KG
11365
421

Instrumental Constants
1870 – 1871.
Depending on the new
Pulkowa Places

KG 11365.421

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Explanation of pages.

a) Under the columns star and R.A. are given the R.A. in hours and minutes, the R.A in hours and tenths of hours, the means of the two groups into which the observations are divided for obtaining the rate (on the left), the mean R.A for the whole series and the deviation of each R.A. from the mean to tenths of hours.

(b) The Columns tang δ and $(T'-RA)$ are for equatorial stars.

(c) The Column $P'-P$ contains the reductions from the old to the new Pulkowa Catalogue.

(d) The column $(T'-RA)-(P'-P)$ contains the corrected $(T'-RA)$ (reduced to Auwers)

(e) The next two columns contain the values of n tang δ and the reduction to the mean R.A. for the rate of the clock. If c has a significant value the column $c \sec \delta$ is added here.

(f) The next two columns contain the values of $-\Delta T+m$ and of the same function corrected for rate.

(g) The remaining columns contain data similar to the above for the polar stars, [as far as $(T'-RA)-(P'-P)$]

(h) Above these columns are written the values of h, the hourly rate of the clock of n and c. The first value of h (either in black or in pencil) is that derived from the comparison of the clock errors from observations on different days and is an approximate value only. Directly beneath this value is written the first value of h derived from the rate of the clock from observations during the same evening. On the same line with the first value and on the right is written the value of h finally determined which is designated h' [see sheets marked H.] In some places the value of h' (in red) is written on the same line with n and c

(i) Below are written:–

On the left {R.A. lang δ and (T – R.A.) for equatorial and mean values.
{R.A. lang δ and (T – R.A.) for zenith stars and mean values.

Next on the right;

R.A. lang δ and (T – R.A.) for polar stars.

The first correction for rate is the reduction of each polar star to the mean time of the equatorial.

The second correction for rate is the reduction of each polar star to the mean time of the zenith group.

The Columns I and II contain the reduced values of (T – R.A.)

(j) Next below are given the equations for the determination of n with their solution.

The values of n from equatorial stars are written on the left and for zenith stars on the right.

The headings of the columns will sufficiently explain the declination pages (on the right) with the exception of the columns R_{fl} and R_{eq}. The values in these columns are derived in the following way:–

The values of $(R_{eq} + R_{fl}) - (R' - R)$ are collected in groups 1. 2. 3. 4. 5. 6. 7. 8. 9. arranged according to the sine of the zenith distance.

The means of the separate columns are written below

The values of $(R_{eq} + R_{fl})$ for each star less a chosen number of seconds as a constant, are laid off on a sheet marked (A) with the argument sin z. A smooth curve was then drawn through these points and a red line was drawn through the point where the curve intersects the ordinate passing through the point sin z = 0 and parallell with the original line of reference.

The approximate values of the flexure for sin z = +.80 +.70 +.60 &c were then measured from the new reference line

These values were then on sheets (A) in groups extending over 12 dates with sin z for a vertical argument and the separate dates for the horizontal argument.

The mean values are given on the right from which it appears that the values of R_{fl} derived independently for corresponding positive and negative zenith distances are nearly identical.

The values of R_{fl} for $\sin z = \left(\frac{+80-80}{2}\right) + \left(\frac{+70-70}{2}\right)$ &c (Sheet marked (B')) were laid off on Sheets marked (B). From the smooth curve drawn through these points the curves on Sheet marked (C) were then laid off, where the vertical argument is ~~sin~~ R_{fl} z and the horizontal argument is the day of the month. The numerical values of R_{fl} on Sheets marked D were drawn from these curves. On these sheets the day of the month is the vertical argument, and the values of $\sin z =$ .80 .70 &c form the · argument

Returning to the book,
the values of R_{fl} corresponding to the mean $\sin z$ taken from Sheets marked D^1. D^2. &c are written under the mean values of R_{eq} for each group. On the next line below are given the provisional values of R_{eq} free from flexure. The mean of these are then taken by weights which are proportional to the number of stars and the value of R_{eq} for the given date is written on the extreme left in black.
In order to free the values of the flexure given in table marked D from any systematic error which may still remain an additional analytical investigation is made as follows:-
On Sheets marked E for $\sin z = +60 — +80$, $+40 — +60$ &c the mean $\sin z$ taken from the books and the value of ΔR_{fl} derived by taking the difference between each (mean) value of R_{fl} and the adopted value (in black) on the left. In this investigation the grouping is by single months without regard to the number of days of observation during the month.
On the right side of Sheets marked E are given the equations of condition of the form:

$$\Delta fl = a \sin z + b \cos z$$

and the solution by weights.

With the values of the coefficients a and b the values of Δ Rfl are computed from which the curves are drawn on sheets marked G with the day of the month for the horizontal argument, the values of Δ Rfl taken from the curves are laid off separately for sin z = ±1.00 ±.80 ±.70 &c are taken the corrections to the provisional values of Rfl given on sheets marked D. The sum of these quantities gives the final values given on sheets marked G.

It is from these sheets that the values in the column marked Rfl in the books are taken. When applied to Rey the corrections are positive for south zenith distances and negative for north zenith distances. When applied to declinations these signs are reversed.

1870 Nov. 10 Obs. R h = -.049 +.009 h' = -.004 h' +.017 h = -.038 n = +.24

Star RA δ tang δ π-RA -(P'-P)

h m ° '

α Cygni 2080 +1.5 20.637 +44 58 + .99 294+127.16 ✓+ 24+126.40 +.03 +126.43
61 Cygni 21.0 1 +38 78 + .78 302+128.46 ✓+ .19 .65 +02 .67
ξ Cassiop. 0.530 +53 13 +1.34 6+126.06 ✓+ .32 .38 -04 .34
850 224 .76 -.01 .75
2345 22.12 126.525 126.570 +126.548 +126.548 480

Star RA δ tang δ π-RA -(P'-P)

h m ° '

α Cephei 21.175 +62 3 +1.88 +126.00 ✓ 306
δ Cephei 22.426 +57 47 +1.59 +126.38 +.38 126.76 318
κ Cassiop. × 0.4276 +62 14 +1.90 +126.12 ✓ 5

20.6 + .99 +127.16
21.0 + .78 128.46
20.8 + .88 +127.31

21.2+1.88 + 126.00 +0.00 +126.00
0.4+1.90 + 126.12 +01 +126.13

0 = +1.00 -0.31 n = +1.31 .31
+1.02 -0.18 +1.17 .17
+.24

1870 Nov. 13 R h = +.018 +.033 h' = +.001 h'' = +.006 n = +.30

Gr. 3415 21.30 21.2 9 +59 28 +1.70 511+127.33 ✓+ .51 127.84 00
g Cygni 21.4 25 +45 59 +1.04 513+127.73 ✓+ .31 8.04
ψ Cassiop. × 0.5 30 +53 13 +1.34 6+127.48 ✓+ .40 7.88
ζ Cassiop. × 0.6 33 +55 57 +1.47 10+128.00 ✓+ .44 8.01 00
0.55 7.57 127.940 127.945
22.92 +127.942 +127.942

α Cephei 21.316 +62 3 +1.88 +127.36 ✓ 306
κ Cass. × 0.426 +62 14 +1.90 +127.45 ✓ 5

21.4 + 1.04 + 127.73
0.5 +1.34 127.48
0.6 +1.47 127.57
0.2 +1.28 +127.59
23.5

21.3+1.88 + 127.36 +.01 +127.37
0.4+1.90 + 127.45 -.01 +127.44

0 = +.60 -0.22 n = +.37
+.62 -.15 +.24
+.30

1870 Nov. 15 R h = +.001 135 h' = -.012 h' = -.096 n = +.30

o Androm. 22.90 22.9 56 +41 39 + .89 327+128.45 ✓+ .27 128.72 -.12 +128.60
ψ Cassiop. × 0.5 30 +53 13 +1.34 6+128.12 ✓+ .40 .52 +04 .56
ζ Cassiop. × 0.6 33 +55 57 +1.47 10+128.11 ✓+ .44 .55 +05 .60
o Cassiop. × 0.6 38 +47 36 +1.09 34+128.27 ✓+ .33 .60 +05 .65
0.57 128.720 128.557
0.15 +128.598 +128.602

30 Cephei 22.634 +62 56 +1.95 +128.05 ✓ 527

22.9 + .89 + 128.45
0.5 +1.34 + 128.12
0.6 +1.09 + 128.27
0.0 +.87 +1.11 +128.28

22.6 +1.95 + 128.05 -.02 +128.03

0 = +0.84 -0.25 n = +.30

1870 Nov 16 R h = +.008 +.012 h' = +.005 h' = -.010 n = +.36

61 Cygni 21.05 21.0 1 +38 81 + .78 302+128.44 ✓+ .28 128.72 +01 +128.73
ζ Cygni 21.1 78 +29 43 + .57 303+128.44 ✓+ .21 .65 +01 .66
o Androm. 22.9 56 +41 39 + .89 327+128.37 ✓+ .32 .69 -00 .69
ρ Cassiop. 23.8 48 +56 48 +1.53 539+128.13 ✓+ .55 .68 -01 .67
β Cassiop. × 0.0 2 +58 28 +1.63 2+128.13 ✓+ .59 .72 -01 .71
23.57 128.685 128.697
22.56 +128.692 +128.692

α Cephei 21.318 +62 3 +1.88 +127.96 ✓ 306

21.0 +.78 + 128.44
21.1 +.57 + 128.44
22.9 +.89 + 128.37
21.7 +.75 + 128.4x

21.3 +1.88 + 127.96 -00 +127.96
0.0 +1.63 + 128.13 +.02 +128.15

0 = +1.13 -0.46 n = +.41
+ .88 - .27 +.31
+.36

1870 Nov. 17 R h = +.005 -.015 h' = -.018 h' = -.009 n = +.32

13 H Cephei 21.50 21.6 35 +56 55 +1.53 515+128.32 ✓+ .49 128.81 -02 +128.79
o Androm. 56 +41 39 + .89 327
β Aquarii 21.4 25 -6 87 + .11 307+128.77 ✓ .94 .73 -02 .71
ζ Cassiop. 0.8 49 +60 2 +1.73 13+128.16 ✓ .55 .71 +04 .75
0.80 128.770 128.710
22.60 +128.748 +128.750

β Cephei 21.427 +70 2.4 +2.785 +127.82 ✓ 308

21.4 -.11 + 128.77
0.8 +1.73 +128.16

21.4 +2.757 + 127.82 +.00 +127.82
0.8 +1.73 128.16 +.03 +128.19

0 = +2.86 -0.95 n = +.33
+1.84 -.58 +.31
+.32

sin z = +.60+.80 +.40+.60 +.20+.40 +0 +.20 +0 −.20 −.20 −.40 −.40 −.60 −.60 −.80

RA δ sin z $R_{ng} - R_{fl}$ P′−P $R_{ng} - R_{fl} + P'-P$ (RA δ sin z $R_{ng} - R_{fl}$ P′−P $R_{ng} - R_{fl} + P'-P$

h m ° ′ ″

06 ~~20 37 +44~~ −.04 −1′ 22 17 +62° −.34 −1′ 50.6 +1.0 49.6 −.7 ~~48.9~~ 50.3

318 21 1 +38 +.07 54.2 ~~54.7~~ +.1 54.1 +.1 −1′ 5 ″4.0 22 26 +57 −.27 51.9 ~~55.9~~ +.8 51.1 −.6 ~~50.5~~ 51.7

5 0 30 +53 −.19 54.0 +.8 53.2 −.5 52.7 53.7 0 27 +62 −.34 50.9 −.3 51.2 −.7 ~~50.6~~ 51.9

(2) −1 53.85

+.07 −54.1 −.19 −53.2 −.34 −49.6 (3) 51.30
−.27 51.1
−.34 51.2
+.07 −54.1 −.19 −53.2 −.32 50.6
+ .2 − .6 − .9
53.9 53.8 51.5
(5) 3.9 3.8 4.3 122
+1.5 +1.4 −.9

−1′ 52.44″
52.32

306 21 9 +59 −.29 −1 46.5 +.5 46.0 −.6 −1 46.6″ 21 16 +62 −.34 −1 47.1 +1.0 46.1 −.7 46.8″
−5 21 25 +45 −.06 49.0 −.1 49.1 −.1 49.2 0 26 +62 −.34 45.5 −.3 45.8 −.7 46.5
0 30 +53 −.19 47.7 +.8 46.9 −.5 47.4
0 33 +55 −.23 46.8 +.6 46.2 −.5 46.7

−.86 −49.1 −.29 −46.0 (2) 46.65
−.19 46.9 −.23 46.2
−.34 46.1
−.34 45.8

(4) 47.48

−.12 48.0 −.30 46.0
− .4 − .9
48.4 46.9
(6) 16.8 27.4 444
+1.0 −.5

−1′ 47.40″
~~47.4~~ 20

527 22 56 +41 +.01 −7 51.5 +.4 51.1 +0 −7 51.1 ~~22 34~~ +62
0 30 +53 −.19 53.9 +.8 53.1 −.5 53.6
0 33 +55 −.23 54.7 +.6 54.1 −.5 54.6
0 38 +47 −.09 54.0 +.2 53.8 −.2 54.0

+.01 −51.1 −.19 −53.1 −.23 −54.1 −7 54.8
−.09 53.8

(7) 53.32

+.01 −51.1 −.14 −53.4 −.23 −54.1 (1) 54.8
+ .0 − .4 − .4
51.1 53.8 54.8
(4) 1.1 7.6 4.8 135
−2.3 +.4 +1.4

−7′ 53.38″
7 ~~53.5~~ 62

306 21 1 +38 +.07 −7 56.5 +.1 56.4 +.0 56.3 21 16 +62 −.34 −7 55.0 +1.0 54.0 −.7 (1) 54.7
21 8 +29 +.22 55.6 ~~52.4~~ −.6 ✓ 56.2 +.5 55.7
22 56 +41 +.01 58.6 +.4 58.2 +0 58.2 +.22 −56.2 +.07 −56.4 −.25 −56.1
23 48 +56 −.25 56.1 +.0 56.1 −.6 ~~55.6~~ 7 +.01 58.2 −.28 56.3
0 2 +58 −.28 −7 57.0 +.7 56.3 −.6 ~~55.7~~ 69 −.34 54.0

+.22 −56.2 +.04 −57.3 −.29 −55.5
+ .7 + .1 − .9
(5) 56.76
55.5 57.2 56.4
(6) 5.5 14.4 19.2 391
−1.0 +.7 ~~−.1 +.9~~

−7′ 56.52″
7 ~~56.54~~ 42

308 21 35 +56 −.25 −7 55.5 +.8 54.7 −.6 55.3 21 27 +70 −.46 −7 56.1 +1.1 55.0 −.9 (1) 55.9
22 56 +41 −.25 +54.7 −.46 +55.0
21 25 −6 −.30 52.4
0 49 +60 −.30 53.1 +.7 52.4 −.6 53.0

−.28 +53.6 −.46 +55.0
−.8 −1.3
(2) 54.15
54.4 56.3
(3) 8.8 6.3 151
−.6 +1.3

−7′ 55.03
−7 54.~~5.43~~
.73

1870 Nov. 19 Obs. R. h = ~~+.002~~ −.050 h′ = −.011 h′ = −.039 h′ = −.025 morn. n = +.32

morning

Star	RA	δ	tang δ	π Ra −(P′−P)					
	260 h m	°	′			128.940			
γ Persei	+1.2 2.6 36	+48	42 +	1.14 40 + 128.58 +	.36	128.94	−05	+128.89	
δ Urs. Maj.	+0.9 11 8 47	+54	23 +	1.40 166 + 128.44 +	.45	.89	−02	87	
η Urs. Maj.	+1.0 13.7 43	+49	56 +	1.19 181 + 128.37 +	.38	75	+02	77	
ε Tauri	−.5 4.3 21	+18	54 +	.34 72 + 128.73 +	.11	.84	+02	.86	
α Tauri	440 −.7 4.5 29	+16	15 +	.29 73 + 128.81 +	.09	128.870 .90	+.03	.93	

M. obs. 3.80

13.7 + 1.19 + 128.37 12.75 morn. 132 − 41.42 + 142.19 + .00 + 142.19

+128.893 +128.893

morn. 128.820 +128.820

0 = − ~~40.23~~ 42.61 + 13.82 n = +.32 ~~n = +.32~~

α Urs. Min. 13.2 13 + 88 +9.01 ~~39~~ 21′ + 41.42 + 142.19 — (19?)

R. obs.

43 + .34 + 128.73

4.5 + .29 + 128.81

4.4 + .32 + 128.77

~~13.2 − 41.42 + 142.19 + .00 + 142.19~~

1870 Nov. 27 R. h = ~~+.002~~ −.019 morn. h′ = −.009 h′ = −.021 h′ = −.005 morn. 128.384 n = +.27

Star	RA	δ	tang δ	π Ra −(P′−P)					
	21.46								
ν Cygni	+1.7 20.9 53	+40	41 +	.86 300 + 128.13 +	.23	128.34	−.04	+128.30	
61 Cygni pk	+1.6 21.0 1	+38	8 +	.78 302 + 128.15 +	.21	.36	−.03	.33	
ζ Cygni	+1.5 21.1 8	+29	43 +	.57 303 + 128.24 +	.15	.39	−.03	.36	
ο Androm.	−3 22.9 56	+41	39 +	.89 327 + 128.18 +	.24	.42	+.01	43	
ν Persei	−2.9 1.5 30	+48	00 +	1.11 23 + 128.05 +	.30	35	+.06	41	
φ Persei	−3.0 1.6 36	+50	3 +	1.20 24 + 127.93 +	.32	25	+.06	.31	
η Urs. Maj.	+3 13.7 43	+49	56 +	1.19 181 + 128.03 +	.32	35	−.01	.34	
η Bootis	+3 14.3 21	+52	26 +	1.30 190 + 128.18 +	.35	53	+.01	.54	
β Aquarii	+1.2 21.4 25	−6	7 −	0.11 307 + 128.44 +	.03	41	−.02	.39	

morning

M. obs. 1.55 22.63

13.7 + 1.19 + 128.03 132 − 41.42 + 138.09 − .01 + 138.08

14.3 + 1.30 + 128.18 14.00

14.0 + 1.24 128.10

128.300

+128.370 +128.361

+128.490 128.440

0 = − ~~40.18~~ 42.66 + 9.98 n = +.24

α Cephei 21.3 16 +62 3 + 1.89 +127.83 — 291 306 ~~306~~

β Cephei 21.5 27 +70 1 2.75 +127.65 — 253 308

α Urs. Minor 13.2 13 + 91 21 − 41.42 +138.09 —

R. obs.

20.9 + .86 + 128.13 21.3 + 1.89 + 127.83 + .00 + 127.83

21.0 + .78 + 128.15 21.5 + 2.75 127.65 + .00 + 127.65

21.1 + .57 + 128.24 ~~13.2 − 41.42 138.09 − .01 + 138.08~~

22.9 + .89 + 128.18

21.4 − .11 + 128.44

21.5 + .60 + 128.23

0 = + 1.29 − 0.40 n = +.31

+ 2.15 − 0.58 +.27

+.29

n = +.27

1870 Dec. 10. h = ~~+.007~~ −.009 8 h′ = −.012 h′ = +.009 R. h′ = −.028 M. n = +.36

Star	RA	δ	tang δ	π Ra −(P′−P)					
	2.00					8.585			
γ Cassiop.	0.8 49	+60	2 +	1.73 13					
γ Androm.	R 1.9 56	+41	44 +	.89 32 + 8.25 +	.32	+ 8.57	+.01	+8.58	
6 Persei	2.1 5	+50	29 +	1.21 351 + 8.16 +	.44	60	+.01	61	
4 Camel.	4.6 38	+56	32 +	1.51 371 + 8.08 +	.54	62	−.01	61	
9 Camel.	R 3.8 46	+60	44 +	1.78 365 + 7.95 +	.64	8.605 59	−.01	.58	
ϑ Persei	M 2.6 36	+48	42 +	1.14 40 + 8.38 +	.41	79	−.02	.77	
η Persei	M 2.7 42	+55	22 +	1.45 43 + 8.17 +	.52	8.717 .69	−.02	.67	
τ Persei	M 2.8 45	+52	15 +	1.29 45 + 8.21 +	.46	.67	−.01	.66	
c Persei	M 4.0 0	+47	23 +	1.09 69 + 8.31 +	.39	70	+.02	.72	
1 Camel.	M 4.4 22	+53	38 +	1.36 368 + 8.16 +	.49	8.675 65	+.03	.68	

M. Obs. 3.10 R.

2.6 + 1.14 + 8.38 3.30 M. 3.5 + 1.95 + 7.95 + .00 + 7.95 +8.595 R. +8.595 R.

+8.700 M. +8.700 M.

2.8 + 1.29 + 8.21

4.0 + 1.09 + 8.31 0 = + 0.78 − .35 n = +.45

3.1 + 1.17 + 8.30

g Camel. R 4.7 42 +66 8 + 2.26 + 7.73 — 76

10 Camel. R 4.9 52 +60 15 + 1.75 + 8.07 — 80

Gr. 716 M 3.5 30 +62 49 + 1.95 + 7.95 — +2.84 363

R. obs.

1.9 + .89 + 8.25 4.7 + 2.66 + 7.73 + .03 + 7.76

2.1 + 1.21 + 8.16 4.9 + 1.75 + 8.07 + .03 + 8.10

2.0 + 1.05 + 8.20

0 = + 1.61 − .44 n = +.28 .28

+ .60 − .10 .45

n = +.36

1870 Dec. 13 h = + ~~.002~~ +.038 .010 h′ = −.003 h′ = +.045 R. h′ = +.018 M. n = +.33

Star	RA	δ	tang δ	π Ra −(P′−P)					
	1.35								
γ Cassiop.	0.8 49	+60	2 +	1.73 13 + 7.45 +	57	7.998 8.02	+.07	8.09	
γ Androm.	1.9 56	+41	44 +	.89 32 + 7.67 +	.29	7.96	+.02	7.98	
6 Persei	2.1 5	+50	29 +	1.21 351 + 7.70 +	.40	8.10	+.01	8.11	
4 Camel.	R 4.6 38	+56	32 +	1.51 371 + 7.56 +	.50	8.080 .06	−.10	7.96	
ϑ Persei	M 2.5 36	+48	42 +	1.14 40 + 7.71 +	.38	.09	+.01	8.10	
η Persei	M 2.7 42	+55	22 +	1.45 43 + 7.60 +	.48	.08	+.01	.09	
τ Persei	M 2.8 45	+52	15 +	1.29 45 + 7.69 +	.37	8.077 .06	+.01	.07	
c Persei	M 4.0 0	+47	23 +	1.09 69 + 7.74 +	.36	.10	−.01	.09	
1 Camel. seq.	M 4.5 22	+53	38 +	1.36 368 + 7.66 +	.45	8.105 .11	−.02	.09	

2.5 + 1.14 + 7.71 2.35 R. +8.035 R. +8.035 R.

2.8 + 1.29 + 7.69 3.30 M. 3.8 + 1.78 + 7.36 + .00 + 7.36 +8.088 M. +8.088 M.

4.0 + 1.09 + 7.74 h′ = −.005 0 = + 0.61 − .35

3.1 + 1.17 + 7.71

9 Camel. R 4.7 42 + 66 8 + 2.26 + 7.27 — +2.92 76

9 Camel. M 3.8 46 +60 44 + 1.78 + 7.36 — 3.45 365

R. obs.

1.9 + .89 + 7.67 4.7 + 2.26 + 7.27 + .01 + 7.28

2.1 + 1.21 + 7.70

2.0 + 1.05 + 7.68

0 = + 1.21 − 0.40 n = +.33

1870 Dec. 1 R. h = +.001 h′ = −.003 n = +.40

Star	RA	δ	tang δ	π Ra −(P′−P)					
α Aquarii	22.0 ~~21 59~~	−0	56 −	.02 311 + 8.37 −	.01	8.36	00		
ϑ Aquarii	22.2 10	−8	24 −	.15 522 + 8.37 −	.06	.31			
3 Cephei	22.1 7	+57	35 +	1.64 + 7.68 +	.66	.34	01		
3 ~~Lacertae~~	22.10					+8.337			

22.0 − .02 + 8.37 22.1 + 1.64 + 7.68 + .00 + 7.68

22.2 − .15 + 8.37

22.1 − .08 + 8.37 0 = + 1.72 − .69 n = +.40

sin z = +60 +80 | +40 +60 | +20 +40 | +0 +20 | +0 −20 | −20 −40 | −40 −60 | −60 −80

	R.A. h	m	δ °	sin z		Rgg − Rfl "	ρ'−ρ "	Rgg−Rfl+ρ'−ρ "			
	2	36	+48	−.11	−7	53.3	+.3	53.0	−.3	−7	533
mom.	11	47	+54	−.21		52.0	+.5	51.5	−.5		520
morn.	13	43	+49	−.13		52.8	+.0	52.8	−.3		531
	4	21	+18								
	4	29	+16								

(3) 52.80

R.A. δ sin z Rgg − Rfl ρ'−ρ Rgg−Rfl+ρ'−ρ

h m °
13 13 +88

−.11 −53.0
−4
534
534
+.0

−7' 53.40"
−7 ~~52.80~~95
53.30

7 52.55 Morning

	h	m	°								
	20	53	+40	+.03	−7	55.8	+.0	55.8	+0	−7	558
	21	1	+38	+.07		57.0	+.1	56.9	+.1		568
	21	8	+29	+.22		55.0	−.6	55.6	+.5		561
	22	56	+41	+.01	563	~~57.8~~	+.4	55.9	+0		559
	1	30	+48	−.10		54.2	+.3	53.9	−.3		542
	1	36	+50	−.13	557	~~59.7~~	+.5	55.2	−.3		555
morn.	13	43	+49	−.13		53.2	+.0	53.2	−.3		535
morn.	14	21	+52	−.17		51.8	+.8	51.0	−.4		514
	21	25	−6								

(4) 55.33

(2) 52.45

h	m	°								
21	16	+62	−.34	−7	55.9	+1.0	54.9	−.7	556 ~~542~~	
21	27	+70	−.46		57.6	+1.1	56.6	−.9	575 ~~557~~	(2) 54.95
13	13	+88								

+.22 −55.6 +.03 −55.8 −.10 53.9 −.34 −54.9 −.46 −56.6
+.07 56.9 −.13 55.2
+.01 55.9 ~~−.13 53.2~~
~~−.17 51.0~~
+22 −55.6 +.04 −56.2 −.12 −53.3 −34 −54.9 −46 −56.6

	+.7	+.1	54.6 −.4	−1.0	−1.3	
	54.9, 1	56.1, 3	55.0, 2	55.9, 1	57.9, 1	
(8)	49	183	104	59	79	470
	−1.0	+.2	−.9	+.0	+2.0	

−7' 55.88"
7 ~~55.22~~ 56.01
55.40

52.45 Morning

h	m	°								
0	49	+60								
1	56	+41	+.01	−7	53.1	+.1	53.0	+0	−7	530
2	5	+50	−.14		52.8	+.5	52.3	−.4		527
4	38	+56	−.24		52.4	+.5	51.9	−.5		524
3	46	+60	−.31		52.1	−.1	52.2	−.6		528
2	36	+48	−.11		50.2	+.3	49.9	−.3		502
2	42	+55	−.19		49.7	−.5	50.2	−.5		507
2	45	+52	−.17		52.1	+.6	51.5	−.4		519
4	0	+47	−.09		52.0	+.4	51.6	−.3		519
4	22	+53	−.19		51.0	+.9	50.1	−.5		506

(9) 51.80

h	m	R.	h	m	M.
4	42	51.2	2	36	50.2
1	56	53.0	2	42	50.7
2	5	52.7	2	45	51.9
4	38	52.4	4	0	51.9
3	46	52.8	4	22	50.6
	R.	52.42			51.06 M.

−7' 52.16"
7 51.74

h	m	°								
4	42	+66	−.40	−7	50.2	−.2	50.4	−.8	51.2	
~~4~~	~~52~~	~~+60~~	−.31	~~8~~	~~19.8~~	~~+.2~~				
3	30	+62	−.35		53.9	−.4	54.3	−.7	(55.0)	
										(1) 51.20

+.01 −53.0 −.14 −52.3 −.24 −51.9
−.11 49.9 −.31 52.2
−.19 50.2 −.40 50.4
−.17 51.5 ~~−.31~~
−.09 51.6 −.35 54.3
−.19 50.1
+.01 −53.0 −.15 50.9 −.32 52.2

	+ .0	−.5	−.9	
	53.0, 1	51.4, 6	53.1, 4	
(11)	30	84	124	238
	+.8	−.8	+.9	

h	m	°							
0	49	+60	−.30	−7	50.6 ~~45.6~~	+.7	49.9	−.7	506
1	56	+41	+.01		51.1	+.1	51.0	+0	510
2	5	+50	−.14		51.2	+.5	50.7	−.3	510
4	38	+56	−.24		50.2	+.5	49.7	−.6	503
2	36	+48	−.11		52.0	+.3	51.7	−.3	520
2	42	+55	−.19		47.9	−.5	48.4	−.5	489
2	45	+52	−.17		51.4	+.6	50.8	−.5	513
4	0	+47	−.09		51.6	+.4	51.2	−.2	514
4	22	+53	−.19		49.3	+.9	48.4	−.5	489

(9) 50.60

h	m	R.	h	m	M.
~~0~~	~~49~~				
0	49	50.6	2	36	52.0
1	56	51.0	2	42	48.9
2	5	51.0	2	45	51.3
4	38	50.3	4	0	51.4
4	42	51.1	4	22	48.9
			3	46	51.0
	R.	50.80			50.58 M.

−7' 50.80"
7 50.68

h	m	°							
4	42	+66	−.40	−7	50.0	−.2	50.2	−.9	511
3	46	+60	−.31		50.2	−.1	50.3	−.7	510

+.01 −51.0 −.14 −50.7 −.30 49.9 (2) 51.05
−.11 51.7 −.24 49.7
−.19 48.4 −.40 50.2
−.17 50.8 −.31 50.3
−.09 51.2
−.19 48.4
+.01 −51.0 −.15 −50.7 −.31 −50.0

	+ .0	−.5	−.9	
	51.0, 1	50.7, 6	50.9, 4	
(11)	510	42	136	88
	+.2	−.1	+.1	

1870 Dec 14 R h = +.005 (n = +292) +14
h' = −.003
h = +.007 h' = +.014 morn. n = +.39

Star RA δ tang δ π Ra −(ρ' ρ)

morning 23 50 h m ° ′ 8.105
α Pegasi +.5 ~~32~~ 2 30 ~~59~~ +14 32 + .26 √329 + 7.94 √+ 10 8.04 00
κ ~~Piscium~~ ? ~~23 31~~ + 0 ~~34~~ + .01 √ ~~+ 14.48~~ √
λ Androm. 0 23.5 31 +45 47 + 1.03 √331 + 7.69 +.08+ .40 +.17
κ Androm. −1 23.6 34 +43 39 + .95 √335 + 7.72 √+ .37 .09
ω Piscium −4 23.9 53 +6 10 + .11 √336 + 8.05 √+ .04 .12
ζ Virginis +0 13.5 28 +0 3 + .00 √179 + 8.20 √+ .00 .20 00
~~ζ Cassiop. 23 48 +56 48 + 1.53 √ + 14.31 √~~ 13.50 8.200
~~M. obs.~~
13.5 + 00 + 8.20 13.2 − 41.42 + 144.16 − 00 + 144.16
23.50 +8.105 + 8.105
13.50 morn. + 8.200 m + 8.200
0 = −41.42 ~~+138.96~~ 16.16 n = +.39

α Urs. Min. S.C. × 13.2 13 +91 21 + 41.42 + 144.16 — 19
R. obs.
23.0 + .26 + 7.94 ~~13.2 − 41.42 + 144.16 − 00~~
23.9 + .11 + 8.05
23.4 + .18 + 8.00

1870 Dec. 18 h = ~~+.008~~ −.017 h' = +.001 R. morn n = +.27
morning h'₀ = −1.010 +.007 R R = 0h 30 to 2 56 M. 3h 15m to 5h 56m
060 h m +.006 M. 13 13 to 13 43
ζ Cassiop. × +7 0.5 30 +53 13 + 1.34 √6 + 7.63 √+ .36 8.225 8.26 .00 + 8.26
α Cassiop. × +6 0.6 33 +55 51 + 1.47 √10 + 7.88 √+ .40 .28 .28
η Cassiop. × 5 0.7 42 +57 9 + 1.55 √12 + 7.81 .09 .42 .14 .15 tel
γ Persei 2.90 2.4 56 +53 1 + 1.33 √48 + 7.87 √+ .36 8.230 .23 .23
ζ Virginis +1 [13.5] 28 + 0 3 + .00 √179 + 8.28 √+ .00 .28] .00 .28 morn
~~ε Bootis 13.7 41 +18 5 + .33 √180~~
α Persei 3.36 3.3 15 +49 25 + 1.17 √52 + 7.84 √+ .32 .16 +.01 .17 M.
σ Persei [3.4] 22 +47 34 + 1.10 √362 + ~~6.67~~ √+ .30
~~α Aurigae 5 7 +45 52 + 1.03 √ + 1.14~~
ο Aurigae 5.60 5.6 36 +49 46 + 1.18 √377 + 7.99 √+ .32 .31 −.01 .30 M
η Urs Maj. −1 [13.7] 43 +49 56 + 1.19 √181 + 7.80 √+ .32 [.12] 00 .12 morn
1.18 R 4.45 M +8.228 R. +8.228
morn. 13.60 morn + 8.200 R. n = +.30 + 8.200

γ Cassiop. × 0.8 49 +60 2 + 1.73 √ ~~1.84~~ + 7.75 √ — 13
~~γ Cephei 23 34 +76 56 + 4.30 √~~
~~α Urs. Min. S.C. × 13 13 +91 21 + 41.42 ~~ + 139.33
24 Camel. 3.3 19 +59 30 + 1.70 √ + 7.70 √ — 361
R. obs.
13.5 + 00 + 8.28 0.8 + 1.73 + 7.75
13.7 + 1.19 + 7.80 13.2 − 41.42 + 139.33 + .00 + 139.33 0 = −42.02 + 31.29 n = +.27
13.6 + .60 + 8.04
M obs.
3.4 + 1.10 + 6.67 3.3 + 1.70 + 7.70 − .01 + 7.69 0 = + .56 + .36 n = −.64
5.6 + 1.18 + 7.99
4.5 + 1.14 + 7.33

1870 Dec 21 h = ~~+.018~~ h' = −.013 (h' = +.003 + 8.235 m. + 8.235
ζ Virginis 13.5 29 + 0 3 + .00 √179 + 7.84 √+ .00 7.84
η Urs Maj 13.7 43 +49 56 + 1.19 √181 + 7.35 √+ .36 .71
13.60 + 7.775

α Urs Min S.C. × 13.2 +88 37 − 41.42 + ~~70.30~~ 135.30 19
13.5 + 00 + 7.84 13.7 + 1.19 + 7.35 + 00 + 7.35
13.2 − 41.42 + 135.30 + 00 + 135.30

1870 Dec. 22 h = ~~+.015~~ −.5 h' = +.004 R. n = +.33
h' = −.016 h' = −.006 M.
α Cassiop. 0.60 R 0.5 33 +55 51 + 1.47 √10 + 7.13 √+ .49 7.545 7.62 + .01 + 7.63
η Cassiop. R 0.7 42 +57 9 + 1.55 √12 + 7.05 .09 .51 .47 + .01 .48
β Persei R 3.0 0 +40 28 + .85 √50 + 7.42 √+ .28 .70 + .00 .70
ι Aurigae 5.0 R 5.7 43 +39 7 + .81 √101 + 7.22 √+ .27 .49 −.01 .48
δ Aurigae R 5.8 49 +54 16 + 1.39 √379 + 7.09 √+ .46 7.560 .55 −.01 .54
β Aurigae R 5.8 50 +44 56 + 1.00 √103 + 7.17 √+ .33 .50 −.01 .49
~~ζ Virginis 13.5 28 + 0 3 + .00 √179~~
~~α Bootis 14 10 + 19 50 + .36 √ + 4.12 √~~
α Persei 3.30 M 3.2 15 +49 25 + 1.17 √52 + 7.17 √+ .39 7.56 00
24 Camel. M 3.3 19 +59 30 + 1.70 √361 + 7.13 √+ .56 7.513 .69
σ Persei ? M 3.4 22 +47 34 + 1.10 √362 + 7.11 √+ .36 .47
ο Aurigae 5.60 M 5.6 36 +49 46 + 1.18 √377 + 7.17 √+ .39 7.560 .56 00
3.2 + 1.17 + 7.17 3.58 R. 3.3 + 1.70 + 7.13 − .01 + 7.12 + 7.555 R. + 7.553
3.4 + 1.10 + 7.11 3.88 M. + 7.570 M. + 7.570
5.6 + 1.18 + 7.17
4.1 + 1.15 + 7.15
0 = + 0.55 − .03 n = +.05

0 = + 1.19 − .49 n = +.41
− 41.42 + 42.46 + .18 n = +.30
γ Cassiop. × R 0.8 49 +60 2 + 1.73 √ + 7.04 √ — 13
~~α Urs. Min. × 1 13 +88 39 + 42.49~~
3.0 + .85 + 7.42 0.8 + 1.73 + 7.04 − .05 + 6.99
5.7 + .81 + 7.22
5.8 + 1.00 + 7.17
4.8 + .89 + 7.27
0 = + 0.84 − 0.28 n = +.33

1870 Dec. 26 R h = ~~+.018~~ −.017 h' = +.003 n = +.31
h' = −.017
ω Piscium +0.5 23.9 53 + 6 10 + .11 √336 + 6.09 √+ .03 6.12 00
α Androm. × +4 0.0 2 +28 24 + .54 √1 + 5.82 √+ .17 5.99
ζ Cassiop. × −1 0.5 30 +53 13 + 1.34 √6 + 5.63 √+ .42 6.05
α Cassiop. × −2 0.6 33 +55 51 + 1.47 √10 + 5.65 √+ .46 6.11
ο Cassiop. × −2 0.6 38 +47 36 + 1.09 √341 + 5.71 √+ .34 6.05
η Cassiop. × −3 0.7 42 +57 9 + 1.55 √12 + 5.53 √+ .09 .48 5.92 00
δ Cassiop. × 1.3 18 +59 35 + 1.70 √20
~~ι Persei 1 30 +48 00 + 1.11 + 9.38~~
0.38 + 6.040 + 6.040 0 = + 40.84 − 12.84 n = +.31

α Urs. Min. × 1.2 13 +88 39 + 41.42 − 6.99 19
23.9 + .11 + 6.09 1.2 + 41.42 − 6.99 + .02 − 6.97
0.0 + .54 + 5.82
0.6 + 1.09 + 5.71
0.2 + .58 + 5.87

sin z +.60 +.80 +.40 +.60 +.20 +.40 +.0 +.20 +.0 -.20 -.20 -.40 -.40 -.60 -.60 -.80

RA δ sin z R_ey − R_fl δ'−δ R_ey−R_fl +10″δ'−δ
h m ° ″ ″ ″

RA δ sin z R_ey R_fl
h m ° ″ ″

19
22 59 +14
23 21 +0 | 13 13 +88
23 31 +45 −.06 −7 49.0 +.6 48.4 −1 48.5 | −.06 − 48.4
23 34 +43 −.02 −7 47.3 −.5 47.8 −0 47.8 (2) 48.10 | −.02 47.8 (2) 48.10
23 53 +6
13 28 +0 | −.04 − 48.1
23 48 +56 | − .1
| 48.2
′ ″ | 1
−7 48.20 | 48.2
48.13 | +.0

13
0 30 +53 −.19 −7 49.7 +.8 48.8 −.5 −7 49.5 | 0 49 +60 −.30 −7 49.5 +.7 48.8 −.7 49.5
0 33 +55 −.23 50.0 +.6 49.4 −.6 50.0 R | 23 34 +76
0 42 +57 −.25 49.1 +.8 48.3 −.6 48.9 49.24 = R | 13 13 +88
361 | 2 56 +53 −.18 . . 48.3 +.5 47.8 −.5 48.3 | 3 19 +59 −.29 (56.9) −.4 (57.3) −.7 58.3 (1) 49.5
13 28 +0 0 49 49.5
13 41 +18
+.27 | 3 15 +49 −.12 49.2 +.6 48.6 −3 48.9 | −.19 − 48.8 −.23 − 49.4
3 22 +47 −.09 +.7 | −.18 47.8 −.25 48.3
5 7 +45 | −.12 48.6 −.30 48.8
5 36 +49 −.11 49.2 +.9 48.3 −3 48.6 | −.11 48.3
−.64 | nom. 13 43 +49 −.13 47.5 +.0 47.5 −.3 [47.8] | −.15 − 48.4 −.26 − 48.8
′ | − 5 − 8
−7 ~~49.17~~ 49.20 | 48.9₄ 49.6₃
49.10 h m R. m (7) 48.87 | (7) 35.6 28.8 644
19 | 13 29 +0 0 30 49.5 0 42 48.9 | −.3 +.4
13 43 +49 0 33 50.0 5 36 48.6
0 42 48.9 3 19 49.5
0 56 48.3
0 49 49.5
R. 49.24 49.00 m

13
0 33 +55 −.23 −8 4.4 +6 3.8 −.5 −8 4.8 | 0 49 +60 −30 −7 (51.5) +.7 50.8 −.4 (50.4)
0 42 +57 −.25 4.7 +.8 3.9 −.6 4.5 | 1 13 +88
~~3 0 +40 +.03 8.3 −.1~~ 8.9 +1 8.3 | +.06 −5.4 −.05 −2.6 −.23 −3.8
5 43 +39 +.06 3.6 −1.8 5.4 +.1 5.3 | −.12 4.9 −.25 3.9
~~5 49~~ +54 ~~−.21~~ (~~8.4 +.1~~) 8.5 −.9 8.9 | −.09 5.0
5 50 +44 −.05 3.1 +5 2.6 −.1 [2.7] | +.06 −5.4 −.09 −4.2 −.24 −3.8
13 28 +00 | +.2 − − .3 − .7
14 10 +19 | 5.2₁ 4.5₃ 4.5₂
3 15 +49 −.12 5.5 +.6 4.9 −.3 5.2 | (6) 5.2 13.5 9.0 277
3 19 +59 −.29 −7 (52.3) −.4 [52.7] −.7 7 [53.4] | +.6 −.1 −.1
3 22 +47 −.09 −8 5.7 +.7 5.0 −.2 5.2
5 36 +49
h m R. m. h m
′ ″ 0 33 ~~4.3~~ 4.3 5.2 3 15 (6) 4.53
−8 4.62 0 42 ~~4.5~~ 4.8 5.2 3 22
4.53 3 0 ~~5.3~~ 8.3
5 43 ~~2.7~~ 5.3
5 49 R. ~~4.20~~ 8.9 5.20 m.
5 50 [2.7]
6.26 R.

19
23 53 +6 −7 | 13 13 +88
0 2 +28 | −.19 −50.9 −.23 −50.7
0 30 +53 −.19 51.7 +.8 50.9 −.5 51.4 | −.09 52.6 −.25 50.8
0 33 +55 −.23 51.3 +.6 50.7 −.6 51.3
0 38 +47 −.09 52.8 +.2 52.6 −.2 52.8 | −.14 −51.8 −.24 −50.8
0 42 +57 −.25 51.6 +.8 50.8 −.6 51.4 | − .4 − .7
1 18 +59 | 52.2₂ 51.5₂
1 30 +48 (4) 51.72 | (4) 44 30 74
′ ″ | +.3 −.4
−7 51.85
51.73

1870 Dec 31 h = ~~+.011~~ −.062 n = +.328 h′ = +.010 R moon. h = −.013 R. n = +.36
h′ = −.007 −.006 h′ = +.032 M.

R 0h 49 to 3 22 . M 3h 34m to 5 36
13 13, 14 21

Star	Ra	δ	tang δ	−(P′P) Ra			
	h m	° ′			+4.02 −.02	+4.00	
γ Cassiop.	10.5 7.8 +1.2 1.3 18	+59 35	+ 1.70 ✓ 20	+ 3.57 ✓+ .61	4.100 4.18 −.02	.16	
ϑ Persei	−.1 2.6 36	+48 42	+ 1.14 ✓ 40	+ 3.65 ✓+ .41	.07 +.00	.07	
η Persei	.2 2.7 41	+55 22	+ 1.45 ✓ 43	+ 3.48 ✓+ .52	00 +.00	.00	
γ Persei	.4 2.9 55	+53 1	+ 1.33 ✓ 48	+ 3.59 ✓+ .48	.07 +.01	.08	
β Persei	.5 3.0 0	+40 28	+ .85 ✓ 50	+ 3.83 ✓+ .31	.14 +.01	.15	
α Persei	2.97 .7 3.2 15	+49 25	+ 1.17 ✓ 52	+ 3.67 ✓+ .42	4.075 .09 +.01	.10	
σ Persei	−.9 3.4 22	+47 34	+ 1.10 ✓ 362	+ 3.68 ✓+ .40	.08 +.01	4.09	
~~η Urs. Maj.~~	13 13.7 43	+49 56	+ 1.19 ✓ 181	+ 3.54 ✓ .43	3.97 oo	3.97 moon	
α Bootis	14.05 ~~14.2~~ 10	+19 50	+ .36 ✓ 187		4.00		
ϑ Bootis	−4 14.4 21	+52 26	+ 1.30 ✓ 190	+ 3.57 ✓ .47	4.04 oo	4.04 moon	
δ Persei	+7 3.6 34	+47 23	+ 1.09 ✓ 57	+ 3.69 ✓ .39	4.085 .08 +.02	4.10 M.	
ν Persei	366 +7 3.6 37	+42 11	+ .91 ✓ 59	+ 3.76 ✓+ .33	.09 +.02	.11 M.	
1 Camel. seq.	4.4 22	+53 38	+ 1.36 ✓ 368	+ 3.88 ✓+ .49	.37		
ο Aurigae	−4.3 5.6 36	+49 46	+ 1.18 ✓ 377	+ 3.73 ✓+ .42	4.150 .15 −.04	.11 M.	

M. Obs. 2.49 R. −1
3.6 +.91 +3.76 14.05 R. moon. 5.3 +1.96 + 3.37 +.00 + 3.37 +4.081 R. +4.081
5.6 +1.18 +3.73 4.27 M. +4.005 R. +4.005 moon.
4.6 +1.04 +3.74 +4.107 M. +4.107.
0 = + 0.92 − 0.37 n = + .40
R. Obs.
13.7 +1.19 +3.54 14.0 +2.14 + 3.36 +.00 + 3.36
132 −41.42 +7.77 +.00 + 7.77
117
0 = +0.95 −0.18 n = +.19

Star	Ra	δ	tang δ	−(P′P) Ra		
	h m	° ′				
γ Cassiop. ×	0.8 49	+60 2	+ 1.73 ✓	+ 3.40 ✓+ .62 + 4.02		13
2H Camel.	3.3 19	+59 30	+ 1.70 ✓	+ 3.44 ✓		361
α Urs. Min. ×	1.2 13	+88 39 7	+ ~~42.49~~	− 9.04 ✓		19
α Urs. Min. 2C	13 2 13	+88 91	39 21 − 41.42 ✓	+ 7.77		
5 Urs. Min. ?						
17 Camel.	5.3 18	+62 58	+ 1.96 ✓	+ 3.37 ✓	− 400	375
α Draconis	14.0 0	+64 58	+ 2.14 ✓	+ 3.36 ✓	− 349	184

R. Obs.
2.6 +1.14 + 3.65
3.0 +.85 + 3.83
3.2 +1.17 + 3.67
3.4 +1.10 + 3.68
3.0 +1.06 + 3.71

1.2 +41.42 − 9.04 −.01 − 9.05
1.3 +1.70 + 3.57 −.01 + 3.56
~~13.2 −41.42 + 7.77~~

0 = +40.36 − 12.76 n = +.32
+ .64 − .15 +.24
n = +.36

1871 Jan 1. R h = ~~+.019~~ −.020 h′ = ~~+.004~~ θ = −43.61 + 4.23 n = +.38
h′ = −.019

Star	Ra	δ	tang δ	−(P′P) Ra	
ν Persei	1.5 30	+48 47 60 58	+ 1.11 ✓ 23	+ 3.59 ✓+ .42	4.01
ϑ Persei	+.4 2.6 36	+48 42	+ 1.14 ✓ 40	+ 3.41 ✓+ .43	3.84 oo
η Persei	+3 2.7 42	+55 22	+ 1.45 ✓ 43	+ 3.16 ✓+ .55	.71
γ Persei	+1 2.9 56	+53 0	+ 1.33 ✓ 48	+ 3.35 ✓+ .51	.86
β Persei	+.0 3.0 00	+40 28	+ .85 ✓ 50	+ 3.51 ✓+ .32	.83
α Persei	−2 3.2 15	+49 25	+ 1.17 ✓ 52	+ 3.38 ✓+ .44	.82
σ Persei	−4 3.4 22	+47 ~~34~~ 33 ✓	+ 1.10 ✓ 362	+ 3.42 ✓+ .42	.84 oo

2.97 +3.817 +3.817

Star	Ra	δ	tang δ	−(P′P) Ra		
α Urs. Min. ×	1.2 12 ~~13~~	+88 37 ✓ ~~39~~	+ 41.42 ✓ ~~42.49~~	− 11.87 ✓	− +379	19
2H Camel.	3.3 19	+59 ~~30~~ 29 ✓	+ 1.70 ✓	+ 3.13 ✓	418	361

2.6 +1.14 + 3.41
3.0 +.85 + 3.51
3.2 +1.17 + 3.38
3.4 +1.10 + 3.42
3.0 +1.06 + 3.43

1.2 +41.42 − 11.87 −.03 −11.90
3.3 +1.70 + 3.13 +.01 +3.14

0 = +40.36 − 15.33 n = +.38
+ .64 − .29 +.45
n = +.38

1871 Jan 7 h = ~~+.018~~ +21 h′ = +.027 R. n = +.30
h′ = −.015 h′ = +.047 M.

R 0 33 to 3 22 M 3 33 31 to 5 36

Star	Ra	δ	tang δ	−(P′P) Ra		
ζ Cassiop.	0.65 +×1.5 0.5 30	+53 13 11 ✓	+ 1.34 ✓ 6	+ 0.49 ✓+ .40	0.900 0.89 +.04	0.93
α Cassiop.	+×1.4 0.6 33	+55 50 ✓	+ 1.47 ✓ 10	+ 0.49 ✓+ .44	.93 +.04	1.02
ο Cassiop.	+×1.4 0.6 38	+47 36 35 ✓	+ 1.09 ✓ 341	+ 0.54 ✓+ .33	.87 +.04	0.91
η Cassiop.	+×1.3 0.7 48	+57 9 8 ✓	+ 1.55 ✓ 12	+ 0.54 ✓+ −.09 .46	.91 +.03	0.94
ϑ Persei	−.6 2.6 36 35	+48 42 ✓	+ 1.14 ✓ 40	+ 0.65 ✓+ .34	.99 −.02	0.97
η Persei	−7 2.7 42	+55 22 ✓	+ 1.45 ✓ 43	+ 0.49 ✓+ .43	.92 −.02	0.90
γ Persei	2.97 9 2.9 56	+53 0 ✓	+ 1.33 ✓ 48	+ 0.63 ✓+ .40	1.03 −.02	1.01
β Persei	−10 3.0 00	+40 28 27 ✓	+ .85 ✓ 50	+ 0.75 ✓+ .26	1.01 −.03	0.98
α Persei	−17 3.2 15	+49 25 24 ✓	+ 1.17 ✓ 52	+ 0.51 ✓+ .35	0.965 .86 −.03	0.83
σ Persei	−14 3.4 22	+47 34 33 ✓	+ 1.09 ✓ 362	+ 0.65 ✓+ .33	.98 −.04	0.94
δ Persei	~~3.6~~ 34	+47 28 22 ✓	+ 1.09 ✓ 57			
ν Persei	~~3.6~~ 37	+42 10 ✓	+ .91 ✓ 59			
1 Camel. seq.	440 +6 4.4 22	+53 38 ✓	+ 1.36 ✓ 368	+ 0.53 ✓+ .41	0.940 0.94 +.03	0.97
α Aurigae	+15.7 7	+45 52 ✓	+ 1.03 ✓ 86	+ 0.60 ✓+ .31	.91 +.00	0.91
ο Aurigae	−6 535 5.6 36	+49 46 ✓	+ 1.18 ✓ 377	+ 0.71 ✓+ .35	0.985 1.06 −.03	1.03

2.01 R. +0.939 R. +0.943 R
5.1 +1.03 +0.60 5.03 M. 5.3 +1.96 + 0.41 +.00 + 0.41 +0.970 M. +0.970 M.

0 = + 0.93 − 0.19 n = +.20

Star	Ra	δ	tang δ	−(P′P) Ra		
2H Camel.	3.3 19	+59 ~~30~~ 29 ✓	+ 1.70 ✓		−	361
α Urs. Min. ×	1.2 13 12 ✓	+88 39	+ ~~42.49~~ 41.42 ✓	− 11.41 ~~9.73~~ ✓	− +258	19
Gr. 716	3.5 31	+62 49 48 ✓	+ 1.95 ✓	+ 0.25 ✓	− 456	363
17 Camel.	5.3 18	+62 ~~58~~ 57 ✓	+ 1.96 ✓	+ 0.41 ✓	− 307	375

0.6 +1.09 + 0.54
2.6 +1.14 + 0.65
3.0 +.85 + 0.75
3.2 +1.17 + 0.51
3.4 +1.09 + 0.65
2.6 +1.07 + 0.62

1.2 +41.42 − 11.41 − .02 − 11.43
3.5 +1.95 + 0.25 +.01 + 0.26

0 = +40.35 − 12.05 n = +.30
+ .88 − .36 +.41
n = +.30

sin z = +60+80 +40+60 +20+40 +0+20 +0−20 −20−40 −40−60 −60−80

RA		δ	sin z	R_{zy}	R_{ff}	P′−P	$R_{zy}-R_{ff}+P'-P$			
h	m	°			″	″	″			
1	18	+59	−.30	−7	48.0	+.6	47.4	−7	−7	48.1
2	36	+48	−.11		50.2	+.3	49.9	−3		50.2
2	41	+55	−.19		46.9	−.5	47.4	−5		47.9
2	55	+53	−.18		49.3	+.5	48.8	−5		49.3
3	00	+40	+.03		49.4	−.1	49.5	+0		49.5
3	15	+49	−.12		50.0	+.6	49.4	−.3		49.7
~~3~~	~~22~~	~~+47~~	~~−.09~~			~~+.7~~				
13	43	+49								
14	10	+19								
14	21	+52								
3	34	+47	−.09		48.4	+.5	47.9	−2	−7	48.1
3	37	+42	+.00		50.2	+2	50.0	−0		50.0
4	22	+53	−.19		49.2	+.9	48.3	−5		48.8
5	36	+49	−.11		49.6	+.9	48.7	−3		49.0

(10) 49.06

h	m	R.	h m	M
1	18	48.1	3 34	48.1
2	36	50.2	3 37	50.0
2	41	47.9	4 22	48.8
2	55	49.3	5 36	49.0
3	0	49.5	5 18	48.8
3	15	49.7		
0	49	49.7		
3	19	50.0		48.94 M.
	R	49.93		

−7′ 49.30″
49.136

RA		δ	sin z	R_{zy}	R_{ff}	P′−P	$R_{zy}-R_{ff}+P'-P$			
h	m	°			″	″	″			
0	49	+60	−.30	−7	49.7	+.7	49.0	−7		49.7
3	19	+59	−.29		48.9	−.4	49.3	−7		50.0
1	13	+88								
13	13	+88								
13	13	+91								
5	18	+62	−.35	−7	48.2	+.2	48.0	−.8		48.8
14	0									

(3) 49.50

+.03	−49.5	−.11	−49.9	−.30	−47.4
+.00	50.0	−.19	47.4	−.30	49.0
		−.18	48.8	−.29	49.3
		−.12	49.4		
		−.09	47.9		
		−.19	48.3		
		−.11	48.7		
+.02	−49.8	−.14	−48.7	−.30	−48.6
	+ .1		− .4		− 9
	49.72		49.17		49.53
(12)	14		7		15
	+.4		−.2		+.2

36

RA		δ	sin z	R_{zy}	R_{ff}	P′−P	$R_{zy}-R_{ff}+P'-P$			
1	30	+48	−.10	−7	50.1	+.3	49.8	−3	−7	50.1
2	36	+48	−.11		50.1	+.3	49.8	−3		50.1
2	42	+55	−.19		47.5	−.5	48.0	−5		48.5
2	56	+53	−.18		48.6	+.5	48.1	−5		48.6
3	00	+40	+.03		50.4	−.1	50.5	+0		50.5
3	15	+49	−.12		48.9	+.6	48.3	−3		48.6
3	22	+47	−.09		50.6	+.7	49.9	−2		50.1

(7) 49.50

−7′ 49.54″
~~50.95~~
49.50

RA		δ	sin z	R_{zy}	R_{ff}	P′−P			
1	13	+88		−7	(46.2)	−.4	46.6 ~~47~~	−7	[47.3]
3	19	+59	−.29						

+.03	−50.5	−.10	−49.8
		−.11	49.8
		−.19	48.0
		−.18	48.1
		−.12	48.3
		−.09	49.9
+.03	−50.5	−.13	−49.0
	+ 1		− .4
	50.4		49.46
(7)	504		296.4
	+9		−.1

3468

RA		δ	sin z	R_{zy}	R_{ff}	P′−P	$R_{zy}-R_{ff}+P'-P$		
0	30	+53	−.19	−7	48.9	+.8	48.1	−5	48.6
0	33	+55	−.23		49.5	+.6	48.9	−6	49.5
0	38	+47	−.09		49.2	+.2	49.0	−2	49.2
0	42	+57	−.25	48.2	~~32.1~~	+.8	47.4	−6	48.0
2	36	+48	−.11		48.9	+.3	48.6	−3	48.9
2	42	+55	−.19		46.9	−.5	47.4	−5	47.9
2	56	+53	−.18		49.6	+.5	49.1	−5	49.6
3	00	+40	+.03		50.9	−.1	51.0	+0	51.0
3	15	+49							
3	22	+47	−.09		50.2	+.7	49.5	−2	49.7
3	34	+47							
3	37	+42							
4	22	+53	−.19		47.4	+.9	46.5	−5	47.0
5	7	+45	−.04		48.4	+.1	48.3	−0	48.3
5	36	+49	−.11		50.2	+.9	49.3	−3	49.6

— 49.16 R.

— 48.30 M.

(12) 48.94

−7 48.99
48.94

RA		δ	sin z	R_{zy}	R_{ff}	P′−P
3	19	+59		−7		
1	13	+88				
~~3~~	~~31~~	~~+62~~	~~−.35~~		~~(79.4)~~	−.4
~~5~~	~~18~~	~~+62~~	~~−.35~~		~~40.4~~	~~+2~~

+.03	−51.0	−.19	−48.1	−.23	−48.9
		−.09	49.0	−.25	47.4
		−.11	48.6		
		−.19	47.4		
		−.18	49.1		
		−.09	49.5		
		−.19	46.5		
		−.04	48.3		
		−.11	49.3		
+.03	−51.0	−.13	−48.4	−.24	−48.2
	+ .1		− .4		− .7
	50.9		48.8		48.9
(12)	509		4392		978
	+1.9		−.2		−.1

5879

1871 Jan. 10 R h = ~~+~~.017 −33 (+.258) n = +.484 h' = −.013 h' = −.001 n = +30

Star	RA	δ		tang δ	T−RA −(ρ'−ρ)				
δ Persei	2.6 36	+48.7	48	+1.14	40 ~~+1.19~~ −0.73 +	.34	.039	oo	
σ Persei	3.3 21	+47.6	34	+1.09	362 − 0.73 +	.33	.40		
6 Persei	2.1 5	+50.5	~~29~~ 28	+1.21	351 − 0.70 +	.36	.34	oo	
~~e Persei~~	~~2.4~~25								
	2.67						−0.377	−0.377	

Star	RA	δ	tang δ	T−RA −(ρ'−ρ)
ι Cassiop.	~~2.3 19~~	+66	~~30~~ + 2.33	− 1.29
~~9H Camel.~~	~~2 22~~			

2.1 + 1.21 − 0.70
2.6 + 1.14 − 0.73
3.3 + 1.09 − 0.73
2.7 + 1.15 − 0.72

2.3 − 2.33 − 1.29 − .01 − 1.30

~~0 = −3.48 − .58 n = −.17~~

1871 Jan 17 h = ~~+.017~~ −.021 −.018 h' = −.015 h' = −.029 R. h' = −.018 M. n = +30

R 0 49 6 422 M 4 38 6 713

Star	RA	δ		tang δ						
ν Persei	205 +1.7 1.5 30	+48 48.0	00	+1.11	23 + ~~6.48~~ −3.52	33	3.180 3.189	−.05 −.02	−3.24 R .19	
δ Persei	+.6 2.6 36	+48.7	42	+1.14	40 − 3.51	34	.17	+.01	.22	
σ Persei	−.2 3.4 22	+47.6	34	+1.18	362 − 3.56	33	.23	+.03	.262	
e Persei	4.00 1.2 4.4	+47.4	23	+1.09	69 − 3.52	33	3.237 .19	+.02	.17 R.	
4 Camel.	−.8 4.6 38	+56.5	32	+1.51	371 − 3.62	.45	.17	−.02	3.19 M	
ε Aurigae	+.9 4.9 53	+43.6	38	.95	81 − 3.33	.28	3.287 .05		17	
η Aurigae	4.0 +.5 5.0 58	+41.1	4	.87	83 − 3.42	.26	.16	−.01	.30	
α Aurigae	+4 5.1 7	+45.9	52	1.03	86 − 3.60	.31	3.29	−.01		
ψ¹ ~~Lyncis~~ Aurigae	6.2 14	+49.4	21	1.16	385 − 3.29	.35	2.94		.23	
19 Lyncis seq.	−.6 −.6 7.2 13 6.4513 6.8	+55.5	31	+1.46	397 − ~~4.94~~	.44	3.235 3.24 3.23	+.01 +.02	.21 M	
							−3.214 R		−3.216 R.	
							−3.218 M.		−3.220 M.	

Star		RA	δ		tang δ				
α Urs. Min.	×	1.2 13 12	+88	34 37	+41.42	−13.67			19
1 Camel. seq.		4.6 22	+53	38	+1.36	−3.69	+40	−3.29	368
2 Lyncis		6.1 8 9	+59	3	+1.67	−3.74	+50	3.24	384
8 Lyncis		6.4 26	+61	35	+1.85	−3.75			388
15 Lyncis		6.8 46	+58	35	+1.64	−3.72	+49	3.23	394
γ Cass.	×	0.8 49	+60	12	+1.73	−3.66			13

4.9 + .95 − 3.33
5.0 + .87 − 3.42
5.1 + 1.03 − 3.60
6.2 + 1.16 − 3.29
5.3 + 1.0 − 3.41

3.22 R.
5.42 M.

6.4 + 1.85 − 3.75 + .02 − 3.73

0 = + .85 − .342 n = + .40

1.5 + 1.11 − 3.52
2.6 + 1.14 − 3.51
3.4 + 1.10 − 3.56
4.0 + 1.09 − 3.52
2.9 + 1.11 − 3.53

0.8 + 1.73 − 3.66 − .03 − 3.69
1.2 + 41.42 − 13.67 − .02 − 13.69

0 = + 0.62 − 0.16 n = + .26
+ 40.31 − 10.136 + .25
~~n = + .26~~

n = + 30

1871 Jan 22 M. h = ~~+.022~~ −.022 h' = −.014 h' = −.015 n = +.35

Star	RA	δ		tang δ			
ξ¹ Ceti	~~2.1 57~~						
ξ η Tauri	3.6 35	+23	42	+ .44	60 − 9.53	~~+.48~~ .15 − 9.45	9.38
	3.60					−9.380	−9.380

3.6 + .44 − 9.53

Star		RA	δ		tang δ		
α Urs. Min.	×	1.2 13 12	+88	34 37	+ ~~42.49~~ 41.42	− ~~16.02~~ 23.60	19

1.2 + 41.42 − ~~16.02~~ 23.60 − .03 − ~~16.05~~ 23.63

0 = + 40.98 − ~~6.52~~ 14.18 n = + ~~16.35~~

1871 Jan 12 R h = ~~+~~ −.013 .016 h' = −.011 h' = +.001 n = +.46

Star	RA	δ		tang δ					
α Androm.	× ~~0.0 2~~	+ 28	20	+ .54	1 − ~~1.49~~				
γ Pegasi	× 0.1 7	+ 14	29	+ .26	3 − 1.49	.12	.137	oo	
κ Cass.	× 0.5 30	+ 53	13	+ 1.34	6 − 2.00	.62	.38		
ζ Cass.	× 0.6 33	+ 55	50	+ 1.47	10 − 2.04	.68	.36		
o Cass.	× 0.6 38	+ 47	36	+ 1.09	342 − 1.97	.50	.47		
η Cass.	× 0.7 42	+ 57	9	+ 1.55	12 − 2.14 .09	.71	.52		
	0.8						.41	oo	
	0.55						−1.418	−1.418	

Star		RA	δ		tang δ				
γ Cass.	×	0.8 49	+ 60	12	+ 1.73	− 2.20	+ .79	− 1.41	13
α Urs. Min.	×	1.2 13	+ 88	34 37	+ ~~42.49~~ 41.42	− 19.86			19
73 r 82		0.7 43	+ 63	34	+ 2.01	− 2.38			343

0.1 + .26 − 1.49
0.6 + 1.09 − 1.97
0.4 + .68 − 1.73

0.7 + 2.01 − 2.38 + .00 − 2.38
1.2 + 41.42 − 19.86 + .01 − 19.85

0 = + 1.33 − .65 n = + .49
+ 40.74 − 18.12 + .44

n = + .46

1871 Jan 25 R h = ~~+~~ −.022 .027 h' = −.019 h' = −.024 n = +.48

Star		RA	δ		tang δ				
η Tauri	+.1	3.6 39	+ 23	43	+ 0.44	61 − 7.56	.21	7.35	oo
ζ Persei	−.1	3.8 46	+ 31	30	+ 0.61	63 − 7.78	.29	.49	oo
		3.70						−7.420	−7.420

Star		RA	δ		tang δ		
α Urs. Min.	× +	1.2 13 12	+ 88	34 37	+ ~~42.49~~ 41.42	−27.35	19

3.6 + .44 − 7.56
3.8 + .61 − 7.78
3.7 + .52 − 7.67

1.2 + 41.42 − 27.35 − .05 − 27.40

0 = + 40.90 − 19.73 n = + .48

sin z = +60+80 | +40+60 | +20+40 | +0 +.20 | +0 -.20 | -20-40 | -40-60 | -60-80

RA		δ	sin z	R_{eq}	R_{fl}	P'-P	$R_{eq}-R_{fl}$+P'-P			
h	m	°		'	"	"	"			
2	36	+48	-.11	-7	49.3	+.3	49.0	-3	-7	49.3
3	21	+47	-.09		48.6	+.7	47.9	-2		48.1
2	5	+50								

-7' 48.70"
48.70

RA		δ	sin z	R_{eq}	R_{fl}	P'-P	$R_{eq}-R_{fl}$+P'-P
h	m	°		'	"		
2	19	+66					

-.11 - 49.0
-.09 47.9
-.10 - 48.4
- .3
48.7
17
+.0

1	30	+48	-.10	-7	48.1	+.03	47.8	-3	-7	48.1
2	36	+48	-.11		48.8	+.3	48.5	-3		48.8
3	22	+47	-.09		48.6	+.7	47.9	-3		48.2
4	0	+47	-.09		48.9	+.4	48.5	-3		48.8
4	38	+56	-.24		47.0	+.5	46.5	-7		47.2
4	53	+43	-.02		48.5	+.0	48.5	-0		48.5
4	58	+41	+.02		48.9	-.5	49.4	+0		49.4
5	7	+45	-.04		48.4	+.1	48.3	-0		48.3
6	14		-.12		50.0	+1.1	48.9	-3		49.2
7	13	+55					48.05			

(9) 48.50

h	m	R.
1	30	48.1
2	36	48.8
3	22	48.2
4	0	48.8
4	22	47.5
0	49	50.2

R. 48.60

		M
4	38	47.2
4	53	48.5
4	58	49.4
5	7	48.3
6	14	49.2
6	9	48.5
6	26	47.8
6	46	46.6
		48.19 M.

-7' 48.41"
48.36

2 7
3 37

1	13	+88		-7		–				
4	22	+53	-.19		47.9	+.9	47.0	-5	47.5	
6	9	+59	-.29		48.1	+.03	47.8	-7	48.5	
6	26	+61	-.33		47.3	+.2	47.1	-7	47.8	
6	46	+58	-.28		46.9	+1.0	45.9	-7	46.6	
0	49		-.30		50.2	+0.7	49.5	-7	50.2	

(5) 48.12

+.02	-49.4	-.10	-47.8	-.24	-46.5
		-.11	48.5	-.29	47.8
		-.09	47.9	-.33	47.1
		-.09	48.5	-.28	45.9
		-.02	48.5	-.30	49.5
		-.04	48.3		
		-.12	48.9		
		-.19	47.0		
+.02	-49.4	-.09	-48.2	-.29	-47.3
	+ .1		- .3		- .8
	49.3		48.5		48.1
(14)	9.3		68.0		40.5
	+.9		+.1		-.3

1178

1 13 +88

0 2
0 7
0 30
0 33
0 38
0 41

0 49
1 12
0 43

3 39
3 46

1 12

1871 Feb. 7 h = −.034 (−90) h′ = −.024 h′ = −.074 R. h′ = −.053 M n = +.51

Star	RA	δ		tang δ	π RA −(P′−P)			C
	h m	°	′				−.08	−15.84 R
ν Arietis	2.28 +1.1 1.8 48	+20	15 +	.37 ✓30	−15.95 ✓	.19	15.822 15.76 −.07	.86
α Arietis	+.9 2.0 00	+22	52 +	.42 ✓33	−16.00 ✓	.21	.79 −.02	.87
δ Persei	+.3 2.6 36	+48	42 ✓+	1.14 ✓40	−16.43 ✓	.58	.85 −.01	.90
τ Persei	+.2 2.7 45	+52	15 ✓+	1.29 ✓45	−16.55 ✓	.66	.89 −.00	.84
η Persei	.0 2.9 56	+53	0 ✓+	1.33 ✓48	−16.52 ✓	.68	15.918 .84 +.01	.85
β Persei	3.58 3.0 00	+40	28 ✓+	.85 ✓50	−16.29 ✓	.43	.86 +.11	.92
e Persei	−1.5 4.4 59 4.0 04	+47	23 ✓+	1.09 ✓69	−16.50 ✓	.56	−16.037 .94 +.08	15.86 R.
ε Aurigae	+1.0 4.9 53	+43	38 ✓+	.95 ✓81	−16.33 ✓	.48	.85 −.05	15.90 M
η Aurigae	4.90 4.8 58	+41	14 ✓+	.87 ✓83	−16.38 ✓	.44	.94 −.05	15.99
α Aurigae	+1.3 +.8 5.1 7	+45	52 ✓+	1.03 ✓86	−16.49 ✓	.53	15.910 .89 .96 −.07 −.04	15.96 16.00
ψ Aurigae	−.3 6.2 15	+49	21 ✓+	1.16 ✓385	−16.52 ✓	.59	.93 +.02	15.91
64 Auriga	−1.2 7.1 9	+41	6 ✓+	.87 ✓396	−16.43 ✓	.44	15.99 +.06	15.93
19 Lyncis seq.	−1.3 7.2 13	+55	31 ✓+	1.46 ✓397	−16.79 ✓	.74	16.000 16.05 +.07	15.98
	6.6 6.1 −9.6						16.03 +.01	16.02
							16.00 +.05	

M. Obs

4.9 +.95 − 16.33

5.0 +.87 − 16.38 2.92 R.

5.1 +1.03 − 16.49 5.89 M.

7.1 +.87 − 16.43

5.5 +.93 − 16.41

6.4 +1.85 − 17.01 +.02 − 16.99 15.95 M

−15.870 R −15.868

−15.960 M. −15.960

0 = +0.92 − .58 n = +.63

R. 1 13 to 4 22 M 4 38 to 7 13

Star	RA	δ		tang δ	π RA −(P′−P)			
	h m	°	′					
1 Camel.	4.4 22	+53	38 ✓+	1.36 ✓	−16.72 ✓	+.69	−16.03	368
α Urs. Min. ×	1.2 12 18	+88	39 +	~~42.49~~ 41.42 ✓	−36.93 ✓			19
4 Camel.	4.6 38	+56	32 ✓+	1.51 ✓	−16.66 ✓	+.77	15.89	371
2 Lyncis	6.1 9	+59	3 ✓+	1.67 ✓	−16.88 ✓	+.85	16.03	384
8 Lyncis	6.4 26	+61	35 ✓+	1.85 ✓	−17.01 ✓			388
15 Lyncis	6.8 46	+58.	35 ✓+	1.64 ✓	−16.84 ✓	+.84	16.00	394

R. Obs.

1.8 +.37 − 15.95

2.0 +.42 − 16.00

2.6 +1.14 − 16.43

3.0 +.85 − 16.29

4.0 +1.09 − 16.50

2.7 +.77 − 16.23

1.2 +41.42 − 36.93 − .04 − 36.97

0 = +40.65 − 20.74 n = +.51

1871 Feb. 11 R h = −.0234 (−65) h′ = −.014 h′ = −.080 n = +.50

Star	RA	δ		tang δ				
							.13 −.06	−19.19
1 Camel. seq.	4.58 +1.0 4.6 4.4 22	+53	38 ✓+	1.36 ✓368	−19.75 ✓+	.68	19.093 19.07 −.08	.15
ψ¹ Aurigae	.8 6.2 15	+49	21 ✓+	1.16 ✓385	−19.82 ✓+	.58	.24 +.06	.18
α Tauri	+.7 4.5 29	+16	15 ✓+	.29 ✓73	−19.22 ✓+	.14	.08 −.07	.15
η Geminor.	+.1 6.5 30	+16	30 ✓+	.30 ✓107	−19.32 ✓+	.15	.17 +.09	.08
	6.27 6.1						19.227 .29 +.06	.21
	5.38						−19.160	−19.160

Star	RA	δ		tang δ				
4 Camel.	4.6 38	+56	32 ✓+	1.51 ✓	−19.88 ✓	+.75	−19.13	371
2 Lyncis	6.1 9	+59	3 ✓+	1.67 ✓	−20.10 ✓	+.83	19.27	384
8 Lyncis	6.4 26	+61	35 ✓+	1.85 ✓	−20.12 ✓			388
~~51 Cephei~~ ?	~~6.39 41~~ 6.6	~~+87~~	~~14 ✓+~~	~~20.73 ✓~~	~~−35.47~~ −28.80			

4.5 +.29 − 19.22

6.5 +.30 − 19.32

5.5 +.30 − 19.27

6.4 +1.85 − 20.12 +.01 − 20.11

6.6 +20.73 − 28.80 +.02 − 28.78

1871 ~~Feb. 16~~

~~α Urs Min~~

0 = +1.55 − 0.84 n = +.54

+20.43 − 9.51 +.47

n = +.50

1871 Feb. 20 R. h = −.020 (−37) h′ = −.008 h′ = −.054 n = +.33

Star	RA	δ		tang δ				
1 Camel. seq.	3.35 +.3 4.6 22	+53	38 ✓+	1.36 ✓368	−24.81 ✓+	.45	24.258 24.36 −.02	−24.38
ψ¹ Aurigae	−1.5 6.2 15	+49	21 ✓+	1.16 ✓385	−24.85 ✓+	.38	.47 +.08	.39
	+.1 4.6						.32 −.01	.33
	1.4 6.1						.38 +.08	.30
η Aurigae	−.3 4.5 58	+41	4 ✓+	.87 ✓83	−24.69 ✓+	.29	.40 +.02	.38
β Arietis	+.29 1.8 48	+20	12 +	.37 ✓30	−24.27 ✓+	.12	.15 −.16	.31
γ Ceti ?	+.2 2.6 37	+2	42 ✓+	.05 ✓41	−24.22 ✓+	.02	.20 −.11	.31
δ Geminor.	−2.5 6.12 7.2 13	+22	13 ✓+	.41 ✓115	−24.54 ✓	.14	24.412 .40 +.13	.27
λ Geminor.	~~7.2~~ 11	+16	46 ✓+	.30 ✓114				
	4.74						−24.335	−24.334

Star	RA	δ		tang δ				
4 Camel.	4.6 38	+56	32 ✓+	1.51 ✓	−24.82 ✓	+.50	−24.32	371
2 Lyncis	6.1 9	+59	3 ✓+	1.67 ✓	−24.94 ✓	+.56	24.38	384
8 Lyncis	6.4 26	+61	35 ✓+	1.85 ✓	−25.16 ✓			388
~~α Urs. Min.~~ ×	~~1.2 18~~	~~+88~~	~~39 +~~	~~42.49~~	~~−18.90~~			19
~~51 Cephei~~ ?	~~6.7 41~~	~~+87~~	~~14 +~~	~~41.42 20.73~~	~~−38.12 −21.00~~			

1.8 +.37 − 24.27

2.6 +.05 − 24.22

5.0 +.87 − 24.69

7.2 +.41 − 24.54

4.1 +.42 − 24.43

1.2 +41.42 − 38.12 − .02 − 38.14

6.4 +1.85 − 25.16 +.02 − 25.14

~~6.7 +20.73 − 21.00 +.02 − 20.98~~

0 = +41.00 − 13.71 n = +.33

+1.43 − .71 +.50

~~+20.31 + 3.485~~ ~~1.42~~

− 30

−.031

1871 Feb. 21 h = ~~+.028~~ h′ = −.019 h′ = −.028 R h = −.033 M. n = +.25 C = +1.00

Star	RA	δ		tang δ	sec δ				
α Aurigae	+.5 5.1 7	+45	52 ✓+	1.03	✓1.43 86	−23.64 ✓+	.26 −1.43	24.81 −.01	−24.82
ψ¹ Aurigae	−.5 6.2 15	+49	21 ✓+	1.16	✓1.53 385	−23.08 ✓+	.29 −1.53	.72 .32 +.01	.71
ψ⁵ Aurigae	+.6 6.6 38	+43	42 ✓+	.96	✓1.37 390	−23.50 ✓+	.24 −1.39	24.667 .65 −.03	.68
64 Aurigae	7.17 7.1 9	+41	6 ✓+	.87	✓1.33 396	−23.55 ✓+	.22 −1.33	.66 −.02	.68
31 Lyncis	+.8 8.2 14	+43	35 ✓+	.95	✓1.36 407	−23.59 ✓+	.24 −1.38	.697 .73 +.02	.72 .71
Gr. 1450	−.8 8.4 25	+38	27 ✓+	.79	✓1.27 408	−23.79 ✓+	.20 −1.27	.86 +.03	.83
Gr. 1460	8.37 −.9 8.5 30	+53	6 ✓+	.33	✓1.05 411	−23.56 ✓+	.08 −1.05	.53 +.03	.50

6.6 +.96	−23.50 −1.39	−24.89	10
7.1 +.87	−23.55 −1.33	24.88	
8.2 +.95	−23.59 −1.38	24.97	
8.4 +.79	−23.79 −1.27	25.06	
8.5 +.33	−23.56 −1.05	24.61	
7.8 +.78	−23.60	−24.88	

24.707

8.3 +1.82 − 23.17 +.01 − 23.16 −2.08 − 25.24

~~0 = +1.04 + 0.44 n = −.42~~ .4

h 0 = +1.04 − 0.36 n = +.34

5.60 R. −24.765 R. −24.765

7.60 M −24.687 M. −24.687

R 5 56 to 6 26 M 6 38 to 8 30

Star	RA	δ		tang δ					
17 Camel.	5.3 18	+62	58 7 ✓+	1.96	✓2.21	−22.89 ✓			375
2 Lyncis	6.1 9	+59	3 ✓+	1.67	✓1.95	−23.19 ✓	+.42 −1.95	−24.72	384
8 Lyncis	6.4 26	+61	35 ✓+	1.85	2.12	−23.03 ✓			388
15 Lyncis	6.8 46	+58	35 ✓+	1.64	1.92	−23.18	+.41 −1.92	−24.69	384
19 Lyncis seq.	7.2 13	+55	31 ✓+	1.46	✓1.77	−23.95 ✓			397
o Urs. Maj.	8.3 20	+61	9 8 +	1.81	2.08	−23.17 ✓			125

5.3 +1.96 − 22.89 −2.21 − 25.10

6.4 +1.85 − 23.03 −2.10 − 25.13

~~8.3 1.81 − 23.17 −2.08~~

~~1.18 +.71 n = +.60~~

~~1.07 +.57 +.53~~

1.18 +.22 n = +.19

1.07 +.25 .23

n = +.25

Diz z= +.60+80 +.40+60 +.20+40 +0+.20 +0 -.20 -.20-40 -.40-60 -.60-.80

	RA		δ	Diz z	Rey-Rff		θ'-θ	R-Rff θ'-θ			
	h	m	°		'	"	"	"			
368	1	47	+20				+0				
19	2	04	+22								
371	2	36	+48	-.11	+0	(2.0)	+.3	+(2.3)	-3	[+0	20]
384	2	45	+52	-.17	-0	4.6	+.6	-4.0	-4	-0	44
388	2	56	+53	-.18		4.4	+.5	3.9	-4		43
394	3	0	+40	+.13		3.0	-.1	3.1	+0		31
	4	0	+47	-.09		3.7	+.4	3.3	-2		35
	4	53	+43	-.02		4.8	+.0	4.8	-0		48
	4	58	+41	+.02		2.8	-.5	3.3	+0		33
	5	7	+45	-.04		1.2	+.1	1.3	-0		13
	6	15		-.12		2.9	+1.1	1.8	-3		21
	7	9		+.02		2.1	-.4	2.5	+0		25
	7	13		-.23		2.5	+1.0	1.5	-5		20

+0 28

(10) 3.11

R		M	
2 45	4.4	4 38	2.8
2 56	4.3	6 9	4.5
3 0	3.1	6 26	2.1
4 0	3.5	6 46	2.9
4 22	1.3	4 53	4.8
		4 58	3.3
		5 7	1.1
		6 15	2.1
		7 9	2.5
		7 13	2.0

' "
-0 3.17
~~3.00~~ 2.98

R 3.32

2.81 M

	RA		δ	Diz z							
371	4	22	+53	-.19	-0	3.1	+.9	-2.2	-5	-0	27
384	6	15	+49	-.12		4.5	+1.1	3.4	-3		37
388	4	29	+16								
	6	30	+16								

(2) 320

' "
-0 3.60
3.43

	RA		δ	Diz z							
371	4	22	+53	-.19	-0	5.3	+.9	4.4	-5.		49
384	6	15	+49	-.12		4.6	+1.1	3.5	-3		3.8
388											[0.8]
19	4	58	+41	+.02		(0.3)	-5	[0.8]	+0	(2)	4.35
	1	48	+20								
	2	37	+2								
	7	15									
	7	11	+16								

' "
-0 3.95
3.75

	RA		δ	Diz z							
375 384	5	7	+45		-0						
24.72	6	15	+49	-.12		4.7	+1.1	3.6	-3		3.9
388	6	38	+43	-.02		3.7	+.5	3.2	-0		32
24.69	7	9	+41								
394 397	8	14	+43	-.02		5.3	+.7	4.6	-0		4.6
12.5	8	25	+38	+.07		7.2	+1.6	5.6	+1		55
	8	30	+53	-.19		4.9	+.7	4.2	-5		47

70
13

R		M	
6 15	3.9	3.2	6 38
6 9	3.3	4.6	8 14
6 26	3.7	5.5	8 25
		4.7	8 20
		4.5	

' "
-0 ~~4.27~~ 4.31
4.~~128~~ 13

R 3.63

4.50 M

(5) 4.38

RA		δ	Diz z							
h	m	°		'	"	"	"			
4	22	+53	-.19	-0	1.7	+.9	-0.8	-5	-0	1.3
1	13	+88								
4	38	+56	-.24		2.7	+.5	-2.2	-6		28
6	9	+59	-.29		4.2	+.03	-3.9	-6		45
6	26	+61	-.33		1.6	+.2	-1.4	-7		21
6	46	+58	-.28		3.3	+1.0	-2.3	-6		2.9

(5) - 2.72

+.03 - 3.1 -.17 - 4.0 -.23 - 1.5
+.02 3.3 -.18 3.9 -.24 2.2
+.02 2.5 -.09 3.3 -.29 3.9
-.02 4.8 -.33 1.4
-.04 1.1 -.28 2.3
-.12 1.8
-.19 0.8
+.02 -3.0 -.12 -2.8 -.27 -2.5
+.1 - .4 -.8
2.93 3.24 3.35
(15) 87 224 165 476
-.3 +.0 +.1

RA		δ	Diz z								
4	38	+56									
6	9	+59	-.29	-0	4.4	+.3	-4.1	-6	-0	47	
6	26	+61	-.33		2.1	+.2	1.9	-7		26	3.65
6	39										

-.19 - 2.2 -.29 - 4.1
-.12 3.4 -.33 - 1.9
-.16 - 2.8 -.31 - 3.0
- .5 - .9
3.32 3.92
(4) 6 18 24
-.3 +.83

RA		δ	Diz z							
4	38	+56		-0						
6	9	+59	-.29		2.6	+.3	2.3	-6	2.9	
6	26	+61	-.33		2.9	+.2	2.7	-7	3.4	(2) 3.15
1	13	+88								
6	41									

-.19 - 4.4 -.29 - 2.3
-.12 3.5 -.33 2.7
-.16 - 4.0 -.31 - 2.5
- .5 - .9
4.5 3.4
(4) 90 68 158
+.6 -.5

RA		δ	Diz z						
5	18	+62		-0					
6	9	+59	-.29		3.0 ~~0.1~~	+.3	2.7	-6	33
6	26	+61	-.33		3.2	+.2	3.0	-7	37
6	46	+58	-.28		10.4	+1.0	(9.4)	-6	
7	13	+65							
8	20	+61	-.32		5.2	+1.4	3.8	-7	4.5 (3) 3.83

+.07 -5.6 -.12 -3.6 -.29 - 2.7
-.02 3.2 -.33 3.0
-.02 4.6 -.32 3.8
+.07 -5.6 -.19 4.2 -.31 -3.2
+.2 -.09 -3.9 9
-5.4 4.1
(8) 54 4.24 125 348
+.14 .16 2

+ 15

1871 Feb. 28 M. h = ~~+~~.027' h' = +.038 n = +.20
h' = -.009

Star		Ra		δ		tang δ		π Ra -(P' - P)			
		h m		° '							
ψ⁵ Aurigae	+.7	6.6 38	+43	42 4		.96	390	-28.29	+ .19	28142 -28.10 +.03	-28.07
~~64 Aurigae~~		~~7~~ 09	+41	~~67~~		.87		~~28.50~~ 27	-		
Gr 1450	-1.1	8.4 25	+38	27	+	.79	408	28.19	+ .16	+.03 -.04	.07
Gr 1460	-1.2	8.5 30	+53	10 9	+	1.33	41L	28.43	+ .27	.16 -.05	.21
ψ Aurigae	+1.1	6.2 15	+49	21	+	1.16	385	28.40	+ .23	.17 +.04	.13
	+.5	6.8								.08 +.02	.06
ζ Geminor.	+.8	6.5 30	+16	30	+	.30	107	28.28	+ .06	.22 +.03	.19
α Can. Min.	888	7.6 33	+5	33	+	.10	12a	28.11	+ .02	.09 -.01	.10
		7.8								.05 -.02	.07

6.2 +1.16 - 28.40
6.5 +.30 - 28.28
6.6 +.96 - 28.29
7.6 +.10 - 28.11
8.4 +.79 - 28.19

7.30

6.4 +1.85 - 28.49
8.3 +1.82 - 28.50
20.8 -5.71 - 27.10

28082 -28.112 -28.112

Star	Ra	δ		tang δ	π Ra -(P' - P)			
	h m	°	'					
15 Lyncis	6.8 46	+58	35 +	1.64	-28.41	+.33	-28.08	394
19 Lyncis	7.2 13	+55	31 +	1.46	-28.34	+.29	-28.05	397
o Urs. Maj.	8.3 20	+61	9 ~~8~~ +	1.82	-28.50	=		125
8 Lyncis	6.4 26	+61	35 +	1.85	-28.49	=		388
Br 2749 L.C	20 851	+99 +80	56 4	-5.71	-27.10	-		5809

6.2 +1.16 - 28.40
6.5 +.30 - 28.28
6.6 +.96 - 28.29
7.6 +.10 - 28.11
8.4 +.79 - 28.19
7.1 +.66 - 28.25

6.4 +1.85 - 28.49 -.01 - 28.50
8.3 +1.82 - 28.50 +.01 - 28.49
8.8 -5.71 - 27.10 +.02 - 27.08

0 = +1.19 - 0.25 n = +.21
+1.16 - 0.24 +.21

~~n = +.21~~

1871 Mar. 1 R. h = ~~+~~.008 h' = -.010 n = +.30
h' = +.004

Star		Ra	δ		tang δ		π Ra -(P' - P)			
10 ~~Urs. Maj.~~		~~8 53~~	+42	~~17 4~~	.91		~~-41.74~~			
19 Leonis Min.	+.2	9.8 50	+41	40 39 +	.89	422	28.92	+ .27	28.65	00
μ Urs. Maj.	-.2	10.2 15	+42	9 ~~8~~ +	.90	142	28.94	+ .27	.67	
α Leonis	0	10.0 2	+12	35 6 +	.22	146	-28.65	+ .07	58	00

10.00

-28.633 -28.633

0 = -6.37 + 1.17 n = +.18 n = +0.20

Star	Ra	δ		tang δ	π Ra -(P' - P)		
53 Camel.	~~7 51~~	~~+60~~	~~40 +~~	~~1.78~~			
ν Urs. Maj.	9.7 42	+59	3 9 +	1.70	-29.22	+.04	143
Gr 1501	8.9 55	+54	46 + 1	1.42	-29.05	-	414
~~9 Draconis~~	~~6 24~~	~~+76~~	~~21~~ 23 +	~~4.18~~ 3			

9.8 +.89 - 28.92
10.0 +.22 - 28.65
10.2 + ~~42~~ 90 - 28.94
10.0 +.67 - 28.84

8.9 +1.42 - 29.05 +.00 - 29.05
9.7 +1.70 - 29.~~22~~ 18 +.00 - 29.18

0 = +.75 ∓ .21 n = +.28
+1.03 ∓ .34 +.33
+.30

1871 Mar. 2 R. h = -.007 h' = +.013 n = +.24
h' = +.005

Star		Ra	δ		tang δ		π Ra -(P' - P)			
α Arietis	+3.8 450	2.0 0	+22	52 +	.42	33	-28.92	28680 +.10	-28.82 +.05	-28.77
o Aurigae		~~5.6~~ 36	+49	~~46 +~~	~~1.18~~	~~1.35~~	~~377~~			
ν Aurigae	? -.1	5.7 43	+39	7 +	.81	1.29	27.55	28.84 +.19	.65 -.00	.65
δ Aurigae	-.0	5.8 49	+54	16 +	1.39	1.72	27.18	28.90 +.33	.57 -.00	.57
63 Aurigae	-1.2	7.0 3	+39	31 +	.82	1.29	27.57	28.86 +.20	.66 -.02	.68
26 Lyncis	-2.0	7.8 46	+47	53 54 +	1.11	1.50	-27.38	28.88 +.27	.61 -.03	.64
	-.2	6.0				1.03		28.87	.47 -.00	.47
	6.3	6.1						28652	.87 -.00	.87

5.77 c = -1.00 from 5h 36m
c = 0 for 2h

-28.664 -28.664

Star		Ra	δ		tang δ	π Ra -(P' - P)				
α Urs. Min.	×	1.2 13 2	+88	3 7 +	~~42.49~~ 41.42	-38.85				19
36 Camel.		6.0 0	+65	44 +	2.21	-26.59	29.02	+.53	-28.47	381
2 Lyncis		6.1 9	+59	3 +	1.67	-27.92	29.27	+.40	28.87	384
24 Lyncis		7.5 32	+59	0 +	1.66	-27.11	28.45	+.40	[28.05]	399

2.0 +.42 - 28.92
5.7 +.81 - 27.55
7.0 +.82 - 27.57
7.8 +1.11 - 27.38
~~5.6 +.79 - 27.85~~
6.8 +.91 - 27.18

~~1.2 +41.42 - 38.85~~
~~6.0 + 2.21 - 26.59~~
1.2 +41.42 - 38.85
2.0 +.42 - 28.92

0 = 41.00 - 9.93 n = +.24

+ 13

1871 Mar. 5 h = ~~+~~.009 h' = +.016 M. n = +.19
h' = +.004 h' = -.008 R.

Star		Ra	δ		tang δ		π Ra -(P' - P)				
27 Lyncis	-.9	~~7~~ 59	+51	52 +	1.28	405					
31 Lyncis	8.5	8.2 14	+43	35 +	.95	447	29.57	+ .18	29.405 29.39 -.01		-29.40 M
~~10 Urs. Maj.~~		~~8 53~~	~~+42~~	~~17 +~~	~~.91~~		~~42.33~~	+			
Br. 1501	-1.6	8.9 55	+54	46 +	1.42	414	29.69	+ .27	42 +.03	45	
19 Leo. Min.	-2.5 -.9	9.8 50	+41	40 39 +	0.89	422	29.49	+ .17	32 -.04	36	
μ Urs. Maj.	-1.0	10.2 15	+42	9 8 +	.90	142	29.58	+ .17	29.380 .41 -.05	46	
31 Leo. Min.	-3.0	10.3 21	+37	27 +	.76	426	29.56	+ .15	41 -.05	46	
β Arietis	+5.5	1.8 48	+20	12 +	.37	30	29.40	+ .07	33 +.09	24	
α Arietis	+5.3	2.0 0	+22	52 +	.42	33	29.39	+ .08	31 +.09	22 M.	
26 Lyncis	-1.0	7.8 46	+47	53 +	1.11	402	29.64	+ .21	43 +.01	-29.42 R	
δ Aurigae	+1.0	5.8 49	+54	16 +	1.39	379	-29.62	.26	36 -.01	.37	
M. obs.	+.7	6.1							51 -.01	.52	
	7.75								56 +.01	.55 R	

8.2 +.95 - 29.57
7.8 +.89 - 29.49
10.2 +.90 - 29.58
10.3 +.77 - 29.56
9.6 +.88 - 29.55

6.47 R.
7.38 M.

8.3 +1.81 - 29.77 +.01 - 29.76
~~1.2 +41.42 - 35.86~~

-29.4~~7~~65 R. -29.465
-29.378 M. 29.370

0 = +.93 ∓ .22 n = +.23

18 +.37 - 29.40
20 +.42 - 29.37
19 +.40 - 29.40

1.2 +41.42 - 35.86 +.00 - 35.86

0 = +41.02 - 6.46 n = +.16

M. 8h 14m 2s - 10h 21m
1 13 6 2 0

R 5 49 6 7 51

Star		Ra	δ		tang δ	π Ra -(P' - P)				
36 Camel.		6.0 0	+65	44 +	2.21	-29.80				381
o Urs. Maj.		8.3 20	+61	9 ~~8~~ +	1.81	-29.77				125
ν Urs. Maj.		9.7 42	+59	3 9 +	1.70	-31.59	+.04	+.32	-31.23	143
α Urs. Min.	×	1.2 13	+88	3 7 +	~~42.49~~ 41.42	-35.86				19
2 Lyncis		6.1 9	+59	3 +	1.67	-29.82		+.31	-29.51	384
24 Lyncis		7.5 32	+59	0 +	1.66	-29.87		+.31	-29.56	399
53 Camel.		7.9 51	+60	40 +	1.78					403
~~36 Camel.~~		~~6 00~~	~~+65~~	~~44 +~~	2.21					
ψ Draco. Aust.		17.7 44	+72	13 +	3.12	-28.89				484
~~Br 1501~~		~~8.9 55~~	~~+54~~	~~46 +~~ +1	~~1.42~~	~~-29.69~~				

7.8 +1.11 - 29.64

6.0 +2.21 - 29.80 +.01 - 29.79
5.7 -3.12 - 28.89 +.01 - 28.88

0 = +1.10 - 0.15 n = +.15

0 = -4.23 + .76 n = +.18

n = +.19

sin z = +.60 +80 | +.40 +.60 | +20 +40 | +0 +20 | +0 −20 | −.20 −40 | −.40 −60 | −.60 −.80

Star	RA		δ	sin z	R_eq −	R_pf	ρ'−ρ	R_eq−R_pf +ρ'−ρ			RA		δ	sin z	R_eq	R_pf	ρ'−ρ	R_eq−R_pf +ρ'−ρ			
	h	m	°		'	"	"	"			h	m	°		'	"	"				
ψ^5 Aurigae	6	38	+43	−.02	−0	4.2	+.5	3.7	−0	37	6.	46	+58								
64 Aurigae	7	09	+41								7	13	+55								
Gr. 1450	8	25	+38	+.07		6.0	+1.6	4.4	−1	4.3	8	20	+61	−.32	−0	4.4	+1.4	3.0	−7	3.7	
Gr. 1460	8	30	+53	−.19		4.4	+.7	3.7	−5	4.2	6	26									(1) 3.70
	6	15									20	51									
									(3)	4.07					+.07 − 4.4		−.02 − 3.7		−.32 − 3.0		
γ Geminor.	6	30	+16														−19 3.7				
x Can. Min.	7	33	+5																		
															+.07 − 4.4		−.10 − 3.7		−.32 − 3.0		
															+ .2		− .3		− .9		
															4.2		4.0		3.9		
−0' 4.02"														(4)	42		80		39	16	
3.98															+.2		+.0		−.1		

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Star	RA		δ	sin z	R_eq −	R_pf	ρ'−ρ	R_eq−R_pf +ρ'−ρ			RA		δ	sin z	R_eq	R_pf	ρ'−ρ	R_eq−R_pf +ρ'−ρ			
10 Urs. Maj.	5	53	+42								7	51	+60								
19 Leo. Min.	9	50	+41	+.01	−0	5.6	+.0	5.6	+0	56	9	42	+59	−.30	−0	6.1	+1.7	4.4	−6	50	
μ Urs. Maj.	10	15	+42	+.00		5.7	+.4	5.3	+0	5.3	8	55		−.21	−0	3.3	−.6	3.9	−5	44	
α Leonis	10	2	+12																		(2) 4.70
									(2)	5.45	10	24	+76								
															+.01 − 5.6				−.30 − 4.4		
															+.00 5.3				−.21 3.9		
															+.00 − 5.4				−.26 − 4.2		
															+.0				−.8		
															5.4				5.0		
−0' 5.20"														(4)	8				0	8	
5.08															+.2				−.2		

Star	RA		δ	sin z	R_eq −	R_pf	ρ'−ρ	R_eq−R_pf +ρ'−ρ			RA		δ	sin z	R_eq	R_pf	ρ'−ρ	R_eq−R_pf +ρ'−ρ			
α Arietis	2	00	+22								1	13	+88		−0		−0				
ο Aurigae	5	36	+49								6	0	+65	−.40		8.1	+1.4	6.7	−8	7.5	
δ Aurigae	5	43	+39	+.06	−0	5.8	−1.8	7.6	+0	7.6	6	9	+59	−.29		5.4	+0.3	5.1	−6	5.7	
ξ Aurigae	5	49	+54								7	32	+59	−.29		6.9	+.4	6.5	−6	7.1	(3) 6.77
63 Aurigae	7	3	+39	+.05		6.7	−.1	6.8	+0	6.8											
26 Lyncis	7	46	+47	−.10		7.8	+.9	6.9	−2	7.1					+.06 − 7.6		−.10 − 6.9		−.40 − 6.7		
								7.10							+.05 6.8				−.29 5.1		
																			−.29 6.5		
									(3)	7.17					+.06 − 7.2		−.10 − 6.9		−.33 − 6.1		
															+ .3		− .3		−1.0		
−0' 7.05"															6.9		7.2		7.1		
														(6)	13.8		72		21.3	423	
6.97															−.1		+.2		+.1		

Star	RA		δ	sin z	R_eq −	R_pf	ρ'−ρ	R_eq−R_pf +ρ'−ρ			RA		δ	sin z	R_eq	R_pf	ρ'−ρ	R_eq−R_pf +ρ'−ρ			
											6	0	+65	−.40	−0	7.3	+1.4	5.9	−8	6.7	
											8	20	+61	−.32		6.6	+1.4	5.2	−7	5.9	
27 Lyncis	7	59	+51		−0	64		5.7			9	42	+59	−.30		5.2	+1.7	3.5	−6	4.1	
31 Lyncis	8	14	+43	−.02		8.1	+.7	7.4	−6	5.7	1	13	+88								
10 Urs. Maj.	8	53	+42								6	9	+59	−.29		4.8	+0.3	4.5	−6	5.7	
Gr. 1501	8	55	+54	−.21		3.4	−.6	4.0	−5	4.5	7	32	+59	−.29		5.1	+.4	4.7	−6	5.3	(5) 5.42
19 Leo. Min.	9	50	+41	+.01		5.9	+.0	5.9	−0	5.9	7	51	+60								
μ Urs. Min	10	15	+42	+.00		6.5	+.4	6.1	−0	6.1	6	00	+65								
31 Leo. Min.	10	21	+37	+.09		5.9	+.3	5.6	+2	5.4	17	44			+.01 − 5.9		−.02 − 5.7		−.21 − 4.0		
β Arietis	1	48	+20					5.80			8	55			+.00 6.1		−.10 6.7		−.40 5.9		
α Arietis	2	00	+22												+.09 5.6				−.32 5.2		
26 Lyncis	7	46	+47	−.10		7.6	+.9	6.7	−2	6.9									−.30 3.5		
																			−.29 4.5		
ξ Aurigae	5	~~49~~	~~+54~~	−.21		~~23.8~~	~~+.1~~	~~23.7~~											−.29 4.7		
	h	m	R.			m	h m								+.03 − 5.9		−.06 − 6.2		−30 − 4.6		
	6	0	6.7			5.7	8 14		(6)	5.75					+ .1		− .2		− .9		
	6	9	5.1			4.5	8 55								5.8		6.4		5.5		
−0' 5.75	7	32	5.3			5.9	9 50							(11)	17.4		12.8		33.0	632	
~~6.16~~ 5.60						6.1	10 15								+.0		+.6		−.3		
						5.4	10 21														
						6.9	7 46														
						5.9	8 20														
						4.1	9 42														
		R 5.70				5.56 m															

1871 Mar. 7 R. h = ~~+~~.018 h' = +.002 h = −.017 n = +.14

~~R 1.13 6 6 0~~

Star		Ra	δ	tang δ	−(ρ'ρ) π Ra			
	5.00	h m	° '				29.796	
ψ Arietis	+5.3	2.0 0	+22 52 +	0.42 √33	−29.79 +	.06	29.73 −09	−29.82
ο Aurigae	+1.7	5.6 36	+49 46 √+	1.18 √377	−30.03 +	.17	.86 −03	.89
ν Aurigae	? +1.6	5.7 43	+39 7 √+	.81 √101	−29.90 √+	.11	.79 −03	.82
δ Aurigae	+1.5	5.8 51	+37 12 √+	.76 √104	−29.93 √+	.11	.82 −03	.85
ψ¹ Aurigae	+1.1	6.2 15	+49 21 √+	1.16 √385	−29.91 √+	.16	.75 −02	.77
Lyncis seq.		7.8 2 13	+56 31 +	1.46 407	−30.02 √+	.13	.89 +01	.88
δ Leonis	+.38	11.1 7	+21 12 +	.39 √156	−29.95 √+	.05	.90 +06	.84
ψ Urs. Maj. med.		11.2 12	+32 15 √+	.63 √158	−30.01 √+	.09	.92 +07	.85
σ Leonis	−4.2	11.5 31	−0 8 +	.00 √438	−29.83 √+	.00	.83 +07	.76
	10.50		+1'				29.885	
	7.34						−29.833	−29.833

Star	Ra	δ	tang δ	−(ρ'ρ) π Ra		
	h m	° '				
α Urs. Min	1.2 13	+88 39 +	41.42 √ ~~42.49~~	−45.36		19
36 Camel.	6.0 0	+65 42 √+	2.28 √	−30.16 √		381
22 H Camel.	6.1 5	+69 22 +	2.66 √	−30.22 √		383
2 Lyncis	6.1 9	+59 3 √+	1.67 √	−30.16 √	+33 −29.83	384

2.0 + .42 − 29.79
5.7 + .81 − 29.90
5.8 + .76 − 29.93
6.2 + 1.16 − 29.91
8.2 + .95 − 30.02
11.1 + .39 − 29.95
11.2 + .63 − 30.01
11.5 + .00 − 29.83
7.7 + .64 − 29.92

1.2 + 41.42 − 45.36 + .01 − 45.35
6.0 + 2.21 − 30.16 + .00 − 30.16
6.1 + 2.66 − 30.22 + .00 − 30.22

0 = + 40.78 − 15.43 n = + .13
+ 1.57 ± .24 + .15
+ 2.02 ± .30 + .15

n = +.14

1871 Mar. 9 M. h = ~~+~~.0~~8~~3 + 31 h' = +.011 h = +.036 n = +18

Star		Ra	δ	tang δ	−(ρ'ρ)			
	7.82						30.375	
ψ¹ Aurigae	+.2	6.2 15	+49 21 +	1.16 √385	−30.68 +	.20	30.48 +.08	−30.40
Gr. 1450	.0	8.4 25	+38 27 +	.79 √408	−30.53 √+	.14	.39 +.00	.39
Gr. 1460	−.1	8.5 30	+53 9 +	1.34 √411	−30.57 √+	.24	.33 +.00	.33
31 Lyncis	+.2	8.2 14	+43 35 +	.95 √407	−30.47 +	.17	.30 +.01	.29
ι Cancri		~~8.6~~ 39	+29 18 +	.56 √127				
36 Lyncis	−.7	9.1 6	+43 44 +	.96 √416	−30.67 √+.16	.17	.34 −03	.37
38 Lyncis	−.8	9.2 11	+37 20 +	.76 √135	−30.48 √+	.14	.34 −03	.37
40 Lyncis	−.8	9.2 13	+34 55 √+	.70 √136	−30.43 √+	.13	.30 −03	.33
Hydrae	9.17		+1'				30.327	
	8.40						−30.354	−30.354

Star	Ra	δ	tang δ	−(ρ'ρ)			
2 Lyncis	6.1 9	+59 3 √+	1.68 √	−30.63 √	~~30~~		384
14 Draconis	9.3 19	+81 53 +	7.03 √	−31.75 √	—	204	137

8.2 + .95 − 30.47
8.4 + .79 − 30.53
9.1 + .96 − 30.67
9.2 + .76 − 30.48
9.2 + .70 − 30.43
8.8 + .83 − ~~30.52~~
− 30.48

6.1 + 1.67 − 30.63 + .03 − 30.60
9.3 + 7.03 − 31.75 − .01 − 31.76

0 = + .84 − .12 n = + .14
+ 6.20 − 1.28 + .21

n = +.18

1871 Mar. 14 R. h = −.00~~9~~ − 54 h' = +.010 h = −.047 n = +.09

Star		Ra	δ	tang δ	−(ρ'ρ)			
	6.97						30.697	
63 Aurigae	+.5	7.0 3	+39 31 +	.82 √395	−30.77 +	.07	30.70 −02	−30.72
64 Aurigae	+.4	7.1 8	+41 6 +	.87 √396	−30.77 +	.08	.69 −02	.71
	+.6	6.8					.70 −.03	.73
31 Lyncis	−.7	8.2 14	+43 35 +	.95 √407	−30.83 +	.09	.74 +.03	.71
Gr. 1450	−.9	8.4 25	+38 27 +	.79 √408	−30.85 √+	.07	.78 +.04	.74
Gr. 1460		8.5 30	+53 9 +	1.38 √411	−32.64 +	.12	.52	
	8.30		+1'				30.760	
	7.50						−30.722	−30.722

Star	Ra	δ	tang δ	−(ρ'ρ)			
51 H Cephei	6.6 39	+87 14 +	20.73 √	−33.17	—		111
15 Lyncis	6.8 46	+58 35 +	1.64 √	−30.85 √	+15 −30.70		394
ο Urs. Maj.	8.3 20	+61 9 +	1.81 √	−30.83 √	—		125
ε Draco L.C.	19.8 48	+110 +69	3 56	2.74 √	−30.43 √	— 96	282

7.0 + .82 − 30.77
7.1 + .87 − 30.77
8.2 + .95 − 30.83
8.4 + .79 − 30.85
7.4 + .86 − 30.80

6.6 + 20.73 − 33.17 + .01 − 33.16
8.3 + 1.81 − 30.83 − .01 − 30.84
18.8 − 2.74 − 30.43 − .00 − 30.43

0 = + 19.87 − 2.36 n = + .12
+ .95 − .04 + .04

− 3.60 + .37 n = + .10

n = +.09

1871 Mar 22 A. h = ~~+~~.001 00 h' = +.014 h = −.016 n = +.16

Star		Ra	δ	tang δ	−(ρ'ρ)			
	8.45						13.020	
31 Lyncis	+1.1	8.2 14	+43 35 +	.95 √407	−13.19 √+	.15	13.04 −.02	−13.06
Gr. 1450	+.9	8.4 25	+38 27 +	.79 √408	−13.13 √+	.13	.00 −.01	13.01
Gr. 1460	+.8	8.5 30	+53 9 +	1.34 √411	−13.26 +	.21	.05 .01	13.06
λ Urs. Maj.	−.9	10.2 10	+43 33 +	.95 √147	−13.20 +	.15	.05 +.01	13.04
μ Urs. Maj.	−.9	10.2 15	+42 9 +	.90 √149	−13.23 √+	.14	.09 +.01	13.08
δ Leonis	−1.8	11.1 7	+21 14 +	.39 √156	−13.08 √+	.06	.02 +.03	12.99
ε Hydrae	+.6	8.7 40	+6 53 √+	.12 √128	−13.01 √+	.02	12.99 −.01	13.00
	10.50		+1'				13.053	
	9.33						−13.034	−13.034

Star	Ra	δ	tang δ	−(ρ'ρ)			
ο Urs. Maj.	8.3 20	+61 9 +	1.81 √	−13.40 √	—	222	125
h Urs. Maj.	9.4 22	+63 7 +	2.01 √	−13.33 √	—	101	139
c Cephei	22.7 45	+65 33 +	2.20 √	−12.83 √ 12.75	—		325

8.2 + .95 − 13.19
8.4 + .79 − 13.13
8.7 + .12 − 13.01
10.2 + .95 − 13.20
10.2 + .90 − 13.23
11.1 + .39 − 13.08
9.5 + .68 − 13.14

8.3 + 1.81 − 13.40 + .02 − 13.38
9.4 + 2.01 − 13.33 + .00 − 13.33
10.7 − 2.20 − 12.75 − .02 − 12.77

0 = + 1.13 − .24 n = + .21 0 = − 2.88 + .37 n = + .13
+ 1.33 − .19 + .14

n = +.16

sin z = +60 +80 | +40 +60 | +20 +40 | +0 +20 | +0 −20 | −20 −40 | −40 −60 | −60 −80

	Ra		δ	sin z	Rcg −	Rfl	ρ'−ρ	R−Rf 99 +10ρ'−ρ				
	h	m	°			″	″	″				
	2	0	+22		− 0		~~−0~~	~~3.5~~				
5.6	5	36	+49	−.11		4.4	+.9	3.5	−2	37		
5.7	5	43	+49	+.06		2.7	−1.8	4.5	+1	44		
5.9	5	51	+37	+.09		6.9	+.3	6.6	+2	64		
63	6	15	+49	−.12		7.6	+11	6.5	−2	67		
8.2	8	13	+55	−.02		7.3⁰	+.7	6.6³	−0	~~63~~	+.68	−0.7
	11.1	7	+21	+.36		2.2	+.5	1.7	+7	~~24~~ 10		
	11.2	12	—	+.18		1.4	−.4	1.8	+4	~~22~~ 1.4		
	11.5 11.3	31	− 0	+.68		1.2	+.5	0.7	+15	~~22~~ 8	+.68	−0.7

(3) 0.53 + 1.8

(9) + 58.9

−0′ 4.74″

~~4.0516~~

6.3 5.71

11.3 0.53

(5) 550

Ra		δ	sin z	Rcg −	Rfl	ρ'−ρ	R−Rf 99 +10ρ'−ρ				
h	m	°		′	″	″	″				
1	13	+88									
6	0	+65	−.40	− 0	6.9	+1.4	5.5	−8	~~47~~ 63		
6	5	+69	−								
6	9	+59	−.29		5.9	+0.3	5.6	−6	~~50~~ 62	(2)	6.25

+.36	−1.7	+.06	−4.5	−.11	−3.5	−.40	−5.5	
+		+.09	6.6	−.12	6.5	−.29	5.6	
		+.18	1.8	−.02	6.3			
+.36	−1.7	+.11	−4.3	−.08	−5.4	−.34	−5.6	
+	+1.0		+ .4		− .3		−1.0	
	0.7		3.9		5.7		6.6	
	7¹		117³		171³		132²	27 438
	−4.0		−.8		+1.0		+1.9	

h	m	δ	sin z	Rcg −	Rfl	ρ'−ρ	R−Rf		value
6	15	+49	−.12	− 0	6.9	+1.1	5.8	−2	60
8	25	+38	+.07		9.3	+1.6	7.7	+1	76
8	30	+53	−.19		6.1	+.7	5.4	−4	58
8	14	+43	−.02		7.7⁵	+.7	~~7.0~~ 6.8	−6	68
8	39	+29							
9	6	+43	−.02		7.1	+1.0	6.1	−0	61
9	11	+37	+.09		5.2	−.8	6.0	+2	58
9	13	+34	+.13		7.2	+.2	7.0	+3	67
							6.43		

(7) 6.40

−0′ 6.16″

6.14

h	m	δ	sin z	Rcg −	Rfl	ρ'−ρ	R−Rf		value	
6	9	+59	−.29	− 0	4.0	+0.3	3.7	−6	43	
9	19	+81								(1) 4.30

+.07	−7.7	−.12	−5.8	−.29	−3.7	
+.09	6.0	−.19	5.4			
+.13	7.0	−.02	6.8			
		−.02	6.1			
+.10	−6.9	−.09	−6.0	−.29	−3.7	
	+ .4		− .3		− .9	
	6.5		6.3		4.6	
(8)	195³		252⁴		46¹	493
	+.3		+.1		−1.6	

h	m	δ	sin z	Rcg −	Rfl	ρ'−ρ	R−Rf		value
7	3	+39	+.05	− 0	6.1	−.1	6.2	+0	62
7	8	+41	+.02		6.2	+.2	6.0	+0	60
8	14	+43	−.02		8.3	+.7	7.6	−0	76
8	25	+38	+.07		9.3	+1.6	7.7	+1	76
8	30	+53	−.19		4.7	+.7	4.0	−4	44

(5) 6.36

−0′ 6.31″

6.29

h	m	δ	sin z	Rcg −	Rfl	ρ'−ρ	R−Rf		value	
6	41	+87								
6	46	+58	−.28	− 0	6.7	+1.0	5.7	−6	63	
8	20	+61	−.32		6.6	+1.4	5.2	−7	59	(2) 6.10
19	48									

+.05	−6.2	−.02	−7.6	−.28	−5.7	
+.02	6.0	−.19	4.0	−.32	5.2	
+.07	7.7					
+.05	−6.6	−.10	−5.8	−.30	−5.4	
	+ .2		− .4		− .9	
	6.4		6.2		6.3	
(7)	12³		4²		6²	22
	+.1		−.1		+.0	

h	m	δ	sin z	Rcg −	Rfl	ρ'−ρ	R−Rf		value
8	14	+43	−.02	− 0	7.4	+.7	6.8	−0	68
8	25	+38	+.07		7.8	+1.6	6.2	+1	61
8	30	+53	−.19		5.7	+.7	5.0	−3	53
10	10	+43	−.01		7.7	+.9	6.8	−0	68
10	15	+42	+.00		6.1	+.4	5.7	+0	57
11	7	+21							
8	40	+ 6							

(5) 6.14

−0′ 6.03″

5.93

h	m	δ	sin z	Rcg −	Rfl	ρ'−ρ	R−Rf		value
8	20	+61	~~−.32~~	~~− 0~~					
9	22	+63	−.36	− 0	4.6	+.4	4.2	−7	49
22	45	+65							

+.07	−6.2	.02	−6.8	−.36	−4.2	(1) 4.90
+.00	5.7	−.19	5.0			
		−.01	6.8			
+.04	−6.0	−.07	−6.2	−.36	−4.2	
	+ .1		− .2		−1.0	
	5.9		6.4		5.2	
(6)	118²		192³		52¹	362
	−.1		+.4		−.8	

1871 Mar. 25 M. h = ~~+.002~~ +11 ~~n = +106~~ h = +.006 n = +.11
h' = +.013

Star | Ra | δ | tang δ | π Ra −(ρ'−ρ)

8.90
10 Urs. Maj. +1.6 8.9 53 +42 17 + .91 √132 13.27 √+ .10 | 13.170 | 13.17 +.01 | −13.16
36 Lyncis 9.1 6 +43 44 + .96 √416 13.30 √+16 .10 | [.04]
λ Urs. Maj. +3 10.2 10 +43 32 + .95 √147 13.25 √+ .10 | .15 +.00 | .15
μ Urs. Maj. +3 10.2 15 +42 9 8 + .90 √149 13.27 √+ .10 | .17 +.00 | .17
ν Leonis 11.5 31 −0 8 − .00 √438 13.17 √± .00 | .17 −.01 | .18
ζ Leonis 1.2 11.5 32 18
β Leonis 11.7 43 +15 16 + .27 √164 13.17 + .03 | .14 −.01 | .15
+1'
10.90 | 13.158
10.50 | −13.160 | −13.162

h Urs. Maj. 9.4 22 +63 36 + 2.01 √ −13.37 √ — 106 139

8.9 + .91 − 13.27
9.1 + .96 − 13.30 14
10.2 + .95 − 13.25
10.2 + .90 − 13.27
11.5 − .00 − 13.17
11.7 + .27 − 13.17
10.x 3 + 66 − ~~13.24~~ 13.21

9.4 + 2.01 − 13.37 + .01 − 13.36

0 = +1.35 − 15 n = +.11

1871 Mar 26 — 0
β Leonis 11 42 +15

α Urs. Min. × 1. 13 2 +88 39 7 + ~~42.49~~ 41.42 √ −18.08

1871 Mar. 28 R. h = ~~+.002~~ 21 = + h = −.039 n = +15
+1 h' = +.014

7.93
7.11 7.2
31 Lyncis +1 8.2 14 +43 35 + .95 √407 13.41 √+ .14 | 13.287 | .32 −.04 | −13.36
Gr. 1450 −.1 8.4 25 +38 27 + .79 √408 13.39 √+ .12 | 13.27 −.00 | .27
Gr. 1460 −.2 8.5 30 +53 9 + 1.38 4311 13.48 √+ .20 | .27 +.00 | .27
α Hydrae −.10 9.3 21 −8 6 7 + .14 √138 ~~14.02~~ 13.35 √− .02 | .28 +.01 | .33
α Geminor. 7.4 28 +32 10 4 .63 √119 13.[13] + .09 | .37 +.04
8.90 +1' | [.04]
8.32 | 13.325
−13.302 −13.300

19 Lyncis 7.2 13 +55 31 √+ 1.46 √ −13.54 √ +22 −13.32 | 397
o Urs. Maj 8.3 20 +61 98 + 1.81 √ −13.59 √ — | 125
1 H Draconis 9.3 19 +81 53 √+ 7.03 √ −14.33 √ — .15 | 137

8.2 + .95 − 13.41
8.4 + .79 − 13.39
9.3 − .14 − 13.35
8.6 + .53 − 13.38

8.3 + 1.81 − 13.59 + .00 − 13.59
9.3 + 7.03 − 14.33 − .01 − 14.34

0 = +1.28 − .21 n = +.16
+6.50 − .96 +.15
n = +.15

1871 Mar. 29 M. h = −.030 −21 ~~n = +~~ h = −.021 S. N.C. n = +.23
+1' h' = −.014

β Arietis 1.8 48 +20 12 + .37 √30 11.03 √+ .08 | 10.98 5
α Arietis 2.0 00 +22 52 + .42 √33 11.07 √+ .10 | .97
19 Leo. Min. +12 9.8 50 +41 39 + .88 9 √422 13.44 √+ .20 | 13.290 | 13.24 −.03 | −13.27
λ Urs. Maj. +8 10.2 10 +43 32 + .95 √147 13.56 √+ .22 | .34 −.02 | .36
ψ Urs. Maj. +0 11.0 3 +45 11 + 1.01 √155 13.53 √+ .23 | .30 .00 | .30
~~Gr. 1757 11 10 +50 9 + 1.20 −15.17~~
χ Urs. Maj. −6 11.6 39 +48 30 28 + 1.13 √163 13.51 √+ .26 | .25 +.01 | .24
ξ Urs. Maj. −8 11.8 47 +54 35 23 + 1.40 √166 13.63 √+ .32 | .31 +.02 | .29
δ Leonis −1 11.1 7 +21 14 12 + .39 √156 13.47 √+ .09 | .38 +.00 | .38
β Leonis 11.44 11.7 43 +15 17 16 + .27 √164 13.42 √+ .06 | 13.320 | .36 +.02 | .35
+2'
South Clock.
1.8 + .37 − 11.03 1.90 S.C.
2.0 + .42 − 11.07 11.03 N.C.
1.9 + .40 − 11.05

1.2 + 41.42 − ~~11.87~~ 22.10 − .01 − ~~11.88~~ 22.11
+ .40 ~~11.05~~ 11.05
~~0 = + 41.02 − 83 n = +.02~~
−10.960 S.C.
−13.311 N.C. −13.311

0 = 41.02 − 11.16 n = +.27

α Urs. Min. × 1.2 13 2 +88 39 7 +1' + ~~42.49~~ 41.42 √ −~~11.87~~ 22.10 —
30 H. Urs. Maj. 10.2 15 +66 12 + 2.27 √ −13.79 √ — 181 | 19
3 Draconis 11.6 35 +67 26 + 2.40 √ −13.85 √ — 199 | 424
~~ν Leonis 11 31 −0 8 − .00 √ −15.76 √~~ | 439
+1'

North Clock.
9.8 + .89 − 13.44
10.2 + .95 − 13.56
11.0 + 1.01 − 13.53
11.1 + 39 − 13.47
11.6 + 1.13 − 13.51
11.7 + .27 − 13.42
10.9 + 77 − 13.49

10.2 + 2.27 − 13.79 − .01 − 13.80
11.6 + 2.40 − 13.85 + .01 − 13.84

0 = +1.50 − 31 n = +.21
+1.63 − .35 +.21
+.21

1871 Apr. 5 R h = ~~+.044~~ +.004 ~~n =~~ h = −.088 N.C. n = +.23
+1 h' = −.028

α Arietis 2.0 0 +22 52 + .42 √33 18.09 √+ .10 | 17.99
27 Lyncis +2.6 8.0 59 +51 52 + 1.28 √405 18.44 √+ .29 | 18.200 | 18.15 −.23 | −18.38
36 Lyncis 8.55 9.1 6 +43 44 + .96 √416 18.63 +16 .22 | .25 −.13 | .38
~~10 Leo. Min. 9 27 +36 57 + .75 √ − 23.74~~ | .38
λ Urs. Maj. ~~10~~ 10 +43 32 + .95 √147 18.53
δ Leonis −.5 11.1 7 +21 12 + .39 √156 ~~24.23~~ √+ .09 | .45 4 +.04 | .40
ψ Urs. Maj. −.4 11.0 3 +45 11 + 1.01 √155 18.61 √+ .23 | .41 +.04 | .37
χ Urs. Maj. −10 11.6 39 +48 30 28 + 1.13 √163 18.64 √+ .26 | .38 +.09 | .29
ξ Urs. Maj. −12 11.8 47 +54 23 + 1.40 √166 18.71 √+ .32 | .39 +.11 | .28
11.40 −9 11.5 +1' | 18.452 | .54 +.08 | .46
8.5
2.00 S.C.
~~11.40~~ N.C.
~~11.59~~ 11.4

0 = +41.00 − 9.22 n = +.23
−17.990 S.C.
−18.~~452~~ 366 N.C. −18.~~366~~ 335

α Urs. Min. × 1.2 13 2 +88 39 7 + ~~42.49~~ 41.42 √ −27.29 √ — 214 | 19
ν Urs. Maj. 9.7 42 +59 37 + 1.70 √ −18.65 √ +.04 — | 143
ν Leonis 11.5 31 − 0 8 − 0.00 √ −18.54 √ +.00 −18.54 | 438
3 Draconis 11.6 35 +67 26 + 2.40 √ − ~~4.06~~ ~~18.95~~ — | 439
+1'

2.0 + .42 − 18.09
9.1 + .96 − 18.63 47
11.1 + 39 − 18.53
11.0 + 1.01 − 18.64
11.6 + 1.13 − 18.64
~~9.0 + 1.78 − 18.50~~
10.7 + .87 − 18.57

1.2 + 41.42 − 27.29 − .02 − 27.31
9.7 + 1.70 − 18.65 − .03 − 18.~~56~~ 64
11.6 + 2.40 − 18.95 + .03 − 18.92

0 = +.83 − .07 n = +.07
+1.53 − .35 +.23

2 sin z = +.60 +.80 +.40 +.60 +.20 +.40 +0 +20 +0 −20 −20 −40 −40 −60 −60 −80

RA δ sin z R_{ay} − R_{ff} P′−P $R_{ay}-R_{ff}+P'-P$

h m ° " " "

139
8 53 +42
9 6 +43 −.02 −0 5.8 +1.0 4.8 −0 48
10 10 +43 −.01 6.0 +.9 5.1 −0 5.1
10 15 +42 +.00 5.5 +.4 5.1 +0 5.1
11 31 −0
(3) 5.00
11 43 +15

′ ″
−0 5.20
5.15

RA δ sin z R_{ay} − R_{ff} P′−P $R_{ay}-R_{ff}+P'-P$

h m ° " "

9 22 +63 −.36 −0 5.3 +.4 4.9 −7 (1) 5.6

−.02 −4.8 −.36 −4.9
−.01 5.1
+.00 5.1
−.01 −5.0 −.36 −4.9
− .0 − .9
5.0 5.8
(4) 0 8 8
−.2 +.6

1 13 +88

397
25
37
8 14 +43 −.02 −0 7.2 +.7 6.5 −0 65
8 25 +38 +.07 7.2 +1.6 5.6 +1 54
8 30 +53 −.19 4.9 +.7 4.2 −4 46
9 21 −8
7 27 +32 +.18 ×0 5.0 −.3 5.3 +4 5.7
(4) 6.55

′ ″
−0 5.76 5.62
5.64

7 13 +55
8 20 +61 −.32 −0 6.7 +1.4 5.3 −7 6.0
9 19 +81
6.00

+.07 −5.6 −.02 −6.5 −.32 −5.3
+.18 5.3 −.19 4.2
+.12 −5.4 −.10 −5.4 −.32 −5.3
+ .4 − .3 − .9
5.0 5.7 6.2
(5) 0 14 12 ~~24~~ ~~38~~ 26
−.5 +.2 +.7

19
24
39
1 48 +20
2 00 +22
9 50 +41 +.01 −0 4.7 +.0 4.7 +0 47
10 10 +43 −.01 5.7 +.9 4.8 −0 48
11 3 +45 −.05 5.6 +.9 4.7 −1 48
11 10 +50
11 39 +48 −.11 5.4 +.7 4.7 −2 49
11 47 +54 −.21 4.8 +.5 4.3 −5 48
11 7 +21 +.36 6.4 +.5 5.9 +8 51
11 43 +.46 ~~8.5~~ 7.7 +.0 7.7 +9 68
(9) 5.13

′ ″
−0 4.99
4.93

1 13 +88
10 15 +66 −.40 −0 4.5 +1.4 3.1 −8 3.9
11 35 +67 −.42 −0 4.5 +.7 3.8 −8 4.6 (2) 4.25
11 31 −0
+.46 −7.7 +.36 −5.9 +.01 −4.7 −.01 −4.8 −.21 −4.3 −.40 −3.1
−.05 4.7 −.42 3.8
−.11 4.7
+.46 −7.7 +.36 −5.9 +.01 −4.7 −.06 −4.7 −.21 −4.3 −.41 −3.4
+1.1 + .9 + .0 − .2 − .6 −1.1
6.6 5.0 4.7 4.9 4.9 4.5
(9) 66 50 47 144 49 90 449
+1.6 +.0 −.3 −.1 −.1 −.5

17
43
38
39
2 0 +22
7 59 +51 −.16 ~~+0~~ −0 ~~9.2~~ 5.0 +.4 4.6 −3 4.9
9 6 +43 −.02 −0 7.4 +1.0 6.4 −0 6.4
9 27 +36
10 10 +43
11 7 +21 +.36 8.0 +.5 7.5 +8 6.7 +.68 −7.1
11 3 +45 −.05 7.3 +.9 6.4 −0 6.4
11 39 +48 −.11 6.8 +.7 6.1 −2 6.3
11 47 +54 +.36 5.4 +.5 4.9 +8 4.1
113
565
285

′ ″
−0 5.77
5.72
.57
565 M 8.5^h
5.59 R 11.4^h
(6) 5.80

+.68 −7.1
+1.5
5.6
(9) 6
2

1 13 +88
9 42 +59 −.30 −0 6.7 +1.7 5.0 −6 5.6
11 31 −0 +.68 7.6 +.5 7.8 +14 5.7
11 35 +67 −.42 5.3 +.7 4.6 −8 5.4
5.57

+.36 −7.5
+.36 4.9
+.36 −6.2
+ .9
5.3
6
5

−.16 −4.6 −.30 −5.0 −.42 −4.6
−.02 6.4
−.05 6.4
−.11 6.1
−.08 −5.9 −.30 −5.0 −.42 −4.6
− .2 − .7 −1.0
6.1 5.7 5.6
44 7 6
−2

1871 Apr. 6 h = ~~+~~.002 +47 h' = +.018 n = + ~~h'=~~ -.054 R. h' = -.055 M. n = +.19

R. 7h 59m to 9h 27m M. 10h 21m to 11h 39m

Star RA δ tang δ π Ra -(P'P)

h m ° +1' '

~~27 Lyncis 7 59 +51 52 + 1.27 + 3.61~~

36 Lyncis +2 9.1 6 +43 44 + .96 √416 + 3.27 4.16 .18 3.61 -.01 +3.60

-1 9.4 .68 +.00 .68

10 Leo. Min. 9.4 27 +36 57 + .75 √419 + 3.43 .14 .57 +.01 .58

~~19 Leo. Min. 10.4 +41 39 + .89~~ 10.40 .68 -.02 .66

31 Leo. Min. 10.4 21 +37 21 + .76 √426 + 3.47 .15 .62 -.02 .60

ψ Urs. Maj. 11.6 39 +48 30 28 + 1.13 √163 + 3.37 .21 .58 +.04 .62

Gr. 1757 11.2 10 +50 9 + 1.20 √435 + 3.38 .23 .61 +.02 .63

M. Obs. 10.4 +2' 10.595 .78 -.02 .76

10.4 +.77 + 3.47 1.16 + 2.40 + 3.18 -.02 + 3.16

9.30 R. +3.620 R. +3.620

10.80 M. 0 = +1.63 -.31 n = +.19 +3.654 M. +3.654

Star RA δ tang δ π Ra -(P'P)

h m +1' 16 +1.29

~~θ~~ λ Urs. Maj. 9.4 24 +59 52 37 + ~~1.70~~ + 3.43 +.25 +3.68 140

36 Urs. Maj. 10.4 23 +56 37 + 1.52 + 3.39 +.29 3.68 427

37 Urs. Maj. 10.4 27 +57 44 + 1.58 + 3.48 +.30 3.78 428

3 Draconis 11.6 35 +67 26 + ~~1.40~~ 2.40 + 3.18 439

+1'

R. Obs.

9.1 +.96 + 3.~~27~~ 43 ~~9.4 + 1.29 + 3.43 -.00 + 3.43~~

9.4 +.75 + 3.43

9.2 +.85 + ~~3.55~~ 3.43 0 = +.44 +.00 n = .00

1871 Apr. 17 h = ~~+~~.048 +19 h' = -.033 h' = -.055 M. h' = -.031 R. n = -.02

R. ~~11h 35m~~ 10 21 to ~~11h 44m~~ 12 0 M. 9 6 to 9 27

36 Lyncis +.1 9.1 6 +43 45 .96 √416 4.01 +.16 .02 +4.15 -.01 +4.14

θ Urs. Maj. -.2 9.4 28 24 +52 15 1.29 √140 + 4.11 .03 .08 +.01 .09

~~10 Leo. Min. 9 27 + 36 57 + .75 13.49~~

ψ Urs. Maj. 11.6 39 +48 30 28 + 1.13 √163 + 4.01 .02 3.960 3.99 +.01 4.00

δ Leonis 10.40 11.7 43 +15 14 .27 √164 + 4.07 .01 4.06 +.02 4.08

31 Leo. Min. +.8 10.4 21 +37 21 + .76 √426 3.98 .02 3.96 -.03 3.93

δ Leonis 11.47 11.1 7 +21 12 + .39 √156 + 3.94 .01 3.993 3.93 -.00 3.93

+1'

9.1 +.96 + 4.17 9.25 M. +4.115 M. +4.115

11.20 R. + 3.985 R. +3.985

+1'

3 Draconis 11.6 35 +67 26 + 2.40 + 3.91 4.00 + 439

37 Urs. Maj. 10.4 27 +57 44 + 1.58 + 4.11 427 428

+1'

10.4 +.77 + 3.98 10.4 +1.58 + 4.11 -.02 + 4.09

11.1 +.39 + 3.94 11.6 +2.40 + 3.91 +.02 + 3.93

11.7 +.27 + 4.07

11.1 +.48 + 4.00 0 = +1.10 +.09 n = -.08

+1.92 -.07 +.04

-.02

1871 April 18 h = ~~+.034~~ -.041 -92 h' = -.026 h' = -.060 M. h' = -.038 R. n = -.04

R. 11 15 to 12 00 M. 9 24 to 11 3

+1' 6 1.29

θ Urs. Maj. +.8 9.4 24 +52 15 + ~~1.30~~ 140 + 3.13 .05 +3.08 -.05 3.03

~~10 Leo. Min. 9 27 + 36 57 + .75 - 14.61~~

υ Urs. Major 10.2 15 +42 9 8 + .90 √149 + 2.90 .04 2.86 +.00 2.86

42 Leo. Min. 39 +31 +2 20 + .61 √431

ψ Urs. Maj. -.8 11.0 3 +45 12 + 1.01 √155 + 2.80 .04 2.76 +.05 2.81

χ Urs. Maj. +.3 11.8 47 +54 23 5 + 1.40 √166 + 2.74 .06 2.68 -.01 2.67

8 Can. Ven. -.4 12.5 28 +42 2 + .90 √445 + 2.67 .04 2.63 +.01 2.64

+2'

10.2 +.90 + 2.90 10.20 M. 10.9 +1.91 + 2.86 +.01 + 2.87 +2.907 M. +2.900

11.0 +1.01 + 2.80 12.15 R. +2.655 R. +2.655

10.6 +.95 + 2.85 0 = +.96 +.02 n = -.02

7

α Urs. Maj. 10.9 56 +62 26 + 1.91 + 2.86 154

Gr. 1771 11.2 15 +65 1 + 2.14 + 2.77 - +.080 436

2

12.5 +.90 + 2.67 11.2 +2.14 + 2.77 -.03 + 2.74

0 = +1.24 +.07 n = -.06

1871 Apr. 24 R. h = ~~+.008~~ -40 +1' h' = +.008 h = -.010 n = -.08

11.00 16 1.29 3.090

θ Urs. Maj. ~~9.4~~ 24 +52 15 + ~~.30~~ 140

42 Leo. Min. ~~10.6~~ 39 +31 20 + .61 √431

ψ Urs. Maj. 11.0 3 +45 12 + 1.01 √155 3.01 .08 3.09 -.02 -3.11

8 Can. Ven. +1 12.5 28 +42 2 + .90 √445 3.08 .07 .15 +.00 3.15

43 Com. Ber. -5 13.1 6 +43 28 21 32 + .94 .54 3.06 .04 .10 +.01 3.09

20 Can. Ven. -6 13.2 12 +41 14 + .88 √452 3.12 .07 .19 +.01 3.18

-4 13.0 3 -4 51 - .09 √449 2.99 .01 2.98 +.00 2.98

12.45 3.105

12.560 -3.102 -3.102

7

α Urs. Maj. 10.9 56 +62 26 + 1.91 - 3.04 154

α Cass. L.C. × 12.6 33 +55 50 1.47 - 3.27 10

~~θ Virginis 13 3 -4 52 .09 - 2.99~~

α ~~Can. Min.~~ Urs. Min. 13.2 13 +88 39 + ~~42.19~~ 41.42 + ~~2.01~~ +1.25 19

11.0 +1.01 - 3.01 10.9 +1.91 - 3.04 +.01 - 3.03

12.5 +.90 - 3.08 12.6 -1.47 - 3.27 +.00 - 3.27

13.0 -.09 - 2.99 13.2 +41.42 + ~~2.01~~ 1.25 -.01 + 1.24

13.2 +.88 - 3.12

12.4 +.68 - 3.05 0 = +1.23 +.02 0 = -2.15 -.22 n = -.10

+40.74 +4.29

n = -.02

-.11

-.06

sin z =	+.60 +.80	+.40 +.60	+.20 +.40	+0 +.20	+0 −.20	−.20 −.40	−.40 −.60	−.60 −.80

RA		δ	sin z	$R_{ag}-R_{ff}$		ρ′−ρ	$R_{ag}-R_{ff}+ρ′-ρ$		
h	m	°		''	''	''	''		
7	59	+51							
9	6	+43	−.02	−0	8.6	+1.0	7.6	−6	76
9	27	+36	+.09		6.2	−.1	6.3	+2	61
~~9~~	~~50~~	~~+41~~							
10	21	+37	+.09		6.8	+.3	6.5	+2	63
11	39	+48	−.11		7.3	+.7	6.6	−2	68
11	10	+50							

(4) 6.70

h	m	R.	M.	h	m
9	6	7.6	6.3	10	21
9	27	6.1	6.8	11	39
9	24	7.7	6.9	10	23
			6.5	10	27
	R	7.13	6.62 M.		

−0′ 6.81″

6.84

RA		δ	sin z	R_{ag} −	R_{ff}	ρ′−ρ	$R_{ag}-R_{ff}+ρ′-ρ$		
h	m	°		''	''	''	''		
9	~~48~~ 24	~~+54~~ +52	−.17	−0	8.2	+.9	7.3	−4	77
10	23	+56	−.11		7.3	+.6	6.7	−2	69
10	27	+57	−.26		7.2	+1.3	5.9	−6	65
11	35	+67	−.42		9.7	+.7	(9.0)	−8	[9.8]

(3) 7.03

+.09 − 6.3 −.02 − 7.6 −.26 − 5.9
+.09 6.5 −.11 6.6
−.17 7.3
−.11 6.7
+.09 − 6.4 −.10 − 7.0 −.26 − 5.9
+.2 −.2 −.6
6.2_2 7.2_4 6.5_1
(7) 4^2 48^4 5^1 57
−.6 +.4 −.3

h	m	δ	sin z						
9	6		−.02	−0	8.6	+1.0	7.6	−0	76
9	24		−.17		8.3	+.9	7.4	−4	78
9	27								
11	39	+48	−.11		7.1	+.7	6.4	−2	66
11	43		+.46		7.4	+.0	7.4	+9	65
10	21	+37	+.09		8.3	+.3	8.0	+2	78
11	7	+21							

(5) 7.26

h	m	R	M	h	m
11	39	6.6	7.6	9	6
11	43	6.5	7.8	9	24
10	21	7.8			
11	3	7.6			
10	27	7.2			
	R.	7.14	7.70 M.		

−0′ 7.30″

7.30

h	m	δ	sin z						
11	35	+67	−.42	−0	7.5	+.7	6.8	−8	7.6
10	27	+57	−.26		7.9	+1.3	6.6	−6	7.2

7.40

+.46 − 7.4 +.09 − 8.0 −.02 − 7.6 −.26 − 6.6 −.42 − 6.8
−.17 7.4
−.11 6.4
+.46 − 7.4 +.09 − 8.0 −.00 − 7.1 −.26 − 6.6 −.42 − 6.8
+1.0 +.1 −.2 −.6 −.9
6.4_1 7.9_1 7.3_3 7.2_1 7.7_1
(7) 64^1 7.9^1 21.9^3 72^1 77^1 511
−.9 +.6 +.0 −.1 +.4

h	m	δ	sin z						
9	24	+52	−.17	−0	9.6	+.9	8.7	−9	[9.1]
9	27	+36							
10	15	+42	+.00		6.6	+.4	6.2	+0	6.2
10	39	+31							
11	3	+45	−.05		8.7	+.9	7.8	−1	7.9
11	47	+54	−.21		6.0	+.5	5.5	−5	6.0
12	28	+42	+.01		7.0	−.1	7.1	−0	7.1

−0′ 7.17″

7.17

h	m	R	M	h	m
11	47	6.0	[9.1]	9	24
12	28	7.1	6.2	10	15
10	56	6.7	7.9	11	3
	R	6.60	~~7.73~~ M. 7.05		

(5) 7.26

h	m	δ	sin z							
10	56	+62	−.34	−0	7.0	+1.0	6.0	−7	6.7	
11	15	+65	−.38		(10.7)	+.8	9.7	−7	(10.4)	(1) 6.40

+.00 − 6.2 −.14 − 8.7 −.21 − 5.5
+.01 7.1 −.05 7.8 −.34 6.0
+.00 − 6.6 −.11 − 8.2 −.28 − 5.8
+.0 −.2 −.7
6.6_2 8.4_2 6.5_2
(6) 13.2^2 16.8^2 13.0^2 430
−.6 +1.2 −.7

h	m	δ	sin z						
9	24	+52							
10	39	+31							
11	3	+45	−.05	−0	8.6	+.9	7.7	−6	7.7
12	28	+42	+.01		7.6	−.1	7.7	+0	7.7
13	6	+43	+.24		4.9	−.6	5.5	+5	6.0
13	12	+41	+.02		7.3	−.4	7.7	+0	7.7

(4) 7.02

−.10 −0′ 6.96″

6.94

h	m	δ	sin z							
10	56	+62	−.34	−0	6.9	+1.0	5.9	−7	(1)	6.6
12	33	+55								
13	3	−4								
1	13	+88								

+.24 − 5.5 +.01 − 7.7 −.05 − 7.7 −.34 − 5.9
+.02 7.7
+.24 − 5.5 +.02 − 7.7 −.05 − 7.7 −.34 − 5.9
+.5 +.0 −.1 −.7
5.0_1 7.7_2 7.8_1 6.6_1
(5) 50^1 15.4^2 78^1 66^1 348
−2.0 +.4 +.8 −.4

1871 April 26 M $h = +.002$ ~~$n = -.040$~~ $h' = -.012$ $n = -.09$ (−9)
$h' = +.013$

Star	Ra	δ	tang δ	π Ra − (ρ′ − ρ)				
	10.20 h m	° +1 ′				3.342		
α Leonis	+1.5 10.0 2	+12 35	+ .22 ✓146	− 3.31	.02	3.33 −.02	−3.35	
λ Urs. Maj.	1.3 10.2 10	+43 32	+ .95 ✓147	− 3.28	.09	.37 −.02	.39	
μ Urs. Maj.	1.3 10.2 15	+42 8	+ .90 ✓149	− 3.29	.08	.37 −.02	.39	
31 Leo. Min.	1.1 10.4 21	+37 21	+ .76 ✓426	− 3.23	.07	.30 −.01	.31	
γ Urs. Maj.	−3 11.8 47	+54 23	+ 1.40 ✓166	− 0.24	.13	.37 .00	.37	
ο Virginis	−7 11.12 50	+9 26	+ .17 ✓167	− 3.33	.02	.35 +.01	.34	
12 Can. Ven.	1.3 12.8 50	+39 0	+ .81 ✓175	− 3.31	.07	.38 +.02	.36	
η Virginis	−.7 12.13	+0 2	+ .00 ✓170	− 3.27	.00	.27 +.01	.26	
ζ Virginis	1.1 12.6 35	~~−1 46~~ −0 44	+ .03 − .01 172	− 3.38	.00	.38 +.01	.37	
	12.37 12.8				3.36	.45 +.02	.43	
	11.50					−3.357	−3.357	

12.1 +4.85 −3.03 −.01 −.01 −3.04 − 3.04
13.2 −41.42 −8.11 −.02 −.03 −8.13 − 8.14

Star	Ra h m	δ ° ′	tang δ	π Ra − (ρ′ − ρ)		
79 Draco. LC.		+1				
ε Urs. Maj.	12.8 49	+56 38	+ 1.52 ✓	− 3.31 −14	− 3.45	173
α Urs. Min LC.	13.2 13	~~+97 21~~ +88 37	41.42 ✓	− 8.11		19
4 H Draconis ✓	12.16	+78 19	+ 4.885 ✓	− 3.03 ✓		168

10.0 +.22 −3.31 10.2 +.95 −3.28
120 +.17 −3.33 10.2 +.90 −3.29
122 +.00 −3.27 11.8 +1.40 −3.24
11.4 +.13 −3.30 12.8 +1.52 −3.31
11.2 +1.19 ~~−3.53~~ −3.28
$n\delta = -.02$

I
0 = +4.72 +.26 n = −.05 0 = −41.55 −4.83 n = −.12

II
0 = +3.66 +.24 n = −.07 −.06 0 = −42.61 −4.86 n = −.11 −.12

1871 apr. 29 M $h = +.003$ ~~$n = -.0$~~ $h' = -.041$ $n = -.10$ (−39)
$+1$ $h' = +.017$

Star	Ra	δ	tang δ				
	10.28					3.414	
α Leonis	+.8 10.0 2	+12 35	+ .22 ✓146	− 3.46	.02	3.48 −.03	−3.51
λ Urs. Maj.	+.6 10.2 10	+43 32	+ .95 ✓147	− 3.30	.09	.39 −.02	.41
μ Urs. Maj.	+.6 10.2 15	+42 8	+ .90 ✓149	− 3.35	.09	.44 −.02	.46
42 Leonis	+.2 10.6 39	+31 20	+ .61 ✓431	− 3.31	.06	.39 .37 −.02 −.01	.41 .38
γ Urs. Maj.	−1.0 11.8 47	+54 23	+ 1.40 ✓166	− 3.39	.14	.53 +.04	.49
η Virginis	−1.4 12.2 13	+0 2	+ .00 ✓170	− 3.44	.00	.44 +.06	.38
	12.00 10.77	+1′				3.485	
						3.434	−3.434

10.6 +2.70 −3.18 +.01 +.00 −3.17 −3.18
12.1 +4.85 −2.92 +.02 +.01 −2.90 −2.91

Star	Ra	δ				
		+1′				
37 Urs. Maj.	10.42 7	+57 44	+ 1.58 ✓	− 3.23	− .16 − 3.39	428
35 Urs. Maj.	10.6 34	+69 44	+ 2.70 ✓	− 3.18		429
4 H Draconis ✓	12.16	+78 19	+ 4.835 ✓	− 2.92 ✓		168

+1′
10.0 +.22 −3.46 10.2 +.95 −3.30
122 +.00 −3.44 10.2 +.90 −3.35
11.1 +.11 −3.45 11.8 +1.40 −3.39
10.4 +1.58 −3.23
10.6 +1.21 −3.32 $n\delta = -.10$

I
0 = +2.59 +.28 n = −.11 −.10
+4.74 +.55 −.12 −.11 −.11

II
0 = +1.49 +.14 n = −.09
+3.64 +.41 −.11 −.10

1871 apr. 30 R. $h = +.004$ n = $h' = +.041$ $n = -.12$ (+33)
$+1$ $h' = +.018$

Star	Ra	δ	tang δ				
	9.70					3.420	
ε Leonis	+1.4 9.6 39	+24 21	+ .45 ✓142	− 3.36	.05	3.41 +.06	−3.35
19 Leo. Min.	+1.2 9.8 50	+41 40	+ .89 ✓422	− 3.32	.11	.43 +.05	.38
η Virginis	−1.7 12.2 13	+0 2	+ .00 ✓170	− 3.26	.00	.26 −.05	.31
ζ Virginis	−1.6 12.6 35	−0 44	− .01 ✓172	− 3.36	.00	.36 −.07	.41
	12.40 11.05	+1′				3.310	
						3.365	−3.362

9.7 +1.70 −3.17 +.03 +.00 −3.14 −3.17

Star	Ra	δ			
		+2′			
ν Urs. Maj. ×	9.7 42	+59 37	+ 1.70 ✓	− 3.21 +04	143

9.6 +.45 −3.36 9.8 +.89 −3.32
122 +.00 −3.26
126 −.01 −3.36
11.5 +.15 −3.33

0 = +1.55 +.19 n = −.12

0 = +.81 +.15 n = −.19

1871 May 1 M. $h = +$ [illegible] n = $h' = -.023$ $n = -.10$ (−15)
$+1$ $h' = +.019$

Star	Ra	δ	tang δ				
	11.27					3.210	
ψ Urs. Maj.	+1.1 11.0 3	+45 11	+ 1.01 ✓155	3.12	10	3.22 −.03	−3.25
Gr. 1757	+.9 11.2 10	+50 9	+ 1.20 ✓435	3.10	12	.22 −.02	.24
χ Urs. Maj.	+.5 11.6 39	+48 28	+ 1.13 ✓163	3.08	11	.19 −.01	.20
η Virginis	−.4 12.2 13	+0 2	.00 ✓170	3.23	00	.23 +.00	.23
ζ Virginis	−.5 12.6 35	−0 44	− .01 ✓172	3.23	00	.23 +.01	.22
ε Urs. Maj.	−.7 12.8 48	+56 38	+ 1.52 ✓173	3.05	15	.20 +.02	.18
12 Can. Venat.	−.7 12.8 50	+39 0	+ .81 ✓175	3.23	08	.31 +.02	.29
ε Virginis	−.8 12.9 55	+11 38	+ .21 ✓176	3.22	.02	.24 +.02	.22
	12.66 12.14	+2′				3.242	
						3.230	−3.229

13.2 −41.42 −7.49 −.01 −.02 −7.50 −7.51

Star	Ra	δ			
α ~~Urs. Min~~	~~1 13~~	~~+88 39~~ 37	~~+42.49~~ ~~41.42~~	− 32.99	
α Urs. Min. L.C.	1.2 13	~~+91 22~~ +88 37	41.42 ✓	− 7.49 ✓	19

12.2 +.00 −3.23 11.0 +1.01 −3.12
126 −.01 −3.23 11.2 +1.20 −3.10
12.9 +.21 −3.22 11.6 +1.13 −3.08
126 +.06 −3.23 12.8 +1.52 −3.05
12.8 +.81 −3.23 $n\delta = -.08$
11.9 +1.13 −3.12

0 = −41.48 −4.27 n = −.10

0 = −42.55 −4.39 n = −.10

sin z = +.60 +80 +.40 +60 +20 +40 +0 +20 +0 − 20 −20 −40 −40 −60 −60 −80

RA δ sin z $R_{eq} - R_{ff}$ ρ'−ρ $R_{eq}-R_{ff}$ + ρ'−ρ
h m ° ' " " "
10 2 +12 − 0
10 10 +43 −.01 10.0 +.9 9.1 − 0 91
10 15 +42 +.00 9.5 +.4 9.1 + 0 91
10 21 +37 +.09 7.8 +.3 7.5 +.1 74
11 47 +54 −.21 8.1 +.5 7.6 −.4 7.2
11 59 + 9
12 50 +39 +.06 9.1 +.2 8.9 +.1 88 +.67 − 86
12 13 + 0 +.67 8.4 −.2 8.6 +1.2 74 +.68 9.8
12 35 − 0 +.68 10.5 +.7 9.8 +1.2 86

+.68 − 9.2
+ 1.3
(7) 8.72
7.9₂
(9) 15 8
− .3

' "
− 0 8.18
8.11

RA δ sin z $R_{eq} - R_{ff}$ ρ'−ρ $R_{eq}-R_{ff}$ + ρ'−ρ
h m ° ' " " "
12 49 +56 −.25 − 0 7.7 +.8 6.9 − .9 73
13 13 +88 −.75 6.8 −.0 6.8 −1.3 81
12 6 +.78 −.59 6.2 +.3 (5.9) −1.0 (6.9) (2) 7.70

+.00 − 9.1 −.01 − 9.1 −.21 − 7.6 −.75 − 6.8
+.09 7.5 −.25 6.9
+.06 8.9
+.05 − 8.5 −.01 − 9.1 −.23 − 7.2 −.75 − 6.8
+ .1 − .0 − .4 −1.5
8.4₃ 9.1 7.6₂ 8.3
25 2 91 15 2 83
+.2 +.9 − .6 +.1

RA δ
10 2 +12 − 0
10 10 +43 −.01 9.0 +.9 8.1 − 0 81
10 15 +42 +.00 9.3 +.4 8.9 +.0 89
10 39 +31 +.19 7.8 +1.0 6.8 +.3 7.1 65
11 47 +54 −.21 7.4 +.5 6.9 −.3 72 +.67 − 7.7
12 13 + 0 +.67 7.5 −.2 7.7 +1.2 ~~8.7~~ 6.5

(5) 7.44 +.67 − 7.7
+ 1.3
6.4
(7) 64
− 1.3

' "
− 0 7.74
7.71

RA δ
10 27 +57 −.26 − 0 9.6 +1.3 8.3 −.4 87
10 34 +69 −.46 8.1 +.7 7.4 −.7 81
12 6 +78 −.59 5.6 +.3 (5.3) −1.0 (6.3) (7) 8.40

+.00 − 8.9 −.01 − 8.1 −.21 − 6.9 −.46 − 7.4
+.19 6.8 −.26 8.3
+.10 − 7.8 −.01 − 8.1 −.24 − 7.6 −.46 − 7.4
+ .1 + .0 − .4 − .9
7.7 8.0 8.0₂ 8.3
15 4² 8.0 16 0 83 5.42
+.0 +.4 +.3 +.6

9 39 +24 +.31 − 0 7.7 +.4 7.3 +.5 6.8
9 50 +41 +.01 7.5 +.0 7.5 + 0 75
12 13 + 0 +.67 8.7 −.2 8.9 +1.2 77
12 35 − 0 +.68 9.6 +.7 8.9 +1.2 78 +.67 − 8.9
+.68 8.9
(4) 7.42 +.68 − 8.9
+ 1.3
7.6₂
(5) 15 2
+.1

' "
− 0 7.54
7.58

9 42 +59 −.30 − 0 9.4 +1.7 8.7 7. −.5 8.2 (1) 8.20

+.31 − 7.3 +.01 − 7.5 −.30 − 7.7

+.31 − 7.3 +.01 − 7.5 −.30 − 7.7
+ .6 +.0 − .6
6.7 7.5 8.3
67 75 83 377
−.8 +.0 + 8

11 3 +45 −.05 − 0 10.0 +.9 9.1 −.1 92
11 10 +50 −.14 9.8 +.8 9.0 −.2 92
11 39 +48 −.11 10.3 +.7 9.6 −.2 98
12 13 + 0 +.67 8.3 −.2 8.5 +1.2 73
12 35 − 0 +.68 11.0 +.7 10.3 +1.2 91
12 48 +56 −.25 8.7 +.8 7.9 −.4 83
12 50 +39 +.06 10.1 +.4 9.7 +.1 96
12 55 +11 +.51 10.5 −.1 10.6 +.8 98

+.67 − 8.5 +.51 − 10.6
(8) 9.04 +.68 10.3

+.68 − 9.4 +.51 − 10.6
+ 1.3 + 1.0
− 8.1 − 9.6
(8) 16 2² 96
− .9 +.6

8.96
− 0 ~~7.84~~
9.04

1 13 +88

+.06 − 9.7 −.05 − 9.1 −.25 − 7.9
−.14 9.0
−.11 9.6
+.06 − 9.7 −.10 − 9.2 −.25 − 7.9
+ .1 − .1 − .5
−.96 −9.3₃ −8.4
96 27 ~~78~~ 9 84 71 ~~62~~ 7
+.6 +.3 −.6

1871 May 2 R. h = +.003 (+32) h′ = +.016 h′ = +.035 n = −.16

Star	Ra	δ	tang δ	π Ra −(P′−P)		3.181	
	h m	° +1′					
ψ Urs Maj. ×	10.2 10	+43 32 +	.95 √147 −	3.07	.15	3.22 +04	−3.18
γ¹ Leonis	~~10.2~~ 12						
μ Urs. Maj. ×	10.2 15	+42 8 +	.90 √149 −	3.02	.14	.16 +04	.12
α Leonis	10.0 2	+12 35 +	.22 √146 −	3.14	.04	.18 +05	.13
31 Leonis Min.	10.4 21	+37 21 +	.76 √426	3.11	.12	.23 +03	.20
42 Leo. Min.	10.6 39	+31 20 +	.61 √431	2.99	.10	.09 +03	.06
46 Leo. Min.	10.8 46	+34 53 +	.70 √152	3.09	.11	.20 +02	.18
~~ν Urs. Maj.~~	~~10.9 11~~	~~+32 15 +~~	~~.63 + 9.73~~			.19 +02	.17
58 Urs. Maj.	11.4 24	+43 52 +	.96 √437 −	3.07	.15	.22 +00	.22
χ Urs Maj.	11.6 39	+48 28 +	1.13 √163 −	3.01	.18	.19 −01	.20
η Virginis	12.2 13	+0 2 +	.00 √170	2.98	00	2.98 −03	.01
γ Virginis	12.6 35	−0 44 −	.01 √172	3.06	00	3.06 −04	.10
ε Urs. Maj.	12.8 48	+56 38 +	1.52 √173	2.97	.24	.21 −05	.26
12 Can. Ven.	12.8 50	+39 00 +	.81 √175 −	2.98	.13	.11 −05	.16
ε Virginis	12.9 55	+11 38 +	.21 √176 −	2.99	.03	.02 −05	.07

10.6 +2.71 −2.78 +.02 +.01 −2.76 −2.77
12.1 +4.85 −2.32 −.00 −.01 −2.32 −2.33
13.2 −41.41 −9.59 −.02 −.03 −9.61 −9.62 26

3.113 −3.147 −3.147

Star	Ra	δ	tang δ	π Ra −(P′−P)		
	h m	° +1′				
β Urs. Maj. ×	10.9 54	+57 3 +	1.55	−2.94 +25	−3.19	153 ~~168~~
4 H Draconis	12 16	+78 19 +	4.83	−2.32		168
κ Urs. Min. S.C.	1.2 12	+91 34 + (88 37)	41.41	−9.59		19
35 Urs. Maj.	10.6 34	+69 44 +	2.71	−2.78		429

+1′

10.0 +22 −3.14 10.2 +95 −3.07
12.2 +.00 −2.98 10.7 +.90 −3.02
12.6 −.01 −3.06 11.4 +.96 −3.07
12.9 +21 −2.99 11.6 +1.13 −3.01
11.9 +10 −3.04 12.8 +1.52 −2.97
10.9 +1.55 −2.94
11.2 +1.17 −3.01

n5 = −.04

0 = +2.61 +.28 n = −.11 −.14 0 = −41.51 −6.57 n = −.16
+4.75 +.72 −.15 −.17
−.15

0 = +1.34 +.24 n = −.18 0 = −42.58 −6.61 n = −.16
+3.68 +.68 −.18 −.18

1871 May 7 M. h = +.006 +1 h′ = +.007 h′ = −.021 n = −.16

42 Leo. Min.	10.6 39	+31 20 +	.61 √431 −	2.66	.10	2.840 2.76 −.02	−2.78
46 Leo Min.	10.8 46	+34 53 +	~~.70 √152~~			.93 −.02	.95
ψ Urs. Maj. ×	11.0 35	+45 11 +	1.01 √155	2.70	.16	.86 −.01	.87
δ Leonis	11.1 7	+21 12 +	.39 √156 −	2.63	.06	.69 −.01	.70]
γ Urs. Maj. ×	11.8 47	+54 23 +	1.40 √166 −	2.74	.22	.96 +00	.96
ζ Urs. Maj. ×	13.3 19	+55 35 +	1.46 √178 −	2.72	.23	.95 +.03	.92
17 H Can. Ven.	13.5 29	+37 49 +	.78 √454 −	2.71	.12	.83 +.04	.79

13.40 11.74 +2′ 2.890 −2.854 −2.853

13.4 +1.78 −2.85 −.01 −.01 −2.86 −2.86

+1′

~~22 H Cephei~~ ×	~~10 29~~					
β Urs Maj. ×	10.9 54	+57 3 +	1.55	−2.68	= .25 − 2.93 ~~2.83~~	153
~~α Urs. Min.~~ ×	~~13 13~~	~~+88 37 36~~	~~+42.47~~ 41.43			
69 H Urs Maj. ×	13.4 24	+60 35 +	1.78	−2.85		453
~~λ Draconis~~ ×	11 ~~24~~	~~+70 1 +~~	~~2.75~~	~~−15.00~~		

+2′

10.6 +61 −2.66 10.9 +1.55 −2.68
11.1 +39 −2.63 11.0 +1.01 −2.70
13.5 +78 −2.71 11.8 +1.40 −2.74
11.7 +.59 −2.67 13.3 +1.46 −2.72
11.8 +1.35 −2.71

0 = +1.19 −.19 n = −.16
0 = +.96 −.00 = −.00

0 = +43 −.15 n = −.40]

May 9. v. after June 27.

1871 May 10 R. h = +.001 (+80) h′ = −.006 n = −.11 +1′ h′ = +.013

6 Can. Ven.	12.3 20	+39 43 +	.83 √442 −	3.04	.09	2.996 3.01 2.98 3.13] 2.70	−.01 .01 00	−3.02 2.99 2.70]
γ Virginis	12.6 35	−0 44 −	.01 √172 −	2.95	.00	2.95		2.93
ε Urs. Maj.	12.8 48	+56 38 +	1.52 √173 −	2.82	.17	2.99		2.99
12 Can. Ven.	12.8 50	+39 00 +	.81 √175 −	2.91	.09	3.00		3.00
ε Virginis	12.9 55	+11 38 +	.21 √176 −	2.82	.02	2.84		2.84
θ Virginis	13.0 3	−4 52 −	.08 √449 −	2.90	.01	2.89		2.89
43 Comae	13.1 5	+28 21 +	.54 √177 −	2.89	.06	2.95	00	2.95
ζ Urs. Maj.	13.3 18	+55 35 +	1.46 √178 −	2.90	.16	3.06 +01		3.05
ζ Virginis	13.5 28	+0 3 +	.00 √179 −	2.92	00	2.92 +01		2.91

13.16 12.57 +1′ 2.932

13.2 −41.41 −7.38 −.00 −.01 −7.38 −7.39 −2.935 −2.935

+1′

β Urs. Maj. ×	10.9 54	+57 3 +	1.55	−2.84	−.17 − 3.01	153
α Urs. Maj. ×	10.9 56	+62 26 +	1.91	−2.77	.21 2.98	154
74 Urs. Maj. ×	12.4 24	+59 6 +	1.67	−2.52	.18 2.70	444
α Urs. Min. S.C.	1.2 12	~~+91 24~~ − +88 37	41.41	−7.38		−19

12.6 −.01 −2.95 10.9 +1.55 −2.84
12.9 +21 −2.82 10.9 +1.91 −2.77
13.0 −.08 −2.90 12.4 +1.67 −2.52
13.1 +.54 −2.89 12.8 +1.52 −2.82
13.5 +.00 −2.92 13.3 +1.46 −2.90
13.0 +13 −2.90 12.1 +1.62 −2.77

n₀ = −.08

0 = −41.54 −4.48 n = −.11

0 = −43.03 −4.62 n = −.11
−.11

1871 May 11 M h = +.002 (−43) h′ = −.003 n = −.12 +1′ h′ = +.014

42 Leo. Min.	10.6 39	+31 20 +	.61 √431 −	2.85	.07	3.002 2.99 3.13 2.92	00	−2.99 3.13] 3.05 2.92
46 Leo. Min.	10.8 46	+34 53 +	.70 √152 −	2.83	.08	3.05 .91		2.91
6 Can. Ven.	12.3 20	+39 43 +	.83 √442 −	2.91	.10	3.01		3.01
ε Urs. Maj.	12.8 48	+56 38 +	1.52 √173 −	2.86	.18	.04		3.04
12 Can. Ven.	12.8 50	+39 00 +	.81 √175 −	2.97	.10	.07		3.07
ε Virginis	12.9 55	+11 38 +	.21 √176 −	2.94	.03	2.97		2.97
θ Virginis	13.0 3	−4 52 −	.08 √449 −	2.97	.01	.96		2.96
43 Comae	13.1 5	+28 21 +	.54 √177 −	2.93	.06	3.006 .99	00	2.99

Ber. 5 12.92 12.05 +28 +1′ .32 12.5 +2.82 −2.73 +.01 −.01 −2.72 −2.74

+1′

β Urs. Maj. ×	10.9 54	+57 3 +	1.55	−2.80	−.19	−2.99	153
α Urs. Maj. ×	10.9 56	+62 26 +	1.91	−2.90	−.23	3.13	154
74 Urs. Maj. ×	12.4 24	+59 6 +	1.67	−2.85	−.20	3.05	444
κ Draconis	12.5 28	+70 29 +	2.82	−2.73			171
κ Urs. Min. S.C.	1.2 12	~~+91 21~~ − +88 37	41.41	−9.01			19

+1′

12.9 +21 −2.94 10.9 +1.55 −2.80 I 0 = +2.60 +.23 = −.090 = I −41.63 −6.06
13.0 −.08 −2.97 10.9 +1.91 −2.90
13.1 +54 −2.93 12.4 +1.67 −2.85
13.0 +22 −2.95 12.8 +1.52 −2.86 II 0 = +1.16 +.11 n = −.09 −.07 II 0 = −43.07 −6.18
11.8 +1.66 −2.85

1871 May 12 M. h = +.010 h′ = +.021 −65 +1′ h′ = +.007 n = −.17

13.2 −41.41 −9.01 −.00 −.02 −9.01 −9.03 −3.004
−3.004

γ Urs Maj.	11.8 47	+54 23 +	1.40 √166	2.74	.24	2.980 2.98 +01	−2.97
ζ Urs Maj.	13.3 18	+55 35 +	1.46 √178	2.66	.25	.91 .00	.91
17 Can. Ven.	13.5 29	+37 49 +	.78 √454	2.70	.13	.83 .00	.83
η Bootis	13.8 48	+19 2 +	.34 √182 −	2.80	.06	2.867 .86 −01	.87

13.53 13.10 +1′ −2.895 −2.895

13.2 − 41.42 −9.81 +.01 −.01 −9.80 −9.82

n5 = −.07

α Urs Min. L.C. ×	13.2 10	+88 21 − (91 21)	41.42	−9.81		19
69 Urs Maj ×	13.4 24	+60 35 +	1.78	−2.74	−.30 − 3.04]	453

+2′

13.5 +78 −2.70 11.8 +1.40 −2.74 0 = −41.98 −7.05 n = −.17
13.8 +.34 −2.80 13.3 +1.46 −2.66
13.6 +.56 −2.75 13.4 +1.78 −2.74 0 = −42.97 −7.11 n = −.17
12.8 +1.55 −2.71

sin z = +.60+80 | +.40+60 | +20+40 | +0+.20 | +0 −.20 | −.20 −.40 | −.40 −.60 | −.60 −.80

RA δ sin z Req–Rpl ρ'–ρ Req–Rpl+ρ'–ρ | RA δ sin z Req–Rpl ρ'–ρ Req–Rpl+ρ'–ρ

h m ° ' " " " | h m ° ' " " "

15̶3 168 19 429 | 10 10 +43 −.01 −0 9.8 +.9 8.9 −.0 89 | 10 54 +57 −.25 −0 9.7 +1.0 8.7 −.4 91
| 12 6 .78 −.59 −0 4.8 +1.0 (3.8) −.9 (47)
10 15 +42 +.00 8.9 +.4 8.5 +.0 85 | 1 12
10 2 +12 | 10 34 −.46 7.7 +.7 7.0 −.7 77 (2) 840
10 21 +37 +.09 8.3 +.3 8.0 +.2 78
10 39 +31 +.19 8.2 +1.0 7.2 +.3 ~~7.5~~ 6.9 +.67 −8.7 +.51 −8.3 +.00 −8.5 −.01 −8.9 −.25 −6.6 −.46 −7.0
10 46 +34 +.13 8.1 −.7 8.8 +.2 8.6 +.68 −8.3 +.09 8.0 −.01 7.1 −.25 8.7
11 11 +.19 7.2 −.11 8.2
11 24 +43 −.01 7.4 +.3 7.1 −.0 7.1 +.13 8.8
11 39 +48 −.11 8.9 +.7 8.2 −.2 8.4 +.06 7.9
12 13 +0 +.67 8.5 −.2 8.7 +1.2 7.5 +.68 −8.5 +.51 −8.3 +.09 −8.1 −.04 −8.1 −.25 −7.2 −.46 −7.0
12 35 −0 +.68 9.0 +.7 8.3 +1.2 7.1 +1.3 +.9 +.1 −.0 −.5 −.9
12 48 +56 −.25 6.4 +.8 5.6 −.4 6.0 7.2 7.4 8.0 8.1 7.7 7.9
−.16 12 50 +39 +.06 8.3 +.4 7.9 +.1 7.8 (14) 14.4 2 7.4 1 40.0 5 24.3 3 15.4 2 7.9 1 1094
12 55 +11 +.51 8.2 −.1 8.3 +.8 7.5 −.6 −.4 +.2 +.3 −.1 +.1

' "
−0 7.81 (12) 7.68
−.16 7.78

10 39 +31 +.19 −0 7.1 +1.0 6.1 +.3 5.8 | 10 54 +57 −.25 −0 7.4 +1.0 6.4 −.4 6.8 (1) 6.80
153 10 46 +34 | 13 13 +88
11 3 +45 −.05 9.4 +.9 8.5 −.1 8.6 | 13 24 +60
453 11 7 +21 +.36 8.9 +.5 8.4 +.6 7.8 | 11 24 +70
11 47 +54 −.21 6.5 +.5 6.0 −.3 6.3 +.36 −8.4 +.19 −6.1 −.05 −8.5 −.21 −6.0
13 19 +55 −.25 6.4
13 29 +37 (4) 7.12 +.36 −8.4 +.19 −6.1 −.05 −8.5 −.23 −6.2
+.7 +.3 −.1 −.4
' " 7.7 5.8 8.6 6.6
−0 7.06 (5) 47 1 58 1 86 1 13.2 2 35.3
7.06 +.6 −1.3 +1.5 −.5

15̶3 154 444 −19 | 12 20 +39 +.05 −0 15.9 +.4 15.5 +.1 15.4 | 10 54 +57 −.25 −0 15.9 +1.0 14.9 −.4 15.3
12 35 −0 +.68 17.0 +.7 16.3 +1.1 15.2 | 10 56 +62 −.34 14.8 +1.0 13.8 −.5 14.3
12 48 +56 −.25 13.8 +.8 13.0 −.4 13.4 | 12 24 +59 −.29 15.0 +.9 14.1 −.5 14.6
12 50 +39 +.06 15.3 +.4 14.9 +.1 14.8 | 1 12 +88 −.75 10.8 +.0 10.8 −1.3 (12.1) 3 14.53
12 55 +11 +.51 14.8 −.1 14.9 +.8 14.1
13 3 −4 +.73 15.6 +.9 14.7 +1.2 13.5 +.68 −16.3 +.51 −14.9 +.24 −14.6 +.05 −15.5 −.25 −13.0 −.75 −10 −.75 −10.8
13 5 +28 +.24 14.0 −.6 14.6 +.4 14.2 +.73 14.7 +.06 14.9 −.23 14.4
13 18 +55 −.23 13.2 +1.2 14.4 −.4 14.8 +.67 15.0 −.25 14.9
13 28 +.67 15.0 +.0 15.0 +1.1 13.9 −.34 13.8
−.29 14.1
(19) 14.37 +.69 −15.3 +.51 −14.9 +.24 −14.6 +.06 −15.2 −.27 −14.0 −.75 −10.8
' " +1.3 +.9 +.4 +.1 −.5 −1.4
−0 14.28 4 14.0 3 14.0 1 14.2 1 15.1 2 14.5 5 12.2 1
14.46 (13) 12.0 4.0 4.2 10.2 22.5 22
−.2 −.2 +.0 +.9 +.3 −2.0

153 154 444 171 19 | 10 39 +31 +.19 −0 14.4 +1.0 13.4 +.3 13.1 | 10 54 +57 −.25 −0 16.2 +1.0 15.2 −.4 15.6
10 46 +34 +.19 13.5 −.7 14.2 +.3 13.9 | 10 56 +62 −.34 16.4 +1.0 15.4 −.5 15.9
12 20 +39 +.05 17.4 +.4 17.0 +.1 16.9 | 12 24 +59 −.29 13.9 +.9 13.0 −.5 13.5
12 48 +56 −.25 15.3 +.8 14.5 −.4 14.9 | 12 28 +.70 −.47 15.6 +.8 14.8 −.7 15.5 (4) 15.12
12 50 +39 +.06 15.4 +.4 15.0 +.1 14.9 | 1 12 +88 −.75 11.0 +.0 11.0 −1.3 (12.3)
12 55 +11 +.51 16.0 −.1 16.1 +.8 15.3
.163 −6.06 13 3 −4 +.73 16.8 +.9 15.9 +1.2 14.7 +.73 −15.9 +.51 −16.1 +.24 −15.0 +.19 −13.4 −.25 −14.5 −.47 −14.8 −.75 −11.0
13 5 +28 +.24 14.4 −.6 15.0 +.4 14.6 +.19 14.2 −.25 15.2
' " +.05 17.0 −.34 15.4
.07 −6.18 −0 14.71 (8) 14.~~46~~ 79 +.06 15.0 −.29 13.0
14.90 +.73 −15.9 +.51 −16.1 +.24 −15.0 +.12 −14.9 −.28 −14.5 −.47 −14.8 −.75 −11.0
19 11 47 −21 −0 16.3 +.5 15.8 −.3 16.1 +1.4 +.9 +.4 +.2 −.5 −.9 −1.4
451 13 ~~48~~ 24 −.31 18.9 +1.6 17.3 −.5 17.8 14.5 1 15.2 1 14.6 1 14.7 4 15.0 4 15.7 12.4
13 29 (13) 45 52 46 18.8 20.0 57 24
13 48 −.21 −15.8 −.2 +.5 −.1 +.0 +.3 +1.0 −2.3
' " −.31 17.3
−0 17.00 −26 −16.6
16.95 −17.0 4 2
+0

1871 May 13 M. h = +.002 (+53) h′ = +.030 n = −.16
h′ = +.013

Star	Ra h m	δ ° ′	tang δ	π Ra −(P′ P)			
ψ Urs. Maj.	11.0 3	+45 11	+ .20 155	− 2.48	.16	−2.64 +.03	−2.61
δ Leonis	11.1 7	+21 12	+ .39 156	2.56	.06	.62 +.03	.59
Gr. 1757	11.2 10	+50 9	+ 1.20 435	2.44	.19	.63 +.03	.60
12 Can. Ven.	12.8 50	+39 0	+ .81 175	− 2.47	.13	.60 −.01	.61
20 Can. Ven.	13.2 12	+41 14	+ .88 451	− 2.58	.14	.63 .48 −.04 −.03	.67 .51
α Arietis	2.0 0	+22 51	+ .42 33	2.38	.05	.45 .00	2.453

1.01 2.630 11.10 13.13 12.12 +1′ 2.570 −2.600 −2598

20+42 −2.38 2.00 mom. 12 +41.42 + 2.19 +.01 +2.20 −2.450 mom. −2.450 30

0 = +4.00 +4.58 n = −.12

Star	Ra h m	δ ° ′	tang δ	π Ra −(P′ P)			
β Urs. Maj.	10.9 54	+57 3	+1.55	− 2.66	.25	2.91	153
α Urs. Maj.	10.9 56	+62 26	+1.91	− 2.51	.31	.82	154
69 Urs. Maj.	13.4 24	+60 35	+1.78	− 2.35	.28	.63	453
α Urs. Min.	1.2 13	+88 37 39	+ ~~42.49~~ 41.42	+2.19			19
α Urs. Min. L.C.	13.2 13	~~+91~~ +88 ~~21~~ 37	−41.42	− 11.37			19

11.1 +39 −2.56
~~2.0 +42 −2.38~~
10.9 +1.55 −2.66
10.9 +1.91 −2.51
11.2 +1.20 −2.44
13.4 +1.78 −2.35 −.16
11.6 +1.61 −2.49
13.2 −41.42 −11.37 −.03 −.02 −11.40 −11.39

I 0 = −41.81 −8.84 n = −.21

II 0 = −43.03 −8.90 n = −.21

1871 May 14. R. h = +.006 (+20) h′ = +.018 n = −.09
+1 h′ = +.017

Star	Ra h m	δ ° ′	tang δ	π Ra −(P′ P)			
42 Leonis	10.6 39	+31 20	+ .61 431	− 2.41	.05	−2.46 +.03	−2.43
l Leonis	10.7 43	+11 12	+ .20 432	2.52	.02	.54 +.03	.51
46 Leo. Min.	10.8 46	+34 53	+ .70 152	− 2.43	.06	.49 +.03	.46
12 Can. Ven.	12.8 50	+39 0	+ .81 175	2.46	.07	.53 −.01	.54
θ Virginis	13.0 8	−4 52	− .09 449	2.47	.01	.46 −.01	.47
ζ Urs. Maj.	13.3 18	+55 35	+ 1.46 178	2.28	.13	.41 −.02	.43
ζ Virginis	13.5 28	+0 3	+ .00 179	− ~~2.40~~ 2.35	.00	.35 −.02	.37
η Urs. Maj.	13.7 42	+49 56	+ 1.19 181	− 2.40	.11	.51 −.02	.53
43 Comae	13.1 6	~~+43~~ +28 ~~21~~ 37	+ .54 177	− 2.39	.05	.44 −.01	.45

10.70 2.497 13.23 12.39 +1′ 2.450 −2.354 2.466 −2.466

Star	Ra h m	δ ° ′	tang δ	π Ra −(P′ P)	
35 H. Urs. Maj.	10.6 34	+69 44	+ 2.70	− 2.26	429
β Urs. Maj.	10.9 54	+57 3	+ 1.55	− 2.35	153
α Urs. Maj.	10.9 56	+62 26	+ 1.91	− 2.38	154
α Urs. Min. S.C.	1.2 12	~~+91~~ +88 ~~21~~ 37	− 41.41	− 6.30	19

10.7 +20 −2.52
13.0 −08 −2.47
13.5 +00 −2.35
12.4 +04 −2.485
13.3 +1.46 −2.28
13.7 +1.19 −2.40
13.5 +1.32 −2.34

0 = +2.66 + .22 n = −.09 0 = +1.38 +.13 −.09
+1.51 + .13 −.09 +.23 +.03 −.13
+1.87 + .10 −.08 +.59 +.00 .03

10.6 +2.70 −2.26 +.03 +.05 −2.23 −2.21
10.9 +1.55 −2.35 +.03 +.04 −2.32 −2.31 0 = −41.45 −3.86 n = −.09
10.9 +1.91 −2.38 +.03 +.04 −2.35 −2.34
13.2 −41.41 −6.30 −.01 +.01 −6.31 −6.29 0 = −42.73 −3.95 −.09

1871 May 18 R h = +.008 h′ = +.008 n = ~~−.11~~ −.09 Ĉ − 2.66
h′ = +.019 +1′

Star	Ra h m	δ ° ′	tang δ	sec δ	csc δ	π RA				
γ Urs. Maj.	11.8 47	+54 23	+ 1.40 172 166	2.54	4.61	− 2.07	−.13	2.20 +.01	2.21 19	
α Bootis	14.2 10	+19 50	+ .36 106 187	0.82	2.82	− 2.00	−.03	.03 −.00	2.03	
λ Bootis	14.2 12	+46 40	+ 1.06 146 188	1.96	3.88	− 1.92	−.10	.02 −.00	2.02	
ϑ Bootis	14.4 21	+52 26	+ 1.30 164 190	1.98	4.36	− 2.38	.12	.50		
ζ Bootis	14.4 27	+38 51	+ .80 193 128	1.47	3.40	− 1.93	−.07	.00 −.01	1.99 2.01	

π RA 2.20 11.88 14.27 13.65 +1′

14.0 +2.14 −1.70 +.01 −.02 −1.69 −1.72
14.3 −2.33 ~~−1.574~~ −2.18 +.00 −.02 ~~−1.574~~ 2.18 ~~−1.576~~ −2.20

2.050 −2.062 −2062

Star	Ra h m	δ ° ′	tang δ	π Ra		π RA	
α Draconis	14.0 1	+64 58	+ 2.14 237	+ 4.60	−6.30	−1.70	184
ι Cassiop.	20.14.3 19	+66 49	+ 2.33 2.35	− 8.96	+6.78	− ~~15.74~~ −2.18	36

14.2 +36 −2.00
14.2 +1.81 −1.93
14.3 +.58 −1.96
11.8 +1.40 −2.07
14.2 +1.06 −1.92
13.0 +1.23 −2.00

0 = 1.56 +27 n = −.11 0 = −2.81 +.22 n = −.07 −.07

0 = .91 +28 n = 0 = −3.56 +20 −.06

1871 May 23 M h = +.002 (+19) h′ = +.021 n = −.11
+1 h′ = +.010

Star	Ra h m	δ ° ′	tang δ	π Ra				
ν Leonis	11.5 31	− 0 8	− .00 438	1.01	.00	−1.01 +.02	−0.99
χ Urs. Maj.	11.6 39	+48 28	+ 1.13 163	0.73	.12	0.85 +.04	.81
β Leonis	11.7 43	+15 16	+ .27 164	0.95	.03	0.98 +.02	.96
γ Urs. Maj.	11.8 47	+54 23	+ 1.40 166	0.68	.15	0.83 +.01	.82
α Bootis	14.2 10	+19 50	+ .36 187	0.84	.04	0.88 −.04	.92
ι Bootis	14.2 12	+51 57	+ 1.28 187	0.71	.14	0.85 −.04	.89

11.65 −0.918 14.20 +1′ 12.50 0.865 0.900 −0.898

11.6 +2.40 −0.32 +.01 +.01 −0.31 −0.31
14.0 +2.14 −0.70 −.02 −.02 −0.72 −0.72

Star	Ra h m	δ ° ′	tang δ	π Ra		
3 Draconis	11.6 35	+67 26	+ 2.40 2.61	− 0.32	−.48	439
α Draconis	14.0 1	+64 58	+ 2.14 2.37	− 0.70	−.272	184

11.5 −.00 −1.01
11.7 +.27 −0.95
14.2 +.36 −0.84
12.5 +.21 −0.93
11.6 +1.13 −0.73
11.8 +1.40 −0.68
14.2 +1.28 −0.71
12.5 +1.27 −0.71

0 = +2.19 +.62 n = −.28
+1.93 +.21 −.11

0 = +1.13 +40 n = −.35
0.87 −.01 −.01

sin z = +.60 +.80 | +.40 +.60 | +.20 +.40 | +0 +.20 | +0 −.20 | −.20 −.40 | −.40 −.60 | −.60 −.80

RA		δ	sin z	R_eq − R_fl	P′−P	R_eq − R_fl	+ P′−P		
h	m	°		′	″	″	″		
11	3	+45	−.05	−0	17.9	+.9	17.0	−.1	171
11	7	+21	+.36		16.5	+.5	16.0	+.5	155
11	10	+50	−.14		17.4	+.8	16.6	−.2	168
12	50	+39	+.06		16.8	+.2	16.6	+.1	165
13	12	+41	+.02		16.2	−.4	16.6	+.0	166
2	0	+22							
								(5)	16.50

−0′ 16.64″
16.65

RA		δ	sin z	R_eq − R_fl	P′−P	R_eq − R_fl	+ P′−P		
h	m	°		′	″	″	″		
10	54	+57	−.25	−0	17.3	+1.0	16.3	−.4	167
10	56	+62	−.34		16.8	+1.0	15.8	−.5	163
13	24	+60	−.31		18.8	+1.6	17.2	−.5	177
1	13	+88						(3)	16.90
13	13	+88							

+.36 −16.0	+.06 −16.6	−.05 −17.0	−.25 −16.3	
	+.02 16.6	−.14 16.6	−.34 15.8	
			−.31 17.2	
+.36 −16.0	+.04 −16.6	−.10 −16.8	−.30 −16.4	
+ .6	+ .1	− .2	− .5	
15.4	16.5	17.0	16.9	
(8) 54	13.0^{2}	14.0^{2}	20.7^{3}	531
−1.2	−.1	+.4	+.3	

10	39	+31	+.19	−0	17.1	+1.0	16.1	+.3	158		
10	43	+11									
10	46	+34	+.13		15.2	−.7	15.9	+.2	157		
12	50	+39	+.06		16.9	+.2	16.7	+.1	166		
13	3		+.73		17.0	+.9	16.1	+1.1	150		
13	18		−.23		15.7	+1.2	14.5	−.4	149	+.73	−16.1
13	28		+.67		15.7	+.0	15.7	+1.1	146	+.67	15.7
13	42		−.13		16.8	+.3	16.5	−.2	167		
13	6		+.24		15.4	−.6	16.0	+.4	156	+.70	−15.9
								(8)	15.61		+ 1.3
											14.6^{2}
										(12)	92
											−1.2

−0′ ~~15.86~~ 15.75″ ~~15.19~~
15.55 ~~15.22~~ ~~15.19~~

10	34	+69	−.46	−0	17.9	+.7	17.2	−.7	179
10	54	+57	−.25		17.5	+1.0	16.5	−.4	169
10	56	+62	−.34		16.9	+1.0	15.9	−.5	164
1	12	+88	−.75		11.8	+.0	11.8	−1.2	130
								(3)	~~16.73~~ 15.43

+.24 −16.0	+.19 −16.1	−.13 −16.5	−.23 −14.5	−.46 −17.2	−.75 −11.8
	+.13 15.9		−.25 16.5		
	+.06 16.7		−.34 15.9		
+.24 −16.0	+.13 −16.2	−.13 −16.5	−.27 −15.6	−.46 −17.2	−.75 −11.8
+ .4	+ .2	− .2	− .5	− .8	− 1.4
15.6	16.0	16.7	16.1	18.0	13.2
5.6^{1}	18.0^{3}	6.7^{1}	18.3^{3}	8.0^{1}	3.2^{1}
−.2	+.2	+.9	+.3	+2.2	−2.6

11	47	+54	−.21	−1	59.6	+.5	59.1	−.3	594
14	10	+19	+.38		21 ~~59.2~~	−.4	25 ~~59.6~~	+.6	19 ~~59.0~~
14	12	+46	−.08	−2	0.0	+1.7	58.3	−.1	584
14	21	+52	−.17		1.2	+.8	60.4	−.3	607
14	27	+38	+.06		3.9	+.3	63.6	+.1	635
								(5)	60.20

−2′ 0.50″
0.45

14	1	+64	−.38	−2	1.7	+.6	1.1	−.6	61.7
14	19	+66						(1)	61.7

+.38 −59.6	+.06 −63.6	−.08 −58.3	−.21 −59.1	
		−.17 60.4	−.38 61.1	
+.38 −59.6	+.06 −63.6	−.12 −59.4	−.30 −60.1	
+ .7	+ .1	− .2	− .6	
58.9	63.5	59.6	60.7	
(6) 589	635	119.2^{2}	121.9^{2}	3630
−1.6	+3.0	−.9	+.2	

11	31	−0								
11	39	+48	−.11	−2	1.2	+.7	0.5	−.2	(0.7)	
11	43	+15								
11	47	+54	−.21	−1	57.3	+.5	56.8	−.4	572	
14	10	+19	+.38		58.6 ~~57.8~~	−.4	59.0 ~~58.2~~	+.6	~~576~~	584
14	12	+51	−.17		58.0	+.7	57.3	−.3	576	
								3	57.47	

−1′ 58.50″
58.02

11	35	+67	−.42	−1	58.9	+.7	58.2	−.7	589
14	1	+64	−.38	2	58.8	+.6	58.2	−.6	588
								(2)	58.85

+.38 −58.2	−.11 −60.5	−.21 −56.8	−.42 −58.2	
	−.17 57.3	−.38 58.2		
+.38 −58.2	−.14 −58.9	−.30 −57.5	−.42 −58.2	
+ .8	− .3	− .6	− .8	
57.4	59.2	58.1	59.0	
(6) 74	18.4^{2}	16.2^{2}	9.0^{1}	510
−1.1	+.7	−.4	+.5	

1871 May 24 R. $h = +.002$ -23 $h' = +.010$ $h' = -.016$ $n = -.22$

Star RA δ tang δ π Ra $-(P'-P)$

11.90 h m ° ′

β Leonis +1.3 x 11.7 43 +15 16 + .27 √164 0.78 .06 0.840 −0.84 −.02 −0.86

γ Urs. Maj. +1.2 x 11.8 47 +54 23 +1.40 √166 − 0.46 .31 .77 −.02 .79

o Virginis x +1.0 11.^{20} 59 + 9 26 + .17 167 − 0.86 .04 .90 −.02 .92

ε Bootis −1.2 x 14.2 10 +19 50 + .36 √187 − 0.87 .08 .95 +.02 .93

~~α Bootis~~ x −1.4 ~~14 12~~ +51 ~~57~~ +1.28 ~~.4~~ + ~~0.42~~ —

ϑ Bootis −1.4 x 14.4 21 +52 26 +1.30 √190 − 0.57 .29 .86 +.02 .84

33 Bootis −1.6 x 14.6 34 +44 57 +1.00 461 − 0.61 .22 .83 +.03 .80

5 Urs Min ~~14.4~~ 27

α₂ Can ~~Min~~ Ven. +0.9 12.1 9 +41 21 + .88 441 − 0.66 .19 .85 −.01 .86

14.40 +1′ 0.880

12.97 −0.857 −0.857

14.0 +2.14 −0.41 −.01 −.00 −0.42 −0.41

~~n = −.22~~

a Draconis x 14.0 1 +64° 58′ + 2.14 √ − 0.41 — − 2.39 184

+1′

11.7 +27 −0.78 11.8 +1.40 −0.46

12.0 +17 −0.86 14.4 +1.30 −0.57

14.2 +36 −0.87 14.6 +1.00 −0.61

12.6 +27 −0.84 13.6 +1.23 −0.55

0 = +1.87 +.42 n = −.22

0 = +.91 +.14 n = −.15

1871 May 25 M. $h = +.004$ $+52$ $h' = +.012$ $h' = +.054$ $n = -.22$

11.70 0.740

χ Urs. Maj. −1.6 x 11.6 39 +48 28 +1.13 √163 0.51 .25 −0.76 +.09 −0.67

γ Urs. Maj. −1.4 x 11.8 47 +54 23 +1.40 √166 − 0.41 .31 .72 +.08 .64

β Comae ⓧ ~~12.3~~ 17

γ Comae ⓧ ~~12.3~~ 20

33 Bootis −1.4 x 14.6 34 +44 57 +1.00 √461 − 0.29 .22 .51 −.08 .59

β Bootis −1.7 x 14.9 56 +40 53 + .87 √199 − 0.45 .19 .64 −.09 .73

14.75 13.22 +1′ 0.575

14.8 +3.65 +0.29 −.00 −.04 +0.29 +0.25 −0.658 −0.658

14.9 +2.29 −0.10 −.00 −.04 −0.10 −0.14

β Urs. Min x 14.8 50 +74 40 +3.65 √ +0.29 — 265 198

2 H Urs Min x 14.9 55 +66 26 +2.29 √ − 0.10 — 246 464

+1′ +1′

14.6 +1.00 −0.29 11.6 +1.13 −0.51

14.9 +.87 −0.45 11.8 +1.40 −0.41

14.7 +93 −0.37 11.7 +1.26 −0.46

0 = +2.72 +66 n = − 24 −24

+1.36 +27 −.20 −20

0 = +1.39 +.71 n = −.51

+1.03 +.32 −.31

May 26. 27 v. after June 29

1871 May 29 R. $h = +.002$ $h' = +.009$ $h' = -.050$ $n = -.32$

1230 0425

γ Urs. Maj. +1.3 x 11.8 47 +54 23 +1.40 √166 0.02 .45 −0.47 −.06 −0.53

~~35 Bootis~~ x +3 12.8 ~~14 39~~ +56 38 +1.52 +0.11 −.49 −0.38 −.02 .40

~~33 Bootis x 14 34 +44~~ 57 ~~+1.00~~ √

~~α₂ Librae~~ x +1.7 ~~14.8~~ 33 +59 48 +1.72 +0.00 −.55 −0.55 +.08 .47

14.80 13.13 +1 −0550 0.467 −0.467

12.6 +2.00 +0.09 +.01 +0.10

14.9 +3.65 +0.70 −.01 +0.69

14.9 +2.29 +0.09 −.01 +0.08

76 Urs. Maj. x 12.6 36 +63 24 + 2.00 √ + 0.09 √ −.64 −.55 447

ε Urs. Maj. x 12.8 49 +56 38 + 1.52 √ + 0.11 √ −.99 −0.38 173

Gr. 2164 x 14.8 48 +59 48 + 1.72 √ + 0.00 √ −.55 .55 462

β Urs. Min. x 14.9 51 +74 40 + 3.65 √ + 0.70 √ 198

2 H. Urs. Min x 14.9 56 +66 26 + 2.29 √ + 0.09 √ −.73 −.64 464

+1′ II

12.8 +1.52 +0.11 0 = +0.38 +.05

14.8 +1.72 +0.00 +2.03 +.64

13.8 +1.62 +0.05 + .67 +.03

1871 June 3 M. $h = +.006$ $h' = +.012$ $n = -.32$ $h' = +.006$ $n = -.44$

12.93 + 1′ 0.413

ε Urs. Maj. +1.5 x 12.8 49 +56 38 +1.52 √173 + 0.22 .67 −0.45 +.01 −0.44

12 Can. Ven. +1.5 x 12.8 50 +39 0 + .81 √175 − 0.09 .36 .45 +.01 .44

20 Can. Ven. +1.1 √ 13.2 12 +41 14 + .88 √451 + 0.05 .39 .34 +.01 .33

−1.1 15.4 +59 24 + 169 +0.37 − .74 .37 −.01 .38

δ Bootis −1.9 15.2 10 +33 17 + .67 √201 − 0.10 .29 .39 −.01 .40

μ Bootis −1.0 15.3 20 +37 49 + .78 √202 0.07 .34 .41 −.01 .42

δ? Bootis −1.1 15.4 26 +41 16 + .88 √206 − 0.03 .39 .42 −.01 .43

15.32 14.30 +1′ 0.398

12.6 +2.00 +0.34 +.02 +.02 +0.36 +0.36 −0.404 −0.406

13.2 −41.42 −21.73 +.01 +.01 −21.72 −21.72

15.2 +2.45 +0.75 −.01 −.01 +0.74 +0.74

76 Urs. Maj. ? 12.6 36 +63 24 + 2.00 √ + 0.34 √ 447

α Urs. Min x 13.2 13 +88 39 + ~~40.92~~ 41.42 −21.73 99

1 H Urs. Min x 15.2 13 +67 49 + 2.45 √ + 0.75 467

√ Draconis x 15.4 22 +59 24 + 1.69 √ + 0.37 −.74 −0.37 204

+1′

12.8 +81 −0.09 12.8 +1.52 +0.22

13.2 +88 +0.05 15.4 +1.69 +0.37

15.2 +67 −0.10 14.1 +1.60 +0.30

15.3 +78 −0.07

15.4 +88 −0.03

14.4 +80 −0.05

n = −.44

0 = +1.20 +.41 n = −.34 −34 0 = −42.22 −21.67 n = −.51 −.51

+1.65 +.79 −.48 −48

= .41

0 = +.40 +.06 n = −.15 0 = −43.02 −22.02 n = −.51

+.85 +.44 −.52

sin z = +.60 +.80 | +.40 +.60 | +.20 +.40 | +0 +.20 | +0 −.20 | −.20 −.40 | −.40 −.60 | −.60 −.80

RA h	m	δ °	sin z	R_{cy} '	R_{ff} "	P'−P "	R_{cy}−R_{ff}+P'−P "		
11	43	+15	+.46	−1	58.5	+.0	58.5	+.7	57.8
11	47	+54	−.21		57.1	+.5	56.6	−.4	57.0
11	59	+9	+.54	−2	0.2	+.2	0.0	+.9	59.1
14	10	+19	+.38	−1	~~58.8~~ 59.8	−.4	~~59.2~~ 0.2	+.6	~~58.6~~ 59.6
14	12	+51							
14	21	+52	−.17	−2	0.0	+.8	59.2	−.3	59.5
14	34	+44	−.05	−1	59.1	−.3	59.4	−.1	59.5
12	9		+.02	−1	59.9	+.7	59.2	+.0	59.2

(6) 58.~~95~~ 67

−1' 58".~~68~~ .72
~~59.04~~
58.80

RA h	m	δ °	sin z	R_{cy} '	R_{ff} "	P'−P "	R_{cy}−R_{ff}+P'−P "			
14	1	+64	−.38	−1	59.6	+.6	59.0	−.6	59.6	(1) 59.60

+.46 − 58.5 | +.38 − 59.2 | +.02 − 59.2 | −.17 − 59.2 | −.21 − 56.6
+.54 0.0 | | | −.05 59.4 | −.38 59.0
+.50 − 59.2 | +.38 − 59.2 | +.02 − 59.2 | −.11 − 59.3 | −.30 − 57.8
+ 1.0 | + .8 | + .0 | − .2 | − .6
58.2 | 58.4 | 59.2 | 59.5 | 58.4
(8) 164 2 | 84 1 | 92 1 | 190 2 | 168 2 | 698
−.5 | −.3 | +.5 | +.8 | −.3

RA h	m	δ °	sin z	R_{cy} '	R_{ff} "	P'−P "	R_{cy}−R_{ff}+P'−P "		
11	39	+48							
11	47	+54	−.21	−0	44.5	+.5	44.0	−.4	44.4
14	34	+44	−.05		46.6	−.3	46.9	−.1	47.0
14	56	~~+.03~~	+.03		47.7	+.6	47.1	+0	47.1

(2) ~~47.05~~ 46.17

−0' 45".62
45.58

RA h	m	sin z	R_{cy}	R_{ff}	P'−P			
14	51	−.53	−0	44.5	+.9	43.6	−.9	44.5
14	55	−.41		44.1	−.1	44.2	−.7	44.9

(3) 44.70

+.03 − 47.1 | −.05 − 46.9 | −.21 − 44.0 | −.53 − 43.6
| | | −.41 44.2
+.03 − 47.1 | −.05 − 46.9 | −.21 − 44.0 | −.47 − 43.9
+ .0 | − .1 | − .4 | − .9
47.1 1 | 47.0 1 | 44.4 1 | 44.8 2
(5) 71 | 70 | 44 | 96 | 281
+1.5 | +1.4 | −1.2 | −.8

RA h	m	δ °	sin z	R_{cy} '	R_{ff} "	P'−P "	R_{cy}−R_{ff}+P'−P "		
11	47	+54	−.21	−0	46.5	+.5	46.0	−.4	46.4
14	34	+44							

(1) 46.40

−0' 46".40
−0 46.32

RA h	m	δ °	sin z	R_{cy}	R_{ff}	P'−P			
12	36	+63	−.36	−0	45.7	+.5	45.2	−.7	45.9
12	49	+56	−.25		48.6	+.8	45.8	−.5	46.3
14	48	+59	−.30		45.3	−.6	45.9	−.5	46.4
14	51	+74							
14	56	+66	−.41		45.8	−.1	45.9	.7	46.6

(4) 46.30

−.21 − 46.0 | −.41 − 45.9
−.36 45.2
−.25 45.8
−.30 45.9
−.28 − 45.7 | −.41 − 45.9
− .6 | − .9
46.3 4 | 46.8 1
(5) 12 | 8 | 20
−.1 | +.4

RA h	m	δ °	sin z	R_{cy} '	R_{ff} "	P'−P "	R_{cy}−R_{ff}+P'−P "		
12	49	+56	−.25	−0	19.3	+.8	18.5	−.5	19.0
12	50	+39	+.06		18.2	+.2	18.0	+.1	17.9
13	12	+41	+.02		20.4	−.4	20.8	+.0	20.8
15	10	+33	+.15		19.3	−.1	19.4	+.4	19.0
15	20	+37	+.08		19.8	+.0	19.8	+.2	19.6
15	26		+.02		19.1	−.6	19.7	+.1	19.6

(6) 19.32

−0' 19".47
19.32

RA h	m	sin z	R_{cy}	R_{ff}	P'−P			
12	36	−.36	−0	18.8	+.5	18.3	−.7	19.0
15	13	−.43		19.2	−.2	19.4	−.8	20.2
15	22	−.29		19.3	+.4	18.9	−.6	19.5

19.57

+.06 − 18.0
+.02 20.8
+.15 19.4
+.08 19.8
+.02 19.7
+.07 − 19.5
+.1
19.4 5
(9) 20
−.1

−.25 − 18.5 | −.43 − 19.4
−.36 18.3
−.29 18.9
−.30 − 18.6 | −.43 − 19.4
− .7 | − .9
19.3 3 | 20.3 1
9 | 13 | 42
−.2 | +.8

1871 June 5 R. h = +.007 (+10) ~~n = -.365~~ h' = +.010 n = -.37
h' = +.012

Star | RA | δ | tang δ | −(P' − P) Π RA | n = −.37
1320 h m ° +1'
~~α Cassiop. dc. x 0 33 +55 50 + 1.52 ✓ + 0.38 ✓~~ .56 | 0.090 −0.18]
~~72 Can. Ven. x 12 50 +39 0 + .81 ✓ + 0.39 ✓~~
26 Can. Ven. +1.4 x 13.2 12 +41 14 + .88 ✓451 + 0.24 ✓ 33 | −0.09 +.01 −0.08
δ Bootis x 15.2 10 +33 47 + .67 ✓201 + 0.21 ✓ 25 | .04 −.01 .05
μ Bootis x 15.3 19 +37 49 + .78 ✓202 + 0.19 ✓ 29 | .10 −.01 .11
15.25 14.57 | −0.070
+1'
13.2 −41.42 −16.11 +.02 −.00 −16.09 −16.11 | −0.077 −0.080
15.2 +2.45 +0.82 −.01 −.03 +0.81 +0.79

Star | RA | δ | tang δ | −(P' − P) Π RA
h m ° +1'
ε Urs. Maj. x 12.8 49 +56 38 + 1.52 ✓ + 0.38 ✓ 56 −0.18] 173
α Urs. Min. dc x 13.2 13 +88 (91) 39 (21) −41.42 ✓ −16.11 19
14 Urs. Min. x 15.2 12 +67 49 + 2.45 ✓ + 0.82 ✓ − 36.5 467
+1'
13.2 +88 +0.24 | 12.8 +1.52 +0.38
15.2 +67 +0.21
15.3 +78 +0.19
14.6 +78 +0.21
$n_5 = -.26$

0 = +1.67 +60 n = −.36 −36 | 0 = −42.20 −16.30 n = −.39 −38

0 = +0.93 +.43 n = −.44 | 0 = −42.94 −16.49 n = −.38

1871 June 6 M. h = +.009 (+40) ~~n =~~ h' = +.008 n = −.37
+1 h' = +.014 | +0.118
13.10
12 Can. Ven. 1.4 12.8 50 +39 0 + .81 ✓175 + 0.37 ✓ .30 | +0.07 +.01 +0.08
43 Comae 1.1 13.1 6 +43 (28) 21 (32) + .94 ✓177 + 0.25 ✓ .20 | .05 +.01 .06
θ Bootis 2 14.4 21 +52 26 + 1.30 ✓190 + 0.55 ✓ .48 | .07 −.00 .07
Gr. 2 Bootis 1.2 15.4 27 +41 19 + .88 ✓207 + 0.60 ✓ .33 | .27] −.01 .26
α Cor. Bor. 1.3 15.5 29 +27 8 + .51 ✓209 + 0.29 ✓ .19 | .10 −.01 .09
φ Bootis 1.4 15.6 33 +40 46 + .86 ✓469 + 0.41 ✓ .32 | .09 −.01 .08
θ Virginis 1.2 13.0 35 −4.52 −.08 ✓449 + 0.17 ✓ .03 | .20 +.01 .21
ζ Virginis 0.7 13.5 28 +0 3 + .00 ✓179 + 0.15 ✓ .00 | 0.135 .15 +.01 .16
15.22 14.16 +1'
13.2 −41.42 −15.07 +.01 +.02 −15.06 −15.05 | +0.125 +0.126
13.8 +2.18 +0.94 +.00 +.01 +0.94 +0.95
14.5 +1.79 +1.36 −.01 −.00 +1.35 +1.36

+2'
~~θ Virginis x 13 3 −4 52 +0.17 ✓~~ ~~19~~
α Urs. Min. dc x 13.2 13 +88 (91) 39 (21) −41.42 ✓ −15.22 (07) 19
10 Draconis x 13.8 48 +65 20 + 2.17 (8) ✓ + 0.94 ✓ 456
Gr. 2125 x 14.5 28 +60 47 + 1.79 ✓ + 1.36 ✓ 460
+1'
13.1 +54 +0.25 | 12.8 +81 +0.37
13.5 +00 +0.15 | 14.4 +1.30 +0.55
13.6 −08 +0.17 | 15.6 +.86 +0.41
15.5 +51 +0.29 | 14.3 +.99 +0.44
13.9 +24 +0.22
$n_5 = -.29$

0 = +1.94 +.72 n = −.37 | 0 = −41.66 −15.28 n = −.37
+1.55 +1.13 −.73]

0 = +1.19 +.51 n = −.43] | 0 = −42.41 −15.49 n = −.37
+.80 +.92 −1.15]

1871 June 12 R. h = +.008 (−22) +1 ~~n =~~ h' = −.024 n = −.42
h' = +.011
13.58 +28 32 .54 ✓177
~~43 Com. Ber. 13.1 6 +43 21 + .94 177 1.31 .23~~ | 1.252 −.03 ~~+1.31~~
ζ Urs. Maj. pr. 13.3 19 +55 35 + 1.46 ✓178 + 1.95 ✓ .61 | +1.34 −.03 .32
17 H Can. Ven. 13.5 29 +37 49 + .78 ✓454 + 1.70 ✓ .33 | .37 −.02 .35
η Urs. Maj. 13.7 43 +49 56 + 1.19 ✓181 + 1.85 ✓ .50 | .35 −.02 .33
α Cor. Bor. 15.5 29 +27 8 + .51 ✓209 + 1.54 ✓ .21 | .33 +.03 .36
φ Bootis 15.6 33 +40 46 + .86 ✓469 + 1.67 ✓ .36 | .31 +.03 .34
γ Cor. Bor. 15.6 35 +37 3 + .76 ✓210 + 1.60 ✓ .32 | .28 +.03 .31
ζ Cor. Bor. 15.6 37 +26 42 + .50 ✓211 + 1.51 ✓ .21 | .30 +.03 .33
θ Bootis 14.4 21 +52 26 + 1.30 ✓190 + 1.88 ✓ .35 | 1.310 .33 +.00 .33
15.34 14.51 +1' | +1.329 +1.331
13.2 −41.41 −15.98 +.03 +.01 −15.95 −15.97

Le +2'
α Urs. Min. x 13.2 13 +88 (91) 39 (21) −41.41 ✓ −15.98 19
69 H Urs. Maj. x 13.4 24 +60 35 + 1.78 ✓ + 2.10 ✓ −.75 + 1.35 453
Gr. 2125 x 14.5 28 +60 47 + 1.79 ✓ + 2.71 ✓ −.75 1.96] 460
+1'
[13.1 +.54 −1.31] | 13.3 +1.46 +1.95
15.5 +.51 +1.54 | 13.4 +1.78 +2.10
15.6 +.76 +1.60 | 13.7 +1.19 +1.85
15.6 +.50 +1.51 | 14.4 +1.30 +1.88
15.6 +.59 +1.58 | [14.5 +1.79 +2.71]
13.7 ~~+1.52~~ +1.43 ~~+2.10~~ +1.94

0 = −42.00 −17.53 n = −.42

0 = −42.84 −17.91 n = −.42

1871 June 14 M. h = +.006 (+13) ~~n =~~ h' = +.018 n = −.36
+1 h' = +.008
17 H Can. Ven. 13.5 29 +37 49 + .78 ✓454 + 2.15 ✓ .28 | 1.790 +1.81 +.02 +1.83
η Urs. Maj. 13.7 43 +49 56 + 1.19 ✓181 + 2.11 ✓ .437 | .87 +.02 .89
d Bootis 3 14.1 5 +25 41 + .48 ✓458 + 2.01 ✓ .18 | .68 +.01 .69
τ Herculis 16.3 16 +46 37 + 1.06 ✓224 + 2.24 ✓ .38 | .83 +.01 .84
φ Herculis 16.1 5 +45 16 + 1.01 ✓221 + 2.24 −.07 .36 | .86 −.03 .83
τ Virginis 13.9 55 +2 9 + .04 ✓183 + 1.85 ✓ .01 | .81 −.03 .78
α Bootis 2 14.2 10 +19 50 + .36 ✓187 + 1.84 ✓ .13 | .84 +.01 .85
16.20 14.39 +1' | .71 +.00 .71
13.2 −41.41 −14.73 +.01 +.02 −14.72 −14.71 | 1.835 +1.801 +1.802
14.0 +2.14 +2.51 −.00 +.01 +2.51 +2.52

+1'
α Urs. Min. S.C. x 13 13 +88 39 (37) −41.41 ✓ −14.76 ✓ 19
ζ Urs. Maj. pr. x 13.3 19 +55 35 + 1.46 ✓ + 2.34 ✓ −.53 + 1.81 178
α Draco. x 14.0 1 +64 58 + 2.14 ✓ + 2.51 ✓ 184
Gr 2320 x 16.1 5
13.5 +78 +2.15 | 13.3 +1.46 +2.34
13.9 +04 +1.85 | 16.1 +1.01 +2.17
14.1 +49 +2.01 | 16.3 +1.06 +2.24
14.2 +36 +1.84 | 15.2 +1.18 +2.25
13.9 +42 +1.96
$n_5 = -.36$

0 = +1.72 +55 n = −.32 | 0 = −41.83 −16.68 n = −.40 −.40

0 = +.96 +27 n = −.28] | 0 = −42.59 −16.96 n = −.40

sin z = +.60 +.80 | +.40 +.60 | +.20 +.40 | +0 +.20 | +0 −.20 | −.20 −.40 | −.40 −.60 | −.60 −.80

RA h	m	δ °	sin z	R_eq − R_pl '	"		θ'θ "		R_eq − R_pl + ρ'−ρ "
0	33	+55							
12	50	+39							
13	12		+.02	−0	24.7	−.4	25.1	+0	25.1
~~15~~	~~10~~								
15	19		+.08		25.9	+.0	25.9	+.2	25.7
								(2)	25.10

−0' 25.13"
25.10

RA h	m	δ °	sin z	R_eq − R_pl '	"		θ'θ "		R_eq − R_pl + ρ'−ρ "
12	49	+56	−.25	−0	~~24.7~~ 21.3	+.8	−.~~2~~0.5	−.5	21.0
13	13	+88							
15	12	~~−47~~	−43		23.5	+.2	23.7	−.8	24.5
								(1)	24.50

+02 − 25.1
+.08 25.9
+.05 − 25.5
+ .1
25.4 2
(3) 10.8
+.3

−.43 − 23.7
−.43 − 23.7
− .9
24.6 1
46
−.5
154

RA h	m	δ °	sin z	R_eq − R_pl '	"		θ'θ "		R_eq − R_pl + ρ'−ρ "
12	50	+39		−0					
13	6	+43	+.24		27.7	−.6	28.3	+.5	[27.8]
14	21	+52	−.17		26.7	+.8	25.9	−.3	26.2
15	27	+41							
15	29	+27	+.26		25.5	−.5	26.0	+.5	25.5
15	33	+40	+.03		25.6	−1.0	2~~7~~6.6	+.1	26.5
13	3		+.73		27.2	+.9	26.3	+1.3	25.0
13	28		+.67		25.3	+.0	25.3	+1.1	24.2
								(6)	25.~~27~~ .48

+.73 − 26.3
+.67 25.3
+.70 − 25.8
+ 1.3
24.5 2
(8) 9.0 2
−.6

−0' 25.12"
~~25.80~~
24.74

RA h	m	δ °	sin z	R_eq − R_pl '	"		θ'θ "		R_eq − R_pl + ρ'−ρ "
~~13~~	~~3~~	~~−4~~							
13	13	+88							
13	48		−.39	−0	23.6	+.6	23.0	−.7	23.7
14	28	+60	−.32		24.3	+2.8	21.5	−.6	~~22.1~~
								1	22.50

+.24 − 28.3 +.03 − 26.6 −.17 − 25.9 −.39 − 23.0
+.26 26.0 −.32 21.5
+.25 − 27.2 +.03 − 26.6 −.17 − 25.9 −.36 − 22.2
+ .6 + .1 − .4 − .8
26.6 2 26.5 1 26.3 1 23.0 2
13.2 6.5 6.3 6.0
+1.5 +1.4 +1.2 −2.1
410

RA h	m	δ °	sin z	R_eq − R_pl '	"		θ'θ "		R_eq − R_pl + ρ'−ρ "
13	6	+43	+.24	−1	35.0	−.6	35.6	+.5	(35.1)
13	19	+55	−.23	~~−2~~	40.3 ~~41.8~~	+1.2	39.1	−.5	39.6
13	29	+37	+.08	−1	39.8	+.6	39.2	+.2	39.0
13	43	+49	−.13	−1	40.3	+.3	40.0	−.2	40.2
15	29	+27	+.26		40.0	−.5	40.5	+.5	40.0
15	33	+40	+.03		39.7	−1.0	40.7	+.1	40.6
15	35	+37	+.09		38.9	+.3	38.6	+.2	38.4
15	37	+26	+.27		40.6	−.1	40.7	+.5	40.2
14	21	+52	−.17		40.7	+.8	39.9	−.3	40.2
								(8)	39.78

−1' 39.94"
39.94

RA h	m	δ °	sin z	R_eq − R_pl '	"		θ'θ "		R_eq − R_pl + ρ'−ρ "
13	13	+88							
13	24	+60	−.31	−1	8.8	+1.6	(7.2)	−.6	
14	28	+60	−.32	−1	43.4	+2.8	40.6	−.6	41.2
								(1)	41.20

[+.24] − [35.6] +.08 − 39.2 −.13 − 40.0 −.23 − 39.1
+.26 40.5 +.03 40.7 −.17 39.9 −.32 40.6
+.27 40.7 +.09 38.6
+.26 − 40.6 +.07 − 39.5 −.15 − 40.0 −.28 − 39.8
+ .6 + .2 − .4 − .6
40.0 2 39.3 3 40.4 2 40.4 2
(9) 80.0 117.9 80.8 80.8 3595
+.1 −.6 +.5 +.5

RA h	m	δ °	sin z	R_eq − R_pl '	"		θ'θ "		R_eq − R_pl + ρ'−ρ "
13	29	+37	+.08	−1	42.6	+.6	42.0	+.2	41.8
13	43	+49	−.13		41.4	+.3	41.1	−.2	41.3
14	5	+25	+.29		41.8	+.3	41.5	+.6	40.9
16	16	+46	−.07		41.9	+.5	41.4	−.1	41.5
16	5	+45	−.05		42.8	+.1	42.7	−.1	42.8
13	55		+.65		40.9	+.4	40.5	+1.1	39.4
14	10		+.38		40.2	−.4	40.6	+.7	39.9
								(9)	41.09

+.65 − 40.5
+.65 − 40.5
+ 1.3
39.2 1
(9) 39.2
−1.8

−1' 41.03"
41.16

RA h	m	δ °	sin z	R_eq − R_pl '	"		θ'θ "		R_eq − R_pl + ρ'−ρ "
13	13	+88		−0					
13	19	+55	−.23	−~~0~~ 1	42.5	+1.2	41.3	−.5	41.8
14	1	+64	−.38	1	40.1	+.7	39.4	−.6	40.0
								(2)	41.40

+.29 − 41.5 +.08 − 42.0 −.13 − 41.1 −.23 − 41.3
+.38 40.6 −.07 41.4 −.38 39.4
−.05 42.7 2
+.34 − 41.0 +.08 − 42.0 −.08 − 41.7 −.30 − 40.4
+ .4 + .2 − .2 − .6
40.3 2 41.8 1 41.9 3 41.0 2
80.6 41.8 125.7 82.0 3693
−.7 +.8 +.9 +.0

1870phae.proj..4220

1871 June 17 R. $h = +.007$ $n = -.455$ $h' = -.003$ $h' = +.008$

Star	RA	δ	tang δ	π Ra $-(\rho' - \rho)$		n = -.47	
	h m	° ′			″	2.128	
17 Can. Ven. x	13.5 29	+37 49 +	.78 ✓454	+ 2.65 ✓	.37	+2.28 .00	+ 2.28
η Bootis	13.8 48	+19 2 +	.34 ✓182	+ 2.33 ✓	.16	.17 .00	2.17
τ Herculis	16.3 16	+46 37 +	1.06 ✓224	+ 2.62 ✓	.50	.12 +01	2.13
η Urs. Maj. x	13.7 43	+49 56 +	1.19 ✓181	+ 2.55 ✓	.56	1.99 .00	1.99
d Bootis x	14.1 5	+25 41 +	.48 ✓458	+ 2.34 ✓	.22	2.12 .00	2.12
α Bootis x	14.2 10	+19 50 +	.36 ✓187	+ 2.25 ✓	.17	.08 .00	2.08

16.30 1427 +1′ 2.120

13.2 −41.41 −17.07 +.01 +.01 −17.06 −17.06 + 2.127 +2.128

14.0 +2.14 + 3.14 +.00 +.01 + 3.14 + 3.15 .098

Star	RA	δ	tang δ	π Ra $-(\rho' - \rho)$	
	h m	91° 21′			
α Urs. Min. x	13.2 13	+ ~~88~~ 39	−41.41 ✓	−17.07	19
α Draconis x	14.0 0	+ 64 58 +	2.14 ✓	+ 3.14 ✓	184
Gr 2320 x	16.1 5				

+1′

13.8 +34 +2.33 13.7 +1.19 +2.55

14.1 +49 +2.34 16.3 +1.06 +2.62

14.2 +36 +2.25 15.0 +1.12 +2.58

14.0 +40 +2.31 $n_5 = -.38$

0 = +2.74 +83 n = −.48 0 = −41.81 −19.37 n = −.46 −46

0 = ~~+1.02~~ .92 +57 n = −.62 0 = −42.53 −19.64 n = −.46

1871 June 19 R. $h = +.004$ $h' = +.007$ n = −.35 $+1'$ $h' = +.004$

Star	RA	δ	tang δ	π Ra $-(\rho' - \rho)$		2.510	
d Bootis x	14.1 5	+25 41 +	.49 ✓458	+ 2.68 ✓	.17	+2.51 +01	+2.52
14 Bootis x	~~14.1~~ 7						
BAC 4797	~~14.4~~ 22						
50 Bootis	14.4 26	+30 55 +	.60 ✓192	+ 2.74 ✓	.21	.53 +00	.53
β Herculis	16.4 25	+21 46 +	.40 ✓228	+ 2.67 ✓	.14	.53 −.01	.52
σ Herculis	16.5 30	+42 42 +	.92 ✓230	+ 2.82 ✓	.32	.50 −.01	.49
ϑ Bootis	14.4 21	+52 26 +	1.30 ✓190	+ 2.95 ✓	.45	.50 +00	.50
α Bootis	14.2 10	+19 50 +	.36 ✓187	+ 2.61 ✓	.13	.48 +01	.49
π Bootis	14.6 34	+16 57 +	.30 ✓194	+ 2.66 ✓	.11	.55 +00	.55

1645 .94 1460 +1′ 2.525 + 2.514 +2.514

13.2 −41.41 −15.10 +.01 +.01 −15.09 −15.09

14.0 +2.14 + 3.31 +.00 +.01 + 3.31 + 3.32

14.9 +3.65 +3.67 +.00 −.00 + 3.67 + 3.67

16.5 +2.61 +3.36 −.01 −.00 + 3.35 + 3.36

Star	RA	δ	tang δ	π Ra $-(\rho' - \rho)$	
α Draconis x	14.0 01	+64 58 +	2.14 ✓	+ 3.31 ✓	184
β Urs. Min. x	14.9 51	+74 40 +	3.65 ✓	+ 3.67 ✓	198
A Draconis x	16.5 28	+69 2 +	2.61 ✓	+ 3.36 ✓	229
α Urs. Min. L.C. x	13.2 13	+ ~~88~~ 91 ~~39~~ 21	−41.41 ✓	− ~~13.58~~ −15.10 ✓	19

+1′

14.1 +49 +2.68 14.4 +1.30 +2.95

14.2 +36 +2.61 16.5 +.92 +2.82

14.4 +60 +2.74 15.4 +1.11 +2.88

14.6 +31 +2.66

16.4 +40 +2.67

14.7 +43 +2.67 $n_5 = -.31$

0 = + ~~2.88~~ 1.71 + ~~.54~~ .64 n = −.37 −37 0 = −41.84 −17.76 n = −.42 −42

+3.24 +1.00 −.31 −31

+ ~~2.93~~ 2.18 +.68 −.31 −37 33

0 = +1.03 +.44 n = −.43 0 = −42.52 −17.97 n = −.42

+2.54 +.79 −.31

+1.50 +.48 −.32 −.32

1871 June 21 M. $h = +.002$ −40 $h' = -.033$ n = −.40 $+1'$ $h' = +.002$

Star	RA	δ	tang δ	π Ra $-(\rho' - \rho)$		2.530	
η Urs. Maj. x	13.7 43	+49 56 +	1.19 ✓181	+ 3.03 ✓	.48	+2.55 −.03	+2.52
ϑ Bootis x	14.4 21	+52 26 +	1.30 ✓190	+ 3.03 ✓	.52	.51 −.01	.50
BAC 4797 ⓧ	~~14.4~~ 22						
ϱ Bootis x	14.4 26	+30 55 +	.60 ✓192	+ 2.74 ✓	.24	.50 −.01	.49
ε Herculis x	16.6 37	+31 50 +	.62 ✓231	+ 2.72 ✓	.25	.47 +.07	.54
η Herculis x	16.6 39	+39 10 +	.82 ✓232	+ 2.75 ✓	.33	.42 +.07	.49
η Bootis	13.8 48	+19 2 +	.34 ✓ 182	+ 2.61 ✓	.14	.47 −.03	.44
τ Virginis	13.9 55	+2 9 +	.04 ✓ 183	+ 2.64 ✓	.02	.62 −.02	.60
d Bootis	14.1 4	+25 41 +	.48 ✓458	+ 2.76 ✓	.20	.56 −.02	.54
α Bootis	14.2 10	+19 50 +	.36 ✓187	+ 2.63 ✓	.14	.49 −01	.48
π Bootis pr.	14.6 34	+16 57 +	.30 ✓194	+ 2.69 ✓	.12	.57 +00	.57

1660 14.63 2.450 +2.516 +2.517

13.2 −41.41 −7.74 +.00 +.00 −7.74 −7.74

13.9 −3.04 +1.03 +.00 .00 +1.03 +1.03

14.0 +2.14 +3.39 +.00 .00 +3.39 +3.39

14.3 −2.33 +1.20 +.00 .00 +1.20 +1.20

16.5 +2.61 +3.38 −.00 +.00 +3.38 +3.38

Star	RA	δ	tang δ	π Ra $-(\rho' - \rho)$	
		91 21		7.74	
α Urs. Min. L.C.	13.2 13	+ ~~88~~ ~~39~~	−41.41 ✓	− ~~16.62~~ ✓	19
α Draconis x	14.0 1	+64 58 +	2.14 ✓	+ 3.39 ✓	184
A Draconis x	16.5 28	+69 2 +	2.60 ✓	+ 3.38 ✓	229
50 Cass. S.P. ✓	1.9 52	~~+108~~ 71 ~~11~~ 48 −	3.04 ✓	+ 1.03 ✓	31
ι Cass. S.C. ✓	2.3 18	~~+113~~ 66 ~~10~~ 49 −	2.33 ✓	+ 1.20 ✓	36

13.8 +34 +2.61 13.7 +1.19 +3.03

13.9 +04 +2.64 14.4 +1.30 +3.03 $n_5 = -.39$

14.1 +49 +2.76 14.0 +1.24 +3.03 I

14.2 +36 +2.63 I 0 = −41.82 −10.42 n = −.25 −25

14.4 +60 +2.74 0 = +1.75 +.71 n = −.41 −41 −3.43 −1.65 −.48 −48

14.6 +31 +2.69 2.22 +.70 −.32 −32 −2.72 −1.48 −.54 −52 −.50

16.6 +62 +2.72 II II .38

14.5 +39 +2.71 II 0 = −42.65 −10.77 n = −.25

2.68 0 = +.90 +.36 n = −.40 −4.28 −2.00 −.47

+1.37 +.35 −.26 −3.57 −1.83 −.51 .41

1871 June 25 R. $h = +.003$ $h' = -.020$ n = −.43 $+1'$ $h' = +.002$

Star	RA	δ	tang δ	π Ra $-(\rho' - \rho)$		2.842	
ϑ Bootis x	14.4 21	+52 26 +	1.30 ✓190	+ 3.31 ✓	.56	+ 2.75 −.01	+2.74
ϱ Bootis x	14.4 27	+38 51 +	.80 ✓193	+ 3.15 ✓	.35	.80 −.01	.79
ε Herculis x	16.6 37	+31 50 +	.62 ✓231	+ 3.07 ✓	.27	.80 +.04	.84
η Herculis x	16.6 39	+39 10 +	.82 ✓232	+ 3.14 ✓	.35	.79 +04	.83
η Bootis	13.8 48	+19 2 +	.34 ✓182	+ 3.06 ✓	.15	.91 −.02	.89
τ Virginis	13.9 55	+2 9 +	.04 ✓183	+ 2.86 ✓	.02	.84 −.02	.82
d Bootis	14.1 4	+25 41 +	.48 ✓458	+ 3.07 ✓	.21	.86 −.01	.85
α Bootis	14.2 10	+19 50 +	.36 ✓187	+ 2.98 ✓	.15	.83 −.01	.82
ϱ Bootis	14.4 26	+30 55 +	.60 ✓192	+ 3.13 ✓	.26	.87 −.01	.86
π Bootis pr.	14.6 34	+16 57 +	.30 ✓194	+ 3.08 ✓	.13	.87 +00	.87
109 Virginis	14.6 39	+2 25 +	.04 ✓197	+ 2.87 ✓	.02	.85 +00	.85
~~ξ Bootis~~							

1660 1469 2.795 +2.834 +2.833

+1′

13.2 −41.41 −15.89 +.00 +.00 −15.89 −15.89

13.9 −3.04 + 1.29 + 1.29 + 1.29

14.0 +2.14 + 3.67 + 3.67 + 3.67

14.3 −2.83 + 1.01 + 1.01 + 1.01

14.9 +3.66 +4.33 +.00 +.00 + 4.33 + 4.33

Star	RA	δ	tang δ	π Ra $-(\rho' - \rho)$	
		91 21		15.89	
α Urs. Min. L.C.	13.2 13	+ ~~88~~ ~~39~~	−41.41 ✓	− ~~13.86~~ ✓	19
α Draconis x	14.0 1	+64 58 +	2.14 ✓	+ 3.67 ✓	184
50 Cass. S.C. ✓	1.9 52	+108 11 −	3.04 ✓	+ 1.29 ✓	31
ι Cass. S.C. ✓	2.3 18	+113 10 −	2.33 ✓	+ 1.01 ✓	36
β Urs. Min. ✓	14.9 51	+74 40 +	3.65 ✓	+ 4.33 ✓	198

+1′

13.8 +34 +3.06 14.4 +1.30 +3.31 I $n_5 = -.33$

13.9 +04 +2.86 I 0 = −41.76 −18.89 n = −.45 −45

14.1 +49 +3.07 0 = +1.79 +.67 n = −.37 −37 −3.39 −1.71 −.50 −.48

14.2 +36 +2.98 +3.31 +1.33 −.40 −41 −2.68 −1.99 −.74 −.46

14.4 +60 +3.13 II 39

14.6 +.31 +3.00 II 0 = −42.71 −19.20 n = −.45

14.6 +.04 +2.87 0 = +.84 +.36 n = −.48 −4.34 −2.02 −.47 .46

16.6 +62 +3.07 +2.36 +1.02 −.43 −3.63 −2.30 −.63

14.5 +35 +3.00

sin z = +.60 +.80 +.40 +.60 +.20 +.40 +0 +.20 +0 −.20 −.20 −.40 −.40 −.60 −.60 −.80

Ra δ sin z Rg − Rfl ρ′−ρ Rg−Rfl + ρ′−ρ

h m ° ′ ″ ″ ″

13 29 +37 −1 4

13 48 +19 +.40 40.9 +.1 40.8 +7 40.1

16 16 +46 −.07 39.6 +.5 39.1 −1 39.2

13 43 +49

14 5 +25 +.29 38.7 +.3 38.4 +.6 37.8

14 10 +19 +.38 38.6 −.4 39.0 +.7 38.3

(4) 38.85

−1′ 38.88″

38.92

Ra δ sin z Rg − Rfl ρ′−ρ Rg−Rfl + ρ′−ρ

h m ° −1′ ″ ″ ″

13 13 +88

14 0 +64 −.38 39.2 +.7 38.5 −7 39.2

(1) 39.24

+.40 − 40.8
+.29 38.4
+.38 39.0
+.36 − 39.4
+ .8
38.6 3
(5) 258
− .3

−.07 − 39.1 −.38 − 38.5
−.07 − 39.1 −.38 − 38.5
− .2 − .8
39.3 1 39.3 1
93 93 444
+.4 +.4

14 5 +25 +.29 +1 0.8 +.3 1.1 +6 1.7

14 26 +.20 2.0 −.7 1.3 +.5 1.8

16 25 +21 +.35 2.3 −.12 1.2 +.6 1.7

16 30 +42 −.01 1.4 −.1 1.3 −0 1.3

14 21 +52 −.17 1.8 +.8 2.6 −.4 2.2

14 10 +.38 3.6 −.4 3.2 +.6 3.8

14 34 +.43 0.9 +.1 1.0 +.7 1.7

(7) 2.03

+1′ 2.07″

2.06

14 01 +64 −.38 +1 1.5 +.7 2.2 −.7 1.5

14 51 +74 −.53 2.9 +.9 3.8 −.9 2.9

16 28 +69 −.45 2.2 +.6 2.8 −.8 2.0

13 13 +88

(3) 2.13

+.43 +1.0 +.29 + 1.1 −.01 +1.3 −.38 + 2.2 −.53 +3.8
+.20 1.3 −.17 2.6 −.45 2.8
+.35 1.1
+.38 3.2

+.43 +1.0 +.30 + 1.7 −.09 + 2.0 −.38 +2.2 −.49 +3.3
+ .9 + .6 − .2 − .8 − 1.0
1.9 1 2.3 4 1.8 2 1.4 1 2.3 2
(10) 19 92 36 14 46 207
+.2 −.2 +3 +.7 −.2

13 43 +49 ~~−.13~~ +0

14 21 +52 −.17 48.6 +.8 49.4 −.3 49.1

14 26 +30 +.20 49.6 −.7 48.9 +.5 49.4

16 37 +31 +.18 50.7 −.1 50.6 +.5 51.1

16 39 +39 +.06 49.6 +.3 49.9 +.2 50.1

13 48 +19 +.40 48.7 +.1 48.8 +.7 49.5 +.65 +49.2 +.43 +48.8 +.20 +48.9 +.18 +50.6 −.17 +49.4 −.38 +50.4 −.45 +51.0

13 55 +.65 48.8 +.4 49.2 +1.1 50.3 +.40 48.8 +.06 49.9

14 4 +.29 48.0 +.3 48.3 +.6 48.9 +.29 48.3

14 10 +.38 50.2 −.4 49.8 +.7 50.5 +.38 49.8

14 34 +.43 48.7 +.1 48.8 +.8 49.6 +.65 +49.2 +.43 +48.8 +.32 +48.9 +.12 +50.2 −.17 +49.4 −.38 +50.4 −.45 +51.0

(9) 49.84 + 13 + .9 + .7 + .3 − .4 − .8 − .9

505 1 49.7 1 49.6 4 50.5 2 49.0 1 49.6 1 50.1 1

+0′ 49.85″ (11) 15 7 24 30 0 6 11 93

49.86 −7 +.1 +.2 −.7 +.8 +2 −.3

13 13 +88 +0

14 1 +64 −.38 49.7 +.7 50.4 −.7 49.7

16 28 +69 −.45 50.4 +.6 51.0 −.8 50.2

1 52 −.91

2 18 −.94

(2) 49.95

14 21 +52 −.17 +0 49.9 +.8 50.7 −3 50.4

14 27 +38 +.06 48.1 +.3 48.4 +.1 48.5

16 37 +31 +.18 50.0 −.1 49.9 +.4 50.3

16 39 +39 +.06 48.0 +.3 48.3 +.1 48.4

13 48 +.40 49.2 +.1 49.3 +.7 50.0

13 55 +.65 48.5 +.4 48.9 +1.1 50.0

14 4 +.29 50.1 +.3 50.4 +.6 51.0 +.65 +48.9 +.40 +49.3 +.29 +50.4 +.06 +48.4 −.17 +50.7 −.38 +50.4 −.53 +51.2

14 10 +.38 50.7 −.4 50.3 +.6 50.9 +.64 51.0 +.43 47.9 +.38 50.3 +.18 49.9

~~14 26~~ ~~+.20~~ ~~42.8~~ ~~−.7~~ ~~42.1~~ +.06 48.3

14 34 +.43 47.8 +.1 47.9 +.8 48.7 +.64 +50.0 +.42 +48.6 +.34 +50.4 +.10 +48.9 −.17 +50.7 −.38 +50.4 −.53 +51.2

14 39 +.64 50.9 +.1 51.0 +1.1 52.1 + 1.3 + .9 + .7 + .2 − .4 − .8 − 1.1

(10) 50.02 51.3 2 49.5 2 51.1 2 49.1 3 50.3 1 49.6 1 50.1

+0′ 50.09″ (12) 1026 990 1022 1473 503 496 501 6011

50.03 − 1.2 − 6 − 1.0 + 1.0 − 2 +.5 +.0

(13 13 +88 +0; 14 1 +64 −.38 49.7 +.7 50.4 −.6 49.8; 1 52 −.91; 2 18 −.94; 14 51 −.53 50.3 +.9 51.2 −9 50.3)

(2) 50.05

1871 June 26 M. $h = \overset{-27}{+.023}$ ~~n =~~ $h' = -.022$ n = −.41
$h' = +.001$

Star	RA	δ	tang δ	π RA −(P′−P)		2.921	
	14.43 h m	° ' +1'					
η Urs. Maj.	13.7 43	+49 56	+1.19 ✓181	+ 3.37	.49	+2.88 +.03	+2.85
ρ Bootis	14.4 26	+30 55	+.60 ✓192	+ 3.14	.25	.89 −.02	.87
β Bootis	14.9 57	+40 53	+.87 ✓199	+ 3.29	.36	.93 +.00	.93
σ Herculis	16.5 30	+42 42	+.92 ✓230	+ 3.30	.38	.92 +.03	.95
υ Herculis	16.6 37	+31 50	+.62 ✓231	+ 3.08	.25	.83 +.03	.86
η Herculis	16.6 39	+39 10	+.82 ✓232	+ 3.21	.34	.87 +.03	.90
η Bootis	13.8 48	+19 2	+.34 ✓182	+ 3.00	.14	.86 −.03	.83
ξ Bootis med.	14.6 35	+14 16	+.25 ✓195	+ 3.05	.10	.95 −.01	.94
109 Virginis	14.7 40	+2 25	+.04 ✓197	+ 2.98	.00	.98 −.01	.97
ξ Bootis seq.	~~14.8~~ 15	+20					
ψ Bootis	1657 14.9 59	+27 26	+.52 ✓465	+ 3.17	.21	.96 00	.96

13.2 −41.41 −14.99 +.00 +.00 −14.99 −14.99 2.873
14.0 +2.14 + 3.75 + 3.75 + 3.75 15.07 +2.907 +2.906
14.9 +3.66 + 4.35 + 4.35 + 4.35
16.5 +2.61 + 4.04 +.00 +.00 + 4.04 + 4.04

Star	RA	δ	tang δ	π RA −(P′−P)	
		91 +1' 24		14.99	
α Urs. Min. LC ×	13.2 13	+~~88~~ ~~34~~	−41.41 ✓	−~~13.76~~ ✓	19
α Dracon. ×	14.0 1	+64 58	+2.14 ✓	+ 3.75 ✓	184
Groom. 2164 ×	14.8 48	+59 48	+1.72 ✓	+ 3.80 ✓ −.40 +3.10	462
A Draconis ×	16.5 28	+69 2	+2.61 ✓	+ 4.04 ✓	229
β Urs. Min. ✓	14.9 51	+74 40	+3.65 ✓	+ 4.35 ✓	198
		+1'			

13.8 +34 +3.00 13.7 +1.19 +3.37 0 = +1.78 +.67 n = −.39 0 = −41.83 −18.07 n = −.43 −.43
14.6 +.25 +3.05 14.4 +.60 +3.14 +3.24 +1.27 −.39 39 38
14.7 +00 +2.98 14.8 +1.72 +3.80 +2.19 +.96 −.44 44 −.40
14.9 +52 +3.17 14.9 +.87 +3.29
16.6 +62 +3.08 16.5 +.92 +3.30
16.6 +82 +3.21 14.9 +1.06 +3.38 0 = +1.08 +.37 n = −.34 0 = −42.47 −18.37 n = −.43
15.2 +42 +3.08 $n_5 = -.45$ +2.60 +.97 −.37
+1.55 +.66 −.43 −.38

1871 June 27 R. $h = +.007$ ~~n = −.39~~ $L' = +.003$ n = −.45
+1 $h' = +.005$ 2.983

Star	RA	δ	tang δ	π RA −(P′−P)			
	14.40						
η Urs. Maj.	13.7 43	+49 56	+1.19 ✓181	+ 3.53	.54	2.99	00
α Bootis	14.2 10	+19 50	+.36 ✓187	+ 3.13	.15	2.98	
ι Bootis	14.2 12	+51 57	+1.28 ✓189	+ 3.52	.58	2.94	
υ Herculis	16.6 37	+31 50	+.62 ✓231	+ 3.29	.28	3.01	
η Herculis	16.6 39	+39 10	+.82 ✓232	+ 3.34	.37	2.97	
τ Virginis	13.9 55	+2 10	+.04 ✓183	+ 3.05	.02	3.03	
θ Bootis	14.3 20	+52 26	+1.30 ✓190	+ 3.55	.58	2.97	
δ Bootis	14.4 27	+38 51	+.80 ✓193	+ 3.34	.36	2.98	
π Bootis	14.6 34	+16 57	+.31 ✓194	+ 3.16	.14	3.02	
Gr. 2164	14.8 48	+59 48	+1.72 ✓462	+ 3.70	.77	2.93	
β Bootis	14.9 57	+40 53	+.87 ✓199	+ 3.38	.39	2.99	
ψ Bootis	~~14.~~ 59	+27 26	+.52 ✓465	+ 3.23	.23	3.00	00

1660 15.0 14.77 +1' 2.990 +2.984 +2.984
13.2 −41.41 −14.23 +.01 +.00 −14.23 −14.23
13.9 −3.04 +1.71 +.00 .00 + 1.71 + 1.71
14.0 +2.14 +3.97 +.00 .00 + 3.97 + 3.97
14.3 −2.33 +1.74 +.00 .00 + 1.74 + 1.74
14.9 +3.66 +4.59 −.00 +.00 + 4.59 + 4.59

Star	RA	δ	tang δ	π RA −(P′−P)	
		91 +1' 21		14.23	
α Urs. Min. LC	13.2 13	+~~88~~ 39	−41.41 ✓	−~~16.36~~ ✓	19
α Draconis ×	14.0 1	+64 58	+ 2.14 ✓	+ 3.97 ✓	184
50 Cas. LC. ×	1.9 53	+71 48	+ 3.04 ✓	+ 1.71 ✓	31
ι Cass. L.C. ✓	2.3 18	+66 49	+ 2.33 ✓	+ 1.74 ✓	36
β Urs. Min. ✓	14.9 51	+74 41	+ 3.66 ✓	+ 4.59 ✓	198
~~Gr. 2164~~	~~14.8 48~~	~~+59 48~~	~~+1.72 ✓~~	~~+ 3.70 ✓~~	

13.9 +04 +3.05 13.7 +1.19 +3.53
14.2 +.36 +3.13 14.2 +1.28 +3.52
14.4 +.81 +3.34 14.3 +1.30 +3.55
14.6 +31 +3.16 14.8 +1.72 +3.70
16.6 +62 +3.29 14.2 +1.37 +3.58
14.7 +43 +3.19 $n_5 = -.42$

I
0 = +1.71 +.78 n = −.46 −.46
+3.23 +1.40 −.43 −.43
−.45

I
0 = −41.84 −17.41 n = −.42 −.42
−3.47 −1.48 −.43 −.42
−2.76 −1.45 −.52 −.51
−.45

II
0 = +.77 +.39 n = −.51
+2.29 +1.01 −.44

III
0 = −42.78 −17.81 n = −.42
−4.41 −1.87 −.42
−3.70 −1.84 −.50
−.45

The data for the following ten pages (included between the Red lines) were omitted in their proper places.

1871 May 9 $h = +.005$ ~~n =~~ $h' = +.001$ n = −.10
$h' = +.017$ 3.050

Star	RA	δ	tang δ	π RA −(P′−P)			
	12.80						
ε Urs. Maj.	12.8 48	+56 38	+1.52 ✓173	− 2.89	15	3.04	00
12 Can. Ven.	12.8 50	+39 0	+.81 ✓175	− 2.98	08	3.06	
ε Virginis	12.9 55	+11 38	+.21 ✓176	− 2.95	02	2.97	
θ Virginis	13.0 3	−4 52	−.08 ✓449	− 2.99	01	3.00	
43 Comae	13.1 5	+28 32	+.54 ✓177	− 2.97	05	3.02	
ζ Virginis	13.5 28	+0 3	+.00 ✓179	− 2.95	00	2.95	
η Urs. Maj.	13.7 42	+49 56	+1.19 ✓181	− 2.95	.12	3.07	00

13.24 +1' 3.002
13.11 −3.016 −3.016
13.2 −41.41 −7.29 −.00 −.00 −7.29 −7.29

Star	RA	δ	tang δ	π RA −(P′−P)	
		+88 37			
α Urs. Min. LC	1.2 11	+~~91~~ ~~21~~	−41.41 ✓	− 7.29 ✓	19

12.9 +21 −2.95 12.8 +1.52 −2.89
13.0 −08 −2.99 13.7 +1.19 −2.95
13.1 +54 −2.97 13.2 +1.35 −2.92
13.5 +00 −2.95
13.1 +17 −2.96

0 = −41.58 −4.33 n = −.10

0 = −42.76 −4.37 n = −.10

	sin z = +.60 +.80	+.40 +.60	+.20 +.40	+0 +.20	+0 −.20	−.20 −.40	−.40 −.60	−.60 −.80

Ra h	Ra m	δ	sin z	Req − Rfl ′	″	P′−P ″	Req−Rfl + P′−P ″		
13	43	+49	−.13	+0	48.2	+.3	48.5	−2	483
14	26	+30							
14	57	+40	+.01		46.9	+.6	47.5	+6	475
16	30	+42	−.01		48.4	−.1	48.3	−0	483
16	37	+31	+.18		50.0	−.1	49.9	+4	~~495~~ 503
16	39	+39	+.06		47.8	+.3	48.1	+.1	4802
13	48		+.40		48.4	+.1	48.5	+.7	492
14	35		+.47		46.9	+.2	47.1	+.8	479
14	40		+.64		48.8	+.1	48.9	+11	500
14	59		+.26		48.7	+.5	49.2	+.5	497
								(9)	48.82

+0′ 48″80
48.80

Ra h	Ra m	δ	sin z	Req − Rfl ′	″	P′−P ″	Req−Rfl + P′−P ″		
13	13	+88		+0					
14	1	+64	−.38		48.4	+.6	49.0	−.7	483
14	48	+59	−.30		49.5	−.6	48.9	−.5	484
16	28	+69	−.45		49.5	+.6	50.1	−.8	493
14	51		−.53		49.0	+.9	49.9	−.9	490
								(4)	48.75

	+.60 +.80	+.40 +.60	+.20 +.40	+0 +.20	+0 −.20	−.20 −.40	−.40 −.60	−.60 −.80
	+.64 +48.9	+.47 +47.1	+.40 +48.5	+.01 +47.5	−.13 +48.5	−.38 +49.0	−.45 +50.1	
			+.26 49.2	+.18 49.9	−.01 48.3	−.30 48.9	−.53 49.9	
				+.06 48.1				
	+.64 +48.9	+.47 +47.1	+.33 +48.8	+.08 +48.5	−.07 +48.4	−.34 +49.0	−.49 +50.0	
	+ 1.3	+ 1.0	+ .7	+ .2	− .2	− .7	− 1.0	
(13)	+ 50.2	48.1	49.5	48.7	48.2	48.3	49.0	
	502 ^{1}	48.1 ^{1}	99.0 ^{2}	146.1 ^{3}	96.4 ^{2}	96.6 ^{2}	98.0 ^{2}	6344
	− 1.4	+.7	−.7	+.1	+.6	+.5	−.2	

Ra h	Ra m	δ	sin z	Req − Rfl ′	″	P′−P ″	Req−Rfl + P′−P ″		
13	43	+49	−.13	+0	47.4	+.3	47.7	−.2	475
14	10	+19	+.38		49.3 ~~50.1~~	−.4	48.9 ~~49.7~~	+.7	~~50.4~~ 49.6
14	12	+51	−.17		47.7	+.7	48.4	−.3	481
16	37	+31	+.18		49.3	−.1	49.2	+.4	496
16	39	+39	+.06		47.5	+.3	47.8	+.1	479
13	55		+.65		47.4	+.4	47.8	+1.2	490
14	20		−.17		48.4	+.8	49.2	−.3	489
14	27		+.06		47.8	+.3	48.1	+.1	482
14	34		+.43		48.0	+.1	48.1	+.8	489
14	48		−.30		50.2	−.6	49.6	−.5	491
14	57		+.01		47.7	+.6	48.3	+0	483
14	59		+.26		47.3	+.5	47.8	+.5	483
								(12)	48.68

+0′ 48″76
48.78

Ra h	Ra m	δ	sin z	Req − Rfl ′	″	P′−P ″	Req−Rfl + P′−P ″		
13	13	+88		+0					
14	1	+64	−.38		48.3	+.6	48.9	−.7	482
1	53	+71	−.91						
2	18		−.94						
14	51		−.53		52.5	+.9	51.4	−.9	505
								(2)	49.35

	+.60 +.80	+.40 +.60	+.20 +.40	+0 +.20	+0 −.20	−.20 −.40	−.40 −.60	−.60 −.80
	+.65 +47.8	+.43 +48.1	+.38 +49.7	+.18 +49.2	−.13 +47.7	−.30 +49.6	−.53 +51.4	
			+.26 47.8	+.06 47.8	−.17 48.4	−.38 48.9		
				+.06 48.1	−.17 49.2			
				+.01 48.3				
	+.65 +47.8	+.43 +48.1	+.32 +48.8	+.08 +48.4	−.16 +48.4	−.34 +49.2	−.53 +51.4	
	+ 1.3	+ 1.0	+ .7	+ .2	− .4	− .7	− 1.1	
	49.1 ^{1}	49.1 ^{1}	49.5 ^{2}	48.6 ^{4}	48.0 ^{3}	48.5 ^{2}	50.3 ^{1}	
(14)	91	91	190	344	240	170	103	1229
	−.3	−.3	−.7	+.2	+.8	+.3	− 1.5	

Ra h	Ra m	δ	sin z		″	″	″		
12	48	+56	−.25	−0	10.5	+.8	9.7	−4	101
12	50	+39	+.06		10.1	+.2	9.9	+.1	98
12	55	+11	+.51		11.1	−.1	11.2	+.8	104
13	3	−4	+.73		11.4	+.9	10.5	+1.2	93
13	5	+28	+.24		9.3	−.6	9.9	+.4	95
13	28	+0	+.67		10.0	+.0	10.0	+1.1	89
13	42	+49	−.13		10.3	+.3	10.0	−.2	10.2
								(7)	9.74

−0′ 10″00
10.00

Ra h	Ra m	δ	sin z		″	″	″		
1	2	+88	−.75	−0	10.6	+.0	10.6	−1.2	11.8
								(1)	11.80

	+.60 +.80	+.40 +.60	+.20 +.40	+0 +.20	+0 −.20	−.20 −.40	−.40 −.60	−.60 −.80
	+.73 − 10.5	+.51 − 11.2	+.24 − 9.9	+.06 − 9.9	−.13 − 10.0	−.25 − 9.7		−.75 − 10.6
	+.67 10.0							
	+.70 − 10.2	+.51 − 11.2	+.24 − 9.9	+.06 − 9.9	−.13 − 10.0	−.25 − 9.7		−.75 − 10.6
	+ 1.3	+ .9	+ .4	− .1	− .2	− .4		− 1.5
(8)	8.9 ^{2}	10.3 ^{1}	9.5 ^{1}	10.0 ^{1}	10.2 ^{1}	10.1 ^{1}		12.1 ^{1}
	17.8	10.3	9.5	10.0	10.2	10.1		12.1
	−1.1	+.3	−.5	+.0	+.2	+.1		+2.1

1871 Apr 23 M. h = ~~+~~.005 (+75) n = − ~~h'=~~ −.035 n = −.11
h' = +.010

Star	R.A. h m	δ	tang δ	π R.A. −(ρ'−ρ) s			
λ Urs. Maj	+4 10.2 10	+43	33 ✓+	.95 ✓147	2.89 ✓−	.10	−2.99 −.01	−3.00
u Urs. Maj	+4 10.2 15	+42	9 ✓+	.90 ✓149	2.89 ✓−	.10	2.99 −.01	3.00
31 Leo Min	+2 10.4 21	+37	22 ✓+	.76 ✓426	2.88 ✓−	.08	2.96 −.01	2.97
37 Urs Maj	[10.4] 27	+57	45 ✓+	1.58 ✓428	3.04 ✓−	.17	[3.21]	
ν Leonis	+9 11.5 31	−0	7 ✓+	.00 ✓438	2.84 ✓−	.00	2.84 +.03	2.81
	10.58						−2.945	−2.945

10.6 +2.70 −2.65 +.00 −2.65 −2.65

Star	R.A. h m	δ	tang δ	π R.A. −(ρ'−ρ) s		
35 H Urs. Maj	10.6 34	+69	45 ✓+	2.70 ✓	−2.65	− .549 — 419

10.4 +.76 −2.88
11.5 +.00 2.84
10.2 +.95 2.89
10.3 +.90 2.89
10.6 +.65 − 2.88

0 = +2.05 +.23 n = −.11

1871 March 19 M. h = +.012 (+2.8 ~~.00~~) n = + h' = −.009 n = −.02

Star	R a	δ +2'	tang δ	π Ra −(ρ'−ρ)			
l Leonis	+5 ~~9~~ 10.7 41	+ 11°	12' +	.20 ✓432	−31.16 ✓−	.00	−31.16 −.01	−31.17
δ Leonis	+1 10.1 16	+21	12 +	.39 ✓156	−31.26 ✓	.01	.27 .00	.27
W 325	~~10.3~~ 19	− 8						
ϑ Leonis	−3 10.5 29	− 0	8 +	.00 ✓438	31.12 ✓	.00	.12 .00	.12
β Leonis	−5 10.7 41	+ 15	16 +	.27 ✓164	31.24 ✓	.01	.25 +.01	.24
	11.25		+2'				−31.200	−31.200

10.4 +4.13 −31.26 −.00 −31.26

Star	Ra	δ +2'	tang δ	π Ra −(ρ'−ρ)		
g Draconis	+4 10.4 ~~22~~ 24	+76	.21 +	4.13 ✓	−31.26	— +15 150
~~g Cephei~~ LC	~~10~~ 43 33	~~+76~~	~~55~~	~~4.30~~ ✓	~~−31.48~~	+

10.7 +20 −31.16
11.1 +.39 31.26
11.5 +.00 31.12
11.7 +27 31.24
11.2 +.22 −31.19

0 = +3.91 +.07 n = −.02

1871 April 2 M. h = ~~−.017~~ (+10) n = +.14 h' = −.011 n = ~~+.15~~ +.16
h', = ~~−~~.021

Star	R.A.	δ	tang δ	π R.A. −(ρ'−ρ)			
36 Lyncis	9.20 +6 9.0 4	+ 43	44 +	.96 ✓416	15.81 +16 4	.14	15.627 −15.57 −.01	−15.52
40 Lyncis	+5 9.2 12	+ 34	55 +	.70 ✓136	15.77 4	.10	.67 −.01	.68
α Hydrae	+4 9.3 20	− 8	7 −	.14 ✓138	15.68 ✓	.02	.70 .00	.70
δ Leonis	+15 10.2 10	+ 21	12 +	.39 ✓156	15.71 +	.06	.65 +.02	.63
δ Crateris	~~11.2~~ 12						15.650	
	11.20 9.70	+2'					−15.632	−15.632

11.4 +2.76 −16.07 +.03 −16.04

Star	R.A.	δ	tang δ	π R.A. −(ρ'−ρ)		
λ Draconis	11.4 22	+ 70	+2' 1 +	2.76 ✓	−16.07 ✓	— +.141 162
Gr. 4163	11.8 47					

9.0 +.96 −15.81 (65)
9.2 +.70 15.77
9.3 −.14 15.68
11.2 +.39 15.71
9.7 +.48 − ~~15.74~~ −15.70

0 = +2.28 −.34 n = +.15

1871 April 8 M. h = −.043 n = h' = −.057 n = +.06 c = +15
h' − .027
cceed

Star	R.A.	δ	tang δ	π R.A. −(ρ'−ρ)			
u Urs Maj	+3 10.2 14	+ 42 135 8 +	.90 ✓149	21.21 ✓ +20	.13	−21.34 −.02	−21.36
31 Leonis	+2 10.3 20	+ 37 125 21 +	.76 ✓426	21.45 ✓ +19	.11	.56 −.01	.57
37 Urs. Maj.	+1 10.4 26	+ 57 87 44 +	1.58 ✓428	21.30 ✓ +28	.24	.54 .01	.55
35 Urs. Maj.	[10.5] 32	+ 69 38 44 +	2.70 ✓429	21.34 ✓ +57			
42 Leo.	−1 10.6 38	+ 31 27 20 +	.61 ✓437	21.48 ✓ +19	.09	.57 +.01	.56
δ Leo.	−6 11.1 6	+ 21 109 12 +	.39 ✓156	21.65 ✓ +16	.06	.71 +.03	.68
δ Crateris	~~11.2~~ 12						
	10.52	+2'					

11.4 +2.76 −21.28 +.02 −21.~~26~~ 70
10.7 −2.19 −22.08 −.01 −2~~2.09~~ 70
10.5 +2.70 −21.34 .00 21.34 91

21.41	+5 −20	−15	~~−21.544~~		~~−21.544~~
21.64	+5 −19	−14	21.36 −2		21.38
21.08	+9 −28	−17	.59 −1		60
21.91	—		47 −1		48
21.67	+4 −19	−15	.63 +1		62
21.81	+2 −16	−14	79 +3		76
			284		
			21.568		21.568

+2.41
−2.93

Star	R.A.	δ	tang δ	π R.A. −(ρ'−ρ)			
ι Cephei	22.7 ~~10~~ 44	+65 ~~+114~~	31 ✓ ~~27~~ +	2.19 ✓	−22.08 ~~15~~ ✓	— .21	325
λ Draconis	11.4 22	+ 70	1 + +2'	2.76 ✓	−21.28 ✓	— −.087	162

10.2 +.90 − 21.~~24~~ 41
10.3 +.76 21.~~45~~ 64
10.6 +.61 21.~~48~~ 58
11.1 +.39 21.~~65~~ 81
10.6 +.66 − 21.~~45~~ 61

0 = +2.10 ~~+.14~~ −.09 n = +.0~~4~~1
+2.04 +.11 −.12 +.05

0 = −2.85 ~~−.64~~ .30 n = + ~~.22~~ .10

+4
+5
+10
706

sin z = +.60 +.80 | +.40 +.60 | +.20 +.40 | +0 +.20 | +0 −.20 | −.20 −.40 | −.40 −.60 | −.60 −.80

449

R.A.		sin z	Rag − Rfl		P′−P	Rag−Rfl P′+P		
h	m		′	″	″			
10	10	−.01	−0	10.1	+.9	9.2	−0	92
10	15	+.00		10.7	+.4	10.3	+0	103
10	21	+.09		8.6	+.3	8.3	+2	81
10	27	−.26		9.7	+1.3	8.4	−4	88
11	31							

(41 9.10

′ ″
−0 9.20
9.06

R.A.		sin z	Rag − Rfl		P′−P	Rag−Rfl P′+P		
h	m		′	″	″	″		
10	34	−.46	−0	8.8	+.7	8.1	−.8	8.9

1. 8.40

+.00 −10.3 | −.01 −9.2 | −.26 −8.4 | −.46 −8.1
+.09 8.3
+.04 −9.3 | −.01 −9.2 | −.26 −8.4 | −.46 −8.1
+ .1 | − .0 | − .7 | −1.2
9.2 2 | 9.2 1 | 9.1 1 | 9.3 1
(5) 4 | 2 | 1 | 3 | 10
+.0 | +.0 | −.1 | +.1

150

Ra		δ						
10	41	+.52	−0	7.0	+.4	6.6	+1.0	5.6
10	6	+.36		5.4	+.5	4.9	+.7	4.2
10	19							
10	29	+.68		6.4	+.5	5.9	+1.4	4.5
10	41	+.46		3.8	+.0	3.8	+.9	(2.9)

(3) 4.77

+.68 −5.9 | +.52 −6.6 | +.36 −4.9
+.46 3.8
+.68 −5.9 | +.49 −5.2 | +.36 −4.9
+1.4 | +1.2 | +1.0
4.2 1 | 4.0 2 | 3.9 1
(4) 42 | 80 | 39 | 161
+.2 | +.0 | −.1

Ra δ
10 22
23 33

′ ″
−0 4.02
4.77

162

9	6	~~−.02~~	~~−0~~	~~13.6~~	~~+1.0~~	~~12.6~~	+0	2.6
9	12	+.13		~~7.2~~ 2.1	+.2	~~7.0~~ 1.9	+3	1.6
9	20							
11	10							
11	12							

(2) 2.10

′ 2.10
−0 ~~0.70~~

11 22
11 47

+.13 −2.1 | −.02 2.6
+ 3 | 0
1.8 | 2.6
+0 | +0
+.0

325
162

10	14	+.00	−0	7.8	+.4	7.4	+0	74
10	20	+.09		8.6	+.3	8.3	+2	81
10	26	−.26		9.9	+1.3	8.6	−5	91
10	32	−.46		8.0	+.7	7.3	−8	8.1
10	38	+.19		11.0	+1.0	10.0	+4	9.6
11	6							
11	12							

(5) 8.46

′ ″
−0 8.54
8.46

10 44
11 22

+.00 −7.4 | −.26 −8.6 | −.46 −7.3
+.09 8.3
+.19 10.0
+.09 −8.6 | −.26 −8.6 | −.46 −7.3
+ .2 | − .6 | −1.0
8.4 3 | 9.2 1 | 8.3 1
(5) 12 | 12 | 3 | 27
−.1 | +.4 | −.2

1871 april 13 M. n = ~~+0.~~ -.056 n = +.06
h' =

Star RA δ tang δ T-RA -(P'-P)

o Virginis +.01 11 ~~8~~ 59 + 9 26 + .17 √167 26.74 √+ .01 -26.73 -.01 -26.74
η Virginis -.01 12 2 12 + 0 2 + .00 .170 26.66 √+ .00 .66 +.01 .65
12.10 +1' -26.695 -26.695

12.1 +4.84 -26.58 +

1.2 +41.42 -27.29

Star RA δ tang δ T-RA -(P'-P)

44 Draconis 12 16 ~~24~~ +78 19 + 4.82 4 √ -26.58 √ - -0.25 168
α Urs. Min. × 1 12 ~~12~~ + ~~91~~ 88 ~~21~~ 37 + 41.42 -27.29 - 19

12.0 +.17 -26.74
12.2 +.00 -26.66
12.1 +.08 -26.70

0 = +4.76 +.12 n = -.02
+41.34 -59 = +.14

May 9. v after June 27.

1871 May 15 R. h = +.008 -5 n = h' = .008 n = -.18
+ 1' h' = +.019
11.28 2.53 24

α Urs. Maj. × 10.9 56 + 62 26 + 1.91 √154 2.24
ψ Urs. Maj. +9.8 × 11.0 2 + 45 11 + 1.01 √155 2.36 .18 -2.54 -.01 -2.55
δ Leonis 8× 11.1 6 + 21 12 + .39 √156 2.44 .06 .50 -.01 .51
Gr. 1757 8× 11.1 8 + 50 9 + 1.20 √435 2.29 .22 .51 -.01 .52
δ Crateris × ~~11.2~~ 12
Gr 1771 ×5 11.2 14 + 65 1 + 2.14 √436 2.14 √
58 Urs. Maj. × 11.4 22 + 43 52 + .96 √437 2.39 .17 .56 -.00 .56
χ Urs. Maj. +1 × 11.8 46 + 54 23 + 1.40 √166 2.26 .25 .51 -.00 .51
γ Urs. Maj. -1.4 × 13.3 18 + 55 35 + 1.46 √178 2.25 .26 .51 +.01 .50
12 Can. Ven. -1.6 × 13.5 29 + 37 49 + .78 √454 -2.43 .14 .57 +.01 .56
13.40 11.89 + 2' 2.540
-2.529 -2.530

10.9 +1.91 -2.24 +.03 +.02 -2.21 -2.22
11.2 +2.14 -2.14 +.02 +.01 -2.12 -2.13
13.2 -41.42 -10.53 -.02 -.03 -10.55 -10.56
13.4 +1.78 -2.23 -.02 -.03 -2.25 -2.26

lc 1.212 37 -41.42 √
α Urs. Min. × ~~13~~ 10 + 88 ~~39 + 42.49~~ -10.53 √ - -194 19
69 Urs. Maj. × 13.4 23 + 60 ~~6 + .74~~ -2.23 √ - 151 453
37 + 1.78 √

11.1 +.39 -2.44
13.5 +.78 -2.43
12.3 +.58 -2.43

11.0 +1.01 -2.36
11.1 +1.20 -2.29
11.4 +.96 -2.39
11.8 +1.40 -2.26
13.3 +1.46 -2.25
11.57 +1.21 -2.31 m = -.19

0 = +1.33 +.22 n = -.17 -17
+1.56 +.31 -.20 -20
+1.20 +.18 -.15 -15
-17

0 = -42.00 -8.12 n = -.19 -19

0 = +.70 +.09 n = -.13
+.93 +.18 -.19
+.57 +.05 -.09

0 = -42.63 -8.25 n = -.19

1871 May 16 R. h = +.005 6 n = h' = +.006 n = -.15
h' + 3' +.016

Gr. 1757 ×1 11.1 8 + 50 9 + 1.20 √435 2.26 .18 -2.44
ψ Urs. Maj. ×0 11.2 10 + ~~32~~ 15 + .63 √158 2.26 .09 .35
τ Leonis ×2 ~~11.4~~ 21
58 Urs. Maj. ×2 11.4 23 + 43 52 + .96 √437 -2.25 .14 .39
11.23 + 1' -2.393 -2.393

11.2 +2.14 -2.00 +.00 +.00 -2.00 -2.00
12.5 +2.82 -1.99 -.02 -.02 -2.01 -2.01

Gr. 1771 × 11.2 14 + 65 +1' 1 + 2.14 √ -2.00 √ - -172 436
κ Draco. 12.5 28 + 70 29 + 2.82 √ -1.99 - -102 171
+ 1'

11.2 +.63 -2.26

11.1 +1.20 -2.26
11.4 +.96 -2.25
11.2 +1.08 -2.25

0 = +1.51 +.26 n = -.17 -17
+2.19 +.25 -.11 -13

0 = +1.06 +.25 n = -.24
+1.74 +.24 -.14

1871 May 17 R n = -.15

δ Leonis × 11.1 6 + 21 +2' 12 + .39 √156
43 Comae Ber √ 13.1 5 ~~+43~~ ~~28~~ 21 + .94 177
+28 32 + .54 √

11.1 +2
13.1 +28

sin z = +.60 +.80 | +.40 +.60 | +.20 +.40 | +0 +.20 | +0 −.20 | −.20 −.40 | −.40 −.60 | −.60 −.80

R.A.		sin z		$R_{eq} - R_{fl}$	P′P	$R_{eq} - R_{fl}$ + P′P		
				″	″	″		
11	59							
12	12							
~~12~~	~~12~~							

R.A.		sin z	$R_{eq} - R_{fl}$	P′P	$R_{eq} - R_{fl}$ + P′P
			″	″	
12	4				
1	10				

10	56	−.34	−0	15.6	+1.0	14.6	−.5	151
11	2	−.05		18.6	+.9	17.9	−.1	180
11	6	+.36		17.5	+.5	17.0	+.5	165
11	8	−.14		17.0	+8	16.2	−.2	16.0
11	12							
11	14	−.38		(20.9)	+.8			(20.1)
11	22	−.01		15.1	+.3	14.8	−0	148
11	46	−.21		17.0	+.5	16.5	−.3	168
13	18	−.23		16.6	+12	15.4	−4	158
~~13~~	~~29~~	~~±.08~~		~~25.8~~	~~+.6~~		(7)	16.14

′ ″
−0 16.19
16.14

13 10
13 23

+.36 −17.0

+.36 −17.0
+.6
16.4 1
(7) 64
+.2

−.05 −17.9 −.34 −14.6
−.14 16.2 −.21 16.5
−.01 14.8 −.23 15.4
−.07 −16.3 −.26 −15.5
−.1 −.4
16.4 3 15.9 3
192 177 433
+.2 −.3

11	8	−.14	−0	12.0	+.8	11.2	−.2	114
11	10	+.18		9.4	−.4	9.8	+.3	9.5
11	21							
11	23	−.01		11.7	+.3	11.4	−0	11.4
							(3)	11.10

′ ″
−0 10.62
~~10.52~~
.58

11	14	−.38	−0	(21.9)	+.8	21.1	−.6	(21.7)
12	28	−.47		10.1	+.8	9.3	−.7	10.0

+.18 −9.8 −.14 −11.2
−.01 11.4
+.18 −9.8 −.08 −11.3
+.3 −.1
9.5 1 11.4 2
(4) 95 228
−1.1 +8

−.47 −9.3
−.47 −9.3
−.9
10.2 1
102 425
−.4

11 6
13 5

1871 May 19 M. $h = +.007$ (+50) $n = -.233$ $h' = -.012$ $n = -.23$
$h' = +.016$

Star 11.75 RA δ tang δ $-\frac{T - Ra}{(P' - P)}$ 1.855
h m ° +2′

β Leonis x 7 11.742 +15 16 + .27 √164 1.82 √ .06 −1.88 −01 −1.89
γ Urs. Maj. x 6 11.846 +54 23 + 1.40 √166 1.91 √ .32 .83 −01 .84
β Corvi −1.4
γ Bootis x 13.848 +19 2 + .34 √182 1.80 √ .08 .88 +02 .86
13.80 12.43 +1′ 1.880
13.2 −41.42 −11.52 −.01 −.02 −11.53 −11.54 −1.863 −1.863

Star RA δ tang δ $-\frac{T - Ra}{(P' - P)}$
LC h m 91° 21′
α Urs. Min. 13.2 10 + ~~88~~ ~~39~~ +41.42 √ −11.52 √ − 19
+88 37
11.7 +27 −1.82 11.8 +1.40 −1.51
13.8 +34 −1.80
12.7 +30 −1.81

I
0 = −41.72 −9.72 n = −.23

II
0 = −42.82 −10.03 n = −.23

1871 May 20 M. $h = +.007$ (+4) $n = -$ $h' = .001$ $n = -.33$
11.67 +1 $h' = +.016$ 1.810
υ Leonis +1.6 11.530 −0 8 − .00 √438 1.81 √ .00 −1.81 00
β Leonis +1.4 11.742 +15 16 + .27 √164 1.69 √ .09 .78
γ Urs. Maj. 1.3 11.846 +54 23 + 1.40 √166 1.38 √ .46 .84
α Bootis x 1.2 14.320 +52 26 + 1.30 √190 1.46 √ .43 .89
ξ Bootis x ~~14.4~~ 26 +30 55 + .60 √192
33 Bootis x 1.4 14.533 +44 57 + 1.00 √461 1.36 √ .33 .69
γ Bootis 1.3 14.427 +38 51 + .81 √193 1.59 √ .27 .86 .00
14.40 13.10 +1′ 1.813
11.4 +2.76 −0.92 +.00 +.03 −0.92 −0.89 −1.812 −1.812
12.1 +4.84 −0.17 −.01 +.02 −0.18 −0.15
12.4 +2.82 −0.84 −.01 +.02 −0.85 −0.82

λ Draconis x 11.4 23 +70 +1′ 1 + 2.75 (6) −~~15.00~~ 0.92 √ − 309 162
4 H Draconis x 12.1 5 +78 19 + 4.83 (4) √ −0.17 √ − 332 168
κ Draconis x 12.4 27 +70 29 + 2.82 √ −0.84 √ − 332 171
+1′
11.5 −.00 −1.81 11.8 +1.40 −1.38
11.7 +.27 −1.69 14.3 +1.30 −1.46
11.6 +.13 −1.75 14.5 +1.00 −1.36
13.5 +1.23 −1.40 n5 = −.32

0 = +2.63 +.83 n = −.32 −32
+4.71 +1.57 −.33 −34
+2.69 +.90 −.33 −34
−33

0 = +1.53 +.51 n = −.33
+3.61 +1.25 −.35
+1.59 +.58 −.36
−35

1871 May 21 M. $h = +.009$ (−8) $n = -.30$ $h' = -.009$ $n = -.28$
11.77 +1 $h' = +.018$ 1.587
Gr. 1771 x 1.1 11.315 +65 1 + 2.14 √436 0.94 √ .60 −1.54 −01 −1.55
γ Urs. Maj. x .6 11.846 +54 23 + 1.40 √166 1.26 √ .39 .65 −01 .66
η Virginis x 2 12.2 13 + 0 2 + 0.00 √170 1.57 √ .00 .57 00 .57
α Bootis −1.9 14.320 +52 26 + 1.30 √190 1.25 √ .36 .61 +02 .59
ξ Bootis x ~~14.4~~ 26 +30 55 + .60 √192
~~γ Bootis [14.427 +38 51 + .81 √ 3039]~~ − .23
14.30 12.40 +1′ 1.610 −1.592 −1.592
12.1 +4.84 −0.11 +.00 +.01 −0.11 −0.10
12.4 +2.82 −0.86 −.00 −.00 −0.86 −0.86

4 H Draconis x 12.1 5 +78 +1′ 19 + 4.83 (4) √ −0.11 √ − +301 168
κ Draconis x 12.4 27 +70 29 + 2.82 √ −0.86 √ − 252 171
+1′
12.2 +.00 −1.57 11.3 +2.14 −0.94
14.4 +.81 −38.39 11.8 +1.40 −1.26
14.3 +1.30 −1.25
12.5 +1.61 −1.15 n5 = −.26

0 = +4.84 +1.46 n = −.30 −31
+2.82 +.~~69~~71 −.25 −25
−28

0 = +3.23 +1.05 n = −.32
+1.21 +.29 −.24 −.28

1871 May 26 M $h = +.005$ (00) $h' = +.014$ $n = -.45$
12.23 +1 $h' = +.013$ 0.723
β Leonis +x 1.0 11.742 +15 16 + .27 √164 0.58 √ .12 −0.70 +.01 −0.69
6 Can. Ven. x 4 12.319 +39 43 + .83 √442 0.31 √ .37 .68 +.00 .68
γ Urs. Maj. x 9 11.846 +54 23 + 1.40 √166 0.23 √ .63 .86 +.01 .85
74 Urs. Maj. x 3 12.423 +59 6 + 1.67 √444 0.02 √ .75 .73 +.00 .73
8 Can. Ven. x +3 12.427 +42 2 + .90 √445 0.30 √ .40 .70 +.00 .70
12 Can. Ven. x −1 12.849 +39 0 + .81 √175 0.31 √ .36 .67 −.00 .67
δ Bootis x 3.5 15.210 +33 47 + 67 ~~.27~~ √201 0.38 √ .30 .68 −.03 .71
μ Bootis x ~~15.3~~19 +37 49 + ~~.27~~ 202
15.20 12.66 +1′ .78 √ 0.680
−0.717 −0.719
12.1 +4.84 +1.54 +.01 +.00 +1.55 +1.54
13.2 −41.42 −18.67 +.00 −.01 −18.67 −18.68

4 H Draconis x 12.15 +78 +1′ 19 + 4.83 (4) √ +1.54 √ − 211 168
α Urs. Min. LC x 13.2 12 +88 ~~39~~ 37 −41.42 −18.67 19
11.7 +27 −0.58 11.8 +1.40 −0.23
12.8 +.81 −0.31 12.4 +.90 −0.30
15.2 +.67 −0.38 12.1 +1.15 −0.26
13.2 +.58 −0.42 n5 = −.92

0 = +4.26 +1.97 n = −.46 −47 0 = −42.00 −18.25 n = −.43 −43

0 = +3.69 +1.80 n = −.49 0 = −42.57 −18.42 n = −.43

sin z = +60+80 +40+60 +20+40 +0 +20 +0 -20 -20 -40 -40 -60 -60 -80

RA sin δ R_{eq} R_{fl} ρ'-ρ R_{eq}-R_{fl}+ρ'-ρ
h m ′ ″ ″ ″
11 42
11 46

13 48

RA sin z R_{eq} R_{fl} ρ'-ρ R_{eq}-R_{fl}+ρ'-ρ
h m ′ ″ ″ ″
13 10

11 30
11 42
11 46 -.21 -1 58.3 +5 57.8 -4 58.2
14 20 -.17 59.8 +.8 59.0 -.3 59.3
14 26 ~~+.06~~ ~~59.9 +.3~~
14 33 -.05 57.4 -.3 57.7 -.0 57.7
14 27 +.06 59.9 +.3 59.6 +1 59.5
(4) 58.68

′ ″
-1 58.72
58.68

11 23
12 5
12 27

+.06 -59.6 -.17 -59.0 -.21 -57.8
-.05 57.7
+.06 -59.6 -.11 -58.4 -.21 -57.8
+ .1 - .2 - .4
59.5 58.6 58.2
(4) 15 12 2 29
+8 -.1 -.5

11 15 -.38 - -2 (1.0) +8 (0.2) -6 (0.8)
11 46 -.21 -1 58.3 +5 57.8 -4 58.2
12 13
14 20 -.17 1 57.6 +.8 56.8 -3 57.1
14 26
~~14 27~~
(2) 57.65

′ ″
-1 57.65
57.65

12 5
12 27 -.47

~~-2 59.8 +.8 59.0~~

-.17 -56.8 -.21 -57.8

-.17 -56.8 -.21 -57.8
- .3 - .4
57.1 58.2
(2) 71 82 153
-.5 +.6

11 42 +.46 -0 (59.9) +.0 (59.9) +8 (59.1)
12 19 +.05 47.4 +4 47.0 +1 46.9
11 46 -.21 46.4 +.5 45.9 -.5 46.4
12 23 -.29 45.6 +.9 44.7 -.6 45.3
12 27 +.01 46.4 -.1 46.5 +0 46.5
12 49 +.06 46.7 +.2 46.5 +1 46.4
15 10 +.15 45.1 -.1 45.2 +.3 45.9
15 19
(6) 46.07

′ ″
-0 46.07
46.07

12 5
13 12

+.05 -47.0 -.21 -45.9
+.01 46.5 -.29 44.7
+.06 46.5
+.15 45.2
+.07 -46.4 -.25 -45.3
+ .1 - .5
46.2 45.8
(6) 248 116 364
+.1 -.3

1871 May 27 M. h = +.001 (−4) h' = +.008 h' = +.005 n = −.30

Star		RA h m	δ °	tang δ	$\frac{T-Ra}{-(P'-P)}$			0.488	
	12.80		+1'						
76 Urs. Maj.	√ +1.0	12.6 35	+63 24 +	2.00	√447 0.03	√–	.60	−0.63 +01	−0.62
ε Urs. Maj.	8	12.8 47	+56 38 +	1.52	√173 0.09	√–	.46	55 +01	.54
12 Can. Ven.	8	12.8 49	+39 0 +	.81	√175 0.20	√–	.24	44 .00	.44
17 Can. Ven.	+6	13.0 3	+39 10 +	.82	√450 0.08	√–	.75	33 .00	.33
δ Bootis	x 1.6	15.2 10	+33 47 +	.67	√201 0.26	√–	.20	46 −01	.47
14 Urs. Min.	x 1.9	~~15.2~~ 12	+67 49 +	2.45	√467 0.19	√–			
~~ν~~ ν Bootis	+	15.5 32	+40 46 +	.86	√469 0.23	√–	.26	49 −01	.50
	15.35	13.65	+1'					0.475 − 0.483	−0.483

13.2 −41.42 −12.84 +.01 −.00 −12.83 −12.84
15.2 +2.45 +0.19 −.01 −.01 +0.18 +0.18

Star	RA h m	δ ° '	tang δ	$\frac{T-Ra}{-(P'-P)}$	
α Urs. Min. S.C.	13.1 7	+88 ~~34~~ 37	−41.42	−12.84	19

12.8 +81 −0.20
13.0 +82 −0.08
15.2 +67 −0.26
15.5 +86 −0.23
14.1 +79 −0.19

12.6 +2.00 −0.03
12.8 +1.52 −0.09
12.7 +1.76 −0.06

0 = +1.66 +.37 n = −.22 −.22]
0 = −42.21 −12.64 n = −.30 −.30

0 = +.69 +.24 n = −.35
0 = −43.18 −12.78 n = −.30

1871 June 1 R h = +.002 n = ~~h'~~ −.001 n = −.49
+1' h' = +.009

Star		RA h m	δ °	tang δ	$\frac{T-Ra}{-(P'-P)}$				
η Bootis	x 1	13.8 48	+19 2 +	.34	√182 0.36	√–	.17	−0.53 .00	
α Bootis	x 2	14.1 9	+19 50 +	.36	√181 0.35	√–	.18	.53 .00	
		13.95	+1'					− 0.530	−0.530

13.2 −41.42 −21.74 +.01 −21.73
14.0 +2.14 +0.49 +.00 +0.49

Star		RA h m	δ ° '	tang δ				
α Draconis	x	14.0 0	+64 58 + (+1')	2.14 √	+0.49 √	–	475	184
α Urs Min. S.C.	x	~~13 3~~ 1.2 12	+ ~~88 36~~ 91 21 / +88 37	−41.42 √	−21.74 √	–	512	19

13.8 +34 −0.36
14.1 +36 −0.35
14.0 +35 −0.36

I
0 = +1.79 +.85 n = −.47
I
0 = −41.77 −21.37 n = −.51

1871 June 2 M. h = +.002 n = h' = −.001 n = −.41
+1 h' = +.009

Star		RA h m	δ °	tang δ	$\frac{T-Ra}{-(P'-P)}$				
δ Bootis	x 2	15.2 10	+33 47 +	.67	√201 0.20	√–	.27	−0.47 .00	
μ Bootis	x 1	15.3 25	+37 49 +	.78	√202 0.10	√–	.32	42	
ν¹ Bootis	x 0	15.4 26	+41 16 +	.88	√206 0.11	√–	.36	47	
α Coronae	x 1	15.5 29	+27 8 +	.51	√209 0.24	√–	.21	45	
φ Bootis	x 2	15.6 32	+40 46 +	.86	√469 0.09	√–	.35	44 .00	
		15.40	+1'					−0.450	−0.450

13.2 −41.42 −18.85 +.02 −18.83
15.0 −4.42 −2.18 +.00 −2.18

Star	RA h m	δ ° '				
α Urs Min. S.C.	~~13 3~~ 13.2 12	+88 ~~39~~ 37	−41.42	−18.85	–	19
48 Cephei S.C.	15.3 0 3	+77 16	−4.42 √	−2.18 √	–	394 360

15.2 +67 −0.20
15.3 +78 −0.10
15.4 +88 −0.11
15.5 +51 −0.24
15.6 +86 −0.09
15.4 +74 −0.15

I
0 = −42.16 −18.68 n = −.44
−5.16 −2.03 −.39

1871 June 4 R. h = +.009 (−19) n = h' = −.023 n = −.43
+1 h' = +.015

Star		RA h m	δ °	tang δ	$\frac{T-Ra}{-(P'-P)}$			0.333	
~~17 Can. Ven.~~	~~x~~ 13.20	~~13 3~~	~~+39 10 +~~	~~.82~~	~~19.56~~				
43 Comae	x 1.5	13.1 5	+ ~~43~~ 28 ~~27~~ 32 +	.94	√177 0.11	√–	.23	−0.34 −.03	−0.37
20 Can. Ven.	x 1.4	13.2 11	+41 14 +	.88	√451 0.04	√–	.38	34 −.03	.37
ζ Urs. Maj.	+ 1.3	13.3 18	+55 35 +	1.46	√178 0.31	√–	.63	32 −.03	.35
β Bootis	x −3	14.9 56	+40 53 +	.87	√199 0.04	√–	.37	41 +.00	.40
δ Bootis	x −6	15.2 10	+33 47 +	.67	√201 0.09	√–	.29	38 +01	.37
μ Bootis	x 7	15.3 19	+37 49 +	.78	√202 0.06	√–	.34	28 +02	.26
ν¹ Bootis	x 8	15.4 26	+41 16 +	.88	√206 0.03	√–	.38	.41 +.02	.39
ν² Bootis	x 8	15.4 26	+41 19 +	.88	√207 0.02	√–	.38	40 +02	.38
α Coronae	x 9	15.5 29	+27 8 +	.51	√209 0.18	√–	.22	40 +02	.38
Boot.	15.28	14.59	+1'					0.380 −0.367 (4)	−0.363

13.2 −41.42 −18.16 +.02 +.02 −18.14 −18.14
14.2 +2.45 +0.72 +.01 +.00 +0.73 +0.72

Star	RA h m	δ ° '					
α Urs Min. L.C.	~~13 8~~ 1.2 12	+ ~~88~~ 91 ~~39~~ 21 / 88 37	−41.42 √	~~−29.03~~ −18.16 √			19
14 Urs. Min.	x 14.2 12	+67 50 +	2.45 √	+0.72 √		467(?)	
ι Draconis	x ~~14 21~~ 15.4 22	+59 25 +	1.69 √	+0.25 √ −.73	−0.48]		204

13.1 +54 −0.11
15.2 +67 −0.09
15.3 +78 +0.06
15.5 +51 −0.18
14.8 +62 −0.08

13.2 +88 +0.04
13.3 +1.46 +0.31
15.4 +1.69 +0.25
15.4 +.88 −0.03
15.4 +.88 −0.02
14.5 +1.16 +0.11 n = −.33

0 = +1.83 +.81 n = −.44 −.44
0 = −42.04 −18.06 n = −.43 −.43

0 = +1.29 +.61 n = −.47]
0 = −42.58 −18.25 n = −.43

sin z = +.60 +.80 | +.40 +.60 | +.20 +.40 | +0 +.20 | +0 −.20 | −.20 −.40 | −.40 −.60 | −.60 −.80

Ra h m	sin z δ	R_oy	− R_fl "	ρ'ρ "	R_oy − R_fl + ρ'ρ "		
12 35	−.36	−0	42.4	+.5	(41.9)	−.7	(42.6)
12 47	−.25		45.2	+.8	44.4	−.5	44.9
12 49	+.06	−0	48.1	+.2	47.9	+0	47.8
13 3	+.06	~~+0~~ 47.8 ~~42.4~~		−.6	48.4	+.1	48.3
15 10	+.15	−0	46.5	−.1	46.6	+.3	46.3
15 12	−.43		44.0	−.2	44.2	−.8	43.4
15 32	+.03		45.6	−1.0	46.6	+0	46.6
						(6)	46.22

' "
−0 46.45
46.22

Ra h m
13 7

+.06 −47.9		−.25 −44.4	−.43 −44.2
+.06 48.4			
+.15 46.6			
+.03 46.6			
+.10 −47.4		−.25 −44.4	−.43 −44.2
+ .2		−.5	−.8
47.2 4		44.9 1	45.0 1
(6) 28.8		49	50
+.8		−1.5	−1.4

387

13 48
14 9

14 0
15 13

15 10	+.15	−0	17.3	−.1	17.4	+.4	17.0
15 20	+.08		18.7	+.0	18.7	+.2	18.5
15 26	+.02		17.3	−.6	17.9	+0	17.9
15 29	+.26		18.4	−.5	18.9	+.5	18.4
15 32	+.03		18.9	−1.0	19.9	+.1	19.8
						(5)	18.32

' "
−0 18.62
18.32

13 3
~~3~~15 3

+.15 −17.4	+.26 −18.9
+.08 18.7	
+.02 17.9	
+.03 19.9	
+.07 −18.5	+.26 −18.9
+ .1	− .6
18.4 4	19.5 1
(5) 33.6	9.5
−.2	+.9

431

13 3							
13 5	+.24	−0	19.4	−.6	20.0	+.5	19.5
13 11	+.02		22.1	−.4	22.5	+.1	22.4
13 18	−.23		20.3	+1.2	19.1	−.5	19.6
14 56	+.03		21.2	+.6	20.6	+.1	20.5
15 10	+.15		19.7	−.1	19.8	+.3	19.5
15 19	+.08		20.5	+.0	20.5	+.2	20.3
15 26	+.02		19.9	−.6	20.5	+.1	20.4
15 26	+.02		21.0	−.3	21.3	+.1	21.2
15 29	+.26		19.4	−.5	19.9	+.5	19.4
						(9)	20.31

E.P.

' "
−0 20.22
20.16

13 8							
15 12	−.43	−0	19.3	−.2	19.5	+.8	20.3
15 22	−.29		18.5	+.4	18.1	−.6	18.7
						(2)	19.50

+.24 −20.0	+.02 −22.5	−.23 −19.1	−.43 −19.5
+.26 19.9	+.03 20.6	−.29 18.1	
	+.15 19.8		
	+.08 20.5		
	+.02 20.5		
	+.02 21.3		
+.25 −20.0	+.05 −20.9	−.26 −18.6	−.43 −19.5
+ .6	+ .1	− .6	− .9
19.4 2	20.8 6	19.2 2	20.4 1
(11) 38.8	124.8	38.4	20.4
− .8	+ .6	−1.0	+ .2

2224

1871 June 9 M. h = +.008 n = −3 h′ = −.010 n = −.42
h′ = +.012

Star	Ra	δ	tang δ	π Ra −(ρ′−ρ)		0.740		
	13.10 h m	° +1′						
ε Urs. Maj. ×	12.8 49	+ 56 38	+1.52 √ 173	+ 1.36 √	64	+ 0.72	+ 02	+ 0.70
θ Virginis ×	13.0 3	− 4 52′	− .09 √ 449	+ 0.68 √ +	.04	.72	− 01	.71
43 Comae ×	13.1 5	+ ~~43~~ 28 21	+ .94 √ 177					
α Virginis	~~13.3~~ 18							
17 Can. Ven. ×	13.5 28	+ 37 49	+ .78 √ 454	1.11 √	33	.78	− 01	.77
ε Cor. Bor. ×	15.9 51	+ 27 14	+ .51 √ 219	+ 0.92 √	21	.71	+ 02	.73
φ Herculis ×	16.1 4	+ 45 16	+ 1.01 √ 221	+ 1.20 −.07	.42	.71	+ 02	.73
α Scorpii ⊗	1600	+1′				0.710		
	14.26							
						+0.728		+0.728

13.2 − 41.42 − 16.76 + .01 + .02 − 16.75 − 16.74

Star	Ra	δ	tang δ	π Ra −(ρ′−ρ)		
	h m	°		−16.76		
α Urs. Min. ×	13.2 13	+ 88 39	− 41.42 √	~~+ 1.36~~		19
θ Draconis ×	15.9 58	+ 58 54 55	+ 1.66 √	+ 1.22 √	+ 12 − .70 + 0.64	220

13.0 − .09 + 0.68 12.8
15.9 + .51 + 0.92
14.4 + .21 + 0.80

12.8 + 1.52 + 1.36
13.5 + .78 + 1.11
15.9 + 1.66 + 1.~~22~~ 34
16.1 + 1.01 + 1.~~20~~ 13
14.6 + 1.24 ~~+ 1.22~~ + 1.23

0 = − 41.63 − 17.55 n = − .42

0 = − 42.66 − 17.97 n = − .42

sin z	+.60+80	+.40+60	+.20+40	+0+20	+0 −.20	−.20 −.40	−.40 −.60	−.60 −.80

RA	sin Σ	Rag −	Rfl	ρ'−ρ	Rag − Rfl + ρ'−ρ		
h m		′	″	″	″		
12 49							
13 3							
13 5							
13 18							
13 28	+.08	−1	42.0	+.6	41.4	+.2	41.2
15 51	+.26		41.2	−.3	41.5	+.5	41.0
16 4	−.05		39.1	+.1	39.0	−.1	39.1
						(3)	40.43

′ ″
−1 40.22
40.25

RA	sin Σ	Rag −	Rfl	ρ'−ρ	Rag − Rfl + ρ'−ρ		
h m		′	″	″	″		
13 13							
15 58	−.28	−1	39.8	+.7	39.1	−.6	39.7
							(1) 39.70

+.26 −41.5 +.08 −41.4 −.05 −39.0 −.28 −39.1

+.26 −41.5 +.08 −41.4 −.05 −39.0 −.28 −39.1
+.6 +.2 −.1 −.6
40.9′ 41.2′ 39.1′ 39.7′
(4) 40.9′ 41.2′ 39.1′ 39.7′ 160.9
+.7 +1.0 −1.1 −.5

1871 June 29 M. h = +.007 (+25) n = −.40 h′ = +.036 n = −.41
h′ = +.004

Star RA h m δ ° ′ tang δ π Ra / (ρ′−ρ)

η Bootis ⊗ 13.8 48 +19 2 + .34 ✓184 3.69 ✓ .14 3.525 +3.55 +06 +3.61
α Bootis x 14.2 10 ~~5 +25 41 + .48~~ 3.65 ✓ .15 .50 +05 .55
~~ι Cass~~ ~~14 18~~ +19 51 + .36 187
τ Herculis x 16.3 16 +46 37 + 1.06 224 + 4.05 ✓ .43 .62 −02 .60
Gr. 2343 x 16.5 22 +55 29 + 1.46 476 + 4.17 ✓ .60 .57 −03 .54
β Herculis x 16.4 25 +21 46 + .40 228 + 3.79 ✓ .16 .63 −03 .60
A Draconis x 16.5 28 +69 2 + 2.60 329 + 4.49 ✓
σ Herculis x 16.5 30 +42 42 + .92 236 + 4.01 ✓ .38 3.612 63 −03 .60
~~ε Urs. Min 16 59~~ 16.42 15.60 +1′ +3.583 +3.583

14.3 −233 +2.36 +00 +.01 +2.36 +2.37
16.5 +260 +4.49 −.01 −00 +4.48 +4.49
17.0 +7.35 +6.45 −01 −00 +6.44 +6.45

1871 June 30 Gannett h = +.006 h′ = +.003
~~α Bootis λ 14.2 10 +19 50 + .36 187 + 3.83 .4 14 +3. +11 3.80~~

1871

Star RA h m δ ° ′ tang δ π Ra / (ρ′−ρ)

ε Urs. Min x 16 59 +82 14 + 7.35 ✓ +6.45 ✓ — 235
ι Cass ✓ 2.3 18 +66 49 − 2.33 ✓ +2.36 ✓ — 36

13.8 +34 +3.69 16.3 +1.06 +4.05
14.2 +36 +3.65 16.5 +1.46 +4.17
16.4 +40 +3.79 16.5 +.92 +4.01
14.8 +37 +3.71 16.4 +1.15 +4.08 n₅ = −.41

0 = +2.23 +.77 n = −.35 .35 0 = −2.70 −1.35 n = −.50 .49
+6.98 +2.73 −.39 .38
37
0 = +1.45 +.41 n = −.28] 0 = −3.48 −1.71 n = −.49
+6.20 +2.37 −.38

1871 June 30 h = +.006 (−15) h′ = −.010 c = +.10 n = −.39
h′ = +.003

~~α Bootis~~ 14.63 14 10 +19 50 +1′ + .36 ~~+3.83~~ − +3.800
γ Bootis x 14.4 27 +38 51 + .80 129 + 3.92 ✓ .32 +.13 + 3.73 −01 + 3.72
υ Bootis x 14.6 35 +14 16 + .25 103 + 3.81 ✓ .10 +.10 .81 −01 .80
~~ξ Bootis 14.7 45 +19 38 + .36~~
ε Bootis x 14.6 39 +27 + .52 ✓
~~Gr. 2164 x 14 48~~
β Bootis x 14.9 57 +40 53 + .87 132 + 4.07 ✓ .34 +.13 .86 −00 .86
η Herculis x 16.6 39 +39 10 + .82 129 + 3.95 ✓ .32 +.13 .76 +01 .77
ζ Herculis x 16.6 37 +31 50 + .62 118 + 3.73 ✓ .24 +.12 .80 +01 .81
~~ε Urs. Min 16 59~~ +1′ +3.780
1660 15.42 +3.792 +3.792

17.0 +7.35 +6.15 −00 −00 +6.15 +6.15

Gr. 2164 x 14.8 48 +59 48 + 1.72 199 + 4.55 ✓ +.67 +.20 +4.08] 462
ε Urs. Min x 16 59 +82 14 + 7.35 ✓ +6.15 ✓ 235
+1′
14.4 +81 +3.92 ~~14.8 +1.72 +4.55~~
14.6 +.25 +3.81
14.9 +.87 +4.07
16.6 +82 +3.95
16.6 +62 +3.92
15.4 +67 +3.93

0 = +6.68 +2.22 n = −.33

0 = +5.63 +1.60 n = −.28

1871 July 1 M. h = +.007 (+15) h′ = +.026 n = −.42
h′ = +.004

α Draconis x 14.0 1 +64 58 + 2.14 184 4.80 ✓ .90 +3.823 3.90 +.03 +3.93
ζ Bootis x 14.4 26 +30 55 + .60 197 4.05 ✓ .25 .80 +.02 .82
π Bootis x 14.6 35 +16 57 + .36 194 4.00 ✓ .13 .87 +02 .89
109 Virg. ✓ 14.7 40 +2 25 + .04 194 3.88 ✓ .02 .86 +01 .87
β Bootis x 14.9 57 +40 53 + .87 199 4.07 ✓ .37 .70 +.01 .71
χ Bootis x 14.59 +27 26 + .52 465 + 4.03 ✓ .22 .81 +.01 .82
ξ Bootis ✓ 14.7 45 +19 38 + .36
~~κ Herculis x 17.1~~ + .86 ~~.91 .05 .86~~
π Herculis x 17.2 11 +36 57 + .75 239 + 4.18 ✓ .31 +3.890 .87 −.05 .82
17.15 15.24 +1′ +3.840 +3.840 87

14.8 +1.72 +4.60 +.00 +.00 +4.60 +4.60
14.9 +3.66 +5.32 +.00 +.00 +5.32 +5.32
~~17.1 +.86 +4.27~~

Gr. 2164 x 14.8 48 +59 48 + 1.72 ✓ + 4.60 ✓ 462
β Urs. Min x 14.9 51 +74 40 + 3.656 ✓ + 5.32 ✓ 198
Gr. 2415 x 17.1 4 +40 44 + .86 ✓ + 4.27 ✓ 36 +3.91 480
+1′
14.4 +60 +4.05 ~~14.0 +2.14 +4.80~~
14.6 +.31 +4.00
14.7 +04 +3.88
16.0 +52 +4.03
17.2 +75 +4.18
17.1 +86 +4.27
15.5 +51 +4.07

0 = +1.21 +.53 n = −.44 44
+3.15 +1.25 −.40 −40

0 = −.42 −.20 n = −.48]
+1.52 +.52 −.34]

1871 July 3 G. h = +.015 (+19) h′ = +.014 n = −.45
h′ = +.011

δ Bootis 14.64 14.3 20 +52 26 + 1.30 194 4.71 ✓ .58 4.096 + 4.13 +.01 + 4.14
ζ Bootis 14.4 26 +30 55 + .60 197 4.41 ✓ .27 .14 +.01 .15
υ Bootis 14.6 35 +14 16 + .25 195 4.27 ✓ .11 .16 +.01 .17
ε Bootis x ~~14.6~~ 39 +27
β Bootis 14.9 57 +40 53 + .87 199 4.42 ✓ .39 .03 +.01 .04
χ Bootis 14.59 +27 26 + .52 465 4.25 ✓ .23 .02 +01 .03
ξ Bootis sup. ✓ ~~14.7~~ 45 +19 38 + .86 .12 −02 .10
π Herculis 17.2 11 +36 57 + .75 239 4.48 ✓ .34 .14 −03 .11
17.15 15.36 +1′ 4.130 4.106 +4.106

14.8 +1.72 +4.90 +.01 +.01 +4.91 +4.91
14.9 +3.66 +5.76 +.00 +.01 +5.76 +5.77
17.1 +2.24 +5.10 −.02 −.02 +5.08 +5.08

~~δ Bootis 14 21 +52 26 + 4.30~~
Gr. 2164 x 14.8 48 +59 48 + 1.72 ✓ + 4.90 ✓ 462
β Urs. Min x 14.9 51 +74 40 + 3.656 ✓ + 5.76 ✓ 198
ψ Draconis x 17.1 8 +65 52 + 2.24 ✓ + 5.10 ✓ 236
Gr. 2415 x 17.1 4 +40 44 + .86 ✓ + 4.50 ✓ −.38 + 4.12 480
+1′
14.4 +60 +4.41 14.3 +1.30 +4.71 0 = +1.19 +.56 n = −.47 .47
14.6 +.25 +4.27 14.9 +.87 +4.42 +3.13 +1.41 −.45 .46
15.0 +.52 +4.25 17.1 +.86 +4.50 +1.71 +.73 −.43 .43
17.2 +75 +4.48 15.4 +1.01 +4.54 −.45
15.3 +53 +4.35

→ u.c. n₅ = −.40 0 = +.71 +.37 n = −.52]
+2.65 +1.23 −.47
+1.23 +.54 −.44]

sin z =	+.60+80	+.40+.60	+.20+.40	+0+.20	+0−.20	−.20−.40	−.40−.60	−.60−.80

R.A.	sin z	R_eq −	R_fl	θ′−θ	R_eq−R_fl	+P′−P	
h m		′	″	″	″		
13 48	+.40	+0	48.2	+.1	48.3	+.7	490
14 10	+.38		49.8 2	−.4	~~49.4~~ 48.8	+.7	~~50.1~~ 495
~~16 16~~							
16 22	−.23		48.8	+1.5	50.3	−.4	49.9
16 25	+.35		49.5	−1.2	48.3	+.6	48.9
16 28	−.45		52.2	+.6	52.8	−.8	52.0
16 30	−.01		49.3	−.1	49.2	−0	49.2
						(6)	49.85

+0′ 49.88″
49.85

~~14 10 +.38~~ +0 ~~51.5 +2 51.7 +8 52.5~~

R.A.	sin z	R_eq − R_fl	θ′−θ	R_eq−R_fl +P′−P
h m		′ ″	″	″
16 59				
2 18	−.94			

+.20+.40:
+.40 +48.3
+.38 49.4
+.35 48.3
+.38 +48.7
+ .8
49.5₃
(6) 15₃
+.4

+0−.20:
−.01 +49.2
−.01 +49.2
− .0
49.2,
2′
+.7

−.20−.40:
−.23 +50.3
−.23 +50.3
− .5
49.8,
8′
+.1

−.40−.60:
−.45 +52.8
−.45 +52.8
− 1.0
51.8,
28′
−1.9

53

R.A.	sin z	R_eq −	R_fl	θ′−θ	R_eq−R_fl	+P′−P	
14 27	+.06	+0	47.9	+.3	48.2	+.1	48.3
14 35	+.47		49.0	+.2	49.2	+.8	50.0
14 45							
14 57	+.01		47.8	+.6	48.4	+0	48.4
16 39	+.06		48.5	+.3	48.8	+1	48.9
16 37	+18		48.3	−.1	48.2	+4	48.6
						(5)	48.84

+0′ 49.02″
48.97

R.A.	sin z	R_eq −	R_fl	θ′−θ	R_eq−R_fl	+P′−P	
14 48	−.30	+0	50.7	−.6	50.1	−.5	49.6
16 59						(11)	49.60

+.40+.60:
+.47 +49.2
+.47 +49.2
+ 1.0
50.2,
(6) 50.2′
−1.2

+0+.20:
+.06 +48.2
+.01 48.4
+.06 48.8
+.18 48.2₁
+.08 +48.5₄
+ .2
48.6₄
1944₄
+.4

−.20−.40:
−.30 +50.1
(1) 50.10
−.30 +50.1
− .6
49.5,
495′
−.5

2941

R.A.	sin z	R_eq −	R_fl	θ′−θ	R_eq−R_fl	+P′−P	
14 1	−.38	+0	48.8	+.6	49.4	−.6	48.8
14 26	+.20		50.7	−.7	50.0	+.4	50.4
14 35	+.43		47.4	+.1	47.5	+.8	48.3
14 40	+.64		48.8	+.1	48.9	+11	50.0
14 57	+.01		48.9	+.6	49.5	+.0	49.5
14 59	+26		49.4	+.5	49.9	+.5	50.4
~~14 45~~							49.57
17 11	+09		50.4	−.9	49.5	+3	49.8

+0′ 49.58″
49.56

R.A.	sin z	R_eq −	R_fl	θ′−θ	R_eq−R_fl	+P′−P	
14 48	−.30	+0	51.5	−.6	50.9	−.5	50.4
14 51	−.53						
17 4	+.03		49.5	−.7	48.8	−.1	48.7
							49.55

+.60+.80:
+.64 +48.9
+.64 +48.9
+ 1.3
50.2,
(9) 50.2′
− 6

+.40+.60:
+.43 +47.5
+.43 +47.5
+ .9
48.4,
48.4′
+1.2

+.20+.40:
+.26 +49.9
+.26 +49.9
+ .5
50.4,
50.4′
−.8

+0+.20:
+.20 +50.0
+.01 49.5
+.09 49.5
+.03 48.8
+.08 +49.4
+ .2
49.6₄
1984₄
+.0

−.20−.40:
−.38 +49.4
−.30 50.9
−.34 +50.1
− .7
49.4₂
988₂
+.2

4462

R.A.	sin z	R_eq −	R_fl	θ′−θ	R_eq−R_fl	+P′−P	
14 20	−.17	+0	47.6	+.8	48.4	−.2	48.2
14 26	+.20		49.0	−.7	48.3	+.4	48.7
14 35	+.47		48.8	+.1	48.9	+.8	49.7
14 39							
14 57	+.01		46.6	+.6	47.2	+0	47.2
14 59	+.26		50.0	+.5	50.5	+.5	51.0
14 45							
17 11	+.09		50.1	−.9	49.2	+.3	49.5
						(14)	49.05

+0′ 49.01″
49.06

R.A.	sin z	R_eq −	R_fl	θ′−θ	R_eq−R_fl	+P′−P	
14 48	−.30	+0	50.6	−.6	50.0	−4	49.6
14 51	−.53		48.4	+.9	49.3	−.9	48.4
17 8	−.38		51.0	+.2	51.2	−.7	50.5
17 4	+.03		48.4	−.7	47.7	+.1	47.8
						(4)	49.08

+.40+.60:
+.47 +48.9
+.47 +48.9
+ 1.0
49.9,
(14) 499′
− .9

+.20+.40:
+.26 +50.5
+.26 +50.5
+ .5
51.0,
51.0′
−2.0

+0+.20:
+.20 +48.3
+.01 47.2
+.09 49.2
+.03 47.7
+.08 +48.1
+ .2
48.3₄
1932₄
+.7

+0−.20:
−.17 +48.4
−.17 +48.4
− .4
48.0,
480′
+1.0

−.20−.40:
−.30 +50.0
−.38 51.2
−.34 +50.6
− .7
49.9₂
998₂
−.9

−.40−.60:
−.53 +49.3
−.53 +49.3
− 1.1
48.2,
482′
+.8

4901

1871 July 5 M. h = +.026 h' = +.022 h' = +.084 n = -.45

Star RA δ tang δ T - RA - (P' - P)

h m °

ε Bootis × 15.13 14

β Bootis × +8 14.956 +40 57 +.87 199 + 5.41 .39 5.060 +5.02 +07 +5.09

δ Bootis × +5 15.210 +33 48 +.67 201 + 5.34 .30 .04 +04 08

μ Bootis × +4 15.320 +37 58 + .78 202 + 5.47 .35 .12 +.03 .15

β Draco. × 1.8 17.528 +52 24 +1.30 240 + 5.84 .58 5.260 .26 -.15 .11

γ' Draco. - 17.50 15.72 +5.110 +5.108

14.8 +1.72 +5.88 +.01 +03 + 5.89 + 5.91

14.9 +365 +6.67 +.01 +.03 + 6.68 + 6.70

15.4 +1.69 + 5.82 -.00 +.02 + 5.82 + 5.84

1871 July 6 R. h = +.033 h' = +.029 h' = +.025 n = -.48

h m ° ' 461

33 Bootis × 14.633 +44 57 +1.00 + 6.04 .48 + 5.56 00

ε Bootis × 14.639 +27 +5.560 +5.560

14.60

1871 July 7 M. h = +.023 -43 h' = -.069 n = -.52

+1' h' = +.019

ψ Bootis 14.60 14.635 +14 16 + .25 195 + 6.52 .13 6.375 +6.39 -.03 +6.36

109 Virginis 14.639 +2 25 + .04 197 + 6.38 .02 .36 -.03 .33

ν Bootis 14.59 15.0 +27 26 + .52 465 6.61 .27 .34 +00 .34

β Librae 15.210 -8 55 ∓ .16 200 + 6.19 .08 .27 +.01 .28

ν' Bootis 15.426 + 41 16 + .88 206 + 6.79 .46 .33 +03 .36

α Cor. Bor. 15.529 + 27 8 + .51 209 + 6.64 .27 6.328 .37 + 03 .40

15.28 15.05 +1' +6.343 +6.345

14.8 +1.72 +7.30 +.00 +.01 + 7.30 + 7.31

14.9 +365 +8.25 +.00 +.01 + 8.25 + 8.26

15.4 +313 +7.88 -.01 +.00 + 7.87 + 7.88

1871 July 8 R h = +.022 h' = +1 +.017 h' = +.021 n = -.48

β Librae +3 15.210 -8 55 - .16 200 + 6.85 + .08 + 6.93 00

ν' Bootis 0 15.426 + 41 16 + .88 206 + 7.36 - .42 .94

α Cor. Bor. -1 15.529 +27 8 + .51 209 + 7.11 - .24 .87

ν₂ Bootis 0 15.427 +41 19 + .88 207 + 7.34 - .42 .92 00

15.38 +1' +6.890 +6.915

15.4 +3.13 +8.40 +00 +.00 +8.40 +8.40

1871 July 9 M. h = +.027 h' = +.027 n = -.55

8 +1' h' = +.022

ζ Bootis +4 14.427 +38 51 + .80 193 + 7.77 .45 + 7.32 +01 +7.33

ψ Bootis -4 ~~14.635~~ + 14 16 + ~~.25~~ ~~195~~

δ Bootis 15.210 +33 47 + .67 204 7.76 .37 .39 -01 38

β Bootis ×' 14.957 + 40 53 + .87 194 + 7.83 .48 .35 00 35

15.62 14.83 +1' +7.353 +7.353

13.2 -41.42 - ~~14.99~~ +.04 - 15.58

14.8 +1.72 +8.25 +.00 + 8.25

14.9 +365 +9.39 -.00 + 9.39

1871 July 5

Star RA δ tang δ T - RA - (P' - P)

h m ° '

Gr. 2164 × 14.848 +59 48 +1.72 + 5.88 - 462

β Urs. Min. × 14.951 +74 40 +3.65 + 6.67 - 443 198

ι Draconis × 15.422 +59 24 + 1.69 + 5.82 - 204

+1'

15.2 +67 +5.34 14.9 +87 +5.41

15.3 +78 +5.47 17.5 +1.30 +5.84

15.2 +72 +5.40 16.2 +1.08 +5.62

0 = +1.00 +.49 n = -.49 -49

+2.93 +1.28 -.44 -43

+.97 +.42 -.43 -43

45

0 = +.64 +.29 n = -.45

+2.57 +1.08 -.42

+.61 +.22 -.36

Gr 2164 × 14.848 +59 48 +1.72 + 7.30 - 462

β Urs. Min. × 14.951 + 74 40 +3.65 + 8.25 198

γ₂ Urs. Maj. 15.421 +72 17 + 3.13 + 7.88 202

+1'

14.6 +25 +6.52 15.4 +88 +6.79

14.6 +04 +6.38

15.2 -16 +6.19

15.5 +51 +6.64

15.0 +16 +6.43 n₅ = -.54

0 = +1.56 +.87 n = -.56 -56

+3.49 +1.82 -.52 -53

+2.97 +1.44 -.48 -48

-.52

0 = +84 +.52 n = -.62

+2.77 +1.47 -.53

+2.25 +1.09 -.48 -.51

+1'

γ₂ Urs. Maj. 15.421 +72 17 +3.13 + 8.40 203

15.2 -16 +6.85 15.4 +88 +7.36

15.5 +51 +7.11 15.4 +88 +7.34

15.3 +.18 +6.98 15.4 +.88 + 7.85 n₅ = -.53

0 = +2.95 +1.42 n = -.48

0 = +2.25 +1.05 n = -.47

+1'

Gr 2164 14.848 + 59 48 +1.72 + 8.25 462

α Urs. Min. 1.2 13 +88 37 - 41.41 - ~~14.77~~ 15.62 17

β Urs. Min. × 14.951 + 74 40 + 3.65 + 9.39 198

+1'

14.4 +81 +7.77

14.9 +87 +7.83

15.2 +67 +7.76

14.8 +.78 +7.79

I

0 = +.94 +.46 n = -.49

+2.87 +1.60 -.56

II

0 = -42.19 - 23.37 n = -.55

sin z +.60+.80 | +.40+.60 | +.20+.40 | +0 +.20 | +0 −.20 | −.20 −.40 | −.40 −.60 | −.60 −.80

462
198
204

R.A. h m	sin z	Ray−Rf ′	(P′−P) ″	Ray−Rf ″	P′−P ″	
14 56	+.03	+0	46.8	+.6	47.4 +.1	47.5
15 10	+.15		49.5	−.1	49.4 +.3	49.7
15 20	+.08		49.3	+.0	49.3 +.2	49.5
17 28	−.17		51.7	+.6	52.3 −.2	(52.1)
					(3)	48.90

+0′ 49.04″
48.60

R.A. h m	sin z	Ray−Rf ′	(P′−P) ″	Ray−Rf ″	P′−P ″	
14 48	−.30	+0	49.0	−.6	48.4 −.5	~~47.9~~ 47.9
14 51	−.53		48.0	+.9	48.9 −.9	~~48.0~~ 48.0
15 22	−.29		49.1	+.4	49.5 −.5	49.0
					(3)	48.30

+.03 +47.4 −.17 +52.3 −.30 +48.4 −.53 +48.9
+.15 49.4 −.29 49.5
+.08 49.3
+.09 +48.7 −.17 +52.3 −.30 +49.0 −.53 +48.9
+ .2 − .4 − .6 − 1.0
48.9 51.9 48.4 47.9
(7) 146.7³ 51.9¹ 96.8² 47.9¹ 3433
+.1 −2.9 +.6 +1.1

14 33

462
198
202

R.A.	sin z	Ray−Rf				
14 35	+.47	+0	47.0 +.2	47.2 +.8	48.0	
14 39	+.64		49.4 +.1	49.5 +1.1	50.6	
14 59	+.26					
15 10	+.78		47.6 −.1	47.5 +1.4	48.9	
15 26	+.00		47.3 −.6	46.7 +.0	46.7	
15 29	+.26		49.5 +.4	49.9 +.5	50.4	
				(5)	48.92	

+.64 +49.5 +.47 +47.2 +.26 +49.9 +.00 +46.7
+.78 47.5
+.71 +48.5 +.47 +47.2 +.26 +49.9 +.00 +46.7
+1.4 +1.0 +.5 +.0
49.9₂ 48.2₁ 50.4₁ 46.7₁
(8) 99.8 48.2 50.4 46.7
−1.3 +.4 −1.8 +1.9

+0′ 48.85″ ″.65
48.62

R.A.	sin z	Ray−Rf				
14 48	−.30	+0	48.5 −.6	47.9 −.5	47.4	
14 51	−.53		47.8 +.9	48.7 −.9	47.8	
15 21	−.50		49.9 +.1	50.0 −.8	49.2	
				(3)	48.13	

−.30 +47.9 −.53 +48.7
−.50 50.0
−.30 +47.9 −.52 +49.4
− .6 − 1.0
47.3₁ 48.4₂
47.3 96.8 3892
+1.3 +.2

203

R.A.	sin z	Ray−Rf				
15 10	+.78	+0	48.2 −.1	48.1 +1.5	49.6	
15 26	+.00		50.6 −.6	50.0 +.0	50.0	
15 29	+.26		49.8 +.4	50.2 +.5	50.7	
15 27	+.00		49.1 −.3	48.8 +0	48.8	
				(4)	49.78	

+.78 +48.1 +.26 +50.2 +.00 +50.0
+.00 48.8
+.78 +48.1 +.26 +50.2 +.00 +49.4
+1.6 +.5 +.0
49.7₁ 50.7₁ 49.4₂
(5) 49.7 50.7 49.8
+.1 −.9 +.4

+0′ 49.46″
49.79

R.A.	sin z	Ray−Rf				
15 21	−.50	+0	50.5 +.1	50.6 −.8	49.8	
					49.80	

−.50 +50.6
−.50 +50.6
− 1.0
49.6₁
49.6 38
+.2

462
17
198

R.A.	sin z	Ray−Rf				
14 27	+.06	+0	46.7 +.3	47.0 +2	47.2	
~~14 35~~						
15 10	+.15		47.3 −.1	47.2 +3	47.5	
14 57	+.03		45.8 +.6	46.4 +1	46.5	
				(3)	47.07	

+0′ 47.34″
47.38

R.A.	sin z	Ray−Rf				
14 48	−.30	+0	49.0 −.6	48.4 −.5	47.9	
12 13						
14 51	−.53		47.8 +.9	48.7 −.9	47.8	
				(2)	47.85	

+.06 +47.0 −.30 +48.4 −.53 +48.7
+.15 47.2
+.03 46.4
+.08 +46.9 −.30 +48.4 −.53 +48.7
+ .2 − .6 − 1.1
47.1₃ 47.8₁ 47.6₁
(3) 3 8 6 17
+.2 −.5 −.3

1871 July 10 M. h = +.026 n = −.5 h′ = +.027 n = −.50
h′ = +.021

Star	RA h m	δ ° ′	tang δ	π Ra −(ρ′−ρ)				
ι Virginis	+.5 ✓ 14.7 40	+ 2 25 +	.04 ✓197 + 8.29 ✓ −	.02	+ 8.27	+ 01	+ 8.28
δ Bootis	+6 15.2 10	+ 34 47 +	.67 ✓204 + 8.49 ✓ −	.33	.16	00	.16
ν1 Bootis	−2 15.4 27	+ 41 16 +	.88 ✓206 + 8.53 ✓ −	.44	.09	00	.09
α Cor. Bor.	−3 15.5 29	+ 27 8 +	.51 ✓209 + 8.44 ✓ −	.25	.19	− 01	.18
	15.20	+1′			+ 8.178		+ 8.178

14.9 + 3.65 + 9.89 + .00 + .01 + 9.89 + 9.90
15.4 + 3.13 + 9.88 − .01 + .00 + 9.87 + 9.88

1871 July 10

Star	RA h m	δ ° ′	tang δ	π Ra −(ρ′−ρ)		
β Urs. Min. x	14.9 51	+ 74 40 +	3.65 ✓	+ 9.89 ✓	—	198
γ2 Urs. Min.	15.4 21	+ 72 17 +	3.13 ✓	+ 9.88 ✓	—	203
		+1′				

14.7 + 04 + 8.29 15.2 + 67 + 8.49
15.5 + 51 + 8.44 15.4 + 88 + 8.53
15.1 + 28 + 8.36 15.3 + 78 + 8.51

0 = + 3.37 + 1.53 n = − .45 − .46
+ 2.85 + 1.51 − .53 − .53
− .50

0 = + 2.87 + 1.39 n = − .48
+ 2.35 + 1.37 − .58 − .53

1871 July 12 R. h = +.020 n = −.5 h′ = .004 n = −.54
+1′ h′ = +.015

Star	RA h m	δ ° ′	tang δ	π Ra −(ρ′−ρ)				
γ Bootis	15.17 +x01 14.4 27	+ 38 51 +	.80 ✓193 + 9.54 ✓ −	.44	9.109 + 9.10	− 01	+ 9.09
β Bootis	6 x 14.9 57	+ 40 53 +	.87 ✓199 + 9.58 ✓ −	.47	.11	00	.11
β Librae	3 15.2 10	− 8 55 −	.16 ✓202 + 9.01 ✓ +	.09	.10		.10
β Coronae	1 15.4 23	+ 29 32 +	.57 ✓205 + 9.40 ✓ −	.31	.09		.09
ν1 Bootis	x 15.4 26	+ 41 16 +	.88 ✓206 + 9.60 ✓ −	.47	.13		.13
ν2 Bootis	x 15.4 27	+ 41 19 +	.88 ✓207 + 9.62 ✓ −	.47	.15		.15
α Cor. Bor.	x 15.5 29	+ 27 8 +	.51 ✓209 + 9.35 ✓ −	.28	.07	00	.07
χ1 Draconis	x 17.5 30	+ 55 16 +	1.44 ✓242 + 9.88 ✓ −	.78	9.100 .10	+ 01	.11
	17.50 15.46	+1′			+ 9.106		+ 9.106

14.9 + 3.66 + 11.14 + .01 + .01 + 11.15 + 11.15
15.4 + 3.13 + 10.69 + .00 + .00 + 10.69 + 10.69
17.5 + 2.50 + 10.51 − .03 − .03 + 10.48 + 10.48

Star	RA h m	δ ° ′	tang δ	π Ra −(ρ′−ρ)		
β Urs. Min. x	14.9 51	+ 74 40 +	3.65 ✓	+ 11.14 ✓	—	198
γ Urs. Min. x	15.4 21	+ 72 17 +	3.13 ✓	+ 10.69 ✓	—	203
χ Draconis x	17.5 32	+ 68 13 +	2.50 ✓	+ 10.51 ✓	—	482
		+1				

15.2 − 16 + 9.01 14.4 + 81 + 9.54
15.4 + 57 + 9.40 14.9 + 87 + 9.58
15.5 + 51 + 9.35 15.4 + 88 + 9.60
15.4 + 31 + 9.25 15.4 + 88 + 9.62
17.5 + 1.44 + 9.88
15.5 + 98 + 9.64 n₅ = −.58

0 = + 3.35 + 1.90 n = − .57 − .56
+ 2.82 + 1.44 − .51 − .50
+ 2.19 + 1.23 − .56 − .56
54

0 = + 2.68 + 1.51 n = − .56
+ 2.15 + 1.05 − .49
+ 1.52 + 0.84 − .55 − .53

1871 July 13 M. h = +.019 n = − h′ = +.022 n = −.60
+1′ h′ = +.013

Star	RA h m	δ ° ′	tang δ	π Ra −(ρ′−ρ)				
β Librae	15.50 +.4 15.2 10	− 8 55 −	.16 ✓200 + 9.43 ✓	10	9.581 + 9.53	+ 01	+ 9.54
β Coronae	2 15.4 23	+ 29 32 +	.57 ✓205 + 9.78 ✓ −	34	.44	+ 01	.45
ν1 Bootis	2 15.4 26	+ 41 16 +	.88 ✓206 + 10.12 ✓ −	.53	.59	00	.595
ν2 Bootis	2 15.4 27	+ 41 19 +	.88 ✓207 + 10.12 ✓ −	.53	.59		.59
α Cor. Bor.	1 15.5 29	+ 27 8 +	.51 ✓209 + 9.88 ✓	31	.57		.57
β Serpentis	−2 15.7 40	+ 15 49 +	.28 ✓213 + 9.79 ✓	17	.62		.62
μ Serpentis	15.7 43	− 3 3 −	.05 ✓214 + 9.63 ✓ +	03	.66		.66
ε Serpentis	1 15.7 44	+ 4 51 +	.08 ✓216 + 9.70 ✓ −	.05	.65	00	.65
β Scorpii	~~15.9~~ 57						
δ Ophiuchi	−5 16.1 7	− 3 22 −	.06 ✓222 + 9.66 ✓	.04	.70	− 01	.69
ε Ophiuchi	−6 16.2 11	− 4 23 −	.08 ✓223 + 9.60 ✓	.05	9.65 .65	− 01	.64
	16.15 15.63	+1′			+ 9.600		+ 9.600

13.2 − 41.41 − 16.68 + .03 + .03 − 16.64 − 16.64
14.9 + 3.65 + 11.68 + .01 + .01 + 11.69 + 11.69
15.4 + 3.13 + 11.35 + .00 + .00 + 11.35 + 11.35
15.8 + 4.78 + 12.50 − .00 − .01 + 12.50 + 12.49
15.9 + 1.43 + 10.37 − .00 − .01 + 10.37 + 10.36
16.0 + 1.66 + 10.60 − .00 − .01 + 10.60 + 10.59

Star	RA h m	δ ° ′	tang δ	π Ra −(ρ′−ρ)		
γ Urs. Min. x	15.4 21	+ 72 17 +	3.13 ✓	+ 11.35 ✓	—	203
η Urs. Min. ✓	15.8 49	+ 78 11 +	4.78 ✓	+ 12.50 ✓	—	217
Gr. 2296 ✓	15.9 55	+ 55 6 +	1.43 ✓	+ 10.37 ✓	—	471
θ Draco. ✓	16.0 00	+ 58 54 +	1.66 ✓	+ 10.48	—	220
λ Urs. Min.	1.2 13	+ 88 39 −	41.41 ✓	− 16.68 ✓	—	19
β Urs. Min.	14.9 51	+ 74 40 +	3.65 ✓	+ 11.68 ✓	—	198
		+1′				

15.2 − 16 + 9.43 15.4 + 88 + 10.12
15.4 + 57 + 9.78 15.4 + 88 + 10.12 n₅ = −.61
15.5 + 51 + 9.88 15.4 + 88 + 10.12
15.7 + 29 + 9.79 0 = + 3.51 + 2.01 n = − .57 − .57
15.7 − 05 + 9.63 + 2.99 + 1.67 − .56 − .56 0 = − 41.55 − 26.32 n = − .63 − .63
15.7 + 08 + 9.70 + 4.64 + 2.82 − .61 − .61
16.1 − 06 + 9.66 + 1.29 + 0.69 − .53
16.2 − 08 + 9.60 + 1.52 + 0.92 − .61 − .61 − .59
15.7 + 14 + 9.68

0 = + 2.77 + 1.57 n = − .57 0 = − 42.29 − 26.76 n = − .63
+ 2.25 + 1.23 − .55
+ 3.90 + 2.37 − .61
+ .55 + .24 − .44
+ .78 + .47 − .60 − .58

1871 July 17 R. h = +.014 n = − h′ = +.018 n = −.59
h′ = +.008

Star	RA h m	δ ° ′	tang δ	π Ra −(ρ′−ρ)				
φ Herculis	16.034 15.9 16.1 5	+ 45 16 +	1.01 ✓221 + 12.29 ✓ −07	.60	11.590 .51 + 11.62	+ .02 + .02	+ 11.53 .66 .64
η Draconis	16.17 54	+ 57 30 +	1.26 ✓252 + 14.41 ✓	.74	.67	− 01	.66
o Herculis	18.03	+ 28 46 +	.55 ✓255 + 11.93 ✓	.32	.61	− 01	.60
b Draconis	18.4 22	+ 58 44 +	1.64 ✓488 + 12.66 ✓	.97	.69	− 02	.67
α Lyncis	17.9				? .49	− .01	.48
Gr. 2640 x	18.6 36	+ 65 25 +	2.18 ✓491 + 12.99 ✓				
α Lyrae	18.6 33	+ 38 40 +	.80 ✓260 + 12.16 ✓	.47	11.630 .69	− 02	.67
	17.35				+ 11.615		+ 11.614

18.7 − 20.73 − 0.53 − .00 − .01 − 0.53 − 0.54
18.6 + 2.18 + 12.99 .00 − .01 + 12.99 + 12.98

Star	RA h m	δ ° ′	tang δ	π Ra −(ρ′−ρ)			
Gr. 2296 x	15.9 55	+ 55 6 +	1.43 ✓	+ 12.35 ✓ − .84	+ 11.51	471
θ Draco. x	16.0 00	+ 58 54 +	1.66 ✓	+ 12.50 ✓ + 12.98	.64	220
ζ Draco. x	17.9 51	+ 56 54 +	1.53 ✓	+ 12.39 ✓ − .90	.49	248
51 H Cephei x	6.7 41	~~+ 87 14 + 20.60~~ + 92 45 −	20.73 ✓	− 0.53 ✓		711
		+1′				

18.0 + 55 + 11.93 15.9 + 1.43 + 12.35 0 = + 1.50 + .95 n = − .63
18.6 + 80 + 12.16 16.0 + 1.66 + 12.50 62
18.3 + 68 + 12.04 16.1 + 1.01 + 12.22 + .73 + .54 − .74
17.9 + 1.53 + 12.39
17.9 + 1.26 + 14.41 0 = − 21.41 − 12.57 n = − .59
18.4 + 1.64 + 12.66
~~17.0 + 1.42 + 12.77~~
16.9 + 1.45 + 12.45 0 = − 22.18 − 12.99 n = − .59

+.60 +.80 | +.40 +.60 | +.20 +.40 | +0 +.20 | +0 −20 | −.20 −40 | −.40 −60 | −.60 −80

R.A. h m	sin z	$R_{sy}-R_{fl}$	′′	$\rho'-\rho$	$R_{sy}-R_{fl}+\rho'-\rho$ ′′		
14 40	+.64	+0	47.6	+.1	47.7	+11	48.8
15 10	+.15		47.3	−.1	47.2	+3	47.5
15 27	+.00		47.2	−.6	46.6	+0	46.6
15 29	+.26		47.6	−.5	47.1	+.5	47.6

(4) 47.62

R.A. h m	sin z	$R_{sy}-R_{fl}$	′′	$\rho'-\rho$	$R_{sy}-R_{fl}+\rho'-\rho$ ′′		
14 51	−.53	+0	48.2	+.9	49.1	−9	48.2
15 21	−.50		48.5	+.1	48.6	−8	47.8

(2) 48.00

+.64 +47.7

+.26 +47.1 | +.15 +47.2
+.00 46.6

−.53 +49.1
−.50 48.6

+.64 +47.7
+ 1.3
49.0
(6) 90
− 1.3

+.26 +47.1
+ .5
47.6
76
+.1

+.08 +46.9
+ .2
47.1
142
+.6

−.52 +48.8
− 1.0
47.8
156
−.1

464

+0′ 47.43′′
47.75

R.A. h m	sin z	$R_{sy}-R_{fl}$		$\rho'-\rho$			
14 27	+.06	+0	48.3	+.3	48.6	+2	48.8
14 57	+.03		48.0	+.6	48.6	+1	48.7
15 10	+.78		48.0	−.1	47.9	+15	49.4
15 23	+.22		48.3	+.3	48.6	+4	49.0
15 26	+.00		48.3	−.6	47.7	+0	47.7
15 27	+.00		48.4	−.3	48.1	+0	48.1
15 29	+.26		49.8	+.4	50.2	+5	50.7
17 30	−.22		49.9	+.8	50.7	−4	51.3

(8) 49.22

R.A. h m	sin z	$R_{sy}-R_{fl}$		$\rho'-\rho$			
14 51	−.53	+0	48.9	+.9	49.8	−9	48.9
15 21	−.50		50.3	+.1	50.4	−8	49.6
17 32	−.44		48.7	+.5	49.2	−8	48.4

(3) 48.97

+.78 +47.9

+.22 +48.6 | +.06 +48.6
+.26 50.2 | +.03 48.6
+.00 47.7
+.00 48.1

−.22 +50.7

−.53 +49.8
−.50 50.4
−.44 49.2

+.78 +47.9
+ 1.7
49.6
(11) 49.6
−.6

+.24 +49.4
+ .5
49.9
99.8
−.9

+.02 +48.2
+ .1
48.3
193.2
+.7

−.22 +50.7
− .5
50.2
50.2
−1.2

−.49 +49.8
− 1.0
48.8
146.4
+ .2

5392

+0′ 49.02′′
49.15

R.A. h m	sin z	$R_{sy}-R_{fl}$		$\rho'-\rho$			
15 10	+.78	+0	47.7	−.1	47.6	+1.5	49.1
15 23	+.22		48.3	+.3	48.6	+.4	49.0
15 26	+.00		48.2	−.6	47.6	+.0	47.6
15 27	+.00		48.6	−.3	48.3	+0	48.3
15 29	+.26		49.7	+.4	50.1 ~~49.3~~	+.4	50.5
15 40	+.45		47.4	+.3	47.7	+.8	48.5
15 43	+.71		47.4	−.6	46.8	+1.2	48.0
15 44	+.61		49.1	−.4	48.7	+1.0	49.7
16 7	+.72		48.0	+.1	48.1 ~~44.9~~	+1.3	49.4
16 11	+.73		46.5	−.1	46.4	+1.4	47.8

(10) 48.80

R.A. h m	sin z	$R_{sy}-R_{fl}$		$\rho'-\rho$			
15 21	−.50	+0	50.1	+.1	50.2	−8	49.4
15 49	−.58		50.4	+.2	50.6	−10	49.6
15 55	−.22		48.5	+.5	49.0	−4	48.6
16 0	−.28		48.3	+.7	49.0	−5	48.5
1 13							
14 51	−.53		50.2	+.9	51.1	−9	50.2

(5) 49.26

+.78 +47.6
+.71 46.8
+.61 48.7
+.72 48.1
+.73 46.4

+.45 +47.7

+.22 +48.6
+.26 50.1

+.00 +47.6
+.00 48.3

−.22 +49.0
−.28 49.0

−.50 +50.2
−.58 50.6
−.53 51.1

+.71 +47.5
+ 1.4
48.9
(15) 244.5
+.1

+.45 +47.7
+ 1.0
48.7
48.7
+.3

+.24 +49.4
+ .5
49.9
198
−.9

+.00 +48.0
+ .0
48.0
160
+1.0

−.25 +49.0
− .5
48.5
170
+.5

−.54 +50.6
− 1.1
49.5
285
−.5

1345

+0′ 48.96′′
48.96

R.A. h m	sin z	$R_{sy}-R_{fl}$		$\rho'-\rho$			
16 5	−.05	+0	47.9	+.1	48.0	−.1	47.9
17 54	−.16	+0	48.9	+.4	49.3	−.3	49.0
18 3	+.24		48.8	+.2	49.0	+5	49.5
18 22							
18 36	−.39	0	49.8	+2.5	52.3	−.6	(51.7)
18 33	+.06	+0	49.3	+.1	49.4	+2	49.6

(4) 49.00

R.A. h m	sin z	$R_{sy}-R_{fl}$		$\rho'-\rho$			
15 55	−.22	+0	50.8	+.5	51.3	−4	50.9
16 0	−.28		49.1	+.7	49.8	−5	49.3
17 51	−.25		51.1	−.1	51.0	−5	50.5
6 41							

(3) 50.22

+.24 +49.0 | +.06 +49.4 | −.05 +48.0
−.16 49.3

−.39 +52.3
−.22 51.3
−.28 49.8
−.25 51.0

+.24 +49.0
+ .5
49.5
(8) 95
+.2

+.06 +49.4
+ .1
49.5
95
+.2

−.10 +48.6
− .2
48.4
168
+1.3

−.28 +51.1
− .6
50.5
420
−.8

778

+0′ 49.72′′
49.52

1871 July 20 R. h = +.015 +28 h' = +.021 n = −.52
h' = +.008

Star	Ra	δ	tang δ	T − Ra −(ρ' − ρ)			
	h m	+1				12.643	
~~2 Urs. Min.~~	~~14 56~~	~~+66° 26'~~	~~+2.29~~	~~+13.96~~			
c Bootis x	14. 59						
δ Bootis +10	15.2 10	+34 3 47+	.67 201	+12.96	.35	+12.61 + 02	+12.63
μ Bootis x 9	15.3 20	+37 49+	.78 202	+13.05	.41	.64 + 02	.66
β Coronae 8	15.4 23	+29 32+	.57 205	+12.93	.30	.63 + 02	.65
ν1 Bootis 8	15.4 26	+41 16+	.88 206	+13.02	.46	.56 + 02	.58
ν2 Bootis 7	15.5 28	+41 19+	.88 207	+13.10	.46	.64 + 02	66
α Cor. Bor. x 7	15.5 29	+27 8+	.51 209	+12.86	.27	.59 + 02	.61
α Serpentis 6	15.6 38	+6 49+	.12 212	+12.71	.06	.65 + 01	66
β Serpentis 9	15.7 40	+16 5 49+	.28 9 213	+12.83	.15	.68 + 01	69
μ Serpentis 9	15.7 43	−3 3−	.05 214	+12.62	.03	.65 + .01	.66
~~ε Urs. Min.~~	~~15 48~~	~~+78 11~~	~~+4.79~~				
ξ +3	15.9	+1'				.60 + 01	.61
β Scorpii +2	16.0					.70 + 00	.70
		+1'					
δ Ophiuchi +1	16.1 8	−3 22−	.06 222	+12.61	.03	.64 + 00	.64
ε Ophiuchi 0	16.2 12	−4 23−	.08 223	+12.67	.04	.71 − 00	.71
Gr. 2640 x 0	[18.6] 36	+65 23+	2.18 491	+13.81	1		
ε Lyrae +2.5	18.7 40	+39 32+	.82 261	+13.16	.43	.73 − 05	.68
β Lyrae 6	18.8 45	+33 13+	.65 264	+13.02	.34	.68 − 05	.63
γ Lyrae	18.9 54	+32 31+	.64 268	+13.04	.33	.71 − 06	.65
ω Herculis +1	16.3 19	+14 19+	.25 473	+12.83	.13	.70 + 00	.70
1880	16.13	+1'				12.707	
						+12.654	+12.654

14.9 +229 +1396 +.01 +.01 +1397 +1397
15.8 +479 +14.95 +.00 +.00 +1495 +14.95
186 +2.18 +13.81 −.02 −.02 +13.79 +13.79
187 −2072 +1.98 −.02 −.02 +1.96 +1.96

1871 July 20

Star	Ra	δ	tang δ	T − Ra −(ρ' − ρ)			
	h m	° +1 '	8				
g Urs Min x	15.8 49	+78 11.4	4.79	+14.95			217
Gr 2296 x	15.9 55	+55 6+	1.43	+13.34	−74 + 12.60		471
θ Draco x	16.0 00	+58 54+	1.66	+13.44	+12.86	.70	220
51 Cephei	6.7 41	+87 14.4	20.59 72	+1.98			111
~~50 Draconis x~~	~~18.8 49~~	~~+59 14.4~~	~~+1.68~~	~~+30.32~~	−.87 [30.45]		
2 H Urs Min	14.9 56	+66 26+	2.29	+13.96			464
		+1'					

15.4+57+12.93 15.4 +88 +13.02
15.5+51+12.86 15.5 +88 +13.10
15.6+12+12.71 15.9 +143 +13.34
15.7+29+12.83 16.0 +166 +13.44 56
15.7−05+12.62 [18.8 +168 +3032]
16.1−06+12.68 15.7 +121 +13.28 5 n5 = −.47
16.2−08+12.67
16.3+25+12.83
15.8 +19 +12.77

0 = +2.10 +1.20 n = −.57 −57 0 = −20.91 −10.81 n = −.52 −.52
+4.59 +2.18 −.48 −48
+1.99 +1.02 −.50 −50 −.52

0 = +1.08 +.72 n = −.66] 0 = −21.93 −11.29 n = −.52
+3.57 +1.70 −.48
+.97 +.54 −.56] −.48

1871 July 22 R. h = +.007 +24 h' = +.023 n = −.42
h' = .000

Star	Ra	δ	tang δ	T − Ra −(ρ' − ρ)			
	16.15 15.9 16.0					13292 .29 + 02	+13.31
						.33 + 02	.35
δ Ophiuchi	16.1 8	−3 22−	.06 222	13.32	.03	+13.35 + 02	.37
ε Ophiuchi	16.2 12	−4 23−	.08 223	13.28	.03	.31 + 02	33
Gr 2343 x 6	16.4 22	+55 29+	1.44 5475	13.86	.61	.25 + 01	26
α Lyrae x	18.5 33	+38 40+	.80 260	13.63	.34	.29 − 03	26
Gr 2640	[18.6] 36	+65 23+	2.18 491	14.15			
β Lyrae x	18.8 45	+33 13+	.65 264	13.61	.27	.34 − 04	.30
o Draconis x	18.8 49	+59 14+	1.68 265	14.13	.71	.42 − 04	38
ω Herculis	16.3 19	+14 19+	.25 473	13.32	.10	.22 + 02	24
18.70	17.00	+1				13.350 +13.311	+13.311

16.2 +4.07 +15.04 +.00 .00 +15.04 +15.04
186 +2.18 +14.15 .00 +14.15 +14.15
18.7 −20.72 +4.20 .00 .00 +4.20 +4.20

1871 July 22

Star	Ra	δ	tang δ	T − Ra −(ρ' − ρ)			
		+1'					
Gr 2296 x	15.9 55	+55 6+	1.43	+13.89	−.60	+13.29	471
θ Draco x	16.0 00	+58 54+	1.66	+13.91	+12.70	.33	220
19 Urs Min	16.2 14	+76 11+	4.07	+15.04			472
51 Cephei x	6.7 41	+87 14.4	20.60 72	+4.20			111
		+1'					

16.1−06+13.32 15.9 +1.43+13.89
16.2−08+13.28 16.0 +1.66 +13.91 1403
16.3+25+13.32 16.4 +1.45+13.86
16.2 +04 +13.31 18.8 +1.68+14.13
16.8 +1.56 +13.95 8 n5 = −.43

0 = +4.03 +1.73 n = −.43 −43 0 = −20.76 −9.11 n = −.43 −.43
+2.14 +0.84 −.39 −41 .42

0 = +2.51 +1.06 n = −.42 0 = −22.28 −9.78 n = −.44
+.62 +.17 −.28] −42

1871 July 23 R. h = +.004 −8 −.501 h' = .002 n = −.48
+1' h' = −.003

Star	Ra	δ	tang δ	T − Ra −(ρ' − ρ)			
	15.17 15.9 16.0					13.334	.30 00
δ Bootis x 9	15.2 10	+34 3 47+	.67 204	13.67	.32	+13.35	.38
β Coronae 7	15.4 23	+29 32+	.57 205	13.56	.27		29
ν1 Bootis x 7	15.4 26	+41 16+	.88 206	13.73	.42		31
ν2 Bootis x 7	15.4 27	+41 19+	.88 207	13.76	.42		34
α Cor. Bor. x 6	15.5 29	+27 8+	.51 209	13.69	.24		.45
α Serpentis 5	15.6 38	+6 49+	.12 212	13.41	.06		.35
β Serpentis 4	15.7 40	+15 49+	.29 213	13.47	.14		.33
μ Serpentis 4	15.7 43	−3 3−	.06 214	13.37	.02		.33
ε Serpentis 4	15.7 44	+4 51+	.09 216	13.38	.04		.34
δ Ophiuchi	16.1 08	−3 22−	.06 222	13.32	.03		.35
ε Ophiuchi	16.2 12	−4 23−	.08 223	13.31	.04		.35
Gr 2530	18.2 11	+42 7+	.90 486	13.79	.43		34
α Lyrae	18.6 33	+38 40+	.80 260	13.71	.38		.33
Gr 2640 x	[18.6] 36	+65 23+	2.18 491	14.40			
γ Serpentis +3	15.8 50	+16 4+	.29 218	13.48	.14		.34
ω Herculis	16.3 19	+14 19+	.25 473	13.43	.12		.31
λ Ophiuchi	16.4 24	+2 16+	.04 227	13.42	.02		.40 00
1840	1606	+1'				13.335 +13.338	+13.338

1871 July 23

Star	Ra	δ	tang δ	T − Ra −(ρ' − ρ)			
		+1'	8				
ε Urs Min x	15.8 49	+78 11+	4.79	+15.67			217
Gr 2296 x	15.9 55	+55 6+	1.43	+13.99	−69	+13.30	471
θ Draconis x	16.0 00	+58 54+	1.66	+13.96 1396	+12.80	.28	220
19 Urs Min x	16.2 14	+76 11+	4.07	+15.17			472
δ Urs Min	18.2 13	+86 36.4	16.83	+21.46			256
51 Cephei	6.7 41	+87 14.4	20.60 72	+3.38			111
		+1'					

15.2+67+13.67 15.9 +1.43+13.99 I 0 = +4.56 +2.22 n = −.49 −.50
15.4+57+13.56 16.0 +1.66 +13.96 1408 n5 = −.44 +3.86 +1.72 −.45 −.45
15.5+51+13.69 16.0 +1.54 +13.99 1403 +16.61 +8.00 −.48 −.48
15.6+12+13.41 15.8 +4.78 +15.67 +.00 −.00 +15.67 +15.67 +1.96 +.94 −.48 −.48 −.48
15.7+29+13.47 16.2 +4.08 +15.17 +.00 −.00 +15.17 +15.17 II
15.7−05+13.31 18.2 +16.83 +21.46 −.01 −.01 +21.45 +21.45 0 = +3.24 +1.64 n = −.51
15.7+08+13.38 18.6 +2.18 +14.40 −.01 −.01 +14.39 +14.39 +2.54 +1.14 −.45
15.8+29+13.48 18.7 −20.72 +3.38 −.01 −.01 +3.37 +3.37 +15.29 +7.42 −.48 +0
16.1−06+13.32 +.64 +.36 −.56
16.2−08+13.31 I 0 = −20.94 −10.08 II 0 = −22.26 −10.66 n = −.48 −.48
16.3+25+13.43
16.4+04+13.42 n = −.48

sin z +.60+.80 +.40 +.60 +.20 +.40 +0 +.20 +0 -.20 -.20 -.40 -.40 -.60 -.60 -.80

RA h m | sin z / δ | $R_{eq} - R_{fl}$ " | P'-P " | $R_{eq}-R_{fl}+P'-P$ "

+0
14 56 ~~-.44~~ 47.4 -.+
14 59
15 10 +.15 47.3 -.1 47.2 +.3 47.5
15 20 +.08 46.3 +.0 46.3 +.2 46.5
15 23 +.22 46.3 +.3 46.6 +.4 47.0
15 26
15 28 +.00 46.7 -.3 46.4 +.0 46.4
15 29
15 38 +.58 46.5 -.3 46.2 +1.0 47.2 +.71 +46.8 +.58 +46.2 +.22 +46.6 +.15 +47.2
15 40 +.45 45.7 +.3 46.0 +.9 46.9 +.72 46.2 +.45 46.0 +.08 46.3
15 43 +.71 47.4 -.6 46.8 +1.4 48.2 +.73 45.6 +.47 46.3 +.00 46.4
15 49 +.05 46.5
15 57 +.16 47.0
16 8 +.17 47.8
+.72 +46.2 +.50 +46.2 +.22 +46.6 +.10 +46.9
16 8 +.72 46.1 +.1 46.2 +1.3 47.5 +1.5 +1.0 +.5 +.2
16 12 +.73 45.7 -.1 45.6 +1.4 47.0 47.7 3 47.2 3 47.1 47.1 6
18 36 -.39 46.0 +2.5 48.5 -.7 47.8 (18) 21 6 1 6
18 40 +.05 46.5 +.00 46.5 +.2 46.7 -.3 +.2 +.3 +.3
18 45 +.16 47.0 +.0 47.0 +.3 47.3
18 54 +.17 47.9 -.1 47.8 +.3 48.1
16 19 +.47 47.7 -1.4 46.3 +.8 47.1
(14) 47.23

' "
+0 47.36
47.36

RA h m | sin z / δ | $R_{eq} - R_{fl}$ " | P'-P " | $R_{eq}-R_{fl}+P'-P$ "

15 49 -.58 +0 49.1 +.2 49.3 -1.0 48.3
15 55 -.22 48.4 +.5 48.9 -.4 48.5
16 00 -.28 47.3 +.7 48.0 -.5 47.5
6 41
~~18 49 -.29~~
14 56 -.41 47.4 -1 47.3 -3 47.0
41 47.3 I
-.39 +48.5 -.58 +49.3
-.22 48.9 -.41 47.3
-.28 48.0
-.30 +48.4 5 -.50 +48.3
-.7 -1.0
47.8 3 47.3
24 3 6 2 64
-.4 +.1

16 8 +.72 +0 45.5 +.1 45.6 +1.4 47.0
16 12 +.73 44.7 -.1 44.6 +1.4 46.0
16 22 -.23 48.0 +1.5 49.5 -.3 [49.2]
18 33 +.06 46.0 +.1 46.1 +.2 46.3
18 36 -.39 45.5 +2.5 48.0 -.6 47.4
18 45 +.16 50.0 +.0 50.0 +.3 [50.3]
~~18 49~~ +.72 +45.6 +.47 +46.8 +.06 +46.1
16 19 +.47 48.2 -1.4 46.8 +.8 47.6 +.73 44.6 +.16 50.0
(7) 47.~~69~~ 25
+.72 +45.1 +.47 +46.8 +.11 +48.0
+1.5 +1.0 +.3
46.6 47.8 48.3
(10) 13.2 2 78 1 16.6 2
+1.0 -.2 -.7

' "
+0 47.62
~~47.39~~ 46.90
~~47~~

15 55 -.22 +0 47.4 +.5 47.9 -.3 47.6
16 00 -.28 46.1 +.7 46.8 -.4 46.4
16 14 -.56 49.5 +.6 50.1 -1.0 [49.1]
6 41
(3) 47.00
-.23 +49.5 -.56 +50.1
-.39 48.0
-.22 47.9
-.28 46.8
-.28 +48.0 -.56 +50.1
-.6 -1.1
47.4 4 49.0 1
29.6 90 76.2
+.2 -1.4

15 10 +.15 +0 46.3 -.1 46.2 +.3 46.5
15 23 +.22 48.4 +.3 48.7 +.4 49.1]
~~15 26 +.02 +0 27.2 -.6~~
15 27 ~~+.00~~ 46.0 -.3 45.7 +.0 45.7
15 29 +.26 47.3 -.5 46.8 +.5 47.3
15 38 +.58 47.9 -.3 47.6 +1.0 48.6
15 40 +.45 46.2 +.3 46.5 +.9 47.4 +.71 +47.5 +.58 +47.6 +.22 +48.7 +.15 +46.2
15 43 +.71 48.1 -.6 47.5 +1.3 48.8 +.61 48.6 +.45 46.5 +.26 46.8 +.00 45.7
15 44 +.61 49.0 -.4 48.6 +1.1 49.7] +.72 47.5 +.44 46.1 +.01 45.6
16 08 +.72 47.4 +.1 47.5 +1.4 48.9 +.73 45.8 +.47 47.5 +.06 48.1
16 12 +.73 45.9 -.1 45.8 +1.4 47.2 +.64 48.2
18 11 +.01 45.0 +.6 45.6 +.1 45.7 +.68 +47.5 +.48 +46.9 +.24 +47.8 +.06 +46.4
18 33 +.06 48.0 +.1 48.1 +.2 48.3 +1.4 +1.1 +.5 +.1
18 36 48.9 5 48.0 4 48.3 2 46.5 4
15 50 +.44 46.2 -.1 46.1 +.8 46.9 (19) 44.5 32.0 16.6 26.0
16 19 +.47 48.9 -1.4 47.5 +.9 48.4 -1.1 -.2 -.5 +1.3
16 24 +.64 48.8 -.6 48.2 +1.2 49.4]
(15) 47.~~86~~ 47

=-.49 -.50
-.45 -.45
-.48 -.48
-.48 -.48 -.48
=-.51
-.45 ' "
-.48 +0 47.79
-.56 ~~47.77~~
-.48 46

15 49 -.58 +0 48.3 +.2 48.5 -1.0 47.5
15 55 -.22 47.5 +.5 48.0 -.3 47.7
16 00 -.28 46.8 +.7 47.5 -.4 47.1
16 14 -.56 47.9 +.6 48.5 -1.0 47.5
18 13 (4) 47.45
6 41
-.22 +48.0 -.58 +48.5
-.28 47.5 -.56 48.5
-.25 +47.8 -.57 +48.5
-.6 -1.2
47.2 2 47.3 2
14.4 2 14.6 2 148.1
+.6 +.5

1871 July 27 G. h = +.008 (−13) n = −.525 h′ = −.006 n = −.48
h′ = .000

16.14 13.928

Star	RA		δ	tang δ	T−RA −(P′−P)				
	h m		40 +1′						
ε Serpentis	15.7 44	+8	51+	.08	216 +14.00	.04	+13.96	−.01	+13.95
δ Ophiuchi	16.1 08	−3	22−	.06	222 +13.88	.03	.91	−.01	13.90
ε Ophiuchi	16.2 12	−4	23−	.08	224 13.91	.04	.95	−.01	13.94
ω Herculis	16.3 19	+14	19+	.25	473 +14.04	.12	.92	−.01	13.91
λ Ophiuchi	16.4 24	+2	16+	.04	227 +13.92	.02	.90	−.00	13.90
Gr. 2533	18.2 12	+42	7+	.90	486 +14.35	.43	.92	+.01	13.93
109 Herculis	18.3 18	+21	43+	.40	258 +14.05	.19	13.86	+.01	13.87
β Draconis	18.4 22	+58	44+	1.64	488 +14.80	.79	14.01	+.01	14.02
α Lyrae	18.5 33	+38	40+	.80	360 +14.25	.38	13.87	+.01	13.88

18.35 17.12 +1′ 13.915
+13.922 +13.922

15.8 + 4.78 +16.38 .00 .00 +16.38 +16.38
16.2 + 4.08 +15.75 .00 .00 +15.75 +15.75

1871 July 27

Star	RA		δ	tang δ	T−RA −(P′−P)		
	h m		+1′				
ε Urs. Min.	15.8 49	+78	11+	4.78	+16.38	—	217
19 Urs. Min.	16.2 14	+76	11+	4.07	+15.75	—	472

15.7+08+14.00 18.2 +.90 +14.35
16.1−06+13.88 18.4 +1.64 +14.80
16.2−08+13.91 18.3 +1.27 +14.58 m5 = −.53
16.3+26+14.04
16.4+04+13.92
18.3+40+14.05
16.5+11+13.97

0 = +4.67 +2.41 n = −.52 −52
+3.97 +1.78 −.45 −44
−.48

0 = +3.51 +1.80 n = −.51
+2.81 +1.17 −.42 −.47

1871 Aug 2 R h = +.008 (−22) n = −.5 h′ = +.010 c = +.07 n = −.48
+1 h′ = .000 sec δ

16.35 15.458

Star	RA		δ	tang δ	T−RA −(P′−P)					
α Serpentis	15.6 37	+6	49+	.12	104 212 15.47	.06	+.07	+15.48	+.01	+15.49
β Serpentis	15.7 40	+16	49+	.28	104 213 15.54	.14	+.07	.47	+.01	.48
μ Serpentis	15.7 43	−3	3−	.05	100 214 15.36	.02	+.07	.45	+.01	.46
ω Herculis	16.3 19	+14	19+	.25	103 473 15.48	.12	+.07	.43	+.01	.44
λ Ophiuchi	16.4 24	+2	16+	.04	100 227 15.35	.02	+.07	.40	+.01	.41
ζ Ophiuchi	~~16.5~~ 30	15.9	−	.18				43	00	43
ζ Herculis	16.6 37	+31	50+	.62	118 231 15.65	.30	+.08	.43	00	.43
η Herculis	16.6 38	+39	10+	.82	129 232 15.78	.39	+.09	.48	00	.48
49 Herculis	16.8 46	+15	11+	.27	104 478 15.51	.13	+.07	.45	00	.45
κ Ophiuchi	16.9 51	+9	34+	.17	101 235 15.44	.08	+.07	.43	00	.43
ζ Draconis	17.9 54	+51	30+	1.26	164 254 15.96	.60	+.11	.47	−.01	.46
θ Lyrae	19.2 12	+37	55+	.78	127 496 15.79	.37	+.09	.51	−.02	.49
κ Cygni	19.2 14	+53	8+	1.33	166 272 15.99	.64	+.12	.47	−.02	.45
τ Draconis	19.3 18	+73	7+	3.29	273 +16.60					
ε Herculis	16.9 55	+31	7+	.60	117 234 +15.77	.29	+.08	.56	.00	.56

18.17 16.91 +1′ 15483
+15.464 +15.464 2

15.8+4.78 +17.92 .00 .00 +17.92 +17.92
16.2+4.08 +16.94 +16.94 +16.94
19.3 +3.29 +16.60 .00 .00 +16.60 +16.60

Star	RA		δ	tang δ	T−RA −(P′−P)				
			+1′	sec δ					
ε Urs Min	15.8 49	+78	11+	4.78	+17.92	—			217
Gr. 2296	15.9 54	+55	6+	1.43 1.74	+16.15	−84+12		15.43	471
19 Urs Min	16.2 14	+76	11+	~~15.75~~ 4.08	+16.94	—			472
η Draconis	16.4 22	+61	48+	1.86 210	+16.19	+16	89+15	+15.61	226
Gr 2377	16.7 43	+57	0+	1.54 184	+16.16	+15	74+14	.69	477

15.6+12+15.47 15.9 +1.43+16.15
15.7+29+15.54 16.4 +1.85 +16.35
15.7−05+15.36 16.7 +1.54 +16.29
16.3+26+15.48 17.9 +1.26+15.96
16.4+04+15.35 19.2 +1.33+15.99
16.8+27+15.57 16.6 +.81 +15.78
16.9+17+15.44 17.1 ~~+1.37~~ ~~+16.0~~9
16.2+16+15.45 1.23 15.97 m5 = .42

0 = +4.62 +2.47 n = −.53 −.54
+3.92 +1.49 −.38 −.36
+3.13 +1.15 −.37 −.34
−.43

0 = +3.415 +1.83 n = −.545
+2.715 +.857 −.34
~~+1.92~~ +.51 −.27
2.06 .63 31 −.40

1871 Aug 3 G. h = +.009 (+73) l′ = +.052 c = −.07 n = −.50
+1 h′ = +.001

15.91 15433

Star	RA		δ	tang δ	T−RA −(P′−P)					
α Serpentis	15.6 37	+6	49+	.12	104 212 15.56	.06	−.07	+15.43	+.03	+15.46
β Serpentis	15.7 40	+16	49+	.28	104 213 15.63	.14	−.07	.42	+.03	.45
μ Serpentis	15.7 43	−3	3−	.05	100 214 15.47	.02	−.07	.42	+.03	.45
γ Serpentis	15.8 50	+16	4+	.29	104 218 14.66	.14	−.07	.45	+.02	.47
γ Herculis	16.3 16	+19	27+	.35	106 15.69	.17	−.07	42 .45	+.01	.46
ω Herculis	16.3 19	+14	19+	.25	103 473 15.64	.13	−.07	.44	+.00	.44
λ Ophiuchi	16.4 24	+2	16+	.06 .04	100 227 15.54	.02	−.07	.45	−.01	.44
ζ Ophiuchi	16.4							.35	−.01	.34
								.43	−.03	.40
ζ Herculis	16.6 37	+31	50+	.62	118 231 15.77	.31	−.08	.38	−.02	.36
η Herculis	16.6 38	+39	10+	.82	129 232 15.91	.40	−.09	.42	−.02	.40
ε Herculis	16.9 56	+31	7+	.60	117 234 15.73	.30	−.08	.35	−.04	.31
~~Gr 2415~~	~~17 4~~	+40	~~44+~~	.86	~~+17.37~~					
θ Lyrae	19.2 12	+37	55+	.78	127 496 16.11	.39	−.09	63		

16.60 16.23 15397
+15.416 +15.416

16.5 +2.61 +16.87 .00 .00 +16.87 +16.87
17.0 +7.35 +19.44 .00 .00 +19.44 +19.44

Star	RA		δ	tang δ	T−RA −(P′−P)				
~~ε Urs Min~~	15 ~~48~~	+78	~~11+~~	4.78 sec δ					
δ Draconis	16.0 00	+58	54+	1.66 ~~194~~	16.27	+12	−83 −14	+15.42	220
η Draconis	16.4 22	+61	48+	1.86 210	+16.26	+16	92 −15	.35	226
ζ Draconis	16.5 28	+69	2+	2.60	+16.87	—			229
Gr. 2377	16.7 43	+57	0+	1.54 184	+16.21	+13	−77 −14	.43	477
ε Urs. Min.	16 59 17.0	+82	14+	7.35	+19.44	—			235

15.6+12+15.56 16.0 +1.66 +16.39
15.7+29+15.63 16.4 +1.85 +16.42
15.7−05+15.47 16.6 +.81 +15.91
15.8+29+15.66 16.7 +1.54 +16.34
16.3+35+15.69 19.2 +.78 +16.11
16.3+26+15.64 17.0 +1.33 ~~+16.15~~
+16.23
16.4+04+15.54
15.9 +19+15.46

0 = +2.42 +1.41 n = −.58
+7.16 +3.98 −.56

0 = +1.28 +.64 n = −.50
+6.02 +3.21 −.53

sin z = +.60 +.80 | +.40 +.60 | +.20 +.40 | +0 +.20 | +0 −.20 | −.20 −.40 | −.40 −.60 | −.60 −.80

RA h m	sin z δ	R_{eq}	R_{il} ″	ρ′−ρ ″	$R_{eq}-R_{il}+ρ'-ρ$ ″		
15 44	+.61	+0	48.3	−.4	47.9	+1.5 (3)	49.2
16 8	+.72		45.4	+.1	45.5	+1.8	47.3
16 12	+.73		46.4	−.1	46.3	+1.8	48.1
16 19	+.47		49.2	−1.4	47.8	+1.3	49.1
16 24	+.64		45.8	−.6	45.2	+1.4	46.9 [6]
18 12							
18 18							
18 22							
18 33							
						(5)	~~47.76~~ 48.07

+.61	+47.9	+.47	+47.8
+.72	45.5		
+.73	46.3		
+.64	45.2		
+.68	+46.2	+.47	+47.8
	+1.5		+1.0
	47.7		48.8
(7)	308^{4}		88^{1}
	+.4		−.7

+0′ 48.06″
~~48.07~~
30

RA h m	sin δ	R_{eq}	R_{il} ″	ρ′−ρ ″	$R_{eq}-R_{il}+ρ'-ρ$ ″		
15 49	−.58	+0	50.1	+.2	50.3	−1.5	48.8
16 14	−.56		48.2	+.6	48.8	−1.5	47.3
						(2)	48.05

−.58 +50.3
−.56 48.8
−.57 +49.6
−1.2
48.4
168^{2} 564
−.3

RA h m	sin z δ	R_{eq}	R_{il}	ρ′−ρ			
15 37	+.58	+0	45.7	−.3	45.4	+1.2	46.6
15 40	+.45		43.4	−.3	43.1	+1.0	[44.1 2 3]
15 43	+.71		46.3	−.6	45.7	+1.5	47.2
16 19	+.47		47.6	−1.4	46.2	+1.0	47.2
16 24	+.64		47.8	−.6	47.2	+1.3	48.5]
~~16 30~~							
16 37	+.18		46.6	−.1	46.5	+.4	46.9
16 39	+.06		46.4	+.3	46.7	+.2	46.9
16 46	+.46		44.7	+.4	45.1	+1.0	46.1
16 51	+.54		46.0	−.1	45.9	+1.1	47.0
17 54	−.16		41.8	+.4	42.2	−.4	[41.8]
19 12	+.08		45.0	+.8	45.8	+.2	46.0
19 14	−.19		47.1	+.7	47.8	−.4	47.4
19 18	−.51		47.6	+.1	47.7	−1.0	46.7
16 55	+.19		46.1	+.2	46.3	+.4	46.7
						(12)	46.94 57

+0′ 47.11″
~~47.29~~
46.68

226
477

+.71	+45.7	+.58	+45.4
+.64	47.2	+.45	43.1
		+.47	46.2
		+.46	45.1
		+.54	45.9
+.68	+46.4	+.50	+45.1
	+1.5		+1.1
	47.9		46.2
(18)	158^{2}		310^{5}
	−.8		+.9

RA h m	sin δ	R_{eq}	R_{il}	ρ′−ρ			
15 49	−.58	+0	50.0	+.2	50.2	−1.1	49.1]
15 54	−.22		47.3	+.5	47.8	−.4	47.4
16 14	−.56		50.7	+.6	51.3	−1.1	50.2]
16 22	−.33		48.5	−.3	48.2	−.6	47.6
16 43	−.25		46.4	+.5	46.9	−.5	46.4
						(5)	~~48.14~~ 47.13

+.18	+46.5	−.19	+47.8	−.22	+47.8	−.51	+47.7	
+.06	46.7			−.33	48.2	−.58	50.2	
+.08	45.8			−.25	46.9	−.56	51.3	
+.19	46.3							
+.13	+46.3	−.19	+47.8	−.27	+47.6	−.55	+49.7	
	+.3		+.4		−.6		−1.2	
	46.6		48.2		47.0		48.5	
	264^{4}		82^{1}		210^{3}		253^{3}	1279
	+.5		−1.1		+.1		−1.4	

220
226
229
477
235

RA h m	sin z δ	R_{eq}	R_{il}	ρ′−ρ			
15 37	+.58	+0	44.0	−.3	43.7	+1.2	44.9
15 40	+.45		43.7	−.3	43.4	+1.0	44.4
15 43	+.71		44.5	−.6	43.9	+1.5	45.4
15 50	+.44		44.1	−.1	44.0	+.9	44.9
16 16	+.39		45.2	+.3	45.5	+.8	46.3
16 19	+.47		45.9	−1.4	44.5	+1.0	45.5
16 24	+.64		46.1	−.6	45.5	+1.3	46.8
16 30							
16 37	+.18		45.4	−.1	45.3	+.4	45.7
16 38	+.06		43.7	+.3	44.0	+.2	44.2
16 56	+.20		45.7	+.2	45.9	+.5	46.4
17 4							
19 12	+.08		45.5	+.8	46.3	+.2	46.5
						(11)	45.54

+0′ 45.61″
45.61

+.71	+43.9	+.58	+43.7	+.39	+45.5	+.18	+45.3
+.64	45.5	+.45	43.4	+.20	45.9	+.06	44.0
		+.44	44.0			+.08	46.3
		+.47	44.5				
+.68	+44.7	+.48	+43.9	+.30	+45.7	+.11	+45.2
	+1.5		+1.1		+.7		+.3
	46.2		45.0		46.4		45.5
(16)	124^{2}		200^{4}		128^{2}		165^{3}
	−.6		+.6		−.8		+.1

RA h m	sin δ	R_{eq}	R_{il}	ρ′−ρ			
15 48		+0					
16 00	−.28		44.4	+.7	45.1	−.5	44.6
16 22	−.33		46.7	−.3	46.4	−.6	45.8
16 28	−.45		46.6	+.6	47.2	−.4	46.8
16 43	−.25		45.4	+.5	45.9	−.5	45.4
16 59	−.64		47.9	−.0	47.9	−1.2	46.7
						(5)	45.76

−.28	+45.1	−.45	+47.2	−.64	+47.9
−.33	46.4				
−.25	45.9				
−.29	+45.8	−.45	+47.2	−.64	+47.9
	−.7		−1.0		−1.4
	45.1		46.2		46.5
	153^{3}		62^{1}		65^{1}
	+.5		−.6		−.9

1871 Aug 5 R. h = ~~+.015~~ −25 h′ = +.007 h′ = −.004 c = −.10 n = −.50

Star	Ra	δ	tang δ	π Ra −(P′ P)					
	16 h m	° + ′		sec δ					
η Ophiuchi	~~16.~~ 30	+ 31	50				16.169 .20	− 01	+16.19
ς Herculis	16.6 36	+ 31	50 +	.62 118 231 + 16 53 ✓	31	− .12	+ 16.10	00	.10
η Herculis	16.6 39	+ 39	10 +	.82 129 232 + 16 70 ✓	40	− .13	.17		.17
49 Herculis	16.8 46	+ 15	11 +	.27 104 478 + 16 38 ✓	.13	− .10	.15		.15
κ Ophiuchi	16.9 51	+ 9	34 +	.17 101 233 + 16 30 ✓	.08	− .10	.12		.12
ε Herculis	16.9 55	+ 31	7 +	.60 117 234 + 16 62 ✓	.30	− .12	.20		.20
α Herculis	17.1 9	+ 14	32 +	.26 103 237 + 16 44 ✓	.13	− .10	.21		.21
π Herculis	17.2 11	+ 36	57 +	.75 125 239 + 16 69 ✓	.37	− .12	.20	00	.20
ι Lyrae	17 19.0 2	+ 35	52 +	.72 123 494 + 16 64 ✓	.36	− .12	.16	+ .01	.17
θ Lyrae	19 19.2 12	+ 37	55 +	.78 .12 496 + 16 68 ✓	.39	− .13	.16	+ .01	.17
κ Cygni ×	19.2 14	+ 53	8 +	1.33 .166 272 + 16 85 ✓	.66	− .17	.02]	+ .01	.01]

19.10 17.30 + 1

16.160 +16.167 +16.168

16.7 − 2.26 +14.73 + .00 + .01 + 14.73 + 14.74

17.0 + 7.35 + 20.53 − .00 + .01 + 20.53 + 20.54

1871 Aug 5

Star	Ra	δ	tang δ	π Ra −(P′ P)		
α Camel sc ✓	4.7 16 41	+ 68 ~~+113~~	7′	− 2.26 ~~+ 1.51~~ sec δ	+ 14.73 ✓	76
Gr. 2377 ×	16.7 43	+ 57	0 +	1.54 .184	+ 17.02 ✓ + 13 77 − 18 + 16.20	477
ε Urs. Min ✓	16 59 17.0	+ 82	14 +	7.32 5 ✓	+ 20.53 ✓	235

16.8 + 27 + 16.38 16.7 + 1.54 + 17.02 15

16.9 + 17 + 16.30 19.0 + .72 + 16.64

17.1 + 26 + 16.44 19.2 + .78 + 16.68

16.9 + 23 + 16.37 19.2 + 1.33 + 16.85

18.5 + 1.09 + 16.83

0 = +7.12 + 4.16 n = − .58 0 = −2.49 − 1.64 n = − .66

0 = +6.26 + 3.71 n = − .59 0 = −3.35 − 2.09 n = − .63

1871 Aug 9 G. h = +.013 +7 n = −.57 h′ = +.004 h′ = +.024 n = −.54 55

	Ra	δ	tang δ					
α Herc.	17.30 ~~17.4~~ 17.1 09	+ 14	32 +	.26 237 + 13.69 ✓	.14	13.56 +13.55	+.03	+13.58
π Herc.	17.2 10	+ 36	57 +	.75 239 + 13.98 ✓	.40	.55 .58	+.03 −.03	.58 .61
α Ophiuchi	17.28 18	+ 12	39 +	.22 241 + 13.66 ✓	.12	.54	+.02	.56
~~ι Cygni~~ ×	~~19 27~~	~~+ 51~~	~~28 +~~	~~1.26 + 15.59~~				
15 Cygni	19.7 40	+ 37	3 +	.76 497 + 14.00 ✓	.41	.59	+.03	.56
θ Aquilae	20.1 5	− 1	11 −	.02 287 + 13.64 ✓	.01	.65	−.04	.61
33 Cygni	20.2 10	+ 56	11 +	1.49 500 + 14.32 ✓	.50 +10	.62	−.04	.58

20.00 18.46 −1

13.620 +13.583 +13.583

17.0 + 7.35 + 17.97 + .00 + .01 + 17.97 + 17.98

17.6 + 2.58 + 14.82 + .00 + .00 + 14.82 + 14.82

	Ra	δ	tang δ			
ε Urs. Min ×	17.0 16 59	+ 82	14 +	7.32 5 ✓	+ 17.97 ✓	235
β Draconis ✓	17.4 28	+ 52	24 +	1.30 .21 ✓	+ 14.20 ✓ − 65 + 13.55	240
ω Draconis ×	17.6 38	+ 68	49 +	2.58 ✓	+ 14.82 ✓	483

17.1 + 26 + 13.69 17.4 + 1.21 + 14.20

17.5 + 22 + 13.66 20.2 + 1.49 + 14.~~32~~42

20.1 − 02 + 13.64 18.8 + 1.35 + ~~14.26~~ 14.31 n 5 = −.53

18.2 + 15 + 13.66

0 = +7.20 + 4.31 n = −.60 −.60

+2.43 + 1.16 −.48 −.48

−.54

0 = +6.00 + 3.67 n = −.61

+1.23 + 0.51 −.41]

1871 Aug 6 h = +.014 −60 h′ = +.006 n = −.5 h′ = −.017 n = −.53

	Ra	δ	tang δ					
λ Ophiuchi	16.50 16.4 24	+ 2	16 +	.04 227 + 12.68 ✓	.02	12.640 + 12.66	−.01	+ 12.65
ς Ophiuchi	4 16 ~~4 30~~					.69	−.01	.68
ς Herc.	2 16.6 36	+ 31	50 +	−.62 231 + 12.90 ✓	.33	.57	00	.57
η Herc.	2 16.6 39	+ 39	10 +	−.82 232 + 13.07 ✓	.43	.64		.64
49 Herc.	0 16.8 46	+ 15	11 +	−.27 478 + 12.75 ✓	.14	.61		.61
κ Ophiuchi	1 16.9 51	+ 9	34 +	.17 233 + 12.74 ✓	.09	.65		.65
α Herc.	3 17.1 9	+ 14	32 +	.26 237 + 12.77 ✓	.14	.63	00	.63
π Herc.	4 17.2 11	+ 36	57 +	.75 239 + 13.06 ✓	.40	.66	+.01	.67
α Ophiuchi	17.5 29	+ 12	39 +	.22 241 + 12.78 ✓	.12	.66	+.01	.67
Gr. 2415	2 17.0 3	+ 41 0	4 +	.86 480 + 13.03 ✓	.46	12.630 .57	00	.57

17.08 16.85

+12.634 +12.634

16.5 + 2.61 + 14.02 + .00 + .00 + 14.02 + 14.02

16.7 − 2.26 + 11.25 + .00 + 11.25 + 11.25

17.0 + 7.35 + 16.64 − .00 + 16.64 + 16.64

17.6 + 2.58 + 13.86 − .00 .00 + 13.86 + 13.86

	Ra	δ	tang δ			
η Draco. ✓	16.4 22	+ 61	48 +	1.85 ✓	+ 13.51 ✓ + 16.98 + 12.69	226
β Draco. ✓	16.5 28	+ 69	2 +	2.66 ✓	+ 14.02 ✓	229
α Camel sc. ✓	4.7 16 41	+ 113 66	7 +	2.26 ✓	+ 11.25 ✓	76
ε Urs Min ✓	17.0 00	+ 82	14 +	7.32 5 ✓	+ 16.64 ✓	235
ω Draco ✓	17.6 37	+ 68	49 +	2.58 ✓	+ 13.86 ✓	483

16.4 + 04 + 12.68 16.4 + 1.85 + 13.~~51~~67

16.8 + 27 + 12.75 16.6 + .81 + 13.07

16.9 + 17 + 12.74 17.0 + .86 + 13.03

17.1 + 26 + 12.77 17.2 + .75 + 13.06

17.5 + 22 + 12.78 16.8 + 1.07 + ~~13.14~~ +13.21 n 5 = −.53

16.9 + 19 + 12.74

0 = +2.42 + 1.28 n = −.53 −.53 0 = −2.45 − 1.49 n = −.61 −.60

+7.16 + 3.90 −.54 −.54

+2.39 + 1.12 −.47 −.47

.57

0 = +1.54 + .81 n = −.53 0 = −3.33 − 1.96 n = −.59

+6.28 + 3.43 −.55

+1.51 + .65 −.43] .54

sin z = +60 +80 | +40 +60 | +.20 +40 | +0 +20 | +0 −20 | −20 −40 | −40 −60 | −60 −80

RA h m	sin δ	R_ay − R_fl "	Q'−Q "	R_ay − R_fl + Q'−Q "		
~~16 30~~		+0				
16 36	+.18	47.4	−.1	47.3	+.5	47.8
16 39	+.06	46.5	+.3	46.8	+.2	47.0 — 7
16 46	+.46	45.5	+.4	45.9	+1.1	47.0
16 51	+.54	45.7	−.1	45.6	+1.2	46.8
16 55	+.19	47.0	+.2	47.2	+.5	47.7
17 9	+.47	45.6	−.4	45.2	+1.1	46.3
17 11	+.09	46.1	−.9	45.2	+.3	45.5
19 2	+.11	34.7	+.7	35.4	+.3	[35.7]
19 12	+.08	44.8	+.8	45.6	+.2	45.8
19 14	−.19	47.9	+.7	48.6	−.4	48.2
					(9)	46.90

+0′ 46.95″
46.98

+.46 +45.9
+.54 45.6
+.47 45.2

+.49 +45.6
+ 1.2
46.8 3
(11) 20 4
+.2

+.18 +47.3
+.06 46.8
+.19 47.2
+.09 45.2
+.08 45.6
+.12 +46.4
+ .3
46.7 5
33 5
+.3

−.19 +48.6
−.19 +48.6
− .5
48.1 1
81
−1.1

−.25 +47.6
−.25 +47.6
− .6
47.0 1
70
+.0

−.64 +48.9
−.64 +48.9
−1.4
47.5 1
75
−.5

RA h m	sin δ	R_ay − R_fl "	Q'−Q "	R_ay − R_fl + Q'−Q "		
16 41	−.95	+0				
16 43	−.25	47.1	+.5	47.6	−.5	47.1
16 59	−.64	48.5	+.4	48.9	1.3	47.6
					(2)	47.35

17 9	+.47	+0	45.8 −.4	45.4	+1.2	46.6
17 10	+.09		46.4 −.9	45.5	+.3	45.8
17 28	+.50		44.5 −.5	44.0	+1.2	45.2
19 27						
19 40						
20 5	+.69		44.8 ~~44.8~~ −.3	44.5	+1.6	46.1
20 10	−.24		45.2 +.5	45.7	−.6	45.1
					(5)	45.76

+0′ 45.90″
45.95

+.69 +44.5
+.69 +44.5
+ 1.7
46.2 1
(8) 12
−.3

+.47 +45.4
+.50 44.0
+.48 +44.7
+ 1.2
45.9 2
18
+.0

16 59	−.64	+0	48.8 +.4	49.2	−1.4	47.8
17 28	−.17		45.3 +.6	45.9	−.4	45.5
17 38	−.44		45.7 +.8	46.5	−1.0	45.5
					(3)	46.27

+.09 +45.5
+.09 +45.5
+ .3
45.8 1
8
+.1

−.17 +45.9
−.17 +45.9
− .5
45.4 1
4
+.5

−.24 +45.7
−.24 +45.7
− .7
45.0 1
0
+.9

−.44 +46.5
−.44 +46.5
− 1.1
45.4 1
4
+.5

−.64 +49.2
−.64 +49.2
− 1.6
47.6 1
26
−1.7

16 24	+.64	+0	46.7 −.6	46.1	+1.4	47.5
16 30						
16 36	+.18					
16 39	+.06		44.6 +.3	44.9	+2	45.7
16 46	+.46		44.9 +.4	45.3	+1.1	46.4
16 51	+.54		46.5 −.1	46.4	+1.3	47.7
17 9	+.47		44.3 −.4	43.9	+1.2	45.1
17 11	+.09		46.1 −.9	45.2	+.3	45.5
17 29	+.50		44.1 −.5	43.6	+1.2	44.8
17 3	+.03					
					(7)	46.01

+0′ 46.73″
46.27

+.64 +46.1
+.64 +46.1
+ 1.5
47.6 1
(11) 76
−.9

+.46 +45.3
+.54 46.4
+.47 43.9
+.50 43.6
+.49 +46.0
+ 1.3
47.3 4
29 2
−.6

+.06 +44.9
+.09 45.2
+.08 +45.0
+ .2
45.2 2
10 4
+1.5

−.33 +46.4
−.33 +46.4
− .8
45.6 1
56
+1.1

−.45 +49.5
−.44 46.4
−.44 +48.0
− 1.0
47.0 2
140
−.3

−.64 +48.7
−.64 +48.7
− 1.5
47.2 1
42
−.5

16 22	−.33	+0	46.7 −.3	46.4	−.8	45.6
16 28	−.45		48.9 +.6	49.5	−1.0	48.5
4 16 41	−.95		51.6 +.2	(51.8)	(−2.3)	(49.5)
17 00	−.64		48.3 +.4	48.7	−1.4	47.3
17 37	−.44		45.6 +.8	46.4	−1.0	45.4
					(4)	46.70

1871 Aug. 10 M. $h = +.009$ (00) $h' = .000$ $h' = -.002$ $n = -.57$

Star	RA	δ	tang δ	π Ra −(P′P)			
	16.74 16.7m		−1′			13.838	
γ Herc.	E 7 16.3 16	+19	27 +	.35 225	+14.02	.20	+13.82 89 00
ω Herc.	x 4.0 16.3 19	+14	19 +	.25 473	+13.95	.14	.81
λ Ophiuc.	8 16.4 24	+ 2	16 +	.04 327	13.86	02	.84
ζ Herc.	x 16.6 36	+31	50 +	.62 231	14.17	35	.82
η Herc.	x 8 16.6 39	+39	10 +	.82 231	+14.29	.46	.83
49 Herc.	6 16.8 46	+15	11 +	.27 478	+14.02	.15	.87
κ Ophiuc.	5 16.9 51	+9	34 +	.17 233	+13.98	.10	88
ε Herc.	x 5 16.9 56	+31	7 +	.60 234	+14.22	.34	.88
α Herc.	+ 3 17.1 8	+14	−32 +	.26 237	+13.95	.15	.80
β Draco.	x 1 17.5 28	+52	24 +	1.30 240	+14.52	.74	.78
β Cygni	x 20 19.4 26	+ 27	42 +	.52 375	+14.15	.30	.85
γ Aquilae	x 23 19.7 40	+ 10	19 +	.18 277	+13.96	.10	.86
α Aquilae	x 24 19.8 45	+ 8	32 +	.75 280	+13.88	09	.79 00
	19.63 17.36		−1′			13.833	
16.5 +2.61	+15.30	.00	.00	+15.30	+15.30	+13.837	+13.837
17.0 +7.35	+18.13	.00	.00	+18.13	+18.13		

1871 Aug. 10

Star		Ra	δ	tang δ	π Ra −(P′P)			
A Draco.	x	16.5 28	+ 69°	2′ + 2.61	+15.30			229
Gr. 2377	x	16.7 43	+ 57	0 + 1.54	+14.64	+13.88	+13.89	477
ε Urs. Min.	x	17.0 00	+82	14 + 7.35	+18.13			235
~~β Draco~~	✓	~~17 27~~						

16.3 +35 +14.02
16.3 +25 +13.95
16.4 +04 +13.86
16.8 +27 +14.02
16.9 +17 +13.98
17.1 +26 +13.95
19.7 +18 +13.96
19.8 +15 +13.88
17.4 +.21 +13.95

16.6 +81 +14.29
16.7 +1.54 +14.64 77
17.5 +1.30 +14.52
16.9 +1.22 + ~~14.48~~ 14.52 $n_5 = -.57$

0 = + 2.40 + 1.35 n = − .56 −.56
+ 7.14 + 4.18 − .59 −.59
−.57

0 = + 1.39 + .78 n = − .56
+ 6.13 + 3.61 − .59
−.57

1871 Aug. 11 M. $h = +.007$ (00) $h' = -.002$ $h' = +.003$ $n = -.58$

Star	RA	δ	tang δ	π Ra −(P′P)					
	16.93 16.7		−1			13.934	.94	+ 01	+13.95
η Herc.	x 1.3 16.6 39	+39	10 +	.82 232	+14.45	.47	+13.98	+01	.99
49 Herc.	1.1 16.8 46	+15	11 +	.27 478	+14.11	.16	.95	00	.95
κ Ophiuc.	1.0 16.9 51	+ 9	34 +	.17 233	+14.06	.10	.96	00	.96
ε Herc.	x 1.0 16.9 55	+31	7 +	.60 234	+14.30	35	.95	00	.95
α Herc.	8 17.1 9	+14	32 +	.26 237	+14.09	.15	.94	+.00	.93
10 Cygni	x 2.3 20.2 10	+ 46	22 +	1.05 288	+14.49	.60	.89	− 01	.88
24 Vulpec.	2.3 20.2 11	+ 24	17 +	.45 501	+14.23	26	.97	− 01	.96
ζ Cygni	x 2.4 20.3 18	+ 39	51 +	.88 4 289	+14.46	.49	.97	− 01	.96
β Draco	x 4 17.5 28	+52	24 +	1.30 240	+14.57	.75	.82	00	.82
	20.23 17.11 17.92 .78		−1′				13.943 95		95
							+13.937 8		+13.935 6

17.0 +7.35 +18.22 .00 .00 + 18.22 + 18.22

Gr. 2377.	x	16.7 43	+ 57	0 + 1.54	+14.70	+13 −.89	+13.94	477
ε Urs. Min.	x	16 17.0 59	+ 82	14 + 7.35	+18.22			235
Gr. 2415	x	17.1 4	+ 40	41 + .86	+14.45	− 50	+13.95	480

16.8 +27 +14.11
16.9 +17 +14.06
17.1 +26 +14.09
20.2 +45 +14.23
17.7 +29 +14.12

16.6 +81 +14.45
16.7 +1.54 +14.70 83
17.1 +.86 +14.45
17.5 +1.30 +14.57
20.2 +1.05 +14.49
20.3 +84 +14.46
18.1 +1.07 +14.52 4 $n_5 = -.54$

0 = +7.06 +4.10 n = − .58

0 = +6.28 +3.68 n = −.59

1871 Aug. 13 R. $h = +.011$ (+5) $h' = +.001$ $h' = +.005$ $n = -.62$

Star	RA	δ	tang δ	π Ra −(P′P)					
	16.98 17.07 16.7					14.370	.37	− 01	+14.36
ε Herc.	x 1.0 16.9 56	+31	7 +	.60 234	+14.72	.37	+14.35	+ 01	.34
α Herc.	x 8 17.1 9	+14	32 +	.26 237	+14.55	.16	.39	− 01	.38
π Herc.	x 7 17.2 11	+ 36	57 +	.75 239	+14.83	.46	.37	− 00	.37
ι Lyrae	x 1.1 19.0 3	+ 35	54.4	.72 494	+14.85	.45	.40	+ 01	.41
θ Lyrae	x 1.3 19.2 12	+37	55 +	.78 496	+14.83	.48	35	+ 01	.36
κ Cygni	x 1.3 19.2 14	+ 53	8 +	1.33 272	+15.15	.82	33	+ 01	.34
	19.13 17.90						14.360		
16.7 −2.26	+12.93	.00	.00	+12.93	+12.93		+14.366		+14.366
17.0 +7.35	+18.87	.00	.00	+18.87	+18.87				

Gr. 2377	x	16.7 43	+57	00 + 1.54	+15.19	+13 −.95	+14.37	477
9 a Camel. S.C.	✓	4.7 42	+113	− 2.26	+12.93			76
ε Urs. Min.	x	16 17.0 59	+ 82	14 + 7.35	+18.87			235

16.9 +60 +14.72
17.1 +26 +14.55
17.2 +75 +14.83
19.0 +72 +14.85
17.5 +58 +14.74

16.7 +1.54 +15.19 32
19.2 +1.33 +15.15
18.0 +1.43 ~~+15.17~~ +15.23 $n_5 = -.586$

0 = +6.77 +4.13 n = − .61 −.61   0 = −2.84 −1.81 n = − .64 −.63

0 = +5.92 +3.64 n = −.61   0 = −3.69 −2.30 n = −.62

229
477
235

Ra h m	sin Σ	$R_{eq}-R_{pl}$	$P'-P$	$R_{eq}-R_{pl}+P'-P$		
16 16	+.39	+0′ 44.6″	+.3″	44.9″	+.8	45.8
16 19						
16 24	+.64	46.9	−.6	46.3	+1.5	47.8
16 36	+.18	48.0	−.1	47.9	+.5	(48.4)
16 39	+.06	44.5	+.3	44.8	+.2	45.0
16 46	+.46	43.6	+.4	44.0	+1.1	45.1
16 51	+.54	45.0	−.1	44.9	+1.3	46.2
16 56	+.19	45.5	+.2	45.7	+.6	46.3
17 8	+.47	44.0	−.4	43.6	+1.1	44.7
17 28	−.17	44.3	+.6	44.9	+.4	45.3
19 26	+.25	44.7	−.4	44.3	+.7	45.0
19 40	+.53	2.(42.3)	+.1	(42.4)	+1.3	(43.7)
19 45	+.56	43.8	+.0	43.8	+1.3	45.1
					(10)	45.55

+0′ 45.66″
45.46

Ra h m	sin Σ	$R_{eq}-R_{pl}$	$P'-P$	$R_{eq}-R_{pl}+P'-P$		
16 28	−.45	+0′ 44.4″	+.6″	45.0″	−1.0	44.0
16 43	−.25	44.7	+.5	45.2	−.6	44.6
17 00	−.64	48.0	+.4	48.4	−1.4	47.0
					(3)	45.20

sin z =	+60+80	+40+60	+20+40	+0+20	+0 −20	−20−40	−40−60	−60−80
	+.64+46.3	+.46+44.0	+.39+44.9	+.18+47.9	−.17+44.9	−.25+45.2	−.45+45.0	−.64+48.4
		+.54 44.9	+.25 44.3	+.06 44.8				
		+.47 43.6		+.19 45.7				
		+.56 43.8						
	+.64+46.3	+.51+44.1	+.32+44.6	+.14+46.1	−.17+44.9	−.25+45.2	−.45+45.0	−.64+48.4
	+1.6	+1.3	+.8	+.4	−.5	−.7	−1.2	−1.6
	47.9 1	45.4 4	45.4 2	46.5 3	44.4 1	44.5 1	43.8 1	46.8 1
	(14) 79	216	108	195	44	45	38	68
	−2.2	+.3	+.3	−.8	+1.3	+1.2	+1.9	−1.1

477
235
−480

Ra h m	sin Σ	$R_{eq}-R_{pl}$	$P'-P$	$R_{eq}-R_{pl}+P'-P$		
16 39	+.06	+0 42.6	+.3	42.9	+.2	43.1 7.
16 46	+.46	43.4	+.4	43.8	+1.1	44.9
16 51	+.54	44.0	−.1	43.9	+1.3	45.2
16 55	+.19	46.3	+.2	46.5	+.6	47.1
17 9	+.47	44.3	−.4	43.9	+1.1	45.0
20 10	−.07	44.5	+.5	45.0	−.3	44.7
20 11	+.31	44.5	−.8	44.7	+.8	45.5
20 18	+.04	45.3	−.2	45.1	+.1	45.2
17 28	−.17	42.7	+.6	43.3	−.5	42.8
					(9)	44.83

+0′ 44.99″
44.99

Ra h m	sin Σ	$R_{eq}-R_{pl}$	$P'-P$	$R_{eq}-R_{pl}+P'-P$		
16 43	−.25	+0 44.8	+.5	45.3	−.7	44.6
16 59	−.64	47.8	+.4	48.2	−1.4	46.8
17 4	+.03					
17 28						
					(2)	45.70

sin z =	+60+80	+40+60	+20+40	+0+20	+0 −20	−20−40	−40−60	−60−80
		+.46 +43.8	+.31 +44.7	+.06 +42.9	−.07 +45.0	−.25 +45.3		−.64 +48.2
		+.54 43.9		+.19 46.5	−.17 43.3			
		+.47 43.9		+.04 45.1				
		+.49 +43.9	+.31 +44.7	+.10 +44.8	−.12 +44.2	−.25 +45.3		−.64 +48.2
		+1.2	+.8	+.3	−.4	−.7		−1.6
		45.1 3	45.5 1	45.1 3	43.8 2	44.6 1		46.6 1
		(11) 15.3	55	15.3	76	46		66
		−.1	−.5	−.1	+1.2	+.4		−1.6

477
76
235

Ra h m	sin Σ	$R_{eq}-R_{pl}$	$P'-P$	$R_{eq}-R_{pl}+P'-P$		
16 56	+.19	+0 44.3	+.2	44.5	+.6	45.1
17 9	+.47					
17 11	+.09	44.7	−.9	43.8	+0.3	44.1
19 3	+.11	44.1	+.7	44.8	+.4	45.2
19 12	+.08	43.0	+.8	43.8	+.3	44.1
19 14	−.19	45.3	+.7	46.0	−.6	45.4
					(5)	44.78

Ra h m	sin Σ	$R_{eq}-R_{pl}$	$P'-P$	$R_{eq}-R_{pl}+P'-P$		
16 43	−.25	+0 45.1	+.5	45.6	−.7	44.9
4 42	−.95	49.4	+.2	49.6	−2.7	[46.9]
16 59	−.64	47.5	−.0	47.5	−1.5	46.0
					(~~3~~ 2)	~~45.93~~ 45

63

sin z =	+0+20	+0 −20	−20−40	−40−60	−60−80
	+.19 +44.5	−.19 +46.0	−.25 +45.6		−.64 +47.5
	+.09 43.8				
	+.11 44.8				
	+.08 43.8				
	+.12 +44.2	−.19 +46.0	−.25 +45.6		−.64 +47.5
	+ .4	+ .5	− .7		−1.6
	44.6 4	46.5 1	44.9 1		45.9 1
	(7) 18.4	6.5	49		59
	+.5	−1.4	+.2		−.8

+0′ 45.10″
~~45.21~~
44.97

1871 Aug. 17 M. h = +.010 (+18) h' = .000 n = -.55 h' = +.020 n = -.52

Star		Ra	δ	tang δ	π-Ra-(ρ'-ρ)				
	17.27 17.15	14.5m					15.460 49	+.03	+15.52
α Herculis	+1.7	17.1 9	+14° 32' +	.26	237 +15.56	.14	+15.42	+.04	.46
π Herc.	+1.0	17.2 11	+36 57 +	.75	234 +15.86	.39	.47	+.04	.51
ϑ Aquilae	-.9	20.1 5	-1 11 -	.02	284 +15.56 +	.01	.57	-.02	.55
31 (o¹) Cygni	-1.0	20.2 10	+46 22 +	1.05	288 +16.07	.55	.52	-.02	.50
γ Cygni	-1.1	20.3 18	+39 51 +	.83	287 +15.97	.43	.52	-.02	.50
α Delphini	-1.4	20.6 34	+15 28 +	.28	293 +15.67	.15	.52	-.03	.49
α Cygni	-1.4	20.6 37	+44 50 +	.99	294 +15.99	.57	48	-.03	.45
	20.36	19.50 (20)					15.522		
19.8+53.16		+43.41	.00	.00	+43.41 +43.41		+15.499		+15.498

1871 Aug. 17

Star	Ra	δ	tang δ	π-Ra-(ρ'-ρ)			
	h m	° '	1.21 ✓				
β Draco. ✓	17.5 28	+52 24 +	1.30	+16.12 ✓	+.63	+15.49	240
λ Urs. Min. ×	19.8 49	+88 56 +	53.12 (6) ✓	+43.41 ✓	—		284

17.1	+26	+15.56	17.2	+75	+15.86	
20.1	-.02	+15.56	17.5	+1.21	+16.12	
20.6	+28	+15.67	20.2	+1.05	+16.07	
19.3	+.17	+15.60	20.6	+.99	+15.99	
			18.9	+1.00	+16.01	n5 = -.37

0 = +52.99 +27.81 n = -.52

0 = +52.16 +27.40 n = -.52

1871 Aug. 18 M. h = +.008 (-29) h' = -.003 n = -.52 h' = -.007 n = -.52

Star		Ra	δ	tang δ	π-Ra-(ρ'-ρ)				
	17.65	17.9					15.712 .67	-.00	+15.67
β Draco.	+1.0	17.5 28	+52 24 +	1.30	240 +16.38	.68	+15.70	-.01	.69
α Ophiuchi	1.0	17.5 29	+12 39 +	.22	241 +15.87	.11	.76	-.01	.75
μ Herc.	+.8	17.7 42	+27 48 +	.53	246 +16.60	.28	.72	-.01	.71
ϑ Cygni	-1.1	19.6 33	+49 56 +	1.19	499 +16.29	.62	.67	+.01	.68
15 Cygni	-1.2	19.7 40	+37 3 +	.76 (5)	499 +14.14	.39	.75	+.01	.76
α Aquilae	-1.3	19.8 45	+8 32 +	.15	280 +15.75	.08	15.697 .67	+.01	.68
	19.70	18.53					+15.706		+15.706
17.0+7.35		+19.76	.00	.00	+19.76 +19.76				
17.6+2.58		+16.99	.00	.00	+16.99 +16.99				

Star	Ra	δ	tang δ				
ε Urs. Min. ×	16 59 (17.0)	+82 14 +	7.32 (5) ✓	+19.76 ✓	—		285
ω Draco. ×	17.6 38	+68 49 +	2.58 ✓	+16.99 ✓	=		483
ξ Draco. ×	17.9 51	+56 54 +	1.53 ✓	+16.36	+.11 -.80	+15.67	248

17.5	+22	+15.87	17.5	+1.30	+16.38	
17.7	+.53	+16.00	17.9	+1.53	+16.36 (47)	
19.8	+15	+15.75	19.6	+1.19	+16.29	
18.3	+30	+15.87	18.3	+1.34	+16.38	n5 = -.48

0 =	+7.05	+3.89	n =	-.55	-.55	
	+2.28	+1.12		-.49	-.49	-.52

0 =	+6.01	+3.38	n =	-.56	
	+1.24	+.61		-.49	-.52

1871 Aug. 19 G. h = +.008 (+47) h' = -.003 n = -.50 h' = +.038 n = -.49

Star		Ra	δ	tang δ					
	17.76	17.9	27				15.955 .87	+.01	+15.88
μ Herc.	+.2	17.7 42	+~~23~~ 48 +	.53	246 +16.16	.26	+15.90	+.02	15.92
α Ophiuchi	✓.6	17.5 29	+12 39 +	.22	241 +16.12	.11	16.01	+.02	16.03
γ Draco.	+.2	17.9 54	+51 30 +	1.26	252 +16.65	.62	.03	+.01	16.04
Gr 2900 ×		[19.5] 29	+79 21 +	5.30	497 +18.78	[illegible]			
15 Cygni	-1.6	19.7 40	+37 3 +	.76	499 +16.40	.37	.03	-.06	15.97
~~θ Cygni~~	19.70	~~19 32~~	~~+49 56~~ +	1.19	~~+13.73~~		~~16030~~		
		18.14	-1'				+15.968		+15.968
17.6+2.58		+17.02	+.00	+.00	+17.02 +17.02				
19.5+5.31		+18.78	+.01	+.00	+18.79 +18.78				
19.8+53.16		+43.70	+.01	+.00	+43.71 +43.70				

Star	Ra	δ	tang δ				
ω Draco. ×	17.6 38	+68 49 +	2.58 ✓	+17.02 ✓	—		483
~~ψ Draco~~ ×	17 ~~44~~	+72 ~~13~~ +	3.12 ✓ +				
ξ Draco ×	17.9 57	+56 54 +	1.53 ✓	+16.51	+.11 -.75	+15.87	248
λ Urs. Min. ×	19.8 49	+88 56 +	53.12 (6) ✓	+43.70 ✓	—		284

17.5	+22	+16.12	17.9	+1.53	+16.57 (62)	
17.7	+.53	+16.16	17.9	+1.26	+16.65	
17.6	+.38	+16.14	19.7	+.76	+16.40	
			18.5	+1.18	+16.52 (6)	n5 = -.49

0 =	+2.20	+.88	n =	-.40	-.40	
	+4.93	+2.65		-.54	-.54	
	+52.78	+27.57		-.52	-.52	-.49

0 =	+1.40	+.46	n =	-.33]	
	+4.13	+2.22		-.54	
	+57.98	+27.14		-.52	-.53

1871 Aug. 22 M. h = +.010 (-27) h' = -.001 n = -.45 h' = -.021 n = -.49

Star		Ra	δ	tang δ					
	17.67		-1		18		16583		
β Draco.	+1.1	17.4 28	+52 24 +	1.30	240 +17.18	.64	+16.54	-.02	+16.52
μ Herc.	+.8	17.7 42	+27 48 +	.53	246 +16.87	.26	.61	-.02	.59
γ Draco.	+.6	17.9 54	+51 30 +	1.26	252 +17.22	.62	.60	-.01	.59
δ Cygni	-1.2	19.7 41	+44 50 +	.99	278 +17.01	.49	.52	+.02	.54
α Aquilae	-1.3	19.8 45	+8 32 +	.15	280 +16.63	.07	16.540 .56	+.03	.59
	19.75	18.50	-1'				+16.566		+16.566
17.6+2.58		+17.78	.00	.00	+17.78 +17.78				
17.7+3.12		+18.25	.00	.00	+18.25 +18.25				
19.8+53.16		+41.66	.00	.00	+41.66 +41.66				

Star	Ra	δ	tang δ			
ω Draco. ×	17.6 38	+68 49 +	2.58 ✓	+17.78 ✓	—	483
ψ Draco. ×	17.7 44	+72 13 +	3.12 ✓	+18.25 ✓	—	484
λ Urs. Min. ×	19.8 49	+88 56 +	53.12 (6) ✓	+41.66 ✓	—	284

17.7	+.53	+16.87	17.4	+1.30	+17.18	
19.8	+15	+16.63	17.9	+1.26	+17.22	
18.8	+34	+16.75	19.7	+.99	+17.01	
			18.3	+1.18	+17.14	n5 = -.48

0 =	+2.24	+1.03	n =	-.46	-.46	
	+2.78	+1.50		-.54	-.55	
	+52.82	+24.91		-.47	-.47	-.49

0 =	+1.40	+.64	n =	-.46	
	+1.94	+1.11		-.57	
	+51.98	+24.52		-.47	-.50

sin z = +.60 +80 | +.40 +60 | +20 +40 | +0 +20 | +0 -20 | -.20 -40 | -40 -60 | -.60 -80

Req - Rfl + ρ' - ρ

Ra | sin z | Req - Rfl | ρ' - ρ | | | | Ra | sin z | Req - Rfl | ρ' - ρ | Req - Rfl + ρ' - ρ
h m | | +0 " | " | " | | | h m | | + " | " | "

240 17 9
284 17 11 +.09 +0 46.7 -.9 45.8 +.3 46.1 | 17 28 -.17 +0 44.6 +.6 45.2 -.5 44.7
20 5 +.69 44.3 -.3 44.0 +1.7 45.7 | 19 49 44.70
20 10 -.07 45.8 +.5 46.3 -.2 46.1
20 18 +.04 45.0 -.2 44.8 +.1 44.9 | +.69 +44.0 | +.47 +44.8 | +.09 +45.8 | -.07 +46.3
20 34 +.47 44.6 +.2 44.8 +1.2 46.0 | +.04 44.8 | -.04 45.4
20 37 -.04 45.4 +.0 45.4 -.1 45.3 | -.17 45.2
(6) 45.69 | +.69 +44.0 | +.47 +44.8 | +.06 +45.3 | -.09 +45.6
+ 1.8 | + 1.2 | + .2 | - .3
45.8, | 46.0, | 45.5 2 | 45.3 3
+0' 45.53" | (7) 8 | 10 | 10 | 9 | 37
45.54 | -.3 | -.5 | +0 | +.2

285 17 28 -.17 +0 45.3 +.6 45.9 -.5 45.4 | 16 59 -.64 +0 47.5 -.0 47.5 -1.5 46.0
483 17 29 +.50 45.1 -.5 44.6 +1.3 45.9 | 17 38 -.44 44.7 +.8 45.5 -1.1 44.4
248 17 42 +.25 45.9 -.3 45.6 +.7 46.3 7 | 17 51 -.25 46.2 -.1 46.1 -.6 45.5
19 33 -.13 44.0 +1.3 ~~42.7~~ 45.3 -.3 45.0 | (3) 45.30
19 40 +.09 45.3 +.2 45.5 +.3 45.8
19 45 +.56 44.6 +.0 44.6 +1.5 46.1 | +.50 +44.6 | +.25 +45.6 | +.09 +45.5 | -.17 +45.9 | -.25 +46.1 | -.44 +45.5 | -.64 +47.5
(6) 45.75 | +.56 44.6 | -.13 45.3
+.53 +44.6 | +.25 +45.6 | +.09 +45.5 | -.15 +45.6 | -.25 +46.1 | -.44 +45.5 | -.64 +47.5
+ 1.4 | + .7 | + .3 | - .5 | - .7 | - 1.2 | - 1.7
+0' 45.53" | 46.0 2 | 46.3, | 45.8, | 45.1 2 | 45.4, | 44.3, | 45.8,
45.60 | (9) 20 | 13 | 8 | 2 | 4 | -7 | 8
-.5 | -.8 | -.3 | +.4 | +.1 | +1.2 | -.3

483 17 42 +.25 +0 46.5 -.3 46.2 +.7 46.9 | 17 38 -.44 +0 45.2 +.8 46.0 -1.1 44.9
17 29 +.50 + 47.0 -.5 46.5 +1.3 47.8 | 17 44 -.50
248 17 54 -.16 46.6 +.4 47.0 -.5 46.5 | 17 51 -.25 46.1 -.1 46.0 -.6 45.4
284 19 29 -.60 49.0 -.5 48.5 -1.4 47.1 | 19 49 (2) 45.15
19 40 +.09 45.8 +.2 46.0 +.3 46.3
(5) 46.92
+.50 +46.5 | +.25 +46.2 | +.09 +46.0 | -.16 +47.0 | -.25 +46.0 | -.44 +46.0 | -.60 +48.5
+.50 +46.5 | +.25 +46.2 | +.09 +46.0 | -.16 +47.0 | -.25 +46.0 | -.44 +46.0 | -.60 +48.5
+ 1.3 | + .7 | + .3 | - .5 | - .7 | - 1.2 | - 1.6
47.8, | 46.9, | 46.3, | 46.5, | 45.3, | 44.8, | 46.9,
+0 46.36 | (7) 48 | 69 | 63 | 65 | 53 | 48 | 69
46.42 | -1.4 | -.5 | +.1 | -.1 | +1.1 | +1.6 | -.5

17 28 -.17 +0 48.9 +.6 49.5 -.5 49.0
483 17 42 +.25 48.9 -.3 48.6 +.7 49.3 | 17 38 -.44 +0 48.2 +.8 49.0 -1.2 47.8
484 17 54 -.16 48.1 +.4 48.5 -.4 48.1 | 17 44 -.50 49.6 +.4 50.0 -1.3 2 48.7 48
284 19 41 -.04 49.9 +.4 50.3 -.1 50.2 | 19 49 (2) 48.30
19 45 +.56 47.1 +.0 47.1 +1.5 48.6
(5) 49.02 | +.56 +47.1 | +.25 +48.6 - | -.17 +49.5 | -.44 +49.0
-.16 48.5 | -.50 50.0
-.04 50.3
+.56 +47.1 | +.25 +48.6 | -.12 +49.4 | -.47 +49.5
+ 1.5 | + .7 | - .4 | - 1.3
48.6, | 49.3, | 49.0 3 | 48.2 2
+0' 48.76" | (7) 6 | 13 | 30 | 4 | 53
48.83 | +.2 | -.5 | -.2 | +.6

1871 Aug 28 G. h = +.012 −4 = −497 h′ = −.006 ~~h′ = +.001~~ c = +.06 n = −.55

Star	RA	δ	tang δ	π = RA − (P′ − P)					
	h m	° ′							
γ Draco. 17.90 x 20	17.9 54	+51	30 +	1.26 ✓ 161 sec δ 252	+18.56 ✓ −	.69	+.10	+17.97 (17.970)	−.01 +17.96
~~δ Aquilae~~ x 3	20.2 9	~~+46~~	~~11~~ +	~~.02~~ 145	~~13.83~~ ✓ −	.58	+.09	1804	00 1804
γ Cygni x 4	20.3 18	+39	51 +	.83 180 +1.05 4288	18.27 ✓ −	46	+.08	17.89	00 17.89
β Delphini x 6	20.5 32	+14	10 +	.25 107 294	18.03 ✓ −	14	+.06	.95	00 17.95
α Cygni x 7 20.40	20.6 37	+44	50 + −1	.99 144	18.40 ✓ −	.54	+.08	94 (17.955)	+.01 17.95

19.90

17.7 + 3.12 + 19.44 .00 .00 + 19.44 + 19.44
19.8 + 53.16 + 45.28 .00 .00 + 45.28 + 45.28
20.4 + 2.01 + 18.84 .00 .00 + 18.84 + 18.84

+17.958 +17.958

1871 Aug 28

Star	RA	δ	tang δ	π = RA − (P′ − P)		
	h m	° ′				
ψ, Draco. aust.	17.7 44	+72	13 +	3.12 ✓	+ 19.44 ✓	484
~~35 Draco.~~ x	~~17. 55~~	~~+76~~	~~59 + 4.33~~ ✓			
λ Urs. Mi. x	19.8 49	+88	56 +	53.16 ✓	+ 45.28 ✓	284
θ Cephei x	20.4 27	+62	34 +	~~1.93~~ 2.01 ✓	+ 18.84 ✓	291

20.3 + 84 + 18.27 17.9 + 1.26 + 18.56 0 = + 2.58 + 1.29 n = − .50
20.5 + 25 + 18.03 20.1 + 1.05 + 18.53 + 52.62 + 27.13 − .52
20.4 + 54 + 18.15 20.6 + .99 + 18.40 + 1.47 + 0.69 − .47 .50
~~20.3~~ 19.5 + 1.10 + 18.50

0 = + 2.02 + 0.94 n = − .47
+ 52.06 + 26.78 − .51
+ .91 + .34 − .37

1871 Aug 29 M. h = +.014 (n = −.497) h′ = +.003 h′ = +.003 n = −.56

Star	RA	δ	tang δ				
γ Draco. x 4	17.9 54	+51	30 +	1.26 252	+18.91 ✓ −	.70	+ 18.21 00
o Herc. x 3	18.0 3	+28	45 +	.55 255	+18.52 ✓ −	.30	.22
ε Lyrae x 4	18.7 40	+39	32 +	.82 261	+ 18.78 ✓ −	.46	.33
β Lyrae x 5	18.8 45	+33	13 +	.65 264	~~0.06~~ +18.75 ✓ −	.36	.39 00

~~17.9 + 4.33~~ 18.35 +18.288 +18.288

~~35 Draco x 17.9 55 + 76 59 + 4.33~~ ✓ ~~485~~

18.0 + 55 + 18.52 17.9 + 1.26 + 18.91
18.8 + 65 + 18.75 18.7 + .82 + 18.78
18.4 + 60 + 18.63 18.3 + 1.04 + 18.84

1871 Aug. 31 M. h = +.014 +16 n = −613 h′ = +.003 h′ = +.016 n = −.57

Star	RA	δ	tang δ					
α Ophiuc. 17.80 x 9	17.5 28	+ 12	39 +	.22 ✓ 241	+ 19.15 ✓ −	.12	+ 19.03 (19.010) + .01	+ 19.04
γ Draco. x 5	17.9 54	+ 51	30 +	1.26 ✓ 252	+ 19.68 ✓ −	.72	18.96 + .01	18.97
~~35 Draco.~~ x 4	~~17 55~~	~~+ 76~~	~~59 +~~	~~4.33~~ ✓				
o₂ Herc. x	18.0 03	+ 28	45 +	.55 ✓ 255	+ 19.35 ✓ −	.31	19.04 + .01	19.05
~~31(o) Cygni~~ x	[20.2] 10	~~+ 46~~	~~22 +~~	~~1.05~~ ✓ 288	~~+ 0.21~~ ✓ −	.60	] − 0.39 − 02	[− 0.41]
γ Cygni x 4 2030	20.3 18	+ 39	51 +	.83 ✓ 4 289	+ 19.53 ✓ −	.48	19.05 (19.050) − .03	18.02

18.42 +19.020 +19.020

17.6 + 2.58 + 20.41 + .00 .00 + 20.41 + 20.41
17.7 + 3.12 + 20.83 + .00 .00 + 20.83 + 20.83
18.2 + 16.83 + 29.38 + .00 .00 + 29.38 + 29.38

Star	RA	δ	tang δ			
ω Draco. x	17.6 38	+ 68	49 +	2.58 ✓	+ 20.41 ✓	483
ψ Draco. aust.	17.7 44	+ 72	13 +	3.12 ✓	+ 20.83 ✓	484
δ Urs. Mi. x	18.2 13	+ 86	36 +	16.83 ✓	+ 29.38 ✓	256

17.5 + 22 + 19.15 17.9 + 1.26 + 19.68
18.0 + 55 + 19.35 [20.2 + 1.05 + 0.21] ex
17.8 + 38 + 19.25 20.3 + .84 + 19.53 $n_5 = -.49$
19.1 + 1.05 + 19.60

0 = + 2.20 + 1.16 n = − .53 − .53
+ 2.74 + 1.58 − .58 − .58
+ 16.45 + 10.13 − .61 − .61 − .57

0 = + 1.53 + .81 n = − .53
+ 2.07 + 1.23 − .59
+ 15.78 + 9.78 − .62 − .58

1871 Sept 1 G. h = +.013 −22 n = h′ = −.021 h′ = +.002 n = −.62

Star	RA	δ	tang δ					
γ Draco. 17.95 x 8	17.9 54	+ 51	30 +	1.26 ✓ 252	+ 20.01 ✓ −	.78	+ 19.23 (19.280) − 02	+ 19.21
o₂ Herc. x 7	18.0 03	+ 28	45 +	.65 ✓ 255	+ 19.67 ✓ −	.34	33] − 01	.32
31 (o₁) Cygni x	[20.2] 10	+ 46	22 +	1.05 ✓ 288	+ 0.50 ✓ −	.65	] − 0.15 − 02	[− 0.17]
γ Cygni x 6 20.30	20.3 18	+ 39	51 +	.88 ✓ 4 284	+ 19.75 ✓ −	.52	23 (19.230) + 03	26

18.73 +19.263 +19.263

17.7 + 3.12 + 21.19 .00 .00 + 21.19 + 21.19
18.2 + 16.83 + 29.94 .00 .00 + 29.94 + 29.94

Star	RA	δ	tang δ			
ψ, Draco. aust.	17.7 44	+ 72	13 +	3.12 ✓	+ 21.19 ✓	484
δ Urs. Mi. x	18.2 13	+ 86	36 +	16.83 ✓	+ 29.94 ✓	256

18.0 + 55 + 19.67 17.9 + 1.26 + 20.01
20.3 + .84 + 19.75
19.1 + 1.05 + 19.88

0 = + 2.57 + 1.52 n = − .59 − .61
+ 16.28 + 10.27 − .64 − .64 − .62

0 = + 2.07 + 1.31 n = − .63
+ 15.78 + 10.06 − .64 .63

sin z = | +.60 +.80 | +.40 +.60 | +.20 +.40 | +0 +.20 | +0 −.20 | −.20 −.40 | −.40 −.60 | −.60 −.80

RA h m	sin δ	R_ag	R_H	ρ′−ρ	R_ag − R_H + ρ′−ρ		
17 54	−.16	+0	46.1	+.4	46.5	−.4	46.1
20 10	−.07		47.3	+.5	47.8	−.3	47.5
20 18	+.04		47.1	−.2	46.9	+.1	47.0
20 32	+.47		46.2	+.1	46.3	+1.3	47.6
20 37	−.04		47.9	+.0	47.9	−.1	47.8
						(5)	47.20

+0′ 47.42″
47.52

RA h m	sin δ	R_ag	R_H	ρ′−ρ	R_ag − R_H + ρ′−ρ		
17 44	−.50	+0	49.0	+.4	49.4	−1.2	48.2
17 55	−.57						
19 49	−.73		49.5 ~~41.9~~	+.6	50.1	−1.7	48.4
20 27	−.35		48.6	−.2	48.4	−.8	47.6
						(3)	48.07

+.47 +46.3 | +.04 +46.9 | −.16 +46.5 | −.35 +48.4 | −.50 +49.4 | −.73 +50.1
−.07 47.8
−.04 47.9

+.47 +46.3	+.04 +46.9	−.09 +47.4	−.35 +48.4	−.50 +49.4	−.73 +50.1
+ 1.3	+ .1	− .3	− 1.0	− 1.4	− 2.0
47.6,	47.0,	47.1,	47.4,	48.0,	48.1,
(8) 6′	0′	3 3	4′	10′	11′
−.2	+.4	+.3	+.0	−.6	−.7

17 54 −.16
18 3
18 40 +.05 +0 49.4 +.0 49.4 +.2 49.6
18 45 +.16 49.8 +.0 49.8 +.4 50.2
(2) 49.90

17 55

+.05 +49.4
+.16 49.8
+.10 +49.6
+ 3
49.9
+.0

+0′ 49.90″
49.90

RA h m	sin δ	R_ag	R_H	ρ′−ρ	R_ag − R_H + ρ′−ρ		
17 28	+.50	~~+0~~	~~44.1~~				
17 54	−.16		48.4	+.4	48.8	−.4	48.4
17 55							
18 03	+.24		48.1	+.2	48.3	+.7	49.0
(20 10)							
20 18	+.04		48.8	−.2	48.6	+.1	48.7
						(3)	48.70

+0′ 48.08″
48.14

RA h m	sin δ	R_ag	R_H	ρ′−ρ	R_ag − R_H + ρ′−ρ		
17 38	−.44	+0	47.9	+.8	48.7	−1.1	47.6
17 44	−.50		47.8	+.4	48.2	−1.2	47.0
18 13							
						(2)	47.30

+.24 +48.3 | +.04 +48.6 | −.16 +48.8 | −.44 +48.7
−.50 48.2

+.24 +48.3	+.04 +48.6	−.16 +48.8	−.47 +48.4
+ .7	+ .1	− .5	− 1.2
49.0,	48.7,	48.3,	47.2
(5) 90′	87′	83′	144² 404
−.9	−.6	−.2	+.9

RA h m	sin δ	R_ag	R_H	ρ′−ρ	R_ag − R_H + ρ′−ρ		
17 54	−.16	+0	47.3 ~~52.3~~	+.4	47.7 ~~52.7~~	−.4	47.3
18 03	+.24		48.7	+.2	48.9	+.7	49.6
(20 10)							
20 18	+.04		48.9	−.2	48.7	+.1	48.8
						(3)	48.57

+0′ 48.62″
48.68

RA h m	sin δ	R_ag	R_H	ρ′−ρ	R_ag − R_H + ρ′−ρ		
17 44	−.50	+0	49.8	+.4	50.2	−1.2	49.0
18 13							
						(1)	49.00

+.24 +48.9 | +.04 +48.7 | −.16 +47.7 | −.50 +50.2

+.24 +48.9	+.04 +48.7	−.16 +47.7	−.50 +50.2
+ .7	+ .1	− .5	− 1.3
49.6,	48.8,	47.2,	48.9,
(4) 96′	88′	72′	89′ 345
−1.0	−.2	+1.4	−.3

1871 Sept 2 M. $k = +.011$ (+15) $k' = .000$ $k' = +.003$ $n = -.57$

Star	RA	δ	tang δ	π Ra −(P′−P)			
	h m 18.56					19.626	
η Serpentis	X 18.2 15	−2° 56′ −	.05 257	+19.62	.03	+19.65	00
109 Herc.	X 18.3 18	+21 43 +	.40 258	+19.84	.20	62	
1 Aquilae	~~18.5~~ 28	+					
α Lyrae	X 18.6 33	+38 40 +	.80 260	+19.99	41	58	
13 R Lyrae	18.8 51	+43 47 +	.96	+20.11	.49	62	
ε Aquilae	X6 18.9 54	+14 54 +	.27 264	+19.80	.14	66	
β Delphini	X 20.5 32	+14 10 +	.25 292	+20.03	.13	.72	
α Cygni	X1 20.6 37	+44 50 +	.99 294	+20.10	.50	60	
ε Cygni	X2 20.7 41	+33 30 +	.66 298	+19.98	.34	64	
η Cephei	X 20.7 43	+61 21 +	1.83 299	+20.50	.93	19632 .57	00
20.62	19.48	−1′				+19.629	+19.629

18.1 −2.66 +18.36 .00 .00 +18.36 +18.36
18.4 +3.21 +21.31 +21.31 +21.31
18.7 −20.69 +9.30 .00 .00 +9.30 +9.30

1871 Sept. 2

Star	Ra	δ	tang δ	π Ra −(P′−P)		
~~72~~ 22 H. Camel. S.C.	6.1 6	+110 38	2.66	+18.36		383
51 Cephei S.C.	6.7 41	+98 45	20.69	+9.30	−	111
X Draco	18.4 23	+72.41	+3.21	+21.31	−	259

18.2 −05 +19.62 +18.8 +.96 +20.11
18.3 +40 +19.84 20.6 +.99 +20.10
18.9 +27 +19.80 20.7 +1.83 +20.50
20.5 +25 +19.83 20.0 +1.26 +20.24 $m_5 = -.42$
19.0 +22 +19.80

$0 = +2.99 + 1.51\ n = -.51$ −.53 $0 = -2.88 - 1.44\ n = -.50$ −.49
$-20.91 - 10.50$ −.50 −.50 .49

$0 = +1.95 + 1.07\ n = -.55$ $0 = -3.92 - 1.88\ n = -.48$
$-21.95 - 10.94$ −.50 .49

1871 Sept 3 M. $k = +.011$ $k' = .000$ −27 $k' = -.022$ $c = -.06$ 19840 −.52

Star	RA	δ	tang δ							
	17.10			aur 237						
α Herculis	X 9 17.1 9	+14 32 +	.26	103 +20.04	.14	−.06	19.84	−02	+19.82	
μ Herc.	3 17.7 42	+27 48 +	.53	113 +20.13	.28	−.07	.78	−.01	.77	ε Urs. Min.
o Herc.	X 0 18.0 3	+28 45 +	.55	114 +20.29	.29	−.07	.93	+00	.93	ψ Draco
109 Herc	X 3 18.3 18	+21 43 +	.40	108 +20.12	.21	−.06	.85	+01	.86	35 Draco
α Lyrae	X 5 18.5 33	+38 40 +	.80	124 +20.18	.42	−.08	.68	+01	.69	b Draco
	18.18 18.4	1800					19816 .84	+01	.85	51 Cephei
							+19.820		+19.820	

17.0 +7.35 +24.26 .00 .00 +24.26 +24.26
17.7 +3.12 +21.52 .00 +21.52 +21.52
~~17.9 +4.33~~
18.7 −20.69 +7.45 .00 .00 +7.45 +7.45

Star	RA	δ	tang δ				
ε Urs. Min.	X 16. 59 (17.0)	+82 14 +	7.38	+24.26	−		235
ψ Draco	Aust 17.7 44	+72 13 +	3.12	+21.52	−		484
~~35 Draco~~	~~X 17.9 55~~	~~+76 59 +~~	~~4.33~~				~~405~~
b Draco	X 18.4 22	+58 44 +	1.64	+20.81	−.86 −.11 +19.84		488
51 Cephei S.C.	X 6.7 41	+98 45	20.69	+7.45	−		111

17.1 +26 +20.04 18.4 +1.65 +20.81
17.7 +53 +20.13 18.5 +.80 +20.18
18.0 +55 +20.29 18.4 +1.22 +20.50 $m_5 = -.50$
18.3 +40 +20.12
17.8 +44 +20.14 $0 = +6.91 + 4.12\ n = -.59$ −.60 $0 = -21.13 - 12.69\ n = -.60$ −.60
$+2.68 + 1.38$ −.51 −.53 −.57

$0 = +6.13 + 3.76\ n = -.61$ $0 = -21.91 - 13.05\ n = -.60$
$+1.90 + 1.02$ −.54 −.57

1871 Sept 6 $k = +.014$ −40 $k' = +.004$ $k' = -.038$ $n = -.49$

Star	RA	δ	tang δ					
~~α Herc.~~	18.22 ~~17 09~~	~~+14 32 +~~	~~.26~~			20.730		
o Herc.	5 18.0 03	+28 45 +	.55 255	+21.01	.27	+20.74	−02	+20.72
η Serpentis	3 18.2 14	−2 56 −	.05 257	20.73 +	.02	.75	−01	.74
109 Herc.	2 18.3 18	+21 43 +	.40 258	+20.87	.20	.67	−.01	.66
1 Aquilae	1 18.4 ~~28~~		488			.76	−00	.76
α Lyrae	1 18.6 33	+38 40 +	.80 260	+21.06	.39	.67	+00	.67
β Lyrae	2 18.7 45	+33 13 +	.65 264	+21.06	.32	.74	+01	.75
13 R Lyrae	3 18.8 51	+43 47 +	.96	+21.20	.44	.73	+01	.74
ε Aquilae	4 18.9 54	+14 54 +	.27 267	+20.90	.13	20.728 .77	+.02	.79
	18.75 18.49					+20.729		+20.729

18.7 −20.69 +10.55 .00 .00 +10.55 +10.55

Star	RA	δ	tang δ				
~~ε Urs. Min.~~	~~16 59~~	+82 ~~44~~ +1′	~~7.32~~ 4				
b Draco.	18.4 22	+58 44 +	1.65	+21.57	−.81	+20.76	488
51 Cephei S.C.	6.7 41	+98 45	20.69	+10.55	−		111

18.2 −05 +20.73 18.4 +1.65 +21.57
18.3 +40 +20.87 18.6 +.80 +21.06
18.9 +27 +20.90 18.8 +.96 +21.20
18.5 +21 +20.83 18.6 +1.14 +21.28 $m_5 = -.48$

$0 = -20.90 - 10.28\ n = -.49$

$0 = -21.83 - 10.73\ n = -.49$

1871

sin z = +60+80 | +40+60 | +20+40 | +0+20 | +0 −20 | −20−40 | −40 −60 | −60−80

RA h m	sin δ z	Rag	− Rfl ″	P′−P ″	Rag−Rfl+P′−P ″		
18 15	+.71	+0	47.2	−.1	47.1	+1.8	48.9
18 18	+.35		47.4	+.3	47.7	+1.0	48.9
~~18 28~~							
18 33	+.06		46.5	+.1	46.6	+.2	46.8
18 51	−.01		46.4	+.5	46.9	−.0	46.9
18 54	+.46		46.6	+.4	47.0	+1.2	48.2
20 32	+.47		47.1	+.1	47.2	+1.3	48.5
20 37	−.04		48.4	+.0	48.4	−.1	48.3
20 41	+.15		49.3	+.0	49.3	+.4	49.7
20 43	−.33		50.1	+.2	50.3	−.8	49.5
						(9)	48.39

+0′ 48.39″
48.42

RA h m	sin δ z	Rag	− Rfl ″	P′−P ″	Rag−Rfl+P′−P ″		
6 6		+0					
6 41	−.77		50.8	−.2	50.6	−1.9	48.7
18 23	−.50						
						(1)	48.70

+60+80	+40+60	+20+40	+0+20	+0 −20	−20−40	−40 −60	−60−80
+.71 +47.1	+.46 +47.0	+.35 +47.7	+.15 +49.3	−.01 +46.9	−.33 +50.3		−.77 +50.6
	+.47 47.2		+.06 46.6	−.04 48.4			
+.71 + 47.1	+.46 + 47.1	+.35 + 47.7	+.10 +48.0	−.02 +47.6	−.33 +50.3		−.77 +50.6
+ 1.9	+ 1.2	+ 1.0	+ .3	− .1	− .9		− 2.0
49.0	48.3	48.7	48.3	47.5	49.4		48.6
(10) 90′	166²	87′	166²	150²	94′		86′
−.6	+.1	−.3	+.1	+.9	−1.0		−.2

RA h m	sin δ z	Rag	− Rfl	P′−P	Rag−Rfl+P′−P		
17 9	+.47	+0	47.6	−.4	47.2	−1.2	46.0
17 42	+.25		47.3	−.3	47.0	+.7	47.7
18 3	+.24		47.6	+.2	47.8	+.7	48.5
18 18	+.35		47.4	+.3	47.7	+1.0	48.7 7
18 33	+.06		46.9	+.1	47.0	+.2	47.2
						(5)	47.62

+0′ 48.39″
48.12

RA h m	sin δ z	Rag	− Rfl	P′−P	Rag−Rfl+P′−P		
16 59		+0					
17 44	−.50		48.5	+.4	48.9	−1.2	47.7
~~17 55~~	~~−.54~~						
18 22	−.28		50.8	−.2	50.6	−.7	49.9
6 41	−.77		51.3	−.2	51.1	−1.8	49.3
						(3)	48.97

+60+80	+40+60	+20+40	+0+20	+0 −20	−20−40	−40 −60	−60−80
	+.47 +47.2	+.25 +47.0	+.06 +47.0		−.28 +50.6	−.50 +48.9	−.77 +51.1
		+.24 47.8					
		+.35 47.7					
	+.47 +47.2	+.28 +47.5	+.06 +47.0		−.28 +50.6	−.50 +48.9	−.77 +51.1
	+ 1.3	+ .8	+ .2		− .8	− 1.3	− 2.0
	48.5	48.3	47.2		49.8	47.6	49.1
	(8) 85′	249³	72′		98′	76′	91′
	−.1	+.1	+1.2		−1.4	+.8	−.7

RA h m	sin δ z	Rag	− Rfl	P′−P	Rag−Rfl+P′−P		
17 9		+0					
18 3	+.24		47.8	+.2	48.0	+.7	~~47.3~~ 48.7
18 14	+.71		46.5	−.1	46.4	+1.8	48.2
18 18	+.35		46.8	+.3	47.1	+1.0	48.1 7
18 28							
18 33	+.06		47.4	+.1	47.5	+.2	47.7
18 45	+.16		47.3	+.1	47.4	+.5	47.9
18 51	−.01		46.7	+.5	47.2	−.0	47.2
18 54	+.46		46.2	+.4	46.6	+1.2	47.8
						(7)	47.94

+0′ 47.94″
47.99

RA h m	sin δ z	Rag	− Rfl	P′−P	Rag−Rfl+P′−P		
16 59		+0					
18 22	−.28		48.3	−.2	48.1	−.6	47.5
6 41	−.77		50.8	−.2	50.6	−1.8	48.8
						(2)	48.15

+.24

+60+80	+40+60	+20+40	+0+20	+0 −20	−20−40	−40 −60	−60−80
+.71 +46.4	+.46 +46.6	+.24 +48.0	+.06 +47.5	−.01 +47.2	−.28 +48.1		−.77 +50.6
		+.35 47.1	+.16 47.4				
+.71 + 46.4	+.46 +46.6	+.30 + 47.6	+.11 +47.4	−.01 +47.2	−.28 +48.1		−.77 +50.6
+ 1.9	+ 1.2	+ .8	+ .3	− .0	− .7		− 2.0
48.3	47.8	48.4	47.7	47.2	47.4		48.6
(9) 83′	78′	168²	154²	72′	74′		86
−.4	+.1	−.5	+.2	+.7	+.5		−.7

1871 Sept. 7 R. h = +.012 (−23) h′ = +.002 h′ = −.013 c = −.05 n = −.50

Star	1848	Ra	δ	tang δ	π Ra −(ρ′−ρ)			21.070		
μ Herc.	+1.5	17.7 41	+27 48+	.53 113	+21.40	26	−.06	+21.08	−.02	±21.06
ο Serpentis	1.0	18.2 14	−2 56−	.05 108	21.20+	.02	−.05	.17	−.01	21.16
109 Herc.	9	18.3 18	+21 43+	.40 108	+21.33	.20	−.05	.08	−.01	21.07
1 Aquilae	+8	18.4 ~~25~~	+	488				20.96	−.01	20.95
α Lyrae	.6	18.6 33	+38 40+	.80 128	+21.53	.40	−.06	21.07	−.01	21.06
110 Herc.	5	18.7 40	+20 26+	.37 107	+21.30	.18	−.05	.07	−.01	21.06
β Lyrae	5	18.7 45	+33 13+	.65 119	+21.44	.32	−.06	.06	−.01	21.05
13 R Lyrae	4	18.8 51	+43 47+	.96 139	+21.61	.48	−.07	.06	00	21.06
ε Aquilae	3	18.9 54	+14 54+	.27 104	+21.27	.14	−.05	.08	00	21.08
α Cygni	−1.4	20.6 37	+44 50+	.99 141	+21.61	.50	−.07	.04	+.02	21.06
ε "	−1.5	20.7 41	+33 30+	.66 120	+21.48	.33	−.06	.09	+.02	21.11
η Cephei	−1.5	20.7 43	+61 21+	1.83 200	+22.04	.92	−.10	.02	+.02	21.04
ν Cygni	−1.7	20.9 53	+40 41+	.86 137	+21.52	.43	−.07	.02	+.02	21.04

20.72 ~~18.92~~ 19.17 −1 21.042

+21.062 +21.062

18.1−2.66 +19.70 .00 .00 +19.70 +19.70
18.2+16.83 +30.08 +30.08 +30.08
18.4+3.21 +22.82 +22.82 +22.82
18.7−20.69 +8.71 .00 .00 +8.71 +8.71

1871 Sept. 7

Star	Ra	δ	tang δ	π Ra −(ρ′−ρ)			
22 Camel SC	18 6.14	+110 38	2.66	+19.70	—		383
δ Urs. Min x	18.2 13	+86 36+	16.83	+30.08	—		256
b Draco x	18.4 22	+58 44+	1.64 193	+21.88	−.82 −10 +20.96		488
51 H Cephei SC x	6.7 41	+87 45	20.69	+8.71	—		111
χ Draco	18.4 23	+72 41+	3.21	+22.82	—		259

18.2−05+21.20 18.4 +1.65+21.88
18.3+40+21.33 20.7 +1.83+22.04
18.7+37+21.30 19.5 +1.74+21.96
18.9+27+21.27
18.5+25+21.28

0= +16.58 +8.80 n = −.53 0= −2.91 −1.58 n = −.54
+2.96 +1.54 −.52 −20.94 −12.57 −.60

0= +15.09 +8.12 n = −.54 0= −4.40 −2.26 n = −.51
+1.47 +.86 −.58 −22.43 −13.25 −.59

1871 Sept 8 M. h = +.005 (00) h′ = −.005 h′ = +.006 c = −.05 n = −.44

Star	1860	Ra	δ	tang δ	π Ra −(ρ′−ρ)			21.260		
~~1 Aquilae~~		~~18 28~~								
α Lyrae	4.8	18.6 33	+38 40+	.80 128	+21.67	.35	−.06	+21.26	+.01	+21.27
τ Cygni	8	21.2 10	+37 31+	.77 126	+21.78	.34	−.06	.38	00	.38
α Cephei	9	21.3 16	+62 3+	1.89 214	+22.11	.83	−.11	.17	−.01	.16
β Cephei		[21.4] 27	+70 1+	2.75	+22.56		+21.275			

21.25 20.37 −1

+21.270 +21.270

18.7−20.69 +10.25 −.01 −.01 +10.24 +10.24
21.4+2.75 +22.56 +.01 .00 +22.57 +22.56

51 Cephei H, x 6.7 41 +87 14 20.68 +10.257 ~~+10.2~~ — 534 111

18.6+80+21.67 21.3 +1.89+22.11
21.2+77+21.78
19.9+78+21.72 n 5 = .32

0= +1.97 +85 n = −.43 0= −21.47 −11.48 n = −.53

0= +.86 +.45 n = −.52 0= −22.58 −11.87 n = −.53

1871 Sept 9 M. h = +.003 (+10) h′ = −.007 h′ = +.012 c = −.05 n = −.40

Star	18.65	Ra	δ	tang δ	π Ra −(ρ′−ρ)			21.435		
α Lyrae	+8	18.6 33	+38 40+	.80 128	+21.78	.32	−.06	+21.40	+.03	+21.43
β Lyrae	+7	18.7 45	+33 13+	.65 119	+21.79	.26	−.06	.47	+.02	.49
~~δ Lyrae~~	9	~~18 49~~ 21.6						.55	−.01	.54
α Cephei	9	21.3 16	+62 3+	1.89 214	+22.22	.76	−.11	.35	−.01	.34
β Aquarii	9	21.4 25	−6 7−	.11 101	+21.48	.04	−.05	.47	−.01	.46
κ Pegasi	9	21.6 39	+25 4+	.47 110	+21.70	.19	−.05	.46	−.01	.45
ε Pegasi	9	21.6 38	+9 18+	.16 101	+21.62	.06	−.05	.51	−.01	.50

ε Pegasi 21.50 20.69 −1 21.468
α Herculis 17 9

+21.459 +21.459

18.7−20.69 +11.52 −.01 −.01 +11.51 +11.51
21.4+2.75 +22.65 00 +.01 +22.65 +22.66

Star	Ra	δ	tang δ	π Ra −(ρ′−ρ)			
57 Cephei H x	6.7 41	+87 14	20.69	+11.52	—		485 111
β Cephei x	21.4 27	+70 1+	2.75	+22.65	—		308
13 H Cephei x	21.6 35	+56 55+	1.53 183	+22.25	−.61 −.09 +21.55		515
δ Urs. Min	~~18 13~~	~~+86 36+~~	~~16.83~~				

18.7+65+21.79 18.6 +80+21.78
21.4−11+21.48 21.3 +1.89+22.22
21.6+47+21.70 21.6 +1.53+22.25
21.6+16+21.62 20.5 +1.41+22.08
20.8+29+21.65

0= +2.46 +1.00 n = −.41 0= −20.98 −10.14 n = −.48

0= +1.34 +.58 n = −.43 0= −22.10 −10.57 n = −.48

1871 Sept. 10 M. h = +.007 (−67) h′ = −.003 h′ = −.021 c = −.05 n = −.39

Star	17.10	Ra	δ	tang δ	π Ra −(ρ′−ρ)			21.570		
α Herculis	x	17.1 9	+14 32+	.26 103	+21.72	10	−.05	+21.57	−.03	±21.54
ψ¹ Draco	Aust	17.7 44	+72 13+	3.12	+23.11					
109 Herc.	6	18.3 18	+21 43+	.40 108	+21.81	.16	−.05	.60	00	.60
~~1 Aquilae~~		~~18.4 28~~	~~+38 40+~~	~~.80~~				.55	.00	.55
α Lyrae	1.5	18.6 33	+38 40+	.80 128	+21.84	.31	−.06	.47	+.01	.48
110 Herc.	3	18.7 40	+20 26+	.37 107	+21.77	.14	−.05	.58	+.01	.59
β Lyrae	4	18.7 45	+33 13+	.65 119	+21.88	.25	−.06	.57	+.01	.58

1830 21.540

+21.557 +21.557

17.7+3.12 +23.11 .00 .00 +23.11 +23.11
18.1−2.66 +20.53 +20.53 +20.53
18.2+16.83 +29.15 +29.15 +29.15
18.7−20.83 +12.50 +12.50 +12.50
18.4+3.21 +22.83 .00 .00 +22.83 +22.83
~~17.9 +11.33~~

Star	Ra	δ	tang δ	π Ra −(ρ′−ρ)			
22 Camel SC	6.1 4	+110 38−	2.66	+20.53	—		383
δ Urs Min x	18.2 13	+86 36+	16.83	+29.15	—		256
b Draco	18.4 22	+58 44+	1.64 193	+22.29	−.64 −10 +21.55		488
51 Cephei H	6.7 41	+87 14	20.60 83	+12.50	—		111
35 Draco	~~17.9 55~~	~~+71 59+~~	~~4.33~~		—		~~485~~
χ Draco	18.4 23	+72 41+	3.21	+22.83	—		259

17.1+26+21.72 18.4 +1.65+22.29 0= +2.70 +1.31 n = −.49 0= −3.08 −1.27 n = −.41
18.3+40+21.81 18.6 +.80+21.84 +16.41 +7.35 −.45 −21.25 −9.30 −.44
18.7+37+21.77 18.5 +1.22+22.06 +2.79 +1.03 −.37
18.7+65+21.88
18.2+42+21.80

0= +1.90 +1.05 n = −.55 0= −3.88 −1.53 n = −.39
+15.61 +7.09 −.45 −22.05 −9.56 −.43
+1.99 +.77 −.39

sin z =	+.60+.80	+.40+.60	+.20+.40	+0 +.20	+0 −.20	−.20 −.40	−.40 −.60	−.60 −.80

Ra h m	sin δz	R_eq − R_fl	″	ρ′−ρ	R_eq − R_fl + ρ′−ρ ″		
17 41	+.25	+0	48.8	−.3	48.5	+.7	49.2
18 14	+.71		46.0	−.1	45.9	+.8	47.7
18 18	+.35		46.0	+.3	46.3	+1.0 .89	47.32
18 28							
18 33	+.06		47.9	+.1	48.0	+.2	48.2
18 40	+.37		45.9	+.3	46.2	+1.0	47.2
18 45	+.16		48.2	+.1	48.3	+.5	48.8
18 51	−.01		48.3	+.5	48.8	−0	48.8
18 54	+.46		45.2	+.4	45.6	+1.2 1	46.7
20 37	−.04		47.7	+0	47.7	−.1	47.6
20 41	+.15		48.0	+.0	48.0	+.5	48.5
20 43	−.33		49.0	+.2	49.2	−.8	48.4
20 53	+.03		48.3	+.0	48.3	+.1	48.4
						(12)	48.06

+0′ 48.32″
48.13

+.60+.80	+.40+.60	+.20+.40	+0 +.20	+0 −.20	−.20 −.40	−.40 −.60	−.60 −.80
+.71 +45.9	+.46 +45.6	+.25 +48.5	+.06 +48.0	−.01 +48.8	−.33 +49.2		−.77 +53.1
		+.35 46.3	+.16 48.3	−.04 47.7	−.28 49.6		
		+.37 46.2	+.15 48.0				
			+.03 48.3				
+.71 +45.9	+.46 +45.6	+.32 +47.0	+.10 +48.2	−.02 +48.2	−.30 +49.4		−.77 +53.1
+ 1.9	+ 1.2	+ .8	+ .3	− .1	− .8		− 2.0
47.8 1	46.8 1	47.8	48.5	48.1	48.6		51.1
(14) 78 1	68 1	239 3	340 4	162 2	172 2		111 1
+.5	+ 1.5	+.5	−.2	+.2	−.3		−2.8

R.A. h m	sin z	R_eq − R_fl ″	ρ′−ρ ″	R_eq − R_fl + ρ′−ρ ″			
18 4		+0					
18 13							
18 22	−.28		49.8	−.2	49.6	−.6	49.0
6 41	−.77		53.3	−.2	53.1	−1.8	(51.3)
~~18 23~~	−.50						
						(1)	49.00

~~18 28~~							
18 33	+.06	+0	48.8	+.1	48.9	+.2	49.1
~~21 10~~	~~+.09~~	~~−2~~	~~13.8~~	~~+.5~~			
21 16	−.34	+0	48.4	+1.0	49.4	−.8	48.6
21 27	−.46		49.7	+1.1	50.8	−1.0	49.8
						(3)	49.17

+0′ 49.07″
49.17

~~6 41 −.77 +0 55.6 −.2 55.4~~

+0 +.20	−.20 −.40	−.40 −.60	
+.06 +48.9	−.34 +49.4	−.46 +50.8	
+.06 +48.9	−.34 +49.4	−.46 +50.8	
+ .2	− .9	− 1.2	
49.1 1	48.5 1	49.6 1	
(3) 91	85	96	272
+.0	+.6	−.5	

18 33	+.06	+0	48.2	+.1	48.3	+.2	48.5
18 45	+.16		48.7	+.0	48.7	+.4	49.1
18 49							
21 16	−.34		50.3	+1.0	51.3	−.9	50.4
21 25	−.25		49.9	+.8	50.7	−.6	50.1
21 39	+.30		47.9	−.3	47.6	+.8	48.4
21 38	+.55		47.5	−.4	47.1	+1.4	48.5
						(6)	49.17

+0′ 49.20″
49.21

6 41							
21 27	−.46	+0	49.4	+1.1	50.5	−1.0	49.5
21 35							
18 13							
						(1)	49.50

+.40+.60	+.20+.40	+0 +.20	−.20 −.40	−.40 −.60	
+.55 +47.1	+.30 +47.6	+.06 +48.3	−.34 +51.3	−.46 +50.5	
		+.16 48.7	−.25 50.7		
+.55 +47.1	+.30 +47.6	+.11 +48.5	−.30 +51.0	−.46 +50.5	
+ 1.5	+ .7	+ .3	− .7	− 1.2	
48.6	48.3	48.8	50.3	49.3	
(7) 486 1	483 1	976 2	1006 2	493 1	3444
+.6	+.9	+.4	−1.1	−.1	

17 9		+0					
17 44							
18 18	+.35		46.2	+.3	46.5	+.9	47.4
18 28							
18 33							
18 40	+.37		47.7	+.3	48.0	+.9	48.9
18 45	+.16		47.9	+.1	48.0	+.4	48.4
						(3)	48.23

+0′ 48.20″
48.25

18 4		+0					
18 13							
18 22	−.28		49.1	−.2	48.9	−.6	48.3
6 41							
17 55	−.57						
18 23	−.50						
						(1)	48.30

+.20+.40	+0 +.20	−.20 −.40	
+.35 +46.5	+.16 +48.0	−.28 +48.9	
+.37 48.0			
+.36 +47.2	+.16 +48.0	−.28 +48.9	
+ .9	+ .4	− .7	
48.1 2	48.4 1	48.2 1	
(4) 2	4	2	8
+.1	−.2	+.0	

1871 Sept 14 R. h = +.006 (+5 8) h' = -.003 h' = +.050 n = -.39

Star	Ra	δ	tang δ	π Ra −(ρ'−ρ)					
	h m	° ′					22.165		
13 R Lyrae	18.9 52	+43	47 +	.96	+22.56	.87	+22.19	+07	+22.26
ζ Aquilae	19.0 00	+13	41 +	.24	+22.23	.09	14	+06	.20
ν Cygni	21.1 8	+29	43 +	.57	+22.45	.22	23	−04	.19
τ Cygni	21.2 10	+37	31 +	.77	+22.59	.30	29	−04	.25
o Cygni	~~21.2~~ 12								
α Cephei	21.3 16	+62	3 +	1.89	+23.08	.74	22.287 34	−.05	.29
	20.30 (21.20)		−1′				+22.238		+22.238

21.3 −7.03 +19.54 .00 .00 +19.54 +19.54

1871 Sept 14

Star	Ra	δ	tang δ	π Ra −(ρ'−ρ)		
	h m					
1 H Draco. Lc.	9.3 19	+81	54 −	7.03	+19.54	137

19.0 +24 +22.23 18.9 +96 +22.56
21.1 +57 +22.45 21.3 +1.89 +23.08
20.0 +.40 +22.34 20.1 +1.42 +22.82 m5 = −.40

0 = −7.43 −2.80 n = −.38

0 = −8.45 −3.28 n = −.39

1871 Sept. 17 M. h = −.032 h' = −.040 h' = +.003 n = −.74

Star	Ra	δ	tang δ	π Ra −(ρ'−ρ)				
α Lyrae	18.6 33	+38	40 +	.80	+23.90	.59	+23.31	00
β Lyrae	18.7 45	+33	13 +	.65	+23.94	.48	46	
ζ Aquilae	19.0 00	+13	41 +	.24	+23.82	.18	64	00
	18.77		−1′				+23.470	+23.470

18.2 +16.83 +35.66 −.02 −.02 +35.64 +35.64
18.7 −20.83 +7.69 −.00 −.02 +7.69 +7.69

Star	Ra	δ	tang δ	π Ra −(ρ'−ρ)		
51 Cephei H. D.C.	6.7 41	+87	14 +	20.60	+7.69	111
δ Urs. Min.	18.2 13	+86	36 +	16.83	+35.66	256

18.7 +65 +23.94 18.6 +80 +23.90
19.0 +24 +23.82
18.8 +44 +23.88

0 = +16.39 +11.76 n = −.72 −72 0 = −21.27 −16.19 n = −.76 −75

0 = +16.03 +11.74 n = −.73 0 = −21.63 −16.22 n = −.75

1871 Sept 18 Ol. h = +.007 (+3) h' = −.001 h' = +.005 n = +.00

Star	Ra	δ	tang δ	π Ra −(ρ'−ρ)					
	18.25						23.113		
α Herc.	17.1 8	+14	32 +	.26	+23.19	.00	+23.19	+.01	+23.20
α Ophiuc.	17.5 28	+12	39 +	.22	+23.09	.00	.09	+.01	.10
~~η Serpent.~~	~~18 14~~	−2	~~56~~ −	~~.05~~				00	
α Lyrae	18.6 33	+38	40 +	.80	+23.03	.00	.03		.03
110 Herculis	18.7 40	+20	26 +	.37	+23.10	.00	.10		.10
13 R Lyrae	18.7 45	+43	47 +	.96	+23.09	.00	.09		.09
~~13 R Lyrae~~	~~18 51~~	~~+43~~	~~47 +~~	~~.96~~	~~+23.18~~				
ε Aquilae	18.9 54	+14	54 +	.27	+23.18	.00	.18	00	.18
g Cygni	21.4 25	+45	59 +	1.04	+23.14	.00	23130 .14	−01	.13
	21.45 21.5 19.05		−1′				.12	−01	.11
							+23.118		+23.118

18.7 −20.83 +21.53 .00 .00 +21.53 +21.53
21.4 +2.75 +22.93 .00 .00 +22.93 +22.93

18

Star	Ra	δ	tang δ	π Ra −(ρ'−ρ)				
51 Cephei H. D.C.	6.7 41	+87	14 +	20.60	+21.53			111
β Cephei	21.4 27	+70	1 +	2.75	+22.93			308
74 ~~Cephei~~ Cygni	21.5 32	+39	51 +	.83	+23.12	+.00	+23.12	514

17.1 +26 +23.19 18.6 +80 +23.03
17.5 +22 +23.09 18.7 +96 +23.09
18.7 +37 +23.10 21.4 +1.04 +23.14
18.9 +27 +23.18 21.5 +83 +23.12
18.0 +28 +23.14 20.0 +.91 +23.10 m5 = −.06

0 = +2.47 −.21 n = +.09 +.09 0 = −21.11 −1.61 n = −.08 −.08

0 = +1.84 −.17 n = +.09 0 = −21.74 −1.57 n = −.07

1871 Sept. 21 Ol. h = +.003 (−31) h' = −.004 h' = −.0185 n = +.02

Star	Ra	δ	tang δ	π Ra −(ρ'−ρ)					
	18.65						23.512		
η Serpent.	18.2 15	−2	56 −	.05	+23.49	.00	+23.49	−02	+23.47
110 Herculis	18.7 40	+20	26 +	.37	+23.52	.01	.53	−01	.52
R13 Lyrae	18.8 51	+43	47 +	.96	+23.48	.02	.50	−01	.49
ε Aquilae	18.9 54	+14	54 +	.27	+23.52	.01	.53	−01	.52
g Cygni	21.4 25	+45	59 +	1.04	+23.42	.02	.44	+.03	.47
~~13 H Cephei~~	~~21.5 35~~	~~+56~~	~~55 +~~	~~1.53~~			.47	+.03	.50
ζ Aquilae	19.0 54	+13	41 +	.24	+23.54	.00	.54	−01	.53
ω Aquilae	19.2 12	+11	22 +	.20	+23.50	.00	.50	−00	.50
	20.28 19.46		−1				23.488		
							+23.500		+23.500

18.2 +16.83 +22.71 −.00 −.01 +22.71 +22.70
21.4 +2.75 +23.53 +.01 +.01 +23.54 +23.54

Star	Ra	δ	tang δ	π Ra −(ρ'−ρ)				
δ Urs. Min.	18.2 13	+86	36 +	16.83	+22.71			256
b Draco	18.4 22	+58	44 +	1.65	+23.31	+.03	+23.34	488
β Cephei	21.4 27	+70	1 +	2.75	+23.53			308
74 ~~Cephei~~ Cygni	21.5 32	+39	51 +	.83	+23.46	+.01	.47	514

18.2 −05 +23.49 18.4 +1.65 +23.31
18.7 +37 +23.52 18.8 +.96 +23.48
18.9 +27 +23.52 21.4 +1.04 +23.42
19.0 +24 +23.54 21.5 +.83 +23.46
19.2 +20 +23.50 20.0 +1.12 +23.42 m5 = +.08
18.8 +21 +23.51

0 = +16.62 −.80 n = +.05 +.05
+2.54 +.03 −.01 −.01 +.02

0 = +15.71 −.72 n = +.05
+1.63 +.12 −.07

sin z = +.60+.80 +.40+.60 +.20+.40 +0+.20 +0 -.20 -.20 -.40 -.40 -.60 -.60 -.80

R.A. sin z R_{gy} Rfl P′-P R_{gy}-Rfl+P′-P

h m " " "

37 18 52

19 00

21 8

21 10

21 12

21 16

R.A. sin z R_{gy} Rfl P′-P

h m "

9 19

111 18 33

256 18 45

19 00

6 41

18 13

75

111 17 8 +0

308 17 29 +.50 +1 ~~419~~ -.5 41.4 +1.0 42.4 +1.1 43.5

514 18 14

18 33

18 40 +.37 +0,1 42.0 +.3 42.3 +.8 43.1 +.8 43.9

18 45

18 51 -.01 42.6 +.5 43.1 -.0 43.1 -0 43.1

18 54 +.46 41.8 +.4 42.2 +1.0 43.3 +1.0 44.3

21 25 -.06 +0,1 41.0 -.1 40.9 -.1 40.8 -.2 40.6

(5) 43.08

+0′1 41.97″

68 1 42.19

6 41

21 27 -.46 +0,1 40.9 +1.1 42.0 -1.0 41.0 -1.0 40.0

21 32 +.04 +0,1 40.5 -.6 39.9 -.01 39.8 +1 39.9

(2) 39.95

+.50 +41.4 +.37 +42.3 +.04 +39.9 -.01 +43.1 -.46 +42.0

+.46 42.2 -.06 40.9

+.48 +41.8 +.37 +42.3 +.04 +39.9 -.04 +42.0 -.46 +42.0

+1.2 +.9 +.1 -.1 -1.2

43.0 2 43.2 1 40.0 1 41.9 2 40.8 1

(7) 60 32 0 38 8 138

-1.0 -1.2 +2.0 +.1 +1.2

21 25 40.6

4 27 39.9

21 32 40.0

40.17 for zone

17 29 43.5

18 40 43.9

18 51 43.1

18 54 44.3

256 18 15 +0

488 18 40 +.37 54.3 ~~43.7~~ +.3 54.6 ~~44.0~~ +.8 55.4 +.8 56.2

308 18 51 -.01 54.7 +.5 55.2 -0 55.2 -0 55.2

514 18 54 +.46 55.9 +.4 56.3 +.9 57.2 +1.1 [58.3]

21 25 -.06 54.7 -.1 54.6 -.2 54.4 -.2 [54.2]

21 35

18 59 +.48 53.5 -.0 53.5 +1.02 54.7 +1.2 55.9 +.46 +56.3 +.37 +54.6 +.04 +55.3 -.01 +55.2 -.46 +54.6

19 12 +.57 53.6 +.3 53.9 +1.2 55.1 +1.3 56.4 +.48 53.5 -.06 54.6

(5) ~~55.57~~ +.51 53.9

56.40 +.48 +54.6 +.37 +54.6 +.04 +55.3 -.04 +54.9 -.46 +54.6

+1.2 +.9 +.1 - .4 - 1.2

55.8 3 55.5 1 55.4 1 54.8 2 53.4 1

(8) 174 55 54 96 34 413

-.6 -.3 -.2 +.4 +1.8

18 13

18 22 -.28

21 27 -.46 +0 53.5 +1.1 54.6 -1.1 53.5 -.5 53.0]

21 32 +.04 55.9 -.6 55.3 +.1 55.4 -1.0 54.4

(2) ~~53.70~~ 54.40

+0′ 55.16″

~~55.04~~

56.07

1871 Sept. 22 R. h = +.005 h' = −.012 h' = +.012 n = +.02

Star Ra δ tang δ π Ra (P' − P)

π₂ Cygni x 21.7 42 + 48 44 + 1.14 ✓517 + 23.47 ✓+ .02 + 23.49 00
16 Pegasi x 21.8 47 + 25 20 + .47 ✓518 + 23.54 ✓+ .01 .55
x Aquarii x ~~21.~~ 22.0 59 − 0 56 − ~~.33~~ .34 23.62 ✓− .00 .62
π Pegasi x 22.1 4 + 32 34 + .64 ✓313 + 23.46 ✓+ .01 .47 00
21.90 −1′ +23.532 +23.532

1871 Sept 22

Star Ra δ tang δ π Ra (P' − P)

79 Draco: ⓧ

21.8 + 47 + 23.54 21.7 + 1.13 + 23.47
22.0 − 62 + 23.62
22.1 + 64 + 23.46
22.0 + 36 + 23.54

1871 Sept 23 R. h = ~~+.003~~ +5 −1 h' = −.003 h' = +.034 n = +.11

13 R Lyrae 18.9 52 + 43 47 + .96 ✓492 + 23.52 ✓+ .11 23.587 + 23.63 + .04 + 23.67
ξ Aquilae 19.0 59 + 13 41 + .24 ✓270 + 23.53 ✓+ .03 .56 + .04 .60
ω Aquilae 19.2 11 + 11 22 + .20 ✓495 + 23.55 ✓+ .02 .57 + .03 .60
δ Aquilae 19.3 18 + 2 52 + .05 ✓274 + 23.60 ✓+ .01 .61 + .03 .64
β Cygni x 19.4 26 + 27 42 + .52 ✓275 + 23.53 ✓+ .06 .59 + .03 .62
ε Cygni + x 1.0 19.2 41 ~~+ 33 30 + .66~~
η Cephei x ~~20.7~~ 43 + 61 21 + 1.83 ✓~~299~~
ν¹ Cygni x 20.9 53 + 40 41 + .86 ✓309 + 23.51 ✓+ .10 .61 − .02 .59
61 Cygni x 21.0 1 + 38 8 + .78 ✓302 + 23.64 ✓+ .09 .73 − .03 .70
ζ Cygni x 21.1 8 + 29 43 + .57 ✓303 + 23.57 ✓+ .06 .63 − .03 .60
τ Cygni x 21.2 10 + 37 31 + .77 ✓305 + 23.59 ✓+ .08 .67 − .03 .64
α ~~Cephei~~ x 21.3 16 + 62 3 + 1.89 ✓306 + 23.43 ✓+ .21 .64 − .04 .60
δ Cephei x ~~22.~~ 25 + 57 47 + 1.59 ✓~~310~~
7 Lacertae x ~~22.4~~ 26 + 49 38 + 1.18 ✓~~314~~
31 Cephei x ~~22.6~~ 33 + 73 0 + 3.27 ✓~~505~~
~~β Cephei~~ 21.4 26 + 70 1 + 2.76 ✓308 + 23.29 ✓+ ~~.50~~
ε Pegasi 21.6 37 + 9 18 + .16 ✓309 + 23.63 ✓+ .02 23.655 .65 − .05 .60
21.18 20.17 − 2′ + 23.621 + 23.621

~~18.2~~
~~19.2~~
21.4 + 2.75 + 23.29 − .00 − .00 + 23.29 + 23.29

δ ~~Urs. Min.~~ x 18.2 13 ~~+ 86 36~~ + 16.83 ✓
δ ~~Draco~~ x 19.2 13 ~~+ 67 26~~ + 2.40 ✓
κ Cygni x 19.2 14 + 53 8 + 1.33 ✓ + 23.41 ~~+.15~~ + 23.56 272
[79 Draconis 2/]
α Cephei
β Cephei

19.0 + 24 + 23.53 18.9 + 96 + 23.52
19.2 ~~− 35~~ + 20 + 23.55 19.2 + 133 + 23.41
19.3 + 05 + 23.60 20.9 + 86 + 23.51
21.1 + 57 + 23.57 21.3 + 189 + 23.43
21.6 + 16 + 23.63 20.1 + 1.26 + 23.47 n₅ = +.11
20.0 + 24 + 23.58

0 = + 2.51 − 29 n = + .11

0 = + 1.49 − .18 n = + .12]

1871 Sept. 24 R. h = +.007 −1 h' = +.001 h' = +.018 n = +.03

α Lyrae 18.6 33 + 38 40 + .80 ✓269 + 23.61 ✓+ .02 23.631 + 23.63 + 01 + 23.64
110 Herc. 18.7 40 + 20 26 + .37 ✓268 + 23.61 ✓+ .01 .62 + 01 .63
β Lyrae 18.7 45 + 33 13 + .65 ✓264 + 23.64 ✓+ .02 .66 + 01 .67
13 R Lyrae x 18.9 52 + 43 47 + .96 ✓492 + 23.65 ✓+ .03 .68 00 .68
ε Aquilae x 18.9 54 + 14 54 + .27 ✓267 + 23.68 ✓+ .01 .69 00 .69
δ Aquilae 19.3 19 + 2 52 + .05 ✓274 + 23.72 ✓+ .00 .72 00 .72
β Cygni x 3 19.4 25 + 27 42 + .52 ✓275 + 23.74 ✓+ .02 .76 − 01 .75
κ ~~Aquilae~~ ~~19. 30~~
γ Aquilae 19.7 40 + 10 19 + .18 ✓272 + 23.71 ✓+ .01 .72 − 01 .71
δ Sagittae 19.7 42 + 18 14 + .33 ✓279 + 23.71 ✓+ .01 23.715 .72 − 01 .71
19.32 19.00 −1′ + 23.689 + 23.689

18.7 − 20.83 + 23.93 .00 .00 + 23.93 + 23.93
19.2 + 2.41 + 23.53 .00 .00 + 23.53 + 23.53
19.8 + 2.74 + 23.63 .00 .00 + 23.63 + 23.63
+ 3 3

δ' Draco. ✓ 19.2 12 + 67 26 + 2.40 ✓ + 23.53 ✓ — 271
ε Draco ✓ 19.8 49 + 69 57 + 2.75 ✓ + 23.63 ✓ — 282
51 Cephei H. & C. 6.7 41 + 87 14 + ~~20.60~~ 20.83 ✓ + 23.93 — 111

18.7 + 37 + 23.61 18.6 + 80 + 23.61
18.9 + 27 + 23.68 18.9 + 96 + 23.65
19.3 + 05 + 23.72 18.8 + 88 + 23.63 n₅ = +.04
19.7 + 18 + 23.71
19.7 + 33 + 23.71
19.3 + 24 + 23.~~71~~ 69

0 = + 2.17 − .16 n = + .07 +.07 0 = − 21.07 + .24 n = + .01 +.01
+ 2.50 − .036 + .02 +.01
+.04
0 = + 1.53 − .10 n = + .06 0 = − 21.71 + .30 n = + .01
+ 1.86 .00 + .00

? Sept. 25 R h = +.009 +3 h' = +.004 h' = +.018 n = +.08

ξ Aquilae 19.23 59 + 13 41 + .24 ✓370 + 23.91 ✓+ .02 23.928 + 23.93 + .02 + 23.95
δ Aquilae 19.3 18 + 2 52 + .05 ✓374 + 24.00 ✓+ .00 24.00 + .01 24.01
β Cygni 19.4 25 + 27 42 + .52 ✓375 + 23.85 ✓+ .04 23.89 + .01 23.90
κ Aquilae 19.2 30 23.89 + .01 23.90
γ Aquilae 19.7 40 + 10 19 + .18 ✓277 + 23.93 ✓+ .01 23.94 − .01 23.93
δ Sagittae 19.7 42 + 18 14 + .33 ✓379 + 23.89 ✓+ .03 23.92 − .01 23.91
θ Aquilae 20.1 05 − 1 11 − .02 ✓387 + 24.01 ✓− .00 24.01 − .03 23.98
19.83 19.49 23.951 + 23.940 + 23.940

19.2 + 2.41 + 23.75 .00 .00 + 23.75 + 23.75
19.8 + 2.74 + 23.66 .00 .00 + 23.66 + 23.66
20.2 + 4.44 + 23.69 .00 .00 + 23.69 + 23.69

+.03
δ Draco ✓ 19.2 12 + 67 26 + 2.40 ✓ + 23.75 ✓ — 271
κ Cygni ✓ 19.2 14 + 53 8 + 1.33 ✓ + 23.78 ✓ +.11 + 23.89 272
ε Draco ✓ 19.8 49 + 69 57 + 2.75 ✓ + 23.66 ✓ — 282
κ Cephei ✓ 20.2 13 + 77 20 + 4.44 ✓ + 23.69 ✓ — 502

0 = + 2.25 − .20 n = + .09 +.09
19.0 + 24 + 23.91 19.2 + 1.33 + 23.78 + 2.58 − .29 + .11 +.10
19.3 + 05 + 24.00 + 4.28 − .26 + .06 +.05
19.7 + 18 + 23.93 n₅ = +.13 +.08
19.7 + 33 + 23.89 0 = + 1.08 − .03 n = + .03]
20.1 − 02 + 24.01 + 1.41 − .12 + .08
19.6 + 16 + 23.95 + 3.11 − .09 + .03 +.06

sin z = +60 +80 | +40 +60 | +.20 +40 | +0 +.20 | +0 −20 | −.20 −40 | −40 −60 | −60 −80

R.A. sin z R₂₇ − R.f.l. P″ − P R₂₇ − R.f.l. P′ − P

R.A. sin z R₂₇ − R.f.l. P′ P R₂₇ − R.f.l. P′ − P

h m ″ ″ 7″ ″ ″

21 42 −.11 +0 56.3 +1.0 57.3 −.2 57.1
21 47 +.29 54.2 +.4 54.6 +.7 53.3
21 59 +.69 54.9 −.1 54.8 +1.6 56.4
22 4 +.17 57.8 −.8 57.0 +.4 57.4
(4) 56.55

+.69 + 54.8 | +.29 + 54.6 | +.17 + 57.0 | −.11 + 57.3

+.69 + 54.8 | +.29 + 54.6 | +.17 + 57.0 | −.11 + 57.3
+ 1.7 | + .7 | + .4 | − .3
56.5, | 55.3, | 57.4, | 57.0,
(4) 65 | 53 | 74 | 70
+.1 | +1.3 | − .8 | − .4
~~258~~
262

′ ″
+0 56.~~45~~55
56.55

+

18 52 −.17 +1
18 59 +.48 19.3 −.0 19.3 +1.1 20.4
19 11 +.51 16.5 +.3 16.8 +1.3 18.1
19 18 +.64 16.2 −.5 (15.7) +1.6 (17.3)
19 26 +.25 18.3 −.4 17.9 +.6 18.5
20 41
20 43
20 53 +.03 22.4 +.0 (22.4) +.1 (22.5)
21 1 +.07 19.0 +.1 19.1 +.2 19.3
21 8 +.22 17.6 −.6 17.0 +.5 17.5
21 10 +.09 17.5 +.6 18.1 +.2 18.3
21 16 −.34 17.5 +1.0 18.5 −.7 17.8
22 25
22. 26 −.13
22 33
21 26 −.46 18.8 +1.1 19.9 −1.0 18.9
21 37 +.55 17.4 −.4 17.0 +1.3 18.3
(9) 18.57

18 13 +1
19 13
19 14 −.19 17.8 +.7 18.5 −.3 18.2
(1) 18.20

+.48 +19.3 | +.25 +17.9 | +.07 +19.1 | −.19 +18.5 | −.34 +18.5 | −.46 +19.9
+.51 16.8 | +.22 17.0 | +.09 18.1
+.55 17.0
+.51 +17.4 | +.24 +17.4 | +.08 +18.6 | −.19 + 18.5 | −.34 + 18.5 | −.46 + 19.9
+ 1.3 | + .6 | + .2 | − .5 | − .8 | − 1.2
19.0 3 | 18.0 2 | 18.8 2 | 18.0 1 | 17.7 1 | 18.7 1
(10) 270 | 160 | 176 | 80 | 77 | 87 | 850
−.5 | +.5 | −.3 | +.5 | +.8 | −.2

′ ″
+1 18.50
18.53

18 33 +.06 +1 18.1 +.1 18.2 +.2 18.4
18 40 +.37 +.9
18 45 +.16 19.4 +.1 19.5 +.4 19.9
18 52 −.17
18 54 +.46
19 19 +.64 16.2 −.5 (15.7) +1.6 (17.3)
19 25 +.25 19.8 −.4 19.4 +.6 20.0
19 30
19 40 +.53 17.7 +.1 17.8 +1.3 19.1
19 42 +.41 20.5 −.6 19.9 +.9 20.8
(5) 19.84

19 12 −.42 +1 18.6 +.8 19.4 −.9 18.5
19 49 −.46 17.2 +.8 18.0 −1.0 17.0
6 41
(2) 17.75

+.53 +17.8 | +.25 + 19.4 | +.06 +18.2 | ~~+.25 +19.4~~ | −.42 +19.4
+.41 19.9 | +.16 19.5 | −.46 18.0
+.47 +18.8 | +.25 + 19.4 | +.11 +18.8 | ~~+.25 + 19.4~~ | −.44 +18.7
+ .1.2 | + .6 | + .3 | − 1.1
20.0 2 | 20.0 1 | 19.1 2 | 17.6 2
(7) 400 | 200 | 382 | 352 | 1334
−.9 | −.9 | +.0 | +1.5

+1 19.06
19.24

18 59 +.48 +1 18.6 −.0 18.6 +1.1 19.7
19 18 +.64 15.4 −.5 (14.9) +1.5 (17.4)
19 25 +.25 18.7 −.4 18.3 +.6 18.9
19 30
19 40 +.53 18.3 +.1 18.4 +1.3 19.7
19 42 +.41 19.8 −.6 19.2 +1.0 20.2
20 05 +.69 18.6 −.3 18.3 +1.6 19.9
(5) 19.68

19 12 −.42 +1 19.4 +.8 20.2 −.9 19.3
19 14 −.19 17.6 +.7 18.3 −.3 18.0
19 49 −.46 19.7 +.8 20.5 −1.0 19.5
20 13 −.57 22.3 +.5 22.8 −1.3 21.5
(4) 19.58

+.69 + 18.3 | +.48 +18.6 | +.25 + 18.3 | −.19 + 18.3 | −.42 +20.2
+.53 18.4 | −.46 20.5
+.41 19.2 | −.57 22.8
+.69 + 18.3 | +.47 + 18.7 | +.25 + 18.3 | −.19 + 18.3 | −.48 +21.2
+ 1.8 | + 1.2 | + .6 | − .5 | − 1.2
20.1 1 | 19.9 3 | 18.9 1 | 17.8 1 | 20.0 3
(9) 20.1 | 59.7 | 18.9 | 17.8 | 60.0 | 1765
−.5 | −.3 | +.7 | +1.8 | −.4

′ ″
+1 19.61
19.63

1871 Sept. 27 M h = +.008 (+22) h' = +.003 n = +112 h' = +.008 n = +.08

Star	RA h m	δ		tang δ	πRa −(P'−P)				
β Aquilae	19.8 49	+ 6°	6' +	.11	283 + 5.81 +	.01	5.833 +5.82 +	01	+5.83
δ Aquilae	20.1 05	− 1	11 −	.02	287 + 5.89 −	.00	.89	00	.89
γ Cygni	20.3 17	+ 39	51 +	.83	289 + 5.72 +	.07	.79		.79
α Cygni	20.6 37	+ 44	50 +	1.08 ~~.99~~	294 + 5.76 +	.08	.83		.83
ε Cygni	20.7 41	+ 33	30 +	.66	298 + 5.77 +	.05	.82		.82
32 Vulpec.	20.8 49	+ 27	35 +	.52	507 + 5.83 +	.04	.87		.87
χ Cygni	21.1 07	+ 29	43 +	.57	303 + 5.73 +	.05	.78		.78
τ Cygni	21.2 10	+ 37	31 +	.77	305 + 5.79 +	.06	.85	00	.85
β Aquarii	21.4 25	− 6	7 −	.11 ~~.03~~	307 + 5.90 −	.01	.89	− 01	.88
ε Pegasi	21.6 38	+ 9	17	+ .16	309 + 5.84 +	.01	5.840 .85	− 01	.84
	20.97 20.67						+5.838		+5.838

19.8 +5338 +1.37 +.00 00 + 1.37 + 1.37
20.2 +4.44 +5.53 .00 00 + 5.53 + 5.53

1871 Sept 27

Star	RA h m	δ		tang δ	πRa −(P'−P)	
λ Urs Min	19.8 49	+ 88°	56' +	53.12 (38)	+ 1.37	− 284
χ Cephei	20.2 13	+ 77	20 (19) +	4.44	+ 5.53	− 502

19.8 +11 +5.81 — 20.3 +83 +5.72
20.1 −02 +5.89 — 20.6 +1.00 +5.76
20.7 +66 +5.77 — 21.2 +.77 +5.79
20.8 +52 +5.83 — 21.4 −11 +5.90
21.1 +57 +5.73 — 20.9 +62 +5.79 n5 = +04
20.5 +37 +5.81

0 = +53.01 −4.44 n = +08 +08
+ 4.07 −28 +07 +07

0 = +52.76 −4.42 n = +08
+3.82 −.26 +07

1871 Sept. 28 R. h = +.004 (+50, −1) h' = −.001 +100 h' = +.054 n = +.08

Star	RA h m	δ		tang δ					
β Cygni	x 19.4 26 (19.60 +4)	+ 27	42 +	.52	275 + 5.89 +	.04	5965 + 5.93 +	02	+5.95
γ Aquilae	x 19.7 40	+ 10	19 +	.18	277 + 5.99 +	.01	6.00 +	01	6.01
~~η Cephei~~	x 20 ~~43~~	~~+ 61~~	21	~~1.83~~	~~−24.91~~				
32 Vulpec.	x 20.8 49	+ 27	35 +	.52	507 + 6.00 +	.04	6.04	− 05	5.99
ν Cygni	x 20.9 52	+ 40	41 +	.86	300				
τ Cygni	x 21.2 10	+ 37	31 +	.77	305				
α Cephei	x 21.3 16	+ 62	3 +	1.89	306				
Cygni	21.8								
7 Lacertae	x 22.4 26	+ 49	38 +	1.18	319				
13 Lacertae	x 22.6 39	+ 41	10 +	.88	528				
λ Pegasi	x 22.7 41	+ 22	54 +	.42	323				
μ Pegasi	x 22.7 44	+ 23	57 +	.44	324				
o Androm.	x 22.9 56	+ 41	39 +	.89	327				
β Pegasi	x 22.9 58	+ 27	24 +	.52	328				
Br. 3077	x 23.1 7 (20.80)	+ 56	29 +	1.51	530				
δ Sagittae	19.7 42 (+2)	+ 18	14 + (−.1)	.33	279 5.99 +	.03	6.030 6.02 +	01	6.03
	19.90						+5.998		+5.995

Star	RA h m	δ		tang δ		
σ2 Urs. Maj.	x 8 59 (9.0)	+ 67	38 +	2.43	—	415
δ Cephei	x 22.4 25	+ 57	47 +	1.59	+	318
30 Cephei	x 22.6 34	+ 62	56 +	1.95	+	527
π Cephei	x 23.0 04	+ 74	43 + (−.1)	3.66	—	529

19.4 +52 +5.89 — 224
19.7 +18 +5.99 — 226
19.7 +33 +5.99
20.8 +52 +6.00
19.9 +39 +5.97

M h' = −.004 − 20
1871 Sept. 30 h = .000 n = +.08 h' = −.007 n = +.06

Star	RA h m	δ		tang δ				
α Cygni	20.6 37 (20.60 +43)	+ 44	50 +	.99 (1.00)	294 + 36.97 +	.06	37.075 + 37.03	00
ε Delphini	20.6 37	+ 10	53 +	.19	290 + 37.11 +	.01	.12	
32 Vulpec.	20.8 49	+ 27	35 +	.52	507 + 37.04 +	.03	.07	
ν Cygni	20.9 52	+ 40	41 +	.86	300 + 36.96 +	.05	.01	
61 Cygni pr.	21.0 01	+ 38	8 +	.78	302 + 37.07 +	.04	.11	
χ Cygni	21.1 07	+ 29	43 +	.57	303 + 37.00 +	.03	.03	
ε Pegasi	21.6 38	+ 9	18 +	.16	309 + 37.13 +	.01	37.072 [36.86] .14	00
	21.08 20.94						+37.073	+37.073

21.4 +2.75 +36.87 .00 00 + 36.87 + 36.87
21.4 −2.81 +37.13 .00 00 + 37.13 + 37.13

Star	RA h m	δ		tang δ				
α Cephei	21.3 16	+ 62	3 +	1.89 (8)	+ 36.75	+ .11	+ 36.86	306
β Cephei	21.4 27	+ 70	1 +	2.75	+ 36.87	−	308	
d Urs. Maj. 8.C.	9.4 23	~~+ 110~~ 70	24 +	2.81	+ 37.13	−	418	

20.6 +19 +37.11 — 20.6 +1.00 +36.97
20.8 +52 +37.04 — 20.9 +86 +36.96
21.1 +57 +37.00 — 21.0 +78 +37.07
21.6 +16 +37.13 — 21.3 +1.88 +36.75
21.0 +36 +37.07 — 20.9 +1.13 +36.94 n5 = +17

0 = +2.39 −20 n = +.08 +.08 — 0 = −3.17 +.06 n = +.02 +04
0 = +1.62 −07 n = +.04 — 0 = −3.94 +19 n = +.05

1871 Sept 29 M. h = +.004 h' = +.000 (for [illegible] only by A. M.) n = +.08 h' = +.014

Star	RA h m	δ		tang δ					
α Aquarii	21 59 (22.0 +7)	− 0	56 −	.02	311 + 37.11 −	.00	+ 37.11 +	01	+ 37.12
λ Aquarii	22.8 46	− 8	15 −	.07 (15)	326 + 37.10 −	.01	37.09	00	7.09
β Pegasi	22.9 58	+ 27	24 +	.52	328 + 36.95 +	.04	36.99	00	6.99
α Pegasi	22 59 (23.0)	+ 14	32 +	.26	329 + 37.06 +	.02	37.08	− 01	7.07
~~κ Piscium~~	~~23 21~~	~~+ 0~~	~~34 +~~	~~.01~~	~~+ 23.35~~				
	22.68						+ 37.068		+ 37.068

23.6 +4.30 +36.75 00 00 + 36.75 + 36.75

Star	RA h m	δ		tang δ		
ι Cephei	23.6 34	+ 76	56 +	4.30	+ 36.75	— 334

22.0 −02 +37.11
22.8 −15 +37.10
22.9 +52 +36.95
23.0 +26 +37.06
22.7 +15 +37.06

II 0 = +4.15 −31 n = +.08

Diz = +60 +80 | +40 +60 | +20 +40 | +0 +20 | +0 −20 | −20 −40 | −40 −60 | −60 −80

R A Diz R_eq − Rfl ρ' − ρ R_eq − Rfl + ρ' − ρ

h m " " "

19 49 +59 +1 14.8 −.3 14.5 +14 159
20 05 +69 16.8 −.3 16.5 +15 180 ~~170~~8
20 17 +04 16.6 −.2 16.4 +.1 165
20 37 −04
20 41 +.15 17.6 −.3 17.3 +.4 177 +69 +16.5 +59 +14.5 +.22 +15.6 +04 +16.4
20 49 +.25 15.6 ~~20.7~~ ~~+6~~ ~~16.2~~ +.75 14.8 +55 15.3 +.15 17.3
21 07 +22 16.2 ~~21.3~~ −.6 +.45 16.01 +09 16.5
21 10 +.09 15.9 +.6 16.5 +.2 167 +.72 +15.6 +.57 +14.9 +.22 +15.6 +06 +16.7
21 25 +.75 14.6 +.2 14.8 +17 167 + 1.8 + 1.5 + .5 + .2
21 38 +.55 15.7 −.4 15.3 +13 166 18.4 2 16.4 2 16.1 1 16.9 3
(8) 16.78 (9) 128 128 61 204
−.7 +.3 +.6 −.2

R A Diz R_eq − Rfl ρ' − ρ R_eq − Rfl + ρ' − ρ
h m " " "
19 49 −73 +1
20 13 −.57 16.9 +.5 17.4 −1.2 16.2
(1) 1620
−.57 +17.4
−57 + 17.4
− 15
15.9 1
59 ~~583~~ 603
+.8

+1 16.48 "70
16.71

19 26 +.25 +1 18.5 −.4 18.1 +6 187
19 40 +.53 17.0 +.1 ~~17.1 16.9~~ +.2 183
20 43 −.32
20 49 +.25
20 52 ~~+.03~~ ~~18.6 +.0 18.6 +1 187~~
21 10
21 16

8 59
22 25
22 34
23 04

+.53 +17.1 +.25 +18.1 +.03 +18.6
+.41 18.4
+47 +17.8 +.25 +18.1 +.03 +18.6
+ 1.2 + .6 + .1
19.0 18.7 1 18.7 1
(4) 20 2 7 7 34
−.2 +.1 +.1

22 26
22 39
22 41
22 44
22 56
22 58
23 7

19 42 +.41 19.0 −.6 18.4 +9 193
(4) 18.75

+1 18.85 "
18.75

21 37 −04 +1 4.7 +0 4.7 −1 46
306 20 27 +52 +1 1.2 +.2 1.4 +1.2 2.6
20 49 +.25 2.0 +.1 2.1 +.6 27
20 52 +.03 2.8 +0 28 +1 29
21 01 +07 2.5 +.1 2.6 +.2 28
21 7 +22
21 38 +.55 0 59.5 −.4 59.1 +13 (0.4)
(5) 3.14

21 16 −.34 +1 4.1 +1.0 5.1 −.9 44
21 27 −.46 3.1 +1.1 4.2 −1.0 32
9 23 −.92 (2) 380

+.52 +1.4 +.25 +2.1 +.03 +2.8 −04 +4.7 −.34 +5.1 −.46 +4.2
+55 59.1 +07 26
+.54 +0.2 +.25 +2.1 +.05 +2.7 −.04 +.47 −.34 +5.1 −.46 +4.2
+ 1.4 + .6 + .1 − .1 − .8 − 1.2
1.6 2 2.7 1 2.8 2 4.6 1 4.3 1 3.0 1
(8) 32 27 56 46 43 30 234
+1.3 +.2 +.1 −1.7 −1.4 −.1

+1 2.92 "
+04 3.33

21 59
22 46
22 58
22 59

23 34

R

1871 Oct 3 h = +.004 (−13) h' = +.001 h' = +.002 n = +.09

Star		RA	δ		tang δ	π Ra −(ρ'−ρ)			
		h m	°	'				6.115	
ε Pegasi	21.45 +1.6 +1.3	21.6 38	+9	18 +	.16 309	+6.15 +	.01	.07 + 6.16	00
φ Pegasi	.9	23.8 46	+18	26 +	.33 538	+6.10 +	.03	.13	
ω Piscium	−1.0 .9	23.9 53	+6	10 +	.11 336	+6.12 +	.01	.13	
	23.83	23.6	22.88					6.120 .10	00
								+6.118	+6.118

21.2−7.03 +6.78 .00 .00 +6.78 +6.78
21.4+2.75 +5.92 .00 .00 +5.92 +5.92

1871 Oct 3

Star		RA	δ		tang δ	π Ra −(ρ'−ρ)			
		h m	°	'					
α Cephei	✓	21.3 16	+ 62	3 +	1.89 ✓	+ 5.90 ✓	+.17	+6.07	306
1 Draco H.S.C.	✓	21 9.2 18	~~+78~~ 81	54	7.03 ✓	+ 6.78 ✓	—		137
β Cephei	✓	21.4 27	+ 70	1 +	2.75 ✓	+ 5.92 ✓	—		308
ρ Cassiop.	✓	23.8 48	+ 56	48 +	1.53 ✓	+ 5.96 ✓	+.14	+6.10	539

21.6+16+6.15   21.3 +1.88+5.90
23.8+33+6.10   23.8 +1.53+5.96
23.9+11+6.12   22.6 +1.70 +5.93   n5 = +.13
23.1 +20+6.12

0 = +2.55 −.20 n = +.08 +08   0 = −7.23 +.66 n = +.09 +10

0 = +1.05 −.01 n = +.01]   0 = −8.73 +.85 n = +.10

R

1871 Oct 4 h = +.007 (+11) h' = +.004 h' = −.011 n = +.08

								6.364		
ζ Aquilae	20.56 19.0	18 59	+ 13	41 +	.24 270	+ 6.32 +	.02	+ 6.34	− 03	+6.31
~~ω Aquilae~~	5	~~19.2 12~~	+ ~~11~~	~~22 +~~	.20	~~205 + 6.42~~		.44	− 01	.43
β Cygni	2.3	19.4 26	+ 27	42 +	.52 275	+ 6.25 +	.04	.29	− 02	.27
δ Aquilae	2.0	19.7 44	+ 8	32 +	.15 280	+ 6.29 +	.01	.30	− 02	.28
η Aquilae	1.9	19.8 46	+ 0	41 +	.01 281	+ 6.34 +	.00	.34	− 02	32
β Aquilae	1.9	19.8 49	+ 6	6 +	.11 283	+ 6.36 +	.01	.37	− 02	.35
γ Cygni	.6	20.1 07	+ 29	43 +	.57 303	+ 6.36 +	.05	.41	− 01	.40
τ Cygni	.6	21.0 09	+ 37	31 +	.77 305	+ 6.33 +	.06	.39	− 01	.38
β Aquarii	3	21.4 24	− 6	7 −	.11 307	+ 6.40 −	.01	.39	− 00	.39
ε Pegasi	1	21.2 38	+ 9	18 +	.16 309	+ 6.34 +	.01	.35	− 00	.35
π₂ ~~Pegasi~~	0	21.7 42	+ 48	44 +	1.14 3 517	+ 6.29 +	.09	.38	− 00	.38
α Aquarii	−.05	~~21.59~~	− 0	56 −	.02 311	+ 6.36 −	.00	.36	+ 00	.36
θ Pegasi	3	22.0 03	+ 5	35 +	.10 314	+ 6.31 +	.01	.32	+ 00	.32
θ Aquarii	5	22.2 10	− 8	24 −	.15 522	+ 6.38 −	.01	.37	+ 01	.38
3 Lacertae	6	22.3 19	+ 51	36 +	1.26 524	+ 6.25 +	.10	.35	+ 01	.36
η Aquarii	7	22.4 28	− 0.	46 −	.01 320	+ 6.37 −	.00	.37	+ 01	.38
η Pegasi	0.9	22.6 34	+ 29	34 +	.57 322	+ 6.32 +	.05	.37	+ 01	.38
λ Pegasi	1.0	22.7 40	+ 22	54 +	.42 323	+ 6.29 +	.03	.32	+ 01	.33
μ Pegasi	1.0	22.7 44	+ 23	57 +	.45 324	+ 6.24 +	.04	.28	+ 01	29
λ Aquarii	1.1	22.8 46	− 8	15 −	.15 326	+ 6.36 −	.01	.35	+ 01	.36
α Pisc Aust		~~22.8 50~~								
ο Androm.	1.2	22.9 56	+ 41	39 +	.89 327	+ 6.30 +	.07	.37	+ 01	.38
α Pegasi	3.2	22.9 58		+	.26 329	+ 6.32 +	.02	.34	+ 04	.38
	422.1							.26	+ 00	.26
ι Pegasi	3	22.0 1	+ 25 24	44 +	.46 312	+ 6.31 +	.04	.35	+ 00	.35
7 Lacertae	1.51	22.4 26	+ 49	38 +	1.18 319	+ 6.29 +	.09 6342 635	.38	+ 01	.39
	22.02	21.637	−1					+6.356 2		+6.351

19.2+2.41 +6.03 +.01 +.01 +6.04 +6.04
19.9+53.38 +3.25 +.01 +.01 +3.26 +3.26
21.3−7.03 +7.01 .00 +.00 +7.01 +7.01
21.4+2.75 +6.25 .00 +.00 +6.25 +6.25

δ Draco	✓	19.2 12	+ 67	26 +	2.40 ✓	+ 6.03 ✓	—		271
α ~~Cygni~~ Cephei	✓	21.2 15	+ 62	3 +	1.89 8 ✓	+ 6.29 ✓	+.15	+ 6.44	306
β Cephei	✓	21.4 27	+ 70	1 +	2.75 ✓	+ 6.25 ✓	—		308
ζ Cephei	✓	22.1 06	+ 57	35 +	1.58 7 ✓	+ 6.13 ✓	+.13	6.26	316
λ Urs. Min	✓	19.9 52	+ 88	56 +	53.12 38 ✓	+ 3.25 ✓	—		284
1 H. Draco S.C.	✓	9.3 18	~~+78~~ 81	54 −	7.03 ✓	+ 7.01 ✓	—		137

19.0+24+6.32   21.2 +1.88+6.29
19.4+52+6.25   21.7 +1.13+6.29
19.7+15+6.29   22.1 +1.57 +6.13
19.8+01+6.34   22.3 +1.26+6.25
19.8+11+6.36   22.9 +.89 +6.30
21.1+57+6.36   22.4 +1.18 +6.29
21.4−11+6.40   22.1 +1.32+ 6.26
21.6+16+6.34
22.0−02+6.36
22.0+10+6.31
22.2−15+6.38
22.4−01+6.37
22.8−15+6.36
22.0+46+6.31
0.9+26+6.32   n5 = +.06
21.3 +14+6.34

0 = +2.27 −.30 n = +.13 +13   0 = −7.17 +.67 n = +.09 +.09
+53.24 −3.08 +.06 +06
+2.61 −.09 +.03 +02
+.07

0 = +1.09 −.22 n = +.20]   0 = −8.35 +.75 n = +.09
+52.06 −3.00 +.06
+1.43 −.01 +.01   +.04

1871 Oct 5 R h = +.005 (+7) h' = +.002 h' = ±.002 n = +.09

	19.22							6418	
ζ Aquilae	21.1 15.0	18 59	+ 13	41 +	.24 270	+ 6.45 +	.02	+6.47	00
ω Aquilae	0.9	19.2 12	+ 11	22 +	.20 495	+ 6.42 +	.02	.44	
κ Cygni	0.9	19.2 14	+ 53	8 +	1.33 277	+ 6.25 +	.12	.37	
δ Aquilae	.8	19.3 19	+ 2	52 +	.05 274	+ 6.43 +	.00	.43	
β Cygni	.7	19.4 26	+ 27	42 +	.52 275	+ 6.33 +	.05	.38	
κ Aquilae		~~19.5~~ 30							
α Aquilae	.4	19.7 44	+ 8	32 +	.15 280	+ 6.42 +	.01	.43	
η Aquilae	.3	19.8 46	+ 0	41 +	.01 281	+ 6.51 +	.00	.51	
ε Cygni	.6	20.7 41	+ 33	30 +	.66 298	+ 6.32 +	.06	.38	
η Cephei	.6	20.7 43	+ 61	21 +	1.83 299	+ 6.19 +	.17	.36	
32 Vulpec.	.7	20.8 49	+ 27	35 +	.52 507	+ 6.35 +	.05	.40	
ν Cygni	.8	20.9 52	+ 40	41 +	.86 300	+ 6.35 +	.08	.43	
61 Cygni		21.0 1	+ 38	8 +	.78 302	+ 6.37 +	.07 6421	.44	
	20.20 21.2	20.44	−1				642	.42	00
								+6.420	+6.420

19.8+2.74 +6.16 +.00 .00 +6.16 +6.16
21.2−7.03 +6.96 .00 .00 +6.96 +6.96

ε Draco.	x	19.8 49	+ 69	57 +	2.74 ✓	+ 6.16 ✓	—		282
~~η Cephei~~	x	~~20.7 43~~	~~+61~~	~~21 +~~	~~1.83 ✓~~	~~+ 6.19 ✓~~			
α Cephei	x	21.2 15	+ 62	3	1.89 8 ✓	+ 6.25 ✓	+.17	+ 6.42	306
1 Draco. H.S.C.	✓	21 9.2 18	81	54 −	7.03 ✓	+ 6.96	—		137

19.0+24+6.45   19.2 +1.33 +6.25
19.2+20+6.42   20.7 +1.83 +6.19
19.3+05+6.43   20.9 +.86 +6.35
19.7+15+6.42   21.0 +.78 +6.37
19.8+01+6.51   21.2 +1.88+6.25   n5 = −.14
19.4+13+6.45   20.6 +1.34 +6.28

0 = +2.61 −.29 n = +.11 +10   0 = −7.16 +.51 n = +.07 +.08

0 = +1.40 −.12 n = +.09   0 = −8.37 +.68 n = +.08

sin z = +.60 +.80 | +.40 +.60 | +.20 +.40 | +0 +.20 | +0 −.20 | −.20 −.40 | −.40 −.60 | −.60 −.80

R.A. sin δ z | R_eq − R_ff | P′−P | R_eq − R_ff + P′−P
h m | ′ | ″ | ″ | ″

21 38 +.55 +1 1.4 −.4 1.0 +13 23
23 46 +.41
23 53 +.59
(1) 2.30

R.A. sin δ z | R_eq − R_ff | P′−P | R_eq − R_ff + P′−P
21 16 −.34 +1 1.1 +1.0 2.1 −.7 1.4
21 18 −.83 0.5 +1.1 1.6 −2.0 59.6 ✓
21 27 −.46 2.9 +1.1 4.0 −.9 3.1
23 48 −.25
(2) 2.25

+.55 +1.0
+.55 +1.0
+14
24,
(3) 24
−.2

−.34 +2.1 −.46 +4.0
−.34 +2.1 −.46 +4.0
−.8 −1.2
1.3, 2.8,
13 28 65
+.9 −.6

+1′ 2.17″
2.23

18 59 +.48 +1 2.0 −.0 2.0 +1.2 3.2
19 12
19 26 +.25 3.0 −.4 2.6 +.6 3.2
19 44 +.56
19 46 +.67 0.5 +.7 1.2 +16 28
19 49 +.59 1.4 −.3 1.1 +1.4 25
21 7 +.22 1.4 −.6 0.8 +.5 1.3
21 9 +.09 1.9 +.6 2.5 +.3 28
21 24 +.75 0 58.7 +.2 58.9 +1.8 0.7 +.67 +1.2 +.48 +2.0 +.25 +2.6 +.09 +2.5 −.11 +1.2 −.34 +3.7 −.42 +3.3 −.73 +4.7
21 38 +.55 59.1 −.4 58.7 +1.4 0.1 +.75 58.9 +.59 1.1 +.22 0.8 +.01 2.2 −.16 1.8 −.46 3.9
21 42 −.11 1 0.2 +1.0 1.2 −.2 1.0 +.69 0.0 +.55 58.7 +.22 0.8 −.13 1.7
21 59 +.69 0.1 −.1 0.0 +1.7 1.7 +.60 59.3 +.47 1.7 +.33 2.2
22 3 +.60 0 59.1 +.2 59.3 +1.4 (0.7) +.77 0.7 +.32 1.3
22 10 +.77 1 0.2 +.5 0.7 +1.8 2.5 +.68 1.1 +.30 59.2
22 19 −.16 1.6 +.2 1.8 +.3 1.5 +.77 0.5
22 28 +.68 1.2 −.1 1.1 +1.7 2.8 +.70 +0.2 +.52 +0.6 +.27 +1.2 +.05 +2.4 −.13 +1.6 −.34 +3.7 −.44 +3.6 −.73 +4.7
22 37 +.22 1.0 −.2 0.8 +.6 1.4 +1.8 +1.3 +.6 +.1 −.3 −.8 −1.1 −1.8
22 40 +.33 2.3 −.1 2.2 +.8 3.0 2.0 7 1.9 4 1.8 6 2.5 2 1.3 3 2.9 1 2.5 2.9
22 44 +.32 1.0 +.3 1.3 +.8 2.1 (26) 140 76 108 50 39 29 50 2 29 1
22 46 +.77 0.8 −.3 0.5 +1.8 2.3 +.0 +.1 +.2 −.5 +.7 −.9 −.5 −.9
22 50
22 56 +.01 1.8 +.4 2.2 +.0 2.2
22 58 +.47 2.3 −.6 1.7 +1.2 2.9

22 1 +.30 0 59.5 −.3 59.2 +.7 (59.9)
22 26 −.13 1 1.1 +.6 1.7 −.3 1.4
(20) 2.07

19 12 −.42 +1 2.5 +.8 3.3 −.9 2.4
21 15 −.34 2.7 +1.0 3.7 −.7 3.0
21 27 −.46 2.8 +1.1 3.9 −1.0 2.9
22 6 −.26 0.4 +.4 (0.8) −.5 (0.3)
19 52 −.73 4.1 +.6 4.7 −1.6 3.1
9 18 −.83 2.0 +1.1 3.1 −1.9 1.2 ✓
(4) 2.85

+1′ 2.00″
2.20

18 59 +.48 +1 2.2 −.0 2.2 +1.1 3.3
19 12 +.51 1.9 +.3 2.2 +1.2 3.4
19 14 −.19 0.8 +.7 1.5 +.3 1.8
19 19 +.64 0.5 −.5 (0.0) +1.4 (1.4)
19 26 +.25 1.9 −.4 1.5 +.6 2.1
19 30
19 44 +.56 1.1 −.0 1.1 +1.4 2.5
19 46 +.67 +0 59.8 +.7 0.5 +1.5 2.0 +.67 +0.5 +.48 +2.2 +.25 +1.5 +.15 +3.1 −.19 +1.5 −.32 +3.4 −.46 +3.7
20 41 +.15 1 3.4 −.3 3.1 +1.1 3.5 +.51 2.2 +.25 3.0 +.03 4.1
20 43 −.32 3.2 +.2 3.4 −.7 2.7 +.56 1.1 +.07 3.1
20 49 +.25 2.9 +.1 3.0 +.6 3.6 +.67 +0.5 +.52 +1.8 +.25 +2.2 +.08 +3.4 −.19 +1.5 −.32 +3.4 −.46 +3.7
20 52 +.03 4.1 +.0 4.1 +.1 4.2 +1.7 +1.3 +.6 +.2 −.5 −.8 −1.2
21 1 +.07 3.0 +.1 3.1 +.2 3.3 2.2, 3.1 3 2.8 2 3.6 3 1.0, 2.6, 2.5,
(11) 2.95 (20) 22 92 56 108 10 26 25 ~~309~~ 340
+.6 −.3 +.0 −.8 +1.8 +.2 +.3

19 49 −.46 +1 2.9 +.8 3.7 −1.0 2.7
~~20 43~~
21 15 −.34
21 18 −.83 2.0 +1.1 3.1 −1.9 1.2 ✓
(1) 2.70

+1′ 2.83″
2.92

1871 Oct 8 (WAR obs) h = +002 (000) h' = 000 h' = +003 n = +0.08

Star	Ra	δ	tang δ	π Ra/(ρ'−ρ)			
	h m 19.46 +9 19.0	° '				6.843	
ζ Aquilae	✓ 18 59	+13	41 +	.24 ✓ 270 +	6.83 ✓+	.02	+6.85	00
β Cygni	✓+5 19.4 26	+27	42 +	.52 275	+6.77 ✓+	.04	.81
ζ Aquilae	✓+2 19.7 40	+10	19 +	.18 277	+6.85 ✓+	.01	.86
δ Sagittae	✓+7 19.7 41	+18	14 +	.33 279 +	6.84 ✓+	.03	.87
η ~~Sagittae~~	+7 ~~19.2 46~~	~~+0~~	~~41~~		~~+6.87~~		.80
θ Aquilae	✓−2 20.1 5	−1	11 −	.02 287 +	6.86 ✓−	.02	.86
γ Cygni	✓−4 −5 20.3 18	+39	51 +	.83 289 +	6.71 ✓+	.07	.78
ε Delphini	✓−6 20.4 27	+10	53 +	.19 290 +	6.83 ✓+	.02	.85
β Delphini	✓ 20.5 32	+14	10 +	.25 292 +	6.83 ✓+	.02	.85
α Delphini	−7 20.6 33	+15	28 +	.28 293 +	6.87 ✓+	.02	.89
η Aquilae	✓ 19 8 46	+0	41 +	.01 284 +	6.87 ✓+	.00	6.846 .87	00
	20 38 19,88						+6.845	+6.845

19.2+2.41 +6.60 .00 .00 +6.60 +6.60
19.8+2.74 +6.64 +6.64 +6.64
19.8+53.38 +4.47 +4.47 +4.47
20.2+4.44 +6.50 +6.50 +6.50
21.4 ± 2.81 +7.12 .00 .00 +7.12 +7.12

AM obs.
1871 Oct 8 h = +002 (+75) h' = 000 h' = +082 n = +0.09

Star	Ra	δ	tang δ	π Ra/(ρ'−ρ)				
	21.12 21.2					~~6905~~ .80	+04	+6.84
61 Cygni	+7 21.0 01	+38	08 +	.78 ✓ 302 +	6.90 ✓+	.07	+6.97 +06	7.03
ν Cygni	✓6 21.1 07	+29	43 +	.57 303 +	6.86 ✓+	.05	.91 +.05	6.96
ζ Cygni	✓5 21.2 10	+37	31 +	.77 305 +	6.87 ✓+	.07	.94 +04	6.98
ε Pegasi	✓ 21.6 38	+9	18 +	.16 309 +	6.96 ✓+	.01	.97 +.01	6.98
π₂ Cygni	✓0 21.7 42	+48	44 +	1.14 517 +	6.80 ✓+	.10	.90 +.00	6.90
16 Pegasi	✓−1 21.8 47	+25	20 +	.47 ~~310~~ +	6.94 ✓+	.04	.98 −.01	6.97
α Aquarii	✓3 21 22.0 59	−0	56 −	.02 311 +	7.02 ✓−	.00	7.02 −.02	7.00
8 Pegasi	✓3 22.0 01	+24	44 +	.46 312 +	6.94 ✓+	.04	6.98 −.02	6.96
θ Pegasi	✓4 22.1 4	+5	35 +	.10 314 +	7.01 ✓+	.01	7.02 −.03	6.99
θ Aquarii	21.945 22.2 10	−8	24 −	.15 522 +	7.03 ✓−	.01	~~6.983~~ 7.02 −.04 6.89 −.03	6.98 6.86
~~π Cygni~~	22.1 21,67						+6.950	+6.954

21.3 −7.02 +7.40 .00 .00 +7.40 +7.40
21.4 +2.75 +6.67 +6.67 +6.67
21.7 +2.86 +6.63 .00 .00 +6.63 +6.63

WAR obs
1871 Oct 8 h = +002 h' = 000 h' = +007 n = +0.03

Star	Ra	δ	tang δ	π Ra/(ρ'−ρ)				
ι Aquarii	✓+4 22.2 15	−2	1 −	~~.03~~ .04 ✓ 317 +	6.94 ✓−	.00	+6.94	00
3 Lacertae	~~22.3~~ 18	~~+51~~	~~36 +~~	~~+.26~~ ✓ 524				
η Aquarii	✓+1 22.5 29	−0	46 −	.01 ✓ 320 +	6.90 ✓−	.00	.90	
ξ Pegasi	✓0 22.6 35	+10	11 +	.18 ✓ 321 +	6.87 ✓+	.01	.88	
η Pegasi	✓0 22.6 37	+29	34 +	.57 322 +	6.80 ✓+	.02	.82	
13 Lacertae	✓ 22.6 38	+41	10 +	.88 7 528 +	6.79 ✓+	.03	.82	
λ Pegasi	✓−1 22.7 40	+22	54 +	.42 323 +	6.88 ✓+	.01	.89	
μ Pegasi	✓ 22.7 44	+23	57 +	.44 324 +	6.79 ✓+	.01	.80	
α Pisc. Aust.	~~22.8~~ 50							
o Androm.	✓−3 22.9 56	+41	39 +	.88 9 ✓ 327 +	6.84 ✓+	.03	.87	
α Pegasi	✓−3 22.9 58	+14	32 +	.26 329 +	6.83 ✓+	.01	.84	
7 Lacertae	✓+2 22.4 26	+~~50~~ 49	38 +	1.18 ✓ 319 +	6.81 ✓+	.04	85	00
	22,61						+6.861	+6.861

22.4 −4.13 +6.99 .00 .00 +6.99 +6.99

1871 Oct 8

Star	Ra	δ	tang δ	π Ra/(ρ'−ρ)			
	h m	° '					
δ Draco. ✓	19.2 12	+67	26 +	2.40 ✓	+6.60 ✓ −		271
κ Cygni ✓	19.2 14	+53	8 +	1.33 ✓	+6.69 ✓ +0.11	+6.80	272
ε Draco ✓	19.8 49	+69	57 +	2.75 4 ✓	+6.64 ✓ −		282
λ Urs. Min. ✓	19.8 50	+88	56 +	53.~~12~~ 38 ✓	+4.47 ✓ −		284
κ Cephei ✓	20 2 13	+77	20 +	4.44 ✓	+6.50 ✓ −		502
d Urs. Maj. S.C. ✓	9.4 23	+~~110~~ 70	24 ±	2.81 ✓	+7.12 ✓ −		418

19.0+24 +6.83 19.2 +1.33 +6.69
19.7+18 +6.85 20.3 +.83 +6.71
19.7+33 +6.84 19.8 +1.08 +6.70 n5 = +.10
19.8+01 +6.87
20.1−02 +6.86 0 = +2.23 −.25 n = +.11 +.11 0 = −2.99 +.27 n = +.09 +.10
20.4+19 +6.83 +2.56 −.21 +.08 +.06
20.5+25 +6.83 +53.20 −2.38 +.04 +.04
20.6+28 +6.87 +4.26 −.35 +.08 +.07 +.07
20.0+18 +6.85

0 = +1.33 −.10 n = +.08 0 = −3.89 +.42 n = +.11
+1.66 −.06 +.04
+52.30 −2.23 +.04
+3.36 −.20 +.06 +.05

Star	Ra	δ	tang δ	π Ra/(ρ'−ρ)			
α Cephei ✓	21.2 15	+62	3 +	1.88 ✓	+6.62 ✓ +0.18	+6.80	306
1 Draco. H. S.C. ✓	21 9.3 18	+81	53 ±	7.02 ✓	+7.40 ✓ −		137
24 Urs. Maj.	21.4 23						
β Cephei ✓	21.4 27	+70	1 +	2.75 ✓	+6.67 ✓		308
H Cephei ✓	21.7 41	+70	44 +	2.86 ✓	+6.63 ✓ −		516
ξ Cephei ✓	22.1 6	+57	35 +	1.58 7 ✓	+6.74 ✓ +.15	+6.89	316

21.6+16 +6.96 21.0 +.78 +6.90
21.8+47 +6.94 21.2 +.77 +6.87
22.0−.02 +7.02 21.2 +1.88 +6.62
22.0+46 +6.94 21.7 +1.14 +6.80
22.1+10 +7.01 22.1 +1.57 +6.74
22.2−15 +7.03 21.4 +1.23 +6.79 n5 = +.15
21.9+17 +6.98

0 = +2.58 −.31 n = +.12 +.10 0 = −7.19 +.42 n = +.06 +.07
+2.69 −.35 +.13 +.11

0 = +1.52 −.12 n = +.08 0 = −8.25 +.61 n = +.07
+1.63 −.16 +.10

Star	Ra	δ	tang δ	π Ra/(ρ'−ρ)			
9 Draconis S.C. ✓	22.4 23	+76	23 ±	4.13 ✓	+6.99 ✓ −		150

22.2−04 +6.94 22.4 +1.18 +6.81
22.5−01 +6.90 22.6 +.87 +6.79
22.6+18 +6.87 22.9 +.89 +6.84
22.7+42 +6.88 22.6 +.98 +6.81
22.7+44 +6.79
22.9+26 +6.83
22.6+21 +6.87

0 = −4.34 +.12 n = +.03

0 = −5.11 +.18 n = +.03

				Decl z =	+60+80	+40+60	+20+40	+0+20	+0 −20	−20 −40	−40 −60	−60 −80
			Rey−Rff + P′−P							Rey−Rff + P′−P		
Ra	Decl z	Rey − Rff	P′−P				Ra	Decl z	Rey − Rff	P′−P		
h m		′ ″	″ ″				h m		′ ″	″ ″		
18 59	+48	+1 3.0	−.0 3.0	+12 42			19 12	−42	+1 2.8	+.8 3.6	−9 27	
19 26	+25	1.3	−.4 0.9	+6 15			19 14	−19	0.1	+.7 0.8	−4 04	
19 40	+53	1.7	+.1 1.8	+13 31			19 49	−46	2.1	+.8 2.9	−10 19	
−19 41	+41	3.3	−.6 2.7	+10 37			19 50	−73	4.3	+.6 4.9	−17 37	
~~19 46~~	~~+67~~	3					20 13					
20 5	+69	0.4	−.3 0.1	+16 17			9 23	−92	0.5	−.1 (0.4)	−23 (58.1)	
20 18	+04	1.2	−.2 1.0	+1 1.1							(4) 2.05	
20 27	+52	0.8	+.2 1.0	+13 23								
20 32	+47	2.6	+.1 2.7	+11 38	+69 +0.1	+48 +3.0	+25 +0.9	+04 +1.0	−19 +0.8		−42 +3.6	−73 +4.9
20 33	+45	1.4	−.2 1.2	+11 23	+67 0.3	+53 1.8					−46 2.9	
						+41 2.7						
19 46	+67	0 59.6	+.7 0.3	+16 19		+52 1.0						
				10 2.56		+47 2.7						
						+45 1.2						
					+68 +0.2	+48 +2.1	+25 +0.9	+04 +1.0	−19 +0.8		−44 +3.2	−73 +4.9
					+1.7	+1.2	+.6	+.1	−.5		−1.1	−1.9
′ ″					1.9 2	3.3 6	1.5 1	1.1 1	0.3 1		2.1 2	3.0 1
+1 2.41					(14) 38	198	15	11	3		42	30
2.41					+.5	−.9	+.9	+1.3	+2.1		+.3	−.6
21 1	+07	+1 0.7	+.1 0.8	+2 10			21 15	−34	+1 0.8	+10 1.8	−7 11	
21 7	+22	0.1	−.6 59.5	+.5 0.0			21 18	−83	0 58.2	+11 (59.3)	−21 (57.2)	
21 10	+09	0 59.7	+.6 0.3	+.2 0.5	7		21 23	~~−46~~				
21 38	+55	58.7	−.4 58.3	+13 59.6			21 27	−46	59.3	+11 0.4	−10 59.4	
21 42	−11	58.4	+1.0 59.4	+.2 59.2			21 41	−47	1 0.6	+.8 1.4	−11 0.3	
21 47	+29	59.5	+.4 59.9	+.7 0.6			22 6	−26	1.4	+.4 1.8	−.5 1.3	
21 59	+69	1 0.2	−.1 0.1	+17 1.8							(4) 0.52	
22 1	+30	1.2	−.3 0.9	+.7 1.6	+69 +0.1	+55 +58.3	+22 +59.5	+07 +0.8	−11 +59.4	−34 +1.8	−46 +0.4	
22 4	+60	0 58.8	+.2 59.0	+14 0.4	+60 59.0		+29 59.9	+09 0.3		−26 1.8	−47 1.4	
22 10	+77	1 0.6	+.5 1.1	+1.8 (2.9)	+77 1.1		+30 0.9					
				(9) 0.52	+69 +0.1	+55 +58.3	+27 +0.1	+08 +0.6	−11 +59.4	−30 +1.8	−46 +0.9	
					+1.8	+14	+.6	+.2	−.3	−.7	−1.2	
′ ″					1.9 3	59.7 1	0.7 3	0.8 2	59.1 1	1.1 2	59.7 2	
+1 0.70					(14) 57	−.3	21	16	−9	22	−6	98
0.52					−1.2	+1.0	+.0	−.1	+1.6	−.4	+1.0	
22 15	+70	+1 0.9	−.4 0.5	+16 21			22 23	−88	+1 2.3	−6 1.7	−23 2	59.4 52✓
22 18												
22 29	+68	1.7	−.1 1.6	+16 32								
22 35	+53	1.3	−.5 0.8	+13 21								
22 37	+22	0.2	−.2 0.0	+.5 0.5	+70 +0.5	+53 +0.8	+22 +0.0	+02 +2.1	−13 +59.8			
22 38	+02	2.9	−.8 2.1	+.1 2.2	+68 1.6	+47 59.6	+33 0.3	+01 0.7				
22 40	+33	0.4	−.1 0.3	+.8 1.1			+32 59.8					
22 44	+32	0 59.5	+.3 59.8	+.8 0.6	+69 +1.0	+50 +0.2	+29 +0.0	+02 +1.4	−13 +59.8			
22 50					+1.8	+1.3	+.7	+.0	−.3			
22 56	+01	0.3	+.4 0.7	+0 0.7	2.8	1.5	0.7	1.4	59.5			
22 58	+47	0.2	−.6 59.6	+11 0.7	(10) 56 2	30 2	21 3	28 2	−5 1	130		
					−1.5	−.2	+.6	−.1	+1.8			
22 26	−13	0 59.2	+.6 59.8	+.4 ~~0.2~~ 59.4								
				(10) 1.26								
′ ″												
+1 1.30												
1.26												

1871 Oct 9 h = ~~+~~.002 h' = +.008 n = +.03
h' = +.001

W. A. R. obs.

Star	Ra	δ		tang δ	πRa −(p'−p)				
	h m	°	′						
ν Aquarii	20.1 05	− 1	11 −	.02	287 + 6.80	.00	+ 6.80	00	
γ Cygni	20.3 18	+ 39	51 +	.83	289 + 6.73	.03	.76		
ε Delphini	20.4 27	+ 10	53 +	.19	290 + 6.81	.01	.82		
β Delphini	20.5 32	+ 14	10 +	.25	292 + 6.84	.01	.85		
α Delphini	20.6 33	+ 15	28 +	.28	293 + 6.83	.01	.84		
α Cygni	20.6 37	+ 44	50 + −.1′	~~.99~~ 1.00	294 + 6.67	.03	.70	00	
	20.42						+6.795	+6.795	

1871 Oct. 9

Star	Ra	δ	tang δ	πRa −(p'−p)
	h m	° ′		

20.1 −.02 +6.80 20.3 +.83 +6.73
20.4 +.19 +6.81 20.6 +1.00 +6.67
20.5 +.25 +6.84 20.4 +.91 +6.70
20.6 +.28 +6.83
20.4 +.18 +6.82

A. M. Obs.
1871 Oct 9 h = ~~+~~.002 h' = +.011 n = +.04
h' = +.001

Star	Ra	δ		tang δ	πRa −(p'−p)			
ε Cygni	20.7 41	+ 33	30 +	.66	298 + 6.79	.03	+ 6.82	00
η Cephei	20.7 42	+ 61	21 +	1.83	299 + 6.72	.07	.79	
32 Vulpec.	20.8 49	+ 27	35 +	.52	507 + 6.86	.02	.88	
ν Cygni	20.9 52	+ 40	41 +	.86	300 + 6.83	.03	.86	
61 Cygni	21.2 1	~~+ 38~~	~~8~~ +	~~.78~~	~~302~~		.84	
ξ Cygni	21.1 8	+ 29	43 +	.57	303 + 6.88	.02	.90	
τ Cygni	21.2 10	+ 37	31 +	.77	305 + 6.86	.03	.89	00
	20.94						+6.854	+6.854

21.3 −7.03 +7.16 .00 .00 + 7.16 + 7.16

Star	Ra	δ		tang δ			
α Cephei	21.2 15	+ 62	3 +	1.89	+ 6.77	+ .07	+ 6.84 306
1 Draco H. L. C.	21.3 18	+ 81	53 −	7.03	+ 7.16	—	187

20.8 +.52 +6.86 20.7 +1.83 +6.72
21.1 +.57 +6.88 21.2 +.77 +6.86
21.0 +.54 +6.87 21.2 +1.88 +6.77
21.0 +1.49 +6.78

0 = −7.57 +.29 n = +.04

0 = −8.52 +.38 n = +.04

W. A. R. obs.
1871 Oct 9 h = +.002 h' = +.012 n = +.01
h' = +.001

Star	Ra	δ		tang δ	πRa −(p'−p)			
~~μ Pegasi~~	~~22.7 44~~	~~+ 23~~	~~57 +~~	~~.44~~	~~324 + 6.87~~	~~.00~~	~~+ 6.87~~ ~~00~~	del
γ Piscium	23.2 11	+ 2	36 +	.04	330 + 6.88	.00	6.88	00
τ Pegasi	23.2 14	+ 23	3 +	.42	531 + 6.84	.00	.84	
υ Pegasi	23.3 19	+ 22	43 +	.42	532 + 6.83	.00	.83	00
	23.10						+6.855	+6.855

22.8 +2.20 +6.85 .00 + 6.85
23.4 −2.77 +6.93 .00 + 6.93

Star	Ra	δ		tang δ		
ι Cephei	22.8 45	+ 65	33 +	2.20	+ 6.85	325
λ Draco S. C.	23.4 23	70	03 +	~~2.75~~ − 2.77	+ 6.93	162

22.7 +.44 +6.87
23.2 +.04 +6.88
23.2 +.42 +6.84
23.3 +.42 +6.83
23.1 +.33 +6.86

0 = +1.87 −.01 n = +.01 0 = −3.10 +.07 n = +.02

A. M. obs.
1871 Oct 9 h = +.002 h' = +.011 n = +.02
h' = +.001

Star	Ra	δ		tang δ	πRa −(p'−p)			
ξ Pegasi	22.4 35	+ 10	11 +	.18	321 + 6.95	.00	+ 6.95	00
η Pegasi	22.6 37	+ 29	34 +	.57	322 + 6.88	.01	.89	
13 Lacertae	22.6 38	+ 41	10 +	.88	528 + 6.87	.02	.89	
λ Pegasi	22.7 40	+ 22	54 +	.42	323 + 6.96	.01	.97	
μ Pegasi	22.7 43	+ 23	57 +	.45	324 + 6.87	.01	.88	00
	22.60						+6.916	+6.916

22.4 −4.13 +6.98 .00 .00 +6.98 +6.98
~~22.8 +2.20~~ +6.85 .00 ~~.00 +6.85 +6.85~~

Star	Ra	δ		tang δ		
9 Draco. L. C.	22.4 24	+ 76	23 −	4.13	+ 6.98	150
~~ι Cephei~~	22.8 45	+ 65	~~33 +~~	2.20	~~+ 6.85~~	

22.4 +.18 +6.95 22.6 +.87 +6.87
22.7 +.42 +6.96
22.7 +.44 +6.87
22.6 +.35 +6.93

0 = −4.48 +.05 n = +.01

0 = −5.00 +.11 n = +.02

sin z =	+60 +80	+40 +60	+20 +40	+0 +20	+0 −20	−20 −40	−40 −60	−60 −80

R a (h m)	sin z	R_gy−R_fl '	"	ρ'−ρ "	R_gy−R_fl+ρ'−ρ "		
20 5	+.69	+1	0.9	−.3	0.6	+17	23
20 18	+.04		3.1	−.2	2.9	+.1	30
20 27	+.52		1.1	+.2	1.3	+13	26
20 32	+.47		2.2	+.1	2.3	+11	34
20 33	+.45		2.2	−.2	2.0	+11	31
20 37	−.04		2.7	+.0	2.7	−1	26
						(6)	2.83

+.69 +0.6 | +.52 +1.3
+.47 2.3
+.45 2.0
+.69 +0.6 | +.48 +1.9
+1.8 | +1.2
2.4 ' | 3.1 3
(6) 24 | 93
+.5 | −.2

+1' 2.88"
2.83

R a	sin z	R_gy−R_fl '	"	ρ'−ρ "	R_gy−R_fl+ρ'−ρ "

+.04 +2.9 | −.04 +2.7
+.04 +2.9 | −.04 +2.7
+ .1 | − .1
3.0 ' | 2.6 '
30 | 26 | 173
−.1 | +.3

20 41	+.15	+1	2.4	−.3	2.1	+4	25
20 42	−.32		2.0	+.2	2.2	−4	18
20 49	+.25		0.9	+.1	1.0	+.6	16
20 52	+.03		2.2	+.0	2.2	+.1	23
~~21 1~~							
21 8	+.22		1.6	−.6	1.0	+.5	15
21 10	+.09		1.0	+.6	1.6	+.2	1.8
						(6)	1.87

21 15	−.34	+1	0.8	+10	1.8	−7	11
21 18	−.83		1.9	+1.1	3.0	−2.0	1.0 ✓
						(1)	1.10

+.25 +1.0 | +.15 +2.1 | −.32 +2.2
+.22 1.0 | +.03 2.2 | −.34 1.8
+.09 1.6
+.24 +1.0 | +.09 +2.0 | −.33 +2.0
+ .6 | + .2 | − .8
1.6 2 | 2.2 | 1.2 2
(7) 32 | 66 3 | 24 | 122
+.1 | −.8 5 | +.4 5

+1' 1.74"
1.76

22 44		+0					
23 11	+.64		58.6	−.3	58.3	+10	(59.8)
23 14	+.33	1	2.1	+.1	2.2	+.8	30
23 19	+.34		1.5	+.2	1.7	+8	25
						(2)	2.75

22 45	−.39	+1	2.2	+1.0	3.2	−.8	24
23 23	−.92		5.6	−.8	4.8	−24	2.4 ✓
						(1)	2.40

+.64 +58.3 | +.33 +2.2 | −.39 +3.2
+.34 1.7
+.64 +58.3 | +.34 +2.0 | −.39 +3.2
+ 1.6 | + .8 | − 1.0
59.9 ' | 2.8 2 | 2.2 '
(4) −1 | 56 | 22 | 77
+2.0 | −.9 | −.3

+1' 1.92"
2.63

22 35	+.53	+1	1.6	−.5	1.1	+13	24
22 37	+.22		0.6	−.2	0.4	+.5	09
22 38	+.02		1.8	−.8	1.0	+.1	11
22 40	+.33		1.4	−.1	1.3	+.8	21
22 43	+.32		1.9	+.3	2.2	+.8	3.0
						(5)	1.90

22 24	−.88	+1	6.1	−.6	5.6	−2.0	3.5 ✓
~~22 45~~							

+.53 +1.1 | +.22 +0.4 | +.02 +1.0
+.33 1.3
+.32 2.2
+.53 +1.1 | +.29 +1.3 | +.02 +1.0
+ 1.4 | + .7 | + .0
2.5 ' | 2.0 3 | 1.0 '
(5) 25 | 60 | 10 | 95
−.6 | −.1 | +.9

+1' 1.90"
1.90

1871 Oct 12 h = ~~+.001~~ −.001 +19 h′ = −.001 h′ = +.027 n = −.02

Star Am. obs.	Ra h m	δ ° ′	tang δ	π Ra −(P′P)				
a Cephei	21.86 +4 ~~22.1 15~~	~~+62 3 +~~ −.1	~~1.89 306~~			7.468	40 + 01	+7.41
74 Cygni	x 21.5 32	+39 51 +	.83 514 +	7.47 ✓ −	.02	+ 7.45	+ .03	.48
ε Pegasi	x 21.6 38	+ 9 18 +	.16 309 +	7.46 ✓ −	.00	46	+ .02	48
κ Pegasi	x 21.6 39	+ 25 4 +	.47 310 +	7.46 ✓ −	.01	45	+ .02	.47
16 Pegasi	x 21.8 47	+ 25 20 +	.47 518 +	7.46 ✓ −	.01	45	+ 02	47
ι Pegasi	x 22.0 1	+ 24 44 +	.46 312 +	7.54 ✓ −	.01	53	+ .01	.54
27 Pegasi	x 22.1 4	+ 32 34 +	.64 315 +	7.49 ✓ −	.01	48	+ 01	.49
θ Aquarii	x 22.2 15	− 2 1 −	.04 317 +	7.52 ✓ +	.00	52	+ 01	.53
λ Pegasi	x 22.7 41	+ 22 54 +	.42 323 +	7.50 ✓ −	.01	49	− 00	.49
μ Pegasi	x 22.7 44	+ 23 57 +	.45 324 +	7.48 ✓ −	.01	47	− 00	.47
o Androm	x 22.9 56	+ 41 39 +	.89 327 +	7.47 ✓ −	.02	45	− 01	.44
β Pegasi	x 22.9 58	+ 27 24 +	.52 328 +	7.48 ✓ −	.01	47	− 01	.46
π Cephei	x [23.1] 4	+ 74 43 +	3.68 529 +	7.58 ✓ −	[illegible]			
Br 3077	x 23.1 7	+ 56 29 +	1.51 530 +	7.51 ✓ −	.03	48	− 02	.46
γ Piscium	x 23.2 11	+ 2 36 +	.05 330 +	7.56 ✓ −	.00	56	− 02	.54
τ Pegasi	x 23.2 14	+ 23 3 +	.43 531 +	7.55 ✓ −	.01	54	− 02	.52
70 Pegasi	x 23.4 23	+ 12 4 +	.21 535 +	7.52 ✓ −	.00	52	− 02	.50
72 Pegasi	x 23.5 28	+ 30 38 +	.59 536 +	7.54 ✓ −	.01	7.501 53	− 03	.50
	23.08 23.3	22.54 −.1′				50	− 02	.48
						+7.486		+7.485

21.4 +2.75 +7.50 .00 .00 +7.50 +7.50
21.7 +2.86 +7.49 +7.49 +7.49
22.8 +2.20 +7.55 +7.55 +7.55
23.1 +3.65 +7.58 +7.58 +7.58
23.6 +4.30 +7.68 .00 .00 +7.68 +7.68

1871 Oct 12

Star		Ra h m	δ ° ′	tang δ	π Ra −(P′P)			
β Cephei	x	21.4 27	+ 70 1 +	2.75 ✓	+ 7.50 ✓ −			308
11 Cephei	x	21.7 40	+ 70 44 +	2.86 ✓	+ 7.49 ✓ −			516
ξ Cephei	x	22.1 7	+ 57 35 +	1.58 ✓	+ 7.43 ✓	−.03	+ 7.40	316
ι Cephei	x	22.8 45	+ 65 33 +	2.20 ✓	+ 7.55 ✓ −			325
4 Cass.	x	23.3 19	+ 61 36 +	1.85 ✓	+ 7.54 ✓	−.04	7.50	533
γ Cephei	x	23.6 34	+ 76 56 +	4.30 ✓	+ 7.68 ✓ −		+030	~~334~~ 334

21.6 +16 +7.46 21.5 +83 +7.47
21.8 +47 +7.46 22.1 +1.58 +7.43
22.0 +46 +7.54 23.1 +1.57 +7.51
22.2 −03 +7.52 23.3 +1.85 +7.54
22.7 +42 +7.50 22.5 +1.44 +7.49 $n_5 = +.02$
22.7 +44 +7.48
23.2 +05 +7.56 0 = +2.46 −.01 n = +.00 −01
23.2 +43 +7.55 +2.57 −.02 +.01 +00
23.4 +21 +7.52 +1.91 +04 −.02 −02
22.5 +29 +7.51 +3.36 +07 −.02 −03
+4.01 +.16 −.04 −05
−02

0 = +1.31 +.01 n = −.01
+1.42 +00 −.00
+.76 +06 −.08]
+2.21 +09 −.04
+2.86 +19 −.07 −.03

1871 Oct 13 M. h = ~~+.002~~ −.00 h′ = −.002 h′ = +.003 n = +.00

Star	Ra h m	δ ° ′	tang δ	π Ra −(P′P)				
61 Cygni	21.45 p. 21.0 1	+ 38 8 +	.78 302 +	7.54 ✓ +	.00	7.497 ~~7.50~~ + 7.54	00
ξ Cygni	x 21.1 8	+ 29 43 +	.57 303 +	7.55 ✓ +	.00	.55	
υ Cygni	x 21.2 10	+ 37 31 +	.77 305 +	7.46 ✓ +	.00	.46	
α Cephei	x 21.3 16	+ 62 3 +	1.89 306 +	7.46 ✓ +	.00	.46	
β Aquarii	x 21.4 25	− 6 7 −	.11 307 +	7.55 ✓ +	.00	.55	
74 Cygni	x 21.5 32	+ 39 51 +	.84 514 +	7.41 ✓ +	.00	.41	
ε Pegasi	x 21.6 38	+ 9 18 +	.16 309 +	7.49 ✓ +	.00	.49	
π Cygni	x 21.7 42	+ 48 44 +	1.14 517 +	7.47 ✓ +	.00	.47	
16 Pegasi	x 21.8 47	+ 25 20 +	.47 518 +	7.58 ✓ +	.00	.58	
20 Pegasi	x 21.9 55	+ 12 31 +	.22 519 +	7.46 ✓ +	.00	.46	
ι Pegasi	x 22.0 1	+ 24 44 +	.46 312 +	7.51 ✓ +	.00	51	
ξ Cephei	x 22.1 7	+ 57 35 +	1.58 316 +	7.53 ✓ +	.00	53.	
β Pegasi	x 22.9 58	+ 27 24 +	.52 328 +	7.48 ✓ +	.00	.48	
Br 3077	x 23.1 7	+ 56 29 +	1.51 530 +	7.37 ✓ +	.00	.37	
γ Piscium	x 23.2 11	+ 2 36 +	.05 330 +	7.55 ✓ +	.00	.55	
τ Pegasi	x 23.2 14	+ 23 3 +	.43 531 +	7.51 ✓ +	.00	.51	
70 Pegasi	x 23.4 23	+ 12 4 +	.21 535 +	7.50 ✓ +	.00	.50	
72 Pegasi	x 23.5 28	+ 30 38 +	.59 536 +	7.52 ✓ +	.00	7.502 .52	
	22.9 23.3	22.17 −1′				.55	00
						+7.499	+7.499

21.4 +2.75 +7.41 .00 .00 +7.41 +7.41
21.7 +2.86 +7.45 +7.45 +7.45
23.0 +3.65 +7.62 +7.62 +7.62
23.5 +4.30 +7.50 .00 .00 +7.50 +7.50

Star		Ra h m	δ ° ′	tang δ	π Ra −(P′P)			
β Cephei	x	21.4 27	+ 70 1 +	2.75 ✓	+ 7.41 ✓ −			308
11 Cephei	x	21.7 40	+ 70 44 +	2.86 ✓	+ 7.45 ✓ −			516
π Cephei	x	23.0 4	+ 74 43 +	3.65 ✓	+ 7.62 ✓ −			529
4 Cass.	x	23.3 19	+ 61 36 +	1.85 ✓	+ 7.55 ✓	✓ +.00	+ 7.55	533
γ Cephei	x	23.5 31	+ 76 56 +	4.30 ✓	+ 7.50 ✓ −		+.036	334

21.4 −11 +7.55 21.0 +78 +7.54
21.6 +16 +7.49 21.2 +77 +7.46
21.8 +47 +7.58 21.3 +1.89 +7.46
21.9 +22 +7.46 21.5 +83 +7.41
22.0 +46 +7.51 21.7 +1.14 +7.47
23.2 +05 +7.55 22.1 +1.58 +7.53
23.2 +43 +7.51 23.1 +1.51 +7.37
23.4 +21 +7.50 23.3 +1.85 +7.55
22.3 +.25 +7.52 21.9 +1.29 +7.47 $n_5 = +.05$

0 = +2.51 −11 n = +.04 +04
+2.62 −07 +.03 +02
+3.41 +10 −.03 −04
+4.06 −02 +.00 −01
+00

0 = +1.46 −06 n = +.04
+1.57 −02 +.01
+2.36 +15 −.06
+3.01 +.03 −.01

RA		sin z	$R_{gq}-R_{pf}$	$\rho'-\rho$	$\frac{R_{gq}-R_{pf}}{\rho'-\rho}$
h	m		″	″	″
21	15				
21	32				
21	38				
21	39				
21	47				
22	1				
22	4				
22	15				
22	41				
22	44				
22	56				
22	58				
23	4				
23	7				
23	11				
23	23				
23	28				

RA		sin z	$R_{gq}-R_{pf}$	$\rho'-\rho$	$\frac{R_{gq}-R_{pf}}{\rho'-\rho}$
h	m		″	″	″
21	27				
21	40				
22	7				
22	45				
23	19				
23	34				

21	1	
21	8	+.22
21	10	
21	16	
21	25	
21	32	
21	38	
21	42	
21	47	
21	55	
22	1	
22	7	
22	58	
23	7	
23	11	
23	14	
23	23	
23	28	

21	27
21	40
23	4
23	19
23	31

1871 Oct. 14 h = ~~+~~ .002 00 h′ = −.002 h′ = −.014 n = +.06

Star		Am obs. Ra h m	δ °	′	tang δ		π Ra −(r′p)				
	21.20 + 6			−1					7.468		
61 Cygni	pr.	21.0 1	+ 38	8 +	.78	302	+ 7.49 ✓ +	.05	+ 7.54	− .01	+ 7.53
ξ Cygni	x⁵	21.1 8	+ 29	43 +	.57	303	+ 7.47 ✓ +	.03	.50	− .01	.49
τ Cygni	x⁴	21.2 10	+ 37	31 +	.77	305	+ 7.35 ✓ +	.05	.40	− .01	.39
α Cephei	x³	21.3 16	+ 62	3 +	1.89	306	+ 7.35 ✓ +	.11	.46	00	.46
β Aquarii	x²	21.4 25	− 6	7 −	.11	307	+ 7.45 ✓ −	.01	.44		.44
74 Cygni	x¹	21.5 32	+ 39	51 +	.83	514	+ 7.42 ✓ +	.05	.47		.47
π₂ Cygni	x¹	21.7 42	+ 48	44 +	1.14	517	+ 7.32 ✓ +	.07	.39		.39
16 Pegasi	x²	21.8 47	+ 25	20 +	.47	518	+ 7.48 ✓ +	.03	.51		.51
20 Pegasi	x³	21.9 55	+ 12	31 +	.22	519	+ 7.43 ✓ +	.01	.44	00	.44
α Aquarii	x⁴	21.220 59	− 0	56 −	.02	311	+ 7.47 ✓ −	.00	.47	+ 01	.48
ι Pegasi	x⁴	22.0 1	+ 24	44 +	.46	312	+ 7.42 ✓ +	.03	.45	+ 01	.46
ζ Cephei	x⁵	22.1 7	+ 57	35 +	1.58	316	+ 7.38 ✓ +	.09	.47	+ 01	.48
ζ Aquarii	x⁶	22.2 15	− 2	1 −	.03	317	+ 7.46 ✓ −	.00	7.458 .46	+ 01	.47
	21.90	21.63							+ 7.462		+ 7.462

21.4 +275 +7.36 .00 .00 + 7.36 + 7.36
21.7 +286 +7.20 .00 .00 + 7.20 + 7.20

1871 Oct. 14

Star		Ra h m	δ °	′	tang δ	π Ra −(r′p)		
β Cephei	x	21.4 27	+ 70	1 +	2.75 ✓	+ 7.36 ✓	=	+.041 308
11 Cephei	x	21.7 40	+ 70	44 +	2.86 ✓	+ 7.20 ✓	−	516

21.4 −11 +7.45 21.3 +189 +7.35
21.8 +47 +7.48 21.5 +83 +7.42
21.9 +22 +7.43 21.7 +114 +7.32
22.0 −02 +7.47 22.1 +158 +7.38
22.0 +46 +7.42 21.6 +1.36 +7.37 n₃ = +.07
22.2 −03 +7.46
21.9 +16 +7.45

0 = +2.59 −.09 n = +.03 +.02
+2.70 −.25 +.09 +.10 +.06

0 = +1.39 −.01 n = +.01
+1.50 −.17 +.11 +.06

1871 W.A.R. Obs. Oct 14 h = ~~+~~ .002 h′ = −.002 −1 h′ = +.004 n = +.07

Star		Ra	δ	′	tang δ		π Ra				
κ Cass.	x²	0.4 26	+ 62	14 +	1.90	5	+ 7.48 ✓ +	.13	.61	00	
π Androm.	x¹	0.5 30	+ 33	2 +	.65	7	+ 7.55 ✓ +	.05	+ 7.60	00	
ε Androm.	x¹	0.5 32	+ 28	38 +	.55	8	+ 7.39 ✓ +	.04	.43		
δ Androm.	x⁰	0.6 33	+ 30	11 +	.58	9	+ 7.33 ✓ +	.04	.37		
α Cass.	x⁰	0.6 33	+ 55	51 +	1.47	10	+ 7.36 ✓ +	.10	.46		
~~o Cass.~~		~~0.6 38~~	~~+ 47~~	~~36 −1~~			~~+ 7.40~~		.48	00	
		0.56 60							+ 7.468 92		+ 7.492

~~0.8 +1.90 +7.48 .00 .00~~ + ~~7.48 + 7.48~~

o Cass.	x	0.6 38	+ 47	36 +	1.10	+ 7.40 ✓ +.08 + 7.48	341

0.5 +65 +7.55 0.6 +1.47 +7.36
0.5 +55 +7.39 0.6 +1.10 +7.40
0.6 +58 +7.33 0.6 +1.28 +7.38
0.5 +59 +7.42

0 = +1.31 +.06 n = −.05

0 = +.62 +.10 n = −.16

R

1871 Oct 15 h = +.006 4 h′ = +.006 h′ = +.019 n = +.08

Star		Ra	δ	′	tang δ		π Ra				
	20.52 + 6								7.462		
ε Delphini	6	20.4 27	+ 10	53 +	.19	290	+ 7.46 ✓ +	.02	+ 7.48	+ 01	+ 7.49
β Delph.	5	20.5 32	+ 14	10 +	.25	292	+ 7.39 ✓ +	.02	.41	+ 01	.42
α Delph.	4	20.6 34	+ 15	28 +	.28	293	+ 7.47 ✓ +	.02	.49	+ 01	.50
α Cygni	+ 4	20.6 37	+ 44	50 +	.99	294	+ 7.39 ✓ +	.08	.47	+ 01	.48
α Pegasi	2.0	22.9 58	+ 14	32	1.00 +.26	329	+ 7.49 ✓ +	.02	7.510 .51	− 04	.47
	23.0 23.0	21.02							+ 7.472		+ 7.472

22.3 +1.26 +7.38 −.01 −.01 + 7.37 + 7.37

3 Lacertae	✓	22.3 19	+ 51	36	+1.26 ✓	+ 7.38 ✓ −	524
~~α Pegasi~~	✓	~~22 58~~	~~+ 14~~	~~32~~		~~+ 7.49~~ ✓	

20.4 +19 +7.46 20.6 +1.00 +7.39
20.5 +25 +7.39
20.6 +28 +7.47
23.0 +26 +7.49
21.1 +24 +7.45

0 = +1.02 −.08 n = +.08

0 = +.26 −.02 n = +.08

R sin z = +.60+.80 | +.40+.60 | +.20+.40 | +0+.20 | +0 −.20 | −.20 −.40 | −.40 −.60 | −.60−.80

R A		R sin z	Req−Rfl	ρ'−ρ	$\frac{R_{eq}-R_{fl}}{\rho'-\rho}$		
h	m		"	"	"		
21	1						
21	8	+22					
21	10						
21	16						
21	25						
21	32						
21	42						
21	47						
21	55						
21	59						
22	1						
22	7						
22	15						
0	26						
0	30						
0	32						
0	33						
0	33						
20	27	+.52	+1 5.2	+.2 5.4	+1.3 6.7		
20	32	+.47	5.1	+.1 5.2	+1.1 6.3		
20	34	+.45	5.1	−.2 4.9	+1.1 6.0		
20	37	−.04	5.4	+.0 5.4	−.1 5.3		
22	58	+.47	6.0	−.6 5.4	+1.1 6.5		
					(5) 6.16		

+ 1' 5.73"
6.16

R A		R sin z	Req−Rfl	ρ'−ρ	$\frac{R_{eq}-R_{fl}}{\rho'-\rho}$
h	m		"	"	"
21	27				
21	40				
0	38				
22	19	−.16	+1 3.5	+.2 3.7	−.3 (3.4)
~~22~~	~~58~~				

+.52 +5.4
+.47 5.2
+.45 4.9
+.47 5.4
+.48 +5.2
+1.2
6.4 4
(6) 256 4
−.7

−.04 +5.4 −
−.16 3.7
−.10 +4.6
− .2
4.4 2
88 2 344
+.13

308
516
341
−24

1871 Oct.16 WAR obs. h = +.005 (−60) h' = +.006 h' = −.024 S.C. n = +.05

Star		RA	δ	tang δ	π − Ra − (ρ' − ρ)				
		h m	° '						
κ Cygni	x 2	19.2 14	+53 8	+ 1.33 272	+7.98 ✓+	.07		+8.05	
β Cygni	x	19.4 25	+27 42	+ .52 275	+8.13 ✓+	.03		.16	
γ Aquilae	✓	19.7 40	+10 19	+ .18 277	+8.21 ✓+	.01		.22	
δ Sagittae	✓	19.7 42	+18 14	+ .33 279	+8.15 ✓+	.02		.17	8.144
κ Aquilae	✓	19.8 45	+8 32	+ .15 280	+8.11 ✓+	.01		.12	
α Cygni	20.55 x	20.6 37	+44 50	+ 1.00 294	7.59 ✓+	.05	7.666	7.64 − 01	+7.63
ε Cygni	x	20.7 41	+33 30	+ .66 298	+7.60 ✓+	.03		.63 − 01	.62
η Cephei	x	20.7 43	+61 21	+ 1.83 299	+7.70 ✓+	.09		.79 − 01	.78
ε Pegasi	x 7	21.6 38	+9 18	+ .16 309	+7.63 ✓+	.01		.64 + 02	.66
π₂ Cygni	x 8	21.7 42	+48 44	+ 1.14 517	+7.61 ✓+	.06		.67 + 02	69
16 Pegasi	x 9	21.8 47	+25 20	+ .47 518	+7.58 ✓+	.02		.60 + 02	.62
~~γ Cygni~~		~~20 18~~	~~+39 51~~		~~+7.57 ✓~~				
ε Delphini	+5 ✓	20.4 27	+11 53	+ .19 290	+7.67 ✓+	.01		.68 − 01	.67
α Delphini	+3 ✓	20.6 33	+15 28	+ .28 293	+7.70 ✓+	.01		.71 − 01	.70
γ Cygni	+8 21.70	20.3 17	+83 +39 51	+ +53 289	+7.57 +	.04	7.637	.61 − 01	.60

+8.144 N.C.
+7.663 S.C. +7.663 S.C.

North Clock.

19.7 + 18 + 8.21 19.2 5 +1.33 +7.98 19.56 N.C. 20.93 S.C. 19.8 + 27.4 + 8.06 .00 .00 + 8.06 + 8.06
19.7 + 33 + 8.15 19.8 + 53.38 + 5.37 .00 .00 + 5.37 + 5.37
19.8 + 15 + 8.11
19.7 + 22 + 8.16

I
0 = +2.52 −.10 n = +.04
+53.16 −2.79 +.05

II
0 = +1.41 +.08 n = −.06
+52.05 −2.61 +.05

1871 Oct 16 WAR obs

Star		RA	δ	tang δ	π − Ra − (ρ' − ρ)		
N.C.		h m	° '				
ε Draco.	x	19.8 49	+69 57	+2.73 4 ✓	+ 8.06 ✓	−	282
λ Urs. Min.	✓	19.8 49	+88 56	+53.12 38 ✓	+ 5.37 ✓	−	284

South Clock.

21.6 + 16 + 7.63 20.6 + 1.00 + 7.59
21.8 + 47 + 7.58 20.7 + 1.83 + 7.70
20.4 + 19 + 7.67 21.7 + 1.14 + 7.64
20.6 + 28 + 7.70 21.0 + 1.32 + 7.63
21.1 + 28 + 7.64

1871 Oct 16 Am obs h = +.005 h' = +.006 h' = +.010 n = +07

Star		RA	δ	tang δ	π − Ra − (ρ' − ρ)			
α Aquarii	✓ +1	21 7 20 .59	− 0 56	− .02 311	+ 7.81 ✓−	.00	+ 7.81	00
ι Pegasi	x 1	22.0 01	+ 24 44	+ .46 312	+ 7.75 ✓+	.03	.78	
θ Pegasi	✓ 1	22.0 03	+ 5 35	+ .10 314	+ 7.75 ✓+	.01	.76	
ι Aquarii	✓ 1	22.2 10	− 8 24	− .15 522	+ 7.79 ✓−	.01	.80	
σ Aquarii	✓ 1	22.2 15	− 2 1	− .03 317	+ 7.77 ✓−	.00	.77	
	−3	22.4 22.13		.04			.83	00

22.1 + 1.57 + 7.66 .00 .00 + 7.66 + 7.66 + 7.792 + 7.792

Star		RA	δ	tang δ	π − Ra − (ρ' − ρ)			
υ Cephei	x	22.1 06	+ 57 35	+ 1.57 ✓	+ 7.66 ✓	−		316
π (2) Lacertae	x	22.4 26	+ 49 38	+ 1.18 ✓	+ 7.75 ✓ + .08	+ 7.83		319

22.0 − 02 + 7.81 22.4 + 1.18 + 7.75
22.0 + 46 + 7.75
22.0 + 10 + 7.75
22.2 − 15 + 7.79
22.2 − 04 + 7.77
22.1 + 07 + 7.77

0 = + 1.50 −.11 n = +.07

0 = +.39 −.09 n = +.23

1871 Oct 16 Am obs. h = +.005 h' = +.006 h' = +.009 n = +.04

Star		RA	δ	tang δ	π − Ra − (ρ' − ρ)			
τ Pegasi	x +3	23.2 14	+ 23 3	+ .43 531	+ 7.80 ✓+	.02	+ 7.82	00
υ Pegasi	✓ +2	23.3 19	+ 22 43	+ .42 532	+ 7.79 ✓+	.02	.81	
λ Androm.	x 0	23.5 31	+ 45 47	+ 1.03 331	+ 7.66 ✓+ +.08	.04	.78	
φ Pegasi	x −3	23.8 46	+ 18 26	+ .33 538	+ 7.78 ✓+	.01	.79	
ρ Cass.	x −3	23.8 48	+ 56 48	+ 1.53 539	+ 7.71 ✓+	.06	.77	00
		23.52	−1				+ 7.794	+ 7.794

23.4 − 2.77 + 7.60 .00 .00 + 7.60 + 7.60
23.6 + 4.30 + 7.65 .00 .00 + 7.65 + 7.65

Star		RA	δ	tang δ	π − Ra − (ρ' − ρ)		
λ Draco. L.C.	x	11, 4 23 23	+ 70 03	~~+ 2.75~~ − 2.77 ✓	+ 7.60 ✓	−	162
π Cephei	x	23.6 34	+ 76 56	+ 4.30 ✓	+ 7.65 ✓	−	334
~~ρ Cass.~~	✓	~~23.8 48~~	~~+ 56 48~~	~~+ 1.53 ✓~~	~~+ 7.71~~		
~~λ Draco~~		~~11 24~~	~~+ 70~~				

23.2 + 42 + 7.80 23.5 + 1.01 + 7.66 74
23.3 + 42 + 7.79 23.8 + 1.53 + 7.71
23.8 + 33 + 7.78 23.6 + 1.27 + ~~7.68~~ 7.72 n = +.08
23.4 + 39 + 7.79

0 = +3.91 −.14 n = +.04 +03 0 = −3.16 −.19 n = +.06 +05

0 = +3.03 −.07 n = +.02 0 = −4.04 −.12 n = +.03

1871 Oct.16 WAR obs.

27 Lyncis	7	50
β Cancri	8	10
γ Cygni	20	17
α Cygni		

sin z =	+.60 +.80	+.40 +.60	+.20 +.40	+.0 +.20	+.0 −.20	−.20 −.40	−.40 −.60	−.60 −.80

RA	sin z	Req-Rfl		P'-P	Req-Rfl + P'-P		
h m		'	"	"	"		
19 14	−.19	+1	2.6	+.7	3.3	−4	29
19 25	+.25		1.7	−.4	1.3	+6	1.9
19 40	+.53		2.2	+.1	2.3	+13	36
19 42	+.41		3.8	−.6	3.2	+10	42
19 45	+.56		2.3	−.0	2.3	+14	37
20 37	−.04		4.4	+.0	4.4	−1	43
20 41	+.15		2.9	−.3	2.6	+4	30
20 43	−.32		3.6	+.2	3.4	−7	27
21 38	+.55		0.4	−.4	0.0	+14	14
21 42	−.11		3.2	+1.0	4.2	−3	3.9
21 47	+.29		1.4	+.4	1.8	+7	25
20 27	+.52		0.1	+.2	0.3	+13	1.6
20 33	+.45		1.8	−.2	1.6	+17	2.7
20 17	+.04		2.9	−.2	2.7	+1	28
						(14)	2.94

+1' 3.21"
3.00

RA	sin z	Req-Rfl		P'-P	Req-Rfl + P'-P		
h m		'	"	"	"		
19 49	−.46	+1	4.0	+.8	4.8	−10	3.8
19 49	−.73		7.8	+.6	8.4	−1.8	(6.6)
						(1)	3.80

+.60 +.80	+.40 +.60	+.20 +.40	+.0 +.20	+.0 −.20	−.20 −.40	−.40 −.60	−.60 −.80
	+.53 +2.3	+.25 +1.3	+.15 +2.6	−.19 +3.3	−.32 +3.4	−.46 +4.8	−.73 +8.4
	+.41 3.2	+.29 1.8	+.04 2.7	−.04 4.4			
	+.56 2.3			−.11 4.2			
	+.55 0.0						
	+.52 0.3						
	+.45 1.6						
	+.50 +1.6	+.27 +1.6	+.10 +2.6	−.11 +4.0	−.32 +3.4	−.46 +4.8	−.73 +8.4
	+1.3	+ .6	+ .2	− .2	− .8	− 1.2	−2.0
	(16) 2.9 6	2.2 2	2.8 2	3.8 3	2.6 1	3.6 1	6.4
	174	44	56	114	26	36	64
	+.3	+1.0	+.4	−.6	+.6	−.4	−3.2

21 59	+.69	+1	0.2	−.1	0.1	+1.7	18
22 1	+.30		1.6	−.3	1.3	+.7	20
22 3	+.60	0	59.0	+.2	59.2	+1.5	07
22 10	+.77		59.3	+.5	59.8	+1.9	1.7
22 15	+.70		58.5	−.4	58.1	+1.7	59.8
						(5)	1.20

22 6	−.26	+1	2.0	+.4	2.4	−.5	1.9
22 26	−.13		0.1	+.6	0.7	−.3	0.4
						(2)	1.15

+.69 +0.1	+.60 +59.2	+.30 +1.3		−.13 +0.7	−.26 +2.4		
+.77 59.8							
+.70 58.1							
+.72 +59.3	+.60 +59.2	+.30 +1.3		−.13 +0.7	−.26 +2.4		
+ 1.9	+ 1.6	+ .7		− .3	− .6		
1.2 3	0.8 1	2.0 1		0.4 1	1.8 1		
(7) 36	8	20		4	18	86	
+.0	+.4	−.8		+.8	−.6		

+1' 1.23"
1.19

23 14	+.33	+0	59.5	+.1	59.6	+8	04
23 19	+.34		58.7	+.2	58.9	+8	59.7
23 31	−.06	1	2.5	+.7	3.2	−2	3.0
23 46	+.41		1.0	−.2	0.8	+1.0	1.8
23 48	−.25		1.7	−.0	1.7	−.8	1.2
						(5)	1.22

23 23	−.92	+1	5.3	−.8	4.5	−24	21 ✓
23 34	−.57		2.0	+.4	2.4	−1.3	1.1
~~23 48~~							
						(1)	1.10

	+.41 +0.8	+.33 +59.6		−.06 +3.2	−.25 +1.7	−.57 +2.4 −	
		+.34 58.9					
	+.41 +0.8	+.34 +59.2		−.06 +3.2	−.25 +1.7	−.57 +2.4	
	+ 1.0	+ .8		−.1	− .6	− 1.5	
	1.8 1	0.0 2		3.1 1	1.1 1	0.9 1	
	(6) 18	0		31	11	9	69
	−.6	+1.2		−1.9	+.1	+.3	

+1' 1.15"
1.20

1871 Oct 16 h = +005 h' = +009 n = +.14
WAR. obs. h' = +006

Star		RA	δ	tang δ	T-RA -(P'-P)			
	+1	h m 7.0	° ' +1'		405			
27 Lyncis	x	7 59	+51 52 +	1.28	+7.91 +	.05	+7.96	oo
β Cancri	x -1	8.2 10	+9 34 +	.17	123 +7.89 +	.01	.90	oo
~~γ Cygni~~	✓	~~20 17~~	~~+39 51 +~~	~~.83~~	~~+7.57~~			
~~α Cygni~~	✓	~~20 37~~	~~+44 50 +~~	~~1.00~~	~~+7.59~~			
~~ε Cygni~~	✓	~~20 41~~	~~+33 30 +~~	~~.66~~	~~+7.60~~			
~~ε Pegasi~~		~~21 38~~	~~+9 18 +~~	~~.16~~				
~~π Cygni~~		~~21 42~~	~~+48 44 +~~	~~1.14~~				
~~16 Pegasi~~		~~21 47~~	~~+25 20 +~~ +1'	~~.47~~				
		8.10					+7.930	+7.930

1871 Oct 16
WAR obs.

Star	RA	δ	tang δ	T-RA -(P'-P)
	h m	° '		
~~η Cephei~~	~~20 43~~	~~+61 21~~	~~+ 1.83~~	~~+7.70~~

8.2 +17 +7.89 8.0 +1.28 +7.91

1871 Oct 17 h = 000 (−12) h' = +.028 S.C. n = +.06
WAR Ob. h' = +001

Star		RA	δ	tang δ						
ε Cygni	x	20.741	+33 30 +	.66	298					
η Cephei	x	20.743	+61 21 +	1.83	299 +8.12 +	.11		+8.23		
32 Vulpec.	x	20.849	+27 35 +	.52	507 +8.20 +	.03		.23		
ν Cygni	x	20.953	+40 41 +	.86	309 +8.18 +	.05		.23	NC.	
κ Pegasi	x	21.639	+25 4 +	.47	310 +8.30 +	.03		.33		
π2 Cygni	x	21.742	+48 44 +	1.14	517 ~~8.12~~ +	.07		.19		
16 Pegasi	x	21.847	+25 20 +	.47 .37	518 +8.32 +	.03		.35		
20 Pegasi	x4	21.955	+12 31 +	.22	519 +7.81 +	.01	7.790 +	7.82	+03	+7.85
α Aquarii	x8 21.97	22.59	− 0 56 −	.02	311 +7.77 −	.00		.77	+02	.79
ι Pegasi	x+8	22.81	+24 44 +	.46	312 +7.75 +	.03		.78	+02 SC.	.80
ι Piscium	x8	23.634	+4 57 +	.09	333 +7.77 +	.01		.78	−02	76
φ Pegasi	x10	23.846	+18 26 +	.33	538 +7.79 +	.02		.81	−03	.78
ρ Cass.	x10 23.73	23.848	+56 48 +	1.53	539 +7.42 54 +	.09	7.740	.63	−03	.60
13 H Cephei		21.6 35	+56 55 +	1.53	515 +8.15 +	.09	8.27	+8.24		

		−2'				
41 H Cephei	x	23.741	+67 7 +	2.37	+7.66	537

North Clock.

20.8 +52 +8.20 20.7 +1.83 +8.12
21.6 +25 47 +8.30 20.9 +86 +8.18
21.2 +50 +8.25 21.7 +1.14 +8.12
21.6 +1.53 +8.15
21.2 +1.34 +8.14

h
NC. 21.22 +8.2680
SC. 22.85 +7.765 +7.763 NC SC.

South Clock.

21.9 +22 +7.81 23.8 +1.53 +7.54 23.7 +2.37 +7.66 +00 +00 +7.66 +7.66
22.0 −02 +7.77
22.0 +47 +7.75
23.6 +09 +7.77
23.8 +33 +7.79
22.7 +22 +7.78

0 = +2.15 − .12 n = +.06

0 = +.84 +.12 n = +.14

1871 Oct. 17 h = 000 (+45) h' = +.040 n = +10
Obs. h' = +001

Star		RA	δ	tang δ						
ξ Cephei	x 22 24	22.17	+57 35 +	1.58	316 +7.61 +	.16	7.808	7.77	+03	+7.80
ϑ Aquarii	x6	22.210	− 8 24 −	.15	522 +7.89 −	.01		.88	+02	.90
γ Aquarii	x6	22.215	− 2 1 −	.03	317 +7.74 −	.00		.74	+02	76
3 Lacertae	x5	22.319	+51 36 +	1.26	524 +7.65 +	.13		.78	+02	.80
α) 7 Lacertae	x4	22.426	+49 38 +	1.18	319 +7.75 +	.12		.87	+02	.89
τ Pegasi	x4	23.214	+23 3 +	.43	531 +7.81 +	.04		.85	−02	.83
4 Cass.	x5	23.319	+61 36 +	1.85	533 +7.62 +	.18		.80	−02	.78
70 Pegasi	x6	23.423	+12 4 +	.21	535 +7.85 +	.02		.87	−02	.85
72 Pegasi	x7	23.528	+30 38 +	.59	536 +7.81 +	.06		.87	−03	.84
λ Androm.	x7 23.38	23.531	+45 47 + −1'	1.03	331 +7.70 +.08 +	.10	7.854	.88	−03	85
		22.81					+7.831			+7.830

22.2 −15 +7.89 22.1 +1.58 +7.61
22.2 −04 +7.74 22.3 +1.26 +7.65
23.2 +42 +7.81 22.4 +1.18 +7.75
23.4 +21 +7.85 23.3 +1.85 +7.62
23.5 +59 +7.81 23.5 +1.01 +7.78
22.9 +21 +7.82 22.7 +1.38 +7.68

sin z = +.60 +.80 | +.40 +.60 | +.20 +.40 | +0 +.20 | +0 −.20 | −.20 −.40 | −.40 −.60 | −.60 −.80

R.A.	sin z	$R_{eq}-R_{fl}$ ′	″		$R_{eq}-R_{fl}+P'-P$ ″		
7 59							
8 10							
20 17	+.04						
20 37	−.04						
20 41	+.15						
21 38							
21 42							
21 47							

R.A.	sin z	$R_{eq}-R_{fl}$ ′	″		$R_{eq}-R_{fl}+P'-P$ ″
20 43	−.32				

20 41	+.15						
20 43	−.33	+1	2.4	+.2	2.6	−.7	1.9
20 49	+.26		2.6	+.1	2.7	+.6	3.3
20 53	+.03		3.6	+0	3.6	+.1	3.7
21 39	+.30		2.0	−.3	1.7	+.7	2.4
21 42	−.11		1.6	+10	2.6	−.3	2.3
21 47	+.29	+0	59.7	+.4	0.1	+.7	(0.8)
21 55	+.50	+1	2.6	−.4	2.2	+12	3.4
21 59	+.69		3.7	−.1	3.6	+17	(5.3)
22 1	+.30		3.1	−.3	2.8	+.7	3.5
23 34	+.61		2.2	+.1	2.3	+15	3.8
23 46	+.41		1.9	−.2	1.7	+10	2.7
23 48	−.25		1.6	+.0	1.6	−.5	1.1
21 35	−.25		1.3	+.8	2.1	−.5	1.6
						(11)	2.70

23 41	−.42	+1	2.5	+.4	2.9	−.9	2.0
						(1)	2.00

+.60 +.80	+.40 +.60	+.20 +.40	+0 +.20	+0 −.20	−.20 −.40	−.40 −.60	−.60 −.80
+.69 +3.6	+.50 +2.2	+.30 +1.7	+.03 +3.6	−.11 +2.6	−.33 +2.6	−.42 +2.9	
+.61 2.3	+.41 1.7	+.29 0.1			−.25 1.6		
		+.30 2.8			−.25 2.1		
		+.26 2.7					
+.65 +3.0	+.46 +2.0	+ ~~.32~~ .29 +1.8	+.03 +3.6	−.11 +2.6	−.28 +2.1	−.42 +2.9	
+1.7	+1.2	+.7	+.1	−.3	−.7	−1.1	
4.7 2	3.2 2	2.5 4	3.7 1	2.3 1	1.4 3	1.8 1	
(14) 94	64	100	37	23	42	18	378
−2.0	−.5	+.2	−1.0	+.4	+1.3	+.9	

+1′ 2.70″
2.64

22 7	−.26	+1	1.4	+.4	1.8	−.5	1.3
22 10	+.77		3.6	+.5	(4.1)	+18	(5.9)
22 15	+.70	+1	1.2	−.4	0.8	+17	2.5
22 19	−.16		2.4	+.2	2.6	−.3	2.3
22 26	−.13		0.6	+.6	1.2	−.3	0.9
23 14	+.33		0.5	+.1	0.6	+.8	1.4
23 19	−.33		1.6	+.0	1.6	−.7	0.9
23 23	+.50		1.8	+.2	2.0	+1.2	3.2
23 28	+.20	+0	59.8	+.3	0.1	+.5	0.6
23 31	−.06	+1	1.4	+.6	2.0	−.2	1.8
						(9)	1.64

+.60 +.80	+.40 +.60	+.20 +.40	+0 +.20	+0 −.20	−.20 −.40	−.40 −.60
+.70 +0.8	+.50 +2.0	+.33 +0.6		−.16 +2.6	−.26 +1.8	
		+.20 0.1		−.13 1.2	−.33 1.6	
				−.06 2.0		
+.70 +0.8	+.50 +2.0	+.26 +0.4		−.12 +1.9	−.30 +1.7	
+1.8	+1.3	+.6		−.3	−.7	
2.6	3.3	1.0		1.6	1.0	
(9) 26 1	33 1	20 2		48 3	20 2	147
−1.0	−1.7	+.6		+.0	+.6	

+1′ 1.63″
1.66

1871 Oct 21 WAR obs. h = .000 (−33) h' = +002 h' = +.046 n = +.16

Star	RA	δ		tang δ	π Ra −(P′ P)					
	20.78 +7 h m	°	′				7.796			
α Delph.	20.5 31	+14	10 +	.25 292 +	7.77 +	.04	+7.81	+03	+7.84	
ε Cygni	✓ 5 20.7 41	+33	30 +	.66 298 +	7.56 ✓ +	.11	67	+02	69	
32 Vulpec	✓ 4 20.8 49	+27	35 +	.52 507 +	7.62 ✓ +	.08	.70	+02	72	
ν Cygni	✓ 3 20.9 52	+40	41 +	.86 300 +	7.62 ✓ +	.14	.76	+01	.77	
61 Cygni	pr. 2 21.0 01	+38	8 +	.78 302 +	7.62 +	.12	.74	+01	75	
ζ Cygni	✓ 1 21.1 7 (0 21.1 2)	+29	43 +	.57 303 +	7.67 +	.09	.76	−00	76	
τ Cygni	✓ 1 21.1 9	+37	31 +	.77 305 +	7.61 ✓ +	.12	.73	−00	.73	
α Cephei	✗ 1 21.3 16	+62	3 +	1.89 306 +	7.53 ✓ +	.30	.83	−00	.83	
π Lacertae	1.2 22.4 26	+49	38 +	1.18 319 +	7.52 +	.19	7.78 73	.71	−05	.66
	21.5 ~~1.48~~ 22.4	21.22						.78	−05	.73

21.0 −2.43 +8.07 .00 .00 +8.07 +8.07   +7.756   +7.756

21.3 −7.03 +8.98 .00 .00 +8.98 +8.98

1871 Oct 21 WAR obs.

Star		RA	δ		tang δ	π Ra −(P′ P)			
			° −2′		1.88				
~~α Cephei~~	✓	~~21.2 10~~	~~+62~~	~~3 +~~	~~1.90~~ ✓	~~+7.53~~	~~+.30~~	~~+7.83~~	306
1 Draco. H. 2 C.	✓ 9	21.3 18	+81	54 −	7.03 ✓	+ 8.98 ✓ −			3 187
δ Cephei	✗	22.4 24	+57	47 +	1.59 ✓	7.53 ✓ + .25		78	318
~~o² Urs Maj L.C~~		~~8 59~~ 9.0	~~+112~~ 67	~~20 −~~ 39	~~2.43~~ ✓	+ 8.07 ✓ −			415

20.5 +25 +7.77   20.9 +86 +7.62

20.7 +66 +7.56   21.0 +78 +7.62

20.8 +52 +7.62   21.2 +1.88 +7.53

21.1 +57 +7.67   21.1 +77 +7.61

20.8 +50 +7.66   21.3 +1.89 +7.53

22.4 +1.18 +7.52

22.4 +1.59 +7.53

21.5 +1.28 +7.57 n_5 = +.15

0 = −2.93 +.41 n = +.14 +14
     −7.53 +1.32   +.18 +18   16

0 = −3.71 +.50 n = +.13
     −8.31 +1.41   +.17   15

1871 Oct 21 am obs. h = .000 h' = +.002 h' = +.022 n = +.15

Star	RA	δ		tang δ	π Ra −(P′ P)			
10 Lacertae	× 22.6 34	+38	24 +	.79 526 +	7.64 ✓ +	.12	+7.76	00
η Pegasi	× 22.6 37	+29	34 +	.57 322 +	7.62 ✓ +	.09	.71	
13 Lacertae	× 22.6 39	+41	10 +	.88 7.528 +	7.67 ✓ +	.13	.80	
λ Pegasi	× 22.7 41	+22	54 +	.42 323 +	7.75 ✓ +	.06	.81	00
ι Cephei	× [22.8] 45	+65	33 +	2.20 325 +	7.46			
	22.62	−2′					+7.770	+7.770

22.8 +2.20 +7.46 00 00 +7.46 +7.46

22.6 +79 +7.64   22.6 +87 +7.67

22.6 +57 +7.62

22.7 +42 +7.75

22.6 +59 +7.67

0 = +1.61 −21 n = +.13 +.15

0 = +1.33 −21 n = +.16

1871 Oct 22 WAR obs. h = +.003 (+25) h' = +.006 h' = +.022 n = +.12

Star	RA	δ		tang δ	π Ra −(P′ P)				
ε Aquilae	19.70 19.3 19	+2	52 +	.05 274 +	7.79 +	.01	7.766 +7.80	+02	+7.82
β Cygni	✓ 7 19.4 26	+27	42 +	.52 275 +	7.66 +	.06	.72	+01	.73
γ Aquilae	✓ 4 19.7 40	+10	19 +	.18 277 +	7.79 ✓ +	.02	.81	+01	.82
η Aquilae	✓ 3 19.8 46	+0	41 +	.01 281 +	7.76 ✓ +	.00	.76	+01	.77
γ Cygni	✓ 2 20.3 17	+39	51 +	.83 289 +	7.64 ✓ +	.10	.74	00	.74
ε Cygni	× 6 20.7 41	+33	30 +	.66 298 +	7.78 +	.08	.86	−01	.85
ν Cygni	× 8 20.9 53	+ [illegible]	41 +	.86 300 +	7.64 ✓ +	.10	.74	−02	.72
61 Cygni	× ~~21.0~~ 1	+38	8 +	~~.78 302~~					
τ Cygni	× ~~21.2~~ 10	+37	31 +	~~.77 305~~					
ζ Cygni	1.0 21.1 7	~~+30~~ 29	43 +	.57 303 +	7.71 ✓ +	.07	7.793 .78	−02	.76
	20.90	20.15							

19.8 +2.74 +7.26 −.00 +.00 +7.26 +7.26   +7.776   +7.776

19.8 +53.38 +1.45 −.00 +.00 +1.45 +1.45

~~21.0 −2.43 +7.84 .01 −.00 +7.83 +7.84~~

Star		RA	δ		tang δ	π Ra −(P′ P)		
		4						
ε Draco.	✓	19.8 49	+69	57 +	2.74 ✓	+7.26 ✓	−	282
λ Urs Min	✓	19.8 49	+88	56 +	53.~~12~~ 38 ✓	+1.45 ✓	−	284
~~o² Urs Maj L.C~~		~~8 59~~ 9.0	~~+112~~ 67	~~20~~ 39	~~2.43~~ ✓	+7.84 ✓		

19.3 +05 +7.79   20.3 +83 +7.64

19.7 +18 +7.79   20.9 +86 +7.64

19.8 +01 +7.76   20.6 +84 +7.64 n_5 = +.21

19.6 +08 +7.78

0 = +2.66 −52 n = +.20 +20   0 = −2.51 +.05 n = +.02 +04
     +53.30 −6.33   +.12 +12 +16

0 = +1.90 −38 n = +.20   0 = −3.27 +20 n = +.06
     +52.54 −6.19   +.12   +.16

sin z =	+.60 +.80	+.40 +.60	+.20 +.40	+0 +.20	+0 −.20	−.20 −.40	−.40 −.60	−.60 −.80

RA	sin z	$R_{eq}-R_{ff}$		$P'-P$	$R_{eq}-R_{ff}+P'-P$		
h m		′	″	″	″		
20 31	+.47	+1	0.0	+.1	0.1	+1.2	13
20 41	+.15	~~+1′~~	3.1 ~~58.1~~	−.3	2.8 ~~57.8~~	+.3	3.1
20 49	+.25		1.3	+.1	1.4	+.6	2.0
20 52	+.03		3.0	+0	3.0	+.1	3.1
21 01	+.07		1.9	+.1	2.0	+.2	2.2
21 7	+.22		1.7	−.6	1.1	+.5	1.6
21 9	+.09		1.5	+.6	2.1	+.2	2.3
21 16	−.34		2.4	+1.0	3.4	−.7	2.7
22 26	−.13		0.9	+.6	1.5	−.2	13
						(9)	2.18

+1′ 2.07″
2.08

RA	sin z	$R_{eq}-R_{ff}$		$P'-P$	$R_{eq}-R_{ff}+P'-P$		
21 10		+1′	″	″	″		
21 18	−.83		3.7	+1.1	4.8	−.22	2.6 ✓
22 24	−.27		1.0	+.8	1.8	−.6	1.2
8 59	−.94					(1)	1.20

+.40 +.60	+.20 +.40	+0 +.20	+0 −.20	−.20 −.40	−.40 −.60
+.47 +0.1	+.25 +1.4	+.15 +2.8	−.13 +1.5	−.34 +3.4	
	+.22 1.1	+.03 3.0		−.27 1.8	
		+.07 2.0			
		+.09 2.1			
+.47 +0.1	+.24 +1.2	+.08 +2.5	−.13 +1.5	−.30 +2.6	
+1.2	+.6	+.2	−.3	−.7	
1.3^1	1.8^2	2.7^4	1.2^1	1.9^2	
(10) 13	36	108	12	38	207
+.8	+.3	−.6	+.9	+.2	

RA	sin z	$R_{eq}-R_{ff}$		$P'-P$	$R_{eq}-R_{ff}+P'-P$		
22 34	+.07	+0	59.8	+.4	0.2	+.2	0.4
22 37	+.22		59.5	−.2	59.3	+.5	59.8
22 39	+.02	+1	2.5	−.8	1.7	+.1	1.8
22 41	+.33		0.2	−.1	0.1	+.8	0.9
22 45	−.39		1.2	+1.0	2.2	−.9	1.3
						(5)	0.84

+1′ 0.84″
0.84

1′

+.20 +.40	+0 +.20	+0 −.20	−.20 −.40	−.40 −.60
+.22 +59.3	+.07 +0.2		−.39 +2.2	
+.33 0.1	+.02 1.7			
+.28 +59.7	+.04 +1.0		−.39 +2.2	
+ .7	+ .1		−1.0	
0.4^2	1.1^2		1.2^1	
(5) 8	22		12	42
+.4	−.3		−.4	

RA	sin z	$R_{eq}-R_{ff}$		$P'-P$	$R_{eq}-R_{ff}+P'-P$		
19 19	+.64	+0	58.0	−.5	(57.5)	+1.6	(59.1)
19 26	+.25	+1	2.0	−.4	1.6	+.6	2.2
19 40	+.53		2.0	+.1	2.1	+1.3	3.4
19 46	+.67		1.6	+.7	2.3	+1.6	3.9
20 17	+.04		4.4	−.2	4.2	+.1	4.3
20 41	+.15						
20 53	+.03		3.6	+.0	3.6	+.1	3.7
21 1	+.07						
21 10	+.09						
21 07	+.22		1.9	−.6	1.3	+.5	1.8
						(6)	3.22

+1′ 3.18″
3.19

RA	sin z	$R_{eq}-R_{ff}$		$P'-P$	$R_{eq}-R_{ff}+P'-P$		
19 49	−.46	+1	2.7	+.8	3.5	−1.0	2.5
19 49	−.73		4.9	+.6	5.5	−1.8	3.7
~~8 59~~	~~−.94~~					(2)	3.10

+.60 +.80	+.40 +.60	+.20 +.40	+0 +.20	−.40 −.60	−.60 −.80
+.67 +2.3	+.53 +2.1	+.25 +1.6	+.04 +4.2	−.46 +3.5	−.73 +5.5
		+.22 1.3	+.03 3.6		
+.67 +2.3	+.53 +2.1	+.24 +1.4	+.04 +3.9	−.46 +3.5	−.73 +5.5
+1.8	+1.4	+.6	+.1	−1.2	−2.0
(8) 4.1^1	3.5^1	2.0	4.0	2.3^1	3.5^1
41	35	40^2	80^2	23	35
−.9	−.3	+1.2	−.8	+.9	−.3

1870phae.proj..4220

1871 Oct 22 h = ~~+003~~ +14 h′ = +.006 h′ = +.057 n = +.13

Star		A M obs. RA	δ	tang δ	π RA − (ρ′−ρ)				
	21.29	h m	° ′				7.86		
ε Delph.	+1.8	20.4 27	+ 10 53 +	.19 290	+ 7.75 +	.02	~~7.80~~ + 7.77	+ 01	+ 7.78
β Delph.	1.7	20.5 32	+ 14 10 +	.25 292	+ 7.77 +	.03	.80	+ 01	.81
α Delph.	1.6	20.6 33	+ 15 28 +	.28 293	+ 7.77 +	.04	.81	+ .01	.82
32 Vulpec.	1.4	20.8 49	+ 27 35 +	.52 507	+ 7.64 +	.07	.71	+ 01	.72
~~ν Cygni~~	× 1.9	~~20.9 52~~	~~+ 40 41 +~~	~~.86 300~~			.70	+ 01	.71
~~β Cephei~~	×	~~21.3 27~~	~~+ 70 1 +~~	~~2.75~~ →					
ε Pegasi	.6	21.6 38	+ 9 18 +	.16 309	+ 7.78 +	.02	.80	00	.80
π₂ Cygni	× .5	21.7 42	+ 48 44 +	1.14 517	+ 7.61 +	.15	.76		.76
α Aquarii	2	21.9 59	− 0 56 −	.02 311	+ 7.86 −	.00	.86		.86
ι Pegasi	2	22.0 1	+ 24 44 +	.46 312	+ 7.75 +	.06	.81		.81
θ Pegasi	2	22.0 3	+ 5 35 +	.10 314	+ 7.83 +	.01	.84		.84
θ Aquarii	0	22.2 10	− 8 24 −	.15 522	+ 7.77 −	.02	.75		.75
η Pegasi	4	22.6 37	+ 29 34 +	.57 322	+ 7.75 +	.07	.82		.82
13 Lacertae		22.6 38	+ 41 10 +	.88 528	+ 7.65 +	.11	.76		.76
λ Pegasi	5	22.7 40	+ 22 54 +	.42 323	+ 7.86 +	.05	.91		.91
μ Pegasi		22.7 44	+ 23 57 +	.45 324	+ 7.72 +	.06	.78	00	.78
ω Piscium	× 1.7	23.9 53	+ 6 10 +	.11 336	+ 7.82 +	.01	.83	− 01	.82
α Androm.	× 1.8	0.0 2	+ 28 24 +	.54 1	+ 7.74 +	.07	.81	− 01	.80
22 Androm.	1.9	0.1 4	+ 45 23 +	1.01 337	+ 7.68 +	.13	.81	− 01	.80
γ Pegasi	1.9	0.1 7	+ 14 29 +	.26 3	+ 7.69 +	.03	.72	− 01	.71

23.21 2220 −2′

~~7.80~~ 7.799

+7.792 +7.793

21.0 −2.43 +7.84 +.01 +.01 + 7.85 +7.85
21.3 −7.03 +8.79 +.00 +.01 + 8.79 +8.80
21.4 −2.81 +8.19 +.00 +.01 + 8.19 +8.20
21.4 +2.75 +7.37 +.00 +.01 + 7.37 + 7.38
22.7 +2.20 +7.44 −.00 −.00 + 7.44 + 7.44

1871 Oct. 22

Star		A M obs. RA	δ	tang δ	π RA − (ρ′−ρ)			
		h m	° ′					
α Cephei	×	21.3 16	+ 62 3 +	1.89 8	+ 7.46	+ .24	+ 7.70	306
1 H Draco	S.C.	21.3 18	+ 81 54 −	7.03	+ 8.79	−		187
β Cephei	×	21.4 27	+ 70 1 +	2.75	+ 7.37	−		308
~~ζ Cephei~~	~~×~~	~~22 7~~	~~+ 57 35 +~~	~~1.58~~				
ι Cephei	×	22.7 45	+ 65 33 +	2.20	+ 7.44	−		325
o² Urs. Maj.	S.C.	8.0 59	~~+ 62~~ 60 40 −	2.44 3	+ 7.84	−		415
d Urs. Maj.	S.C.	9.4 23	~~+ 69 24~~	~~2.66~~	+ 8.19	−		418
			70 24 −	2.81				

20.4 +19 + 7.75 21.7 +1.14 +7.61
20.5 +25 + 7.77 22.6 +87 +7.65
20.6 +28 + 7.77 0.1 +1.01 +7.68
21.6 +16 + 7.78 21.3 +1.88 +7.46
22.0 −02 + 7.86 22.4 +1.22 +7.60
22.0 +46 + 7.75
22.0 +10 + 7.83
22.2 −15 + 7.77
22.7 +42 + 7.86
22.7 +44 + 7.72
23.9 +11 + 7.82
0.1 +26 + 7.69
22.1 +21 + 7.78

n5 = +18

0 = +2.54 −.41 n = +.16 +15
+1.99 −.34 +.17 +17
.16

0 = +1.53 −.22 n = +.14
+.98 −.16 +.16
.15

0 = −2.64 +.07 n = +.03 +05
−7.24 +1.01 +.14 +14
−3.02 +.91 +.14 +15
+08

0 = −3.65 +.25 n = +.07
−8.25 +1.20 +.15
−4.03 +.60 +.15 +12

1871 Oct. 23 h = ~~+008~~ +21 h′ = +.011 h′ = +.072 n = +.09

	20.14	A M obs.							
κ Cygni	+1.8	19.2 14	+ 53 8 +	1.33 272	+ 7.65 +	.12	7.897 ~~7.84~~ 7.77	+ 13	+ 7.90
δ Aquilae	1.7	19.3 19	+ 2 52 +	.05 274	+ 7.90 +	.00	.90	+ 12	8.00
δ Sagitt.	1.3	19.7 41	+ 18 14 +	.33 279	+ 7.83 +	.03	.86	+ 09	7.95
α Aquilae	1.2	19.7 45	+ 8 32 +	.15 280	+ 7.88 +	.01	.89	+ 09	7.98
η Aquilae	1.2	19.8 46	+ 0 41 +	.01 281	+ 7.95 +	.00	.95	+ .09	8.04
β Aquilae	1.2	19.8 49	+ 6 6 +	.11 283	+ 7.91 +	.01	.92	+ 09	8.01
θ Aquilae	.9	20.1 05	− 1 11 −	.02 287	+ 7.96 −	.00	.96	+ .06	8.02
α Capric.	.3	~~20.2~~ 11					.95	+ .02	7.97
γ Cygni	.7	20.3 17	+ 39 51 +	.83 289	+ 7.77 +	.07	.84	+ .05	7.89
ε Delphini	.6	20.4 27	+ 10 53 +	.19 290	+ 7.88 +	.02	.90	+ .04	7.94
β Delphini	.5	20.5 32	+ 14 10 +	.25 292	+ 7.87 +	.02	.89	+ 04	7.93
α Delphini	.4	20.6 33	+ 15 28 +	.28 293	+ 7.88 +	.03	.91	+ .03	7.94
α Cygni	.4	20.6 37	+ 44 50 +	1.00 294	+ 7.82 +	.09	.91	+ .03	7.94
32 Vulpec.	.2	20.8 49	+ 27 35 +	.52 507	+ 7.82 +	.05	.87	+ .01	7.88
ν Cygni	+.1	20.9 52	+ 40 41 +	.86 300	+ 7.85 +	.08	.93	+ 01	7.94
ζ Cygni	.1	21.1 7	+ 29 43 +	.57 303	+ 7.92 +	.05	7.97	− 01	7.96
τ Cygni	.2	21.2 10	+ 37 31 +	.77 305	+ 7.81 +	.07	7.88	− 01	7.87
β Aquarii	.4	21.4 25	− 6 7 −	.11 307	+ 7.92 −	.01	7.91	− 03	7.88
~~13 H Cephei~~	× .2	~~21.2 35~~	~~+ 56 55 +~~	~~1.53~~	~~+ 8.46~~		8.00	01	7.99
ε Pegasi	× .6	21.6 38	+ 9 18 +	.16 309	+ 7.97 +	.01	7.98	− 04	7.94
16 Pegasi	.8	21.8 47	+ 25 20 +	.47 518	+ 7.94 +	.04	7.98	− 06	7.93
α Aquarii	× 1.0	21.9 59	− 0 56 −	.02 311	+ 8.01 −	.00	8.01	− 07	7.94
ι Pegasi	× 1.0	22.0 1	+ 24 44 +	.46 312	+ 8.08 +	.04	8.12	− 07	8.05
π₁ Pegasi	× 1.1	22.1 4	+ 32 34 +	.64	+ 8.03 +	.06	8.09	− 08	8.01
π₂ Pegasi	× 1.1	22.1 4	+ 32 34 +	.64 316	+ 7.96 +	.06	8.11 8.02	− 08	7.94 8.03
γ Aquarii	× 1.2	22.2 15	− 2 1 −	.04 317	+ 8.07 −	.00	8.07	− 09	7.98
3 Lacertae	1.3	22.3 18	+ 51 36 +	1.26 524	+ 7.84 +	.12	7.96	− 09	7.87
η Aquarii	× 1.5	22.5 29	− 0 46 −	.01 329	+ 8.10 −	.00	8.10	− 11	7.99
ζ Pegasi	1.6	22.6 35	+ 10 11 +	.18 324	+ 8.10 +	.02	8.021 8.12	− .11	8.01

21.88 21.02 −1′

+7.956 +7.957

19.8 +53.38 +3.94 +.01 +.01 + 3.95 + 3.95
21.3 −7.03 +8.67 −.01 −.00 + 8.66 + 8.67

λ Urs. Min.		19.8 49	+ 88 56 +	53.12 38	+ 3.94	−		284
η Cephei	×	20.7 43	+ 61 21 +	1.83	+ 7.78	+ .17	+ 7.95	299
α Cephei		21.2 16	+ 62 3 +	1.89 8	+ 7.82	+ .18	8.00	306
1 H Draco	S.C.	21.3 18	+ 81 54 −	7.03	+ 8.67	−		187
ζ Cephei		22.1 7	+ 57 35	1.58	+ 7.96	+ .15	8.11	316

19.3 +05 + 7.90 19.2 +1.33 +7.65
19.7 +33 + 7.83 20.3 +.83 +7.77
19.7 +15 + 7.88 20.6 +1.00 +7.82
19.8 +01 + 7.95 20.7 +1.83 +7.78
19.8 +11 + 7.91 20.9 +.86 +7.85
20.1 −02 + 7.96 21.2 +1.88 +7.82
20.4 +19 + 7.88 22.1 +1.58 +7.96
20.5 +25 + 7.87 22.3 +1.26 +7.84
20.6 +28 + 7.88 20.9 +1.32 +7.81
21.4 −11 + 7.92
21.6 +16 + 7.97
22.0 −02 + 8.01
22.2 −04 + 8.07
22.5 −01 + 8.10
22.6 +18 + 8.10
20.8 +10 + 7.95

n5 = +12

0 = +53.28 −4.00 n = +.08 +08
0 = −7.13 +.71 n = +.10 +10

0 = +52.06 ~~−3.96~~ 3.86 n = +.07
0 = −8.35 +.86 n = +.10

1870phae.proj.v.4220

sin z =	+60+80		+40+60		+20+40		+0 +20		+0 −20		−20−40		−40−60		−60−80	
	+.69	+2.4	+.52	+1.2	+.25	+1.2	+.02	+2.5	−.05	+3.4	−.34	+1.3	−.46	+2.1		
	+.60	0.7	+.47	2.8	+.30	2.9			−.11	2.1	−.39	2.1				
	+.77	1.4	+.55	1.4	+.22	2.1										
			+.59	1.0	+.33	1.9										
			+.47	2.9	+.32	1.8										
					+.24	1.5										
	+.69	+1.5	+.52	+1.9	+.28	+1.9	+.02	+2.5	−.08	+2.8	−.36	+1.7	−.46	+2.1		
		+1.8		+1.4		+.7		+.0		−.2		−.9		−1.2		
		3.3		3.3		2.6		2.5		2.6		0.8		0.9		
	(20)	.99 3		165 5		156 6		25 1		52 2		16 2		9 1		522
		−.7		−.7		+.0		+.1		+.0		+1.8		+1.7		

Ra h	m	sin z	$R_{eq.} - R_{fl}$	"	ρ'−ρ "	$R_{eq} - R_{fl} + ρ'-ρ$ "		
20	27	+.52	+1	1.0	+.2	1.2	+13	25
20	32	+.47		2.7	+.1	2.8	+11	39
20	33	+.45		4.2	−.2	(4.0)	+11	(51)
20	49	+.25		1.1	+.1	1.2	+6	18
~~20~~	~~52~~	~~+.03~~						
21	27							
21	38	+.55		1.8	−.4	1.4	+13	27
21	42	−.11		1.1	+1.0	2.1	−2	19
21	59	+.69		2.5	−.1	2.4	+17	41
22	1	+.30		3.2	−.3	2.9	+11	36
22	3	+.60		0.5	+.2	0.7	+15	28 2
22	10	+.77		0.9	+.5	1.4	+21	35
22	37	+.22		2.3	−.2	2.1	+4	25
22	38	+.02		3.3	−.8	2.5	+1	26
22	40	+.33		2.0	−.1	1.9	+8	27
22	44	+.32		1.5	+.3	1.8	+8	26
23	53	+.59		0.8	+.2	1.0	+15	25
0	2	+.24		1.6	−.1	1.5	+2	21
0	4	−.05		3.5	−.1	3.4	−2	32
0	7	+.47		2.5	+.4	2.9	+12	41
							(16)	3.03

+1' 2.61"
2.71

R.A. h	m	sin z	$R_{eq.} - R_{fl}$	"	ρ'−ρ "	$R_{eq} - R_{fl} + ρ'-ρ$ "		
21	16	−.34	+1	0.3	+1.0	1.3	−.7	.06
21	18	−.83		2.0	+1.1	3.1	−22	09 ✓
21	27	−.46		1.0	+1.1	2.1	−1.0	1.8
22	7							
22	45	−.39		1.1	+1.0	2.1	−.8	13
8	59	−.94		6.1	−.8	5.3	−24	29 ✓
9	23	−.92		3.3	−.1	3.2	−23	09 ✓
							(3)	1.00

19	14	−.19	+1	1.5	+.7	2.2	−4	(18)
19	19	+.64		1.4	−.5	0.9	+15	(24)
19	41	+.41		2.9	−.6	2.3	+10	33
19	45	+.56		2.7	−.0	2.7	+14	41
19	46	+.67		2.0	+.7	2.7	+16	43
19	49	+.59		2.8	−.4	2.4	+14	38
20	5	+.69		1.4	−.3	1.1	+17	28
20	11							
20	17	+.04		3.5	−.2	3.3	+1	34
20	27	+.52		2.9	+.2	3.1 ~~2.7~~	+13	44
20	32	+.47		3.5	+.1	3.6	+11	47
20	33	+.45		3.2	−.2	3.0	+11	41
20	37	−.04		4.7	+.0	4.7	−1	46
20	49	+.25		3.9	+.1	4.0	+6	46
20	52	+.03		4.3	+.0	4.3	+1	44
21	7	+.22		2.6	−.6	2.0	+5	25
21	10	+.09		2.7	+.6	3.3	+2	35
21	25	+.75	0	58.8	+.2	(59.0)	+20	(10)
21	35							
21	38							
21	47	+.29	1	3.3	+.4	3.7	+8	45
21	59							
22	1							
22	4							
22	4							
22	15							
22	18	−.16		3.7	+.2	3.9	−4	35
22	29						(16)	3.91
22	35							

+1' 3.68"
3.85

19	49	−.73	+1	8.2	+.6	7.6	−.18	58
20	43	−.32		3.9	+.2	3.7	−.6	3.1
21	16	−.34		1.4	+1.0	2.4	−.7	1.7
21	18	−.83	+0	58.3	+1.1	(59.4)	−22	(5.2)
22	7						(3)	3.53

+60+80		+40+60		+20+40		+0 +20		+0 −20		−20−40		−40−60		−60−80	
+.64	+0.9	+.41	+2.3	+.25	+4.0	+.04	+3.3	−.19	+2.2	−.32	+3.7			−.73	+7.6
+.67	2.7	+.56	2.7	+.22	2.0	+.03	4.3	−.04	4.7	−.34	2.4				
+.64	1.1	+.59	2.4	+.29	3.7	+.09	3.3	−.16	3.9						
		+.52	3.1												
		+.47	3.6												
		+.45	3.0												
+.67	+1.6	+.50	+2.8	+.25	+3.2	+.05	+3.6	−.13	+3.6	−.33	+3.0			−.73	+7.6
	+1.8		+1.3		+.6		+.1		−.3		−.8				— 2.0
	3.4		4.1		3.8		3.7		3.3		2.2				5.6
(21)	102 3		246 6		114 3		111 3		99 3		44 2				56 1
	+.3		−.4		−.1		+.0		+.4		+1.5				−1.9

1871 Oct 27 h = +012 h' = +016 h' = +033 n = +10

Star	AM obs Ra		δ	tang δ	π Ra −(P'−P)				
	h m		o −1'						
γ Lacertae	+2 x 22 4 26	+49	38 +	1.18 319	+ 8.64 ~~9.40~~ +	.12	+ 8.76 +	01	+ 8.77
η Aquarii	x 22 5 29	− 0	46 −	.01 320	+ 8.83 −	.00	.83	00	.83
ζ Pegasi	x 22 6 35	+ 10	11 +	.18 324	+ 8.88 +	.02	.90		.90
λ Pegasi	x 22 7 41	+ 22	54 +	.42 323	+ 8.75 +	.04	.79	00	.79
~~μ Pegasi~~	~~x 22 44~~	~~+ 23~~	57 +	~~.44~~					
α Pegasi	x 22 59 −4 23.0	+ 14	32 +	.26 229	+ 8.80 +	.03	.83 −	01	.82
		22.64 −1'					+ 8.822		+ 8.822

22.8 +2.20 +8.48 −00 −01 +8.48 +8.47
23.0 +3.66 +8.69 −00 −01 +8.69 +8.68

1871 Oct. 27

Star	AM obs Ra		δ	tang δ	π Ra −(P'−P)		
	h m		o −2'				
c Cephei	x 22 8 45	+ 65	33 +	2.20	+ 8.48 —	182	325
π Cephei	x 23.0 3	+ 74	43 +	3.66	+ 8.69 —	73	529
			−2'				

22.5 −01 +8.83   22.4 +1.18 +8.64
22.6 +18 +8.88   u5 = +.19
22.7 +42 +8.75
23.0 +26 +8.80
22.8 +21 +8.82

0 = +1.99 −34 n = +.17 +17
+3.45 −13 +.04 +03
+10

0 = +1.02 −17 n = +.17
+2.48 +04 +.02 +08

1871 Oct. 29 h = +002 +25 h' = +007 h' = +025 4 n = +13

A M obs.

Star		Ra		δ	tang δ	π Ra					
α Aquilae	.9	19 8 45	+ 8	32 +	.15 280	+ 9.29 +	.02		+ 9.31 +	.02	+ 9.33
π Capric	.4	~~20~~ 21.3 19						9.36 9.354	.33	.01	.34
ε Delphini	1.3	20 4 27	+ 10	53 +	.19 290	+ 9.37 +	.02		.39	.03	.42
β Delphini	1.2	20 5 32	+ 14	10 +	.25 292	+ 9.38 +	.03		.41	.03	.44
α Delphini	1.1	20 6 33	+ 15	28 +	.28 293	+ 9.36 +	.04		.40	.03	.43
α Cygni	1.1	20 6 37	+ 44	50 +	100 .99 294	+ 9.17 +	.13		.30	.03	.33
ε Cygni	1.0	20 7 41	+ 33	30 +	.66 298	+ 9.24 +	.09		.33	.02	.35
32 Vulpec	.9	20 8 49	+ 27	35 +	.52 507	+ 9.28 +	.07		.35	.02	.37
ν Cygni	.8	20 9 52	+ 40	41 +	.86 300	+ 9.22 +	.11		.33	.02	.35
61 Cygni pr.	.7	21 0 1	+ 38	8 +	.78 302	+ 9.30 +	.10		.40	.02	.42
ζ Cygni	.6	21 1 7	+ 29	43 +	.57 303	+ 9.27 +	.07		.34	.01	.35
τ Cygni	+.5	21 2 10	+ 37	31 +	.77 305	+ 9.26 +	.10		.36 +	.01	.37
α Aquarii	.3	~~21 22 59~~	− 0	56 −	.02 314	9.42 −	.00		.42 −	.01	.41
ι Pegasi	.3	22 0 1	+ 24	44 +	.46 312	+ 9.38 +	.06		.44	.01	.43
θ Pegasi	.4	22 1 4	+ 5	35 +	.10 314	+ 9.43 +	.01		.44	.01	.43
θ Aquarii	.5	22 2 10	− 8	24 −	.15 522	+ 9.35 −	.02		.37	.01	.36
η Aquarii	.4 .8	22 5 28	− 0	46 −	.01 320	+ 9.42	.00	.37	42	.01 02	.36 .40
η Pegasi	.9	22 6 37	+ 29	34 +	.57 322	+ 9.30 +	.07		.37	.02	.35
λ Pegasi	1.0	22 7 40	+ 22	54 +	.42 323	+ 9.32 +	.05		.37	.02	.35
μ Pegasi	1.0	22 7 44	+ 23	57 +	.44 324	+ 9.34 +	.06		.40	.02	.38
ο Androm	1.2	22 9 56	+ 41	39 +	.89 327	+ 9.25 +	.12		.37	.03	.34
α Pegasi	1.2	22 9 58	+ 14	32 +	.26 329	+ 9.36 +	.03		.39	.03	.36
γ Piscium	1.5	23 2 10	+ 2	36 +	.05 330	+ 9.46 +	.01		.47	.04	.43
υ Pegasi	1.6	23 3 19	+ 22	43 +	.42 532	+ 9.37 +	.05		.42	.04	.38
λ Androm	1.8	23 5 31	+ 45	47 +	1.03 331	+ 9.21 +08	.13	9.404	.42 −	.04	.38
	22.64	21.48						+ 9.382			+ 9.379

19.8 +2.75 +9.07 +.01 +.01 +9.08 +9.08
23.4 −2.77 +9.67 −.01 −.01 +9.66 +9.66
23.6 +4.30 +8.64 −.01 −.01 +8.63 +8.63

				δ	tang δ				
				−1'					
ε Draco	✓	19 8 49	+ 69	57 +	2.75	+ 9.07 —			282
a Cephei	✓	21 3 16	+ 62	3 +	1.89	+ 9.08	+.25	+ 9.33	306
ν Cephei	✓	22 10 6	+ 57	35 +	1.58	+ 9.16	+.21	9.37	316
λ Draco	8 11	23 4 23	+ 70	03 +	2.75	+ 9.67 —			162
β Cephei	✓	23 6 34	+ 76	56 +	4.31	+ 8.64 —			334
				−1'					

19.8 +15 +9.29   20.6 +1.00 +9.17
20.4 +19 +9.37   20.9 +.86 +9.22
20.5 +25 +9.38   21.3 +1.89 +9.08
20.6 +28 +9.36   22.1 +1.58 +9.16
22.0 −02 +9.42   22.9 +.89 +9.25
22.1 +10 +9.43   23.5 +1.01 +9.229
22.2 −15 +9.35   21.9 +1.20 +9.189 u5 = +.18
22.5 −01 +9.42
22.9 +26 +9.36
23.2 +04 +9.46
21.6 +11 +9.38

0 = +2.64 −30 n = +.11 +09   0 = −2.88 +28 n = +10 +11
+4.19 −75 +.18 +18
+14

0 = +1.55 −11 n = +.07   0 = −3.97 +47 n = +12
+3.10 −56 +.18 +13

1871 Oct 30 h = +004 h' = +001 h' = +019 n = +17

aquilae W+R obs

Star		Ra		δ	tang δ	π Ra				
β ~~Aquarii~~	+1 .4	19 8 49	+ 6	6 +	.11 283	+ 9.31 +	.02	+ 9.33 +	01	+ 9.34
θ Aquilae	✓	20 1 5	− 1	11 −	.02 287	+ 9.33 −	.00	33 +	01	.34
α Capric		~~20.2~~ 11								
ζ Cygni	+ 2	20 3 17	+ 39	51 +	.83 289	+ 9.11 +	.14	25	00	.25
π Capric.		~~20.3~~ 19								
β Delph.	.0	20 5 32	+ 14	10 +	.25 292	+ 9.19 +	.04	.23		.23
α Delph.	.1	20 6 33	+ 15	28 +	.28 293	+ 9.18 +	.05	.23		.23
α Cygni	.1	20 6 37	+ 44	50 +	100 .99 294	+ 9.03 +	.17	.20		.20
ε Cygni	.2	20 7 41	+ 33	30 +	.66 298	+ 9.12 +	.11	.23	00	.23
32 Vulpec	.3 −2	20 8 49 20.7	+ 27	35 +	.52 507	+ 9.08 +	.09	.17 −	01	.16
								~~.13 −~~	~~01~~	~~.12~~
		20.46						+ 9.233		+ 9.2~~33~~ 48

19.8 +53.38 −0.12 +.00 +.00 −0.12 −0.12
20.2 +4.44 +8.53 +.00 +.00 +8.53 +8.53

1871 Oct. 30 W+R obs

				δ	tang δ				
λ Urs. Min	✓	19 8 49	+ 88	56 +	53.72 38	− 0.12 —			284
κ Cephei	✓	20 2 13	+ 77	20 +	4.44	+ 8.53 —			502
η Cephei	✓	20 7 42	+ 61	21 +	1.83	+ 8.82	+.31	+ 9.13	299

19.8 +11 +9.31   20.3 +83 +9.11
20.1 −02 +9.33   20.6 +1.00 +9.03
20.5 +25 +9.19   20.7 +1.83 +8.82
20.6 +28 +9.18   20.5 +1.22 +8.958 u5 = +.26
~~20.2~~ +15 +9.25

0 = +53.23 −9.37 n = +.18 +18
+4.29 −.72 +.17 +16
.17

0 = +52.16 −9.10 n = +.18
+3.22 −.45 +.14
.16

sin z = +60+80 | +40+60 | +20+40 | +0 +20 | +0 −20 | −20−40 | −40−60 | −60−80

R.A. h m	sin z	R_{eq} '	R_{fl} "	$P'-P$ "	R_{eq} R_{fl} + $P'-P$ "		
22 26							
22 29							
22 35							
22 41							
22 44							
22 59							

R.A. h m	sin z	R_{eq} '	R_{fl} "	$P'-P$ "
22 45				
23 3				

19 45	+.56	+0	59.8	−.0	59.8	+1.3	1.1
20 19							
20 27	+.52		59.8	−.2	59.6	+1.2	08
20 32	+.47		58.8	+.2	59.0	+1.1	01
20 33	+.45	1	0.2	+.1	0.3	+1.0	13
20 37	−.04		3.2	−.2	3.0	−.1	29
20 41	+.15		1.9	−.3	1.6	+.2	18
20 49	+.25		4.0	+.1	(4.1)	+.6	(47)
20 52	+.03		3.1	+.0	3.1	+.1	32
21 1	+.07		1.5	+.1	1.6	+.2	18
21 7	+.22		1.7	−.6	1.1	+.5	16
21 10	+.09		1.0	+.6	1.6	+.2	18
21 59	+.69		0.3	−.1	0.2	+1.8	2.0
22 1	+.30		1.4	−.3	1.1	+.7	18
22 4	+.60	0	58.1	+.2	58.3	+2.0	59.8
22 10	+.77		58.5	+.5	59.0	+2.1	11
22 28	+.68		59.7	−.1	59.6	+1.7	13
22 37	+.22		59.8	−.2	59.6 ~~0.0~~	+.5	01
22 40	+.33	1	0.7	−.1	0.6	+.9	15
22 44	+.32		0.6	+.3	0.9	+.8	17
22 56	+.01		2.5	+.4	2.9	+.0	29
22 58	+.47		0.4	−.6	59.8	+1.2	10
23 10	+.64	0	58.2	−.3	57.9	+1.6	59.5
23 19	+.34	1	0.9	+.2	1.1	+.9	2.0
23 31	−.06		1.3	+.7	2.0	−.1	19
						(23)	1.43

+1' 1.57"
1.53

+60+80	+40+60	+20+40	+0 +20	+0 −20	−20−40	−40−60	−60−80
+.69 +0.2	+.56 +59.8	+.22 +1.1	+.15 +1.6	−.04 +3.0	−.34 +2.0	−.46 +3.5	
+.60 58.3	+.52 59.6	+.30 1.1	+.03 3.1	−.06 2.0	−.26 3.1	−.57 3.4	
+.77 59.0	+.47 59.0	+.22 59.6	+.07 1.6				
+.68 59.6	+.45 0.3	+.33 0.6	+.09 1.6				
+.64 57.9	+.47 59.8	+.32 0.9	+.01 2.9				
		+.34 1.1					
+.68 +59.0	+.49 +59.7	+.29 +0.7	+.07 +2.2	−.05 +2.5	−.30 +2.6	−.52 +3.4	
+1.9	+1.3	+.7	+.2	−.1	−.8	−1.4	
0.9 5	1.0 5	1.4 6	2.4 5	2.4 2	1.8 2	2.0 2	
(27) 45	50	84	120	48	36	40	423
+.4	+.6	+.2	−.8	−.8	−.2	−.4	

19 49	−.46	+1	2.7	+.8	3.5	−1.0	2.5
21 16	−.34		1.0	+1.0	2.0	−.8	1.2
22 6	−.26		2.7	+.4	3.1	−.5	2.6
23 23	−.92		5.3	−.8	4.5	−2.6	1.9 ✓
23 34	−.57		3.0	+.4	3.4	−1.4	2.0
						(4)	2.08

19 49	+.59	+1	0.6	−.4	0.2	+1.5	1.7
20 5	+.69		0.7	−.3	0.4	+1.8	2.2
20 11							
20 17	+.04		3.0	−.2	2.8	+.1	2.9
20 19							
20 32	+.47		1.9	+.1	2.0	+1.2	3.2
20 33	+.45		1.3	−.2	1.1	+1.1	2.2
20 37	−.04		+2.6	+.0	2.6	−.1	2.5
20 41	+.15		2.6	−.3	2.3	+.3	2.6
20 49	+.25					+(7)	2.47

+1' 2.43"
2.40

19 49	−.73	+1					
20 13	−.57		2.9	+.5	3.4	−1.4	2.0
20 42	−.32		2.8	+.2	3.0	−.7	2.3
						(2)	2.15

+60+80	+40+60	+20+40	+0 +20	+0 −20	−20−40	−40−60	−60−80
+.69 +0.4	+.59 +0.2		+.04 +2.8	−.04 +2.6	−.32 +3.0	−.57 +3.4	
	+.47 2.0		+.15 2.3				
	+.45 1.1						
+.69 +0.4	+.50 +1.1		+.10 +2.6	−.04 +2.6	−.32 +3.0	−.57 +3.4	
+1.9	+1.4		+.2	−.1	−.8	−1.6	
2.3 1	2.5 3		2.8 2	2.5 1	2.2 1	1.8 1	
(9) 23	75		56	25	22	18	219
+.1	−.1		−.4	−.1	+.2	+.6	

1871 Oct 31 h = +.002 h' = +.007 h' = +.024 n = +.15

Star		W.A.R. obs. Ra h m	δ °	′	tang δ	T–Ra –(P'–P)				
π Cygni	t ✓ 4	21.7 42	+ 48	44 +	1.14	517 + 9.01 ✓ +	.17	+ 9.18 +	01	+ 9.19
16 Pegasi	✓ 3	21.8 47	+ 25	20 +	.47	518 + 9.17 ✓ +	.07	.24 +	01	.25
α Aquarii	✓ 1	21 220 59	− 0	56 −	.02	311 + 9.21 ✓ −	.00	.21 +	00	.21
ι Pegasi	+ ✓ 1	22.0 1	+ 24	44 +	.46	312 + 9.09 ✓ +	.07	.16	00	.16
θ Pegasi	✓ 0	22.1 4	+ 5	35 +	.10	314 + 9.19 ✓ +	.01	.20	00	.20
θ Aquarii	✓ 1	22.2 10	− 8	24 −	.15	522 + 9.23 ✓ −	.02	.21	00	.21
γ Aquarii	✓ 1	22.2 15	− 2	1 −	.03	317 + 9.20 ✓ −	.00	.20	00	.20
3 Lacertae	✓ 2	22.3 18	+ 51	36 +	1.26	524 + 8.95 ✓ +	.19	.14	00	.14
ζ Pegasi	✓ 5	22.6 35	+ 10	11 +	.18	321 + 9.20 ✓ +	.02	.22 −	01	.21
η Pegasi	✓ 5 0 22.1	22.6 37	+ 29	34 +	.57	322 + 9.07 ✓ +	.09	.16 −	01	.15
		22.15						.13 −	00	.13

204 −4.13 +9.61 +.01 +.01 +9.62 +9.62 +9.186 +9.186
21.4 +2.75 +8.65 +.01 +.00 +8.66 +8.65
21.7 +2.86 +8.81 +.00 +.00 +8.81 +8.81

1871 Oct. 31

Star		W.A.R. obs. Ra h m	δ °	′	tang δ	T–Ra –(P'–P)				
β Cephei	✓	21.4 27	+ 70	1 +	2.75 ✓	+ 8.65 ✓	−			308
11 Cephei	✓	21.7 40	+ 70	44 +	2.86 ✓	+ 8.81 ✓	−			516
ν Cephei	✓	22.1 6	+ 57	35 +	1.58 7 ✓	+ 8.90 ✓	✓ + 23	+ 9.13		316
[illegible] Draco S.C.	✓	22 4 24	+ ~~10~~ 3 76	37 − 23	4.13 ✓	+ 9.61 ✓	−			150

22.0 −.02 +9.21 21.7 +1.14 +9.01
22.1 +10 +9.19 22.1 +1.57 +8.90
22.2 −15 +9.23 22.3 +1.26 +8.95
22.2 −03 +9.20 22.0 +1.32 +8.95 m₅ = +.20
22.6 +18 +9.20
22.2 +.02 +9.21

0 = +2.73 −.55 n = +.20 +.20 0 = −4.15 +.41 n = +.10 +11
+2.84 −.40 +.14 +14
+17

0 = +1.43 −.30 n = +.21 0 = −5.45 +.67 n = +.12
+1.54 −.14 +.09 +.15

1871 Nov. 2 h = +.004 (+16) h' = +.010 h' = +.018³ n = +.17
1980

Star		W.A.R. obs. Ra	δ	′	tang δ					
δ Aquilae	+ 11	19.3 19	+ 2	52 +	.05	274 + 9.48 ✓ +	.01 − 9.470	+ 9.49 +	.01	+ 9.50
β Cygni	✓ 10	19.4 26	+ 27	42 +	.52	275 + 9.39 ✓ +	.09	.48 +	.01	.49
δ Sagitt.	✓ 7	19.7 42	+ 18	14 +	.33	279 + 9.43 ✓ +	.06	.49 +	.01	.50
α Aquilae	✓ 6	19.8 45	+ 8	32 +	.15	280 + 9.45 ✓ +	.03	.48 +	01	.49
η Aquilae	✓ 6	19.8 46	+ 0	41 +	.01	281 + 9.51 ✓ +	.00	.51 +	01	.52
θ Aquilae	t 8 0	20.1 05	− 1	11 −	.02	287 + 9.52 ✓ −	.00	.52 +	00	.52
ε Delph.	✓ 0	20.4 27	+ 10	53 +	.19	290 + 9.42 ✓ +	.03	.45		.45
β Delph.	✓ 1	20.5 32	+ 14	10 +	.25	292 + 9.41 ✓ +	.04	.45		.45
α Delph.	✓ 2	20.6 33	+ 15	28 +	.28	293 + 9.43 ✓ +	.05	.48		.48
α Cygni	x 2	20.6 37	+ 44	50 +	1.00	294 + 9.34 ✓ +	.17	.51		.51
ε Cygni	x 3	20.7 41	+ 33	30 +	.66	298 + 9.34 ✓ +	.11	.45 −	00	.45
32 Vulpec.	✓ 4	20.8 49	+ 27	35 +	.52	507 + 9.38 ✓ +	.09	.47 −	00	.47 .44
ν₂ Cygni	x 5 3 20.7	20.7 53	+ 40	41 +	.86	300 + 9.35 ✓ +	.15	.44 .50 −	00 01	.49
61 Cygni	x 6	21.0 1	+ 38	8 +	.78	302 + 9.33 ✓ +	.13	.46 −	01	.45
τ Cygni	x 8	21.2 10	+ 37	31 +	.77	305 + 9.35 ✓ +	.13	.48 −	01	.47
α ~~Cephei~~	x 9	21.3 ~~16~~	~~+ 62~~	~~3 +~~	~~1.89~~	306 + 9.19 +	.32	.51 −	01	.50
ζ Pegasi	22	22.6 35	+ 10	11 +	.18	321 + 9.53 ✓ +	.03	.56 −	03	.53
κ Cygni	+ 1.2 21.04	19.2 14	+ 53	8 +	1.33	272 + 9.13 ✓ +	.23 9.486	.36 +	.02	.38
		20.44						+ 9.478		+ 9.478

19.2 +2.41 +9.00 +.01 +.01 +9.01 +9.01
19.9 +53.38 +0.51 +.01 +.01 +0.52 +0.52
21.3 −7.03 +10.58 −.01 −.01 +10.57 +10.57
21.4 +2.75 +9.07 −.01 −.01 +9.06 +9.06

δ Draco.	✓	19.2 13	+ 67	26 +	2.40 ✓	+ 9.00 ✓	−		271
λ Urs. Min.	✓	19.9 53	+ 88	56 +	53.12 38 ✓	+ 0.51 ✓	−		284
η Cephei	x	20.7 43	+ 61	21 +	1.83 ✓	+ 9.13 ✓	+ .31	+ 9.44	299
~~α Cephei~~	✓	~~21.3 16~~	+ ~~62~~	~~3 +~~	~~1.88~~	+ ~~9.19~~	~~.32~~	~~9.51~~	
1H Draco. L.C.	✓ 9	21.3 19	+ 81	54 −	7.03 ✓	+ 10.58 ✓			137
β Cephei	✓	21.4 27	+ 70	1 +	2.75 ✓	+ 9.07 ✓			308

19.3 +05 +9.48 19.2 +1.33 +9.13
19.8 +15 +9.45 20.6 +1.00 +9.34
19.8 +01 +9.51 20.7 +1.83 +9.13
20.1 −02 +9.52 20.9 +86 +9.35
20.4 +19 +9.42 21.0 +78 +9.33
20.5 +25 +9.41 21.2 +77 +9.35
20.6 +28 +9.43 21.3 +1.88 +9.19
22.6 +18 +9.53 20.7 +1.22 +9.26 m₅ = +.20
20.4 +14 +9.47

0 = +2.27 −.46 n = +.20 +20 0 = −7.17 +1.10 n = +.15 +.15
+53.24 −8.95 +.17 +17
+2.61 −.41 +.16 +15
+.17

0 = +1.19 −.25 n = +.21 0 = −8.25 + ~~1.21~~ 1.31 n = +.16
+52.16 −8.74 +.17
+1.53 −.20 +.13 +.17

1871 Nov. 2 h = +.004 h' = +.010 h' = +.022 c = −.08 n = +.11
W.A.R. obs.

12 Ceti	✓ 2 2	0.4 23	− 4	39 −	.08	400 339 + 9.68 ✓ −	.01	− .08	+ 9.59 35	00
ε Androm.	x 1	0.5 32	+ 28	38 +	.55	414 10 + 9.48 ✓ +	.06	− .09	.45	
α Cass.	x 0	0.6 33	+ 55	51 +	1.47	178 + 9.34 ✓ +	.16	− .14	.36	
ο Cass.	x 0	0.6 38	+ 47	36 +	1.10	148 341 + 9.44 ✓ +	.12	− .12	.44	
ζ Androm.	x 1	0.7 42	+ 23	35 +	.44	409 11 + 9.58 ✓ +	.05	− .09	.54	
	1 0.7	0.56	−1′						.37	00

0.5 −2.82 +9.54 .00 .00 +9.54 +9.54 +9.443 +9.443

−1′

κ Cass.	x	0.4 26	+ 62	14 +	1.90	214 + 9.31 ✓ ✓	+ .21 − 17	+ 9.35	5
κ Draco S.C.	x	12.5 28	+ 70	29 +	2.82 ✓	+ 9.54 ✓ −			171
~~α Cass.~~	✓	~~0 33~~	~~+ 55~~	~~51 +~~	~~1.47~~	~~185 9.34~~			
η Cass.	x	0.7 41	+ 57	9 7 +	1.55	185 + 9.42 ✓	− .09 + .17 − 15	9.37	12
~~α Urs. Min.~~	x	~~1 13~~	~~+ 88~~	~~39 +~~	~~42.49~~				
				−1′	~~41.41~~				

0.4 −08 +9.68 0.4 +1.90 +9.31
0.5 +55 +9.48 0.6 +1.47 +9.34
0.7 +44 +9.58 0.6 +1.10 +9.44
0.5 +30 +9.58 0.7 +1.55 +9.~~44~~35 c₅ = +.11
0.6 +1.50 +9.386

0 = −3.12 −.04 n = ±.01

0 = −4.32 +.18 n = +.04

08
16
16
50

R.A. h	m	sin z	R_og-R_fl '	"	P'-P "	R_og-R_fl + P'-P "	Rfl.	
21	42	-.11	+0	59.9	+1.0	0.9	-.3	06
21	47	+.29	1	1.7	+.4	2.1	+.8	29
21	59	+.69		1.2	-.1	1.1	+1.9	30
22	1	+.30		2.6	-.3	2.3	+.8	31
22	4	+.60		0.6	+.2	0.8	+1.6	24
22	10	+.77		0.7	+.5	1.2	+2.2	34
22	15	+.70		2.5	-.4	2.1	+1.9	40
22	18	-.16		1.9	+.2	2.1	-.4	17
22	35	+.53		2.4	-.5	1.9	+1.4	33
22	37	+.22		1.0	-.2	0.8	+.6	14
							(10)	258
								~~258~~

R.A. h	m	sin z	R_og-R_fl '	"	P'-P "	R_og-R_fl + P'-P "		
21	27	-.46	+1	2.8	+1.1	3.9	-1.2	27
21	40	-.47		1.4	+.8	2.2	-1.3	09
22	6	-.26		2.3	+.4	2.7	-.6	21
22	24	-.88		3.6	-.6	3.0	-2.3	07 ✓
							(3)	~~1.90~~

11

sin z = +.60+.80	+.40+.60	+.20+.40	+0+.20	+0-.20	-.20-.40	-.40-.60	-.60-.80
							16.0
+.69 +1.1	+.53 +1.9	+.29 +2.1		-.11 +0.9	-.26 +2.7	-.46 +3.9	
+.60 +0.8		+.30 2.3		-.16 2.1		-.47 2.2	
+.77 1.2		+.22 0.8					
+.70 2.1							
+.69 +1.4 3	+.53 +1.9	+.27 +1.7		-.14 +1.5	-.26 +2.7	-.46 +3.0	
+1.9	+1.5	+ .7		-.3	-.6	-1.2	
3.2 4	3.4 1	2.4		1.2 2	2.1 1	1.8 2	
(13) 12.8	34	7.2 3		24	21	36	31.5
-.8	-1.0	+.0		+1.2	+.3	+.6	

+1' 2.42"
2.42

271
284
299
137
305

R.A. h	m	sin z	R_og-R_fl '	"	P'-P "	R_og-R_fl + P'-P "		
19	19	+.64	+0	59.7	-.5	(59.2)	+1.7	(0.9)
19	26	+.25	+1	2.3	-.4	1.9	+.7	26
19	42	+.41		2.3	-.6	1.7	+1.1	28
19	45	+.56		1.8	-.0	1.8	+1.5	33
19	46	+.67		0.3	+.7	1.0	+1.8	28
20	5	+.69		1.5	-.3	1.2	+1.9	31
20	27	+.52		1.0	+.2	1.2	+1.4	26
20	32	+.47		0.7	+.1	0.8	+1.3	21
20	33	+.45		0.2	-.2	0.0	+1.2	12
20	37	-.04		4.0	+0	4.0	-.1	39
20	41	+.15		3.5	-.3	3.2	+.3	35
20	49	+.25		1.9	+.1	2.0	+.7	27
20	53	+.03		2.7	+.0	2.7	+.1	28
21	1	+.07		1.5	+.1	1.6	+.2	18
21	10	+.09		2.3	+.6	2.9	+.2	31
21	16	-.34						
22	35	+.53		1.1	-.5	0.6	+1.4	20
19	14	-.19	+1	1.3	+.7	2.0	-.4	16
							(16)	263

R.A. h	m	sin z	R_og-R_fl '	"	P'-P "	R_og-R_fl + P'-P "		' "
* 19	13	-.42	+1	2.5	+.8	3.3	-1.1	+1 22
19	53	-.73		2.7	+.6	3.3	-1.9	14
20	43	-.32		4.0	+.2	4.2	-.7	35
~~21~~	~~16~~							
21	19	-.83						
21	27	-.46		3.4	+1.1	4.5	-1.2	3.3
							(4)	2.60

15

+.67 +1.0	+.41 +1.7	+.25 +1.9	+.15 +3.2	-.04 +4.0	-.32 +4.2	-.42 +3.3	-.73 +3.2
+.69 1.2	+.56 1.8	+25 2.0	+.03 2.7	-.19 2.0		-.46 4.5	
	+.52 1.2		+.07 1.6				
	+.47 0.8		+.09 2.9				
	+.45 0.0						
	+.53 0.6						
+.68 +1.1	+.49 +1.0	+.25 +2.0	+.08 +2.6	-.12 +3.0	-.32 +4.2	-.44 +3.9	-.73 +3.3
+1.9	+1.4	+.6	+.2	-.3	-.8	-1.2	-2.1
3.0 2	2.4 6	2.6 2	2.8 4	2.7 2	3.4 1	2.7 2	1.2 1
(20) 60	144	52	112	54	34	54	12
-.4	+.2	+.0	-.2	-.1	-.8	-.1	+1.4

+1' 2.61"
2.62

5 85
171
12

R.A. h	m	sin z	R_og-R_fl '	"	P'-P "	R_og-R_fl + P'-P "		
0	23	+.73	+1	0.2	+.1	0.3	+2.0	23
0	32	+.24		2.7	-.2	2.5	+.6	31
0	33	-.23		3.9	+.6	4.5	-.5	40
0	38	-.09		2.9	+.2	3.1	-.2	29
0	41	+.32		3.5	-.1	3.4	+.8	42
							(5)	330

R.A. h	m	sin z	R_og-R_fl '	"	P'-P "	R_og-R_fl + P'-P "		
0	26	-.34	+1	4.8	-.3	4.5	-.8	37
12	28	-.92		6.8	-.8	6.0	-2.3	37 ✓
~~0~~	~~33~~							
0	41	-.25		4.1	+.8	4.9	-.5	44
1	13							
							(2)	4.05

+.73 +0.3		+.24 +2.5		-.09 +3.1	-.23 +4.5		
		+.32 3.4			-.34 4.5		
					-.25 4.9		
+.73 +0.3		+.28 +3.0		-.09 +3.1	-.27 +4.6		
+2.1		+.8		-.2	-.7		
2.4 1		3.8 2		2.9 1	3.9 3		
(7) 24		76		29	117	246	
+1.1		-.3		+.6	-.4		

+1' 3.51"
3.51

1871 Nov. 2 A. M. obs. h = ~~+.003~~ +13 h' = +.009 h' = +.014 n = +.12

Star RA δ tang δ π RA −(ρ'−ρ)

2263 h m ° ′ 9570

η Androm × 5 0.0 2 +28 24 + .54 ✓1 + 9.51 + .06 +9.57 −01 +9.56 0.1 +26 +9.59 58 0.1 +1.01 +9.49
22 " × 6 0.1 4 +45 23 + 1.01 ✓337 + 9.49 ✓+ .12 .61 −01 .60 0.2 −17 +9. ~~63~~ 226 +87 +9.49
γ Pegasi × 6 0.1 7 +14 29 + .26 ✓3 + 9.59 ✓+ .03 .62 −01 .61 227 +42 +9.55 23.3 +.94 +9.49
ι Ceti ✓7 0.2 13 − 9 31 − .17 ✓4 + 9.63 ✓ −.05 .02 .56 −01 .55 23.7 +17 +9.5~~9~~7
η Pegasi × 9 22.6 37 + 29 34 + .57 ✓322 + 9.45 ✓+ .07 .52 + 01 .53
13 Lacertae × 9 22.6 39 +41 10 + .88 ✓7528 + 9.49 ✓+ .10 .59 +01 .60
λ Pegasi × 8 227 41 +22 54 + .42 ✓323 + 9.55 ✓ + .05 .60 +01 .61 0= +2.03 −23 n = +.11 +12
ι Cephei × 22.8 45 +65 33 + 2.20 ✓325 + 9.33 ✓ 9590
0.10 23.46 +9.581 +9.580
228+220 +9.33 +.01 +.00 +9.34 + 9.33 0= +1.26 −.16 n = +.13

1871 Nov 5 W A R obs. h = ~~+.006~~ +50 h' = +.001 h' = ~~+.064~~ .058 n = +.17

γ Cygni 2055 ✓1.2 20.3 17 +39 51 + .83 ✓289 + 9.34 ✓+ .14 9494 9.48 + 07 +9.55
ε Delph. ✓1.1 20.4 27 +10 53 + .19 ✓290 + 9.46 ✓+ .03 .49 + 06 .55
~~β Delph. 20 32 +14 10 + .25 ✓~~
ν Cygni ✓6 20.9 52 +40 41 + .86 ✓300 + 9.35 ✓+ .15 .50 + 03 .53
ε Pegasi ✓ 21.6 37 + 9 18 + .16 ✓309 + 9.54 ✓+ .03 .57 −00 .57
π₂ Cygni ✓2 21.7 42 +48 44 + 1.14 ✓517 + 9.42 ✓+ .19 .61 − 01 .60
α Aquarii 21.9 59 − 0 56 − .02 ✓311 + 9.61 ✓− .00 .61 − 03 .58
ι Pegasi ✓5 22.0 01 + 24 44 + .46 ✓312 + 9.44 .08 .52 − 03 .49
θ Pegasi ✓6 22.1 4 + 5 35 + .10 ✓314 + 9.56 ✓+ .02 .58 − 03 .55
γ Aquarii ✓7 22.2 10 − 8 24 − .15 ✓522 + 9.62 ✓− .03 9.573 .59 − .04 .55
21.96 22.1 21.53 .53 − .03 .50
199+53.38 −4.25 .00 .00 −4.25 −4.25 +9.548 +9.547
20.2+4.44 +8.80 +8.80 +8.80
21.0−2.43 +9.88 +9.88 +9.88
21.4+2.75 +8.99 +8.99 +8.99
1.2+41.41 +6.83 .00 .00 +6.83 +6.83

1871 Nov 5 W A R obs.

α Urs. Min × 1.2 13 + 88 39 + ~~42.46~~ 41.41 ✓ + 6.83 ✓ − 19
λ Urs. Min ✓ 19.9 52 +88 56 + 53.138 ✓ − 4.25 ✓ − 284
κ Cephei ✓ 20.2 13 +77 20 + 4.404 ✓ + 8.80 ✓ − 502
o² Urs. Maj. S.C. ✓ 8.9.0 59 +~~42~~ 67 40 − 2.443 ✓ + 9.88 ✓ − 415
β Cephei ✓ 21.4 26 +70 1 + 2.75 ✓ + 8.99 ✓ − 308
ζ Cephei ✓ 22.1 6 +57 35 + 1.587 ✓ + 9.26 ✓ +.27 + 9.53 316

20.4 +19 +9.46 20.3 +83 +9.34 U.C. I 0= +53.32 −13.81 n = +.26 +26
21.6 +16 +9.54 20.9 +86 +9.35 +4.38 −.76 +.17 +16
22.0 −02 +9.61 21.7 +1.14 +9.42 +2.69 −.57 +.21 +21
22.1 +10 +9.56 22.1 +1.57 +9.26 +41.35 −2.73 +.07 +07
22.2 −15 +9.62 21.5 +1.10 +9.34 +.18
21.7 +06 +9.56
II
S.C. I n5 = +.21 0= +52.28 −13.59 n = +.26
0= −2.49 +.32 n = +.13 +14 +3.34 −~~.44~~ 54 +.16
+1.64 −.35 +.21
S.C. II +40.31 −2.51 +.06
0= −3.53 +.54 n = +.15 +.17

1871 Nov 6 W A R obs. h = ~~+.012~~ −11 h' = −.005 h' = −.015 n = +.13

π₁ Pegasi 22.1 22.1 × 22.1 4 +32 34 + .64 ✓315 + 9.22 ✓ .08 9.218 9.09 − 02 +9.07
+9.30 − 02 .28
π₂ Pegasi × 1 22.1 4 + 32 34 + .64 ✓315 + 9.18 ✓+ .08 .26 − 02 .24
γ Aquarii × 22.2 14 − 2 1 − .08 ✓4317 + 9.43 ✓− .01] 42 − 02 [40]
~~31 Pegasi × 8 22.4 18 + 11 35 + .26 ✓~~ .22 − 01 .21
72 Pegasi × 2 23.4 27 + 30 38 + .59 ✓536 + 9.24 ✓+ .08 .32 + 00 .32
λ Androm. × 3 23.5 31 + 45 47 + 1.03 ✓1331 + 9.01 +.08 .13 .22 + 00 .22
κ Androm. × 4 23.6 34 + 43 39 + .95 ✓335 + 9.06 ✓+ .12 .18 + 01 .19
ε Piscium × 1.7 0.4 56 + 7 13 + .13 ✓15 + 9.27 ✓+ .02 .29 + 03 .32
β Androm. × 1.8 1.0 2 + 34 57 + .70 ✓16 + 9.06 ✓+07 .09 9.246 .22 + 03 .25
0.08 23.23 +9.233 +9.233
1.2+41.41 +3.80 +.01 +.01 +3.81 +3.81

ζ Cephei × 22.1 6 + 57 35 + 1.587 ✓ + 8.89 + .20 + 9.09 316
δ Cephei × 22.4 24 + 57 47 + 1.598 ✓ + 9.01 + .21 9.22 318
α Urs. Min. × 1.2 13 + 88 39 + ~~53.12~~ 41.41 ✓ + 3.80 ✓ 19

22.1 +64 +9.22 22.1 +1.57 +8.89
22.1 +64 +9.18 22.4 +1.58 +9.01
0.9 +13 +9.27 23.5 +1.01 +9.01
23.0 +47 +9.22 23.6 +.95 +9.06
22.9 +1.28 +8.99 n5 = +.28

0= +40.94 −5.41 n = +.13

0= +40.13 −5.18 n = +.13

1871 Nov 6 A M obs.

sin z = +.60 +.80 +.40 +.60 +.20 +.40 +0 +.20 +0 -.20 -.20 -.40 -.40 -.60 -.60 -.80

R.A. sin z Reg-Rfl. P′-P Reg-Rfl + P′-P R.A. sin z Reg-Rfl P′-P Reg-Rfl + P′-P

h m ′ ″ ″ ″ ′ ″ ″ ″

0 2 +.24 +1 1.5 -.1 1.4 +.6 2.0
0 4 -.05 1.4 -.1 1.3 -.1 1.2
0 7 +.47 1.1 +.4 1.5 +1.3 2.8
0 13 +.79 0 59.2 +.1 59.3 +2.3 1.6 +.79 +59.3 +.47 +1.5 +.24 +1.4 +.02 +1.8 -.05 +1.3 -.39 +2.9
22 37 +.22 0 59.5 -.2 59.3 +.7 0.0 +.22 59.3
22 39 +.02 1 2.6 -.8 1.8 +.1 1.9 +.33 59.1
22 41 +.33 0 59.1 -.0 59.1 +.9 0.0 +.79 +59.3 +.47 +1.5 +.26 +59.9 +.02 +1.8 -.05 +1.3 -.39 +2.9
22 45 -.39 1 1.9 +1.0 2.9 -1.0 1.9 +2.3 +1.3 +.7 +.0 -.1 -1.1
(8) 1.42 1.6′ 2.8′ 0.6 1.8′ 1.2′ 1.8′
+1′ 1.38″ (8) 16′ 28′ 18 3 18′ 12′ 18′ 110
1.42 -.2 -1.4 +.8 -.4 +.2 -.4

20 17 +.04 +1 3.6 -.2 3.4 +.1 3.5 1 13 +1
20 27 +.52 2.4 +.2 2.6 +1.4 4.0 19 52 -.73
20 32 20 13 -.57 0.9 +.5 1.4 -1.6 59.8
20 52 +.03 3.9 +.0 3.9 +.1 4.0 8 59 -.94 4.8 -.8 4.0 -2.6 1.4 ✓
21 37 +.55 2.1 -.4 1.7 +1.6 3.3 21 26 -.46 2.7 +1.1 3.8 -1.3 2.5
21 42 -.11 1.8 +1.0 2.8 -.3 2.5 22 6 -.26 3.8 +.4 4.2 -.7 3.5
21 59 +.69 2.6 -.1 2.5 +2.0 4.5 ~~1.4~~ (3) 1.93
22 1 +.30 2.2 -.3 1.9 +.9 2.8 ~~0.6~~
22 4 +.60 0.5 +.2 0.7 +1.7 2.4 +.69 +2.5 +.52 +2.6 +.30 +1.9 +.04 +3.4 -.11 +2.8 -.26 +4.2 -.57 +1.4
22 10 +.77 1.2 +.5 1.7 +2.3 ~~2.8~~ +.60 0.7 +.55 1.7 +.03 3.9 -.46 3.8
4.0 +.77 1.7
(9) 3.44 +.69 +1.6 +.54 +2.2 +.30 +1.9 +.04 +3.6 -.11 +2.8 -.26 +4.2 -.52 +2.6
+2.0 +1.6 +.9 +.1 -.3 -.8 -1.5
3.6 3.8 2.8 3.7 2.5 3.4 1.1
+1′ 3.06″ (12) 10 8 3 76 2 28 1 74 2 25 1 34 1 22 2 367
3.07 -.5 -.7 +.3 -.6 +.6 -.3 +2.0

22 ~~45~~ +.17 +1 4.3 -.8 3.5 +.5 4.0 22 6 -.26 +~~0~~1 4.2 ~~5.42~~ +.4 4.6 -.7 3.9
22 4 +.17 2.9 +.1 3.0 +.5 3.5 22 24 -.27 +1 4.2 +.8 5.0 -.7 4.3
22 14 +.70 1.3 -.4 0.9 +2.0 2.9 1 13 (2) 4.10
~~22 18~~
23 27 +.20 1.4 +.3 1.7 +.6 2.3
23 31 -.06 4.0 +.6 4.6 -.1 4.5
23 34 -.02 4.8 -.5 4.3 -.0 4.3
0 56 (6) 3.58
1 2 +.70 +0.9 +.20 +1.7 +.17 +3.5 -.06 +4.6 -.26 +4.6
+.17 3.0 -.02 4.3 -.27 5.0
+.70 +0.9 +.20 +1.7 +.17 +3.2 -.04 +4.4 -.26 +4.8
+2.1 +.6 +.5 -.1 -.8
3.0 2.3 3.7 4.3 4.0
+1′ 3.66″ (8) 30 1 23 1 74 2 86 2 80 2 293
3.71 +.7 +1.4 +.0 -.6 -.3

M.

1871 Nov. 6 ~~A M obs.~~ h = +.012 h' = +.011 n = +19

h' = −.005

Star		Ra	δ	tang δ	π Ra −(ρ'−ρ)				
		h m	° '						
φ Pegasi	x 1	23.8 46	+18 26	+ .33 538	+9.35 ✓ +	.06	+9.41	00
ρ Cass	1	23.8 48	+56 48	+ 1.53 539	+ 8.99 +	.29	.28	
ω Piscium	x 0	23.9 53	+ 6 10	+ .11 336	+9.37 ✓ +	.02	.39	
γ Pegasi	x 2	0.1 7	+14 29	+ .26 ✓3	+9.36 ✓ +	.05	.41	00

23.90

23.7+2.37 +8.96 .00 .00 + 8.96 +8.96 +9.372 +9.372

R 22 46 − 23 34 M. 23 42 6 − ~~23.53~~ 0 7

R 0 56 6 1 13 0 7 1

1871 Nov 6 A M obs.

Star		Ra	δ	tang δ	π Ra −(ρ'−ρ)			
41 H. Cephei	x	23.7 42	+67 7	+ 2.37 ✓	+ 8.96 ✓ −			537
~~ρ Cass~~	x	~~23.8 48~~	~~+56 48~~	~~+ 1.53~~ ✓	~~+ 8.99~~ ✓ ~~+.29~~	~~+ 9.28~~		

23.8+33 +9.35 23.8 +1.53 +8.99

23.9+11 +9.37

0.1 +26 +9.36

23.9 +23 +9.36

0 = +2.14 −.40 n = + .19 +.19

0 = +.84 −.03 n = + .04

− 2 3

1871 Nov. 7 P.M. obs h = +.010 h' = −.017 ~~.015~~ n = +26

h' = −.003

Star		Ra	δ	tang δ						
β Delph.	✓ 1.2	20.5 31	+14 10	+ .25 ✓292	+ 8.93 ✓ +	.06	~~8.945~~ 8.99	−02	+8.97
α Delph	✓ 1.1	20.6 33	+15 28	+ .28 ✓293	+ 8.90 +	.07	.97	−02	.95
α Cygni	✓ 1	20.6 37	+44 50	+ 1.00 ~~.99~~ 294	+ 8.66 ✓ +	.26	.92	−02	.90
ε Cygni	✓ 1.0	20.7 41	+33 30	+ .66 298	+ 8.77 ✓ +	.17	8.94	−02	.92
~~η Cephei~~	1.0	~~20.7 43~~	+61 21	+ 1.83 299	+ 8.53 +	.48	9.01	−02	.99
32 Vulpec.	x 9	20.8 49	+27 35	+ .52 ✓507	+ 8.77 ✓ +	.14	8.91	−02	.89
61 Cygni	px x 7	21.0 1	+38 8	+ .78 ~~.80~~ 302	+ 8.74 ✓ +	.20	.94	−01	.93
ξ Cygni	✓ 6	21.1 7	+26 43	+ .57 ✓303	+ 8.80 ✓ +	.15	.95	−01	.94
τ Cygni	λ 5	21.2 10	+37 31	+ .77 ✓305	+ 8.68 ✓ +	.20	.88	−01	.87
β Aquarii	✓ 3	21.4 25	− 6 7	− .11 ✓307	+ 9.02 ✓ −	.03	.99	−01	.98
ε Pegasi	✓ 3	21.6 38	+ 9 18	+ .16 309	+ 8.88 ✓ +	.04	.92	00	.92
π2 Cygni	x 0	21.7 42	+48 44	+ 1.14 ✓517	+ 8.65 ✓ +	.30	.95	00	.95
16 Pegasi	✓ 1	21.8 47	+25 20	+ .47 518	+ 8.87 ✓ +	.12	.99	+00	.99
α Aquarii	✓ 3	21. 22.0 59	− 0 56	− .02 311	+ 8.94 ✓ −	.01	.93	+01	.94
ι Pegasi	✓ 3	22.0 1	+24 44	+ .46 312	+ 8.77 ✓ +	.12	.89	+01	.90
θ Pegasi	✓ 3	22.0 3	+ 5 35	+ .10 314	+ 8.97 ✓ +	.03	9.00	+01	9.01
γ Aquarii	✓ 5 4	22.2 15	− 2 1	− .03 4 317	+ 8.91 ✓ −	.01	8.90	+01	.91
~~3 Lacertae~~	x	~~22.1 48~~	~~+51~~ 36	+ ~~1.26~~ ✓ ~~521~~			.92	+01	.93
φ Pegasi	21	23.8 46	+18 26	+ .33 ✓538	+ 8.77 +	.09	.855 .86	+04	.90
ω Piscium	22	23.9 53	+ 6 10	+ .11 ✓336	+ 8.87 +	.03	.90	+04	.94
α Cephei	+ x 4	21.3 16	+62 3	+ 1.89 ✓306	+ 8.40 ✓ +	.49	8.919 .89	−01	.90

22 45 21.67 +8.932 +8.933

21.3 −7.03 +10.71 .00 .00 +10.71 +10.71

21.4+2.75 +8.24 +8.24 +8.24

21.7+2.86 +8.14 +8.14 +8.14

21.4 −2.81 +9.65 .00 .00 +9.65 +9.65

Star		Ra	δ	tang δ				
~~λ Urs Min~~		~~19.8 49~~	~~+88 56~~	~~+ 53.12~~ 38 ✓				~~284~~
~~η Cephei~~	x	~~20.7 43~~	~~+61 21~~	~~+ 1.83~~ ✓	~~+ 8.53~~ ✓ ~~+ .48~~	~~+ 9.01~~		
1 Draco. L.C.	x 9	21.3 18	+81 54	7.03 ✓	+10.71 ✓ −			3 ~~187~~
β Cephei	x	21.4 27	+70 1	+ 2.75 ✓	+ 8.24 ✓ −			308
11 Cephei	✓	21.7 41	+70 44	+ 2.86 ✓	+ 8.14 ✓ −			516
ξ Cephei	✓	22.1 6	+57 35	+ 1.58 7 ✓	+ 8.51 ✓ + .41	8.92		316
ρ Cass	x	23.8 48	+56 48	+ 1.53 ✓	+ 8.45 ✓ + .40	885		539
~~α Urs. Min~~	x	~~1 13~~	~~+88 39~~	+ ~~42.49~~ 41.41 ✓				
d Urs. Maj. L.C.	✓	9.4 23	+70 24	− ~~2.66~~ 2.81 ✓	+ 9.65 ✓ −			418

20.5+25 +8.93 20.7 +1.83 +8.53

20.6+28 +8.90 21.0 +.78 +8.74

21.4 −11 +9.02 21.2 +.77 +8.68

21.6 +16 +8.88 21.7 +1.14 +8.65

22.0 −02 +8.94 21.3 +1.89 +8.40

22.0 +10 +8.97 22.1 +1.57 +8.51

22.2 −04 +8.91 23.8 +1.53 +8.45

23.8 +33 +8.77 21.7 +1.36 +8.57

23.9 +11 +8.87

22.0 +12 +8.91 n5 = +29

0 = +2.63 −.67 n = + ~~.35~~ 26 +25 0 = −7.15 + 1.80 n = +.25 +26

+2.74 −.77 n +.28 +28 26 −2.93 + .74 +.25 +26

0 = +1.59 −.33 n = +.24 0 = −8.39 +2.14 n = +.26

+1.50 −.43 +.29 .26 −4.17 +1.08 +.26

+ 55

1871 Nov. 7 A M obs. h = +.010 h' = +.050 ~~+.062~~ n = +27

h' = −.003

Star		Ra	δ	tang δ						
α Androm	x 8	0.0 2	+28 24	+ .54 ✓1	+ 8.78 ✓ +	.15	8.930 8.93	+04	+8.97
22 Androm	x 7	0.1 4	+45 23	+ 1.01 ✓337	+ 8.60 ✓ +	.27	8.87	+03	8.90
γ Pegasi	+ 7	0.1 6	+14 29	+ .26 ✓3	+ 8.92 ✓ +	.07	8.99	+03	9.02
ε Piscium	x 1	0.9 56	+ 7 13	+ .13 ✓15	+ 8.99 ✓ +	.04	9.03	00	9.03
β Androm	x 2	1.0 2	+34 57	+ .70 ✓16	+ 8.77 +07 +	.19	9.03	00	9.03
η Piscium	x 6	1.4 24	+14 42	+ .26 ✓22	+ 8.91 ✓ +	.07	8.98	−03	8.95
υ Persei	x 5 7	1.5 29	+48 00	+ 1.11 ✓23	+ 8.67 ✓ +	.30	~~9.00~~ 8.97	−04	8.93
	1.22 1.3	0.78					8.988 8.93	−02	8.91

+8.959 61 +8.967

0.1 +4.08 +7.79 .00 .00 +7.79 +7.79

1.2+41.41 −0.89 .00 .00 −0.89 −0.89

Star		Ra	δ	tang δ				
Br 6 = Gr 293	x	0.1 8	+76 15	+ ~~4.10~~ 4.08 ✓	+ 7.79 ✓ −		296	338
α Urs Min	x	1.2 13	+88 39	+ ~~42.49~~ 41.41 ✓	− 0.89 ✓		239	19
δ Cass.	x	1.3 17	+59 35	+ 1.70 ✓	+ 8.47 ✓ + .46	+8.93		20

0.1+26 +8.92 1.0 +70 +8.77 84

0.9+13 +8.99 1.5 +1.11 +8.67

1.4+26 +8.91 1.3 +1.70 +8.47

0.8 +22 +8.94 1.3 +1.17 +8.646 n5 = −.32

0 = +3.86 −1.15 n = +.30 +30

+41.19 −9.83 +24 +24

.27

0 = +2.91 −.87 n = +.30

+40.24 −9.55 +.24

.27

sin z = +.60+.80 | +.40+.60 | +.20+.40 | +0+.20 | +0–.20 | –.20–.40 | –.40–.60 | –.60–.80

R.A.	sin z	Red.–Refl.		P'–P	Red–Refl +P'–P		
h m		'	"	"	"		
23 46	+.41	+1	~~4.1~~ 3.8	–.2	~~4.5~~ 3.6	+1.2	38
23 48	–.25		3.3	+.0	3.3	–.7	2.6
23 53	+.59		1.5	+.2	1.7	+1.7	34
0 7	+.47		1.2	+.4	1.6	+1.3	29
						(4)	3.18

R.A.	sin z	Red.–Refl.		P'–P	Red–Refl +P'–P		
h m		'	"	"	"		
23 42	–.42	+1	3.9	+.4	4.3	–1.2	31
~~23 48~~						(1)	3.10

+.60+.80	+.40+.60	+.20+.40	+0+.20	+0–.20	–.20–.40	–.40–.60	–.60–.80
	+.41 +2.6				–.25 +3.3		
	+.59 1.7						
	+.47 1.6						
	+.49 +2.0				–.25 +3.3		
	+1.4				–.8		
	3.4 3				2.5 1		
	(4) 102				25	127	
	–.2				+.7		

+1' 3.18"
3.16

R.A.	sin z	Red.–Refl.		P'–P	Red–Refl +P'–P		
20 31	+.47	+1	4.1	+.1	4.2	+1.3	55
20 33	+.45		3.8	–.2	3.6	+1.2	48
20 37	–.04		5.2	+.0	5.2	–.1	51
20 41	+.15		4.2	–.3	3.9	+.5	44
20 43	–.32		5.2	+.2	5.4	–.8	46
20 49							
21 1	+.07		4.8	+.1	4.9	+.1	50
21 7	+.22		2.5	–.6	1.9	+.7	26
21 10	+.09		2.2	+.6	2.8	+.3	31
21 25	+.75	0	59.9	+.2	0.1	+2.2	23
21 38	+.55	1	1.5	–.4	1.1	+1.5	26
21 42	–.11		2.7	+1.0	3.7	–.3	34
21 47	+.29		2.0	+.4	2.4	+.9	33
21 59	+.69		2.4	–.1	2.3	+2.0	43
22 1	+.30		2.8	–.3	2.5	+.9	34
22 3	+.60	0	59.2	+.2	59.4	+1.7	(1.1)
22 15	+.70	1	2.9	–.4	2.5	+2.0	45
22 18							
23 46	+.41		1.3	–.2	1.1	+1.2	23
23 53	+.59	0	58.5	+.2	58.7	+1.7	(0.4)
21 16						(16)	3.82

+1' 3.47"
3.73

R.A.	sin z	Red.–Refl.		P'–P	Red–Refl +P'–P		
19 49		+1					
~~20 43~~							
21 18							
21 27	–.46		3.4	+1.1	4.5	–1.3	~~2.8~~ 3.2
21 41	–.47		3.8	+.8	4.6	–1.3	33
22 6	–.26		4.0	+.4	4.4	–.7	37
23 48	–.25		4.1	–.0	4.1	–.7	34
1 13							
9 23	–.92		7.1	–.1	7.0	–2.6	4.4
						(4)	3.40

+.60+.80	+.40+.60	+.20+.40	+0+.20	+0–.20	–.20–.40	–.40–.60	–.60–.80
+.75 +0.1	+.47 +4.2	+.22 +1.9	+.15 +3.9	–.04 +5.2	–.32 +5.4	–.46 +4.5	
+.69 2.3	+.45 3.6	+.29 2.4	+.07 4.9	–.11 3.7	–.26 4.4	–.47 4.6	
+.60 59.4	+.55 1.1	+.30 2.5	+.09 2.8		–.25 4.1		
+.70 2.5	+.41 1.1						
	+.59 58.7						
+.68 +1.3	+.49 +1.7	+.27 +2.3	+.10 +3.9	–.08 +4.4	–.28 +4.6	–.46 +4.6	
+2.0	+1.4	+.8	+.3	–.2	–.8	–1.3	
3.1 4	3.1 5	3.1 3	4.2 3	4.2 2	3.8 3	3.3 2	
(22) 124	155	93	126	84	114	66	762
+.4	+.4	+.4	–.7	–.7	–.3	+.2	

R.A.	sin z	Red.–Refl.		P'–P	Red–Refl +P'–P		
0 2	+.24	+1	2.2	–.1	2.1	+.7	28
0 4	–.05		4.1 ~~5.7~~	–.1	4.0	–.1	3.9 ~~4.5~~
0 6	+.47		1.3	+.4	1.7	+1.3	30
0 56	+.58		0.1	+.3	0.4	+1.6	20
1 2	+.13		3.7	–.3	3.4	+.4	38
1 24	+.46		2.0	–.2	1.8	+1.3	31
1 29	–.10		2.8	+.3	3.1	–.3	28
						(7)	3.06

R.A.	sin z	Red.–Refl.		P'–P	Red–Refl +P'–P		
0 8	–.56	+1	3.3	+.5	3.8	–1.6	2.2
1 13							
1 17	–.30		3.2	+.6	3.8	–.9	29
						(2)	2.55

+.60+.80	+.40+.60	+.20+.40	+0+.20	+0–.20	–.20–.40	–.40–.60	–.60–.80
	+.47 +1.7	+.24 +2.1	+.13 +3.4	–.05 +4.0	–.30 +3.8	–.56 +3.8	
	+.58 0.4			–.10 3.1			
	+.46 1.8						
	+.50 +1.3	+.24 +2.1	+.13 +3.4	–.08 +3.6	–.30 +3.8	–.56 +3.8	
	+1.4	+.7	+.4	–.2	–.9	–1.6	
	2.7 3	2.8 1	3.8 1	3.4 2	2.9 1	2.2 1	
	(19) 81	28	38	68	29	22	266
	+.3	+.2	–.8	–.4	+.1	+.8	

+1' 2.96"
2.94

1871 Nov. 9 h = ~~+~~.008 +29 h' = +.001 h' = +.033 n = +.23

Star	W&R obs RA	δ	tang δ	π Ra − (ρ'−ρ)				
	h m	° '						
β Delphi	20.5 32	+14 10 +	.25	+ 8.47 +	.06	8.542 ~~8.55~~ 8.53 + 04	+8.57	
α Delphi	20.6 33	+ 15 28 +	.28	+ 8.53 +	.06	.59 + 04	.63	
α Cygni	20.6 37	+ 44 50 +	.99	+ 8.31 +	.23	.54 + 04	.58	
~~ζ Cygni~~	~~20.7 53~~	~~+ 44 21~~ +	1.88	8.55 +	.21	.46 + 04	.50	763
61 Cygni pr	21.0 1	+ 38 8 +	.78	+ 8.42 +	.18	.60 + 03	.63	
α Cephei	21.3 16	+ 62 3 +	1.89	+ 8.08 +	.43	.51 + 02	.53 sub	
β Aquarii	21.4 24	− 6 7 −	.11	+ 8.66 −	.03	63 + 01	.64	
π² Cygni	21.7 42	+ 48 44 +	1.14	+ 8.24 +	.26	.50 + 01	.51	
α Aquarii	21. 59	− 0 56 −	.02	+ 8.70 −	.00	.70 − 00	.70	
ι Pegasi	22.0 1	+ 24 44 +	.46	+ 8.43 +	.11	.54 − 00	.54	
θ Pegasi	22.1 4	+ 5 35 +	.10	+ 8.60 +	.02	.62 − 01	.61	
~~ξ Cephei~~	22.1 7	+ 57 35 +	1.57	+ 8.17 +	.36	.53 − 01	.52	
θ Aquarii	22.2 10	− 8 24 −	.15	+ 8.60 −	.03	.57 − 01	.56	
3 Lacertae	22.3 19	+ 51 36 +	1.26	+ 8.31 +	.29	.60 − 01	.59	
λ Androm.	23.5 31	+ 45 47 +	1.08	+ 8.32 +08	.23	.63 − 05	.58	
φ Pegasi	23.8 46	+ 18 26 +	.33	+ 8.52 +	.08	.60 − 06	.54	
ρ Cass.	~~23.8~~ 48	+ 56 48 +	1.53	+ 8.23 +	.35	.53 − 06	.47	
ω Piscium	23.9 53	+ 6 10 +	.11	+ 8.63 +	.03	.66 − 06	.60	
γ Cygni	20.3 20	+ 39 51 +	.83	+ 8.33 +	.19	8.598 ~~8.61~~ 52 + 05	.57	
	21.88					+ 8.572	+ 8.572	

21.3 − 7.03 + 9.64 .00 .00 + 9.64 + 9.64
21.4 + 2.75 + 7.93 .00 .00 + 7.93 + 7.93
22.4 − 4.13 + 9.43 .00 .00 + 9.43 + 9.43
~~18.2~~ 13.2 − 41.41 + 21.20 ± 01 ± 01 + 21.19 + 21.19

1871 Nov. 9

Star	W&R obs. S.C. RA	δ	tang δ	π Ra − (ρ'−ρ)			
1 η Draco	21 18	° '	− 7.03	+ 9.64	−		137
η Cephei	20.7 42	+ 61 21 +	1.83	+ 8.04 +	.42	+ 8.46	299
β Cephei	21.4 27	+ 70 1 +	2.75	+ 7.93	−		308
~~ξ Cephei~~	~~22.1 6~~	~~+ 57 35~~ +	~~1.58~~	~~+ 8.17 +~~	~~.36~~	~~8.53~~	
ρ⁴ Draco	22.4 24	76 23 +	4.13	+ 9.43	−		150
~~ρ Cass.~~	~~23.8 48~~	~~+ 56 48~~ +	~~1.53~~	~~+ 8.23 +~~	~~.35~~	~~8.58~~	
~~α Urs. Min.~~ S.C.	~~1 13~~	~~+ 88 39~~	~~+ 42.49~~ − 41.41	+ 21.20 (stet)			19

20.5 + 25 + 8.47 20.3 + 83 + 8.33
20.6 + 28 + 8.53 20.6 + 1.00 + 8.31
21.4 − 11 + 8.66 20.7 + 1.83 + 8.04
22.0 − 02 + 8.70 21.3 + 1.89 + 8.08
22.1 + 10 + 8.60 21.7 + 1.14 + 8.24
22.2 − 15 + 8.60 22.1 + 1.57 + 8.17
23.8 + 33 + 8.52 22.3 + 1.26 + 8.31
23.9 + 11 + 8.63 23.5 + 1.01 ~~+ 8.32~~ 40
22.1 + 10 + 8.59 23.8 + 1.53 + 8.23
21.8 + 1.34 + 8.223 n₅ = + .28

0 = + 2.65 − .66 n = + .25 + .25
0 = − 7.13 + 1.05 n = + .15 + .16
− 4.23 + .84 + .20 + .21
− 41.51 + 12.60 + .30 + .30
.22

0 = + 1.41 − .30 n = + .21
0 = − 8.37 + 1.41 n = + .17
− 5.47 + 1.20 + .22
− 42.75 + 12.96 + .30
.23

16
1871 Nov. 9 h = ~~+~~.008 h' = +.001 h' = −.013 n = +.20

Star	Am obs	δ	tang δ	π Ra − (ρ'−ρ)				
α Androm.	0.0 2	+ 28 24 +	.54	+ 8.50 +	.11	8.657 8.61 − 01	+ 8.60	
22 Androm.	0.1 4	+ 45 23 +	1.01	+ 8.51 +	.20	.71 − 01	.70	
γ Pegasi	0.1 7	+ 14 29 +	.26	+ 8.60 +	.05	.65 − 01	.64	
ε Piscium	0.9 36	+ 7 13 +	.13	+ 8.68 +	.03	.71 − 00	.71	
β Androm.	1.0 3	+ 34 57 +	.70	+ 8.40 + .07	.14	.61 + 00	.61	
η Piscium	1.4 25	+ 14 42 +	.26	+ 8.61 +	.05	.66 + 00	.66	
ν Persei	1.5 30	+ 48 00 +	1.11	+ 8.29 +	.22	.51 + 01	.52	
φ Persei	1.6 36	+ 50 3 +	1.19	+ 8.39 +	.24	.63 + 01	.64	
ν Piscium	1.6 38	+ 8 32 +	.15	+ 8.69 +	.03	8.640 .72 + 01	.73	
	1.03 0.91					+ 8.646	+ 8.646	

0.1 + 4.08 + 7.84 .00 .00 + 7.84 + 7.84
1.2 + 41.41 + 1.06 .00 .00 + 1.06 + 1.06
1.6 + 2.40 + 8.12 .00 .00 + 8.12 + 8.12

		δ	tang δ			
Br. 6 ± 7 Gr. 293	0.1 8	+ 76 15 +	4.08	+ 7.84	−	199 308
α Urs. Min.	1.2 13	+ 88 39 +	41.41 ~~42.49~~	+ 1.06	−	183 19
43 Cass	1.6 33	+ 67 25 +	2.40	+ 8.12	−	348

0.1 + 26 + 8.60 0.1 + 1.01 + 8.51
0.9 + 13 + 8.68 1.5 + 1.11 + 8.29
1.4 + 26 + 8.61 1.6 + 1.19 + 8.39
1.6 + 15 + 8.69 84 1.1 + 1.10 + 8.40 n₅ = + .24
1.0 + .20 + 8.64

0 = + 3.88 − .80 n = + .21 + .20
+ 41.21 − 7.58 + .18 + .18
+ 2.20 − .52 + .24 + .23
+ .20

0 = + 2.98 − .56 n = + .19
+ 40.31 − 7.34 + .18
+ 1.30 − .28 + .22 + .20

+ 24
1871 Nov. 12 h = ~~+~~.016 h' = ~~+~~ −.006 h' = −.021 ~~.016~~ n = +.24

Star	W&R obs.	δ	tang δ	π Ra − (ρ'−ρ)				
	2070							
γ Delphi	20.7 41	+ 15 40 +	.28	+ 7.95 +	.07	8.020 + 8.02 − 03	7.99	
η Cephei	20.7 43	+ 61 21 +	1.83	+ 7.58 +	.44	8.02 − 03	7.99	
Br. 2749	20.9 53	+ 80 5 +	5.73	+ 6.61				
77 Draco	21.1 8	+ 77 37 +	4.55	+ 6.89 +				
ι Pegasi	22.0 1	+ 24 44 +	.46	+ 7.86 +	.11	8.00 − 00	8.00	
η Aquarii	22.5 29	− 0 46 −	.01	+ 8.01 −	.00	8.01 + 01	8.02	
13 Lacertae	22.6 38	+ 41 10 +	.88	+ 7.76 +	.21	7.97 + 01	7.98	
λ Pegasi	22.7 40	+ 22 54 +	.42	+ 7.88 +	.10	7.98 + 01	7.99	
~~λ Aquarii~~	~~22.7 43~~					7.93 + 00	7.93	
α Pisc. Aust.	~~22.9~~ 51							
α Pegasi	22.9 58	+ 14 32 +	.26	+ 7.95	.06	8.01 + 02	8.03	
μ Pegasi	22.7 44	+ 23 55 +	.45	+ 7.87	.11	7.98 + 01	7.99	
	~~22.50~~ 22.10	− 1'				7.983 + 7.991	+ 7.991	

20.9 + 5.72 + 6.61 − .01 − 01 + 6.60 + 6.60
21.1 + 4.55 + 6.89 − .01 − .00 + 6.88 + 6.89
~~22.1 + 1.57 + 7.55~~

		δ	tang δ				
ξ Cephei ~~Pegasi~~	22.1 6	+ 57 35 +	1.57	+ 7.55 +	.38	7.93	316

20.7 + 28 + 7.95 20.7 + 1.83 + 7.58
22.5 − 01 + 8.01 22.6 + .87 + 7.76
22.7 + 42 + 7.88 22.1 + 1.57 + 7.55
22.7 + 44 + 7.87 21.8 + 1.42 + 7.63
22.9 + 26 + 7.95 n₅ = + .27
22.3 + 28 + 7.93

0 = + 5.44 − 1.33 n = + .24 .24
+ 4.27 − 1.05 + .25 .24

0 = + 4.30 − 1.03 n = + .24
+ 3.13 − .74 + .24

sin z = +.60+.80 | +.40+.60 | +.20+.40 | +0+.20 | +0−.20 | −.20−.40 | −.40−.60 | −.60−.80

R.A.	sin z	Reg-Rf		P'-P	Reg-Rf+P'-P		
h m		'	"	"	"		
20 32	+.47	+1					
20 33	+.45						
20 37	−.04						
20 53	+.03		5.9	+.0	(5.9)	+1	(6.0)
21 1	+.07		4.1	+.1	~~4.2~~	+2	4.4
21 16	−.34		2.2	+1.0	3.2	−.9	2.3
21 24	+.75						
21 42	−.11		1.8	+1.0	2.8	−3	2.5
21 59	+.69		2.4	−.1	2.3	+2.0	4.3
22 1	+.30		0.5	−.3	0.2	+.9	1.1
22 4	+.60		0.3	+.2	0.5	+1.7	2.2
22 7	−.26		3.6	+.4	4.0	−.7	3.3
22 10	+.77		0.8	+.5	1.3	+2.3	3.6
22 19	−.16		3.3	+.2	3.5	−.5	3.0
23 31	−.06		2.5	+.7	3.2	−2	3.0
23 46	+.41		1.1	−.2	0.9	+1.2	2.1
23 48	−.25		3.0	−0	3.0	−.6	2.4
23 53	+.59		1.4	+2	1.6	+1.7	3.3
20 18	+.04		8.0	−.2	(7.8)	+1	(7.9)
						(13)	2.88

+1' 2.98"
3.01

+.60+.80	+.40+.60	+.20+.40	+0+.20	+0−.20	−.20−.40	−.40−.60	
+.69 +2.3	+.41 +0.9	+.30 +0.2	+.07 +4.2	−.11 +2.8	−.34 +3.2	−.46 +4.3	
+.60 0.5	+.59 1.6			−.16 3.5	−.26 4.0		
+.77 1.3				−.06 3.2	−.25 3.0		
					−.32 5.5		
+.69 +1.4	+.50 +1.2	+.30 +0.2	+.07 +4.2	−.11 +3.2	−.29 +3.9	−.46 +4.3	
+2.1	+1.5	+.9	+.2	−.4	−.9	−1.4	
3.5 3	2.7 2	1.1 1	4.4 1	2.8 3	3.0 4	2.9 1	
(15) 105	54	11	44	84	120	29	447
−.5	+.3	+1.9	−1.4	+.2	+.0	+.1	

R.A.	sin z	Reg-Rf		P'-P	Reg-Rf+P'-P		
		'	"	"	"		
9 18		+1					
20 42	−.32		5.3	+.2	5.5	−.9	4.6
21 27	−.46		3.2	+1.1	4.3	−1.3	3.0
~~22 6~~							
22 24	−.88		8.4	−.6	7.8	−2.3	5.5 ✓
~~23 48~~							
1 13						(2)	3.80

R.A.	sin z	Reg-Rf		P'-P	Reg-Rf+P'-P		
0 2	+.24	+1	3.4	−.1	3.3	+.7	4.0
0 4	−.05		4.3	−1	4.2	−.2	4.0
0 7	+.47		2.8	+.4	3.2	+1.4	4.6
0 56	+.58		0.4	+.3	0.7	+1.6	2.3
1 3	+.13		4.1	−3	3.8	+.4	4.2
1 25	+.46		3.3	−.2	~~2.1~~ 3.1	+1.3	4.4
1 30	−.10		3.7	+.3	4.0	−.3	3.7
1 36	−.13		3.3	+.5	3.8	−.4	3.4
1 38	+.56		4.3	+4	4.7	+1.6	6.3
						(9)	4.10

+1' 4.02"
4.01

R.A.	sin z	Reg-Rf		P'-P	Reg-Rf+P'-P		
0 8	−.56	+1	4.7	+.5	5.2	−1.6	3.6
1 13							
1 33	−.42		5.2	−.4	4.8	1.2	3.6
						(2)	3.60

+.40+.60	+.20+.40	+0+.20	+0−.20	−.40−.60	
+.47 +3.2	+.24 +3.3	+.13 +3.8	−.05 +4.2	−.56 +5.2	
+.58 0.7			−.10 4.0	~~−.42~~ 4.8	
+.46 3.1			−.13 3.8		
+.56 4.7					
+.52 +2.9	+.24 +3.3	+.13 +3.8	−.09 +4.0	−.49 +5.0	
+1.5	+.7	+.4	−.2	−1.5	
4.4 4	4.0 1	4.2 1	3.8 3	3.5 2	
(10) 176	40	42	114	70	442
−.4	+.0	−.2	+.2	+.5	

R.A.	sin z	Reg-Rf		P'-P	Reg-Rf+P'-P		
20 41		+1					
20 43							
20 53							
21 7							
22 1	+.30		3.6	−.3	3.3	+1.0	4.3
22 29	+.68		3.7	−.1	3.6	+2.0	5.6
22 38	+.02		5.0	−.8	4.2	+.1	4.3
22 40	+.33		2.3	−.0	2.3	+1.1	3.4
22 43	~~+.32~~						
22 51							
22 58	+.47		1.6	−.6	(1.0)	+1.4	(2.4)
22 44	+.37		3.6	+3	3.9	+1.0	4.9
						(5)	4.50

+1' 4.38" 3
4.33

R.A.	sin z	Reg-Rf		P'-P	Reg-Rf+P'-P		
22 6	−.26	+1	3.8	+.4	4.2	−.7	3.5
						(1)	3.50

+.60+.80	+.20+.40	+0+.20	−.20−.40	−.40−.60
+.68 +3.6	+.30 +3.3	+.02 +4.2	−.26 +4.2	
	+.33 2.3			
	+.32 3.9			
+.68 +3.6	+.32 +3.2	+.02 +4.2	−.26 +4.2	
+2.1	+1.0	+.1	−.8	
5.7 1	4.2 3	4.~~1~~ 3 1	3.4 1	~~2.60~~
(6) 57	126	4~~1~~	34	2.58
−1.4	+.1	+0	+.9	

1871 Nov. 13 W A R. obs. h = ~~+~~.019 +29 h' = −.008 h' = +.004 n = +.24

Star	Ra h m	δ ° '	tang δ	T−Ra −(P'−P)			
61 Cygni pr.	2120 ✓ 21.0 01	+ 38 8 +	.78 302	+ 7.18 ✓ + .19	7.399	7.37	00
ξ Cygni	✓ 21.1 7	+ 29 43 +	.57 303	+ 7.25 ✓ + .14		.39	
α Cephei	x 21.3 16	+ 62 3 +	1.89 306	+ 6.83 ✓ + .45		.28	
β Aquarii	✓ 21.4 24	− 6 7 −	.11 307	+ 7.55 ✓ − .03		.5~~1~~2	
3 Lacertae	✓ 22.3 19	+ 51 36 +	1.26 324	+ 7.02 ✓ + .30		.32	
η Aquarii	✓ 22.5 29	− 0 46 −	.01 320	+ 7.41 ✓ − .00		.41	
ζ Pegasi	✓ 22.6 35	+ 10 11 +	.18 321	+ 7.38 ✓ + .04		.42	
η Pegasi	✓ 22.6 37	+ 29 34 +	.57 322	+ 7.22 ✓ + .14		.36	
λ Pegasi	✓ 22.7 40	+ 22 54 +	.42 323	+ 7.26 ✓ + .10		.36	
o Androm.	✓ 22.9 56	+ 41 39 +	.89 327	+ 7.11 ✓ + .21		.32	
α Pegasi	✓ 22.9 58	+ 14 32 +	.26 329	+ 7.35 ✓ + .06		.41	
γ Piscium	✓ 23.2 10	+ 2 36 +	.05 43 339	+ 7.51 ✓ + .01		.52	
τ Pegasi	✓ 23.2 14	+ 23 3 +	.43 2 531	+ 7.30 ✓ + .10		.40	
υ Pegasi	✓ 23.3 19	+ 22 43 +	.42 534	+ 7.30 ✓ + .10	7.392	.40	00
~~Gr. 3415~~	~~2282 21~~ 22.36	~~9 +59 28~~		~~+6.05~~	+7.392	+7.392	

210 −2.43 +7.41 −.01 −.01 + 7.40 + 7.40
213 −7.03 +9.01 −.01 −.01 + 9.00 + 9.00
21.4 +2.75 +6.76 −.01 −.01 + 6.75 + 6.75
21.4 −2.81 +8.17 −.01 −.01 + 8.16 + 8.16
23.4 −2.77 +8.03 +.00 +.01 + 8.03 + 8.04

1871 Nov. 13 W A R. obs.

Star	Ra h m	δ ° '	tang δ	T−Ra −(P'−P)	
1 H Draco.	L.C x 9.3 19	+ 81 53 +	7.03 ✓	+ 9.01 ✓ −	137
β Cephei	✓ 21.4 27	+ 70 1 +	2.75 ✓	+ 6.76 ✓ −	308
λ Draco.	L.C ✓ 23.4 23	+ 70 3 +	2.767 ✓	+ 8.03 ✓ −	162
o² Urs. Maj.	L.C ✓ 8 59	~~+112~~ 67 40 +	2.443 ✓	+ 7.41 ✓ −	415
d Urs. Maj.	L.C ✓ 9.4 23	~~+110~~ 69 +70 24 −	~~2.66~~ 2.81 ✓	+ 8.17 ✓ −	418

225 −01 +7.41 21.3 +189 +683
226 +18 +7.38 22.3 +126 +702
227 +42 +7.26 22.9 +89 +7.11
229 +26 +7.35 22.2 +1.35 +6.99
232 +04 +7.51
23.2 +42 +7.30 $n_5 = .34$
233 +42 +7.30
22.9 +25 +7.36

0 = +2.50 −.61 n = +.24

0 = −2.68 +04 n = +.01
−7.28 +1.64 +.23 +23
−3.06 +.80 +.26 +27
−3.02 +.67 +.22 +23 .24

0 = +1.40 −.74 n = +.17

0 = −3.78 +.41 n = +.11
−8.38 +2.01 +.24
−4.16 +1.17 +.28
−4.12 +1.05 +.25 +.26

h = −.70 n = h' = ~~−.044~~ −.035 n = +.22

1871 Nov. 17 A M obs. h = ~~+~~.019 h' = −.006

Star		Ra h m	δ ° '	tang δ	T−Ra −(P'−P)				
~~κ Piscium~~	0.26 x	~~23 21~~	~~+ 0 34 +~~	~~.01~~	~~+ 12.62~~				
λ Androm.	+ 2.0 x	23.5 31	+ 45 47 +	1.08 334	+ 6.09 ✓ +.08 + .22	+ 6.39 − .07 + 6.32			
2 Cephei	x	23.6 34	+ 76 56 +	4.30 334	+ 5.62	~~6.35~~ 6.341			
ω Piscium	1.6 x	23.9 53	+ 6 10 +	.11 336	+ 6.44 ✓ + .02 .02		.46 −	06	.40
α Androm.	1.5	0.0 2	+ 28 24 +	.54 1	+ 6.16 ✓ + .11 .11		.27 −	05	.22
γ Pegasi	1.4 x	0.1 7	+ 14 29 +	.26 3	+ 6.32 ✓ + .05 .06		.38 −	05	.33
4 Ceti	1.3 x	0.2 13	− 9 31 −	.17 4	+ 6.44 − .05 .04		.35 −	05	.30
κ Cass.	1.1 x	0.4 26	+ 62 14 +	1.90 5	+ 5.84 ✓ + .40 .41		.25 −	04	.21
π Androm.	1.0 x	0.5 30	+ 33 2 +	.65 7	+ 6.18 ✓ + .14 .14		.32 −	04	.28
ε Androm.	1.0 x	0.5 32	+ 28 38 +	.55 ~~.25~~ 8	+ 6.19 ✓ + .11 .12		.31 −	04	.27
α Cass.	0.9	0.6 33	+ 55 51 +	1.47 10	+ 6.02 ✓ + .30 .32		.34 −	03	.31
ζ Androm.	x	~~0.7 42~~	~~+ 23 35 +~~	~~.44~~	~~11~~				
η Cass.	x	~~0.7 43~~	~~+ 57 9 +~~	~~1.55~~	~~12~~				
ε Piscium	6 x	0.9 56	+ 7 13 +	.13 15	+ 6.31 ✓ + .03 .03		.34 −	02	.32
β Androm.	5 x	1.0 3	+ 34 57 +	.70 16	+ 6.14 ✓ +.07 + .15		.36 −	02	.34
τ Piscium	4	1.1 5	+ 29 26 +	.56 17	+ 6.11 ✓ + .12 .12		.23 −	01	.22
υ Persei	+ 0 x	1.5 30	+ 48 00 +	1.11 23	+ 6.07 ✓ + .23 .24		.31 −	00	.31
φ Persei	∓ 1	1.6 36	+ 50 3 +	1.20 19 24	+ 5.98 ✓ + .25 .26		.24 +	00	.24
o Piscium	∓ 1	1.6 39	+ 8 32 +	.15 25	+ 6.33 ✓ + .03 .03		.36 +	00	.36
ε Cass.	x 2	1.7 45	+ 63 3 +	1.97 26	+ 5.76 ✓ + .41 .43		.19 +	01	.20
ξ Piscium	x 3	1.8 47	+ 2 34 +	.05 29	+ 6.34 ✓ + .01 .01		.35 +	01	.36
β Arietis	x 3	1.8 48	+ 20 12 +	.37 30	+ 6.16 ✓ + .08 .08		.24 +	01	.25
50 Cass.	x	1.9 53	+ 71 49 +	3.04 31	+ 5.42 ✓ + .63				
γ Androm.	x 4	1.9 56	+ 41 44 +	.89 32	+ 5.95 ✓ + .18 .20		.15 +	01	.16
α Arietis	x 5	2.0 0	+ 22 52 +	.42 33	+ 6.19 + .09 .09		.28 +	02	.30
β Triang.	x 5	2.0 2	+ 34 24 +	.68 34	+ 6.13 ✓ + .14 .15		.28 +	02	.30
θ Arietis	+ 7	2.2 11	+ 19 19 +	.35 354	+ 7.04 ✓ + .07 .08		.12 +	02	.14
ι Cass.	x	2.3 19	+ 66 50 +	2.33 36	+ 5.77 ✓ + .46				
36 H Cass.	x	2.4 26	+ 72 16 +	3.13 38	+ 5.56 ✓ + .65				
δ Ceti	x 11	2.6 33	− 0 13 −	0.00 39	+ 6.35 ✓ + .00 .00		.35 +	04	.39
θ Persei	x 11	2.6 36	+ 48 42 +	1.14 40	+ 6.01 ✓ + .24 .25		.26 +	04	.30
γ Ceti	x 11	2.6 37	+ 2 42 +	.05 41	+ 6.33 ✓ + .01 .01		.34 +	04	.38
μ Ceti	x 11	2.6 38	+ 9 35 +	.17 42	+ 6.30 ✓ + .04 .04		.34 +	04	.38
η Persei	x 12	2.7 42	+ 55 22 +	1.45 43	+ 5.86 ✓ + .30 .32		.18 +	04	.22
41 Arietis	x 12	2.7 43	+ 26 45 +	.50 44	+ 6.16 ✓ + .10 .11		.27 +	04	.31
τ Persei	x 13	2.8 45	+ 52 15 +	1.29 45	+ 5.87 ✓ + .27 .28		.15 +	04	.19
η Eridani	x 13	2.8 50	− 9 24 −	.16 46	+ 6.41 ✓ − .03 .04		.37 +	04	.41
α Ceti	x 14	2.9 56	+ 3 36 +	.06 47	+ 6.35 ✓ + .01 .01		.36 +	05	.41
ξ₂ Ceti	2.11 2.09 9	2.4 ~~24~~ 1.58 5	+ 7 54 +	.14 37	+ 6.20 ✓ + .03 .03	6.276	.23 +	03	.26
			−1'			+6.293			+6.293

Br 6 = 2, Gr 293 x 0.19 + 76 15 + −1' 4.10 ✓ + 5.56 ✓ − 196 338
α Urs. Min. x 1.2 13 + 88 36 + −2' ~~42.49~~ 41.43 ✓ − 2.74 ✓ − 219 19

23.9 +11 +6.44 23.5 +1.01 +6.09 17
0.1 +26 +6.32 0.4 +1.90 +5.84
0.2 −17 +6. ~~44~~ 39 0.6 +1.47 +6.02
0.9 +13 +6.31 1.5 +1.11 +6.07
1.6 +15 +6.33 1.6 +1.19 +5.98
1.8 +05 +6.34 1.7 +1.97 +5.76
1.8 +37 +6.16 2.6 +1.14 +6.01
[2.2 +35 +7.04] 2.7 +1.45 +5.86
2.4 +14 +6.20 2.8 +1.29 +5.87
2.6 +00 +6.35 1.85 +1.39 +5.95
2.6 +05 +6.33
2.6 +17 +6.30
2.8 −16 +6.41
2.9 +06 +6.35
1.7 +09 +6.3~~8~~3 $n_5 = .29$

0 = +4.21 −.72 n = +.17 +15
+4.01 −.78 +.19 +17
+41.34 −9.07 +.22 +22
+2.95 −.91 +.31 +31
+2.24 −.56 +.25 +25
+3.04 −.77 +.25 +24
+.22

0 = +2.91 −.34 n = +.12
+2.71 −.40 +.15
+40.04 −8.69 +.23
+1.65 −.53 +.32)
+.94 −.18 +.19)
+1.74 −.38 +.22 +.18

23.6 +4.30 +5.62 −.01 −.01 +5.61 +5.61
0.1 +4.10 +5.56 −.01 −.01 +5.55 +5.55
1.2 +41.43 −2.74 −.00 .00 −2.74 −2.74
1.9 +3.04 +5.42 +.00 +.00 +5.42 +5.42
2.3 +2.33 +5.77 +.00 +.00 +5.77 +5.77
2.4 +3.13 +5.56 +.00 +.01 +5.56 +5.57

R.A.		Sniz	Ray-	R.H.	P'-P	Ray-R.H. + P'-P		
h	m		′	″	″	″		
21	1	+.07	+1	2.3	+.1	2.4	+.3	2.7
21	7	+.22		3.2	-.6	2.6	+.7	3.3
21	16	-.34		3.7	+1.0	4.7	-1.0	3.7
21	24	+.75	0	56.5	+.2	(56.7)	+2.3	(59.0)
22	19	-.16	1	3.3	+.2	3.5	-.5	3.0
22	29	+.68		1.1	-.1	1.0	+2.0	3.0
22	35	+.53		3.5	-.5	3.0	+1.6	4.6
22	37	+.22		3.2	-.2	3.0	+.7	3.7
22	40	+.33		1.9	-.0	1.9	+1.1	3.0
22	56	+.01		1.8	+.4	2.2	+.0	2.2
22	58	+.47		2.4	-.6	1.8	+1.4	3.2
23	10	+.64		0.7	-.2	0.5	+1.9	2.4
23	14	+.33		2.9	+.1	3.0	+1.1	4.1
23	19	+.34		0.7	+.2	0.9	+1.1	2.0
							(13)	3.15

R.A.		Sniz	Ray.	R.H.	P'-P	Ray-R.H. + P'-P	
h	m			″	″	″	
9	19		+1				
21	27	-.46					
23	23	-.92					
8	59	-.94		7.3	-.8	6.5	-2.9 3.6
9	23	-.92		8.1	-.1	8.0	-2.8 5.2

Sniz =	+.60+.80	+.40+.60	+.20+.40	+0+.20	+0-.20	-.20-.40	-.40-.60	-.60-.80
	+.68 +1.0	+.53 +3.0	+.22 +2.6	+.07 +2.4	-.16 +3.5	-.34 +4.7		
	+.64 0.5	+.47 1.8	+.22 3.0	+.01 2.2				
			+.33 1.9					
			+.33 3.0					
′ ″			+.34 0.9					
+1 3.14 3.15	+.66 +0.8	+.50 +2.4	+.29 +2.3	+.04 +2.3	-.16 +3.5	-.34 +4.7		
	+2.0	+1.5	+ .9	+ .1	-.5	-1.1		
	2.8^2	3.9^2	3.2^5	2.4^2	3.0^1	3.6^1		
	(13) 56^2	78^2	160^5	48^2	30^1	36^1	408	
	+.3	-.8	-.1	+.7	+.1	-.5		

0 9
1 13

23 21
23 31
23 34
23 53
0 2
0 7
0 13
0 26
0 30
0 32
0 33
0 42
0 43
0 56
1 3
1 5
1 30
1 36
1 39
1 45
1 47
1 48
1 53
1 56
2 0
2 2
2 11
2 19
2 26
2 33
2 36
2 37
2 38
2 42
2 43
2 45
2 50
2 56

2 22

1871 Nov 17 am obs h = ~~+~~−.019 (−14) h′ = −.006 k′ = ~~+~~−.014 n = ~~+~~.22

Star	RA	δ	tang δ	π RA −(R′P)					
	3.18 h m	° ′							
ξ Persei	x7 2.9 57	+38	21 +	.79 √48 (9) + 6.13 √+	.17		+ 6.30	−01	+6.29
β Persei	x6 3.4 0	+40	28 +	.85 √50 + 6.10 √+	.19	~~626~~ 6.248	.29	−01	.28
α Persei	x4 3.2 15	+49	25 +	1.17 √52 + 5.95 √+	.26		.21	−01	.20
o Tauri	x3 3.3 18	+8	35 +	.15 √53 + 6.28 √+	.03		.31	00	.31
ξ Tauri	x3 3.3 20	+9	18 +	.16 √54 + 6.24 √+	.04		.28		.28
f Tauri	x2 3.4 23	+12	30 +	.22 √55 + 6.23 √+	.05		.28		.28
~~ε Eridani~~	~~x 3.4 27~~	~~−9~~	~~53 −~~	~~.17 √56 + 4.97~~ −	~~.04~~		—		
δ Persei	x0 3.6 34	+47	23 +	1.09 √57 + 5.98 √+	.24		.22		.22
η Tauri	x1 3.7 40	+23	43 +	.44 √61 + 6.18 √+	.10		.28		.28
27 Tauri	x1 3.7 42	+23	40 +	.44 √62 + 6.17 √+	.10		.27		.27
ζ Persei	x2 3.8 46	+31	31 +	.61 √63 + 6.11 √+	.13		.24		.24
ε Persei	x2 3.8 49	+39	39 +	.83 √64 + 6.01 √+	.18		.19		.19
ξ Persei	x2 3.8 51	+35	26 +	.71 √65 + 6.14 √+	.16		.30		.30
λ Tauri	x3 3.9 54	+12	8 +	.21 √66 + 6.22 √+	.05		.27	00	.27
Gr. 750	x ~~3.9~~ 58	+85	13 +	11.93 5 ~~68~~					
c Persei	x9 4.0 00	+47	23 +	1.09 √69 + 6.02 √+	.24		.26	+01	.27
γ Tauri	x6 4.2 13	+15	19 +	.27 √70 + 6.26 √+	.06		.32	+01	.33
δ Tauri	x7 4.3 16	+17	15 +	.31 √71 + 6.26 √+	.07	6.268	.33	+01	.34
	3.88		−1′						
	3.62						+6.272		+6.272

3.3 +15 +6.28		3.0	+85 +6.10
3.3 +16 +6.24		3.2	+1.17 +5.95
3.4 +22 +6.23		3.6	+1.09 +5.98
3.7 +44 +6.18		3.8	+83 +6.01
3.7 +44 +6.17		4.0	+1.09 +6.02
3.9 +21 +6.22		3.5	+1.01 +6.01
4.2 +27 +6.26			
4.3 +31 +6.26			
3.7 +28 +6.23			

1871 ☉ Nov. 18 h = −.014 (−29) h′ = −.009 n = +.26
WAR obs −1 h′ = −.001

Star	RA	δ	tang δ						
ω Piscium	23.9 53	+6	10 +	.11 √336 + 5.92 √+	.03	5.84 / 5.824	+5.95	−02	+5.93
α Androm.	19 x8 0.0 2	+28	24 +	.54 √1 + 5.68 √+	.14		.82	−02	.80
γ Pegasi	x5 0.1 47	+14	29 +	.26 √3 + 5.78 √+	.07		.85	−02	.83
π Androm.	x4 0.5 30	+33	2 +	.65 √7 + 5.66 √+	.17	672	.83	−01	.82
ε Androm.	x 0.5 32	+28	38 +	.55 √8 + 5.65 √+	.14		.79	−01	.78
~~ζ Androm.~~	13 x 0.6 ~~42~~	~~+33~~	~~51~~ +	~~1.44~~ √10 5.42 +	.38		.80	−01	.79
ε Piscium	10 x 0.9 56	+7	13 +	.13 √15 + 5.80 ~~5.84~~ √+	.03		.83	−01	.82
β Androm.	9 x 1.0 3	+34	57 +	.70 √16 + 5.61 +07 +	.18		.86	−01	.85
τ Piscium	8 x 1.1 5	+29	26 +	.56 √17 + 5.66 √+	.15	.79	.81	−01	.80
δ Cass.	x6 1.3 18	+59	35 +	1.70 √20 + 5.25 √+	.44		.69	−01	.68
η Piscium	x5 1.4 25	+14	42 +	.26 √22 + 5.78 √+	.07		.85	−00	.85
υ Persei	x4 1.5 30	+48	00 +	1.11 √23 + 5.51 √+	.29		.80		.80
φ Persei	x3 1.6 36	+50	3 +	1.20 (19) √24 + 5.53 √+	.31		.84		.84
o Piscium	x 1.6 39	+8	32 +	.15 √25 + 5.84 √+	.04		.88		.88
ε Cass.	x2 1.7 45	+63	3 +	1.97 √26 + 5.31 √+	.51		.82		.82
γ Arietis	x1 1.8 46	+18	41 +	.34 √28 + 5.87 √+	.09		.96		.96
β Arietis	x1 1.8 48	+20	12 +	.37 √30 + 5.72 √+	.10		.82		.82
α Arietis	x1 2.0 00	+22	52 +	.42 √33 + 5.74 (3) √+	.11		.84		.84
β Triang.	x1 2.0 2	+34	24 +	.68 √34 + 5.59 √+	.18		.77		.77
6 Persei?	[2.1]6	+50	29 +	1.21 √35 + [12.43] +	.31		12.[74]		[12.74]
o Ceti	3 2.2 13	−3	33 −	.06 √35 + 5.91 √−	.02		.89	+00	.89
δ Ceti	x7 2.6 33	−0	13 −	.00 √39 + 5.85 √−	.00		.85	+01	.86
θ Persei	x7 2.6 36	+48	42 +	1.14 √40 + 5.45 √+	.30		.75	+01	.76
γ Ceti	x7 2.6 37	+2	42 +	.05 √41 + 5.85 √+	.01		.86	+01	.87
μ Ceti	x7 2.6 38	+9	35 +	.17 √42 + 5.80 √+	.04		.84	+01	.85
η Persei	x8 2.7 42	+55	22 +	1.45 √43 + 5.38 √+	.38		.76	+01	.77
41 Arietis	x8 2.7 43	+26	45 +	.50 √44 + 5.64 √+	.13		.77	+01	.78
τ Persei	x9 2.8 45	+52	15 +	1.29 √45 + 5.37 √+	.34		.71	+01	.72
η Erid.	x9 2.8 50	−9	24 −	.16 √46 + 5.82 √−	.04		.82	+01	.83
α Ceti	x1.0 2.9 56	+3	36 +	.06 √47 + 5.83 √+	.02		.85	+01	.86
ρ Persei	x1.0 2.9 57	+38	21 +	.79 √48 + 5.59 √+	.21		.80	+01	.81
o Tauri	x1.4 3.3 18	+8	35 +	.15 √53 + 5.76 √+	.04		.80	+01	.81
ξ Tauri	1.4 3.3 20	+9	18 +	.16 √54 + 5.73 √+	.04		.77	+01	.78
f Tauri	x1.5 3.4 23	+12	30 +	.22 √55 + 5.80 √+	.06		.86	+01	.87
ε Erid.	x [3.4]27	−9	53 −	.17 √56 + [4.97] −	.04		4.93	+01	[4.94]
δ Persei	x1.7 3.6 34	+47	23 +	1.09 √57 + 5.46 √+	.28		.74	+01	.75
o Persei	x1.7 3.6 36	+31	53 +	.62 √58 + 5.61 √+	.16		.77	+01	.78
ξ2 Ceti	.5 2.4 2	+7	54 +	.14 √37 + 5.85 √+	.04		.89	+00	.89
β Persei	1.1 3.0 0	+40	28 +	.85 √50 + 5.58 √+	.22	~~5.13~~ 5.807	.80	+01	.81
	2.80 1.91	−1′					+5.815		+5816

Gr 29 = B+6		0.1 9	+76	15 +	4.10 √ + 4.95 √ −		219	334 8
κ Cass	x	0.4 26	+62	14 +	1.90 √ + 5.36 .4 √.31 +	5.67		5
~~α Cass~~	x	~~0.6 33~~	~~+55~~	~~51 +~~	~~1.47 √ + 5.42 .4 .38~~	~~5.80~~		
21 Cass	x	0.6 37	+74	18 +	3.56 √ + 4.86 √ −		.281	340
~~η Cass~~	x	~~0 42~~	~~+57~~	~~9 +~~	~~1.55 √~~			
γ Cass	x	0.8 49	+60	2 +	1.73 √ + 5.34 .4 √.45	5.79		13
Polaris	x	1.2 13	+88	39 (7) +	~~42.49~~ 41.43 √			~~19~~
50 Cass.	x	1.9 53	+71	49 +	3.04 √ + 5.21 √ −			31
36 H Cass	x	2.4 26	+72	16 +	3.13 √ + 4.94 √ −		294	38
48 H Cephei	x	3.1 5	+77	16 +	4.44 (2) √ + 4.54 √ −		299	360
				−1′				

239 +11 +5.92	0.4	+1.90 +5.36	0.1	+4.10 +4.95	.00 .00
0.1 +26 +5.78	0.6	+1.47 +5.42	0.6	+3.56 +4.86	
0.9 +13 +5.80	0.8	+1.73 +5.34	1.9	+3.04 +5.21	
1.4 +26 +5.78	1.3	+1.70 +5.25	2.4	+3.13 +4.94	
1.6 +15 +5.84	1.5	+1.11 +5.51	3.1	+4.42 +4.54	.00 .00
1.8 +34 +5.87	1.6	+1.19 +5.53			
1.8 +37 +5.72	1.7	+1.97 +5.31			
2.0 +42 +5.73	~~2.1~~	~~+1.21 +12.43~~			
2.2 −06 +5.91	2.6	+1.14 +5.45			
2.4 +14 +5.85	2.7	+1.45 +5.38			
2.6 +00 +5.85	2.8	+1.29 +5.37			
2.6 +05 +5.85	3.6	+1.09 +5.46			
2.6 +17 +5.80	1.8	+1.46 +5.40	n5 = +31		
2.8 −16 +5.82					
2.9 +06 +5.83					
3.3 +15 +5.76					
3.3 +16 +5.73					
3.4 +22 +5.80					
[3.4 −17 +4.97]					
2.1 +.15 +5.81					

0 = + 3.95 − 86 n = + 22 +20
+ 3.41 − .95 +.28 +27
+ 2.89 − .60 +.21 +24
+ 2.98 − 87 +.29 +29
+ 4.27 − 1.27 +.30 +30

.26

0 = + 2.64 − .45 n = + .17
+ 2.10 − .54 +.26
+ 1.58 − .19 + .12
+ 1.67 − .46 + .28
+ 2.96 − .86 + .29

.27

	R.A.		sin z	Req–Rfl	P′–P	Req–Rfl + P′–P
	h	m		"	"	"
	2	57				
	3	0				
	3	15				
	3	18				
	3	20				
	3	23				
	3	27				
	3	34				
	3	40				
	3	42				
	3	46				
	3	49				
	3	51				
	3	54				
	3	57				
	4	0				
	4	13				
	4	16				
334 8	23	53				
5	0	2				
	0	7				
340	0	30				
	0	32				
13	0	33				
~~19~~	0	56				
31	1	3				
38	1	15				
360	1	18				
	1	25				
	1	30				
	1	36				
	1	39				
	1	45				
	1	46				
	1	48				
	2	0				
	2	2				
	2	6				
	2	13				
	2	33				
	2	36				
	2	37				
	2	38				
	2	42				
	2	43				
	2	45				
	2	50				
	2	56				
	2	57				
	3	18				
	3	20				
	3	23				
	3	27				
	3	34				
	3	36				
	2	22				
	3	0				

R.A.		sin z	Req–Rfl	P′–P	Req–Rfl + P′–P
			"	"	"
0	9				
0	26				
~~0~~	~~33~~				
0	37				
0	42				
0	49				
1	13				
1	53				
2	26				
3	5				

1871 Nov 18 WAR Obs h = ~~−~~.014 n = h′ = −.003 n = +.32
h′ = −.001

Star		Ra	δ	tang δ	π Ra −(ρ′−ρ)			
		h m	° ′					
17 Tauri	x²	3.6 37	+23 43 +	.44 √60	+ 5.69√	+ .14	+5.83	00
η Tauri	x¹	3.7 40	+23 43 +	.44 √61	+ 5.68√	+ .14	.82	
27 Tauri	x¹	3.7 42	+23 40 +	.44 √62	+ 5.60√	+ .14	.74	
ζ ~~Tauri~~ Persei	¹ ⁰	3.8 46	+31 31 +	.61 √63	+ 5.59√	+ .20	.79	
ε Persei	x⁰	3.8 49	+39 39 +	.83 √64	+ 5.58√	+ .26	.84	
ξ Persei	x⁰	3.8 51	+35 26 +	.71 √65	+ 5.60√	+ .23	.83	
λ Tauri	x¹	3.9 54	+12 8 +	.21 √66	+ 5.78√	+ .07	.85	00
Gr. 750	x×	~~3.9~~ 58	+85 13 +	11.9 ×5 √68				
~~16 Pegasi~~ ?		~~21 47~~	~~+25 20 +~~	~~.47~~√				
		3.76					+5.814	+5.814

1.2 + 41.43 −4.44 .00 .00 −4.44 −4.44
14.8 + 3.65 +4.42 +.01 +.01 +4.43 +4.43

1871 Nov. 18 WAR Obs

Star		Ra	δ	tang δ	π Ra −(ρ′−ρ)	
		h m	° ′			
α Urs Min	x	1.2 13	+88 39 +	41.43√	−4.44√	— 19 247
β Urs Min	x	14.8 51	+74 40 + +1′	3.65√	+4.42√	— 198

3.6 +44 +5.69   3.8 +83 +5.58
3.7 +44 +5.68
3.7 +44 +5.60
3.9 +21 +5.78
3.7 +38 +5.69   n5 = +.24

0 = +41.05 −10.13 n = +.25 +25
+3.27 −1.26 +.39 +40
32

0 = +40.60 −10.02 n = +.25
+2.82 −1.15 +.41
.33

1871 Nov. 19 WAR Obs h = ~~+~~.013 +16 h′ = +.003 6 n = +.31
h′ = +.001

Star		Ra	δ	tang δ					
β Aquarii	21.95	21.4 25	−6 7 −	.11 √307	+ 5.53√−	.03	+5.50	+01	+5.51
16 Pegasi	12	21.8 47	+25 20 +	.47 √518	+ 5.32√+	.15	5.480 .47	+01	.48
α Aquarii	12	21.8 49	−0 56 −	.02 √314	+ 5.54√−	.01	.53	+01	.54
ι Pegasi	10	22.0 61	+24 44 +	.46 √312	+ 5.32√+	.14	.46	+01	.47
θ Pegasi	9	22.1 04	+5 35 +	.10 √314	+ 5.42√+	.03	.48 .45	+01	.46
θ Aquarii	8	22.2 10	−8 24 −	.15 √522	+ 5.47√−	.05	.42	+00	.42
γ Aquarii	8	22.2 15	−2 1 −	.03 √4317	+ 5.54√−	.01	.53	−00	.53
~~η Pegasi~~	−1.6	~~22.6 37~~	~~+29 34 +~~	~~.57~~√			.42	−01	.41
13 Lacertae		22.6 38	+41 10 +	.87 √528	+ 5.20√+	.27	.47	+00	.47
α Androm	−1.0	0.0 2	+28 24 +	.54 √1	+ 5.32√+	.17	.49	−01	.48
~~22 Androm~~		~~0.1 4~~	~~+45 23 +~~	~~1.01~~ √337	+ 5.13 +	.31	.44	−01	.43
γ Pegasi	−1.4	0.1 7	+14 29 +	.26 √3	+ 5.45√+	.08	.53	−01	.52
α Androm	−1.7	0.7 42	+23 35 +	.44 √11	+ 5.38√+	.14	5.493 .52	−01	.51
	0.11 22.90 0.1	22.89					.58	−01	.57
							+5.486		+5.486

22.4 −4.13 +6.68 .00 .00 +6.68 +6.68
0.6 +3.56 +4.47 .00 .00 +4.47 +4.47
1.2 + 41.43 −5.95 .00 .00 −5.95 −5.95
13.2 −41.43 +20.53 −.01 −.01 +20.52 +20.52

Star		Ra	δ	tang δ			
ξ Cephei	x	22.1 06	+57 35 +	1.58 7√	+ 4.99√ + √.49 + 5.48		316
9H Draco	2c √	22.4 24	+76 23 −	4.13√	+ 6.68√	—	150
α Cass	√	0.6 33	+55 51 +	1.487√	+ 4.96√ √.46	5.42	10
21 Cass	x ×	0.6 37	+74 18 +	3.56√	+ 4.47√	—	340
0 ~~Cass~~		0 ~~41 +47~~	36	~~+ 4.57 7.10~~ √			
η Cass	×	0.7 42	+57 9 +	1.55 √	+ 5.19 √.09 + .48	5.58	12
α Urs Min	×	1.2 13	+88 39 +	41.43√	− 5.95√	—	19
α Urs Min	S.C.	1.2 13	+91 22 −	41.43√	+ 20.53√	—	19

21.4 −11 +5.53   0.1 +1.01 +5.13
21.8 −02 +5.54   22.1 +1.57 +4.99
22.1 +10 +5.42   22.6 +87 +5.20
22.2 −15 +5.47   0.6 +1.47 +4.96
22.2 −04 +5.54   0.7 +1.55 +5.10
0.1 +26 +5.45   ~~23.5 +1.36 +5.08~~
22.3 +01 +5.49   23.6 +1.29 +5.06
n5 = +.34

0 = +3.55 −1.02 n = +.29 +28
+41.42 −11.44 +.28 +28

0 = −4.14 +1.19 n = +.29 +29
−41.44 +15.03 +.36 +37
33

0 = +2.27 −.59 n = +.26
+40.14 −11.01 +.27

0 = −5.42 +1.62 n = +.30
−40.14 +15.46 +.38 .34

1871 Nov. 22 WAR Obs h = ~~+~~.010 + 20 h′ = ~~+.006~~ +.023 n = +.21
h′ = +.005

Star		Ra	δ	tang δ					
	22.12 +6 22.1						.50	+01	+4.51
θ Aquarii	√5	22.2 10	−8 24 −	.15 √522	+ 4.68√−	.03	+4.65	+01	.66
γ Aquarii	√5	22.2 15	−2 1 −	.03 √4317	+ 4.67√−	.01	~~4.62~~ .66	+01	.67
β Lacertae	4	22.3 19	+51 36 +	1.26 √524	+ 4.26√+	.26	4.588 .52	+01	.53
η Aquarii	2	22.5 29	−0 46 −	.01 √320	+ 4.68√−	.00	.68	+01	.69
ζ Pegasi	√	22.6 35	+10 11 +	.18 √321	+ 4.62√+	.04	.66	−00	.66
η Pegasi	x¹	22.6 37	+29 34 +	.57 √322	+ 4.46√+	.12	.58		.58
13 Lacertae	x⁰	22.6 39	+41 10 +	.87 √528	+ 4.30√+	.18	.48		.48
λ Pegasi	x	22.7 41	+22 54 +	.42 √323	+ 4.47√+	.09	.56	+00	.56
α Androm	x −3	0.0 2	+28 24 +	.54 √1	+ 4.55√+	.11	.66	−03	.63
22 Androm	x −4	0.1 4	+45 23 +	1.01 √337	+ ~~5.13~~ 4.37 √+	.21	4.625 .59	−03	.56
	0.05	22.72					+4.595		+4.594

22.4 −4.13 +5.44 +.00 +.00 +5.44 +5.44
0.1 −4.84 +5.68 −.01 −.01 +5.67 +5.67

Star		Ra	δ	tang δ			
ξ Cephei	x	22.1 7	+57 35 +	1.57√	+ 4.17√ + 4.33	+4.50	316
9H Draco	S.C. √	22.4 23	+76 23 −	4.13√	+ 5.44√		150
4H Draco	S.C. x	12.1 6	+78 19 −	4.84√	+ 5.68√		168

22.2 −15 +4.68   22.1 +1.57 +4.17
22.2 −04 +4.67   22.3 +1.26 +4.26
22.5 −01 +4.68   22.6 +87 +4.30
22.6 +18 +4.62   0.1 +1.01 +4.37
~~0.1 +1.01 +4.37~~   22.8 +1.18 +4.28   n5 = +.33
22.4 −01 +4.66

0 = −4.12 +.78 n = +.19 +20
−4.83 +1.01 +.21 +22

0 = −5.31 +1.16 n = +.22
−6.02 +1.39 +.23

sin z = +.60 +.80 | +.40 +.60 | +.20 +.40 | +0 +.20 | +0 −.20 | −.20 −.40 | −.40 −.60 | −.60 −.80

1871 Nov 18

RA h	m	sin z	$R_{gq}-R_{fl}$ ′	″	θ′−θ ″	$R_{gq}-R_{fl}+\theta''-\theta$ ″
3	37					
3	40					
3	42					
3	46					
3	49					
3	51					
3	54					
3	58					
21	47					

RA h	m	sin z	$R_{gq}-R_{fl}$ ′	″	θ′−θ ″	$R_{gq}-R_{fl}+\theta''-\theta$ ″
1	13					
14	51					

	RA h	m	sin z	′	″				
316	21	25	+.75	+0	59.9	+.2	0.1	+2.3	~~3.4~~ 2.4
150	21	47	+.29	1	1.4	+.4	1.8	+1.0	2.8
10	21	59	+.69		1.9	−.1	1.8	+2.2	4.0
340	22	1	+.30		2.2	−.3	1.9	+1.0	2.9
	22	4	+.60	0	59.9	+.2	0.1	+1.8	1.9
12	22	10	+.77		~~59.7~~				
19	22	15	+.70		2.5	−.4	2.1	+2.2	~~3.3~~ 4.3
19	22	37							
	22	38	+.02		4.8	−.8	4.0	+.1	4.1
	0	2	+.24		2.5	−.1	2.4	+.8	3.2
	0	4	−.05		4.4	−.1	4.3	−.2	4.1
	0	7	+.47		1.2	+.4	1.6	+1.5	3.1
	0	40	+.32						
								(40)	3.28

RA h	m	sin z	′	″				
22	6	−.26	+1	3.6	+.4	4.0	−.8	3.2
22	24	−.88	+0	45.7	−.6	(45.1)	−2.7	(42.4)
0	33	−.23	1	4.9	+.6	5.5	−.7	4.8
0	37	−.53		4.3	+1.1	5.4	−1.6	3.8
0	41	~~−.25~~		~~3.2~~				
0	42	−.25		3.2	+.8	4.0	−.7	3.3
1	13							
1	13							
							(4)	3.78

sin z =	+.60 +.80	+.40 +.60	+.20 +.40	+0 +.20	+0 −.20	−.20 −.40	−.40 −.60	−.60 −.80
	+.75 +0.1	+.47 +1.6	+.29 +1.8	+.02 +4.0	−.05 +4.3	−.26 +4.0	−.53 +5.4	
	+.69 1.8		+.30 1.9			−.23 5.5		
	+.60 0.1		+.24 2.4			−.25 4.0		
	+.70 2.1		~~+.32~~					
	+.68 +1.0	+.47 +1.6	+.28 +2.0	+.02 +4.0	−.05 +4.3	−.25 +4.5	−.53 +5.4	
	+2.2	+1.5	+.9	+.1	−.2	−.8	−1.7	
	3.2 4	3.1 1	2.9 3	4.1 1	4.1 1	3.7 3	3.7 1	476
(14)	12 8	31	87	41	41	111	37	
	+.2	+.3	+.5	−.7	−.7	−.3	−.3	

+1′ 3.40″
3.42

	RA h	m	sin z	′	″				
316	22	10	+.77	+0	59.7	+.5	0.2	+2.4	2.6
150	22	15	+.70		1.4	−.4	1.0	+2.2	3.2
168	22	19	−.16		5.5	+.2	(5.7)	−.6	(5.1)
	22	29	+.68	0	59.3	−.1	59.2	+2.1	1.3
	22	35	+.53	1	0.8	−.5	0.3	+1.7	2.0
	22	37	+.22		2.2	−.2	2.0	+.8	2.8
	22	39	+.02		2.4	−.8	1.6	+.1	1.7
	22	41	+.33		2.1	−.0	2.1	+1.1	3.2
	0	2	+.24		1.7	−.1	1.6	+.8	2.4
	0	4	−.05		3.1	−.1	3.0	−.2	2.8
								(9)	2.44

RA h	m	sin z	′	″				
22	7	−.26	+1	2.9	+.4	3.3	−.8	2.5
22	23	−.88		4.2	−.6	3.6	−2.8	~~1.0~~ 0.8 ✓
12	6	−.86		5.4	−.3	5.1	−2.7	2.4 ✓
							(1)	2.50

sin z =	+.60 +.80	+.40 +.60	+.20 +.40	+0 +.20	+0 −.20	−.20 −.40	−.40 −.60	−.60 −.80
	+.77 +0.2	+.53 +0.3	+.22 +2.0	+.02 +1.6	−.05 +3.0	−.26 +3.3		
	+.70 1.0		+.33 2.1					
	+.68 59.2		+.24 1.6					
	+.72 +0.1	+.53 +0.3	+.30 +1.9	+.02 +1.6	−.05 +3.0	−.26 +3.3		
	+2.3	+1.7	+1.0	+.1	−.2	−.9		
	2.4 3	2.0 1	2.9 3	1.7 1	2.8 1	2.4 1		248
10	72	20	87	17	28	24		
	+.1	+.5	−.4	+.8	−.3	+.1		

+1′ 2.48″
2.45

1871 Nov 23 h = ~~+~~.012 (+50) h' = +.003 l' = −.008 (~~−.030~~) n = +.18

Star		WAR obs. Ra h m	δ ° '	tang δ					
~~θ Aquarii~~	✓	~~22~~ 15	~~−2~~ 1−	~~.03⁴ ✓317 +4.33~~	~~0~~		[4.33]		
η Aquarii	✓	22.5 29	−0 46−	.02 ✓320 +4.54 ✓	.00		+4.54	00	
ζ Pegasi	✓	22.6 35	+10 11+	.18 ✓321 +4.45 ✓+	.05	~~4.46~~	.48		
η Pegasi	✓	22.6 37	+29 34+	.57 ✓322 +4.32 ✓+	.10	4.472	.42		
λ Pegasi	✓	22.7 40	+22 54+	.42 ✓323 +4.37 ✓+	.08		.45		
α Piscis		~~22.8~~ 51							
ο Androm.	✓	22.9 56	+41 39+	.89 ✓327 +4.18 ✓+	.16		.34		
α Pegasi	✓	22.9 58	+14 32+	.26 ✓329 +4.45 ✓+	.05		.50		
γ Piscium	✓	23.2 11	+2 36+	.04 ✓330 +4.43 ✓+	.01		.44		
τ Pegasi	✓	23.2 14	+23 3+	.42 ✓531 +4.47 ✓+	.08		.55		
υ Pegasi	✓	23.3 19	+22 43+	.42 ✓532 +4.36 ✓+	.08		.44		
λ Androm.	✓	23.5 31	+45 47+	1.03 ✓334 +4.21 +.08+	.18		.47		
φ Persei	×	~~1.6~~ 36	+50 3+	1.19 ✓24					
ο Piscium	×	~~1.6~~ 39	+8 32⁰+	.15 ✓25					
ε Cass.	×	1.8 45	+63 3+	1.96 ✓26					
ι Piscium	✓	23.6 33	+5⁴ −1 57+	.09 ✓333 +4.51 ✓+	.02	4467 4.44	.53	00	
		23.53 23.00							

22.4−4.13 +5.16 +00 +00 +5.16 +5.16 +4.469 +4.469
22.8+2.20 +4.06 +00 +00 +4.06 +4.06
23.4−2.77 +4.84 −00 +00 +4.84 +4.84
1.2+41.41 −3.41 −01 −00 −3.42 −3.41

1871 Nov 23

Star		WAR obs. Ra h m	δ ° '	tang δ	π Ra (P'−P)		
θ Draco	S.C. ✓	22.4 24	+76 23−	4.13 ✓	+5.16 ✓	−	150
ι Cephei	✓	22.8 45	+65 33+	2.29 ~~+.19~~ ✓	+4.06 ✓	−	325
λ Draco	S.C. ✓	23.4 23	+70 3−	2.757 ✓	+4.84 ✓	−	162
α Urs. Min.	×	1.2 13	+88 39+	41.41 ✓	−3.41 ✓	−	19
43 Cass.	×	1.6 33	+67 25+ −2'	1.40 ✓	+3.92 ✓ + ✓.25	+ 4.17]	348
α Urs. Min.	×						

22.5−01 +4.54 22.9 +89 +4.18
22.6+18 +4.45 23.5 +1.01 +4.27⁹
22.9+26 +4.45 1.6 +1.40 +3.92
23.2+04 +4.43 0.0 +1.10 +4.10
23.2+42 +4.47
23.3+42 +4.36
23.6+09 +4.51
23.0+20 +4.46

0 = +2.00 −.40 n = +.20 +20 0 = −4.33 +.70 n = +.16 +.18
+41.21 −7.88 +.19 +19 −2.97 +.38 +.13 +16

0 = +1.10 −.04 n = +.04] −5.23 +1.06 n = +.20
+40.31 −7.51 +.19 −3.87 +.74 +.19

+1

1871 Nov. 25 h = ~~+~~.015 (−6) h' = +.001 l' = −.006 (.003) c = +.05 n = +.27

WAR Obs.									
~~α Lacertae~~	+1.2 22.6 22.4 26	+49 38+	1.18 ✓154 ³¹⁹ +3.47 ✓+	.32	−.08	+3.66 (3.627)	−01	+3.65
η Aquarii	✓ 1.1 22.5 29	−0 46−	.02 ✓100 ³²⁰ +3.74 ✓	.00	−.05	.69	−01	.68
ζ Pegasi	✓ 1.0 22.6 35	+10 11+	.18 ✓102 ³²¹ +3.60 ✓+	.05	−.05	.60	00	.60
η Pegasi	✓ 1.0 9 22.6 37	+29 34+	.57 ✓115 ³²² +3.54 ✓+	.15	−.06	.63		.63
λ Pegasi	✓ 9 22.7 40	+22 54+	.42 ✓109 ³²³ +3.54 ✓+	.11	−.05	.60		.60
ο Androm. ~~α Piscis~~	✓ 7 22.9 56	+41 39+	.89 ✓134 ³²⁷ +3.38 ✓+	.24	−.07	.55		.55
α Pegasi	✓ 7 22.9 58	+14 32+	.26 ✓103 ³²⁹ +3.64 ✓+	.07	−.05	.66		.66
γ Piscium	✓ 4 23.2 11	+2 36+	.04 ✓100 ³³⁰ +3.76 ✓+	.01	−.05	.72		.72
τ Pegasi	✓ 3 23.2 14	+23 3+	.42 ✓109 ⁵³¹ +3.54 ✓+	.11	−.05	.60		.60
υ Pegasi	✓ 1 23.3 19	+22 43+	.42 ✓108 ⁵³² +3.55 ✓+	.11	−.05	.61		.61
λ Androm.	✓ 23.5 31	+45 47+	1.08 ✓147 ³³¹ +3.39 +.08+	.27	−.07	~~.66~~ 67		.67
γ Piscium	× −1.8 1.4 24	+14 42+	.26 ✓103 ²² +3.60 ✓+	.07	−.05	.62		.62
υ Persei	× −1.9 1.5 30	+48 00+	1.11 ✓144 ²³ +3.38 ✓+	.30	−.07	.61	00	.61
φ Persei	× −2.0 1.6 35	+50 3+	1.19 ✓156 ²⁴ +3.31 ✓+	.32	−.08	.55	+01	.56
ο Piscium	× −3.0 1.6 38	+8 32⁰+	.15 ✓101 ²⁵ +3.60 ✓+	.04	−.05	.59	+01	.60
	0.41 23.59					3.621		

22.8+2.20 +3.12 .00 .00 +3.12 +3.12 +3.624 +3.624
23.4−2.77 +4.18 +4.18 +4.18
23.6+4.30 +2.78 +2.78 +2.78
1.2+41.41 −5.86 .00 .00 −5.86 −5.86

β Cephei		22.5 30					
ι Cephei	✓	22.8 45	+65 33+	2.28 ~~+.14~~ ✓	+3.12 ✓	−	325
λ Draco	S.C. ✓	23.4 23	+70 3−	2.757 ✓	+4.18 ✓	−	162
γ Cephei	✓	23.6 34	+76 56+	4.30 ✓	+2.78 ✓	−	334
α Urs. Min.	×	1.2 13	+88 39+	41.41 ✓	−5.86 ✓	−	19
43 Cass.	×	1.5 32	+67 25³+	1.40 .26	+3.19 ✓ + ✓.38 −13 +3.44)		348

22.5−01 +3.74 22.4 +1.18 +3.42
22.6+18 +3.60 22.9 +89 +3.38
22.9+26 +3.64 23.5 +1.01 +3.39 47
23.2+04 +3.76 1.5 +1.11 +3.38
23.2+42 +3.54 1.5 +1.40 +3.19
23.3+42 +3.55 1.6 +1.19 +3.31
1.4+26 +3.60 0.2 +1.13 +3.345
1.6+15 +3.60 n5 = .29
23.6+22 +3.64³

0 = +1.98 −.51 n = +.26 0 = −2.99 +.55 n = +.18
+4.08 −.85 +.21
+41.19 −9.47 +.23 +23

0 = +1.07 −.23 n = +.21 0 = −3.90 +.83 n = +.21
+3.17 −.57 +.18
+40.28 −9.21 +.23 +21

+1

sin z =	+.60+.80	+.40+.60	+.20+.40	+0+.20	+0−.20	−.20−.40	−.40−.60	−.60−.80

	RA	sin z	R_{eq}	R_{ff}	ρ'−ρ	$R_{eq}-R_{ff}+\rho'-\rho$		
	h m		′	″	″	″		
150	~~22 15~~	+~~.70~~	+ ~~0~~	~~49.2~~	~~−.4~~	~~48.8~~	+.21	[50.9]
325	22 29	+.68		48.7	−.1	(48.6)	+.21	(50.7)
162	22 35	+.53	1	0.6	−.5	0.1	+.16	1.7
19	22 37	+.22		1.2	−.2	1.0	+.8	1.8
[7] 348	22 40	+.33		0.8	−.0	0.8	+1.1	1.9
	22 51							
	22 56	+.01		3.1	+.4	3.5	+.0	3.5
	22 58	+.47		0.1	−.6	59.5	+1.5	1.0
	23 11	+.64	0	59.0	−.2	58.8	+1.9	[0.7]
	23 14	+.33	1	1.1	+.1	1.2	+1.1	2.3
	23 19	+.34	0	59.7	+.2	59.9	+1.1	1.0
	23 31	−.06	1	3.2	+.7	3.9	−.2	3.7
	1 36							
	1 39							
	1 45							
+.18 +.16	23 33	+.61	0	57.7	+.1	57.8	+1.9 (10)	(59.7) ~~1.73~~ 2.11

RA	sin z	R_{eq}	R_{ff}	ρ'−ρ	$R_{eq}-R_{ff}+\rho'-\rho$		
h m		′	″	″	″		
22 24	−.88	+1	5.4	−.6	4.8	−2.57	2.81 ✓
22 45	−.39		2.8	+1.0	3.8	−1.3	2.5
23 23	−.92		7.4	−.8	6.6	−2.09	4.6 37 ✓
1 13							
1 33	−.42		4.9	−.4	4.5	−1.4 (2)	3.1 2.80

+.60+.80		+.40+.60		+.20+.40		+0+.20		+0−.20		−.20−.40		−.40−.60		
+.64	+58.8	+.53	+0.1	+.22	+1.0	+.01	+3.5	−.06	+3.9	−.39	+3.8	−.42	+4.5	
+.61	57.8	+.47	59.5	+.33	0.8									
				+.33	1.2									
				+.34	59.9									
+.62	+58.3	+.50	+59.8	+.30	+0.7	+.01	+3.5	−.06	+3.9	−.39	+3.8	−.42	+4.5	
	+2.0		+1.6		+1.0		+.0		−.2		−1.3		−1.4	
	0.3	2	1.4	2	1.7	4	3.5	1	3.7	1	2.5	1	3.1	
(12)	6		28		68		35		37		25		31	2.90
	+1.6		+.5		+.2		−.16		−1.8		−.6		−1.2	

+1′ ~~2.42~~″ ~~1.92~~ 2.25 1.91

RA	sin z	R_{eq}	R_{ff}	ρ'−ρ	$R_{eq}-R_{ff}+\rho'-\rho$		
22 26	−.13	+1	1.2	+.6	1.8	−.5	[1.3]
22 29	+.68		3.1	−.1	3.0	+2.2	[5.2]
22 35	+.53		2.8	−.5	2.3	+1.7	4.0
22 37	+.22		2.7	−.2	2.5	+.8	3.3
22 40	+.33		3.3	−.0	3.3	+1.1	[4.4]
22 56	+.01		3.5	+.4	3.9	+.0	[3.9]
22 58	+.47		2.7	−.6	2.1	+1.6	3.7
23 11	+.64	0	59.9	−.2	59.7	+2.0	1.7
23 14	+.33	1	2.1	+.1	2.2	+1.1	3.3
23 19	+.34		2.0	+.2	2.2	+1.1	3.3
23 31	−.06		1.6	+.7	2.3	−.2	2.1
1 24	+.46		1.0	−.2	0.8	+1.5	2.3
1 30							
1 35	−.13		1.3	+.5	1.8	−.5	1.3
1 38	+.56	0	59.8	+.4	0.2	+1.8	2.0 (14) 2.985

325
162
334
−19
(44) 348

RA	sin z	R_{eq}	R_{ff}	ρ'−ρ	$R_{eq}-R_{ff}+\rho'-\rho$		
22 30		+1					
22 45	−.39		3.5	+1.0	4.5	−1.3	3.2
23 23	−.92		6.5	−.8	5.7	−2.9	~~3.0~~ 2.8 ✓
23 34	−.57		3.8	+.3	4.1	−1.8	2.3
1 13							
1 32	−.42		4.1	−.4	3.7	−1.4 (3)	2.3 2.60

+.60+.80		+.40+.60		+.20+.40		+0+.20		+0−.20		−.20−.40		−.40−.60		
+.68	+3.0	+.53	+2.3	+.22	+2.5	+.01	+3.9	−.13	+1.8	−.39	+4.5	−.57	+4.1	
+.64	59.7	+.47	2.1	+.33	3.3			−.06	2.3			−.42	3.7	
		+.46	0.8	+.33	2.2			−.13	1.8					
		+.56	0.2	+.34	2.2									
+.66	+1.4	+.50	+1.4	+.30	+2.6	+.01	+3.9	−.11	+2.0	−.39	+4.5	−.50	+3.9	
	+2.2		+1.7		+1.0		+.0		−.4		−1.3		−1.7	
	3.6		3.1		3.6		3.9		1.6		3.2		2.2	
(17)	72	2	124	4	144	4	39	1	48	3	32	1	44	2	51 3
	−.6		−.1		−.6		−.9		+1.4		−.2		+.8	

+1′ 2.96″ ~~2.90~~ ~~2.4~~ 2.58

1871 Nov. 27 WAR obs h = ~~+~~ −.018 h' = −.002 h' = −.005 n = +.20

Star Ra δ tang δ π Ra −(ρ'−ρ)

m s ° '
γ Piscium × 23.2 11 + 2 36 + .04 ✓ 330 + 2.94 ✓ + .01 +2.95 00
ι Pegasi × 23.2 14 + 23 3 + .42 ✓ 531 + 2.91 ✓ + .08 .99 00
23.20 +2.970 +2.970

23.3 +1.51 +2.66 00 .00 +2.66 +2.66

1871 Nov 27 WAR obs

Star Ra δ tang δ π Ra −(ρ'−ρ)

Br. 3077 23.17 + 56° 29' −2 + 1.51 ✓ + 2.66 ✓ − 530

23.2 +04 +2.94
23.2 +42 +2.91
23.2 ~~+43~~ .23 +2.92

0 = +1.28 −26 n = +.20

1871 Nov. 28 R h = ~~+~~ −.018 +12 h' = −.022 h' = −.007 n = +.25

22.10 + 4
θ Aquarii ✓ 3 22.2 15 − 2 1 − .03 317 + 2.71 ✓ − .01 + 2.70 00 +2.70
3 Lacertae ✓ 3 22.3 19 + 51 36 + 1.26 524 + 2.31 ✓ + .31 2.632 .62 .62
7 α Lacertae ✓ 2 22.4 26 + 49 38 + 1.18 319 + 2.28 ✓ + .30 58 .58
η Aquarii ✓ 1 22.5 28 − 0 46 − .01 320 + 2.79 ✓ − .08 .79 .79
ζ Pegasi ✓ 0 22.6 35 + 10 11 + .18 321 + 2.64 ✓ + .04 68 .68
13 Lacertae ✓ 9 22.6 38 + 41 10 + .87 528 + 2.36 ✓ + .22 .58 .58
μ Pegasi ✓ 1 22.7 44 + 23 57 + .44 324 2.48 ✓ + .11 .59 .59
λ Aquarii ✓ 2 22.8 45 − 8 15 − .14 5 326 + 2.78 ✓ − .04 .74 .74
α Pisc. Aust. ~~22.8 51~~
ο Androm. −3 ✓ 22.9 56 + 41 39 + .89 ✓ 327 + 2.32 ✓ + .22 .54 .54
α Pegasi −4 ✓ 22.9 59 220 + 14 32 + .26 ✓ 329 + 2.58 ✓ + .06 .64 00 .64
λ Androm. −9 23.5 31 + 45 47 + 1.03 ✓ 334 + 2.33 + 08 + .25 .66 + 01 .67
22.9 ~~+12~~ 23.8 .58 + 01 .59
ε Pegasi ~~+10~~ 21.6 37 ~~+11~~ 9 17 + .16 ✓ 309 + 2.55 ✓ + .04 .54 − 01 .58
π² Cygni + 9 21.7 42 ~~+47~~ 48 43 + 1.14 ✓ 517 + 2.19 ✓ + .28 2.626 .47 − 01 .46
α Aquarii + 6 ~~+~~ 59 220 − ~~1.0~~ .56 − .02 ✓ 311 + 2.64 ✓ − .00 ~~2.63~~ .64 00 .64
21.4 −2.81 +3.32 .00 .00 0 57 +3.32 +3.32 h
23.6 +4.30 +1.67 .00 .00 +1.67 +1.67 22.57 +2,627 +2627

γ Cephei ✓ 23.6 34 + 76 56 + 4.30 ✓ + 1.67 ✓ − 334
ρ Cass. ✓ 23.8 48 + 56 48 + 1.53 ✓ + 2.20 ✓ + ✓ .38 +2.58 539
d Urs. Maj's S.C. ✓ 9.4 23 ~~+110~~ 70 24 − 2.81 ✓ + 3.32 ✓ − 418

21.7 +1.14 +2.19
21.6 +16 +2.55 22.3 +1.26 +2.31
22.0 −02 +2.64 22.4 +1.18 +2.28
22.2 −04 +2.71 22.6 +.87 +2.36
22.5 −01 +2.79 22.9 +.89 +2.32
22.6 +18 +2.64 23.5 +1.01 +2.33 41
23.0 +26 +2.58 23.8 +1.53 +2.20
22.3 +09 +2.65 22.7 +1.13 +2.289 m = .34

0 = +4.21 −.98 n = +.23 +22 0 = −2.90 +67 n = +.23 +24

0 = +3.17 +62 n = +.20 0 = −3.94 +1.03 n = +.26

1871 Nov. 29 AM obs h = ~~+~~ −.026 −38 h' = −.009 h' = −.014 n = ~~+.20~~ +.23

+ 3 0.4
α Androm. + 7 0.0 2 + 28 24 + .54 ✓ 1 + 1.96 ✓ + .12 .16 00 +2.16
α Cass. ✓ 1 0.6 33 + 55 51 + 1.48 7 ✓ 10 + 1.69 ✓ + .34 +2.08 − 01 2.07
.03 2.03
γ Androm. 9 0.7 41 + 23 35 + .44 ✓ 11 + 1.97 ✓ + .10 .07 2.07
ε Piscium −2 ✓ 0.9 56 + 7 13 + .13 ✓ 15 + 2.08 ✓ + .03 .11 2.11
β Androm. −3 1.0 3 + 34 57 + .70 ✓ 16 + 1.84 + 07 + .16 .07 2.07
δ Piscium −4 1.1 5 + 29 26 + .56 ✓ 17 + 1.87 ✓ + .13 2.50 + 01 2.01
−1 0.8 0.69 1.95 00 1.95
21.4 +2.75 +1.79 −.03 −.03 +1.76 +1.76 +2.067 +2.067
0.5 −2.83 +2.50 −.00 .00 +2.50 +2.50
1.2 +41.42 −9.55 +00 +01 −9.55 −9.54
0.6 +3.55 +1.29 00 +3.55 +3.55

β Cephei × 21.4 27 + 70 −1' 1 + 2.75 ✓ + 1.79 ✓ − 308
α Cass. ✓ 0.4 28 + 62 14 + 1.90 ✓ + 1.72 ✓ + ✓ .44 +2.16 5
× Draco S.C. ✓ 0.5 28 + 74 17 − 2.83 ✓ + 2.50 ✓ − 171
21 Cass. ✓ 0.6 37 ~~+47~~ +74 ~~+ 1.09~~ 355 + 1.29 ✓ 340
γ Cass. ✓ 0.8 49 + 60 2 + 1.75 3 ✓ + 1.55 + ✓ .40 +1.95 13
α Urs. Min. 1.2 13 + 88 39 + 41.42 ✓ − 9.55 ✓ − + 19

0.7 +44 +1.97 0.4 +1.90 +1.72
0.9 +13 +2.08 0.6 +1.47 +1.69
1.1 +56 +1.87 0.8 +1.73 +1.55
0.9 +38 +1.97 0.6 +1.70 +1.65 m = .24

0 = +2.37 −21 n = +.09 +09 0 = −3.21 +53 n = +.17 +.18
+41.04 −11.52 +.28 +28
+ 3.17 + ~~0.68~~ 1.58

0 = +1.05 +.11 n = +.10 0 = −4.53 +.85 n = +.19
+39.72 −11.19 +.28
+ 1.85 1.90

sin z = +.60+.80 | +.40+.60 | +.20+.40 | +0+.20 | +0−.20 | −.20−.40 | −.40−.60 | −.60−.80

RA h m	sin z	R_eq −	R_fl "	P'−P "	R_eq−R_fl+P'−P "		
23 11	+.64	+1	0.7	+.9	1.6	+20	3.6
23 14	+.33		1.6	+.1	1.7	+1.1	2.8
						(2)	3.20

RA h m	sin z	R_eq −	R_fl "	P'−P "	R_eq−R_fl+P'−P
23 17	−.24	+1	0.7	"	

+.60+.80	+.20+.40
+.64 +1.6 +2.1 3.7 −.5	+.33 +1.7 +1.1 2.8 +.5

+1' 3.25"
3.20

RA h m	sin z	R_eq −	R_fl	P'−P	R_eq−R_fl+P'−P		
22 15	+.70	+1	1.2	−.4	0.8	+22	30
22 19	−.16		4.1	+.2	4.3	−.6	37
22 26	−.13		3.3	+.6	3.9	−.5	34
22 28	+.68		0.8	−.1	0.7	+22	29
22 35	+.53		0.2	−.5	59.7	+1.7	(1.4)
22 38	+.02		5.3	−.8	4.5	+.1	4.6
22 44	+.32		2.7	+.3	3.0 ~~2.4~~	+1.1	4.1
22 45	+.77		1.0	−.3	0.7	+2.5 4	3.8 1
22 51							
22 56	+.01		4.9	+.4	5.3 ~~4.5~~	+.0	5.3
22 59	+.47		4.3	−.6	3.7	+1.6	5.3
23 31	−.06		5.2	+.7	5.9	−.2	5.7
21 37	+.55		1.9	−.4	1.5	+1.7	3.2
21 42	−.11		2.8	+1.0	3.8	−.4	3.4
21 59	+.69		2.0	−.1	1.9	+2.2	4.1
						(13)	3.98

RA h m	sin z	R_eq −	R_fl	P'−P	R_eq−R_fl+P'−P		
23 34	−.57	+1	5.9	+.3	6.2	−1.8	4.4
23 48	−.25		5.5	−.0	5.5	−.9	4.6
9 23	−.92		5.4	−.1	5.3	−~~.7~~ 3	~~2.4~~ 2.2 ✓
						(2)	4.50

+.60+.80	+.40+.60	+.20+.40	+0+.20	+0−.20	−.20−.40	−.40−.60	
+.70 +0.8 +.68 0.7 +.77 0.7 +.69 1.9 +.71 +1.0 +2.3 3.3 4 (16) 132 +.6	+.53 +59.7 +.47 3.7 +.55 1.5 +.52 +1.6 +1.7 3.3 3 99 +.6	+.32 +3.0 +.32 +3.0 +1.1 4.1 1 41 −.2	+.02 +4.5 +.01 5.3 +.02 +4.9 +.1 5.0 2 100 −1.1	−.16 +4.3 −.13 3.9 −.06 5.9 −.11 3.8 −.12 +4.5 −.4 4.1 4 164 −.2	−.25 +5.5 −.25 +5.5 −.9 4.6 1 46 −.7	−.57 +6.2 −.57 +6.2 −1.9 4.3 1 43 −.4	625

+1' 3.91"
4.05

RA h m	sin z	R_eq −	R_fl	P'−P	R_eq−R_fl+P'−P		
0 2	+.24	+1	2.9	−.1	2.8	+.8	3.6
0 33	−.23		3.0	+.6	3.6	−.8	2.8
0 41	+.32		2.9	−.1	2.8	+1.1	3.9
0 56	+.58		0.4	+.3	0.7	+1.8	2.5
1 3	+.13		4.3	−.3	4.0	+.5	4.5
1 5	+.22		2.4	+.2	2.6	+.8	3.4
						(6)	3.45

RA h m	sin z	R_eq −	R_fl	P'−P	R_eq−R_fl+P'−P		
21 27		+1					
0 26	−.34		5.6	−.3	5.3	−1.1	4.2
0 28	−.92		7.7	−.8	6.9	−~~2.6~~ 3.1	~~4.3~~ 3.8 ✓
0 37	−.53		5.2	+1.1	6.3	−1.7	4.6
0 49	−.30		4.8	+.7	5.5	−1.0	4.5
1 13							
						(3)	4.43

+.40+.60	+.20+.40	+0+.20	−.20−.40	−.40−.60	
+.58 +0.7 +.58 +0.7 +1.9 2.6 1 (9) 26 +1.2	+.24 +2.8 +.32 2.8 +.22 2.6 +.26 +2.7 +.9 3.6 3 108 +.2	+.13 +4.0 +.13 +4.0 +.5 4.5 1 45 −.7	−.23 +3.6 −.34 5.3 −.30 5.5 −.29 +4.8 −1.0 3.8 3 114 +.0	−.53 +6.3 −.53 +6.3 −1.8 4.5 1 45 −.7	338

+1' 3.76"
3.78

−56

1871 Dec 1 h = ~~+~~ −.031 h' = −.014 h' = −.066 n = +.38

Star	AM obs RA	δ	tang δ	π Ra −(δ'ρ)					
	h m	° '							
ι Piscium 1.51/8	1.1 5	+29 26 +	.56 ✓17	+ 0.44 ✓+	.21		+065 −	05	+0.60
η Piscium 5	1.424	+14 42 +	.26 ✓27	+ 0.55 ✓+	.10	0.67 0.666	65 −	03	.62
υ Persei × 4	1.530	+48 00 +	1.11 ✓23	+ 0.29 ✓+	.42		[71] −	03	.68
ο Piscium ✓ 3	1.6 38	+ 8 32 +	.15 ✓25	+ 0.62 ✓+	.06		68 −	02	.66
β Arietis ✓	1.8 48	+20 12 +	.37 ✓30	+ 0.46 ✓+	.14		60 −	01	.59
γ Androm. +6 ×	1.9 56	+41 44 +	.89 ✓32	+ 0.29 ✓+	.34		63 −	00	.63
α Arietis − ×	2.0 00	+22 52 +	.42 ✓33	+ 0.40 ✓+	.16		56 +	01	.57
γ Triang. × 3	2.2 10	+33 16 +	.66 ✓35²	+ 0.37 ✓+	.25		62 +	02	.64
ο Ceti ✓ 3	2.21 3	− 3 33 +	.06 ✓35	+ 0.73 ✓+	.02		75 +	02	.77
5½ ξ Ceti ~~Cass~~ ✓ 5	2.4 21	+ 7 54 +	.14 ✓37	+ 0.55 ✓+	.05		60 +	03	.63
ι Persei × 7	2.6 35	+48 42 +	1.14 ✓40	+ 0.09 ✓+	.43		52] +	05	.57
β Persei − × 1.1	3.0 00	+40 28 +	.85 ✓50	+ 0.27 ✓+	.32	0.607	59 +	07	.66
θ Ceti 2.40	4.6 1.3 18	−8 50 +	.15 ✓21	+ 0.68 ✓+	.06		62 ~~4~~ −	04	.70
	1.92						+0.638		+0.640

1.2 +41.42 −14.94 −.01 −.01 −14.95 −14.95
1.9 +3.04 −0.45 +.00 +.00 −0.45 −0.45
2.3 +2.34 −0.26 +.01 +.00 −0.25 −0.26

1871 Dec 1

Star		AM obs RA	δ	tang δ	π Ra −(δ'ρ)		
		h m					
α Urs Min	×	1.2 13	+88 39 +	41.42 ✓	−14.94 ✓	−	19
ι Cass	×	2.3 18	+66 50 +	2.34 ✓ ~~1.33~~	− 0.26 ✓	−	36
50 Cass	✓	1.9 52	+72 49 +	3.04 ✓	− 0.45 ✓	−	31

1.3 +15 +0.68	1.5 +1.11 +0.29	
1.4 +26 +0.55	1.9 +89 +0.29	
1.6 +15 +0.62	26 +1.14 +0.09	
1.8 +37 +0.46	3.0 +85 +0.27	
22 +06 +0.73	2.2 +1.00 +0.24	
24 +14 +0.55		$n_5 = +.42$
1.78 +.19 +0.60		

0 = +41.23 −15.55 n = +.38 +.38
+2.85 −1.05 +.37 +.36
+2.15 −0.85 +.40 +.40
+.38

0 = +40.42 −15.19 n = +.39
+2.04 −.69 +.34
+1.34 −.50 +.37] .37

1871 Dec 2 h = ~~+~~ −.028 h' = −.010 h' = −.013 n = +.37

Star	AM obs	δ	tang δ					
ι Pisc. +5 ×	1.1 5	+29 26 +	.56 ✓17	− 0.33 ✓+	.21	−0.12 −	01	−0.13
η Piscium 2 ×	1.425	+14 42 +	.26 ✓22	− 0.18 ✓+	.10	.08	00	08
υ ~~Pisc.~~ Persei ×	1.530	+48 00 +	1.11 ✓23	− 0.59 ✓+	.41	.18		18
β Arietis −7 ×	1.848	+20 12 +	.37 ✓30	− 0.22 ✓+	.14	.08		08
γ Androm. 3 ×	1.956	+41 44 +	.89 ✓32	− 0.55 ✓+	.33	.22	00	22]
α Arietis −4 ×	2.0 00	+22 52 +	.42 ✓33	− 0.31 ✓+	.16	.15 +	01	.14
	1.62					−0.138		−0.138

1.2 +41.42 −15.60 .00 .00 −15.60 −15.60

Star		AM obs RA	δ	tang δ			
α Urs Min	×	1.2 13	+88 39 +	41.42 ✓	−15.60 ✓	−	19

1.4 +26 −0.18	1.5 +1.11 −0.59
1.8 +37 −0.22	1.9 +89 −0.55
20 +42 −0.31	1.7 +1.00 −0.57
1.7 +.35 −0.24	

0 = +41.07 −15.36 n = +.37

0 = +40.42 −15.03 n = +.37

−17

1871 Dec 5 h = ~~+~~ −.029 h' = −.011 h' = −.012 ~~h' = −.009~~ h' = −.018 morn. n = +.39
MAR obs.

Star		RA	δ	tang δ					
α Bootis +3 ×	14.2 10	+19 50 +	.36 ✓187	2.29 ✓+	.14		−2.15 −	01	−2.16
β Bootis −4 ×	14.957	+40 53 +	.87 ✓199	2.64 ✓+	.34		30 +	01	.29
16 Pegasi 1.5 2.16	21.847	+25 20 +	.47 ✓518	1.87 ✓+	.18		−1.69 −	02	−1.71
α Aquarii 8	21.59 220	− 0 56 −	.02 ✓311	−1.65 ✓−	.01	1.67	.66 −	02	.68
3 Lacertae 1.0	22.318	+51 36 +	1.26 ✓524	− 2.12 ✓+	.49	1.669	63 −	01	.64
α Lacertae 0.9	22.426	+49 38 +	1.18 ✓319	− 2.10 ✓+	.46		64 −	01	.65
η Pegasi 0.7	22.637	+29 34 +	.57 ✓322	1.90 ✓+	.22		.68 −	01	.69
μ Pegasi 0.6	22.741	+23 57 +	.44 ✓324	− 1.91 ✓+	.17		.74 −	01	.75
~~λ Aquarii~~ 1.2	~~22.1 46~~	~~− 8 15~~	~~.15~~ ✓ ~~326~~				.66 −	01	.67
ο Androm. 4	22.956	+41 39 +	.89 ✓327	− 1.99 ✓+	.35		.64 −	01	.65
α Pegasi +4	22.958	+14 32 +	.26 ✓329	− 1.78 ✓+	.10		.68	00	.68
12 Ceti −1.1	0.423	− 4 39 −	.08 ✓339	1.70 ✓−	.03		~~67~~ 73 +	01	.72
α Cass 1.3	0.633	+55 51 +	1.48 ✓7.10	− 2.23 ✓+	.57		66 +	02	.64
ζ Androm. 1.4	0.741	+23 35 +	.44 ✓11	− 1.85 ✓+	.17		.68 +	02	.66
ε Piscium 1.6	0.956	+ 7 13 +	.13 ✓15	− 1.75 ✓+	.05		.70 +	02	.68
β Androm. 1.4	1.0 3	+34 57 +	.70 ✓16	− 2.04 ✓+ .07	.27	1.695	.70 +	02	.68
	0.67 0.420.4						.70 +	01	.69

14.2 +.86 −2.29 14.9 +87 −2.64

13.2 −41.41 +15.77 −.01 −.02 +15.74 +15.75
14.8 +3.65 −3.63 +.01 +.00 −3.62 −3.63

Star		RA	δ	tang δ					
ζ Cephei	✓	22.06	+57 35 +	1.58 7 ✓	− 2.27 ✓	+ .61	− 1.66	~~5.46~~ 316	
α Urs Min	×	13 1.213	+88 39 +	41.41 ✓	− 16.38 ✓	−		19	
β Urs Min	×	14.851	+74 40 +	3.64 5 ✓	−3.63	−		19 8	
κ Cass	✓	0.426	+62 14 +	1.90 ✓	− 2.44 ✓	+ .44	− 1.70	5	
α Urs Mi		13.212		−41.41	+15.77			19	

22.0 −02 −1.65	22.1 +1.58 −2.27
22.7 +44 −1.91	22.3 +1.26 −2.12
22.9 +26 −1.78	22.4 +1.18 −2.10
0.4 −08 −1.70	22.9 +89 −1.99
0.7 +44 −1.85	0.4 +1.90 −2.44
0.9 +13 −1.75	0.6 +1.47 −2.23
23.6 +20 −1.77	23.1 +1.38 −2.19

$n_5 = +.36$

1.2 +41.41 −16.38 +.02 +.02
−16.36 −16.36

I
0 = +41.21 −14.59 n = +.35 +.35

II
0 = +40.03 −14.17 n = +.35

I
0 = +3.29 −1.33 0 = −41.77 +18.05 n = +.43 +.43

II
0 = +2.78 −.99 0 = −42.28 +18.39 n = +.43

h
mean 23.~~85~~ 31
morn. 14.55

δ
−1.67~~8~~ 9 −1.679
−2.225 −2.225 morn

				sin z =	+.60 +.80	+.40 +.60	+.20 +.40	+0 +20	+0 −20	−.20 −.40	−.40 −.60	−.60 −.80

RA h	m	sin z	R_{eq} ′	$-R_{fl}$ ″		$P'-P$ ″		$R_{eq}-R_{fl}+P'-P$
1	5	+.22	+1	1.3	+.2	1.5	+.8	23
1	24	+.46		2.6	−.2	2.4	+1.5	39
1	30	−.10		4.2	+.3	4.5	−.4	41
1	38	+.56		2.6	+.4	3.0	+1.8	48
1	48	+.38		2.2	−.2	2.0	+1.3	33
1	56	+.01		4.8	+.1	4.9	+0.0	49
2	00	+.33		3.6	−.1	3.5	+1.1	46
2	10	+.16		4.0	−.2	3.8	+.6	44
2	13	+.72		2.3	−.5	1.8	+2.3	41
2	21	+.57		2.3	+.1	2.4	+1.8	42
2	35	−.11		3.5	+.3	3.8	−.4	34
3	00	+.03		5.2	−.1	5.1	+.1	52
							(12)	4.10
1	18	+.78						

+1′ 4.22″
4.17

Ra h	m	sin z	R_{eq}	R_{fl} ″		$P'-P$ ″		$R_{eq}-R_{fl}+P'-P$ ″
1	13		+1					
2	18	−.41		4.9	+.7	5.6	−1.4	42
1	52	−.49		6.8	−.2	6.6	−1.6	50
							(2)	4.60

+.60 +.80	+.40 +.60	+.20 +.40	+0 +20	+0 −20	−.20 −.40	−.40 −.60	−.60 −.80
+.72 +1.8	+.46 +2.4	+.22 +1.5	+.01 +4.9	−.10 +4.5		−.41 +5.6	
	+.56 3.0	+.38 2.0	+.16 3.8	−.11 3.8		−.49 6.6	
	+.57 2.4	+.33 3.5	+.03 5.1				
+.72 +1.8	+.53 +2.6	+.31 +2.3	+.07 +4.6	−.10 +4.2		−.45 +6.1	
+2.4	+1.8	+1.1	+.3	−.4		−1.5	
4.2 1	4.4 3	3.4 3	4.9 3	3.8 2		4.6 2	
(14) 42	13.2	10.2	14.7	7.6		9.2	591
+.0	−.2	+.8	−.4	+.4		−.4	

RA h	m	sin z	R_{eq}	R_{fl}		$P'-P$		
1	5	+.22	+1	2.3	+.2	2.5	+.8	33
1	25	+.46		4.2	−.2	4.0	+1.5	55
1	30	−.10		4.1	+.3	4.4	−.4	40
1	48	+.38		2.5	−.2	2.3	+1.3	36
1	56	+.01		4.2	+.1	4.3	+.0	43
2	00	+.33		4.3	−.1	4.2	+1.1	53
							(6)	4.33

1 13

+1′ 4.42″
4.33

+.60 +.80	+.40 +.60	+.20 +.40	+0 +20	+0 −20	−.20 −.40
	+.46 +4.0	+.22 +2.5	+.01 +4.3	−.10 +4.4	
		+.38 2.3			
		+.33 4.2			
	+.46 +4.0	+.31 +3.0	+.01 +4.3	−.10 +4.4	
	+1.6	+1.2	+.0	−.4	
	5.6 1	4.2 3	4.3 1	4.0 1	
	(6) 16	6	3	0	25
	−1.2	+.2	+.1	+.4	

RA h	m	sin z	R_{eq}	R_{fl}		$P'-P$		
14	10		+0					
14	57							
21	47	+.29	+0	59.2	+.4	59.6	+1.0	(0.6)
21	59	+.69						
22	18	−.16		57.8	+.2	(58.0)	−.6	(57.4)
22	26	−.13	1	2.6	+.6	3.2	−.4	2.8
22	37	+.22		4.0	−.2	3.8	+.8	4.6
22	44	+.32		0.3	+.3	0.6	+1.1	1.7
22	46							
22	56	+.01		2.4	+.4	2.8	+.0	2.8
22	58	+.47	.0	59.8	−.6	59.2	+1.6	(0.8)
0	23	+.73	1	1.2	+.1	1.3	+2.4	3.7
0	33	−.23		3.8	+.6	4.4	−.9	3.5
0	41	+.32		2.7	−.1	2.6	+1.1	3.7
0	56	+.58		0.2	+.3	0.5	+1.9	2.4
1	3	+.13		3.8	−.3	3.5	+0.5	4.0
							(9)	3.24

+1′ 2.90″
3.32

Ra h	m	sin z	R_{eq}	R_{fl}		$P'-P$		
22	6	−.26	+1					
13	13							
14	51							
0	26	−.34	~~+1~~	5.5	−.3	5.2	−1.2	4.0
13	12							
							(1)	4.00

+.60 +.80	+.40 +.60	+.20 +.40	+0 +20	+0 −20	−.20 −.40	−.40 −.60
+.73 +1.3	+.47 +59.2	+.29 +59.6	+.01 +2.8	−.13 +3.2	−.23 +4.4	
	+.58 0.5	+.22 3.8	+.13 3.5		−.34 5.2	
		+.32 0.6				
		+.32 2.6				
+.73 +1.3	+.52 +59.8	+.29 +1.6	+.07 +3.2	−.13 +3.2	−.28 +4.8	
+2.4	+1.7	+1.1	+.3	−.5	−1.0	
3.7 1	1.5 2	2.7 4	3.5 2	2.7 1	3.8 2	
(12) 37	30	10.8	7.0	2.7	7.6	348
−.8	+1.4	+.9 2	−.6	+.2	−.9	

1871 Dec 6 h = ~~+~~.030 −.038 h' = ~~+.023~~ +.004 n = +.40
h' = −.011

Star	WAR obs Ra	δ		tang δ	π Ra −(P'−P)				
τ Cygni	✓21.7 42	+48	43' +	1.14 ✓517	− 3.07 ✓ +	.46		− 261	00
ξ Pegasi	✓22.6 35	+ 10	10 +	.18 ✓521	2.57 ✓ +	.07	2540	.50	
13 Lacertae	✓22.6 38	+ 41	10 +	.87 ✓528	2.95 ✓ +	.35	−	.60	
μ Pegasi	✓22.7 44	+ 23	57 +	.41 ✓324	2.74 ✓ +	.18		.56	
λ Aquarii	✓22.8 45	− 8	15 −	.15 ✓326	− 2.47 ✓	.06		.53	
α Pisc Aust.	~~22.8~~ 51							.62	
ο Androm.	✓22.9 56	+ 41	39 +	.89 ✓327	2.96 ✓ +	.36		.60	
α Pegasi	✓22.9 58	+ 14	32 +	.26 ✓329	2.58 ✓ +	.10		.48	
γ Piscium	23.2 11	+ 2	36 +	.04 ✓330	2.47 ✓ +	.02		.45	
τ Pegasi	✓23.2 14	+ 23	3 +	.42 ✓531	2.76 ✓ +	.17		.59	
υ Pegasi	✓23.3 19	+ 22	43 +	.42 ✓532	2.69 ✓ +	.17		.52	
λ Piscium	✓23.6 33	+ 4	57 +	.09 ✓333	2.48 ✓ +	.04		.44	
φ Pegasi	✓23.8 46	+ 18	26 +	.33 ✓538	2.67 ✓ +	.13		.54	
ω Piscium	✓23.9 53	+ 6	10 +	.11 ✓336	2.62 ✓ +	.04	~~257~~ 2536	.58	00

~~23.400 3.35~~ 23.07
21.7+2.86 −3.91 −.02 −.01 −3.93 −3.92
23.4−2.77 −1.79 +.00 +.01 −1.79 −1.78
−2.5 37/44 −2.544

1871 Dec 6

Star	WAR obs Ra	δ		tang δ	π Ra −(P'−P)			
11 Cephei	✓ 21.7 41	+70	44 +	2.86 ✓	− 3.91 ✓	−		516
λ Draconis	C ✓11.3 23	+70	3 −	2.75 ✓	− 1.79 ✓	−		162
ρ Cass.	✓ 23.8 48	+56	48 +	1.53 ✓	− 3.23 ✓	+ ✓.61	−2.62	539

22.6+18 −2.57 21.7 +1.14 −3.07
22.7+44 −2.74 22.6 +.87 −2.95
22.8−15 −2.47 22.9 +.89 −2.96
22.9+26 −2.58 23.8 +1.53 −3.23
23.2+04 −2.47 22.8 +1.11 −3.05
23.2+42 −2.76
23.3+42 −2.69 n5 = +.50
23.6+09 −2.48
23.8+33 −2.67
23.9+11 −2.62
23.2+.21 −2.60

0 = +265 −1.33 n = +.50 +50 0 = −2.98 +.81 n = +.27 +.30

0 = +1.75 −.87 n = +.50 0 = −3.88 +1.27 n = +.33

1871 Dec 6 h = ~~+~~.030 −.050 h' = +.009 n = +.43
Am obs h' = −.011

Star	Ra	δ		tang δ						
α Androm.	+0.10 ✓ 0.0 2	+28	24 +	.54 ✓1	− 2.77 ✓ +	.23		− 2.54	+01	−2.53
22 Androm.	10 ✓ 0.1 4	+45	23 +	1.01 ✓337	2.97 ✓ +	.43	2503	.54	+01	.53
ι Ceti	9 ✓ 0.2 13	− 9	31 −	.17 ✓4	− 2.31 ✓ − .05	.07		.43	+01	.42
τ Piscium	+0 ✓ 1.1 5	+29	26 +	.56 ✓17	− 2.78 ✓ +	.24		.54	00	.54
ο Piscium	−5 ✓ 1.2 39	+ 8	32 +	.15 ✓25	− 2.46 ✓ +	.06		.40	00	.40
β Arietis	7 ✓ 1.8 48	+20	12 +	.37 ✓30	− 2.64 ✓ +	.16		.48	−01	.49
γ Androm.	8 ✓ 1.9 56	+41	44 +	.89 ✓32	− 2.88 ✓ +	.38		.50	−01	.51
α Arietis	9 ✓ 2.0 00	+22	52 +	.42 ✓33	− 2.71 ✓ +	.18	2490	.53	−01	.54
~~β Bootis~~	~~14 57~~	~~+40~~	~~53~~		~~− 2.65 ✓~~					

~~1.68~~ 1.09
0.1−4.84 −0.60 −.01 −.01 −0.61 −0.61
~~1.2+41.42 +15.77 −.00 +.00 +15.77 +15.77~~
1.9+3.04 −3.86 +.01 +.01 −3.85 −3.85
−2.495 −2.495

Star	Ra	δ		tang δ			
4 Draco S.C.	✓ 0.1 6	+ ~~101~~ 78	20	4.88 ✓	∓ 0.60 ✓	−	168
~~α Urs Min~~	~~1C 1.2 13~~	~~+ 88~~ 91	~~39~~ 21	~~41.42 ✓~~	~~+ 15.77 ✓~~	−	~~19~~
50 Cass	✓ 1.9 52	+ 71	49 +	3.04 ✓	− 3.86 ✓	−	31
~~δ Urs. Min.~~	~~14 57~~	~~+ 74~~	~~40 +~~	~~3.65 ✓~~	~~− 3.65 ✓~~		

0.2−17 −2.36
1.1+56 −2.78 0.1 +1.01 −2.97
1.6+15 −2.46 1.9 +.89 −2.88
1.8+.37 −2.64 1.0 +.95 −2.92
20 +.42 −2.71 n5 = +.47
~~1.6 +.38 −2.65~~
1.3 +.26 −2.59

0 = −5.10 +1.98 n = +.39 +.40
~~41.68 +18.36~~ +.44 ~~+.44~~

0 = +2.78 −1.26 n = +.45 +.45

0 = +2.09 −.93 n = +.45 0 = −5.79 +2.31 n = +.40
~~42.37 +18.69~~ +.44

1871 Dec 9 h = ~~+~~.029 −.033
WAR obs h' = −.009 h' = −.025 n = +.37

Star	~~0.05~~ 0.025 Ra	δ		tang δ						
λ Androm.	+15 ✓ 23.5 31	+45	47 +	1.08 ✓331	− 5.03 ✓ + .08	.37		−4.58	−04	−4.62
ψ Pegasi	1.2 ✓ 23.8 45	+18	26 +	.33 ✓538	− 4.64 ✓ +	.12	4511	.52	−03	.55
~~ρ Cass.~~	~~23.8 48~~	~~+56~~	~~48 +~~	~~1.53 ✓539~~	~~− 5.08 ✓ +~~	.57		.51	−03	.54
ω Piscium	0 ✓ 23.9 52	+ 6	10 +	.11 ✓336	− 4.50 ✓ +	.04		.46	−03	.49
α Androm.	0 ✓ 0.0 2	+28	24 +	.54 ✓1	− 4.78 ✓ +	.20		.58	−02	.60
22 Androm.	+9 × 0.1 4	+45	23 +	1.01 ✓337	− 4.92 ✓ +	.37		.55	−02	.57
γ Triang.	−1 × 2.2 10	+33	16 +	.66 ✓352	− 4.85 ✓ +	.24		.61	+03	.58
α Ceti	1.3 ✓ 2.2 13	− 3	33 −	.06 ✓35	− 4.56 ✓ −	.02		.58	+03	.55
ξ₂ Ceti	14 ✓ 2.4 21	+ 7	54 +	.14 ✓37	− 4.61 ✓ +	.05		.56	+03	.53
35 ν Arietis	15 ✓ 2.5 31	+21	25 +	.39 ✓355	− 4.69 ✓ +	.14		.55	+04	.51
δ Ceti	−16 × 2.6 33	− 0	15 −	.00 ✓39	− 4.58 ✓ −	.00		.58	+04	.54
θ Persei	× 2.6 36	+48	42 +	1.14 ✓40	− 4.97 ✓ +	.42	4.572	.55	+04	.51
ι Piscium	+2.42 ✓ 23.6 33	+ 5 4	57 +	.09 ✓333	− 4.49 ✓ +	.03		.46	−03	.49
ι Ceti	+8 ✓ 0.2 13	− 9	31 −	.17 ✓4	− 4.41 −05	.06		.52	+02	.54
θ Ceti	−3 ✓ 1.3 18	− 9 8	50 −	.15 ✓21	− 4.48 ✓ −	.06		54 ~~42~~	+01	.41

0.98
0.1−4.84 −3.01 −.01 −.00 −3.02 −3.01
2.3 +2.34 −5.48 +.01 +.02 −5.47 −5.46
1.2+41.41 −20.42 .00 +.01 −20.42 −20.41
−4.535 −4.535

~~ρ Cass ✓ 23.8 47 +56 48 + 1.53 ✓ − 5.08 ✓ + ✓.57 − 4.51~~

Star	Ra	δ		tang δ			
4 Draco S.C.	✓ 0.1 6	+ ~~101~~ 78	20 −	4.88 ✓	− 3.01 ✓	−	168
ι Cass	× 2.3 18	+66	50 +	2.38 ✓	− 5.48 ✓	−	36
~~5 Urs Maj.~~	~~2 28~~			−			
α Urs Min	× 13.2 13	+88	39 +	41.41 ✓	− 20.42 ✓	−	19

23.6+09 −4.49 23.5 +1.01 ~~−5.05~~ 4.95
23.8+33 −4.64 23.8 +1.53 −5.08
23.9+11 −4.50 0.1 +1.01 −4.92
0.2−17 −4.46 2.6 +1.14 −4.97
1.3+15 −4.48 0.5 +1.17 ~~−5.00~~ −4.98
2.2−06 −4.56
2.4+14 −4.61 n5 = .53
2.6−01 −4.58
2.5+39 −4.69
1.2+11 −4.56

0 = +2.23 −.91 n = +.41 +.41 0 = −4.95 +1.54 n = +.31 +.32
+41.30 −15.86 +.38 +.38

0 = +1.17 −.48 n = +.41 0 = −6.01 +1.97 n = +.33
+40.24 −15.43 +.38

sin z =	+.60 +.80	+.40 +.60	+.20 +.40	+0 +.20	+0 −.20	−.20 −.40	−.40 −.60	−.60 −.80

RA	sin z	Reg	Rfl	P′−P	Reg−Rfl+P′−P		
h m		′	"	"	"		
21 42	−.11	+1	1.1	+10	2.1	−4	17
22 35	+.53		0.3	−.5	59.8	+186	1.64
22 38	+.02		2.6	−.8	1.8	+.1	1.9
22 44	+.32		1.3	+.3	1.6	+1.1	2.7
22 45	+.77		2.1	−.3	1.8	+2.5	4.3
22 51							
22 56	+.01		1.6	+.4	2.0	+.0	2.0
22 58	+.47		2.5	−.6	1.9	+1.6	3.5
23 11	+.64		0.7	−.2	0.5	+2.1	2.6
23 14	+.33		1.2	+.1	1.3	+1.2	2.5
23 19	+.34						
23 33	+.61	0	59.8	+.1	59.9	+2.0	1.9
23 46	+.41	1	3.1	−.2	2.9	+1.4	4.3
23 53	+.59		0.6	+.2	0.8	+1.9	2.7
						(12)	2.62

+1′ 2.58"
2.56

RA	sin z	Reg	Rfl	P′−P	Reg−Rfl+P′−P		
h m		′	"	"	"		
21 41	−.47	+1	2.2	+.8	3.0	−1.6	1.5
23 23	−.92		5.0	−.8	4.2	−2.9	1.53 ✓
23 48	−.25		3.8	−.0	3.8	−.9	2.9
						(2)	2.20

+.60 +.80	+.40 +.60	+.20 +.40	+0 +.20	+0 −.20	−.20 −.40	−.40 −.60	−.60 −.80
+.77 +1.8	+.53 +59.8	+.32 +1.6	+.02 +1.8	−.11 +2.1	−.25 +3.8	−.47 +3.0	
+.64 0.5	+.47 1.9	+.33 1.3	+.01 2.0				
+.61 59.9	+.41 2.9						
	+.59 0.8						
+.67 +0.7	+.50 +1.4	+.32 +1.4	+.02 +1.9	−.11 +2.1	−.25 +3.8	−.47 +3.0	
+2.2	+1.7	+1.1	+.1	−.4	−.9	−1.6	
2.9 3	3.1 4	2.5 2	2.0 2	1.7 1	2.9 1	1.4 1	
(14) 87	124	50	40	17	29	14	361
−.3	−.5	+.1	+.6	+.9	−.3	+1.2	

RA	sin z	Reg	Rfl	P′−P	Reg−Rfl+P′−P		
0 2	+.24	+1	2.8	−.1	2.7	+.9	3.6
0 4	−.05		3.7	−.1	3.6	−.2	3.4
0 13	+.79	0	59.6	+.1	59.7	+2.6	2.3
1 5	+.22	1	1.4	+.2	1.6	+.8	2.4
1 39	+.56		0.7	+.4	2.1	1.8	3.9
1 48	+.38		1.6	−.2	1.4	+1.3	2.7
1 56	+.01		2.7	+.1	2.8	+.0	2.8
2 00	+.33		1.6	−.1	1.5	+1.2	2.7
						(8)	2.98

RA	sin z	Reg	Rfl	P′−P	Reg−Rfl+P′−P		
0 6	−.86	+1	5.5	−.3	5.2	−2.7	2.5 ✓
1 13							
1 52	−.49		4.2	−.2	4.0	−1.6	2.4
						(1)	2.40

+.60 +.80	+.40 +.60	+.20 +.40	+0 +.20	+0 −.20	−.20 −.40	−.40 −.60	−.60 −.80
+.79 +59.7	+.56 +2.1	+.24 +2.7	+.01 +2.8	−.05 +3.6		−.49 +4.0	
		+.22 1.6					
		+.38 1.4					
		+.33 1.5					
+.79 +59.7	+.56 +2.1	+.29 +1.8	+.01 +2.8	−.05 +3.6		−.49 +4.0	
+2.6	+1.9	+1.0	+.1	−.2		−1.7	
2.3 1	4.0 1	2.8 4	2.9 1	3.4 1		2.3 1	
(9) 23	40	112	29	34		23	261
+.6	−1.1	+.1	+.6	−.5		+.6	

+1′ 2.90"
2.91

RA	sin z	Reg	Rfl	P′−P	Reg−Rfl+P′−P		
23 31	−.06	+.1	1.3	+.7	2.0	−.2	1.8
23 45	+.41		1.8	−.2	1.6	+1.4	3.0
23 48	−.25		3.6	−.0	3.6	−.9	2.7
23 52	+.59	0	58.9	+.2	59.1	+1.9	1.0
0 2	+.24	1	2.4	−.1	2.3	+.9	3.2
0 4	−.05		1.9	−.1	1.8	−.2	1.6
2 10	+.16		3.1	−.2	2.9	+.6	3.5
2 13	+.72		0.8	−.5	0.3	+2.3	2.6
2 21	+.57		1.2	+.1	1.3	+1.8	3.1
2 31	+.36		0.6	+.7	1.3	+1.2	2.5
2 33	+.68		1.3	−.2	1.1	+2.2	3.3
2 36	−.11		2.6	+.3	2.9	−.4	2.5
23 33	+.61		0.0	+.1	0.1	+2.0	2.1
0 13	+.79	0	59.1	+.1	59.2	+2.6	1.8
1 18	+.78						
						(14)	2.49

+1′ 2.51"
2.45

RA	sin z	Reg	Rfl	P′−P	Reg−Rfl+P′−P		
~~23 47~~							
0 6	−.86	+1	6.6	−.3	6.3	−2.7	3.6 ✓
2 18	−.41		2.8	+.7	3.5	−1.4	2.1
2 28							
13 13							
						(1)	2.10

+.60 +.80	+.40 +.60	+.20 +.40	+0 +.20	+0 −.20	−.20 −.40	−.40 −.60	−.60 −.80
+.72 +0.3	+.41 +1.6	+.24 +2.3	+.16 +2.9	−.06 +2.0	−.25 +3.6	−.41 +3.5	
+.68 1.1	+.59 59.1	+.36 1.3		−.05 1.8			
+.61 0.1	+.57 1.3			−.11 2.9			
+.79 59.2							
+.70 +0.2	+.52 +0.7	+.30 +1.8	+.16 +2.9	−.07 +2.2	−.25 +3.6	−.41 +3.5	
+2.4	+1.8	+1.1	+.6	−.3	−.9	−1.4	
2.6 4	2.5 3	2.9 2	3.5 1	1.9 3	2.7 1	2.1 1	
(15) 10.4	7.5	5.8	3.5	5.7	2.7	2.1	377
−.1	+.10	−.34	−.10	+.16	−.12	+.54	

1871 Dec 9 R. h = ~~+~~.029 h' = -.009 h' = -.008 n = +.40

Star		Ra h m	δ ° '		tang δ	$\frac{\pi Ra}{-(P'-P)}$				
τ Persei	x	2.8 45	+52	15 +	1.29	45 − 5.06 ✓ +	.52	-4.54	00	
α Ceti	✓	2.9 55	+ 3	36 +	.06	47 − 4.55 ✓ +	.02	.53		
ρ Persei	x	2.9 57	+ 38	21 +	.79	49 − 4.88 ✓ +	.32	.56		
β Persei	x	3.0 00	+40	28 +	.85	50 − 4.89 ✓ +	.34	.55	00	
		2.90						-4.545		-4.545

28 + 5.10 − 6.57 .00 .00 − 6.57 − 6.57

1871 Dec 9

Star		Ra h m	δ ° '		tang δ	$\frac{\pi Ra}{-(P'-P)}$		
47 Cephei	✓	2.8 49	+78	55 +	5.10 ✓	− 6.57 ✓	−	358

2.9 +06 − 4.55

2.8 +1.29 −5.06
2.9 +.79 −4.88
3.0 +.85 −4.89
2.9 +.98 −4.94

0 = +5.04 −2.02 n = +.40

0 = +4.12 −1.63 n = +.40

− 25 −

1871 Dec 11 h = ~~+~~.030 h' = -.010 h' = ~~-.023~~ -.017 n = +.38
WaR obs

0.80 +0.11.04

Star		Ra h m	δ ° '		tang δ						
α Cass	✓	0.0 33	+ 55	51 +	1.48	10 − 6.55 ✓ +	.56	6.023	6.04 − / −5.99 −	02 / 02	−6.06 / 6.01
η Piscium	✓	1.4 25	+ 14	42 +	.26	22 6.14 ✓ +	.10	6.02	6.04	00	6.04
υ Persei	✓	1.5 30	+ 48	00 +	1.11	23 − 6.46 ✓ +	.42		6.04	00	6.04
ν Piscium	✓	1.6 35	+ 4	51 +	.08	349 − 6.09 ✓ +	.03		6.06	00	6.06
ο Piscium	✓	1.6 39	+ 8	32 +	.15	25 − 6.14 ✓ +	.06		6.08	00	6.08
β Arietis	3 ✓	1.8 48	+ 20	12 +	.37	30 − 6.18 ✓ +	.14		6.04	00	6.04
γ Androm.	4 ✓	1.9 56	+ 41	44 +	.89	32 − 6.33 ✓ +	.34		5.99 +	01	5.98
67 Ceti	7 ✓	2.2 11	− 7	00 −	.12	353 − 6.03 ✓ −	.05		6.08 +	01	6.07
ξ2 Ceti	−8 ✓	2.4 21	+ 7	54 +	.14	37 − 6.05 ✓ +	.05	6.041	6.00 +	02	5.98
	1.86	1.54							-6.036		-6,036

0.6 +3.55 −7.24 −.01 +.00 −7.25 −7.24
1.2 +41.41 −21.70 −.01 +.00 −21.71 −21.70
1.9 +3.04 −7.22 +.00 +.01 −7.22 −7.21
2.1 +2.24 −6.89 +.00 +.01 −6.89 −6.88
2.3 +2.34 −7.01 +.00 +.01 −7.01 −7.00

Star		Ra h m	δ ° '		tang δ				
χ Cass.	✓	0.4 26	+ 62	14 +	1.90 ✓	− 6.76 ✓	+ ✓.72	− 6.04	5
21 Cass.	✓	0.6 37	+ 74	18 +	3.55 ✓	− 7.24 ✓	−		340
δ Urs Min	✓	1.2 13	+ 88	39 +	41.41 ✓	− 21.70 ✓	−		19
~~κ Cass.~~		x ~~22~~ −							
50 Cass.	✓	1.9 52	+ 71	49 +	3.04 ✓	− 7.22 ✓	−		31
55 Cass.	✓	2.1 4	+ 65	56 +	2.24 ✓	− 6.89 ✓	−		350
ι Cass.	✓	2.3 18	+ 66	50 +	2.34 ✓	− 7.01 ✓	−		36
5 ~~Urs. Min.~~		2 ~~28~~			− ~~4.10~~ ✓				

1.4 +26 −6.14
1.6 +08 −6.09
1.6 +15 −6.14
1.8 +37 −6.18
2.2 −12 −6.03
2.4 +14 −6.05
1.8 +15 −6.10

0.4 +1.90 −6.76
0.6 +1.47 −6.55
1.5 +1.11 −6.46
1.9 +.89 −6.33
1.1 +1.34 −6.52

n5 = +.36

0 = +3.40 −1.15 n = +.34 +34
+41.26 −15.61 +.38 +38
+2.89 −1.12 +.39 +40
+2.09 −.79 +.38 +38
+2.19 −.91 +.42 +42
+38

0 = +2.21 −.72 n = +.33
+40.07 −15.18 +.38
+1.70 −.69 +.41 +37
+.90 −.36 +.40]
+1.00 −.48 +.48]

→

1871 Dec 12 h = ~~+~~.031 h' = -.010 h' = ~~-.012~~ -.017 n = +.38
WaR obs

Star		Ra h m	δ ° '		tang δ						
τ Pegasi	2.38	23.2 14	+ 23	3 +	.43	531 − 6.75 ✓ +	.16		.63 − / − 6.59 −	01 / 02	−6.64 / .61
υ Pegasi	−9	23.3 19	+ 22	43 +	.42	532 6.80 ✓ +	.16	6.656	.64 −	01	.65
ε Piscium	−6	23.6 33	+ 4	57 +	.09	333 6.67 ✓ +	.03		.64 −	01	.65
φ Pegasi	4	23.8 46	+ 18	26 +	.33	538 6.84 ✓ +	.13		.71 −	01	.72
ω Piscium	3	23.9 53	+ 6	10 +	.11	336 6.76 ✓ +	.04		.72	00	.72
α Androm.	2	0.0 2	+ 28	24 +	.54	1 − 6.86 ✓ +	.21		.65	00	.65
22 Androm.	1	0.1 4	+ 45	23 +	1.01	332 7.08 ✓ +	.38		.70	00	.70
γ Pegasi	+1	0.1 7	+ 14	29 +	.26	3 − 6.79 ✓ +	.10		.69	00	.69
η Piscium	−12	1.4 25	+ 14	42 +	.26	22 6.75 ✓ +	.10		.65 +	02	.63
υ Persei	13	1.5 30	+ 48	00 +	1.11	23 − 7.11 ✓ +	.42		.69 +	02	.67
ι Piscium		~~23.4~~ 22						6.678			
λ Androm.	+7	23.5 31	+ 45	47 +	1.03	331 − 7.12 +.98	.38		.66 −	01	.67
	0.88										
γ Trianguli	−20	2.2 10	+33	16 +	.66	352 − 6.94 ✓ +	.25		.69 +	03	.66
		0.26 / .79							-6.666		-6666

23.4 −2.77 −5.65 −.00 −.01 −5.65 −5.66
1.2 +41.41 −22.58 +.01 +.01 −22.57 −22.57

Star		Ra h m	δ ° '		tang δ				
λ Draconis	✓	23.4 23	+ 70	3 −	2.75 ✓	− 5.65 ✓	−		162
ρ Cass.	x	23.8 48	+ 56	48 +	1.53 ✓	− 7.21	+ ✓.58	− 6.63	539
δ Urs Min	x	1.2 13	+ 88	39 +	41.41 ✓	− 22.58 ✓	−		19

23.5 +1.01 −7.04

23.2 +42 −6.75
23.3 +42 −6.80
23.6 +09 −6.67
23.8 +33 −6.84
23.9 +11 −6.76
0.1 +26 −6.79
1.4 +26 −6.75
23.9 +27 −6.77

23.8 +1.53 −7.21
0.1 +1.01 −7.08
1.5 +1.11 −7.11
0.2 +1.16 −7.13

n5 = .38

0 = +41.14 −15.80 n = +.38 +.38

0 = −3.04 +1.12 n = +.37 +.37

0 = +40.25 −15.46 n = +.38

0 = −3.93 +1.45 n = +.37

sin z = +.60+.80 | +.40+.60 | +.20+.40 | +0+.20 | +0−.20 | −.20−.40 | −.40−.60 | −.60−.80

RA h m	sin δ	Req−Rfl ′	″	θ'−θ ″	Req−Rfl+θ'−θ ″		
2 45	−.17	+1	3.6	+.6	4.2	−.6	3.6
2 55	+.63		1.0	+.7	1.7	+2.0	3.7
2 57	+.07		2.4	−.3	2.1	+.3	2.4
3 00	+.03		3.2	−.1	3.1	+.1	3.2
						(4)	3.22

RA h m	sin δ	Req−Rfl ′	″	θ'−θ ″	Req−Rfl+θ'−θ ″		
2 49	−.59	~~+0~~ 1	~~56.6~~ 1.6	+1.1	~~54.4~~ 2.7	−1.8	0.9
						(1)	0.90

+.60+.80	+0+.20	+0−.20	−.40−.60	
+.63 +1.7	+.07 +2.1 +.03 3.1	−.17 +4.2	−.59 +2.7	
+.63 +1.7 + 2.1 3.8 1 (5) 3.8 −1.1	+.05 +2.6 + .2 2.8 2 5.6 −.1	−.17 +4.2 − .7 3.5 1 3.5 −.8	−.59 +2.7 −2.0 0.7 1 .7 +2.0	136

+1′ 2.72″
2.76

RA h m	sin δ						
0 33	−.23	+1	0.5	+.6	1.1	−.9	0.2
1 25	+.46		1.0	−.2	0.8	+1.5	2.3
1 30	−.10		2.1	+.3	2.4	−.4	2.0
1 35	+.61	0	58.9	+.1	59.0	+2.0	1.0
1 39	+.56	1	0.8	+.4	1.2	+1.8	3.0
1 48	+.38		2.5	−.2	2.3	+1.3	3.6
1 56	+.01		3.2	+.1	3.3	+0	3.3
2 11	+.76	0	59.3	+.8	0.1	+2.5	2.6
2 21	+.57	1	0.8	+.1	0.9	+1.9	2.8
						(9)	2.31

RA h m	sin δ						
0 26	−.34	+1	3.1	−.3	2.8	−1.2	1.6
0 37	−.53		0.7	+1.1	1.8	−1.7	0.1
1 13							
1 52	−.49		2.8	−.2	2.6	−1.6	1.0
2 4	−.40		3.8	+.4	~~3.4~~ 4.2	−1.4	2.8
2 18	−.41		2.4	+.7	3.1	−1.4	1.7
2 28						(5)	1.44

+.60+.80	+.40+.60	+.20+.40	+0+.20	+0−.20	−.20−.40	−.40−.60	
+.61 +59.0 +.76 0.1	+.46 +0.8 +.56 1.2 +.57 0.9	+.38 +2.3	+.01 +3.3	−.10 +2.4	−.23 +1.1 −.34 2.8	−.53 +1.8 −.49 2.6 −.40 4.2 −.41 3.1	
+.68 +59.6 + 2.3 1.9 2 (14) 3.8 +.1	+.53 +1.0 +1.8 2.8 3 8.4 −.8	+.38 +2.3 +1.3 3.6 1 3.6 −1.6	+.01 +3.3 + .1 3.4 1 3.4 −1.4	−.10 +2.4 − .4 2.0 1 2.0 +.0	−.28 +2.0 −1.0 1.0 2 2.0 +1.0	−.48 6 +2.9 − 1.6 1.3 4 5.2 +.7	284

+1′ 2.03″
2.00

RA h m	sin δ						
23 14	+.33	+1	1.7	+.1	1.8	+1.1	2.9
23 19	+.34		1.3	+.2	1.5	+1.2	2.7
23 33	+.61	0	59.0	+.1	59.1	+2.0	1.1
23 46	+.41	1	2.1	−.2	1.9	+1.4	3.3
23 53	+.59	0	58.9	+.2	59.1	+1.9	1.0
0 2	+.24	1	1.8	−.1	1.7	+.8	2.6
0 4	−.05		4.3	−.1	4.2	−0.2	4.0
0 7	+.47		1.7	+.4	2.1	+1.6	3.7
1 25	+.46		1.5	−.2	1.3	+1.5	2.8
1 30	−.10		1.9	+.3	2.2	−.4	1.8
23 22							
23 31	−.06		4.2	+.7	4.9	−.2	4.7
2 10	+.16		3.6	−.2	3.4	+.6	4.0
						(12)	2.88

RA h m	sin δ						
23 23	−.92	+1	6.8	−.8	6.0	−2.7	3.8 ✓
23 48	−.25		1.9	−.0	1.9	−.9	1.0
1 13						(1)	1.00

+.60+.80	+.40+.60	+.20+.40	+0+.20	+0−.20	−.20−.40	
+.61 +59.1	+.41 +1.9 +.59 59.1 +.47 2.1 +.46 1.3	+.33 +1.8 +.34 1.5 +.24 1.7	+.16 +3.4	−.05 +4.2 −.10 2.2 −.06 4.9	−.25 +1.9	
+.61 +59.1 + 2.1 1.2 1 (13) 1.2 +1.6	+.48 +1.1 +1.6 2.7 4 10.8 +.1	+.30 +1.7 +1.1 2.8 3 8.4 +.0	+.16 +3.4 + .6 4.0 1 4.0 −1.2	−.07 +3.8 − .3 3.5 3 10.5 −.7	−.25 +1.9 − .9 1.0 1 1.0 +1.0 8	359

+1′ 2.76″
2.74

1870phae.proj..4220

1871 Dec 14 WAR obs. h = ~~+~~ −.032 (+66) h' = −.010 h' = +.066 n = +.36

Star	RA h m	δ ° '	tang δ	π Ra −(P'P)				
5H. Camel	x [3.6] 37	+ 70 57 +	289 √ 364	− 9.~~70~~ 25 √				
η Tauri	x 3 3.7 40	+ 23 43 +	.44 √ 61	− 8.41 √ +	.16		− 8.25 + 02	− 8.23
27 Tauri	x 3 3.7 42	+ 23 40 +	.44 √ 62	− 8.39 √ +	.16		.23 + 02	.21
ψ Persei	3.76 x 2 3.8 46	+ 31 31 +	.61 √ 63	− 8.45 √ +	.22		.23 + 01	.22
ε Persei	x 3 3.8 49	+ 39 39 +	.83 √ 64	8.54 √ +	.30	8.234	.24 + 01	.23
ξ Persei	x 2 3.8 51	+ 35 26 +	.71 √ 65	− 8.48 √ +	.26		.22 + 01	.21
λ Tauri	+ x 3.9 54	+ 12 8 +	21 ~~.14~~ √ 66	8.25 √ +	.08		.17 + 01	.16
Gr 750	x ~~3.7 58~~	~~+ 85~~ 13 +	~~11.9 x 5 √ 68~~					
δ Tauri	x 3 4.3 16	+ 17 15 +	.31 √ 71	− 8.30 √ +	.11		.19 − 02	.21
ε Tauri	x 3 4.3 21	+ 18 54 +	.34 √ 72	− 8.27 √ +	.12		.15 − 02	.17
α Tauri	x 5 4.5 29	+ 16 15 +	.29 √ 73	− 8.33 √ +	.10	8.198	.23 − 03	.26
ν Eridani	x 5 4.5 30 (4.30)	− 3 37 −	.06 √ 74	− 8.23 √ −	.02	~~8.20~~	.25 − 03	.28
	4.03	−1'						
3.6 +2.89	− 9.25 .00	.00	− 9.25	− 9.25		− 8.216		− 8.218

1871 Dec 14 WAR obs.

Star	RA h m	δ ° '	tang δ	π Ra −(P'P)
~~α Urs. Min~~ x	~~1 13~~	~~+ 88 39~~		

3.7 +44 −8.41 3.8 +83 −8.54
3.7 +44 −8.39 3.8 +71 −8.48
3.9 +21 −8.25 3.8 +.77 −8.51
4.3 +31 −8.30
4.3 +34 −8.27
4.5 +29 −8.33
4.5 −06 −8.23
4.1 +.28 −8.31 m5 = .41

0 = + 2.61 − 94 n = + .36 + .36

0 = + 2.12 − .74 n = + .35

1871 Dec 17 WAR obs. h = ~~+~~ −.032 (−50) h' = −.009 h' = −.046

n = + .39

Star	RA	δ	tang δ					
	23.32 ~~23.27~~ 23.8						.66 − 00	− 10.66
μ Pegasi	√ 22.7 44	+ 23 57 +	.44 √ 324	− 10.84 √ +	.17		− 10.67 − 05	.41
ο Androm.	√ 9 22.9 56	+ 41 39 +	.89 √ 327	− 11.01 √ +	.35		.66 − 04	.40
α Pegasi	√ 9 22.9 58	+ 14 32 +	.26 √ 329	− 10.76 √ +	.10	10.627	.66 − 04	.40
γ Piscium	√ 6 23 2 11	+ 2 36 +	.04 √ 330	− 10.60 √ +	.02		.58 − 03	.61
π Pegasi	√ 5 23.2 14	+ 23 3 +	.42 √ 531	− 10.77 √ +	.16		.61 − 03	.64
υ Pegasi	√ 23.3 19	+ 22 43 +	.43 √ 532	− 10.41 √ +	.16		.55 − 02	.57
λ Androm.	√ 3 23.5 31	+ 46 47 +	1.03 √ 331	− 11.10 + .08	.39		.63 − 01	.64
φ Pegasi	√ 0 23.8 46	+ 18 26 +	.33 √ 538	− 10.75 √ +	.13		.62 − 00	.62
ω Piscium	√ 23.9 53	+ 6 10 +	.11 √ 336	− 10.67 √ +	.04		.63 + 00	.63
α Androm.	√ 0.0 1	+ 28 24 +	.54 √ 1	− 10.92 √ +	.21		.71 + 01	.70
22 Androm.	√ 3 0.1 4	+ 45 23 +	1.01 √ 337	− 11.10 √ +	.39		.71 + 01	.70
τ Piscium	√ 3 1.1 5	+ 29 26 +	.56 √ 17	− 10.97 √ +	.22		.75 + 06	.69
ε Piscium	√ 1 0.9 56	+ 7 13 +	.13 √ 15	− 10.74 √ +	.05		.69 + 00	.69
β Androm.	√ 2 1.0 3	+ 35 57 +	.70 ~~.69~~ √ 16	− 11.03 + .07	.27	10.692	.69 + .05	.64
θ Ceti	0.45 1.3 18	− 8 50 *	.15 √ 21	− 10.66 √ *	.06		.72 ~~.60~~ + 07	.53
	23.8						− 10.651	− 10.652

22.8 +2.20 −11.55 −.01 −.01 −11.56 −11.56
23.4 −2.77 −9.55 −.00 −.00 −9.55 −9.55
23.6 +4.30 −12.37 −.00 −.00 −12.37 −12.37
0.1 −4.84 −8.94 +.00 +.01 −8.94 −8.93
1.2 +41.41 −26.55 +.01 +.02 −26.54 −26.53

Star		RA	δ	tang δ			
ι Cephei	√	22.8 45	+ 65 33 +	2.19 (2.20) √	− 11.55 √		325
χ Draconis	S.C. √	23.4 24	+ 70 3 −	2.75 √	− 9.55 √	−	162
γ Cephei	√	23.6 34	+ 76 56 +	4.30 √	− 12.37 √	−	334
ρ Cass.	√	23.8 48	+ 56 48 +	1.53 √	− 11.26 √	+ 1.60 − 10.66	539
4H. Draconis	S.C. √	0.1 6	+ 78 19 −	4.83 √	− 8.94 √	−	168
α Urs. Min	√	1.2 13	+ 88 39 +	41.41 √	− 26.55 √	−	19

22.9 +26 −10.76 22.9 +89 −11.01
23.2 +104 −10.60 23.5 +1.01 −11.~~10~~ 02
23.2 +42 −10.77 23.8 +1.53 −11.26
23.3 +42 −10.71 0.1 +1.01 −11.10
23.8 +33 −10.75 23.6 +1.11 −11.~~12~~ 10
23.9 +11 −10.67
0.9 +13 −10.74
1.3 +15 −10.66
23.8 +23 −10.70

0 = +1.97 −.86 n = +.44 .49 0 = −3.00 +1.15 n = +.38 .38
+4.07 −1.67 +.41 .41 −5.07 +1.76 +.35 .36
+41.18 −15.84 +.38 .38 +.41 .37

m5 = .34

0 = +1.09 −.46 n = +.42 0 = −3.88 +1.55 n = +.40
+3.19 −1.27 +.40 −5.95 +2.17 +.37
+42.30 ~~−16.23~~ −15.43 +.38 .39 .39

1871 Dec 17 Am obs. h = ~~+~~ −.032 h' = −.009 h' = +.022 n = +.44

1.68

Star	RA	δ	tang δ					
ν Persei	+ 7 1.5 30	+ 48 00 +	1.11 √ 23	− 11.11 √ +	.48		− 10.63 + 01	− 10.62
98 Piscium	√ 6 1.6 35	+ 4 51 +	.08 √ 349	− 10.68 √ +	.04	10.636	.64 + 01	.63
ο Piscium	√ 6 1.6 39	+ 8 32 +	.15 √ 25	− 10.70 √ +	.07		.63 + 01	.62
β Arietis	√ 4 1.8 48	+ 20 12 +	.37 √ 30	− 10.79 √ +	.16		.63 + 01	.62
γ Androm.	+ 3 1.9 56	+ 41 44 +	.89 √ 32	− 11.04 √ +	.39		.65 + 01	.64
67 Ceti	√ 2 2.2 10	− 7 00 −	.12 √ 353	− 10.60 √ −	.05		.65 + 00	.65
ξ Ceti	√ 2.3 21	+ 7 54 +	.14 √ 37	− 10.69 √ +	.06		.63 − 00	.63
ξ Arietis	√ [2.5] 31	+ 21 25 +	.39 √ 355	− 10.66 √ +	.17		[.49]	[.49]
δ Ceti	√ 4 2.6 33	− 0 13 +	~~.00~~ .01 √ 39	− 10.56 √ −	.00		.56 − 01	.57
θ Persei	√ 4 2.6 35	+ 48 42 +	1.14 √ 40	− 11.19 √ +	.50		.69 − 01	.70
γ Ceti seq.	√ 4 2.6 37	+ 2 42 +	.05 √ 41	− 10.63 √ +	.02		.61 − 01	.62
41 Arietis	√ 5 2.7 42	+ 26 45 +	.50 √ 44	− 10.87 √ +	.22		.65 − 01	.66
τ Persei	√ 6 2.8 45	+ 52 15 +	1.29 √ 45	− 11.10 √ +	.57	10.617	.53 − 01	.54
	2.54 2.18						− 10.625	− 10.625

1.9 +3.04 −11.85 −.00 −.00 −11.85 −11.85
2.3 +2.34 −11.73 +.00 +.00 −11.73 −11.73
2.8 +5.10 −12.93 +.01 +.01 −12.92 −12.92

Star		RA	δ	tang δ		
50 Cass.	√	1.9 52	+ 71 49 +	3.04 √	− 11.85 √	31
ι Cass.	√	2.3 18	+ 66 50 +	2.34 √	− 11.73 √	36
47H. Cephei	√	2.8 48	+ 78 55 +	5.10 √	− 12.93 √	358

1.6 +08 −10.68 1.5 +1.11 −11.11
1.6 +15 −10.70 1.9 +.89 −11.04
1.8 +.37 −10.79 2.6 +1.14 −11.19
2.2 −.12 −10.60 2.8 +1.29 −11.10
2.3 +.14 −10.69 2.2 ~~+1.36~~ 1.11 −11.11
2.5 +.39 −10.66
2.6 +.05 −10.63 m5 = .45
2.1 +.15 −10.68

0 = +2.89 −1.17 n = + .40 + .36
+2.19 −1.05 + .48 + .48
+4.95 −2.24 + .45 + .45 .44

0 = +1.93 −.74 n = + .38
+1.23 −.62 + .50
+3.99 −1.81 + .45 .41

sin z = +.60 +.80 +.40 +.60 +.20 +.40 +0 +.20 +0 −.20 −.20 −.40 −.40 −.60

RA		sin z	Rey − Rfl		P′−P	Rey−Rfl + P′−P
h	m		′	″	″	″
3	37					
3	40					
3	42					
3	46					
3	49					
3	51					
3	54					
3	58					
4	16					
4	21					
4	29					
4	30					

RA		sin z	Rey − Rfl		P′−P	Rey−Rfl + P′−P
h	m		′	″	″	″
1	13					

325		22	44	+.32	+1					
162		22	56	+.01		3.1	+.4	3.5	+.1	36
384		~~22~~	~~58~~	~~+.47~~		~~2.3~~	~~−.6~~	~~1.7~~	~~+1.6~~	~~33~~
539		23	11	+.64		1.2	−.2	1.0	+2.0	30
168		23	14	+.33		2.2	+.1	2.3	+1.1	34
19		23	19	+.34		1.9	+.2	2.1	+1.2	33
		23	31	−.06		3.4	+.7	4.1	−.2	39
		23	46	+.41		1.4	−.2	1.2	+1.3	25
		23	53	+.59		0.8	+.2	1.0	+1.8	28
		0	1	+.24		2.2	−.1	2.1	+.8	29
		0	4	−.05		4.3	−.1	4.2	−.2	40
		1	5	+.22		2.1	+.2	2.3	+.7	30
38	38	0	56	+.58		0.6	+.3	0.9	+1.7	26
35	36	1	2	+.13		3.0	−.3	2.7	+.5	32
27		1	18	+.78					(13)	3.19

+.64	+1.0	+.47	+1.7	+.33	+2.3	+.01	+3.5	−.06	+4.1	−.39	+3.7	−.57	+3.8
		+.41	1.2	+.34	2.1	+.13	2.7	−.05	4.2	−.25	3.2		
		+.59	1.0	+.24	2.1								
		+.58	0.9	+.22	2.3								
+.64	+1.0	+.51	+1.2	+.28	+2.2	+.07	+3.1	−.06	+4.2	−.32	+3.4	−.57	+3.8
	+21		+1.7		+1.0		+.03		−.2		−1.1		−1.9
	3.1	1	2.9	4	3.2	4	3.4	2	4.0	2	2.3	2	1.9 1
(16)	31		116		128		68		80		46		19
	−.1		+.1		−.2		−.4		−1.0		+.7		+1.1
													488

22	45	−.39	+1	2.7	+1.0	3.7	−1.3	24
23	24	−.92		4.7	−.8	3.9	−2.0	09 ✓
23	34	−.57		3.5	+.3	3.8	−1.7	21
23	48	−.25		3.2	−0	3.2	−.8	24
0	6	−.86					(3)	2.30
1	13							

−40 +1′ 3.05″
.37 3.02
.39

31	1	30	−.10	+1	2.7	+.3	3.0	−0.4	2.6
36	1	35	+.61	0	59.3	+.1	59.4	+1.9	1.3
358	1	39	+.56	1	1.1	+.4	1.5	+1.8	3.3
	1	48	+.38		2.7	−.2	2.5	+1.3	3.8
	1	56	+.01		2.0	+.1	2.1	+0.0	2.1
	2	10	+.76		0.7	+.8	1.5	+2.4	3.9
	2	21	+.57		1.0	+.1	1.1	+1.8	2.9
	2	31	+.36	0	58.6	+.7	59.3	+1.2	0.5
	2	33	+.68	1	1.1	−.2	0.9	+2.1	3.0
	2	35	−.11	0	59.0	+.3	(59.3)	−0.5	(58.8)
	2	37	+.64		59.6	+.3	59.9	+2.0	1.9
	2	42	+.27	1	1.4	+.4	1.8	+.9	2.7
	2	45	−.17		0.9	+.6	1.5	−.6	0.9
								(12)	2.41

+.61	+59.4	+.56	+1.5	+.38	+2.5	+.01	+2.1	−.10	+3.0			−.49	+3.0
+.76	1.5	+.57	1.1	+.36	59.3			−.17	1.5			−.41	2.6
+.68	0.9			+.27	1.8								
+.64	59.9												
+.67	+0.4	+.56	+1.3	+.34	+1.2	+.01	+2.1	−.14	+2.2			−.45	+2.8
	+2.2		+1.9		+1.2		+.0		−.5				−1.5
	2.6	4	3.2	2	2.4	3	2.1	1	1.7	2			1.3 2
(14)	104		64		72		21		34				26
	−.3		−.9		−.1		+.2		+.6				+1.0
													321

1	52	−.49	+1	3.2	−.2	3.0	−1.5	1.5
2	18	−.41		1.9	+.7	2.6	−1.3	1.3
2	48	−.59					(2)	1.40

+1′ 2.29″
2.26