

KG
11365
122

E. 1

Meridian Circle.

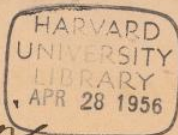
1859 Nov. 7th

to

1860 May 25th

Sold by T. Groom & Co., Stationers, India Building, 82 State St., Boston.

KG 11365.122



Method of Observing

I. The observer sets the circle at an even 5' by the pointer.

As the star approaches the wire, ~~it~~ is bisected by the horizontal (declination-) micrometer.

The transits over the vertical wire are observed (by the Electric method).

The micrometer reading is obtained, and the star again bisected.

Both bisections (before culmination and after) are indicated by the ending of the breaks, which serve also as signals.

The four microscopes attached to circle *A* are then read off, and the ^{only} seconds from the micrometer heads put down.

When the Illumination is West

1859phae.proj.:122W

the microscopes read off are in their order,
A. B. C. D. ; if the Illumination is East
H. G. F. E. are used, in that order.

II. The Galvanic Record.

No signal, except the breaks for the microscopes
bisection is made.

III. The Record in the Book.

Every star occupies one column.

The seconds from the sheet come first, in
their usual place; then the mean; then
the Pointer-reading; next the micrometer
readings, thus $4 \begin{smallmatrix} 25 \\ 34.5 \end{smallmatrix}$ by which is meant that
the telescope = micrometer read 4,25 at the
first bisection, and 4,345 at the second.

Note below; that the telescope = micrometer
reading is composed of two parts; a whole

number ^{of revolutions} and a decimal fraction.

~~The~~

The sign of the whole number is positive or negative, and is indicated in each observation; the decimal fraction is + when the Illumination is West, and - when East.

The last item is the times of bisection by the horizontal micrometer-wire. An example will be found on the next

page.

The horizontal wire of the telescope micrometer will be found inclined about ^{10'} ~~50'~~ to the horizon; so that a star on the equator will change its position by about $0^{\text{rev}}.07 = 2''.4$ in 1^{m} , with reference to the wire; going apparently northward.

The method

Example - See next page

Star's name η Aquarii

Transit }
Mean of Wires

22 28 26.92

See previous pages for explanation. μ inter = Reading
Telescope Micrometer

3.3 5
+ 1 56.4
50.5

Microscope A
B
C
D

50.3
51.5
10.9
10.6

Telescope Micrometer = Read. Corresponding Time

+1^{rev}, 56.4 22 27 56.7
1, 50.5 28 47.2

As Illumination is West,
+1^{rev}, 56.4 signifies +1, 56.4
and not +1^{rev} - 0.564 as it
would if the Ill. were East.

El. 22520 540

1859 Nov. 7. E. 22140 Rn. 30.637 Alt. 64.3 E.H. Inc.

Agg. 1068 H. lat	1077 H. lat	1086	1090
200	59.1	53.5	18.1
236	2.8	57.1	(21.8)
269	6.1	0.5	25.2
301	9.7	3.9	28.6
340	13.4	7.5	32.2
22 28 26.92	22 36 6.22	22 47 0.50	22 58 25.14
23 6 36.22			

$$\begin{array}{r} 373.05 \\ + 1.56.4 \\ \hline 50.5 \end{array}$$

$$\begin{array}{r} 311.45 \\ + 0.68.8 \\ \hline 69.5 \\ 64.6 \end{array}$$

$$\begin{array}{r} 311.10 \\ + 3.89.7 \\ \hline 84.56 \end{array}$$

$$\begin{array}{r} 311.40 \\ + 1.00 \\ \hline - 2.92.6 \end{array}$$

$$\begin{array}{r} 312.5 \\ + 2.47.3 \\ \hline \end{array}$$

A	50.3	45.6	45.5	46.8	49.5
B	51.5	46.4	46.8	47.0	49.7
C	10.9	2.3	4.4	6.7	7.5
D	10.6	3.3	4.3	7.1	7.8

22 27 56.7	22 35 43.4	22 46 40.1	22 57 55.8
28 47.2	36 34.0	47 24.8	59 11.4
	37 21.3		23 7 19.3

1859phae.proj.: 122W

Ext In 256 El 23380

Doubtful Cloud El. 0-4m

8 Picinn

12 Picinn

19 Picinn

20 Picinn

No R.

No R.

55.9
59.5
2.9
6.3
10.1

17.9
(20.4)
25.0
28.3
31.9

28 20 2.94

307 40
+5 85

311 45
26.4
+1 21.3

309 25
+6 80

306 10
+2 84.8

40.5
39.8
52.2
53.9

42.0
43.6
0.3
59.3

44.1
43.6
1.3
1.3

34.2
35.2
49.5
51.2

23 13 56.3 23 19 53.8 20 25.8 23 40 9.2 23 53 16.4

1859 Nov 8th Bar. 30.871 Alt. 63.4 E. 47.1

2875 Br.

1051

1055.

1060*

η Aquarii

4.2

31.1

50.2

19.0

7.9

34.2

53.9

22.2

11.3

38.0

57.2

26.1

14.9

41.8

0.9

29.5

(Chrom. /
Applied (18.4)

45.0

4.2

33.2

21 54 11.34

22 11 38.12 22 10 57.28 22 28 26.10

312 20

311 65

312 5

314 20

313 5

$$\begin{array}{r} 1^{\text{st}} \text{ in.} \\ \text{Last br.} \end{array} \begin{array}{r} - \\ +3 \end{array} \begin{array}{r} 98.2 \\ 91.0 \end{array}$$

+1 77.6

+2 68.7 faint

+5 13.2
9.4+1 52.3
47.6

✓
B
C
D

44.0

41.4

44.8

43.0

48.8

45.0

43.3

46.2

43.6

50.5

4.2

1.5

5.0

2.5

44.7

1.6

58.6

2.5

0.6

9.3

21 54 2.5

22 20 31.0 22 28 2.7

55 2.7 22 6 18.1

22 12 38.2

21 15.8

28 46.5

Faint - 9th up

22 50 45.6

1071	1079	1086	1090	1096
24.3	52.0	17.4	Reg. 1 st w. (28.3)	42.7
28.2	55.6	21.0	32.0	46.5
31.4	59.1	24.3	35.3	50.0
34.9	2.3	27.8	38.8	53.4
38.3	6.0	31.2	42.4	56.8
22 38 31.62	22 48 59.00	22 58	23 6 35.36	23 20 49.88

311 10
-6 47.7
40.3311 40
+4 14.6311 40
-1 01.0312 5
+2 59.5
58.0311 5
-3 07.6
01.643.5
45.0
4.3
2.641.5
43.1
5.4/23
1.142.4
44.1
4.7
2.443.4
44.0
6.0
1.039.5
39.5
59.7
55.3

22 38 10.2

37 2.0

22 50 2.0

22 58 46.6

23 6 20.0

6 52.6

23 20 30.1

21 15.8

Faint M.

1103

19 P. 11.00

1118

1122

3

32.6

24.1

31.9

46.0

35.9

27.7

35.6

49.7

39.5

31.1

39.4

53.0

42.8

34.4

42.3

56.4

46.4

37.9

46.1

0.1

23 27 39.40

23 39 31.06

23 49 39.06

23 57 53.04

$$\begin{array}{r} 311.45 \\ - 4.45.8 \\ \hline 40.0 \end{array}$$

$$\begin{array}{r} 309.30 \\ - 2.20.3 \\ \hline 13.2 \end{array}$$

$$\begin{array}{r} 311.45 \\ - 1.08.9 \\ \hline \end{array}$$

$$\begin{array}{r} 311.30 \\ + 3.15.3 \\ \hline 12.6 \end{array}$$

$$\begin{array}{r} 311.40 \\ + 4.57.4 \\ \hline 51.2 \end{array}$$

$$\begin{array}{r} 49.7 \\ 51.7 \\ 11.4 \\ 8.3 \end{array}$$

$$\begin{array}{r} 37.4 \\ 37.0 \\ 56.0 \\ 54.1 \end{array}$$

$$\begin{array}{r} 44.6 \\ 45.3 \\ 6.8 \\ 2.3 \end{array}$$

$$\begin{array}{r} 42.3 \\ 43.3 \\ 3.8 \\ 0.3 \end{array}$$

$$\begin{array}{r} 42.5 \\ 42.8 \\ 6.6 \\ 1.6 \end{array}$$

$$\begin{array}{r} 23 27 17.6 \\ 28 24.5 \end{array}$$

$$\begin{array}{r} 23 39 23.1 \\ 40 1.8 \end{array}$$

$$\begin{array}{r} 23 50 16.1 \end{array}$$

$$\begin{array}{r} 23 57 32.4 \\ 58 11.3 \end{array}$$

66 0 15 0

faint for 2.9)

For Remy 0 41.0
Ext for 43.5

Per 25

11.

13

23.4

55.4

24.6

27.2

59.2

28.0

Supplied. (30.4)

2.4

31.7

33.8

5.9

34.9

37.3

9.5

38.4

0 ~~27~~ 14 30.42 0 ~~27~~ 25 2.48 0 ~~27~~ 30 31.52

311 5

+ 2 9.5
1.9

311 30

+ 0 83.6
80.9

311 45

+ 3 24.6

To following division
on line
Mid. R

42.1

43.6

37.2

301.4

41.7

43.9

37.3

303.0

0.2

5.2

57.0

311.5

59.1

2.1

54.1

303.8

23 17 18.4

23 21 36.7

18 56.6

25 22.6

23 32 7.0

1859 Nov 9. Run 30.00 17 61.6 End Jan 01.7. 22^h 45^m 0^s 22 23 50
 22 23 50
 22 23 50

1 Picman

1086

1091

1095

58.1

37.2

37.2

13.2

1.6

40.8

40.8

16.6

5.1

44.2

44.2

19.9

8.6

47.7

47.7

23.5

12.0

51.3

51.3

26.9

22 18 5.08

44.24

23

8

44.24

23

20

20.02

$$\begin{array}{r} 311.55 \\ + 0.78 \\ \hline 312.33 \end{array}$$

$$\begin{array}{r} 311.40 \\ - 2.96.8 \\ \hline 308.43 \end{array}$$

$$\begin{array}{r} 311.40 \\ - 2.33.0 \\ \hline 309.07 \end{array}$$

$$\begin{array}{r} 311.55 \\ + 4.36 \\ \hline 315.91 \end{array}$$

42.4

45.4

44.6

43.6

42.2

44.0

43.4

43.6

5.9

10.3

11.0

8.6

57.0

0.4

0.4

59.1

22 47 41.8

48 24.6

23

9

4.1

23

20

42.3

Bad Army

1859 Nov 11th El.

4 P. min.

2.4 H.

Ba. 30.108 12.64^{1/2} Ex. P. 30.7

44 P. min.

$$\begin{array}{r} 311.55 \\ - 2.82 \\ \hline \end{array}$$

$$\begin{array}{r} 311.45 \\ - 2.54 \\ \hline \end{array}$$

$$\begin{array}{r} 311.20 \\ + 1.642 \\ \hline \end{array}$$

$$\begin{array}{r} 311.10 \\ + 1.96.8 \\ \hline 91.4 \end{array}$$

$$\begin{array}{r} 312.0 \\ \hline \end{array}$$

$$\begin{array}{r} 38.6 \\ 39.5 \\ 1.9 \\ 59.5 \end{array}$$

$$\begin{array}{r} 42.0 \\ 42.6 \\ 6.7 \\ 0.2 \end{array}$$

$$\begin{array}{r} 42.6 \\ 43.1 \\ 6.9 \\ 1.3 \end{array}$$

$$\begin{array}{r} 47.2 \\ 44.9 \\ 8.7 \\ 4.4 \end{array}$$

my bullful

311 10
-3 99.3

42.2

42.3

4.8

1.4

1859 Nov 14. ⁴ El. Bm

Sunday,

1859 Nov. 16th E. 2 31 0 Bar 30.586 Dr. In 64.3 Et. In 40.6

88.1

89.8

309 35
87.3
-1 86.1

311 50
88.2
-2 88.1

311 10
20.9
+ 4 14.9

311 10
28.2
- 1 26.6

311 50
91.2
+1 88.2

A	48.2	44.9	46.5	50.1	50.1
B	47.7	53.0	46.3	51.6	52.3
C	52.9	57.6	52.8	57.1	58.2
D	57.9	37	59.1	3.8	4.3

Microscope C has been adjusted

+ Take the mean.

— —

Ext. Inv. 57.4 Cl. ^{am} 3460

12 Tami

311 20
+ 47.7
92.3

309 110
+ 101.9
94.6

312 5
+ 39.6

49.4

47.3

51.9

50.9

47.4

52.1

56.7

52.1

59.4

2.3

57.9

66.3

1859 Nov. 17th Bar 90433 H. 6.3 S. 4.6 E. 2.23
 83816 90433 95816

311 45
 -2 106.7
 97.2

49.2
 52.5
 0.8
 3.3

311 50
 +2 23.6
 18.8

65.8
 48.1
 56.4
 59.7

311 35
 +1 81.6

49.9
 51.6
 60.6
 3.6

312 0
 -2 56.3
 49.5

50.0
 51.6
 62.4
 3.7

311 35
 +6 67.2
 59.7

44.9
 44.1
 54.4
 57.2

Br. 496

$$\begin{array}{r} 312^{10} \\ +6 \quad 107.6 \\ \hline 98.0 \end{array}$$

$$\begin{array}{r} 313^0 \\ +3 \quad 18.0 \\ \hline 16.0 \end{array}$$

$$\begin{array}{r} 511^{25} \\ +4 \quad 12.2 \\ \hline 11.1 \end{array}$$

$$\begin{array}{r} 47.4 \\ 50.1 \\ 61.2 \\ 4.4 \end{array}$$

$$\begin{array}{r} 54.5 \\ 55.6 \\ 10.4 \\ 10.1 \end{array}$$

$$\begin{array}{r} 47.3 \\ 49.0 \\ 58.0 \\ 0.6 \end{array}$$

See Zone Book for Barometer

1859 Nov. 26th El. 2 25 0/2 38 0

faint

r leti

H.C. 83

H.C. 87

Al. 100.

$$\begin{array}{r} 0 \\ 307.15 \\ + 0 \quad 7.0 \\ \hline 4.5 \end{array}$$

$$\begin{array}{r} 311.50 \\ + 7 \quad 64.6 \\ \hline 55.6 \end{array}$$

$$\begin{array}{r} 311.30 \\ + 5 \quad 83 \\ \hline 79.7 \end{array}$$

$$\begin{array}{r} 311.75 \\ + 1 \quad 53.5 \\ \hline \end{array}$$

$$\begin{array}{r} 312.0 \\ - 2 \quad 7.2 \\ \hline \end{array}$$

47.6
44.3
55.9
58.7

55.5
52.4
8.7
8.0

53.6
51.7
6.8
6.6

50.6
49.0
3.6
6.9

2.5
59.5
16.1
15.7

R. 496. ~~Pentagon~~
El. 3350

N. N.

811.17

311.15

-1 23.9

312.5

-2 07.4

312.0

-6 31.3
32.4

56.3

49.6

6.6

7.6

53.6

49.5

8.0

6.4

56.7

50.4

13.3

11.6

1859 November 28th

191 Oct.

45 St. C.

50 St.

(61)

(71)

Rnd. 313 20
 Micr. -3 29.6

312 0
 +0 58.9
 51.3

311 25
 -2 28.2

312 0
 +3 26.3
 37.7

311 55
 +1 33
 25.9

A. 58.9
 B. 55.0
 C. 12.6
 D. 12.6

62.0
 58.2
 13.9
 13.8

5.2
 0.6
 15.9
 17.0

2.4
 57.3
 16.7
 14.9

3.6
 59.2
 17.3
 16.5

Nov.

1935

Cloudy El. 3 13 • Ext. Th. 32.2

75

r. Citi

x. Citi

$$\begin{array}{r} 312.5 \\ 0 \text{ } 59.6 \\ \hline \end{array}$$

$$\begin{array}{r} 301.35 \\ - 1 \text{ } 59.9 \\ \hline 54.4 \end{array}$$

$$\begin{array}{r} 308.40 \\ - 3 \text{ } 35.6 \\ \hline 29.6 \end{array}$$

$$\begin{array}{r} 1.5 \\ 55.7 \\ 14.4 \\ 14.3 \end{array}$$

$$\begin{array}{r} 58.5 \\ 50.9 \\ 7.8 \\ 8.6 \end{array}$$

$$\begin{array}{r} 53.2 \\ 46.8 \\ 3.4 \\ 4.0 \end{array}$$

Hand - lamp was used to illuminate the limb.
 the zone book for Brown
 1859 Nov. 29th El. 139 ~~2~~ ~~139~~ ~~140~~ El 2140
 339 Per. γ Ceti

Remd. 315 0
 Mis +2 46.6
 35.6

315 40
 + 2 17.8
 14.2

307 15
 - 1 99.4
 74.4

309 35
 - 1 76.3
 75.0

306 20
 - 0 5.9
 97.4

A 7.1
 B 8.1
 C 25.4
 D 23.9

1.0
 1.8
 17.1
 18.8

51.8
 49.1
 59.6
 3.8

52.4
 46.4
 58.3
 2.0

57.0
 53.3
 5.7
 8.4

¹⁸⁵⁹
Nov. 29 Ext. Tm 28° 6

El. 3 20 0 Ext Tm 28° 2

2 Lsi

2² Ceti

308 40
- 3 33.5
26.

313 55
- 4 18.8
18.8

309 5
+ 2 26.
31.4

55.7
50.9
3.2
7.2

60.2
58.2
15.1
14.7

53.9
~~53.9~~
48.4
0.8
4.7

Is there any difficulty
with the screws?

1859 Jan. 8 Barrow. 30.179 A.T. 52.2 Ext. In. 13.2

LWS 020 Bad Land.

P. Pinn.

P. Pinn.

P. Pinn.

P. 38 Ceti
Rep. M.W.

Mm. Ltr

Read 304 50
dmi + 1 54.6
late 309 10" 51.4 Time to306 5
+ 3 82.5305 25
+ 0 99.6
93.4305 5
- 2 74.1
72.6314 0
+ 4 66.6
63.951.9
52.5
54.8
5.246.8
47.6
51.6
61.349.3
51.3
56.4
2.951.3
54.6
55.7
5.13.6
8.2
17.8
23.2

El 224.05 E. Jh. 11.2

A' Cals'

✓ Picinus

E. Picum

2 Piani

o leti

Jo. M.

32 10

+2 97 (good)

16.4

183

36.4

33-4

30730

$$+ 5 \quad 5.7$$

52.9

52.4

551

50

+ 1 30.4
26.2

6.2

7.2

12.7

19.0

310, 0

$$+ 2 \begin{array}{r} 29.3 \\ 19.6 \end{array}$$

o. /

1.0

80

13.6

315 50

$$-2 \frac{71}{63.7}$$

5.0

10.3

21.6

24.4

Ken

301-5

301.4

302.9

301.6

1859 Dec 21st Barom. 29.895 A.T. 56.4 E.T. 26.8 El. 2 16 0
 32 lati H. 85 H. 92 H. 100

304 25
 + 1 54.2
 47.0

54.6
 52.8
 2.2
 9.7

311 50
 - 2 41.2

4.6
 0.8
 17.7
 21.4

311 25
 + 0 3.4

5.6
 2.3
 17.0
 21.3

312 0
 - 2 21.8
 17.2

0.6
 57.8
 12.6
 16.7

312 10
 - 3 25.8

3.5
 0.8
 15.4
 20.6

El. 420 E. Tr. 24.8.

17 Widmi

517 Re.

S.C. 126.

317 50
+ 4 47.4
37.9

313 50
- 1 36.8
30.3

311 10
- 3 36.9
30.0

15.1
12.9
34.2
34.7

3.4
0.9
19.1
20.3

4.0
0.4
15.8
19.6

~~El. 0~~
 459 Dec 22 Parom. 30.000 A. 5u. 68.8 E. 5. El. 0 32 0
 Bl. 91. H.L. 33 H.L. 37 H. 42.

No R.

309 35
 - 3 49.5
 46.6

311 40
 No Dec.

312 5
 + 2 ~~30.8~~
 30.8

311 13
 + 1 18.1

A 0.4
 B 55.3. 53.8
 C 8.0
 D 14.1

1.1
 57.7
 11.5
 17.0

3.5
 0.3
 14.2
 19.6

R. P. 100%
 * faint



El. 1 41 0
 Est. 23.4

1859 Dec. 23

El. 3350

Bar.

29.852

At. Th.

61.9

Ext. Th. 12.07

H.L. 125.

550 Bar.

132 ft. C.

139 ft. L

144 ft. L.

311 25

+ 3 49.4

5.1

3.5

14.4

23.0

314 10

- 2 53.6

13.3

11.5

29.0

33.3

311 50

- 4 97.

4.0

2.6

15.2

22.9

311 25

+ 4 17.3
9.8

11.6

8.9

20.0

29.1

311 10

+ 0 10.4
9.4

3.7

3.2

13.5

21.4

x faint for 5th day
 day 6th or 7th

1859 Dec-23 continued.

Exp No. 116

154 Bl

162 Bl

173 Bl

193 Bl

$$\begin{array}{r} 311\ 30 \\ -3\ \overline{67.5} \end{array}$$

$$\begin{array}{r} 311\ 55 \\ -2\ \overline{77.} \end{array}$$

$$\begin{array}{r} 311\ 20 \\ +0\ \overline{79.2} \\ 73.1 \end{array}$$

$$\begin{array}{r} 311\ 30 \\ +2\ \overline{05.4} \end{array}$$

$$\begin{array}{r} 311\ 50 \\ +4\ \overline{18.0} \\ 15.0 \end{array}$$

A	4.8
B	2.7
C	16.2
D	23.5

10.0
8.4
21.3
28.6

56.2
54.3
6.7
15.0

1.6
1.9
13.4
21.6

5.3
4.5
17.5
26.0

1859 Dec 23 continued

El 5390 Et Im. 11.8

Donom

Clouded

up.

311 50
-1 19.1
15.2312 40
+2 84.8
81.06.1
5.6
17.3
25.75.6
5.6
19.2
27.9

Stars very tremulous.

1859 Jan 24

El. 0 43 0 Exl. Hr 10.5

Br- 91

Sh. C. 29

Sh. C. 33

Hl 27

Hl 42

$$\begin{array}{r} 309 \ 40 \\ + 6 \ 14.5 \\ \hline \end{array}$$

$$\begin{array}{r} 2.8 \\ 2.0 \\ 10.6 \\ 20.6 \end{array}$$

$$\begin{array}{r} 312 \ 15 \\ \quad 40.8 \\ + 4 \ 38.2 \\ \hline \end{array}$$

$$\begin{array}{r} 11.7 \\ 14.4 \\ 22.1 \\ 32.0 \end{array}$$

$$\begin{array}{r} 311 \ 40 \\ \quad 86.5 \\ + 4 \ 82.4 \\ \hline \end{array}$$

$$\begin{array}{r} 7.8 \\ 9.1 \\ 18.0 \\ 28.6 \end{array}$$

$$\begin{array}{r} 312 \ 5 \\ \quad 21.5 \\ + 2 \ 16.7 \\ \hline \end{array}$$

$$\begin{array}{r} 7.7 \\ 7.65 \\ 9.3 \\ 19.6 \\ 26.8 \end{array}$$

$$\begin{array}{r} 311 \ 15 \\ + 1 \ 8.2 \\ \hline \end{array}$$

$$\begin{array}{r} 8.0 \\ 8.6 \\ 17.6 \\ 26.4 \end{array}$$

1859 Dec 24 continued El. 260 Ex. Tm. 9.2
H. C. 50 Brakley 280

311 35
-2 ^{24.2} 211.4

312 45
-4 ^{50.3}

312
-2 ^{50.3}

7.3
9.6
16.6
26.6

12.1
14.2
23.6
33.8

1860 Jan 20th 2520 Eph. Mr. D

1860 Jan 5th. 2nd Tr. 8^h 5^m Sun acting very badly. π^6 Orion

H.L. 203

H.L. 208

 π^6 Orion

St. C. 228

$$\begin{array}{r} 31045 \\ +1 \overline{46} \\ 31091 \end{array}$$

$$\begin{array}{r} 31150 \\ +3 \overline{99} \\ 31249 \end{array}$$

$$\begin{array}{r} 31150 \\ -2 \overline{927} \\ 30853 \end{array}$$

$$\begin{array}{r} 31030 \\ -4 \overline{993} \\ 30537 \end{array}$$

$$\begin{array}{r} 31135 \\ +2 \overline{668} \\ 31803 \end{array}$$

59.2

4.9

8.8

23.8

10.0

17.2

21.3

36.2

9.7

16.3

18.7

37.3

3.8

10.9

16.8

32.5

5.7

10.6

14.3

29.5

1850 Jan 5th continued, El. 552 00

At. and El. 650 El. Fin. 9.3

El. 107

311 20
do. do.

Definition very bad.

1856 Jan. 10thEl. $\frac{1}{2}$ 31^m 0^v

Hazy

El. 55(0?) Ext. Am. 38.8

El. 360

y let i

Sh. 100

ft. 113

No. K

$$\begin{array}{r} 309.35 \\ -1 \quad 59.6 \\ \hline \end{array}$$

$$\begin{array}{r} 312.0 \\ -2 \quad 31.1 \\ \hline 280.9 \end{array}$$

$$\begin{array}{r} 311.50 \\ +1 \quad 37 \\ \hline 348.5 \end{array}$$

54.4

48.5

6.0

5.8

55.8

52.7

11.0

10.8

3.8

1.8

19.7

19.6

1860 Jan. 25th
~~1859 Dec.~~

236 gms	Point	Microscope E
2 37 43		52.5 60.3
2 44 0		49.6 62.3 49.6

Lenses have been attached to two of the microscopes.
 The above is an unsuccessful attempt at using the circle without
 a proper stand for the ~~etc~~ lamps by which the divisions are
 illuminated.

The star observed was ~~speculatively~~ Johnson (Cat. of stars within 6° of the
 north pole; Radcl. Obs. 1854) no. 28.

1860 January 30th

El. 5530

Measurements of the Distance between δ Ursae Minoris (Below Above Pole) and δ Cephei (Below Above Pole)

Object.	Pointer - Reading	Time by El.	Micrometer in Telescope	Microscope E.
δ Ursae Min. S.P.	218 50	6 3 50.3 δ Ursae Min. 5 21.0 6 21.5	- 3.932 77.3 69.5	57.33 { 57.7 57.6 56.7
Same	218 45	B.D.B. 15 19.0 16 20.3 17 20.6	+ 5.76.3 75.6 71.3	62.77 { 62.8 62.5 62.0
δ Cephei	225 0	25 20.0 26 7.1 27 51.4	- 5.7.6 14.3 25.0	14.20 { 14.5 14.1 14.0
El. 631 0				
δ U. S.P.	218 50	33 33.6 34 27.2 35 21.5	- 3.68.5 82.5 90.5	58.73 { 59.0 58.6 58.6
δ Cephei	224 55	40 30.3 41 52.4 42 49.4	+ 3.71.3 63.0 61.5	58.27 { 58.7 57.9 58.2

B.D.B.

El. 648.0 East

1860 Feb 7th El. 6₁₀ — 653 Est. Temp. 33.8 Barom. 30.034 A.T. 64.96

Munitions

Rest

Munitions D.

Same Munitions	21850	6 12 50.2	+4.1	-02.3	0.0.1	{	27.2
		14 50.6		5.4			27.6
		15 50.3		12.5			27.2
Same.	21855	21 57.6	-4.1	-88.9	5.55	{	28.3
		23 43.6		85.0			28.6
		24 41.6		84.0			28.2
51 Lepus	2250	30 46.7 (2.0)	+2.1	-33.0	359.50	{	27.7
		31 51.1		25.8			28.2
		33 5.4		23.6			28.0
	21850	38 49.6 (3.1)	+6	-92.3		{	
		40 1.2 (1.6)		74.0			
		40 55.8 (1.8)		60.6			
51 Lepus	2255	46 19.2 (-6.7)	-7	+12.5	359.45	{	29.3
		47 20.0		18.5			30.5
		48 37.1		27.0			29.8

Rever

1860. Feb. 9th Microscope A alone ast. El. 4 46.0 Alt 55.0 Ext. 32.6

H. I. 176.

H. 189

H. 196

H. C. 207

Galvoni

58.4
 (K-9)
 May 18
 in with net.

28.2

58.3

10.2

9.5

31.7

52.9

13.9

13.2

35.1

57.2

17.2

16.5

38.4

60.5

20.5

20.2

42.1

64.3

24.4

23.7

5 0 35.10

5 6

57.24

5 18

17.32

5 27

16.62

312 0
 + 0 14.8

311 15
 - 1 75.2

311 25
 + 4 68.61

311 20
 + 2 01.4
 + 4 93.8

312 40
 + 2 75.3
 + 2 69.5

D { 0.8
 1.6
 0.8

58.8

60.5

59.4

58.7

58.4

(chump flicking)
 (windy)

60.8

59.5

58.5

58.2

59.8

59.3

58.1

Nota. Micro. A was
 read three times for each
 star.

Galvoni Record
 satisfactory

4 50 26

4 59 55.3
 5 1 33.0

Rever bar —
 5 7 36. —

5 17 49
 19 6

5 26 47
 24 2

8th Magister

At Rev. El 5.32.0

0.15 3 1 2.0
 0.20 1 0 0
 0.26 1 1 3.0

St. 455-0415

1860 Feb. 10.

Microscope A alone.

El. 3540 El. 14.4 El. 250

Hb. 131.

Hb. 134.

Hb. 139.

49 Eridani

Hb. 162.

50.1

10.4

11.6

21.3

51.7

53.7

14.2

15.3

25.0

55.3

57.3

17.6

18.7

28.3

58.5

28

20.9

22.3

4th doubtful (31.9)

21

4.3

24.7

25.8

35.3

5.5

4 3 57.24

4 11 17.56

4 16 18.74

4 32 28.36

4 39 58.62

311 50

+ 1 8.4

312 10

+ 3 69.5
67.8

311 25

+ 4 18.2

311 35

+ 6 44.4
37.5

311 55

- 2 88.2
82.6

A

{ 58.5
58.5
58.9

59.9

60.3

59.3

59.5

59.8

59.6

60.4

60.0

60.1

59.8

59.8

59.2

Doubtful.
badly seen.Doubtful.
unsteady.

4 5 5.

4 11 0

11 52

4 17 11.

4 32 13

33 17

4 39 37

40 27

9.8th day.

8.

29th

1800 Feb. 10 continued El 4 29 0.

El 5 14 0 El 17 14 0 El 25 22 0 El 27 12 8

Feb. 173

Feb. 186

Feb. 196

Feb. 207

J Orionis

7	52.4	56.8	57.6	13.1	12.2
3	56.2	7.4	56.5	16.7	15.7
5	59.3	15.7	59.8	20.1	19.3
5	3.0	9.4	7.4	27.5	22.8
5	6.5	12.8	7.0	27.0	26.2
2	4 45 59.48	4 57 58.8	5 6 59.86	5 18 20.08	5 27 19.24

311 20
+ 0 51.8
46.4

311 45
+ 3 29.5
23.1

311 25
+ 4 64.7
60.1

311 20
+ 2 3.2
97.0

312 40
+ 2 77.5 and 67.2
71.8

8	57.4	1.3	3.7	2.3	1.2
8	58.1	0.8	3.6	2.2	0.9
2	58.3	1.5	4.5	1.6	0.9

4 45 41
46 28

4 56 46
57 28

5 6 43
7 60

5 17 55
19 4

26 27
5 27 6
28 3

Results of Observations Feb. 10. (Specimen)

Micrometer screw	34.0	Rate of clock	+2.67		
Run of A	297"	Coll. Lr. D2. (assumed)	= 0.		
Star's name	Mean of wires	Rate wr. to δ^h	Härdler Comp'd.	Clock cor.	
H.L. 131	4 3 57.24	+0.21	57.45		4 1 31.38
134	11 17.56	0.20	17.76		8 51.69
139	16 18.74	0.21	18.95		13 52.88
49 Eridani	32 28.36	0.16	28.52	2.46	30 2 45
H.L. 162	39 38.62	0.15	38.77		37 32.70
49					
176	4 45 59.48	0.14	59.62		43 33.55
186	57 5.82	0.12	5.94		54 39.87
196	5 6 59.86	0.10	59.96		5 4 33.89
207	18 20.08	0.08	20.16		15 54.09
δ Orionis	27 19.24	0.06	19.30	53.22	24 53.23

49 Eridani		δ Orionis	
L.	δ		
67 22 29.71	+0 41 24.46	81 5 10.05	-0° 24' 52.40
+ 0.03	- 0.38	+ 0.75	- 0.40
+7 42.82	+ 1 17.16	+7 39.16	+ 31.07
+ 0.05	- 0.21	+ 0.03	- 0.22
67 30 12.61	+0 42 41.03	81 12 49.99	-0 24 21.95
for δ 30 0.841	+ 9	5 ^h 24 ^m 51.333	
- 0.377	+ 6.67		
+ 0.783	+ 0.06		- 0 24 21.2
+ 1.216	+ 3.03		
- 0.002	+ 5.67		
+ 1.614			

Circ. Reading	Approx. Res. to Meridian altitude	Approx. Reading (mean)	Ref.	Ref. not included. Delinahi
3° 09' 58."63	+ 36.66	3° 11' 35.5"		+0 25 41.0
2 59 59.83	2 5.34	2 52 5.2		+0 6 19.7
3 34 59.63	2 22.18	3 37 21.8		+0 51 27.3
2 25 59.83	3 37.93	3 24 37.8	Q - 42 43.3	2 45 54.5
3 4 59.60	- + 28.04	3 4 20.6		+0 18 26.1
3 40 57.93	+ 16.70	3 41 14.6		+0 55 20.1
3 15 1.20	+1 50.94	3 16 52.1		+0 30 57.6
2 35 3.93	+2 37.30	2 37 41.2		+0 51 46.7
3 40 2.07	+1 8.03	3 41 10.1		+0 55 15.6
2 20 1.00	+1 32.53	2 21 33.5	- 24 21.2	2 45 54.7

1860 Feb. 14th ^B Microscope Sabre - Galby. (Ar) 4200 Est. Jan 20.2

Al. 186.	Al. 196.	Al. 207	Al. 219
7.0	0.9	20.8	20.0
10.4	4.5	24.5	23.8
13.8	7.9	28.0	27.1
(17.3)	11.5	31.4	30.5
20.8	14.9	34.9	34.3
4 57 13.86	5 7 7.94	5 18 27.92	5 27 27.14

311 45
+ 3 20.6
11.6

311 25
+ 6 68.2
57.6

311 20
+ 1 92.8
89.8

312 40
+ 2 61.8
59.8

311 30
+ 1 85.1
81.4 wh. 1/2
+ 1/2

A. { 23.0
3.7
3.6

2.9
2.9
2.1

2.6
2.6
2.5

2.5
2.5
3.0

3.6
3.3
4.0

4 57 1
58 8

5 6 32
7 38

5 18 13
19 2

5 27 8
28 11

Isa failed.

8th Aug.

26 5480 1860 Feb 14th continued

311 10 312 10 311 37

59 53	Pl. 237	Pl. 244	Pl. 250	Pl. 259
27.2	24.5	36.4	7.7	28.3
40.8	28.9	(46.0)	11.3	41.9
44.2	31.6	43.4	14.8	45.2
47.6	35.0	46.8	18.2	48.7
51.2	38.6	50.4	21.7	52.4
5 53 44.20	6 0 31.60	6 11 43.40	6 21 14.74	6 25 45.34

310 25
- 1 47.6311 20
- 4.788311 10
+ 5 87.8
83.1311 20
- 2.51.0312 10
- 1.33.6
27.41.7
1.3
2.11.2
2.3
1.858.8
59.2
59.72.7
2.0
1.94.6
4.8
5.4

5 55 13.

6 1 16

6 11 25
12 56 21 0
21 476 24 55
26 202nd ft.

1860 Feb. 14th continued El. 638 0 Ext Int.

Ext. 654 0

Hl. 262.

Hl.

8

47.7

(514)

54.9

58.3

61.9

6 30 54.82

311 35

-4 3.86

A { 2.0
1.0
2.16 30 28 }
31 22 }
faint. 8.9

Dark spot

311 40

stars

1860 Feb. 23. ^y Apr. Dr. El. $5^{\circ} 33' 0''$ Ext. Im. 65.4° El. 5470 off. El. 5490.

During

? 9.8 mg

59 Orionis

HL. 250

In R

1.8

56.3

26.6

W. W. Loh

5.6

59.8

30.3

16.7

9.0

3.2

37.8

20.2

12.3

6.5

37.2

23.5

16.0

10.2

40.7

27.1

5 39

8.94

5

54

3.20

6 21

33.72

312 40

+2 $\frac{50.7}{46.0}$ wt. i

312 10

+3 $\frac{99.6}{89.0}$

310 25

-1 $\frac{105.4}{97.7}$ 93.2

311 20

-2 $\frac{60.4}{53.8}$

312 10

-1 $\frac{53.2}{50.2}$

A above

{ 58.4
57.8
58.4

58.2

57.1

55.9

58.5

57.9

57.5

55.8

58.4

58.7

57.8

55.5

58.0

5 28 31.

29 5

5 38 36.

40 6.

Ink faded

(5 55 27)

6 21 4

22 12

6 29 0

30 3

HL. 250

El. 6340

Ext. Im. 46°4

Merid

Dist. - 0.2

Dist. + 0.6

1860 March 27th. El. 831° 0' El. Sur.

H. 455

311 410
+1 47.8
44.8A { 16.8
15.4
16.5

1860 March 29th. ~~At West~~ Circle of West. Cl. 8530⁸ 10 24 0

Hydroe	10 Lion	Alphantis	43 Sextans	34 Sextans
52.6	37.0	R. 100		11.95
56.3	40.8			15.5
59.6	44.2	Dr. Hyman Coolidge		19.0
3.0	47.7			22.5
6.6	51.2			25.95
9 10 59.62	9 33 44.18			10 39 18.98

309 15 - 43.8 - 2 - 56.2	304 45 - 63.5 + 4 - 67.5 - 70.5	311 50 - 26 41.2 26.4	319 35 82.8 + 4 87.3	307 55 75.8 + 6 86.4
--------------------------------	--	--------------------------------	----------------------------	----------------------------

H	28.4	27.2	19.6	21.0	20.9	21.3	31.0	30.8	15.9	15.1
G	6.9	6.8	59.1	59.3	60.4	60.1	2.4	2.8	53.8	54.6
F	8.0	9.3	1.0	1.6	2.0	1.4	1.2	0.8	55.3	55.7
E	10.2	9.5	2.6	1.3	4.8	3.7	9.4	9.7	57.2	56.4
	13.37	13.20	5.87	5.80	7.02	6.62	11.00	11.02	0.55	0.45

9 11 29 12 15	9 32 55 33 26 34 3	10 38 24 39 39
------------------	--------------------------	-------------------

Note. Microscopy read twice by hand lamp.
 l.g. ~~read~~ ^{pm} ~~two~~

Est. hr. 35.0

1860 March 29 cont. El. 11 8 03 lat min 11 30+. Dec Sub El 11 37 0

transit
B.D. B. fu
m

10 ² Lumin	80 Lumin pr.	5 Unmarked Bode	Lamin Star	Lamin Star
34.1	28.6		B.e.	12 14 31.6
37.7	32.2	Before Transit	J.	16 10.6
41.2	35.55		Bv	
44.6	38.9			18 13.5
48.1	42.5			19 29.0
11 5 41.14	11 24 35.57			

Boog 40 + 4 13.0 + 4 22.8	308 25 + 2 48.5 + 1 3.2	225 0 + 3 97.5 + 2 04.5	225/0 + 2 31.0 + 2 37.8	225 0 + 7 99.6 + 4 4.4
H 23.6 24.8	10"0 10"4	31.3 21.6 48.7 48.4	39.3 39.1	27.4 28.4
G 3.3 2.8	49.8 49.7	32.0 32.3	39.3 39.8	28.6 27.2
f 3.6 3.4	49.6 49.1	3.2 3.4	11.4 12.1	59.6 60.2
g 4.9 5.6	50.4 51.0	9.2 8.6	17.2 17.0	4.6 5.0
8"85 9"15	54.95 55.05	18.93 18.97	26.80 27.00	15.05 15.20

J.B.D

11 5 3	11 23 56	11 58 29.6	12 5 17.4	12 12 38.4
6 8	24 56	58 57	6 5.6	13 3.0

216.7m 35.0 B.

1/2 m. in water
break

1860 March 29 cont.

SS in upper Transit

Hamilton

Polaris L.P.

Transit Polaris

13 6 14.7

11 6.6

13 26.3

15 49.8

$$\begin{array}{r} 224.55 \\ - 7.632 \\ \hline 58.8 \end{array}$$

$$\begin{array}{r} 225.0 \\ + 2.62.8 \\ \hline 26.4 \end{array}$$

$$\begin{array}{r} 220.50 \\ + 6.26.6 \\ \hline 30.9 \end{array}$$

$$\begin{array}{r} 220.45 \\ - 2.85.4 \\ \hline 82.1 \\ 83.1 \end{array}$$

$$\begin{array}{r} 220.45 \\ - 2.45.0 \\ \hline 45.0 \\ 49.6 \end{array}$$

$$\begin{array}{r} H \quad 32.6 \quad 31.8 \\ G \quad 30.5 \quad 32.0 \\ F \quad 3.3 \quad 3.7 \\ E \quad 8.5 \quad 8.8 \\ \hline 18.97 \quad 19.07 \end{array}$$

$$\begin{array}{r} 33.6 \quad 33.4 \\ 32.2 \quad 31.8 \\ 5.6 \quad 5.5 \\ 11.4 \quad 11.5 \\ \hline 20.55 \quad 20.55 \end{array}$$

$$\begin{array}{r} 32.5 \quad 30.8 \\ 32.9 \quad 32.9 \\ 1.2 \quad 1.2 \\ 8.3 \quad 8.2 \\ \hline 18.47 \quad 18.27 \end{array}$$

$$\begin{array}{r} 16.6 \quad 17.3 \\ 17.7 \quad 18.4 \\ 46.1 \quad 46.6 \\ 53.0 \quad 52.8 \\ \hline 3.35 \quad 3.77 \end{array}$$

$$\begin{array}{r} 23.3 \quad 24.0 \\ 25.2 \quad 24.8 \\ 54.2 \quad 55.3 \\ 61.8 \quad 60.4 \\ \hline 11.12 \quad 11.12 \end{array}$$
B.D. before
D.B. after
$$\begin{array}{r} 12 \quad 24 \quad 23 \\ 24 \quad 57 \\ 25 \quad 38 \end{array}$$

$$\begin{array}{r} 12 \quad 31 \quad 13.4 \\ 31 \quad 50 \end{array}$$

$$\begin{array}{r} 12 \quad 45 \quad 55.8 \\ 46 \quad 55.5 \end{array}$$

$$\begin{array}{r} 13 \quad 00 \quad 8.7 \\ 26.4 \\ 57.8 \\ + 3.5 \end{array}$$

$$\begin{array}{r} 13 \quad 13 \quad 0 \\ 13 \quad 46.5 \\ 14 \quad 7.0 \end{array}$$
Runs
at 300'
$$\begin{array}{r} H \quad 300' \text{ P.R.} \quad +1'' \\ G \quad -3 \\ F \quad -1.5 \\ E \quad +3.5 \end{array}$$

1860 Dec 29. continued

Spicer

37.9

41.5

45.0

(48.5)

52.0

13 21 44.98

- 30

52.00

Ch. Dec.

Exp. In 31.5

Pm 29.810

Alt. In 53.4

El. 13 26 0

Being very good indeed

Sub. P. 13 17 52.00

+ 3 52.98

1860 March 30th El $9^{\circ}10'0''$

at 941.0 - 943.0 Ex. In 49.7 Dec 29.770

x Hydræ

10 Leonis

4 Sextantis

14 Sextantis

~~AT~~ AT 59.2

31.7

38.6

17.9

35.4

42.4

No M.

21.4

39.0

45.8

Declination after

24.8

42.3

49.3

(transit.

28.3

46.0

52.9

32.0

9 24 38.88

9 33 45.80

10 3 24.80

$$\begin{array}{r} 320^{\circ}15' \\ + 4 \quad 98.6 \\ \hline 3 \quad 6.8 \\ 9.0 \end{array}$$

$$\begin{array}{r} 304^{\circ}45' \\ + 4 \quad 19.0 \\ \hline 27.2 \end{array}$$

$$\begin{array}{r} 307^{\circ}10' \\ - 1 \quad 18 \\ \hline 24 \end{array}$$

$$\begin{array}{r} 305.55 \\ + 4 \quad 40.4 \\ \hline 46.8 \end{array}$$

48"6 46"9

35"1 36"5

38"6 37"1

39"9 38"2

19.0 18.5

16.7 16.6

19.8 18.9

20.4 19.6

14.6 14.7

17.6 18.6

19.6 19.5

20.3 20.4

25.6 26.120.0 19.620.2 19.721.5 20.9

26.95 26.55

22.35 22.57

24"35 23"80

25.52 24.90

$$\begin{array}{r} 9 \quad 24 \quad 11.5 \\ 24 \quad 58. \\ 25 \quad 39. \end{array}$$

$$\begin{array}{r} 9 \quad 33 \quad 14 \\ 34 \quad 29 \end{array}$$

$$\begin{array}{r} 9 \quad 48 \quad 5 \\ 48 \quad 43 \end{array}$$

$$\begin{array}{r} 10 \quad 3 \quad 11 \\ 4 \quad 18 \end{array}$$

$$\begin{array}{r} \text{Feb. 16.} \quad 20 \quad 44.63 \\ 3 \quad 54.25 \end{array}$$

Circle Reading
3 12° 10' 3

1860 April 2.

Polaris

El. 1 27 03

+ Hydrus

Mr. R.

Decl. just as star
left the field

El. 97 0. alt 9 m 0

El. 1 Sextant is

RR 313 40
 km +3 4.6
 6.2
 9.8

H 20.6 20.4
 G 24.1 23.7
 F 51.2 51.5
 E 58.7 57.5
 8.65 8.28

313 40
 +3 68.7
 69.6

59.8 60.3
 3.0 3.2
 31.1 30.8
 26.6 27.5
 47"

309 15
 -2.91.9

14.3 12.9
 50.8 50.2
 48.3 49.2
 53.0 52.4
 56.6 56.17

306 55+
 +3 66.2
 72.3

41.7 41.1
 18.1 18.6
 18.0 17.7
 21.0 21.5
 24.70 24.72

-1 44.6
 46.4

25.4 26.8
 4.0 3.3
 4.2 4.5
 3.6 3.8
 9.30 9.60

D. D.

Notes on 005 p.m.

1 2/1 1.3 20.20

3 4 31 20.40

5 19 21.05

Page 15 4.5
 16 21

Windy.

External Therm

29.2

29.717 25.704

Bar.

29.717

External Thermometer at El. 9.1
 24.0

1860 Apr 2.

El. 10 27°

L Leonis

γ Leonis (as red giant)

49 Leonis

34 Sclaudis

57 Leonis

49.3

9.9

36.2

18.7

54.8

53.3

13.7

40.0

22.2

58.5

56.7

17.4

43.3

25.8

1.6

0.2

20.8

46.7

29.2

5.0

0.5

24.7

50.4

32.6

8.6

10 4 56.60

10 16 17.30

10 31 43.32

10 39 25.70

10 53 1.74

$$\begin{array}{r} 299.30 \\ - 3 \quad 19.0 \\ \hline 300.0 \\ 32.8 \end{array}$$

$$\begin{array}{r} 291.30 \\ + 3 \quad 22.8 \text{ M. 2} \\ \hline 294.1 \\ 29.4 \text{ M. 1} \\ 13.7 \end{array}$$

$$\begin{array}{r} 302.50 \\ + 3 \quad 69.6 \\ \hline 372.1 \end{array}$$

$$\begin{array}{r} 307.50 \\ - 3 \quad 50.7 \\ \hline 358.2 \end{array}$$

$$\begin{array}{r} 311.0 \\ + 1 \quad 71.8 \\ \hline 382.8 \end{array}$$

H	20"0	20"3	4	6"2	6"3
G	59.7	58.8		39.6	38.4
F	2.8	2.9		47.4	47.8
E	58.8	58.5		31.1	31.0
	5.33	5.12		46.07	45.87

9"9	10"5
47.6	46.6
50.7	50.7
48.5	47.6
54.17	53.85

12.5	13.2
52.2	52.0
53.7	54.0
54.1	54.8
58.12	58.50

23"0	23"3
1.4	0.0
1.9	1.7
5.3	5.1
7.90	7.52

H

10 15 29
15 59ⁱ
17 1

10 31 30
32 11

10 38 59
39 50

10 52 23
53 24

Star flicker body.

At 10.5 El. 10 27°

9l. ^{h m s}
11 34 0

2 p Loris	83 Loris M.	89 Loris	3 Virgin	5 Ursa Min. Bode
40.9	35.4	7.3	19.3	
46.4	39.0	10.8	22.9	
47.9	42.4	14.5	26.5	
51.3	45.9	17.8	29.8	
55.0	49.4	21.4	33.4	
11 3 47.90	11 23 42.42	11 31 14.34	11 47 26.38	

309 30
20.4
+ 4 27.5

21.3 21.3
59.5 58.3
59.6 60.8
2.6 2.5
57.5 57.2

308 25
29.6
+ 8.6

5.7 4.8
43.6 42.2
44.5 44.3
46.8 46.6
50.15 49.32

308 20
0 25.3
- 1 2.0

19.5 18.8
54.6 54.5
57.9 58.3
59.6 58.8
2.90 2.60

309 35
70.6
+ 4 73.2
81.5

9.9 10.1
46.6 45.4
49.0 48.4
49.6 48.8
53.77 53.18

225 0
31.8
+ 2 35.0
42.3

17.0 16.6
14.5 12.9
47.0 47.4
52.6 52.7
278 240

11 3 38.5
4 28.

11 22 52.5
24 8.

11 30 54.
31 40.

11 46 24
47 10
48 8

11 57 25
57 59
58 45

Ar El. 11.6
29.732 Bar
55.4 A.M.
21.1 E.M.

3 maximum base same star

12 14 48.5
 16 0.8
 17 11.1
 18 20.0
 19 36.4
 12 17 11.36

225 0
 + 2 96.4
 + 1 01.6

225 0
 + 1 31.8
 35.0
 47.2

H 16.5 16.9
 G 13.3 13.3
 F 46.5 47.2
 E 53.4 52.6
 2.42 2.50

17.5 18.0
 12.7 14.3
 47.3 47.0
 52.5 51.8
 2.50 2.78

2nd break pw(?)
 ans 5 min

3rd pot. after 2nd w.
 A. B - D.

4

12 4 15
 4 53

12 10 32
 11 2
 18 3

End signal
 B

EL 12 21 0 End. J. 20:3

1800 Apr. 7th El 14.0Acad E 55^h 5^m 0^s Brown again El 10 4 0

Polaris

 δ Orion α Orion

23 Sextantis

29 Sextantis

57.8

51.8

362

50.6

24.4

55.4

398

56.1

27.9

58.9

433

57.6

31.3

2.2

46.6

0.8

34.7

5.8

50.3

4.6

38.3

-5 28 58.82

5 51

43.24

10 17

57.54

10 16

31.32

+3

9.6

312 40

+1 56.6 1st week
62.0

304 50

+4 24.8
28.5

309 10

-1 58.6
64.4

314 10

-3 8.2
13.5

H 24.8

23.7

20.0 21.1

25.8

26.1

34.4

34.0

34.8

34.2

34.9

G 25.1

25.0

2.4 1.0

8.2

6.8

16.15

15.6

16.7

16.0

15.3

F 54.6

55.6

3.3 2.2

8.6

8.8

14.35

14.3

14.4

13.1

14.2

E 59.6

61.4

7.6 7.67.69.0

18.95

19.318.620.621.2

8.32

7.98

12.57

12.68

20.96

20.97

21.40

1 11 3

5 28 20

5 51 21

10 17 25

10 16 11

11 19

29 17

51 59

18 25

26 52

11 49

El. Th. 48.05

Ther. in } 47.5 (Adie)

Ok. Room }

Baron 30.247

A. Th. 60.4

4 6.0

El. Th. 48.5

Adie 49.7

30.193

A. Th. 58.5

1860 Apr. 7th continued, El 11 18 0

Clouded up.

33 Sextantis	83 Leonis pr	89 Leming	β Virginis
19.3	42.7	14.6	26.9
22.9	46.4	18.2	30.4
26.3	49.8	21.8	33.8
29.8	53.1	24.9	37.1
33.3	56.7	28.8	40.9
10 38 26.32	11 23 49.72	11 31 21.66	11 47 33.82

$$\begin{array}{r} 313 \ 10 \\ - 1 \ 862 \\ \hline 900 \end{array}$$

$$\begin{array}{r} 308 \ 25 \\ + 2 \ 76.9 \\ \hline 84.5 \end{array}$$

$$\begin{array}{r} 308 \ 20 \\ 0 \ 97.3 \\ \hline 03.4 \end{array}$$

$$\begin{array}{r} 309 \ 30 \\ + 5 \ 60.4 \\ \hline 70.6 \end{array}$$

H	18"0	17"6	14"4	15"3	18"3	17"5	21"3	20"3
G	59.1	59.3	58.9	56.8	1.4	59.8	2.8	3.3
F	57.1	57.5	55.8	55.8	58.8	58.6	2.6	1.2
E	6.9	6.6	59.8	58.5	2.0	3.3	6.2	6.6
	4.77	4.75	2.22	1.60	5.37	4.80	8.22	7.85

11 47 33.5

11 42 26.95

+ 4 6.5

4 11.1

10. 38 2	11 23 28	11 31 5.5	11 46 45
38 54	24 39	31 53.	47 22
			48 47

Wt. Th 37.1

Int. (d.c.) 43.0

Base 30" 216

A. Th 55.6

Sub. Th 36.3

In. Th. 42.2

1860 Apr. 10th

Professor Bond set the clock

4 minutes back.

1860 Apr. 18th El. 9 29 α - El. 10 19 0

ε Leonis	γ' Leonis	δ Leonis	ι Leonis	χ Leonis
13.7	35.4	46.9	16.2	8.5
18.0	39.2	50.6	18.2	12.2
21.7	42.9	54.1	21.7	15.5
25.5	46.5	57.4	25.0	19.0
29.5	50.0	1.1	28.9	22.7
9 38 21.68	10 12 42.80	10 25 54.02	10 41 21.6	10 58 15.58
56.45	17.61	28.76	56.34	50.75

$$\begin{array}{r} 287.45 \\ - 194.4 \text{ ? m. in} \\ \hline 95.5 \end{array}$$

$$\begin{array}{r} 291.40 \\ + 321.6 \\ \hline 28.8 \end{array}$$

$$\begin{array}{r} 302.10 \\ + 275.8 \\ \hline 81.2 \end{array}$$

$$\begin{array}{r} 300.55 \\ + 399.6 \\ \hline \end{array}$$

$$\begin{array}{r} 304.5 \\ - 076.3 \\ \hline \end{array}$$

H	15".4	15".2	3".0	3".2	20".8	20".8	17".4	17".7	16".8	15".9
G	9.8	8.2	56.3	56.0	16.2	16.6	13.6	13.4	8.8	9.0
F	55.1	56.3	46.6	47.4	0.8	1.9	59.5	59.8	53.1	53.9
E	43.8	45.4	31.7	32.0	3.5	3.5	60.0	59.4	56.2	55.8
	1.02	1.27	49.40	49.65	10.32	10.70	7.62	7.57	3.72	3.65

Circle much out of
focus under ε.

9 37 45
38 43.

10 12 29
13 37

10 24 44
25 31

10 41 15
41 51

10 57 53
58 47

Ext. Th 41.6
Int. (Aie) 46.1
Barom 30.640
A.T. 57.9

M 9.53^m

The ink faded, but the second remand
right.
Afterwards S.G. ran down.

End of Sheet El. 11 20 0 and 11 21 0. ~~End~~ El. 11 33 0

8 Hypo. et Grub.

10 Virginia

 η Virginia γ Virginia

Polaris S.P.

41.3

52.2

6.0

55.5

45.0

55.8

9.5

59.0

48.5

59.3

13.0

2.4

51.9

2.5

16.5

5.6

55.8

6.3

20.0

9.6

11 12 48.50
23.06

12 2 59.22

12 13 13.00
47.4012 35 2.42
36.89

326 10

309 30

312 5

312 50

220 45

- 2 32.9
37.0
40.0+ 1 39.0
45.4+2 26.8
31.5-2 73.2
80.0- 3 34.6
28.5

37"8 39"0

24"8 24"3

17"9 17"7

17"4 16"2

14"7 15"2

17.1 17.5

17.3 16.6

11.0 12.9

9.9 9.6

30.8 30.6

53.7 53.3

0.4 0.7

57.5 58.6

52.1 54.2

38.0 38.3

15.4 15.6

8.4 7.2

4.1 3.7

2.6 0.7

52.9 53.1

16.00 16.35

12.72 12.20

7.62 8.22

5.50 5.17

4.10

11 12 2

12 2 41

12 12 40

12 34 49

12 33

4 1

13 46

35 32

13 15

Exl. Thr 38.1

Adic 43.7

Exl. Thr 37.4

Adic 43.1

At 11 22 Exl. Thr

At 12 20

1860 Apr. 21. El. 10 34 0

♌ Leonis

Time lost

Juk.

302 5

+2 72.0

28

H	23.3
G	18.7
F	4.2
E	<u>7.7</u>
	13.67

after Transit
 about as usual

El. 9m 38.8
 Alt 64.2

1860 Apr. 24.

New Sheet El. 11 55 0

H.C. 554

Leonin

H.C. 566.

H.C. 573.

H.C. 580.

45.6

17.8

32.7

1.0

2.6

49.2

21.4

36.2

4.6

6.2

52.7

24.65

39.6

8.0

9.4

56.1

28.3

43.0

11.2

12.7

59.7

31.8

46.5

14.9

16.3

11 22 52.66

11 30 24.79

12 0 39.60

12 12 7.94

12 19 9.44

312 15

- 0 47.3 ?

312 15

+ 3 46.0 wt. 1
47.8 wt. 1/2
56.6 wt. 1

(312 0)

- 2 63.8
71.0

20.8 20.7 P.W.

312 (5)

= 10 83.0
91.8

311 40

= 1 93.0
96.9

following

29.2 29.6

25.6 25.7

6.3 7.6

16.1 15.5

19.30 19.60

44.2 50.3

27.2 26.8

7.9 7.9

18.1 19.2

45.60 44.05

same error here

23.0 23.2

19.4 18.6

0.9 59.8

9.9 9.8

13.20 12.85

21.9

18.2

58.2

7.8

11.52

11 33 54

11 29 32

30 6

30 56

12 0 11

1 25

12 11 56

13 3

12 18 51

19 38

H.L. 584

21.0

24.3

28.0

31.1

(35.0)

12 26 27.88

 γ^1 Virginis

5.4

8.8

12.5

15.6

19.3

12 35 12.32

H.C. 595

12.9

16.4

19.8

23.2

27.0

12 45 19.86

H.L. 602

7.2

10.7

14.1

17.3

21.1

12 58 14.08

H.L. 608

51.6

55.1

56.5

1.8

5.8

13 10 58.56

$$\begin{array}{r} 311.40 \\ - 140.7 \\ \hline 170.7 \end{array}$$

20.8

17.0

58.6

7.4

10.95

312

$$\begin{array}{r} 312 \\ 312.0 \\ \hline 624.0 \end{array}$$

20.9

19.9

14.0

13.6

54.2

54.5

4.3

4.0

8.35

8.02

311.20

$$\begin{array}{r} 311.20 \\ + 154.8 \\ \hline 466.0 \end{array}$$

23.12

18.9

59.0

9.2

311.5

$$\begin{array}{r} 311.5 \\ 498.5 \\ \hline 810.0 \end{array}$$

5.16

1.0

43.1

51.3

312.5

$$\begin{array}{r} 312.5 \\ 41.6 \\ \hline 354.1 \end{array}$$

14.16

12.2

52.1

1.6

$$\begin{array}{r} 12 \ 26 \ 3 \\ 26 \ 53 \end{array}$$

$$\begin{array}{r} 12 \ 34 \ 50 \\ 35 \ 38 \end{array}$$

$$\begin{array}{r} 12 \ 45 \ 11 \\ 46 \ 25 \end{array}$$

$$\begin{array}{r} 12 \ 57 \ 40 \\ 58 \ 51 \end{array}$$

$$\begin{array}{r} 13 \ 10 \ 18 \\ 11 \ 22.5 \end{array}$$

Observation Script

The observation of γ^1 Virginis is more difficult than to observe the stars as one mass.

At 13^h on 4th Mar. 34.6At 13^h — 34.2

Bar 29.786

A. 7.2

El 13 21 0

1860 Apr. 26th El. 11 12 0

El 11 51 0

HL. 551

Leonis

HL. 563.

HL. 566

HL. 573

41.4

20.8

48.6

3.8

45.2

24.3

52.0

7.4

48.6

27.6

55.7

10.8

52.0

31.4

58.9

14.3

55.5

(34.9)

2.0

17.8

11 16 48.54

11 30 27.80

11 53 55.44

12 12 10.82

No. R.

~~11 55 10.82~~

$$\begin{array}{r} 311.15 \\ - 280.5 \\ \hline 30.65 \end{array}$$

$$\begin{array}{r} 312.15 \\ + 358.5 \\ \hline 66.8 \end{array}$$

$$\begin{array}{r} 312.5 \\ - 067.3 \\ \hline 245.1 \end{array}$$

$$\begin{array}{r} 312.0 \\ + 294.2 \\ \hline \end{array}$$

$$\begin{array}{r} 312.5 \\ - 1105.9 \\ \hline \end{array}$$

$$\begin{array}{r} \text{II} \quad \text{I} \\ 25.6 \quad 27.0 \\ 20.9 \quad 22.0 \\ 3.1 \quad 4.0 \\ \hline 12.8 \quad 12.5 \\ \hline 15.60 \quad 16.37 \end{array}$$

$$\begin{array}{r} 26.1 \quad 26.4 \\ 23.2 \quad 21.7 \\ 5.2 \quad 5.6 \\ \hline 12.4 \quad 12.6 \\ \hline 16.72 \quad 16.57 \end{array}$$

$$\begin{array}{r} 21.15 \\ 18.3 \\ 0.4 \\ 8.8 \\ \hline 12.25 \end{array}$$

$$\begin{array}{r} 25.16 \\ 22.1 \\ 3.7 \\ 12.7 \\ \hline 16.02 \end{array}$$

See following

11 16 24
17 13

11 30 10
30 58

11 53 34
54 28

11 55 24
12 01 38

Set I (plus second)
we not worth much
day wks 1/2

Ext. Temp. 42.4
Ave 47.9

faint and
doubtful.

1860 Apr 26
η Virginis

El. 12 10 0 R.D.B.

Al 584

γ Virginis

At end El 13 4 0

18.7

23.6

8.1

78

22.2

27.3

11.8

11.5

25.9

30.8

15.3

14.7

28.9

34.0

18.7

18.0

32.7

38.0

22.3

21.8

12 13 25.68

12 26 30.74

12 35 15.24

12 44 14.76

3 12 5
+ 2 44.9
45.03 11 40
- 1 60.33 12 50
- 2 84.7
91.0
98.33 12 10
- 0 41.4
49.6

17.10 16.19

16.19

10.14 8.6

Declination
watching

12.5 11.8

13.5

2.6 4.0

54.9 54.6

55.9

47.0 44.8

1.7 2.4

2.8

53.5 54.8

6.52 6.42

7.27

58.37 58.55

12 13 3

14 7

12 26 57

12 33 42

34.24

35.36

At 12^h 20^m Est. M. 41.0
Alie 46.7At 13^h est. M. 40.0
Alie 46.2

Clouded up

1860 Apr. 27th 26.10 40 0.
S.C. 532?

S. 544.

S.C. 551

S.C. 555

S.C. 558

	16.7	43.2	12.7	21.2
No. R.	19.9	46.7	16.4	24.7
Beg. of bk. abt. line	23.4	50.4	19.7	28.2
of last wire	26.8	53.6	23.0	31.7
	30.4	57.3	26.6	35.2
11 6	23.44	11 16	50.24	11 29
			19.68	11 34
				28.20

311 35
-1 27.5

311 10
-3 8.0
14.2

311 15
-2 64.4
74.1

311 10
-2 95.8
97.8

312 5
+1 47.0

28.5
26.0
9.8
15.7
20.0

21.3 21.7
18.8 19.7
1.1 1.2
6.6 7.1
11.95 12.42

28.10 27.13
23.8 23.6
6.7 7.1
15.5 15.4
18.50 18.35

16.12
13.0
56.8
3.0
7.15

12.16
9.0
51.2
0.5
3.32

10 51 32

18 5 59
7 5

11 15 53
17 22

11 28 46
29 46

11 34 50

Doubtful, or
little. wt. $\frac{1}{2}$

Mag. 9.

Mag. 6.7

Mag. 9.10

At 10^h 40^m Ext. Temp 47.6
Air 49.8

Baro. 30.163
A. 54. 58.5

faint
doubtful.

1860 Apr. 27 continued.

(3 Virgin

S.C. 563'

S.C. 564

S.C. 570

7 Virgin

59.9

3.4

6.9

10.1

13.9

59.8

3.3

6.8

57.0

0.3

3.8

7.3

57.5

54.7

58.1

1.5

5.0

20.3

24.0

27.4

30.8

34.4

11 44 6.84

11 54

11 55

12 4 58.16

12 13 27.38

$$\begin{array}{r} 309.35 \\ - 4.25.4 \\ \hline 312 \end{array}$$

$$\begin{array}{r} 311.45 \\ + 1.16.3 \\ \hline \end{array}$$

$$\begin{array}{r} 311.45 \\ + 2.68.8 \\ \hline \end{array}$$

$$\begin{array}{r} 311.10 \\ + 4.1.0 \\ \hline 6.1 \end{array}$$

$$\begin{array}{r} 312.5 \\ + 13.3 \\ \hline + 2.18.0 \end{array}$$

$$\begin{array}{r} 25.6 \quad 27.1 \\ 22.4 \quad 23.6 \\ 4.6 \quad 5.2 \\ \hline 10.4 \quad 11.2 \\ 15.75 \quad 16.78 \end{array}$$

see following

$$\begin{array}{r} 29.2 \quad 30.0 \\ 25.4 \quad 27.0 \\ 7.9 \quad 7.8 \\ \hline 16.7 \quad 15.9 \\ 19.80 \quad 20.17 \end{array}$$

$$\begin{array}{r} 24.0 \\ 21.8 \\ 2.5 \\ \hline 10.3 \\ 14.61 \end{array}$$

$$\begin{array}{r} 23.2 \quad 23.5 \\ 19.6 \quad 19.1 \\ 1.5 \quad 2.3 \\ \hline 10.4 \quad 10.4 \\ 13.67 \quad 12.82 \end{array}$$

(The time for dec. of
this star comes after
ward).

Some of the earlier
were lost of both

$$\begin{array}{r} 11 \quad 43 \quad 32 \\ 44 \quad 36 \end{array}$$

11 56 4

11 55 28

$$\begin{array}{r} 12 \quad 4 \quad 43 \\ 5 \quad 25 \end{array}$$

$$\begin{array}{r} 12 \quad 13 \quad 7 \\ 13 \quad 45 \end{array}$$

1860 Apr. 27th continued.
S.C. 582.

El. 12 41 0

S.C. 584.

γ Virginis

11.8.	25.4	10.0
15.4	29.0	13.5
18.9	32.5	16.9
22.3	35.7	20.3
25.9	39.4	23.9
12 20 18.86	12 26 32.40	12 35 16.92

311 35
- 0.472

311 40
- 1.66.8
- 1 71.8

312 50
- 2 75.2
- 82.3

17.13
14.0
55.8
2.9
7.50

14.10
12.6
53.9
0.4
4.97

16.16 16.17
12.3 10.3
53.0 52.7
1.0 0.7
9.72 5.10

12 20 52.5

12 26 14
26 58

12 35 0
35 46

Apr 12 32

tz

Ext. Temp 43.0
Air 48.3

Baro.
A. Th.

30.194
53.8

1860 May 21 El. 10 13 0

83 Lemois pr.

L.C. 558

L.C. 562

L.C. 568

 η Virgin~~19.4~~

19.8

28.3

26.6

30.2

21.8

25.5

28.9

32.2

35.7

27.3

30.8

34.4

37.7

41.2

52.3

55.9

59.4

2.7

6.3

21.1

24.7

28.2

31.4

35.2

17 20

11 34 28.82

11 48

34.28

12 2

59.32

12 13

28.12

1 6.84

1 4.97

1 4.80

1 6.88

308 25
+2 56.8
64.8
70.8312 5
+1 37.0
42.1311 55
-4 21.0
23.0312 10
+2 84.0
95.0312 5
+2 48.6
55.1 18
30.H 16.3 16.7
G 17.7 17.2
F 53.8 54.6
E 1.6 2.5
7.35 7.7510.6
12.4
49.4
58.6
2.8012.7
12.8
48.2
58.3
3.0017.6
17.0
53.4
5.0
8.2510.8 17.1
12.8 12.6
48.1 48.8
58.1 58.8
2.45 2.82

faint

bright for 8/9 mg.

17 19 50
20 11
20 52.517 34 4
35 117 48 13
49 312 2 47
4 912 13 19
14 26

L.C. 558

L.C. 562
L.C. 568
L.C. 568

1860 May 4.

At End El. 12 52 0

 γ 12 12 12

S.C. 595.

S.C. 598.

10.6

17.9

5.4

14.2

21.5

9.0

17.6

25.0

12.5

20.9

28.4

15.8

24.6

32.0

19.2

12 35

17.58

12 45

24.96

12 49

12.38

1 4.86

1 4.98

312.50

311.20

311.20

-287.3

+150.1

-317.0

-292.6

+158.5

8.7 9.2

20.7

See Preceding
star.

10.0 9.0

21.3

44.7 45.3

56.4

55.3 55.9

7.5

59.67 59.85

11.47

12 34 45

12 44 51

12 50 0

35 34

45 46

At 12 52 El. 61.2 40.4

At 12 52 El. 61.2 40.4

At 12 52 El. 61.2 40.4

At 12 52 El. 61.2 40.4

1860 May 5.

El. ^{h m s} 11 22 0

New Sheet El. 12 21 0 - 12 22 0

v Leonis

S.C. 564.

 η Virginis

S.C. 584.

 η VirginisA lost through
fault of circuit.2⁵ Dec. 24 after Transit

49.9

18.6

23.3

21.1

53.6

22.2

27.1

11.7

56.8

25.5

30.5

15.0

0.3

28.9

33.8

18.4

2.8

32.6

37.6

22.0

12 2 56.84

12 13 25.56

12 26 30.46

12 35 15.04

312 10
- 6 77.6
85.3312 10
+ 7 93.2
02.1312 5
+ 2 31.6
33.0
38.6311 40
- 1 40.6
46.2312 45
- 2 92.0
97.9

H	11.4	10.7
G	10.3	11.1
F	45.9	46.4
E	56.4	56.7
	<u>1.00</u>	<u>1.22</u>

13.7
13.4
49.4
<u>1.0</u>
4.38

14.5	15.8
16.4	16.2
51.8	51.9
<u>3.4</u>	<u>2.6</u>
6.57	6.62

19.6
21.8
57.6
<u>7.9</u>
11.72

8.2	9.3
8.9	8.0
42.2	41.6
<u>53.5</u>	<u>54.6</u>
58.20	58.37

Star faint

11 29 57

11 2 38.
3 36.12 12 38
13 2
13 4212 26 8
27 112 34 47
35 39At 11 42^mAlt. Sm. 51.3
Alt. 55.5At 12 42 El. Sm. 49.4
Bar. 29.978
A. Th. 59.2

Examine type stars

Sl. 595

Sl. 598

Sl. 602

Sl. 606

Sl. 608

35.6

49.8

9.6

28.6

56.0

39.2

53.3

13.2

32.1

57.6

42.7

56.8

16.7

35.3

1.0

45.9

0.2

20.2

38.7

4.2

49.7

3.7

22.7

42.3

0.0

12 45 42.62

12 49 56.76

12 58 16.68

13 3 35.34

13 11 1.98

311 20

- 1 20.2
29.0

311 20

+ 3 88.3
95.4

311 5

- 4 75.3

312 0

- 4 97.0
5.04.0

312 5

- 3 56.6
64.0

18.1

18.8

17.6

19.6

8.6

19.0

17.4

17.4

21.8

10.6

52.9

54.3

53.1

55.6

44.5

6.9

5.4

2.9

75

56.1

Star faint
607 missing

12 44 58

46 16

12 49 11

50 16

12 58 52

13 3 19

4 1

13 10 34

11 33

1860 May 5 continued. At Ent El. 13 38 0.

3 Virgins

32.3	7.9
35.8	11.4
39.3	14.9
42.8	18.2
46.4	21.9

13	15	39.32	13	28	14.86
----	----	-------	----	----	-------

$$\begin{array}{r} 311 \ 30 \\ - 0 \ 99.6 \\ \hline \end{array}$$

$$\begin{array}{r} 312 \ 5 \\ + 3 \ 94.2 \\ \hline 375 \\ 41.0 \end{array}$$

H	31.6	14.4	14.0
G	34.5	15.8	16.2
F	8.0	51.3	51.1
E	19.2	2.8	1.9
		6.07	5.80

8th 9th mag.

13 16 19

13	27	49
	28	32
	29	54

At 13 34

Baro

Baro	29.979
A.H.	57.6
Q.H.	48.2
Adic	53.4

1860 May 11. ⁴ EL. 1246 0? 11.1255 0

2 Virgin

—
31.2
34.7
38.3
—

0.3
4.0
7.5
10.8
14.5

4.2
7.6
11.3
14.5
18.0

45.0
48.5
51.9
55.3
58.8

13 18 7.42
(17 52.2)

13 21 11.12

13 27 51.90
(27 36.7)

2 Virgin

42.5
46.1
49.7
52.9
56.6
13 54 49.56
(34.4)

312.5
5.2
-3 13.0

to Dec.

311.45
-0 94.6 } both after
99.3

312.5
66.3
+4 70.0

309.55
59.5
-3 66.5

27.2 27.5
26.6
3.2
15.3
16.07

+ 51.0
49.8
26.6
39.5
41.72

38.5 38.0
39.2 37.8
15.4 15.8
27.8 27.8
30.22 29.85

34.0 34.6
33.9 32.8
10.2 10.6
22.3 20.6
20.10 20.65

13 10 1
11 19

13 21 49
22 18

13 27.52
About 3 wire 1 Dec.
13 28 42

13 54 13
55 33

Exp. In 56.7
Obs. 58.7

Observations unsatisfactory. Poor seeing for faint stars.

Investigation of Microscope Readings.

1860 Mch. 29 - May 11.

Δ . Dec. $-1^{\circ}0' + 2^{\circ}0'$
 Correction to reduce to mean

	H.	G.	F.	E.	H-F	Dec.	Temp.
Mch. 29 4 Sept.	-13.88		+5.02		-4.43		
	14.68		+5.22		4.73		
Apr. 2 57 Dec.	15.10		+6.00		4.55		
	15.78 11.56		+5.82		4.98		
7 8 Apr.	11.68		+5.02		3.33		
	13.12		+5.78		3.67		
33 Sept.	13.23		7.67		2.78		
	12.85		7.25		2.80		
18 η Vir.	10.28		10.12		-0.08		
	9.48		9.62		+0.07		
γ Vir	11.90		13.40		+0.75		
	11.03		10.97		-0.03		
24 v Leo.	9.90		13.00		+1.55		
	10.00		12.00		1.00		
566	8.60	Rejct.					
	9.25						+1.29
573	9.70		12.40		+1.35		
	10.35		13.05		+1.35		
580	10.38		13.32		+1.47		
584	9.85		12.35		+1.25		+1.08
γ Vir	12.55		14.15		+0.80		
	11.88		13.52		+0.82		
26 v Leo.	9.38		11.52		+1.07		
	9.83		10.97		+0.97		
563	9.25		11.85		+1.30		
586	9.58		12.32		+1.37		
η Vir	10.48		11.62		+0.57		+0.98
	10.48		11.82		+0.67		
584	9.63		11.37		+0.67		
γ Vir	12.03		11.37		-0.33		
	10.05		11.75		+0.85		+0.51

		H	G	F	E	(H+F)
Apr. 27	532	-8.50		+10.20		+0.85
	544	9.35		10.85		1.50
		9.28		11.22		0.92
	551	9.50		11.80		1.15
		8.95		11.25		1.15
	555	8.95		10.45		0.75
	558	9.28		12.12		1.42
	564	9.40		11.90		1.25
		9.83		12.37		1.27 + 1.15
	570	9.35		12.15		1.40
	η Vir	9.53		12.17		1.32
		9.68		11.52		0.92
	582	9.80		11.70		0.95
	584	9.03		11.07		1.02
	γ Vir	10.88		12.72		0.92
		11.60		12.40		0.90
May 4.	558	7.80		13.40		+ 2.60
	562	9.70		14.80		2.55
	568	10.65		14.85		2.10
	η Vir	8.35		14.35		2.50 2.49
		8.28		14.02		2.82
	γ Vir	9.03		14.97		2.97
		9.35		14.55		2.60
May 5.	595	9.23		15.07		2.62 2.84
	ν Leo.	10.60		15.10		2.135
		9.48		14.92		2.67
	568	9.32		14.98		2.83
	η Vir	9.93		14.77		3.42
		9.18		14.72		2.77
	584	7.88		14.12		3.12
	γ Vir					

Temp.
Rising

1859phae.proj..122W

1860 May 16th Daylight Observations on Circle

Illuminating Lamp used.

Circle A as before (West).

	292° 0'	302° 0'	307° 0'	312° 0'	317° 0'
H	36.6	36.8	38.6	37.6	42.9
G	30.0	35.2	36.2	36.6	39.2
F	18.2	16.8	15.2	15.4	16.1
E	<u>9.8</u>	<u>24.4</u>	<u>24.9</u>	<u>29.0</u>	<u>31.8</u>
M	23.65	28.30	28.72	29.65	32.50
M-H	-12.95	-8.50	-9.88	-7.95	-10.40
M-F	+5.45	+11.50	+13.52	+14.25	+16.40
M(F+H)	-3.75	+1.50	+1.82	+3.15	+3.00

Observations
These were very rough indeed.

4th 0th E.C.

Exp. Time 54.8

Adie 55.3

309° 30'

43.16

39.5

21.0

31.0

33.77

-9.83

+12.77

+1.47

311° 0'

36.16

35.9

15.4

27.4

28.82

-7.78

+13.42

+2.82

310° 0'

39.5

36.7

16.3

27.6

30.02

-9.48

+13.72

+2.12

1860 May 17.

El 11 56.0

El 12 45.0

7 Virginis

El 588

El 598

El 602

1.6

3.6

46.8

45.9

5.2

7.2

50.6

49.4

8.6

10.6

54.0

12.0

14.1

57.3

Circuit in fault

15.5

17.8

59.7

3.2

6.8

12 13 8.58

12 32 10.66

12 39

12 48

12 57

312 0

312 15

312 5

311 20

311 10

- 6 46.8
52.6- 0 61.4
67.4+ 2 57.8
66.9- 2 81.0
89.0

+ 5 45.0

H 34.3 34.4

39.7

33.4

26.7 27.7

31.2

G 34.1 33.1

37.8

33.6

26.5 26.8

30.6

F 11.0 12.0

17.7

12.8

3.4 4.6

10.3

E 24.9 25.2

28.3

24.6

17.5 18.1

20.1

26.10 26.30

30.97

26.10

29.70

27.10

12 12 35

12 31 53

12 39 33

12 48 12

12 58 46

13 26

32 41

40 40

49 17

Star faint (7th m.)* J
13 Hk. for sec.
2 w. int

Exp. Int. 49.05

Adie 53.8

El 12^h 20^m

El. 13 34 (11)

♂ Virgin

le 608

59.4

2.9

6.4

9.8

13.4

13 3 6.38

40.8

46.3

47.5

51.1

13 10 —

317 0

+ 5 68.0
74.8

312 5

-3 0.6
7.3

42.3 43.0

39.6 41.0

17.2 17.7

32.8 32.7

32.97 33.60

29.25 30.35

23.2

24.3

3.5

16.6

16.90

17.

13 2 47
3 3913 10 21
11 92nd Able. for sur.
1st w. int

Exp. Jm 48.0

Exp. Jm 47.0
Baro. 30.273
A. T. 56.4

1860 May 19th
 S.C. 585
 1st w. bet

21.12.47 0 Clouds.

El.

0 Virgins

2 Virgins

311 40
 - 1 23.4

312 5
 + 4 66.8
 75.1

316 55
 - 3 26.1
 35.6

322 35
 + 1 38.4
 43.4

312 0
 - 3 79.6
 88.3

H	39.6	42.13	28.2	27.14
G	40.0	43.2	27.4	27.2
F	14.3	18.0	1.3	1.4
E	31.5	34.4	19.1	19.3
	31.35	34.47	19.00	18.82

56.4	57.6	31.0	31.0
48.3	48.0	34.5	33.8
16.8	18.4	8.0	8.0
44.9	44.3	24.6	24.8
41.6	42.07	26.5	26.6

alt. 7m. 60.7

At 13^h 15^m
 Base 29.600
 A.J. 66.3
 alt. 7m. 59.7

alt. 7m. 58.7
 alt. 62.6

$$\begin{array}{r} 311.40 \\ + 377.7 \\ \hline \end{array}$$

$$\begin{array}{r} 27.0 \\ 29.7 \\ 3.7 \\ 18.6 \\ \hline \end{array}$$

$$\begin{array}{r} 309.55 \\ - 1.67.2 \\ 65.5 \end{array} \left. \begin{array}{l} \\ \\ \end{array} \right\} \text{both after}$$

$$\begin{array}{r} 41.7 \quad 42.8 \\ 43.9 \quad 43.4 \\ 17.1 \quad 17.1 \\ 32.6 \quad 33.6 \\ \hline 33.82 \quad 34.22 \end{array}$$

$$\begin{array}{r} \text{Run} \\ H + 2.4 \\ G - 3.8 \\ F - 0.4 \\ E + 3.4 \end{array}$$

Run denotes the excess of 5' on the line
over 300" of the microm.

1860 Aug 23. ^d El. 13 52 0 α Virginis β^1 Virginis ρ Virginis α^1 Librae α^2 Librae

(19) 27

(230) 58

(23) 00

(34) 58

(26) 59

(38) 00

(30) 06

(41) 58

(33) 73

(45) 26

14 43

$$\begin{array}{r} 309.55 \\ - 176.8 \\ \hline 83.7 \end{array}$$

$$\begin{array}{r} 313.45 \\ - 256.4 \\ \hline 61.2 \end{array}$$

$$\begin{array}{r} 313.45 \\ - 064.3 \\ \hline 70.3 \end{array}$$

$$\begin{array}{r} 327.35 \\ + 3.49.8 \\ \hline 58.3 \end{array}$$

$$\begin{array}{r} 327.35 \\ - 221.3 \\ \hline 26.3 \end{array}$$

36."4 36."6

25."7 25."4

32.7 32.8

22.4 22.4

11.4 11.6

1.1 1.2

24.6 25.417.5 18.4

26.28 26.60

16.68 17.10

47."6 47."8

28.6 29.4

59.7 60.3

31.3 30.4

26.80 26.98

$$\begin{array}{r} 14 \text{ } 43 \text{ } 60.1 \\ 44 \text{ } 23 \end{array}$$

$$\begin{array}{r} 14 \text{ } 43 \text{ } 9 \\ 43 \text{ } 54 \end{array}$$
At 13^h 50^m

Baro. 30.077

A.T. 57.03

ExL. Juv 50.8

Ee. 15 53 0.

1 Serpenti

10 Serpenti

Alcorae

2 Serpenti

3 Ursae Min.

56.60

7.06

5.18

0.26

11.00

Time lost.

22.33

3.63

14.93

S. ly. out of order.

39.33

6.95

18.72

55.38

10.64

22.86

13.63

15 22 3.62

15 29 14.91

15 49 39.17

44.83

7.42

26.0

311 45

309 50

285 0

305 20

- 0 72.4

+ 1 33.9

+ 3 86.1

+ 5 62.4

39.8

30.6

28.5

30.0

38.1

28.6

28.3

28.6

16.5

6.9

10.9

9.3

31.0

21.6

10.7

19.5

15 21 21
22 27

15 37 37
38 34

Limb under E very bad.

At 14 55^m
9th Juv. 49.7

At 15 30^m
2nd Juv. 49.3

A

At 15 54
Bar. 30.386
A.T. 55.8

1860 May 24

 α Virgin

6.93

10.54

14.00

17.40

20.90

 ϕ Virgin

22.40

26.10

29.44

32.84

36.53

 μ Virgin

no R.

 δ Librae

M. lat.

23.70

27.14

30.78

34.41

 α Librae

31.32

34.96

38.66

42.03

45.70

12 13

13.95

14 21

29.46

14 43

14 43

38.53

Ind.

B.J.

0.27

11.71

312 5

+ 4 ^{04.0}_{14.6}

313 45

- 0 ^{64.}_{72.}

317 15

+ 5 ²⁸

327 35

+ 3 ^{55.2}_{71.3}

327 35

- 2 ^{27.4}_{35.7}

30.6 30.8

29.2 28.2

9.8 9.4

23.7 23.4

24.8 26.0

23.0 22.1

2.8 2.1

18.0 18.0

22.0

20.6

56.2

14.7

12 12 22

14 0

14 20 36

22 7

14 36 42

14 42 29

44 52.1

14 43 13

44 12

Ext. Jm. 46.6
at 14 ²³

1859phae.proj. 1-22W

11 end bl 15 16 0

2 Leap:

2.00

5.50

8.93

12.32

15.90

8.93

311 45

+1 27.5

23.0

28.5

24.5 25.3

21.4 20.8

0.2 0.4

17.1 17.0

14 53 51

54 30

55 33

Bm 30.108

A.M. 56.0

at 15^h 7^m

1860 May 25. El. 12 40 0

El. 598

602

608

2 Uirgin

Notin S.C.

51.56

58.54

42.83

12.25

27.03

55.26

2.00

46.63

15.90

30.51

58.65

5.56

50.00

19.27

34.02

1.98

8.90

53.33

22.80

37.16

5.46

12.63

56.88

26.38

40.82

12 48 58.56

12 58 5.53

13 10 49.93

13 18 19.32

13 22 33.93

52.26

311 20
- 0 89.
96.311 5
- 2 46.4
49.2312 5
- 1 01.6

do Dec.

311 45
- 4 42.0
47.0

36.14

31.6

34.1

35.8

34.0

30.4

36.3

38.8

10.9

7.6

12.6

14.6

27.6

22.8

28.8

29.7

27.22

23.10

22.65

19.60

12 48 43

12 57 46

13 10 23

13 22 3

49 29

58 25

11 26

22 53

faint for a 7th mag.At 13 0^m
El. Th. 62.3

U. 140		2 Bootis		Q Virgin	
3 Virgin	646				664
56.70	13.7	39.2			13.6
0.26	17.1	43.2		No R	17.3
3.67		46.6			20.6
7.00	23.9	50.4			24.0
10.66	27.3	54.3			27.5
13 28 3.66	14 4 20.50	14 9 46.74			14 29 20.60
		19.72			

312 5
+ 6 79.8
5 06.0

311 15
No Dec.

311 20
37.0
+ 1 42.6

313 45
- 0 48.6

311 20
68.7
+ 2 75.1

33.0 32.0
35.1 35.4
10.7 11.1
25.4 25.6

32.9
35.4
10.9
26.4

32.1
34.4
8.9
26.2

45.8
45.0
20.7
37.5

13 27 45
28 26

Very faint and
mic. 3 wire?

14
14 21 56

14 28 54
29 54

At 13 33
Oct. 7m 61.6

^{selected}
 Pairs of Stars within 6° of the North Pole.
 from Johnson's Catalogue (Rev. Oct. 1855)

	Dec. 1860.0. R.A.			A.P.D.		
67 Groombr.	7,90	22 52	+ 4.8	4 27 17"	- 20.0	
146 Groombr.	6,6	46 29	12.1	1 43 46	19.6	!
2 Ursae Min.	4,4	50 17	6.8	4 29 47	19.6	
Polaris	2.0	1 8 2	18.7	1 26 13	19.2	!
339 Groombr.	8.2	1 32 32	11.1	3 45 47	18.4	

Stars for Fundamental Determination

49 Groombr.	4 30.1	+ 0 41.7
8 Ursae Min.	5 5 58	+ 2 41.5
1 Ursae Min.	5 24.51	- 0 24.4
59 Ursae Min.	5 51 8	+ 1 49.2
18 Monocerotis	6 40 34	+ 2 34.9
22 Monocerotis	7 4 43	- 0 14.0
11 Lacin Minim.	7 24 50	+ 2 12.6

The Instrument was reversed

Feb. 1. afternoon from N. W. to N. E.

Bark Feb. 1, midnight — E — W.

Nota

Adie denotes the small thermo-
meter hung near the Pier.

Equator " Point
(acc. to Nautical Almanac)

Apr. 18. ϵ Leonis 287 45 127 Apr.

Mean + 1 6.37

Ref. + 19.6

287 46 27.2

Dec. + 24 24 56.0

E. P. 312 11 23.2

γ' Leonis 291 39 49.52

- 1 33.78

+ 24.2

291 38 39.9

20 32 45.2

312 11 25.1

^{Refraction}
 Determination of the Equator. Point of the hor. circle from
 obs. of Naut. Alm Stars between Apr 7th and May 5th.

Assumed 1) that the Mer. Key is $34^{\circ}00'$
 2) that the cor. for Rains is insensible

The Refractions are taken from Vega's Logarithms (Bessel)

				Ref.				
Apr 7	Or. 312 40	8.15	-13.43	312 39 51.7	54.5	312 40 49.2	-0 26 22.9	312(11) 26.1
	26. 304 50	12.63	-12.92	304 48 5.8	41.7	304 48 47.0	+7 22 39.3	312 11 26.3
18	Vir 312 5	7.92	-58.07	312 4 9.9	54.9	312 5 4.8	-0 6 23.9	312 11 28.7
	γ Vir 312 50	5.33	+93.70	312 51 39.0	56.5	52 35.4	-0 41 12.0	11 23.5
24	Vir. 312 15	19.45	-84.35	312 13 58.1	54.4	312 14 49.5	-0 3 20.7	312 11 28.8
	γ Vir 312 50	8.17	+94.71	312 51 38.9	54.7	52 33.6	-0 41 11.9	11 26.7
26	U Leo. 312 15	16.65	-80.92	312 13 58.73	57.6	312 14 46.3	-0 3 20.6	312 11 27.7
	γ Vir 312 5	6.47	-53.04	312 4 13.43	52.4	5 5.5	+0 6 24.1	312 11 29.6
	γ' Vir 312 49	58.61	+100.71	51 39.12	52.6	52 34.7	41 11.8	22.7
27	γ Vir. 312 5	13.75	-62.66	312 4 11.1	53.9	312 5 5.0	0 6 24.1	29.1
	γ' Vir 312 50	5.41	+94.55	312 51 40.0	55.6	52 32.6	11.8	23.8
May 4	γ Vir 312 5	2.64	-51.34	312 4 11.3	52.9	312 5 4.2	24.4	28.6
	γ' Vir 312 49	59.76	+98.9	312 51 38.7	54.4	312 52 33.1	11.5	24.6
5	γ Vir 312 5	6.60	-55.12	312 4 11.2	52.7	312 5 3.9	24.4	28.3
	γ' Vir 45	58.29	+100.37	312 51 38.7	54.3	312 52 33.0	11.5	24.5
	ζ Vir 5	5.93	-89.59	312 3 36.3	53.0	312 4 29.3	58.4	27.7

Naut. Alm.		γ Vir $\zeta + \sigma$	ν Leo. $\zeta + \sigma$	ζ Vir $\zeta + \sigma$	γ' Vir ± 0.73 P. d. 2. P. ≈ 0.28		
{	Apr 18	28.7	Apr 24	28.8	Apr. 18	x	
	26	31.4	26	29.1	24	22.47 γ' Vir	
	27	33.1			26	$\sigma - \sigma$ $\frac{1.54 + x}{24.01}$	
	May 4	28.6			27		
	5	28.3			May 4	$x = 4.05$	
		29.22	"	28.95	27.70	5	
$\sigma - \sigma$		-0.77		-1.37	-0.6	γ Vir M	
	28.45	5	0.13	0.63	0.0	0.4	γ Vir - γ Vir
	27.58	2	2.57	0.33	6.5	0.1	γ' Vir M = 0.40 51.58 + x
	27.10	1	0.27	0.66	0.1	0.9	
			0.27		0.1		
			0.53		0.3		
By Madhu	28.06		1.10	8.44			

				Refr.		Dec.			
May 17 7 Vir	312 0	26.20	+ 6.504	34 312 6	7.34	53.75	+ 0 6 25.0	312 11	26.1
8 Vir	317 0	26.20	- 4.293	316 58	7.14	63.45	- 4 47 45.3	312 11	26.6
		33.28			7.32				26.4

8' Orion
8' Orion

59. Orion

1859phae,proj.,122M