	40.90
−2	−2	−2	−2	−2
14,08,,30.26	14,,38,,07.43	14,,42,,17.60	1450,,48.71	15,,08,,38.90
14,,08,,52.49	col +,21	col + .18	col.	col + .18
22.23	az. +,04	az. + .12	az.	az. + .11
col. + .19	lev. + 12	lev. + .04	lev.	lev. + .04
az. + .06	14,,38,,07.67	14,,42,,17.94		15,,08,,39.23
lev. + .07	14,,38,,29.41	14,,42,,39.64		15,,09,,00.76
21.91	21.74	21.70		21.53

Aug. 6th 3 o'clock A.M., Counted in 3/4 of an hour 19 meteors—all of which were ~~in~~ east of the Meridian, and most of them, in or near, the constellation of Perseus. None of them were above common size

(145)

col + .188
az. + .145
lev. + .070

August 5th Pm. Ill. West

2964	2964	2964	2964	♂ 2964
α Coron Borealis	α Serpentis	♃ θ Librae	δ Ophiuchi	Mars I' limb
+27° 7,,17.5	-7° 5,,55.5	-16° 4,,19.4	~~-16~~° 5,,33.0	-17° 8,,53.5
7,,33.0	6,,09.4	4,,34.0	-3° 5,,46.5	4,,08.5
7,,48.5	6,,23.3	4,,48.0	6 00.4	4 23.0
8,,04.0	6,,37.0	5,,02.9	6,,14.0	4 38.0
8,,19.4	6,,51.0	5,,16.8	6,,27.9	4 52.6
8,,34.9	7,,04.9	5,,31.0	6,,41.5	5 07.5
15,,28,,50.0	15,,37,,18.7	15,,45,,45.5	16,,06,,55.3	16 15,,22.0
207.3	199.8	197.0	218.6	205.1
180	60	180.0	120	60
7)27.3	7)259.8	7)17.0	7)98.6	7)265.1
03.9	37.11	2.43	14.09	37.87
-2	-2	-2	-2	-2
15,,28,,01.9	15,,36,,35.11	15,,45,,00.43	16,,06,,12.09	16,,14,,35.87
col +.21	col +.19	col +.20	col +.19	col +.20
az +.04	az +.10	az +.12	az +.10	az +.12
lev +.08	lev +.04	lev +.03	lev +.05	lev +.03
15,,28,,02.23	15,,36,,35.44	15,,45 00.78	16,,06,,12.43	16,,14,,36.22
15,,28,,23.73	15,,36,,57.04			
21.50	21.60			

lev +0.093
coll +0.188
az +0.145

August 5 P.m

2964
χ Ophiuchi
-18° 7,, 22.0
7,, 36.6
7 51,0
8 05.5
8,, 20,0
8,, 34,5
16,, 18,, 48.9
218.5
180
7)38.5
05.5
-2
16,, 18,, 03.50
al +.20
az +.19
lev + .03

γ Draconis
+52 45.0
7.7
B 2 29.5
2 51.5
3 13.8
3 35.6
17 ,, 53 , 57. 2
240 .3
120
7)360.3
51.47
-2
17,, 52,, 49.47
al +.31
az -.04
lev +.11
17,, 52,, 49.85
17,, 53,, 10.78
20.93

2964
φ Ophiuchi
-16° 1,, 36.0
1,, 50.4
2 04.5
2 18.9
2 33,0
2 47,5
16,, 23,, 01.6
191.9
160
7)131.9
18.84
-2
16,, 22,, 16.84
al +.20
az +.12
lev +.03
Ill went

δ urs. min
18 ,,08 ,,38.5
12 ,,33.0 very faint
B Lost by clouds
20 ,,15.5 mid clear
24 ,,07.3
27 ,,58.3
31 ,,48.0

2964
α Herculis
+14° 6,, 51.0
7,, 05.2
7 19.5
7 33.5
7 47.4
8 01.8
17,, 08,, 16.0
174.4
60
7)234.4
33.48
-2
17.07,, 31.48
17.07,, 52, 86
21 .38
al +.20
az +.07
lev +.07

β Lyræ
+33° 3,, 28.4
3 ,, 44.5
B 4 ,, 1.0
4 ,, 17.5
4 ,, 34.2
4 ,, 50.
18 ,,45 ,, 6.5
182.1
60
7)122.1
17.44
-2
18,, 44,, 15.44
al +.23
az +.03
lev. +.08
18,, 44,, 15.78
18,, 44,, 36.75
20.97

(Copied thus far July 6th. 1852)

(147)

1851.

Aug^t. 5/6 Am

Ill. west

Polaris

b

2964 A 0.. 47.. 55.0 −4

ε C 0 56.. 42.5

β D 1.. 05.. 35.5

C E 1.. 14.. 19.5

β F 1.. 23.. 11.0

5)27.. 43.5

1. 05. 34.5

2

1.. 05.. 32.5

1.. 05. 55.07

−22.57

α Ceti

−9°

β

36.4

50.5

6.. 4.7

6 18.4

6 32.7

6 46.0

1.. 17.. 0.0

188.7

60

7)128.7

18.38

−2

1.. 16.. 16.38

1.. 16.. 35.89

−19.51

col. +.19

az. +.11

lev. +.04

19.18

2964

α Arietis

J 7.. 46.2

+23 8.. 01.0

8.. 16.0

8.. 31.0

8.. 45.8

9.. 00.7

1.. 59.. 15.6

156.3

60

7)216.3

30.9

−2

1.. 58.. 28.9

1.. 58. 48.29

−19.39

col. +.20

az. +.08

lev. +.07

19.04

β urs. min S. P.

2.. 48.. 17.6

49.. 9.6

50.. 2.2

50.. 54.3

51.. 46.5

52.. 38.8

53.. 31.0

)6.. 20.0

2.. 50.. 54.29

−2

2.. 50.. 52.29

51.. 11.14

−18.85

Aug. 5/6 Am.

EC. 17.. 05.. 08

2964 − 2.. 01.. 06.0

19.3

2.. 01.. 25.3

8.. 54.. 32.45

17.. 06.. 52.85

2.. 48.23

17.. 04.. 04.62

17.. 05.. 08

1.. 03.38

8.. 53.. 45.71

46.74

8 54.. 32.45

1851phae.proj.

Aug. 5/6 Am.
2962
α Persei
+45° 2,, 23.0
2,, 44.3
3,, 05.4
3,, 26.5
3,, 47.5
4,, 08.6
3,, 14,, 29.5
184.8
000
7) 184.8
26.4
−2
3,, 13,, 24.4
3,, 13,, 43.74
19.34
col. +.28
az. −.03
lev. +.10
18.99

8,, 57,, 42.27
46.74
8,, 58 29.01

E.C. − 12,, 17,, 15
2964 − 9,, 14,, 23.5
August 6 Pm.
E.C. − 4,, 34,, 50 — 4,, 37,, 40 — 5,, 32,, 40
2964 − 13,, 33,, 40.5 — 13,, 36,, 31 — 14,, 31,, 40
16.84 16.
13,, 33,, 57.34
8,, 58,, 29.01
4,, 35,, 28.33

3,, 59,, 20.68
34,, 54.26
27.92
.33
4,, 34,, 43.19
4,, 34,, 50
C +6.81
.16
B −9.2

August 6th P.M. Ill. west Zero 100 = 0

Polaris
2964 - 13..05..47 Cloudy

Ill west -
β Urs. Min.
16 ..48 ..18.8
β 49 ..11.4
50 ..03.8
50 ..56.0
51 ..48.3
52 ..40.5
53 ..32.7

−10° α Virginis
lost
B lost
lost
6.3
20.5
34.5
13 ..17 ..48.4
Σ = 109.7
cor = − 83.69
4) 26.01
6.50
− 2
13..17..04.50

+20° α Bootis
7 53.6
8 8.5
B 8 23.2
8 37.5
8 52.2
9.. 7.0
14.. 09.. 21.5
203.5
60
7) 263.5
37.64
−2
14.. 08.. 35.64
14.. 08.. 52.46
16.82
col. +.21
az. +.07
lev. +.11
16.43

cul + 0.205
art + 0.158
lev. + 0.113

August 6 Pm. Ill. West

Therm + 71°.5

2964

-09° β Libræ	Level East	Level West
8.04.7	48.0	50.3 +
8 18.8	48.0	50.8 +
8.32.7	48.0	50.8 +
8.46.5	+ 46.8	52.0
9.00.4	+ 47.3	51.4
9.14.6	+ 48.0	51.0
15.. 09.. 28.0	286.1	306.3
145.7	47.67	51.05

180
7)325.7
15.08 46.53
-2
15..08..44.53
cul + .20
art + .13
lev + .07
44.93

51.05
47.67
3.38
1.69
+.113

lev. = +0.10

15.08..44.93
15..09..00.77
15.84

Ill West — Mer. marks. — Hazy & East wind. not ~~good~~ very

C.T. South	C.T. North	β South	β North	Zero
1r.068	.3300	1r 080	0r 330	0r.008
.050	.325	072	340	.007
.065	.335	068	325	.012
.058	.334	075	320	.011
1 .050	.320	1r 073	0 320	.009
5)291	44	368	135	47
1 .058	.329	1.073	0.327	0.009
		.009	.009	
		1.064	0.318	
		2.3	2.3	
		3192	954	
		2128	636	
		2.4472s	.7314n	

.7314n
3.1786 = n+s
1.7158 = s−n
1.5893 $\frac{s+n}{2}$
.8579 $\frac{s-n}{2}$

cul = −1.384 + 1.589 = +0.205
art = −0.700 + 0.858 = +0.158

August 6 P.m. Ill West

β' Scorpii	2964	2964	2964	2964
−15° 2964	δ Ophiuchi	χ Ophiuchi	Moon's I limb	θ Ophiuchi
X 5,, 50.4	−3° 5,, 38.3	−18° 7 27.9	−19° 9,, 31.5	−25° 1,, 54.4
6,, 05.0	5,, 52.0	7 43.0	9 46.5	2 09.5
6,, 19.5	6,, 05.9	7 57.0	0,, 01.4	2,, 24.8
6,, 34.2	6,, 19.8	8,, 11.4	0,, 16.3	2,, 39.8
6,, 48.9	6,, 33.6	8,, 25.5	0, 31.4	2,, 55.0
7,, 03.4	6,, 47.3	8,, 40.0	0, 46.6	3,, 10.0
15,, 57,, 17.8	16,, 07,, 00.9	16,, 18,, 54.5	17,, 11,, 01.7	17,, 13,, 25.0
179.2	197.8	259.3	175.4	218.5
60	+60	180	60	60
7) 239.2	7) 137.8	7) 79.3	7) 115.4	7) 278.5
34.17	19.68	11.33	16.48	39.78
−2	−2	−2	−2	−2
15,, 56,, 32.17	16,, 06,, 17.68	16,, 18,, 09.33	17,, 00,, 14.48	17,, 12,, 37.78
col +.21	col +20	col +.20	col +.20	col +.20
az +.15	az +.11	az +.15	az +15	az +.16
lev +.06	lev +.08	lev +06	lev +.06	lev +.05
15,, 56,, 32.59	16,, 06,, 18.08	16,, 18,, 09.74	17,, 00,, 14.89	17,, 12,, 38.18
15,, 56,, 48.29	16,, 06,, 33.84			
15.70	15.76			

lev +0,112
coll +0,205
az +0,158

1851phae.proj..

Aug. 6 Pm. Ill. West			Aug 6/7 Am.	
2964	2964	2964	2964	2964
−24° b Ophiuchi	a Ophiuchi	γ Draconis	α Aurigæ	β Orionis
6.. 19.0	+13° 7.. 06.9	+52° 1.. 51.0	+46° 4.. 31.5	−8° —
6.. 34.4	7.. 21.0	2.. 13.0	4.. 51.4	—
6.. 49.5	7 35.0	2.. 35.3	5.. 11.1	6.. 58.0
7.. 04.5	7 49.0	2.. 57.3	5.. 31.0	7.. 12.0
7.. 19.6	8.. 03.8	3.. 19.4	5.. 50.6	7.. 26.0
7 34.5	8.. 17.4	3.. 41.5	6.. 10.5	7.. 39.9
17.. 17.. 49.4	17.. 28.. 31.5	17.. 54.. 03.5	5.. 06.. 29.9	5.. 07.. 53.6
210.9	164.1	221.0	216.0	
180	180	180	60	
7)30.9	7)344.1	7)401.0	7)276	
4.41	49.15	57.28	30.86	
−2.	−2	−2	−2	
17.. 17.. 02.41	17.. 27.. 47.15	17 52.. 55.28	5.. 05.. 28.86	
col +.21	col +.20	col +.32	col. +.29	
az. +.16	az. +.08	az −.04	az. −.01	
lev. +.05	lev. +.10	lev +.18	lev. +.16	
17.. 17.. 02.83	17.. 27.. 47.53	17.. 52.. 55.74	5.. 05.. 29.30	
	17.. 28.. 02.80	17.. 53.. 10.76	5.. 05.. 41.69	
	15.27	15.02	12.39	

copied thus far July 5th. 1852

August 6/7 Am.				August 7/8 Am
2969	2964	2964	2964	2964
β Tauri	δ Orionis	ε Orionis	α Orionis	α Tauri
+28° 55.0	±0° 3 31.5	−1° 7„47.4	+7° 14.2	+16° 6.34.4
6„10.8	3„45.8	8„01.2	28.0	6.48.6
6„26.6	3„59.5	8 14.8	41.9	7.03.0
6„42.0	4„13.0	8 28.5	6„55.7	7„17.2
6 57.6	4 26.9	8 42.2	7„09.5	7.31.7
7„13.5	4„40.5	8„55.9	7„23.3	7 46.0
5„17„29.0	5„24„54.0	5„29„09.6	5„47„37.0	4„28„00.2
234.5	271.2	199.6	209.6	181.1
60	180	000	180	60
7)294.5	7)91.2	7)199.6	7)389.6	7)121.1
42.07	13.03	28.51	55.66	17.3
−2	−2	−2	−2	−2
5„16„40.07	5„24„11.03	5„28„26.51	5„46„53.66	4„27„15.3
col. +.23	col +.20	5„28„39.31	col +.20	4„27„23.0
az. ~~+~~.06	az +.11	12.86	az +.11	7.70
lev. +.14	lev. +.09	col +.20	lev. +.09	col +.05
5„16„40.50	5„24„11.93	az +.12	5„56„54.06	az. +.08
5„16„52.84	5„24„23.90	lev. +.09	5„47„06.39	lev. +.11
12.34	12.47	12.39	12.33	7.46

August 7/8 Am. Ill West

col. +0.058
az. +0.184
lev. +0.116

2964 α Aurigæ	2964 β Tauri	2964 δ Orionis	2964 ε Orionis
+46° 4,,37.2	+28° 00.5	±0° 3,,37.2	−1° 7,,52.7
4,,57.0	6,,16.1	3,,50.8	8,,06.5
5,,16.6	6 31.8	4,,04.5	8,,20.3
5,,36.4	6 47.5	4,,18.4	8,,34.0
5,,55.8	7 03.0	4,,32.1	8,,47.7
6,,15.5	7 18.5	4,,46.0	9,,01.3
5,,06,,35.3	5,,17,,34.0	5,,24,,59.6	5,,29,,15.1
253.8	151.4	248.6	177.6
or	180	120	60
7)253.8	7)331.4	7)128.6	7)237.6
36.26	47.34	18.37	33.94
−2	−2	−2	−2
5,,05,,34.26	5 16,,45.34	5,,24,,16.37	5,,28,,31.94
col +.08	col. +.06	5,,24,,23.68	5,,28,,39.30
az −.01	az. +.06	7 31	7,36
lev +.17	lev. +.14	col +.06	col +.05
5,,05,,34.50	5,,16,,45.60	az +.11	az. +.12
5,, 5,,41.74	3470	lev +.09	lev. +.09
724	21795-9	6.95	~~7.10~~
	.3590 m		

2.526 5 s+n
1,820 5 s−n
1.2632 $\frac{s+n}{2}$
.9102 $\frac{s-n}{2}$

col = − 1.984 + 1,263 = −.121
az = − 700 + 0,910 +.210

August 8 Pm. Ill. West

Marks

c.W.S. North	South	North B	South	North B West dot	North East dot
0,148	0,950	0r170	0r960	1r415	0r895 = 1r105
160	960	170	953	432	895
148	958	162	942	413	897
162	948	0r165	,945	410	0r892
618	3816	667	3800		
0,154	0.954	0.167	0.950		
.007	.007	.007	007		
0.147	.947	.160	.943		
2.3	2.3	2.3	23		
441	2841	480	2829		

Reversed to Aug. 8 (385)

Illumination East

Ill East

North	B	South	
0r790	.210	0r955	=1.045
785	.215	945	=1.055
780	.220	966	=1.034
790	.210	950	=1.040
0.790	.210	0r952	=1.048
3935	165	~~37~~68	222
.7870	.213	.954	1.044
1.007	.007	1.046	.007
0r.220	.220	1.007	1.051

2,3
660
440
.5060

1r053
2,3
3,159
2106
2,4219

North	C	South		Zero
0r.750=.250		.960	=1r.040	0r010
.755=.245		.970	1.030	.005
.740=.260		.968	1.032	006
.740=.260		.965	1.035	006
.730=.270		0.968	1.032	027
3715	285	4831	169	.007
0.743	.257	0.966	1.034	
1.007	.007	034	.007	
	264	007	1.041	

.264 J
220 B
84
.242
2,3
726
484
.5566 n
3

1r041 J
1.053 B
2.094
1.047
2.3
3141
2094
2,4081 s
,5566 n
2.9647 = s+n
1.8515 s−n
1.4823 = $\frac{s+n}{2}$
.9257 = $\frac{s-n}{2}$

Ill, East
col = −1,414 + 1,482 = +.068
az = −0.700 + .926 = +.226

North	South	South
.220 E	1r053 E	2.4219 E
.160 W	.943 W	2.1689 W
.060	.110 = 2e	2530
.03	.05	.12
2,3	2,3	
09	15	
6	10	
.069	.115	

(156)

cal. +0.068
az. +0.224
lev. +0.120
Here

August 8th Pm Ill East PM

2964	2964	2964		2964	2964
μ' Sagittarii	λ Sagittarii	α Lyrae		β Lyrae	ζ Aquilae
-21° 4,, 06.8	-26° 8,, 00.8	+39° 0,, 59.5	7.9	+33° 3,, 45.0	+14° —
4 ,, 21.5	8,, 16,0	1 17.4	7.9	4 01.3	8 05.0
4,, 36.2	8 : 31.2	1 35.3	7.9	4,, 17.8	8 19.3
4,, 51.0	8 46. 4	1 53.2	7.4	4 4,, 34.8	8 33.5
5,, 05.6	9,, 01.5	2 10.6	7 4	4,, 51.0	8 47.4
5,, 20.5	9,, 16.8	2,, 28.0	7.6	5 07.5	9 01.2
18,, 05,, 35.1	18,, 19,, 32.0	18 32 45.6		18,, 45,, 24.0	18,, 59,, 15.8
176.7	144.7	299.6		180.9	102.4
180	180	120		60	60
7) 356.7	7) 324.7	7) 369.6		7) 240.9	5) 166.4
50.96	46.38	52.80		34.41	33.28
-2	-2	-2		-2	-2
18,, 04,, 48.96	18,, 18,, 44.38	18,, 31 50.80		18,, 44,, 32.41	18,, 58,, 31.28
cal + 07	cal. +.07	col +.09		col +.09	col +.07
ax +.21	ax. +.23	az. + 02		az. +.04	az. +.11
lev. +.05	lev. +.04	lev. +.15		lev. +.14	lev. +.11
18,, 04,, 49.29	18,, 18,, 44.72	18,, 31,, 51.06		18,, 44,, 32.68	18,, 58,, 31.57
4.19	4.13	18,, 31,, 55.59		18,, 44,, 36.72	18,, 58,, 35.68
18,, 04,, 53.48	18,, 18,, 48.85	4.53		4.04	4.11

.04
15
18,, 51 4,08

Σ = 122.2
cor = 42.40
6) 79.80
13.30
20
33.30
-2
18,, 58,, 31.30

lev + 0,120
coll + 0.068
az + 0,226

(157)

August 8 Pm. Ill. East | August 9th Pm Ill East

π 2964 π Sagittarii	2964 Moon's 1st limb	2964 ρ' Sagittarii	2964 ζ Aquilae	2964 π Sagittarii
−21° 10.0	−19° 1,, 11.5	−18° 2,, 18.4	+14° 7,, 57.4	−21° 0 16.1
24.6	1,, 26.2	2,, 32.9	8 11.5	0,, 30.8
39.4	1,, 41.5	2,, 47.5	8 25.4	0 45.5
19,, 00 54.0	1 57.0	3,, 01.8	8 39.5	1,, 00.0
—	2,, 12.1	3,, 16.2	8 53.8	1,, 15.0
—	2, 27.4	3,, 30.5	9 08.0	1,, 29.8
—	19,, 02,, 42.8	19,, 13,, 45.0	18,, 59,, 22.2	19,, 01,, 44.5
	218.5	192.3	217.8	181.7
Σ = 128.0	180	180	60	180
cor = + 88 28	7)398.5	7)12.3	7)277.8	7)01.7
4)216.28	56.93	01.76	39.68	19,,01,,00.24
19,,00,,54.07	−2	−2	−2	−2
	19.01,,54.93	19,,12,,59.76	18,,58,,37.68	19,,00,,58.24
	col + .07	col + .07	col + .07	col. + .07
	az. + .21	az + .20	az + .11	az. + .21
	lev + .06	lev + .06	lev + .11	lev. + .05
	19,,01,,55.27	19,,13,,00,,09	18.58 37.97	19,,00,,58.57
	4.04	4.60	58 35.71	
	19,,01,,59.31	19,,13,,04 09	+2.26	

August 8/9 Am

Level Ill. East

East	West		E.	W.
		Means	48.5	52.1
+ 48.3	53.0			48.5
+ 48.4	52.8			3.6
+ 48.5	52.6			1.80
49.0	+ 51.5	level = + 0.11 (5)		+ .120
48.7	+ 51.5			
48.8	+ 51.4			
291.7	312.8			

West End too high

August 9 Pm Ill. East

2964 ρ' Sagittarii	2964 δ Aquilae	2964 γ Aquilae	2964 α Aquilae	2964 β Aquilae
−18° 2,, 24.7	+3° 6,, 24.0	+10° 8,, 35.0	+8° 2,, 55.3	+6° 7,, 24.7
2,, 39.2	6,, 37.6	8,, 48.9	3,, 09.0	7,, 38.2
2,, 53.5	6,, 51.5	9, 02.8	3,, 23.1	7,, 52.0
3,, 08.0	8,, 05.0	9 16.5	3,, 37.0	8,, 06.0
3,, 22.4	8,, 18.9	9,, 30.7	3,, 50.9	8,, 20.0
3,, 36.9	8,, 32.6	9 44.8	4,, 05.0	8,, 33.6
19,, 13,, 51.3	19,, 18,, 46.5	19,, 39,, 58.9	19,, 44,, 19.0	19,, 48,, 47.5
236.0	216.1	237.6	199.3	222.0
180	180	120	60	180
7)56.0	7)96.1	7)117.6	7)259.3	7)42.0
08.00	05.16	19,, 39,, 16.80	37.04	06.0
−2	−2	−2	−2	−2
19,, 13,, 06.00	19,, 18,, 03.16	19,, 39,, 14.80	19,, 43,, 35.04	19,, 48,, 04.0
col + .07	col + .07	col. + .07	col. + .07	col + .07
az. + .20	az. + .14	az. + .13	az. + .13	az. + .14
lev. + .06	lev. + .09	lev. + .10	lev. + .10	lev. + .09
19,, 13 06.33	19,, 16,, 03.46	19,, 39,, 15.10	19,, 43,, 35.34	19,, 48,, 04.30
	18 01.23			
	2.23			

dai. rate of 2964 + 6.0s

lev + .120
coll + .078
az + .210

Ill East (159)

August 9 Pm. e. J.

2964 Moon's I limb	2964 α² Capricorn	2964 β Capricorn	2964 ρ Capricorn
-20° very unsteady 5,,52.9	-13 9,,11.5	-15° 2,,02.0	-18° 9,,45.2
6,,08.2	9,,25.5	2,,16.0	9,,59.4
6,,23.6	9,,39.4	2,,30.3	0,,13.5
6,,38.5	9,,53.5	2,,44.7	0,,28,0
6,,53.5	0,,07.4	2,,59.0	0,,42.4
7,,08.9	0,,21.5	3.13.1	0,,57.0
19,,57,,24.0	20 10,,35.8	20,,13,,27.4	20,21,,11.4
209.6	198.6	292.5	256.9
60	180	120	60
7)269.6	7)374.6	7)312.5	7)196.9
38.51	53.51	44.64	28.13
-2	-2	-2	-2
19,,56,,36.51	20,,09,,51.51	20,,12,,42.64	20,,20,,26.13
col +.07	col +.07	col. +.07	col +.07
az.+.21	az.+.19	az.+.19	az +.20
lev. +06	lev. +.07	lev. + 06	lev +.06
19,,56,,36.85	20,,09,,51.84	20,,12,,42.96	20,,20,,26,46
	~~4 49.38~~	40.38	
	+ 2.46	+ 2 58	

$\overset{h}{9},,\ 20^{h}$ +2.5

11,, 5 +12.0

1,, 09 9.5

1.37)9.5(6.8
822
1220

11,, 5 +12.0
11,, 17.30 15.6
12.30 3.6

August 10/11th Am   Illbert East

	2964 B B. hrs. min. S.P.	2964 α Tauri	2964 α Aurigæ	2964 β Tauri	2964 ε Orionis
F	14^{24}..49..40.0	6..54.2	4..57.0	6..20.3	8..12.3
E	50..31.9	7..08.3	5..16.5	6..35.9	8..26.0
D	51..24.0	7..22.5	5..35.9	6..51.5	8..39.7
C	52..16.0	7..36.9	5..55.5	7..07.0	8..53.5
B	53..08.0	7..51.3	6..15.4	7..22.5	9..07.2
A	54..00.0	8..05.5	6..34.9	7..38.4	9..20.8
	119.9	4..28..19.8	5..06..54.8	5..17..54.0	5..29..34.7
	000	198.5	270.0	229.6	194.2
	5)119.9	60	120	180	180
	23.98	7)258.5	7)390.0	7)49.6	7)374.2
	−2	36.99	55.71	7.09	53.46
	14..51..21.98	−2	−2	−2	−2
	14..51..10.89	4..27..34.93	5..05..53.71	5..17..05.09	5..28..51.46
S.P.	11.09	4..27..23.14	5..05..41.85	5..16..52.97	5..28..39.42
		11.79	11.86	12.12	12.04

Ill. East
August 10/11 Am
2964
α Orionis
6„ 39.0
6„ 52.9
7„ 06.8
7„ 20.6
7„ 34.5
7„ 48.3
5„ 48„ 02.2
204.3
60
7)144.3
20.61
−2
5„ 47„ 18.61
5„ 47„ 06.53
12.18

2964
α Ori
60

Aug. 11th Pm. Ill East
Marks

North		South	
0r 740 =	.260	0r 970	1.030
720	.280	.962	1.038
713	.287	963	1.037
734	.266	964	1.036
720	.280	965	1.035
3627		4824	
.725	.275	.965	
1.004		.035	
.279		1.004	
23		1.039	
837		2.3	
558		3117	
.6417 n		2078	
		2.3897 s	
		6417 n	
		3.0314 = s + n	
		1.7480 s − n	
		1.5252 $\frac{s+n}{2}$	
		.8740 $\frac{s-n}{2}$	

11th Pm.
2964
α Ophiuchi
38.0
52.0
9 06.0
8 19.8
8 34.0
8 48.3
17„ 29„ 02.5
200.6
60
7)140.6
20.09
−2
17„ 28„ 18.09
17„ 28„ 02.75
15.34
3
18.3

col = −1.414 + 1.523 = +0.109
az = −0.700 + .874 = +0.174

Ill west South mark reads direct
East South „ – „ compliment

(162)

August 11/12 Am. Ill East | 12 Pm. Ill East

2964 β Tauri clouds	2964 δ Orionis	2964 α Orionis	2964 α Lyrae	2964 β Lyrae
	4,,02.8	44.3	25.8	10.8
42.0	4,,16.6	59.0	43.5	27.0
57.5	4,,30.3	12.8	01.0	43.5
>13.1	4,,44.0	26.6	18.8	00.0
>28.8	4,,57.8	40.4	36.5	16.4
>44.9	5,,11.5	54.5 —	54.0	33.0
5,,18,,00.0	5,,25,,25.3	5,,48,,08.4	18,,33,,11.6	18,,45,,49.2
185.7	188.3			
120	120			
5)065.7	7)308.3			
13.14	44.04			
−2	−2			
5.17.11.14	5,,24,,42.04			
5,,16,,53.00	5,,24,,24.05			
18.14	17.99			

Ill East

Aug 12 Pm. Marks Therm 78

very distinct and steady

North		South		Zero	
0r735	=.265	0r961	=1.039	0r999	.001
734	.266	958	1.042	995	1005
728	.272	962	1.038	993	.007
734	-266	965	=1.035	0 999	.001
729	.271	963	1.037	3986	
3660		4809		.996	
.732		.962	1,038		
996		996			
0r.264		.034			
2.3		1.000			
.792		1.034			
528		23			
.6072		3102			
		2068			
		2,3782 s			
		.6072 n			
		2,9854 s+n			
		1,7710 s−n			

2,9854 = s + n

1,7710 = s − n

1.4927 = $\frac{s+n}{2}$

.8855 = $\frac{s-n}{2}$

col. = − 1.414 + 1.493 = +.079

az. = − 0.700 + .886 = +186

(85)

(163)
Ill East

August 13 P.m.

2964 α Ophiuchi illumination bad	2964 γ Draconis	2964 α Lyrae	2964 β Lyrae	Aug. 14 P.m. 2964 α Boötis
45.5				
03.4	33.8	32.0	16.8	43.3
17.6	55.5	49.3	33.0	57.7
31.9	18.5	06.6	39.5	12.3
46.0	39.4	24.4	05.9	26.9
00.0	01.8	42.3	22.4	41.5
17" 29" 14.3	23.9	59.8	38.6	56.2
	17" 54" 46.0	18" 33" 17.4	18" 45" 55.0	14" 10" 10.8

Aug. 13/14 A.m. Ext. Therm 74° Ill East

	Zero	Level East	West	North	South
				0.733 = .267	.963 1.037
+.003 =	1003	48.8	+51.3	730 .270	976 1.024
±.000	1000	48.7	+51.3	728 .272	969 1.031
−.002	0998	+47.0	52.0	0 733 .267	968 1.032
+.007	1007	+47.5	51.2	0.732 .268	0.975 1.025
+0.010	4008	320	58	3656	4851
+0.005		48.0	51.4	.731	.970
−.002	1.002		48.0	.002	.002
+0.003			3.4	.271	.032
			1.70		1.000
					1.032

13 P.m.
εC 9" 22" 00
2964 18" 49" 31

Cor. = $+0\overset{s}{.}11$ +.113

Aug 14 Pm   Illumination East

Ext Thermo 74°

B. South		North		
0.960	=1.040	0.733	mark not well seen	=.267
965	1.035	760		.240
960	1.040	730		.270
968	1.032	745		.255
967	1.033	.752		.248
965	very [illegible] & steady	220		20
965		.744 m		.964
966		.003		.003
966		.259 m		1.039 s
967		23		23
958		777		3118
963		518		2678
970		.5957 m		2.3897 s
965				.5957 m
967				2.9854 s+m
0.962				1.7940 s−m
				1.4927 $\frac{s+m}{2}$
				.8970 $\frac{s-m}{2}$

Mid micr

B. 97 − 104
97 . 104
97 . 104
7 − 3.5
23
105
70
.805
.402

Os − 97 − 104
96.5 − 104
96.5 − 104
96.7 −
104.0
7.3 − 3.6
.23
108
72
.828
.414

.023
15
115
023
.0345

col. = − 1.414 + 1.493 = +.079
az. = − 0.700 + .897 = +.197

August 14 Pm. Ext. Therm 74°

I. North		South		North	South
0.733	= .267	0.970	1.030		0.960
.738	.262	970	1.030		.965
.720	.280	971	1.029		.960
.715	.285	.965	1.035		.968
106		3876			.967
.726		.969			.965
.002		002			.966
.276		1.033			.966
					.967
					.958
					.963
					.970
					.965

north M. not steady

Copied Level & marks
thus far July 7th − 1852 −

(165) ; cdl:

Ill East

Aug. 14 Pm

2964 ε Boötis	2964 β' Scorpii	2964 β Draconis	2964 γ Draconis
17.5	39.7	84,4	40.0
33.0	54,2	56.0	62,0
48.5	08,7	18,8	24.0
03.9	23,4	41.5	45.9
19.4	38,0	04.0	08.1
35.0	52.4	26,5	30,3
14,, 39,, 30.5	15,, 58,, 07.0	17,, 28,, 49.0	17,, 54,, 52.6

August 14/15 Am

2964 α Tauri

7,, 19.4

7 33.5

7,, 47.9

8,, 02.1

8,, 16.3

8,, 30.8

4,, 28,, 45.0

195.0

180

7) 15.0

4 28,, 02.14

-2

4, 28,, 00,14

4,, 27,, 23.22

36 92

Ill, East.

Aug. 14/15 Am 5 2 m 40 sid Time

Level Ext. Therm 64°

East	West
+56	61
+56	61
+56	61
56,8	+60
56,7	+60
56,9	+60,2
1,8	32
56,3	60,5
	56.3
	4,2

2.10

+ .140

dev. = + 0.14 s

JC (166) Cart

August 14/15 Am. | 15 Pm

2964 β Tauri	2964 α Orionis	2964 Polaris S.P.	2964 β Ursae Min	2964 α² Librae
45.4	7.. 04.5		45.. 16.0	38.8
01.0	7.. 18.4	F 12.. 45.. 07.0 - 4th	0.. 07.5	53.0
16.5	7.. 32.0	E 57.. 58.5	1 00.0	07.0
32.0	7.. 45.8	D 13 06.. 46.5	1.. 52.0	21.3
47.6	7.. 55.8	C 13 15.. 35.0	2.. 44.5	35.5
03.5	8 13.5	B 13.24.. 21.5	3.. 36.5	49.8
5.. 18.. 19.0	5.. 48.. 27.4		14.. 54.. 29.0	14.44.04.0
	201.3		185.5	49.4
	120		180	
	7)321.3		7)365.5	
	45.90		52.21	
	-2			
	5.. 47.. 43.90			
	5.. 47.. 06.61			
	37.29			

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August 15 Pm.	15/16 Am	Ill East	
2964	2964	2964	2964
α Coronae Borealis	α Aurigae	ε Orionis	α Orionis
8.. 19.5	5.. 28.5	8.. 44.3	7. 11.0
8.. 35.0	5.. 48.0	8.. 57.9	7 24.6
8.. 50.4	6 07.7	9.. 11.5	7 38.5
9.. 05.8	6.. 27.5	9 25.2	7 52.3
9.. 21.3	6.. 47.2	9 39.0	8. 06.3
9.. 36.5	7.. 07.4	9 52.8	8.. 20.0
15.. 29.. 52.0	5.. 07.. 27.0	5.. 30 06.5	5.. 48.. 33.9
220.5	193.3	237.2	186.6
180	00	66	180
7) 40.5	7) 193.3	7) 170.2	7) 366.6
5.78	27.61	25.17	52.37
−2	−2	−2	−2
15.. 29.. 03.78	5.. 06.. 25.61	5.. 29.. 23.17	5.. 47.. 50.37
		5.. 28.. 39.55	
		43.62	

Ill East

Aug. 16 3h 30m Pm see foll. page

1.0378	.264 m
2.3	2.3
3111	792
2074	528
2.3851 s	.6072 m
6072 m	
2.9923 s+m	
1.7779 s−m	
1.4961 $\frac{s+m}{2}$	
.8889 $\frac{s-m}{2}$	

cal = − 1.414 + 1.496 = + .082

αz = − .800 + 0.889 = +0.189

1851phae.proj.

Aug. 16 Pm Ext Therm. 74° $3^h.30$

Ill East

						Level	
B	South	North	Zero	T. South	North	East	West
	0^r965 =1.035	0^r745 .255	0^r.990 = 1^r010	.960 1.040	0^r720 .280	50.3	+53.1
	967 1.033	743 .257	987	013 965 1.035	724 .280	50.1	+53.2
	962 1.038	742 .258	998	002 964 1.016	745 .255	+47.9	54.8
	953 1.047	765 .235	997	003 968 1.032	723 .277	+48.0	53.9
	.963 1.037	.730 .270	989	011 967 1.033	.740 .260	196.3	15.0
	4810	.3725	4961	.034 124	148	49.07	53.75
	.962	.745	~~991~~	.008 965	0.729		49.07
	.008	.008	~~040~~	1.035	.271		4.68
	1.076	0.263		008	008		2.34
	1.000			1.043 J	.237 J		+.152
	1.039			039 B	.256 B	lev. = $+0^s.17$	
	037 m			15	128		
	16			1.037	0.264		
	~~1.038~~			1.053	279		

hastily

unsteady

Reversed the Instrument

Ill West Therm.° 75

16th

North C.T.	South	North	South	Zero B		B	
		0^r223 B	0^r.913 direct				
0.215	0.939	225	.920	+1.005	-.005	1.002	-.002
.238	.930	228	923	− 997	.003	1.000	.000
.200	.930	230	930	− 998	002	.993	.007
.215	.924	0.220	923	+1.015	-.015	1.000	.000
.228	.923	26	109	+1.003	-.003	1.002	-.002
96	4646	0.225	0^r.922	+5.018		4997	
0.219	929	001	1.001	−1.003		.999	
002	002	0.224 B	921 B	2.018			
.220	.930	.218 J	0.928 J	1.003			
.272	1.036	.042	.119				
.054	.108	0.221	0.924				
		2.3	2.3				
		663	2772				
		442	1848				
		.5093 m	2.12529				
			.5093 m				
			2.63459 s+m				
			1.61599 s−m				
			1.31729 $\frac{s+m}{2}$				
			.80799 $\frac{s-m}{2}$				

Zero C.T.

1.002	−.002
1.004	−.004
.998	.002
1.002	−.002
1.003	−.003
5.009	
+1.002	
1.003	
0.995	
3.004	
1.001	

col = −1.384 + 1.317 = −.067

az = −0.700 + .809 = +.109

August 17/18 Am. Ill West

				Aug. 18 Pm.
2964	2964	2964	2964	2964
β Tauri	δ Orionis	ε Orionis	α Orionis clouds	α Serpentis
7„05.6	4 42.3	57.8		7„17.5
7„21.4	4 56.0	5 ~~11.5~~	7 38.5	7„31.5
7„37.0	5 09.8	9 25.3	7 52.5	7„45.3
7„52.5	5 clouds	9 39.0	8 06.4	7„58.9
8„080	5 37.4	9 52.8 clouds	8 20.0	8„13.0
8„23.7	5 51.0		8 34.0	8„26.9
5„18„39.4	5„26„04.6	5„20„20.3	5„48„~~48.0~~	15„38„40.8
187.6	201.1	195.2	131.4	233.9
180	60	60	120	180
7)367.6	6)141.1	5)195.2	5)31.4	7)413.9
52.51	23.51	39.04	06.28	59.13
−2	−2	−2	−2	−2
5„17„50.51	5„25„21.51	5„29„37.04	5„48„04.28	15„37„57.13
5„16„53.19	5„24„24.20	5„28„39.60	5„47„06.70	
57.32	57.31	57.44	57.58	

(Copied)
60 Sheets
delivered

Ill West
Aug. 18 Pm Ext Therm 20°

very steady

North	South		
0r.162	0r.910		
160	915		
160	916		
161	917		
.162	915		
162	912		
0r.161	0r.914	.3726 n	
0.161	.001	2.1045 s	col = − 1.384 + 1.234 = +.150
.001	.915	2.4771 s+n	az = − .700 + 0.866 = +.166
.162	2.3	1.7319 s−n	
2.3	2745	1.2385 $\frac{s+n}{2}$	
486	1830	0.8659 $\frac{s-n}{2}$	
324	2.1045		
.3726			

(170)

August 18/19 Am. Ill West

2964 α Aurigæ	2964 β Tauri	2964 δ Orionis	2964 ε Orionis	2964 α Orionis
5,,49.0	7,,12.6	4,,49.2	9,,04.8	7,,31.3
6,,09.0	7,,28.5	5,,03.0	9,,18.7	7,,45.4
6,,28.7	7,,44.0	5,,17.0	9,,32.3	7,,59.3
6,,48.5	7,,49.6	5,,30.6	9,,46.0	8,,13.3
7 08.4	8,,15.4	5,,44.4	9 59.9	8,,27.0
7 28.0	8 30.9	5,,58.1	0 13.6	8,,41.0
5,,07,,47.6	5,,18,,46.5	5,,26,,11.9	5,,30,,27.2	5,,48,,54.7
219.2	227.5	214.2	202.5	272.0
120	120	000	120	180
7)339.2	7)347.5	7)214.2	7)322.5	7)92.0
48.45	49.64	30.60	46.07	13.14
−2	−2	−2	−2	2
5,,06,,46.45	5,,17,,47.64	5,,25,,28.60	5,,29,,44.07	5,,48,,11.14
5,,05,,42,16	5,,16,,53,22	5,,24,,24,23	5,,28,,39.63	5,,47,,06,73
1,,04,29	1,,04,42	1,,04,37	1,,04.44	1,,04.41

(171) Stiwert

Aug. 19/20 Am.

2964	2964	2964	2964	2964	2964
α Persei	ξ Tauri	η Tauri	Moon's II limb	α Tauri	β Tauri
3,, 53.9	9,, 38.0	9,, 07.0	3,, 13.0	7 53.6	19.6
4,, 15.0	9,, 52.0	9,, 22.5	3,, 28.0	8,, 08.0	35.4
4,, 36.0	0,, 06.0	9,, 37.9	3,, 42.8	8,, 22.0	51.0
4,, 57.0	0,, 19.9	9,, 52.4	3,, 57.4	8,, 36.3	18,, 06.5
5,, 18.0	0,, 33.8	0,, 07.1	4,, 11.9	8,, 50.8	21.9
5,, 39.5	0,, 47.7	0,, 22.0	a 4,, 26.5	9,, 05.0	37.8
3,, 16,, 00.6	3,, 21,, 01.5	3,, 40,, 37.5	4,, 04,, 41.3	4,, 29,, 19.2	5,, 18,, 53.5
220.0	198.9	185.8	220.9	194.9	225.7
180	60	180	180	060	180
7)400.0	7)138.9	7)365.8	7)400.9	7)254.9	7)45.7
57.14	19.84	52.25	57.27	36.41	6.53
−2	−2	−2	−2	−2	2
3,, 16,, 55.14	3,, 20,, 17.84	3,, 39,, 50.25	4,, 03,, 55.27	4,, 28,, 34.41	5,, 18,, 4.53

col
az
lev

lev +.040
coll −.150
az +.166

(172)

Aug. 19/20 Am — Ill west | Aug. 20/21 Am. Ill west

2964 δ Orionis	2964 ε Orionis	2964 α Orionis	2964 Castor	2964 Procyon
56.4	9„17.8	7 38.5	37.8	2„09.9
10.0	9„25.5	7 52.5	54.0	2„23.9
23.9	9„39.4	8 06.4	6 10.0	2„37.4
5„37.5	9„53.2	8„20.3	6 26.0	2„51.4
5 —	0 06.9	8„34.0	6 42.9	3„05.0
6 05.0	0„20.6	8„47.8	6 58.8	3„18.8
5„26„18.8	5„30„34.1	5„49„01.5	7„27„15.0	7„33„32.6
Σ = 151.6	191.5	201.0	243.9	179.0
cor = + 13.76	180	60	60	180
6)165.36	7)371.5	7)141.0	7)183.9	7)359.0
27.56	53.07	20.14	26.27	51.29
10	−2	−2	−2	−2
37.56	5„29„51.07	5„48„18.14	7„26„24.27	7„32„49.29
−2	5„28„39.66	5„47„06.76	7„25„05.13	7„31„29.45
5„25„35.56	1„11.41	1„11.38	1„19.14	1„19.84

M West

Aug. 22/18 Am.	Aug 24/25 Am			
2964	2964	2964	2964	2964
β Orionis	α Aurigæ	β Tauri	δ Orionis	ε Orionis
8,, 16.0	31.0	54	5,, 30.4	9,, 46.0
8,, 30.0	50.5	09.5	5,, 44.9	9,, 59.8
8,, 43.9	10.0	24.9	5 58.0	0,, 13.3
8,, 57.8	29.8	40.8	6 11.8	0,, 27.0
9,, 11.7	49.5	56.5	6 25.5	0,, 41.0
9,, 25.6	09.2	12.0	6 39.1	0 54.6
5,, 09,, 39.5	5,, 08,, 29.9	5,, 19,, 27.5	5,, 26,, 52.9	5,, 31,, 08.3
224.5			262.0	250.0
180			180	60
7)404.5			7) 82.0	7)190
57.78			11.71	27.14
−2			−2	−2
5,, 08,, 55.78			5,, 26,, 09.71	5,, 30,, 25.14
5,, 07,, 23.25			5,, 24,, 24.69	5,, 28,, 39.80
1,, 32,, 53			1,, 45.02	1,, 45.34

Aug 23 Pm
2964
α Lyrae
41.0
58.4
15.8
3,, 32.5
3,, 51.0
18,, 34 08.5
26.0
234.2
600
7)234.2
33.46
−2
18,, 33,, 31.46
18,, 31,, 55.33
1,, 36.13

Aug. 26 Pm.
2964
a Lyrae
3.00.0
3.17.8
3.35.4
3.53.0
4.10.7
4.28.5
18.34.46.0
197.4
180.
7)371.4
53.06
−2
18.33.51.06
18.31.55.28
1.55.78

Mr West
2964
a Cygni
7 24.0
7 43.3
8 02.5
8.22.0
8.41.2
9.01.0
20.39.20.0
154.0
000.
7)1540
22.0
−2
20.38.20.00
20.36.23.69
1.56.37

Aug 26/27 Am.
2964
a Orionis
8.26.9
8.40.7
8.54.5
9.08.4
9.22.2
9.36.0
5.49.49.9
238.6
180
7)58.6
08.37
−2
5.49.06.37
5.47.06.98
1.59.39 fast

Mr West
2964 has been adjusted since a Orionis was observed
β Gemin
52.8
4 08.5
4 24.0
4 39.5
5 55.4
6 11.0
7.36.26.5
217.7
60
7)277.7
39.67
−2
7.35.37.67
7.36.11.59
0.33.92 slow

Ill Wirt (175)

Aug. 27 Pm.			Aug. 27/28 Am	28 Pm.
2964	2964	2964	2964	2964
°ε Bootis	β Librae	α Coronae Borealis	α Ceti	β Librae
7,, 10.4	46.5	04.5	16.5	
7,, 25.8	00.4	7 20.0	3,, 30.5	58.9
7,, 41.2	8,, 14.6	7,, 35.5	3,, 44.4	13.9
7,, 56.6	8,, 28.5	7,, 51.0	3,, 58.3	8 26.7
8,, 12.4	8,, 42.3	8,, 06.5	4,, 12.0	8 40.5
8,, 28.0	8,, 56.0	8 22.0	4,, 25.7	8 54.5
14,, 38,, 43.4	15,, 09,, 10.0	15,, 28,, 37.3	2,, 54,, 39.5	15,, 09,, 08.4
217.8	198.3	176.8	226.9	
180	000	180	180	
7)397.8	7)198.3	7)356.8	7)406.9	
56.83	28.33	50.97	58.13	
−2	−2	−2	−2	
14,, 37,, 54.83	15,, 08,, 26.33	15,, 27,, 48.97	2,, 53,, 56.13	
14,, 38,, 29.09	15,, 09,, 00.45	15,, 28,, 23.32		
,,34.26	34.12	34.35		

Aug. 28 Pm.	Ill West		28/29 Am	Ill West	
2964	2964	2964	2964	2964	2964
α Cor. Borealis	γ Aquilae	α Aquilae	α² Gem	Procyon	β Gem.
		2,,17.0	41.5	0,,13.5	49.5
18.5	8,,10.3	2,,30.8	unsteady 58.0	0,,27.4	unsteady 5,,05.5
34.0	8,,24.5	2,,44.6	4 14.0	0,,41.3	5 21.0
49.5	8,,38.4	2,,58.5	4,,30.3	0,,55.1	5 36.7
05.0	8,,52.2	3,,12.4	4,,46.5	1,,09.0	5 52.3
20.4	9,,06.0	3,,26.3	5,,02.5	1,,22.6	6 07.9
15,,28,,35.7	19,,39,,20.0	19,,43 40.0	7,,25,,19.0	7,,31,,36.5	7,,36,,23.5
	131.4	229.6	211.8	205.4	196.4
	60	180	000	180	60
	5)191.4	7)409.6	7)211.8	7)385.4	7)256.4
	38.28	58.51	30.26	55.06	36.63
	−2	−2	−2	−2	−2
	19,,38 36.28	19,,42,,56.51	7,,24,,28.26	7,,30,,53.06	7,,35,,34.63
	19,,39,,12.54	19,,43,,32.81	7,,25,,05.34	7,,31,,30.02	7,,36,,11.63
	36.26	36.30	37.08	36.96	37.00

	Ill West			Ill West
Aug. 29 Pm.			Aug. 29/30 Am	
2964	2964	2964	2964	2964
α Lyrae	γ Aquila	α Aquila	α Orionis	Procyon
26.6	54.3	2,, 15.0	48.5	11.8
44.0	8 08.3	2,, 28.9	02.3	0 25.5
01.2	8 22.4	2,, 42.6	16.0	0 39.4
19.0	8 36.1	2,, 56.5	29.5	0 53.1
36.5	8 50.2	3,, 10.4	43.7	1 06.8
54.0	9 04.2	3,, 24.5	57.6	1 20.5
18 32,, 11.7	19,, 39,, 18.1	19,, 43,, 38.5	5,, 47,, 11.5	7,, 31,, 34.4
	19 3.6	216.2		191 5
	60	180		180
	7) 253.6	7) 396.2		7) 371.5
	36.23	56.60		53.07
	− 2	− 2		− 2
	19,, 38,, 34.23	18,, 42,, 54.60		7,, 30,, 51.07
	19,, 39,, 12.53	19,, 43,, 32.80		7,, 31,, 30.04
	38.30	38.80		38.97

Small dome for 5th Equatorial ft
west of center of large dome — 66.5

(178)

Aug 29/30 Am.
2964
β Geminorum
4 47.4
5 03.3
5,, 18.9
5,, 34.5
5,, 50.0
6 05.8
7.. 36,, 21.4
181.3
60
7)241.3
34.47
−2
7,, 35,32.47
7,, 36,, 11.65
39.18

		2964 s	Rate
Aug 6/7	5h 30m	−12.4	
			+5.4
7/8	"	7.0	
			5.0
8	19h	−4.2	
			+6.4
9	19	+2.2	+6.1
11/12	5-20	+17.0	+6.8
14/15	5..50	37.3	
			+6.1
15/16	5..30	43.3	
			+6.9
17/18	5..30	57.1	
			+7.1
18/19	5..30	64.2	
			6.9
19/20	5..30	71.1	
			6.8
24/25	5..30	+1..44.9	
			6.5 α Lyræ
26/27	5..50	1..59.1	+7.0

α Lyræ
23rd 1..36.13
26 1..55.78
3)1965
654

2964 was now adjusted in Rate & error —

51.5
20.0
7
78.5

August 30th measures taken at the Observatory.

	ft
From Tr. Circle to the East side of the main pier	20.0
Circumference of main pier at 5 feet height.	44.8
From west side of Pier to small Transit	37.3
" North side of Pier to P.V. Transit	17.8
" Small 4ft Transit to the E side of wooden pier N.W.	19.0
Diameter of wooden Pier N.W.	6.0

Length of the Observatory East and west.

	ft
Eastern Porch	6..0
Inside of Eastern wall to ~~Transit~~ Circle	51.5
Transit Circle to E side of main pier	20.0
Diameter of central pier	14.0
West side of central Pier to west wall	72.0
Western Porch	6.0
Entire length of Obsy.	169.5 East & west.

	ft
Transit circle ~~to~~ East of center of main pier	27.1
Prime vertical Transit North of center of main pier	25.0
west Transit west of central pier	44.4

(179)

Aug & $\frac{30}{31}$ Am Ile west.

2964

α orionis

5 .. 46.0 – 2

6 .. 0.1

β 6 .. 14.3

6 .. 27.8

6 .. 42

6 .. 55.5

5 .. 47 .. 9.3

7)195.0

.. 27.86

– 2

5 .. 46 .. 25.86

5 .. 47 .. 67.07

41.21

M.T.C 19 .. 20 .. 30

2964 – 5 .. 55 .. 52.5

M.T.C = 19 .. 23 .. 10

2964 – 5 .. 58 .. 33

South mark	North
.935	.213
.920	.238
.912	.240
.920	.242
.912	.240

(180) Ill West

August 31/32 Am

Capella

22.2
41.3
1.0
20.8
5 .5 ..20.4

Bonn

28.1
42.0
56.0
9.8
5..07..23.7

B Tauri

5,,24.7
5,,40.5
5,,56.1
6,,12.0
6,,27.8
6,,43.1
5..16..58.9

263.1
180
7) 83.1
11.87
-2
5,16,,09.87
5.16,,53.64
43.77

2964
ε Orionis

7 17.1
7 31.0
7,,44.7
7..56.5
8,,12.1
8,,26.0
5,,28,,39.7
229.1
180
7) 409.1
58.44
-2
5,,27,,56.44
5..28,,40.00
43.56

Aug 31/32 Am
2964
α Orionis

58.0
11.7
25.5
49.4
53.2
5,,47,,06.9

2964
B Gem.

4,,43.2
4,,58.9
5,,14.5
5,,30.0
5,,45.8
6 01.4
7..36,,17.1
210.9
000
7) 210.9
30.13
-2
7,,35,,28.13
7..36,,11.71
43.5~~8~~7

(181) Chron. Exp begin here

col −.190
az +.103
lev +.096

September 1st P.m. Ill West

2964	2964	2964	2964	2964
δ Ophiuchi	α Ophiuchi	δ Aquila	γ Aquilae	α Aquila
−3° 5,,09.9	+13° 37.5	+8° —	+10° —	+8° 2,,08.5
5,,23.6	51.9	51.0	—	2,,22.4
5,,37.4	7 06.0	7,,04.8	16.0	2,,36.5
5,,51.1	7 20.1 –	7 18.5	8,,30.0 –	2 50.4
6,,04.9	7 34.2	7 32.3	8 44.0	3,,04.0
6,,18.5	7 48.1	7 46.0	8 ~~58.0~~	3,,18.0
16,,06,,32.3	17,,28,,02.2	19,,17,,59.8	19,,39,,~~01.9~~	19,,43,,31.7
177.7	200.0	152.6	90.0	171.5
180	60	60	00	180
7)357.7	7)14.00	5)92.6	3)90	7)351.5
51.1	20.00	18.52	30.0	50.21
−2	−2	−2	2	−2
16,,05,,49.10	17,,27,,18.00	19,,17,,16.52	19,,38,,28.00	19,,42,,48.21
cal −.14	cal +.14	19,,18,,00.98	cal +.14	19,,43,,32.77
az +.07	az +.05	44.46	az +.05	44.56
lev +.07	lev +.09	cal +.14	lev +.09	cal +.14
16,,05,,49.10	17,,27,,18.00	az +.06	19,,38,,28.00	az +.06
16,,06,,33.45	17,,28,,02.44	lev +.08	19,,39,,12.50	lev +.08
44.35	44.44	44.46	44.50	44.56

daily rate of 2964 = $\underset{s}{-}\overset{s}{2}.15$
2964 Slow at 12 M. Sept 3d 48.03

(182)

Sept. 1st P.m.

September 3d P.m

Ill Work

col − 0.144
az + 0.070
lev + 0.116

2964	2964	2964	2964	2964
β Aquilae	ζ Aquilae	δ Aquilae	γ Aquilae	α Aquilae
+6° 6,, 37.6	+14 08.9	+3° 35.4	+10° 7,, 46.4	+8° 2,, 06.9
6,, 51.5	23.0	49.4	8,, 00.3	2,, 20.9
7,, 05.4	7 37.1	03.2	8,, 14.2	2,, 34.6
7,, 19.0	7 51.2	7 16.7	8,, 28.0	2,, 48.5
7,, 33.2	8 05.1	7 30.5	8 41.9	3,, 02.4
7,, 46.8	8 clouds	7,, 44.4	8 56.0	3,, 16.3
19,, 48,, 00.5	18,, 58,, 33.9	19,, 17,, 58.1	19,, 39,, 10.0	19,, 43,, 30.1
194.0	136.2	237.7	196.8	159.7
60	120	120	00	180
7)134.0	5)256.2	7)117.7	7)196.8	7)339.7
19.14	51.24	16.81	28.11	48.53
−2	−2	−2	2	−2
19,, 47,, 17.14	18,, 57,, 49.24	19,, 17,, 14.81	19,, 38,, 26.11	19,, 42,, 46.53
19,, 48,, 01.63	col. +.14	col. +.14	col +.14	col +.14
44.49	az. +.05	az. +.06	az. +.05	az. +.05
col. +.14	lev. +.10	lev. +.08	lev +.09	lev +.11
az. +.06	18,, 57,, 49.25	19,, 17,, 14.81	19,, 38,, 26.11	19,, 42,, 46.55
lev. +.08	18,, 58,, 35.41	19,, 18,, 00.97	19,, 39,, 12.47	19,, 43,, 32.75
44.49	46.16	46 16	46.36	46.20

just visible through clouds

faint

Copied thus far, July 6th.

(183) Cl West

September 3d P.m. | 3/4 Am

2964	2964	2964	2964	2964
β Aquilae	+16° α Tauri	β Orionis	β Tauri	δ Orionis
+6 36.0	5,, 56.5	−8° 57.4	+28° —	−00° —
49.9	6,, 11.0	11.5	—	9 12.8
7,, 09.8	6 25.2	25.3	—	9 36.5
7 17.5 –	6 39.5	6 39.2 –	09.5	9 40.4 –
7 31.4	6 53.8	6 53.0	25.0	9 53.8
7 45.3	7 08.0	7 06.9	40.5	4 07.6
19,, 47,, 59.0	4,, 27,, 21.8	5,, 07,, 20.7	5,, 16,, 56.0	5,, 24,, 21.2
242.9	215.3	204.0		140.1
120	60	160		60
7)122.9	7)275.3	7)274.0		5)200.1
17.56	39.33	39.14		40.02
−2	−2	−2		−2
19,, 47,, 15.56	4,, 26,, 37.33	5,, 06,, 37.14		5,, 23,, 38.02
col −.14	4,, 27,, 23.84	col. −.14		col. −.14
az +.04	46.51	az. +.05		az. +.05
lev. +.09	col. −.14	lev. +.06		lev. +.07
19,, 47,, 15.55	az. +.04	5,, 06,, 37.11		5,, 23,, 38.00
19,, 48,, 01.60	lev. +.12	5,, 07,, 23.60		5,, 24,, 24.70
46.05	46.49	46.49		46.70

September 3/4 Am (1849): 9ll West—

col −0.144
az + 0.070
lev + 0.116

2964	2964	2964	2964	2964
ε Orionis	α Orionis	α² Gem.	Procyon	β Gem.
−1° 14.3	+7° 41.0	+32° 32.1	+6° 04.4	+28° 40.3
28.0	55.0	48.5	0 18.3	56.2
41.8	6.. 08.7	04.8	0 32.1	5.. 11.8
7.. 55.7	6.. 22.7	4.. 21.2	0 46.0	5.. 27.5
8.. 09.5	6 36.5	4.. 37.4	0 59.7	5.. 42.9
9 23.0	6 50.5	4.. 53.6	1 13.5	5.. 58.5
5.. 28.. 36.8	5.. 47.. 04.2	7.. 25.. 09.5	7.. 31.. 27.1	7.. 36.. 14.0
209.1	218.6	207.1	201.1	251.2
180	60	60	120	60
7) 389.1	7) 158.6	7) 147.1	7) 321.1	7) 191.2
55.57	22.66	21.01	45.87	27.31
−2	−2	−2	−2	−2
5.. 27.. 53.57	5.. 46.. 20.66	7.. 24.. 19.01	7.. 30.. 43.87	7.. 35.. 25.31
5.. 28.. 40.80	col −.14	col −.16	col −.15	7.. 36.. 11.80
46.53	az +.03	az +.01	az +.04	46.49
col −.14	lev +.09	lev +.14	lev +.09	col −.15
az +.05	5.. 46.. 20.64	7.. 24.. 19.00	7.. 30.. 43.85	az +.02
lev +.07	5.. 47.. 07.19	7.. 25.. 05.51	7.. 31.. 30.14	lev +.14
46.35	46.55	46.51	46.29	46.48

September 3/4 Am.	3/4 Am	Ill. East Am		
2964 Ill West	Ill. East	2964	2964	2964
ι Ursae Majoris	α Leonis	Polaris	η Ursae Maj	η Bootis
+49° 12.0	+13° 8,, 57.5	12,,39,,58.0 −4 hb	+50° 49.8	+19 6,, 07.0
33.0	9,, 12.7	last 12,, 56,,40.0	10.4	6,, 21.4
53.5	9,, 26.8	13,, 05 38.5	0 32.5	6,, 36.0
8 14.0	9,,41.0		0 54.0	6,, 50.2
8 34.9	59,, 55.0	13,, 23,, 14,0	1 15.5	7,, 05.0
8 55.5	0 09.0	13,, 32,, 04.5	1 36.7	7 19.5
8,, 49,, 16.4	10,,00,, 23.2		13,,41,, 58.0	13,,47,, 34.0
229.3	226.2		256.9	173.1
120	60		120	180
7)099.3	7)286.2		7)376.9	7)353.1
14.18	40.88		53.84	50.44
−2	−2		−2	−2
8,, 48,, 12.18	9,, 59,, 38.88		13,,40,,51.84	13,,46,,48.44
8,, 48,, 58.50	10,, 00,, 25,, 80		col +.11	col +.08
4632	46.92		arc +.02	arc +.04
col +.20	col +.08		lev +.20	lev +.12
arc +.00	arc +.05		13,,40,,52.15	13,,46,,48.68
lev +.18	lev +.12		13,,41,,39.08	13,,47,,35.46
46.30	46.67		46.93	46.78

col + 0.080
az + .100
lev + 0.130

4th Pm Ill. East

2964	2964	2964	2964	2964
α Bootis	ε Bootis	α² Librae	β Ursae Min	α Serpentis
+20° 23.3	+28° 57.5	−15° 10.4	+75° 47.0	+7° 30.0
37.7	12.8	1 25.7	39.0	5 43.8
52.5	7 28.3	1 40.0	31.0	5,, 57.5
8,,07.0	7 44.0	1 54.1	0 23.1	6 11.4
8,,21.5	8 59.2	2 08.4	1 15.3	6,,25.3
8 36.4	8 14.9	2 22.6	2 07.5	6,,39.0
14,,08,,51.0	14,,38,,30.5	14,,42,,37.0	14,,53,,00.3	15,,36,,53.0
229.4	247.2	198.2	183.2	260.0
180	60	180	20	180
7)49.4	7)307.2	7)378.2	7)163.2	7)80.0
14,,08,,07,06	43.88	54.0	23.31	11.43
2	−2	−2	−2	−2
14,,08,,05,06	14,,37,,41.88	14,,41,,52.00	14,,50,,21.31	15,,36,,09.43
col +.08	col +.08	col +.08	col	col +.08
az +.04	az +.03	az +.09	az	az +.06
lev +.13	lev +.16	lev +.08	lev	lev +.10
14,,08,,05.31	14,,37,,42.15	14,,41,,52.25		15,,36,,09.67
14,,08,,52.04	14,,38,,28.90	14,,42,,39.21		15,,36,,56.57
46.73	46.75	46.96		46.90

Transit Circle reversed to Ill. East, and no measures of the marks were taken while it remained in that position.

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September 4th Pm. Ill East

2964	2964	2964	2964	2964
α Herculis	β Draconis	γ Draconis	ζ Aquilae	δ Aquilae
+15° 6,,24.9	+52° 5,,10.3	+51° —	+14 7,,08.0	+3° 39.5
6,,39.0	5,,34.5	—	7,,22.0	48.4
6,,53.0	5,,57.0	2 02.5	7,,36.4	7 02.0
7,,07.1	6,,19.5	2 24.9	7,,50.2	16.0
7,,21.5	6,,42.0	2 46.5	8,,04.5	7 29.5
7,,33.5	7 04.5	3 ~~08.5~~	8,,18.5	7 43.0
17,,07,,49.8	17,,27,,27.3	17,,53,,~~31.0~~	18,,58,,33.0	19,,17,,57.0
230.8	195.1	73.9	172.6	230.4
180	60	60	180	120
7)508	7)135.1	3)73.9	7)352.6	7)110.4
07.26	19.30	24.63	50.37	15.77
−2	−2	−2	−2	−2
17,,07,,05.26	17,,26,,17.30	17,,52,,22.63	18,,57,,48.37	19,,17,,13.77
col +.08	col +.12	col +.12	col +.08	19,,18,,00.96
az +.05	az −.02	az +.02	az +.05	47.19
lev +.12	lev +.21	lev +.21	lev +.12	col +.08
17,,07,,05.51	17,,26,,17.65	17,,52,,22.98	18,,57,,48.62	az +.06
17,,07,,52.37	17,,27,,04.90	17,,53,,09.96	18,,58,,35.40	lev +.10
46.86	47.25	46.98	46.78	46.95

Sept. 4 Pm

M.T.C. 8,,27,,24

2964 19,,20,,36.0

47.19

19,,21,,23.19 10,,52,,02.33

10,,52,,49.07 46.74

8,,28,,34.12 10 52 49.07

1,,23.32

8,,27,,10.80

8,,27,,24

13.20

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September 4th Pm. Ill East

2964
γ Aquilae
+10°
7,, 45.4
7,, 59.4
8,, 13.4
8,, 27.3
8,, 41.2
8,, 55.0
19,, 39 09.0
250.7
60
7)190.7
27.24
−2
19,, 38,, 25.24
col +.08
az +.05
lev +.11
19,, 38,, 25.48
19,, 39,, 12.46
46.98

β

30.8
48.1
5.7
21 00 23.2

α Aquilae
+8°
2 06.0
2 19.7
2 33.5
2 47.5
3,, 01.4
3. 15.4
19,, 43,, 29.3
152.8
180
7)332.8
47.54
−2
19,, 42,, 45.54
col +.08
az +.06
lev +.11
19,, 42 45.79
19,, 43 32.74
46.95

β

52.5
8.5
24.4
21 6 40.2

2964
β Aquilae
+6°
6,, 34.9
6,, 48.6
7,, 02.8
7,, 16.5
7,, 30.4
7,, 44.2
19,, 47,, 58.0
235.4
120
7)115.4
16.48
−2
19,, 47,, 14.48
col +.08
az +.06
lev. +.10
19,, 47,, 14.72
19,, 48 01.60
46.88

col +0.080
az + .100
lev +0.130
Ill. East
2964
α² Capricorni
−13°
8,, 22.0
8,, 36.0
8,, 50.0
9,, 03.9
9,, 18.0
9,, 32.0
20,, 09,, 46.8
208.2
180
7) 28.2
20,, 09,, 04.03
−2
20,, 09,, 02.03
col +.08
az +.08
lev +.07
20,, 09,, 02.26
20,, 09,, 49.17
46.91

4th Pm.
Ill West
2964
α Cygni
+45
4 45
5 00.0
5 19.0
—
5 58.0
6 17.5
20,, 36,, 36.5
171.5
60
6)231.5
38.58
−2
20,, 35,, 36.58
col +.11
az +.01
lev +.14
20.35.36.82
20,, 36,, 23.52
46.70

61¹ Cygni
+38
38.2
53.7
13.2
9 30.8
9 48.1
0 5.7
21,, 00,, 23.2
214.9
60
7)214.9
30.70
2
20,, 59,, 28.70
col +.09
az +.02
lev +.16
20,, 59,, 28.97
46.93
47.27

2964
I Cygni
+30
05.0
β
21.9
37.2
5 52.5
6 08.5
6 24.4
21,, 06,, 40.2
189.1
180
7)369.1
52.73
−2
21,, 05,, 50.73
col +.10
az +.01
lev +.15
21,, 05,, 50.99
21,, 06,, 38.11

col + .058
az + .135
lev + 100

Sept: 4/5th Am Illumination West.

M. TC. 18,, 38 ,,0 — 18,, 41 ,,20
2964 — 5,, 32 ,,53 — 5,, 36 ,, 13.5

	2964. β Tauri		ε Orionis
	21.1		7,, 13.2
+28°	36.8	−1°	7,, 26.9
	5,, 52.4		7,, 40.9
	6 08.0		7,, 54.4
	6 23.8		8,, 8.2
	6 39.2		8,, 22.0
	5 ..16 .. 54.8		5 ..28 .. 35.7
	236.1		201.3
	180		180
	7)56.1		7)381.3
	8.01		54.47
	−2		−2
	5,,16,,06.01		5,,27,,52.47
	col + .06		col + .06
	az + .03		az + .08
	lev + .12		lev + .07
	5,,16,,06.22		5,,27,,52.68
	5,,16,,53.77		5,,28,,40.10
	47.55		47.42

4/5 Am. Ill. West

2964 Sirius	2964 α² Gem,	2964 α Canis Min	β Gem.	ι Ursae Maj.
−16°	+32°	+6	+28	+49
7,, 06.9	31.2	03.4	4,, 39.2	7,, 11.0
7,, 21.0	47.5	17.2	4,, 55.0	7 31.5
7,, 35.4	03.6	30.9	5,, 10.5	faint. 7 52.1
7,, 49.8	4,, 20.0	0,, 44.8	5,, 26.1	8 13.0
8,, 04.0	4,, 36.0	0,, 58.5	5,, 41.7	8 34.0
8,, 18.3	4 52.4	1 12.3	5,, 57.3	8 54.5
6,, 38,, 32.4	7,, 25,, 08.4	7,, 31,, 26.1	7,, 36,, 13.0	8,, 49 15.5
167.8	199.1	193.2	242.8	211.6
180	6	120	60	120
7)347.8	7)139.1	7)313.2	7)182.8	7)91.6
49.68	19.87	44.74	26.11	13.09
−2	−2	−2	−2	−2
6,, 37,, 47.68	7,, 24,, 17.87	7,, 30,, 42.74	7,, 35,, 24.11	8,, 48,, 11.09
col + .06	col + .07	col + .06	col + .07	col + .09
az + .11	az + .03	az + .08	az + .03	az − .02
lev + .05	lev + .12	lev + .08	lev + .12	lev + .15
6,, 37,, 47.90	7,, 24,, 18.09	7,, 30,, 42.96	7,, 35,, 24.33	8,, 48,, 11.31
6,, 38,, 34.32	7,, 25,, 05.53	7,, 31,, 30.18	7,, 36,, 11.80	8,, 48 58.50
	47.44	47 22	47.47	47.19

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Left 4/5 Am Ill. West 5th Am Ill West

2964
α Leonis
+13° 57.5
9 12.0
9 26.0
9 40.0
9 54.0
0 08.3
10„ 00„ 22.1
219.9
60
7)279.9
39.99
-2
9„ 59„ 37.99
10„ 00„ 25.80
47.81
col + .06
az + .06
lev + .09
47.60

2964
Polaris S.P.
A 12„ 38„ 54.0 - 4 Wts
12„ 47„ 44.5
12„ 56„ 37.0
13„ 05„ 19.5
13„ 14„ 10.5
13„ 23„ 01.5
13„ 32 02.0 ?

2964
Spica
-10° 53.4
07.5
6„ 21.3
6 35.2
6 49.0
7 02.9
13„ 17„ 17.0
186.3
60
7)246.3
35.19
-2
13„ 16„ 33.19
col + .06
az + .10
lev + .06
13„ 16„ 33.31
13„ 17„ 21.11
-47.80

η Virg mag
2964
49.0
10.5
0„ 32.0
+5.0° 0„ 53.1
1„ 14.4
1„ 36.0
13„ 41„ 57.4
252.4
120
7)372.4
53.20
-2
13„ 40„ 51.20
col + .09
az - .02
lev + .15
13„ 40„ 51.42
13„ 41„ 39.09
47.67

2964
η Bootis
+19° 5„ 06.0
6„ 20.4
6„ 35.0
6„ 49.0
7„ 04.0
7„ 19.5
13„ 47„ 33.1
167.0
180
7)347.0
49.57
-2
13„ 46„ 47.57
col + .06
az + .05
lev + .10
13„ 46„ 47.78
13„ 47„ 35.46
47.68

5th Br. Ill West

2964
β Librae
-9° 32.5
46.5
8 00.4
8 14.5
8 28.2
8 42.0
15„ 08„ 56.0
220.1
120
7)100.1
14.3
-2
15„ 08„ 12.30
col + .06
az + .09
lev + .06
15„ 08„ 12.51
15„ 09„ 00.33 47.89

2964
α Serpentis
+6 28.9
43.0
5 56.9
6 10.5
6 24.3
6 38.1
15„ 36„ 52.0
253.7
180
7)73.7
10.53
-2
15„ 36„ 08.53
col + .06
az + .08
lev + .08
15„ 36„ 08.75
15„ 36„ 56.56

2964
β Draconis
+52 5„ 11.0 22.5
5„ 33.5 22.5
5„ 56.0 22.4
6„ 18.4 22.7
6„ 41.1 22.4
7„ 03.5 22.5
17„ 27„ 26.0
189.5
60
7)129.5
18.5
-2
17„ 26„ 16.50
col + .09
az - .03
lev + .16
17„ 26„ 16.72
17„ 27„ 04.67

2964
γ Draconis
+51 17.0 22.4
39.4 22.1
2„ 01.5 21.9
2„ 23.4 22.1
2„ 45.5 21.9
3„ 07.4 22.1
17„ 53„ 29.5
163.7
60
7)163.7
23.39
-2
17„ 52„ 21.39
col + .09
az - .03
lev + .16
17„ 52 21.61
17„ 53„ 9.93
48.32

Copied.

Ill. East

$col. = -1.414 + \frac{s+n}{2}$

$az = -0.700 + \frac{s-n}{2}$

Ill West

$col. = -1.384 + \frac{n+s}{2}$

$az. = -0.700 + \frac{s-n}{2}$

Sept.r 5/6th
α Tauri

+1.6° 54.0
08.4
22.8
6 37.0
6 51.5
7 05.5
4.. 27.. 20.0
179.1
60
7)259.1
37.01
— 2
4.. 26.. 35.01
4.. 27.. 23.90
48.89
col. + .06
az. + 06
lev. + .09
48.68

1851phae.proj...

1851phae.proj...