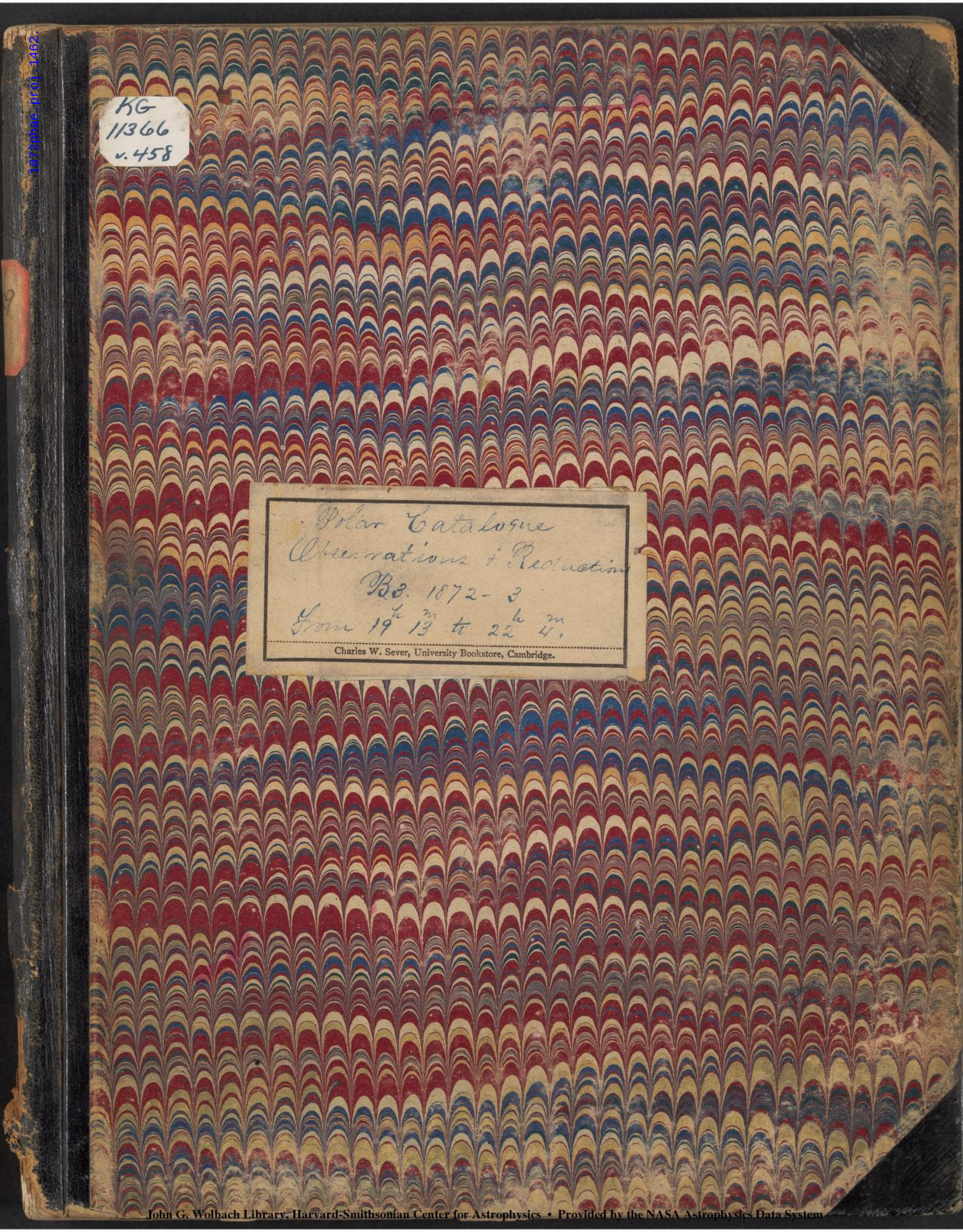
KG
11366
v.458



Polar Catalogue
Observations & Reductions
B3. 1872-3
From 19^h 13^m to 22^h 4^m.

Charles W. Sever, University Bookstore, Cambridge.

1872pnae.proj.1462.

Polar Stars.

Observations – Reductions

A 8

1872–3

δ Draco.

tang δ = +2.408 = π
x = −.038
cos x = −~~.03~~

Sin δ 9.96541
Cos δ 9.58406 9.58406
.11571n .09302
9.69977n 9.67708n

h	m	s		
19	12	35		
19	12	31		
+	67°	26′	″	
+	67	26	17	α 1872 = 31.147 δ = 26′ 10.23″ $\frac{d\alpha}{dt}$ = +0.034

Z = +2 5 0 3 29 α 1873 = 31.180 δ = 26 16.52 $\frac{d\delta}{dt}$ = +6.30
−.42

Chronograph failed

1872 July 27 −.233		1872 August 1 −.268	1872 August 6 −.248	1872 Oct. 10 −.015	1872 Oct. 14 +.047	1872 Oct. 20 +.121
12 27.5 29.9 32.7 38.4 38.2 41.0 43.7 46.3 49.1	12 10.6 11.7 14.4	12 31.3 34.4 36.8 39.6 42.3 44.9 47.9 50.4 53.1	~~12~~ ~~13~~ 12	12 — 12 13.9 15.0 18.0 20.7 23.3 26.0 28.7 31.4 —	12 13.3 11 46.7 16.0 47.9 18.7 48.6 21.3 24.0 26.6 29.3 32.0 34.8	12 10.9 11 48.4 13.6 50.0 16.0 52.9 18.8 21.6 24.1 26.8 29.5 32.2
343.8		380.7		163.1	216.0	193.5
38.200 12 12.03		42.300		23.300 12 13.90	24.000 11 47.73	21.500 11 50.43
12 38.16		12 42.26		12 23.26	12 23.96	12 21.46
−3.28 −0.56 −3.20		−7.50 −.64 −3.08	−.60	+7.70 −.04 −2.82	+6.58 +.11 −2.68	+8.51 +.29 −2.46
12 31.12		12 31.04		12 28.10 Ml.	12 27.97 Sy	12 27.80 Sy
+0.64 0 2 1.9 50.0 111.9 1 55.95		AR	0 2 11.1 0.0 111 2 5.55	+1.14 0 4 43.5 29.8 733 4 36.65	+1.23 0 4 23.0 7.9 309 4 15.45	+1.37 0 4 28.2 9.5 377 4 18.85
+26.17 1.41780 1.11757n 1 −13.11 1 55.95 1 42.84 ° ′ ″ +67 21 5.58				+9.40 0.97313 0.65021 +4.47 4 36.65 4 41.12 18 7.23	+36.27 1.55955 2.23763 +17.29 4 15.45 4 32.74 18 ~~16.29~~ 15.61	+31.07 1.49234 1.16942 +14.77 4 18.85 4 33.62 18 14.73
−25 3 2 −141 1.42859n	1.43000n			−25 3 2 −1123 1.41877n	−112 1.42888n	+847 1.43847n
+ 26.83 − .13 + .04 −.19				+ 26.23 − .02 + .14 −.46	+ 26.85 − .25 + .13 −.43	+ 27.45 − .19 + .13 −.43
+ 26.74 +67 21 32.25 − 5.24 +4 43.39 +4 38.12 +67 26 10.37	21 32.06			+ 26.35 18 33.58 18 33.12 − 9.50 +7 46.25 +7 36.75 26 10.33	+ 26.73 18 42.34 41.91 − 10.60 +7 46.92 +7 36.32 26 18.66	+ 27.39 18 42.12 41.69 − 12.16 +7 46.34 +7 34.18 26 16.30
	− 5.27 +4 43.43 + 26 +4 38.42 26 10.48			− 9.50 +7 46.11 + 47 +7 37.08 26 10.20 Sy	− 10.60 +7 46.63 + 51 +7 36.54 26 18.45 Sy	− 12.16 +7 46.10 + 57 +7 34.51 26 16.20 Sy

1872 Oct. 21. +.089	1873 Aug 28 −.401	Sept 1 −.443	Sept. 3 −.396	1873 Oct 9 −.325
12 (0.6) 13.4 12 37.8 16.0 40.6 18.6 43.2 21.6 24.3 26.8 29.3 32.0 1926	12 50.6 13 19.2 53.1 22.0 56.1 24.7 58.8 1.7 3.9 6.7 9.6 12.0 252.5 552.5	~~14~~ 12 ~~13~~ 26.0 13 30.0 57.6 30 32.9 0.2 29 3.1 31 5.7 30 8.5 31 11.0 30 13.7 30	12 54.5 57.0 12 25.0 59.5 28.4 2.4 34.0 2 5.3 7.7 10.4 13.0 15.8 225.6 5.6	12 (32.9) 12 39.8 35.7 38.3 41.0 43.7 46.5 49.3 52.0 54.7
21.400 12 40.53	1.389 13 21.97	3.013 13 29.63	5.067 12 29.13	43.789 12 39.80
12 21.36	13 1.35	13 2.98	13 5.03	12 43.75
+ 8.71 + .21 − 2.42	− 27.22 − .97 − 1.99	− 28.92 − 1.07 − 1.80	− 31.12 − .965 − 1.70	− 12.43 − .79 + 0.34
12 27.86 Erq	13 ~~28.53~~ 30.11	13 ~~28.72~~ 31.19	13 37.45 31.25	13 30.87
+1.41	+1.92	+1.96	+1.98	+2.30
0 4 51.0 32.6 83.6 4 41.80	55 0 23.8 36.7 60.5 55 30.25	55 0 15.8 31.7 47.5 55 23.75	55 0 47.0 0.1 107.1 55 53.55	50 0 32.2 39.0 71.2 50 35.60
− 10.13 1.28171m 0.95879m + 9.09 4 41.80 4 32.71 18 15.64	− 20.58 1.31345m 1.01322 + 10.31 55 30.25 55 40.56 27 7.79	− 26.62 1.42521m 1.12498 + 13.33 55 23.75 55 37.08 27 11.27	+ 35.94 1.55558 1.25535m − 18.00 55 53.55 55 35.55 27 12.80	+ 3.99 0.60097 0.30074m − 2.00 50 35.60 50 33.60 32 14.75
+1135 1.44135m	− 25 3 11 − 241 1.42759m	− 1445 1.41555m	− 765 1.42235m	+760 1.43760m
+ 27.63 − .07 + .14 − .47	+ 26.77 − 08 + .03 − .04	+ 26.03 − .14 + .02 − .03	+ 26.45 − .25 + .05 − .07	+ 27.39 − .01 + .04 − .05
+ 27.70 18 43.34 18 43.87 − 12.38 +7 45.95 +7 33.57 26 16.91	+ 26.72 27 34.51 27 34.47 − 11.92 − 1 6.41 − 1 18.33 26 16.18	+ 25.91 27 37.18 37.15 − 12.78 − 1 7.81 − 1 20.59 26 16.59	+ 26.25 27 39.05 38.98 − 13.18 − 1 7.06 − 1 20.24 26 18.81	+ 27.42 32 42.17 42.12 − 17.19 − 1 8.29 − 1 25.48 16.69
− 12.38 +7 45.29 + .59 +7 33.45 26 17.32	− 11.92 − 1 6.70 + .80 − 1 17.82 26 16.65	− 12.78 − 8.17 + .82 − 1 20.03 26 17.12	− 13.18 − 7.81 + .83 − 1 20.16 26 18.82	− 17.19 − 8.41 + .96 − 1 24.64 26 17.48

κ Cygni

h m s
19 14 10
19 14 10
4 53° 08' 05"
+ 53 .08

tang δ = +.33
x = −.025
cos α = −.01
α 1872 8.549 δ = 7' 58.38"
α 1873 9.934 δ = 8 4.85

τ = +10 45 17
sin z = −.18
.19

1872
Sept. 17 14m 9.83s
22 9.66 17
27 9.48 18
Oct. 2 9.31 17
7 9.13 18
12 8.96 17
17 8.79 17
22 8.62 17
27 8.45 17

1873
Aug 28 14m 11.83s
2 11.69 14
7 11.55 14
12 11.40 15
17 11.24 16
11.10 14
Oct. 7 10.55
12 10.38 17
17 10.20 18
22 10.03 17
27 9.85 18

sin δ 9.90311
cos δ 9.77812
.1157n
9.89383n

dα = +1.385
dδ = +6.47

star ?

1872
September 23

Sheet illegible

1872
Sept. 28. −.137
−.13

13 40.7
44.1 14 15.8
47.3
54.2
57.8
1.1
4.7
8.3
15.0
18.5
21.9
313.6
13.6
1.236 14 15.80

14 1.21
14 9.45
−8.24
~~8.23~~

+ 8.42 +.01
− .17 −.18
− 0.90 +0.48
+ 7.35
14 1.21 8.56
20 +0.91 8.56
2 43.6 9.94
31.7
75.3
22 37.65"

− 14.56
1.16316n
1.03430n
− 1082
22 37.65
22 26.83
+53° 00' 21.52"

− 10 45 13 1.03880n
− 269
1.03611n

+ 10.87
− .06
+ .18

+ 10.99
+53 0 32.25 32.57 0 32.25
8 16.6
+7 44.1 −.26 43.8
− 11.73
− 18.20
+7 45.34
+7 27.14 − 18.20
+53 7 59.65 +7 45.04
−21 + .17
+53 7 59.44 +7 7 27.01
59.26
8 5.73

1872 −.115
Oct. 9 −.11

14 58.3
1.6 14 48.4
5.0 49.7
12.0 51.6
15.5
19.0
22.4
25.8
32.8
36.1
39.7
268.2
208.2
18.927 14. 49.90

By wrong

14 18.90
14 9.05
(+9.85)

+ 7.88 +.00
− .15 −.15
− 0.50 + 0.88
+ 8.23
18.90
20 +1.13
0 40.8
29.5
70.3
20 35.15

− 30.97
1.49094n
1.36208n
− 23.02
20 35.15
20 12.13
2 36.20

−

− .26
+ .02

1872 −.015
Oct. 10 −.01

13
54.6 14 19.2
56.3 20.3
58.1 21.1
59.7
1.4
3.1
4.9
6.6
8.3
253.0
13.0
1.444 14 20.20

14 1.42
14 9.01
− 7.59
~~7.58~~

+ 7.70 +.00
− .01 −.02
− 0.46 +0.92
+ 7.232
1.42 8.65
20 +1.14 8.64
2 45.4 10.02
35.6
81.0
22 40.50

− 18.76
1.27323n
1.14437n
− 13.94
22 40.50
22 26.56
00 21.79

− 1123
1.02757n

+ 10.66
− .09
+ .08

+ 10.65
0 32.44 32.17
8 17.0
+7 44.6 −.27 44.3
− 12.13
− 18.60
+7 46.25
+7 27.65 − 18.60
8 0.09 + 46.11
−.21 + .21
7 59.88 +7 7 27.72
59.89
6.36

1872 +.047
Oct. 14 +.05

13 41.6
3.3 45.1 13 34.6
3.6 48.7 35.6
6.8 55.5 36.6
3.3 ~~57.2~~
59.0
3.4 2.4
3.4 5.8
3.4 9.2
6.9 16.1
3.4 19.5
22.9
360.9
2.345 13 35.60

13 2.32
14 8.87
− 6.55
~~6.54~~

+ 6.57 +.01
+ .07 +.06
− 0.32 +1.06
+ 6.32
2.32 8.64
20 +1.23 8.66
2 15.2 10.04
1.5
16.7
22 8.35
+ 26.74
− ~~23.26~~
1.42716
1.29830
+19.87 +19.87
~~22 26.74~~ 22 8.35
~~22 46.61~~ 22 28.22
00 20.13

− 112
1.03768n

+ 10.91
− .19
+ .06

+ 10.78
0 30.91 30.70
8 16.8
+7 45.9 −.21 45.7
− 11.93
− 18.40
+7 46.92
+7 28.52 − 18.40
7 59.43 + 46.63
−.21 + .23
7 59.22 +7 7 28.46
59.16
5.63

1872 +.121
Oct. 20 +.11

13 39.2
42.9 14 26.7
46.3 28.6
53.2 30.5
56.6
0.1
3.6
6.9
14.0
17.4
20.7
300.9
0.9
0.082 14 28.60

14 0.06
14 8.68
− 8.62
~~8.61~~

+ 8.53 −.02
+ .15 +.16
− 0.13 + 1.25
+ 8.584
0.06 8.61
20 +1.37 8.60
2 58.6 9.98
42.0
100.6
22 50.30

− 28.52
1.45515n
1.32634n
− 21.20
22 50.30
22 29.10
00 19.25

+ 847.
1.04727n

+ 11.15
− .21
+ .08

11.02
0 30.27 29.99
8 16.6
+7 46.3 −.28 46.0
− 11.73
− 18.20
+7 46.34
+7 28.14 − 18.20
7 58.41 + 46.10
−.21 + .26
7 58.20 +7 7 28.16
58.15
4.62

9.77812
.09302
9.87114 n

1872		° ′ ″	
Sept	17	53 7 75.6	
	22	76.2	+ 6
	27	76.6	4
Oct.	2	76.8	2
	7	77.0	+ 2
	12	76.9	− 1
	17	76.7	2
	22	76.5	2
	27	76.3	− 2

1873		′ ″	
Aug	28	7 76.7	
Sept.	2	77.5	+ .8
	7	78.4	.9
	12	79.2	.8
	17	80.1	.9
Oct	7	81.5	
	12	81.3	− 2
	17	81.2	1
	22	81.0	2
	27	80.9	1

1872.0 α	δ	1873.0 α	δ
8.56	59.44	9.97	5.27
8.64	59.88	.90	5.10
.66	59.22	.99	4.50
.60	58.20		
8.615	59.18 + .42	9.953	4.96 + .80 5.76
.549	58.38	.934	4.85 4.85
+.066	~~+0.80~~	+.019	~~+0.11~~ + .91
	59.60		
	58.38		
	+ 1.22		

Ch. f

1873 Aug 28 ~~−.41~~ 1873 −.41

14 19.3
22.5 14 4.5
25.9 6.2
32.7 7.8
36.0
39.4
43.0
46.5
53.5
56.8
0.3
375.9
435.6
39.627 14 6.17

14 39.60
14 11.82
+27.78
+~~27.79~~

−27.20 −.01
− .55 −.53
− 1.89
− 29.643
39.60 9.96
10 +1.92 9.97
3 54.8
8.0
122.8
14 1.40

+ 33.46
1.52453
1.41836 n
− 26.20
14 1.40
13 35.20
~~9 13.15~~
9 13.15

− 10 45.17 1.03890 n
− 241
1.03649 n

+ 10.88
− .29
+ .24

+ 10.83
9 23.98 9 23.66
8 16.7
− 1 7.3 − .32 7.6

− 11.90
− 1 6.41
− 1 18.31 − 11.90
8 5.67 − 1 6.70
− .40 + .36
8 5.27 − 1 18.24
8 5.42

Sept 1 −.44 −.443

13 20.6
14 24.1 12 17.7
27.4 14 19.1
34.4 20.1
37.9
41.1
44.7
48.1
~~50.7~~
55.0
58.3
1.8
393.4
453.4 14 18.97
41.218

14 41.19
14 11.71
+ 29.48
+~~29.49~~

− 28.91 −.01
− .59 −.59
− 1.78
− 31.289
41.19 9.91
10 +1.96 9.90
3 43.2
58.1
101.3
13 50.65

+ 22.25
1.34733
1.24116 n
− 17.42
13 50.65
13 33.23
9 15.12

− 1445
1.02445 n

+ 10.58
− .12
+ .23

+ 10.69
9 25.81 25.51
8 17.4
− 1 8.4 − .30 8.7

− 12.50
− 1 7.81
− 1 20.31 − 12.50
8 5.50 − 8.17
− .40 + .37
8 5.10 − 1 20.30
8 5.21

Sept 2

10
3 47.9
0.6
108.5
13 54.25

Oct 9 −.18 1873 ~~−.175~~

14
16.4 14 10.3
18.0 11.4
19.7 12.2
21.5
23.1
24.9
26.7
28.4
30.3
209.0
23.222 14 11.30

14 23.20
14 10.48
+ 12.72
+~~12.73~~

− 12.43 +.00
− .24 −.23
− 0.55
− 13.221
23.20 9.98
10 +2.30 9.99
3 35.9
42.5
78.4
13 39.20

+ 11.92
1.07628
0.97011 n
− 9.33
13 39.20
13 29.87
9 18.48

+ 760
1.04650 n

+ 11.13
− .04
+ .22

+ 11.31
9 29.79 29.49
8 21.4
− 1 8.4 − .30 8.7

− 16.60
− 1 8.29
− 1 24.89 − 16.66
8 4.90 − 8.41
− .40 + .43
8 4.50 − 1 22.58
8 4.91

1872

1873

T Draco.

h m s
19 18 06
19 17 59
4 73° 07′ 08″
+ 73 07 08

n = +31 44 26
− 53

tang δ = +3.29
x = −.052

cos x =

α 1872 = 59.982

α 1873 = 58.868

δ 1872 = 7′ 1.70″

δ 1873 = 7 8.50

July 29 18 3.82
Aug 3 3.65 .17
8 3.46 .19

Sept 17 18 1.02
22 0.63 .39
27 0.23 .40
Oct. 2 17 59.83 .40
7 59.42 .41
12 59.01 .41
17 58.60 .41
22 58.19 .41
27 57.79 .40

m s
Aug 28 18 1.05
Sept. 2 .73 .32
7 0.39 .34

Oct 7 17 58.07
12 57.66 .41
17 .41
22 57.25

Sin δ 9.98087
Cos δ 9.46303 9.46
11571n .09
9.57874n 9.55

dα = −1.113
dδ = +6.80

1872 −268
August 1 −.27

17 18
58.2 10.6
18 1.8 13.9
5.1 17.8
8.5 21.2
12.4 24.8
15.7 28.4
19.1 31.7
22.7 35.3
26.6 38.7

170.1 222.4
110.1
12.233 24.711

18 12.18 18 24.66
18 3.71 18 3.53
+8.47 +21.13
−7.51 +.01 −20.24 +.00
−.89 −.88 −.79 −.82
−3.73 −4.84 −3.55 −4.66
−12.131 −24.58 61
18 12.18 24.66
18 0.06 0.08
18 0.07 5896 0.05 5894

A.R A.R

1872 −248
August 6. −.24

1872
Sept. 23

Sheet illegible

A R

1872 −.137
Sept 28 −.13

17
38.2 17 26.2
41.6
45.2
49.0
52.3
56.0
59.3
3.0
6.7

351.3
471.3
52.367 17 26.20

17 52.32
18 0.13
−7.81
+8.42 +.01
−.43 −.45
−0.15 −1.26
+7.83
52.32
+0.16
0.15 59.04
20 +0.91
3 45.2
31.0
76.2
23 38.10

+ 26.17
1.41780
0.97385
+9.42
23 38.10
23 47.52
+7° 59′ 0.83″

−31 43 55 1.55140n
−254
1.54886n

+ 35.39
− .10
+ .25

+ 25.54
+72 59 26.37 26.37 36.01
7 20.5 −.36
20.6 −.36 43.7
− 12.60
− 18.10
+7 45.34
+6 56.54 − 18.80
7 2.9 +7 45.04
+ 48
+7 27.72
7 3.73
7 10.53

1872 +.047
Oct. 14 +.05

17
38.0 17 46.0
41.4
45.4
48.7
52.1
55.8
59.4
3.0
6.5

350.3
470.3
52.256 17 46.00

17 52.20
17 58.82
−6.62
+6.57 +.01
+ .16 +15
+1.16 +0.05
+7.89
52.20
0.09
0.09 5898
20 +1.23
3 56.0
39.5
95.5
23 47.75

+ 6.26
0.79657
0.35262
+2.25
23 47.75
23 50.00
58 58.35

−103
1.55037n

+ 35.51
− .01
+ .11

+ 35.61
59 33.96 59 33.58
7 27.0 −
+7 47.0 −.38 46.6
−12.50
− 19.30
+7 46.92
7 27.62 − 19.30
7 1.58 +7 46.63
+ 65
+7 27.98
7 6.56
8.36

1872 +.121
Oct. 20 +.11

17
35.2 Do
38.5
42.0
45.7
49.2
52.9
56.4
59.0
4.1

324.0
444.0
49.333

17 49.28
17 58.33
−9.05
+8.53 −.02
+ .36 +40
+1.65 +0.54
+10.546
49.28
59.82
59.84 5873

A.R.

+866
1.56006n

+ 36.31
−

9808
6303 7.46303
1571 .09302
7874 9.55605

1872		°	′	″	
July	29	73	6	67.1	
Aug.	3			68.6	+1.5
	8			70.1	1.5
Sept.	17			79.2	
	22			79.9	+.7
	27			80.4	.5
Oct.	2			80.8	.4
	7			81.0	.2
	12			81.0	+0
	17			81.1	−.1
	22			81.4	.3
	27			80.7	.3

1873		′	″	′	″	
Aug.	28	~~20~~	~~57.4~~	6	80.1	
Sept.	2				81.2	+1.1
	7		~~59.6~~		82.2	1.0
Oct.	7		~~62.9~~		85.9	
	12				86.0	+.1
	17		~~64.3~~		86.0	+.0
	22				85.9	−.1
	27				85.7	−.2

Ch. J.

1872 Oct. 21 +.089 +.10

17
35.1 17 43.2
38.9
42.7
45.7
49.4
52.9
56.5
0.1
3.8

325.1
445.1
49.456 17 43.20

17 49.40
17 58.25
− 8.85
+ 8.70 +.01
+ .33 −.29
+1.73 +0.62
+10.783
49.40
0.16
0.13 59.02
20 +1.41
3 56.6
39.8
96.4
23 48.20

+ 6.26
0.79657
0.35262
+2.25
23 48.20
23 50.45
58 57.90

+1135
1.56275 m

+ 36.54
− .01
+ .11

+ 36.64
59 34.54 59 34.16
7 21.3
+7 46.8 −.38 46.4
− 12.80
− 19.60
+7 45.95
+7 26.35 − 19.60
7 0.89 +7 45.24
+ .74
+7 26.38
7 0.54
7 7.34

1873 Aug 28 −.491 −.41

18
15.6 17 42.6
18.7 47.1
22.4 49.7
26.1
29.7
33.1
36.7
40.0
43.6

265.9
29.544 17 46.47

18 29.49
18 1.03
+28.46
− 27.21 −.01
− 1.35 −1.32
− 2.16
− 30.720
29.49
58.77
58.79
15 +1.92
0 7.5
17.8
25.3
15 12.65

+ 43.07
1.63417
1.21291 m
− 16.33
15 12.65
14 56.32
7 52.03

−31 43 56

− 231
1.54909 m

+ 35.41
− .28
+ .01

+ 35.14
8 27.17 8 27.15
7 20.2
−1 7.0 −.02 7.0
− ~~6.70~~
− 11.70
−1 6.41
−1 18.11 − 11.70
7 9.06 −1 6.70
+ 1.01
−1 17.39
7 9.76

Sept 1 −.443 −.44

17
18 17.0 16 46.0
20.6 17 50.7
24.0 54.5
27.7
31.0
34.6
38.5
41.7
45.1

280.2
31.133 17 50.40

18 31.08
18 0.78
+ 30.30
− 28.91 −.01
− 1.45 −1.46
− 1.91
− 32.279
31.08
58.81
58.79
15 +1.96
0 1.1
14.8
15.9
15 7.95

+ 40.73
1.60991
1.18865 m
− 15.44
15 7.95
14 52.51
7 55.84

− 1425
1.53715 m

+ 34.45
− .25
+ .01

+ 34.21
8 30.05 30.04
7 21.0
−1 9.0 −.01 9.0
− 12.50
−1 7.81
−1 20.31 − 12.50
7 9.74 −1 8.17
+ 1.03
−1 19.64
7 10.40

Sept 2

15
0 10.2
21.1
31.3
15 15.65

Oct 9 −.175 −.18

17
56.7 17 54.1
0.2
4.0
7.4
11.3
14.8
18.1
21.9
25.5

159.9
99.9
11.100 17 54.10

18 11.05
17 57.89
+13.16
− 12.44 +.00
− .59 −.58
+ 0.98
− 12.054
11.05
59.00
59.01
15 +2.30
0 −6.0
−2.0
8.0
15 −4.00
14 56.00
+ 17.00
1.23045
0.80919 m
− 6.44
14 56.00
14 49.56
7 58.79

+776
1.55916 m

+ 36.24
− .05
+ .29

+ 36.48
8 35.27 34.88
7 25.9
−1 9.4 −.39 9.8
− 17.40
−1 8.29
−1 25.69 − 17.40
7 10.58 −1 8.41
+ 1.21
−1 24.60
7 10.28

1873 Oct 22 −.197 −.21

18
1.3
5.1
8.7
12.2
15.6
19.1
22.4
26.1
30.2

140.7
15.633

18 15.58
17 57.23
+18.35
− 18.19 +.00
− .69 −.65
+ 1.64
− ~~18.28~~ 17.2420
15.58
58.34
58.38

A. R

δ Aquilae

19h 19m 01s
19 19 06
4 2° 51′ ″
+ 2 51 48
z_1 = +39 31 00
+64

tang δ = +.05
x = −.015
corr = +.04
α 1872 2.644
α 1873 5.669
δ 1872 = 51′ 41.18″
δ 1873 = 51 48.06

1872	m	s	
Aug 8	19	4.78	3
13		4.75	3
18		4.72	3
Oct 7	19	4.07	8
12		3.99	8
17		3.91	8
22		3.83	8
27		3.75	8

1873	m	s	
Aug 28	19	7.86	
Sept. 2		7.80	6
7		7.74	6
Oct 7	19	7.29	
12		7.21	8
17		7.13	8
22		7.06	7
27		6.98	8

654
Sin δ 8.69907
Cos δ 9.99946
.11571n
.11517n

dα = +3.025
dδ = +6.87

1872 August 6 −.248 −.24	1872 Oct. 9 −.115 −.11	1872 Oct. 10 −.015 −.01	1872 Oct. 20 +.121 +.11	1872 Oct. 21 +.089 +.10	1873 Aug 28 −.408 −.41
19 12.8	18 43.7	18 43.9	18 43.0	18 42.6	17 22.8
14.8	46.8 18 30.7	46.0 18 40.3	45.0 18 43.4	45.7 18 38.7	9 24.9 18 18.6
16.9	48.0	48.1 40.9	47.0	46.9	27.0 19.9
21.0	52.0	52.2	51.1	50.9	30.9 21.0
23.1	54.1	54.3	53.3	53.0	33.1
25.1	56.2	56.3	55.5	55.1	35.1
27.2	58.3	58.5	57.4	57.0	37.1
29.2	0.4	0.4	59.5	59.1	39.8
33.4	4.4	4.7	3.6	3.4	43.2
35.4	6.5	6.7	5.7	5.5	45.4
37.6	8.7	8.8	7.7	7.6	47.6
276.5	378.1	379.9	428.8	426.8	386.9
	618.1	619.9	608.8	606.8	
25.136	56.191 18 30.70	56.255 18 40.40	55.345 18 43.40	55.164 18 38.70	35.173 18 19.83

Chron. failed

19 25.12 18 56.18
19 4.79 19 4.03
+20.33 +00 −7.85 +.00
~~+20.29~~ ~~7.89~~
+00 − 20.24 − .01 + 7.87 − .01 +00 −.01
−2.15 +0.87 1.39 +1.63
−22.40 +6.48
19 25.12 18 56.18
19 2.72 2.66
AR 19 2.71 5.73 2.65 5.67
35 +1.13
2 26.8
20.6
4.74
37 23.70
+ 25.49
1.40637
1.49885
+31.54
37 23.70
37 53.24
+2° 44′ 53.11″
+39 30 12 1.67610
+.0012
−47.45
.01
+ .07
+2 − 47.39
44 5.72 44 5.48
51 49.0
+7 43.3 −.24 43.1
− 0.93
− 7.80
+7 45.16
+7 37.36 − 7.80
+2 51 43.08 +7 44.84
.72
+7 51 36.32
41.80
48.67

18 56.34
19 4.01
− 7.67 ~~+00~~
+7.70 ~~−7.71~~ +00
− .00
+1.63 − 1.37
+ 6.33
56.34
2.67
5.67 2.66
35 +1.14
2 41.1
35.4
7.65
37 38.25
+ 15.95
1.20276
1.29524
+19.73
37 38.25
37 57.98
44 50.37
−11.07
1.66503
− 46.24
.00
+ .08
− 46.16
44 4.21
51 48.9
+7 44.7 −.26
− 0.83
− 7.70
+7 46.25
+7 38.55 − 7.70
51 42.76 +7 46.11
.72
+7 51 37.69
41.64
48.51

18 55.33
19 3.86
− 8.53 ~~−.02~~
+8.53 ~~−8.55~~ −.02
+1.65 + .01
− 1.22
+ 7.32
55.33
2.65
5.68 2.63
35 +1.37
2 47.7
37.2
8.49
37 42.45
+ 11.94
1.07700
1.16948
+14.77
37 42.45
37 57.22
44 51.13
+856
1.68466
− 48.38
.00
+ .08
− 48.30
3.95 44 2.83
51 48.6
44.4 +7 45.8 −.27
− 0.53
− 7.40
+7 46.34
+7 38.94 − 7.40
51 41.77 +7 46.10
.87
+7 51 37.83
40.39
47.26

18 55.15
19 3.84
− 8.69 ~~+.01~~
+8.70 ~~−8.73~~ +.01
+.01 +1.80 + .01
− 1.20
+ 7.51
55.15
2.66
5.65 2.68
35 +1.41
2 40.7
30.7
7.14
37 35.70
+ 16.46
1.21643
1.30891
+20.37
37 35.70
37 56.07
44 52.28
+1136
1.68745
− 48.69
.00
+ .08
− 48.61
2.56 44 3.67 44 3.41
51 48.5
45.5 +7 41.8 −.26 44.5
− 0.43
− 7.30
+7 45.95
+7 38.65 − 7.30
51 42.35 +7 45.28
.90
+7 51 37.08
40.49
47.36

18 35.16
19 7.86
− 32.70 −.01
~~− 32.74~~
+.00 − 27.21 −.01 − .02
+1.82 − 2.19 −.02 ~~0.83~~
− 29.42
35.16
5.74
5.70 5.73
25 +1.92
4 15.1
25.1
4.02
29 20.10
+ 15.34
1.18583
1.30100n
−20.00
29 20.10
29 00.10
53 48.25
+39 29 52
−241
1.67389
7
− 47.18
.00
+ .26
− 46.92
53 1.33 53 0.99
51 53.0
−1 8.3 −.34 8.6
~~8~~
−4.90
−1 6.41
−1 11.31 − 4.90
51 50.02 −1 6.70
1.22
−1 12.82
51 48.17

9.99946
.09302.
.09248

1872		°	′	″	
Aug.	8	2	51	46.4	
	13				
	18				
Oct.	7			49.0	
	12			48.9	-.1
	17			48.7	.2
	22			48.5	.2
	27			48.3	.2

1873		′	″	
Aug.	28	51	530	
Sept	2		5.33	+.3
	7		535	.2
	12		537	.2
	17		53.9	.2
Oct	7		540	
	12		539	-.1
	17		537	.2
	22		535	.2
	27		533	.2

Ch. f.

Sept 1 -.44 -.443 Sept 2 Oct 22 -.21 1873 -.197

N 24.4
19 26.5 N 19.3
28.5 19 20.6
32.6 22.0
34.7
36.8
38.8
40.9
45.0
47.0
49.1
4043

3.6755 19 20.63

19 36.74
19 7.81
~~+28.73~~ ~~-.11~~
~~+28.19~~
-.01 28.91 - .02 -.02
- 2.14
- 31.07
36.74
5.67
5.66
25 ~~+1.98~~ 25
4 14.9 4 22.0
29.3 33.1
44.2 55.1
29 22.10 29 27.55

+ 16.12
1.20737
1.32254 m
- 21.02
29 22.10
29 1.08
53 47.27

-1425
1.66185

+ - 45.90
- .50
+ .26

- 45.64
53 1.63 1.28
51 5.33
- 1 8.3 - 35 8.6

- 5.20
- 1 7.81
- 1 13.01 - 5.20
51 48.62 - 1 8.17
1.25
- 1 14.62
51 46.66

19 1.20
15.0
17.1
21.1
23.3
25.3
27.0
29.5
33.5
35.6
37.7
278.1

25.282

19 25.27
19 7.07
+18.20 ~~8.60~~
9 ~~8.16~~
+.02 1878 - .01 -.01 .2
- 1.40
- 19.59 .60
25.27
5.67
5.66
A. R.

1872 1873

β Cygni

h m s
19 25 32
19 25 36
+ 27° 41′ ″
+ 27 41 40
Z = +14 41 8

sin. z = +.25

tang δ = +.53
t = −.018
Cos α = −.03

α 1872 33.579 δ = 41′ 32.46″ dα = +2.419
dδ = +7.32
α 1873 35.998 δ = 41 39.79

Sept 17 25m 35s.14
22 .04 10
27 .94 10
Oct. 2 .84 10
7 34.73 11

Oct 7 25m 37s.28
12 .18 .10
17 .08 .10
22 .98 .10
27 36.58 .10

Sin δ 9.66731
Cos δ 9.94714
.11571 n
.06285 n

1872 Sept. 23.
25
17.3
19.6
21.9
25.3
26.8
—
31.3
33.6
36.0

A.R

1872. Sept 28. −.134 −.13
25 12.7
15.0 25 2.4
17.4
22.0
24.3
26.5
28.9
31.3
36.0
38.4
40.6
293.1
26.641 25 2.40

25 26.63
25 34.92
−8.29
~~−8.26~~
+.01
+ 8.42 +.08
− .07 −.07
−1.34 +1.08
+ 7.01
25 26.63 33.64
45 +10.91 25 33.65
3 9.6 25 36.07
−0.2
9.4
48 4.70

+ 24.25
1.38471
1.42487
+ 26.60
48 4.70
~~48 32.30~~ 48 31.30
+27° 34′ 17.05″
+14 40 48 1.17850
− 240
1.17610

* − 15.00″
− .13
+ .22

− 14.91
+27 34 2.14 34 1.83
41 47.0
+7 45.1 44.9 −.31 44.6
− 7.18
−14.50
+7 45.34
+7 30.84 − 14.50
+27 41 32.98 +7 45.04
+.29 − .23
+27 41 33.27 +7 30.31
41 32.14
39.46

1872 Oct. 10. −.415 −.01
25 12.9
15.4
17.6
22.3
24.6
26.9
29.3
31.7
36.4
38.7
41.0
296.8
26.982

25 26.96
25 34.65
− 7.69
~~−7.66~~
+ 7.70 +.00
− .01 −.01
−1.07 + 1.35
+ 6.62
26.96 33.58
A.R 33.58
36.004

1873 Oct. 8 −.208 −.22
25 (35.2)
37.5 25 54.8
39.7 55.9
44.6 57.1
46.8
49.2
51.6
53.8
58.6
0.8
3.2
49.182 25 55.93

25 49.16
25 37.26
+11.90
~~+11.93~~
− 11.80 −.01
− .12 −.11
−1.26
−13.18
49.16 35.98
45 +2.28 35.98
19.6
26.6
46.2
49 8 23.10

− 6.75
0.82930 n
0.89215
+ 7.80
49 23.10
49 8 30.90
33 4 17.95

+ 52
1.17902

* − 15.10
− .02
+ .26

− 11.86
33 4 2.59 34 2.32
41 47.5 52.9
+17 44.9 50.3 −.27
− 13.10
−1 8.38
−1 21.48 − 13.10
41.11 − 1 8.61
+.55 − .57
41.66 − 1 22.28
32 40.04

Oct. 22 −.197 −.21
25 41.2
43.7
46.0
50.6
52.9
55.1
57.5
59.9
4.6
6.9
9.3
427.7
604.4
55.245

25 55.23
25 36.97
+ 18.26
~~+ 18.29~~
−18.19 +.00
− .11 −.10
−0.97
−19.276
55.23 35.96
A.R 35.97

Nov. 2 +.023 +.02
25 44.9 No Deltas
47.3
49.6
54.2
56.5
58.9
26 1.2
3.5
8.2
10.5
12.9
347.7
647.4
58.882

25 58.86
25 36.76
+ 22.10
~~+ 22.13~~
− 22.11 +.00
+ .01 +.01
−0.76
− 22.86
58.86 36.00
A.R. 36.00

9.94714
.09302
.04016 n

1872					1873			
Sept 17	27°	41′	46.5″		Oct. 7	41	529	
22			46.7	+.2	12		528	-.1
27			46.9	.2	17		526	.2
Oct. 2			47.1	.2	22		525	.1
7			47.4	.3	27		523	.2

1872.0 α	δ	1873.0 α	δ
33.65	33.27	35.98	41.66
.58		.97	
		36.00	
		3	
33.615	33.27 -58	35.987	41.66 -1.10
.579	32.46	.998	39.79
+.036	~~+0.81~~	-.011	~~+1.87~~
		15	
	32.69		40.56
	.46		39.79
	+.23		+.77

ι Cygni.

h	m	s	
19	26	30	
19	26	30	
4	51°	27′	″
+	51	27	35
z = − 9		4	47
	− .16		

Red.	s
1	19.8
2	16.3
3	13.2
4	6.6
5	3.3
6	0.0

tang δ = +1.25 ″

x = −.024

cos α =

δ1872 = 27 27.82 α 1872 28.664

δ1873 = 27 35.32 α 1873 30.176

1872

	m	s	
Sept. 17	26	30.05	
22		29.89	16
27		29.73	16
Oct. 2		29.57	16
7		29.40	17
12		29.23	17
17		29.06	17

dα = +1.512
dδ = +7.49

1873

	m	s	
Oct. 7	26	30.94	16
12		.78	16
17		.61	17
22		.45	1
27		30.28	17

Ch. f

1872 Sept. 23

26
~~8.5~~
15.0
18.3
21.8
25.1
28.?
31.6
35.0

A.R.

+19 20 0.20

1872 Oct. 10 −.015 −.01

26 1.7
5.1 26 3.4
8.5
15.0
18.4
21.7
25.0
28.4
~~28.4~~
34.9
38.3
~~41.?~~
238.3

21.682 26 34.0

26 21.66
26 29.29
−7.63

+ 7.70 +.00
− .01 −.02
−0.63 +0.88
+7.065
26 21.66 28.72
26 28.71 30.22

0 +1.14
2 48.8
37.2
86.0
2 43.00

+ 18.28
1.26198
1.14947
+14.11
2 43.00
2 57.11
+19° 19′ 51″24
−9 4 46 0.96390n
−1092
0.95298n

~~−1 29.74~~
+0 8.97
− .09
+ .08
+ 8.96
+19 20 0.20 19 59.93
27 46.8
+7 46.6 −.27 46.3
− 11.51
− 19.00
+7 46.25 − 19.00
+7 27.25 +7 46.11
+19 27 27.45 + .18
+7 27.29
27 27.22
27 34.71

1872 Oct. 14. +.047 +.05

26 2.7
6.1 25 48.5
9.4 50.6
16.0 53.1
19.4
22.6
26.0
29.1
35.9
39.2
42.4
248.8

22.618 25 50.73

26 22.59
26 29.15
−6.56

+ 6.57 +.01
+ .06 +.06
−0.49 +1.02
+6.145
22.59 28.73
28.74

0 +1.23
2 39.7
25.2
64.9
2 32.45

+ 31.89
1.50365
1.39114
+24.61
2 32.45
2 57.06
19 51.29
−93
0.96297n

~~−1 31.83~~
+0 9.18
− .27
+ .07
+ 8.98
20 0.27 20 0.02
27 46.8
+7 46.5 −.25 46.2
− 11.51
− 19.00
+7 46.92 − 19.00
+7 27.92 +7 46.63
27 28.19 + .19
+7 27.82
27 27.84
35.33

1873 Sept. 2

30.25
50
4 14.0
28.8
42.8
54 21.40

Oct. 8 −.208 −.22

26
− ~~26~~ [33.6?] 26
26
39.7 430
41.5 431
43.0 430
44.6 429
46.2 429
48.0 430
49.6 430

42.986 26 33.60

26 42.96
26 30.90
+12.06

− 11.80 −.01
− .28 −.26
− 0.72
−12.80 .79
42.86 30.16
30.17

50 +2.28
4 0.9
9.1
10.0
54 5.00
+ 9.39
+ ~~8.39~~
0.97267
0.88285n
− 7.64
54 5.00
~~53~~ 59.36 53 57.36
28 50.99
−9 4 56 0.96400n
+.52
0.96452n

~~−1 32.15~~
+0 9.21
− .03
+ .25
+ 9.43
29 0.42
27 52.4
−1 8.0
− 17.10
−1 8.38
−1 25.48
27 34.94

Oct. 22 −.197 −.21

26
~~53.7~~
55.3 489
2.1 489
5.3 490
8.7 489

48.875

26 48.85
26 30.44
+18.41

− 18.19 +.00
− .26 −.25
−0.26
−18.?0
48.85 30.14
30.15

A.R.

.84
.78
.61
45
.28

Sin δ 9.89334
Cos δ 9.79447 9.79447
.11571n .09302
9.91018n 9.88749

1872

	°	′	″	
Sept. 17	51	27	45.1	
22			45.7	+.6
27			46.2	.5
Oct. 2			46.6	.4
7			46.8	.2
12			46.8	+0
17			46.7	−.1
			46.6	.1
27			46.4	2

1873

	′	″	
Oct. 7	27	52.4	
12		52.4	−.0
17		52.3	.1
22		52.2	.1
27		52.1	.1

+.023
Nov. 2 +.02

26 Ao Dallai

45.5
47.2
48.9
50.6
52.2
53.9
55.5
57.2
58.8

46.98

52.200

26 52.18
26 30.08
+22.10

−22.11 +.00
+ .03 +.03
+0.10
−21.98
52.18 30.20
30.20

A. R.

Gr. 2900.

h m s
19 29 27
19 29 26
4 79° 20′
+ 79 20 46″
Z = − 36 57 58
− .60

Red. s
1 22.3
2 17.8
3 11.2
4 5.6
5 0.0

Corr δ = +.532
x = −.082
corr α = +.10 −.04

δ = 20′ 38.82″ α 1872 23.338
δ = 20 46.41 α 1873 19.839

dα = −3.498
dδ = +7.59

1872
Sept. 17 29m 24.49s
22 23.88 .61
27 23.25 .63
Oct. 2 22.60 .65
7 21.95 .65
12 21.29 .66
17 20.62 .67
22 19.96 .66
27 19.30 .66

1873
Aug 28 29m 27.61s
2 27.05 56
7 24.46 59
12 19.85 61
17 19.22 63
22 18.57 65
27 17.52 65
Oct. 7
12
17
22
27

Reject

1872. Sept. 23 −.134 −.14
28
31.5
42.0
54.2
5.0
16.0
27.7
38.8
50.0
0.6
265.8
145.8
16.200
29 16.12
29 23.43
−7.61
−7.71
+8.36 +.01
−.74 −.71
−0.39 3.89
+7.237
29 16.12 23.35
29 23.39
α, R 29 19.89 10

1872. Sept. 28 −.137 −.13 −~~.15~~
28
53.6 28 29.3
58.9
4.0
9.4
15.3
21.1
26.8
32.6
38.0
259.7
139.7
15.522 28 29.30
29 15.44
29 23.09
−7.65
−7.75
+8.42 +.01
−.80 .69 −.73
+0.25 −0.25
+8.98 95
15.44 23.37
+0.91 .42
23 ~~.46~~ 39
19.89 10
0 15.5
−0.9
14.6
10 7.30
+ 46.22
1.66483
1.02457
+10.58
10 7.30
10 17.88
+79° 12′ 30.47″
−36 57 25 1.63650n
−225
1.63425n
+ 43.08
− .27
+ .01
+ 42.88
+79 13 13.35 13 13.34
20 57.3
+7 44.0 −.01 44.0
−0.4 +7 43.6 43.6
− 10.91
− 18.50
+7 45.34 − 18.50
+7 26.84 +7 45.04
+79 20 40.19 + .55
+7 27.09
20 40.43
20 48.02

1872. Oct. 10 −.015 −.01
28
50.7 29 57.2
57.2 13.0 15.0
8.6 14.2
14.0 14.0
19.8 14.2
25.0 13.8
29 36.3 ~~37.1~~
14.033 29 57.20
29 13.95
29 21.52
−7.57
−7.67
+7.70 +.00
−.05 −.08
+1.82 −1.68
+9.474
13.95 23.42
+1.14 23.39
19.89 10
0 34.8
20.9
55.7
10 27.85
43.17
~~− 13.25~~
1.63518n
0.99492n
− 9.88
10 27.85
10 17.97
~~.38~~
12 30.38
− 1076
1.62574n
+ 42.24
− .19
+ .01
+ 42.06
13 12.44 13 12.40
20 58.3
+7 45.9 −.04 45.9
+7 45.5 45.5
− 11.91
− 19.50
+7 46.25 − 19.50
+7 26.75 +7 46.11
20 39.19 + .68
+7 27.29
20 39.69
47.28

1872 Oct 20 +.121 +.11
Record illegible 30 32.7
37.7
43.0
30 37.80
10
0 52.3
29.0
81.3
10 40.65

1872 Oct. 21 +.089 +.10
30 ~~47.1~~
~~52.6~~
31 3.2 1
14.6
25.6
Rej. Cent. mahrd.
3.420 30 46.97
(31) 3.34
29 20.06
(−16.72
−16.82)
+8.70
+.53 +.47
+3.28
+12.51
3.34
10
1 1.7
30.3
32.0

1873 Sept. 1 −.443 −.44
41.1 28
30 47.2 29 31.5 ~~28~~ 6.2
59.6 36.7 29 9.4
42.3 16.4
48.0
53.7
59.1
4.8
10.6
16.0
302.7
482.7
53.633 29 10.67
29 53.55
29 22.21
+31.34
+31.24
−28.92 −.01
−2.34 −2.36
−2.37
−33.63 b
53.55 19.92
+1.96 19.89
0
1 26.7
42.6
69.3
1 34.65
+42.96
1.63306
1.01549n
− 1036
1 34.65
1 24.29
21 24.06
− 36 57 28
−1385
1.62265n
+ 41.94
− .19
+ .10
+ 41.85
22 5.91 22 5.78
20 58.3
−1 7.6 −.13 7.7
−1 8.0 8.1
− 11.90
−1 7.81 − 11.90
−1 19.71 −1 8.17
20 46.20 + 1.18
−1 18.89
20 46.89

22 65	
22.14	51
21.61	53
21.05	56
20 46	59
19.85	61
19.22	63
17.92	
17.26	66
16.59	67
15.93	66
15.27	66

Sin δ 9.99245

Cos δ 9.26672 9.26672
.11571n .09302
9.38243n 9.35974

1872

Sept	17	79° 20′	55.″8	
	22		56.6	+.8
	27		57.2	.6
Oct.	2		57.7	.5
	7		58.1	4
	12		58.4	3
	17		58.5	+ 1
	22		58.4	− 1
	27		58.3	1

1873

Aug.	28	20	574	
Sept.	2		585	+ 11
	7		596	11
	12		606	10
	17		615	9
	22		622	.7
	27		629	.7
Oct.	7		639	
	12		641	+.2
	17		643	+.2
	22		642	− 1
	27		641	− 1

Oct. 8 − $^{.208}_{.22}$

29
8.3 28 45.2
13.8 47.8
19.3 52.8
25.3
30.7
35.9
42.0
47.6
53.1

2760

30.667 28 48.60

29 30.59
29 17.76
+12.83
+12.73
− 11.80 −.01
− 1.17 −1.11
+2.08
− 10.874
30.59 19.70
+2.28 19.75

0
1 26.8
33.9
60.7
1 30.35

+ 4207
162397
1.00640n
−10.15
1 30.35
1 20.20

21 28.15

+47
1.63697n

± 43.35
.19
∓ .09

+ 43.25
22 11.40 22 11.28
21 3.9
−1 7.5 −.12 7.6
−1 7.9 8.0

− 17.50
−1 8.38 − 17.50
−1 25.88 −1 8.61
20 45.52 + 1.37
−1 24.74
20 46.54

Oct. 9 − $^{.175}_{.18}$

29
29 57.4
1.3
10.6
25.9 315
31.3 313
36.7 311
42.6 314
48.1 303
53.8 315

31.163 30 3.10

29 31.10
29 17.63
+13.47
+13.37
− 12.44 +.00
− .96 −.93
+2.21
− 11.196
31.10 19.91
+2.30 19.94

0
1 10.6
16.9
27.5
1 13.75

− 3192
150406n
0.88649
+ 7.70
1 13.75
1 21.45

21 26.90

+808
1.64458n

± 44.11
.09
∓ .07

+ 44.09
22 10.99 22 10.89
21 4.0
−1 7.0 −.10 7.1
−1 7.4 7.5

− 17.60
−1 8.29 − 17.60
−1 25.89 − 8.41
20 45.10 + 1.38
−1 24.63
20 46.26

Oct. 22 − $^{.197}_{.21}$

29
12.7
18.7
24.1
29.7
35.0
40.4
46.2
51.7
57.6

3161

35.122

29 35.04
29 15.90
+19.14
+19.04
− 18.19 +00
− 1.12 −1.05
+3.94
− 15.370
35.04 19.67
19.74

A. K

2320. Urs. Min. = 22

h	m	s	
19	25	21	
7	26	42	
	91°	00′	″
+	88	59	55
~~z = −48~~	~~37~~	~~17~~	
	91	0	5
g =	−48	37	17

−0.75

Red.
2.561
2 571
1 550
55.0
0.0

Sin δ 9.99993
Cos δ 8.24186n 8.24186n
.11571n .09302
8.35757 8.33488n

Tang p = −57.103
57.009
k = +.873

α 1872 = 25m 21.075s
α 1873 = 26 41.380

Oct. 20. 1872 +.121

—
—
24 16.7
25 13.4
26 8.5
27 9.3
28 9.2
—
—
5.71

26 11.424
26 12.2930
+8.51
−6.91
−57.69
~~26 37.80~~
25 22.21

30
1 34.5
11.9
46.4
31 23.20

Oct. 21. 1872 +.089

22 13.4
23 13.9
24 13.7
25 8.7
26 9.6
27 10.0
28 6.1
29 3.3
30 5.2
83.9

26 9.322
26 10.19
+8.72
−5.08
−53.17
~~26 39.34~~
25 19.94

+1.41
30
1 39.2
19.2
584
31 29.20
+ 22372 s
2.34971
0.68459n
−4.84
31 29.20
31 24.36
~~51 23.99~~
+90° 51 23.99

−48 36 19
+1133
1.82575n
+ .00
+1 6.95
+ .48
+ .04 −.15

+1 7.47
+90 52 31.46 52 31.31
− 18.38
+7 45.95
+8 4.33
+90 ~~0 35.49~~
59 57.03

22 25.6
~~26~~25 33.8
~~27~~26 29.0
~~28~~27 33.9
338
310
36.5

22 2560 26 27 6 33.87

Sept. 1 1873 −.443

~~27~~ 5.0
28

28 5.00

27 6 34.74
−28.93
+25.25
+8.74
~~26 40.48~~
39.80

+1.96
20
2 20.1
37.9
580
22 29.00
− 7 9113
1.95966n
0.31723n
−2.08
22 29.00
22 26.92
00 21.43

1.81440n 48 36.25
−1405
1.80035n
+ 01
+1 3.15
+ .08
+ .15 −.20

+1 3.29
1 24.72 1 24.52
− 10.68
−1 7.81
−0 57.13
0 ~~24.59~~
6.23

~~Oct. 23~~

35
45.4
48.7
51.7
54.9
~~56.4~~
1.5
4.7
7.9
4.1

A. R.

Oct 23. 1873 −.168

24
=
53.8
−25 54.0
26 52.5
27 51.5
28 51.0
29 49.1

528
510
535
535
539
530

~~25~~26 53.45
~~25~~26 54.32
−18.87
+9.58
−62.07
~~26 1.87~~
26 42.96

A. R.

7 26 42
+88° 59′ 46″ 43″

* − 18.38
+7 45.24
+ 4.05
+8 ~~27.91~~ 4.67
1.0 ~~57.22~~ 35.98

* − 10.68
−1 8.17
+ 1.47
−0 ~~7.38~~ 56.02
0 4.14 28.50

1872 — 1873

θ Cygni.

19 33m 60s
19 33 02
4 49° 55′ ″
+ 49 55 39
z = −7 32 51
−.13

tang δ = +1.19
λ = −.024
″ cos α = +.02 +1.1
α 1872 = 0.474 δ = 55′ 30.98″
α 1873 = 2.083 δ = 55 39.13

dα = +1.609
dδ = +8.14

Sept. 17 33m 1.92s
22 .77 .15
27 .61 .14
Oct. 2 .26 .15
7 1.30 .16
12 1.16 15
17 1.01 14
22 0.84 17
27 0.66 18

1873
Aug. 28 33m 4.06s
Sept. 2 3.74 12
7 3.82 12
12 3.69 13
17 3.56 13
22 3.41 15
27 3.25 16
Oct. 2 3.10 15
7 2.94 16
12 2.78 16
17 2.62 16
22 2.46 16
27 2.31 15

1872 Sept. 23. −.134 −.14
32
40.7
43.7
47.0
50.4
53.5
56.6
59.9
3.1
6.4
361.3
481.3
53.478
32 53.45
33 1.73
−8.28
−8.30
+8.36 +.01
− .17 −.16
−1.26 +1.35
+6.985
32 53.45 0.38
33 0.40 2.01
A.R.

1872 Oct. 20. +.121 +.11
32
45.7 33 5.0
47.5 6.7
49.0 8.3
50.6
52.4
53.8
55.4
57.0
58.7
470.1
52.233 33 6.67
32 52.21
33 0.90
−8.69
−8.71
+8.54 −.02
+ .13 +.14
−0.43 +1.18
+8.293
52.21 0.45
+1.37 0.44 1.05

35
0 12.0
54.5
12.65
35 3.25

− 1444
1.15957n
1.06126n
−11.52
35 3.25
34 51.73
+49° 47′ 56.62″

−7 32 51 0.88260n
+876
0.89136n

+ 7.79″
− .05
+ .00

+ 7.74
+49 48 4.36 48 4.35
55 50.0
+7 45.6 −.01 45.6
+1.1 +7 46.7 46.7
1086
− 1900
+7 46.34 − 19.00
+7 27.34 +7 46.10
+49 55 31.70 + .17
+7 27.27
55 31.62
39.76

1872 Oct. 21 +.089 +.10
32
45.7
47.2
48.9
50.5
52.0
53.9
55.3
56.8
58.5
468.6
52.067
32 52.04
33 0.87
−8.83
−8.85
+8.71 +.01
+ .12 +.11
−0.40 +1.21
+8.43
52.04 0.47
0.47 1.08
A.R.

1873 Sept. 1 −.443 −.44
32
33 14.1 32 15.0
17.4 33 15.9
20.7 18.2
27.0
30.2
33.3
36.6
39.9
46.2
49.5
52.7
367.6
33.418 33 16.37
33 33.39
33 3.96
+29.43
+29.41
−28.92 −.01
− .52 −.53
−1.88
−31.324
33.39 2.07
+1.96 2.05

25
1 1.1
18.2
193
26 9.65

+ 1705
1.23172
1.15610n
−14.33
26 9.65
25 55.32

56 53.03

−7 32 57
−1385
0.86875n

+ 7.39
− .08
+ .07

+ 7.38
57 0.41 57 0.32
55 51.8
−1 8.6 −.09 8.7
−1 7.5 7.6
~~−4.56~~
− 12.70
−1 7.81 − 12.70
−1 20.51 −1 8.17
55 39.90 + .25
−1 20.62
55 39.70

1873 Sept. 6 −.420 −.41
32 45.7
47.0 32 35.3
52.1 36.7
58.5 38.1
1.6
4.8
8.0
11.1
17.6
20.7
23.9
298.0
53.0
4.818 32 36.70
33 4.79
33 9.824
+0.95
+0.93
− 0.46 +.04
− .49 −.50
−1.76
−2.7168
4.79 2.08
+1.99 2.11

25
1 11.1
25.9
370
26 18.50

+ 2812
1.44902
1.37340n
−23.63
26 18.50
25 54.87

56 53.48

−352
0.87908n

+ 7.57
− .21
+ .08

+ 7.44
57 0.92 0.82
55 52.8
−1 8.1 −.10 8.2
−1 7.0 7.1
~~−5.56~~
− 13.70
−1 6.09 − 13.70
−1 19.79 −6.17
55 41.13 + .25
−1 19.62
55 41.20

Oct. 8 −.208 −.22
32 55.9
59.0 32 51.1
2.2 52.6
8.6 54.9
11.8
15.0
18.2
21.4
27.7
31.0
34.2
285.0
165.0
15.500 32 52.87
33 14.98
33 2.90
+12.08
+12.06
−11.81 −.01
− .26 −.25
−0.82
−12.89
14.98 2.09
+2.28 2.09

25
1 4.3
12.3
166
26 8.30

+ 2213
1.34498
1.26936n
−18.59
26 8.30
25 49.71

56 58.64

+47
0.88307n

+ 7.64
− .13
+ .07

+ 7.58
57 6.22 6.13
55 56.5
−1 9.7 −.09 9.8
−1 8.6 8.7
− 17.40
−1 8.38 − 17.40
−1 25.78 −8.61
55 40.44 + .29
−1 25.72
55 40.41

Sin δ 9.88383
Cos δ 9.80867 9.80867
,11574n ,09302
9.92438n 9.90169n

1872			
Sept 17	49° 55′	48.3″	
22		48.9	+6
27		49.4	5
Oct. 2		49.8	4
7		50.1	+3
12		50.1	+0
17		50.1	−0
22		50.0	1
27		49.9	1

1873			
Aug. 28	55	509	
Sept. 2		520	+11
7		530	10
12		539	9
17		546	7
22		552	.6
27		558	.6
Oct 2		562	4
7		565	3
12		565	+0
17		565	−0
22		564	− 1
27		563	1

Oct. 9 −.18 −.175

32 56.4
59.6 32 41.7
2.8 43.0
9.1 44.7
12.4
15.6
18.7
21.9
28.4
31.6
34.8
291.2
171.2
15.573 32 43.13

33 15.55
33 2.87
−12.68
+12.66
−12.45 +.00
− .21 −.21
−0.79
−13.45
15.55 2.10
+2.30 2.10

25
1 13.4
21.3
34.7
26 17.35

+ 32.44
1.51108
1.43546n
−27.26
26 17.35
25 50.09

56 58.26

+8.08
0.89068n

+ 7.77
− .27
+ .08

+ 7.58
57 5.84 5.74
55 56.5
−1 9.3 −.10 9.4
−1 8.2 8.3

− 17.40
−1 8.29 − 17.40
−1 25.69 −1 8.41
55 40.15 + .30
−1 25.51
55 40.23

Oct. 13 −.18 −.178

32 58.4
1.4 32 56.0
4.7 57.2
11.0 57.0
14.2
17.5
20.7
24.0
30.1
33.4
36.7
252.1
192.1
17.464 32 57.40

33 17.44
33 2.74
+14.70
+14.68
−14.41 +.00
− .21 −.21
−0.66
−15.28
17.44 2.16
+2.32 2.16

25
1 3.1
11.1
14.2
26 7.10

+ 20.06
1.30233
1.22671n
−16.85
26 7.10
25 50.25

56 58.10

+9.44
0.89204n

+ 7.80
− .11
+ .07

+ 7.76
57 5.86 5.77
55 56.5
−1 9.4 −.09 9.5
−1 8.3 8.4

− 17.40
−1 8.83 − 17.40
−1 26.23 −1 9.01
55 39.63 + .30
−1 26.11
55 39.66

Oct. 23 −.17 −.168

32
44.7
46.3
48.0
49.6
51.1
52.8
54.3
56.0
57.5
460.3
51.144

32 51.12
33 2.42
−11.39
−11.38
−18.~~90~~.88
− .20 −.20
−0.34
−19.~~44~~.42
51.12

A.K.

Nov. 2 +.02 +.023

33 5.1 Ao Deltio
8.3
11.4
17.9
21.0
24.4
27.4
30.8
37.0
40.3
43.5
267.1
24.282

33 24.26
33 2.12
+22.14
+22.12
−22.10 +.00
+ .02 +.03
−0.04
−22.121
24.26 2.14
2.15

A.K.

Gr. 2919. = 23

h	m	s
19	35	40
19	35	43
+	71°	19′ ″
+	71	19 28
z =	−28	56 40

−0,48

Sin δ 9.97649
Cos δ 9.50561 9.50561
1157½m .09302
9.62132m 9.59863

Tang δ = +1.959
k = −.046
α1872 = 35m 41.600s 19′ 13.04″
α1873 35 41.192 19 21.48

1872 Sept. 23 −.134	1872 Sept. 28 −.137	1872 Oct. 20. +.121	1873 Sept. 1 −.443	Ch. f Sept. 2	Sept. 6 −.420
35	34 55.1	35	35 0.3		35
8.7	2.0 34 21.3	18.7 34 35.0	36 3.5 34 29.0		31.8 35 9.0
15.0	8.3	22.0 37.6	6.6 35 32.3		35.0 12.9
21.6	21.2	25.4 40.4	9.8 36.8		38.0 15.4
28.4	27.7 36 53.7	28.6	13.1		41.1
34.6	34.0	31.7	16.5		44.3
40.8	40.4	35.1	19.8		47.4
47.5	47.0	38.3	22.9		50.6
54.0	59.7	41.3	26.3		54.4
0.7	6.3	44.7			57.1
	12.8				
287.3	314.5	285.7	1188		399.7
311.3	374.5				
34.589	35 34.045 34 21.30	31.744 34 37.67	13.200 35 32.70		44.411 35 12.43
	36 53.70				
35 34.54	35 ~~33.99~~ 34.00	35 31.69 .70	36 13.15		35 44.36
+8.37	+8.43	+8.52	−28.94		−0.42
−.26	−.27	+.24	−.87		−.82
−0.93	−0.58	+1.04	−2.08		−1.80
35 41.72	35 41.578	41.50	35 41.26		35 41.32

A. R					
	+0.91	+1.37	+1.96		+1.99
	10	10	0	0	0
	1 9.2 2 10.0	1 22.0	2 47.4	2 43.8	2 46.8
	57.0 57.7	2.5	0.9	56.1	58.0
	126.2 127.7	24.5	108.3	99.9	103.8
	11 3.10 12 3.85	11 12.25	2 54.15	2 49.95	2 51.90
	+ 72.74	+ 54.07	+ 40.50		+ 31.98
	1.86177	1.73296	1.60746		1.50488
	1.46040	1.33159	1.22878n		1.12620n
	+28.87	+21.48	−16.93		−13.37
	11 3.10	11 12.25	2 54.15		2 51.90
	11 31.97	11 33.74	2 37.22		2 38.53
+71°	11′ 16.38″	11 14.64	20 11.13		20 9.82
−28	56 11	1.50228n 1.48470n	−28 56 15		
	−211	+886	−1365		−378
	1.50069n	1.51166n	1.48915n		1.49902n
	+ 31.67	+ 32.48	+ 30.84		+ 31.55
	− .89	− .48	− .28		− .18
	+ .07 −.11	+ .04 −.12	+ .17 −.23		+ .17 −.23
	+ 30.85	+ 32.04	+ 30.73		+ 31.54
+71	11 47.23 11 47.12	11 46.68 11 46.56	20 41.86 20 41.63		20 41.36 20 41.13
	− 19.11	− 20.71	− 12.58		− 13.58
	+7 45.34	+7 46.34	−1 7.81		−1 6.09
	+7 26.23	+7 25.63	−1 20.39		−1 19.67
+71	19 13.46	19 12.31	19 21.47		19 21.69
	− 19.11	− 20.71	− 12.58		− 13.58
	+7 45.04	+7 46.10	−1 8.17		−1 6.17
	+ 43	+ 65	+ 94		+ 95
	+7 26.36	+7 26.04	−1 19.81		−1 19.80
	19 13.48	19 12.60	19 21.82		19 21.33

h	m	s	m	s
19	35	42	35	44
+71°	19′	30″		34″

Oct. 8 – .208		Oct. 9 – .175		Oct. 13 – .178	Oct. 22 – .197
35		35	35	35	35
40.1	35 26.6	40.7 ~~35.0~~	34 58.0	42.4°	45.4
43.5	29.0	43.6 ~~36.4~~	35 02.0	45.7	48.7
46.6	32.4	47.0	36.4 4.3	48.8	51.7
49.8		50.4		52.4	54.9
53.2		53.5		55.4	56.4
56.1		56.6		58.6	1.5
59.6		59.8		1.6	4.7
2.9		3.2		5.2	7.9
6.0		6.3		8.4	11.1
3578		3611		3185	2843
477.8		481.1		498.5	624.3
53.389	35 29.33	53.455	35 35.70	55.389	58.255
35 53.04		35 53.401		35 55.34	35 58.201
− 11.82		− 12.44		− 14.41	− 18.19
− .41		− .34		− .35	− .39
+ 0.36		+ 0.44		+ 0.73	+ 1.39
35 41.17		35 41.067		35 41.31	35 41.012
+ 228		+ 230			
				A.R	A.R

0		0	
2 40.1		2 37.8	
46.2		43.9	
86.3		81.7	
2 43.15		2 40.85	
+ 2376		+ 1775	
1.37585		1.24920	
0.99717n		0.87052n	
− 9.93		− 7.42	
2 43.15		2 40.85	
2 33.22		2 33.43	
20 15.73		20 14.92	
+ 47		+ 808	
1.50327n		1.51088n	
+ 31.86		+ 32.42	
− .10		− .06	
+ .16	− .22	+ .16	− .22
+ 31.92		+ 32.52	
20 47.05	20 46.83	20 47.44	20 47.22
− 18.19		− 18.25	
− 1 8.38		− 1 8.29	
− 1 26.57		− 1 26.54	
19 20.48		19 20.90	
	− 18.19		− 18.25
	− 1 8.61		− 1 8.41
	+ 1.09		+ 1.10
	− 1 25.71		− 1 25.56
	19 21.12		19 21.66

Gr. 1339 = 24

Sin δ 9.97653
Cos δ 9.50523n
.09302n
9.59825n

α 1872 =
α 1873 = 35 8.020

h	m	s
19	36	11
17	35	53
	99°	23′
	~~80~~	35	00″

	99°	23′	
+	80	35	00″
z = −	~~28~~ 8	57	11
		40	1
	99	25	00

1872 Oct. 10 −.015	1872 Oct. 21 ~~+.089~~	1873 Oct. 23 −.168
34 32.0	34	35
38.8	33.9 35 28.4	
9 min	39.4	
	46.0	24.0
	52.0	30.0
	58.3	36.5
	4.9	42.9
	11.6	48.8
	17.3	
35 16.4	23.9	
23.2		
	287.3	1822
	527.3	
34 57.60	58.589 35 28.40	36,440
+7.70	+8.72	−1888
−4.81	−6.63	~~−697~~ 8.02

A.R

5
1 39.8
20.1
′ 59.9
6 29.95

− 29.81
1.47436n
1.07261
+11.82
6 29.95
6 41.77
+99° 16′ 6.58″
+11.35

±1.21
+ .16
± .04

+ 1.41
+99 16 7.99
+

57

a.R

15. Cygni.

h m s
19 39 39
19 37 42
4 37° 03′
+ 37 02 55″
z = + 5 19 53
+.09

tang δ = +.75
x = −.020
corr = −.00 −0.2″
α 1872 = 39.606 δ = 2 46.41
α 1873 = 41.769 δ = 2 54.89
dα = +2.163
dδ = +8.48

1872
Sept 17 39m 41.18s
22 41.07 .11
27 40.95 .12
Oct 7 39 40.72
12 60 .12
17 .48 .12
22 .36 .12
27 40.25 .11

1873
Aug 28 39m 43.79s
Sept 2 43.71
7 43.62
Oct 7 42.98
12 42.85 .13
17 42.73 .12
22 42.61 .12
27 42.50 .11

1872 Sept. 28 −.134 −.13
39 17.0
19.7 38 52.5
22.3
27.4
30.1 40 6.1
32.7
35.0
37.9
43.0
45.6
48.0
358.7
32.689 38 52.50
40 6.10
39 32.59
39 40.92
−8.33
+8.42 +.01
−.10 −.10
−1.31 +0.85
+7.0 ×2
39 32.59 39.60
+0.91 39 39.61 41.77
25
1 46.5 3 2.3
39.5 54.1
88.0 116.4
26 44.00 27 58.20
+40.11
1.60325
1.59833
+39.66
26 44.00
27 23.66
+37° 55′ 24.69″
+5 19 1 0.72910
−211
0.72699
+− 5.33
− .42
+ .12
− 5.63
+36 55 19.06 55 18.89
3 3.1
+7 44.0 −.17 43.8
−.02 +7 43.8 43.6
−8.22
−16.70
+7 45.34 − 16.70
+7 28.64 +7 45.04
+37 2 47.70 −+7 .08
2 28.26
47.15
55.63

1872 Oct. 10 −.015 −.01
39 17.5
20.1 39 25.3
22.7 26.2
27.7 26.9
30.4
32.9
35.5
38.0
42.3
45.9
48.5
362.5
32.955 39 26.13
39 32.94
39 40.64
−7.70
+7.69 +.00
−.01 −.01
−1.03 +1.13
+6.65
32.94 39.59
+1.14 39.59 41.75
25
2 22.2
14.3
36.5
25 18.25
+6.82
0.83378
0.82886
+6.74
27 18.25
29 24.99
55 23.36
−1061
0.71849
+− 5.23
− .02
+ .01
− 5.24
55 18.12 17.89
3 3.7
+7 45.6 −.23 45.6
+7 45.4 45.4
−8.82
−17.30
+7 46.25 − 17.30
+7 28.95 +7 46.11
2 47.07 −+7 .10
2 28.71
46.60
55.08

1872 Oct. 20 +.121 +.11
39 16.3
19.0 39 38.3
21.5
26.7
29.2
31.8
34.4
37.0
42.2
44.7
47.3
350.1
31.827 39 38.30
39 31.81
39 40.40
−8.59
+8.54 −.02
+.08 +.09
−0.79 +1.37
+7.83 2
31.81 39.64
+1.37 39.63 41.79
25
2 35.4
24.4
59.8
27 29.90
−6.47
0.81090m
0.80598m
−6.40
27 29.90
27 23.50
55 24.85
+886
0.73796
5.47
+− ~~5.22~~
− .02
+ .07
− 5.42
55 19.43 19.18
3 3.5
+7 44.1 −.25 43.8
+7 43.9 43.6
−8.63
−17.10
+7 46.34 − 17.10
+7 29.24 +7 46.10
2 48.67 −+7 .12
2 28.88
48.06
56.54

1872 Oct. 21 +.089 +.10
39 32.7 39 20.0
26.4 35.7 12.6 39
27.7 38.6 13.8
29.0 44.4 15.8
30.2 47.3
31.6 50.2
32.7 52.1
34.1 56.0
35.4 1.8
36.7 4.7
7.6
282.8
31.533 39 30.00
39 31.51
39 41.38
−8.87
+8.71 +.01
+.08 +.07
−0.77 +1.39
+8.02
31.51 39.53
+1.41 39.53 41.69
25
2 31.1
17.0
48.1
27 24.05
+1.53
0.18469
0.17977
+1.51
27 24.05
27 25.56
55 22.79
+1135
0.74045
+− 5.50
− .02
+ .07
− 5.45
55 17.34 17.10
3 3.5
+7 46.2 −.24 46.0
+7 46.0 45.8
8.62
−17.10
+7 45.95 − 17.10
+7 28.85 +7 45.24
2 47.19 −+7 .13
2 28.01
45.11
53.59

1873 Sept. 1 −.443 −.44
39 57.6
39 0.1 ~~38~~ 48.4
2.7 39 49.6
7.9 50.9
10.5
13.0
15.6
18.3
23.3
25.9
28.5
203.4
143.4
13.036 39 49.63
~~39~~ 40 13.02
39 43.73
+ ~~30.7~~ 29.29
−28.92 −.01
−.33 −.33
−1.96
−31.2 ×2
40 13.02 41.81
+1.96 41.80
15
3 46.9
0.8
107.7
18 53.85
+23.41
1.36940
1.38717m
−24.39
18 53.85
18 29.46
4 18.89
+5 19 37 0.72990
−1345
0.71645
+− 5.20
− .14
+ .23
− 5.11
4 13.78 4 13.47
3 6.4
−1 7.4 −.31 7.7
−1 7.6 7.9
−11.50
−1 7.81 − 11.50
−1 19.31 −1 8.17
2 54.47 −7 .18
2 19.85
53.62

Ch. f Sept. 2
15
3 35.0
47.1
82.1
18 41.05

Sin δ 9.77997

Cos δ 9.90206 9.90206
.11571m .09302
.01777m 9.99508m

1872				1873		
Sept 17	37° 2′ 62″.2			Aug 28	2′ 65″.7	
22	62.6	+4		Sept. 2	66.5	+.8
27	63.0	+4		7	67.3	.8
Oct. 2	63.4	+4		12	68.1	.8
				17	68.9	.8
Oct. 7	63.8			Oct. 7	70.5	
12	63.7	-.1		12	70.4	-.1
17	63.6	.1		17	70.4	.0
22	63.5	.1		22	70.3	.1
27	63.5	.0		27	70.3	.0

Oct. 9 -.175 -.18	Oct 22 -.197 -.21	Oct. 23 -.168 -.17	Nov. 2 +.023 +.02	1873 Oct. 13 -.178 -.18
39 40.0	39 45.6	39 46.2	39 49.0	39 41.9
42.6	48.1	48.7	51.6	44.4
45.1	50.7	51.3	54.2	47.0
50.4	55.9	56.4	58.3	52.1
53.0	58.5	58.9	40 1.9	54.6
(58.1) 55.5	1.0	1.6	4.5	57.5
0.7	3.5	4.1	7.1	0.0
5.9	6.2	6.7	9.7	2.7
8.4	11.4	12.0	14.8	7.7
11.0	13.8	14.5	17.4	10.5
	16.5	17.1	20.1	13.0
	311.2	317.5	289.6	331.6
	11.2	17.5	49.6	631.6
55.578	1.119	1.591	4.509	57.418
39 55.50	40 1.00	40 1.57	40 4.49	39 57.40
39 42.92	39 42.60	39 42.58	39 42.36	39 42.82
+12.58	+18.40	+18.99	+22.13	+14.58
-12.45 +.00	-18.20 +.00	-18.~~90~~.88 +.01	-22.10 +.00	-14.41 ~~+.00~~
- .14 -.13	- .16 -.15	- .13 -.13	+ .02 +.02	- .14 -.13
-1.15	-0.83	-0.81	-0.59	-1.05
-13.7~~4~~3	-19.17 √8	-20.8 √.81	-22.67	-15.~~60~~.59
39 55.50 ~~41.81~~41.76	40 1.00 41.81	1.57 41.75	4.49 41.82	57.40 41.80
~~41.82~~41.77	41.82	41.76	41.82	41.81
A.R.	A.R	A.R	A.R	A.R

1872
1873

δ Cygni.
19h 40m 58s
19 41 00
4 44° 49'
+ 44 49 18
z = −2 26 30
−04

tang δ = +.99
x = −.022
cos α = +.03
α 1872 = 58.409 δ = 49° 9'.37"
α 1873 = 0.284 δ = 49 17.94

Oct. 7 40m 59.38s
12 59.23 .15
17 59.09 .14
22 58.95 .14
27 58.81 .14

dα = +1.874
dδ = +8.57

O Aug 28 41m 2.25s
Sept. 2 2.05 .20
7 1.85 .20
Oct. 7 1.29
12 1.15 14
17 1.00 15
22 0.86 14
27 0.73 13

Oct. 2. 1872 −.041 −.05
40 33.9
36.9 40 1.6
39.7 2.7
45.5 3.9
48.5
51.4
54.4 41 40.6
57.3 41.8
3.0 43.8
6.0
8.9
385.5
565.5
51.409 40 2.73
41 42.07
40 51.39
40 59.52
−8.13
−8.16
+8.20 +.00
−.05 −.04
−1.11 +0.76
+7.045
40 51.39 58.43
+0.99 40 58.44
40 41 0.31
0 30.0 1 56.9
21.4 47.9
51.4 1048
40 25.70 41 52.40
+4868
1.68735
1.63124
+42.78
40 25.70
41 8.48
+44° 41 39.87"
−2 26 35
+14
0.39054n
2.46"
± .65
+ .03
+ 1.84
+44 41 41.71 41 41.67
49 28.1
+7 46.4 −.04 46.4
−10.13
−18.70
+7 45.69
+7 26.99 − 18.70
+44 49 8.70 +7 45.53
+ .04
+7 26.87
49 8.54
17.11

Oct. 10 1872 −.015 −.01
40 34.3
37.2 40 18.3
40.1 19.6
45.8 20.8
48.8
50.8
54.7
57.6
3.4
6.3
9.2
388.2
568.2
51.655 40 19.53
40 51.63
40 59.28
−7.65
−7.68
+7.69 +.00
−.01 −.01
−0.87 +1.00
+6.81
51.63 58.44
+1.14 58.44
0.31 40
0 46.8
37.4
842
40 42.10
+3212
1.50678
1.45067
+28.23
40 42.10
41 10.33
41 38.02
0.39040n
−1045
0.37995n
2.40
± .28
+ .02
+ 2.14
41 40.16 40.09
49 27.9
+7 47.7 −.07 47.6
−9.93
−18.50
+7 46.25
+7 29.75 − 18.50
49 9.91 +7 46.11
+ .04
+7 27.65
49 4.44
16.31

Oct. 20 1872 +.121 +.11
40 33.0
35.9 40 8.6
38.8 9.7
44.6 11.2
47.6 ~~11.4~~
50.6
53.4
56.5
2.3
5.1
8.0
375.8
555.8
50.527 40 9.83
40 50.51
40 59.00
−8.49
−8.52
+8.54 −.02
+ .11 +.12
−0.59 +1.28
+8.085
50.51 58.57
+1.37 58.56
0.43 40
0 41.0
25.1
661
40 33.05
+40.70
+ ~~4270~~
1.60959
1.55348
+35.77
40 33.05
41 8.82
41 39.53
+896
0.39936n
2.51
± .47
+ .02
+ 2.06
41 41.59 41.53
49 27.9
+7 46.3 −.06 46.2
−9.93
−18.50
+7 46.34
+7 27.84 − 18.50
49 9.43 +7 46.10
+ .05
+7 27.65
49 9.18
17.75

Oct. 21. 1872 +.089 +.10
40 32.7 40
35.7 12.6
38.6 13.8
44.4 15.8
47.3
50.2
53.1
56.0
1.8
4.7
7.6
372.1
552.1
50.191 40 14.07
40 50.17
40 58.97
−8.80
−8.83
+8.71 +.01
+ .10 +.09
−0.56 +1.31
+8.25
50.17 58.42
+1.41 58.42
0.29 30
0 44.2
30.1
−743
40 37.15
+3612
1.55775
1.50164
+31.74
40 37.15
41 8.89
41 39.46
+1135
0.40175n
2.52
± .36
+ .02
+ 2.18
41 41.64 41.58
49 27.9
+7 46.3 −.06 46.2
−9.93
−18.50
+7 45.95
+7 27.45 − 18.50
49 9.09 +7 45.24
+ .06
+7 26.80
49 8.38
16.95

Sept. 1 1873 −.443 −.44
40 14.2
41 17.0 40 5.7
20.0 41 7.1
25.7 8.7
28.8
31.6
34.7
37.5
43.3
46.0
49.0
347.8
31.618 41 7.17
41 31.60
41 2.08
~~−30.48~~ +29.52
+29.49
−28.93 −.01
− .44 −.44
−1.80
−31.178
41 31.60 0.43
+1.96 0.42
30
2 28.9
43.1
720
32 36.00
+2445
1.38828
1.35486n
−22.64
32 36.00
32 13.36
50 34.99
−2 26 39
−1345
0.37695n
2.38
± .16
+ .16
+ 2.38
50 37.37 50 37.16
49 30.1
−1 7.3 −.21 7.5
−12.20
−1 7.81
−1 20.01 − 12.20
49 17.36 −1 8.17
+ .08
−1 20.29
49 16.84

Cl. f Sept. 2
30
21 27.5
40.2
677
32 33.85

Sin δ 9.84809
Cos δ 9.85087 9.85087
.11571n .09302
9.96658n 9.94389n

1872

Oct. 7	44°	48′	88.0″	
12			87.9	−.1
17			87.9	.0
22			87.9	.0
27			87.9	.0

1873

Aug. 28	49′	29.3″	
Sept. 2		30.3	+1.0
7		31.3	1.0
12		32.1	.8
17		32.9	.8
Oct 7		34.9	
12		34.8	−.1
17		34.8	.0
22		34.8	.0
27		34.8	.0

Oct. 8 −.22 −.208
40 56.1
57.0 40 47.8
1.9 49.1
7.6 51.0
10.6
13.5
16.5
19.3
25.0
28.0
30.8
268.8
148.3
13.482 40 49.30

41 13.26
41 1.25
+1201
+11.98
− 11.81 −.01
− .22 −.21
−0.97
−1300
13.26 0.26
+228 0.26
30
2 27.2
32.3
59.5
32′ 29.75″

+ 2418
1.38346
1.35004n
− 2239
32 29.75
32 7.36

50 40.99

+ 36
0.39076n

+ 2.46
− .16
+ .15

+ 2.45
50 43.44 43.24
49 34.9
−1 8.5 −.20 8.7

− 17.00
−1 8.38
−1 25.38 − 17.00
49 18.06 −1 8.61
+ 09
−1 25.52
49 17.72

Oct. 9 −.18 −.175
40 56.6
59.5 40 46.3
2.4 47.5
8.1 49.0
11.1
14.0
16.9
19.8
25.6
28.6
31.3
273.9
153.9
13.991 40 47.60

41 13.97
41 1.22
+1275
+ 12.72
− 12.45 +.00
− .18 −.17
− 0.94
−13.586
13.97 0.40
+230 0.41
30
2 34.7
34.9
69.6
32 34.80

+ 2639
1.42144
1.38802n
− 2444
32 34.80
32 10.36

50 37.99

+840
0.39880n

+ 2.50
− .18
+ .16

+ 248
50 40.47 40.26
49 34.9
−1 5.6 −.21 5.8

17.00
−1 8.29
−1 25.29 − 17.00
49 15.18 −1 8.41
+ 09
−1 25.32
49 14.94

~~Oct. 12~~
~~39 41.9~~
~~44.4~~ 39 ~~41.9~~
~~47.0~~ ~~44.4~~
~~52.1~~ 47.0
~~54.8~~ 5°
~~57.5~~
~~0.0~~
~~2.7~~
~~7.8~~
~~10.5~~
13.0
30
~~2 25.6~~
~~31.8~~

Oct. 23 −.17 −.168
41
14.1
15.7
17.0
18.5
20.0
21.3
22.8
24.3
25.7
179.4
19.933

41 19.91
41 0.83
+1908
+1905
− 18.88 +.01
− .17 −.17
− 0.55
−19.59
+ 19.91 0.31 0.32
A. R

Nov. 2 +.02 +.023
41 5.3 No Dellio
8.3
11.2
16.9
19.8
22.8
25.6
28.6
34.4
37.4
40.3
250.6
22.782

41 22.76
41 0.59
+2219
+2216
− 22.10 +.00
+ .02 +.02
−0.27
−22.37
22.76 0.39
0.39
A. R.

1873
Oct 13 −.18 −.178
40 58.4
(1.4) ~~5~~ 40 52.3
4.2 57.3
10.0 54.8
13.0
15.9
18.8
21.8
? 30.37 27.3
33.3
234.4
174.4
15.855 40 53.20

41 15.83
41 1.12
+1491
+1468
− 14.41 +.00
− .18 −.18
− 0.84
− 15.43
15.83 0.40
+232 0.40
30
2 25.6
31.8
57.4
32 28.70

+ 2265
1.35507
1.32165n
− 2097
32 28.70
32 7.73

50 40.62

+968
0.40008n

+ 2.51
− .14
+ .15

+ 2.52
50 43.14 50 42.94
49 34.8
−1 8.3 −.20 8.5

− 16.90
−1 8.83
−1 25.73 − 16.90
49 17.41 −1 9.01
+ .09
−1 25.82
49 17.12

1872 1873

a Aquilae

19 44 31
4 8 32
8 32 14
z = + 33 50 44
sin z = +.56

tang δ = +.15
x = −.016
cons = ~~−.04~~
α 1872 = 32.274 δ = 31′ 54.90″
α 1873 = 35.203 δ = 32 4.13
dα = +2.929
dδ = +9.22

1872	m	s	
Sept. 17	44	34.11	
22		34.03	8
27		33.95	8
2		33.87	8
7		33.79	8
12		03.70	9
17		33.62	8
22		33.54	8
27		33.46	8

1873	m	s	
Aug. 28	44	37.44	
Sept. 2		39	5
7		33	6
12		27	6
17		37.21	6
22		14	7
27		06	8
Oct. 2		36.98	8
7		36.90	8
12		82	8
17		74	8
22		66	8
27		36.59	7

1872 Sept. 28 −.134 −.13

44 12.0
15.2 44 5.0
17.2
21.5
23.5
25.6
27.6
29.7
33.9
36.0
38.1
281.3
25.573 44 5.00
44 25.56
44 33.93
−8.37
~~8.33~~
+8.42 +.01
−.02 −.02
−1.66 +1.27
+6.745
44 25.56 32.30
+0.91 44 32.31
44 35.24 55
55
2 24.9
20.8
45.7
57 22.85
+20.57
1.31323
1.40142
+2520
57 22.85
57 48.05
+8 ~~24 59.70~~
25 0.30
+33 50 5
−196
1.58434n
−38.40
−.03
+.17
−38.26
+8 24 22.04 24 21.80
32 5.6
+7 43.6 −.24 43.4
−1.48
−10.70
+7 45.34
+7 34.64 10.70
+8 31 56.68 +7 45.04
+.65 .50
+8 31 57.33 +7 33.84
31 55.64
32 4.86

1872 Oct. 10 −.015 −.01

44 13.5
15.7 44 7.9
17.7 8.9
21.8 10.0
24.0
26.0
28.0
30.1
34.4
36.5
38.6
286.3
26.027 44 8.93
44 26.01
44 33.73
−7.72
~~7.68~~
+7.69 +.00
−.00 −.00
−1.46 +1.47
+6.23
26.01 32.24
+1.14 32.24
35.17
2 31.8
27.4
59.2
57 29.60
+17.10
1.23300
1.32119
+2095
57 29.60
57 50.55
24 57.80
1.58639n
~~1.60260n~~
−1045
1.57585n
−37.66
−.02
+.07
−37.61
24 20.19 19.94
32 5.7
+7 45.3 −.25 45.2
1.58
−10.80
+7 46.25
+7 35.45 10.80
31 55.64 +7 45.11
+.65 63
31 56.29 +7 34.68
59.62
3.84

1872 Oct. 20 +.121 +.11

44 12.5
14.5
16.6
20.8
22.9
25.0
27.0
29.2
33.4
35.4
37.5
274.8
24.982
44 24.97
49 33.57
−8.60
~~8.56~~
+8.54 −.02
+.02 +.02
−1.30 +1.63
+7.264
24.97 32.23
32.21
35.14 45
a.R

1873 Sept. 1 −.443 −.44

43 54.0
44 56.0 43 42.7
58.1 44 44.0
2.9 45.0
4.4
6.4
8.5
10.7
14.7
16.8
18.9
250.8
70.8
6.436 44 43.90
45 6.42
44 37.40
−~~30.98~~ 25.02
−~~29.06~~
−28.93 −.01
−.07 −.07
−2.20
−31.281
6.42 35.22
+1.96 35.21
4 12.9
26.0
38.9
49 19.45
+22.54
1.35295
1.46383n
−2910
49 19.45
48 50.35
33 58.50
+33 49 58
−1345
1.57285n
−37.40
−.04
+.26
−37.18
33 21.3 20.82} 33 20.48
32 11.7
−1 9.6 −.34 9.4
−7.60
−1 7.81
−1 15.41 − 7.60
32 5.42 −1 8.17
+1.23 − 1.09
32 6.65 −1 16.86
32 3.62

Ch.f. Sept. 2

45
4 17.0
28.9
45.9
49 22.95

Oct. 5 −.207 −.20

44 34.5
36.5 44 25.9
38.6 26.9
42.7 28.0
44.8
47.0
49.0
51.0
55.1
57.2
59.4
516.8
46.891 44 26.93
44 46.88
44 36.93
+9.95
~~9.99~~
−9.91 +.00
−.03 −.03
−1.73
−11.67
46.88 35.21
+2.24 35.21
45
4 10.1
18.2
28.3
49 14.15
+19.96
1.30016
1.41104n
−2576
49 14.15
48 48.39
33 59.96
−1310
1.57320n
−37.43
−.03
+.25
−37.21
33 22.75 22.41
32 13.3
−1 9.4 −.34 9.7
−9.20
−1 8.55
−1 17.75 − 9.20
32 5.00 8.73
+1.23 − 1.25
32 6.23 −1 19.18
32 3.23

Sin δ 9.17139
Cos δ 9.99517 9.99517
.11571n .09302
.11088n .08819

1872		°	'	"	
Sept	17	8	31	65.3	
	22			65.5	+.2
	27			65.6	.1
Oct.	2			65.7	.1
	7			65.8	+.1
	12			65.7	−.1
	17			65.6	.1
	22			65.5	.1
	27			65.3	.2

1873		'	"	
Aug.	28	31	71.3	
Sept.	2		71.8	+.5
	7		72.2	.4
	12		72.5	.3
	17		72.8	.3
	22		73.0	.2
	27		73.2	.2
Oct	2		73.3	.1
	7		73.3	+.0
	12		73.4	−.1
	17		73.5	.1
	22		73.6	.1
	27		72.8	−.2

1872.0 α	δ	1873.0 α	δ
32.31	57.33	35.21	6.65
.24	56.29	.21	6.23
21		.33	6.54
		.19	
		.21	
		.17	
		.29	
		.18	
32.253	56.81 −1.30	35.224	6.47 −2.46
.274	54.90	.203	4.13
−.021	+1.91	+.021	+2.34
	55.51		4.01
	54.90		4.13
	+.61		−.12

Oct. 8 −.208 −.22

44
44.8 44 58.0
45.9 59.0
46.8 0.0
47.9
49.0
49.9
50.8
51.9
52.9
4899
48.878 44 59.00

~~44~~ 48.86
44 3688
+11.98
~~+12.02~~
−11.81 +.01
− .03 −.03
−1.68
−13.583
48.86 35.34
+2.28 35.33

45
3 32.2
35.8
' 680
48 34.00

− 1012
1.00518n
1.11606
+13.06
48 34.00
48 47.06

34 1.29

+36
1.58666n

− 3861
.01
+ .22

− 3840
33 22.89 22.60
32 13.3
−1 9.6 −.29 9.9

− 9.20
−1 8.38
−1 17.58 9.20
32 5.31 −1 8.61
+1.23 − 1.27
32 6.54 −1 19.08
32 3.52

Oct. 9 −.175 −.18

~~44~~ 36.8
37.9 ~~44~~
41.0
45.0
47.3
49.4
51.5
53.5
57.7
59.7
1.8
4826
5426
49.327

44 49.31
44 3686
+12.45
~~+12.49~~
−12.43 +.00 .03
− .03 −.03
−1.66
−14.12
49.31 35.19
35.19
A. R.

Oct. 13 −.178 −.18

44 39.0
40.8
43.0
47.0
49.0
51.4
53.3
55.4
59.6
1.6
2.8
4439
5639
51.264

44 51.25
44 3680
+14.46
~~+14.49~~
−14.41 +.00 .03
− .03 −.03
−1.60
−16.04
51.25 35.21
35.21
A. R.

Oct. 21 −.199 −.20

44 41.7
44.0
46.1
50.2
52.4
54.5
56.5
58.6
45 2.8
4.8
6.8
4184
5984
54.400

44 54.38
44 3667
+17.71
~~+17.75~~
−17.72 +.01
− .03 −.03
−1.47
−19.281
54.38 35.16
35.17
A. R.

Oct. 23 −.168 −.17

44
43.0
45.0
47.2
51.3
53.5
55.6
57.7
0.8
3.9
6.0
8.1
3721
6121
55.645

44 55.63
44 3664
+18.79
~~+19.03~~
−18.~~90~~88 +.01 .03
− .03 −.01
−1.44
−20.~~37~~534
55.63 35.28
35.29
A. R.

Nov. 2 +.023 +.02

44 46.2
48.2
50.3
54.4
56.4
58.6
0.6
2.7
7.0
9.0
11.1
3445
6445
58.591

44 58.58
44 3650
+22.08
~~+22.12~~
− 22.10 +.00
+ .00 +.00
−1.30
−23.40
58.58 35.18
35.18
A. R.

Gr 1374

h m s
19 44 42.
7 44 57
105° 45' "
74 15
+ 74 15 10
z = − 63 2 43 2
− .89

Red.
A − 1, tan δ = 7.355
1 45.5
2 37.9
3 30.4
x = +.055
cos α = +.40 +.06
δ = 15' 18.77" α 1872 = 49.207
δ = 15 9.88 α 1873 56.522
1872 δ = 44' 41.23" dα = +7.316
dδ = −8.89
1873 δ = 44 50.12

1872
Sept. 27 44m 51.17s
Oct. 2 51.66 49
Oct. 7 52.15 49
" 12 52.65 50
17 53.16 51
22 53.67 51
27 54.18 51

1873
Aug 28 44m 56.62s ~~38~~ .41
Sept 2 57.00
7 57.41
~~57.83~~
Oct 7 0.18
12 0.70 .52
17 51.19 .49
22 1.70 .51
27 2.22 .52

Jub. 2s

Oct. 2 1872 −.041 −.05
44 45
28.1 45 7.0
32.0 10.9
35.6 12.6
39.7
43.3
47.0
50.7
54.7
58.7
389.8
43.311 45 10.17
44 43.37 ~~26~~
44 51.63
− 8.26
− 8.66
+ 8.20 +.00
+ .18 +.15
− 2.42 +4.90
+ 6.963
44 43.37 49.37
+.099 44 49.30
45 44 56.62
2 33.5
16.9
5.04
47 25.20
− 26.86
− ~~27.06~~
1.42911n
0.95580
+ 9.03
47 25.20
47 34.23
105° 35' 14.12"
−63 20 9 2.05746n
+ 14
2.05760n
+ .00
+1 54.18
+ .10
+ .17
+1 54.45
+105 37 8.57 37 8.33
44 56.6
− " +7 48.0 −.24 47.8
~~+06 +7 48.6~~ 47.2
+7 47.4
− 6.51
− 15.40 − 15.40
+7 45.69 +7 45.53
+7 30.29 + .88
+105 44 38.86 +7 30.01
44 38.34
47.23

Oct. 1872 21 +.089 +.10
44
30.0 43 53.1
34.0 56.6
37.6 61.2
41.4
45.5
49.1
52.9
56.9
0.6
348.0
408.0
45.333 43 56.97
44 45.28 39
44 51.55
− 6.16
− 6.56
+ 8.71 +.01
− 36 −.31
− 2.34 +4.98
+ 6.087
45.39 51.40
+.141 51.46
45 58.78
2 59.1
38.3
97.4
47 48.70
+ 48.36
1.68449
1.21118n
− 16.26
47 48.70
47 32.44
35' 15.91
+ 1135
2.06881n
+ .01
+1 57.16
+ .33
+ .08
+1 57.58
37 13.49 13.21
44 58.2
+7 44.7 −.28 44.4
~~+7 45.3~~ 43.8
+7 44.1
− 8.11
− 17.00 − 17.00
+7 45.95 +7 45.51
+7 28.95 + 1.25
44 42.44 +7 29.76
44 42.97
51.86

1873 Sept. 1 −.443 −.44
~~44~~ 45
44 59.9
45
~~53~~ 49.1 249
55.1 247 247
2.7 248 248
10.1 246 246
24.700 59.90
45 24.65 76
44 56.90
+ 27.86
+ 27.46
− 28.93
+ 1.56 +1.57
− 0.38
− 27.75
45 24.76 57.01
+1.96
35
3 40.2
56.0
96.2
38 48.10
− 35.20
1.54654n
1.09592n
− 12.47
38 48.10
38 35.63
44 12.72
−63 20 17 2.05752n
− 1345
2.04407n
+ .02
+1 50.68
+ .18
+ .23
+1 51.11
46 3.83 46 3.53
44 58.5
−1 5.3 −.30 5.6
~~−1 4.7~~ 6.2
−1 6.9
− 8.40 − 8.40
−1 7.81 −1 8.17
−1 16.21 + 1.74
44 47.62 −1 14.83
44 48.70

Ch. f.
Sept. 2
35
3 35.0
48.9
83.9
38 41.95

Oct. 9 −.175 −.18
45
45 44.0
43.1 127
50.7 128
58.3 128
12.767
82 45 44.00
45 12.71
45 0.08
+ 12.77
+ 12.37
− 12.45 +.00
+ .64 +.62
− 3.53
− 15.386
12.82 57.48
+.230 57.46
35
3 42.3
58.8
93.1
38 46.55
− 31.23
1.49457n
1.04395n
− 11.06
38 46.55
38 35.49
44 12.86
+ 840
2.06592n
+ .01
+1 56.39
+ .14
+ .23
+1 56.77
46 9.63 9.33
~~44 55.6~~ 45 4.5
−1 5.1 −.30 5.4
~~−1 4.5~~ 6.0
−1 5.7
− 14.40 − 14.40
−1 8.29 −1 8.48
−1 22.69 + 2.04
44 46.94 −1 20.77
44 48.56

Oct. 13 −.178 −.18
45
45.3 149
53.0 151
0.4 149
14.967
15.02
45 ~~14.91~~
45 0.68
+ 14.34
+ 13.94
− 14.41 +.00
+ .64 +.63
− 4.16
− 17.984
15.02 57.09
57.08
A. R.

Sin δ 9.98338

Cos δ 9.43367n 9.43367n
1.15771n .09302
9.54938 9.52669n

1872						1873			
		°	′	″			′	″	
Sept.	27	74	15	4.1		Aug. 28	14	62.7	
Oct.	2			3.4	−.7	Sept 2		61.6	−1.1
	7			2.8	.6	7		60.5	1.1
	12			2.4	.4				
	17			2.0	.4	Oct. 7		55.7	
	22			1.8	.2	12		55.2	−.5
	27			1.7	.1	17		54.8	.4
						22		54.6	.2
						27		54.4	.2

Oct. 23 −.168
−.17

45

51.0 20.6
58.8 20.4
5.8 20.3

20.433
45 20.38 49
45 1.68
+ 1881
+ 18.41
− 18.90 8.8 +.01
+ .60 +.60
− 5.16
− 23.44 .43
20.49 57.05
5706

A.R.

Gr. 1359. = 25 Red.

h	m	s		
19	46	22		A₋₁ 2m 40s
	46	38		1459
+	95°	33′		
+	84	25	01	1 24.7
	z = − 53	12	11	
	~~85~~	34	59	A
	−0.80			

42.3
31.8
22.2
10.6 1059
0.0

Sin δ 9.99793
Cos δ 8.98808n 8.98808n
.11571n .09802n
9.10379 9.08110n

tang δ = − 10.228
k = + .157

α1872 = 45m ~~57.445~~ 57.445s
α1873 = 46 13.083

34 60
34 59

1872 Oct. 2 −.041

46 43.0
47.6
54.9
61.6
~~4~~5 52.7 52.7
3.6 53.0
14.3 52.1
25.4 53.6
35.5 53.2

45 52.92 46 51.77
45 53.08
+ 8.20
+ .43
~~+ .37~~
− 4.48
45 57.23

+0.99
55
1 44.8
28.9
73.7
56 36.85

− 5885
1.76975n
0.85085
+ 7.09
56 36.85
56 43.94
+95° 26′ 4.41″

− 53 10 59
+ 35
1.88555n
+ .00
+1 16.83
+ .18
+ .11 −.16

+1 17.12
+95 27 21.53 27 21.37
~~+~~ 17.30
+7 45.69
+8 29.9 +7 28.39
+95 ~~35 24.52~~
34 49.92

h m s m s
7 46 3 46 12 +7 17.30
45.53
+ .79
+84 24 55 53 +7 28.01
34 49.38

1872 Oct. 10 −.015

46 12.7
middle 45.8
56.3
3 6.7

108.8
168.8
45 56.267 46 12.70
45 56.432
+ 7.69
+ .15
− 6.60
45 57.6

+ 1.14
55
1 45.5
31.8
77.3
56 38.65

− 1643
1.21564n
0.29674
+ 1.98
56 38.65
56 40.63
26 7.72

1.88520n
− 1029
1.87491n
+ .00
+1 14.97
+ .01
+ .05 −.16

+1 15.03
27 22.75 22.59
~~+~~ 18.15
+7 46.25
+8 ~~4.40~~
~~35 27.15~~
34 50.83

− 18.15
+7 46.11
+ .91
+7 28.87
34 51.46

1872 Oct. 20 +.121

45
18.4
28.6
39.5
49.0
1.3
10.8
21.2
31.6
42.8
24.32
3.2
46 0.356
46 0.521
+ 8.52
− 1.24
− 4.19
− 9.32
45 58.487

45 ~~46~~ 17.8 ; 46 47
45 17.80

55
1 47.7
26.3
74.0
56 37.00

+ 4256
1.62900
0.71010n
− 5.13
56 37.00
56 31.87
26 16.48

+ 9.06
~~54~~
~~1.88466n~~
1.89926n
+1 18.39 +.00
+ .10
+ .05

+1 18.54
+27 35.02
~~+~~ 18.78
+7 46.34
+8 ~~5.12~~
35 40.14

46.10
+

1873 Sept. 1 −.443

~~46~~ 29.1
47 31.2
36.9

19.0 36.7
21.0 36.3
22.3 36.4
47 42.6 35.6

46 36.25 47 32.40
46 36.41
− 28.95
+ 4.53
+ 4.48
+ 1.16
46 13.35

+1.96
45
2 ~~4~~56.8
~~1~~2.8
109.6
47 54.80

− 5615
1.74935n
0.85314n
− 7.13
47 54.80
47 47.67
35 5.18

− 53 11 4
~~1325~~
~~180~~
~~1.88340n~~
1.87195n
+1 14.46 +.01
+ .17
+ .17 −.30

+1 14.81
+36 15.49 36 15.19
~~+~~ 9.75
− 1 7.81
1 17.56
34 57.23
151

− 9.75
− 1 8.11
+ 1.56
− 1 16.36
34 58.83

1873 Oct. 13 −.178

46
34.8 ~~46~~ 46 41.8
46.1 34.8
56.5 35.5
9s 7.0 34.3
8 17.0 35.2
foll 34.7

46 34.90 46 41.80
46 35.06
~~14.00~~
− 14.42
+ 1.82
+ ~~1.77~~
− 9.12
46 13.34

+2.32
45
2 41.1
48.9
90.0
47 45.00

− 690
0.83865n
9.94264n
− 0.88
47 45.00
47 44.12
35 4.23

+ 981
1.89501n
+ .00
+1 18.53
+ .00
+ .17 −.27

+1 18.70
22.66 +36 22.93
~~+~~ 9.75 16.72
− 1 8.83
− ~~0 59.08~~ −1 25.55
35 ~~23.85~~ 35 57.38
~~35 4.35~~

− 16.72
− 1 9.01
+ 1.85
− 1 23.88
34 58.78

1873 Oct. 21 −.199

46 47 1.1
—
—
—
—
47 49.9 39.3
47 0.5 38.3
11.5 39.7
21.7 39.4

46 39.175 47 1.10
46 39.33
− 17.70
+ 2.03
− 11.31
46 12.35

+2.40
45
1 29.8
36.2
66.0
46 33.00

− 2193
1.34104n
0.44483n
− 2.78
46 33.00
46 30.22
36 18.13

− 53 11 9
− 155
1.88365n
+ .00
+1 16.50
+ .02
− .03 −.26

+1 16.49
+37 ~~34.62~~ 34 34.36
~~+~~ 17.18
− 2 19.33
− ~~2 2.15~~ 36.51
35 ~~32.47~~ 58.11

− 17.18
− 2 19.65
+ 1.92
− 2 34.91
34 59.45

34 60.43 25 9.57
34 59.02 25 0.98

Oct 23 -.168

46
—
—
31.2 53.4
42.0 52.6
— 53.0 53.0
3.0 52.4
13.2 51.0
24.9 53.1
—

46 52583
46 57.74
18.88
— +1.72
~~+1.67~~
−11.86

A.R

Nov. 2 +.023

46
7.9
18.8
28.8
40.0
49.6
47 0.7
11.6
22.0
32.9

212.3
452.3
46 50.255
46 50.41

—22.10
—0.23
—14.59

46 13.49

A.R

e Draconis

h m s
19 48 39
19 + 69° 56'
+ 69 56 39
z = − 27 33 51
− .46

tan δ = +2.75
λ = −.041
cos α = +.01
α1872 = 35.702
α1873 = 35.530
δ1872 = 56 30.01 dα = −0.171
δ1873 = 56 39.16 dδ = +9.15

1872	m	s	
Sept 17	48	37.24	
22		36.93	.31
27		36.62	.31
Oct 2		36.30	.32
7		35.98	.32
12		35.64	.34
17		35.30	.34
22		34.97	.33
27		34.64	.33

1873	m	s	
Aug 28	48	37.90	
Sept 2		37.66	.24
7		37.41	.25
Oct 7		35.60	
12		35.26	.34
17		34.92	.34
22		34.59	.33
27		34.26	.33

Sept 28 1872 −.13 −.134
48
16.6 46 46.0
19.3
22.9
25.6
28.4
31.4
34.6
37.6
40.8
257.2
28.578 46 46.00
48 28.54
48 36.54
− 8.00
~~− 8.01~~
+ 8.42 +.01
− .36 −.37
− 0.84 −1.01
+ 7.22
48 28.54 35.76
+0.91 48 35.76
30 35 35.59
3 36.1 0 9.5
24.3 34 58.2
6.04 1277
33 30.20 35 385
+ 10258
2.01106
1.63917
+ 4357
33 3020
34 1377
+69 48 34.58
− 27 33 29 1.47770 n
− 182
1.47588 n
00
+ 29.91
− 1.85
+ .24
+ 28.30
+69 49 2.88 49 2.53
56 49.3
+7 46.4 −.35 46.1
− 10.15
− 19.30
+7 45.34
+7 26.04 − 19.30
+69 56 28.92 +7 45.04
+ .41
+7 26.15
56 28.68
37.83

Oct 2 1872 −.05 −.041
48
16.4 47 55.1
19.2 56.7
22.3 58.8
25.4
28.3
31.3
34.5
37.4
40.5
255.3
28.367 47 56.87
48 28.33
48 36.28
− 7.95
~~− 7.96~~
+ 8.20 +.00
− .14 −.11
− 0.58 − 0.75
+ 7.48 .51
28.33 35.81
+0.99 35.84
30 35.67 30
4 8.2
53.8
1220
34 1.00
+ 3150
+ 2150
1.49831
0.12642
+ 1.338
34 1.00
34 2.34
14.38
48 ~~46.01~~
33.97
+ 35
1.47805 n
00
± 30.06
.17
+ .28
+ 30.17
49 ~~16.18~~ 4.14 3.74
56 49.7
+7 45.5 −.40 45.2
− 10.55
− 19.70
+7 45.69
+7 25.99 − 19.70
56 30.15 +7 45.53
+ .45
+7 26.28
56 30.02
39.17

Oct 21 1872 +.18 +.127
48
13.9 47 59.0
17.0 1.2
20.0 4.8
23.0
26.0
28.7
31.8
35.2
38.3
234.0
26.000 47 48 1.67
48 25.96
48 35.02
− 9.06
~~− 9.07~~
+ 8.71 +.01
+ .28 +.33
+0.68 +0.51
+ 9.67 .73
25.96 35.63
+1.41 35.69
35.52
4 12.7
54.2
126.9
34 3.45
+ 6433
1.92598 1.38632
1.55409 1.01443
+ 35.81 +10.34
34 3.45
34 39.26 13.79
48 ~~9.09~~
34.56
+ 1135
1.48905 n
.00
+ 30.84
− 1.25
+ .12
+ 29.71
48 ~~38.80~~ 4.27 3.87
56 51.0
+7 46.7 −.40 46.3
− 11.85
− 21.00
+7 45.95
+7 24.95 − 21.00
56 29.22 +7 45.24
+ .64
+7 24.88
56 28.75
37.90

Sept 1 1873 −.44 −.443
47 48
56.0 48 25.1
59.0 49 27.0
2.0 29.4
5.8
7.8
11.0
13.8
16.8
19.9
191.3
71.8
7.922 49 27.17
49 7.88
48 37.70
+ 30.18 8
~~+ 30.17~~
− 28.93 −.01
− 1.21 −1.22
− 2.17
− 32.313
7.88 35.57
+1.96 35.55
25
0 2.3
17.1
19.4
25 9.70
− 1925
1.28443 n
0.93523
+ 861
25 9.70
25 18.31
57 30.04
− 27 33 34 1.47778 n
− 1325
1.46453 n
00
+ 29.14
− .06
+ .01
+ 29.09
57 59.13 57 59.12
56 51.5
−1 7.6 −.01 7.6
− 12.30
−1 7.81
−1 20.11 − 12.30
56 39.02 −1 8.17
+ .90
−1 19.57
56 39.55

Oct 5 1873 −.20 −.261
48
34.1 48 3.0
37.0 4.8
40.3 8.2
43.5
46.4
49.3
52.4
55.3
58.4
416.7
46.300 48 5.33
48 46.26
48 35.72
+ 10.54
~~+ 10.53~~
− 9.91 +.00
− .55 −.55
− 0.19
− 10.65
46.26 35.61
+2.24 35.61
25
0 24.3
36.2
605
25 30.25
+ 4097
1.61247
1.26327 n
− 1833
25 30.25
25 11.92
57 36.43
− 1290
1.46488 n
00
+ 29.17
− .30
+ .03
+ 28.89
58 5.32 58 5.28
56 57.7
−1 7.6 −.04 7.6
− 18.50
−1 8.55
−1 27.05 − 18.50
56 38.27 −1 8.73
+ 1.03
−1 26.20
56 39.08

Oct 9 1873 +.18 +.175
48
36.3 48 3.4
39.4 6.7
42.6 9.0
45.4
48.5
51.5
54.6
57.6
0.4
376.3
436.3
48.478 48 6.37
48 48.44
48 35.44
+ 13.00
~~+ 12.99~~
− 12.46 +.00
− .50 −.48
+ 0.09
− 12.85
48.44 35.67
+2.30 35.59
25
0 29.4
34.8
642
25 32.10
+ 4211
1.62439
1.27519 n
− 1884
25 32.10
25 13.26
57 35.09
+ 856
1.48634 n
00
+ 30.64
− .31
+ .03
+ 30.36
58 5.45 5.41
56 57.9
−1 7.5 −.04 7.5
− 18.70
−1 8.29
−1 26.99 − 18.70
56 38.46 −1 8.41
+ 1.06
−1 26.05
56 39.36

Sin δ 9.97285
Cos δ 9.53509 9.53509
1.15771n .09302
9.65080n 9.62811n

		°	′	″	
Sept	17	69	56	47.6	
	22			48.4	+.8
	27			49.1	.7
Oct.	2			49.7	.6
	7			50.3	.6
	12			50.6	.3
	17			50.9	.3
	22			51.0	.1
	27			51.0	.0

~~Aug 28 56 50.5~~
~~Sept 2~~
7

		′	″	
Oct.	7		57.8	
	12		58.0	+.2
	17		58.2	.2
	22		58.4	.2
	27		58.5	.1

		′	″	
Aug	28	56	50.5	
Sept	2		51.7	+1.2
	7		52.9	1.2
	12		54.0	1.1
	17		55.0	1.0

Oct 13 1873 ~~+.178~~ −.18

48
37.7 48 59.5
40.6
43.6
46.8
49.7
53.0
55.5
58.4
1.9

387.2
447.2
49.689 48 59.50

48 49.65
48 35.18
+14.47
~~+14.46~~
−14.42 +.00
− .50 −.49
+0.35
−14.5~~8~~6
49.65 35.08
+2.32 35.09

Oct 21 1873 −.199 −.20

48
41.1
44.0
47.0
50.0
53.1
56.0
59.3
49 2.2
5.1

48 29.8
31.4
33.3

477.8
53.089 48 31.50

48 53.05
48 34.64
+18.41
~~+18.40~~
−17.72 +.01
− .55 −.55
+0.89
+17.3~~8~~7
53.05 35.67
+2.40 35.68

Oct 22 1873 −.197 −.21

48
41.5
44.6
47.4
50.5
53.4
56.5
59.7
2.6
5.4

361.6
481.6
53.511

48 53.47
48 34.57
+18.90
~~+18.89~~
−18.21 +.00
− .58 −.54
+0.96
−17.~~83~~.79
53.47 35.64
35.68
A.R

Oct 23 1873 −.168 −.17

48
41.7
45.0
48.0
51.0
54.1
57.0
59.9
2.8
5.7

365.2
485.2
53.911

48 53.87
48 34.51
+19.36
~~+19.35~~
−18.~~90~~.88 +.01
− .47 −.46
+1.02
−18.3~~8~~1
53.87 35.54
35.56
A.R

Oct 29 1873 −.066 −.06

48
44.8
47.7
50.7
53.5
56.5
59.8
49 2.5
5.3
8.5

Andelta

329.3
509.3
56.589

48 56.55
48 34.11
+22.44
~~+22.43~~
−22.~~20~~18 19 −.02
− .17 −.18
+1.42
−~~21.01~~ 20.936
56.55 35.~~54~~ .62
35.59
A.R

Nov 2 1873 +.823 +.82

48
43.9
47.0
50.0
53.0
56.0
59.2
49 1.9
5.0
7.9

323.9
503.9
55.989

48 55.95
48 33.84
+22.11
~~+22.10~~
−22.10 +.00
+ .06 +.06
+1.69
−20.35
55.95 35.60
35.60
A.R

25
0 4.9
11.4
16.3
25′ 8.15″

− 9.81
0.99167n
0.64247
+4.39
25 8.15
25 12.54

57 35.81

+9.81
1.48759n
.00
+ 30.73
− .02
+ .01

+ 30.72
58 6.53 6.52
56 58.0
−1 8.5 −.01 8.5

− 18.80
−1 8.83
−1 27.63 − 18.80
56 38.90 −1 9.01
+ 1.06
−1 26.75
56 38.77

20
4 8.5
13.0
21.5
24 10.75

+ 21.59
1.33425
0.98505n
− 9.66
24 10.75
24 1.09

58 47.26

− 27 33 38
−1.55
1.47623n
.00
+ 29.94
− .08
− .08

+ 29.94
59 17.20 59 16.86
56 58.4
8 −.34

− 19.20
−2 19.33
−2 38.53 − 19.20
56 38.67 −2 −19.65
+ 1.10
−2 37.75
56 37.11

λ Urs. Min

19 52 10
14 88° 55
1 88 55 33
z = − 46 32 45

sin. z = − .72

N.A. 52
α 1872 = 18.360 δ = 55 23.93 (P) 8.38559n
α 1873 = 57 18.451 δ = 55 33.35 (P)
Cos α = − 1.28 1872
− 1.28 1873
P 1873 19 51 19.107
+ 1.88
17.23
P 1872 19 52 18.960
− 1.83
17.13

Sin δ 9.99992
Cos δ 8.26988
.11571n

8.26988
.09302
8.36290n

N.A. δ 32.34 + 1.0 dα = − 59.705
P + 88 55 33.35 dδ = + 9.46

tg δ = 53.26 53.44 53.44 53.44

~~Aug 4~~ ~~1872~~

Aug. 6 1872 − .248 − .24

50
49 (54.9)
50 48.9
51 45.9
52 39.0
53 34.0
54 28.5
55 26.4
56 19.2
57 11.5

53′ 34.27

53 33.46
53 1.73
+ 31.73
~~+ 32.68~~ 32.96
− 15.20
− 12.79
− 43.307
53 11.36
53 33.46 52 22.10

A.R

Sept 28 1872 − .13 − .134

20 25.3
28.9
31.2
51 11.69.6
52 9.6
53 4.2 51 11.5

52 8.57 50 28.47

52 ~~8.56~~
52 9.69
− 1.93
~~− 0.98~~
− 0.70
+ 8.42
− 6.95
+ 8.687
+ 10.14
52 7.76 17.92
35 + 0.91
0 1.1
46.0
10.71
35 53.55

+ 100.10
2.00043
0.36333
+ 2.31
35 53.55
35 55.86
+ 88° 46′ 52.49″
− 46 31 47 1.78290n
− 167
1.78123n
± 1′ 0.43″
− .10
+ .06
+ 1 0.39
+88 47 52.88 47 52.79
35 40.8
+10″ + 7 47.8 − .09 47.8
+ 7 48.9 48.8
− 16.90
+ 7 45.34 16.90
+ 7 28.44 + 7 45.04
+ 88 55 21.32 + 65
− 83 + 7 28.79
+ 88 55 20.49 55 21.58

Oct 2 1872 − .05 − .041

49 28.6
50 0.4
51 2.9
51 56.0
52 52.5
53 46.8

158.6
278.6
55.720 49 28.60

51 54.91
52 4.82
− 9.91
~~− 8.96~~
− 8.68
+ 8.20
− 2.67
+ 13.084
+ 19.08
51 54.91 13.99
35 + 0.99
0 59.1
41.5
10.06
35 50.30

+ 147.12
2.16768
0.53058
+ 3.39
35 50.30
35 53.69
46 54.66
+ 57
1.78347n
± 1 0.74
− .22
+ .06
+ 1 0.58
47 55.24 55.16
55 41.3
+ 7 46.1 − .08 46.0
+ 7 47.1 47.0
− 17.40
+ 7 45.69 17.40
+ 7 28.29 + 7 45.53
55 23.53 + 71
− 83 + 7 28.84
55 22.70 55 24.00

No sheet

Oct 9 1872 − .11 − .115

35
0 58.2
44.0
10.22
35 51.10

Oct 10 1872 − .81 − .815

49 8.7
48 4.79.5 50 55.6
49 5.0 56.7
49 51.5 58.3
50 53.4 48 5.0 ?
51 45.9 48 8.6
52 43.0 55 40.9
53 35.1
(54 31.0)
55 27.0

46.73 55 40.90

51 46.92
51 54.01
− 8.09
~~− 7.4~~
− 6.86
+ 7.69
− .53
+ 24.365
+ 31.521
51 45.92 17.43
35 + 1.14
0 5.3
49.7
11.50
35 57.50

− 234.17
2.36953n
0.73243n
− 5.40
35 57.50
35 52.10
46 56.25
− 1013
1.77277n
+ 0 59.25
− .56
+ .03
+ 0 58.72
47 54.97 54.88
45 42.3
+ 7 47.3 − .09 47.2
+ 7 48.3 48.2
− 18.40
+ 7 46.25 18.40
+ 7 27.85 + 7 46.11
55 22.82 + 82
− .83 + 7 28.53
55 21.99 55 23.41

5343 5343 5344

Ch. f

Oct 20 1872 +.11 +.121 Oct 21 1872 +.987 +.989 Nov 4 1872 Sept 1 1873 -.44 -.443 Sept 2 1873 Sept 6 1873 -.41 -.420

Cf. f

52 32.6 49 32.9 53 30.1

50 33.4 ~~51~~ 51 44.0

52.7

50 49 36.2

51 50 28.7

52 51 26 37.4

53 52 19.5

54 53 13.9

50 31.4 53 33.9 13.0

51 33.6 50 30.6

52 21.0 51 25.0

52 17.8

53 13.0

28.67 52 32.60 51 24.06 53 30.10 52 27.14 51 √48.35

51 27.86 51 23.15 52 26.23

51 40.81 51 39.34 51 33.29 51 32.15 51 27.82

-12.95 -15.19 +52.94

~~-12.00~~ ~~-15.24~~ ~~+59.89~~

-11.82 -14.96 54.17

+8.54 +8.71 ± 28.53

+5.87 +5.34 - 23.51

+37.05 ~~+38.79~~ 39.02 - 14.84

+51.96 +53.04 -1 7.38

51 27.86 19.82 23.15 16.19 .22 52 26.23 18.85

35 +1.37 35 +1.41 30 25 +1.86 A. R A. R

1 7.2 1 6.8 2 55.6 1 50.0

46.0 44.3 32.8 6.1

11.32 11.11 8.84 11.61

35 56.60 35 55.55 32 44.20 26 58.05

- 63.93 - 126.04 +38.69

1.80570n 2.10053n 1.58760

0.16860n 0.46343n 9.97319n

- 1.47 - 2.91 -0.94

35 56.60 35 55.55 26 58.05

35 55.13 35 52.64 26 57.11

46 53.22 46 55.71 55 51.24

-46 31 55 1.78300n

+9.16 +11.35 -13.25

1.77374n 1.79425 1.76975n

1.79206n

+1 1.95 +1 2.27 +0 58.85

.41 .16 .01

∓ .08 ∓ .03 ∓ .11

+1 1.57 +1 2.14 +0 58.95

47 54.79 54.70 47 57.85 57.76 55 50.19 50.03

55 43.0 55 43.1 55 43.1

+7 48.2 -.09 48.1 +7 45.3 -.09 45.2 -1 7.1 -.16 7.3

+7 49.2 49.1 +7 46.3 46.2 -1 6.1 -.16 6.3

- 19.10 - 19.10 - 19.20 - 19.20 - 9.80 - 9.80

+7 46.34 +7 46.10 +7 45.95 +7 45.24 ^ -1 7.81 -1 5.17

+7 27.24 +7 27.98 +7 26.75 +7 27.05 -1 17.61 + 2.13

55 22.03 55 24.60 4.01 55 32.58 -1 15.84

-83 55 22.68 -83 55 24.81 -1.58 55 34.19

55 21.20 55 23.77 55 31.00

Log *550 δ = 1.72879

Red = 3 40.64 m s
2 45.48
1 50.32
55.16

☆ Urs. Min

x = −.81 s

19 52 10
+ 88 55

5357 Oct 5 1873 −.291

5354 Oct 9 1873 −.178

5356 Oct 13 1873 −.178

5358 Oct 21 1873 −.199

53.58 Oct 22 1873 −.197

53.58 Oct 23 1873 −.188

51 51 50 3 49 49

50 50.6 7.0 50 38.8 ~~0.7~~ 54 56.6
51 46.8 ? 52 3.0 ~~52 2.6~~
52 56.0 ~~52 57.2~~
~~51 46.8~~ ? 53 55.2
54 49.9

51 15.9 | 5 15.9 5 51 0.7 50. 7.0 4 59.4
52 11.1 | 6 15.2 6 52 2.6 51. 1.6 5 49 0.4 4 50 55.9
53 4.0 | 7 13.7 7 52 57.2 51 54.4 6 50 57.0 5 51 51.4
53 59.9 | 8 14.4 8 53 53.4 52 49.2 7 51 52.6 6 52 46.1
54 56.3 | 9 15.7 9 54 49.0 53 44.5 8 52 46.8 7 53 41.6
~~15.50~~ 54 41.4 9 53 44.4 8 54 37.3
14.88 54 36.9 9

51 ~~15.66~~ 51 ~~16~~ 70 50 8.30 6.26 0.45 50 56.95 55.88
51 ~~14.69~~ 1 7.49 50 38.80 51 8.45 54 56.60 50 59.64 50 56.14 55.07
51 14.17
50 52.73 50 47.75 50 41.99 50 31.27 50 29.96 50 28.60
+21.44 +19.74 +23.46 +28.37 +26.18 +26.47
+22.68 +20.96 +24.68 (+29.57) +29.45 +27.40 +27.69
− 9.92 − 12.46 − 14.42 − 17.72 − 18.21 − 18.89
+25.72 +30.70 + 36.46 +47.18 +48.49 +49.85
−10.72 − 9.64 − 9.64 − 10.72 − 11.25 − 9.11
51 +16.08 + 8.60 + 12.40 + 18.74 +19.08 +21.85
51 14.17 19.28 7.49 16.09 5.45 17.85 50 59.84 18.38 56.14 15.17 55.07 16.52

+224 +230 +232

25 25 25 25 A. R. A. R.
1 43.8 1 51.0 1 43.1 0 37.8
56.3 58.9 49.9 44.2
10.01 10.99 9.30 8.20
26 50.05 26 54.95 26 46.50 25 41.00

−18.40 −4.53 + 29.50 −23.034
1.92634 0.65612 1.46982 2.36236n
0.31 1.93 9.04171 8.5544n 0.74795
− 2.05 +0.11 +0.71 +5.60
26 50.05 50.05 26 54.95 26 46.50
26 48.00 50.16 26 54.24 26 52.10

56 0.35 55 58.19 55 54.11 55 56.25

− 12.90 +8.56 +9.81
1.77010n 1.79156n 1.77281n

+ 0 58.90 + 1 1.88 + 1 2.06
− .54 − .07 − .01
+ .11 + .11 + .11

+ 1 58.47 + 1 1.92 + 1 2.16
+88 56 ~~58.82~~ 56.16 56.48 56 56.03 56 55.84 56 58.41 56 58.23
55 49.4 55 49.9 55 50.4
− 1 9.4 −.18 9.6 − 1 9.61 −.19 6.3 − 1 8.0 −.18 8.2

− 16.00 − 16.60 − 17.00
− 1 8.55 − 1 8.29 − 1 8.83
55 32.11 − 16.00 55 31.14 − 16.60 55 32.58 − 17.00
−1.58 − 1 8.73 −1.58 − 1 8.41 −1.58 − 1 9.01
55 30.53 + 1.61 55 29.56 + 1.65 55 31.00 + 1.67
− 1 23.12 − 1 23.36 − 1 24.34
55 33.36 55 32.48 55 33.89

1872.0 α	δ	1873.0 α	δ
22.10	20.49	18.85	31.00
17.92	22.70	19.25	30.53
13.99	21.99	16.09	29.56
17.43	21.20	17.85	31.00
19.82	23.77	18.38	
16.22		15.17	
		16.92	
		13.28	
17.913 ~~+1.66~~	22.03 +1.66	16.974	30.52 +3.16
18.960	23.93	19.107	33.35
−1.047	~~−1.90~~	−2.133	−2.83
	23.69		33.68
	.93		.35
	− .24		+ .33

53.58)

Nov 2 1873
+.023
+.02

49	38.3
50	32.2
51	28.9
52	24.3
53	19.8
54	13.3

50 33.40
50 32.59

50 1.459
+1.801
+19.22
−22.10
+63.86
+1.07
+49.69
50 32.59 1.328

A.K

Gr 1408 = ~~761~~

h m s
20 03 23
8 03 32
+ 103 51 "
+ 76 09
76 08 24
z = − 61 28 48
103 51 36
sin z = −.88

Go δ for this star.

Red. s
1 17.2
2 12.9
3 8.6
4 4.3
5 0.0

1872

tang δ = −.405
x = +7.063
cos α = −.11 + 1.5"
α1872 = 23.904 δ = 8' 34.34" = 51' 25.66"
α1873 31.642 δ = 8 24.05 = 51 35.95
dα = +7.739
dδ = −10.29

		m	s	
Sept. 28		8	25.60	
Oct.	2		26.13	.53
	7		26.67	.54
	12		27.22	.55
	17		27.78	.56

1873

		m	s	
Aug 28		3	31.41	44
Sept.	2		31.81	
	7		32.24	43
			3	
Oct.	7		35.24	
	12		35.80	56
	17		36.36	56
	22		36.93	57
	27		37.51	58
Nov.	1		38.08	57
	6		38.66	58

Sept 28 1872 −.134
02
59.4 00 43.9
3.7 46.0
7.7 49.2
12.2
16.7
21.0 05 48.0
25.0 52.8
29.1 58.7
34.0
208.8
148.8
16.533 0 46.37
60 5 53.17
3 16.47
3 25.58
−8.98
−8.87
+8.42 +.01 .55
+ .53 +.54
−1.68 +6.06
+7.27 30
3 16.60 23.87
+0.913 23.90
40 31.64
1 37.3 0 5.2
23.2 4 35 57.5
1 60.5 116.7
41 30.25 39 58.35
+ 150.16
2.17659
1.64921n
− 44.59
41 30.25
40 45.66
+103 42 2.69
−61 26 57
−152
2.02143n
+ .01
+1 45.05
+ 2.86
+ .10
+1 48.02
+103 43 50.71 43 50.56
51 41.1
+7 50.4
~~−.15 +7 51.9~~
+7 48.5 −.15 48.8
+ 5.11
− 15.40 15.40
+7 45.34 +7 45.04
+7 29.94 + .80
+103 51 20.65 +7 30.44
51 21.00
51 31.29

Oct 2 1872 −.041
03
03 02 6.2
4.9 10.5
8.7 13.5
13.3
17.9
22.0
26.3
30.5
34.8
158.7
17.633 2 10.07
80
3 17.57
3 26.11
−8.41
−8.30
+8.20 +.00
+ .20 +.17
−2.21 +5.53
6.19.16
17.70 23.89
+0.99 23.86
40 31.60
1 8.9
53.7
122.6
41 1.30
+ 67.56
1.82969
1.30231n
−20.06
41 1.30
41 41.24
42 7.11
2.02295n
+79
2.02374n
+ .00
+1 45.62
+ .58
+ .07
+1 46.27
43 53.38 53.28
51 41.9
+7 48.5
~~+7 50.0~~
+7 47.0 −.10 46.9
+ 5.91
− 16.20 16.20
+7 45.69 +7 45.53
+7 29.49 + .87
51 22.87 +7 30.20
51 23.48
33.77

Oct 12 1872 +.832
03
2.2 02 50.7
7.0 52.6
11.3 ~~15.8~~ 55.4
15.8
19.8
24.3
28.8
32.9
37.9
180.0
20.000 2 52.90
20.06
3 ~~19.94~~
3 27.20
−7.14
−7.03
+7.27 −.01
− 24 −13
−3.30 +4.44
+3.72 83
20.06 23.79
+1.19 23.89
31.63
40
1 1.5
42.5
104.0
40 52.00
+ 27.10
1.43297
0.90559n
− 8.05
40 52.00
40 43.95
42 4.40
+1000
2.03295n
+ .00
+1 47.87
+ .09
+ .03
+1 47.99
43 52.39 52.30
51 43.2
+7 50.8
~~+7 52.3~~
+7 49.3 −.07 49.2
+ 7.21
− 17.50 17.50
+7 47.83 +7 47.64
+7 30.33 + 1.04
51 22.72 +7 31.18
51 23.48
33.77

Sept 1 1873 −.443
02 (41.3)
03 45.6 01 48.0
50.0 02 50.6
54.1 54.4
58.5
3.0
7.1
11.4
15.7
58.522 2 51.00
58
3 58.46
3 31.72
+26.86
+26.97
−28.94 −.01
+ 1.78 +1.79
− 0.08
− 27.24
58.58 31.34
+1.96 31.34
30
1 12.7
28.8
41.5
31 20.75
+ 67.52
1.82943
1.32474
+21.12
31 20.75
31 41.87
51 6.48
−61 27 10 2.02301n
−1285
2.01016n
+ .01
+1 42.36
+ .58
+ .08
+1 43.03
52 49.51 52 49.41
51 44.1
−1 5.4 α 5.3
~~−1 3.9~~
−1 6.9 −.10 7.0
− ~~20.10~~ −8.10 −8.10
−1 7.81 −1 8.17
−1 15.91 + 1.72
51 33.60 −1 14.55
51 34.86

Oct 9 1873 −.175
03
30.0 02 56.8
34.0 59.5
38.5 5.0
42.8
47.4
51.4
55.6
0.4
4.4
304.5
424.5
47.167 3 0.43
.23
3 47.70
3 35.45
+11.78
+11.89
−12.46 +.00
+ .73 +.71
−3.81
−15.546
47.23 31.69
+2.30 31.67
30
1 22.0
31.1
53.1
31 26.55
+ 46.74
1.66969
1.16500
+14.62
31 26.55
31 41.17
51 7.18
+888
2.03189
+ .00
+1 47.62
+ .28
+ .08
+1 47.98
52 55.16 55.05
51 51.4
−1 3.8 3.9
~~−1 2.3~~
−1 5.3 −.11 5.4
− ~~27.30~~ −15.40 −15.40
−1 8.29 −1 8.41
−1 23.69 + 2.02
51 31.47 −1 21.79
51 33.26

Oct 13 1873 −.18
3 (32.7) 2 56.4
37.0
41.3
45.0
48.9
52.8
58.3
4 2.2
6.6
49.422 2 56.40
.48
3 49.36
3 35.89
+13.59
+13.70
−14.42 +.00
+ .73 +.72
−4.25
−17.945
49.48 31.54
+2.32 31.53
30
1 21.5
29.5
51.0
31 25.50
+ 53.02
1.72444
1.21975
+16.59
31 25.50
31 42.09
51 6.26
+1006
2.03307
+ .00
+1 47.91
+ .36
+ .08
+1 48.35
52 54.61 54.50
51 52.0
−1 2.6 2.7
~~−1 1.1~~
−1 4.1 −.11 4.2
− ~~28.00~~ −16.02 16.00
−1 8.83 −1 9.01
−1 24.83 + 2.04
51 29.78 −1 22.97
51 31.53

Sin δ 9.98715
Cos δ 9.37960n 9.37960
.11571n .19302n
9.49531 9.47262n

1872

		°	'	"	
Sept	27	76	8	19.0	
Oct.	2			18.2	−.8
	7			17.5	.7
	12			16.9	.6
	17			16.4	.5

1873

		'	"	
Aug	28	8	16.9	
Sept.	2		15.6	−1.3
	7		14.4	1.2
Oct.	7		8.8	
	12		8.1	−.7
	17		7.6	.5
	22		7.2	.4
	27		6.9	.3
Nov.	1		6.8	.1
	6		6.7	.1

Oct 21 1843 −:201 .199

3 4 7.2 03
9.4
11.1
—
—
—
49.3 53.6
53.1 53.1
57.5 53.2
4 2.2 53.6
6.4 53.5
10.5 53.3

53.833 4 9.23

3 53.77 90
3 36.79
+17.11
+17.22
−17.72 +.01
+ .81 +.81
−5.15
−220.45
53.90 31.84
+2.40 31.85

30
0 26.2
33.2
59.4
30 29.70

− 15.40
1.18752n
0.68283n
− 4.82
30 29.70
30 24.88

52 23.47

− 61 27 14
−190
2.02111n
+1 44.98 .00
+ .00
− .01

+1 44.97
54 8.44 54 8.40
51 52.7
− 2 15.7 15.7

−.04

− ~~28.60~~ −~~16.70~~ 16.70
− 2 19.33 −2 19.65
− 2 36.03 + 2.11
51 32.41 −2 34.24
51 34.16

Oct 23 1873 −:17 .168

37.5
41.8
46.5
50.7
55.0
59.1
2.8
8.1
12.0

3145
4945
54.944
55.01
55.01
3 37.02
+17.99
+18.10
− 18.89 +.01
+ .69 +.68
− 5.38
− 23.58
55.01 31.43
31.43

A.K.

Nov 1 1873 −:047 .047

3 3 52.8
43.0
46.8
51.5
55.4
59.8
4 4.1
8.4
12.7
16.9

2986
5386
59.844 3 52.80

3 59.78 91
3 38.05
+21.86
+21.97
−22.12 +.01
+ .16 +.19
−6.41
−28.383
59.91 31.54
31.58

A.K.

+ 7.04
0.84757
0.34288
+ 2.20

Nov 2 1873 1.823 1.82

3
43.3
47.8
51.6
55.8
4 0.3
4.6
8.9
12.9
17.4

242.6
.26
0.289
.35
4 0.23
3 38.17
+22.08
+23.19
− 22.10 +.00
− .08 −.09
− 6.53
− 28.912
4 0.34 31.63
31.62

A.K.

1873

θ Aquilae

h	m	s	
20	04	44	
20	04	45	
—	1°	12′	″
—	1	11	48
z = + 43		34	36
+ ,69			

tang ϑ = −.02

x = −.015

cos x = ~~+.02~~

α 1872 = 41.975

α 1873 45.073

δ 1872 = 11′ 58″.09

δ 1873 = 11 47.71

Aug 28	4m	47s.46	
Sept. 2		42	4
7		38	4
12		33	5
17		47.27	6
Oct 7		46.99	
12		.91	8
17		.83	8
22		.75	8
27		46.68	7

dα = +3.098

dδ = +10.38

Sin δ 8.32103n

Cos δ 9.99990

.11571n

.11561n

6h. f

Sept 1 1873 = .443

~~04~~ 4.2
05 6.1 ~~04~~ 0.0
8.2 05 1.0
2.3
12.2
14.3
16.4
18.4
20.5
24.7
26.7
28.7
180.4
16.400 5 1.10

5 16.89
4 47.43
+28.96
~~+28.93~~
−28.94 −.01
+ .01 +.01
−2.36 +0.74
−31.29 530
5 16.39 45.10
+1.96 4 45.09
30 ~~46.19~~ 30
2 42.0
54.9
96.9
32 48.45

+ 15.30
1.18469
1.30030n
−19.97
32 48.45
32 28.48
−1° 9′ 40″.13

+43 33 36 1.73800
−1265
1.72535
∗ − 53″.13
+ .50
+ .17
− 52.96
−1 10 33.09 10 33.31
11 41.5
−1 8.4 −.22 8.6
∗ 6.20
−1 7.81
−1 14.01 − 6.20
−1 11 47.10 −1 8.17
− 1.35
−1 15.72
11 49.03

Sept 2 1873

30
2 54.2
3.9
1181
32 59.05

Oct 5 1873 = .281

04 44.6
46.7 04 39.1
48.8 40.0
52.9 41.1
54.9
57.0
59.0
1.1
5.1
7.2
9.3
386.6
626.6
56.964 4 40.07

4 56.95
4 47.02
+9.93
~~+9.90~~
−9.92 +.00
+ .00 +.00
−1.95
−11.87
56.95 45.08
+2.24 45.08
30
2 43.8
51.8
956
32 47.80

+ 1689
1.22763
1.34324n
−2204
32 47.80
32 25.76
9 37.41

−1229
1.72571
∗ − 53.18
+ .00
+ .17
− 53.01
10 30.42 30.64
11 40.7
−1 10.3 −.22 10.5
∗ 7.00
−1 8.55
−1 15.55 − 7.00
11 45.97 −1 8.73
− 1.54
−1 17.27
11 47.91

Oct 9 1873 = .175

04
— 05 6.2
— 7.1
57.1 8.2
58.4
59.5
0.6
1.4
~~2.6~~
~~3.5~~
59.40 5 7.17

4 59.38
4 46.95
+12.37
~~+12.34~~
−12.46 +.00
+ .00 +.00
−1.88
−14.34
59.38 ~~44.98~~
45.04 45.04
30 +2.30
2 13.2
15.0
282
32 14.10

− 777
0.89042n
1.00603
+10.14
32 14.10
32 24.24
9 35.89

+904
1.74704
∗ − 55.85
+ .00
+ .13
− 55.72
10 31.61 31.79
11 40.9
−1 9.3 −.18 9.5
∗ 6.80
−1 8.29
−1 15.09 − 6.80
11 46.70 −1 8.41
− 1.58
−1 16.79
11 48.58

Oct 13 1873 = .178

4 48.8 44.03
51.0
53.0
57.1
59.2
5 1.2
3.3
5.3
9.6
11.6
13.7
313.8
13.8
1.255 4 40.30

5 1.24
4 46.89
+14.35
~~+14.32~~
−14.42 +.00
+ .00 +.00
−1.72 82
16.74 24
1.24 45.00
45.00
30 +2.32
2 49.4
52.1
1015
32 50.75

+ 2095
1.32118
1.43679n
−2734
32 50.75
32 23.41
9 35.06

+1018
1.74818
∗ − 56.00
+ .00
+ .17
− 55.83
10 30.89 31.79
11 41.0
−1 10.1 −.22 10.3
∗ 6.70
−1 8.83
−1 15.53 − 6.70
11 46.92 −1 9.01
− 1.60
−1 17.31
11 48.42

Oct 21 1873 = .199

4 52.2 5 19.4
54.3 20.4
56.3 21.5
0.4
2.4
4.5
6.5
8.5
12.8
14.9
16.9
229.7
49.7
4.518 5 20.42

5 4.50
4 46.76
+17.74
~~+17.71~~
−17.72 +.01
+ .00 +.00
−1.69
19.40
4.50 45.09
45.10
30 +2.40
0 51.6
53.7
1053
30 52.65

− 1591
1.20167n
1.31728
+2076
30 52.65
31 13.41
8 25.06

+43 33 34
−207
1.73593
∗ − ~~55.71~~ 54.44
+ 00
− .02
− 54.46
9 19.52 31.11 9 19.59
11 41.2
−2 21.7 −.07 21.8
∗ 6.50
−2 19.33
−2 25.83 − 6.50
11 45.35 −2 19.65
1.65
=2 27.80
11 47.39

1873

	'	"	
Aug 28	11	41.7	
Sept. 2		41.5	+.2
7		41.3	.2
12		41.1	.2
17		40.9	.2
Oct 7		40.8	
12		41.0	∓.2
17		41.1	∓.1
22		41.2	.1
27		41.3	.1

	Oct 23 1873 −.198		Nov 1 1873 −.847				Nov 2 1873 +.823
04	53.2		—	5	19.1	4	56.4
	55.3		—		20.2		58.4
	57.3	5	—		21.0	5	0.5
	1.5		4.5				4.6
	3.6		6.5				6.6
	5.6		8.6				8.8
	7.7		10.6				10.8
	9.8		12.8				12.9
	13.9		—				16.9
	16.0		—				19.0
	18.0		—				21.0
	2419		430				215.9
	61.9		8600				95.9
	5.627		8.600	5	20.10		8.718
5	5.61	5	8.59			5	8.70
4	46.73	4	46.60			4	46.58
	+18.88		(+21.99				+22.12
	~~+18.85~~		~~+21.96~~)				~~+22.09~~
	−18.89 +.01		−22.12 +.01				−22.10 +.00
	+ .00 +.00		+ .00		+.00		∓ .00 −.00
	−1.66		−1.53				−1.51
	−20.554		−23.654				−23.61
	5.61 45.06		8.59 44.94			5	8.70 45.09
	4507		4495				4599
	A.R		A.R				A.R

1872 1873

ο¹ ο² Cygni

h	m	s	
20	09	40	
20	09	38	
+	46	21′	″
+	46	21	25
z = −3		58	37

ο¹ ∓ ο² sin. z = −.07

tang δ = +1.05

x = −.022

cos x =

α 1872 = 36.053 δ = 21 13.97

α 1873 = 37.942 δ = 21 24.72

dα = +1.888

dδ = +10.75

1872	m	s	
Sept. 17	9	37.76	
~~Oct~~ 22		.63	.13
27		.50	.13
Oct 2		37	.13
7		.24	.13
12		10	.14
17		95	.15
22			
27			

1873	m	s	
Aug 28	9	40.07	
Sept. 2		39.98	.09
7		39.89	.09
Oct. 7		39.17	
12		39.02	.15
17		38.88	.14
22		38.74	.14
27		38.60	.14

(ο²) (ο²) (ο¹)

ο¹ ο ο²₂

O. K. Ch. f.

Sept 28 1872 −.13 Oct 2 1872 −.85 Oct 12 1872 +.86 Sept 1 1873 −.44 Sept 2 1873 Oct 5 1873 −.28

08 51.9 | 08 | 09 11.8 | 08 51.4 | 09 31.5
54.7 08 18.7 | 51.8 08 35.8 | 14.9 08 55.8 | 09 54.6 08 41.6 | 34.5 09 22.8
57.7 20.8 | 54.9 37.3 | 17.7 56.9 | 57.4 09 42.8 | 37.5 24.1
3.7 22.5 | 57.8 38.7 | 23.7 58.9 | 3.4 44.0 | 43.5 25.6
6.8 | 3.9 | 26.8 | 6.4 | 46.5
9.8 | 7.0 | 29.9 | 9.3 | 49.4
12.7 09 59.7 | 9.8 | 32.9 | 12.4 | 52.4
15.7 1.3 | 12.8 | 35.7 | 15.3 | 55.4
21.8 3.4 | 15.8 | 41.9 | 21.4 | 1.4
24.7 | 21.8 | 44.7 | 24.3 | 4.4
27.7 | 24.8 | 47.8 | 27.1 | 7.4
287.2 | 27.7 | 327.8 | 283.0 | 363.9
107.2 | 288.1 | | 103.0 | 543.9
9.745 8 20.67 | 118.1 8 37.27 | 29.800 8 57.20 | 9.364 9 42.80 | 49.445 9 24.17
10 1.47 | 9.827

9 9.72 | 9 9.81 | 9 29.78 | 10 9.34 | 9 49.42
9 37.47 | 9 37.36 | 9 37.09 | 9 39.99 | 9 39.22
−27.75 | −27.55 | −7.31 | (+29.35 | +10.20

+8.42 +.01 | +8.20 +.00 | +7.27 −.01 | −28.95 −.01 | −9.92 +.00
− .14 −.14 | − .05 −.04 | + .06 +.03 | − .46 −.46 | − .21 −.22
−1.42 +0.47 | −1.31 +0.58 | −1.04 +0.85 | − 2.05 | −1.28
+6.867 | +6.845 | +6.295 | −31.467 | −11.412
9 9.72 16.58 | 9.81 16.65 | 29.78 36.07 | 9.34 37.88 | 49.42 38.01
9 16.59 9 18.48 | 16.66 18.55 | 36.03 37.92 | 37.87 | 38.00
0 +0.915 | 0 +0.99 | 5 +1.19 | 0 +1.96 | 0 0 | 0 +2.24

3 56.8 0 23.1 4 10.9 | 3 45.2 | 0 23.8 | 0 23.7 | 0 18.7
46.9 14.0 59.9 | 30.8 | 38.9 | 37.2 | 30.1
103.7 37.1 13.08 | 76.0 | 62.7 | 60.9 | 48.8
3 51.85 5 18.55 4 5.40 | 8 38.00 | 0 31.35 | 0 30.45 | 0 24.40

+49.07 − 51.75 + 32.56 | + 32.60 | + 26.56 | + 25.27
+ ~~22.60~~
1.69082 1.71391ₙ 1.51268 | 1.51322 | 1.42423 | 1.40261
1.62285 1.64594 1.44471 | 1.44525 | 1.37895ₙ | 1.35733ₙ
+41.96 − 44.25 +27.84 | +27.88 | −23.93 | −22.77
3 51.85 5 18.55 4 5.40 | 8 38.00 | 0 31.35 | 0 24.40
4 33.81 4 34.30 4 33.24 | 9 5.88 | 0 7.42 | 0 1.63
+46° 18 14.54 18 14.05 18 15.11 | 13 42.47 | 22 40.93 | 22 46.72

−3 58 38 0.60180ₙ (250) 3 58 45 0.60190 (270)

−137 | +101 | +1012 | −1245 | −1209
0.60113ₙ | 0.60351ₙ | 0.61262ₙ | 0.59025ₙ | 0.59061ₙ

+ 3.99 +3.99 + 4.01 | + 4.10 | + 3.89 | + 3.90
− .58 −.66 − .72 − .29 | − .29 | − .19 | − .17
+ .27 + 10 + .29 | + .11 | + .03 | + .62

+ 4.38 +3.60 +3.37 + 4.01 | + 3.92 | + 3.73 | + 3.75
+46 18 18.92 18.14 17.46 18 19.12 | 1872 13 46.39 ~~13 46.03~~ | 22 44.66 22 44.62 | 22 50.47 22 50.44
21 32.7 17.04 21 33.1 | 21 33.9 | 21 37.1 | 21 42.8
+3 14.6 (0.38) 14.2 + 3 14.0 (0.35) −.40 | 13.6 +7 47.5 −.36 47.1 | −1 7.6 −.04 7.6 | −1 7.7 −.03 7.7
− 9.15
− 18.70 | −19.10 | −19.90 | −12.40 | −18.10
+7 45.34 | +7 45.69 | +7 47.83 | −1 7.81 | −1 8.55
+7 26.64 − 18.70 | +7 26.59 − 19.10 | +7 24.93 19.90 | −1 20.21 − 12.40 | −1 26.65 − 18.10
+46 25 44.75 +7 45.04 | 25 45.71 +7 45.53 | 21 14.32 +7 47.64 | 21 24.45 −1 8.17 | 21 23.82 −1 8.73
− 08 + 6.06 | − 08 + 07 | − 08 + 08 | − .15 + .14 | − .15 + .16
+46 25 44.67 +7 27.40 | 25 45.63 +7 26.50 | 14.24 +7 27.82 | 21 24.30 −1 20.43 | 21 23.67 −1 26.67
25 45.16 | 25 45.22 | 21 13.85 | 21 24.19 | 21 23.74
21 24.60

Sin δ 9.85948
Cos δ 9.83901 9.83901
.11571n .09302
9.95472n 9.93203n

1872		°	′	″	
Sept.	17	46	21	31.1	
	22			31.9	+ .8
	27			32.6	.7
Oct.	2			33.1	.5
	7			33.6	.5
	12			33.9	3
	17			34.2	3
	22			34.3	1
	27			34.3	0

1873		′	″	
Aug.	28	21	36.1	
Sept.	2		37.3	+ 1.2
	7		38.4	1.1
	12		39.4	1.0
	17		40.3	.9
Oct.	7		42.9	
	12		43.1	+ .2
	17		43.3	.2
	22		43.5	.2
	27		43.7	.2

1872.0 α	δ	1873.0 α	δ
~~16.59~~		37.87	24.30
~~16~~		38.00	23.67
36.03		37.94	24.27
		.92	23.83
		.93	23.57
		.89	
		.97	
	14.24 +.16		
~~16.625~~		37.931	+30 23.93
36.030	13.97	.942	24.72
36.053			
−.023	~~+.27~~	−.011	−0.79
	14.40		24.23
	13.97		.72
	+ .43		−.49

Oct 9 −.175 −.18

09 33.8
36.9
40.0
45.7
48.8
51.8
54.7
57.7
3.6
6.7
9.7
389.4
569.4
51.764

09 23.7
24.9
26.3
9 24.97

9 51.74
9 39.10
+12.64

−12.46 +.00
−.19 −.18
−1.16
−13.8 +80
51.74 37.93
37.94
0 +2.30
0 22.9
27.9
50.8
0 25.40

+ 26.79
1.42797
1.38269n
− * 24.14
0 25.40
0 1.26

22 47.09

+920
0.61190n

+ 4.09
− .19
+ .02

+ 3.92
22 51.01 22 50.98
21 43.0
−1 8.0 −.03 8.0

−18.30
−1 8.29
−1 26.59 − 18.30
21 24.42 −1 8.41
−15 + .16
21 24.27 −1 26.55
21 24.43

Oct 13 −.178 −.18

9 35.5
38.7
41.8
47.7
50.6
53.6
56.6
59.7
10 5.5
8.5
11.5
409.6
589.6
53.600

9 21.2
22.3
23.6
9 22.37

9 53.58
9 38.99
+14.59

−14.42 +.00
−.19 −.19
−1.05
−15.66
53.58 37.92
37.92
0 +2.32
0 26.5
31.8
58.3
0 29.15

+ 31.23
1.49457
1.44929n
− * 28.14
0 29.15
0 1.01

22 47.34

+1030
0.61310n

+ 4.10
− .26
+ .03

+ 3.87
22 51.21 51.17
21 43.1
−1 8.1 −.04 8.1

−18.40
−1 8.83
−1 27.23 − 18.40
21 23.98 −1 9.01
−.15 + .16
21 23.83 −1 27.25
21 23.92

Oct 21 −.199 −.20

9 38.8
41.9
44.8
50.8
53.7
56.8
59.7
10 2.6
8.6
11.4
14.5
383.6
623.6
56.691

9.27.3
28.7
30.1
9 28.70

9 56.67
9 38.76
+17.91

−17.72 +.01
−.21 −.21
−0.82
−18.754
56.67 37.92
37.93
55 +2.40
4 13.1
17.7
30.8
59 15.40

+ 27.99
1.44700
1.40172n
− * 25.22
59 15.40
58 50.18

23 58.17

−3 58 49

−224
0.60046n

+ 3.98
− .21
− .09

+ 3.68
24 1.85 24 1.51
21 43.5
−2 18.3] −.34 18.6

−18.80
−2 19.33
−2 38.13 − 18.80
21 23.72 −2 19.65
−.15 + .17
21 23.57 −2 38.28
21 23.23

Oct 23 −.168 −.17

09 39.8
42.8
45.8
51.8
54.8
57.8
0.7
3.7
9.7
12.7
15.6
335.2
635.2
57.745

9 57.72
9 38.71
+19.01

−18.89 +.01
−.18 −.18
−0.77
−19.843
57.72 37.88
37.89
A.K

Nov 1 −.047 −.04

9 42.7 No Dellas
45.8
48.7
54.8
57.6
10 0.6
3.7
6.6
12.6
15.6
18.5
307.2
4.2
0.655

10 0.63
9 38.45
+22.18

−22.12 +.01
−.04 −.05
−0.51
−22.67
10 0.63 37.97
37.97
A.K

Nov 2 +.023 +.02

9 23.2
26.1
29.1
35.7
38.1
41.1 Rej
44.0
47.0 wrong
53.0
56.0
58.0
451.7
41.064

9 41.04
9 38.42
+2.62

−22.10 +.00
+ .02 +.02
−0.48
−22.56
9 41.04 18.48
A.K

1872 1873

24 V.ub. Pec.

h	m	s	
20	11	20	
20	11	21	
+	24°	16′	″
+	24	16	52
	z = +18	5	56
	+.31		

tang δ = +.45
x = -.17
Corr = -.05 - .08 ″
α 1872 = 18.489 δ = 16 41.64 dα = +2.567
dδ = +10.851
α 1873 = 21.057 δ = 16 52.49

1872

	m	s	
Sept 17	11	20.30	
22		20.22	8
27		20.13	9
Oct 2		20.04	9
7		19.96	8

1873

	m	s	
Aug 28	11	23.23	
Sept 2		.18	5
7		.13	5
Oct 7	11	22.66	10
12		.56	10
17		.46	10
22		.37	9
27		22.28	9

Sept 28 1872 -.13
11
7.0 11 20.8
8.2 21.8
9.5 22.9
10.7
11.8
12.8
14.0
15.1
16.3
10 54
11.711 11 21.83
11 11.69
11 20.11
- 8.42
- 8.37
+ 8.42 +.01
- .06 -.06
- 1.62 +0.95
+ 67.45
11 11.69 18.43
11 18.434 11 20.07
10 +0.91
3 35.0
27.7
6.27
13 31.35
- 10.12
1.00518n
1.05797n
- 11.43
13 31.35
13 19.92
+24 9 28.43
+18 5 37 1.27440
- 123
1.27317
x - 18.76
- .02
+ .24
- 18.54
+24 9 9.89 9 9.54
16 56.7
+7 46.8 -.35 46.4
-.08 +7 46.0 45.6
- 4.25
- 15.10
+7 45.34 - 15.10
+7 30.24 +7 45.04
+24 16 40.13 - 28
+7 29.66
16 39.20
50.05

Oct 2 -.041 -.05
10
58.3 10 48.7
0.6 50.0
2.8 50.9
7.3
9.6
11.9
14.2
16.4
20.8
23.1
25.5
190.5
130.5
11.864 10 49.87
11 11.85
11 20.04
- 8.19
- 8.14
+ 8.20 +.00
- .02 -.02
- 1.55 +1.02
+ 6.63
11.85 18.48
18.48 21.05
10 +0.99
2 57.0
49.1
10.61
12 53.05
+ 21.99
1.34223
1.39502
+ 24.83
12 53.05
13 17.88
9 30.47
+122
1.27562
x - 18.86
- .10
+ .20
- 18.76
9 11.71 11.42
16 57.0
+7 45.3 -.21 45.0
+7 44.5 44.2
- 4.55
- 15.40
+7 45.69 - 15.40
+7 30.29 +7 45.53
16 42.00 - 30
+7 29.83
16 41.25
52.10

Sept 1 1873 -.443 -.44
10 38.8
11 41.0 10 24.9
43.3 11 26.2
47.8 27.5
50.1
52.3
54.7
56.9
1.4
3.6
5.8
395.7
575.7
52.336 11 26.20
11 52.32
11 23.19
+ 29.13
+ 29.18
- 28.95 -.01
- .20 -.20
- 2.13
- 31.289
52.32 21.04
21.03
0 +1.96
4 45.2
58.9
10.41
4 52.05
+ 26.14
1.41731
1.49279n
- 31.10
4 52.05
4 20.95
18 27.40
+18 5 29 1.27430
- 1245
1.26185
x - 18.27
- .14
+ .29
- 18.12
18 9.28 18 8.89
17 3.1
- 1 6.2 -.39 6.6
- 1 7.0 7.4
- 10.60
- 1 7.81 - 10.60
- 1 18.41 - 1 8.17
16 50.87 - 60
- 1 19.37
16 49.52

Ch. f.
Sept 2
0
4 40.7
53.1
9.38
4 46.90

Oct 5 -.207 -.20
11 19.1
21.4 11 13.7
23.7 14.8
28.2 15.6
30.4
32.7
35.0
37.3
41.8
44.0
46.2
359.8
32.709 11 14.70
11 32.69
11 22.70
+ 9.99
+ 10.04
- 9.93 +.00
- .09 -.09
- 1.64
- 11.66
32.69 21.03
21.03
0 +2.24
4 34.3
43.2
7.45
4 37.25
+ 18.01
1.25551
1.33099n
- 21.43
4 37.25
4 15.82
18 32.53
- 1209
1.26221
x - 18.29
- .07
+ .28
- 18.08
18 14.45 18 11.08
17 6.9
- 1 7.5 -.37 7.9
- 1 8.3 8.7
- 14.40
- 1 8.55 - 14.40
- 1 22.95 - 1 8.73
16 51.50 - 69
- 1 23.82
16 50.26

Oct 13 -.178 -.18
11 23.4 So deltas
25.6
27.9
32.3
34.5
36.9
39.3
41.5
46.1
48.3
50.6
406.4
36.945
11 36.93
11 22.54
+ 14.39
+ 14.44
- 14.42 +.00
- .08 -.08
- 1.48
- 15.98
36.93 20.95
20.95
0
4 13.8
20.0
3.38
4 16.90

Sin δ 9.61411
Cos δ 9.95977 9.95977
.11571n .09302
.07548n .05279n

1872

Sept. 17	24	16	55.9	
22			56.2	+.3
27			56.6	.4
Oct 2			57.0	.4
7			57.4	.4

1873

	'	"	
Aug. 28	16	62.4	
Sept. 2		63.2	+ .8
7		64.0	.8
12		64.7	.7
17		65.3	.6
Oct. 7		66.9	
12		67.0	+.1
17		67.0	.0
22		67.0	.0
27		67.0	.0

Nov 1 − .047 −.04		Nov 2 + .023 +.02	
11 30.8	Ao Dellui	11 30.8	Ao Dellui
32.9		33.0	
35.3		35.2	
37.6		37.6	
42.0		41.9	
44.5		44.2	
46.6		46.4	
48.8		48.8	
53.2		53.3	
55.7		55.5	
57.9		57.9	
487.3		486.6	
44.300		44.236	
11 44.28		11 44.22	
11 22.19		11 22.17	
+22.09		+22.05	
+22.14		+22.10	
−22.12 +.01		−22.10 +.00	
− .02	−.02	+ .01	+.01
−1.13		−1.11	
−23.26		23.20	
44.28	21.01	44.22	21.02
21.02		21.02	
A.K		A.K	

1872

1873

X = $\frac{\pi}{K}$ Cephei

h	m	s	"
20	13	09	
20	13	07	
+	77°	19′	
+	77	19	40
	z = −34	56	52
	−.57		

tang δ = +445

x = −070 ~~+06~~

corr = +.13 +.06

α 1872 = 9.228 δ = 19 28.70 dα = −1.897

dδ = +11.01

α 1873 = 7.331 δ = 19 39.71

		m	s	
Sept.	27	13	10.39	
Oct.	2		9.90	.49
	7		9.39	.51
	12		8.86	.53

		m		
Aug	28	13	10.47	
Sept.	2		10.12	.35
	7		9.75	.37
Oct	7		6.98	
	12		6.45	53
	17		5.92	53
	22		5.38	54
	27		4.84	54
Nov.	1		4.30	54
	6		3.77	53

Ch. f

1872 Sept 28 −.1337 −.13

12 22.0
12 5.9 1.34
10.6 22
15.8 73
20.3 54
25.0 55

Ref.

776
~~+5.520~~ 11.470 12 22.00
12 15.45 1.40
13 10.27
+ 8.42
− .58 −.60
− 1.04
+ 6.80
12 ~~15.45~~ 1.40 (22.25)
0
4 53.6
20.8
744
4 37.20

Oct 2 −.041 −.05

12
43.3 12 20.4
47.8 24.4
52.8 30.0
57.4
2.2
6.5
11.5
16.0
20.9
2584
184
2,044 12 24.93
13 1.97
13 9.87
− 7.90
− 8.03
+ 8.20 +.00
− .22 −.18
− 0.64 −2.34
+7.38
13 1.97 9.31
13 9.35 13 7.45
10 +0.99
1 23.8
9.0
328
11 16.40
+ 37.11
1.56949
1.00351
+10.08
11 16.40
11 26.48
+77 11 21.87
−34 56 21
+122
1.60532 n
+ 40.30
− .17
+ .09
+ 40.38
+77 12 2.75 12 2.12
19 4.86
+7 4.64 −.13 4.63
+.06 +7 4.70 4.69
− 8.89
− 19.90
+7 45.69 − 19.90
+7 25.79 +7 45.53
+77 19 28.04 + .56
+7 26.19
19 28.31
19 39.32

Oct 12 +.032 +.06

11
54.9 11 33.9
0.5 34.7
5.4
10.0
14.5
19.0
24.1
28.7
33.4

Ref.

1905
1305
14,500 11 34.30
12 14.43
13 8.80
+ 7.27 −.01
− 27 +.14
+ 0.40
14.43
14.43
3
0
4 ~~22.3~~
4.9
282
4 14.10
+ 40.20
1.60423
1.03825
+10.92
4 14.10
4 35.02
18 23.33
60.41 n
1.62030 n
+10.23
1.61433 n
+ 41.15
− .20
+ .13
+ 41.22
19 ~~4.55~~
19 4.99
4.54
~~4.55~~ ~~4.41~~
− 21.20
+7 47.83 − 21.20
+7 26.63 +7 47.64
31.18 +

1873 Sept 1 −.443 −.44

12
13 22.0 11 44.3
27.2 12 49.8
31.8 52.2
36.7
41.4
45.8
50.7
55.3
0.0
3109
3709
41211 12 48.77
13 41.14
13 10.17
+30.97
+30.84
−28.95 −.01
−1.96 −.197
−2.84
−33.757
41.14 7.39
7.37
0 +1.46
2 36.0
49.8
858
2 42.90
+ 52.44
1.71966
1.17637 n
− 15.01
2 42.90
2 27.89
20 20.46
−34 56 24
−12.45
1.59165 n
+ 39.05
− .32
+ .16
+ 38.89
20 59.35 20 59.13
19 51.2
−1 8.1 −.22 8.3
−1 7.5 7.7
− 11.50
−1 7.81 − 11.50
−1 19.31 −1 8.17
19 40.04 + 1.11
−1 18.56
19 40.57

Sept 2

A.K

Oct 5 −.207 −.20

13 43.9
13 13.4 17.5
18.3 18.3
22.9 18.4
27.7 18.3
32.4 18.3
37.0 18.2
18.233 13 43.90
13 18.16
13 7.16
+11.00
+10.87
− 9.93 +.00
− .89 −.92
+0.17
−10.658
18.16 7.51
7.48
0 +2.24
2 7.2
18.1
253
2 12.65
− 25.67
1.40943 n
0.86614
+ 7.35
2 12.65
2 20.00
20 28.35
−12.09
1.59201 n
+ 39.08
− .08
+ .13
+ 39.13
21 7.48 21 7.30
19 58.7
−1 8.8 −.18 9.0
−1 8.2 8.4
− 19.00
−1 8.55 − 19.00
−1 27.55 −1 8.73
19 39.93 + 1.27
−1 26.46
19 40.84

Red. 1876
1407
9.38
4.69
0.12

Sin δ 9.98930
Cos δ 9.34100 9.34100
.11571n .09302
9.45671n 9.43402n

1872				
Sept 27	77°	19′	47.8″	
Oct. 2			48.6	+.8
7			49.3	.7
12			49.9	.6
17			50.4	.5

1873.			
Aug. 28	19′	50.0″	
Sept. 2		51.4	+1.4
7		52.8	1.4
Oct. 7		58.9	
12		59.5	+.6
17		60.0	.5
22		60.3	.3
27		60.6	.3
Nov. 1		60.6	.0
6		60.6	.0

Oct 21 −.199 −.20			Oct 23 −.168 −.17	Nov 1 −.047 −.04		Nov 2 +.023 +.02
13		13 45.5	13	13	No Dellas	13
—		47.2	6.3	7.9		7.7
—		52.2	10.9	12.6		12.3
14.7	24.1		15.5	17.6		16.8
19.6	24.1		20.2	22.5		21.6
24.2	24.2		24.8	26.6		26.1
28.9	24.4		29.8	31.4		31.2
33.7	24.3		34.2	36.0		35.7
38.7	24.6		39.0	40.6		40.4
43.3	24.5		43.8	45.4		45.3
			224.5	240.6		237.1
24.814	13 48 30		24.944	26.733		26.344

13	24.24		13	24.87		13	26.66		13	26.27	
13	5.47		13	5.25		13	4.27		13	4.16	
	+18.77			+19.62			+22.39			+22.11	
	+18.64			+19.49			+22.26			+21.98	
	−17.72 +.01			−18.90 +.01			−22.12 +.01			−22.10 +.00	
	− .89	−.89		− .76	−.75		− .18	−.21		+ .09	+.10
	+1.86			+2.08			+3.06			+3.17	
	−16.54			−~~17.58~~ 56			−~~19.04~~ 19.246			−18.83	
	24.24	7.49		24.87	7.29		26.66			26.27	7.43
	7.50			7.31			7.49			7.44	
				A.K			A.K			A.K	

0 +2.40
1 0.7
4.5
′ 5.2
1′ 2.60″

— 23.99
1.38003n
0.83674
+6.87
1 2.60
1 9.47

21 38.88

−34 56 30
−2.24
1.60186n

+ 39.98
— .07
— .02

+ 39.89
22 18.77 22 18.69
20 0.3
−2 18.5 −.08 18.6
−2 17.9 18.0

−20.60
−2 19.33 − 20.68
−2 39.93 −2 19.65
19 38.84 + 1.37
−2 38.88
19 39.81

γ Cygni

h	m	s	
20	17	40	
20	17	40	
+	39°	51′	
+	39	51	04
z = + 2		31	44
+.04			

tan φ = +.89
x = −.020
cos x = ~~−.03~~
α 1872 = 38.086 δ = 50° 53′ 06″
α 1873 = 40.240 δ = 51 4.41

1872			
Sept 17	17m	39.86s	
22		39.75	.11
27		39.64	.11
2		39.53	.11
7		39.42	.11
12		39.30	.12
17		39.18	.12
22		39.06	.12
27		38.94	.12
Nov 1		38.82	12
6		38.71	11

1873			
Aug 28	17m	42.39s	
Sept 2		.32	7
7		.25	7
Oct 7		41.64	
12		41.52	8
17		41.40	8
22		41.28	8
27		41.16	8

dα = +2.153
dδ = +11.35

Sept 28 1872 −.13
17
25.9
27.2
28.7
30.0
31.3
32.6
34.0
35.3
36.7
281.7
31.300 17 52.27
17 50.9
52.1
53.8
17 53.0 16 58.9
55.7 1.7
58.4 4.4
0.1 7.0
3.9 9.8
17 31.28
17 39.61
−8.33
~~−8.30~~
+ 8.42 +.01
− .11 −.11
−1.52 + 0.63
+ 6.79 80
17 31.28 38.07
17 38.08 17 40.23
35 +0.91
4 45.9
37.2
8.31
39 41.55
− 20.97
1.32160m
1.29983m
− 19.94
39 41.55
39 21.61
+39 43 26.74
+ 2 31 39 0.40500
− 108
0.40392
* − 25.35
− .72
+ .33
− 25.14 −2.32
+39 43 1.60 24.42 23.95
51 11.1
+7 46.7 −.47 46.2
− 6.65
− 18.00
+7 45.34
+7 27.34 — 18.00
+39 50 51.76 +7 45.04
.04
+7 27.00
50 50.95
51 2.30

Oct 2 −.041 −.05
16 41.7
42.7
44.0
18 15.8
16.8
18.2
16 42.80
18 16.93
−.03
35
3 36.9
29.1
660
38 33.00
40
0 7.1
4 57.2
1243
40 2.15

Oct 12 +.032 +.06
17
16.0 17 0.5
18.6 2.0
21.4 3.7
26.7
29.4
32.0
34.8
37.6
42.8
45.7
48.2
353.2
32.189 17 2.07
17 32.09
17 39.29
− 7.20
~~− 7.17~~
+ 7.27 −.01
+ .05 +.03
− 1.20 +0.95
+ 6.12 .09
32.09 38.21
38.18 40.33
35 +1.19
3 59.1
45.9
1050
38 52.50
+ 30.04
1.47770
1.45593
+ 28.57
38 52.50
38 21.07
9
43 27.28
+1035
0.41535
* − 26.02
− .24
+ .12
− 26.14 −2.72
43 1.14 24.56 24.17
51 12.3
+7 47.7 −.39 47.3
− 7.85
− 19.20
+7 47.83
+7 28.63 — 19.20
50 53.19 +7 47.64
.05
+7 28.39
50 52.56
3.91

Nov 4 +.072 +.07
17
6.2 17 4.4
8.9
11.7
17.2
19.7
22.4
24.9
27.6
33.0
35.7
38.3
245.6
22.327 17 4.40
17 22.31
17 38.75
− 16.44
~~− 16.41~~
+ 16.30 +.01
+ .06 +.06
− 0.66 +1.49
+ 15.70
22.31 38.01
38.02 40.17
35 +1.73
1 46.8
31.0
778
36 38.90
+ 17.93
1.25358
1.25450
+ 17.97
36 38.90
36 56.87
45 51.48
+ 2 32 9 0.40650
+ 20.64
0.42714
* − 26.74
− .09
+ .05
− 26.78 −2.71
45 24.70 48.77
51 12.2
− 19.10
+4 52.43
4 33.33

Sept 1 1873 −.44
16 55.6
17 58.3 16 53.0
1.0 17 54.4
6.3 56.0
9.0
11.7
14.5
17.0
22.4
25.0
27.7
248.5
128.5
11.682 17 54.80
18 11.66
17 42.33
+ 29.33
~~+ 29.36~~
− 28.95 −.01
− .37 −.37
− 2.09
− 31.42
11.66 40.25
40.24
30 +1.96
0 32.2
46.0
782
30 39.10
+ 16.88
1.22737
1.22829m
− 16.91
30 39.10
30 22.19
52 26.16
+2 31 30
− 12.25
0.39425
* − 24.79
− .08
+ .04
− 24.83 −2.52
52 1.33 23.64 23.58
51 16.5
−1 7.1 −.06 7.2
− 12.10
−1 4.81
−1 19.91 — 12.10
51 3.73 −1 8.19
.08
−1 20.35
51 3.23

Oct 5 −.207 −.20
17 27.2
35.7 17 27.6
38.4 29.2
41.7 30.5
46.6
49.1
51.7
54.5
57.2
2.6
5.1
7.8
389.8
569.8
51.800 17 29.10
17 51.78
17 41.67
+ 10.11
~~+ 10.14~~
− 9.93 +.00
− .17 −.17
− 1.43
− 11.53
51.78 40.25
40.25
30 +2.24
0 32.5
43.1
756
30 37.80
+ 22.70
1.35603
1.35695m
− 22.75
30 37.80
30 15.05
52 33.20
− 11.89
0.39461
* − 24.81
− .14
+ .04
− 24.91 −2.58
52 8.39 30.72 30.67
51 22.0
−1 8.7 −.05 8.8
− 17.60
−1 8.55
−1 26.15 — 17.60
51 4.57 −1 8.73
.09
−1 26.42
51 4.25

Sin δ 9.80671
Cos δ 9.88521 9.88521
.11571n .09302
.00092n 9.97823n

1872				
Sept 17	39°	50′	69.7″	
22			70.4	+.7
27			71.0	.6
Oct. 2			71.5	.5
7			72.0	.5
12			72.3	.3
17			72.5	.2
22			72.6	.1
27			72.7	.1
Nov. 1			72.4	−3
6			72.1	3
11			71.8	3
16			71.5	3

1873			
Aug 28	50′	75.5″	
Sept. 2		76.7	+1.2
7		77.8	1.1
12		78.8	1.0
17		79.6	.8
Oct. 7		82.1	
12		82.2	+.1
17		82.4	.2
22		82.6	.2
27		82.8	.2

Oct 21 −.20 −.199		Oct 23 −.17 −.168	Nov 1 −.04 −.047	Nov 2 +.02 +.023
17 43.0	18 5.7	17 44.2	17 47.0	17 47.0
45.8	7.0	46.9	49.8	49.8
48.5	8.1	49.5	52.5	52.4
53.9		55.0	57.7	57.7
56.5		57.5	18 0.5	18 0.4
59.2		0.2	8.1	3.2
18 1.8		2.9	5.9	5.8
4.7		5.6	8.6	8.5
10.0		10.9	13.9	13.8
12.6		13.6	16.4	16.6
15.3		16.4	19.3	19.1
351.3		302.7	274.7	244.3
651.3		2.7	34.7	34.3
59.209	18 6.93	0.245	3.155	3.118

17 59.19	18 0.23	18 3.14	18 3.10
17 41.29	17 41.26	17 41.08	17 41.06
+17.90	+18.97	+22.06	+22.04
+17.93	~~+18.00~~	+22.09	+22.07
−17.73 +.01	−18.90 +.01	−22.12 +.01	−22.10 +.00
− .17 −.17	− .14 −.14	− .03 +.04	+ .02 +.02
−1.05	−1.02	−0.84	−0.82
−18.954	−20.065	−22.971	−22.90
17 59.19 40.24	18 0.23 40.17	3.14 40.15	3.10 40.20
40.25	40.18	40.15	40.20
	A.R	A.R	A.R

25 +2.40
3 53.4
58.2
111.6
28 55.80

− 7.72
0.88762n
0.88854n
+ 7.74
28 55.80
29 3.54

53 44.81

+2 31 24
− 2.41
0.40409

× − 2.536
− .02
− .08

− ~~2.546~~ 2.62
53 19.35 42.19 41.88
51 22.6
−2 19.6 −.31 19.9

−18.20
−2 19.33
−2 37.53 — 18.20
51 4.66 −2 19.65
— .10
−2 37.95
51 3.93

1872phae.proj.1462.

Gr 1431 (6) = 26

Tang δ = -7.787 Sin δ 9.99645

K = +.120 Cos δ 9.10501n 9.10501n

.11571n .09302n

9.22072 9.19803n

α1872 = 23^m 0.832^s

α1873 = 23 12.047

h	m	s	
20	23	19	
~~21~~ 7 8	23	1.4	
	97°	18'	''
+	82	40	55
z = - ~~40~~	~~18~~	~~7~~	
+ 97	19	5	
δ = - 54	56	17	

-0.82

Ch. f.

Sept 28 1872 -.13	Oct 2 1872 -.05 -.041	Oct 12 +.06 +.032	Nov 4 +.07 +.072	Sept 1 1873 -.44 -.443	Sept 2
22	22	22	22	22	
21.0 20 56.8	21.8 20 42.6	24.7 21 55.5	20.8 21 5[illegible]	23 5.1 ~~22~~ 43.3	
29.0 23	30.1 50.0	34.4 7.6	28.4 58.1	(12.5) 74 47.2	
36.3 9.0	37.4 57.9	42.3 19.0	38.2 9.8	19.8 20 50.3	
45.0	46.0	49.7	44.9	28.4	
52.4	54.4	58.0	52.8	35.9	
59.9	2.4	6.6	0.6	44.5	
8.4	11.8	13.9	10.2	52.3	
17.0	19.0	22.1	18.7	0.3	
24.8	23 27.2	30.6	26.1	8.8	
293.8	250.1	282.3	241.7	327.6	
473.8	490.1	522.3	481.7		
52.644 21 2.70	54.455 20 50.17	58.033 22 7.37	53.522 22 1.53	23 36.400 20 46.93	
22 52.76	22 54.57	22 58.15	22 53.64	23 36.52	
+8.43	+8.20	+7.26	+16.33	-28.97	
+1.07	+.32	-.25	-.56	+3.45	
-1.43	-2.18	-4.12	-8.86	+1.~~39~~ 45	
23. 0.83	23 0.91	23 1.04	23 0.55	23 12.~~39~~45	
+0.91	+0.99	+1.19	+1.73	+1.96	
10	10	10	10	0	0
3 15.2	3 15.0	3 7.8	0 58.0	3 14.9	3 38.0
1.5	59.2	48.0	+35.8	30.0	51.9
16.7	134.2	115.8	93.8	44.9	89.9
13 8.35	13 7.10	12 57.90	140 46.90 ?	3 22.45	3 44.95
+109.94	+124.28	+50.66	+51.99	+169.47	
2.04117	2.09443	1.70467	1.71592	2.22913	
1.23920n	1.29246n	0.90270n	0.93664	1.49985	
+17.35	+19.61	+7.99	+8.64	+28.17	
13 8.35	13 7.10	12 57.90	140 46.90	3 22.45	
~~12 57.00~~ 13 25.70	~~13 47.49~~ 13 26.71	~~12 49.41~~ 13 5.89	140 55.54	3 50.62	
+97 9 57.35 9 22.65	9 0.86 9 21.64	~~9 58.44~~ 9 42.46	10' 52.81	18 57.73	
-54 54 52 1.91270n			-54 52 53	-54 55 2	
-94	+165	+1046	+2073	-1205	
1.91176n	1.91835n	1.92316n	1.93343n	1.90065n	
+ .01	+ .00	+ .00	+ .00	+ .01	
+1 21.61	+1 22.10	+1 23.78	+1 23.79	+1 19.55	
+ .83	+ 1.06	+ .18	+ .19	+ 1.98	
+ .22 -.31	+ .22 -.31	+ .09 -.29	+ .05 -.18	+ .20 -.27	
+1 22.67	+1 23.38	+1 24.05	+1 26.03	+1 21.74	
+97 11 20.02 10 45.32 10 45.01	11 ~~24.24~~ 45.02 44.71	11 22.49 11 6.51 6.22	12 18.84 18.66	20 19.47 20 19.20	
+ - 16.75	+ - 17.52	+ - 19.13	+ - 21.00	+ - 8.86	
+7 45.34	+7 45.69	+7 47.83	+4 52.43	-1 7.81	
+8 2.09 7 28.59	+8 3.21	+8 6.96	+5 13.43	-0 58.95	
+97 19 22.11 18 13.91 Gr.	19 27.45 Gr.	19 29.45 Gr.	16 32.27 Gr.	19 20.52	
50.4	52.4	51.2	50.3	19 2.82	
- 16.75	- 17.52	- 19.13	- 21.00	- 8.86	
+7 45.04	+7 45.53	+7 47.64	+4 52.46	-1 8.17	
+ .74	+ .81	+ .97	+ 1.41	+ 1.60	
+7 29.03	+7 28.82	+7 27.48	+4 32.87	-1 15.43	
				19 3.77	

	h	m	s
α	20	2	11
		2.3	
	°	'	''
δ	+82	40	57
		40	47

Oct 5 −.207
−.20

22
52.0 22 13.2?
59.9
7.7
15.7
23.7
32.0
39.8
48.2
56.7

335.7
215.7
23.967 22 13.20

23 24.09
−9.93
+1.61
−4.22

23 11.55

+224
0
3 23.2
35.2
58.4
3 29.20

+70.77
1.84985
1.07057
+11.76
3 29.20
3 40.96

19 7.39

−1168
1.90102 a
+ .01
+1 19.62
+ 43
+ .21 −.28

+1 20.27
20 27.66 27.38
+ − 16.71
−1 8.55
−0 51.84
~~19 35.82~~
19 2.40

− 16.71
−1 8.73
+ 1.83
−1 23.61
19 3.77

Oct 15

A.R

Oct 21 −.199
−.20

23
3.1
10.9
19.5
27.8
35.8
43.7
50.8
59.7
24 7.8

23 5.7
9.7
13.7

259.1
319.1
35.455 23 9.70

23 35.57
−17.72
+1.55
−7.42

23 11.98

+240
0
~~3~~ 2 22.6
2 29.0
51.6
3 25.80
2 + 25.75
~~+ 25.85~~
1.41078
0.63150
+4.28
3² 25.80
3₂ 30.08

~~19~~ 20 18.27

−54 54 9
−259
~~1.91529~~ a
1.91011 m
+1 21.31 +.00
+ .05
− .07 −.28

+1 21.43
~~28~~ 20 40.70 39.70 39.42
+ − 18.94
−2 19.33
−2 ~~0.39~~
38.31
19 1.43

− 18.94
−2 19.65
+ 1.96
−2 36.63
18 2.79

Oct 23 −.168
−.17

2 3
6.3
13.0
20.9
29.4
37.1
45.4
52.9
1.1
9.8

215.9
335.9
37.322

23. 37.44
−18.89
+1.31
−7.83

23 12.03

A.R

Nov 1 −.047
−.04

23 No Deltas
12.7
19.8
26.8
34.6
43.0
50.8
58.0
24 7.4
16.2

270.3
390.3
43.366

23 43.49
−22.11
+.37
−9.71

23 12.04

A.R

Nov 2 +.023
+.02

23
12.7
20.6
27.9
36.2
44.2
51.8
24 0.5
8.4
16.5

218.8
398.8
44.311

23 44.43
−22.10
−.18
−9.92

23 12.23

A.R

1872

1873

Gr 1446

h	m	s	
20	25	25	
8	25	32	
+	105 °	56 ′	″
+	74	04	12
	z = −63	33	00
	105	55	48

sin z = −.89

Red. s

1	15.0
2	11.2
3	7.5
4	3.7
5	0.0

tang δ = −.350

x = +.055

cos x = −.10 +.06

α 1872 = 25.145 δ = 4′ 23.98″ = 55′ 36.02″

α 1873 = 31.987 δ = 4 11.98 − 55 38.02

dα = +6.842

dδ = −11.99

1872	m	s	
Sept. 27.8	25	26.35	
Oct 2		26.99	.44
7		27.25	.46
12		27.72	47

1873	m	s	
Aug 28	25	31.70	
Sept. 2		32.02	
7		32.37	
Oct 7		34.86	
12		35.33	47
17		35.82	49
22		36.32	50
27		36.82	50

Ch. f.

Sept 28 1872 −.13

25 31.0 6+4
328 1+4
37.5 +3
40.8
25 10.2
13.7
17.2
21.0
25.0
871
17.420 25 35.52
25 17.48
25 26.41
−8.93
−8.83
+ 8.42 +.01
+ .46 +.47 +5.57
− 1.27
+ 7.64
25 17.48 25.09
25 25.12 25 31.96
30
25 0 13.3
4 59.1
132.4
30 6.20
− 1810
1.25768n
0.78927
− 616
30 6.20
30 0.41
105° 52′ 48.81
−63 37 48 2.06297n
− 94
2.06203n
+ .02
+1 55.35
+ .05
+ .01
+1 55.43
105 54 43.74
55 31.2
+1 7.5
+1 8.1
− 1520
+7 45.34
+7 30.14 +
106 2 13.88

Oct 2 −.041 −.05

25
3.4 24 58.7
6.9 63.5
10.7
14.8
18.9
21.9
26.0
30.0
33.4
1660
18.444 25 1.10
25 18.50
25 26.76
− 8.26
− 8.16
+ 8.20 +.00
+ .18 +.14 +5.22
− 1.62
+ 6.762
18.50 25.26
25.22 32.06
35 +0.99
1 53.8
36.7
90.5
36 45.25
+ 1734
1.23905
0.77064n
− 590
36 45.25
36 39.35
48 9.00
−63 31 4
+ 165
2.06462n
+ .00
+1 56.04
+ .04
+ .13
+1 56.21
48 5.21 48 5.04
55 51.9
+7 46.7 −.17 46.5
+7 47.3
+7 46.1 45.9
− 3.91
− 15.40 − 15.90
45.04 +7 45.69 +7 45.53
+7 29.79 + .88
55 35.00 +7 30.51
55 35.55
55 47.54

Oct 12 +.032 +.06

25
5.0 24 52.2
8.9 54.2
12.6 59.2
16.3
20.1
24.0
28.0
31.4
35.1
1814
20.156 24 55.20
25 20.21
25 27.69
− 7.48
− 7.38
+ 7.27 −.01
− .21 − .11 − 4.29
− 2.55
+ 4.5460
20.21 24.740
24.881 31.65
35 +1.19
2 1.2
40.5
101.7
36 50.85
+ 2496
1.39724
0.92883n
− 849
36 50.85
36 42.36
46 5.99
+ 1046
2.07343n
+ .01
+1 58.12
+ .09
+ .05
+1 58.57
48 4.56 4.38
55 53.7
+7 49.1 −.18 48.9
+7 49.7
+7 48.5 48.3
− 5.71
− 17.70 − 17.70
+7 47.83 +7 47.64
+7 30.13 + 1.05
55 34.69 +7 30.99
55 35.34
47.36

Sept 1 1873 −.443 −.44

24
25 44.5 23 49.1
48.0 24 51.0
51.8 53.3
55.4
59.4
2.7
6.9
10.5
14.1
2933
5333
59.255 24 51.13
25 59.31
25 31.94
+27.37
+27.47
− 28.96 −.01
+ 1.54 + 1.55
+0.05
− 27.37
59.81 31.94
31.94
25 +1.96
2 5.3
21.5
26.8
27 13.40
+ 6812
1.83327
1.38755
+2441
27 13.40
27 37.81
55 10.54
−63 31 14 2.06087n
− 1205
2.04882n
+ .02
+1 51.90
+ .07
+ .13
+1 52.12
57 2.66 57 2.48
55 55.4
−1 7.3 −.18 7.5
−1 6.7
−1 7.9 8.1
− 17.40 − 7.40 − 7.40
−1 7.81 −1 8.17
−1 15.21 + 1.74
55 47.45 −1 13.83
55 48.65

Sept 2

25
2 12.8
28.0
41.8
27 20.90

Oct 5 −.207 −.20

25
26 5.3
43.9 43.9
47.4 43.7
51.2 43.7
55.0 43.8
58.7 43.7
43.760 26 5.30
25 43.82
25 34.64
+ 9.18
+ 9.28
− 9.93 +.00
+ .70 +.72
− 2.65
− 11.886
43.82 31.94
31.96
25 +2.24
2 30.5
45.8
76.3
27 38.15
− 2154
1.33325n
0.88753n
− 772
27 38.15
27 30.43
55 17.92
− 1168
2.04919n
+ .02
+1 51.99
+ .07
+ .15
+1 52.23
57 10.15 9.94
56 3.2
−1 7.0 −.21 7.2
−1 6.4
−1 7.6 7.8
− 25.20 −15.20 15.20
−1 8.55 −1 8.73
−1 23.75 + 1.99
55 46.40 −1 21.94
55 48.00

Sin δ 9.98299

Cos δ 9.43857n 9.48857
11571n .09302n
9.55428 9.53159n

1872		°	′	″	
Sept	27	74	4	8.9	
Oct	2			8.0	−.9
	7			7.1	.9
	12			6.3	.8
	17			5.6	.7

1873		′	″	
Aug.	28	3	65.6	
Sept	2		64.2	−1.4
	7		62.9	1.3
Oct.	7		56.4	
	12		55.6	−.8
	17		54.9	.7
	22		54.4	.5
	27		53.9	.5

Oct 15   Oct 21 −.20 −.199   Oct 23 −.17 −.168

25   25 11.4   25
38.3   15.4   39.8
41.7   19.5   43.0
45.6   47.0
49.5   50.8
53.0   54.7
56.6   58.4
26 0.2   1.8
3.9   5.7
8.1   9.6

296.9   310.8
476.9   490.8
52.989   25 15.43   54.533

25 53.04   25 54.59
25 36.20   25 36.40
+16.84   +18.19
+16.94   +18.29
−17.73 +.01   −18.40 +.01
+ .70   +.69   + .60   +.59
− 4.201   −4.41
−21.21   −22.71
53.04   31.80   54.59   31.88
31.80   31.88

A. R   25 ~~42.40~~   A. R
1 4.2
10.9
15.1
26 7.55

+ 37.56
1.57473
1.12901
+13.46
26 7.55
26 21.01

56 27.34

−63 31 18
−259
2.05828n
+ .01
+1 54.36
+ .20
− .02

+1 51.45
58 ~~21.79~~ 21.79 ~~+.09~~ 21.70
56 5.5
−2 16.3 −.09 16.4
~~−2 15.7~~
−2 16.1 17.0

− ~~27.50~~ 17.50 − 17.50
−2 19.33 −2 19.65
−2 36.83 + 2.13
55 44.96 −2 35.02
55 46.68

1873

ε Delphini   ~~Wrong~~ Star.

h	m	s	″
20	27	08	
20	27	09	
+	~~20~~	~~27?~~	
+	10	52	22
	z = +31	30	26
	+.52		

tang δ = +.19
x = −.016
corr α = ~~+.01~~
α 1872 = 5.825 δ = 52′ 10.39″
α 1873 8.690 δ = 52 22.37

	m	s	
Oct. 27	27	10.24	
Nov. 1		10.16	8
6		10.09	7
11		10.02	7
16		9.95	7

dα = +2.865
dδ = +11.97

Sin δ 9.27537
Cos δ 9.99214
.11571m
.10785m

Group #
Oct 3 1872   Ch. f.   Sept 2 1873

Oct 21 −.199 ~~+.689~~ +.20		Oct 23 −.168 −.17	Nov 1 −.047 −.04	Nov 2 +.023 +.02
27 15.5	27 20.4	27 16.7	27 19.8	27 19.7
17.6	21.1	18.8	21.9	21.8
19.8	21.7	20.9	24.0	23.9
23.8		25.0	28.2	28.0
26.0		27.2	30.2	30.1
28.1		29.2	32.3	32.2
30.2		31.3	34.4	34.3
32.3		33.4	36.5	36.5
36.4		37.6	40.7	40.6
38.6		39.8	42.9	42.7
40.7		41.9	45.0	44.9
309.0		321.8	355.9	354.7
28.091	27 21.07	29.255	32.355	32.245

27 28.08		27 29.24		27 32.34		27 32.23	
27 10.33		27 10.30		27 10.16		27 10.14	
+17.75		+18.94		+22.18		+22.09	
~~+17.74~~		~~+18.93~~		~~+22.17~~		~~+22.08~~	
−17.73 +.01		−18.90 +.01		−22.12 +.01		−22.10 +.00	
− .04	−.04	− .03	−.03	− .01	−.01	+ .00	+.00
−1.64		−1.61		−1.47		−1.45	
−194 +0		−20.543		−23.60 59		−23.55	
27 28.08		29.24		32.34		32.23	
27 8.67		8.70		8.74		8.68	
27 8.68		8.71		8.75		8.68	

+ 7.02
0.84634
0.95419m
0.1 − 4.00
27 8.67
26 59.67
° ′ ″
+ 10 55 48.68

+ 31 29 21   1.54730
− 259
1.54471

*− 3505
− .01

1873

		'	"	
Oct.	27	52	340	
Nov.	1		33.7	- .3
	6		33.4	.3
	11		33.1	.3
	16		32.8	.3

Gr 3241 = 2 7

Tang δ = +3.098

k = -.049

Sin δ 9.97845

Cos δ 9.48764 9.48764

.11571n .09302

9.60335n 9.58066

α1872 = 30 32.580

α1873 = 30 32.436

h m s
20 30 30
20 30 32
+ 72 06 ″
+ 72 06 05
z = -29 43 17
-.050

Ch. f. Ch. f.

Oct 3 1872 -.015

29 45.5
52.2 28 35.3
59.0 36.2
12.0
19.0
26.0 31 56.1
32.0 59.7
39.3 3.5
52.7
59.5
6.3
403.5
283.5
25.773 ~~28 35.75~~
31 59.77
30 25.72
+8.05
-.05
-1.12
30 32.60

+1.00
20 25
4 18.8 0 37.2
5.6 22.2
244 594
24 12.20 25 29.70
+ 50.02 -94.0
1.69914 1.97313
1.27980 1.55379
+19.05 +35.79
24 12.20 25 29.70
24 31.25 24 53.91
+72 58 17.10 57 54.44
-29 43 12 1.51670n
+112
1.51782n
+ 32.95
- ~~.40~~ 1.41
+ .13 -.05
+ ~~32.68~~ 31.62
+71 58 49.78 ~~27.12~~
- 20.44 26.06 ~~27.07~~
+7 46.39
+7 25.95
+72 6 ~~15.43~~ 53.07

- 20.44
h m s +7 46.10
20 30 34 +.50
° ′ +7 26.16
+72 6 5 ~~53.23~~ 51.22

Oct 12 +.032

+15
29 11.9
30 15.0 28 57.7
18.4 1.4
22.2 4.8
25.6
28.8
32.5
35.3
39.0
228.7
25.411 29 1.30
30 25.36
+7.25
+.10
-.049
30 31.22

+1.19
20
4 31.0
15.2
462
24 23.10
+84.11
+ 23.81
1.92485
1.50551
+32.03
24 23.10
24 55.13
57 53.22
+1058
1.52728n
33.67
+ ~~32.91~~
- 1.10
+ .13 -.44
+ 32.70
58 25.92
- 21.87
+7 47.83
+7 25.96
5 51.88

- 21.87
+7 47.64
+ .60
+7 26.37
5 51.85

Nov 4 +.072

30
1.3 29 44.5
4.6 45.7
8.3 47.3
11.6
14.7
18.4
21.3
24.6
28.0
132.8
14.756 29 45.83
30 14.71
+16.33
+ .22
+1.30
30 32.56

+1.73
20
2 23.3
2.8
261
22 13.05
+ 28.93
1.46135
1.06470n
-11.61
22 13.05
22 1.44
00 46.91
-29 42 47 1.51640n
+2082
1.53722n
+ 34.45
- .14
+ .07 -.22
+ 34.38
25.48 0′ 21.29 1 21.07
- 23.29
+4 52.43
+4 29.14
5 50.43

- 23.29
+4 52.46
+ 86
+4 29.03
5 50.10

Sept 1 1873

15
1 8.3
21.1
294
16 14.70

Sept 2

15
1 11.9
23.5
334
16 17.70

Oct 5 -.207

30
30.6 29 44.1
33.7 46.0
37.2 48.7
40.5
43.9
47.1
50.6
54.0
57.1
394.7
43.855 29 46.27
30 43.80
-9.93
-.64
-0.67
30 32.56

+2.24
15
1 5.0
15.4
204
16 10.20
+ 57.58
1.76027
1.36362n
-23.10
16 10.20
15 47.10
7 1.25
-29 43 5
-1148
1.50492n
+ 31.98
- .53
+ .07 -.10
+ 31.52
7 32.77 7 32.67
- 19.63
-1 8.55
-1 28.18
6 4.59

- 19.63
-1 8.73
+ 112
-1 27.24
6 5.43

5′ 51.″73
6 4.25

Oct 21 -.199		Oct 23 -.168	Nov 1 -.047	Nov 2 +.023
30	30 17.1	30	30	30 ~~12.8~~
36.7	21.4	37.7	40.1	~~19.8~~
(40.1)	25.1	41.0	43.6	~~26.2~~
44.0		44.5	46.8	39.5
47.1		47.8	49.9	46.4
50.6		51.1	53.5	53.0
53.6		54.7	56.8	57.9
57.2		58.1	31 0.0	6.4
31 0.4		1.2	3.4	—
4.0		4.8	6.8	—
				—
		34.09	30.09	
50.411		46.99	48.19	
50.411	30 21.20	51.211	53.433	53.040
30 50.36		30 51.16	30 53.38	30 52.99
−17.72		−18.89	−22.11	−22.10
−.61		−.52	−.14	+.07
+0.47		+0.62	+1.29	+1.37
30 32.~~47~~50		30 32.37	30 32.42	30 32.3~~4~~3
+2.40		A.R	A.R	A.R

10
4 47.7
50.2
97.9
14 48.95

+ 29.21
1.46553
1.06888n
− 11.72
14 48.95
~~14~~ 37.23

8 11.12

− 29 43.2
− 2.76
1.57364n

+ 32.63
− .13
− .10 −.38

+ 32.40
8 43.52 8 43.14
− 21.61
− 2 19.33
− 2 40.94
6 2.58

− 21.61
− 2 19.65
+ 1.20
− 2 40.06
6 3.08

Preliminary places
of 3241 ?.

1873 L.C.	Ma. 10	20 30	31.99
	Ma 17		31.99
1872 U.C.	Oct 3		32.64
	Nov 4		32.68
1873 ~~Oct~~	Oct 5		32.69
	21		32.55
	23		32.77
	Nov 1		32.50
	Nov 2		32.38

Rd. 1872 1873

73 Draco

h	m	s				
20	33	10				
2f	33	09				
f	74°	31′	″			
+	74	31	08			
z =	− 32	8	20			
	− .53					

s
1 154
2 11.6
3 7.7
4 3.9
5 8.0

δ = 30 ′ 55.21″
δ = 31 7.61

tan φ δ = +3.61
x = −.057
corr α = +.02 +0.9″
α 1872 = 10.124
α 1873 = 9.407
dα = −0.717
dδ = +12.40

1872		m	s	
Sept 27		33	11.72	
Oct.	2		11.33	.39
	7		10.94	.39
	12		10.53	.41
	17		10.12	.41
Nov.	6		8.40	
	11		7.97	.43
	16		7.55	.42

1873		m	s	
Sept 27		33	10.60	
Oct.	2		10.22	38
	7		9.83	39
	12		9.42	41
	17		9.00	42
	22		8.57	43
	27		8.15	42
Nov.	1		7.72	42
	6		7.29	43

Ch. f Ch. f

Oct. 3 1872 −.02 −.015 | Oct. 12 +.06 +.032 | Nov. 4 +.07 +.072 | Nov. 19 1872 +.21 +.208 | Sept. 1 1873 | Sept 2

32 | 32 | 32 | 32

47.8 32 34.6 | 47.4 31 6.8 | 36.6 31 55.8 | 33 50.0?
51.6 37.3 | 51.3 | 40.4 59.0 | 4.0
55.8 40.1 | 55.4 | 44.5 0.8 | 6.5
59.4 | 59.3 35 19.0 | 47.8 | 43.3 433 11.0
3.2 | 3.0 22.2 | 51.8 | 47.0 431
7.3 | 7.0 25.0 | 55.9 | 50.3 426
11.1 | 10.7 | 59.7 | 54.1 425
15.0 | 14.6 | 3.5 | 57.9 425
18.8 | 18.5 | 7.6

2700 | 2672 | 347.8
300 | 27.2 | 467.8
3.333 32 37.33 | 3.022 31 6.80 | 51.978 31 58.53 | 42.800 33 7.17
35 23.10

32 3.28 | 32 2.97 | 32 51.92 | 32 42.74
33 11.23 | 33 10.51 | 33 8.55 | 33 7.28
−7.95 | −7.54 | −16.63 | −24.54
−7.97 | −7.56 | −16.65 | −24.56

− .07 −.05 | + .22 +.12 | + .25 +.26 | + .76 +.75
−1.11 − 1.83 | −0.39 | +1.57 | +2.84
(+6.89) + 8.05 +.00 | + 7.26 +.01 | (+18.16) + 16.32 +.01 | (+27.60) + 24.02 .01
33 3.28 10.15 | (+6.98) 2.97 10.06 | 32 51.92 10.06 | 42.74 10.36
33 10.17 33 9.45 | ~~10.17~~ 9.95 9.23 | 10.08 9.36 | 10.34 9.62
55 +1.00 | 55 +1.19 | 55 +1.73 | 55 +2.02 | 50 | 50
4 53.7 | 4 25.0 0 49.5 | 2 29.7 | 2 0.6 | 1 9.4 | 1 10.9
40.0 | 8.2 32.2 | 8.4 | 38.2 | 22.5 | 21.9
93.7 | 33.2 81.7 | 38.1 | 98.8 | 31.9 | 32.8
59 46.85 | 59 16.60 0 40.85 | 57 19.05 | 56 49.40 | 51 15.95 | 51 16.40

+ 2600 | + 15622 | + 5345 | − 2437
1.41497 | 1.74989 1.06528 | 1.72795 | 1.38686n
0.93443 | 1.26935 | 1.27010n | 0.92901n
+ 860 | + 1859 +3844 | − 1862 | + 849
59 46.85 | 59 16.60 | 57 19.05 | 56 49.40
59 55.45 | 59 ~~35.19~~ 55.04 | 57 0.43 | 56 57.89
+74° 22′ 52.9″ 0 | 23 13.16 53.31 | 25 47.92 | 25 50.46

− 32 7 48 1.55810n | − 32 7 48
+ 112 | + 1058 | + 2082 | + 1520
1.55922n | 1.56868n | 1.57892n | 1.57330n

+ 36.24 | + 37.04 | + 37.92 | + 37.44
− .10 | − .46 | − .38 | − .18
+ .14 | + .13 | + .07 | + .05

+ 36.28 | + 36.71 | + 37.61 | + 37.41
+74 23 29.18 23 28.70 | 23 ~~49.87~~ 30.02 29.59 | 26 25.53 26 25.30 | 26 27.87 27.69
31 15.6 | 31 17.0 | 31 18.8 | 31 18.4
″ +7 46.4 −.48 45.9 | +7 47.0 −.43 46.6 | +4 53.3 −.23 53.1 | +4 50.5 −18 50.3
+0.9 +7 47.3 46.8 | +7 ~~28.0~~ 47.9 47.5 | +4 54.2 54.0 | +4 51.4 51.2
− 8.60 | − 9.40 | − 11.20 | − 10.80
− 20.40 | − 21.80 | − 23.60 | − 23.20
+7 46.39 20.40 | +7 47.83 21.80 | +4 52.43 23.60 | +4 49.13 23.20
+7 25.99 +7 46.10 | +7 26.03 +7 47.64 | +4 28.83 +4 52.46 | +4 25.93 +4 48.17
+74 30 55.17 + 53 | 30 56.05 + 63 | 30 54.91 + .91 | 30 53.80 + 1.07
+7 26.23 | +7 26.47 | +4 29.77 | +4 26.01
30 54.93 | 30 56.06 | 30 55.07 | 30 58.73
31 7.33 | 8.46 | 7.47 | 6.13

Sin δ 9.98395

Cos δ 9.42644 9.42644
.11571n .09302
9.54215n 9.51946n

1872						1873			
Sept. 27	74	30	74.4			Sept. 27	30′	85.6″	
Oct. 2			75.4	+1.0		Oct. 2		86.6	+1.0
7			76.3	.9		7		87.5	.9
12			77.0	.7		12		88.2	.7
17			77.6	.6		17		88.8	.6
						22		89.3	.5
						27		89.7	.4
Nov. 6			78.7			Nov. 1		89.9	.2
11			78.5	−.2		6		90.0	.1
16			78.4	.1					

Oct. 5 −.20 −.207		Oct. 15	Nov. 1 −.04 −.047	Nov. 2 +.02 +.023	Oct 23 −.17 −.168
33			33	33	33
5.1	32 35.8		14.6	14.2	12.5
9.1	37.1		18.8	18.3	16.8
13.0	39.6		22.6	21.9	20.6
16.9	41.7		26.4	25.7	24.4
20.9			30.3	29.7	28.3
24.9			34.0	33.5	32.0
28.4			37.9	37.4	35.8
32.0			41.6	41.3	40.0
36.0			45.5	45.0	43.8
1863			2717	2670	2542
20.700	32 38.55		30.189	29.667	28.244

33 20.64
33 9.97
+10.67
+10.65
+.07 9.93 −.72 −.75
−0.56
−11.21 ~~1.00~~ 11.24
33 20.64 9.43
9.40
50 +2.24
1 57.9
7.4
125.3
52 ~~57~~ 2.65

33 30.13
33 7.70
+22.43
+22.41
+.01 22.12 − .14
+1.71
−20.57 +.01
30.13 9.58
9.56
A.R.

A.R.

33 29.61
33 7.62
+21.99
+21.97
−.17 22.10 +.00 + .07
+1.79
~~−20.26~~ 4 ~~+.02~~ −20.23
29.61 9.387
9.388
A.R.

33 28.19
33 8.46
+19.73
+19.71
+.08 −18.90 +.01 − .61 −.61
+ 0.95
−18.56 5 ~~+.01~~
28.19 9.63
9.64

+ 42.15
1.62480
1.16695n
− 14.69
52 ~~57~~ 2.65
50 ~~56~~ 47.96

~~26~~ 30 0.39

− 32 7 4
− 1148
1.54662n

+ 35.21
− .25
+ .12

+ 35.08
26 30 35.47 31 35.27
31 27.2
+4 51.7 − 1 51.7 −.20 51.9
+4 52.6 − 1 50.8 50.0

− 19.60
− 1 8.55 − 19.60
− 1 28.15 − 1 8.73
31 7.32 + 1.18
− 1 27.15
30 8.12

a Cygni

1872

1873

20 37 08
20 37 06
+ 44° 49′ ″
+ 44 49 39
z = − 2 26 51

sin. z = −.04

Tang δ = +1.00
x = −.02 2
corr α = −.01
α 1872 = 4.100 δ = 49 25.87
α 1873 = 6.143 δ = 49 38.56

	m s	
Oct 7	37 5.52	
12	5.38	14
17	5.25	13
22	5.12	13
27	4.99	13
Nov 1	4.86	13
6	4.73	13

dα = +2.043
dδ = +12.69

	m s	
Oct 7	37 7.59	13
12	7.46	13
17	7.33	13
22	7.20	13
27	7.07	13
Nov 1	6.94	13
6	6.81	13

Ch. f.

Oct. 3 1872 +.015 −.02

36
39.9 36 1.2
43.0 2.5
46.0 4.6
51.8
54.8
57.7 37 47.5
0.6 49.1
3.3 50.5
9.2
12.1
15.0
3334
6334
57.582 36 2.77
36 57.56 37 49.03
37 5.63
− 8.07
~~− 8.06~~
+ 8.05 +.00
− .02 − .02
−1.53 + 0.52
+6.50
36 57.56 4.06
37 406 37 6.11
40 +100
0 8.2 1 40.5
58.0 30.2
126.2 70.7
40 3.10 41 35.35
+ 5481
1.73886
1.68262
+48.15
40 3.10
40 51.25
° ″
+44 41 57.10
−2 26 52 0.39130n
+103
0.39233n
″
+ 2.47
− .82
+ .00
+ 1.65
+44 41 58.75 41 58.75
49 45.7
+ 7 47.0 −.00 47.0
− 7.11
−19.80
+7 46.39
+7 26.59 − 19.80
+44 49 25.34 +7 46.10
−.05 + .04
+44 49 25.29 +7 26.34
49 25.09
49 37.78

Oct. 12 +.032 +.06

36
40.5 36 15.9
43.7 17.0
46.4 18.3
52.3
55.0
58.3 37 52.0
1.1 53.8
4.0 55.0
9.6
12.7
15.6
3392
6392
58.109 36 17.07
36 58.09 37 53.60
37 5.38
− 7.28
~~− 7.27~~
+ 7.26 −.01
+ .06 +.03
−1.27 + 0.78
+6.051
58.09 4.14
410 6.15
40 +119
0 22.6 1 47.1
10.0 35.1
326 822
40 16.30 41 41.10
+ 4104
1.61321
1.55697
+36.05
40 16.30
40 52.35
41 56.00
+1069
0.40199n
+ 2.52
− .47
+ .01
+ 2.06
41 58.06 58.03
49 46.3
+7 48.2 −.03 48.2
− 7.71
− 20.40
+7 47.83
+7 27.43 − 20.40
49 25.49 +7 47.64
−.05 + .05
49 25.44 +7 27.29
49 25.32
38.01

Nov. 4 +.072 +.07

36
42.4 37 0.3
43.9 1.6
45.3 2.7
46.9
48.5
49.9
51.4
52.8
54.5
435.6
48.400
37 1.60
36 48.38
37 4.77
−16.39
~~−16.38~~
+16.32 +.01
+ .07 +.07
− 0.67 + 1.38
+15.62 72.73
48.38 4.0010
404.11 6.16
35 +173
2 52.4
35.1
875
37 43.75
− 1320
1.12057n
1.08702
+12.22
37 43.75
37 55.97
44 52.38
−2 27 52 0.39430n
+2092
0.41522n
+ 2.60
− .05
+ .08
+ 2.63
44 55.01 44 54.74
49 47.0
+4 52.0 −.27 51.7
8.41
− 21.10
+4 52.43
+4 31.33 − 21.10
49 26.34 +4 52.46
−.05 + .07
49 26.29 +4 31.23
49 25.97
38.66

Nov. 27 +.281 +.28

35
3 27.8
8.5
363
38 18.15

Sept 2 1873

38
2 11.5
22.9
344
32 17.20

Oct. 5 −.207 −.20

37
0.4 36 50.0
3.4 51.3
6.3 52.8
12.0
14.9
17.7
20.7
23.7
29.5
32.4
35.3
7463
17.845 36 51.87
37 17.82
37 7.63
+10.01
~~+10.12~~
− 9.93 +.00
− .20 −.21
− 1.49
−11.623
17.82 6.02
6.19
30 +224
2 4.7
14.8
195
32 9.75
+ 2629
1.41979
1.38624m
− 2434
32 9.75
31 45.41
51 2.94
−2 27 7 0.39160n
−1128
0.38032n
+ 2.40
− .18
+ .13
+ 2.35
51 5.29 51 5.08
49 57.4
−1 7.9 −.21 8.1
− 18.80
−1 8.55
−1 27.35 − 18.80
49 37.94 −1 8.73
−.09 + .09
49 37.85 −1 27.54
49 37.54

Sin δ 9.84822
Cos δ 9.85074 9.85074
,11571n ,09302
9,96645n 9.94376n

1872				1873			α	1872.0 δ	α	1873.0 δ
Oct. 7	44° 49′ 46.0″		Oct. 7	49′ 57.5″		4.06	25.29	6.19	37.85
12	46.3	+.3	12	57.9	+4	.10	25.44	.13	37.42
17	46.6	.3	17	58.2	3	.11	26.29	.22	
22	46.9	.3	22	58.5	3			.18	
27	47.2	+.3	27	58.8	+3	4.090	25.67 +.10	6.180	+.18 37.63
Nov. 1	47.1	−1	Nov. 1	58.7	−1	.100	25.87	.143	38.56
6	46.9	2	6	58.5	2	−.010	~~+0.20~~	+.037	−0.93
11	46.7	2		58.3	2		25.77		37.81
16	46.5	2	16	58.2	1		.87		38.56
							−.10		−.75

Oct 15	Oct, 21 −.199 −.20	Nov. 1. −.047 −.04	Nov 2. +.023 +.02
37 7.6	37 16.0	37 11.7	37 11.6
10.8	16,6	14.6	14.5
13.7	17.7	17.6	17.5
19.0		23.3	23.1
22.0		26.3	26.2
25.0		29.2	
28.1		32.0	31.9
31.0		35.0	34.9
36.9		41.0	40.6
39.4		43.8	43.7
42.6		46.6	46.4
276.7		321.1	
251.55	~~37 16.43~~	29.191	29.040
	37 16.77		

37 25.13
37 ~~17.22~~
+17.91
~~+17.92~~
~~−17.73~~ +.011
− .20 −.20
− 1.08
−19.0×0
25.13 6.12
6.13

37 29.17
37 6.93
+22.24
~~+22.25~~
~~−22.12~~ +.01
− .04 −.05
−0.79
22.95
29.17 6.22
6.22
A.R

37 29.02
37 6.90
+22.12
+22.13
− ~~22.10~~ +.00
+ .02 +.02
− 0.76
−22.84
29.02 6.18
6.18
A.R.

A.R
30 ~~+2.40~~
0 39.9
43.9
′ 8.38
30 41.90″

+ 8.38
0.92324
0.88969n
− 7.76
30 41.90
30 34.14

52 14.21

− 2 27 5
− 2.93
~~0.38873n~~
0.38867n
+ 2.45
− .03
− .01

+ 2.43
52 16.64 52 16.57
49 58.4
− 2 18.2 −.07 18.3

−19.80
− 2 19.33
− 2 39.13 − 19.80
49 37.51 −2 19.65
−.09 + .10
49 37.42 −2 39.35
49 37.22

γ² Delphini

h m s
20 40 45
20 40 46
+ 15° 40′
+ 15 40 44″
Z = + 26 42 44
+ .45

tang δ = +.28
x = −.016
Corr =
α 1872 = 43.089
α 1873 = 45.869
δ 1872 = 39′ 57″.64
δ 1873 = 40 4.40

1872				1873			
Oct 7	40m	44.80s		Oct 7	40m	47.74s	
12		44.72	8	12		47.66	8
17		44.64	8	17		47.58	8
22		44.56	8	22		47.50	8
27		44.48	8	27		47.42	8
Nov. 1		44.40	8	Nov. 1		47.34	8
6		44.32	8	6			
11		44.24	8				
16		44.17	7				
21		44.09	8				

dα = +2.779
dδ = +12.75

Oct 3 1872 −.015 −.02

40 24.1
26.1 40 11.9
28.3 12.8
32.6 13.6
34.7
36.8
38.9
41.0
45.4
47.87
49.8
405.4
36.855 ~~40 12.80~~
40 12.77
40 36.84
40 44.86
− 8.02
+ 8.05 +.00
− .01 −.00
−1.77 +1.01
+6.28
40 36.84 43.11
40 43.12 45.90
45 +1.00
4 32.0
27.2
59.2
49 29.60
+ 2408
1.38166
1.45824
+28.72
49 29.60
49 58.32
+15° 32′ 50″.03
+26 42 15 1.46180
+94
1.46274
*− 29″.02
− .08
+ .13
− 28.97
+15 32 21.06 32 20.61
40 6.1
+7 48.0 −.45 44.6
− 1.75
− 14.50
+7 46.39
+7 31.89 − 14.50
+15 39 52.95 +7 46.10
45
∓7 31.15
39 51.76
40 4.51

Oct 12 +.032 +.06

40 24.8
26.9 40 15.9
29.0 16.9
33.3 17.9
35.4
37.6
39.8
42.0
46.1
48.4
50.4
413.7
37.609 40 16.90
40 37.59
40 44.72
−7.13
+ 7.26 −.01
+ .02 +.01
−1.63 +1.15
+5.653
37.59 43.24
43.22 46.00
45 +1.19
4 39.1
30.9
70.0
49 35.00
+20.71
+ 19.79
1.31618
1.39276
+ 24.70
49 35.00
49 59.70
32 48.65
+1081
1.47261
*− 29.89
− .06
+ .14
− 29.61
32 19.04 18.58
40 6.3
+7 47.3 −.46 46.8
− 1.95
− 14.70
+7 47.83
+7 33.13 − 14.70
39 52.17 +7 47.64
.53
∓7 32.41
39 50.99
3.74

Nov. 4 +.072 +.07

40 15.4
17.6 40 9.2
19.7 10.2
24.1 11.3
26.1
28.3
30.5
32.6
36.8
38.9
41.0
311.0
28.272 40 10.23
40 28.26
40 44.35
−16.09
+16.32 +.01
+ .02 +.02
−1.26 + 1.52
+15.089
28.26 ~~43.24~~ 43.34
~~43.25~~ 43.35 46.13
45 +1.73
2 33.2
19.1
52.3
47 26.15
+ 18.04
1.25624
1.35551m
−22.67
47 26.15
47 3.48
35 44.87
+26 42 15
+2101
1.48281
*− 30.40
− .04
+ .07
− 30.37
35 14.50 35 14.26
40 5.9
+4 51.4 −.24 51.2
−1.55
− 14.30
+4 52.43
+4 38.13 − 14.30
39 52.63 +4 52.46
.77
∓4 37.39
39 51.65
4.40

Nov 21 +.234 +.25

40 5.8
7.8 40 6.9
10.0
14.2
16.3
18.5
20.7
22.7
27.0
29.2
31.2
202.6
18.509 40 6.90
40 18.49
40 44.09
−25.60
+ 25.64 −.03
+ .07 +.07
−1.00 +1.78
+24.71 68
18.49 43.20
43.17 45.95
45 +2.07
2 25.6
8.8
34.4
47 17.20
+ 11.61
1.06483
1.16410m
− 14.59
47 17.20
47 2.61
35 45.74
+1135
1.47315
*− 29.73
− .02
− .05
− 29.80
35 15.94 15.71
40 4.9
+4 49.0 −.23 48.8
−0.55
− 13.30
+4 50.01
+4 36.71 − 13.30
39 52.65 +4 49.58
.93
∓4 35.35
39 51.06
3.81

Nov 27 +.28

45
2 30.5
14.7
45.2
47 22.60

Ch. f. Sept. 2 1873

40
1 18.9
28.2
47.1
41 23.55

Sin δ 9.43143
Cos δ 9.98356 9.98356
.11571m .09302
.09927m .07658

1872	°	'	"		1873	'	"	
Oct. 7	15	39	66.2		Oct 7	39	77.9	
12			66.3	+.1	12		77.9	+.0
17			66.3	.0	17		78.0	.1
22			66.3	.0	22		78.0	0
27			66.3	.0	27		78.1	.1
Nov. 1			66.1	−.2	Nov. 1		77.9	−.2
6			65.9	.2	6		77.6	.3
11			65.6	.3			77.4	.2
16			65.3	.3	16		77.1	.3
21			64.9	.4				
26			64.4	.5				
Dec. 1			63.8	.6				
6			63.1	.7				

Oct 5 −.20 −.207

40 40
44.3 45.0 40 35.4
46.4 47.1 40 36.8
46.5 49.3
52.7 53.5
54.9 55.8
57.0 57.9
59.1 0.0
1.3 2.1
5.5 6.3
7.7 8.5
9.9 10.7
3873 3962
6273 6371 40 35.40
57.027 57.918 40 36.80
40 57.01 57.90
40 47.77
+10.13

− 9.93 +.00
− .06 −.06
−1.90
−11.89
40 57.90 46.01
46.01
40 +22.4
1 16.3
23.9
40.2
41 20.10

+ 2163 + 21.12
1.33506 1.32469
1.43433m 1.42396m
− 27.18 − 2654
41 20.10 41 20.10
40 5292 40 5356

41 5543 41 54.79

+26 42 1 1.46170
− 1108
1.45062

* − 2822 −28.22
− 07 − .06
+ .08 + .08

− 2821 − 28.20 41 27.12
41 27.22 41 26.59 41 26.49
40 14.9
−1 9.3 −.10 9.4

− 13.50
−1 8.55
−1 22.05 −1 22.05 − 13.50
40 5.17 40 4.54 −1 8.73
1.00
−1 23.23
40 3.89 3.26

Oct 15

~~40 51.8 52.7~~
~~53.9 54.7~~
~~56.0 56.8~~
~~41 0.3 1.1~~
~~2.5 3.2~~
~~4.6 5.4~~
~~6.8 7.4~~
~~8.8 9.6~~
~~13.1 14.0~~
~~15.3 16.2~~
~~17.4 18.3~~

A.K

Oct 21 −.20 −.199

40 47.6 40 51.8 52.7
53.9 54.7
40 49.3 56.0 56.8
41 0.3 1.1
2.5 3.2
4.6 5.4
6.8 7.4
8.8 9.6
13.1 14.0
15.3 16.2
17.4 18.3
230.5 239.4
58.5 59.4
4.591 5.400
40 47.60
40 49.41^{30} 4.58 5.38
40 47.51
+17.87

−17.73 +.01
− .06 −.06
− 1.64
− 19.48
41 5.38 45.95
45.96
40 +12.40
a −0.2
1.1
0.9
40. 0.45

+ 1699 + 1610
1.23019 1.20683
1.32946m 1.30610m
− 21.35 − 20.23
40 0.45 40 0.45
39 39.10 39 40.27

43 9.25 43 8.13

+26 42 0
− 310
1.45860

* − 2875
− 04 − .03
.00 .00

− 2879 − 2878 42 40.46
42 4046 42 39.35 42 39.35
40 18.0
−2 22.5 −.00 22.5

− 1360
−2 1933
−2 3293 − 13.60
40 7.53 40 6.45 −2 19.65
1.07
−2 34.32
40 6.14 5.03

Nov. 1 −.04 −.047

40 47.6 40 55.9 56.7
58.1 59.0
41 0.2 1.0
40 49.3 4.5 5.3
6.7 7.5
8.9 9.8
11.0 11.8
13.0 13.8
17.3 18.1
19.4 20.2
21.5 22.5
2165 2257
965 1057
8.773 9.609
40 47.60
40 49.30
41 8.76 9.59
40 47.34
+22.25

− 22.12 +.01
− .01 −.01
− 1.47
− 23.60 .59
9.59 45.99
4600
A.K

Nov. 2 +.02 +.023

40 55.9 56.6
58.0 58.8
41 0.3 1.1
4.5 5.1
6.6 7.4
8.8 9.6
10.9 11.7
13.0 13.7
17.2 18.0
19.4 20.2
21.5 22.4
2161 2246
961 1046
8.736 9.509
41 8.72 9.49
40 47.32
+22.17

− 22.10 +.00
+ .01 +.01
− 1.40
− 23.54
9.49 45.95
45.95
A.K

1872 1873

6 Her. Cephei

20ʰ 42ᵐ 15ˢ
2ʰ 42 12
+ 57° 07′
+ 57 07 28″
z = − 14 44 40
− .25

tang δ = +1.55
x = −.028
corr = +.13 − .04″

α 1872 = 10.297 δ = 7 15.26″
α 1873 = 11.786 δ = 7 28.05

Oct. 27 42ᵐ 10.90ˢ
Nov. 1 10.71 19
6 10.52 19
11 10.34 18
16 10.16 18
.21″ 9.99 17

dα = +1.488
dδ = +12.79

Oct. 27 40ᵐ 47.43ˢ 12.32
Nov. 1 .38 9 12.15 17
6 .25 9 11.97 18
11 .08 9 11.78 19
16 47.91 9 11.59 19

1872

Nov. 4 +.872 +.87

41
(46.6) 42 4.0
48.5 5.1
50.5 6.2
52.2
54.3
56.1
58.0
59.9
1.9

488.0

54.222 42 5.10

41 54.19
42 10.58
− 16.39
− 16.52
+ 16.32 +.01
+ .11 +.11
− 0.28 +1.21
+ 16.156
41 54.19 10.34
42 10.35 42 11.84
20 +173
0 22.4
2.4
24.8
20 12.40

− 188
1.03663ₙ
0.88708
+ 7.71
20 12.40
20 20.11
+57° 2′ 28.24″

− 14 44.28 1.18040ₙ
+ 2101
1.20141ₙ

+ 15.90
− .03
+ .01

+ 15.88
+57 2 44.12 2 44.10
7 38.1
+4 54.0 −.02 54.0
−.04 +4 53.6 53.6
− 10.01
− 22.80
+4 52.43 − 22.80
+4 29.63 +4 52.46
+57 7 13.75 + 43
+4 30.09
7 14.19
7 26.98

Nov 16 +.134 +.13

41
40.1 42 4.7
42.2
44.4
46.0
48.2
49.8
51.7
53.7
56.0

432.4

48.044 42 4.70

41 48.02
42 10.15
− 22.13
− 22.26
+ 21.90 +.02
+ .20 +.21
+ 0.15 +1.64
+ 22.258
48.02 10.27
10.30 11.79
20 +196
0 15.0
53.7
17.07
20 5.35

− 1666
1.22167ₙ
1.07212
+ 11.80
20 5.35
20 17.15
2 31.20

+ 1554
1.19594ₙ

+ 15.70
− .07
+ .00

+ 15.63
2 46.83 46.82
7 37.8
4 51.0 −.01 51.0
+4 50.6 50.6
− 9.71
− 22.50
4 51.85 − 22.50
+4 29.35 +4 51.66
7 16.18 + 49
+4 29.65
7 16.47
29.26

Nov 21 +.234 +.25

41
41 31.2
33.2
34.8
36.2
38.5
40.5
42.4
44.6

Rej. Wrong #

202.2

40.440 41 33.07

41 40.41
42 9.98
− 29.57
− 29.70
+ 25.64 −.03
+ .39 +.36
+ 0.32 +1.81
+ 26.35
40.41
~~35~~
20 +207
0 36.6
13.5
50.1
20 25.05

+ 737
0.86747
0.71792ₙ
− 522
20 25.05
20 19.83
2 28.52

+ 1135
1.19175ₙ

+ 15.55
− .02
− .01

+ 15.52
2 44.04

Nov 27 +.281 +.28

20
0 13.8
4 51.8
12.56
20 2.80

1873

Oct 21 .199 −.20

42
24.9
26.8
28.9
30.7
32.6
34.6
36.2
38.3
(~~40.1~~)

30.633

42 30.65
42 12.46
+ 18.15
+ 18.02
− 17.73 +.01
− .31 −.31
− 0.67
− 18.710
30.61 30.65 13.90
11.91
10 +240
2 46.1
58.5
9.66
12 48.30

− 922
0.96473ₙ
0.81518
+ 6.53
12 48.30
12 54.83
9 53.52

− 14 44.45 1.18060
− 310
1.17750ₙ

+ 15.05
− .02
− .06

+ 14.97
10 8.49 10 8.27
7 49.4
− 2 19.1 −.22 19.3
− 2 19.5 19.7
− 21.40
− 2 19.33 − 21.40
− 2 40.73 ∓ 2 19.65
7 27.76 + .60
− 2 40.45
7 27.82

42 39.3
40.4

42 39.85

Nov. 1 −.047 −.04

42 11.7
15.6
19.5
26.8
30.7
34.6
38.4
42.0
49.6
53.4
57.0
379.4

34.491

42 34.46
42 12.14
+ 22.32
+ 22.19
− 22.12 +.01
− .06 −.07
− 0.35
− 22.53
34.46 11.93
11.93
A.R

Sin δ 9.92416
Cos δ 9.73474
.11571n
9.85045n

1872

		°	'	"	
Oct	27	57	7	38.1	
Nov.	1			38.1	−.0
	6			38.0	.1
	11			37.9	.1
	16			37.8	.1
	21			37.5	.3
	26			36.9	.6
	1			36.2	.7
Dec.	6			35.3	.9

1873

		'	"	
Oct	27	7	49.9	
Nov.	1		49.9	−.0
	6		49.8	.1
	11		49.8	.0
	16		49.7	.1

1873

Oct	7	7	48.0	
	12		48.6	+ .6
	17		49.1	.5
	22		49.5	.4
	27	7	49.9	.4

+.023
Nov. 2. +.02

42
26.5
28.6
30.5
32.2
34.1
36.1
38.1
40.0
42.2

3083

34.255

42 34.23
42 12.11
+22.12
+21.99
−22.10 +00
+ .03 +.03
− 0.32
− 22.39
34.23 11.84
11.84
A.K

Lal. ~~1378~~ 3606 = 28

20	47	16
+	63	30

η = −21 7

−0.36

Sin δ 9.95179

Cos δ 9.64953

Tang. δ = +.201 1.1571n 9.76524n

κ = −.016

α 1872 = 47ᵐ 2ˢ.310 33′ 53″.23

α 1873 = 47 3.505 34 6.67

Nov 4 1872 +.072	Nov 16 +.134	Nov 19 +.208	Nov 21 +.234	Oct 5 1873 −.207	Oct 21 −.199
46 37.0	46 °	46 (27.9)	46	47	47 47 7.7
(39.2 41.5) 46 58.0	31.4 46 25.6	(30.1) 46 53.0	26.3 45 53.6	5.6 46 26.7	12.7 9.6
43.4 59.3	32.3 27.7	32.3 54.2	28.4 55.0	8.0 28.2	15.0 12.0
45.9 0.7	35.0	34.9 55.1	31.0 56.8	10.3 31.4	17.4
48.0	37.4	37.0	33.3	12.7	19.7
50.3	39.8	39.3	35.5	14.9	22.0
52.6	42.0	41.7	37.8	17.1	24.3
55.0	44.3	44.0	40.3	19.5	26.5
(57.8)	46.5	46.4	42.4	21.8	28.8
	49.0	4	44.6	24.3	31.4
	356.7		319.6	184.2	197.8
46 45.850 46 59.33	39.633 46 26.65	46 37.067 46 54.10	35.511 45 55.13	14.911 46 28.77	21.978 47 9.77
46 45.834	46 39.642	46 37.05	46 35.49	47 14.89	47 21.96
+16.34	+21.93	+24.01	+25.62	−9.94	−17.72
+.14	+.27	+.42	+.47	−.42	−.40
+0.50	+0.49.56	+0.69	+0.79	−1.24	−0.52
47 2.32	47 2.30 38	47 2.17	47 2.37	47 ~~4.13~~ 3.29	47 3.32
+1.73	+1.96	+2.02	+2.07	+2.24	+2.40
50	50	50	50	45	45
3 51.0	4 4.2	3 45.2	4 20.2	2 56.3	1 27.7
28.5	44.3	23.2	55.5	7.8	31.0
785	1085	684	1357	1241	587
53 39.25	53 54.25	53 34.20	54 7.85	48 2.05	46 29.35
−1348	+1298	−1703	+4038	+4614	+1221
1.12969n	1.11327	1.23124n	1.60617	1.66408	1.08672
0.89493	0.87851n	0.99645	1.37141n	1.42932n	0.85196n
3 +7.85	−7.56	+9.92	−23.52	−26.87	−7.11
53 39.25	53 54.25	53 34.20	54 7.85	48 2.05	46 29.35
~~54 46.92~~ 54 47.11	53 46.69	53 44.12	53 44.33	47 35.18	46 22.24
+63° 29′ 1″.24	29 1.66	29 4.23	29 4.02	35 13.17	36 26.11
10 1	−21 11 1 1.3486n			−21 11 17	11 17
+2110	+1572	+1551	+1135	−1088	−327
1.36970n	1.36432n	1.36411n	1.35995n	1.33772n	1.34533n
+ 23.43	+ 23.14	+ 23.13	+ 22.91	+ 21.76	+ 22.15
− .03	− .03	− .06	− .34	− .46	− .03
+ .14 −.39	+ .12 −.39	+ .11 −.36	− .08 −.41	+ .18 −.24	− .03 −.12
+ 23.54	+ 23.23	+ 23.18	+ 22.49	+ 21.48	+ 22.09
+63 29 24.78 29 24.59	29 24.89 29 24.50	29 27.41 27.05	29 26.51 26.10	35 34.65 35 34.41	36 48.20 36 48.08
− 23.95	− 23.66	− 23.45	− 23.29	− 20.12	− 22.80
+4 52.43	+4 51.85	+4 49.13	+4 50.01	−1 8.55	−2 19.33
+4 28.48	+4 28.19	+4 25.68	+4 26.72	−1 28.67	−2 41.63
+63 33 53.26	33 53.08	33 53.09	33 52.23	34 5.98	34 6.57
− 23.95	− 23.66	− 23.45	− 23.29	− 20.12	− 22.30
+4 52.46	+4 51.66	+4 48.77	+4 49.58	−1 8.73	−2 19.65
+ .62	+ .40	+ .42	+ .74	+ .80	+ .86
+4 29.13	+4 28.46	+4 26.04	+4 27.03	−1 28.05	−2 41.09
33 53.52	33 53.20	33 53.09	33 53.13	34 6.36	34 6.99

h m s
20 47 2

Oct 22 -.197	Oct 28 -.134	Nov 1 -.047	Nov 2 +.023
47	47	47	47
13.3	16.4	16.4	16.0
15.6	18.7	18.6	18.3
18.0	21.2	21.0	20.8
20.2	23.5	23.2	22.9
22.6	25.8	25.4	25.3
24.9	27.8	27.8	27.5
27.1	30.2	30.3	30.0
29.4	32.4	32.5	32.3
31.9	35.1	34.9	34.6
203.0	231.1	230.2	227.7
22.555	25.678	25.578	25.300
47 22.534	47 25.66	47 25.56	47 25.28
-18.23	-21.73	-22.11	-22.10
-.39	-.27	-.09	+.05
-0.48	-0.19	+0.00	+0.068
47 3.484	47 3.47	47 3.36	47 3.2931
A.R	A.R	A.R	A.R

1872 1873

32 Vulpec.

Tang δ = +5.2 Oct. 27 49 m 7.59 s Oct 7 49 m 10.62 s
x = −.018 Nov. 1 ~~.50~~ 9 12 .53 9
6 .41 9 17 .44 9
Cos α = ~~+.02~~ −.03 ″ 11 .31 10 22 .35 9
+.04 16 7.22 9 27 .26 9
21 .13 9 1

h 20 m 49 s 09
20 49 09
+ 27° 34′ ″
+ 27 34 32
z = +14 48 16
+.26

α 1872 = 6.298 δ = 34 18.57
α 1873 = 8.853 δ = 34 32.06
dα = +2.555
dδ = +13.49

Nov 4 1872 +.072 +.07 | Nov 16 +.134 +.13 | Nov 19 +.208 +.21 | Nov 21 +.234 +.25 | Nov 27 +.281 | Oct 5 1873 −.207 −.20

48 37.0 48 | 48 29.0 | 48 27.6 | 49 6.8
39.4 49 15.6 48 36.3 | 31.5 48 39.6 | 29.8 48 17.0 | 9.1 48 58.5
41.8 16.6 | 24.0 41.0 | 32.1 18.0 | 11.4 59.7
17.4 40.6 | 38.3 | 36.8 19.0 | 16.0 0.8
43.0 | (40.6) | 39.0 | 18.4
45.4 | 43.0 | 41.4 | 21.8 (23.1)
47.7 | 45.3 | 43.8 | 23.3
49.9 | 47.7 | 46.0 | 30.0
52.5 | 50.8 | 32.3
54.8 | 53.1 | 34.7
57.0 | 55.3
226.6 | 453.7 | 227.9

51 49 16.53 | 45.320 48 35.30 | 43.064 48 40.30 | 41.427 48 18.00 | 20.719 48 59.67

48 45.30 | 48 43.05 | 48 41.41 | 49 20.70
49 7.22 | 49 7.16 | 49 7.13 | 49 10.65
−21.92 | −24.11 | −25.72 | +10.05
−21.96 | −24.15 | −25.76 | +10.01
+21.91 +.02 | +24.02 −.01 | +25.64 −.03 | −9.93 +.00
+.07 +.07 | +.11 +.11 | +.13 +.12 | −.10 −.11
−0.92 +1.63 | −0.86 +1.69 | −0.83 +1.72 | −.80
+21.068 | +23.276 | +24.980 | −11.834

48 45.30 49 6.36 | 43.05 6.32 | 41.41 6.35 | 49 20.70 8.87
49 6.38 49 8.93 | 6.31 8.86 | 6.31 8.86 | 8.86 ~~11.41~~
50 | 50 +1.96 | 50 +2.07 | 50 +2.07 | 50 | 45 +2.24
2 26.6 | 3 9.1 | 2 58.2 | 3 22.7 | 3 17.8 | 1 55.3
9.2 | 51.6 | 39.7 | 2.8 | 59.3 | 6.3
35.8 | 120.7 | 97.9 | 25.5 | 13.71 | 12.16
52 17.90 | 53 0.35 | 52 48.95 | 53 12.75 | 53 8.55 | 47 0.80

+1002 | +276 | +2343 | +21.05
1.00087 | 0.44091 | 1.36977 | 1.32325
1.06418 n | 0.50422 n | 1.46308 n | 1.38656 n
−11.59 | −3.19 | −29.04 27.11 | −24.35
53 0.35 | 52 48.95 | 53 12.75 | 47 0.80
52 48.76 | 52 45.76 | 52 43.71 45.64 | 46 36.45
° ′ ″
+27 29 59.59 | 30 2.59 | 30 4.64 2.71 | 36 11.90

+14 48 1 1.18220 | +14 47 44 1.18200
+1572 | +1551 | +1135 | −1088
1.19792 | 1.19771 | 1.19355 | 1.17112

*− 15.77 | *− 15.77 | *− 15.62 | *− 14.83
− .02 | − .00 | − .12 | − .10
+ .09 | + .08 | * ~~.06~~ −.06 | + .12

− 15.70 | − 15.69 | − 15.80 | − 14.81
+27 29 43.89 29 43.59 | 29 46.90 46.62 | 29 48.84 46.91 46.59 | 35 57.09 35 56.93
34 36.2 | 34 35.9 | 34 35.7 | 34 48.7
″ +4 52.3 −30 52.0 | +4 49.0 −28 48.7 | +4 46.9 −32 46.6 | −1 8.4 −16 8.6
−.03 +4 52.0 | 51.7 +4 48.7 | 48.4 +4 46.6 | 46.3 | −1 8.7 8.9
− 4.11 | − 3.81 | − 3.61
− 17.60 | − 17.30 | − 17.10 | − 16.60
+4 51.85 − 17.60 | +4 49.13 − 17.30 | +4 50.01 − 17.10 | −1 8.55 16.60
+4 34.25 +4 51.66 | +4 31.83 +4 48.77 | +4 32.91 +4 49.58 | −1 25.15 −1 8.73
+27 34 18.14 .50 | 34 18.73 .52 | 34 ~~21.75~~ 19.82 53 | 34 31.94 .58
+4 33.56 | +4 30.95 | +4 31.93 | −1 25.91
34 17.15 | 34 17.57 | 34 18.54 | 34 31.02
30.64 | 31.06 | 32.03

Sin δ 9.66562
Cos δ 9.94760
.11571m
.06531m

1872			1873		
Oct. 27	27° 34′ 37.0″		Oct. 7	34′ 48.7″	
Nov. 1	36.9	−.1	12	48.8	+.1
6	36.8	.1	17	49.0	.2
11	36.6	.2	22	49.2	.2
16	36.2	.4	27	49.4	.2
21	35.7	.5	Nov. 1		
26	35.2	.5			
Dec 1	34.5	.7			
Dec. 6	33.8	.7	16	48.7	

Oct 21 −.199 −.20		Oct 22 −.197 −.21	Oct 28 −.134 −.14	Nov. 1 −.047 −.04	Nov 2 +.023 +.02
49 14.2	49 7.7	49 14.8	49 18.1	49 18.4	49 18.3
16.5	8.8	17.1	20.4	20.8	20.6
18.9	10.0	19.6	22.7	23.0	23.0
23.5		24.0	27.4	27.5	27.5
25.9		26.5	29.6	28.9	28.9
28.2		28.8	32.0	32.3	32.3
30.5		31.0	34.5	34.6	34.5
32.9		33.4	36.9	36.9	36.8
37.5		38.1	41.3	41.6	41.5
39.8		40.4	43.6	43.9	43.8
42.1		42.7	46.0	46.3	46.2
310.0		316.4	352.5	355.2	354.4
28.182	49 8.83	28.764	32.045	32.291	32.219

Oct 21		Oct 22		Oct 28		Nov. 1		Nov 2	
49 28.16		49 28.75		49 32.03		49 32.27		49 32.20	
49 10.36		49 10.35		49 10.24		49 10.17		49 10.15	
+17.80		+18.40		+21.79		+22.10		+22.05	
+17.76		+18.36		+21.75		+22.06		+22.03	
−17.74 +.01		−18.23 +.00		−21.72 −.01		−22.12 +.01		−22.10 +.00	
−.10	−.10	−.11	−.10	−.07	−.07	−.02	−.02	+.01	+.01
−1.51		−1.50		−1.39		−1.32		−1.30	
−19.354		−19.843		−23.189		−23.465		−23.39	
49 28.16	8.81	28.75	8.91	32.03	8.85	32.27	8.81	32.20	8.81
882		8.92		8.84		8.82		8.81	
		A.R		A.R		A.R		A.R	

45 +2.40
′ 47.2
46.3
93.5
′ 45 46.75

+ 1935
1.28668
1.34999m
−2239
45 46.75
45 24.36

37 23.99

+14 47 45
−327
1.17873

+ −15.09
− .08
− .02

− 15.19
37 8.80 37 8.74
34 49.2
−2 19.6 −.06 19.7
−2 19.9 20.0

−17.10
−2 19.33 − 17.10
−2 36.43 −2 19.65
34 32.37 − 62
−2 37.37
34 31.37

76 Draco. = 27 Y.

h m s
20 51 40
20 51 39
+ 82° 03′
+ 82 03 32
z = − 39 40 44
− ,64

cos. α = −.01 +06
α 1872 = 42.478
" α 1873 = 38.537
δ 1872 = 3′ 18″.43
δ 1873 = 3 32.09

Sin δ 9.99582
" Cos δ 9.13994
.11571m
9.25565m
Tang. δ +7.17
k = −.150

dα = −3.938
dδ = +13.66

Nov 16 1872 +.134 +.13

50
45.0 50 21.4
51.1 24.8
59.4 27.8
6.6 35.2
14.8 10.92
21.9
29.0
36.5
44.2

308.5
128.5
14.278 27.30

51 14.13
+21.93
+ .96
+5.85

51 42.87

+1.96
25
0 6.2
4 43.6
109.8
24 54.90
+46.98
− 12.77
1.67191
0.92756n
− 8.46
24 54.90
24 46.44
+82 10 58′ 1″.91

−39 40 2 1.67860n
+15.72
1.69432n

+ 49.47
− .17
+ .15 −.49

+ 49.45
+81 58 51.36 58 50.87
" + − 24.37
+06 +4 51.85
+4 27.48
+82 3 18.84

− 24.37
+4 51.66
+ 1.25
+4 28.54
3 19.41

Nov 19 +.208 +.21

50
40.3 50 12.2
48.3
55.9
3.5
10.9
18.6
26.0
33.1
39.8

276.4
96.4
10.711 50 13.20

51 10.56
+24.02
+1.49
+6.36

51 42.43

+2.02
25
0 5.6
4 42.2
107.8
24 53.90
+ 57.51
1.75974
1.01539n
−10.36
24 53.90
24 43.54
58 4.81

+15.51
1.69411n

+ 49.44
− .25
+ .15 −.49

+ 49.34
58 54.15 53.66
− 24.25
+4 49.13
+4 24.88
3 19.03

− 24.25
+4 48.77
+ 1.29
+4 25.81
3 19.47

Nov 21 +.234 +.25

50
28.6
45.9
53.7
1.2
8.2
16.2
23.2
31.0
38.3

256.3
76.3
8.478

51 8.33
+25.62
+1.68
+6.69

51 42.32

A.R

Nov 27 +281

25
0 4.5
39.7
104.2
24 52.10

Oct 5 1873 −.207

51
20.1 50 59.4
27.6 2.3
35.3 6.6
(42.9)
50.1
57.3
4.4
12.9
21.5

50.122 51 2.77

51 49.97
− 9.94
− 1.48
− 0.13

51 38.42

+2.24
15
3 37.7
51.2
88.9
18 44.45
+ 47.35
1.67532
0.93097n
− 8.53
18 44.45
18 35.92
4 12.43

−39 40 16 1.67870
−10.68
1.66802n

+ 46.56
− .17
+ .22 −.30

+ 46.61
82 4 59.04 4 58.74
− 19.33
−1 8.55
−1 27.88
3 31.16

− 19.33
−1 8.73
+ 1.43
−1 26.63
3 32.11

Oct 15

A.R.

Oct 21 −.199	Oct 22 −.197	Oct 28 −.134	Nov 1 −.047	Nov 2 +.023
51 51 19.5	51	51	51	51
25.5	26.3	26.9	26.9	26.1
33.0	33.1	34.5	34.0	34.1
40.6	40.9	42.0	41.2	41.4
48.0	48.6	49.0	49.2	49.0
55.5	56.0	57.3	57.0	56.1
52 3.3	3.0	52 4.9	52 4.0	52 3.3
10.1	10.7	12.1	11.0	10.7
17.8	18.0	20.2	19.0	17.9
25.1	25.6	27.9	26.7	25.9
2595	262 2	2748	2690	2645
4995	502.2	51.48	5090	5045
55.500 51 19.50	55.800	57.200	56.555	56.055
51 55.35	51 55.65	51 57.05	51 56.40	51 55.90
−17.73	−18.23	~~−18.90~~ −21.73	−22.11	−22.10
− 1.43	− 1.41	− .96	− .34	+ .16
+2.40	+2.57	+3.59	+4.28	+4.45
51 38.59	51 38.58	~~51 40.88~~ 51 37.95	51 38.23	51 38.41
	A.R	A.R	A.R	A.R

+2.40

15
2 26.0
33.0
59.0
17 29.50

+ 36.00
1.55630
0.81195m
− 6.48
17 29.50
17 23.02

5 25.33

− 39 40 16
− 3.44
1.67526m

+ 47.34
− .09
− .05 − .20

+ 47.20
6 12.53   6 12.33
− 22.01
− 2 19.33
− 2 41.34
3 31.19

− 22.01
− 2 19.65
+ 1.53
− 2 41.13
3 31.20

1872 1873

Bz. 2749. tang δ = +5.72 Nov. 16 53ᵐ 14.86ˢ Oct. 7 53ᵐ 16.90ˢ

x = −.089 21 14.19 .67 12 16.28 .62

26 13.54 .65 17 15.64 .64

ʰ ᵐ ˢ 22 14.98 .66

20 53 17 corr. = −.02 + .08″ 27 14.31 .67

20 53 17 Nov. 1 13.63 .64

+ 80° 04′ ″ 6 12.90 .68

+ 80 04 29

z = − 37 41 41

− .61

α 1872 = 19.077 δ = 4′ 14.95″ dα = −2.492

dδ = +13.72

α 1873 = 16.583 δ = 4 28.67

Nov. 16 1872 +.134 +.13 Nov 19 +.208 +.21 Nov 21 +.234 +.25 Oct 5 1873 .207 −.20 Oct 15 Oct 21 −.199 −.20

52 52

53 ~~21~~.2 ? 53 24.7 23.2 52 8.1 53 56.8 56 53 54 02

8.1 ? 25.7 29.0 9.0 58.4 —

35.2 10.0 1.5 —

41.1 4.0 —

46.9 —

53.9 47.9 52.9 —

0.9 48.0 59.0 54 16.0 ~~52.128~~ ~~53 56.8~~ 45.5 33.6

53 10.2 ? 7.0 49.1 5.0 A-1 27.7 ~~51.5~~ ~~58.4~~ 51.9 34.0

16.3 ? 13.1 49.2 11.0 40.0 50.2 1.5 58.2 34.3

4.0

30.3.3

42.2.3

48.80 53 25.20 47.033 52 9.03 51.400 54 0.17 33.967 54 0.20

28.17

52 48.71 52 46.94 53 51.312 8.08 53 33.88

53 14.42 53 14.16 53 17.11 17.11 53 15.08

− 25.71 − 27.22 − ~~25.80~~ +10.97 + 18.80

− 25.69 − 27.20 − ~~25.78~~ +10.99 + 18.82

+ 24.03 −.01 + 25.64 −.03 − 9.94 +.00 − 17.74 +.01

+ 1.20 +1.19 + 1.43 +1.34 − 1.14 − 1.18 − 1.14 − 1.14

+ 4.66 + 2.17 + 4.92 + 2.43 − .53 + 1.50

+ 29.88 .87 + 31.99 .87 − 17.65 − 17.38 .87

52 48.71 18.60 46.94 18.93 51.31 ~~33.70~~ 33.88 16.50

53 18.58 53 16.09 18.81 16.32 28.08 16.47 16.51

20 20 + 2.02 20 + 2.07 15 + 2.24 A. K. 15 + 2.40

3 51.8 3 48.2 4 7.0 2 23.8 1 15.4

26.8 22.4 39.5 34.6 19.4

7.81 70.6 106.5 58.4 34.8

23 39.05 23 35.30 23 53.25 17 29.20 16 17.40

− 36.40

− ~~26.40~~ + 38.00 − 32.00 − 26.23

1.56110ₙ 1.57978 1.50515ₙ 1.41880ₙ

0.91360 0.93228ₙ 0.85765 0.77130

+ 8.20 − 8.56 + 7.20 + 5.91

23 35.30 23 53.25 17 29.20 16 17.40

23 43.50 23 44.69 17 36.40 16 23.31

+79° ′ ″

+ ~~80~~ 59 4.85 59 3.66 5 11.95 6 25.04

− 37 41 5 1.64790ₙ − 37 41 16 1.64800ₙ − 37 41 16

+ 15.62 + 11.35 − 10.68 − 3.44

1.66352ₙ 1.65925ₙ 1.63732ₙ 1.64456ₙ

+ 46.08 + 45.63 + 43.38 + 44.11

± .12 ± .14 ± .09 ± .06

+ .11 − .08 + .15 − .03

+ 46.07 + 45.41 + 43.44 + 44.02

+79 59 50.92 59 50.56 59 49.07 48.68 5 55.39 5 55.19 7 9.06 7 8.96

4 39.4 4 39.3 4 48.2 4 50.9

+ 4 48.5 −.36 48.1 + 4 50.2 −.39 49.8 − 1 7.2 −.20 7.4 − 2 18.2 −.10 18.3

+.08 + 4 49.3 48.9 + 4 51.0 50.6 − 1 6.4 6.6 − 2 17.4 17.5

− 10.78 − 10.58 − 5.78

− 24.50 − 24.30 − 19.50 − 22.20

+ 4 49.13 − 24.50 + 4 50.01 − 24.30 − 1 8.55 − 19.50 − 2 19.33 − 22.20

+ 4 24.63 + 4 48.77 + 4 25.71 + 4 49.58 − 1 28.05 − 1 8.73 − 2 41.53 − 2 19.65

+ 80 4 15.55 + 1.23 4 14.78 + 1.26 4 27.34 + 1.36 4 27.56 + 1.46

+ 4 25.50 + 4 26.54 − 1 26.87 − 2 40.39

4 16.06 4 15.22 4 28.32 4 28.57

4 29.78 28.94 ~~2.04~~

Red.
2388
17.91
11.94
5.97
0.00

Sin δ 9.99344
Cos δ 9.23679
.11571 ln
9.35250 n

1872				
Nov. 16	80°	3'	99.5"	
21			99.3	−.2
26			99.0	.3

1873			
Oct. 7	4'	48.5"	
12		49.5	+1.0
17		50.3	.8
22		51.0	.7
27		51.6	.6
Nov. 1		52.0	.4
6		52.3	.3

Oct 22 −.197 −.21	Oct 28 −.134 −.14	Nov 1 −.047 −.04	Nov 2 +.023 +.02
53	53	53	53
10.7	12.5	12.4	11.6
16.7	17.8	18.4	17.8
22.7	24.2	23.6	23.6
28.7	30.9	29.9	29.0
34.2	36.5	35.9	35.4
40.3	42.4	41.9	41.3
46.3	48.6	47.6	47.4
52.3	55.1	53.0	53.0
58.1	54 0.6	59.6	59.2
310.0	268.6	322.3	318.3
	328.6		
34.444	36.511	35.811	35.267
53 34.36	53 36.42	53 35.72	53 35.28
53 14.95	53 14.14	53 13.60	53 13.47
+19.41	+22.28	+22.12	+21.81
+19.43	+22.30	+22.14	+21.83
−18.23 +.00	−21.72 −.01	−22.12 +.01	−22.10 +.00
−1.20 −1.13	− .80 −.77	− .23 −.27	+ .11 +.13
+1.63	+2.44	+2.98	+3.11
−17.80 73	−20.08 6	−19.37 40	−18.88 6
34.36 16.56	36.42 16.34	35.72 16.35	35.28 16.40
16.63	16.36	16.32	16.42
A.K	A.K	A.K	A.K

11 Urs. Maj. = 29

Tang δ = + 2.400
k = + .038

Sin δ 9.96525
Cos δ 9.58497n
1157 1n
9.70068

α 1872 = 57m 7s.410 36 54.88 23 5.12
α 1873 = 57 12.768 37 6.84 22 53.16

20h 57m 21s
8 57 13
+ 112° 36′ ″
67 22 52
+ z = −70 14 20
112 37 8
−0.94

Ex:

Nov 16 1872 +.134
56 57
57 5.8
7.6
9.5
56 47.6
49.9
52.5 3 mic.
1500
50.500 57 7.63
56 50.04
+ 21.93
− .32
− 4.17
57 7.48

+1.96
50
3 31.1
7.6
38.7
53 19.35
− 17.63
1.24625n
0.94693n
− 885
53 19.35
53 10.50
112° 29′ 37″.85
− 70 11 38 2.20000n
+ 1590
2.21590n
+ 1 .04
+ 2 44.40
+ .06
+ .10 −.33
+2 44.60
+112 32 22.45 32 22.12
+ 20.99
+4 51.85
~~+5 12.84~~
+112 ~~37 35.29~~
36 53.31
− 20.99
+4 51.66
+ 1.84
+4 32.51
36 54.63

Nov 19 +.208
56 27.5 56 16.8
40.0 19.6
42.8 23.2
46.0
48.4
50.9
53.4
55.8
59.0
433.8
48.200 56 19.87
56 48.24
+ 24.02
− .50
− 4.39
57 7.37

+2.02
50
3 5.7
40.0
105.7
52 52.85
+ 28.33
1.45225
1.15293
+ 14.22
52 52.85
53 7.07
29 41.28
+ 1562
2.21562n
+ .06
+ 2 44.29
+ .16
+ .09 −.29
+ 2 44.60
32 25.88 25.59
+ − 21.12
+ 4 49.13
~~+ 5 10.25~~
~~37 36.13~~
36 53.89
− 21.12
+4 48.77
+ 1.89
+4 29.54
36 55.13

Nov 21 +.234
56 36.2 56 24.2
38.9 28.4
41.4 30.2
44.3
46.9
49.3
52.1
54.7
57.6
421.4
46.822 56 27.61
56 46.86
+ 25.62
− .56
− 4.54
57 7.38

A.R.
+ 19.22
1.28375
0.98443
+ 9.65

Oct 3 1873 −.207
57 12.1 56 35.8
15.8 38.2
18.5 40.7
21.1
23.7
26.5
29.2
32.0
34.5
214.4
23.822 56 38.23
57 23.86
− 9.94
+ .49
− 1.82
57 12.59

+2.24
45
1 23.7
39.9
63.6
46 31.80
+ 45.59
1.65887
1.35955
+ 22.88
46 31.80
46 54.68
35 53.67
− 70 11 57 2.20016n
− 1047
2.18969n
+ .04
+ 2 34.77
+ .40
+ .09 −.12
+2 35.30
38 28.97 38 28.85
+ − 14.13
− 1 8.55
~~− 0 54.42~~
~~34 34.55~~
37 6.29
− 14.13
− 1 8.73
+ 2.10
− 1 20.76
37 8.09

Oct 21 +−.199
57 (22.0)
24.8
27.5
29.8
32.8
35.2
38.1
41.0
43.7
57 32.767 57 41.9 44.4 47.1
57 ~~44.80~~
57 44.47
57 32.81
− 17.73
+ .47
− 2.59
57 12.66

+2.40
45
0 46.2
54.2
100.4
45 50.20
− 11.70
1.06819n
0.76887n
− 5.87
45 50.20
45 44.33
37 4.02
70 11 54
− 362
2.19654n
+ .01
+ 2 37.23
+ .03
− .02 −.06
+2 37.25
39 41.27 39 41.21
+ − 17.22
− 2 19.33
~~− 2 2.11~~
~~37 39.16~~
37 4.72
− 17.22
− 2 19.65
+ 2.25
− 2 35.62
37 5.59

Oct 22 −.197
57 22.9
26.0
28.4
31.4
33.7
36.1
39.2
41.5
44.2
303.4
33.711
57 33.75
− 18.23
+ .47
− 2.96
57 13.03

A.R.

Oct 28 -.134	Nov 1 -.047	Nov 2 +.023
	57	57
	27.6	28.0
	30.8	30.7
	33.0	33.3
	35.7	36.2
	38.5	38.6
	41.0	41.3
	43.4	43.9
	46.1	46.8
	49.0	49.3
	3454	3481
	38.378	38.678
	57 38.42	57 38.72
	-22.11	-22.10
	+.11	-.05
	-3.68	-3.75
	57 12.74	57 12.82
A.R.	A.R.	A.R.

1872 1873

61 Cygni

21ʰ 01ᵐ 12ˢ
21 01 12
+38° 07′ 33″
+38 07 33
15 15
z = +4
+.07

tang δ = +.78
x = -.020
cos α = +.02

α 1872 = 9.605 δ = 7′ 15.84″
α 1873 = 12.286 δ = 7 33.31

dα = +2.680
dδ = +17.47

Nov. 16 1ᵐ 10.69ˢ
21 10.59 10
26 10.50 9
Dec. 1 10.41 9
6 10.33 8

Oct. 27 1ᵐ 13.86ˢ
Nov. 1 .75 11
6 .65 10
11 .55 10
16 .45 10

Sin δ 9.79063
Cos δ 9.89574
1.1571n
.01145n

1873
Oct. 27 7′ 56.2″
Nov. 1 56.2
6 56.1
11 56.1
16 56.1

1872 +.208
Nov. 19 +.21

00
31.0 00 26.0
33.4 27.5
36.0 28.7
41.2
43.9
46.5
49.2
51.8
57.0
59.6
2.2
451.8
511.8
46.527 0 27.40

0 46.51
1 10.63
-24.12
~~24.14~~
+25.65 -.01
~~24.98~~
+.96 +.16
-1.03 +1.66
+23.146
0 46.51 9.67
1 9.66 1 12.35
20 +2.02
0 21.5
2.7
24.2
20 12.10″

+19.13
1.28171
1.29316n
-19.64
20 12.10
19 52.46
+38° 2′ 55.84″

+4 15 4 1.65360
+15.74
1.66934

*−46.70
−.09
+.01

−46.78
+38 2 9.11 2 9.09
7 39.1
+5 30.0 −.02 30.0
−5.83
−23.30
+4 49.13
+4 25.83 − 23.30
+38 6 34.94 +4 48.77
.14
−
+4 25.33
6 34.42
6 51.89

+.234
Nov. 21 +.25

00
29.0 00 35.0
31.7 36.4
34.3 37.7
39.5
42.0
44.7
47.4
50.1
55.3
57.8
0.5
432.3
492.3
44.745 0 36.37

0 44.73
1 10.59
-25.86
~~25.88~~
+25.65 -.03
+.20 +.18
-0.99 +1.70
+24.841
44.73 9.59
9.54 12.23
20 +2.07
0 13.2
53.1
126.3
20 8.15

+8.37
0.92273
0.93418n
−8.59
20 3.15
19 54.56
2 53.79

+11.35
1.66495

*−46.23
−.03
.00

−46.26
2 7.53 7.53
7 38.9
5 31.4 −.00 31.4
−5.63
−23.10
+4 50.01
+4 26.91 − 23.10
6 34.44 +4 49.58
.14
−
+4 26.34
6 33.87
51.34

+.281
Nov. 27 +.28

20
0 25.8
6.2
32.0
20 16.00

1873 -.197
Oct. 22 -.21

01
27.2
29.8
32.4
35.1
37.7
162.2
32.440

1 32.42
1 13.95
-18.47
~~18.49~~
-18.23 +.00
-.16 -.15
-1.66
-20.054
1 32.42 12.37
12.38
A. K.

-.047
Nov. 1 -.04

1 20.2
22.8
25.5
30.6
33.3
35.9
38.5
41.0
46.4
48.9
51.8
394.9
35.900

1 35.88
1 13.74
+22.14
~~+22.12~~
-22.12 +.01
-.03 -.04
-1.45
-23.60
35.88 12.28
12.28
A. K.

+.023
Nov. 2 +.02

1 20.2
22.9
25.5
30.7
33.2
35.8
38.4
41.0
46.3
49.0
51.5
394.5
35.864

1 35.84
1 13.72
+22.12
~~+22.10~~
-22.10 +.00
+.02 +.02
-1.43
-23.51
35.84 12.33
12.33
A. K.

Oct. 5

01
8.8
11.3
14.0
19.0
21.8
24.4
27.0
29.7
34.9
37.7
40.1
268.7
24.427

1 24.41
1 14.30
+10.11
~~+11.49~~
-9.94
-.16
-2.01
-12.11
24.41
12.30

~~Δ2b 1517~~

~~21~~ ~~13~~ ~~03~~

~~106~~ ~~31~~

1872

Nov. 16	38°	7'	39.4"	
21			38.9	- 5
26			38.4	5
Dec. 1			37.9	5
6			37.4	5

Not the right star. Rg

207
-20

1872 Nov.16		Nov.21		1873 Oct.9		Oct.21		Oct.22	Nov.1 Lost.
03	6.2 9.0 12.0	03	8.1	3 3.9 7.3 11.0 14.4 18.2 21.9 25.6 29.3 33.0 .1646	2 41.6 43.9 48.9	3 9.9 13.6 16.9 20.8 24.5 27.9 31.6 35.1 38.5 2188	2 36.6 03 39.6 44.5	— 14.1 17.7 21.2 25.0 28.6 32.3 36.0 39.8	
02	41.5 44.9 48.8 52.3 55.7	02	34.8 38.6 42.2 45.7 49.0 52.8						
3	9.07	3	8.10	18289	2 44.50	24311	40.23		

+00
-16

12.30

55		55		50		50		A.R	A.R
3	6.5	3	8.3	1	19.0	0	59.0		
	41.3		39.0		26.7		5.4		
	107.8		107.3		45.7		124.4		
57'	53.90"	57	53.65	51	22.85	51	2.20		

Lal 1517

21 03 03

106 31

Sin δ 9.98170

Cos δ 9.43377n

11571n

9.56948n

Nov. 2 1873	Oct. 5
3	03
16.0	0.2
19.6	3.7
23.4	7.6
27.0	11.1
30.6	14.7
34.3	18.5
37.9	22.1
41.2	25.6
45.2	29.5
275.2	133.0
30.578	14.778

A.R. A.R.

1872 1873

77 Draco.

h m s
21 08 01
21 08 00
77° 36′ ″
+ 77 36 38
z = −35 13 50
−.58

tang δ = +4.55
x = −.071
Corr = −.2340
α1872 = 1.015
α1873 = 59.948
δ1872 = 36 23.24 dα = −1.066
dδ = +14.68
δ1873 = 36 37.92

Nov. 16 7 m 58.49 s
21 57.96 .53
26 57.44 .52

Nov. 16 77° 36′ 48.8″
21 48.6 −.2
26 48.5 .1

Oct. 7 7 m 60.93 s
12 60.46 .47
17 59.97 49
22 59.46 51
27 58.95 51
Nov. 1 58.42 53
6 57.90 52

Sin δ 9.98978
Cos δ 9.33183
1157 n
9.44704 n

1873
Oct. 7 36′ 58.2″
12 59.3 + .11
17 60.2 .9
22 61.0 .8
27 61.6 .6
Nov. 1 62.1 .5
6 62.5 .4

1872 Nov. 16 +.13 +.134

07
16.6 07 56.6
20.9
26.6
31.4
35.7
40.2
45.5
50.3
55.0
322.2
35.800 7 56.60
7 35.73
7 58.46
−22.73
−22.50
+ 21.91 +.02
+ .59 +.61
+ 2.55 +1.48
+ 25.08 9
7 35.73 8 0.78
8 0.82 7 59.75
50 +1.96
1 38.2
15.8
53.5
51 26.75
− 2080
1.31806 n
0.76510
+ 5.82
51 26.75
51 32.57
+77° 31′ 15.78″
−35 13 15 1.60900 n
+ 1625
1.62525 n
+ 42.19
− .05
+ .04
+ 42.18
+77 31 57.96 31 57.82
36 48.8
″ +4 50.8 −.14 50.7
+.09 +4 51.7 51.6
− 10.92
− 25.60
+ 4 51.85 − 25.60
+ 4 26.25 +4 51.66
+77 36 24.21 + 1.13
+4 27.19
36 25.01
36 39.69

Nov. 19 +.21 +.208

07 13.5
18.7 07 0.7
23.7 3.7
9 27.8 7.2
32.8 11.5
37.8
42.4
47.6
52.3
296.6
32.956 7 5.77
7 32.88
7 58.14
−25.26
−25.03
1 +24.03 −.01
+ .96 +.95
+ 2.87 +1.80
+ 27.86 4
32.88 0.74
0.72 59.65
50 +2.02
1 49.6
24.8
74.4
51 37.20
+ 2719
1.43441
0.88145 n
− 7.61
51 37.20
51 29.59
31 18.76
+ 1585
1.62485 n
+ 42.15
− .08
+ .05
+ 42.12
32 30.88 32 0.72
36 48.7
+54 47.8 −.16 47.6
+4 48.7 48.5
− 10.82
− 25.50
+ 4 49.13 − 25.50
+ 4 23.63 +4 48.77
36 24.51 + 1.17
+4 24.44
36 25.16
39.84

Nov. 21 +.25 +.234

07
11.7 06 7.0?
16.9
21.6
26.3
31.6
35.5
40.4
45.5
50.2
279.7
31.078 6 7.00
7 31.01
7 57.93
−26.92
−26.69
+ 25.65 −.03
+ 1.14 +1.08 7
+ 3.08 +2.01
+ 29.87 77
31.01 0.88
0.78 59.71
50 +2.07
2 7.6
41.0
108.6
51 54.30
+ 8408
1.38166 . 1.92469
0.82870 n 1.49417
− 6.74 58 − 31.20
51 54.30
51 47.56 51 47.72
23.10
31 0.63 25.25
+ 1135
1.62035 n
+ 41.72
− .06
− .04
+ 41.62
32 42.25 6.87
36 48.6
+54 6.4 41.7
+5 4.3 42.6
− 25.40
+ 4 53.01 − 25.40
+ 4 24.61 +4 49.58
36 31.48 + 1.20
+4 25.38

Nov. 27 +.28 +.281

50
2 8.7
44.0
112.7
51 36.35

1873 Oct. 9 −.18 .175

7 8 33.8
54.2
59.0
8 4.3
9.2
13.9
18.6
23.3
28.2
33.0
242.7
122.7
13.748 8 33.80
8 13.67
8 0.72
+ 12.84
+ 13.07
− 12.46 +.00
− .82 −.80
− 0.77
− 14.07 5
18 13.67 59.60
59.62
45 +2.30
0 44.6
48.9
93.5
45 46.75
+ 3994
1.60141
1.04845 n
− 11.18
45 46.75
45 35.57
37 12.78
−35 13 16
+ 1063
1.61963 n
+ 41.65
− .20
+ .04
+ 41.49
37 54.27
36 58.7
− 20.80
− 1 8.29 − 20.80
− 1 29.09 − 1 8.41
36 25.18 + 1.32
− 1 27.89

Oct. 21 −.20 −.199

7 7 18.7
7 58.5 24.1
8 3.8 25.9
8.6
13.1
18.0
23.0
27.6
32.2
37.0
221.8
161.8
17.978 7 20.77
20.10
8 17.91
7 59.53
+ 18.38
+ 18.61
− 17.74 +.01
− .91 −.91
+ 0.42
− 18.23 2
8 17.91 59.68
59.69
40 +2.40
4 23.0
27.2
50.2
44 25.10
+ 57.88
+ 5721
1.76253
1.20957 n
− 16.20
44 25.10
44 8.90
38 39.45
−35 13 30
− 379
1.60521 n
+ 40.29
− .38
− .09
+ 39.82
38 19.27 39 18.92
37 0.9
−2 18.4 −.35 18.7
−2 17.5 17.8
− 23.00
− 2 19.33 − 23.00
− 2 42.33 − 2 19.65
36 31.95 + 1.34
− 2 41.26
36 37.66

Sin δ 9.98975
Cos δ 9.33190n
1157n
9.44761n

77 Draco

21 08 01
77 36

1873.197
Oct. 22 -.21

Oct 28 -.14
~~-.12.34~~

07
59.2 07 11.7
8 4.0 14.5
9.3 18.1
13.7
18.5
23.0
28.2
33.0
38.2

8
1.7
7.0
11.6
16.3
21.8
25.9
30.5
35.2
39.6

22.1
18.1
18.566 7 14.77

1886
20.955

8 18.50
7 59.43
+19.07
+19.30
-18.23 +.00
- .96 -.90
+0.52
- ~~19.71~~ 18.64 .67
8 18.50 √ ~~.879~~
7 59.89 59.83
40 +24.1
4 26.5
28.9
55.4
44 27.70

8 20.88
7 58.82
+22.06
+22.99
-21.72 -.01
- .64 -.61
+.13
- ~~23.49~~ 21.23 21
20.88 20.18
59.67 59.65
H.R

+ 6380
1.80482
~~1.25186n~~ 1.25243n
~~-17.86~~ -17.88
44 27.70 44 27.70
44 9.82

38 38.53

+420
1.61320n

+ 41.04
- .44
- .09

+ 40.51
+77 39 19.64 39 18.69
37 1.0
- 2 18.0 -35 18.4
- 2 17.1 17.5

-23.10
- 2 19.43
- 2 42.53 - 23.10
+77 36 36.51 - 2 19.86
+ 1.39
- 2 41.57
36 37.12

~~ψ Bootis~~ T Cygni

h	m	s
21	09	44
21	09	43

+37° 30′
+37 30 14″
z = +4 52 34
sin. z = +.08

Tang δ = +.77
x = −.020
cos α = +.03
α 1872 = 40.918
α 1873 = 43.313
δ 1872 = 29′ 58.83″
δ 1873 = 30 14.05

1872	m	s	
Nov. 16	9	41.81	
21		.71	10
26		.62	9
Dec. 1		.53	9
6		.45	8

1873	m	s	
Oct. 7	9	45.11	
12		45.01	10
17		44.91	10
22		44.80	11
27		44.70	10

sin δ 9.78445
cos δ 9.89947
.11571n
.01518n

	°	′	″	
Nov. 16	37	29	80.4	
21			80.0	− 4
26			79.6	4
Dec. 1			79.0	6
6			78.4	6

dα = +2.394
dδ = +15.21

1873

	′	″	
Oct 7	30	33.3	
12		33.8	+ 5
17		34.2	4
22		34.6	4
27		35.0	4

1872 +.134 Nov. 16 +13		+.208 Nov. 19 +.21		+.234 Nov. 21 +.25	
09 4.4		α 09 2.0		09 0.3	
6.8	08 56.4	4.5	08 57.4	3.0	08 53.1
9.4	57.7	7.2	58.9	5.5	54.4
14.7	59.0	12.5	0.8	10.7	55.7
17.2		15.0		13.2	
19.8		17.6		15.9	
22.4		20.0		18.4	
25.0		22.7		21.0	
30.2		27.9		26.3	
32.7		30.7		28.7	
35.5		33.2		31.5	
218.1		193.3		174.5	
19.645 19.824	8 57.70	17.573	8 58.87	15.864	8 54.40
9 19.81		9 17.55		9 15.84	
9 41.81		9 41.75		9 41.71	
−22.10		−24.20		−25.87	
~~−22.09~~		~~−24.18~~		~~−25.90~~	
+21.91 +.02		+24.03 −.01		+25.65 −.03	
+ .10	+.10	+ .16	+.16	+ .19	+.18
−0.89	+1.50	−0.83	+1.56	−0.79	+1.60
+22.70 +21.174		+23.365		+ ~~24.85~~ 25.027	
9 19.81	~~42.51~~	17.55	40.91	15.84	40.6989
9 40.95	9 40.93 43.34	40.90	43.29	40.6585	43.24
55 +1.98		55 +2.02		55 +2.07	
2 44.7		2 37.7		2 44.9	
27.8		19.0		24.5	
72.5		56.7		69.4	
57 36.25		57 28.35		57 34.70	
+22.13					
+ ~~21.94~~		+ 18.70		+ 21.46	
1.34498		1.27184		1.33163	
1.36016n		1.28702n		1.34681n	
−22.92		−19.37		−22.22	
57 36.25		57 28.35		57 34.70	
57 13.33		57 8.98		57 12.48	
+37° 25′ 35.02″		25 39.37		25 35.87	
+4 52 25	0.69110				
+16.25		+15.85		+11.35	
0.70735		0.70695		0.70245	
∗− 5.10		∗− 5.09		∗− 5.04	
− .12		− .10		− .11	
+ .08		+ .07		− .05	
− 5.14		− 5.12		− 5.20	
+37 25 29.88	25 29.62	25 34.25	34.00	25 30.67	30.41
30 20.4		30 20.1		30 20.0	
+4 50.5 −.26	50.2	+4 45.9 −.25	45.7	+4 49.3 −.26	49.0
−6.39		−6.09		−5.99	
−21.60		−21.30		−21.20	
+4 51.85		+4 49.13		+4 50.01	
+4 30.25 −	21.60	+4 27.83 −	21.30	+4 28.81 −	21.20
37 30 0.13 +4	51.66	30 2.08 +4	48.77	29 59.48 +4	49.58
+.09 −	.16	+.09 −	.16	+.09 −	.16
37 30 0.22 +4	29.90	30 2.17 +4	27.31	29 59.57 +4	28.22
	29 59.52		30 1.31		29 58.63
	30 14.73		16.52		13.84

Next page

π Cygni

21 09 44

+ 37 30

tang δ + .77

Sin δ 9.78445

Cos δ 9.89947

.11571n

.01518n

1872 Nov. 27	1873 −.175 Oct. 9 −.18		−.178 Oct. 13 −18		−.172 Oct. 14 −.17		−.199 Oct. 21 −.20		−.197 Oct. 22 −.21	
	9 42.0	9 33.0	9 44.0	9 38.0	9	10 8.5	9 47.1	9 39.6	09 47.6	
	44.8	34.2	46.4	39.3	(54.7)	9.5	49.7	40.8	50.2	09 40.7
	47.3	35.2	49.0	41.7	(56.0)	10.8	52.3	42.2	52.8	41.8
	52.4		54.4		57.3		57.5		58.1	42.9
	(54.7)		56.9		58.6		10 0.0		0.7	
	57.8		59.5		59.9		2.8		3.2	
	10 0.3		10 2.2		10 1.2		5.4		5.8	
	2.9		4.8		2.5		7.9		8.4	
	8.0		9.9		3.9		13.1		13.6	
	10.6		12.7		5.2		15.7		16.2	
	13.3		15.0				18.5		18.8	
	33 41		35 48		53 93		27 00		27 54	
	63 41		65 48				30.0		35.4	
	57.645	9 34.13	59.527	9 39.67	59.922	10 9.60	2.727	9 40.87	3.218	9 41.80
	9 57.62		9 59.51		9 59.90		10 2.71		10 3.20	
	9 45.07		9 44.99		9 44.97		9 44.81		9 44.80	
	+12.55		+14.52		+14.93		+17.90		+18.40	
	+12.52		+14.49		+14.90		+17.87		+18.37	
	−12.46 +.00		−14.44 +.00		−14.94 −.01		−17.74 +.01		−18.23 +.00	
	−.14	−.13	−.14	−.14	−.13	−.13	−.15	−.15	−.16	−.15
	−1.76		−1.68		−1.66		−1.50		−1.49	
	−14.38 7		−16.26		−16.73 4		−19.39 8		−19.88 7	
	9 57.62	43.24	59.51	43.25	59.90	43.17	10 2.71	43.32	3.20	43.32
	9 43.25		43.25		43.16		43.33		43.33	
55	50 +2.30		50 +2.32		50 +2.34		50 +2.40		50 +2.41	
2 44.3	1 22.9		1 16.9		0 48.0		0 8.3		0 9.5	
25.9	27.9		21.6		55.7		11.7		11.5	
70.2	50.8		38.5		103.7		20.0		21.0	
57 35.10	51 25.40		51 19.25		50 51.85		50 10.00		50 10.50	
	+ 23.51		+ 19.86		− 9.68		+ 21.86		+ 21.42	
	1.37125		1.29798		0.98588n		1.33965		1.33082	
	1.38643n		1.31316n		1.00106		1.35483n		1.34600n	
	−24.35		−20.56		+10.02		−22.64		−22.18	
	51 25.40		51 19.25		50 51.85		50 10.00		50 10.50	
	51 1.05		50 58.69		50 61.87		49 47.36		49 48.32	
°	′ ″									
+37	31 47.30		31 49.66		31 46.48		33 0.99		33 0.03	
+4	52 9	0.69050					+4 52 8			
	+1063		+1142		+187		−379		+420	
	0.70113		0.70192		0.69237		0.68671		0.69470	
	*− 5.02		*− 5.03		*− 4.92		*− 4.86		*− 4.95	
	− .14		− .11		− .03		− .13		− .12	
	+ .08		+ .08		− .02		− .00		.00	
	− 5.08		− 5.06		− 4.97		− 4.99		− 5.07	
+37	31 42.22	31 42.11	31 44.60	44.50	31 41.51	41.45	32 56.00	32 55.98	32 54.96	54.94
	30 33.5		30 33.9		30 34.0		30 34.5		30 34.6	
	−1 8.7 −.11	8.8	−1 10.7 −.10	10.8	−1 7.5 −.06	7.6	−2 21.5 −.02	21.5	−2 20.4 −.02	20.4
	−19.50		−19.80		−20.00		−20.40		−20.60	
	−1 8.29		1 8.83		−1 8.16		−2 19.33		−2 19.43	
	−1 27.79 −	19.50	−1 28.63 −	19.80	−1 28.16 −	20.00	−2 39.73 −	20.40	−2 40.03 −	20.60
	30 14.43 −1	8.41	30 15.97 −1	9.01	30 13.35 −1	8.44	30 16.27 −2	19.65	30 14.93 −2	19.86
	+.18 −	.18	+.18 −	.18	+.18 −	.19	+.18 −	.19	+.18 −	.19
	30 14.61 −1	28.09	30 16.15 −1	28.99	30 13.53 −1	28.63	30 16.45 −2	40.24	30 15.11 −2	40.65
		30 14.02		30 15.51		30 12.82		30 15.74		30 14.29

	1872.0			1873.0	
α	δ		α	δ	
40.95	0.22		43.25	14,61	
.90	2,17		.25	16,15	
.85	59.57		.16	13,53	
			.33	16,45	
			.33	15,11	
			.33		
40.900	0.65	−.18	43.275	15.17 −.36	14.81
.918	58.83		.313	14.05	.05
−.018	~~+1.82~~		−.038	~~+1.12~~	+ .76
	0.47				
	58.83				
	+ 1.64				

Oct 28 −.134
−.14

9 51.0
53.6
56.2
10 1.3
4.0
6.6
9.2
11.7
17.0
19.5
22.0
25.21
7.21
6.554

10 6.53
9 44.68
+21.85
+21.82
−21.72 −.01
−.11 −.10
−1.37
−23.20
10 6.53 43.33
43.33
A. R.

1'

a Cephei

h	m	s	
21	15	36	
21	15	33	
+	62°	12'	''
+	62	02	52
z = − 19		40	4
− .34			

tang δ = +1.89
x = −.033
conα = ~~−.07~~ +1.1''
α1872 = 31.384
α1873 = 32.822
δ1872 = 2' 36.41''
δ1873 = 2 51.53

1872		m s	
Oct. 7	15	33.07	
12		32.86	.21
17		32.66	.20
Nov. 16		31.40	
21		31.19	.21
26		30.98	.21
Dec. 1		30.78	.20
6		30.59	.19

1873		m s	
Oct. 7	15	34.37	
12		34.18	19
17		33.98	20
22		33.77	21
27		33.57	20

dα = +1.437
dδ = +15.12

Oct. 12 1872 +.032 +.06

14 59.0 16 43.3
3.5 44.0
8.3 46.6
16.7 48.5
21.1
25.6
30.0
34.4
43.4
47.8
52.1
3419
281.9 16 45.60
25.627
15 25.59
15 32.85
−7.26
~~−.97~~
+7.26 −.01
+ .11 +06
−1.47 −0.03
+5.~~96~~.84
15 25.59 31.49
15 31.53 15 32.87
25
2 32.4
16.7
49.1
27 24.55
−7997
1.90293n
1.66685n
−4643
27 24.55
26 38.12
+~~63~~ 61 56 10.23
−19 41 5 1.31380n
+1167
1.32547 n
+ 2116
− 1.57
+ .07
+ 19.66
+61 56 29.89
+ 2 58.9
+ 6 29.0
+19 +6 30.1
− 22.50
+ 7 47.83
+ 7 25.33 47.64
+62 3 55.22 +

[illegible]

Nov. 16 +.134 +.13

15
0.4 15 11.0
2.7
6.0
7.0
9.0
11.2
13.4
15.6
17.9
822
9.133 15 11.00
15 9.10
15 31.39
−22.29
~~−22.20~~
+21.92 +.02
+ .25 +25
−0.01 +1.43
+22168
9.10 31.26
31.28 32.72
25 +1.96
0 10.4
4 49.1
119.5
24 59.75
−187
0.27184n
0.05845
+1.14
24 59.75
25 40.89
57 47.46
−19 39 47
+1643
1.33023n
+ 2139
− .01
+ .15
+ 21.53
58 8.99 58 8.49
3 1.7
+4 52.7 −.50 52.2
+4 53.8 53.3
− 10.18
− 25.30
+4 51.85 − 25.30
+4 26.55 +4 51.66
2 35.54 + 66
+4 27.02
2 35.51
50.63

Nov. 19 +.208 +.21

14
58.1 14 20.4
0.2 21.9
2.4
4.6
6.7
8.9
11.1
13.3
15.5
1208
60.8
6.755 14 21.15
15 6.72
15 31.26
−24.54
~~−24.45~~
+24.04 −.01
+ .40 +39
+0.12 +1.56
+24564
6.72 31.28
31.26 31.70
25 +2.02
0 35.8
13.2
49.0
25 24.50
~~−187~~ + 4560
165896
1.44557n
−27.90
25 24.50
24 56.60
57 51.75
+1596
1.32976 n
+ 2137
− .44
+ .01
+ 20.91
58 12.66 12.62
3 1.6
+4 48.9 −.04 48.9
+4 50.0 50.0
− 10.08
− 25.20
+4 49.13 − 25.20
+4 23.93 +4 48.77
2 36.59 + .68
+4 24.25
2 36.87
51.99

Ch. failed ~~Nov. 21~~

25
0 35.5
10.9
46.4
25 23.20

Nov. 27

25
0 4.8
42.3
107.1
24 53.55

Oct. 9 1873 .175 −.18

15
37.9
40.4
42.6
44.8
47.0
49.3
51.5
53.6
55.9
4230
47.000
15 46.97
15 34.44
+12.53
+12.62
−12.49 +.00
− .34 −.33
− 1.62
−14484
46.97 32.52
32.53
15
4 9.1
15.0
24.1
19 12.05

Sin δ 9.94614
Cos δ 9.67090 9.67090
.11571m .09302
9.78661m 9.76392m

	1872					1873			
Oct	7	62°	2′	58.0″		Oct. 7.	2′	72.4″	
	12			58.9	+ .9	12		73.1	+ 7
	17			59.7	.8	17		73.9	8
	22			60.3	.6	22		74.7	8
	27			60.9	.6	27	1	75.4	7
Nov.	16			61.7					
	21			61.5	− 2				
	26			61.2	.3				
Dec.	1			60.7	.5				
	6			60.2	.5				

Oct. 13 −.~~18~~ −.178 ~~Oct. 13~~

15 | 15 18.2
40.2 | 20.5
43.3 | 22.4
44.6
46.7
48.9
50.4
53.4
55.5
58.0

441.0
49.000 15 20.37

15 48.97
15 − 34.13
+14.84
+14.93
−14.45 +.00
− .34 −.34
−1.31
−16.10
48.97 32.87
32.87
15 +2.32

15
4 2.4 | 4 2.4
8.0 | 8.0
10.4 | 10.4
19 5.20 | 19 5.20

+ 28.63
1.45682
1.24343n
−17.52
19 5.20
18 47.68
+62° 4′ 0.67″

−19 40 4 1.31340n
+1154 ~~+180~~
~~1.31520~~
1.32494n
+ 21.13
− .19
+ .24

+ 21.18
+62° 4 21.85 4 21.52
3 13.3
−1 8.5 −.33 8.8
−1 7.4 7.7

− 21.80
−1 8.83 − 21.80
−1 30.63 −1 9.01
+62 2 51.25 + .78
−1 30.03
2 51.49

Oct. 21 −.20 −.199

15 | 15 24.8
43.1 | 26.8
45.3 | 28.8
47.5
49.8
51.8
54.1
56.3
58.4
16 0.6

406.9
466.9
51.878 15 26.80

15 51.85
15 − 33.80
+18.05
+18.14
−17.75 +.01
− .38 −.38
−0.98
−19.110
51.85 32.74
32.75
15 +2.40
2 47.3
52.5
99.8
17 49.90

+ 25.08
1.39933
1.18594n
− 15.34
17 49.90
17 34.56
5 13.19

−19 40 4
−396
1.30944n
+ 20.39
− .14
− .06

+ 20.19
5 33.98 5 33.76
3 14.6
−2 19.4 −.22 19.6
−2 18.3 18.5

− 23.10
−2 19.33 − 23.10
−2 42.43 −2 19.65
2 51.55 + .81
−2 41.94
2 51.82

Oct. 22 −.21 −.197

15 ~~25.9~~ | 15 21.5
47.4 ~~50.4~~ | 23.1
45.9 ~~34.6~~ | 25.0
48.0 ~~43.4~~
50.3
52.5
54.7
56.7
59.0
1.1

411.6
471.6
52.400 15 23.20

15 52.37
15 − 33.76
+18.61
+18.70
−18.24 +.00
− .40 −.37
−0.94
−19.585
52.37 32.79
32.82
15 +2.41
2 51.2
52.5
10.37
17 51.85

+ 29.20
1.46538
1.25199n
−17.86
17 51.85
17 33.99
5 14.36

+436
1.31776n
+ 20.79
− .19
− .06

+ 20.54
5 34.90 34.67
3 14.7
−2 20.2 −.23 20.4
−2 19.1 20.3

− 23.20
−2 19.43 − 23.20
−2 42.63 −2 19.86
2 52.27 + .81
−2 42.25
2 52.42

This star is 1 M Dro Gr

~~Gr. 1537 = 30 = 9~~ 18

21 18 57
9 98 03

n = -55 40
-0.83

No. Red. to App. place for δ.

sin δ 9.99570
Cos δ 9.14624n 9.14624
.1157n .09302n
9.26195 9.23926n

α 1872 = 18m 38s.088 δ = 53 19.92
α 1873 = 18 47.204 δ = 53 4.63

tang δ = -7.012
= -7.009
R = +.108

dα +9120
dδ = -15.29

α 1872 = 18m 38s.140
α 1873 = 18 47.790

Oct. 12 1872 +.032 +.06

Wrong ★ Rej

18
3.5
10.5
17.8
24.9
31.7
38.7
46.9
54.8
1.7

42.4
44.0
46.7
48.5

231.5
291.5
32.388 45.40

~~+21.94~~
-.22

25
0 32.9 ?
13.4
463
25 23.15

Gr. 98°

-55 42 44

h m s m s
9 18 46 18 51
° ' " ' "
+81 53 00 52 46

Nov. 16 +.134 +.13

17
55.6 19 28.2
3.6
9.6
18.0
24.6
32.5
39.5
47.4
53.7

284.5
224.5
18 24.944 19 28.20

18 25.05
+21.94
-.94
-7.72
18 38.33

+1.96
20
2 27.2
4.0
312
22 15.60

-63.26
1.80113n
1.06308n
-11.56
22 15.60
22 4.04
' "
00 44.31

42 44
+1661
1.94211n
+ ' 1.00
+1 27.52
+ .30
+ .07 -.22

°+1 27.89
+98° 2 12.20 2 11.98
~~+ 24.74~~
+4 51.85
~~+5 16.59~~
+98 ~~7 28.79~~
6. 39.31

- 24.74
+4 51.66
+ 1.62
+4 28.54
6 40.52

Nov. 19 +.208 +.21

17
53.4 16.1
0.7 18.8
9.2
16.8
23.9
30.7
38.0
46.0
53.2

272.0
212.0
19 28.20 23.555

18 23.66
+24.03
-1.46
-8.28
18 37.95.

+2.02
20
2 2.1
35.9
980
21 49.00

+ 3.85
0.58546
9.84741
+ 7.04
21 49.00
21 56.04
00 52.31

1.92550n
+1606
1.94156n
+ .00
+1 27.41
+ .00
+ .05 -.18

+1 27.46
2 19.77 19.59
~~+ 24.87~~
+4 49.13
~~5 14.00~~
~~7 33.77~~
6 44.03

- 24.87
+4 48.77
+ 1.87
+4 25.57
6 45.16

17 16.1
18.8
21.2
17 19.70

Nov. 27 +.281 +.28

20
2 5.7
40.3
106.0
21 53.00

Oct. 13 1873 .178 -.18

18
33.4
41.4
48.8
56.5
19 3.5
12.3
19.2
25.5
33.9

16 52.7
17 4.4
17 18.8

274.5
34.5
19 3.833 17 5.40

19 3.94
-14.45
+1.24
-3.10
18 47.63.

+2.32
15
0 29.8
35.7
655
15 32.75

3
+118.40
2.07347
1.23542
+21.65
15 32.75
15 54.40
6 53.95

42 58
+1166
1.93716n
+ .00
+1 26.53
+ 1.06
+ .03 -.04

+1 27.62
8 21.57 8 21.53
~~+ 19.24~~
-1 8.83
~~-0 59.59~~
~~7 21.98~~
6 43.50

- 19.24
-1 9.01
+ 1.92
-1 26.33
6 55.20

Oct. 14 -.172 -.17

18
35.9
42.8
50.3
57.8
19 4.7
12.2
19.5
26.5
33.5

17 56.8
18 1.6
6.9

283.2
43.2
4.800 18 1.77

19 4.91
-14.96
+1.20
-3.27
18 47.88

+2.34
15
0 33.0
42.9
759
15 37.95

+ 63.03
1.79955
1.06150
+11.52
15 37.95
15 49.47
6 58.88

+174
1.92724n
+ .00
+1 24.5
+ .30
- .01 -.05

+1 24.86
8 23.74 23.69
~~+ 19.46~~
-1 8.16
~~-0 58.70~~
~~7 25.04~~
6 46.12

- 19.46
-1 8.44
+ 1.94
-1 25.96
-6 57.73

Oct. 21 −.199 −.20		Oct. 22 −.197 −.21		Oct. 28 −.134 −.14	Nov. 2 +.023 +.02
18	17 49.5 18			18	18
38.9	54.6	40.6	17 33.0	44.9	47.2
46.2	18 03.0	47.1	38.2	52.7	54.4
53.5		54.7	44.2	59.4	1.6
19 0.7		1.9	54	19 7.1	8.9
8.6		9.0		14.5	16.4
15.7		16.3		21.5	23.6
23.0		24.2		29.0	31.5
30.1		31.0		35.8	38.4
37.4		37.0		43.1	45.7
254.1		263.8		308.0	267.7
74.1		83.8		128.0	147.7
8.233	17 55.70	9.311	17 38.49	14.222	16.411
19 8.34		19 9.42		19 14.33	19 16.52
−17.74		−18.24		−21.74	−22.10
+1.39		+1.38		+.94	−.16
−4.44		−4.62		−5.67	−6.38
18 47.55		18 47.94		18 47.86	18 47.88
				A.R.	A.R.

+2.40	+2.41
10	10
4 23.9	4 20.2
28.3	24.0
52.2	44.2
14 26.10	14 22.10
	+90.84
+ 7253	+ 9418
1.86052	1.95828
1.12247	1.22023
+13.26	+16.60
14 26.10	14 22.10
14 39.36	14 38.70
8 8.99	8 9.65
43 .00	
−413	+451
1.92137 n	1.93001 n
+ .00	+ .00
+1 23.44	+1 25.12
+ .40	+ .62
− .09 −.35	− .09 −.35
+1 23.75	+1 25.65
9 32.74 9 32.39	9 35.30 34.95
4 −20.89	7 −21.07
−2 19.33	−2 19.43
−1 58.44	−1 ~~58.36~~
7 34.30	7 36.94
0 52.52	6 54.80
− 20.89	− 21.07
−2 19.65	−2 19.86
+ 1.99	+ 2.00
−2 38.55	−2 38.93
6 53.84	6 56.02

1872phae.proj.1462.

1872

1873

d Urs. Maj.

h	m	s	
21	23	07	
9	23	13	
	109°	36′	″
	70	24	
+	70	23	11
z = −	67	14	1
−	109 92	36	49

Red.

	″
1	12.3
2	9.3
3	6.2
4	3.1
5	0.0

tang δ = −2.81

x = +.043

cos α = −.02 − 0.″2

α 1872 = 7.420

α 1873 = 12.853

δ 1872 = 23′ 26.″87 = 36 33.″13

δ 1873 = 23 11.39 = 36 48.61

		m	s	
Oct. 7		23	8.36	
	12		8.70	.34
	17		9.06	.36
Nov. 16			11.45	
	21		11.87	.42
	26		12.29	.42
	31		12.70	.41
	36		13.11	.41

		m	s	
Oct. 37		23	14.50	34
	12		14.84	36
	17		15.20	38
	22		15.58	38
	27		15.96	40
Nov.	1		16.36	40
	6		16.76	

dα = +5.433
dδ = −15.48

Oct. 12 1872 +.032 +.06

22 49.0 22 57.1
52.0 ~~49.0~~ 58.3
55.0 ~~52.0~~
? 57.0 ~~55~~
4.1
7.5
10.6
13.9

1.244 22 58.30

23 1.29
23 8.69
−7.40
−7.38
+7.26 −.01
− .17
−1.27 −.09 +4.16
− ~~8.82~~ 89
23 1.29 ~~52.47~~
23 7.18 23 7.12.61
55 +1.19
1 18.0
58.9
3.69
~~56 3.45~~
56 8.45
+ 2.94
0.46835
0.08735n
− 1.22
56 8.45
56 7.23
109° 26′ 41.″12
−67 11 36 2.13373n
+12.18
2.14591n
+ .01
+2 19.93
+ .00
+ .03

+2 19.97
109 29 1.09 29 0.98
36 50.4
+7 49.3 −.11 49.2
+.2 +7 ~~49.1~~ 49.4
+7 49.5
− 1.82
− 17.30 − 17.30
+7 47.83 +7 47.64
+7 30.53 + 1.09
109 36 31.62 +7 37.43
36 32.41
36 47.89

Nov. 16 +134 +.13

22 ″
− 28 59.9
40.7 46.9
44.3 47.4
46.7 46.7
49.8 46.7
52.9 46.7
56.1 46.8
57.0 46.7
—

~~46.856~~ 49.93 59.90
45.97
22 ~~46.90~~ 49.87
23 11.43
− ~~24.53~~ 21.46
− ~~24.51~~ 21.44
+ 21.92 +.02
− .37
− 4.01 −.38 + 1.42
± ~~28.87~~ 55
22 46.90 ~~8.01~~
49.97 7.51 12.75
~~45~~ 50 7.52 +1.96
3 24.3
− 0.2
241
~~48~~ 12.05
53 − 9.97
− ~~13.04~~
0.99870n
0.64039n
− 4.37
53 ~~48~~ 12.05
~~48~~ 53 7.68
~~34~~ 29 40.67
~~67 19 35~~
+ 16.79
2.15052n
+ .03
+2 21.42
+ .02
+ .10

+2 21.57
~~37~~ 37 2.24 32 1.92
36 56.3
+4 54.1 −.32 (53.8)
7.72
= 23.20 − 23.20
+4 51.85 +4 51.66
+4 28.65 + 1.80
30.89 +4 30.26
32.18
47.66

Nov. 17 +.211 +.20

50
3 22.6
55.0
1376
58 8.80

Nov. 19 +.208 +.21

22
35.7 22 ~~26.8~~
38.6 53.1
42.3
45.3
48.0
51.1
54.0 ✓
57.0
0.6

37.26
48.26
48.067 22 26.80
53.1
22 48.11
23 11.68
− 23.57
− 23.55
+ 24.04 −.01
− .59 −.58
− 4.26 + 1.17
− ~~28.40~~
48.11 ~~7.71~~
7.30 12.73
50 +2.02
3 19.0
54.0
13.30
53 6.50
+ ~~21.27~~ − 5.03
1.32777 0.70157n
0.96946n 0.34826
+ 9.32 − 2.20
53 6.50 6.50
53 ~~15.82~~ 53 4.30
~~29 32.53~~ 29 44.05
− 67 11 29
+ 16.17
2.14990n
+ .03
+2 21.22
+ .08
+ .09

+2 21.42
32 ~~53.95~~ 54.7 32 51.6
36 56.5
~~+5 2.6~~ 54.0 −.31 50.7
+ 5 2.4 51.2 50.9
− 7.92
− 23.40 − 23.40
+4 49.13 +4 48.77
+4 25.73 + 1.85
36 ~~19.68~~ +4 27.22
31.20 36 32.38
47.86

Nov. 23 +.174 +.17

22
33.7 22 21.0
36.3 24.1
39.5 26.4
42.2
45.6
48.8
51.5
54.3
58.1

410.0
x
45.555 ~~22 23.47~~
22 23.80
22 45.60
23 12.02
− 26.42
− 26.40
+ 26.96 +.00
− .48 −.49
− 4.60 + 0.83
+ 21.887
45.60 7.48
7.47 12.90
50 +2.10
3 10.4
43.3
1137
52 56.85
+ 21.75
1.33746
0.97915
+ 9.53
52 56.85
53 6.38
29 41.97
+ 18.30
2.15203n
+ .03
+2 21.92
+ .08
− .06

+2 21.97
32 3.94 3.65
36 56.8
+ 4 52.9 −.29 52.6
+ 4 ~~52.7~~ 52.8
+ 4 53.1
− 8.22
− 23.70 − 23.70
+4 49.90 +4 49.95
+4 26.20 + 1.93
36 30.14 +4 28.18
36 31.83
47.31

Nov. 27 +.281 +.28

50
3 3.2
37.2
100.4
52 50.20

Sin δ 9.97403.

Cos δ 9.52598n 9.52598
,11571n ,093a2n
9.64169 9.61900n

1872

		°	′	″	
Oct.	7	70	23	10.6	
	12			9.4	-1.2
	17			8.3	1.1
Nov.	16			3.7	
	21			3.3	- .4
	26			3.1	.2
	31			3.0	.1
Dec	36			3.0	.0

1873

		′	″	
Oct	7	22	55.8	
	12		54.6	-1.2
	17		53.4	1.2
	22		52.4	1.0
	27		51.5	.9
Nov.	1		50.7	.8
	6		49.9	.8

1873
Oct. 13 -.18 -.178

23 | 23 12.2
16.7 | 13.7
19.7 | 14.8
23.0
25.7
28.8
31.4
34.9
37.9
40.9

2590

28.778 23 13.57

23 28.82
23 14.82
+14.00
+14.02
-14.45 +.00
+ .51 +.52
-1.97
-15.92
23 28.82 12.91 12.91
12.90
45 +2.32
1 46.8
55.2
102.0
46 51.00

+ 15.21
1.18213
0.82382
+6.66
46 51.00
46 57.66

35 50.69

-67 11.54
+1178
2.14551n
.01
+2 17.80
+ .04
+ .11

+2 19.96
38 10.65 38 10.51
37 5.6
-1 5.0 -.14 5.1
~~-1 5.2~~ 4.9
-1 4.8

-17.00 -17.00
-1 8.83 -1 9.01
-1 25.83 + 2.13
36 44.82 -1 23.88
36 46.63

Oct. 28 -.14 -.134

23
25.0
28.3
31.3
34.3
37.3
40.3
43.7
46.4
49.7

3363

37.366

23 37.41
23 16.02
+21.39
+21.41
-21.73 -.01
+ .39 +.38
-3.17
-24.54 24.53
37.41 12.90
12.88
S.K

Nov. 2 +.02 +.023

23
26.2
29.3
32.4
35.5
38.5
41.5
44.6
47.7
50.8

3465

38.550

23 38.54
23 16.42
+22.12
+22.14
-22.10 +.00
- .06 -.06
-3.57
-25.73
38.54 12.81
12.81
S.K

Nov. 4 +.02 +.044

23
35.1 38.2
37.9 37.9
41.0 37.9
44.7 38.5
47.1 38.8
50.3 38.0

38.050

23 38.09
23 16.58
+21.57
+21.53
-21.66 -.02
- .06 -.12
-3.73
-25.43
38.09 12.64
12.56
S.K

√

7504 Urs. Min. = 31 Red.

h	m	s	
21	24	45	
21	24	34	
°	′	″	
	86	30	
+	86	30	26
z = −	43	7	38

− 068

~~6964~~ 676
~~5223~~ 507
~~3482~~ 338
~~1741~~ 169
~~0.00~~ 0.0

Sin δ = 9.99919
Cos. δ = 8.78568 | 8.78568
11571m | .09302n
8.90139m | 8.87870n

Tang δ = +16.382
+16.405

k = −.078

α 1872 = 24ᵐ 32ˢ.290
α 1873 = 24 33.602
1.312

1872
Oct. 12 ~~+.032~~ +.06 | #? Nov. 16 +.134 +.13 | Nov. 17 +.211 +.20 | Nov. 19 +.208 +.21 | 1873 Oct. 13 −.178 | Oct. 14 −.172

Oct. 12:
23 ~~X~~ — 24 24.6
47.5
3.0
23.2
38.3
55.7
10.7
28.7
—
20.61
26.61
24 38.014 24 24.60
24 37.984
+ 7.25
+ 0.52
− 1.68
24 44.02

Nov. 16:
—
23 —
350
519
24 7.0
26.1
42.3
—
—
1623
423
24 8.460
24 8.38
+ 21.94
+ 2.19
− 0.30
24 32.21

24 9.8
12.5
11.2
24 12.83

Nov. 19:
— 26 53.6
— 25 53.8
— 23.3 58.3
—
24 —
21.7 43.18
39.4 46.56
54.5 23.38
10.4 08.28
24 ~~300~~ 4.25
24 4.17
+ 24.03
+ 3.41
+ 0.76
24 32.37

Oct. 13:
24 ~~25~~ 24 16.0
—
—
—
491 491 488 451
25 5.7 48.7 477 488
25.5 50.7 486.17
40.3 48.1 456
55.6 46.0 48.0
24 ~~48.52~~ 49.44 ~~25~~ 24 16.00
24 49.36
− 14.45
− 29.26
+ 1.34
24 33.33

Oct. 14:
24 —
—
—
14.9 49.7 487
32.8 49.2 457
49.8 49.8 458
25 6.3 47.9 454
23.1 48.3 453
40.9 49.7 502
56.8 47.2 45.2
24 ~~48.97~~ 49.475
24 ~~49.39~~ 49.40
− 14.96
− 2.82
+ 1.60
24 33.22

+1.19
0
1 12.2
52.1
′ 12.43
1 2.15
+ 13.41
1.12743
0.00613
+ 1.01
1 2.15
1 3.16
° ′ ″
+86 21 45.19
− 43 6 40 1.73120n
+ 12.18
1.74338n
″
+ 55.38
− .01
+ .03 − .10
+ 55.40
+86 ~~21~~ 22 40.59 22 40.49
− 21.35 21.35
+7 47.83 +7 47.64
+7 26.48 + .80
+86 30 7.07 +7 27.49
30 7.98

h m s m s
21 24 45 24 32
° ′ ″ ″
+86 30 23 43

A.R
− 4.37
0.64048n
9.54187
+ 0.36

55
3 10.0
42.8
11 28
57 56.40

55
2 7.8
41.0
10.88
56 54.40

+2.32
50
1 47.2
53.3
100.5
51 50.25
~~− 26.56~~ +33.44
~~1.42423n~~ 1.52427
~~0.32562~~ 0.40297n
+ 2.12 − 2.53
51 50.25
51 ~~52.37~~ 47.72
~~30 55.98~~ 31 0.63
− 43 7 0 1.73130n
+ 11.78
1.74308n
+ 55.34
− .03
+ .11 − .14
+ 55.42 55.91
31 ~~51.40~~ 31 ~~51.26~~
− 20.97 − 20.97
−1 8.83 −1 9.01
−1 29.80 + 1.57
30 21.60 −1 28.41
30 22.85

50
1 34.0
43.0
77.0
51 38.50

18=

30 7.98
30 22.85

Oct. 28 — .134		Nov. 2 + .023		Nov. 4 + .044	
24 —		24		24	
0.4	51.1	—		—	
17.9	51.7	—		—	
23.2	50.1	12.3	46.1	11.7	45.5
51.3	51.3	30.5	47.0	28.4	45.3
25 7.0	50.1	47.5	47.5	43.5	43.5
24.9	51.1	25 4.5	47.6	1.0	44.1
42.0	51.3	20.9	47.1	18.9	45.1
59.0	51.4	35.6	44.5	36.6	45.9
++		53.4	45.8	53.6	46.0

24 51.012	24 46.629	24 45.057
24 50.93	24 46.55	24 44.98
~~18.91~~ −21.74	−22.10	−21.68
−2.20	+0.38	+0.72
+6.98	+8.91	+9.69
24 24.01	24 33.74	24 33.71

33.33
33.22
34.01
33.74
33.71
1801
33.60²

32.21
32.37
58
32.29
1.31
33.60

A.R

A.R

50
0 30.0
30.9
6.09
50 30.45

β Cepheï

h m s
21 27 00
21 27 01
70 .00
+ 70° 00′ 11″
z = − 27 37 23

sin. z = −.46

Red. s
1 12.0
2 9.0
3 6.0
4 3.0
5 0.0

tang δ = +2.75
x = −.041
cos α = +.N + 1.″0

α1872 = 59.976 δ = 59 55.64
α1873 = 0.774 δ = 0 11.35

1872

Oct. 7 26m 61.s85
12 61.59 .236
17 61.31 .28
Nov. 16 59.49
21 59.33 .16
26 59.18 .15

1873

Oct. 7 26m 62.s35
12 62.09 26
17 61.81 28
22 61.52 29
27 61.23 29
Nov. 1 60.93 30
6 60.62 31

dα = +0.799
dδ = +15.70

1872 Oct. 12 +.032 +.06

26
42.2 26 6.1
45.6
48.1
51.2 28 22.8 ? 36
54.2 26.4
57.3 30.7
0.3 32.1
3.2
6.3

3084
4884
54.267 26 6.10
28 28.00

26 54.23
27 1.58
− 7.35
~~− 7.46~~
+ 7.26 −.01
+ .17 +.09
− 1.60 − 0.80
+ 5.43 .74
26 54.23 0.06 ~~.11~~
27 ~~0.02~~ 31 0.77
30 59.97 +1.19
0 37.1 1 36.0
19.9 18.8
57.0 54.8
30 28.50 31 27.40

+ 4817
1.68278
1.30985
+ 2041
30 28.50
30 48.91
° ′ ″
+~~70~~ 69 51 59.44

− 27 36 54 1.47880n
+ 1218
1.49098n

″
+ 30.97
− .37
+ .01

+ 30.61
~~70~~ 69 52 30.05 52 30.00
~~00~~ 18.2
+ 7 48.2 −.05 48.1
+1.0 +7 49.2 49.1
− 6.90
− ~~18.60~~ 22.60
+ 7 47.83 − 22.60
+ 7 25.23 +7 47.64
+69 59 55.28 + .54
− .53 +7 25.58
+69 59 54.75 59 55.58
0 11.28

Nov. 16 +.134 +.13

26 53.4
55.0
58.0
34.0 37.0
36.9 36.9
40.2 37.2 40.9
43.3 37.3 4
46.1 37.1
49.3 37.3

37.133 26 55.47

26 37.09
26 59.48
− 22.39
~~− 22.50~~
+ 21.92 +.02
+ .36 +.37
+ 0.50 +1.30
+ 22.78 .81
37.09 59.87
26 59.90 0.70
25 +1.96
2 51.3
28.9
80.2
27 40.10

− 1834
1.26340n
0.91316
+ 819
27 40.10
27 48.29

55 0.06

27 37 0
+ 1679
1.49559n

+ 31.30
− .06
+ .08

+ 31.32
55 31.38 55 31.11
0 22.0
+ 4 50.6 −.27 50.3
+ 4 51.6 51.3
10.70
− ~~22.40~~ 26.40
+ 4 51.85 − 26.40
+ 4 25.45 + 4 51.66
59 56.83 + .90
− .53 + 4 25.96
59 56.30 59 54.07
12.77

Nov. 19 +.208 +.21

26 53.6
55.5
58.3
26 40.5 34.5
43.6 34.6
47.0 35.0

34.700 26 55.80

26 34.66
26 59.38
− 24.72
~~− 24.83~~
+ 24.04 −.01
+ .58 +.57
+ 0.60 + 1.40
+ 25.280
34.66 59.88
59.86 0.66
25 +2.02
2 48.6
~~25.3~~
73.9
27 36.95

− 21.10
1.32428n
0.97404
+ 942
27 36.95
27 46.37

55 1.98

+ 1617
1.49497n

+ 31.26
− .08
+ .08

+ 31.26
55 33.24 32.98
0 22.0
+ 4 48.8 −.26 48.5
+ 4 49.8 49.5
10.70
− ~~22.40~~ 26.40
+ 4 49.13 − 26.40
+ 4 22.73 + 4 48.77
59 55.97 + .92
− .53 + 4 23.29
59 55.44 59 56.27
11.97

Nov. 27

25
2 17.6
54.7
13.23
28 6.15

1873 Oct. 13 −.178 −.18

27 26 28.1
5.3 32.6
8.0 35.4
11.0
14.0
17.0
20.2
23.2
26.0
29.3

167.0

17.111 26 32.10

27 17.07
27 2.02
− 15.05
+ 14.94
− 14.45 −.00
− .50 −.49
− 1.16
− 16.270
17.07 0.86
0.87
20 +2.30
1 55.8
1.3
117.1
~~21 58.60~~
21 58.55
+ 45.01
1.65331
1.30307n
− 2009
21 58.55
21 38.46

1 9.89

− 27 37 14
+ 1191
1.49071n

+ 30.95
− .32
+ .11

+ 30.74
+70 1 40.63 1 40.47
0 32.4
− 1 8.2 −.16 8.4
− 1 7.2 7.4
− 21.10
− 1 8.83 − 21.10
− 1 29.93 − 1 9.01
+70 0 10.70 + 1.05
− 1.01 − 1 29.06
+70 0 9.69 0 11.41

Sin δ 9.97299
Cos δ 9.53405 9.53405
11571n .09302
9.64976n 9.62707n

1872			
Oct. 7	69° 59′	77.0″	
12		78.1	+1.1
17		79.1	1.0
Nov. 16		82.0	
21		82.0	+.0
26		81.9	.1

1873			
Oct. 7	59′	92.1″	
12		92.2	+ 1.1
17		94.2	1.0
22		95.1	.9
27		95.8	.7
Nov. 1		96.4	.6
6		96.8	−.4

1872.0 α	δ	1873.0 α	δ
59.97	54.75	0.87	9.69
90	56.30	64	12.17
.86	55.44	70	10.56
		84	
		75	
59.910	55.50 +1.06	0.760	+2.02 10.81
59.976	55.64	0.774	11.35
−.066	−0.14	−.014	−0.54
	56.56		12.83
	55.64		11.35
	+ .92		+ 1.48

Oct. 14 −.17 −.172

27 | 27 39.3
40.6
44.0
—
—
11.2 172
14.3 173
17.5 175
20.4 174
23.1 19.
26.3 173
29.4 174

17.314 27 41.30

27 17.27
27 1.97
+15.30
+15.19
−14.95 −.01
− .47 −.47
− 1.20
− 16.683
17.27 0.65
0.64
20 +2.34
1 21.3
29.1
50.4
21 25.20

− 23.99
1.38003n
1.02979
+10.71
21 25.20
21 35.91

1 12.44

+160
1.48040n

+ 30.23
− .10
− .03

+ 30.10
1 42.54 42.43
0 32.6
−1 9.9 −.1 10.0
−1 8.9 9.0

− 21.20
−1 8.16 − 21.20
−1 29.36 −1 8.44
0 13.18 + 1.07
−1.01 −1 28.57
0 12.17 0 13.86

Oct. 28 −.14 −.134

27
11.3
14.2
17.5
20.0
23.0
26.4
29.3
32.3
35.2

2092

23.244

27 23.20
27 1.16
+22.04
+21.93
−21.73 −.01
− .39 −.37
−0.39
−22.540
23.20 0.69
0.70
20
0 19.1
17.0
36.1
20 18.05

Nov. 2 +.02 +.023

27
11.0
14.1
16.9
20.0
23.0
26.0
29.0
32.0
35.0

2070

23.070

27 22.96
27 0.85
+22.11
+21.00
−22.10 +.00
+ .06 +.06
−0.08
−22.12
22.96 0.84
0.84
A.R

Nov. 4 +.02 +.044

27
10.3 ~~46.6~~ ~~27~~ 25.3
13.1 ~~52.3~~ 26 27.7
16.4 ~~56.2~~ 31.1
19.4
22.4
25.3
28.3
31.1
34.5

2008

22.311 26 28.03

27 22.27
27 0.73
+21.54
+21.43
−21.66 −.02
+ .06 +.12
+0.04
−21.562
22.27 0.71
0.75
20 +2.52
1 49.8
42.2
9.20
21 46.00

+ 54.28
1.73464
1.38440n
−24.23
21 46.00
21 21.77

1 26.58

−27 36 17
+1188
1.49068n

+ 30.95
− .48
− .29

+ 30.18
~~1~~2 56.76 2 56.62
0 36.7
−~~1~~2 20.1 −.14 20.2
~~−2~~ 19.1 . . 19.2

− 25.40
−2 19.79 − 25.40
−2 45.19 −2 20.24
0 11.57 + 1.15
−1.01 −2 44.49
0 10.56 0 12.13

1872 1873

74 Cygni

	h	m	s	
	21	31	50	
	21	31	52	
+	39°	50′		
+	39	50	38″	
z = +	2	32	10	
	+.04			

Tang δ = +.83

f x = −.020

corr = +.00 −1.3″

α 1872 = 49.149

α 1873 = 51.548

δ 1872 = 50′ 21.62″

δ 1873 = 50 37.64

1872	m	s	
Oct. 7	31	51.01	
12		50.91	.10
17		50.81	.10
Nov. 16		50.17	
21		50.06	.11
26		49.96	.10
Dec. 1		49.86	.10
6		49.77	9

1873	m	s	
Oct. 7	31	53.45	
12		.36	9
17		.27	9
22		.17	10
27		53.06	11
No. 1		52.95	11
6		52.84	11

dα = +2.400
dδ = +16.01

Sin δ 9.80671
Cos δ 9.88521
.11571
.00092

1872 +.032
Oct. 12 +.06

31 27.4
30.4 ~~11.3~~ 30 56.1
32.9 ~~13.9~~ 57.3
38.2 ~~16.7~~ 58.6
40.9 ~~19.3~~
43.7 ~~22.0~~
46.4 32 16.0
49.0 17.0
54.4 18.2
57.0 19.8
59.8
48 0.1

43.645 30 57.33
32 17.75

31 43.62
31 50.91
−7.29

+7.25 −.01
+.05 +.03
−1.76 +0.64
+5.54
31 43.62 49.16
31 49.18 31 51.53
35 +1.19 40
4 13.2 0 30.2
0.0 16.7
13.2 469
39 6.60 40 23.45

+4631
1.66567
1.64390
+44.04
39 6.60
39 50.64
+39° 42′ 57.71″

+2 32 8 0.40650 + 2 32 6
+1244
0.41894

x − 26.28
− .35
+ .12
− 2.85
39 42 54.86 42 54.45
50 42.6
+7 47.7 −.41 47.3
−1 +7 46.6 46.2
− 4.99
− 21.80
+7 47.83 − 21.00
+7 26.83 +7 47.64
+39 50 21.69 .05
+7 26.59
50 21.04
50 37.05

+.134
Nov. 16 +.13

31 12.2
15.0 31 3.2
17.5 4.5
22.9 6.0
25.7
28.3
30.9
33.8
38.9
41.5
44.2
31.89

28.264 31 4.57

31 28.24
31 50.16
−21.92

+21.92 +.02
+ .11 +.11
−1.01 +1.39
+21.024
28.24 49.286
49.248 51.68
35 +1.96
2 26.2
8.9
351
37 17.55

+2369
1.37457
1.37544 n
−23.74
37 17.55
36 53.81
45 54.54

+2 32 6
+1697
0.42347

x − 26.5
− .15
+ .07
− 2.73
45 51.81 45 51.58
50 44.1
+4 52.6 −.23 52.4
+4 51.5 51.3
− 6.79
− 22.80
+4 51.85 − 22.80
+4 29.05 +4 51.66
50 20.86 .08
+4 28.78
50 20.36
36.37

+.208
Nov. 19 +.21

31
9.8 31 0.2
12.7 1.4
15.1 2.9
20.7
23.2
26.0
28.6
31.3
36.7
39.3
42.0
28.54

25.945 31 1.50

31 25.97
31 50.10
−24.18

+24.05 −.01
+ .17 +.17
−0.95 +1.45
+23.276
25.92 49.19
49.18 51.58
35 +2.02
2 24.2
8.9
331
37 16.55

+2444
1.38810
1.38902 n
−24.49
37 16.55
36 52.06
45 56.29

+1627
0.42277

x − 26.5
− .15
+ .07
− 2.73
45 53.56 53.33
50 44.3
+4 50.7 −.23 50.5
+4 49.6 49.4
− 6.69
− 22.70
+4 49.13 − 22.70
+4 26.43 +4 48.77
50 19.99 .08
+4 25.99
50 19.32
35.33

+.174
Nov. 23 +.17

31 6.8
9.5 30 52.2
12.2 53.2
17.5 55.0
20.2
22.9
25.5
28.2
33.7
36.4
39.0
27.9

22.900 30 ~~53.13~~
30 53.47

31 22.88
31 50.03
−27.15

+26.96 +.00
+ .14 +.14
−0.88 +1.52
+26.22
22.88 49.10
49.10 51.50
35 +2.10
2 30.7
10.6
413
37 20.65

+2943
1.46879
1.46971 n
−29.49
37 20.65
36 51.16
45 57.19

+1836
0.42486

x − 26.7
− .23
− .05
− 2.95
45 54.24 54.01
50 44.1
+4 49.9 −.23 49.7
+4 48.8 48.6
− 6.49
− 22.50
+4 49.90 − 22.50
+4 27.40 +4 49.95
50 21.64 .08
+4 27.37
50 21.38
37.39

+.281
Nov. 27 +.28

35
2 28.7
14.0
387
37 19.35

1873 +.178
Oct. 13 −.18

31 51.9 31 41.2
54.5 43.3
57.2 44.9
32 2.6
5.1
7.9
10.8
13.5
18.8
21.3
24.1
26.77
84
7.978 31 ~~43.10~~
31 43.13

32 7.95
31 53.34
+14.61

−14.45 +.00
− .15 −.15
− 1.79
−16.39
32 7.95 31.56
51.56
30 +2.30
0 1.0
1 4.9
59
30 2.95

+2484
1.39515
1.39607 n
−24.89
30 2.95
29 38.06
53 10.29

+1191
0.41841

x − 26.2
− .18
+ .00
− 2.80
53 7.49 52 7.49
50 58.3
− 9.2 −.00 9.2
10.3
− 20.70
−1 8.83 − 20.70
−1 29.53 −1 9.01
37.96 .09
−1 29.80
50 37.69

9.88521
.09302
9.97828 m

	1872				1873		
Oct.	7	39° 50′ 41.9″		Oct.	7	50 57.4	
	12	42.6	+ .7		12	58.1	+ .7
	17	43.2	.6		17	58.8	.7
	22	43.7	.5		22	59.3	.5
	27	44.1	.4		27	59.6	.3
Nov.	16	44.4		Nov.	1	59.9	.3
	21	44.2	− .2		6	60.7	.2
	26	43.9	.3		11	60.1	.0
Dec.	1	43.4	.5		16	60.1	.0
	6	42.9	.5				

−.172
Oct. 14 −.17

31 52.4 31 58.4
55.0 59.4
57.8 32 0.7
32 0.0
5.7
8.5
11.0
13.9
19.2
21.9
24.5
272.9
42.9
18.445 31 59.50

32 8.42
31 53.32
+15.10

−14.95 −.01
− .14 −.14
−1.77
−16.867
8.42 31.56
51.55
30 +2.34
0 45.2
50.9
96.1
30 48.05
+ 8.94
+ ~~28.94~~
0.95134
0.95226 n
− 8.96
30 48.05
30 39.09

52 9.26

+2 31 47 0.40590
+160
0.40750

× − 25.66
− .03
− .02

− 2.61
52 6.65 6.59
50 58.4
−1 8.2 −.06 8.3
−1 9.3 9.4

− 20.80
−1 8.16 − 20.80
−1 28.96 −1 8.44
50 37.69 − .09
−1 29.33
50 37.26

−.134
Oct. 28 −.14

31 58.8 31 48.5
32 1.5 50.0
4.2 51.1
9.5
12.4
14.9
17.5
20.4
25.6
28.5
31.0
224.3
164.3
14.936 31 49.87

32 14.92
31 53.03
+21.89

−21.73 −.01
− .12 −.11
−1.48
−23.33
14.92 51.59
51.59
25 +2.47
4 51.7
49.85
101.7
29 50.75
+ 2507
1.39915
1.40007 n
−25.12
29 50.75
29 25.63

53 22.72

+2 31 46
+496
0.41086

× − 25.75
− .17
− .10

− 2.74
53 19.98 53 19.60
50 59.7
−2 20.3 −.38 20.7
−2 21.4 20.8

− 22.10
−2 20.18 − 22.10
−2 42.28 −2 20.38
50 37.70 − .10
−2 42.58
50 37.02

+.023
Nov. 2 +.02

31 59.0
32 1.6
4.3
9.7
12.3
15.0
17.7
20.4
25.9
28.5
31.0
225.4
165.4
15.036

32 15.02
31 52.92
+22.10

−22.09 +.00
+ .02 +.02
−1.37
−23.44
15.02 51.58
51.58
A. K.

+.044
Nov. 4 +.02

31 58.4
1.1 31 52.4
3.8 53.7
9.0 54.8
12.0
14.6
17.1
19.9
25.2
27.9
30.6
219.6
154.6
14.509 31 53.63

32 14.49
31 52.88
+21.61

−21.66 −.02
+ .02 +.04
−1.33
−22.97
14.49 51.52
51.52
25 +2.52
4 50.4
43.0
93.4
29 46.70
+ 2088
1.31973
1.32065 n
−20.92
29 46.70
29 25.78

53 22.57

+1188
0.41778

× − 26.27
− .12
− .77

− 3.51
53 19.06 18.68
51 0.0
−2 19.1 −.38 19.5
−2 20.2 20.6

− 22.40
−2 19.79 − 22.40
−2 42.19 −2 20.24
50 36.87 − .10
−2 42.74
50 35.94

1872　　　　　　1873

13 H Cephei

h m s
21 35 04
21 35 01
+56° 54'
+56 54 54"
z = −14 32 6
−.25

Tang δ = +1.53
x = −.028
Cos γ = −.12 + 02
α 1872 = 59.426
α 1873 = 1.286
δ 1872 = 54' 38.00"
δ 1873 = 54 54.16

1872	m	s	
Sept. 17	34	61.79	
22		61.68	11
27		61.56	12
Oct. 2		61.43	13
7		61.30	13
Nov. 16		59.99	
21		59.81	18
26		59.64	17

1873	m	s	
Oct. 7	35	3.08	
12		2.93	15
17		2.78	15
22		2.62	16
27		2.46	16
Nov. 1		2.30	16
6			

dα = +1.860
dδ = +16.16

1872 .137
Sept. 28 − .13
34 30.7
34.6 34 21.1
38.1 23.5
45.9 25.8
49.6
53.3
57.0
0.6
8.1
12.0
16.0
345.9
585.9
53.264 34 23.47
34 53.24
35 1.53
− 8.29
− 8.17
+ 8.42 +.01
− .20 −.21
−2.10 − 0.24
+6.12
34 53.24 59.36
34 59.36 35 1.22
35 +0.91
0 36.1
25.0
611
35 30.55
+ 2979
1.47407
1.30417
+2014
35 30.55
35 50.69
° ' "
+56 46 57.66
−14 31 53 1.17400n
+081
1.17481n
+ 14.96
− .23
+ .03
+ 14.76
+56 47 12.42 47 12.37
54 57.6
" + 7 45.2 −.05 45.2
+0.2 + 7 45.4 45.4
− 3.44
− 19.60
+7 45.34 − 19.60
+7 25.74 +7 45.04
+56 54 38.16 + .23
+7 25.67
54 38.04
54 54.20

−.041
Oct. 2 − .05
34 30.5
34.3 33 57.9
38.0
45.6
49.4 35 53.7
53.3 56.0
56.9 58.0
0.7
8.3
12.2
15.9
345.1
585.1
53.191 33 57.90
35 55.90
34 53.16
35 1.42
−8.26
− 8.14
+ 8.~~20~~19 +.00
− .08 −.06
−1.99 − 0.13
+ 6134
53.16 59.28
59.30 1.16
35 +0.99
0 17.9 1 38.1
6.1 25.1
240 632
35 12.00 36 31.60
+5529
174265
1.57275
+3739
35 12.00
35 49.39
46 58.96
+371
1.17771n
+ 15.06
− .76
+ .01
+ 14.31
47 13.27 13.25
54 58.5
+7 45.2 −.02 45.2
+7 45.4 45.4
− 4.34
− 20.50
+7 45.69 − 20.50
+7 25.19 +7 45.53
54 38.46 + .25
+7 25.28
54 38.53
54.69

+.032
Oct. 12 +.06
34
31.1 ~~8.1~~
34.9 ~~+2.0~~ 34 1.2
38.6 ~~+5.8~~
46.2 ~~+9.7~~
49.9 ~~+23.4~~ 35 55.6
53.7 57.5
57.5 60.2
1.2
8.8
12.6
16.4
350.9
590.9
53.718 34 1.20
35 57.77
34 53.69
35 1.16
−7.47
− 7.35
+ 7.25 −.01
+ .09 +.05
−1.8373 + 0.13
+ 6156
53.69 59.30
59.25 1.11
35 +1.19
0 22.9 1 41.1
6.2 26.0
291 671
35 14.55 36 33.55
+ 52.52
172032
1.55042
+3552
35 14.55
35 50.07
46 58.28
+1269
1.18669n
+ 15.37
− .64
+ .01
+ 14.69
47 12.97 12.95
55 0.4
+7 47.4 −.02 47.4
+7 47.6 47.6
− 6.24
− 22.40
+7 47.83 − 22.40
+7 25.43 +7 47.64
54 38.40 + .30
+7 25.34
54 38.44
54.65

Nov. +.208
~~Oct.~~ 19 +.21
34
27.9 34 18.4
29.9 19.6
31.8 20.8
33.7
35.6
37.4
39.3
41.0
43.3
319.9
35.544 34 19.60
34 35.52
34 59.87
−24.35
−24.23
+ 24.05 −.01
+ .32 +.32
− 0.44 +1.42
+2398 −2
35.52 59.45
59.44 1.30
A. R.
+ 1594
1.20249
1.05528n
− 11.36
+1638
1.19038n
+ 15.50
− .07

Nov. +.281
~~Oct.~~ 27 +.28
30
3 15.6
53.4
1290
33 4.50

1873 .178
Oct. 13 − .18
34 55.0 34 53.9
58.7 55.4
35 2.5 57.3
10.1
13.8
17.7
21.5
25.4
32.5
36.5
40.3
314.0
194.0
17.636 34 55.63
35 17.61
35 2.89
+14.72
+14.84
− 14.45 +.00
− .28 −.27
−1.60
−16382
17.61 1.28
1.29
25 +2.32
1 50.5
57.0
1075
26 53.75
+ 2201
1.34262
1.19541n
− 1568
26 53.75
26 38.07
56 10.28
−14 32 14 1.17400n
+1203
1.18603n
+ 15.35
− .12
+ .11
+ 15.34
56 25.62 56 25.47
55 16.3
−1 9.3 −.15 9.4
−1 9.1 9.2
− 22.10
−1 8.83 − 22.10
−1 30.93 −1 9.01
54 54.69 + .51
−1 30.54
54 54.93

Sin δ 9.92318

Cos δ 9.73708 9.73708

.11571n .09302

9.85279n 9.83010n

1872					
Sept	17	56	54	54.6	
	22			56.0	+1.4
	27			57.3	1.3
Oct	2			58.4	1.1
	7			59.5	1.1
	12			60.4	.9
	17			61.3	.9
	22			62.0	.7
	27			62.7	.7

1872					
Sept	17	56°	54′	54″.6	
	22			55.9	+1.3
	27			57.1	1.2
Oct.	2			58.3	1.2
	7			59.5	1.2

1872			
Nov.	16	63.8	
	21	63.7	−.1
	26	63.5	.2
	31	63.1	.4
Dec.	6	62.7	.4

1873					
Oct.	7	54′	75″.1		
	12		76.1	+1.0	
	17		77.0	.9	
	22		77.8	.8	
	27		78.4	.6	
Nov.	1		78.9	.5	
	6		79.3	.4	?
	11		79.5	.2	
	16		79.6	.1	

−.134 Oct 28 −.14	+.023 Nov. 2 +.02	+.044 Nov. 4 +.02
35 16 35 50.0	35	35
5.3	16.5	16.1 34 50.9
6.1	18.5	18.3 52.4
16.6	20.5	20.0 54.1
21.5	22.4	22.0
24.3	24.2	23.7
28.1	26.1	25.7
31.7	28.0	27.7
39.4	30.0	29.2
43.1	31.8	31.3
47.0		
2667	2180	2142
24.245 35 0.00	24.222	23.800 34 52.47
35 24.22	35 24.19	35 23.77
35 2.42	35 2.26	35 2.19
+21.80	+21.93	+21.58
+21.92	+22.05	+21.70
−21.73 −.01	−22.09 +.00	−21.66 −.02
− .21 −.21	+ .03 +.03	+ .03 +.07
−1.13	−0.97	−0.90
−23078	−23.03	−2258.1
24.22 1.15	24.19 1.16	23.77 1.24
1.14	1.16	1.26
25 +2.47	A.R.	25 +2.52
0 41.7		0 49.8
42.0		43.8
83.7		93.6
25 41.85		25 46.80
+ 24.24		+ 31.33
1.38453		1.49596
1.23732n		1.34875n
−17.27		−22.32
25 41.85		25 46.80
25 24.58		25 24.48
57 23.77		57 23.87
−14 32 14		
+ 5.06		+ 11.90
1.17906n		1.18590n
+ 15.10		+ 15.34
− .15		− .25
− .01		− .13
+ 14.94		+ 14.96
57 38.71 57 38.65		57 38.83 38.77
55 18.5		55 19.2
−2 20.2 −.06 20.3		−2 19.6 −.06 19.7
−2 20.0 20.1		−2 19.4 19.5
− 24.30		− 25.00
−2 20.18 − 24.30		−2 19.79 − 25.00
−2 44.48 −2 20.38		−2 44.79 −2 20.24
54 54.23 + .62		54 54.04 + .63
−2 44.06		−2 44.61
54 54.59		54 54.16

1872

11 Cephei

h m s
21 40 02
21 40 03
70° 03′
+ 70 43 36″
z = − 28 20 48
− .47

Tang δ = +2.86
x = −.044
Cor α = −.03 + 1.″0
α 1872 = 2.354
α 1873 = 3.260
δ 1872 = 43′ 19.″94
δ 1873 = 43 36.45

Sept. 27	40^m	4.^s95	
Oct. 2		4.72	.23
7		4.48	.24
Nov. 16		2.10	
21		1.78	.32
26		1.47	.31
Dec. 1		1.16	.31
6		0.85	.31

Oct. 7	40^m	5.^s06	
12		4.80	.26
17		4.53	.27
22		4.24	.29
27		3.95	.29
Nov. 1		3.64	.31
6		3.33	.31

dα = +0.906
dδ = +16.51

Sin δ 9.97497
Cos δ 9.51847
1157m
9.63418m

Sept. 28 1872
Wrong #
45
1 51.1
38.7
89.8
46 44.″90

Oct. 2 −.041 −.05
39
44.4 39 18.7
47.2 20.2
50.3
53.0
56.6
59.6
2.9
5.6
9.0
328.6
678.6
56.511 39 19.45
39 56.47
40 4.71
−8.24
−8.21
+ 8.19 +.00
− .14 −.12
−2.36 −1.45
+ ~~5.69~~ 71
39 56.47
2.16 40 2.18
45 +0.99 40 3.09 45
2 17.2
2.1
193
47 9.65
+ 3706
19.56891
19.18040
~~+ 0.15~~ 15.15
47 9.65
47 ~~9.80~~ 54.50
+ 70° 30 38.″55 ~~53.80~~
− 28 20 33″ 1.49200n
+ 383
1.49583n
+ 31.32
− .23
+ .15
+ 31.24
+ 70 36 9.79
43 40.1
+ 7 30.3
+ 70 + 7 31.3
− 20.20
+ 7 45.69 − 20.20
+ 7 25.49 + 7 45.53
+ 70 43 35.28 + 46
+ 7 25.79

Chron. failed
Oct. 12
45
2 21.0
63.9
249
47 12.45

Nov. 19 +208 +.21
39
24.7 38 53.3
28.0 55.3
31.0 56.8
34.1
37.1
40.3
43.4
46.9
50.0 38 55.13
33.55
37.278
39 37.23
40 1.89
−24.66
−24.63
+ 24.05 −.01
+ .60 +.59
+ 0.46 +1.37
+ 25.09
37.23 2.34
2.32 3.23
40 +2.02
4 52.2
27.7
799
44 39.95
+ 4215
19.62480
19.25898n
~~− 0.18~~ 18.19
44 39.95
44 ~~39.77~~ 21.76
38 ~~8.58~~ 26.59
− 28 20 8
+ 1649
1.50849n
+ 32.25
− .30
+ .14
+ 32.09
38 40.67 58.66 38 58.19
43 47.1
+ 4 46.4 −.47 47.9
+ 4 49.4 48.9
− 106.9
− 27.20
+ 4 49.13 − 27.20
+ 4 21.93 + 4 48.77
43 20.59 + .94
+ 4 22.51
43 20.70
43 37.21

Nov. 21 +.234 +.25
39
32.5 38 32.8
26.2
29.3
32.4
35.5
38.6
41.5
44.6
48.0 38 32.80
31.86
35.400
39 35.36
40 1.76
−26.40
−26.37
+ 25.67 −.03
+ .72 +.67
+ 0.59 +1.50
+ 26.98 0
35.36 2.34
2.26 3.17
40 +2.07
4 63.8
36.7
1005
43 50.25
+ 6260
1.79657
1.43075n
− 26.96
43 50.25
43 23.29
39 25.06
+ 1135
1.50335n
+ 31.87
− .66
− .08
+ 31.13
38 56.19 55.71
43 47.2
+ 4 51.0 −.48 50.5
+ 4 52.0 51.5
− 27.30
+ 4 50.01 − 27.30
+ 4 22.71 + 4 49.58
43 18.90 + .97
+ 4 23.25
43 18.96
35.47

Nov. 23

9.51847
.09302
9.61149n

1872				1873		
Sept. 27	70° 42′ 98.7″			Oct. 7	43′ 57.4″	
Oct. 2	100.0	+1.3		12	58.5	+1.1
7	101.3	1.3		17	59.6	1.1
				22	60.5	.9
				27	61.4	.9
Nov. 16	107.1			Nov. 1	62.1	.7
21	107.2	+.1		6	62.7	.6
26	107.2	+.0				
Dec. 1	107.4	− 2				
6	106.7	3				

Nov. 27

1873 Oct. 13 −.178 −.18		Oct. 14 −.172 −.17		Nov. 2 +.023 +.02		Nov. 4 +.044 +.02	
40	39 13.7	40	39 55.0	40		40	
7.4	16.5	7.6	56.5	13.2		12.7 39	48.3
10.3	20.1	10.8	59.6	16.4		15.8	52.0
13.5		13.8		19.4		19.0	55.2
16.8		17.0		22.5		22.0	
19.7		20.0		25.5		25.1	
22.9		23.4		28.8		28.2	
26.3		26.5		31.6		31.3	
29.2		29.5		34.9		34.4	
32.2		32.7		38.2		37.4	
178.1		181.3		230.5		225.9	
19.789	39 16.77	20.144	39 57.03	25.611		25.100	39 51.83
40 19.75		40 20.10		40 25.57		40 25.06	
40 4.74		40 4.68		40 3.56		40 3.44	
+15.01		+15.42		+22.01		+21.62	
+15.04		+15.45		+22.04		+21.65	
−14.45 +.00		−14.95 −.01		−22.09 +.00		−21.66 −.02	
− .51	−.51	− .49	−.49	+ .06	+.06	+ .06	+.12
−1.48		−1.42		−0.30		−0.18	
−16.44		−16.88 7		−22.33		−21.78 4	
40 19.75	3.31	20.10	3.24	25.57	3.24	25.06	3.28
3.31		3.23		3.24		3.32	

	+2.32	+2.34	A.R.	+2.52
40	35	35		35
4 57.7	3 38.7	3 19.7		2 16.1
33.6	42.0	26.1		8.5
91.3	80.7	45.8		24.6
44 45.65	38 40.35	38 22.90		37 12.30
	+63.02	+23.11		+33.27
	1.79948	1.36380		1.52205
	1.43366n	0.99798n		1.15623n
	−27.14	−9.95		−14.33
	38 40.35	38 22.90		37 12.30
	38 13.21	38 12.95		36 57.97
	+70° 44′ 35.14″	44 35.40		45 50.38
	−28 20 39 1.49210n			−28 20 41
	+12.15	+1.46		+11.92
	1.50425n	1.49356n		1.50402n
	+ 31.93	+ 31.16		+ 31.92
	− .69	− .09		− .19
	+ .22	− .07		− .35

Oct. 13					Oct. 14			Nov. 4
	+ 31.46		+ 31.00			+ 31.38		46 21.58
45 6.30	45 6.60		45 6.40		~~6.13~~ 6.13	46 21.76		
− 22.40	43 58.8		43 59.0		− 22.50	44 2.5		26.10
−1 9.01	−1 7.8	−.30 8.1	−1 7.4	−.27 7.7	−1 8.44	−2 19.3 −.18	19.5 −2	20.24
+ 1.09	−1 6.8	7.1	−1 6.4	6.7	+ 1.09	−2 18.3	18.5 +	1.18
−1 30.32		−1 31.23		−1 30.66	−1 29.85		−2 45.89 −2	45.16
43 35.98	−22.40	43 35.37	−22.50	43 35.74	43 36.28	−26.10	43 35.87	43 36.42
	−1 8.83		−1 8.16			−2 19.79		

π₁ Cygni

h m s
21 42 08
21 42 06
+48° 43′
+ 48 43 20″
2 = −6 20 32
− .11

Tang δ = +1.14
x = −.023
corr α = −.01 + .05″
α 1872 = 3.934
α 1873 = 6.153
δ 1872 = 43′ 3.73″
δ 1873 = 43 20.25

1872

	m	s	
Sept. 17	42	~~5.87~~ 6.23	
22		6.15	8
27		6.06	9
Oct. 2		5.97	9
7		5.87	10
Nov. 16		4.86	
21		4.72	.14
26		4.59	.13

1873

	m	s	
Oct. 7	42	8.07	
12		7.95	.12
17		7.83	.12
22		7.72	.11
27		7.60	.12
Nov. 1		7.47	13
6		7.33	14

dα = +2.210
dδ = +16.51

Sin δ 9.87590
Cos δ 9.81940
11570n
9.93511n

9.81940
09302
9.91242n

Sept. 28 1872 − .137 − .13

41 39.0
?41.4
45.2
51.5
57.7
58.0 2
1.0
4.0
10.5
13.4
16.7
33.54
63.54
57.765

41 16.0
16.7
17.5
43 1.7
3.1
5.7
41 16.73
43 3.50

41 57.74
42 6.04
−8.30
−8.29
+8.42 +.01
− .15 −.16
−2.11 + 0.10
+6.16
41 57.74 3.90
42 3.90 42 6.11
45 +0.91
1 49.1 3 16.0
37.6 5.2
8.67 212
46 43.35 48 10.60

+ 4103
161310
1.52552
+33.54
46 43.35
47 16.89
+48° 35′ 31.46″

−6 20 26 0.80610n
+096
0.80706n

+ 6.41
− .46
+ .12

+ 6.07
48 35 37.53 35 37.36
43 23.0
+7 45.5 −.17 45.3
+.05 +7 46.0 45.8
− .279
−19.30
+7 45.34 − 19.30
+7 26.04 +7 45.04
+48 43 3.57 + .10
+7 25.84
43 3.20
43 19.71

Oct. 2 − .041 − .05

41 41
38.9 ~~20.3~~
42.3 ~~22.4~~
45.4 ~~26.3~~
51.5 ~~29.4~~
54.7 ~~32.6~~
57.9
1.0
4.3
10.5
13.6
16.7 57.891

π₁
41 2.7
4.0
5.7
42 51.5
53.6
55.2
41 4.13
42 53.43

41 57.87
42 6.96
−8.09
−8.08 19
+8.~~20~~ +.00
− .06 −.05
−2.03 +0.18
+6.10
57.87 3.987
3.988 6.19
45 +0.99
1 37.9 3 5.9
24.0 53.1
619 1190
46 30.95 48 59.50

+ 53.76
1.73046
1.64288
+43.94
46 30.95
47 14.89
35 33.46

+383
0.80993n

+ 6.45
− .76
+ .10

+ 5.79
35 39.25 39.10
43 23.9
+7 44.7 −.15 44.5
+7 45.2 45.0
− 369
− 2020
+7 45.69 − 20.20
+7 25.49 +7 45.53
43 4.74 + .10
+7 25.43
43 4.53
2.1.04

Chron. failed
Oct. 12

45
1 44.8 3 3.3
28.5 47.0
733 11.03
46 36.65 48 55.15

Nov. 19 +.21 +.208

41 21.7
24.8
27.9
34.1
37.4
40.4
43.7
46.7
53.0
56.1
59.4
445.2
40.473

41 29.0
30.1
31.5
41 30.20

41 40.45
42 4.77
−24.32
−24.31
+24.05 −.01
+ .24 +.24
−0.84 +1.37
+23.454
40.45 3.90
3.89 6.10
40 +2.02
4 34.4
12.2
466
44 23.30

+ 10.27
1.01157
0.94668n
− 8.84
44 23.30
44 14.46
38 33.89

−6 20 34
+1649
0.82259n

+ 6.65
− .03
+ .13

+ 6.75
38 40.64 38 40.60
43 28.5
+4 47.9 −.04 47.9
+4 48.4 48.4
−829
− 2480
+4 49.13 − 24.80
+4 24.33 +4 48.77
43 4.97 + .22
+4 24.19
43 4.79
21.30

Nov. 21 +.25 +.234

41 26.0
23.2
26.3
32.8
35.8
38.9
~~40.0~~ 42.0
(45.1)
51.3
54.7
57.7
422.7
38.420
3889

41 13.1
14.4
15.3
41 14.27

41 38.87
42 4.71
−26.84
−26.83
+25.67 −.03
+ .29 +.27
−0.78 +1.43
+25.183
38.87 4.05
4.07 6.21
40 +2.07
4 48.6
25.1
737
44 36.85

+ 24.16
1.38310
1.31824n
− 20.81
44 36.85
44 16.04
38 32.31

+1135
0.81745n

+ 6.57
− .17
− .09

+ 6.31
38 38.62 38.56
43 28.5
+4 49.9 −.06 49.8
+4 50.4 50.3
− 829
− 2480
+4 58.01 − 24.80
+4 25.21 +4 49.58
43 3.83 + .22
+4 25.00
43 3.56
20.07

Nov. 23 +.17 +.1784

41 18.8
22.0
25.0
31.3
34.4
37.5
40.6
43.8
50.0
53.1
56.3
412.8
37.527

41 7.2
8.7
9.8
41 8.57

41 37.50
42 4.66
−27.16
−27.156
+26.96 +.00
+ .19 +.20
−0.73 +1.48
+26.423
37.50 3.92
3.93 6.14
40 +2.10
4 51.6
28.2
798
44 39.90

+ 28.96
1.46180
1.39691n
− 24.94
44 39.90
44 14.96
38 33.39

+1848
0.82458n

+ 6.68
− .23
− .09

+ 6.36
38 39.75 39.68
43 28.4
+4 48.7 −.07 48.6
+4 49.2 49.1
− 819
− 2470
+4 49.90 − 24.70
+4 25.20 +4 49.95
43 4.95 + .23
+4 25.48
43 5.16
21.67

1872

Sept. 17	48°	43'	20.3"	
22			21.5	+1.2
27			22.7	1.2
Oct. 2			23.8	1.1
7			24.8	1.0
Nov. 16			28.6	
21			28.5	-.1
26			28.3	.2
1			27.9	.4
Dec. 6			27.5	.4

1873

Oct. 7	43'	40.9"	
12		41.9	+1.0
17		42.7	.8
22		43.4	.7
27		43.9	.5
Nov. 1		44.3	.4
6		44.7	.4
11		44.9	.2
16		44.9	.0

1873 .178 Oct. 13 -.18		-.172 Oct. 14 -.17		+.023 Nov. 2 +.02		+.044 Nov. 4 +.02	
42 3.8	41 51.3	42 4.4	42 0.7	42 10.9		42 10.3	
7.0	53.4	7.5	2.4	14.0		13.4	42 0.7
10.2	55.6	10.7	3.9	16.9		16.6	2.0
16.2		16.8		23.2		22.8	3.8
19.4		19.8		26.4		26.0	
22.4		23.0		29.5		29.0	
25.7		26.3		32.6		32.1	
28.8		29.4		35.7		35.2	
35.1		35.6		42.0		41.4	
38.2		38.7		45.1		44.6	
41.2		41.8		48.3		47.7	
248.0		253.9		324.6		319.1	
22.545	41 53.43	23.082	42 2.33	29.509		29.009	42 2.17
42 22.52		42 23.06		42 29.49		42 28.99	
42 7.92		42 7.90		42 7.44		42 7.39	
+14.60		+15.16		+22.05		+21.60	
+14.61		+15.17		+22.06		+21.61	
-14.45 +.00		-14.95 -.01		-22.09 +00		-21.66 -.02	
- .21	-.20	- .19	-.20	+ .02	+.03	+ .02	+.05
-1.77		-1.75		-1.29		-1.24	
-16.482		-16.8991		-23.365		-22.887	
22.52	6.09	23.06	6.17	29.49	6.13	28.99	6.11
6.10		6.15		6.14		6.12	
35 +2.32		35 +2.34		A.K.		35 +2.52	
3 25.6		3 17.8				2 14.4	
31.1		24.9				8.9	
1 5 6.7		42.7				23.3	
38 28.35		38 21.35				37 11.65	
+ 2911		+ 2075				+ 2684	
1.46404		1.31702				1.42878	
1.39915n		~~1.35213n~~	1.25213n			1.36389n	
-25.07		~~-22.50~~	-17.87			-23.11	
38 28.35		~~38 21.35~~	38 21.35			37 11.65	
38 3.28			38 3.48			36 48.54	
44 45.07		44 44.87				45 59.81	
-6 20 49	0.80660					-6 20 51	
+1215		+146				+1192	
0.81875n		0.80806n				0.81852n	
+ 6.59		+ 6.43				+ 6.58	
- .23		- .13				- .20	
+ .21		- .07				- .35	
+ 6.57		+ 6.23				+ 6.03	
44 51.64	44 51.36	44 51.10	50.83			46 5.84	46 5.66
43 42.1		43 42.3				43 44.6	
-1 9.5 -.28	9.8	-1 8.8 -.27	9.1			-2 21.2 -.18	21.4
-1 9.0	9.3	-1 8.3	8.6			-2 20.7	~~16.4~~ 20.9
- 21.90		- 22.00				- 24.40	
-1 8.83	- 21.90	-1 8.16	- 22.00			-2 19.79	- 24.40
-1 30.73	-1 9.01	-1 30.16	-1 8.44			-2 44.19	-2 20.24
43 20.91	+ .25	43 20.94	+ .25			43 21.65	+ .27
	-1 30.66		-1 30.19				-2 44.37
	43 20.70		43 20.64				43 21.29

1872 1873

Gr. 1586

h m s
21 46 53
9 46 59
106° 31′ ″
73 29
+ 73 28 54
λ = − 64 8 18
106 31 6
− .90

Red. s
1 1.45
2 1.09
3 .73
4 .36
5 0.0

tang δ = −3.37
x = +0.53
Corr = +.15 + .03″
α 1872 = 52.987
α 1873 = 58.510
δ 1872 = 29′ 10.″39 = 30′ 49.″61
δ 1873 = 28 53.58 = 31 6.42

Sept. 27 46ᵐ 52.ˢ73
Oct. 2 53.05 .32
7 53.40 .35
Nov. 16 56.84
21 57.32 .48
26 57.80 .48

dα = +5.524
dδ = −1681

Oct. 17 47ᵐ 0.ˢ51
22 0.91 40
27 1.34 43
Nov. 1 1.88 1m 9.9
6 2.24

reject

1872 Sept 28 .137 −.13	Oct. 2 −.041 −.05	Oct. 12 +.032 +.06	Nov. 19 +.208 +.21	Nov. 21 +.234 +.25	Nov. 27 +.281 +.28
45	46	46	46	46	
29.8 44? 47.0	30.3 45 ~~30.2~~		19.6 45 41.7	18.3 45 52.1	
33.1 45? 48.9	33.8 30.2		23.5 48.0	21.6 55.6	
36.8 51.3	37.7 31.0		26.3 51.8	25.1 58.2	
40.5 52.7	41.5		29.7	28.8	
44.2	44.7	46 ~~48.7~~	34.2	32.8	
47.6	48.4	46.4	37.0	36.5	
50.8 49 15.6	52.5	50.6	40.9	39.0	
54.6 19.6	55.8		44.6	42.6	
58.6 22.8	59.7		48.7	47.0	
396.0	404.4		304.5	292.7	
44.000 49.72 49 19.33	44.933 45 30.60		33.833 45 47.17	32.522 45 55.30	
46 44.05	46 44.99		46 33.89	46 32.58	
46 52.78	46 53.04		46 57.11	46 57.29	
−8.73	−8.05		−23.22	−24.71	
−8.88	−8.20		−23.87	−24.86	
+8.42 +.01	+8.19 +.00		+24.05 −.01	+25.67 −.03	
+ .44 +.46	+ .17 +.14		− .71 −.70	− .84 −.79	
+0.21 +5.73	−0.05 +5.47		−4.12 +1.39	−4.30 +1.22	
+9.10	+8.28		+19.22	+20.585	
46 44.05 53.12	44.99 53.30		33.89 53.11	32.58 53.11	
46 53.15 46 58.67	53.27 58.79		53.11 58.63	53.13 58.65	
0 +0.91	0 +0.99	0	55 +2.02	55 +2.07	55
2 24.3 0 49.5	2 7.0	1 37.2	3 23.7	3 37.6	3 26.8
7.6 34.0	47.8	15.1	57.4	2.2	0.4
31.9 8.35	11.48	5.23	14.11	33.8	2.72
2 15.95 0 41.75	1 57.40	1 26.15	58 10.55	58 16.90	58 13.60
+54.28 114.38	+74.33		+46.66	+37.22	
1.73464 2.05795	1.87116		1.66894	1.57078	
1.28143n 1.54679 1.60476	1.41795n		1.23842	1.14026	
−19.12 −40.25	−26.18		+17.31	+18.81	
2 15.95 15.95	1 57.40		58 10.55	58 16.90	
1 56.83 1 35.70	1 31.22		58 22.86 27	58 30.71	
106 20 51.82 21 12.65	21 17.13		24 20.49	24 17.64	
−64 5 46 2.07183n			−64 6 25	−64 6 36	
+110	+396		+1660	+1135	
2.07293n	2.07579n		2.08843n	2.08218n	
+ .01	+ .01		+ .02	+ .03	
+1 58.29	+1 59.06		+2 2.58	+2 1.11	
+ .44	+ .82		+ .32	+ .21	
+ .15	+ .13		+ .09	− .07	
+1 58.89	+2 0.02		+2 3.01 26	+2 1.48	
106 22 50.41 21.54	23 17.15 23 16.95		26 28.50 23.50 23.18	26 19.12 18.79	
31 51.2 3.7	31 24.9		31 14.8	31 15.0	
−40	+7 47.8 −.20 47.6		+4 46.3 51.3 −.32 51.0	+4 55.9 −.33 55.6	
	+7 ~~48.1~~ 47.3		+4 ~~46.6~~ 50.7	+4 ~~56.2~~ 55.3	
	+7 47.5		+4 46.0	+4 55.6	
+2.71	+1.51		−8.39	−8.39	
−14.10 14.10	−15.30 15.30		−25.20 25.20	−25.40 25.40	
+7 45.34 +7 45.04	+7 45.69 +7 45.53		+4 49.13 +4 48.77	+4 50.01 +4 49.58	
+7 31.24 + .81	+7 30.39 + .89		+4 23.93 + 1.81	+4 24.61 + 1.86	
107 30 21.65 +7 31.75	30 47.54 +7 30.12		30 47.43 +4 25.38	30 43.73 +4 25.04	
	30 47.07		30 48.56	30 43.83	
	31 3.88		31 5.37	0.64	

Sin δ 9.98170
Cos δ 9.45377n 9.45377
.11571n .09302n
9.56948 9.54679n

1872				
Sept. 27	73	28	56.5	
Oct. 2			55.0	-1.5
7			53.6	1.4
12			52.3	1.3
17			51.0	1.3
Nov. 16			45.5	
21			45.0	-.5
26			44.6	.4

1873			
Oct. 7		37.1	
12		35.8	-1.3
Oct. 17	28	34.5	1.3
22		33.3	-1.2
27		32.2	1.1
Nov. 1		31.2	1.0
6		30.3	.9

1873 .172
Oct. 14 -.17

47 46 15.9
0.5 21.0
4.0 24.7
7.5
11.4
14.8
18.4
22.0
25.8
29.3

133.7

14.855 46 20.53

47 14.91
47 0.29
+14.65
+14.50
-14.96 -.01
+ .57 +.58
-1.75
-16.14
47 14.91 58.77
58.77
50 +2.34
1 51.1
59.9
111.0
51 55.50

+54.32
1.73496
1.30444
+20.16
51 55.50
52 15.66

30 32.69

+140
2.073~~23~~n 52
+ .01
+1 58.44
+ .44
- .04

+1 58.85
32 31.54 32 31.39
31 24.7
-1 6.8 -.15 7.0
~~-1 6.5~~ 7.3
-1 7.1

- 18.30 - 18.30
-1 8.16 -1 8.44
-1 26.46 + 2.10
31 6.08 -1 24.64
31 6.75

+.023
Nov. 2 +.02

47 9.5
13.3
17.0
20.7
24.2
27.9
31.5
35.3
38.7

218.1

24.233

47 24.29
47 1.84
+22.45
+22.30
-22.09 +.00
- .07 -.08
-3.33
-25.49 .50
+24.29 58.80
58.79
A.K.

+.044
Nov. 4 +.02

47
~~46~~ 46 6.3
13.0 7.9
17.0 9.2
20.7
24.0
27.3
31.0
34.8
38.4

215.8

23.978 46 7.80

47 24.03
47 2.03
+22.00
+21.85
-21.66 -.02
- .07 -.15
-3.52
-25.~~25~~35
+24.03 58.78
58.68
50 +2.57
0 36.8
31.7
68.5
50 34.25
+73.18
+ ~~66.18~~
1.86439
1.43387
+27.15
50 34.25
51 1.40

31 46.95

-64 6 38 2.07212n
+1193
2.08405n
+ .01
+2 1.35
+ .80
- .10

+2 2.06
33 49.01 33 48.96
31 29.3
-2 19.7 -.05 19.8
~~-2 19.4~~ 20.1
-2 20.0

- 22.90 - 22.90
-2 19.79 -2 20.24
-2 42.69 + 2.27
31 6.32 -2 40.87
31 8.09

+.020
Nov. 5 +.02

47
9.2 46 35.3
12.5 40.3
16.4 44.1
20.0
23.7
27.2
30.8
34.7
38.1

212.6

23.622 46 39.90

47 23.68
47 2.12
+21.56
+21.41
-21.47 +.00
- .07 -.07
-3.61
-25.15
+23.68 58.53
58.53
50 +2.52
0 52.1
48.6
100.7
50 50.35
+43.72
+ ~~103.72~~
1.64068
1.21016
+16.22
50 50.35
51 6.57

31 41.78

+2244
2.09456n
+ .02
+2 4.32
+ .36
- .13

+2 4.57
33 46.35 46.29
31 29.5
-2 16.8 -.06 16.9
~~-2 16.5~~ 17.2
-2 17.1

- 23.10 - 23.10
-2 19.01 -2 19.01
-2 42.11 + 2.27
31 4.24 -2 40.84
31 5.45

+.002
Nov. 6 +.00

47
24.3 24.3
28.0 24.4
31.1 23.8
34.9 24.0
38.5 24.0

24.100

47 24.15
47 2.21
+21.94
+21.79
-21.35 -.01
- .00 -.01
-3.70
-25.05 .07
+24.15 59.10
59.08
A.K.

79 Draco. = 3.2 ~~tan~~ tang δ = + 3.291
x = –.052
Sin δ 9.98083
Cos δ 9.46345 9.46345
.11571n .09302
9.57916n 9.55647n

α1872 = 51m 16s.360 5′ 47″.48
α1873 = 51 17.117 6 6.15
5.97

h m s
21 51 20
21 51 17
73° 06′ ″
+ 73 06 05
Z = – 30 43 17 α1872
–0.51 α1873
cos α =

~~Reject~~

Sept. 23 – .14 1872 –.134
50
43.4
51.4
57.3
4.6
11.8
21.5 ~~18.9~~
18.9
25.8
33.0
40.0
2862
106.2
11.800
51 11.75
+ 8.37
– .44
– 3.09
51 16.59

Sept. 28 – .14 –.137
50
57.1 50 7.6
0.6
4.5
7.7 52 36.8
11.4 38.4
14.8 39.5
18.1
22.1
25.2
1615
1015
11.278 50 7.60
52 38.23
51 11.23
+ 8.43
– .45
– 2.86
51 ~~16.45~~
16.35

Oct. 2 – .05 –.041
50
57.0 50 45.9
0.4 48.3
4.0 52.7
7.2
10.8
14.7
18.0
(21.6)
25.5
11.022 50 48.97
51 10.97
+ 8.19
– .13
– 2.64
51 16.39

Oct. 12 + .06 +.032
50
56.8 50 26.8
0.0 29.4
3.7 √ 32.0
7.7
11.0
14.4
18.2
21.7 √
24.9
1584
98.4
10.932 50 29.40
51 10.88
+ 7.24
+ .10
– 2.10
51 16.11

Nov. 19 + .21 +.208
50
37.0 50 0.8
40.6 3.0
44.1 6.8
47.6 7.7
51.2
54.7
58.2
1.8
5.6
3408
460.8
51.200 50 54.45
50 51.15
+ 24.04
+ .68
+ 0.51
51 16.38

~~Oct.~~ Nov. 21 + .25 +.234
50
35.2 49 51.6
38.7 55.2
42.2 58.7
46.0
49.2
52.9
56.3
59.9
3.4
383.8
448.8
49.311 49 55.17
50 49.26
+ 25.65
+ .77
+ 0.66
51 16.34

D. R.

+.091
20 25
4 45.9 0 39.9
32.5 26.1
78.4 66.0
24 39.20 25 33.00
+ 63.68
+ ~~3.68~~
1.80400
1.36047
+ 22.93
24 39.20
25 2.13
′ ″
+ ~~72~~ 20 57 46.22
– 30 42 41 1.53390n
+ 110
1.53500n
+ 34.28
– .61
+ .32 –.47
+ 33.99
+ 72 58 20.21 58 19.74
– 18.57
+ 7 45.34
+ 7 26.77
+ 73 5 46.98
– 18.57
+ 7 45.04
+ .46
+ 7 26.93
5 46.67

+.099
25
0 0.2
46.2
106.4
25 53.20
+ 22.05
1.34341
0.89988
+ 7.94
24 53.20
25 1.14
57 47.21
+ 3.96
1.53786n
+ 34.50
– .08
+ .34 –.49
+ 34.76
58 21.97
– 19.71
+ 7 45.69
+ 7 25.98
5 47.95
21.48
– 19.71
+ 7 45.53
+ .50
+ 7 26.32
5 47.80

+1.19
20
4 56.0
41.8
97.8
24 48.90
+ 41.22
1.61511
1.17158
+ 14.84
24 48.90
25 3.74
57 44.61
+ 13.20
1.54710n
+ 35.24
– .25
+ .14 –.48
+ 35.13
58 19.74
– 22.31
+ 7 47.83
+ 7 25.52
5 45.26
19.26
– 22.31
+ 7 47.64
+ .60
+ 7 25.43
5 45.19

+2.02
20
2 26.6
2.8
29.4
22 14.70
+ 46.75
1.66978
1.24894n
– 17.74
22 14.70
21 56.96
0 51.39
– 30 42 51
+ 16.60
1.55050n
+ 35.52
– .34
+ .07 –.22
+ 35.25
01 26.64 1
– 27.76
+ 4 49.13
+ 4 21.37
5 48.01
26.42
– 27.76
+ 4 48.77
+ 1.02
+ 4 22.03
5 48.45

+2.07
20
2 31.9
5.7
37.6
22 18.80
+ 54.14
+ ~~44.14~~
1.73352
1.31268n
– 20.54
22 18.80
21 58.26
0 50.09
+ 11.35
1.54525n
+ 35.10
– .43
– .05 –.23
+ 34.62
01 24.71
– 27.83
+ 4 50.01
+ 4 22.18
5 46.89
24.48
– 27.83
+ 4 49.58
+ 1.04
+ 4 22.79
5 47.27

h m s
21 5 18 18
° ′ ″ ″
+ 73 6 3 29

+.174
Nov.23 +.17

50
34.3 49 32.5
37.4 35.6
40.8 38.1
44.3
47.9
51.6
55.2
58.8
2.3

3926
4826
48.066 49 35.40

50 48.021
+26.97
+ .57
+0.81

51 16.376

+2.10
20
2 36.8
11.5
48.3
22 24.15

+ 7267
1.86136
1.44052n
− 27.58
22 24.15
21 56.57

0 51.78

+1854
1.55244 n

+ 35.68
− .81
− .05 −.24

+ 3482
1 26.60 26.36
− 27.87
+4 49.90
+4 22.03
5 48.63

− 27.87
+4 49.95
+ 1.06
+4 23.14
5 49.50

+.281
Nov.27 +.28

20
2 27.5
3.2
30.7
22 15.35

1873.172
Oct.14 −.17

51 50 56.4
28.0 59.0
23.6 51 2.6
27.0
30.8
34.3
37.8
41.3
44.8
48.6

3082
34.244 50 59.23

51 34.19
− 14.96
+ .56
− 1.57

51 17.10

+2.34
15
0 56.3
1.8
1181
15 59.05

+3491
1.54295
1.12211n
− 1325
15 59.05
15 45.80

7 2.55

− 30 43 6 1.53400n
+140
1.53540n

+ 34.31
− .19
− .02 −.08

+ 34.10
7 36.65 7 36.57
− 22.49
−1 8.16
−1 30.65
6 6.00

− 22.49
−1 8.44
+ 1.19
−1 29.74
6 6.83

−.199
Oct.21 −.20

51 50 25.0
22.6 28.4
26.1 31.8
29.8
33.0
36.6
40.2
43.6
47.1
50.8

3298
36.644 50 28.40

51 36.59
− 17.74
− .65
− 1.13

51 17.07

+ 2.40
15
0 58.2
1.3
1195
15 59.75

+68.24
1.83404
1.41320n
− 25.89
15 59.75
15 33.86

7 14.49

−

19.65
+ 1.21

+.023
Nov.2 +.02

51 50 49.7
(25.4) 51.6
28.0 54.1
32.3
35.9
39.4
42.9
46.6
50.1
53.6

39.467 50 51.80

51 39.42
− 22.09
+ .07
− 0.32

51 17.08

+2.49
10
4 54.0
48.2
102.2
14 51.10

+ 4767
1.67825
1.25744n
− 18.09
14 51.10
14 33.01

8 15.34

− 30 43 6
+ 1143
1.54543n

+ 35.11
− .34
− .77 −.39

+ 34.00
8 49.34 8 48.95
− 24.03
−2 19.24
−2 43.27
6 6.07

− 24.03
−2 17.53
+ 1.26
−2 42.30
6 6.15

+044
Nov.4 +.02

51
24.8 50 53.0
28.2 55.6
32.0 59.8
35.4
38.7
42.6
46.1
49.7
53.0

3508
38.944 50 56.13

51 38.89
− 21.68
+ .14
− .18

51 17.17

+2.52
10
4 52.3
43.2
95.5
14 47.75

+ 42.81
1.63155
1.21071n
− 16.25
14 47.75
14 31.50

8 16.85

+1193
1.54593n

+ 35.15
− 28
− .77 −.38

+ 34.10
8 50.95 50.57
− 26.35
−2 19.79
−2 46.14
6 4.81

− 26.35
−2 20.24
+ 1.28
−2 45.31
6 5.26

79 Draco.

21 51 20

73 06

Sin δ 9.98083
Cos δ 9.46345
, 11571n
9.57916n

1873 +.020
Nov. 5 +.02

+.002
Nov. 6 +00

51 24.6 51 15.6 | 51 24.4 59 0.3
28.0 17.8 | 28.1 2.8
31.6 20.9 | 31.6 6.1
35.4 | 34.9
38.6 | 38.6
41.9 | 42.2
45.9 | 45.8
49.4 | 49.1
52.8 | 52.7

248.2 | 347.4

38.689 51 18.10 | 38.600 ~~50 3.03~~
~~50~~ 49 3.07

51 38.64 | 51 38.55
21.47 | 21.36
+ .06 | + .01
− 0.11 | − 0.04

51 17.12 | 51 17.16

A.R.

+252
10
4 51.8
41.1
92.9
14 46.45

+ 20.59

+ ~~95.53~~ 35.53
1.98014 1.55060
1.55930n 1.12976
− ~~36.25~~ − 13.48
14 46.45 46.45
14 ~~10.20~~ 32.97

8 38.15 15.38

+2222
1.55622n

+ 35.99
− 1.38

− .77 −22

+ 3384
73 9 11.998 49.22
−26.63
−2 19.57 8 49.20
−2 46.20
+73 6 ~~25.49~~ 6 3.02

− 26.63
−2 19.69
+ 1.28
−2 ~~44.04~~
~~6~~ ~~5.16~~

1872

21 Pegasi
h m s
21 54 54
21 54 54
+12° 30′ ″
+12 30 45
Z = +29 52 3
+.50

tang δ = +.22
x = −.016
Corr = −.04 −.05
α 1872 = 51.249
α 1873 = 54.172
δ 1872 = 30′ 27.53″
δ 1873 = 30 44.61

		m	s	
Sept.	17	54	53.53	
	22		.50	3
	27		.46	4
″ Oct.	2		.42	4
Oct.	7		53.37	5
Nov.	16		52.85	
	21		.78	7
	26		.72	6
Dec.	1		.66	6
	6		52.60	6

Sin δ 9.33591
Cos δ 9.98955 9.98955
.1157n .09302
.10526n .08257n

dα = +2.923
dδ = +17.08

1872

			° ′ ″
Sept.	17		12 30 41.9
	22	+.5	42.4
	27	.4	42.8
Oct	2	.4	43.2
	7, 12	.4	43.6
			42.7
Nov	16		43.8
	21	−.4	43.4
	26	.4	43.0
Dec.	1	.3	42.7
	6	.3	42.4

Sept 1872 28 −.137 −.13
54 32.4
34.4 54 9.1
36.5 10.7
40.7 11.6
42.9
44.9
47.0 55 20.2
49.3 21.1
53.5 22.5
55.6
57.7
494.9
44.991 54 10.47
55 21.27
54 44.98
54 53.45
−8.47
−8.43
+8.42 +.01
− .03 −.03
−2.20 +0.72
+6.14 .20
54 44.98 51.17
54 51.18 54 54.10
55 +0.91 0
3 37.7 0 3.0
32.9 4 59.9
70.6 122.9
58 35.30 0 1.45
+34.52
1.53807
1.62064
+41.75
58 35.30
59 17.05
° ′ ″
+12 23 31.30
+29 51 34 1.51920
+125
1.52045
*− 33.15
− .14
+ .25
− 33.04
+12 22 58.26 22 57.90
30 42.9
+7 44.6 −.36 44.2
−.05 +7 44.1 43.7
+1.68
−15.40
+7 45.34 − 15.40
+7 29.94 +7 45.04
+12 30 28.20 .46
+7 29.18
30 27.08
30 44.16

Oct. 2 −.041 −.05
54 32.4
34.6 54 20.0
36.7 21.7
40.9 22.8
43.0
45.0
47.1
49.4
53.6
55.8
57.9
496.4
45.127 54 21.50
54 45.11
54 53.42
−8.31
−8.27
+8.19 +.00
− .01 −.01
−2.17 +0.75
+6.01
45.11 51.12
51.12 54.04
55 +0.99
3 51.1
46.1
97.2
58 48.60
+23.63
1.37346
1.45603
+28.68
58 48.60
59 17.18
23 31.17
+409
1.52329
*− 33.36
− .06
+ .27
− 33.15
22 58.02 57.64
30 43.2
+7 45.2 −.38 44.8
+7 44.7 44.3
+1.38
−15.70
+7 45.69 − 15.70
+7 29.99 +7 45.53
30 28.01 − .50
+7 29.33
30 26.97
44.05

Oct. 12 +.032 +.06
54 33.3
35.4 54 9.0
37.5 10.2
41.8 11.2
43.9
46.0
48.1 55 24.0
50.3 24.7
54.4 25.9
56.6
58.7
506.0
46.000 54 10.13
55 24.87
54 45.98
54 53.32
−7.34
−7.30
+7.25 −.01
+ .01 +.01
−2.07 +0.85
+5.18
45.98 51.17
51.16 54.08
55 +1.19 0
3 39.7 0 8.5
30.1 4 1.8
69.8 10.8
58 24.90 0 5.15
+35.87
1.55473
1.63730
+43.38
58 34.90
59 18.28
23 30.07
+1346
1.53266
*− 34.09
− .14
+ .11
− 34.12
22 55.95 55.59
30 43.7
7 47.8 −.36 47.4
+7 47.3 46.9
+0.88
−16.20
+7 47.83 − 16.20
+7 31.63 +7 47.64
30 27.58 − .59
+7 30.85
30 26.44
43.52

Nov. 19 +.208 +.21
54 16.1
18.2 54 9.4
20.3 10.6
24.4 11.6
26.5
28.7
30.8
32.9
37.0
39.1
41.3
315.3
28.664 54 10.53
54 28.65
54 52.81
−24.16
−24.12
+24.06 −.01
+ .05 +.05
−1.56 +1.36
+22.584
28.65 51.20
51.19 54.11
55 +2.02
1 49.1
34.7
83.8
56 41.90
+18.13
1.25840
1.36366n
−23.10
56 41.90
56 18.80
26 29.55
+29 51 31
+1670
1.53590
*− 34.35
− .03
+ .05
− 34.33
25 55.22 25 55.05
30 43.5
+4 48.3 −.17 48.1
+4 47.8 47.6
+1.08
−16.00
+4 49.13 − 16.00
+4 33.13 +4 48.77
30 28.35 − 1.11
+4 31.76
30 26.81
43.89

Nov. 21 +.234 +.25
54 14.4
16.5 54 7.3
18.6 8.5
22.8 9.7
24.9
27.0
29.2
31.3
35.5
37.6
39.7
297.5
27.045 54 8.50
54 27.03
54 52.78
−25.75
−25.71
+25.68 −.03
+ .06 +.05
−1.53 +1.39
+24.24 .17
27.03 51.24
51.20 54.12
55 +2.07
1 50.4
34.2
84.6
56 42.30
+18.54
1.26811
1.37337n
−23.63
56 42.30
56 18.67
26 29.68
+1135
1.53055
*− 33.93
− .04
− .03
− 34.00
25 55.68 55.51
30 43.4
+4 47.7 −.17 47.5
+4 47.2 47.0
+1.18
−15.90
+4 50.01 − 15.90
+4 34.11 +4 49.58
30 29.79 − 1.03
+4 32.65
30 28.16
45.24

Nov. 23 +.174 +.17
54 13.0
15.2 54 8.5
17.3 9.4
21.6 10.3
23.6
25.7
27.8
30.0
34.1
36.3
38.4
288.0
25.727 54 9.40
54 25.71
54 52.75
−27.04
− ~~27.00~~ 26.97
+ ~~27.00~~ .00
+ .04 +.04
−1.50 +1.42
+25.~~54~~43
25.71 51.14
51.14 54.06
55 +2.10
1 47.9
32.8
80.7
56 40.35
+16.33
1.21299
1.31825n
−20.81
56 40.35
56 19.54
26 28.81
+1860
1.53780
*− 34.50
− .02
− .03
− 34.55
25 54.26 54.09
30 43.2
+4 48.9 −.17 48.7
+4 48.4 48.2
+1.38
−15.70
+4 49.90 − 15.70
+4 34.20 +4 49.95
30 28.46 − 1.05
+4 33.20
30 27.29
44.37

1873

20 Pegasi
21 54 54
+12 30

Oct 7 54m 56.45s
12 .39 6
17 33 6
22 .27 6
27 56.21 6
Nov 1 .15 6
6 .09 6

tan δ = +.22
x = −.176
1873 α = 54.172

Sin δ 9.33534
Cos δ ~~9.98951~~5 9.98951 5
.11571n
.1052~~1~~6n

Dec. 7 +.26 (+.255)

54 20.4
22.5 54 11.4
24.6 12.4
28.8 13.3
30.9
33.0
35.1
37.2
41.4
43.5
45.7
363.1
33.009 54 12.37

54 32.99 32.99
54 ~~55.69~~ 52.59
− ~~22.70~~ −19.60
− ~~22.66~~ −19.56
+ ~~9.27~~ 19.51 +.00
+ .06 +.06
− ~~4.44~~ 1.34
+ ~~15.13~~ ~~17.99~~ +18.23
54 32.99 ~~17.46~~
~~51.22~~ 51.22
55 .22 +2.32 54.14
1 56.1
39.4
95.5
56 47.75

+ 20.64
1.31471
1.41997n
− 26.30
56 47.75
56 21.45
+12 26 26.90

− .05
− .05

+12
30 42.3

+ 2.28
− 14.80
+4 50.02 − 14.80
+4 35.22 +4 49.67
− 9.16
+4 33.71

Oct. 14 −.17 (1873.172)

54 58.7 54 47.6
55 0.8 48.6
2.9 49.6
7.1
9.4
11.3
13.4
15.5
19.8
21.9
24.0
184.8
124.8
11.345 ~~54 46.27~~ 54 48.60

55 11.32
54 56.36
+14.97
+15.01
− 14.96 −.01
− .04 −.04
−2.19
− 17.19 20
55 11.33 54.14
54.13
50 +2.34
0 31.8
36.1
67.9
50 33.95

+22.74
1.35679
1.46205n
−28.98
50 33.95
50 4.97
32 48.38

+29 51 13
+132
1.52042

* − 33.15
− .06
− .01
− 33.22
32 10.16 32 10.11
31 0.7
−1 9.5 −.05 9.6
−1 10.0 10.1

− 16.10
−1 8.16 − 16.10
−1 24.26 −1 8.44
30 45.90 − 1.17
−1 25.41
30 44.40

Oct. 21 −.20 (−.199)

54 56.0 55 1.5
57.0 3.7
58.2 5.6
9.8
12.0
14.2
16.2
18.3
22.5
24.5
26.7
155.0
14.091 54 57.07

55 14.08
54 56.28
+17.80
+17.84
− 17.76 +.01
− .04 −.04
− 2.11
− 19.94 0
14.08 54.19
54.18
45 +2.40
4 15.0
15.4
30.4
49 15.20

+ 17.02
1.23096
1.33622n
− 21.69
49 15.20
48 53.51
33 54.84

1.51910 +29 51 14
− 517
1.51393

* − 32.65
− .03
− .08
− 32.76
33 22.08 33 21.74
31 1.0
−2 21.1 −.34 21.4
−2 21.6 21.9

−16.40
−2 19.33 − 16.40
−2 35.73 −2 19.65
30 46.35 − 1.20
−2 37.25
30 44.49

Nov. 1 −.04 (−.047)

55 5.6 54 58.4
7.8 59.6
9.8 55 1.0
14.0
16.2
18.3
20.5
22.4
26.6
28.8
30.9
200.9
18.264 54 59.67

55 18.25
54 56.15
+22.10
+22.14
− 22.12 +.01
− .01 −.01
−1.98
−24.10
18.25 54.14
54.15
45 +2.49
4 19.3
11.9
31.2
49 15.60

+ 18.59
1.26928
1.37454n
− 23.69
49 15.60
48 51.91
33 56.44

+1822
1.53732

* − 34.46
− .04
− .67
− 35.17
33 21.27 21.93
31 1.0
−2 20.3 −.34 20.6
−2 20.8 21.1

− 16.40
−2 19.23 − 16.40
−2 35.63 −2 19.37
30 45.64 − 1.74
−2 37.01
30 43.92

Nov. 2 +.02 (+.023)

55 5.6 54 58.3
7.6 59.4
9.7 55 0.4
14.0
16.2
18.3
20.3
22.4
26.6
28.6
30.6
199.9
18.173 54 59.37

55 18.16
54 56.14
+22.02
+22.06
− 22.09 +.00
+ .00 +.00
−1.97
−24.06
18.16 54.10
54.10
45 +2.49
4 20.0
12.7
32.7
49 16.35

+ 18.80
1.27416
1.37942n
−23.96
49 16.35
48 52.39
33 55.96

+1135
1.53045

* − 33.92
− .04
− .69
− 34.65
33 21.31 20.97
31 1.0
−2 20.3 −.34 20.6
−2 20.8 21.1

−16.40
−2 19.24 − 16.40
−2 35.64 −2 19.53
30 45.67 − 1.24
+2 37.17
30 43.80

Chf
Nov. 4 +.02 (+.044)

45
4 22.2
11.5
33.7
49 16.85

1873

		'	"	
Oct.	7	30	60.4	
	12		60.6	+2
	17		60.8	2
	22		61.0	2
	27		61.1	+1
Nov.	1		60.0	−1
	6		60.8	2
	11		60.8	0
	16		60.8	0

+.020
Nov. 5 +.02

55 4.9
7.1 54 55.4
9.2 56.7
13.4 58.1
15.6
17.6
19.6
21.7
25.9
28.0
30.2
1932

17.564 54 56.73

55 17.55
54 56.10
+21.45
+21.49
− 21.47 +.00
+ .00 +.00
−1.93
−23.40
55 17.55 54.15
54.15
45 +2.52
4 23.6
13.2
3.6.8
49 18.40

+ 2083
1.31869
1.42395n
− 2654
49 18.40
48 51.86

33 56.49

+2244
1.54154

+− 34.80
− .05
− .69

− 35.54
33 20.95 20.61
31 0.8
−2 20.1 −.34 20.4
−2 20.6 20.9

− 16.20
−2 19.01 — 16.20
−2 35.21 −2 19.01
30 45.74 — 1.26
−2 36.47
30 44.14

+.002
Nov. 6 +.00

55 4.9
6.9 55 0.4
8.9 1.7
13.0 2.8
15.3
17.4
19.4
21.7
25.9
27.9
30.0
1913

17.391 55 1.63

55 17.38
54 56.09
+21.29
+21.33
− 21.35 −.01
+ .00 +.00
−1.92
−23.28
17.38 54.11
54.10
45 +2.52
4 15.8
3.3
191
49 9.55

+ 1576
1.19756
1.30282n
− 2008
49 9.55
48 44.47

33 58.88

+2241
1.54151

+− 34.79
− .02
− .66

− 35.47
33 23.41 23.08
31 0.8
−2 22.6 −.33 22.9
−2 23.1 23.4

− 16.20
−2 19.57 — 16.20
−2 35.77 −2 19.69
30 47.64 — 1.26
−2 37.15
30 45.93

1872

1873

a Aquarii
h m s
21 59 15
~~21 59 15~~
− 0 57 "
− 0 56 09
z = + 43 18 57
sin. z = +.68 9

tang δ = −.02
x = −.015
cos α = +.04
α 1872 = 12.529
α 1873 = 15.612
δ 1872 = 56′ 26″.75
δ 1873 = 56 9.42

	m	s	
Sept. 17	59	14.91	
22		14.88	3
27		14.85	3
Nov. 16		14.29	
21		.23	6
26		.17	6
Dec. 1		.11	6
6		.06	5

	m	s	
Oct. 7	59	18.06	
12		18.01	5
17		17.95	6
22		17.90	5
27		17.84	6
Nov. 1		17.78	6
6		17.81	7

dα = +3.083
dδ = +17.33

Sept. 28 1872 −.137 −.13
59
2.8
3.4
4.4
5.4
6.4
7.5
8.6
9.6
10.6
58 2 !
6.466.
59 6.45
59 14.84
− 8.39
~~− 8.43~~
+ 8.42 +.01
+ .00 +.00
− 2.31 +0.77
+ 6.12
59 6.45 12.56 58
59 12.57 59 15.65
Y.K
− 01

Nov. 19 +.208 +.21
58 37.8
40.0 58 26.2
42.0 27.4
46.1 28.7
48.2
50.1
52.2
54.3
58.5
0.6
2.7
4825
5525
50.227 58 27.43
58 50.21
59 14.25
− 24.04
~~− 24.08~~
+ 24.06 −.01
− .00 ~~−.00~~
− 1.72 +1.28
+22.343
50.21 12.55
12.54 15.62
20 +202
3 31.1
18.0 ?
4.41
23 24.55
+2280
1.35793
1.47358n
− 29.76
23 24.55
22 54.79
− 41 00 6.44
+ 43 18 7 1.73400
+1680
1.75080
*− 56.34
± 00
+ .10
56.24
− 1 *2.68 1 2.34
56 15.2
+ 4 47.5 −.34 47.2
± 5.83
* 11.50
+ 4 49.13
+ 4 37.63 − 11.50
− 0 56 25.05 +4 48.77
+.79 − 1.39
~~0 56 25.84~~ +4 35.88
− 0 56 24.26 56 26.46
56 9.13

Nov. 21 +.234 +.25
58 36.3
38.3 58 28.2
40.4 29.1
44.5 30.2
46.5
48.6
50.6
52.7
56.8
58.8
0.8
4743
5343
48.573 58 29.17
58 48.56
57 14.23
− 25.67
~~− 25.71~~
+ 25.68 −.03
− .01 ~~−.00~~
− 1.70 +1.38
+23.975
48.56 12.53
12.51 15.59
20 +207
3 28.7
13.0 ?
417
23 20.85
+ 1940
1.28780
1.40345n
− 25.32
23 20.85
22 55.53
0 7.18
+1135
1.74535
*− 55.63
00
− .07
55.70
− 1 2.88 2.55
56 15.3
+ 4 47.6 −.33 47.3
± 5.93
* 11.40
+ 4 50.01
+ 4 38.61 − 11.40
56 24.27 +4 49.58
+.79 − 1.42
+4 36.76
56 23.48 56 25.79
8.46

Nov. 23 +.174 +.17
58 34.9
36.9 58 30.0
39.0 30.8
~~41.1~~ 31.7
43.1
45.2
47.2
49.2
51.4
55.4
57.6
59.7
5196
47.236 58 30.83
58 47.22
59 14.20
− 26.98
~~− 27.02~~
+ 26.97 +.00
− .00 −.00
− 1.67 +1.41
+25.30
47.22 12.52
12.52 15.60
20 +210
3 26.2
11.6
37.8
23 18.90
+ 1641
1.21511
1.33076n
− 21.42
23 18.90
22 57.48
0 9.13
+1866
1.75266
*− 56.58
00
− .07
56.65
− 1 5.78 5.45
56 15.4
+ 4 50.4 −.33 50.1
± 6.03
* 11.30
+ 4 49.90
+ 4 38.60 − 11.30
56 27.18 +4 49.95
+ 79 − 1.44
+4 37.21
56 26.39 56 28.24
10.91

Nov. 27 +.281
20
3 30.1
17.1
47.2
23 23.60

Dec. 7 +.255 +.26
58 (~~42.1~~)
~~44.2~~ 59 1.1
~~46.3~~
50.3
52.5
54.6
56.6
58.7
~~0.7~~
~~4.8~~
~~6.9~~
54.540 59. 1.10
58 54.53
59 14.05
− 19.52
~~− 19.56~~
+ 19.51 +.00
− .01 −.01
− 1.52 +1.46
+17.98 ∫
54.53 12.51
12.51 15.58
20 +232
2 57.7
40.8
98.5
22 49.25
− 656
0.81690n
0.93255
+ 856
22 49.25
22 57.81
0 9.46
− .08
+ 4 50.02
+.79

Sin δ 8.21189n
Cos δ 9.99994 9.99994
.11571n .09302
.11565n .09296n

1872				
Sept. 17	−0 56	13.9		
22		13.9	+.0	
27		13.8	.1	
2		13.7	.1	
Oct. 7		13.6	.1	
Nov. 16		14.9		
21		15.3	+.4	
29		15.6	3	
Dec. 1		15.9	3	
6		16.2	3	

1873	′	″		
Oct. 7	55	56.4		
12		56.4	*0	= 3
17		56.5	1	
22		56.6	1	
27		56.7	1	
Nov. 1		56.9	2	
6		57.0	2	
11		57.3	2	
16		57.6	3	

1873 Oct. 14 −.17 .172

59 20.6
22.7
24.7
28.8
31.0
33.0
35.0
37.0
41.0
43.2
45.2
362.3
32.936

59 11.9
12.9
13.0
14.0
59 ~~12.70~~
59 12.95

59 32.92
59 17.99
+14.93
~~+14.89~~
− 14.96 −.01
+ .00 +.00
− 2.38
−17.345
32.92 ~~.026~~ 15.58
15.57
15 +2.34
2 5.0
10.4
15.4
17 7.70
+ 19.99
1,30094
~~1.41656~~n 1.41646n
− 26.10 − 26.09
17 7.70 17 7.70
16 41.61
53 53.26
+43 17 50 1,73410
+125
1,73535
* − 54.37
.00
− .04
− 54.41
54 47.67 54 47.50
55 56.5
−1 8.8 −.17 9.0
* 12.90
−1 8.16
−1 21.06 − 12.90
56 8.43 −1 8.44
+1.50 − 1.61
56 7.23 −1 22.95
56 10.45

Oct. 21 −.20 −.199

59 (23.3)
25.4
27.5
31.6
33.6
35.7
37.8
39.8
44.0
46.1
48.3
393.1
35.736

59 30.0
59 30.00

59 35.72
59 17.91
+17.81
~~+17.77~~
−17.76 +.01
+ .00 +.00
− 2.30
−20.065
35.72 15.66
15.67
15 +2.40
0 37.0
38.0
73.0
15 37.50
+ 5.74
0.75891
0.87456n
− 7.49
15 37.50
15 30.01
52 41.66
+43 17 51
− 534
1,72876
* − 53.55
.00
− .01
− 53.56
53 35.22 53 35.17
55 56.6
−2 21.4 −.05 21.5
* 12.80
2 19.33
−2 32.13 − 12.80
56 7.35 −2 19.65
+1.50 1.65
56 5.85 −2 34.10
56 9.27

Nov. 1 −.04 −.047

59 27.4
29.7
31.7
33.8
37.9
40.0
41.9
44.0
48.0
50.2
52.3
438.9
39.900

59 16.6
17.9
19.3
59 17.93

59 39.89
59 17.78
+22.11
~~+22.07~~
− 22.12 +.01
+ .00 +.00
− 2.17
− 24.278
39.89 15.60
15.61
15 +2.49
0 1.0
53.0
114.0
~~14~~ 15 57.00
+ 21.97
1,34183
1.45748n
15 − 28.67
~~14~~ 57.00
~~14~~ 15 28.33
5~~1~~2 39.98
+1832
1,75242
* − 56.55
.00
− .78
− 57.33
5~~2~~3 37.31 37.22
55 56.9
−2 19.6 −.09 20.0
* 12.50
−2 19.23
−2 31.73 − 12.50
9.04 −2 19.37
+1.50 − 1.71
7.54 −2 33.58
56 10.80

Nov. 2 +.02 +.023

59 27.4
29.6
31.6
33.8
37.8
39.9
42.0
44.0
48.1
50.2
52.2
438.6
39.873

59 17.7
19.0
20.4
59 19.03

59 39.86
59 17.77
+22.09
~~+22.05~~
− 22.09 +.00
− .00 −.00
− 2.16
−24.25
39.86 15.61
15.61
15 +2.49
0 60.0
51.9
111.9
15 55.95
+ 20.84
+ ~~29.84~~
1,31890
1,43455n
− 27.20
15 55.95
15 28.75
52 40.40
+1127
1,74537
* − 55.64
.00
− .14
− 55.78
53 36.18 36.11
55 56.9
−2 20.7 −.07 20.8
* 12.50
−2 19.24
−2 31.74 − 12.50
56 7.92 −2 19.53
+1.50 − 1.71
56 6.42 −2 33.74
56 9.85

Ch. f. +044
Nov. 4 +.02

13
0 3.3
− 6.8
3 5
~~15 1.75?~~
14 58.25

Nov. 5 +.02 +.020

59
26.9
29.0
31.0
35.1
37.1
39.3
41.3
43.4
47.4
49.5
51.6
430.6
39.273

59 18.6
19.7
20.8
59 19.70

59 39.26
59 17.72
+21.54
~~+21.50~~
− 21.47 +.00
− .00 −.00
− 2.11
− 23.58
39.26 15.68
15.68
15 +2.52
0 57.8
48.0
105.8
15 52.90
+ 19.57
1,29159
1.40724n
− 25.54
15 52.90
15 27.36
52 39.01
+2244
1,75654
* − 57.09
.00
− .14
− 57.23
53 36.24 36.17
55 57.1
−2 20.9 −.07 21.0
* 12.30
2 19.01
−2 31.31 − 12.30
56 7.55 −2 19.01
+1.50 − 1.73
56 6.05 −2 33.04
56 9.21

α Aquarii

21 59 15

− 0 57

Sin δ 8.21958n
Cos δ 9.99994
.11571n
.11565n

1872.0 α	δ	1873.0 α	δ
12.57	24.26	15.57	7.23
.54	23.48	.67	5.85
.51	26.39	.61	7.54
.52		.61	6.42
.51		.68	6.05
		.56	5.73
12.530	24.71 −1.58	15.617	6.47 −3.00
.529	26.75	.612	9.42
+.001	+2.04	+.005	+2.95
	26.29		9.47
	.75		.42
	+ 46		−.05

1873 + .002
Nov. 6 − .00

C h J
Nov. 9

59 (26.6)
28.7 59 53.7
30.7 54.6
34.9 56.0
37.0
39.1
41.2
43.2
47.3
49.3
51.4
4294

39.036 59 54.77

59 39.02
59 17.71
+21.31
~~+ 21.27~~
− 21.35 −.01
+ .00 − 7.00
− 2.10
− 23.4~~5~~6
59 39.02 15.57
59 15.56
15 +2.52
0 12.1
0.0
12.1
15 6.05
− 15.73
+ ~~15.73~~
1.19673n
1.31238
+2053
15 6.05
15 26.58

52 38.23

+2261
1.75671

∗ − 57.11
.50

− .02

57.13
0° 53 35.36 53 35.35
55 57.1
− 2 21.7 −.01 21.7

∗ 12.30
− 2 19.57
− 2 31.87 − 12.30
56 7.23 − 2 19.69
+1.50 − 1.43
56 5.73 − 2 33.72
56 9.07

1872

1872

20 Cephei
h m s
22 01 08
22 01 09
+ 62° 09′
+ 62 09 58″
Z = − 19 47 10
− .34

Tang δ = +1.89
x = −.133
corr = +.12 +1.3″
α1872 = 6.945 δ = 9′ 40.80″
α1873 = 8.759 δ = 9 58.25

Sept 17 1m 9.65s
22 9.54 11
27 9.43 11
Oct 2 9.10 13
7 9.16 14
12 9.01 15
Nov. 16 7.67
21 7.46 .21
26 7.26 .20
Dec 1 7.06 .20
6 6.86 .20

dα = +1.813
dδ = +17.45

Sin δ 9.94660
Cos δ 9.66922 9.66922
1.1571n .09302
9.78493n 9.76224n

° ′ ″
62 9 56.4
57.9
59.3
60.7
62.1

Sept 17 62 9 55.5 72.9
22 58.1 74.5 +16
27 58.6 76.0 .15
Oct 2 60.1 77.4 14
7 61.4 78.7 13
12 62.6 79.9 12
17 63.7 81.1 12
22 82.1 11.0
27 65.7 83.1 10
Nov. 16 68.1
21 68.1
26 68.2

Nov 16 85.5
21 85.5
26 85.6
Dec 1 85.6
6 85.7

1872 Sept. 28 −.13 −.137
00
52.6 59 43.0
54.7 44.9
56.8 48.0
58.8
1.0
3.7 01 59.7
5.8 1.6
8.0 3.9
10.3
2577
11.4
1.300 59 45.30
1 1.73
1 1.27
1 9.40
− 813
− 835
+ 842 +.01
− .25 −.26
− 246 −0.65
+ 5.71
1 1.27 6.98
1 6.98 1 8.79
20 +0.91
0 15.1 1 36.3
3.9 24.4
19.0 607
20 9.50 1 30.35
+ 7600
1.88081
1.64305
+ 43.96
20 9.50
20 53.46
° ′ ″
+62 1 54.89
−19 46 50 1.31610n
+ 140
1.31750n
+ 20.77
− 1.35
+ .01
+ 19.43
+62 2 14.32 2 14.30
″ +09 16.3 59.9
+1.3 +7 45.6 −.02 45.6
+7 46.9 46.9
− 1.65
− 19.10
+7 45.34 − 19.10
+7 26.24 +7 45.04
+62 9 40.56 + 30
+7 2624
9 4054
9 5799

Oct. 2 −.05 −.041
00
52.7 00 22.0
54.8 23.6
57.0 25.3
59.5
1.3
3.8
5.8
8.0
10.2
2531
13.1
1.4550 23.63
1 1.42
1 9.09
− 767
− 779
+ 8.19 +.00
− .09 −.08
− 215 −0.34
+ 5.956
1.42 7.37
7.38 9.19
20 +0.99
0 39.0
26.8
658
20 32.90
+ 3782
1.57772
1.33996
+ 21.87
20 32.90
20 54.77
1 53.58
+ 422
1.32032n
+ 20.91
− .33
+ .03
+ 20.61
2 14.19 14.14
10 17.5 01
+7 45.9 −.05 45.8
+7 47.2 47.1
− 1.85
− 19.30
+7 45.69 − 19.30
+7 26.39 +7 45.53
9 40.58 + 33
+7 2656
9 4070
5815

Oct. 12 +.06 +.032
00
52.8 0 34.7
55.1 37.1
57.5 39.1
59.7
1.8
4.0
6.1
8.6
10.7
2563
16.3
1.811 0 36.97
1 1.78
1 9.00
− 7.22
− 7.34
+ 7.25 −.01
+ .11 +.06
− 206 −0.25
+ 5.30 24
1.78 7.08
7.02 8.83
20 [illegible]
~~4~~ 0 48.2
31.0
792
24 0 39.60
+ 2484
1.39515
1.15749
+ 14.37
24 0 39.60
24 0 53.97
~~57~~ 1 54.38
+ 1370
1.32980n
+ 21.37
− .14
+ .14
+ 21.87
~~58~~2 15.75 15.68
10 ~~20.0~~ 26
+7 46.8 −.07 46.3
+7 48.1 47.6
− 4.35
− 21.80
+7 47.83 − 21.80
+7 26.03 +7 47.64
41.78 + .40
+7 2624
9 4192
59.37

Nov. 1 +.208
Oct. 19 +.21
00
34.5 00 25.0
36.7 26.5
39.0 28.8
41.0
43.4
45.4
47.7
49.9
52.0
3897
43.300 0 26.77
0 43.27
1 7.58
− 24.26
− 24.38
+ 24.06 −.01
+ .40 +.39
− 0.59 +1.22
+ 23.88 5
0 43.27 7.14
7.12 8.93
15 +2.02
3 12.7
48.8
1215
18 0.75
+ 16.53
1.21827
1.00320n
− 10.08
18 0.75
17 50.67
4 57.68
−19 46 58
+ 1680
1.33290n
+ 21.52
− .07
+ .09
+ 21.54
5 19.22 5 18.92
10 ~~25.5~~ 81
+4 48.9 −.30 48.6
+4 ~~50.2~~ 49.9
− 9.85
− 27.30
+4 49.13 − 27.30
+4 21.83 +4 48.77
9 41.75 + .68
+4 2215
9 4107
5852

+.234
Nov. 21 +.25
00
32.5 00 26.6
35.0 28.4
37.0 30.7
39.4
41.8
43.9
46.0
48.3
50.6
3745
41.611 0 28.57
0 41.58
1 7.45
− 25.87
− 25.99
+ 25.68 −.03
+ .47 +.44
− 0.51 +1.30
+ 25.64 58
41.58 7.22
7.16 8.97
15 +2.07
3 12.5
48.0
1205
18 0.25
+ 13.04
1.11528
0.90021n
− 7.95
18 0.25
17 52.50 3
4 56.05
+ 1135
1.32745n
+ 21.25
− .04
− .06
+ 21.15
5 17.20 16.90
10 ~~25.5~~ 81
+4 50.9 −.30 50.6
+4 52.2 51.9
− 9.85
− 27.30
+4 50.01 − 27.30
+4 22.71 +4 44.58
9 39.91 + .70
+4 2298
9 3988
5733

+.174
Nov. 23 +.17
00
31.4 00 9.3
~~33.6~~ 10.6
35.9 12.3
38.3
40.3
42.5
44.7
46.8
49.0
3625
40.278 0 10.73
0 40.25
1 7.37
− 27.12
− 27.24
+ 26.97 +.00
+ .32 +.33
− 0.43 +1.38
+ 27.08 26.86
40.25 7.33 7.18
7.12 8.93
15 +2.10
3 20.8
56.5
1373
18 8.65
+ 29.55
1.47056
1.25549n
− 18.01
18 8.65
17 50.64
4 57.71
+ 1866
1.33476n
+ 21.62
− .20
− .06
+ 21.36
5 19.07 18.76
10 ~~25.5~~ 81
+4 49.0 −.31 48.7
+4 50.3 50.0
− 9.85
− 27.30
+4 49.90 − 27.30
+4 22.60 +4 49.95
9 41.67 + .71
+4 23.36
9 4212
5957

20 Cephei

22 01 08

+62 09

1873.

	m	s	
Oct 7	1	10.82	
12		10.66	16
17		10.49	17
22		10.32	17
27		10.14	18
Nov 1		9.95	19
6		9.75	20
11		9.55	20
16		9.35	20

tang δ = +1.89 Cos δ 9.66922 Cos δ

11571n

x = −.033 9.78493n

cos x = ~~6.945~~ +.12 +1.3

1472 α = 6.945 δ = 9′ 40″.80

1473 α = 8.759 δ = 9 58.25

Sin δ 9.94654

~~9.66946~~

~~11571n~~

~~9.78517n~~

′	″		
9	78.7		79.3
	80.0	+1.3	
	81.1	1.1	
	82.2	1.1	
	83.1	.9	83.5
	83.9	.8	
	84.5	.6	
	85.0	.5	
	85.5	.5	85.6

Ch. f

1872 +.281
Nov. 27

15
3 17.3
53.3
131.6
18 5.80

Dec 7 +.26 +.255

38.4
41.5
42.6
44.8
47.2
49.2
51.2
53.5
55.8

15.3
17.0
20.4

4242

47.133 0 17.57

0 47.10 4710
1 ~~8.49~~ 6.81 6.81
− 21.39 1971
− 21.51 − 1582
+ 19.51 +.80
+ .49 +.48
~~+.55~~ +.13
+ 18.45 2012
0 47.10 7.23 ~~5.55~~
1 7.22 1 9.03
15 +2.32
3 22.6
58.1
140.7
18 10.35

+ 2956
1.47070
1.25563n
− 1801
18 10.35
17 52.34
+62° 4′ 56″.01

+2080
− .20
− .10
+2050
~~16.51~~
~~8.2~~
+.3
+4 51.4
+4 53.8

+62

− 27.40 − 27.40
+4 56.02 +4 49.60
+4 23.62 + .78
9 40.17 +4 23.04

1873 .172
Oct. 14 − .17

01
17.3
19.6
21.7
23.9
26.1
28.3
30.6
32.7
35.0

0 49.2
49.2
51.3

2352

26.133 0 49.23

1 26.10
1 10.59
+15.51
+15.39
− 14.96 −.01
− .32 −.32
− 1.83
− 17.12
1 26.10 8.99
8.98
10 +2.34
1 58.9
7.2
126.1
12 3.05

+ 3690
1.56703
1.35196n
− 2249
12 3.05
11 40.56
11 7.79

− 19 47 11 1.31630n
+125
1.31755n

+ 20.78
− .31
− .04
+ 20.43
11 28.22 11 28.05
10 20.5 210
− 1 7.72 − 17 7.4
− 1 6.9 6.1

− 2280 − 2280
− 1 8.16 − 1 8.44
− 1 30.96 + .79
9 57.26 − 1 30.45
9 57.60

Nov. 4 +.044

10
0 36.5
29.5
66.0
10 33.00

Nov. 5 +.02 +.020

01
22.6
24.8
27.0
29.2
31.6
33.6
35.8
38.2
40.4

01 39.7
41.0
44.6

2832

31.466 1 41.77

1 31.43
1 9.78
+21.65
+21.53
− 21.47 +.00
+ .04 +.04
− 1.02
− 22.45
31.43 8.98
8.98
10 +2.52
0 22.2
16.4
38.6
10 19.30

− 1030
1.01284n
0.79777
+ 628
10 19.30
10 25.58
12 22.77

− 19 47 13

− 21.00
− .02
− .05
− 21.07
12 43.20 12 − 43.18
10 24.46
− 2 18.6 − .02 18.6
− 2 17.3 17.3

− 2630 − 2630
− 2 19.01 − 2 19.01
− 2 45.31 + .85
9 57.89 − 2 44.46
9 58.72

Nov. 9 +.01 +.013

01
22.1
24.2
26.6
28.7
31.0
33.2
35.4
37.5
39.6

01 11.7
13.3
15.3

2783

30.922 1 13.43

1 30.89
1 9.62
+21.27
+21.15
− 21.14 +.00
+ .03 +.02
− 0.86
− 21.98
30.89 8.91
8.91
10 +2.53
0 38.4
28.7
67.1
10 33.55

+ 1749
1.24279
1.02772n
− 10.66
10 33.55
10 22.89
12 25.46

+795
1.32425n

+ 21.10
− .07
− .08
+ 20.95
12 46.41 12 46.37
10 24.8 250
− 2 21.4 − .04 21.4
− 2 20.1 20.3

− 2680 − 2680
− 2 20.77 − 2 20.60
− 2 47.57 + .86
9 58.44 − 2 46.54
9 59.83

1872

π1 π2 Pegasi
h m s
22 03 36
22 03 36
+32° 33′ ″
+ 32 33 10
Z= +9 49 38
+.17

tan y δ = +.645
x = -.019
Corr α = π1
α 1872 33.411
α 1873 = 36.064
δ 1872 = 32′ 52″.84
δ 1873 = 33 10.36

	π1 s		π2 s	
Sept 17	3m 35.68		4m 20.52	
22	.64	4	.48	4
27	.59	5	43	5
2	.54	5	38	5
7	35.48	6	20.32	6
12				
Nov. 16	34.83		19.67	
21	44	9	.58	9
26	.65	9	.49	9
Dec. 1	.57	8	.41	8
6	34.49	8	19.33	8

Sin δ 9.73081
Cos δ 9.92579 9.92579
.11571n .09302
.04150n .01881
π2
α 1872 = 18.242
α 1873 20.901
δ 1872 = 33′ 3″.08
δ 1872 = 33 20.63

$d\alpha = +2.653) \pi'$
$d\delta = +17.52)$

$d\alpha = +2.659) \pi^2$
$d\delta = +17.55)$

π2
1872 Sept. 23 -.134 -.14
4
2.4
4.8
7.3
9.8
12.3
14.5
17.0
19.4
21.9
1094
~~12.933~~
12.155
4 12.14
4 20.47
-7.56
+8.36 +.01
-.09 -.09
-2.23 +0.43
+6.045
4 12.914 18.18
4 1819 4 20.85
A.R.

π1 Oct. 2 -.041 ~~+.032~~ -.05
T1
03
12.7 5(7.7) 02 45.8
15.0 (0.2) 47.0
17.6 (2.8) 48.2
22.5 (5.2)
24.8 7.7
27.3
29.8
32.3
37.1
39.6
42.0
3007
27.336 2 47.00
3 27.32
3 35.54
-8.22
+8.19 +.00
-.03 -.03
-2.13 +0.52
+6.03
27.32 33.35
3335 36.00
55 +1.99
1 35.0 2 58.7
27.0 49.0
62.0 107.7
56 31.00 57 53.85
+4034
1.60574
1.62455
+42.13
56 31.00
57 13.13
+32° 25′ 35″.32
+9 49 30 0.99880
+422
1.00302
*- 10.07
- .39
+ .10
- 10.36
+32 25 24.86 25 24.71
33 11.5
+7 46.6 -.15 46.4
- 1.18
- 1870
+7 45.69 - 1870
+7 26.99 +7 45.53
+32 32 51.85 - .16
+7 33.33
32 58.04
33 15.56

π1 Oct. 12 +.032 +.06
03
13.4 03 10.7
15.9 12.1
18.4 12.9
23.3
25.7
28.2
30.6
33.0
37.8
40.2
42.8
3093
28.119 3 11.90
3 28.10
3 35.42
-7.32
+7.25 -.01
+.04 +.02
-2.01 +0.64
+5.285
28.10 33.38
3335 36.00
55 +1.19
2 3.4
51.1
114.5
56 57.25
+1622
1.21005
1.22886
+16.94
56 57.25
57 14.19
25 34.16
+1370
1.01250
*- 10.29
- .07
+ .06
- 10.30
25 23.86 23.67
33 12.9
+7 49.0 -.19 48.8
- 2.58
- 2010
+7 47.83 - 20.10
+7 27.73 +7 47.64
32 51.59 - .20
+7 27.31
33 .098
33 18.50

π1 Nov. 19 +.208 +.21
02
56.0 02 44.5
58.4 46.1
0.9 47.6
5.7
8.2
10.6
13.0
15.5
20.4
22.8
25.3
2268
11.68 2 46.07
10.619
3 10.60
3 34.77
-24.17
+24.06 -.01
+.13 +.13
-1.36 +1.29
+22.882
10.60 33.43
33.42 36.07
50 +2.02
4 49.0
30.8
79.8
54 39.90
+2455
1.39005
1.43155n
-27.10
54 39.90
54 12.80
28 35.55
+9 49 25
+1680
1.01560
*- 10.36
- .15
+ .14
- 10.37
28 25.18 28 24.71
33 15.1
+4 49.9 -.47 49.4
- 4.78
- 2230
+4 49.13 - 22.30
+4 26.83 +4 48.77
32 52.01 - .34
+4 23.33
32 58.04
15.56

π1 Nov. 21 +.234 +.25
12 54.3
56.7 02 48.9
59.1 50.2
4.1 51.5
6.5
9.0
11.2
13.7
18.7
21.2
23.6
2782
982
8.927 2 50.20
3 8.91
8 34.74
-25.83
+25.68 -.03
+.16 +.15
-1.33 +1.32
+24.547
8.91 33.42
3338 36.03
50 +2.07
4 44.3
25.3
69.6
54 34.80
+1873
1.27254
1.31404n
-20.61
54 34.80
54 14.19
28 34.16
+1135
1.01015
*- 10.24
- .09
- .09
- 10.42
28 23.74 23.28
33 15.0
+4 51.3 -.46 50.8
- 4.68
- 2220
+4 58.01 - 22.20
+4 27.81 +4 49.58
32 51.55 - .35
+4 27.03
33 .031
17.83

π2 Nov. 21 +.234 +.25
03 3
39.0 38.1
41.6 41.6
44.1 44.1
48.9
51.3
53.8
56.1
58.6
3.5
6.0
8.4
411.3
591.0
58.755
3 53.74
4 19.58
-25.84
+25.68 -.03
+.16 +.15
-1.33 +1.33
+24.547
53.74 18.25
1829 20.87
A.R.

1873

π1, π2 Pegasi

22 03 36

+ 32 33

	π1 m	s		π2 m	s	
Oct. 7	3	38.22		4	23.06	
12		38.15	7		22.99	7
17		38.08	7		22.92	7
22		38.00	8		22.84	8
27		37.92	8		22.76	8
Nov. 1		37.84	8		22.68	8
6		37.75	9		22.60	8

Sin δ 9.73081
Cos δ 9.92579
.11571n
.04150n

1872 .174
Nov. 23 + .17
π1
02
53.0 02 43.1
55.4 44.2
58.0 45.2
2.7
5.1
7.7
10.0
12.6
17.4
19.8
22.3
2640
84.0. 2 44.17
7.636
3 7.62
3 34.70
− 27.08
+ 26.97 +.00
+ .11 +.01
− 1.29 +1.36
+ 25.79
3 7.62 33.41
33.41 36.06
50 +2.10
4 50.2
31.4
81.6
54 40.80
+ 2347
1.37051
1.41201n
− 2582
54 4080
54 14.98
28 33.37
+1866
1.01746
*− 10.41
− .14
− .09
− 10.64
29 22.73 28 22.26
33 14.9
+4 52.2 −.47 51.7
− 4.68
− 22.10
+4 49.90
+4 27.80 − 22.10
32 50.53 +4 49.95
− .35
+4 27.50
32 49.76
33 7.28

π1 +255
Dec. 7 +26
03 (0-2)
2.6 02 59.0
5.0 0.5
10.0 1.7
12.6
15.0
17.3
19.8
24.6
27.1
29.5
3 14.882 3 0.40
2 14.86 14.86
3 ~~37.23~~ 34.47
− 22.37 17.61
+ 19.51 +.00
+ .17 +.16
− 1.06 +1.59
+ 19.62 .61
2 14.86 33.48
33.47 36.12
50 +2.32
4 40.2 ~~4 40.2~~
19.4
15.96
~~54 29.80~~
54 29.80
2345
+ ~~4552~~
1.65820n 1.16137
1.69970n
− ~~5009~~ +15.95
54 29.80
53 ~~39.41~~ 13.85
29 ~~8.64~~
34.50
+2386
1.04132
− 11.02
− .51
− .13
− 11.65
28 ~~22.85~~ 22.40
33 14.1
+ 4 51.2 −.15 50.7
− 3.78
− 21.30
+4 58.02
+4 28.72 − 21.30
32 57.57 +4 49.67
− .39
+4 27.98
32 50.38
33 7.90

π2
Dec. 7 ~~1873~~ +.255
+.26
03 45.0
47.6 03 34.7
49.7 36.2
54.8 37.6
57.3
59.7
2.2
4.6
9.3
11.8
14.5
35.67
65.67
59.700 36.17
3 59.68
4 22.06
− 22.38
+ 19.51 +.00
+ .17 +.16
− 1.06 +1.60
+ 18.62 1
3 59.68 18.30
18.29 18.95
50 +2.32
4 40.2
19.4
11.96
54 ~~29.80~~
54 29.80
+ 2353
1.37162
1.41312n
− 2589
54 29.80
54 3.91
28 44.94
− 11.09
− .14
− .13
− 11.27
28 33.17 32.72
33 24.9
+4 51.2 −.45 50.8
− 3.75
− ~~31.60~~ 21.30
+4 58.02
+4 28.72 − 21.30
33 1.89 +4 49.67
− .39
+4 27.98
33 0.70
18.25

1873 −.172
Oct. 14 −.17
3 38.5 3 28.3
41.0 29.6
43.4 30.9
48.2
50.9
53.3
55.8
58.2
4 3.0
5.5
8.0
40.58
58.58
53.255 3 29.60
3 53.24
4 22.96
− 29.72
− 14.96 −.01
− .11 −.11
− 2.06
− 17.13 14
53.24 36.11
36.10
45 +2.34
3 22.2 3 1.9
30.0 9.2
52.2 11.1
48 26.10 48 5.55
+ 2365
1.37383
1.41533n
− 2602
48 26.10
48 0.08
34 48.27
+9 49 8 0.99850
+125
0.99975
*− 9.99
− .14
− .07
− 10.20
34 38.07 34 37.80
33 30.8
−1 7.2 −.27 7.5
− 20.40
−1 8.16
−1 28.56 − 20.40
33 9.51 −1 8.44
.39
−1 29.23
33 8.54

Ch. f
π1
Nov. 6
45
2 6.2
57.8
12.40
~~47 32.00~~
47 2.00

Ch. f
π2
Nov. 4
45
2 6.2
57.8
12.40
~~47 22.00~~
47 2.00

1873 π^1 π^2 ~~π^1~~

	'	"	"	
Oct. 7	33	29.8	40.1	
12	+.7	30.5	40.8	+.7
17	.7	31.2	41.4	.6
22	.5	31.7	41.9	.5
27	.4	32.1	42.3	.4
Nov. 1	.3	32.4	42.6	.3
6	.3	32.7	42.8	.2
11	.1	32.8	42.9	.1
16	.0	32.8	43.0	.1

1872 π^1 π^2

	π^1		π^2	
Sept. 17	32° 32' 68.8"		32 33 19.0	
22	79.7	+.9	19.9	+.9
27	70.6	.9	20.8	9
Oct. 2	71.5	.9	21.7	9
7	72.4	.9	22.6	9
12				
Nov. 16	75.2		25.5	
21	75.0	-.2	25.3	-2
26	74.7	.3	25.0	3
Dec. 1	74.9	.2	24.8	2
6	74.2	.3	24.5	3

π_1 +.020
Nov. 5 +.02

03
54.0 04 9.5
55.5
56.7
(57.5)
59.1
0.3
1.8
3.0
4.3

59.178 4 9.50

3 59.16
3 37.77
21.39

− 21.47 +.00
+ .01 +.01
− 1.71
− 23.17
3 59.16 35.99
35.99
45 +2.52
1 37.4
31.3
68.7
46 34.35

− 10.32
1.01368n
1.05518
+11.35
46 34.35
46 45.70

36 2.65

+9.497
+2244
1.0~~1~~094
2

*− 10.49
− .02
− .26

− 10.77
+32 35 51.88 35 51.74
33 32.7
−2 19.2 −.14 19.3

− 22.30
−2 19.01
−2 41.31 − 22.30
33 10.53 −2 19.01
42
−
−2 41.73
33 10.01

π_2 +.020
Nov. 5 +.02

04 29.6
32.0 04 44.6
34.3
37.2
41.7
44.1
46.6
49.0
53.8
56.4
58.7
485.4

44.127 4 44.60

4 44.11
4 22.61
+21.50

− 21.47 +.00
+ .01 +.01
− 1.71
− 23.17
4 44.11 ~~35.94~~ 20.
20.94
45 +2.52
1 37.4
31.3
68.7
46 34.35

− 0.47
9.67210n
9.71360
+0.52
46 34.35
46 34.87

36 13.98

− 10.49
− .00
− .26

10.75
36 2.73 36 2.60
33 42.9
−2 19.8 −.13 19.9

− ~~22.50~~ 22.30
−2 19.01
−2 41.31 − 22.30
33 21.44 −2 19.01
42
−
−2 41.73
33 20.87

π_1 +.002
Nov. 6 +.00

03 44.8
46.8 03 39.2
49.4 40.3
54.3 41.3
56.8
59.2
1.6
4.0
8.9
11.7
13.9
351.0
651.0

59.1823 40.27

3 59.16
3 37.75
+21.41

− 21.35 −.01
+ .00 +.00
− 1.69
− 23.045
3 59.16 36.12
36.11
45 +2.52
2 11.8
3.2
15.0
47 7.50

+ 18.91
1.27669
1.31819n
− 20.81
47 7.50
46 46.69

36 1.66

+2261
1.02111

*− 10.50
− .09
− .34

− 10.93
35 50.73 35 50.56
33 32.7
−2 18.0 −.17 18.2

− 22.30
−2 19.57
−2 41.87 − 22.30
33 8.86 −2 19.69
42
−
−2 42.41
33 8.15

π_2 +.002
Nov. 6 +.00

04 29.4
31.8
34.2
39.0
41.6
44.0
46.4
48.9
53.9
56.3
58.6
484.1

44.009

4 43.99
4 22.60
+21.39

− 21.35 −.01
+ .00 +.00
− 1.69
− 23.045
4 43.99 20.95
20.94
~~45~~ +2.52
~~2~~ ~~11.8~~
~~3.2~~

π_1 +.013
Nov. 9 +.01

03 44.2
46.7 04 0.6
49.1
53.9
56.4
58.9
1.0
3.7
8.6
11.0
13.6
347.1
644.1

58.8274 0.60

3 58.81
3 37.70
+21.11

− 21.14 +.00
+ .01 +.01
− 1.64
− 22.77
3 58.81 36.04
36.04
45 +2.53
1 46.6
38.7
85.3
~~46 42.35~~
46 42.65
− 1.77
0.24797n
0.28947
+ 1.95
46 42.65
46 44.60

36 3.75

+795
1.00645

*− 10.15
− .01
− .27

− 10.43
35 53.32 35 53.18
33 32.8
−2 20.5 −.14 20.6

− 22.40
−2 20.70
−2 43.10 − 22.40
33 10.22 −2 20.60
43
−
−2 43.43
33 9.75

π_2 +.013
Nov. 9 +.01

04 28.9
31.4 04 34.7
33.9 36.0
38.7 37.6
41.1
43.7
46.0
48.6
53.5
56.0
58.3
480.1

43.645 4 36.10

4 43.63
4 22.55
+21.08

− 21.14 +.00
+ .01 +.01
− 1.64
− 22.77
4 43.63 20.86
20.86
45 +2.53
1 46.6
38.7
85.3
~~46 42.35~~
46 42.65
+7.54
0.87737
0.91887n
− 8.30
46 42.65
46 ~~50.95~~
34.35
36 14.00

− 10.15
− .02
− .27

− 10.44
36 3.56 36 3.42
33 42.9
−2 20.7 −.14 20.8

~~32.50~~ 22.30
−2 20.70
−2 43.00 − 22.40
33 20.56 −2 20.60
43
−
−2 43.43
33 19.99

π_2 Oct. 2 +

03
04 6.0
7.4
47.0 8.5
49.6
52.0
56.4
56.9

259.9

51.980 4 7.40

3 51.96
3 23.13
+28°.83

48 Bdls.