

KG
11366
v. 727

Zone stars
Observations and
From Apr 9 1870
to Apr 27 1870

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

Sundry notices

The microscopes are always to be read with increasing readings and the last motion is to be given in the same direction

The microscopes are numbered thus:

Lamp ^{West}~~East~~ West Circle

Lower north A	Lower south B	Upper south C	Upper north D
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Lamp ^{West}~~East~~ East Circle

Lower north E	Lower south F	Upper south G	Upper north H
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By Lamp ^{West}~~East~~ is meant the position of the telescope when the end of the axis which is lighted to give a dark field and bright wires is West

The stroke is to be read with increasing readings in the opposite direction of the micrometer thread for increasing readings, i.e. the micrometer for the ^{West}~~East~~ circle is to be turned outward ^{from the center} and the thread appearing to move in the order E. F. G. H. the reading of the circle will be in the order H. G. F. E. For the ^{West}~~East~~ circle the micrometer is to be turned ^{inward} ~~toward~~ and the center, but the circle is still to be read (for stroke) in the opposite direction from the apparent motion of the thread.

Increasing declinations give decreasing ^{south} zenith distances.

When ~~for~~ the declination micrometer is set at 15 R or, for $S = 42^\circ 23'$ and $z = 0$ the reading of the microscopes is nearly as follows

E	F	G	H
43° 30'	133° 30'	223° 30'	313° 30'

When the declination micrometer is set at 15 R for $S = 50^\circ 0'$ and $z = 9^\circ 34'$ the reading of the microscopes is nearly

E	F	G	H
35° 50'	125° 50'	215° 50'	305° 50'

For $S = 51^\circ$

E	F	G	H
34° 50'	124° 50'	214° 50'	304° 50'

Star May. m to D E P Sum Mean attn ntg Sced Sum ω
 And=

Pr 3077 ^{h m s}
^{23 58} 4.3 13.0 16.6 20.6 24.4

(1855) 50 ^{0 12.1}
 10.0 18.9 23.2 28.0 32.6

^{0 22} 50 ^{h m}
^{23 10} 34.7 42.3 46.0 50.0 54.0

533 ~~44~~ 15 14.7 ³³ 54.4 1.3 5.3 9.4

9.0 ^{18 m}
~~21.4~~ 21.4 ^{25.0} 25.0 ^{29.0} 29.0 33.0

12.0 ~~1790~~ ^m 21 6.0 13.7 17.7 21.4 25.7

34.0 77 24 13.0 20.7 24.7 28.4 32.6

279 73 31 36.8 44.7 48.6 52.4 56.4

43.0 90 39 41.4 49.1 53.0 57.0 61.1

		ϵ	ζ	η	θ
15	4	28.8	23.7	22.0	27.5

~~22~~ ~~16~~ ¹⁰ 15	0	18.3	13.5	13.8	2.8
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10	0	26.8
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23 13 18.5	~~50~~ ¹⁰	~~4~~ ⁶	~~54.3~~ ^{26.3}	~~54.3~~
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15 37.0	~~50~~ ⁵⁰	~~1~~ ⁴	~~5.0~~ ^{55.3}	~~54.3~~
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18 0.0	~~40~~	~~0~~	~~27.8~~	~~27.8~~
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20 50.5	~~15~~ ⁴⁰	~~3~~ ⁰	~~32.6~~ ^{27.8}	~~27.9~~ ^{21.7}
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23 59.5	~~30~~ ¹⁵	~~8~~	~~32.6~~	~~27.9~~
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31 20.2	30	4	49.8	40.7
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34 28.0	5	4	23.7	18.3
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h_m 5'
233910.5 18.2 22.0 25.8 30.0

1.7 9.3 13.2 17.2 21.2

57.7 7.2 11.4 13.2 19.1

57.5 5.0 9.4 13.2 17.1

11.5 19.4 23.2 27.2 31.0

11.3 19.2 23.0 27.0 31.1

58.0 6.7 9.4 13.5 17.5

38.2 45.6 49.6 53.4 57.4

4.8 12.7 16.5 20.4 24.4

7.8 15.4 19.2 23.1 27.2

38 56.0 55 4 32.9

28.8

40 55.7

42 43.0

44 38.0

46 54.7

48 52.0

50 43.8

53 19.0

54 54.0

57 51.0

38.4 46.0 49.7 53.8 58.0

14.2 22.0 26.2 29.9 33.9

59.7 7.8 11.5 15.4 19.7

52.6 6.5 10.2 14.0 18.2

22.6 30.4 34.5 38.3 42.2

27.8 35.7 39.6 43.6 47.7

59.7 7.7 11.7 15.5 19.4

31.9 39.5 43.7 47.6 51.6

36as $\frac{h}{0.315}$ 3.2 1.3 5.5 4.4 13.8 α 6as $\frac{h}{0.351}$ 7.3 26.1 30.5 35.0 39.5

5 23.5

7 20

9 40.3

12 44.5

18 4.0

20 12.8

22 43.0

27 13.7

31 34.6

34 56.5

Gas

 $\begin{matrix} \text{h} & \text{m} & \text{s} \\ 0 & 39 & 38.1 \end{matrix} \quad 45.2 \quad 49.0 \quad 52.8 \quad 56.4$

The observations of Nov. 7 are not certainly to be relied upon as it was discovered by an examination of Nov. 9 that the east circle had changed its position, the pointer having been originally set at 0 when the instrument pointed to the zenith. The theory is that the circle has moved by friction against the frame of the glass case. It is yet to be seen whether it is this or whether the microscopes are disturbed by putting on the cases.

On account of the apparent-unsteadiness of the east circle the west fixed circle will be used.

The pointer was this day set exactly half way between the microscopes

To get true zenith distances from the reading of the microscopes, subtract 45° from the reading of A and add 45° to the reading of D. For B and C subtract and add 22.5° . All the readings of all the microscopes are to be reduced to the pointer reading.

39 21.3-

Nov. 10 1870

$$m = +.37 \quad c = 0$$

Star	mag.	T_1	T_2	T_3	T_4	T_5	T_6	Mean	n	g	ntg'd
α Cygni 44 45	20	39.6	7.8	15.0	18.0	21.5	25.6	20.05	20	39	8.00 + .37

-12.00
8.05
-12.05

μ Aquar -9 28	47	46.2	34.6 33.6	37.5 36.5	39.8 38.8	40 41.4	20 47 46.30
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1879	54	27.1	15.3 55.0	24.7 8.8	44.0 23.7	58.3 38.3	20 53 22.34
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δ Cygni 38 7	21	34.4	12.2 18.3	18.3 21.3	21.3 24.5	24.5 27.7	22.05	21	4	12.05	17.8
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-10.80
12.00
+12.00
12.05

ζ Cygni 42 21 28 41	9	31.8	17.4 37.3	20.4 40.2	23.7 43.0	26.0 45.7	21 09 31.74
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α Cephei 61 38	17	10.0	35.5	45.7	50.8	56.2	1.1	53.45	21	17	35.36
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-18.15
35.32
+04

δ Cephei 59 40	22	26	3.24	24.3	38.2	43.0	47.3	52.2	45.18	22	26	29.27
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15.92
29.26
+01

~~37 53.5 9.1 16.8 20.6 24.7 28.3~~

37 53.5 9.1 16.8 20.6 24.7 28.3

~~36 31.5 44.8 52.5 56.6 0.3 4.4~~

34 05	9.3	22 36	31.5	44.8	52.5	56.6	0.3	4.4
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50° 42.5	8.4	41	45.5	2.4	10.4	13.9	17.9	21.8
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Point	Station	A	B	C	D	
70 35'	0	50.8	52.8	57.4	57.4	Bad.
			50.8			
			103.6			
			51.80			

40 10'	4	1.3	- 1.1	2.2	10.0
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2 35'	4	49.8	49.9	47.7	58.8
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34 15'	4	1.0	- 2.2	0.0	3.8-
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4 35'	0	57.0	0	56.4	1 0.0	7.9
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55	50.0	43.6
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40	27.5	—
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2	35.4	29.2
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Pointa Shooter A 6

$$\delta = -23^{\circ}$$

150 50 1 24.3 19.7

440 1220-32-1170-08
1210

22 4860
51 0.10
31 4850
-36.15
-08

31 1235
4.9

0 2 0 2 57.8 57.7
6 15 1 0.8 0.551

145 2 57.25-69-00-00
56.56

22 4860
2 56.56
19 52.04
-35.94
+1.88
19 15.2
22.5

15 1 0.8 55.1

0 15 1 0.8 55.1

1159 57.95 -23-00-00

22 4860
15 57.92
6 56.88
-33.96
+1.52
6 17.44
31.0

163 55 0 59.8 58.6

154 57.70-23-1216-08
1247

22 4860
55 45.23
27 3.37
-33.32
+1.38

26 3043
28.9

120 55 4 34.6 30.2

648 3240-103-90-04
10.07

22 4860
59 22.33
23 26.25
-33.11
-12

22 5304
53.6

155 20 0 55.8 49.7

171 30 1 20.7 14.9

356 1780-31-1244-08
13.13

22 4860
31 04.67
51 43.93
-82.88
+1.21
51 1166
11.3

30. 2 29.9

1870 Nov 10

Star	mag	T S	m	e	d	R	f						
10 15	9.4	12 55.0	9.3	16.8	20.7	24.8	28.6	1002	20.04	23	13	9.11	
10 58	8.74								10.92		1	55.10	
~~10 5~~									9.74				
									33				
											17	14.01	
13 53	8.4	16 29.8	14.5	52.3	56.2	0.2	4.0	2570	55.40		16	44.42	
14 34	47.6								10.98				
									44.72				
									64				
16 4	7.0	18 38.5	53.6	1.3	57.0	9.0	13.0	3219	64.88		18	53.51	
16 48	20.4								10.87		1	54.97	
									3.52				
									73		16	58.54.89	
18 16	8.4	20 45.2	7.0	14.5	18.4	22.3	26.0	88.2	17.64		24	67.8	
19 01	17.3								10.86		1	54.90	
									67.8				
									7.00		19	11.88.77	
20 4	8.5	22 38.4	53.1	2.8	6.8	10.7	14.6	3300	6.600		22	53.22	
20 49	-1.3								10.78		1	54.88	
									55.22		21	0.34	
									44				
21 43	8.2	24 26.0	34.4	42.1	46.0	50.0	53.7	2262	45.24		24	34.36	
X 22 28	21.8								10.88		1	54.44	
									34.86		22	39.52	
									5.8				
23 2	7.8	25 44.0	53.0	0.8	4.7	8.6	12.5	3196	63.72		25	52.91	
23 47	37								10.87		1	54.80	
									32.91				
									53.13		23	58.11.86	
24 44	8.5	27 20.3	35.8	43.7	47.2	51.3	55.1	2331	46.62		27	35.74	
25 29	22.9								10.88		1	54.78	
									35.74		25	40.96.13	
									96				
26 30	8.2	29 7.0	21.2	29.0	32.8	36.5	40.5	1600	32.00		29	21.17	
27 15	4.5								10.83		1	54.73	
									21.78				
									39		27	26.44	
27 45		30 4		43.7	47.6	51.3	55.3						
28 30	34.4												

45 0 142 80

30 3 306 259.

157	7	0	0	46.2	41.9
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$881 \quad 0 \quad 49.03 = 16 \quad 11.38 - 06 \quad 0 \quad 22.45$
 $0 \quad 16.15$
 $- 31.36$
 $- 1.15$
 $21.49 \times 94 \quad 4694$
 97.2

21,8 17 3 58,3 54,4

130 3 56.50 - 92 - 16.42 - 12
- 7.46 19 8.56 3 89.04
31.46 - 31.20
18 38.16 20
38.9 3 7.64

16.7	15-	4	59.2	56.8
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160 4 5800-115-1266-08 19 4411
-1389
30.88
46

84 ¹ 55	- 4	301	334
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$718 \quad 4 \quad 3590 - 102 - 632 - 02$
 $\quad \quad \quad 436$
 $\quad \quad \quad 2854$
 $\quad \quad \quad 23 \quad 20.06$
 $\quad \quad \quad \quad \quad 30.91$
 $\quad \quad \quad 22 \quad 49.15$
 $\quad \quad \quad \quad \quad 58$

90.13 12 9.3 5.7

$150 \ 2 \ 450 - 50 - 650 - 02$
 7.32
 $05 \ 48.42$
 31.04
 $5 \ 17.38$
 20.0
 16

15	5	3	210	161
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3713 ~~18.05~~ - 76 - 1170 - 07 $\overset{22}{58}$ $\overset{18.6}{6.02}$
 $\underset{12.53}{}$
 $\underset{30.52}{2442.58} - 30.42$
 $\underset{13.8}{2412.06} \rightarrow 7.10$
 $\underset{57}{3550}$

142	40	1218	443	407
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50 3 4 250-85-1074-06 13 3085
11.65
9 1775 - 3021
3055
8 4720 - 34
482 13 0030

1870 Nov 10

Star	mag	T	S	m	c	d	e	f				
30 48	8.1	33	22.7	41.1	48.6	52.5	56.2	59.9	2584	5168	33	4083
31 34	12.9									10.85		
										4083		
										41.05		
32 32	8.5	35	6.3	23.5	31.5	35.4	39.1	43.2	1727	3454	35	2360
33 18	37.6									10.94		
										2360		
										1.82		
34 11	2.8	36	45.5	3.8	11.7	15.3	19.0	23.0	728	1456	37	354
34 58	58.3									11.02		
										3.54		
										76		
35 34	8.8	37	32.8	40.2	48.5	52.5	56.2	0.3	2577	5154	37	4052
35 34	58.9									11.02		
										4052		
										74		
											35	4599
36 34	8.3	38	10.2	26.8	34.5	38.5	42.2	46.2	1881	3762	39	2669
37 20	33.4									10.93		
										2669		
										91		
38 56	8.0	42	27.1	49.3	57.0	1.0	4.7	8.7	3007	6014	42	4915
40 43	58.5									10.99		
										4915		
										37		
41 34	8.0	44	19.0	37.6	45.0	49.0	53.0	57.1	2007	4014	44	3731
42 21	62.0									11.03		
										3731		
										54.37		
45 56	8.3	48	33.1	50.3	58.0	1.8	5.7	9.5	3053	6106	48	5025
46 44	4.5									10.87		
										5025		
										47		
50 44	1.0	53	22.8	39.0	46.6	50.2	54.0	58.0	2978	4956	53	3874
51 32	7.1									10.82		
										3874		
										96		
											54	4458
52 11		54	52.5	6.1	13.5	17.3	21.3	25.0	832	1664	55	582
52 59	6.9									10.82		
										582		
										6.04		
											53	1169

20 0 52.1 46.3

40 3 48.7 44.5

20 3 30 12

20 2 23 27

45 3 14.2 9.8

30 0 54.8 48.2

10 4 45.9 42.0

15 1 10.8 5.8

10 4 8.5 3.9

10 4 21.3 15.7

1870 Nov 10

Star	mag	T	S	m	c	d	e	f					
249	8.4	55 ²	36.5	44.5	52.3	56.2	57.8	3.5	2763	5526	55	4433	
53 36	339									1083	1	5404	
										4433		53 5029	
155 15	8.5	57	48.1	10.3	17.5	21.7	25.3	24.4	1042	2084	58	1004	
40.4										1080	1	5404	
56 4	12									1004	56	1600	
57 13	20	59	54.0	8.5	16.1	20.0	23.8	27.8	96.8	1926	1084	839	
15.9										8.36	0.0	8.51	
58 2	18.9										1	5407	
												58 1444	
1 9													
0 18 R	83	2	52.3	15.0	22.7	26.8	30.4	34.4	1295	2590	1091	1499	
296											3	1521	
											-1	5393	
											+	00	
											0	1 2128	
2 31													
1 40 R	81	4	23.4	36.0	43.3	47.1	51.0	53.2	2326	4652	1082	3570	
67											4	3592	
											-1	5389	
											+	01	
											0	2 4204	4180
3 11	78	5	20.2	30.1	37.8	41.4	45.2	49.3	2038	4076	1086	2880	
421											5	3002	
											1	5384	
											-	00	
											3	3615	
3 16	81	6	33.1	43.8	51.3	55.0	58.9	3.0	2470	8170	1100	717	
524									2720	5440	1100	4340	
											6	4362	
											-1	5384	
											7	4277	
5 16	9.45	7	52.2	13.2	20.8	24.8	28.8	32.8	1202	2404	1075	8 1329	
463											-1	5384	
											0	06 1988	
2 55													
3 4	7.8	9	42.2	0.6	8.4	12.2	15.9	20.4	575	1150	1078	10 072	
542												185376	
											0	8 696	
												2.09	
10 11	7.8	12	51.1	54.0	7.7	15.0	19.3	23.2	3592	7182	1066	16	
216													

15 1 49.2 43.7

21.5 20 292.31 26.9

7 2 ~~39.5~~ 39.5 36.2

50 2 11 55.7

10 4 31.7 26.3

15 0 52.5 46.8

10 3 35.2 39.7

35 0 21.8 15.2

25 2 18.2 13.7

16.5 4 46.8 41.5

31.7 15.95 25 27 15.95 - 48 - 1238 - 0.9 - 1295 27.03

35 26 3.5 351 37 3.0
42 22 4.5
50 55 4.5
- 23.5
50 55 12.7 351 26 1.95
42 32 4.5
50 55 2.2

351 27 3.0
26.3

1870 Nov 10
Star. Mag

11 17	7.8	14 ^m	8.2	14.3	22.0	26.0	24.8	33.8	1259	2518	014	1439
~~12 8~~	~~8.1~~									1079		
12 8	8.1									1439		

13 26	8.1	15	13.4	32.4	40.2	43.7	47.7	51.6	2156	4312	15	3233
										1079		
										3233		

15 26	7.8	18	4.5	23.7	31.5	35.3	39.1	43.2	1728	3456	-1081	182375
												1 5356
												0 16 30.19

17 31	8.5	20	13.5	28.6	36.8	40.5	44.6	48.3	1988	3976	1078	20 2898
												1 5350
												18 3548-11

19 51	8.4	22	31.0	48.5	56.5	6.2	4.2	8.3	2977	5954	1075	22 4 8.79
												5344
												20 5835

21 21	8.0	24	2.3	19.6	27.3	31.0	34.9	39.0	1518	24	1943
									8036	1	5340
									1093		
									1943	22	2603

62 08	27	13.0	42.5	58.4	3.5	8.7	14.0	6150	27 4784
								1823	
								4792	
								198	

53 6	31	34.5	54.0	2.0	6.1	10.1	14.3	8.12	0.31	5395
								-14.18		
								5384		
								404		

The values of F are found by reducing ^{the last 4 wires} to the middle wire and adding to the reduction Middle wire - reduction
5

20 2 279 238

20 3 595 554

15 3 116 13

40 4 550 495 1045 5225 445225 -113 -118 -06 -1237 44 3988

42 22 486
351 32 351 15 2012
42 22 486
50 38 87 57 09 2848
273
414

35 1 187 123 310 + 15.5 - .30 - 1306 - .07 35 1 207 3736 207

351 36 21 40.2

504646.5 50 47 567

504618.3 27.2 351 35 219

40 1 88 33

5 5 3 268 223
280 257

149 10 0 10.7 59
~~148~~ 16.8 82

Nov. Nine intervals from λ Urs Min and 1879 J.S.C.

λ Urs Min		$\psi = 88^\circ 55' 29''$ log $\psi c = 1.72674$					i	
		I	log I	log I cos ψ	log cos ψ	log i		
1	+ 11 ^m 0 ^s	6608	2.82007	1.09333	-.0017	1.09316	+1239	
2	8 45.7	5254	2.72074	.99410	11	.99389	9.86	
3	6 34.2	3942	2.59572	.86898	6	.86892	7.39	
4	4 20.7	2604	2.41564	.68890	2	.68888	4.88	
5	4 25.8	2658	2.42455	.69781	2	.69779	4.99	
6	6 36.9	3989	2.59868	.87188	6	.87188	7.45	
7	8 47.6	5276	2.72230	.99556	11	.99545	9.89	
8	11 2.1	6621	2.82092	.09918	-.0017	.09901	12.42	

J.S.C. 1879		$\psi = 80^\circ 4' 15''$ log $\psi c = .76339$ log cos $\psi = .23661$			
1	+ 1 ^m 11.8	418	1.85612	1239	+ 12.
2	0 57.2	572	1.75740	9.86	
3	43.1	431	1.63448	7.43	
4	28.8	288	1.45939	5.09	

						Mean adopted Nov. 10
5	27.9	279	1.44560	4.81	4.81	4.81
6	41.7	417	1.62074	7.19	7.25	7.22
7	56.6	566	1.75282	9.76	9.68	9.72
8	11.2	71.2	1.85248	12.28	12.24	12.26
						8.50

[The values from λ Urs. Min are adopted min.]
(See note)

+	-
1239	499
9.86	7.45
7.39	9.89
4.88	12.42
34.52	434.75
8.63	8.69

-i S⁵⁰ -i S^{58 30} -i S^{50.00}
-13.52 -13.66 -13.81

Note. The observation for λ Urs Min was made Nov. 2. On Nov. 5 Mr. Blake overhauled the telescope for illumination and during the operation the wire intervals clearly changed. Hence the values of i from λ Urs Min are only true to Nov. 5. See next page for new values.

$$n = 20$$

$$RA = T + 47 + n \tan S + c \sec S$$

$$47 + m = RA - T - n \tan S - c \sec S$$

New stars Nov. 10

		T	S	RA	RA	$T - n \tan S$	$\tan S$	$47 + m$
a	lygni	20	39	700	37	0.75 - 2	0.25 - 37	-2 6.52
w	lygnain	20	47	4630	45	39.75	6.55 + 06	-17 6.49
61	lygni	21	3	1216	1	5.68	6.48 + 29	.78 6.70
z	lygni	21	9	3174	7	25.44	6.30 + 19	.57 6.49
a	lygnin	21	17	3836	15	29.33	6.03 + 70	1.88 6.73
s	lygnin	22	26	2927	24	22.81	6.46 .59	1.59 7.05
K	bars	0	27	4784	25	41.65	6.19 .80	1.90 6.99
z	bars.	0	31	5395	29	47.86	6.07 .47	1.25 6.56

a lygni	6.52	99	3 lygnin	73	188
61 "	77	78	5 "	105	1.59
z "	49	57	K Cars	99	1.90
3 Cars	56	1.25		277	2.87
	234	2.59		99	1.79
	58	.89			

Values of i from Dec. 10Star α lygn β lygn γ lygn δ lygn ϵ lygn ζ lygn η lygn θ lygn ι lygn κ lygn λ lygn μ lygn ν lygn ξ lygn $\omicron$ lygn π lygn ρ lygn σ lygn τ lygn υ lygn ϕ lygn χ lygn ψ lygn ω lygn

I	44.769	25.461	38.777	62.62	57.44	62.12	53.10	ally-5.11
I	19913	06124	10416	32887	27257	33125	22222	3 ally. 4.78 7.30 9.72 (26)
2								61 " 50 16 68 20
3								ally 67 01 50 -
4								S. " 75 32 61 22
5	72.8523	55.7404	61.7853	102.0036	89.9994	10.90374	80.9031	K Cars 108 46 89 36
6	102.0036	84.9243	91.9550	153.1847	137.1367	16.02041	121.0828	3 bars 80 26 65 17
7	137.1367	112.0492	123.0899	207.3160	180.2553	21.23263	161.2068	4.81 7.25 9.68 12.4
8	178.2504	141.1452	153.1903	256.4082	229.3578	26.17432	203.3075	

1870 Nov 13th
 1879phae
 S

3415 21 11 21.1 37.7 47.3 52.3 57.0 2.2

α Cephei 18 26.5 36.8 47.2 52.3 57.8 3.0

γ Cygni 27 41.0 48.0 55.3 58.8 2.3 60

13 A Cephei (8.1/2) 54.0 4.5 13.4 17.8 22.2 27.0

23² 0 6 7.5 23² 2 42.0 ~~36.4~~ — 2.3 6.0 9.7 13.8

4 40 8.0 7 22.5 31.7 ^{20.0} 38.8 42.4 46.3 50.2

14 59 8.2 17 35.5 51.0 58.7 2.4 6.5 10.6

x16 4 7.5 18 48.0 55.0 2.8 6.5 10.5 14.4 32.92 6584 18 5497
 16 48 20.7 10.87 -1 56.7
 54.97 +0.1

x18 16 8.8 20 52.7 8.3 16.0 19.8 23.7 28.7 965 1830 21 847
 19 1 19.3 10.86 1 56.22
 89.4 19 122.2
 10.70

x20 4 9.0 22 42.8 57.2 44.7 8.2 12.3 16.6 3890 6782 22 5773
 20 49 1.3 42.8 57.2 47 8.2 10.29 1 56.77
 57.03 21 08.6
 34.56

$R = -162$

Punkte	Stroke	A	C	B	D
--------	--------	---	---	---	---

2° 50'	7° 55'	3	55.1	51.1	51.0 59.8
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340° 15'	5° 15'	3	54.7	51.3	50.8 57.8
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6° 20'	20	2	40.1	34.2	34.8 44.8
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5° 25'	25	1	49.2	43.7	46.5 53.9
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55	3	22.1?	23.4?		
----	---	-------	-------	--	--

35 or 55	3	42.9	40.8		
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45	1	38.7	31.9		
----	---	------	------	--	--

7.0	55	0	44.2	42.3	
-----	----	---	------	------	--

86.5	0.9325	-11	-5.28	-01	
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4860
3785
1075
-2804
-10
4256

7° 0'	3	54.8	50.4		
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20	0	2.5	53.9		
----	---	-----	------	--	--

840 Nov 13

Star Mag

21	43	8.5	24	21.5	~~21.8~~ 36.0	~~36.0~~ 43.8	~~47.7~~ 43.8	51.6	55.5	2346	4692	24	3604
2	28	21.8									1088	1	5814
											3604	22	3990
													74
22	40	8.2	25			41.5	45.6	49.3	53.5				
24	26	8.6	27	27	19.2	27.7	31.8	35.7	38.3				
25	41	8.4	28	22.2	35.8	42.7	46.3	50.3	54.2				
27	4	8.2	29	~~48.7~~ 1.3	~~48.7~~ 1.3	~~48.7~~ 9.3	~~48.7~~ 13.2	~~48.7~~ 17.3	21.5				
28	45	8.0	31	27.2	39.1	47.0	51.0	54.7	58.7				
29	34	8.8	32	27.0	—	35.7	38.8	42.5	46.4				
31	49	9.0	34	30.4	43.9	51.6	55.6	59.8	3.3				
33	3	8.9	35	46.0	56.5	4.3	8.3	12.0	16.0				
34	48	9.2	37	23.0	42.0	49.8	53.7	57.5	117	2647	5284	37	4192
35	34	58.9									1102	1	5882
											41.92	35	4610
													46.21

Pomita Stote A-6-

55 1 44.1 39.2

15 1 48.4 43.7

40 0 4 17.0 13.3

25 3 55.8 48.2

45 4 13.2 8.7

55 1 20.8 15.3

30 2 51.2 45.2

30 0 40.1 32.9

20 2 19.3 12.2

870 Nov 13

Star mag

37	8.3	23 ² 38	38.3	42.3	46.3	50.1			
38 56	7.2	41 40.0 50.2	54.7	1.7	5.6	9.3			
40 7	9.0	42 53.8 2.0	9.6	13.4	17.1	21.2			
43 9	6.5	45 46.7 3.8	11.6	15.6	19.5	23.5			
44 18	8.7	46 58.0 13.8	21.5	26.2	30.3	34.3			
x 45 56	9.2	48 37.3 57.8 57.7	3.2	7.0	11.0	3127	48 51.73		
46 44	4.5					62.54	1 55.58		
						10.81			
						51.73			
48 2	8.4	50 41.0 57.3 5.0	9.0	12.8	17.3	3314	46 56.15		
						6628	50 56.17		
x 50 44	8.7	53 28.5 40.4 47.9	51.7	55.7	57.7	2554	53 40.26		
51 32	7.1					51.08	1 55.46		
						10.82	4.58		
						40.26			
x 52 11	7.0	54 54.8 7.2 15.0	18.8	22.7	27.7	914	57 44.80		
52 59	6.9					18.28	54 7.46		
						10.82	1 55.42		
						7.16			
x 53 28	9.2	56 11.5 24.8 32.7	35.7	39.2	43.0		1204		
							11.94		

Pomita Stroke A. C

20 4 26.1 20.4

10 0 9.8 3.7

20? 2 0.2 54.2

30 4 8.7 2.1

70 15 1 10.5 5.6

20 0 16.6 40.8

10 4 8.8 2.8

10 4 23.9 17.9

15 0 29.2 25.0

Pointe Strotu A C

20 0 32.0 25.4

20 1 15

70 0 2 44.6 38.5

21 1

40 2 16.7 12.2

50 2 1.2 56.2

22

35 4 2.1 54.0

10 3 44.7 38.8

35 0 15.7 8.2

25 3 34.2 28.1

35 4 16.1 9.8

15 4 15.6 11.9

Pointer Stroke + B

15 3 6.2 58.9

45 2 19.3 12.0

5 4 12.9 7.6

45 1 10.2 2.5

340° 5 5 3 20.2 ~~24.7~~ 15.8 22.2

349° 10' 10 0 6.9 0.7 1.8 6.9

6 30 30 1 33.2 28.0 30.1 43.9

1870 November 15th

2 d mag 7.5 m

beph

22^h 36^m 0.0 12.5 23.4 24.0 34.5 40.1

0 And

57^h 58.0 7.1 13.9 17.0 20.5 24.0

23

23^h 2^m 31^s 50^o 30.2 —

10 19.0 29.0 36.7 40.8 48.8 48.5

23^h

15 43

8.5 17 35.2 37.7 0.0 3.6 7.4 11.5

34.7

~~9.0~~ 18 ^{doubtful} 58.2 58.0 3.3 7.2 11.0 15.1

19 11

44.0

9.0 21 5.8 19.1 24.0 31.0 34.7 38.8

22 0.8

39.3

8.2 25 22.3 34.8 42.3 46.4 50.0 57.1

24 41

4.2

8.0 26 43.0 50.0 57.5 1.2 4.9 8.8

24 41

24.4

9.2 28 23.1 35.4 43.0 46.7 50.9 55.0

Pointer Stroke A 6

4° 20 0 32.5 - 26.0 27.0 34.7

0° 35' 35 2 2.7 4.9 0.0 9.2

20 0 14.3 - 2.3

40 0 33.2 25.8

50 4 32.9 28.1

30 1 12.1 5.3

35 0 ^{57.8}
38.2 50.6
31.5

15 1 38.2 31.5

40 0 49.2 41.2

1870 November 15th

26 27 17.0	8.0	23 29 ~ 45.6	~~58.4~~ ^{48.8}	58.4	~~2.2~~ ^{6.2}	14.1	14.0	18.0
27 43 52	9.2	50.0		2.2	6.2	10.3	14.2	18.2
27 1	9.0	31	38.7	50.6	58.3	2.1	6.0	10.0
32 35 ~~29 42~~ 48.483	9.2	34	35.0	44.3	52.0	58.0	0.0	4.0
33 49 49.2	9.2	35	48.0	57.0	5.0	9.0	13.0	17.0
34 58 58	8.5	36	53.8	8.0	13.5	17.6	21.3	25.2
37 6 11.6	8.8	39	0.5	13.1	21.0	25.0	28.8	32.5
38 56 8.0	9.5	40	53.5	4.7	12.4	16.1	20.2	24.0
55 15 40.1	9.0	58		12.0	19.8	23.7	27.3	31.6
11 2 21.6		13	7.0	9.9	~~9.9~~	17.5	21.3	25.0

55 3 12.3 57

20 2 48.7 42.1

20 2 48.7 42.1

25 1 42.5-33.6

30 4 33.9 27.8

15 1 56.9 50.0

0 3 34.2 29.7

5 1 29.5-23.3

25 4 55.2 48.8

50 3 34.1 28.2

1870 Nov 15th

gas

31 48.0 56.0 42 8.3 12.4 16.7

gas

35 — 29.0 33.6 37.9 42.5 — 56.6

gas

39 28.0 41.0 48.2 52.0 53.6 57.3

346° 5	0	4	0.0	53.3	56.0	2.2
--------	---	---	-----	------	------	-----

6 20	20	4	36.7	50.8	52.8	57.0
------	----	---	------	------	------	------

1° 40'	40	0	28.8	24.0	24.8	29.8	~~24.8~~
--------	----	---	------	------	------	------	-----------------

1870 Nov 16th

Cygni 21st 2nd 7.3 14.0 20.3 23.5 26.7 29.7

3 Cygni 8 ^{22.5}~~34.0~~ 34.0 39.7 42.3 45.1 48.0

^{Cephei}
2 Cygni 16 23.9 32.0 42.7 53.0 58.0 3.7

^{B Aquarii} 24 53.0 58.0 0.3 3.0 5.6 ^{13.0 45.7 48.0}

^{Cephei} 26 37.8 ~~47.7~~ ^{20.3 44.5} 21.1 28.1 35.7 43.0

11th Cephei
1st & 2nd 3rd Pen Failed

0 Androm 22nd 57 59.3 7.0 13.8 17.0 20.5 23.7

(59 33) { the stars observed here are wrong the settings }
were for the wrong hour

pleas 23 49 52.0 5.2 14.0 18.8 23.0 27.9

3 Qas 0 4 11.5 26.7 36.0 41.0 45.6 50.6

Pointer	Stroke	R	A	b
	5	3	49.4	46.4
23°	30	2	51.7	48.7
	10	2	50.2	46.0
	35	1	52.5	48.3
50 25'	25	3	48.4	43.3
30 15'	45	~~3~~	59.1	51.9

1870 Nov 16

δ	δ	mag	δ	δ	δ	δ	δ	δ	δ
~~10 54~~	8.0	9.0	55.0	2.6	10.2	14.2	18.0	22.0	
10 54	43.4	9.0	12.0	49.0	1.7	9.5	13.4	17.2	21.0
12 57	1.9	8.8	14	57.0	1.4	14.0	17.9	21.6	25.6
16 17	63.2	8.6	18	14.7	25.7	33.3	37.1	41.4	45.1
~~19 58~~	9.0	21	14.8	26.8	34.6	38.3	42.2	46.2	
20 54	12.0	9.0	22	47.0	2.9	10.7	14.6	18.2	32.1
22 13	35.1	9.0	24	7.0	21.8	29.4	33.5	37.5	41.5
25.25	61.3	8.8	27	24.5	34.8	42.8	46.7	50.7	54.7
27.5	17.1	8.8	29	1.5	13.8	21.2	28.2	29.0	33.0
	9.0	30	26.7	41.4	49.0	52.8	56.6	60.7	
29 55	—	9.2	31	53.0	3.5	11.0	14.8	18.7	22.6

Pointer	Stroke	R	A	C
	20	1	4.7	57.3
	30	2	8.7	2.2
	10	3	2.8	57.6
	10	1	55.6	48.9
	50	4	7.0	2.0
	0	3	6.8	2.1
	40	0	-0.2	-6.2
	10	4	9.8	3.8
	55	2	58.5	57.0
	5	2	9.8	2.1
	15	1	4.1	2.0

31 16 33.6 8.0 ~~31 53.0 3.5 11.0 14.8 18.7 22.6~~
^{33 14.3 24.1 31.8 35.8 39.8 43.8}

32 42 3.4 9.1 ~~33 14.3 24.1 31.8 35.8 39.8 43.8~~
^{34 42.6 53.2 3.0 6.8 10.7 14.7}

33 44 16.6 8.2 ~~34 42.6 53.2 3.0 6.8 10.7 14.7~~
^{35 42.0 52.4 0.2 4.2 7.9 11.9}

36 19 64.5 8.2 ~~35 42.1 27.7 35.4 39.5 43.2 47.2~~
^{38 17.6}

39 1 51.1 9.0 40 55.9 9.7 17.2 21.1 25.1 29.1

40 42 44.5 8.3 42 39.0 49.9 57.8 1.6 5.5 9.6
Close double

9.0 42 41.0 50.1 57.8 1.7 5.5 9.6

42 44 33 8.9 44 42.6 52.8 0.5 4.2 8.1 12.2

44 19 29.7 8.5 46 18.1 28.0 35.8 39.9 43.8 47.5

45 53 10.0 8.6 47 46.5 0.7 8.4 12.2 16.0 20.0

40	1	32.7	27.0
10	1	44.8	39.0
55	3	24.5	20.3
10	0	41.9	36.0
20	9	54.7	49.6
30	0	41.8	36.1
30	0	41.8	36.1
40	4	24.0	20.0
45	0	14.9	8.0
5	0	16.2	9.8

1870 Nov 16th

46 54⁵ 7.5 9.3 18 49.5 20 9.9 13.7 17.7 21.4

49 33 42.0 8.3 51 31.5 42.0 49.7 53.7 57.3 1.4

51 27 -0.5 8.9 53 23.6 35.0 42.8 46.7 50.3 54.3

52 52 53.6 8.4 54 50.8 2.1 10.0 13.7 17.7 21.7

54.20 20.9 8.4 56 16.6 28.2 35.7 39.8 43.7 47.7

56.9 27.7 9.0 57 59.8 17.7 25.2 29.2 33.0 37.0

5	2	30.8	24.9
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30	3	0.9	56.6
----	---	-----	------

15	0	45.2	40.3
----	---	------	------

20	0	24.1	18.2
----	---	------	------

50	4	4.8	0.0
----	---	-----	-----

45	2	38.7	33.1
----	---	------	------

1870 Nov 17th

Lysmi

Lepthi
B. Aquarii

21	26	40.8	43.1	45.6	48.3	53.1
		58.1	0.6	3.0	56	

B. Lepthi

28	46.5	30.5	37.8	44.9	52.1
		6.8	21.0	28.3	35.5
					43.0

13 H. Lepth

36	53.5	4.8			
~~38~~	~~4.8~~	~~14.2~~	14.2	18.4	23.0
					27.9

0 And

21^L
52

23 ^L	3	9	21.7	9.2	23 ^L	5	6.5	17.1	25.0	28.8	32.5	36.3
-----------------	---	---	------	-----	-----------------	---	-----	------	------	------	------	------

4	59	46.9	8.5	6	55.6	2.5	15.2	19.3	23.0	27.1
---	----	------	-----	---	------	-----	------	------	------	------

7	39	42.9	9.5	9	32.2	47.2	55.0	59.0	29	7.0
---	----	------	-----	---	------	------	------	------	----	-----

8	38	48.3	8.7	10	36.0	46.6	57.6	58.4	2.4	6.3
---	----	------	-----	----	------	------	------	------	-----	-----

10	7	8.9	9.5	12	2.2	15.7	23.4	27.0	30.8	34.7
----	---	-----	-----	----	-----	------	------	------	------	------

Poniter

~~30 2 32.8 49.8~~~~340 10 2 28.5 22.5~~

15 0 42.0 35.0

20 0 45.3 38.5

~~360 35 1 54.8 54.6~~

50 3 28.2 26.3

25 3 13.1 11.6

25 0 14.9 12.6

25 1 19.8 18.0

5 1 19.5 18.2

11 29 7.4 8.3 ^{23²} 13^m 26.0 37.6 45.1 49.0 53.0 58.9

12 50 40.4 9.3 14 45.0 58.6 6.5 10.1 14.2 18.0

14 34 47.6 9.0 16 30.7 46.7 54.2 58.2 2.2 6.0

15 43 34.7 8.0 17 45.5 57.9 59.5 3.2 7.3 11.2

17 20 10.9 9.0 19 14.6 26.1 36.0 39.7 43.7 47.7

23 47 3.7 8.7 25 44.3 55.3 3.1 6.8 10.7 14.7

25 12 4.4 8.0 27 ^{1.5} 19.8 27.4 31.4 35.1 38.0

26 27 17.0 8.4 28 24.0 35.4 43.1 46.8 50.9 54.9

27 51 34.1 9.5 29 49.0 39.2 7.0 11.1 14.8 18.8

29 31 33.2 7.7 31 35.5 ^{39.9} 47.7 57.7 55.5 57.4

5	2	43.1	42.5
---	---	------	------

30	4	33.3	32.1
----	---	------	------

25	2	24.0	23.0
----	---	------	------

40	0	23.8	22.8
----	---	------	------

0	4	30.7	30.5
---	---	------	------

10	1	4.3	3.0
----	---	-----	-----

10	0	37.8	36.9
----	---	------	------

55	3	10.1	10.2
----	---	------	------

40	1	2.8	0.7
----	---	-----	-----

40	2	8.3	59.5
----	---	-----	------

31	10	16.0	9.0	^{23h} 33 ^m	3.6	18.6	26.5	30.3	34.0	38.0
32	35	48.3	9.0	34	28.8	44.7	52.3	56.1	0.0	4.0
33	49	49.2	8.7	35	44.5	57.0	5.3	8.8	12.8	16.8
34	58	58.3	8.5	36	57.0	5.8	13.8	17.5	21.5	25.5
36	24	42.8	8.0	38	16.9	31.4	39.0	43.0	46.8	51.0
38	44	3.6	9.0	40	40.0	53.2	0.7	4.5	8.4	12.5
39	43	2.8	8.4	41	52.1	57.0	6.8	10.7	14.5	18.5
45	6	48.4	8.8	42	1.6	14.6	22.3	26.4	30.2	34.2
46	44	4.5	9.5	48	38.8	52.5	0.0	4.0	7.9	11.8
48	49	60.7	8.8	50	40.6	57.8	5.6	10.0	13.5	17.8

0	0	13.4	12.3
---	---	------	------

25	1	43.8	43.2
----	---	------	------

20	4	33.4	32.1
----	---	------	------

15	1	52.9	51.2
----	---	------	------

30	2	26.2	25.7
----	---	------	------

10	1	38.0	37.0
----	---	------	------

10	0	48.2	46.0
----	---	------	------

25	1	58.3	58.0
----	---	------	------

10	0	3.2	1.8
----	---	-----	-----

10	4	42.4	40.9
----	---	------	------

50 7 46.4 9.0 52^m 2.0 15.0 22.8 26.8 30.6 34.6

51 51 41.2 7.0 53 54.2 0.2 8.0 11.8 15.7 19.8

53 38 33.9 9.0 55 33.6 46.2 54.0 57.9 1.9 5.7

54 19 57.5-8.5 56 22.3 27.3 35.1 39.1 42.8 46.7

56 4 55.4 8.2 58 0.0 12.1 ~~20.0~~ 23.8 27.7 31.6

58.7 48.8 8.9 59 59.6 15.0 22.8 26.7 30.6 34.6

59 33 39.1 ^{oh} 8.8 1^m 29.6 41.7 49.1 53.2 57.0 1.0

^{oh}
1 9 24.6 9.0 3 1.0 17.1 24.9 28.6 32.4 36.4

2 3 6.7 8.8 4 25.5 38.0 45.7 49.6 53.2 57.3

8.5 5 ^{bad}
_{or 14.5} 12.9 32.0 40.0 43.7 47.3 51.6

25-3 40.2 39.2

30 4 52.5-50.3

40 1 13.3 11.9

15-2 29.0 27.2

25-4 54.0 53.0

25-1 15.3 13.0

35-1 8.4 8.5

45-0 51.3 49.7

5 3 28.1 27.0

5 9 46.8 46.7

4^m 39' 2.8 8.8 ^{8^h} 6^m 31.9 45.9 53.6 37.3 1.2 5.2

10 54 43.4 7.0 12 50.6 1.8 9.7 13.3 17.3 21.3

12 59 1.9 8.8 14 53.5 6.4 14.1 18.0 21.8 25.8

16 17 63.2 8.2 18 14.8 25.7 33.5 37.4 41.3 45.2

19 17 21.0 8.9 21 11.1 26.7 34.8 38.5 42.3 46.5

20 54 12.0 — 22 49.5 3.0 10.7 14.5 18.3 22.3

20 13 38.1 8.9 24 9.7 22.0 29.8 33.6 37.5 41.3

25 25 61.3 7.8 27 25.1 35.0 42.7 46.7 50.5 54.6

27 5 17.1 8.9 29 1.0 13.7 21.4 25.5 29.1 33.1

28 33 8.3 9.5 30 26.5 41.3 49.0 53.0 56.6 0.7

5	2	37.8	37.2
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30	2	9.8	8.0
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10	3	6.8	6.2
----	---	-----	-----

10	1	58.4	56.9
----	---	------	------

50	4	11.4	10.9
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0	3	6.8	7.2
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40	0	0.3	59.8
----	---	-----	------

10	4	10.0	9.6
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55	3	3.1	1.2
----	---	-----	-----

5.	2	9.8	9.8
----	---	-----	-----

29 55 -1.2 ⁰² 9.3 31^m 47.9 3.3 11.0 14.9 18.9 22.8

31 16 33.6 8.0 33 14.0 24.2 31.9 36.0 39.8 43.8

32 47 3.4 9.0 34 40.0 55.3 3.1 6.9 10.8 14.9⁴

33 44 16.7 8.7 35 43.5 52.6 0.4 4.1 8.1 11.9

36 19 64.5 8.4 38 17.9 27.6 35.2 39.2 43.3 47.3

37 10 14.0 9.5 39 10.6 19.8 27.3 31.6 35.5 39.3

39 1 51.1 9.1 40 59.5 9.7 17.9 21.3 25.4 29.4

40 42 44.5 8.0 ^{double} 42 39.1 50.1 57.8 1.8 5.4 9.7

42 40.7 50.2 57.8 1.8 5.8 9.7

42 44 30.3 9.0 ~~42 40.7 50.2 57.8 1.8 5.8 9.7~~

44 43.0 52.8 0.6 4.6 8.6 12.5

44 17 29.7 8.5 46 16.6 28.0 35.9 39.7 43.7 47.7

15 1 14.3 12.2

40 1 34.5 33.2

10 1 47.3 47.2

45 3 26.3 25.0

$\frac{10}{43} \frac{0}{2}$ 42.0 42.0

0 1 40.3 39.0

20 4 35.2 34.0

30 0 43.5 43.6

40 4 26.7 26.1

45 0 18.0 16.3

1870 Nov 17

Cass

50 54.0 5.0 15.1 19.8 24.6 29.8

oh

51 27 -0.5 9.5 53 20.0 35.0 42.9 46.7 50.5 54.5

52 52 54.6 8.4 54 46.9 2.0 10.0 14.0 18.8 21.9

54 20 20.9 8.8 56. 15.7 28.1 36.0 38.9 43.7 48.6

54 59 20.5 7.8 ~~56~~ 54.7 57.3 5.1 8.7 12.8 16.856 9 27.7 9.6 ^{sure} 58 1.6 17.8 25.3 29.4 33.2 37.1

1870 Nov 19 W.A.R.

Ponni

2^h37^m

21.5 32.8 40.1 44.0 48.7 51.6

2^L

38 30 16.7 8.5- 41 34.2 45.0 52.8 58.7 0.5 4.5-

43 19 26.6 8.4 46 18.3 28.7 36.5 40.1 44.0 48.2

45 22 28.7 8.2 48 33.0 37.2 45.0 49.0 52.8 58.8

49 31 42.6 8.8 52 44.0 47.7 55.3 59.3 3.3 7.2

53 4 22.9 8.6 56 57.2 0.9 8.5 12.3 16.2 20.2

58 10 35.8 7.3^{3L} 1 18.2 26.4 34.1 38.3 42.2 46.03^L

2 53 - 5.6 9.3

5 29 24.9 6.5

8 4 12.0 8.0

30	4	21.6	20.3
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50	3	36.3	51.6
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45	0	45.6	11.2
----	---	------	------

40	1	7.2	4.0
----	---	-----	-----

40	3	42.9	41.0
----	---	------	------

45	3	12.0	11.0
----	---	------	------

35	0	10.6	6.6
----	---	------	-----

15	2	3.7	1.0
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45	1	47.8	45.2
----	---	------	------

10	0	28.0	25.3
----	---	------	------

31 4 57.5 8.8

α Persei

20 39 -1.2 7.5^{3.2} 23^m 48.5 56.7 4.3 8.3 12.0 16.0

23 38 5.2 9.2 26 42.0 58.3 3.8 ~~2.8 11.7~~ ~~4.7 15.6~~ 15.6

30 50 20.7 7.9 34 0.0 8.0 15.9 19.8 23.5 27.5

34 4 4.7 7.6 38 11.2 22.7 30.4 34.3 38.2 42.1

37 39 16.7 8.5 40 49.1 57.0 6.7 8.5 12.4 16.4

40 25 57.5 9.2 43 30.8 46.7 54.5 58.4 2.4 6.3

44 3 -5.2 8.4 47 12.6 22.7 30.3 34.2 38.0 41.8

46 32 25.7 9.2 49 40.5 52.8 0.6 4.6 8.4 12.2

10	4	29.0	27.2
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50	1	19.1	15.6
----	---	------	------

10	3	3.0	1.3
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5	1	39.6	36.7
---	---	------	------

50	1	17.7	15.6
----	---	------	------

5	2	23.5	20.2
---	---	------	------

55	0	11.9	8.4
----	---	------	-----

15	2	37.3	27.4
----	---	------	------

15	2	38.5	36.3
----	---	------	------

45	1	36.0	33.9
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1870 Nov. 19. W.A.R.

 $9^m 24^s$ 28.5 9.4 52^m 16.5 23.2 31.0 34.9 38.8 42.7

52 20 11.8 8.5- 55 27.8 40.3 48.0 57.8 56.0 55.8

54 47 21.5 8.6 57 55.3 2.0 14.8 18.7 22.4 26.3

 h^L
 0 12 -4.6 8.4 3 20.3 32.2 40.0 43.8 47.5 51.4

3. 2 6.1 8.1 6 11.7 22.9 30.5 34.6 38.3 42.1

5 25 22.1 8.8 8 30.7 45.3 53.1 58.8 0.8 4.8

8 17 59.7 8.4 11 28.0 38.1 46.1 50.0 54.0 58.0

 ϵ Tauri 23 5.1 13.8 19.0 21.5 24.0 26.8

 α Tauri 30 31.7 39.7 45.0 47.6 50.0 52.8

 γ Tauri

 γ Boot Maj 11^L 48^m 58.3 7.9 16.4 20.6 24.9 24.1

W.A.R.

40 3 53.6 - 53.6

0 0 50.0 47.1

50 1 5.1 2.4

12 2 20.9 18.9

5 1 39.3 36.1

50 0 48.3 48.0

10 3 4.0 0.0

20 1 10.0 11.4

53 4 46.1 49.5

347 50 0 38.2 34.0

2 15 2 1 46.0 38.2

1870 Nov 19th

W. A. R.

Jus Min

13^h14^m34.3
36.8
30.1

17

58.1
62.3
65.5

19

40.7
43.9
49.2

21

23.0
26.5
30.4

23

9.7
12.0
14.9

Jus Max

44

22.8

32.8

40.5

44.4

48.2

52.1

1890 Nov 20th

S. M.

2 Lephui 21st 17th 37.0 42.8 53.1 58.4 3.8

20 Leph 37 2.1 5.1 14.2 18.9 23.6 28.3

20 Leph 22nd 2nd 52.6 13.0 23.8 29.0 34.2 39.8

3 Leph 22nd 8th 17.7 30.7 40.0 44.7 49.2 53.8

3 Lacertae 20 24.9 37.3 45.1 49.1 53.1 57.1

1870 Nov 27th20th

54 14.1 28.5 35.0 38.1 41.5 44.8

21st3rd 5.2 13.5 19.8 23.0 26.1 29.3

9 24.3 33.5 39.0 42.0 44.9 47.8

17 19.2 36.5 42.0 52.0 57.8 2.9

26 ^{42.1}
~~45.0~~ 40.2 42.9 45.0 47.7 52.2

57.7 0.1 2.6 5.0

28 38.0 29.7 37.0 44.2 51.2 5.7

20.4 27.5 34.8 42.0

22nd 34th 51.8 57.8 6.8 13.3 16.7 19.9 23.323rd

3 55.5 7.0 14.9 18.9 22.7 26.8

9th 33.5 46.7 54.3 58.5 2.3 6.2

10 32.6 46.1 53.9 57.9 1.7 5.7

23^h12^m 2.4 15.0 23.0 26.6 30.4 34.3

13 24.6 37.0 44.7 48.3 52.3 56.1

14 42.7 57.9 5.8 9.7 13.7 17.6

16 33.2 46.0 52.0 57.8 1.7 5.8

17 37.8 51.0 57.0 2.9 6.8 10.7

19 13.1 27.7 35.3 39.0 43.0 47.0

21 ^{doubtful}
52.5 8.6 16.1 20.1 23.9 27.8

22 41.7 57.0 4.7 3.5 12.2 16.1

24 19.2 36.0 43.9 47.8 51.7 55.7

25 39.3 54.9 2.3 6.3 10.1 14.1

23^L
27^m 5.7 19.0 26.9 30.7 34.6 38.6

28 24.6 35.0 42.6 46.4 50.3 54.3

29 44.8 58.6 6.2 10.2 14.0 18.0

31 24.9 39.2 47.0 51.0 54.7 58.7

33 2.0 18.2 26.0 29.9 33.7 37.7

34 24.6 43.9 51.6 55.6 59.5 3.9

35 41.9 56.7 4.4 8.3 12.1 16.0

36 52.7 5.2 13.0 17.0 21.0 24.9

38 16.7 30.7 38.7 42.4 46.3 50.3

40 33.7 52.6 0.2 4.0 7.7 11.9

23^L

41. 46.7 58.4 6.1 10.0 13.9 18.0

42 32.9 ^{42.2} ~~50.1~~ ^{54.0} ~~58.0~~ 2.0 2.0

45 50.9 4.0 11.7 15.6 19.4 23.5

47 ^{5.2} ~~13.9~~ 13.9 21.8 25.7 29.6 33.6

48 36.9 52.0 59.6 3.4 7.2 11.0

50 42.8 57.5 51 9.0 13.0 18.0

51 58.6 14.6 22.3 26.2 30.4 34.0

53 46.7 59.7 7.4 11.2 15.0 19.0

55 31.9 45.4 53.3 57.0 1.0 5.0

56 51.7 *PLAR* 34.6 38.4 42.3 46.3

23²

58

0.5 11.3 19.1 23.0 27.0 31.0

0²0²

0.6 14.3 22.0 26.0 30.0 34.0

1

27.7 40.9 48.7 52.6 56.6 0.4

3

2.6 16.7 24.3 28.1 32.0 36.0

4

22.0 37.2 45.1 48.9 52.9 56.7

5

30.4 40.7 48.5 52.3 56.3 0.3

6

36.1 53.2 0.9 4.7 8.6 12.2

8

2.7 14.6 22.3 26.3 30.3 34.1

9

47.6 2.1 9.9 14.0 17.9 21.9

12

51.8 1.1 9.0 12.7 16.8 20.7

oh
10 3.0 16.1 23.8 ~~27.7~~ 31.3 35.2

14 55.5 6.0 13.8 17.6 21.1 25.1

16 17.9 34.4 42.0 46.0 50.1 54.0

18 ~~5.0~~ 10.8 25.0 32.9 36.8 40.9 44.9

20 6.1 26.6 34.2 38.0 42.0 46.0

22 53.8 2.4 10.1 14.0 17.9 21.8

24 6.2 21.2 29.0 33.0 37.0 40.8

26 22.3 34.6 42.2 46.0 50.2 54.1

28 56.0 13.3 21.0 25.0 28.7 32.7

30 27.0 40.9 48.8 52.3 56.2 0.2

1870 Nov 27th

W.A.R.

0h

31^m 47.8 3.0 10.7.

Along here the chronograph
pen failed

12

31 58.9 13.1 20.7 24.1 27.9 31.7

37 33.8 13.3 51.0 54.9 58.7 2.6

A. M.

1870 Nov 27th

A. M

44	28.1	13.7	51.4	55.1	59.1	3.1
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46	28.0	44.9	52.8	56.7	0.6	4.7
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47	52.8	12.6	20.3	24.1	28.3	32.0
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49	22.0	31.7	44.1	48.1	52.2	56.1
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51	12.0	24.1	31.9	35.7	39.7
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W A R

1870 Nov 27th

W. A. R.

2 Ins Min	13 ^h	5	50.9 53.1 <u>58.1</u> 162.1 54.03	7	33.6 37.0 <u>40.8</u> 111.4 37.13	9	16.0 20.5 <u>24.7</u> 61.2 20.40	10	54.3 62.3 <u>62.3</u> 182.8 61.30	14	29.9
5	54.0										
7	37.1										
9	20.4	17	52.3 55.1 <u>58.0</u> 165.4 55.13	19	34.1 36.9 <u>40.0</u> 111.0 37.00	21	17.0 18.6 <u>19.5</u> 21.6 76.7 22.18	23	10 4.0 <u>7.0</u> 120 4.00		
11	1.3										
14	29.9										
17	55.1										
19	37.0										
21	19.2										
23	40.2										

η Ins Maj' 44 22.6 32.7 40.2 44.1 48.0 52.0

θ Proctis 14 22 44.6 53.7 1.8 5.7 9.9 13.8

1731

1731

Nov 7-2 2

8-2

9-2

14 3

18-6

19 2

20 2

21 2

23-5

24-3

25 4

28 2

35 nov = 35

Dec 1 = 4

2 = 1

4 = 3

5 = 3

6 = 1

7 = 3

8 = 3

9 1

11 4

13 3

14 3

16 2

21 2

25 5

28 4

29 5

47

31 5

52

Jan 1 5

5 2

8 6

10 2

16 3

18 5

15 3

16 to 23 12

23 to 28 8

28 to 30 5

51

Feb 1 to 3 9

4 6

Feb. 1 to 08 = 15

" 8 to 12 = 4

" 13 = 9

" 14 to 16 = 7

87

29

116

57

29

