KG
11366
v.460

Polar Catalogue
Observations & Reductions.
B5 1872 3
From $0^{h}\,48^{m}$ to $3^{h}\,54^{m}$

Charles W. Sever, University Bookstore, Cambridge.

Polar Stars

Observations — Reductions

A_5 1872-3

Approximate values of R_g.

32 Camel

0^h 48

1872 +309   Dec 17 +309

— Dec 17

47 50.9 46 16.44 47 I 48 26.0

0.3 310 — 304

11.3 313 x—

21.7 317 58.4 314

M.l. 31.9 319 8.8

mdm 18.9

29.0

39.3 312

~~31.260~~   ~~53.840~~

48 11.22 46 16.40 48 18.88 48 26.00

25

2 41.1

32.3

7.34

27 36.70

+ 114.82

~~+ 174.82~~   — 7.12

2.06002

1.18769n

— 15.40

27 36.70

27 21.30

.1

+ .10

1872 1873

J. δ Cass

h m s
0 49 00
0 49 04
+60° 01′ ″
+60 01 .42
δ = −17 38 54
− .30

tang δ = +1.73
x = −.031
corr = −~~.06~~
α1872 = ~~39.129~~ 59.969
α1873 = ~~42.429~~ 3.534
δ1872 = 1′ 21″.94
δ1873 = 1 41.51
dα = +3.568
dδ = +19.57

		s	
Nov. 16	49	3.37	
21		3.27	10
26		3.17	10

1872	°	′	″	
Nov. 16	60	1	48.0	
21			49.0	+10
26			49.9	9
1			50.8	9
Dec 6			51.7	9

	m	s		′ ″	
Nov. 16	49	6.91		1 69.5	
21		6.82	9	70.6	+11
26		6.72	10	71.6	10
Dec. 1		6.61	11	72.4	.8
6		6.49	12	73.2	.8
11		6.36	13	73.8	.6
16		6.32	14	74.4	.6
21				74.8	.4
26				75.1	.3

Sin δ 9.93768
cos δ 9.69853
.11571 n
9.81424 n

1872 +.174
Nov. 23 +.17
48 48 45.9
27.8 47.6
29.9 49.5
31.8
33.9
35.8
37.8
39.9
42.1
44.1
32.29
35.878 48 47.67
48 35.85
49 3.23
− 27.38
− ~~27.32~~
+ 27.05 +.00
+ .29 +.30
− 3.26 +0.31
+ 24.089
48 35.85
48 59.93
48 59.94 49 3.51
+2.10
25
1 11.0
47.9
118.9
25 59.45
− 11.79
1,07151
0.88575 n
+ 7.69
25 59.45
26 7.14
59 56 41.21
−17 38 41 1.26280 n
+2206
1,28486 n
+ 19.27
− .03
− .02
+ 19.22
59 57 0.43 57 0.33
1 49.4
+4 49.0 −10 48.9
− 7.93
− 27.50
+4 49.90
+4 22.40 − 27.50
+60 1 22.83 +4 49.95
+ .62
+4 22.07
1 23.40
1 42.97

1872 +.197
Nov. 25 +.20 49
48 48 8.8
26.4 10.6
28.4 12.5
30.6
32.6
—
36.6
38.8
40.8
42.8
Refr. Coast Ascension
34.520 48 10.63
48 34.59
49 3.19
− 28.60
− ~~28.54~~
+ 28.31 +.00
+ .35 +.34
− 3.22 +0.35
+ 25.443
34.59
0.03
0.02 3.59
+2.15
25
1 33.1
12.9
46.0
26 23.00
+ 24.00
1,38021
1.19445 n
− 15.65
26 23.00
26 7.35
56 41.00
+323
1,26603 n
+ 18.45
− .14
− .03
+ 18.28
56 59.28 56 59.14
1 49.8
+4 50.5 −.14 50.4
− 8.33
− 27.90
+4 49.93
+4 22.03 − 27.90
1 21.31 +4 49.72
+ .64
+4 22.46
1 21.60
41.17

1873 +.209
Nov. 18 +.21
— 49 45.2
— 47.3
—
25.9
27.9
30.1
32.2
34.1
Rej.
150.2
30.040 49 46.25
49 30.01
49 6.87
+ 23.14
+ 23.20
− 19.44 +.00
+ .36 +.36
− 3.34
− 22.42
30.01
15
3 31.0
15.3
46.3
18 23.15
− 16.21
1,20978
1.02402 n
+ 10.57
18 23.15
18 33.72
4 14.63
−17 39 5 1.26290 n
− .06
− .54

1873 +.209
Dec. 7 +.21
— 49 33.0
— 34.7
— 36.9
—
15.0 .00
17.3 .24
19.6 .38
21.6 .42
23.7 .46
97.2
49
19.440 15.30 34.87
49 ~~19.41~~ 15.28
49 6.46
+ ~~12.96~~ 8.82
+ ~~13.01~~
− 9.19 +.00
+ .36 +.36
− 2.93
− 11.76 11.76
~~14.41~~ 15.28
3.52
3.52
+2.78
15
3 30.9
20.9
51.8
18 25.90
− 19.57
− ~~15.43~~
1,29159 n
1.10583
+ 12.76
18 25.90
18 38.66
4 9.69
+3517
1,29807 n
+ 19.86
− .09
+ .10
+ 19.87
+60 4 29.56 4 29.29
2 13.3
− 2 16.3 −.27 16.6
− 34.80
− 2 17.12
− 2 48.92 − 31.80
1 40.64 − 2 17.40
+ 83
− 2 48.37
1 40.92

Dec. 16 +.221 +.21
48 46.0 48 38.1
50.0 40.1
54.3 42.4
49 2.6
6.8
10.8
14.9
18.9
27.2
31.4
35.4
298.3
118.3
10.755 48 40.20
49 10.72
49 6.21
+ 4.51
+ ~~4.57~~
− 4.91 +.01
+ .36 +.38
− 2.68
− 7.280
10.72
~~3.39~~ 3.49
~~3.42~~ 3.52
+2.85
15
3 0.1
51.9
112.0
18 56.00
+ 30.55
1,48501
1,29925 n
− 19.92
18 56.00
18 36.08
4 12.27
+2078
1,28368 n
+ 19.22
− .23
+ .12
+ 19.11
4 31.38 31.07
2 14.4
− 2 17.0 −.31 17.3
− 32.90
− 2 17.03
− 2 49.93 − 32.90
1 41.45 17.39
+ 85
− 2 49.44
1 41.63

Dec. 17 +.132 +.14
49 1.7 48 56.2
4.1 49 1.7
6.1 ~~4.1~~
8.2
10.3
12.5
14.4
16.6
18.7
9.26
10.289 48 56.20
49 10.26
6.18
+ 4.08
+ 4.~~14~~
− 4.27 +.05
+ 24 +.23
− 2.65
− 6.~~68~~ 64
10.26
3.58
3.62
+2.86
15
3 49.1
40.0
89.1
18 44.55
+ 14.09
1,14891
0.96315 n
− 9.19
18 44.55
18 35.36
4 12.99
+2196
1.28486 n
+ 19.27
− .05
+ .15
+ 19.37
4 32.36 32.06
2 14.8
− 2 17.9 −.30 18.2
− 33.00
− 2 17.40
− 2 50.40 − 33.00
1 41.96 17.59
+ 85
− 2 49.74
1 42.32

√ =45

240 Urs Min (P.B.) Red. s

h m s
0 49 01 2m 22.4
0 49 12 1 46.8
88 20′ ″ 1 11.2
+88 20 30 35.6
η = −45 57 42 5.0

−0.72

Sin δ 9.9998 Tang δ′ = +34.716
Cos δ 8.46150 k = −.531
.11571n
8.57721n

1872 Nov. 23 +.174
48 27 48 45.9
27.8 47.6
29.7 49.4
31.8
33.9
35.8
37.8
39.9
42.1
44.1
322.9
35.878 48 47.97
48 47.63
+6.040

1872 Dec. 10 +.349
− 52 55.0
− 11.3
− 26.9
−
−
− 52 41.2
50 2.1 50.9
14.8 48.0
11.6 49.2
52 41.20
48 49.37 53 7.73
48 48.84
+19.07
+12.12
−17.49
49 2.54

1873 Jan. 6

Dec. 1 +.269
49 − 49 11.1
−
−
50 3.1
35.6
11.1
49 36.60 49 11.10
49 36.07
−13.78
+9.34
−18.47
49 13.16

Dec 16 +.221
51 10.7
49 57.5 21.9
50 34.6 23.4
51 9.7 22.9
45.2 22.8
49 22.75 51 10.70
49 22.22
−14.90
+7.67
−8.83
49 16.06

Dec. 17 +.132
50 17.2
50 31.6 20.4
51 8.8 22.0
43.5 21.1
49 21.17 50 17.20
49 20.64
−4.22
+4.58
−8.23
49 12.77

+2.34
5 5
3 10.9 3 10.7
44.9 36.3
11.58 10.70
7 57.90 7 53.50
−22.183
−2.34602n
0.52323
+8.38
7 53.50
88 8 1.88
14 46.47
+3320
~~1.29620~~
1.80450n
+1 4.19 +.01
− .78
− .09 −.29
+1 3.33
88 15 49.80 15 49.51
− 32.17
+4 51.71
+4 19.54
88 16 9.34 Eq.

0
0 39.5
28.7
68.2
0 34.10

+2.72
0
0. 50.0
25.4
75.4
0 37.70
+25.50
1.40654
9.98376n
−0.96
0 37.70
0 36.74
22 11.61
−45 57 2 1.77420n
+5241
1.82661n
+ .01
+1 7.08
− .01
+ .02 −.05
+1 7.10
+88 23 18.71 23 18.66
− 31.94
−2 19.83
−2 51.77
+88 20 26.94

+2.85
0
0 30.5
22.3
52.8
0 26.40
−107.95
2.03324n
0.61046
+4.08
0 26.40
0 30.48
22 17.87
+2078
1.79498n
.00
+1 2.37
− .18
+ .01 −.03
+1 2.20
23 20.07 20.04
− 35.14
−2 17.93
−2 52.17
20 27.90

+2.86
0
1 44.0
24.3
68.3
1 24.15
−56.03
1.74842
0.32563
+2.12
0 24.15
0 36.27
22 17.08
+2196
1.79616n
.00
+1 2.54
− .05
+ .06 −.13
+1 2.55
23 14.63 19.50
− 35.32
−2 17.40
−2 52.72
20 21.91

h m s
0 49 32
° ′ ″
+88 20 58

− 32.17
+4 51.33
+ 1.68
+4 20.84
20 10.35

− 31.94
−2 19.64
+ 1.95
−2 49.63
20 29.03

− 35.14
17.39
+ 2.05
−2 50.48
20 29.56

− 35.32
17.59
+ 2.05
−2 50.86
20 26.64

δ 20′ 10″35 α 1872 = 49ᵐ 2ˢ.540

28.98 α 1873 = 49 13.538

+.206

Dec. 28

51 1.4

-

-

-

-

-

-

50 -

.52.1 53

51 28.3 5.9

49 5.60 51 1.40

49 5.07

+ 0.33

+ 7.15

- 0.39

49 ~~11.86~~ 12.16

+2.93

0

0 32.8

22.8

65.6

0 ~~32~~.80

29

- 115.80

2.06371

0.64092

+ 438

0 ~~32~~ 27 80

0 0 32 18

88° 22 16.17

+9.57

1.78347

~~17~~ 1 0.78

- .21

+ .02 -.04

+1 0.59

23 11.76 16.72

- 36.79

-2 13.76

-2 50.55

20 21.21

- 36.79

-2 13.33

+ 2.10

-2 48.02

20 28.70

43 H Cephei = Fr

h m s
0 51 38
0 51 47
+ 85° 34′ ″
+ 85 34 28
3 = −43 11 40
− .68

4α = +12
4δ = +0!

Red.
s
1. 53.30
2 39.97
3 26.66
4 13.33
5 0.00

Sin δ 9.99870
Cos δ 8.88817
.11571n
9.00388n

α 1872 = 39.721 δ = 34′ 8.″79
α 1873 = 46.701 δ = 34 28.33

1872 Tang δ = + 12.921
k = −.197

dα = +6.973
dδ = +19.54

1872 +.197
Nov. 25 +.20
50 49 54.6
28.0 58.9
40.7 12.5
54.6
6.9
20.7
34.0
47.7
0.8
14.5
247.9
187.9
20.8 / 8 50 2.00
51 20.68
+ 28.30
+ 2.54
− 11.21
51 40.31

1873 +.335
50 Jan. 9
15.2 48 59.7
28.8 49 5.0
42.7 18.2
55.9
51 9.0
22.2
35.9
49.8
52 2.8
32.23
(51) 9.144 49 7.63
51 8.95
+ 27.39
+ 4.33
+ 6.88
51 47.55

+.209
50 Nov. 18 50 4.0
22.3
35.1
48.8
2.6
15.0
29.0
42.1
55.0
8.6
258.5
138.5
15.389 ~~50~~ 51 4.00
~~51~~ 15.19
52 − 19.44
+ 2.70
− 10.91
47.54

Ch f
Nov. 19

+.269
Dec. 1
51 50 36.9
12.8 45.4
27.3 6.2
40.0
53.0
5.8
19.8
33.7
46.6
59.6
298.6
58.6
6.511 50 (49.50)
52 6.32
− 13.78
+ 3.47
− 8.51
47.50

+.209
Dec. 7
51 50 43.9
8.5 45.6
22.0 52.7
34.6
49.3
2.6
15.6
28.3
42.0
56.0
258.9
18.9
2.100 50 47.40
52 1.90
− 9.19
+ 2.70
− 7.20
48.21

+2.15
50
4 16.1
52.3
128.4
54 4.20
+ ~~1.88~~ 7.88
~~1.27600~~ 1.89697
~~.27988~~ 0.90085n
~~−1.91~~ − 7.96
54 4.20
53 ~~2.29~~ 56.24
85 28 ~~41.06~~ 52.11
−43 10 46. 1.73230n
+331
1.73561n
~~54.40~~
~~53.16~~
+ .02
− .08 −.40
+ 54.30
85 29 ~~40.36~~ ~~29 39.96~~
− 28.52 29 46.01
+.01 + 4 49.93
+ 4 21.91
+85 34 1.47
− 28.52
h m ±4 49.72
0 51 56+ 1.46
+4 22.66
34 26.2

+2.47
45
1 46.1
35.7
81.8
46 40.90
+ 121.51
+ 57.51
2.08462
1.08850n
− 12.26
46 40.90
46 28.64
36 19.71
43 11 8
+ 23.02
1.75532n
+ 56.93
− .62
− 02 −.14
+ 56.29
37 16.00 37 15.86
− 15.89
− 2 31.29
− 2 47.18
34 28.82
− 15.89
− 2 31.51
+ 1.67
− 2 45.73
34 30.13

+2.61
45
1 43.1
27.7
78.8
46 35.40
+ ~~1.39~~ 71.39
1.05652 1.85364
0.06040n 0.85752
− 1.14 − 7.20
46 35.40 35.40 46
46 34.26 28.20
36 ~~14.09~~ 20.15
− 43 11 5
+ 877
1.74107n
+ 55.09
− .01
− .26 −.13
+ 54.82
37 ~~8.91~~ 14.97 14.84
− 28.31
− 2 20.02
− 2 48.33
34 ~~20.58~~ 26.64
− 28.31
− 2 19.50
+ 1.77
− 2 46.04
34 28.80

45
1 47.0
33.3
80.3
46 40.15

+2.72
45
1 51.1
27.5
78.6
46 39.30
+ 77.01
1.88655
0.89043n
− 7.77
46 39.30
46 31.53
36 16.82
+ 52.44
1.78474n
+ 1 0.92
− .25
+ .05 −.14
+ 1 0.72
37 17.54 17.40
− 31.94
− 2 19.83
− 2 51.77
34 26.17
− 31.94
19.64
+ 1.84
− 2 49.74
34 27.66

+2.78
45
1 41.3
32.9
74.2
46 37.10
+ 74.70
1.87332
0.87720n
− 7.54
46 37.10
46 29.56
36 18.79
+ 35.25
1.76755n
+ 58.55
− .24
+ .05 −.13
+ 58.36
37 17.16 17.02
− 33.35
− 2 17.12
− 2 50.47
34 26.68
− 33.35
17.40
+ 1.89
− 2 48.86
34 28.16

Dec 15 +.158

51 49 35.3
3.3 36.7
15.7 38.1
29.0
42.6
54.8
8.8
22.2
36.0
48.8

2612
5012
55,089 49 36.77
51 35.49
−5.39
+2.04
−5.31
~~46.83~~
46.83

? Dec. 17 +.132

50 31.7
52 8.8
43.6

~~52 23.9~~
52 9.0 557
21.4 547
35.0 550
48.0 547
55.025 52 8.03
51 54.83
−4.21
+1.70
−4.81
~~47.51~~
47.51

?
Dec 16 +.221

51. 10.7
49 57.5
50 34.6
51 9.8
51 45.2
Rej.

51 10.70

+284
45
1 45.1
38.1
832
46 41.60
+ 138.92
+ ~~7892~~
2,14277
1,14665
−1402
46 41.60
46 27.58
85° 36 20.77

+2759
1.75989

+ 5753
− 81

+ .05 −.14

+ 56.77
37 ~~16.54~~ 17.54
− 34.92 17.40
−2 16.04
−2 50.96
34 26.58

− 34.92
−2 16.30
+ 1.93
−2 49.29
34 28.11

+2.86
45
1 26.9
18.8
457
46 22.85
+ 16.49
+ ~~10699~~
1,67201
0,67589
−4.74 +~~1.82~~
46 22.85 22.85
46 18.11 24.07
36 ~~30.24~~ 24.18

+ 2183
1.75413

+ 56.77
− .11

+ .06 −.11

+ 56.72
37 ~~26.98~~ 20.90
− 35.26 20.79
−2 17.40
−2 52.65
34 ~~34.31~~ 28.25

− 35.25
17.59
+ 1.94
−2 50.90
34 29.89

1872

ε Piscium

tang δ = +.13

x = −.016

cos x = +.04 − .09

0	56	17
0	56	21
+ 7	12	
+ 7	12	21

η = +3.5 10 27

+.58

	m	s	
Nov. 16	56	20.74	
21		71	3
26		68	3
Dec 1		.65	3
6		20.61	4

1872 = 18.087 δ = 12′ 1.17″ dα = +3.108

dδ = +1948

1873 = 21.196 δ = 12 20.65

~~1873~~2

1872.0

	m	s	
Jan 0	56	20.38	
5		20.32	6
10		20.26	6

1873

Dec 1	23.97	
6	23.93	4
11	23.89	4
16	23.85	4

±

Sin δ 9.09807

Cos δ 9.99656

.14571

.11227/m

Nov 16	56	24.04	− 2
21		24.02	3
26		23.99	3
1		23.96	3
6		23.93	3

1872 +.070

55 Nov. 13 +.06 55

47.7 55 48.0

49.8

51.7

55.7

57.8

59.9

2.1

4.0

8.3

10.5

12.4

359.0

~~309~~.6

659.6

59.964 55 55 48.00

+.174

Nov. 23 +.17

41.2 55 38.8

43.3 39.8

45.4 40.3

49.5

51.6

53.6

55.7

57.8

2.0

4.0

6.1

410.2

590.2

53.655 55 39.70

53.64

+.197

Nov. 28 +.20

55 39.9 55

42.0 32.6

44.1 37.7

48.3 34.8

50.4

52.6

54.6

56.6

0.7

2.8

4.9

396.9

576.9

52.445 55 33.70

+.349

5 Dec. 10 +.36

49.0 55 53.8

51.0 54.6

53.2

57.2

59.4

1.4

3.5

5.6

9.7

11.8

13.8

315.6

15.6

1.418 55 54.20

1873

Jan. 6

gone

+.335

55 Jan. 9 +.33

40.4 55 31.8

42.4 32.8

44.5 33.8

48.7

50.8

52.9

54.9

57.0

56 1.1

3.1

5.3

401.1

581.1

52.827 55 32.80

56 59.95

56 20.76

− ~~20.72~~ 20.72

− ~~20.76~~

+ 20.86 − .03

+ .01 +.01

− 2.67 + 0.44

+ 18.20 17

56 ~~59.95~~

56 ~~18.15~~

56 18.12 56 21.23

+1.93

15

3 55.8

51.3

107.1

~~15~~ 14 ~~56~~.05

53.25

+ 1196

1.07773

1.19000n

− 15.49

14 ~~16~~ ~~53~~.05

14 ~~18~~ ~~40.56~~ 37.76

7 48 ~~7.79~~ 10.57

+1568

1.62358

∗ − 42.03″

− .01

+ .12

− 41.92

7 47 ~~25.87~~ 28.61 17 28.38

12 19.3

+ 4 ~~5.34~~ 5.06 − .29 5.03

− 0.9 + 7 32.5 49.4

+ 41.38

− 18.10

+ 4 52.39 − 18.10

+ 4 34.29 + 4 51.80

+ 7 12 ~~0.16~~ − 1.11

0.96 + 4 32.59

12 0.97

12

55 53.64

56 20.70

− ~~37.06~~ 27.06

− ~~27.10~~

+ 27.05 + .00

+ .02 + .02

− 2.61 + 0.50

+ 24.46

55 53.64

18.10

18.10 21.21

+2.10

15

0 0.1

46.8

106.9

14 53.45

+ 1395

1.14457

1.35684n

− 18.06

14 53.45

14 35.39

8 12.96

+35 9 47 1.60790

+2221

1.63011

∗ − 42.67

− .01

− .10

− 42.78

7 30.18 29.69

12 18.9

+ 4 48.7 − .49 48.2

+ 4 47.8 47.3

+ 1.78

− 17.70

+ 4 49.90 − 17.70

+ 4 32.20 49.95

12 2.38 − 1.21

+ 4 31.04

12 0.73

55 52.43

56 20.68

− 28.25

− ~~28.29~~

+ 28.30 + .00

+ .03 + .03

− 2.59 + 0.52

+ 25.74

52.43

18.17

18.17 21.28

+2.15

15

0 7.0

55.3

122.3

15 1.15

+ 1874

1.27277

1.38564n

− 24.27

15 1.15

14 31.88

8 11.47

+331

1.61121

∗ − 40.85

− .02

.00

− 40.87

7 30.60 30.60

12 18.8

+ 4 48.8 − .00 48.8

+ 4 47.9 47.9

+ 1.88

− 17.60

+ 4 49.93 − 17.60

+ 4 32.33 49.72

12 2.93 − 1.24

+ 4 30.88

12 1.48

56 1.40

56 20.57

− 19.17

− ~~19.21~~

+ 19.07 + .01

+ .05 + .05

− 2.48 + 0.63

+ 16.64 5

56 1.40

18.04

18.05 21.16

+2.34

15

0 56.9

34.5

91.4

15 45.70

+ 7.22

0.85854

0.97081n

− 9.35

15 45.70

15 36.35

7 8 12.00

+3330

1.64120

∗ − 43.77

− .01

− .02

− 43.80

6 7 28.20 27.72

12 18.2

4 50.0 − .18 49.5

4 49.1 48.6

+ 2.48

− 17.00

+ 4 51.71 − 17.00

+ 4 34.71 51.33

12 2.91 − 1.35

+ 4 32.98

12 0.70

5

2 44.3

29.6

73.9

7 36.95

55 52.81

56 20.27

− 27.46

− ~~27.50~~

+ 27.41 − .02

+ .04 + .04

+ 0.93

+ 28.38 6

55 52.81

21.19

21.17

+2.47

5

2 48.0

34.7

82.7

7 41.35

+ 2003

1.30168

1.41395n

− 25.93

7 41.35

7 15.42

15 32.93

+35 9 38

+2302

1.63092

∗ − 42.75

− .03

− .03

− 42.81

14 50.12 − 14 49.90

12 16.7

− 2 33.4 − .22 33.6

− 2 34.3 34.5

+ 3.90

− 2 31.29 + 3.90

− 2 27.39 − 2 31.51

12 22.73 − 1.43

− 2 29.04

12 22.56

1872	°	'	"	
Nov. 16	7	11	79.2	
21			79.0	−.2
26			78.8	.2
Dec. 1			78.6	.2
6			78.4	.2

1873 (~~1872~~) ?	'	"	
Jan. 0	12	17.2	
5		16.9	− 3
10		16.6	3

1873			
Dec. 1	12	41.1	
6	12	39.9	− 2
11		39.7	−.2
16		39.4	.3
21		39.1	.3
26		38.8	.3

16
21
26

1873			
Nov 16	12	40.6	− 1
21		40.5	− 2
26		40.3	2
Dec 1		40.1	2
6		39.9	

Nov 19	56	Dec. 1 +.269 +.27		Dec. 7 +.209 +.21		Dec 15 +.158 +.18		Dec 16 +.221 +.21		Dec 17 +.132 +.14	
56 30.9	20.1	56	56 17.1	56	56 12.6	56 16.6	55 58.1	56 16.3	56 9.7	56 15.6	56 5.1
33.0	21.4	25.3	18.3	20.6	13.7	18.8	59.2	18.4	10.8	17.7	6.2
35.1	22.9	27.3	19.0	22.7	15.3	20.8	0.0	20.4	11.9	19.7	7.2
39.3		29.4		24.8		25.0		24.5		23.8	
41.4		33.6		28.4		27.1		26.6		26.0	
43.3		35.7		31.8		29.2	56 47.5	28.7		28.0	
45.6		37.7		33.0		31.3	48.7	30.8		30.0	
47.6		39.7		35.0		33.4	49.9	32.9		32.0	
51.7		41.9		37.2		37.6		36.8		36.2	
53.7		46.0		41.8		39.6		39.0		38.3	
55.8		48.0		43.5		41.7		41.0		40.3	
		50.0		45.6		221.1		315.4		307.6	
43.400	56 21.47	414.6		363.6							
		37.691	56 18.13	33.055	56 13.87	29.191	55 59.10 56 48.70.	28.673	56 10.80	27.964	56 6.17
56 43.38		56 37.68		56 33.04		56 29.18		56 28.66		56 27.95	
56 24.03		56 23.97		56 23.92		56 23.86		56 23.85		56 23.84	
+ 19.35		+13.71		+9.12		+5.32		+4.81		+4.11	
		~~+13.67~~		~~+9.08~~		~~+5.28~~		~~+4.77~~		~~+4.07~~	
		−13.78 +.01		− 9.19 +.00		5.40 − ~~7.26~~ +.01		− 4.90 +.01		− 4.26 +.05	
		+ .04	+.03	+ .03	+.03	+ .02	+.02	+ .03	+.03	+ .02	+.02
		−2.77		−2.72		−2.66		−2.65		−2.64	
		−16.51		−11.88		−8.043		−7.521		−6.883	
		56 37.68		33.04	21.16	29.18	21.14	28.66	21.14	27.95	21.07
		21.17									
		21.17		21.16		21.15		21.15		21.12	
		+2.72		+2.78		+2.84		+2.85		+2.86	
5		5		5		5 52.0		5		5	
2 40.9		2 39.9		2 36.3		2 41.9	1 46.7	2 38.0		2 42.9	
22.1		12.5		24.1		93.9	36.1	26.8		31.9	
63.0		52.4		60.4		7 46.95	82.8	64.8		74.8	
7 31.50		7 26.20		7 30.20			6 44.40	7 32.40		7 37.40	
+ 21.93		+ 19.56		+ 19.18		+ 30.09		+ 17.87		+ 21.79	
1.34104		1.29137		1.28285		1.47842		1.252~~61~~12		1.33826	
1.45331		1.40364		1.39512		1.59069		1.364~~88~~39		1.45058	
−28.40		−25.33		−24.84		−38.97		−23.17		−28.22	
7 31.50		7 26.20		7 30.20		7 46.95		7 32.40		7 37.40	
7 3.10		7 0.87		7 5.36		7 7.98		7 9.23		7 9.18	
15 45.25	7°	15 47.48		15 42.99		15 40.37		15 39.12		15 39.17	
		+35 9 22									
+ 1519		+5244		+3525		+2759		+2124		+2183	
1.62309		1.66034		1.64315		1.63549		1.62914		1.62973	
− 41.98		x − 45.74		x − 43.97		x − 43.20		x − 42.57		x − 42.63	
− .03		− .03		− .02		− .06		− .02		− .03	
+ .05		+ .07		+ .07		+ .08		+ ~~.04~~ .08		+ .10	
− 41.96		− 45.70		− 43.92		− 43.18		− 42.51		− 42.56	
15 3.29	± 7	15 1.78	15 1.59	14 59.07	14 58.87	14 57.19	56.94	14 56.61	56.41	14 56.61	56.40
12 40.5		12 41.1		12 39.9		12 39.5		12 39.4		12 39.3	
−2 22.8		−2 20.7 −.19	20.9	−2 19.2 −.20	19.4	−2 17.7 −.22	17.9	−2 17.2 −.20	17.4	−2 17.3 −.21	17.5
		−2 21.6	21.8	−2 20.1	20.3	−2 18.6	18.8	−2 18.1	18.3	−2 18.2	18.4
		− 20.40		− 19.30		− 18.80		− 18.80		− 18.60	
		−2 19.83 −	20.40	−2 17.12 −	19.30	−2 16.04 −	18.80	−2 17.03 −	18.80	−2 17.40 −	18.60
		−2 40.23 −2	19.64	−2 36.42	17.40	−2 34.84	16.30	−2 25.83	17.39	−2 36.00	17.59
		12 21.56 −	1.57	12 22.65 −	1.61	12 22.35 −	1.64	12 20.78 −	1.65	12 20.61 −	1.65
			−2 41.61		−2 38.31		−2 36.74		−2 37.84		−2 37.84
			12 20.98		12 20.56		12 20.23		12 18.57		12 18.56

44 Cephei H tang δ = +514
x = −080
cos α = −.06 +08

h m s
1 1 18
1 01 23
+ 78° 59′ ″
+ 78 59 48
2 = −36 37 00
− .60

α 1872 = 18.193 δ = 59′ 28.48″
α 1873 = 23.112 δ = 59 47.79 dα = +4917
dδ = +19.31

Red.	s
1	21.56
2	16.17
3	10.78
4	5.39
5	0.00

1872

	m	s	
Nov. 16	1	24.78	
21		24.50	.28
26		24.18	.32
Dec. 1		23.83	.35
6		23.45	.38
11		22.97	.38
16		22.59	.38

1873
1872.0

	m	s	
Jan 0	1	21.11	
5		20.59	.52
10		20.07	.52

	m		
Nov. 16	1	29.22	
21		28.95	27
26		28.64	31
Dec. 1		28.29	35
6		27.91	38
11		27.50	41
16		27.06	44

1872 +.070
Nov. 13 +.06

0 42.759 39.1
48.4 48.0
53.3 53.6
58.7
4.5
9.5
14.8
20.5
25.5

27.79
37.9
1 4.21159 (46.90)

1 4.13
1 24.93
−20.80
−20.74

+ 20.86 −.03
+ .31 +.36
− 6.74 −1.82
+ 14.435
1 4.13
1 18.56
18.58 23.50
+ 1.93

25
3 0.4
39.8
1 100.2
27 50.10

+ 77.31
1.88824
1.28455
−19.25
27 50.10
27 30.85
78 55 17.50

−36 37 17 1.63120n
+1258
1.64378n

″
+ 44.03
− .61
+ .08 −.28

+ 43.50
+78 56 1.00 56 0.72
59 53.3
″ 52.3 52.0
+.08 3 53.1 −.28 52.8
− 5.49
− 24.80
+4 52.39 − 24.80
+4 27.59 +4 51.80
+79 0 28.59 + 1.15
+4 28.15
0 28.87
0 [illegible]

Nov. 25
00

25
3 49.8
26.7
76.5
28 38.25

+349
Dec. 10 +.36

00 59 31.2 00
40.7 36.5
45.8 41.0
51.4
56.4
1.7
7.8
12.8
18.8
23.6
259.0
19.0

2.111 59 36.23

1 2.03
1 23.03
−21.00
−20.94

+ 19.07 +.01
+ 1.85 +1.79
− 4.84 +0.08
+ 16.083
2.03
18.11
18.06 22.98
+ 2.34

25
3 3.0
29.3
92.3
27 46.15

+ 85.88
1.93389
1.33020n
−21.39
27 46.15
27 24.76
55 23.59

+3330
1.66450n

+ 46.18
− .75
− .08 −.28

+ 45.35
55 6 8.94 56 8.66
0 0.2
+4 51.3 51.0
+4 52.1 −.28 51.8
− 12.39
− 31.70
+4 51.71 − 31.70
+4 20.01 4 51.33
59 28.95 + 1.40
+4 21.03
0 29.69
0 [illegible]

+.309
~~+.209~~
~~+.304~~
17
Dec 1(7)? n = 1.30

0 25.1
27.7
—
—
49.2 600
54.0 594
59.0 590
4.6 592
10.0 592
16.5 603
21.1 595

0 59.514 1 26.40

0 59.43
1 22.33
−22.90
−22.84

+ 21.53 ~~+.00~~ ~~+.01~~ −.01
+ 1.54 +1.59
− 4.14 +0.78
+ 18.937
0 59.43
18.30
18.40 23.32
+ 2.86

20
1 59.8
48.8
108.6
21 54.30

− 26.89
1.42959n
0.82540
18 − 6.90
21 54.30
21 47.60
1 0.75

Wrote — Maclear [illegible]

46.00
− .07
− .06

+ 45.87
1 46.62
0 1.5

− 33.00
− 2 31.20 31.70
− 3 4.20 −2 31.35
58 42.42 + 1.71

1873
Jan. 6

20
1 13.1
2.5
15.6
21 7.80

+.335
Jan. 9 +.33

0 (28.8) 1 18.7
34.5 20.1
40.8 24.5
46.2
51.3
56.6
1 2.3
7.8
13.1

0 51.20 1 21.10

0 51.12
1 20.15
−29.03
−28.97

+ 27.41 −.02
+ 1.70 +1.72
+ 2.96
+ 32.07
51.12
23.19
23.19
+ 2.47

20
0 57.3
45.5
102.8
20 51.40

− 29.90 89.90
1.47567n 1.95376
0.87198 1.39027
+ 7.45 −02.29
20 51.40 6.40
20 43.95 85 29.61
12 4.40 49.50

−36 36 53 1.63110n
+ 2314
1.65424n

+ 45.11
− .09
− .01

+ 45.01
2 44.41 34.51 34.45
0 3.3
− 2 46.1 −.312 3.13
− 2 45.3 −.304 −.06 3.05
− 15.50
− 2 31.29 − 15.50
− 2 46.79 − 2 31.51
0 2.62 + 1.48
59 47.72 − 2 45.53
59 48.92

Sin δ 9.99195
Cos δ 9.38060
.11571n
9.39631n

1872		°	'	"	
Nov.	16	78	59	54.1	
	21			55.5	+1.4
	26			56.9	1.4
Dec.	1			58.2	1.3
	6			59.4	1.2
	11			60.4	1.0
	16			61.3	.9

187~~2~~3 ?		'	"	
Jan.	0	59	62.9	
	5		63.1	+.2
	10		63.3	.2

1873		'	"	
Nov.	16	59	75.3	
	21		76.8	+1.5
	26		78.2	1.4
Dec.	1		79.4	1.2
	6		80.6	1.2
	11		81.6	1.0
	16		82.5	.9

1873			
Dec	16	82.5	
	21	83.3	+.8
	26	83.9	+.7

+.117
Nov. 19 +.12
01 | 00 20.6
26.3 | 26.5
32.1 | 33.1
37.2
42.6
46.0
53.7
59.0
4.6
9.8
313.3
433.3
1 48.144 0 26.73
1 48.06
1 29.05
+19.01
+19.07
−19.52 +.00
+ .62 +.60
−5.94
−24.846
1 48.06
23.22
23.20
+2.62
20
1 23.0
8.2
1 31.2
21 15.60
+81.41
+82.41
1.91068
1.30699
−20.27n
21 15.60
20 55.33
+78° 21 53.02
−36 36 44
+15.26
1.64636n
+ 44.30
− .68
− .04
+ 43.58
+79° 2 36.60
0 16.3
−2 20.3
−2 19.5 −.10
− 28.50
−2 20.77 −
−2 49.27 −2
59 47.33 +
2 36.50
20.4
19.6
28.50
20.90
1.56
−2 49.81
59 48.66

+.269
Dec. 1 +.27
01 | 00 35.1
18.5 | 39.5
24.1 | 46.8
30.0
35.2
41.0
46.2
51.6
57.2
2.7
317.5
367.5
40.833 0 40.13
1 40.75
1 28.27
+12.48
+12.54
−13.78 +.01
+ 1.39 +1.38
−5.16
−17.55
40.75
23.20
23.20
+2.72
20
1 24.7
58.9
143.6
21 11.80
+ 60.70
1.78819
1.17950n
−15.12n
21 11.80
20 56.68
1 51.67
+52.49
1.68359n
+ 48.26
− .38
+ .04
+ 47.92
2 39.59
0 19.5
−2 20.1
−2 19.3 −.10
−31.70
−2 19.83 −
−2 51.53
59 48.06 +
39.49
20.2
19.4
31.70
19.64
1.62
−2 49.72
59 49.77

+.184
Dec 3 +.22
01 | 01 4.5
18.0
23.2
28.8
34.0
39.1
45.2
50.4
56.0
1.0
295.7
355.7
39.522 1 4.50
1 39.44
1 28.13
+11.31
+11.37
−12.27 +.00
+ 1.13 +.94
−5.02
−16.16 35
39.44
23.28
23.09
+2.73
20
1 10.1
58.9
129.0
21 4.50
+ 35.02
1.54432
0.94063
−8.72n
21 4.50
20 55.78
1 52.57
+16.59
1.64769n
+ 44.43
− .12
+ .03
+ 44.34
2 36.91
0 19.9
−2 17.0
2 16.2 −.09
−32.10
2 17.04 −
−2 49.14
59 47.77 +
36.82
17.1
16.3
32.10
17.48
1.63
−2 47.95
59 48.87

+.209
Dec. 7 +.21
01 | 00 15.0
14.6 | 18.1
19.9 | 25.0
25.0
30.5
36.3
41.6
47.2
52.4
57.0
324.5
36.055 0 19.37
1 35.98
1 27.81
+8.17
+8.23
−9.19 +.00
+ 1.08 +1.07
−4.70
−12.81 .8182
35.98
23.17
23.16
+2.78
20
1 20.1
10.8
30.9
21 15.45
+ 76.68
1.88468
1.28099
−19.09
21 15.45
20 56.36
1 51.99
+35.34
1.66644n
+ 46.39
− .60
+ .04
+ 45.83
2 37.82
0 20.8
−2 17.0
−2 16.2 −.10
− 33.00
2 17.12 −
−2 50.12
59 47.70 +
37.72
17.1
16.3
33.00
17.40
1.67
−2 48.73
59 48.99

+.158
Dec. 15 +.18
01 | 59 40.6
10.4 | 44.4
15.6 | 51.1
21.6
26.5
31.5 | 02 1.4
36.9 | 5.1
41.7 | 9.1
47.8
53.0
285.0
31.667 59 45.37
2 5.20
1 31.59
1 27.13
+4.46
+4.52
− 5.40 +.01
+ .93 +.81
−4.02
−8.49 60
31.59
23.10
22.99
+2.84
20
1 25.2 0 51.4
17.1 44.1
42.3 95.5
21 21.15 20 47.75
+ 106.30
2.02653
1.42284n
−26.47
21 21.15
20 54.68
1 53.67
+27.64
1.65874n
+ 45.58
− 1.15
+ .04
+ 44.47
2 38.14
0 22.4
2 15.7
−2 14.9 −.10
−34.60
2 16.04 −
2 50.64
59 47.50 +
38.04
15.8
−15.0
34.60
16.30
1.70
−2 49.20
59 48.84

+.221
Dec 16 +.21
01 | 00 16.0
9.9 | 22.2
15.0 | 26.8
20.4
25.6
30.8
36.4
41.9
47.6
52.9
280.5
31.167 0 21.57
1 31.09
1 27.04
+4.05
+4.11
−4.90 +.01
+1.08 +1.13
−3.93
−7.75 69
31.09
23.34
23.40
+2.85
20
1 15.0
6.1
21.1
21 10.55
+ 69.50
1.84198
1.23829
−17.37
21 10.55
20 53.24
1 55.11
+21.71
1.65281n
+ 44.96
− .49
+ .04
+ 44.51
2 39.62
0 22.5
−2 17.1
−2 16.3 −.10
− 34.70
−2 17.03 −
−2 51.73
59 47.89 +
39.52
17.2
16.4
34.70
17.39
1.91
−2 50.38
59 48.14

		+.132				+.206	
	Dec. 17	+.14			Dec. 28	+.21	
01	59	52.0		01	60	35.7	
	9.1	57.8			2.5	39.0	
	14.0	2.8			8.0	44.2	
	19.9				13.2		
	25.3				18.7		
	30.6				24.1		
	35.8				29.6		
	41.6				35.2		
	47.0				40.1		
	52.9				46.2		
	2762				2176		
1	30.689	59	58.53		24.178	0	39.63
1	30.61			1	24.10		
1	26.95			1	25.90		
	+3.66				−1.80		
	+3.72				−1.74		
	−4.26	+.05			+0.34	−.01	
	+ .72		+.68		+1.08		+1.06
	−3.84				−2.79		
	−7.347				−~~1.37~~ 1.40		
1	30.61				24.10		
1	23.23				23.73		
	23.24				22.70		
	+2.86				+2.93		
20				20			
1	20.0			1	11.6		
	11.0				0.8		
1	31.0				12.4		
21	15.50			21	6.20		
	+ 9216				+ 4455		
	1.96454				1.64885		
	1.36085				1.04816		
	−2295				−1110		
21	15.50			21	6.20		
20	52.55			20	55.10		
1	55.80			1	53.25		
	+2169				+958		
	1.65279				1.64068		
+	44.96			+	43.72		
−	.87			−	.20		
+	.05			+	.04		
+	44.14				43.56		
2	39.94	2	39.84	2	36.81		36.12
0	22.7			0	24.2		
−2	17.2		17.3	−2	12.6		12.7
2	16.4	−.10	16.5	−2	11.8	−.09	11.9
	−34.90				−36.40		
−2	17.40	−	34.90	−2	13.76	−	36.40
−2	52.30	−2	17.59	−2	50.16		13.33
59	47.64	+	1.71	59	46.65	+	1.75
		−2	50.78			−2	47.98
		59	49.06			59	48.74

1872 1872

Sin δ 9.69122

τ Piscium tang δ = +.56

h m s
1 4 35
1 04 40
+29° 24′ ″
+29 24 53
+12 57 55
+.22

f α = -.018

cos α = -.11

1872 = 36.999

1873 = 40.290

	m s		° ′ ″	
Nov. 16	4 39.82		29 24 55.8	
21	.79	3	56.2	+4
26	.76	3	56.6	4
Dec. 1	.72	4	56.9	.3
6	39.68	4	57.1	.2
11	63	5	57.2	.1
16	58	5	57.2	.0
21	52	6	57.3	.1
26	39.46	6	57.3	.0

cos δ 9.94005
.11571 m
.05576 n

δ1872 = 24′ 33.61″ dα = +3.291
dδ = +19.23
δ1873 = 24 52.84

1872 +.070 Nov 13 +.06 | +.174 Nov. 23 +.17 | +.349 Dec. 10 +.36 | 17 +.309 Dec 18 n = +.30 | 1873 Jan. 6 | +.335 Jan. 9 +.33

04 4.7 03 57.8 03 58.6 03 50.7 04 6.1 03 58.0 04 3.5 04 9.3 3 57.5 3 53.0
7.0 59.3 0.9 51.8 8.6 59.3 6.0 59.8 54.1
9.5 0.2 3.3 52.5 10.8 0.5 8.3 4 2.3 55.2
14.0 7.9 ~~58.6~~ 15.6 12.0 6.9
16.5 10.2 17.8 15.5 9.2
18.9 12.6 20.3 17.8 11.6
21.3 15.0 22.7 20.1 14.0
23.5 17.3 25.0 22.5 16.3
28.3 22.0 29.7 27.2 21.0
30.8 24.5 32.1 29.6 23.4
33.1 26.8 34.6 32.1 25.8
207.6 199.1 223.4 195.6 247.8
139.1 127.8

4 18.873 3 59.10 4 12.645 3 51.67 4 20.309 3 59.27 4 17.782 4 9.30 4 11.618 3 54.10

4 18.86 4 12.63 4 20.29 4 17.76 4 11.60
4 39.84 4 39.78 4 39.64 4 39.54 4 39.25
-20.98 -27.15 -19.35 -21.78 -27.65
-20.87 -27.04 -19.24 -21.67 -27.54

+20.86 -.03 +27.05 +.00 +19.07 +.01 +21.53 -.01 +27.41 -.02
+ .03 +.04 + .10 +.10 + .20 +.20 + .17 +.17 + .18 +.19
-2.84 + 0.45 -2.78 + 0.51 -2.64 + 0.65 -2.54 + 0.75 +1.04
+18.053 +24.37 +16.634 +19.165 +28.632
4 18.86 12.63 20.29 17.76 11.60
4 36.91 37.00 36.92 36.92 37.23
4 36.89 4 40.18 37.00 40.29 36.93 40.22 36.91 40.20 40.22
+1.93 +2.10 +2.34 +2.86 +2.47
0 0 0 55 55 55
3 2.0 3 3.9 3 6.2 0 18.9 0 35.6 0 30.9
46.1 41.3 36.7 9.1 23.7 19.6
108.1 105.2 102.9 28.0 59.3 50.5
2 54.05 2 52.60 2 51.45 55 14.00 55 29.65 55 25.25
+ 19.77
+ ~~29.77~~ + 20.97 + 21.04 + 8.48 + 17.52
1.29601 1.32160 1.32305 0.92840 1.24353
1.35172 1.37736 1.37881 0.98416 1.29929
-22.48 -23.84 -23.92 - 9.64 -19.92
2 54.05 2 52.60 2 51.45 55 14.00 55 25.25
2 31.57 2 28.76 2 27.53 55 4.36 55 5.33
+29 20 16.78 20 19.59 20 20.82 27 43.99 27 43.02

+12 57 44 1.12230 +12 57 35 +12 57 28 1.12210
+12.92 + 22.51 + 33.30 + 23.30
1.13522 1.14481 1.15560 1.14540

*- 13.65 *- 13.96 *- 14.31 -14.30 *- 13.98
- .09 - .10 - .16 .02 - .07
+ .09 - .06 - .09 - .01 - .00

- 13.65 - 14.12 - 14.50 - 14.33 - 14.05
+29 20 3.13 20 2.84 20 5.47 20 5.18 20 6.32 6.04 27 29.66 27 29.64 27 28.97 27 28.94
24 55.6 24 56.4 24 57.2 24 57.2 24 56.5
+4 52.5 -.29 52.2 +4 50.9 -.29 50.6 +4 50.9 -.28 50.6 -2 32.5 -.02 32.5 -2 32.5 -.03 32.5
- 2.77 - 3.57 - 4.37 - 3.70
- 22.00 - 22.80 - 23.60 - 23.60
+4 52.39 +4 49.90 +4 51.71 -2 31.20 -2 31.29
+4 30.39 - 22.00 +4 27.10 - 22.80 +4 28.11 - 23.60 -2 54.80 - 23.60 -2 34.99 - 3.70
+29 24 33.52 +4 51.80 24 32.47 49.95 24 34.43 +4 51.33 24 34.86 -2 31.35 24 53.98 -2 31.51
.42 .46 .51 .62 .54
- - - - -
+4 29.38 +4 26.64 +4 27.22 -2 55.57 -2 35.75
24 32.22 24 31.87 24 33.26 24 34.07 24 53.19
51.45 51.10 52.48 53.30

3
1872?

	m	s		'	"	
Same	4	39.39		24	57.1	
5		.32	7		56.7	− .4
10		.24	8		56.4	− .3
1873						
Nov. 16		43.25		24	77.0	
21		23	2		77.4	+ .4
26		20	3		77.7	.3
Dec. 1		16	4		78.0	.3
6		43.12	4		78.3	.3
11		07	5		78.4	.1
16		43.01	6		78.5	.1
21		42.95	6		78.5	.0
26		42.90	5		78.6	.0

+209
Nov. 18 +.21

04 | 04 37.7
48.3 | 38.7
50.6 | 40.0
53.0
57.8
0.2
2.5
4.8
7.2
11.9
14.8
16.6
267.2
27.2
5 2.4734 | 38.67
5 2.45
4 43.24
+19.21
19.32

−19.44 +.00
+ .12 | +.12
−2.95
−22.27
5 2.45
4 40.18
4 40.18

+2.61
55
0 32.1
15.9
48.0
55 24.00

+2380
1.37658
1.43234
−27.06
55 24.00
54 56.94
27 51.41

+12 57.18
+877
1.13087

*− 13.52
− .14
− .06

− 13.72
27 37.69 | 27 37.66
25 17.2
−2 20.5 −.03 | 20.5

− 24.40
−2 20.02
−2 44.42 | − 24.40
24 53.27 | −2 19.50
− .57
−2 44.47
24 53.19

+.117
Nov. 19 +12

04 | 04 40.1
~~48.3~~ | 41.7
~~51.7~~ | 43.0
~~53.0~~
~~55.7~~
57.8 | 05 11.9
0.1 | 14.4
2.6 | 16.6
~~2.5~~
4.9
7.1
274.6
260 | 4 41.60
5 2.58 | 5 14.304
4 43.24
19.34
19.45

−19.52 +.00
+ .07 | +.07
−2.95
−22.40
2.58
40.18
40.18

+262
55
0 27.7
12.1
39.8
55 19.90

+21.00
1.32222
1.37798
−23.87
55 19.90
54 56.03
27 52.32

+1538
1.13748

*− 13.72
− .10
− .01

− 13.83
27 38.49 | 38.47
25 17.3
−2 21.2 −.02 | 21.2

− 24.50
−2 20.77
−2 45.27 | − 24.50
24 53.22 | 20.90
− .57
−2 45.97
24 52.50

+.184
Dec. 3 +.22

04 | 04 28.5
41.0 | 29.8
43.4 | 31.0
45.8
50.6
52.9
55.1
57.6
0.0
4.7
7.0
9.4
367.5
604.5
55.22 | 4 29.77
4 55.21
4 48.14
+12.07
+12.18

−12.27 +.00
+ .12 | +.10
−2.85
−15.00 2
4 55.21
40.21
40.19

+2.73
55
0 33.0
21.1
54.1
55 27.05

+25.46
1.40586
1.46162
−28.95
55 27.05
54 58.10
27 50.25

+1659
1.13869

*− 13.76
− .15
+ .01

− 13.90
27 36.35 | 36.32
25 18.1
−2 18.2 −.03 | 18.2

− 25.30
−2 17.04
−2 42.34 | − 25.30
24 54.01 | 17.48
− .60
−2 43.38
24 52.94

+.209
Dec. 7 +.21

04 | 04 30.5
37.9 | 31.8
40.3 | 33.2
42.6
47.3
49.7
51.9
54.4
56.7
1.4
3.8
6.2
092.2
572.2
52.019 | 4 31.83
4 52.00
4 43.11
+8.89
+9.00

−9.19 +.00
+ .12 | +.12
−2.82
−11.89
52.00
40.11
40.11

+2.78
55
0 26.8
15.0
41.8
55 20.90

+20.19
1.30514
1.36090
−22.96
55 20.90
54 57.94
27 50.41

+3541
1.15751

*− 14.37
− .09
+ .01

− 14.45
27 35.96 | 35.94
25 18.3
−2 17.7 −.02 | 17.7

− 25.50
−2 17.12
−2 42.62 | − 25.50
24 53.34 | 17.40
− .61
−2 43.51
24 52.93

+.158
Dec. 15 +18

04 34.0 | 04 28.7
36.4 | 30.3
38.9 | 31.7
43.6
46.0
48.4 | 05 20.6
50.7 | 22.0
53.0 | 24.3
57.8
0.1
2.4
411.3
531.3
48.300 | 4 30.23
4 48.28 | 5 22.30
4 43.02
+5.26
+5.37

−5.40 +.01
+ .11 | +.09
−2.73
−8.03
48.28
40.25
40.25

+2.84
55 | 50
0 32.1 | 4 24.1
12.9 | 17.1
35.0 | 41.2
55 17.50 | 54 20.60

+18.07
1.25696
1.31272
−20.55
55 17.50
54 56.95
27 51.40

+2768
1.14978

*− 14.12
− .08
+ .01

− 14.19
27 37.21 | 37.19
25 18.5
−2 18.7 −.02 | 18.7

− 25.70
−2 16.04
−2 41.74 | − 25.70
24 55.47 | 16.30
− .62
−2 42.62
24 54.57

+.221
Dec. 16 +.21

04 33.6 | 04 24.8
36.0 | 26.0
38.3 | 27.0
43.0
45.4
47.7
50.0
52.6
57.0
59.6
2.0
465.2
525.2
47.74 | 4 25.93
4 47.73
4 43.01
+4.72
+4.83

−4.90 +.01
+ .12 | +.12
−2.72
−7.50 49
47.73
40.23
40.~~22~~ 24

+2.85
55
0 28.9
20.3
49.2
55 24.60

+21.81
1.33866
1.39442
−24.80
55 24.60
54 59.80
27 48.55

+2217
1.14427

*− 13.94
− .11
+ .01

− 14.04
27 34.51 | 34.48
25 18.5
−2 16.0 −.03 | 16.0

− 25.70
−2 17.03
−2 42.73 | − 25.70
24 51.78 | 17.39
− .62
−2 43.71
24 50.77

+.132 +.206
Dec. 17 +.14 Dec. 28 +.21

04 32.9 04 20.1 04 28.1 04 18.0
35.2 21.2 32.8 30.6 19.1
37.7 22.3 37.6 20.5
42.3 39.9
44.7 42.2
47.0 44.7
49.5 47.0
51.9 51.9
56.6 54.1
58.9 56.6
1.2
45.9
51.9
47.0824 21.20 42.3184 19.20
4 47.06 4 42.30
4 43.00 4 42.88
4 +4.06 −0.58
+4.17 +0.44

−4.26 +.05 + 0.34 −.01
+ .05 +.07 + .12 +.12
−2.71 −2.59
−6.895 −2.134
4 47.06 42.30
40.14 17 40.17
40.15 21 40.16

+2.86 +2.93
55 55
0 31.9 0 32.3
23.1 23.1
550 554
55 27.50 55 27.70

+ 25.88 + 23.12
1.41296 1.36399
1.46872 1.41975
−27.43 −26.29
55 27.50 55 27.70
54 58.07 55 1.41
27 50.28 27 48.94

+ 21.56 + 9.57
1.14366 1.13167

+ − 13.92 + − 13.54
− .16 − .13
+ .02 + .02

− 14.06 − 13.65
27 36.22 36.19 27 33.29 33.26
25 18.5 25 18.5
− 2 17.7 −.03 17.7 − 2 14.8 −.03 14.8

− 25.70 − 25.70
− 2 17.40 − 2 13.76
− 2 43.10 − 25.70 − 2 39.46 − 25.70
24 53.12 − 2 17.59 24 53.83 13.33
− 62 − 64
− 2 43.91 − 2 39.67
24 52.28 24 53.59

1872phae.proj.1464.

Red. s   A±1   log sin δ 9.99988

2m 51.5   1   m s 5 45.5   log cos δ 8.37750
2 8.6   2   7 11.8   1.1571n
1 25.8   3   8 38.2   8.49321n
0 42.9
0 0.0

Polaris
h m s
1 11 0
1 12 18
+88° 37′ 40″
+88 37 56
z = −46 15 08
ain. z = −.72
N.D. places.

α 1872 N.A. m s 11 58.231   cor α = −.09 (−11) for 1872   −.13 s for 1873
−58.14
α 1873 N.A. 12m 18.728   α 1872 = 57.610 = P = 58.14   δ 1872 = 37′ 36.93″ (P)   dα = +20.388
+53
α 1873 = 18.071 = P   18.60   δ 1873 = 37 56.02   dδ = +19.09
+53

log S = 41.92   41.95   41.98   42.00   42.02   42.02
1872 +.070   +.197   +.349   17 +.309   42.04 +.534   1873
Nov. 13 +.06   Nov. 25 +.20   Dec. 10 +.36   Dec. 17 +.3   Dec. 30 +.53   Jan. 1

09 26.4 06 (37.1 09   07 17.0 08   05 19.7 08   07 16.1   16 5.8
10 10.7 (38.9   10 10.0   59.2   33.5   43.7   40.2   7.6
10 54.7 14 27.8   10 49.8   09 44.7   52.0 09 30.7   54.0   11.4
11 37.0   11 37.0 15 22.6   10 28.7   58.4 10 17.0
12 21.4 −   12 19.5   11 10.1   10 57.3
13 22.0   13 0.1   11 51.7 −   11 42.2
13 44.0   13 45.2   12 35.6   12 30.9
14 27.8   14 29.4   13 20.6   13 17.2
15 11.2   15 12.1   14 4.8   14 0.5   17 7.8 11 22.3
15 53.2   14 47.1   14 45.2   18 40.3   28.5
235.2   256.3   31 2.5   284.9   20 2.9   24.7
175.2 6 380   176.3   404.9
12 19.47 14 27.8 13 1.81 7 17.00 15 22.60   11 53.61 5 40.90   44.99 7 (36.90) 12 31.10 11 25.17 8.27

12 18.83   12 1.17   11 52.97   11 44.35   12 30.46 8 11 24.53
12 43.17   12 37.27   12 27.58   12 20.77   12 11.62
−24.34   −36.10   −34.61   −36.42   +18.84
−24.33 25   −35.99 −36.01   −34.52   −36.38   +18.93

+20.86 −.03   +28.29 +.00   +19.07 +.01   +21.53 −.01   +23.96 +.01
+2.51   +8.39   +15.12   +12.60   +22.26
−44.94   −39.04   −29.35   −22.54   −13.39
−21.57 60   −2.36   +4.84 5   +11.58   +32.84
12 18.83   1.17   52.97   44.35   24.53
11 57.26 23   58.81   57.82   55.93   57.37

+1.93   +2.15   +2.34   +2.86   +2.63
50   50   50   40   40   40
0 2.2 0 49.3 0 56.1 0 43.9 1 6.2   3 24.2   3 12.0   3 26.3
42.1   28.7   32.3   20.7   31.1   17.9   56.3   13.1
10.43   7.80   8.84   6.46   9.73   4.21   12.83   3.94
49 52.15 50 39.00 50 44.20 50 32.30 50 48.65   43 21.05   43 4.15   43 19.70
50 +34.15 51 −12.83 +28.48 −20.08 +37.27   +24.80   +21.78 −24.38
2.53339 2.10823 2.45454 2.30276 2.57136   2.39445   2.33806
0.02660n 0.60144 0.94776 9.79597 0.06457n   9.88766n   9.83127n
−10.63 +3.99 −8.87 +6.25 −11.66   −7.72   −6.78 −7.70
49 50 52.15 39.60 50 44.20 50 32.30 50 48.65   43 21.05   43 4.15
49 50 41.52 49 42.99 50 35.33 50 38.55 50 37.05   43 13.33   42 57.37 43 11.85
+38 2 6.83 32 2 5.36 32 13.02 32 9.80 32 11.30   39 35.02   39 50.97 39 36.50

−46 15 7 1.77870n   −46 14 24

+13.27   +3.54   +33.30   +30.84   +45.50
1.79197n   1.78224n   1.81200n   1.20954   1.82420n
+ .00   + .00   + .01   + .01   + .01
+1 1.94   +1 0.57   +1 4.86   1 4.50   +1 6.71
− 1.52   − 1.06   − 1.81   − .80   − .62
+ .15   − .01   − .02   − .10   − .03

+1 1.57 0.57   + 59.50   +1 3.04   +1 3.61   +1 6.07
34 8.4 7.40   7.31 33 12.52   12.45 33 14.34   14.26 40 38.63 40   38.30 40 57.94   57.04 42.57 42.26
38 0.0   38 3.9   38 7.9   38 9.5   38 11.3
+4 52.6   5.25 +4 51.4   51.3 +4 53.6   53.5 −2 29.1   29.4 38.2 31.3   31.6
+4 52.9 −.09   52.8 +4 51.7 −.07   51.6 +4 53.9 −.08   53.8 −2 28.8 −.33   29.1 −2 31.0 −.31   31.3

−23.10   −27.00   −31.00   −32.60   −34.40
+4 52.39 −   23.10 +4 49.93 −   27.00 +4 51.71 −   31.00 −2 31.20 −   32.60 −2 30.83 −   34.40
+4 25.29 +4   51.80 +4 22.93 +4   47.72 +4 20.71 +4   51.33 −3 03.60 −2   31.35 −3 5.23   31.20
37 36.69 +   1.38 37 36.45 +   1.54 37 35.05 +   1.68 37 34.80 +   2.05 37 37.34 +   1.89
−.83 +4   30.08   −.83 +4   24.26   −.83 +4   22.01   −.83 −3   01.90   −.83 −3   3.71
37 35.86 37 37.39   37 35.62 37 36.71   34.22 37 36.27   34.00 37 36.40   36.51 37 38.54

1872		1873	
s	"	s	
57.23	36.68	18.87	54.78
58.81	36.45	18.60	53.21
57.82	35.05	20.98	53.36
55.93	34.83	17.14	54.66
57.37	37.34	18.83	54.36
		19.36	55.16
		16.61	53.89
		16.92	53.58
		15.11	54.64
		17.58	53.56
		18.69	54.27
		18.39	52.03
57.432	36.07	18.090	53.96
58.14	36.93	18.60	56.02
−0.71	−0.86	−.51	−2.06

1872.0		1873.0	
α	δ	α	δ
57.432	36.07	18.090	53.96
.610	.93	.071	56.02
−.178	−.86	+.019	−2.06

Ch. f.

Jan. 6

Jan. 9 +.33 42.07 +.335
8
27.6
9 11.7
55.2
10 38.4
11 21.5
12 4.8
49.2
13 33.0
14 16.3
25.7
19.7
21.967 7
11 21.33
12 2.44
+18.89
+19.02
40.98
+27.41 −.02
+13.86
+~~15.63~~ +16.29
+56.90 57.584
11 21.33 21.33
12 ~~18.23~~ 18.89
18.87

7 6.0
11.5
23.0
42.6

Jan. 12 +.33 42.07 +.351
11
53.8
12 36.4
13 24.4
20.77 Ref. [illegible]
11 59.05
+27.85 −.02
+13.86
+18.22 88
+59.93
1

Nov. 18 +.21 42.10 +.209
10 06 7.8
14.0
10 58.9
11 43.9
12 26.2
13 8.6
13 51.4
14 33.2
15 15.0
16 0.8
252.0
72.0
8.00 6 7.80
13 7.36
12 56.49
+10.47
+10.60
−19.44 +.00
+8.84
+ ~~21.28~~ −38.16
+ ~~11.28~~ −45.76
~~7.36~~ 7.36
~~18.64~~ 18.60

Nov. 19 +.12 42.14 +.117
10 06 24.2
15.6
11 3.6
11 46.6
12 28.6
13 7.8
13 51.2
14 38.7
15 16.8
16 2.0
210.9
90.9
10.10 6 24.20
13 9.46
12 56.53
+12.93
+13.06
−19.52 +.00
+8.84
+ ~~21.54~~ −37.80
+ ~~18.46~~ 48.48
9.46 9.46
~~20.32~~ 20.98

Dec. 3 +.22 42.13 +.184
06 1.6
10 1.6
10 43.4
11 25.6
12 13.3
12 53.0
13 39.1
14 21.2
15 2.0
15 47.2
216.4
45.64
50.71 6 1.60
12 50.07
12 48.65
+1.42
+1.55
−12.27 +.00
+9.26
−29.92
+ ~~36.41~~ −32.93
~~50.07~~ 50.07
~~16.48~~ 17.14

40
3 20.5
8.9
29.4
43 14.70

+2.47
40
2 21.5
10.6
32.1
42 16.05
+241.1
2.38220
9.87541n
−7.51
42 16.05
42 8.54
+ 39 39.81
−46 15 29 1.77880n
+2346
1.80226n
+ .01
+1 3.42
− .76
− .02
+1 2.65
+88 40 42.46 40 42.28
38 32.8
−2 30.2 30.4
−2 29.9 −.18 30.1
−16.30
−2 31.29 − 16.30
−2 47.59 −2 31.51
37 54.87 + 1.77
− 1.58 −2 46.04
37 53.29 37 56.24

+261
40
3 28.6
11.4
40.0
43 20.00
+4202
2.62346
0.11667n
−13.08
43 20.00
43 6.92
39 41.43
−46 14 32
+877
1.78757n
+ .01
+1 1.32
− 2.30
− .53
+ 58.50
40 39.93 39.67
38 22.7
−2 17.2 17.5
−2 16.9 −.26 17.2
−26.70
−2 20.02 − 26.70
−2 46.72 −2 19.50
37 53.21 + 1.87
− 1.58 −2 44.33
37 51.63 37 55.34

+262
40
3 27.9
11.9
39.8
43 19.90
+4059
2.60842
0.10163n
−12.64
43 19.90
43 7.26
39 41.09
+1550
1.79430n
+ .01
+1 2.27
− 2.14
− .10
+1 0.04
40 41.13 40.87
38 23.0
−2 18.1 18.4
−2 17.8 −.26 18.1
−27.00
−2 20.77 − 27.00
−2 47.77 −2 20.90
37 53.36 + 1.88
− 1.58 −2 46.02
37 51.78 37 54.85

+273
40
3 23.1
14.0
37.1
43 18.55
+4091
2.61183
10.10504n
−12.74
43 18.55
43 5.81
39 42.54
+1659
1.79539n
+ .50
+1 2.43
− 2.17
+ .10
+1 0.36
+40 42.90 42.64
38 27.2
−2 15.7 16.0
−2 15.4 −.26 15.7
−31.20
−2 17.04 − 31.20
−2 48.24 17.48
37 54.66 + 1.96
− 1.58 −2 46.72
37 53.08 37 55.92

Polaris
1 11 0
+88 34

1873

4214 +.209
Dec. 7 +.21
m s 06 12.0
09 54.1 7 0.2
10 35.7
11 21.0
12 4.2
12 50.6 11 30.0
13 30.2
14 14.5
14 55.0
15 39.0
304.3
424.3
12 47.14 6 36.1
12 46.50 11 30.06
12 46.06
+.44
+0.57

-9.19 +.00
+8.85
-27.33
-27.67
12 46.50
12 18.83

+2.78
40
3 24.2
14.9
39.1
43 19.55
+37.50
2.56937
1.06288
-11.55
43 19.55
43 8.00
+39 40.35

+35.49
1.81429
+ .01
±1 5.21
- 1.79
+ .10
+1 3.53
40 43.88 40 43.62
38 28.4
-2 15.5 15.8
-2 15.2 -.26 15.5

-32.40
-2 17.12 - 32.40
-2 49.52 -2 17.40
37 54.36 + 2.00
- 1.58 -2 47.80
37 52.78 37 55.82

4214 +.140
Dec. 9 +.17
9 6 29.8
52.1
10 34.6
11 19.6
12 2.1
48.8
13 29.0
14 12.1
14 57.8
15 42.0
297.6
417.6
12 46.40 6 29.80
12 45.76
12 44.43
+1.33
+1.46

-7.87 +.01
+7.46
-25.40
-26.4x0
45.76
19.356

+2.80
40
3 17.1
10.9
28.0
43 14.00
37.66
2.57588
1.06909
-11.72
43 14.00
43 2.28
39 46.07

+8.54
1.78734
+ .00
±1 1.28
- 1.84
+ .10
+ 59.54
40 45.61 45.35
38 28.9
2 16.7 17.0
-2 16.4 -.26 16.7

-32.90
-2 17.55 - 32.90
-2 50.45 -2 17.88
37 55.76 + 2.01
- 1.58 -2 48.77
37 53.58 37 56.58

4214 +.179
Dec. 10 +.19
9 6 40.7
9 48.0
10 33.0
11 13.1
11 59.6
12 42.8
13 24.6
14 7.6
14 50.6
15 35.8
316.0
376.0
12 41.78 6 40.70
12 41.14
12 44.01
-2.87
-2.74

-7.26 +.00
+8.01
-20.28
-24.53
41.14
16.61

+2.80
40
3 23.8
13.0
36.8
43 18.40
+36.04
2.55678
1.04999
-11.22
43 18.40
43 7.18
39 41.17

+26.50
1.80530
+ .01
±1 3.87
- 1.69
+ .10
+1 .229
40 43.46 43.20
38 29.1
-2 14.4 14.7
-2 14.1 -.26 14.4

-33.10
-2 16.47 - 33.10
-2 49.57 -2 16.34
37 53.89 + 2.01
- 1.58 -2 47.43
37 52.31 37 55.77

42.16 +.158
Dec 15 +.18
09 06 12.1
41.5 17.2
10 29.7 20.3
11 9.7
11 53.9
12 38.0
13 19.7
14 0.3
14 46.2
15 29.3
268.3
328.3
12 36.48 6 16.53
12 35.84
12 39.85
-4.01
-3.88

-5.40 +.01
+7.59
-21.12
-18.9x2
35.84
16.9x2

+2.84
40
3 22.1
15.4
37.5
43 18.75
38.00
2.57978
1.07299
-11.83
43 18.75
43 6.92
39 41.43

+27.72
1.80652
+ .01
±1 11.05
- 1.88
+ .10
+1 2.28
40 43.72 43.46
38 30.1
2 13.6 13.9
-2 13.3 -.26 13.6

-34.10
-2 16.04 - 34.10
-2 50.14 -2 16.30
37 53.58 + 2.04
- 1.58 -2 48.36
37 52.00 37 55.10

42.16 +.221
Dec. 16 +.21
05 42.9
09 41.9 48.6
10 25.4 51.9
11 10.4
11 52.1
12 37.9
13 22.4
14 3.2
14 46.9
15 29.0
231.2
290.2
12 32.24 5 47.80
12 31.60
12 39.18
-7.58
-7.45

-4.90 +.01
+8.85
-20.45
-16.50 49
31.60
15.101

+2.85
40
3 20.0
12.5
32.5
43 16.25
40.44
2.60681
1.10002
-12.59
43 16.25
43 3.66
39 44.69

+22.63
1.80143
+ .00
±1 3.30
- 2.12
+ 10
+1 1.18 1.28
40 45.87 45.97 45.71
38 30.3
-2 15.8 16.0
-2 15.4 -.26 15.7

- 34.30
-2 17.03 - 34.30
-2 51.33 -2 17.39
37 54.64 + 2.05
- 1.58 -2 49.64
37 53.06 37 56.07

42.16 +.132
Dec. 17 +.14
09 05 28.0
44.7
10 25.3
11 12.2
11 52.3
12 36.5
13 20.3
14 0.8
14 45.4
15 29.0
266.5
326.5
12 36.28 05 28.00
12 35.64
12 38.48
-2.84
-2.71

-4.26 +.05
+5.90
-19.75
-18.1 06
35.64
17.53 58

+2.86
40
3 21.1
13.1
34.2
43 17.10
+42.83
2.63175
1.12496
-13.23
43 17.10
43 3.77
39 44.58

+21.43
1.80023
+ .01
±1 3.13
- 2.38
+ .13
+1 0.88
40 45.46 45.20
38 30.5
-2 15.0 15.3
-2 14.7 -.26 15.0

- 34.50
-2 17.40 - 34.50
-2 51.90 -2 17.59
37 53.56 + 2.05
- 1.58 -2 50.04
37 51.98 37 55.16

	1872.0			1873.0
m / s α	δ		α	δ
11 57.23	35.86	12	18.87	53.29
58.81	35.62		18.60	51.63
57.82	34.22		20.98	51.78
55.93	34.00		17.14	53.08
57.37	36.51		18.83	52.78
			19.36	53.58
			16.61	52.31
			16.92	52.00
			15.11	53.06
			17.58	51.98
			18.69	52.69
			18.39	50.45
57.432	35.24 +1.66		18.090	+3.16 52.39
s .610	36.93		.071	56.02
−.178	−1.69		+.019	−3.63
~~+.166~~	+1.66			+3.16
	−.03			−0.47

4216 +.179
Dec. 18 +.16
9 5 58.6
42.5
10 24.7
11 8.8
11 51.6
12 34.6
13 16.8
14 1.8
45.6
15 30.3
256.7
3 16.7
12 35.19
5 58.60
12 34.55
12 37.78
−3.23
−3.10
−3.57 +.02
+6.74
−19.05
−15.88 86
34.55
18.67 9

+2.86
40
3 20.1
10.9
31.0
43 15.50
+396.6
2.59835
1.09156
−12.35
43 18.50
−43 3.15
39 45.20

+17.13
~~1.780593~~
+1.79593
.00
+1 2.51
− 2.05
+ .13
+1 0.59
40 45.79 40 45.53
38 30.7
−2, 15.1 15.4
−2 14.8 −.26 15.1
− 34.70
−2 16.82 − 34.70
−2 51.52 −2 17.06
37 54.27 + 2.05
−1.68 −2 49.71
37 52.69 37 55.82

4216
Dec. 21
No deltas
Rej
14 43.2 34.6
27.9 36!
12 35.35
12 34.71
12 35.32
−0.61
−0.48
+
−14.59

4217 +.251
Dec 22
Ch J
40
2 3.3
50.6
113.9
41 56.95

4217 +.206
Dec. 28 +.21
09 06 12.2
26.8
10 7.3
10 52.5
11 36.7
12 20.3
13 3.7
13 48.3
14 31.0
15 15.1
241.7
181.7
20.19
6 12.20
12 19.55
12 29.07
−9.52
−7.31
+0.34 −.01
+8.85
−10.34
−1.156
19.55
18.40 39

+2.93
40
3 22.8
12.2
35.0
43 17.50
+367.3
2.56502
1.05823
−11.43
43 17.50
43 6.07
39 42.28

+0.55
1.78835
+ .00
+1 1.43
− 1.75
+ .13
+ 59.81
40 42.09 41.83
38 32.3
−2 9.8 ~~10.1~~
−2 9.5 −.26 9.8
− 36.30
−2 13.76 − 36.30
−2 50.06 −2 13.33
37 52.03 + 2.10
− 1.58 −2 47.53
37 50.45 37 54.30

1872phae.proj.1464.

ψ Cass

h m s
1 16 55
1 16 59
+67° 28' "
+67 27 57
z = −25 05 09
− .42

Red.
s'
1 10.75
2 8.06
3 5.38
4 2.69
5 0.00

1872

tang δ = +2.41
x = −.038
corr x = +.09 + 0.5"

Nov. 16	16ᵐ	59.50ˢ	
21		40	10
26		.38	12
Dec. 1		.15	13
6		59.01	14

α 1872 = 55.091 δ = 27' 38.32"
dα = +4.143
dδ = +18.95
α 1873 = 59.234 δ = 27 57.27

18~~7~~32

Jan. 0	16ᵐ	58.04ˢ	
5		57.81	23
10		57.58	23

1873

Dec. 6	17	3.09	
11		2.92	17
16		2.75	17
21		2.55	20
26		2.35	20

1872 +070
Nov. 13 +.06
16 27.9 16 16.4 (17).
30.5 18.7
33.2 20.9
36.0
38.6
41.2
43.8
47.0
49.4
344.6
38.622 16 18.67

+.197
Nov. 25 +.20
16 40.3
20.0 43.6
22.7 45.1
25.3
28.0
30.4
33.3
36.0
38.5
41.3
.275.5
30.611 16 43.00

1873
Jan. 1

+.335
Jan. 9 +.33
16 — 16 46.1
— 48.1
— 50.1
~~—~~ 51.7
26.8 29.5
29.4 .4
32.3 .6
35.0 .6
37.6 .5
40.2 .5
29.517 16 49.00

+.209
Dec. 7 +.21
17 16 31.4
1.2 34.8
3.7 36.617
6.7
9.3
11.9
14.7
17.5
20.1
22.6
107.7
11.967 16 34.27

+.140
Dec. 9 +.17
16 16 26.0
55.6 28.9
17 2.6 31.7
5.2
7.9
10.7
13.3
16.0
18.6
21.2
135.1
95.1
10.567 16 28.87

16 38.58
16 59.55
−20.97
−21.06
+20.86 −.03
+ .14 +.17
−4.46 −0.32
+16.54
16 38.58
16 55.12
16 55.12 16 59.26
+1.93
0
0 25.7
+6.1
+9.6 31.8
0 9.80 15.90
+ 19.95
1.29994
0.99910
− 10.00
0 ~~9.80~~ 15.90
59.60 ~~59.80~~ 5.90
67 22 ~~48.55~~
42.45
−25 4 48 1.43040ₙ
+1361
1.44401ₙ
+ 27.80
− .07
+ .04
+ 27.74
+67 23 ~~16.29~~ 10.19 10.17
28 2.5
+4 ~~46~~ 25.23 5.23
+0.5 +4 ~~92.8~~ 52.8 −.02
52.5
− 24.20
+4 52.39 − 24.20
+4 28.19 +4 51.80
67 27 38.38 + .81
+4 28.41
27 38.58
27 57.53

~~17~~6. 30.57
16 59.30
−28.73
−28.82
+28.29 +.00
+ .48 +.47
−4.21 −0.07
+24.56 5
17 6 30.57
55.13
55.12 59.26
+2.15
0
0 34.2
12.1
46.3
0 23.15
+ 47.61
1.677~~61~~ 70
1.3767~~7~~ 86
− 23.81
0 23.15
59 59.34
22 49.01
+362
1.43402ₙ
+ 27.17
− .45
− .01
+ 26.71
23 15.72 23 15.68
28 5.6
+4 49.9 49.9
528 +4 50.4 −.04 50.4
− 8.35
− 27.30
+4 49.93 − 27.30
+4 22.63 +4 49.72
27 38.35 + .90
+4 23.32
27 39.00

50
2 31.3
17.9
49.2
52 24.60

16 29.48
16 57.61
−28.13
−28.32
+27.41 −.02
+ .80 +.81
+1.62
+29.83 2
16 29.48
59.31
59.30
+2.47
50
2 29.9
17.1
47.0
52 23.50
− 19.49
1.28981ₙ
0.98892
− 9.75
52 23.50
52 ~~13.75~~ 33.20
30 ~~34.60~~
15.10
−25 5 23
+2363
1.45403ₙ
+ 28.45
− .07
− .02
+ 28.36
30 ~~2.56~~ 43.46 43.27
28 ~~11.3~~
−2 ~~51.7~~ 32.2 32.4
−2 ~~51.8~~ 31.7 −.19 31.9
− 14.00
−2 31.29 − 14.00
−2 45.29 −2 31.51
27 58.17 + 1.03
−2 44.48
27 58.79

17 11.93
17 3.05
+8.88
+8.79
− ~~9.18~~ +.00
+ .51 +.50
−3.82
−12.4~~9~~ 50
17 11.93
59.44
59.43
+2.78
+ 37.70
1.57634
1.27560
− 11.86
+3552
1.48592ₙ
6
+ 29.24
− .27
+28.90
28 29.2
− 31.90
−2 17.12
−2 49.02 −2 17.40
+ 1.16

17 10.53
17 2.98
+7.55
+7.46
− 7.86 +.01
+ .41 +.34
− 3.75
− 11.26
10.53
59.33
59.27
+2.80
50
2 53.1
46.2
99.3
52 49.65
+ 41.70
1.62014
1.31930ₙ
− 30.86
52 49.65
52 28.79
30 19.56
−25 5 10
+854
1.43894ₙ
+ 27.47
− .34
+ .08
+ 27.21
30 46.77 30 46.55
28 29.5
−2 17.3 17.5
−2 16.8 −.22 17.0
− 32.20
−2 17.55 − 32.20
−2 49.75 17.88
27 57.02 + 1.17
−2 48.91
27 57.64

Sin δ 9.96551
Cos δ 9.58345
.11571n
9.69916n

1872			
Nov. 16	67° 27′	63.2″	
21		64.5	+1.3
26		65.8	1.3
Dec. 1		66.9	1.1
6		67.9	1.0
11		68.8	.9
16		69.6	.8
21		70.2	.6
26		70.8	.6

1872? 1873			
Jan. 0	27′	71.2″	
5		71.3	+.1
10		71.3	.0
1873			
Dec. 6	27	89.0	
11		89.8	+.8
16		90.5	.7
21		91.2	.7
26		91.9	.7

Dec 10 +.179 +19	Dec. 15 +.158 +18	Dec. 16 +.221 +21	Dec. 17 +.132 +14	Dec. 18 +.179 +16	Dec 28 +206 +21
16 590 (17) 17 4.4 7.1 9.7 12.5 15.2 17.9 20.5 1480 880 9.778	16 57.1 59.7 2.6 5.2 7.8 10.3 13.4 16.0 18.8 190.9 70.9 7.878	16 56.3 59.0 1.8 4.4 7.4 9.8 12.6 15.4 17.8 184.5 64.5 7.167	16 55.9 58.5 1.5 4.3 6.8 9.5 12.0 14.8 17.7 181.0 61.0 6.778	16 55.0 57.6 17 0.4 3.2 5.7 8.4 11.0 13.8 16.5 171.6 51.6 5.733	16 50.7 53.3 56.2 59.0 1.5 4.3 6.9 9.7 12.6 254.2 14.2 1.578
16 62.4 64.0 67.3	16 22.1 24.0 27.2	16 15.6 19.1 20.9	16 23.2 25.2 27.0	16 31.4 35.0 37.6	16 22.5 25.7 28.1
16 54.57	16 24.43	16 18.53	16 25.13	16 34.67	16 25.43
17 9.74 17 2.95 +6.79 +6.70	17 7.84 17 2.77 +5.07 +4.98	17 7.13 17 2.74 +4.39 +4.30	17 6.74 17 2.70 +4.04 +3.95	17 5.69 17 2.66 +3.08 +2.99	17 1.54 17 2.26 −0.72 −0.81
−7.25 +.00 + .46 +.43 −3.72 −10.51 4	−5.39 +.01 + .43 +.38 −3.54 −8.56 54	−4.89 +.01 + .51 +.53 −3.51 −7.88 6	−4.25 +.05 + .34 +.32 −3.47 −7.38 5	−3.56 +.02 + .39 +.43 −3.43 −6.60 54	+0.34 −.01 + .51 +.50 −3.03 −2.~~18~~ 20
17 9.74 5923 5920 +2.80	7.84 5934 5930 +2.84	7.13 5924 5927 +2.85	6.74 5936 5939 +2.86	56.9 59.04 59.15 +2.86	1.54 5936 5934 +2.93
50 2 44.2 33.9 78.1 52 39.05	50 3 58.0 48.9 106.9 53 53.45	50 2 57.9 49.1 107.0 52. 53.50	50 2 55.0 46.0 101.0 52 50.50	50 2 49.9 39.1 89.0 52 44.50	50 2 55.1 46.3 101.4 52 50.70
+ 1521 1.18213 0.88127 − 761 52 39.05 52 31.44 30 16.91	+ 4345 1.63799 1.33915 − 2174 52 53.45 52 31.71 30 16.64	+ 4864 1.68699 1.38615 − 24.33 52 53.50 52 29.17 30 19.18	+ 41.65 + ~~41.55~~ 1.61962 1.31878 − 2083 52 50.50 52 29.67 30 18.68	+ 3106 1.49220 1.19136 − 1554 52 44.50 52 28.96 30 19.39	+ 3615 1.55811 1.25727 − 1808 52 50.70 52 32.62 30 15.73
+2660 1.45700n	+2776 1.45816n	+2309 1.45349n	+2130 1.45170n	+1723 1.44763n	+954 1.43994n
+ 28.64 − .05 + .08	+ 28.72 − .36 + .09	+ 28.41 − .47 + .09	+ 28.29 − .34 + .11	+ 28.03 − .19 + .11	+ 27.54 − .26 + .11
+ 28.67 30 45.58 28 29.7 −2 15.9 −2 15.4 −.22	+ 28.45 30 45.09 28 30.4 −2 14.7 −2 14.2 −.23	+ 28.03 30 47.28 28 30.5 −2 16.7 −2 16.2 −.23	+ 28.06 30 46.74 28 30.7 −2 16.0 −2 15.5 −.22	+ 27.95 30 47.34 28 30.8 −2 16.6 −2 16.0 −.22	+ 27.39 30 43.12 28 32.2 −2 10.9 −2 10.4 −.22
45.36 16.1 15.6	44.86 14.9 14.4	46.98 16.9 16.4	46.52 16.2 15.7	47.12 16.7 16.2	42.90 11.1 10.6
−32.40 −2 16.47 − −2 48.87 27 56.71 +	−33.10 −2 16.04 − −2 49.14 27 55.95 +	−33.20 −2 17.03 − −2 50.29 27 56.98 +	−33.40 −2 17.40 − −2 50.80 27 55.94 +	−33.50 −2 16.82 − −2 50.32 27 57.02 +	−34.90 −2 13.76 − −2 48.66 27 54.46 +
32.40 −2 16.34 1.17 −2 47.57 27 57.79	33.10 16.30 1.19 −2 48.21 27 56.65	33.20 17.39 1.14 −2 47.40 27 57.58	33.40 17.59 1.20 −2 49.79 27 56.73	33.50 17.06 1.20 −2 49.36 27 57.76	34.90 13.23 1.23 −2 47.00 27 55.90

~~Reject.~~

B A C 852

1 19 49

94. 20

Reject Wrong Star.

Ch. f

1872 Nov. 13
19. 47.1
49.7

19 ~~47.1~~

32.4
45.3
11.0

1873 Jan. 1

Jan. 7

Dec. 17
18 18 27.7
102 59.7
25.9
38.7
51.9
4.8
15.7
30.8
43.3

281.0
461.0
51,222 27.70

Dec. 18 Reject.

Dec. 21

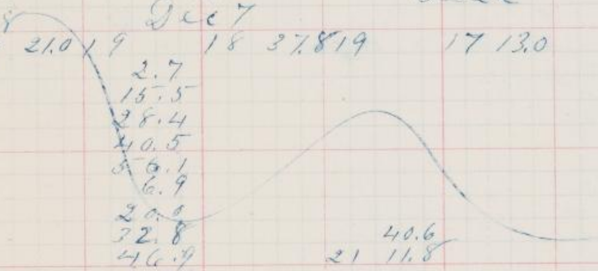
50		45		45		45		45		45	
4	16.6	1	39.1	1	27.0	1	19.8	1	18.9	1	25.9
	56.7		25.4		17.0		10.9		10.5		14.9
'	1333		645		440		307		294		408
54	6.65	46	32.25	46	22.00	46	15.35	46	14.70	46	20.40

1873 Dec 28

1873 Dec 7

1873 Dec 22

20 21.0 19 18 37.8 19 17 13.0



2.7
15.5
28.4
40.5
56.1
6.9
20.0
32.8
46.9
249.8
189.8

20 17.1
30.3
43.3
21 33.4
0.0
26.7

40.6
21 11.8

20 21.00 54.422 37.80 13.00

45
1 32.7
22.4
551
46 . 27.55

1872 | 187~~2~~0 3

η Piscium

h	m	s
1	24	37
1	24	41
+ 14°	41′	″
+ 14	41	25

z = + 27 41 23

am. z = +.46

tang δ = +.26

x = −.016

Ωaα = +.03

α 1872 = 38.141

α 1873 = 41.340

δ 1872 = 41′ 6.″37 dα = +3.198

dδ = +18.71

δ 1873 = 41 25.08

	m	s	
Nov. 16	24	40.94	1
21		.93	1
26		.91	2
Dec. 1		.89	2
6		40.86	3
11		.83	3
16		.79	4
21		.74	5
26		40.69	5

	m	s	
Jan. 0	24	40.64	
5		.58	6
10		.52	6
1873			
Dec 6		44.24	
11		.21	3
16		.18	3
21		.14	4
26		44.09	5

1872 +.070 Nov. 13 +.06		+.197 Nov. 25 +.20		7? +.309 Dec 1 X30		+.221 Dec 21 +.23		+.534 Dec. 30 +.53		+.500 Jan. 1873, +.50	
24 7.4	23 59.9	23 59.8	24 45.8	24	5.0	24 5.2	24 0.9	24 3.9	24 0.6	24 2.8	23 55.9
9.7	1.3	1.9	46.7			7.3	2.1	5.9	1.6	4.9	57.7
11.7	2.5	4.1	47.7			9.6	3.1	8.0	2.6	7.1	59.4
15.9		8.4		14.7		13.8		12.4		11.3	
18.0		10.5		17.0		16.0		14.6		13.5	
20.1		12.6		18.9		18.2		16.7		15.5	
22.3		14.7		21.4		20.5		18.8		17.6	
24.5		16.8		23.6		22.4		20.8		19.7	
28.7		21.0				26.7		25.1		24.1	
30.7		23.2				28.8		27.1		26.2	
33.0		25.3				30.9		29.3		28.3	
222.0		198.3				199.4		182.6		171.0	
		138.3									
20.~~170~~ 182 24	1.23	12.573 24	46.73	19.16 24	5.00	18.127 24	2.03	16.600 24	1.60	15.545 23	57.67

24 19.98	24 12.56	24 19.14	24 18.11	24 16.58	24 15.53
24 40.95	24 40.91	24 40.76	24 40.74	24 40.65	24 40.63
−20.97	−28.35	−21.62	−22.63	−24.07	−25.10
~~−21.00~~	~~−28.38~~	~~−21.65~~	~~−22.66~~	~~−24.10~~	~~−25.13~~
+20.87 −.03	+28.28 +.00	+21.53 −.01	+22.57 +.01	+23.96 +.01	+25.01 +.00
+ .02 +.02	+ .05 +.05	+ .08 +.08	+ .06 +.06	+ .14 +.14	+ .13 +.13
−2.81 +0.39	−2.77 +0.43	−2.62 +0.58	−2.60 +0.60	−2.51 +0.69	+0.71
+18.085	+25.56	+18.988	+20.024	+21.5960	+25.85
24 20.76	12.56	19.14	18.11	16.58	15.53
24 38.24	38.12	38.13	38.14	38.17	41.38
24 38.21 24 41.41	38.12 41.32	38.12 41.32	38.15 41.35	38.18 41.38	41.38
+1.93	+2.15	+2.86	+2.75	+2.63	+2.60
45	45	35	35	35	35
1 12.0	1 20.9	3 35.2	3 46.9	3 46.3	3 50.4
2.2	9.2	20.0	34.8	28.2	32.5
1 1.42	30.1	55.2	81.7	74.5	82.9
46 7.10	46. 15.05	38 27.60	38 40.75 40.85	38 37.25	38 41.45
+ 18.95	− 34.16 +25.64	+ 14.16	+ 16.10	+ 15.00	+ 17.87
1.27761	1. ~~53382~~ 1.41229	1.15106	1.20683	1.17609	1.25212
1.37890	1. ~~63481~~ 2.51358	1.25235	1.30812	1.27738	1.35341
−23.93	+43.14 − 32.63	−17.88	−20.34	−18.94	−22.56
46 7.10	46 15.05 15.05	38 27.60	38 40.85	38 37.25	38 41.45
45 43.17	8.19 ~~47.10~~ 42.42	38 9.72	38 20.51	38 18.31	38 18.89
14 37 5.18	37 5.93	44 38.63	44 27.84	44 30.04	44 29.46
+27 40 55 1.48010		+27 40 41 30.84			+27 40 41
+13.96	+ 3.70		+ 30.91	+ 45.93	+ 37.62
1.49406	1.48380		1.51101	1.52603	1.51772
+− 31.19	+− 30.47	− 32.42	+− 32.43	+− 33.58	+− 32.94
− .05	− .09	.03	− .03	− .03	− .04
+ .03	− .02	− .10	− .11	− .04	− .04
− 31.21	− 30.58	− 32.55	− 32.57	− 33.65	− 33.02
14 36 33.97 36 33.86	36 35.35 35.23	44 6.08	43 55.27 43 54.90	43 56.39 56.03	43 56.44 56.14
41 25.6	41 25.6	41 25.2	41 25.2	41 24.8	41 24.8
+4 51.6 −.11 51.5	+4 50.3 −.12 50.2		−2 30.1 −.37 30.5	−2 31.6 −.36 32.0	−2 31.6 −.30 31.9
− 0.49	− 0.49		− 0.09	+ 0.31	
− 19.20	− 19.20	− 18.80	− 18.80	− 18.40	+ 0.30
+4 52.39	+4 49.93	−2 31.20	−2 30.43	−2 30.83	−2 30.82
+4 33.19 − 19.20	+4 30.79 − 19.20	−2 50.00	−2 49.23 − 18.80	−2 49.23 − 18.40	−2 30.52 + 0.30
14 41 7.16 +4 51.80	41 6.14 +4 49.72	41 16.08	41 6.04 −2 30.36	41 7.16 31.20	41 25.92 30.86
+ .53 − .88	+ .53 − .98		+ .53 − 1.26	+ .53 − 1.20	+ 1.01 − 1.19
14 41 7.69 +4 31.72	41 6.67 +4 27.54		41 6.57 −2 50.42	41 7.69 −2 50.80	41 26.93 −2 31.75
41 5.58	41 4.77		41 4.98	41 5.23	41 24.39
41 24.29	23.48		23.19	23.94	

Sin δ 9.40394
Cos δ 9.98558
.1157½
.1029

1872
Nov. 16 14° 41′ 25.6″
21 25.6 −.0
26 25.6 .0
Dec. 1 25.6 .0
6 25.6 .0
11 25.5 .1
16 25.3 .2
21 25.2 .1
26 25.0 .2

~~1872~~ 1873 ?
Jan. 0 41′ 24.8″
5 24.5 −.3
10 24.2 .3

1873
Dec. 6 41′ 46.4″
11 46.2 −.2
16 46.1 .1
21 46.0 .1
26 45.9 .1

1872
s′ ″
38.21 7.16 7.69
.12 6.14 6.67
.13² 6.57
.15 6.4
.18 7.16 7.69

38.156 6.62 7.15 −1.06
.141 6.37 6.37
+.015 +0.25 +.78
−1.06
−.28

1873
s ″ ″
41.38 25.92 26.93
.32 25.71 26.72
.37 25.32 26.33
.40 26.34 27.35
.37 25.69 26.70
.25 27.55 28.56
.37 25.01 26.02

41.351 25.93 26.94
340 25.08 25.08
+.011 0.85 +1.86
− 2.02
− .16

Obs.

Dec. 3 +.22 +.184
24 43.7
45.8
48.0
52.3
54.3
56.4
56.6
0.6
4.8
7.1 ~~6.7~~
9.2
381.1
621.1
56.464 24 39.07

24 37.7
39.0
40.5

Dec. 7 +.21 +.209
24 40.5
42.8
44.9
49.0
51.4
53.5
55.7
57.6
1.9
4.0
6.2
407.5
587.5
53.409 24 29.40

24 28.0
29.4
30.8

Dec. 9 +.17 +.140
24 39.2
41.5
43.6
47.9
50.0
52.2
54.3
56.4
25 0.6
2.6
4.9
393.2
573.2
52.109 24 35.97

24 34.9
36.0
37.0

Dec. 18 +.16 +.179
24 34.9
37.0
39.2
43.4
45.6
47.8
49.9
51.9
56.2
58.4
25 0.5
464.8
524.8
47.709 24 29.97
25 13.10

24 28.5
29.6
31.8
25 12.1
13.1
14.1

Dec. 21
24

Dec. 22 +.24 +.251
24 58.4
59.6
1.0
41.9
44.0
46.0
48.1
50.3
230.3
46.060 24 59.67

24 56.45
24 44.26
+12.19
~~+12.16~~
−12.26 +.00
+ .06 +.05
−2.92
−15.12 3
56.45
41.33
41.32
+2.73
35
3 42.8
26.9
6.97
38 34.85
+ 17.39
1.24030
1.34159
− ~~21.66~~ −21.96
~~38 34.85~~ 38 34.85
~~38 13.19~~ 38 12.89
44 35.46
+27 40 34
+ 16.59
1.49669
+− 31.38
− .04
+ .11
− 31.31
44 41.5 44 3.86
41 46.5
−2 17.6 −.29 17.9
−21 40
−2 17.04
−2 38.44 − 21.40
41 25.71 −2 17.48
+ 1.01 − 1.25
41 26.72 −2 40.13
41 23.73

24 53.39
24 44.23
+9.16
~~+9.13~~
− 9.18 +.00
+ .05 +.05
−2.89
−12.02
53.39
41.39
41.37
+2.78
35
3 50.2
34.1
843
38 42.15
+ 24.01
1.38021 39
1.48156 68
−30.30
38 42.15
38 11.85
44 36.50
+ 35.64
1.51574
+− 32.79
− .08
+ .11
− 32.76
3.44 44 37.4
41 46.4
−2 17.3 −.30 17.6
− 21.30
−2 17.12
−2 38.42 − 21.30
41 25.32 17.40
+ 1.01 − 1.27
41 26.33 −2 39.94
41 23.47

24 52.09
24 44.22
+7.87
~~+7.84~~
− 7.86 +.01
+ .04 +.04
−2.88
−10.70 69
52.09
41.39
41.40
+2.80
35
3 38.9
26.9
6.58
38 ~~22.90~~
38 32.90
+ 16.14
1.20790
1.30919
−20.38
38 32.90
38 12.52
44 35.83
+ 8.54
1.48864
+− 30.81
− .03
+ .10
− 30.74
4.81 44 50.9
41 46.3
−2 18.8 −.28 19.1
−21.20
−2 17.55
−2 38.75 − 21.20
41 26.34 17.88
+ 1.01 − 1.29
41 27.35 −2 40.37
41 23.44

24 47.69
24 44.17
+3.52
~~+3.49~~
− 3.56 +.02
+ .04 +.05
− 2.83
− 6.35 2
47.69
41.34
41.37
+2.86
35
3 42.92
28.9
7.18
38 35.90
+ 17.74
1.24895
1.35024
−22.40
38 35.90
38 13.50
44 34.85
+ 17.33
1.44743
+− 31.44
− .04
+ .14
− 31.30 31.34
44 35.5 3.51 3.22
41 46.1
−2 17.4 −.29 17.7
−21.00
−2 16.82
−2 37.82 − 21.00
41 25.69 17.06
+ 1.01 − 1.31
41 26.70 −2 39.37
41 23.85

35
2 49.0 3
34.5
83.5
37 41.75

3 40.0
23.3
63.3
38 31.65

24 46.04
29 44.13
+1.91
~~+1.18~~
−2.04 −.02
+ .06 +.06
− 2.79
− 4.79
46.04
41.27
41.25
+2.88
35
3 3.2
44.4
107.6
37 53.80
+− 13.61
1.13386
1.23515
+ 17.17
~~37 53.80 38 10.99~~
37 36.61 38 10.99
45 11.74 37.36
+2979
1.50989
+− 32.35
− .03
+ 12
− 32.26
44 39.48 5.10 4.85
41 46.0
−2 53.5 19.1 −.25 19.4
−20.90
−2 16.65
−2 37.55 − 20.90
41 27.55 16.77
+ 1.01 − 1.32
41 28.56 −2 38.99
41 25.86

+206
Dec 28 +.21
24 30.9 24, 23.8
33.1 25.0
35.2 26.1
39.4
41.7
43.8
46.0
48.0
52.1
54.3
56.6
481 1

43.73624 24.97
24 43.72
24 44.07
– 0.35
~~– 0.38~~

+ 0.34 –.01
+ .0.05 +.05
– 2.73
– 2.345
24 43.72
41.38
41.37

+293
35
3 493
34.1
834
38 41.70

+ 1877
1.27346
1.37475
– 23.70
38 41.70
38 18.00
+44 30.35

+952
1,489.62

– 30.88
– .05
+ .15

– 30.78
43 59.57 43 59.27
41 45.9
–2 13.7 –.30 14.0

– 20.80
–2 13.76
–2 34.56 – 20.80
41 25.01 – 2 13.33
+ 1.01 – 1.34
41 26.02 – 2 35.47
41 23.80

1872

40 Cass
h m s
1 28 20
1 28 25
72° 23′ ″
+ 72 23 28
ꝺ = −30 00 40
— ,50

Red. s
1 13.61
2 10.21
3 6.80
4 3.40
5 0.00

Tang δ = +3.15
x = −.050
Corr α = −.03 +.07
α1872 = 19.905
α1873 = 24.552
δ1872 = 23′ 9.84″
δ1873 = 23 28.40

1872
Nov. 16 28m 25.29s
21 25.17 12
26 25.03 14
Dec. 1 24.87 16
6 24.68 19
11 24.47 21
16 24.293 23
21 23.988 25
26 23.721 27

dα = +4.647
dδ = +18.56

Sin δ 9.97914
Cos δ 9.48094
.11571n
9.59660n

72° 22′ 93.8″
+ 15 95.3
14 96.7
13 98.0
12 99.2
10 100.2
10 101.2
.8 102.0
.7 102.7

1872 +.070 Nov. 13 +.06	+.197 Nov. 25 +.20	+.221 Dec. 21 +.23	+.534 Dec. 30 +.53	1873 +.500 Jan. 1 +.50	+.184 Dec. 3 +.22
27 50.5 27 28.7	27 — 28.7 12.1	27 27 28.9	27 28 1.2	27 4 27 13.0	28 27 34.6
54.2 30.8	— 13.7	47.4 32.0		43.6 15.4	27.5 37.1
57.5 32.7	49.0 56.8 15.0	51.5 35.7		46.7 19.5	31.2 40.3
0.8	53.0 4	53.7		50.2	34.4
4.4	56.3 3	57.5	54.7 581	53.4	37.7
7.9	59.8 4	1.0	57.8 578	56.8	41.0
11.0	3.0 2	4.2	0.8 574	28 0.2	44.1
14.6	6.4 2	7.5	4.6 578	3.7	48.2
18.0	10.0 4	10.7	8.3 581	7.3	51.7
		14.2	11.7 581	10.6	55.0
218.9 35.9		246.7 6.7		272.5 512.5	370.8
4.3222 27 31.17 27 31.07	56.386 28 13.60	0.744 27 32.20	57.883 28 1.20	56.944 27 15.97	41.200 27 37.33
28 4.27	27 56.34	28 0.69	27 57.83	27 56.89	28 41.15
28 25.35	28 25.05	28 23.987	28 23.498	28 23.51	28 29.30
−21.08	−28.71	−23.298	−25.685	−26.48	+11.85
−21.05	−28.68	−23.285	−25.682	−26.45	+11.88
+20.87 −.03	+28.28 +.00	+22.57 +.01	+23.96 +.01	+25.01 +.00	−12.26 +.00
+ .19 +.22	+ .63 +.62	+ .72 +.70	+1.67 +1.68	+ 1.58 +1.58	+ .69 +.58
−5.45 − 0.80	− 5.14 − 0.49	− 4.08 + 0.57	−3.58 + 1.07	+1.18	−4.75
+15.61	+23.786	+19.280	+22.05 .07	+27.77	−16.~~32~~ .43
28 4.27	27 56.34	28 0.69	27 57.83	56.89	28 41.15
28 19.88	20.11	19.90	19.88	24.66	24.83
28 19.88 28 24.53	20.10 24.75	19.89 24.54	19.90 24.55	24.66	24.72
+1.93	+2.15	+2.75	+2.63	+2.60	+2.73
0	0	55	50	55	55
0 4.0	0 3.8	2 30.8	2 20.8	2 35.6	2 38.1
4 44.8	4 42.2	19.8	3.0	19.8	25.1
. 108.8	106.0	50.6	23.8	55.4	63.2
4 54.40	4 53.00	57 25.30	52 11.90	57 27.70	67 31.60
					+ 63.87
+33.25	− ~~17.21~~ 12.78	+ 28.54	− 3.32	+ 40.97	+ ~~3.87~~
1.52179	1.~~23578~~ 1.63024	1.45545	0.52114	1.61247	1.80530
1.11844n	0.~~83243~~ 1.22784n	1.05210n	0.11779n	1.20912n	1.40195
−13.13	−12.95 −16.40	−11.28	+1.31	−16.19	−25.23
4 54.40	4 53.00 5300	57 25.30	57 11.90	57 27.70	57 31.60
4 41.27	4 40.05 36.10	57 14.02	57 13.21	57 11.51	57 6.37
72 18 7.08	18 8.30 12.25	25 34.33	25 35.14	25 36.84	25 41.98
−30 0 7 1.52160n		−30 0 15		−30 0 26 1.52170n	−30 0 33
+1430	+378	+3110	+4614	+3779	+1659
1.53590n	1.52538n	1.55270n	1.56774n	1.55949n	1.53829n
+ 34.35	+ 33.53	+ 35.70	+ 36.96	+ 36.26	+ 34.54
− .17	− .17	− .13	− .00	− .26	− .66
+ .15	− .10	− .07	− .02	− .02	+ .07
+ 34.33	+ 33.36	+ 35.50	+ 36.94	+ ~~25.98~~ 35.98	+ 33.95
+72 18 41.41 18 40.92	18 ~~41.66~~ 45.61 45.12	26 9.83 26 9.59	26 12.08 11.86	26 12.82 12.63	26 15.93 15.73
23 33.0	23 36.5	23 42.0	23 43.3	23 43.1	23 59.3
+4 51.6 51.1	+4 ~~54.8~~ 50.9 50.4	−2 27.8 28.0	−2 28.8 29.0	−2 14.7 29.7 29.9	−2 16.6 16.8
+.07 +4 52.3 −.49 51.8	+4 ~~56.6~~ 51.6 −.49 51.1	−2 27.1 −.24 27.3	−2 28.1 −.22 28.3	−2 29.0 −.19 29.2	−2 15.9 −.20 16.1
− 4.64	− 8.14	− 13.64	− 14.94	− 14.70	− 30.90
− 23.20	− 26.70	− 32.20	− 33.50		
+4 52.39 − 23.20	+4 49.93 − 26.70	2 30.43 − 32.20	2 30.83 − 33.50	2 30.82 − 14.70	2 17.04 − 30.90
+4 29.19 +4 51.80	+4 23.23 +4 49.72	3 2.63 −2 30.36	3 4.33 31.20	2 45.52 30.86	2 47.94 −2 17.48
+72 23 10.60 + .96	23 4.89 8.84 + 1.07	23 7.20 + 1.38	23 7.75 + 1.31	23 27.30 + 1.30	23 27.99 + 1.56
+4 29.56	+4 24.09	−3 1.18	−3 3.39	−2 44.26	−2 47.02
23 10.48	23 9.21	23 8.41	23 8.47	23 28.37	23 28.71
23 28.04	27.77	26.97	27.03		

187~~2~~3 ?

Jan 0	28^m 23.41^s		23' 43.1"	
5	23.11	30	43.4	+.3
10	22.82	29	43.7	.3
1873				
Dec. 6	29.18		23' 59.9"	
11	28.97	21	61.0	+1.1
16	28.74	23	61.9	.9
21	28.49	25	62.7	.8
26	28.23	26	63.4	.7

Ch. f

+.209 +.179 +.251 +.206
Dec. 7 +.21 Dec. 18 +.16 Dec. 21 Dec. 22 +.24 · Dec. 28 +.21
28 24.6 28 36.0 28 28 49.4 28 28 25.5 28 27 24.0
27.8 17.9 53.0 (16.4) 13.7 27.5
30.9 21.3 53.4 19.8 17.0 32.4
34.5 25.0 23.1 20.5
37.8 28.3 26.6 24.0
41.3 31.4 29.8 27.2
44.8 33.5 33.2 30.7
48.0 38.5 36.5 34.0
51.2 41.9 40.1 37.6
9 45.4 43.9 41.1

28.52 24.58

37.878 28 36.00 31.689 28 32.60 29.933 28 25.50 27.311 27 27.97

37.83 28 31.64 28 29.88 28 27.26
28 29.13 28 28.63 28 28.43 28 28.11
+8.70 +3.01 +1.45 −0.85
+8.73 +3.04 +1.48 −0.82

−9.18 +.00 −3.56 +.02 −2.04 −.02 +0.34 −.01
+.66 +.66 +.50 +.56 +.76 +.79 +.66 +.65
−4.58 −4.08 −3.88 −3.56
−13.10 −7.~~14~~06 −5.16 −2.58
37.83 28 31.64 29.88 27.26
24.73 24.50 24.72 24.70
24.73 24.58 24.73 24.68
+2.78 +2.86 +2.88 +2.93

55 55 55 55 55
2 16.0 2 36.9 2 1.9 2 30.8 2 15.7 2 36.8
4.0 25.3 50.2 15.9 60.0 23.9
20.0 62.2 112.1 46.7 15.7 60.7
57 10.00 57 ~~30.95~~ 55 56.05 57 23.35 57 7.85 57 30.35
57 31.10 + 59.34
+1.88 − 20.91 + 4.43 − 0.66
0.27416 1.32035 0.64640 1.77335
9.87081n 0.91700n 0.24305n 0.37000n
− 0.74 + 8.26 + 8.26 − 1.75 − 23.45
57 10.00 ~~56 56.05~~ 57 31.10 57 7.85 57 30.35
57 9.26 ~~57 4.31~~ 57 39.36 57 6.10 57 6.90
25 39.09 25 8.99 25 42.25 25 41.45

+3572 +1744 +2982 +951
1.55742n 1.53914n 1.55132n 1.53121n

+ 36.09 + 34.60 + 35.61 + 33.98
− .60 − .07 − .03 − .56
+ .07 + .10 + .08 + .10

+ 36.16 + 34.63 + 35.69 + 33.52
26 15.25 26 15.07 25 43.62 ~~25 43.42~~ 26 17.74 17.77 26 14.97 14.77
24 0.2 24 2.3 24 2.9 24 3.7
−2 15.0 15.2 −1 41.3 −2 15.0 15.2 −2 11.3 11.5
−2 14.3 −.18 14.5 −1 40.6 −.20 −2 14.3 −.17 14.5 −2 10.6 −.20 10.8

−31.80 −33.90 −34.50 −35.30
−2 17.12 − 31.80 −2 16.82 − 33.90 −2 16.65 − 34.50 −2 13.76 − 35.30
−2 48.92 −2 17.40 −2 50.72 17.06 −2 51.15 16.77 −2 49.06 13.33
23 26.33 + 1.39 22 42.70 + 1.43 23 25.79 + 1.44 23 25.91 + 1.46
−2 47.81 −2 49.53 −2 49.83 −2 47.17
23 27.26 23 27.94 23 27.60

Red.
1 13.25
2 9.94
3 6.62
4 3.31
5 0.00

1872 — 1873

Gr 2029

h m s
1 34 06
13 34 12
108 06 (″)
+71 53 14
108 06 46
η = −65 43 58
−.91

tang ϑ = −.306
x = +.048
Corr = +.10 −.03
α 1872 = 6.581
α 1873 = 8.012

1872	m	s		1873	m	s	
Nov. 16	34	4.57		Dec. 6	34	7.53	
21		4.78	21	11		7.85	32
26		5.01	23	16		8.18	33
Dec. 1		5.27	26	21		8.53	35
6		5.56	29	26		8.90	37
11		5.88	32				
16		6.21	33				
21		6.59	36				
26		6.94	37				

δ 1872 = 53′ 38.″52 = 6′ 21.″48 dα = +1.431
dδ = −18.38
δ 1873 = 53 20.14 = 6 39.86

1872 +.070 Nov. 13 +.06 | Dec. 21 +.221 +.23 | 1873 +.209 Dec. 7 +.21 | Dec 18 +.179 +.16 | Ch. f Dec. 21 | Dec 22 +.251 +.24

− 33 44.8? 33 | 32 17.7 34 | ? 34 31.9 33 | 33 7.0 | 33 | 33 12.2
− | 31.9 19.7 | 13.8 17.1 | 59.4 9.0 | 57.8 14.1
− | 34.9 21.7 | 17.7 17.7 | 34 2.5 12.2 | 1.4 16.0
− | 38.2 | 20.6 17.3 | 6.0 | 5.0
33 44.8 44.8 | 41.4 | 24.6 18.0 | 9.2 | 8.9
47.5 44.2 | 44.6 | ~~27.6~~ | 12.5 | 11.8
57.1 44.4 | 47.8 | | 15.8 | 14.8
54.3 44.4 | (54.1) | | 18.9 | 18.3
57.2 44.0 | 54.5 | | 22.4 | 20.8
| 57.9 | | 26.0 | 25.3

2548 44360 | | 1043 | 172.7 | 164.1
4441 | | | 112.7 | 104.1
50966 33 44.80 | 44.700 32 19.70 | 17.75 34 31.90 | 12.522 33 9.40 | 11.567 33 14.10
33 | 33 | 34 | 34 | 34

33 57.01 | 33 44.75 | 34 17.80 | 34 12.57 | 34 11.61
34 4.45 | 34 6.86 | 34 7.58 | 34 8.30 | 34 8.58
− 13.44 | −21.81 | +10.22 | +4.27 | +3.03
−13.54 | −21.91 | +10.12 | +4.17 | +2.93

+20.87 −.03 | +22.58 +.01 | + 9.17 +.00 | − 3.55 +.02 | − 2.04 −.02
− .18 −.21 | − .70 −.68 | − .64 −.64 | − .49 −.55 | − .73 −.77
+2.13 | +0.02 +1.45 | +0.43 ~~+1.86~~ | −0.29 | −0.57
+22.82 | +21.90 3 | −9.38 | −4.33 7 | −3.34 40
33 44.41 | 44.75 | 34 17.80 | 12.57 | 11.61
34 (7.23) | 6.65 | 8.42 | 8.24 | 8.27
Rej +1.93 | 34 6.68 34 8.11 | 8.42 | 8.20 | 8.~~28~~ 21
| +2.75 | +2.78 | +2.86 | +2.88

20 | 15 | 15 | 15 | 15 | 15
3 33.2 | 0 15.1 | 0 51.2 | 0 11.0 | 0 21.0 | 0 19.3
12.5 | 7.7 | 42.7 | 3.1 | 10.3 | 6.9
45.7 | 22.8 | 93.9 | 14.1 | 31.8 | 26.2
23 22.85 | 15 11.40 | 15 46.95 | 15 7.05 | 15 15.65 | 15 13.10

− 0.44 | + 85.60 | | |
~~+ 6.16~~ | + ~~24.30~~ | − 14.15 | + 63.12 | + 57.47
4.64348 | 1.92942 | 1.15076n | 1.80017 | 1.75944
9.25185 | 1.53782n | 0.75916n | 1.40857n | 1.36784n
− 0.18 | + 34.50 | −5.74 | +25.62 | + 23.33
23 22.85 | 15 11.40 | 15 46.95 | 15 7.05 | 15 13.10
23 22.67 | 15 45.90 | 15 41.21 | 15 32.67 | 15 36.43
108 59 23.68 | 7 2.45 | 7 7.14 | 7 15.68 | 7 11.92

−65 41 25 2.10299n | −65 41 43 | −65 41 58 | |
+14.65 | +31.29 | +35.80 | +17.54 | +29.86
2.11764n | 2.13428n | 2.13879n | 2.12053n | 2.13285n
+ 2 .02 | + .06 | + .05 | + .03 | + .04
+ 1 11.11 | + 2 16.23 | + 2 17.65 | + 2 11.98 | + 2 15.78
+ .00 | + 1.16 | + .03 | + .64 | + .53
+ .07 10 | − .01 | + .02 | + .00 | + .01

+2 11.23 | +2 16.44 17.44 | +2 17.75 | +2 12.65 | +2 16.36
108 1 36.91 | 9 18.89 19.89 | 19.87 9 24.89 | 24.83 9 28.33 28.32 | 9 28.28 9 28.26
6 41.2 | 16 53.5 | 17 10.1 | 17 13.2 | 17 14.2
+.03 Rej | −2 25.4 26.4 | −2 14.8 | −2 15.1 | −2 14.0
| ~~−2 26.7~~ | ~~−2 15.1~~ | ~~−2 15.4~~ | ~~−2 14.4~~
| −2 26.1 −.02 26.1 | −2 14.5 −.06 14.6 | −2 14.8 −.01 14.8 | −2 13.8 −.02 13.8
| − 13.62 | | |

− 19.70 | − 32.00 − 32.00 | − 30.20 − 30.20 | − 33.30 − 33.30 | − 34.30 − 34.30
+4 52.39 +4 51.80 | −2 30.43 −2 30.36 | −2 17.12 −2 17.40 | −2 16.82 17.06 | −2 16.65 16.77
+4 32.69 + 1.75 | −3 2.43 + 2.50 | −2 47.32 + 2.52 | −2 50.12 + 2.60 | −2 50.95 + 2.62
108 6 9.60 | 6 17.46 −2 59.86 | 6 37.57 −2 45.08 | 6 38.21 −2 47.76 | 6 37.33 −2 48.45
| 6 19.01 | 6 39.75 | 6 40.56 | 6 39.81
| 6 27.29 | | |

		1872					1873			
Sin δ	9.97792		°	′	″			′	″	
Cos δ	9.49269n	Nov. 16	71	53	17.6		Dec. 6	52	50.1	
	.11571n	21			15.8	−1.8	11		486	−1.5
	9.60840″	26			14.0	1.8	16		47,2	1.4
	=	Dec. 1			12.3	1.7	21		460	1.2
		6			10.7	1.6	26		44.8	1.2
		11			9.2	1.5				
		16			7.8	1.4				
		21			6.6	1.2				
		26			5.4	1.2				

+.206
Dec. 28 +.21
33 33 25.7 7
56.4 28.6
59.6 31.0
3.0
6.4
9.6
12.9
16.5
19.7
23.0

20.1
8.1
9.67833 28.30

34 9.72
34 9.03
+0.69
+0.59

+ 0.35 −.01
*−.64 −.63
−1.02
−1.31
34 9.72
* 8.41
8.41
+2.93
15
0 21.2
12.5
33.7
15 16.85

+ 41.38
1.61679
1.32619
+ 16.79
15 16.85
15 33.64
7 14.71

+949
2.11248n
+ 04
+ 2 9.56
+ 28
+ .01

2 9.89
9 24.60 9 24.57
7 15.6
−2 9.0
~~−2 9.3~~
−2 8.7 −.03 8.7

−35.70 − 35.70
−2 13.76 −2 13.33
−2 49.46 + 2.66
6 35.14 −2 46.37
6 38.20

1872   1873

o Piscium   tang δ = +.15   Dec. 6 38^m 41.09^s   Dec. 6 38^m 44.45^s   Sin δ 9.17055
1 38 38   x = −.016   11 41.06 3   11 .42 3   cos. δ 9.99518
1 38 41   16 41.03 3   16 39 3   .1157 1n
+ 8 30   cos x = −.14   21 40.99 4   21 35 4   .11089n
+ 8 31 03   26 40.94 5   26 44.31 4
λ = +33 51 45   α 1872 = 38.305 δ = 30′ 44.70″   dα = +3.161
dδ = +18.26
sin. z = +.56   α 1873 = 41.467 δ = 31 2.96

1872 s   1873 s ″
38.05 — ″   41.30 5.34 6.59
.22 47.43 48.08   .35 5.04 6.27
.32 4.60 5.83
.34 5.25 6.48
.34 5.35 6.58
38.135 47.43 48.08   41.330 5.12 6.35
305 44.70 44.70   467 2.96 2.96
−170 +2.73 +3.38   −137 +2.16 3.39
Dec 25 1.30   −2.46
+2.08   +.93

1872 Dec 21 +.221 +.23   Dec 30 +.534 +.53   1873 Dec 7 +.209 +.21   Dec 9 +.140 +.17   Dec 18 +.179 +.16

No 5
38 4.4 | 38 4.83 | 40.9 | 38 30.1 | 38 39.8 | 38 42.5 | 38 35.2 | 38 21.8
6.3 | 43.0 | 31.6 | 41.8 | 37.4 | 22.8
8.5 | 45.1 | 32.6 | 43.9 | 39.4 | 24.0
38 13.9 | 12.6 | 49.2 | 48.0 | 43.6
16.1 | 14.7 | 51.3 | 50.0 | 45.8
18.1 | 16.8 | 53.6 | 52.1 | 47.8 | 39 11.0
20.2 | 18.9 | 55.5 | 54.2 | 49.8 | 12.0
22.4 | 21.0 | 57.6 | 56.3 | 51.8 | 13.0
25.0 | 1.8 | 39 0.5 | 56.0
27.2 | 3.8 | 2.5 | 58.2
29.2 | 5.9 | 4.6 | 39 0.1
90.7 | 184.6 | 40.7 | 393.7 | 465.1
58.7 | 573.4 | 525.1
18.140 | 16.782 38 4.80 | 53.427 38 31.47 | 52.155 38 42.50 | 47.736 38 22.87
38 31.43 | 39 12.00

38 18.12 | 38 16.77 | 38 53.41 | 38 52.14 | 38 47.72
38 40.99 | 38 40.90 | 38 44.44 | 38 44.43 | 38 44.37
−22.87 | −24.13 | +8.97 | +7.71 | +3.35
−22.73 | −23.99 | +9.11 | +7.85 | +3.49

+22.58 +.01 | +23.96 +.01 | − ~~12.25~~ 9.17 +.00 | − 7.86 +.01 | − 3.55 +.02
+ .03 +.03 | + .08 +.08 | + .03 +.03 | + .03 +.02 | + .02 +.03
− 2.69 +0.47 | − 2.60 +0.56 | − 2.97 +0.19 | − 2.96 | − 2.90
+ 19.92 | + 21.445 | − ~~15.19~~ 12.11 | − 10.79 | − 6.430
38 18.12 | 16.77 | 53.41 | 52.14 | 47.72
38 38.04 | 38.21 | 41.30 | 41.35 | 41.29
38 38.05 38 41.21 | 38.22 41.38 | 41.30 | 41.35 | 41.82
+2.75 | +2.63 | +2.78 | +2.80 | +2.86

45 | 45 | 45 | 45 | 45 | 45
3 48.5 | 3 55.6 | 4 0.0 | 3 44.0 | 3 5.93 | 3.1 3 54.1
36.4 | 36.9 | 45.9 | 35.1 | 54.0 | 57.1 40.3
84.9 | 92.5 | 105.9 | 79.1 | 119.9 | 114.2 94.4
48 42.45 | 48 46.25 | 48 52.95 | 48 39.55 | 48 59.95 | 47 57.10 48 47.20

+11.98 | + 22.06 | + 9.65 | + 24.87
1.07846 | 1.34242 | 0.98453 | 1.39568
1.18935n | 1.45331n | 1.09542n | 1.50657n
−15.46 | −28.40 | −12.46 | −32.11
48 46.25 | 48 52.95 | 48 39.55 | 48 59.95
48 30.79 | 48 24.55 | 48 27.09 | 48 27.84
+ 8° 34 17.56 | 34 23.80 | 34 21.26 | 34 20.41 5

+33 51 2   1.58660 +33 50 46
+46.36 | +35.80 | +8.64 | +17.54
1.63296 | 1.62240 | 1.59514 | 1.60414

− 42.95 | − 41.92 | − 39.37 | − 40.19
− .01 | − .04 | − .01 | − .06
− .04 | + .12 | + .11 | + .16

− 43.00 | − 42.00 41.84 | − 39.20 39.27 | − 40.09
+ 8 33 34.56 33 34.18 | 33 42.18 41.96 41.65 | 33 42.06 41.99 41.69 | 33 40.42 33 40.10
31 1.0 | 31 22.5 | 31 22.4 | 31 22.0
− 2 33.6 − 38 34.0 | − 2 19.35 − 31 19.8 | − 2 19.76 − 30 19.9 | − 2 18.4 − 32 18.7
+ 1.96
− 16.30 | − 19.50 | − 19.40 | − 19.00
− 2 30.83 | − 2 17.12 | − 2 17.55 | − 2 16.82
− 2 47.13 − 16.30 | − 2 36.62 − 19.50 | − 2 36.95 − 19.40 | − 2 35.82 − 19.00
+ 8 30 47.43 − 2 31.20 | 31 5.34 − 2 17.40 | 31 5.04 17.88 | 31 4.60 17.06
+ .65 − 1.47 | + 1.23 − 1.55 | + 1.23 − 1.56 | + 1.23 − 1.60
+ 8 30 48.08 − 2 48.97 | 31 6.57 − 2 38.45 | 31 6.27 − 2 38.84 | 31 5.83 − 2 37.66
30 45.21 | 31 3.20 | 31 2.85 | 31 2.94

1872				1873			
Dec. 6	8° 30'	62.1		Dec. 6	30'	82.6	
11		61.8	-.3	11		82.3	-.3
16		61.6	.2	16		82.1	.2
21		61.4	.2	21		81.9	.2
26		61.2	.2	26		81.7	.2

+.251 +.206

Dec 22 +.24 Dec 28 +.21 Dec. 30

28 25.0 38 31.3 38 19.0 Reject

33.8 26.1 32.4 20.0

35.9 27.6 35.5 21.0

38.0 39.6

42.0 41.7

441 46.2 39 12.0 43.9

48.3 13.1 45.9

50.5 14.2 48.0

54.5 52.1

56.6 54.1

56.8 56.4

5087 481.9

46.245 38 26.23 43.809 38 16.67

39 13.10 38 20.60

38 46.23 38 43.79

38 44.34 38 44.29

+1.89 − 0.50

+2.03 − 0.36

−∓ 2.04 −.02 + 0.35 −.01

+ .04 +.04 + .03 +.03

− 2.87 − 2.82

− 4.879 − 2.475

38 46.23 43.79

38 41.36 41.35

38 41.34 41.34

+2.88 +2.93

45 45 45

3 59.9 2 59.8 3 8.1 2 58.1 3 0.9 2 59.9

44.4 43.9 55.9 45.2 49.6 46.9

1043 1037 1240 1033 1105 1068

48 52.15 47 51.85 48 2.00 (47 51.65) 47 55.25 47 53.40

+ 20.01 + 2381

1.30125 1.37678

1.41214 1.48762

−25.83 −30.74 −30.74

48 52.15 (47 51.65) 48 2.00

48 26.32 48 2238) 47 31.26

+34 22.03 35 4 17.09

+2986 +949

1.61646 1.59609

∓ 41.35 ∓ 39.45

− .04 − .05

+ .16 + .12

− 41.23 − 39.38

33 4080 33 40.49 34 3771 33 37.47

31 21.9 31 21.6

−2 18.9 −.31 19.2 −2 18.1 −24 16.3

−18.90 −18.60

−2 16.65 −2 13.76

−2 35.55 − 18.90 −2 32.36 − 18.60

31 5.25 −2 16.77 31 5.35 13.33

+1.23 − 1.61 +1.23 − 1.64

31 6.48 −2 37.28 31 6.58 −2 33.57

31 3.21 31 3.90

Gr. 2063 = 46

~~13~~ 43 49
13 45 49
+83 27
+83 23 07
δ = −41 ~~02~~ ~~12~~

96° 36′ 53″
54 14 5
−0.81

Sin δ 9.99710
Cos δ 9.06155n
.11571n
9.17726n

tang δ = −8.624
k +.133

α 1872 = 46m 5.870s
α 1873 = 46 3.312

1872 +.070
Nov. 13 +.06
45 0.744 19.0
10.2 29.6
18.2 38.3
27.7
35.7
46.2
54.5
3.9
12.8

2099
3299
36.544 28.97
45 36.68
+20.845
−.60
+8.94
46 5.87

Record failed +.221
Dec. 21 +.23
41 44.7
51.0
59.0
~~4~~ 4 6

−1.91

Chron. failed
Dec. 30 +.53

1873 +.209
Dec. 7 +.21
45 41 59.6? 45
32.7
41.1
49.8
58.7
7.9
17.7
26.9
35.8
45.0

3156
75.6
8.410 41 59.60
45 8.53
−9.187
−1.80
+5.49
46 3.05

+.140
Dec. 9 +.17
49.7
57.8
46 7.5
15.8
23.5

6.86
46 6.99
−7.84
−1.20
+5.23
3.18

Cte. Z.
Dec. 21

+1.93
50
2 26.0
5.0
31.0
52 15.50

+6757
~~1.8175~~ 1.82975
~~0.99483~~ 1.00701n
−9.88 +10.16
~~52 15.50~~ 52 15.50
~~52 56.~~ 52 25.66
+83° ~~20 43.01~~ 30 22.69

Sy 84 12 27 1.90140n
~~−41 12 43~~ 1.70230n
+1499
1.71729n 1.91639n

+5215 +1 22.49
+.28 + .28
+.07 + .07

+3250 +.1 22.84
+83 31 3551 31 45.53
+20.14
+4 5239
+5 4253 5 12.53
76 ~~83~~ 36 48.04 36 58.06 Eq.

−20.14
+4 51.80
+1.56
4 33.22
41 31.28

40
4 29.0
19.8
488
44 24.40

40
4 25.1
9.0
341
44 17.05

+2.78
40
4 23.7
12.9
366
44 18.30

+18880
2.27600
1.45326n
+28.40
44 18.30
43 ~~49.90~~ 44 46.70
~~38 58.45~~ 38 1.65

~~−41 13 49~~
+3587 1.93727
1.73817n

+5472 +1 26.55
+2.22 + .28
+.17 .13 +.17

+5707 +1 27.60
39 5552 39 28.65
+30.62
−2 17.12
~~−2 13.50~~ −2 13.50
−1 46.50 37 1.515 Eq.

−30.62
−2 17.40
+2.25

40
4 10.8
5.0
158
44 7.90

40
4 42.9
31.1
740
44 37.00

Cant Ind. Lord:

Gr 2063

+.251 +.206

Dec. 22 +.24 Dec. 28 +.21 Dec. 30

45 44 29.5 46 42 50.3 Reject

29.0 1.4

36.3 10.3

46.7

56.1

3.7 46 54.1 46

12.9 ~~12.4~~

21.3 ~~21.2~~

31.0 29.8

40.1 38.7

27.71

3.41

46 4.122 44 29.50 46.282 43 0.67

46 4.25 46 54.10 2.85

−2.05 +0.34

−2.16 −1.78

+3.25 +2.22

46 3.29 46 3.73

+288 +293

40 40 40

4 41.0 4 26.6 4 42.0

27.0 16.1 31.7

6.80 4.37 7.37

44 34.00 44 21.35 44 36.85

+9462 +1265

1.97598 2.26162

1.15324 1.43888

+14.28 +27.47

44 34.00 4823 44 21.35

44 17.77 44 48.23 43 53.88 48.82

+37 28.48 38 0.12 38 54.47 37 59.53

+2990 +948

1.75220 n 1.94629 1.71178 n 1.92587

+ ~~53.98~~ +1 28.37 + ~~51.50~~ +1 24.31

+ .56 + .56 + 2.08 + 2.08

+ .18 + .18 + .18 + .18

+ ~~54.72~~ +1 29.11 + 53.76 +1 26.57

38 23.30 39 29.23 39 48.33 39 26.10

+ 34.66 + 35.93

−2 16.65 −2 13.76 −1 37.83

−1 41.99

37 47.24 Gre. 37 48.27 Gre.

34.66 − 35.93

−2 16.77 −2 13.33

+ 2.33 + 2.37

−2 49.14 −2 46.89

3 4 58.14 −35 13.5

E Case

h m s
1 45 08
1 45 17
+63° 02′ ″
+63 02 35
η = − .20 39 47
− .35

tang δ = +1,97
x = −.034
cou x =

α 1872 = 12.604 δ = 2′ 17″.53 dα +4.241
dδ = +17.96
α 1873 = 16.846 δ = 2 35.49

1873
Jan. 20 45m 15s.30
26 15.10 20
30 14.91 19
Feb. 9

Sin δ 9.95007
Cos δ 9.65630 2′ 49″.5
.11571n 49.1 −.4
9.77201n 48.8 .3
48.4 .4
48.1 .3

Ch. failed
1872
Dec 30

+.413
1873 +.42
Jan 29
45 45 26.2
34.4 27.2
36.3 28.4
38.4
40.1
43.3
45.8
48.8
50.1
52.6

3900
43.333 45 27.27

45 43.30
46 14.94
+28.36
−31.64

+30.84 +.01 +.81
+ .83
+ 1.91
+33.587
45 43.30
46 16.88
46 16.87
+2.32

15 15
3 10.0 3 11.0
53.7 55.0
12.37 12.60
18 1.85 18 3.00

+ 16.06
1.20575
0.98776n
−9.50
18 3.00
17 53.50
+ 63° 4 54.85

− 20 39 44 1.33670n
+ 47.68
1.38438n

24.23
± .06
− .15

+ 24.01 2
+63 5 18.86 7 5 18.63
2 21.89
− 2 30.0 −.24 30.2

− 13.40
− 2 31.09
− 2 44.49 − 13.40
+63 2 34.38 −2 30.94
+ .81
−2 43.53
2 35.10

√

Gr. 404 = 47 Red. Tang δ = +4.437 Sin δ 9.98924
+4.439
h m s 1874 Cos δ 9.34212
1.50 08 1406 K = −.069 .11571n
1 50 4 9.37 9.45783n
+ 77° 2 8 " 4.68
+ 77 17 49 0.00
z = − 34 55 0'

−0.57

Ch. f

1872 Nov. 13 +070 Dec. 3 +257 Dec. 30 +534 1873 Dec. 7 +209 Dec. 9 +140 Dec. 21

49 48 41.3 49 48 54.7 49 24.7 49 23.0 50 49 14.7 50 49 40.0
32.4 51' 45.6 33.3 57.4 29.6 7.0 16.1 5.8
37.0 51' 52.0 38.2 2.1 34.4 11.8 18.9 10.2
41.9 51.3 43.0 38.9 16.7 15.0
46.6 51.3 47.3 43.3 21.3 19.6
51.0 51.0 52.5 46.8 25.6 24.5
— 56.9 30.5 28.8
— 1.6 35.5 (38.1)
— 6.4 40.0 38.5
11.0 44.7 43.2

2089 290.2 233.1
51160 470.2
~~41.80~~ 48 46.30 52.244 48 58.07 49 23.00 25.900 49 16.57 24.36 49 40.00
49 51.09 49 52.~~4~~17 50 25.~~1~~83 50 24.~~3~~29
+ 20.85 + 18.49 − 9.1~~7~~8 − 7.84
+ .31 + 1.14 +2.37 + .93 + .62
− 7.45 − 6.~~80~~99 − 6.38 − 6.28

50 9.80 50 4.~~7~~81 50 11.~~1~~20 50 10.~~7~~79

+1.93 +2.28 +2.78
10 10 0 0 0
0 53.1 0 43.1 2. 59.1 3 10.0 3 11.5
32.2 16.1 42.8 1.7 57.0
85.3 59.2 1019 1.7 1285
10 42.65 10 29.60 2 50.95 3 5.85 3 4.25

+ 6486 + 5417 + 6933 + 4436
1.81178 1.73376 1.84092n 1.64699
1.26981n 1.19159n 1.29875n 1.10482n
− 18.61 − 15.54 − 19.90 − 12.73
10 42.65 10 29.60 3 5.85
10 24.04 10 14.06 2 53.12
77 12 24.31 12 34.29 19 55.23

−34 54 24 1.60380n −34 53 46
+ 1534 + 1659 + 3595 + 854
1.61914n 1.62039n 1.63975n 1.61234n

+ 41.60 + 41.73 + 43.63 + 40.96
− .50 − .34 − .56 − .24
+ .02 −.07 − .01 −.05 + .09

+ 41.12 + 41.38 + 40.81
77 13 5.43 13 5.36 12³ 15.67 15.62 20 36.04
− 21.28 − 27.42 − 30.74 − 31.25
+ 4 52.39 + 4 49.84 − 2 17.12 − 2 17.55
+ 4 31.11 + 4 22.42 − 2 47.86 − 2 48.80
+ 77 17 36.54 17 38.09 17 47.24

− 21.28 − 27.42 − 30
+ 4 51.80 + 4 49.47 − 2 17.40 − 2 17.88
+ 1.10 + 1.29 + 1.58 +
+ 4 31.62 + 4 23.34
17 36.98 17 38.96

α1872 = 50^m 48.05^s 17′ 37.97″

α1873 = 50 10.862 17 55.72

		+251			+206
	Dec. 22		Dec. 28		
50	~~55~~.49	6.3 49		48	57.0
	3.2	10.4	56.0		5.1
	7.5	15.7	0.4		7.7 ×
	12.3		5.2		
	× 17.3		9.6		
	22.0		14.6		
	26.6		19.2		
~~33.6~~	31.6		24.0		
	36.0		28.7		
			33.5		
	215.0				
	140.1		191.2		
	155.0		131.2		
	172.2				
	~~21~~.22 49	10.80	14.578 49		3.27
50	17.15		49 ~~14.49~~ 51		
	−2.05		+0.34		
	+1.11		+.91		
	−5.47		−5.04		
50	10.74		50 10.~~74~~72		

	+2.88		+2.93
0		0	
3	12.1	3	13.6
	57.4		1.2
1	12.95		14.8
3	4.75	3	7.40
			+ 71.31
	+ 70.32		+ ~~11.31~~
	1.84708		1.85315
	1.30491n		1.31098n
	−20.18		−20.46
3	4.75	3	7.40
2	44.57	2	46.94
+77 20	3.78	20	1.41
	+29.94		+9.46
	1.63374n		1.61326n
+	43.03	±	41.04
±	.59		.60
+	.12 −.25	+	.12 −.25
+	42.56	+	40.56
+77 20	46.34 20 46.09	20	41.97 41.72
−	34.07	−	35.11
−2	16.65	−2	13.76
−2	50.72	−2	48.87
17	55.62	17	53.10

−	34.07	−	35.11
−2	16.77		13.33
+	1.64	+	1.67
−2	49.20	−2	46.77
17	56.84	17	54.95

1872

1873.0

50 Case.
h m s
1 52 33
1 52 38
+ 71° 48′ ″
+ 71 48 18
z = − 29 25 30
sin z = −.49

tang δ = +3.04
x = −.048
corr = ~~+.06~~
α 1872 = 32.898
α 1873 = 37.875
δ 1872 = 48′ 0.71″
δ 1873 = 48 18.42

		m	s	
Dec.	6			
	11			
	16			
	21			
	26	52	37.38	
	31		37.13	25
	36		36.86	27

		m	s	
Jan.	20	52	35.98	
	25		35.82	16
	30		35.68	15

1873

Dec.	6	43.10	
	11	42.93	17
	16	42.74	19
	21	42.53	21
	26	42.30	23

Sin δ 9.97771
Cos δ 9.49462
.11571n
9.61033n

dα = +4.976
dδ = +17.71

Ch. f

1872 Dec. 30 +.534 +.53
51 58.7 51 40.8
2.1
5.4
8.6
11.8
15.1
18.0
22.0
25.3
~~27.3~~
167.0
167.0
11.889 51 40.80
52 11.54
52 37.17
− 25.33
~~− 35.39~~
+ 23.96 +.01
+ 1.61 +1.62
− 4.27 +0.71
+ 21.3×2
52 11.84
52 33.14
52 33.16 52 38.14
+2.63
30
2 44.8
26.1
709
32 35.45
+ 31.09
1.49262
1.10295n
− 12.67
32 35.45
32 22.78
+71 50 25.47
−29 25 6 1.51130n
+47.00
1.55830n
+ 36.17″
− .16
− .03
+ 35.98
+71 51 1.45 51 1.19
48 33.1
− 2 28.3 −.26 28.6
− 14.69
− 32.40
− 2 30.83 − 32.40
− 3 3.23 − 2 31.20
+71 47 58.22 + 1.28
− .57 − 3 2.32
+71 47 57.65 47 58.87
48 16.58

1873 Jan. 29 +.413 +.42
52 6 52 18.0 52
1 50.1 1 21.6
54.0 25.4
57.4
58 0.3
2 3.7
7.0
10.5
13.3
16.7
21.30
33.0
3.667 51 21.67
52 3.62
52 35.69
− 32.07
~~− 32.13~~
+ 30.84 +.01
+ 1.28 +1.26
+ 2.18
+ 34.30 29
3.62
37.92
37.91
+2.32
30
2 45.1
29.3
744
32 37.20
+ 42.00
1.62325
1.23358n
− 17.12
32 37.20
32 20.08
50 28.27
−29 25 17
+ 47.83
1.55913n
+ 36.23
− .29
− .13
+ 35.81
51 40.8 3.87
48 34.1
− 2 30.0 −.21 30.2
− 15.70
− 2 31.09 − 15.70
− 2 46.79 30.94
48 17.29 + 1.13
− 1.08 − 2 45.51
16.21 48 18.36

Dec. 7 +.209 +.21
51 52.8 52
25.6 59.1
30.1 2.8
34.0
39.0
42.5
47.9
52.7
56.5
59.7
331.2
391.2
43.467 51 58.23
52 43.42
52 43.06
+ 0.36
~~+ 0.30~~
− 9.16 +.00
+ .64 +.64
− 5.17
− 13.71
43.42
29.71
+2.78
40
0 56.4
43.7
1001
40 50.05
+ 45.24
1.65552
1.26585n
− 18.44
40 50.05
40 31.61
42 16.74
+ 36.03
1.54733n
+ 35.26
− .34
+ .02
+ 34.94
42 51.68
48 48.9
− .06
− 30.50
− 2 17.12 − 30.50
− 2 47.62 − 2 17.40
4.06 + 1.36
− 1.08 − 2 46.54

Dec. 9 +.140 +.17
52 51 45.3
37.6 48.2
40.9 52.6
44.1
47.4
50.6
54.1
57.3
53 0.6
4.0
3366
4566
50.733 51 49.03
52 50.69
52 42.99
+ 7.70
~~+ 7.64~~
− 7.85 +.01
+ .52 +.42
− 5.12
− 12.45 .54
50.69
38.24
38.15
+2.80
30
2 44.9
35.9
808
32 40.40
+ 61.70
1.79029
1.40062n
− 25.16
32 40.40
32 15.24
50 33.11
−29 25 24
+ 8.54
1.51984n
+ 33.10
− .61
+ .08
+ 32.57
51 56.8 51 5.46
48 49.3
− 2 17.7 16.4 −.22 16.6
− 30.90
− 2 17.55 − 30.90
− 2 48.45 17.88
48 17.23 + 1.37
− 1.08 − 2 47.41
48 16.15 48 18.05

Dec. 10 +.179 +.19
52 52 4.2
36.3 6.0
39.8 8.9
43.3
46.6
49.9
53.1
56.5
59.7
3.1
3883
1148.3
49.811 52 6.37
52 49.76
52 42.96
+ 6.80
~~+ 6.74~~
− 7.24 +.00
+ .58 +.54
− 5.09
− 11.75 .79
49.76
38.01
37.97
+2.80
30
2 42.2
28.3
705
32 30.25
+ 43.44
1.63789
1.24822n
− 17.71
32 30.25
32 17.54
50 30.81
+ 27.18
1.53848n
+ 34.55
− .31
+ .08
+ 34.32
51 51.3 51 4.92
48 49.5
2 15.6 −.21 15.8
− 31.10
− 2 16.47 − 31.10
− 2 47.57 16.34
48 17.56 + 1.37
− 1.08 − 2 46.07
48 16.48 ~~48 5.51~~
48 18.85

Dec. 21
30
2 43.0
28.9
719
32 35.95

1872

Dec. 6	71° 47′ 88″.6		Jan 20	48 34.4	
11	89.8	+1.2	25	34.3	−.1
16	90.8	1.0	30	34.1	2
21	91.7	.9			
26	92.5	.8	1873 Dec. 6	48′ 48″.6	
31	93.2	.7	11	49.7	+1.1
36	93.7	.5	16	50.8	1.1
			21	51.8	1.0
			26	52.6	.8

δ ″	1872 ′	″	1873 ′	″	
57.65	33.16	58.22	37.91	17.29	16.21
			38.15	17.23	.15
			37.97	17.56	.48
			37.99	16.91	15.83
			38.08	15.34	.26
57.65 +1.14	33.160	58.22	38.020	16.57	16.~~89~~19 +2.16
0.71	32.898	0.71	37.875	16.42	18.42
−3.06	+.262	−2.49	+.145	−1.55	~~−8.03~~
+1.14					−2.23
−1.92					+2.16
					−.07

	Dec. 22	+.251 +.24			Dec. 28	+.206 +.21	
52		52 4.9		52		51 53.7	
	30.9	7.8			28.1	57.7	
	34.0	10.2			31.6	2.9	
	37.2				34.8		
	40.7				38.2		
	44.0				41.5		
	47.1				44.8		
	50.5				48.2		
	53.7				51.2		
	57.3				54.9		
	3954				3733		
	43.933 52	7.63			41.478 51	~~57.77~~ 58.10	
52	43.89			52	41.43		
52	42.48			52	42.19		
	+1.41				−0.76		
	~~+1.35~~				~~−0.82~~		
	−2.043	−.02			+0.35	−.01	
	+ .73		+.76		+ .64		+.63
	−4.61				−4.32		
	−5.~~921~~90				−3.385		
52	43.89				41.43		
	37.98				38.10		
	37.99				38.08		
	+2.88				+2.93		
30				30			
2	38.8			2	40.9		
	22.5				25.7		
	61.3				666		
32	30.65			32	33.30		
	+3630				+43.38		
	1.55991				1.63729		
	1.17024				1.24862		
	−1480				−17.69		
	32 30.65				32 33.30		
	32 15.85				32 15.61		
+71	50 32.50				50 32.74		
	+2998				+945		
	1.54128				1.52075		
+	34.78			+	33.17		
−	.22			−	.31		
+	.10			+	.10		
+	34.66			+	32.96		
51	7.16		6.96	51	5.70		5.50
48	52.0			48	53.0		
−2	15.2	−.20	15.4	−2	12.7	−.20	12.9
	−33.60				−34.60		
−2	16.65	−	33.60	−2	13.76	−	34.60
−2	50.25	−2	16.77	−2	50.36		13.33
48	16.91	+	1.41	48	15.34	+	1.43
	−1.08	−2	48.96		−1.08	−2	46.50
48	15.83	48	18.00	48	14.26	48	19.00

1872 | 1873.0

Sin δ 9.82311
Cos δ 9.87300
.11571n
9.98871n

γ Andromedae tang δ = +.89 x = −.021 cos α = +.03

h	m	s
1	56	01
1	56	07
+41°	43′	″
+41	43	08
n = +0	39	40
+.01		

	m	s	
Dec. 6	56	6.23	
11		.19	4
16		.14	5

α 1872 = 2.929 δ = 42′ 50.93″ dα = +3.650 dδ = +17.48

α 1873 = 6.579 δ = 43 8.41

	m	s	
Jan 0	56	5.93	
5		5.85	8
10		5.76	9
15		5.67	9
20		5.58	9
25		5.48	10
30		5.39	9
1873.0 Dec. 6		10.01	
11		9.97	4
16		9.93	4
21		9.87	6
26		9.80	7

1872 +.257	1873 +.356	+.413	+.483	+209	+.140
55? = Dec. 3 + +.28	Jan. 4 +.36	Jan. 29 +.42	Feb. 2 +.49	Dec. 7 +.21	Dec. 9 +.17
42.0 55 26.3	55 22.9 55 13.6	56 17.7 58 14.7	55 16.4 55 21.0	56 2.5 55 45.7	56 1.1 2.2 55 54.0
44.8 26.6	25.6 14.5	5 20.4 5	19.0 21.5	5.3 47.0	4.0 4.8 55.5
47.6 27.7	28.5	23.2	21.9	8.0 48.0	6.7 7.7 56.9
50.4	33.9	28.8	27.6	13.5	12.2 13.1
53.1	36.5	31.9	30.2	16.1	15.0 16.0
~~58.6~~	39.3	34.5	32.9	19.0	17.7 18.6
~~1.3~~	42.0	37.1	35.8	21.7	20.5 21.4
~~4.0~~	45.1	39.8	38.4	24.6	23.4 24.2
	50.6	45.5	44.2	30.0	28.8 29.6
	53.2	48.2	46.9	32.8	31.6 32.5
	56.2	50.6	49.6	35.7	34.4 35.3
	433.8	377.7	362.9	209.2	195.4 205.4
47.580 55 26.53	39.436 55 14.05	34.336 55 14.70	32.991 55 21.25	19.018 55 46.90	17.764 18.67 55 55.47

55 47.56 56 6.23 −18.69 ~~−18.72~~	55 39.42 56 5.86 −26.44 ~~−26.47~~	55 34.32 56 5.41 −31.09 ~~−31.12~~	55 32.97 56 5.34 −32.37 ~~−32.40~~	56 19.00 56 10.00 +9.00 ~~+8.97~~	56 17.74 18.65 56 9.99 9.99 +7.75 +8.66 ~~+7.72 +8.63~~
+18.49 +.01 +.25 +23 −3.32 +0.33 +15.481 55 47.56 56 2.98 56 2.97 56 6.62 +2.28	+26.19 +.02 +.32 +.32 +0.72 +27.235 39.42 6.65 6.67 +2.56	+30.84 +.01 +.37 +.37 +1.17 +32.389 34.32 6.70 6.71 +2.32	+32.05 +.01 +.44 +.43 +1.24 +33.73 32.97 6.70 6.70 +2.34	−9.16 +.00 +.19 +.19 −3.42 −12.39 56 19.00 6.61 6.61 +2.78	−7.85 +.01 +.15 +.12 −3.41 −11.13 −11.13 17.74 18.65 6.63 7.542 6.61 +2.80
45 0 54.0 4 34.2 88.2 44 44.10	35 2 27.8 15.3 43.1 37 21.55	35 2 25.7 10.0 35.7 37 17.85	35 2 19.6 4.0 23.6 37 11.80	35 2 33.9 20.8 54.7 37 27.35	35 2 20.0 12.9 32.9 37 16.45
+21.05 1.32325 1.31196n −20.57 44 44.10 44 23.59 +41 38 24.76	+25.39 1.40466 1.39337n −24.74 37 21.55 36 56.81 45 51.54	+19.64 1.29314 1.28185n −19.14 37 17.85 36 58.71 45 49.64	+11.74 1.06967 1.05838 −11.44 37 11.80 37 0.36 45 47.99	+32.12 1.50678 1.49549n −31.30 37 27.35 36 56.05 45 52.30	+22.29 +23.20 1.34811 1.33682n −21.72 37 16.45 36 54.73 45 53.62
+0 39 36 9.82200 +16.88 9.83888	+0 39 20 +23.08 9.84508	+47.83 9.86983	+41.57 9.86357	+0 39 17 +36.03 9.85803	+8.54 9.83054
✶− 0.69 − .12 − .09 − 0.90	✶− 0.70 − .17 − .02 − 0.89	✶− 0.74 − .10 − .11 − 0.95	✶− 0.73 − .04 − .11 − 0.88	✶− 0.72 − .27 + .07 − 0.92	✶− 0.68 − .13 + .07 − 0.74
+41 38 23.86 38 23.39 43 14.9 +4 51.0 −.47 50.5	45 50.65 45 50.47 43 16.9 −2 33.7 −.18 33.9	45 48.69 48.51 43 16.6 −2 32.1 −.18 32.3	45 47.11 46.93 43 16.2 −2 30.9 −.18 31.1	45 51.38 51.19 43 35.1 −2 16.3 −.19 16.5	45 52.88 52.70 43 35.3 −2 17.6 −.18 17.8
−6.52 −24.00 +4 49.84 − 24.00 +4 25.84 +4 49.77 +41 42 49.70 − .02 +4 25.75 42 49.14 43 6.62	−8.50 −2 31.35 − 8.50 −2 39.85 −2 31.44 43 10.80 − .02 −2 39.46 43 10.51	−8.20 −2 31.09 − 8.20 −2 39.29 −2 30.94 43 9.40 − .02 −2 39.16 43 9.35	−7.80 −2 30.59 − 7.80 −2 38.39 −2 30.78 43 8.72 − .02 −2 38.60 43 8.33	−26.70 −2 17.12 − 26.70 −2 43.82 −2 17.40 43 7.56 − .03 −2 44.13 43 7.06	−26.90 −2 17.55 − 26.90 −2 44.45 17.88 43 8.43 − .03 −2 44.81 43 7.89

1872

	°	'	"	
Dec. 6	41	42	75.1	
11			75.5	+ .4
16			76.0	.5
21			76.4	.4
26			76.9	.5

1873

	'	"	
Jan. 0	43	17.0	
5		16.9	− .1
10		16.8	− .1
15		16.9	+ .1
20		17.0	+ .1
25		16.8	.2
30		16.5	.3

1873

	'	"	
Dec. 6	43	35.0	
11		35.5	+ .5
16		35.9	.4
21		36.3	.4
26		36.7	.4

Ch. f

+.179
Dec. 10 +.19 Dec. 21 Dec. 28 +.21
+.206

56 ~~0.7 1.7~~ 55 55 ~~55.0~~ 58.7
~~3.4 4.3~~
~~6.3 7.0~~
11.5 12.5
14.3 15.2
17.2 18.1
20.0 20.9
22.8 23.7

56 55 ~~55.1~~ ?
3.9 ~~56.0~~ ?
5.1 ~~58.0~~
6.6
8.0
9.3 56 36.7
10.7 38.2
12.0 40.3
13.6
14.8

840

17.160 18.080 55 ~~55.00~~
587

9.333 ~~55~~ 55.70
56 38.40

56 17.14 18.06
56 9.98 9.98
+7.16 +8.08
~~17.18 18.08~~

− 7.24 +.00
+ .17 +.16
− 3.40
− 10.478 − 10.47
17.14 18.06
6.67 7.59
6.66
+2.88

56 9.31
56 9.77
− 0.46
~~− 0.49~~
+ 0.35 − .01
+ .19 +.18
− 3.19
− 2.657
56 9.31
6.66
6.64
+2.93

35
2 20.7
7.0
27.7
37 13.85
18.4

35
2 19.5 1 18.0
5.8 3.9
25.3 21.9
37 12.65 36 10.95

35
1 34.1
16.5
50.6
36 25.30

+ 22.16 + 23.08
1.34557 1.26482
1.33428
− ~~21.59~~
37 13.85 −
36 ~~52.80~~
+ 41 45 ~~66.09~~
52.43

− 29.09
1.46374
1.45245
+ 28.35
37 25.30
36 53.65
44 45 54.70

+ 27.18
9.84918

+ 9.45
9.83145

− 0.71
− .13
+ .07

− 0.68
− .23
+ .06

− 0.77
+ 41 45 51.20 51.48
43 35.4
− 2 16.2 − .18 16.4

− 0.85
44 45 53.85 53.66
43 36.9
− 2 16.9 − .19 17.1

− 27.00
− 2 16.47 − 27.00
− 2 43.47 − 2 16.34
43 7.69 − .03
− 2 43.37
43 8.11

− 28.50
− 2 13.76 − 28.50
− 2 42.26 − 2 13.33
43 11.59 − .03
− 2 41.86
43 11.80

a Arictis

h m s
1 59 58
2 00 01
+22 51
+22 51 39
z=+19 31 9
+ .33

tang δ = +.42
δ
x = −.017
cos α = −.03

α1872 = 57.676 δ = 51′ 21.47″ dα = +3.367
dδ = +17.23
α1873 = 1.044 δ = 51 38.70

1872	m	s	
Dec. 6	0	0.69	
11		.67	2
16		.64	3

1873	m	s	
Jan. 0	59	60.50	
5		.44	6
10		.38	6
15		.32	6
Jan. 20		60.25	7
25		.18	7
30		.10	8
Feb. 4		.03	7
9		59.96	7

1873	m	s	
Dec. 6	0	4.23	
11		.21	2
16		.18	3
21		.14	4
26		4.10	4

1872 Dec. 3 +.257 +.28		1873 Jan. 4 +.356 +.36		Jan. 29 +.413 +.42		Feb. 2 +.483 +.49		Feb. 5 +.325 +.34		Dec. 7 +.209 +.21	
59 28.7	59 20.4	59 20.8	59 17.5	59 16.0	59 59.3	59 ~~23~~	59 20.2	59 18.3	59 31.8	59 59.8	59 47.0
31.0	21.7	22.9	18.7	18.3	0 0.5	23.3		15.6	32.9	2.1	48.6
33.0	23.0	25.2	19.7	20.3	2.6	24.5		17.6	34.5	4.2	50.3
37.7		29.8		24.8		25.5		22.2		8.7	
39.8		32.0		26.9		26.5		24.4		11.1	
42.0		34.0		29.0		27.8		26.8		13.4	
44.3		36.5		31.3		28.9		29.0		15.6	
46.5		38.6		33.5		30.1		31.0		17.8	
51.0		43.2		38.0		31.2		35.6		22.2	
53.2		45.3		40.2		32.2		38.0		24.5	
55.5		47.6		42.6				39.9		26.7	
462.7		375.9		320.9		250.0		293.4		206.1	
										146.1	
42.064	59 21.70	34.173	59 18.63	29.173	0 0.80 59	27.778	59 20.20	26.673	59 33.07	13.282	59 48.63

59 42.05
0 0.70
− 18.65
~~− 18.60~~
+18.49 +.01
+ .12 +.11
− 3.02 + 0.35
+ 15.59
59 42.05
57.64
59 57.64 0 1.01
+2.28
35
1 18.9
48.7
11.96
35 59.80
+ 20.36
1.30878
1.38894 n
−24.49
35 59.80
35 35.31
22 47 13.04
+19 30 47 1.30970
+ 17.25
1.32685
*− 21.22
− .08
− .02
− 21.32
22 46 51.72 46 51.62
51 41.6
+4 49.9 − .10 49.8
− 2.87
−20.10
+4 49.84
+4 29.74 − 20.10
+22 51 21.46 +4 49.47
− .15
+4 28.62
51 20.24
51 37.47

59 34.16
0 0.45
− 26.29
~~− 26.36~~
+26.19 +.02
+ .15 +.15
+ 0.59
+26.98 .5
34.16
1.09
1.11
+2.56
25
3 38.0
26.3
6.43
28 32.15
+ 15.54
+ ~~16.54~~
1.19145
1.27161 n
− 18.70
28 32.15
28 13.45
54 34.90
+19 30 36
+23.27
1.33297
*− 21.53
− .05
− .02
− 21.60
54 13.30 54 13.02
51 41.7
− 2 31.6 −.28 31.9
− 3.00
− 2 31.35
− 2 34.35 − 3.00
51 38.95 − 2 31.44
− .84
− 2 35.28
51 37.74

59 29.16
0 0.11
− 30.95
~~− 30.92~~
+ 30.84 +.01
+ .18 +.17
+0.93
+31.95
29.16
1.11
1.11
+2.32
25
3 52.8
37.2
9.00
28 45.00
+ 28.87
− ~~31.69~~
1.50010 n 1.45286 n
1.58026 1.53302
+38.04 − 34.12
28 45.00 45.00
~~28 6.96~~ 10.88
29 23.04 53 25.31
54 37.47
+ 47.99
1.35769
*− 22.79
− .20
− .19
− 23.18
~~28 57.86~~ 54 14.29 13.99
51 40.6
− 2 21.5 83.7 − .30 34.0
− 1.90
− 2 31.09
− 2 32.99 − 1.90
51 41.30 − 2 30.94
− .76
− 2 33.60
51 40.39

59 27.76
0 0.05
− 32.29
~~− 32.26~~
+ 32.05 +.01
+ .21 +.20
+ 0.99
+33.25
27.76
1.01
1.01
+2.34
25
3 31.2
14.8
4.60
28 23.00
+ 7.58
0.87967
0.95983 n
− 9.12
28 23.00
28 13.88
54 34.47
+ 41.74
1.35144
*− 22.46
− .02
− .17
− 22.65
54 11.82 11.55
51 40.2
− 2 31.6 −.27 31.9
− 1.50
− 2 30.59
− 2 32.09 − 1.50
51 39.73 30.78
− .77
− 2 33.65
51 38.50

59 26.66
0 0.01
− 33.36
~~− 33.32~~
+ 33.24 −.01
+ .14 +.14
+1.03
+ 34.40
26.66
1.07
1.06
+2.36
25
3 12.3
5.0
1.73
28 8.65
− 6.40
0.80618
0.88634 n
+7.70
28 8.65
28 16.35
54 32.00
+ 21.58
1.33128
*− 21.44
− .01
− .15
− 21.60
54 10.40 10.15
51 40.0
− 2 30.4 − .25 30.7
− 1.30
− 2 30.22
− 2 31.52 − 1.30
51 38.88 30.35
− .77
− 2 32.42
51 37.73

0 13.27
0 4.23
+9.04
~~+9.07~~
− 9.16 +.05
+ .09 +.09
− 3.19
− 12.26
0 13.27
1.01
1.01
+2.78
+ 24.65
1.39182
1.47198 n
− 29.64
+ 36.12
1.34582
*− 22.17
− .12
− .15
− 22.44
52 1.3
− 22.60
− 2 17.12
− 2 39.72 − 22.60
− 2 17.40
− .91
− 2 40.91

Sin δ 9.58949
Cos δ 9.96445
.11571n
.08616n

1872			1873			1873		
Dec. 6	22° 51′ 41.6″		Jan 0	51′ 41.8″		Dec. 6	51′ 61.3″	
11	41.6	+.0	5	41.7	−.1	11	61.3	+0
16	41.7	.1	10	41.5	.2	16	61.4	.1
21	41.7	.0	15	41.3	.2	21	61.4	.0
26	41.8	.1	20	41.1	.2	26	61.4	0
			25	40.8	.3			
			30	40.5	.3			
			Feb. 4	40.1	.4			
			9	39.7	.4			

	Dec. 9	+.140 +.17	Dec 10	+.179 +.19	Ch. f Dec 21		Dec. 28	+.206 +.21	Dec. 30 Reject
	59 58.7	59 45.5	59 58.0	59 42.5			59 50.2	59 40.8	
	0 0.8	46.5	0.3	43.6			52.6	41.7	
	3.0	47.7	2.6	44.6			54.8	43.0	
	7.5		6.8				59.1		
	9.8		9.2				1.3		
	12.0		11.5				3.7		
	14.2		13.6				6.0		
	16.5		15.9				8.1		
	20.9		20.3				12.6		
	23.2		22.6				14.9		
	25.4		24.8				17.0		
	142.0		185.6				280.3		
	132.0		125.6				40.3		
	12.000	59 46.57	11.418	59 43.57			3.6	6 45941.83	
	0 11.98		0 11.40				0 3.65		
	0 4.22		4.21				4.08		
	+7.76		+7.19				−0.43		
	~~+7.79~~		~~+7.22~~				~~−0.40~~		
	−7.85 +.01		−7.24 +.00				+0.35 −.01		
	+ .07	+.06	+ .08	+.08			+ .09	+.09	
	−3.18		−3.17				−3.04		
	−10.96		−10.33				−2.601		
	0 11.98		11.40				3.65		
	1.112		1.07				1.05		
	1.02		1.107				1.04		
	+2.80		+2.80				+2.93		
	25		25		25		25		25
	3 43.9		3 48.1		3 42.1	2 44.6	3 44.9		3 40.9
	34.8		35.1		29.0	30.3	31.0		30.3
	7.87		8.32		7.11	7.49	7.59		7.12
	~~25~~ 8 39.35		28 41.60		28 35.55	27 37.45	28 37.95		28 35.60
	+ 25.43		+ 27.85				+ 21.83		
	1.40535		1.44483				1.33905		
	1.48551n		1.52499n				1.41921n		
	−30.60		−33.49				−26.26		
	28 39.35		28 41.60				28 37.95		
	28 8.75		28 8.11				28 11.69		
+22	54 39.60		54 40.24				54 36.66		
	+19 30 30								
	+8.54		+27.29				+9.43		
	1.31824		1.33899				1.31913		
	*− 20.81		*− 21.83				*− 20.85		
	− .12		− .15				− .09		
	+ .02		+ .11				+ .14		
	− 20.91		− 21.87				− 20.80		
+22	54 18.69	18.39	54 18.37	18.07			54 15.86	15.57	
	52 1.3		52 1.3				52 1.4		
	− 2 17.4	−.30 17.7	− 2 17.1	−.30 17.4			− 2 14.5	−.29 14.8	
	−22.60		−22.60				−22.70		
	− 2 17.55		− 2 16.47				− 2 13.76		
	− 2 40.15	− 22.60	− 2 39.07	− 22.60			− 2 36.46	− 22.70	
+22	51 38.54	− 2 17.88	51 39.30	16.34			51 39.40	13.33	
		− .92		− .92				− .96	
		− 2 41.40		− 2 39.86				− 2 36.99	
		51 36.99		51 38.21				51 38.58	

β Trianguli tang δ = +.68

h	m	s
2	01	53
2	01	59
+34°	23′	″
+34	23	07

z = +7 59 41

sin. z = +.14

δ x = −.019

cos x = +.00 −.08

α 1872 = 55.937 δ = 22′ 49.69″ dα = +3.547 dδ +17.25

α 1873 = 59.485 δ = 23 6.94

1872			
Dec. 6	1m 59.14s		
11	.11	3	
16	07	4	

1873 1872.0		
Jan. 0	1m 58.91s	
5	.84	7
10	.77	7
15	69	8
20	58.61	8
25	53	8
30	.44	9
Feb. 4	.36	8
9	58.27	9

1873		
Dec. 6	2m 2.84s	
11	.81	3
16	.78	3
21	73	5
26	2.68	5

1872 +.257 Dec. 3 +.28		1873 +.356 Jan. 4 +.36		Jan. 29 +.413 +.42		Feb. 2 +.483 +.49		Feb. 5 +.325 +.34		+.140 ~~+.209~~ Dec. 9 +.17	
01 25.6	01 10.2	1 17.5	1 14.4	2 12.2	2 3.4	1 11.0	1 3.9	1 9.8	1 3.0	1 55.6	1 39.0
28.0	11.3	19.9	15.8	1 15.1	1 4.8	13.4	5.8	12.5	3.8	58.0	40.2
30.5	12.5	22.4	16.8	17.6	5.8	16.2	6.9	15.0	4.6	2 0.8	41.4
33.5		27.3		22.8	~~2.65~~	21.1		19.9		5.6	
38.0		29.9		24.7		23.8		22.5		8.0	
40.5		32.5		27.1		26.2		24.9		10.5	
43.0		34.9		29.6		28.6		27.4		13.0	
45.5		37.6		32.2		31.0		29.9		15.6	
50.5		42.5		34.3		35.8		35.0		20.6	
53.0		44.9		40.0		38.4		37.4		23.0	
55.5		47.5		42.5		41.2		39.8		25.5	
445.6		356.9		301.1		286.7		274.1		236.2	
										116.2	
40.509	1 11.33	32.445	1 15.33	27.373	1 4.67	26.064	1 5.53	24.918	1 3.80	10.564	1 40.20
			1 15.67								
1 40.49		1 32.43		1 27.35		1 26.05		1 24.90		2 10.55	
1 59.15		1 58.85		1 58.45		1 58.39		1 58.36		2 2.84	
−18.66		−26.42		−31.10		−32.34		−33.46		+7.71	
+18.49 +.01		+26.19 +.02		+30.84 +.01		+32.05 +.01		+33.24 −.01		−7.85 +.01	
+ .19	+.17	+ .24	+.26	+ .29	+.28	+ .33	+.33	+ .23	+.22	+ .12	+.09
−3.21	+0.34	+0.63		+1.04		+1.09		+1.13		−3.36	
+15.46		+27.06 8		+32.17		+33.47 8		+34.60 58		−11.09 11	
1 40.49		32.43		27.35		26.05		24.90		10.55	
1 55.96		59.49		59.52		59.52		59.50		59.46	
1 55.95	1 59.50	59.51		59.52		59.53		59.48		59.44	
+2.28		+2.56		+2.32		+2.34		+2.36		+2.80	
0		55		55		55		55		55	
4 58.9		2 19.8		2 28.8		2 28.8		2 25.7		2 27.1	
39.0		6.3		12.2		11.4		14.9		17.8	
97.9		26.1		41.0		40.2		40.6		44.9	
4 48.95		57 12.05		57 20.50		57 20.10		57 20.30		57 22.45	
		+16.77									
+29.18		+ ~~8.77~~		+22.70		+20.53		+21.12		+30.36	
1.46509		1.22483		1.35603		1.31239		1.32469		1.48230	
1.49740w		1.25684w		1.38834w		1.34570w		1.35700w		1.51461w	
−31.44		−18.07		−24.45		−22.17		−22.75		−32.70	
4 48.95		57 13.65		57 20.50		57 20.10		57 20.30		57 22.45	
4 17.51		56 54.98		56 56.05		56 57.93		56 57.55		56 49.75	
34 18 30.84		25 53.37		25 52.30		25 50.42		25 50.80		25 58.60	
+7 59 30	0.90730 6	+7 59 18								+7 59 11	
+17.05		+23.27		+47.99		+41.74		+21.58		+8.54	
0.92475		0.93087		0.95559		0.94934		0.92918		0.91614	
± 8.41		± 8.53		± 9.03		± 8.90		± 8.50		± 8.24	
− .22		− .07		− .14		− .10		− .11		− .29	
− .10		− .02		− .11		− .11		− .11		+ .07	
− 8.73		− 8.62		− 9.28		− 9.11		− 8.72		− 8.46	
34 18 22.11	18 21.63	25 44.75	25 44.57	25 43.02	42.84	25 41.31	41.13	25 42.08	41.90	25 50.14	49.95
23 12.81		23 13.5		23 12.7		23 12.5		23 12.3		23 32.2	
±4 50.20	50.5	−2 31.2	31.4	−2 30.3	30.5	−2 28.8	29.0	−2 29.8	30.0	−2 17.9	18.1
−0.8″ +4 49.2	−.48 48.7	2 32.0 −.18	32.2	2 31.1 −.18	31.3	−2 29.6 −.18	29.8	−2 30.6 −.18	30.8	−2 18.7 −.19	18.9
−5.15											
−22.40		−6.60		−5.80		−5.60		−5.40		−25.30	
+4 49.84 −	22.40	2 31.35 −	6.60	2 31.09 −	5.80	2 30.59 −	5.60	2 30.22 −	5.40	−2 17.55 −	25.30
+4 27.44 +4	49.47	−2 37.95 −2	31.44	−2 36.89	30.94	−2 36.19	30.78	−2 35.62	30.35	−2 42.85 −2	17.88
34 22 49.55 −	.31	23 6.80 −	.35	23 6.13 −	.32	23 5.12 −	.32	23 6.46 −	.33	23 7.29 −	.39
+.16 +4	26.76	+.31 −2	38.29	+.31 −2	37.06	+.31 −2	36.70	+.31 −2	36.08	+.31 −2	43.57
34 22 49.71	22 48.39	23 7.11	23 6.18	23 6.44	23 5.78	23 5.43	23 4.43	23 6.77	23 5.82	23 7.60	23 5.38
	23 5.64										

1873

Sin δ 9.75184	1872			1873			1873			
Cos δ 9.91660	Dec. 6	34° 22′ 72.3″		Jan 0	23′ 13.5″		Dec. 6	23′ 32.0″		
.11571	11	72.6	+.0	5	13.5	−.0	11	32.3	+.3	
.03231	16	72.9	.2	10	13.5	.0	16	32.6	.3	
	21	73.2	.3	15	13.4	.1	21	32.9	.3	
	26	73.5	.3	20	13.3	.1	26	33.2	.3	
				25	13.0	.3				
				30	12.7	.3				
				Feb. 4	12.4	.3				
				9	12.0	.4				

1872			1873	
s	″			
55.95	49.55	49.71	59.51	6.30
			.52	6.13
			.53	5.12
			.48	6.14
			.44	7.29
			.47	6.61
			.45	6.39
		−.32		
55.95	49.55	49.71	59.486	6.36
55.94	49.69	49.69	.485	6.94
+.010	−.14	+.02	+.001	−0.58
		−.32		
		−.30		

1873.0
δ
7.11″
6.44
5.43
6.77
7.60
6.96
6.70
−.62 6.72
6.94
−.22
−.62
−.84

	+.179			+.206		1873. +.117	
	Dec. 10 +19			Dec. 28 +.21		Nov. 19 +.12	
01	55.0	01 52.2	01	47.1	01 41.7	01 26.3	00 20.6
	57.5	53.2		49.8	42.8	32.1	26.5
	6.0	54.2		52.1	43.9	37.2	33.1
	4.8			57.2		43.5	
	7.4			59.8		48.0	
	9.9			2.2		53.7	
	12.5			4.7		58.9	
	15.0			7.1		4.6	
	19.9			12.1		9.7	
	22.5			14.7			
	24.9			17.0			
	229.4			323.8			
	109.4			238			
	9.945 1	53.20		2.164 1	42.80		

2	9.93		2	2.15	
2	2.82		2	2.66	
	+7.11			−0.51	
	−7.24 +.00			+0.35 −.01	
	+.13	+.12		+.14	+.14
	−3.34			−3.18	
	−10.456			−2.670	
	9.93			2.15	
	59.48			59.46	
	59.47			59.45	
	+.280			+.293	
55			55		
2	15.8		2	21.0	
	2.7			7.8	
′	18.5″			28.8	
57	9.25		57	14.40	
	+1674			+1936	
	1.22376			1.28691	
	1.25607			1.31922	
	−1803			−2086	
	57 9.25			57 14.40	
	56 51.22			56 53.54	
+34	25 57.123			25 54.81	
	+2729			+943	
	0.93489			0.91703	
+−	8.61		+−	8.26	
−	.07		−	.09	
+	.07		+	.09	
−	8.61		−	8.26	
25	48.52	48.34	25	46.55	25 46.37
23	32.3		23	33.3	
−2	16.2	16.4	−2	13.2	13.4
−2	17.0 −.18	17.2	−2	14.0 −.18	14.2
	−25.40		−	26.40	
−2	16.47 −	25.40	−2	13.76 −	26.40
−2	41.87 −2	16.34	−2	40.16	13.33
23	6.65 −	.39	23	6.39 −	.41
	+.31 −2	42.13		+.31 −2	40.14
23	6.96	23 6.21	23	6.70	23 6.23

Tang ρ = +5.755　　Sin δ 9.99353

Sch 109 = 48　　K = −.089　　Cos δ 9.23390

h m s　　.11571n

2 05 00　　9.34961n

2 06 00

79° 55′ ″

80 08 17

η = −37 45 29

−.061

δ = 7′ 51″.13　α1872 = 5m 15s.610

8 9.32　α1873 = 5 22.703

1872 Dec. 3 +.28　+.257　1873 Dec. 9　+.140　Dec. 10　+.179　Dec. 28　+.206

04　04 14.7　5　4 43.7　05　04 30.7　05 3.8　04 8.4　04

40.3　18.4　14.3　48.0　13.1　35.0　9.3　13.9

46.4　23.0　20.4　54.1　19.1　38.6　15.7　20.0

(52.7)　26.3　25.2　22.0

59.0　32.3　30.8　27.8

− 4.5　38.2　37.0　33.7　06 36.0 9w

10.6　44.0　42.8　40.0　41.3

16.6　50.8　48.9　46.1　48.2

22.8　56.5　56.0　52.0

28.9　6 2.3　1.9

2851　2748　2504

3451　3348

5 4.644　4 18.70　5 38.344　4 48.60　37.200　4 34.77　27.822　4 14.10

5 4.55　5 38.25　5 37.11　5 27.73　6 41.83

+18.50　−7.84　−7.24　+0.34

+1.48　+.80　+1.03　+1.18

−8.92　−8.28　−8.22　−6.75

5 15.61　5 22.93　5 22.68　5 22.50

+.228　+.280　+.280　+.293

20　10　10　10

0 33.3　2 52.0　2 59.5　2 0.7　2 27.2

4 2.0　45.0　48.3　50.0　16.9

35.3　97.0　107.8　110.7　44.1

20 17.65　12 48.50　12 53.90　11 55.35　12 22.05

+ 45.94　+ 49.74　+ 62.43　+ 73.72

1.66219　1.69671　~~1.62767~~ 1.79539　~~1.36759~~ 1.86759

1.01280n　1.04632n　~~0.97728n~~ 1.14500n　~~0.91720n~~ 1.21720n

−10.30　− 11.18　~~−9.49~~　− 13.96　~~−8.26~~　−16.49

20 17.65　12 48.50　~~12 53.90~~　12 53.90　~~11 55.35~~　11 55.35

20 7.35　12 37.32　~~10 8.41~~　12 39.94　38.86

79 2 41.00　10 10.98　10 8.41　10 9.49

80

−37 45 2 1.64890n

+17.16　+8.54　+27.29　+9.43

1.66608　1.65744n　1.67619n　1.65833n

+ 45.77　+ 45.44　+ 47.45　+ 45.53

− .20　− .23　− .36　− .57

− .01 −.03　+ .08 −.22　+ .09 −.23　+ .08 −.19

+45.54　+ 45.29　+ 47.18　+ 45.10

3 26.54　3 26.51　10 56.29　10 56.07　10 55.59　55.36　10 54.59　54.40

− 26.24　− 30.31　− 30.59　− 34.63

+4 49.84　−2 17.55　−2 16.47　−2 13.76

+4 23.60　−2 47.86　−2 47.06　−2 48.39

4 50.14　8 8.43　8 8.53　8 6.20

− 26.24　− 30.31　− 30.59　− 34.63

+4 49.47　−2 17.88　16.34　13.33

+ 1.39　+ 1.71　+ 1.41　+ 1.78

+4 24.62　−2 46.48　−2 45.22　−2 46.18

7 51.13　8 9.59　8 10.14　8 8.22

1872

Tang. δ −4.76
Sin δ 9.99064
Cos δ 9.31250
.11571
9.42821m

Nov. 16 14h 9m 18.30s .20 +78° 8′ 36.5″ −1.9
21 18.50 .24 35.0 −1.9
26 18.74 .28 33.1 −1.8
Dec 1 19.03 .28 31.3 −1.8
6 19.36 .33 29.6 −1.7
1873

4 Urs. Min.
h m s
2 09 23.289
14 09 22.950
+78° 08′ 55.70
+78 08 38.77
δ 10.1 51 21
z = −59 28 33
−.86

Fr.
x = +400 s
Δα = −.21
Δδ = +0.5

α 1872 = 23.289 δ = 8′ 55.70″ = 51′ 4.30″
α 1873 = 22.950 δ = 8 38.77 = 51 21.23
dα = −0.340
dδ = −16.92

Dec 6 14 9 19.63 +78 8 10.3
11 20.00 .37 8.6 −1.7
16 20.41 .41 7.1 −1.5
21 20.85 .44 5.7 −1.4
26 21.33 .48 4.4 −1.3

Jan 0 21.60 .53 22.7 −1.0
10 22.68 21.4 .9
20 23.83 19.6 .7
30 24.99 19.3 .5

1872 +.070
Nov 13 +.06
08 | 08 24.2
27.4
42.4
47.0
52.4
57.4
2.7
7.4
12.7
17.9
277.3
514.3
57.478 8 24.20
8 57.58
9 18.18
−20.60
−20.39
8 57.58
+20.85
−.33
+0.11
9 23.21

+.257
Dec. 3 +.28
08 0.1
41.2 5.5
46.8 11.6
(51.6)
56.9
1.0
6.9
11.7
16.6
21.8
9 16.11 8 5.73
1.41
19.14
−17.47
−17.26
9 1.71
+18.50
−1.22
+4.15
9 23.14

1873 +.356
Jan. 4 +.36
8 | 7 42.3
38.2 50.2
42.1 8 2.3
47.2
52.0
57.9
9 2.7
7.3
12.4
18.1
277.9
517.9
57.544 7 51.60
57.64
21.98
−22.46
−22.25
8 57.64
+26.21
−1.69
+0.97
23.18

+413
Jan. 29 +.42
9 | 9 9.8
35.6 13.3
40.1 17.4
45.2 18.2
50.0
55.1
10 59.9
10 5.1
10.2
14.5
315.7
495.4
55.078 9 ✓ 14.68
55.18
24.88
−29.70
−29.49
8 55.18
+30.85
−1.96
−1.93
22.14

+.148
Dec. 9 +~~.21~~.17
9 | 7 16.5
8.0 21.6
12.9 28.1
17.8
23.0
27.9
33.0
38.0
43.0
48.3
257.9
27.988 7 22.07
9 28.09
9 19.12
+8.19
+8.86
9 28.09
−7.84
−.67
+3.03
22.61

+179
Dec. 10 +.19
09 | 07 20.0
7.5 26.3
12.8 32.3
17.6
22.6
27.9
33.1
37.9
42.9
48.0
250.3
27.811 7 26.20
27.91
20.00
+7.81
+8.12
9 27.91
−7.24
−.85
+2.95
22.77

+1.93
35
3 5.1
43.0
108.1
37 54.05
+33.28
1.52218
0.95039n
+8.92
37 54.05
~~37 45.13~~
38 2.97
+10° ~~45 32.2~~
44 45.38
−59 27 3 1.98787n
+16.72
2.00459n
+ .01
+1 41.06
+ .12
+ .09
+1 41.28
+101 46 ~~44.50~~ 26.66 26.37
″ 51 21.9 21.9
−*0.5 +4 ~~37.4~~ 55.2 54.9
+4 ~~37.9~~ 54.7 −.29 54.4
− 0.68
− 17.60
+4 52.39 − 17.60
+4 34.79 +4 51.80
+101 51 1.45 + 1.65
+4 35.85
51 22.2
51 19.16

+2.28
35
2 52.0
24.6
76.6
37 38.30
+55.88
1.74726
1.17547n
+14.98
37 38.30
37 ~~23.32~~
37 53.28
~~45 25.03~~
44 45.07
+17.17
2.00504n
+ .01
+1 41.17
+ .34
− .05
+1 41.47
46 ~~36.50~~ 26.54 26.28
51 ~~48.6~~ 29.2
+4 42.1 21
~~+4 42.6~~ −26
− 7.98
− 24.90
+4 49.84 − 24.90
+4 24.94 +4 49.47
−50 51.48 + 1.76
+4 26.53
50 52.81
9.7

+2.56
30
0 13.1
~~45.9~~
~~19.2~~
30 ✓ 9.50
~~30 3.60~~
+65.94
1.81915
1.24736n
+17.67
30 9.60
~~29 45.93~~ 27.17
30 21.22
~~53 24.2~~ 21.18
52 24.08
−59 27 51 1.98815
+23.64
2.01179n
+ .02
+1 42.75
+ .48
− .00
+1 43.25
54 ~~45.67~~ 4.43 4.42
51 38.1 38.1
−2 26.3 ~~37.2~~ 26.3
26.8 ~~32.4~~ −.01 26.8
−16.90
−2 31.35 − 16.90
−2 48.25 −2 37.44
51 ~~22.08~~ 16.18 + 2.20
−2 46.14
57 18.28

+2.32
30
0 25.6
14.7
40.3
30 20.15
+40.40
1.60638
1.03459n
+10.83
30 20.15
30 ~~9.32~~
30.98
~~52 39.03~~
52 17.37
+48.29
2.03844n
+ .04
+1 48.15
+ .18
− .01
+1 48.96
54 ~~27.99~~ 6.33 6.31
51 40.9 40.9
−2 ~~46.1~~ 25.4 25.4
−2 45.6 25.9 −.02 25.9
−19.70
−2 31.09 − 19.70
−2 50.79 30.94
51 15.54 + 1.99
−2 48.65
51 17.66

+2.80
30
0 52.7
49.0
101.7
30 50.85
+125.92
+~~59.2~~
2.10011
1.52832n
+33.75
30 50.85
~~31 14.10~~
31 24.60
~~52 31.25~~
52 23.75
−59 27 22
+8.54
1.99669n
+ .01
+1 39.24
+ 1.74
+ .02
+1 41.01
54 ~~12.21~~ 4.76 4.70
51 50.6 50.6
2 21.7 14.2 14.3
~~−2 21.2 13.7~~
−2 14.7 −.06 14.8
−29.40
−2 17.55 − 29.40
−2 46.95 −2 17.88
51 17.81 + 2.90
−2 44.88
51 19.82

+2.80
30
0 2.9
54.5
117.4
29 58.70
+121.61
2.08497
1.51318n
+32.60
29 58.70
~~29 24.10~~
30 31.30
~~53 22.25~~
52 17.05
+27.48
2.01563n
+ .02
+1 43.66
+ 1.66
+ .15
+1 45.49
54 ~~7.74~~ 2.14 2.14
51 51.0 51.0
−2 ~~26.7~~ 11.5
−2 ~~26.2~~ ~~11.0~~ 11.9
−2 12.0 −.40 12.4
−29.80
−2 16.47 − 29.50
−2 46.27 16.34
51 16.27 + 2.90
−2 43.74
51 18.40

	Dec 22		+251		Dec. 28		+206		Dec. 29		+257
09		08	52.8	09		08	28.2	9		9	28.1
	4.0		54.7		1.6		32.3		2.0		30.7
	9.7		4.8		6.3		37.1		7.2		34.3
	14.5		17 23		11.6				12.2		
	18.9				16.8				16.9		
	23.9				22.0	09	46.0		22.3		
	29.4				27.0		49.6		26.9		
	34.0				31.8		53.3		32.3		
	38.9				37.0				37.1		
	44.5				42.0				42.5		
	217.8				196.1				199.4		
	24.200	8	(57.77)		21.789	8	32.53		22.155	9	31.03
	24.30	8	57.43		21.89	9	49.63		22.15		
	20.89				21.49				21.58		
	+3.41				+0.40				+0.57		
	+3.62				+0.61				+0.78		
9	24.30			9	21.89			9	22.15		
	−2.05				+0.34				+0.70		
	−1.19				−.98				−1.22		
	+2.06				+1.46				+1.37		
9	23.12				22.71				23.10		
	+2.88				+2.93				+2.94		
30				30				30			
0	24.5			0	14.0	0	34.3	0	7.6	0	27.0
	13.1				6.1		27.1		−2.5		21.9
1	37.6				20.1		61.4		5.1		48.9
30	18.80			30	10.05	30	30.70	30	2.55	30	24.45
	+26.77				+49.26				−8.88		
	1.42765				1.69249				0.94841n		
	0.85586n				1.12070n				0.47662		
	+7.18				+13.20				−+3.00		−3.00
30	18.80			30	10.05			30	2.55	30	24.45
~~29~~	~~11~~.62			~~29~~	~~56.85~~			~~30~~	~~5.55~~	30	21.45
36	~~11~~.98			30	23.25			29	59.55		
~~52~~	~~37.73~~			52	~~51.50~~			52	42.80		26.90
52	22.38			52	25.10						
	+30.10				+9.40				+17.49		
	2.01825n				1.99755n				2.00564n		
+	.02			+	.02			+	.02		
+1	44.29			+1	39.44			+1	41.31		
+	.08			+	.27			+	.00		
+	.01			+	.01				.00		
+1	44.40			+1	39.74			+1	41.33		
54	20.13	~~21.13~~ 6.77	+1.01	54	~~31.24~~		4.84	54	~~24.13~~		8.23
51	54.5	54	6.75	51	56.1		4.82	51	56.3		8.20
−2	~~26.6~~ 12.3			−2	~~35.1~~ 8.7			−2	27.8		11.9
~~−2~~	~~26.1 11.8~~		12.3	~~−2~~	~~34.6 8.2~~		8.7	~~−2~~	~~27.3~~		12.4 11.9
−2	12.8	−.02	12.8	−2	9.2	−.02	9.2	2	~~28.3~~ 12.4	−.03	~~28.3~~ 12.4
	−33.30	−	33.30		−34.90	−	34.90		−35.10	−	35.10
−2	16.65	−2	16.77	−2	13.76	−2	13.33	−2	13.77	−2	14.12
−2	49.95	+	2.97	−2	48.66	+	2.51	−2	48.87	+	2.52
51	16.82	−2	47.60	51	16.18	−2	45.72	51	~~35.26~~ 19.36	−2	46.70
		51	19.15			51	19.10			51	21.50

ι Cass.

h m s
2 18 28
2 18 38
+66° 49′ ″
+66 49 55
n = −24 27 7
− .41

Red.s
1 10.46
2 7.85
3 5.22
4 2.61
5 0.00

tang δ = +2.34
x = −.038
corr = +.18

α1872 = 32.863 δ = 49′ 29.05″ dα = +48.36 dδ = +16.47
α1873 = 37.700 δ = 49 45.52

1872	m	s	
Nov. 16	18	38.13	
21		38.11	2
26		38.08	3
Dec. 1		38.02	6
6		37.95	7

1873
18720

	m	s			′ ″
Jan. 0	18	37.26			49 59.4
5		37.07	19	+.6	60.0
10		36.87	20	.5	60.5
15		36.66	21	.3	60.8
20		36.45	21	.3	61.1
25		36.22	23	0	61.1
30		35.98	24	0	61.1
Feb. 4		35.75	23	−.2	60.9
9		35.53	.22	.3	60.6

1872 +.070 Nov. 13 +.06	+.257 Dec. 3 +.28	Dec. 21	1873 +.356 Jan. 4 +.36	+.350 Jan. 6 +.32	+.413 Jan 29 +.42
18 6.7 17 52.7 9.3 54.8 12.0 57.1 15.8 17.5 20.0 22.6 25.1 27.9	18 17 26.7 8.7 28.7 11.3 31.0 14.0 16.6 19.3 21.9 24.4 26.9 29.7		17 17 34.1 59.6 36.5 18 2.7 38.9 4.9 7.5 10.4 13.0 15.6 18.2 20.7	17 17 18.3 59.1 19.7 18 1.7 22.8 4.5 24.3 7.2 9.7 12.4 15.0 17.6 20.3	17 5 18 30.0 53.9 32.0 56.5 35.3 59.1 18 1.8 4.1 7.0 9.8 12.5 14.9
156.9 17.411 17 54.87	172.8 19.200 17 28.80		102.6 92.6 10.289 17 36.50	147.5 87.5 9.722 17 21.27	219.4 39.4 4.378 17 32.43
18 17.37 18 38.14 −20.77 −20.95	18 19.16 18 37.99 −18.83 −19.01		18 10.25 18 37.10 −26.85 −27.03	18 9.68 18 37.02 −27.34 −27.52	18 4.34 18 36.02 −31.68 −31.86
+20.89 −.03 + .14 +.16 −5.28 −0.44 +15.74 54 18 17.37 18 33.12 18 33.11 18 37.95 +1.93	+18.50 +.01 + .66 +.60 −5.13 −0.29 ~~+14.03~~ 13.98 19.16 33.19 33.14 37.98 +2.28		+26.19 +.02 + .84 +.83 +0.60 +27.634 10.25 37.88 37.89 +2.56	+26.62 +.00 + .84 +.82 +0.68 +28.142 9.68 37.82 37.80 +2.51	+30.84 +.01 + .98 +.97 +1.68 33.50 4.34 37.84 37.84 +2.32
35 3 41.0 21.6 62.6 38 31.30	35 3 52.8 25.4 76.2 38 38.10	30 1 6.9 56.3 123.2 31 1.60	30 1 7.0 56.5 123.5 31 1.75	30 1 14.9 63.9 18.8 31 9.40	30 1 10.1 55.0 125.1 31 2.55
+22.54 1.35295 1.06350n −11.57 38 31.30 38 19.73 +66° 44 28.62	+50.40 1.70243 1.41298n −25.88 38 38.10 38 12.22 44 36.13		+33.79 1.52879 1.23934n −17.35 31 1.75 30 44.40 52 3.95	+48.45 1.68529 1.39584n −24.88 31 9.40 30 44.52 52 3.83	+31.95 1.50447 1.21502n −16.41 31 2.55 30 46.14 52 2.21
−24 26 28 1.41770n +17.06 1.43476n	+17.18 1.43488n		−24 26 53 1.41790n +23.82 1.41172n	+29.18 1.44708n	+48.44 1.46634n
+ 27.21 − .10 + .10	+ 27.22 − .50 − .07		+ 27.65 − .24 − .01	+ 28.00 − .48 − .01	+ 29.26 − .23 − .05
+ 27.21 +66 44 33.83 44 55.48 49 48.4 +4 52.6 −.35 52.3 − 2.93 − 19.40 +4 52.39 +4 32.99 − 19.40 +66 49 28.82 +4 51.80 + .79 +4 33.19 49 28.61	+ ~~36.65~~ 26.65 45 ~~12.78~~ 2.78 2.42 49 53.9 +4 ~~41.1~~ 51.1 −.36 50.7 − 8.33 − 24.80 +4 49.84 +4 25.04 − 24.80 49 27.82 +4 49.77 + .93 +4 25.90 49 28.32		+ 27.40 52 31.35 52 31.27 49 59.9 −2 31.4 −.08 31.5 − 14.40 −2 31.35 −2 45.75 − 14.40 49 45.60 −2 31.44 + 1.04 −2 44.80 49 46.47	+ 27.51 52 31.34 31.25 50 0.1 −2 31.2 −.09 31.3 − 14.60 −2 31.66 −2 46.26 − 14.60 49 45.08 31.76 + 1.02 −2 45.34 49 45.91	+ 28.98 52 31.19 31.11 50 1.1 −2 30.1 −.08 30.2 − 15.60 −2 31.09 −2 46.69 − 15.60 49 44.50 30.94 + .95 −2 45.59 49 45.52

1873 Sin δ 9.96349

	m	s		′	″		
Dec. 6	18	42.82		49	73.7		Cos δ 9.59484
11		.72	.10		74.8	+1.1	.41 571
16		.61	.11		75.8	1.0	9.71 055n
21		.48	.13		76.8	1.0	
26		42.33	.15		77.8	1.0	

1872

	°	′	″	
Nov. 16	66	49	49.2	
21			50.6	+1.4
26			52.0	1.4
Dec. 1			53.3	1.3
6			54.6	1.3

Feb. 5 +.325 +.34

2.17 18 17.4
57.5 18.4
53.9 19.3
56.6
59.2
1.6
4.5
7.2
9.9
12.4

25.68
1.68
1.867 18 18.37

18 1.83
18 35.69
−33.86
−34.04

+33.25 −.01
+ .80 +.76
+2.01
+36.061
18 1.83
18 37.89
18 37.84
+2.36
30
0 37.7
30.0
67.7
30 38.85

−16.50
1.21748n
0.92803
+8.47
30 38.85
30 47.32
52 1.03

+22.07
1.43997n

+ 27.54
− .06
− .03

+ 27.45
52 28.48 52 28.43
50 0.9
−2 27.6 −.05 27.6

−15.40
−2 30.22
−2 45.62 − 15.40
49 42.86 −2 30.35
+ .96
−2 44.79
49 43.64

Dec. 10 +.179 +.19

18 18 17.6
39.1 49.6 19.0
42.0 49.8 21.7
44.9 50.1
47.6 50.2
—
—
55.0 49.8
57.6 49.8
0.3 49.8

49.871 18 19.43

18 49.83
18 42.73
+7.10
+6.92

− 7.23 +.00
+ .44 +.42
−5.03
−11.824
49.83
38.01
37.99
+2.80
30
1 6.6
55.9
122.5
31 1.25

+ 30.44
1.48344
1.19399n
−15.63
31 1.25
30 45.62
52 2.73

−24 26 53
+27.58
1.44548n

+ 27.89
− .19
+ .03

+ 27.73
52 30.48 30.28
50 14.6
−2 15.89 −.08 16.0

−29.10
−2 16.47
−2 45.57 − 29.10
49 44.89 −2 16.34
+ 1.14
−2 44.30
49 45.98

Dec. 22 +.251 +.24

18 18 10.3
33.7 12.2
36.1 13.9
38.8
41.5
44.3 19 16.0
46.7 17.8
49.4 20.6
52.0
54.7

397.1

44.122 18 12.13
19 18.13

18 44.08
18 42.45
+1.63
+1.45

− 2.02 −.02
+ .56 +.59
− 4.75
−6.240
44.08
37.87
37.88
+2.88
30
1 6.9 0 22.6
57.9 18.1
118.8 50.7
30. 59.40 30 25.35

+ 31.99
1.50501
1.21556n
−16.43
30 59.40
30 42.97
52 5.38

+30.14
1.44804n

+ 28.06
− .21
+ .04

+ 27.89
52 33.27 33.19
50 17.0
−2 16.3 −.08 16.4

− 31.50
−2 16.65
−2 48.15 − 31.50
49 45.12 16.77
+ 1.18
−2 47.09
49 46.10

Dec. 29 +.257 +.26

18 18 9.0
30.6 12.0
33.3 15.1
36.1
38.6
41.2 19 18.5
43.5 20.9
45.3 24.5
49.0
57.8

369.4

41.044 18 12.03
19 21.30

18 41.01
18 42.22
− 1.22
−1.40

+ 0.69 +.01
+ .61 +.60
−4.53
− 3.282
41.01
~~37.75~~ 37.79
~~37.79~~ 37.79
+2.94
30
0 2.1 0 26.2
53.9 18.0
116.0 44.2
30 58.00 30 22.10

+ 29.01
1.46255
1.17310n
−14.90
30 58.00
30 43.10
52 5.25

+17.49
1.43539n

+ 27.26
− .18
+ .04

+ 27.11
52 32.36 32.28
50 18.4
−2 14.0 −.08 14.1

− 32.90
−2 13.77
−2 46.67 − 32.90
49 45.69 14.12
+ 1.20
−2 45.82
49 46.46

36 H. Cass
h m s
2 25 54
2 26 00
+72° 15′ ″
+72 15 37
z = −29 52 49
sin. z = −.50

Red.	s
1	13.51
2	10.13
3	6.76
4	3.38
5	0.00

tang δ = +3.12
f = −.050
Corr =

α1872 = 54.647 δ = 15′ 21.17″ dα = +5.542
dδ = +16.12
α1873 = 0.190 δ = 15 37.29

1872

	m	s	
Nov. 16	26	1.11	1
21		1.10	5
26		1.05	8
Dec. 1		0.97	10
6		0.87	

1873
1872.0

	m	s	
Jan. 0	25	59.95	
5		59.70	25
10		59.44	26
15		59.15	29
20		58.86	29
25		58.56	30
30		58.25	31
Feb. 4		57.94	31
9		57.63	31

1872 +.070 Nov. 13 +.06	+.257 Dec. 3 +.28	1873 +.356 Jan. 4 +.36	+.350 Jan. 6 m=+.36	+.335 Jan. 9 +.33	+.413 Jan. 29 +.42
25 25 28.1	25 24 35.0	25 24 37.0	25 25 8.5	25 24 34.4	26 25 29.4
26.8	28.2 37.5	19.0 37.2	18.5 10.6	17.5 36.3	5 12.7 4 31.9
30.1	31.7 40.0	22.5 25 3.8	22.0 14.5	21.0 38.3	16.9 35.6
33.4	34.8	25.8	25.0	24.4	20.0 39.3
36.6	38.4	28.9	28.8	27.8	23.3
40.0	41.6	32.6	32.2	31.3	26.4
43.5	45.0	36.0	35.4	34.6	29.5
47.0	48.4	39.2	38.8	38.0	33.0
50.4	51.8	42.8	42.3	41.4	36.8
53.5	55.3	46.0	45.8	44.7	40.0
361.5	375.2	292.8	288.8	280.7	238.6
40.144 25 28.00	41.689 24 36.83 24 37.50	32.533 25 0.00	32.089 25 11.20	31.189 24 36.33	26.511 24 34.05
25 40.09	25 41.64	25 32.48	25 32.04	25 31.14	26 26.46
26 1.12	26 0.93	25 59.74	25 59.64	25 59.48	25 58.29
− 21.03	− 19.29	− 27.26	− 27.60	− 28.34	− 31.83
+ 20.859 −.03	+ 18.50 +.01	+ 26.19 +.02	+ 26.62 +.00	+ 27.42 −.02	+ 30.84 +.01
+ .19 +.22	+ .87 +.80	+ 1.12 +1.11	+ 1.12 +1.09	+ 1.03 +1.04	+ 1.31 +1.29
− 6.47 − 0.93	− 6.28 − 0.74	+ 0.45	+ 0.55	+ 0.71	+ 1.90
+ 14.601	+ 13.083	+ 27.767	+ 28.296	+ 29.165	+ 34.084
25 40.09	41.64	32.48	32.04	31.14	26 26.46
35 34.70	34.73	0.24	0.33	0.30	0.51
25 54.70 26 0.24	54.67 0.21	0.25	0.30	0.29	0.50
+1.93	+2.28	+2.51	+2.51	+2.47	+2.32
10	10	5	5	5	5
2 51.5	3 6.5	0 19.8	0 14.5	0 27.9	0 30.6
31.3	40.5	9.5	8 2.23	14.9	13.5
1 82.8	107.0	29.3	16.7	42.8	44.1
12 41.40	12 53.50	5 14.65	5 8.35 5 6.15	5 21.40	5 22.05
+ 12.14	+ 64.19	+ 32.53	+ 20.89	+ 54.86	+ 52.46
1.08422	1.80747	1.51228	1.31994	1.73926	1.71983
0.68364n	1.40689n	1.11170n	0.91936n	1.33868n	1.31925n
− 4.83	− 25.52	− 12.93	− 8.30 8.30	− 21.81	~~− 20.96~~ − 20.86
12 41.40	12 53.50	5 14.65	5 6.15 8.35	5 21.40	~~5 22.05~~ 5 22.05
12 36.57	12 27.98	5 1.72	4 ~~57.85~~ 5 0.05	4 59.59	~~5 1.09~~ 5 1.19
~~+7 10 11.78~~ +72 10 11.78	10 20.37	17 46.63	17 50.50 48.30	17 48.76	17 47.16
− 29 52 11 1.51930n		− 29 52 35 1.51950n			
+ 17.41	+ 17.18	+ 24.01	+ 29.31	+ 25.23	+ 48.59
1.53671n	1.53648n	1.54351n	1.54881n	1.54473n	1.56809n
+ 34.41	+ 34.39	+ 34.95	+ 35.38	+ 35.05	+ 36.99
− .02	− .66	− .16	− .07	− .48	− .44
+ .08	− .06	− .00	− .00	− .00	− .02
+ 34.47	+ 33.67	+ 34.79	+ 35.31	+ 34.57	+ 36.53
+72 10 46.25 10 45.98	10 54.04 53.75	18 21.42 18 21.24	18 ~~25.81~~ 23.61 23.60	18 23.33 23.31	18 23.69 23.66
15 39.7	15 45.7	15 52.6	15 52.9	15 53.2	15 54.3
+4 53.5 −.27 53.2	+4 51.7 −.29 51.4	−2 28.8 −.18 29.0	−2 32.9 −.01 32.9	−2 30.1 −.02 30.1	−2 29.4 −.03 29.4
− 2.38	− 8.38				
− 18.50	− 24.50	− 15.30	− 15.60	− 15.90	− 17.00
+4 52.39	+4 49.84	−2 31.35	−2 31.66	−2 31.29	−2 31.09
+4 33.89 − 18.50	+4 25.34 − 24.50	−2 46.65 − 15.30	−2 47.26 − 15.60	−2 47.19 − 15.90	−2 48.09 − 17.00
+72 15 20.14 +4 51.80	15 19.38 +4 49.47	15 34.77 −2 31.44	15 ~~38.55~~ 35.35 31.76	15 36.14 31.51	15 35.60 30.94
− .58 + .96	− .58 + 1.14	− 1.10 + 1.28	− 1.10 + 1.25	− 1.10 + 1.23	− 1.10 + 1.16
+72 15 19.56 +4 34.26	15 18.80 +4 26.11	15 33.67 −2 45.46	15 34.25 −2 47.11	15 35.04 −2 46.18	15 34.50 −2 46.78
15 20.24	15 19.86	15 35.78	15 36.49	15 37.13	15 36.88
15 26.36	15 25.98				

1873

		m	s	
Dec	6	26	6.39	
	11		6.28	12
	16		6.12	15
	21		5.94	18
	26		5.74	20

Sin δ 9.97886
Cos δ 9.48371
.11571
9.59942n

1872

		°	'	"	
Nov.	16	72	15	40.6	
	21			42.2	+1.6
	26			43.7	1.5
Dec.	1			45.1	1.4
	6			46.5	1.4

1873

		'	"	
Jan.	0	15	51.9	
	5		52.7	+.8
	10		53.3	.6
	15		53.8	.5
	20		54.1	.3
	25		54.3	+.2
	30		54.3	+0
Feb.	4		54.1	−2
	9		53.9	2

Dec.	6	15	65.2	
	11		66.5	+1.3
	16		67.7	1.2
	21		68.8	1.1
	26		69.8	1.0

1872.0 α	1872.0 δ	1873.0 α	1873.0 δ
54.70	19.56	0.25	33.67
.67	18.80	.30	34.25
		.29	35.04
		.50	34.50
		.37	34.84
		.33	34.11
		.61	
54.685	19.18 +1.16	0.379	34.40 +2.20
54.647	21.17	0.190	37.29
+.038	−1.99	+.189	−2.89
	+1.16		+2.20
	−.83		−.69

+.325   +.179   +.251

Feb. 5 +.34   Dec 10 +.19   Dec. 22 +.24

25   25 54.3   25 59.7   25 24.0   25 45.8

3.0   28.0
6.4   30.7
−30.8 37.6 A.5 24.1   9.8
37.2 37.2 23.7   13.1
24.0   16.6
51.0 37.5 A−1 23.7   20.0
57.5 37.2 23.7   23.1   25 34.8 7.8
4.2 37.2   26.6   41.3 7.5 A−1
48.1 7.6

23.84   17.83
11.83
37.34 23.79   13.144 25 27.57   7.63 25 45.80

25 37.29 2379   26 13.09   25 7.58
25 57.86 5786   26 6.28   26 5.90
−~~20.57~~ ? ~~25.93~~ −34.07   +6.81   +1.68

+33.25 −.01   −7.23 +.00   −2.02 −.02
+1.06 +1.01   +.59 +.56   +.75 +.78
+2.33   −6.09   −5.71
+36.64 58   −12.726   −6.987
25 23.79   26 13.09   25 7.58
26 0.43   0.36   0.60
26 0.37   0.33   0.61

+2.86   +2.80   +2.88
5   5   0
0 −8.7 ?   0 27.0   4 53.1
−17.5   13.2   37.2
26.2   40.2   98.3
5 −13.10   5 20.10   4 45.15
+45.57
~~−14.43~~   −38.17
1.65868   1.58172n
1.24810n   1.18114
−17.70   −18.12   +15.17
5 ~~20.10~~   5 20.10   4 45.15
5 ~~2.40~~   5 1.98   5 0.32

+ 72° 17' 46.37"   17 48.03
−29 52 37   1.52090n
+22.24   +27.67   +30.18
1.54174n   1.54857n   1.55108n

+ 34.81   + 35.36   + 35.57
.33   .23
− .24   + .01   + .19

+ 35.04   + 35.53
+72 18 21.41   18 21.39   18 23.56   23.18
15 54.1   16 6.3   16 9.0
−2 15.1 −.02   15.1   −2 14.6 −.38   15.0

− 16.80   −~~27.00~~ 29.00   − 31.70
−2 30.22   −2 16.47   −2 16.65
−2 117.02   −2 45.47 − 29.00   2 48.35 − 31.70
−2 80.35   15 35.94 −2 16.34   15 35.21   16.77
− 1.10 + 1.18   −1.10 + 1.40   −1.10 + 1.44
15 34.84 −2 43.94   15 34.11 −2 47.03
15 37.45   15 36.15

√ 5 Uhr. Min. = 49 tang δ = −4.090 Sin δ 9.98737 δ 44 38.5 56.18 α 1872 = 27ᵐ 49.460ˢ

h m s x = +.064 Cos δ 9.37600n

.61571n

2 27 50 9.49171 2877 39.23 α 1873 = 27 49.~~421~~ .293

14 27 49

+76 16′ ″

+ 76 15 04

103 44 56

z = −61 22 8

−.88

α 1872 14 27 49.05 α 1873 14 27 49.19

δ 1872 +76 15 52.54 δ 1873 +76 15 36.49

103 44 7.46 103 44 23.61

1872 ~~Nov. 13~~	Dec. 3 +.28	+.257	1873 Jan. 4	+.356	Jan. 6	+.350	Jan. 9	+.335	Jan. 29	+.413
	27	26 52.1	27	26 35.8	27	26 22.3	27	26 28.0	28	27 56.2
	10.5	56.6	5.9	42.0	6.0	23.6	5.1	32.2	3.5	58.7
	15.0	1.8	10.7	46.9	10.4	25.0	9.2	35.6	7.6	28 1.4
	19.6		14.6		14.2		13.7		12.0	
	23.6		18.9		18.2		18.2		16.2	
	27.8		23.0		22.9		22.5		21.0	
	32.5		27.7		27.2		26.9		24.9	
	37.0		32.0		32.1		31.0		29.1	
	41.3		36.3		35.9		35.3		33.2	
	45.5		40.8		40.2		39.9		36.3	
	252.8		209.9		207.1		201.8		184.4	
	28.089	26 56.88	23.322	26 41.57	23.011	26 23.63	22.429	26 31.93	20.711	27 59.10
	27 18.15		27 23.39		27 23.07		27 22.49		27 20.77	27 58.77
	+18.51		+26.22		+26.63		+27.41		+30.876	
	−1.05		−1.46		−1.43		−1.37		−1.69	
	+3.85		+1.42		+1.15		+0.88		−1.12	
	27 49.46		27 49.57		27 49.42		49.41		48.82	

	Dec. 3	Jan. 4	Jan. 6	Jan. 9	Jan. 29
	+2.28	+2.56	+2.51	+2.47	+2.32
	45	35	35	35	35
	0 3.1	2 24.8	2 18.6	2 20.4	2 37.0
	4 36.0	15.7	9.1	10.2	24.3
	99.1	40.5	27.7	30.6	61.3
	44 49.55	37 20.25	37 13.85	37 15.30	37 30.65
	+31.26	+41.75	+59.38	+50.49	+21.72
	1.49499	1.62066	1.77364	1.70321	1.33686
	0.98670	1.11237	1.26535	1.19492	0.82857
	+9.70	+12.95	+18.42	+15.67	+6.74
	44 49.55	37 20.25	37 13.85	37 15.30	37 30.65
	44 59.25	37 33.20	37 32.27	37 30.97	37 37.39
+103°	37′ ~~9.10~~ 49.10	45 15.15	45 16.08	45 17.38	45 10.96
	−61 19 49 2.02080n	−61 20 4 2.02086n			
	+17.19	+24.19	+29.44	+25.35	+48.74
	2.03799~	2.04505~	2.05030~	2.04621~	2.06960~
	+ .01	+ .03	+ .03	+ .03	+ .06
	+1 49.14	+1 50.93	+1 52.27	+1 51.23	+1 57.37
	+ .12	+ .22	+ .44	+ .32	+ .06
	− .10 −.48	− .02 −.18	− .02 −.18	− .02 −.18	− .12 −.20
	+1 49.17	+1 51.16	+1 52.72	+1 51.66 57.56	+1 57.37
+103	39 38.27 39 37.79	47 6.31 47 6.13	47 8.80 8.62	47 9.04 8.94 8.76	47 8.33 8.13
	44 22.90	44 40.20	44 40.60	44 41.20	44 42.70
	+4 49.84	−2 31.35	−2 31.66	−2 31.29	−2 31.09
	+25.44	+16.69	+16.99	+17.69	+20.19
	~~+5 15.28~~ 4 24.40	~~−2 14.66~~ 2 48.04	~~−2 14.67~~ 2 48.65	~~−2 13.60~~ 2 48.98	~~−3 10.90~~ 2 57.28
Ge. all three.	~~44 53.55~~ 44 2.67	~~44 51.65~~ 44 18.27	44 20.15	44 19.96	44 17.05
	− 25.44	− 16.69	− 16.99	− 17.69	− 20.19
	+4 49.47	−2 31.44	−2 31.66	31.51	30.94
	+ 2.00	+ 2.25	+ 2.20	+ 2.17	+ 2.04
	+4 26.03	−2 45.88	−2 46.55	−2 47.03	−2 49.00
+76° 15′ 34″ 17	44 3.82	44 20.25	44 22.07	44 21.73	44 19.13

	+.483		+.179		+.251
Feb. 2		Dec. 18		Dec. 22	
27	26 56.9	27	27 6.7	27 (32.7) 12.7	26.9
3.5	57.8	37.6	11.0	37.0	30.3
7.4		41.6	20.8	41.3	35.2
11.9		45.3		45.6	
16.1		50.1		49.9	
20.4		54.1		54.2	
25.0		58.6		59.0	
29.2		3.0		3.3	
33.7		7.3		7.6	
37.9		11.6			
18 51		309.2			
		489.2			
20567	26 57.35	54.355	27 12.83	50.067	27 30.80
27 20.62		27 54.42		27 50.13	
+32.07		−7.23		−2.04	
−1.98		−.73		−1.03	
−1.52		+2.97		+2.14	
27 49.20		49.43		49.20	

+2.34		+2.80		+2.88	
35		35		35	
2 33.6		2 29.3		2 35.0	
18.9		19.0		22.9	
5.25		4.83		5.79	
37 26.25		37 24.15		37 28.95	
+ 23.22		+ 41.52		+ 19.27	
1.36586		1.61826		1.28488	
0.85757		1.10997		0.77659	
+ 7.20		+ 12.88		+ 5.98	
37 26.25		37 24.15		37 28.95	
37 33.45		37 37.03		37 34.93	
+ 45 14.90		45 11.32		45 13.42	
		−61 20 2			
+ 42.61		+ 27.77		+ 30.22	
2.06347n		2.04863n		2.05108n	
+ .05		+ .02		+ .02	
+ 1 55.79		+ 1 51.85		+ 1 52.48	
+ .07		+ .22		+ .05	
− .12	−.19	+ .07	−.19	+ .10	−.20
+ 1 55.74		+ 1 52.16		+ 1 52.65	
47 10.64	47 10.45	47 3.48	3.29	47 6.07	5.87
44 43.90		44 51.70		44 55.50	
−2 30.59		−2 16.47		−2 16.65	
− 20.39		−28.19		−31.99	
−2 50.98		−2 44.66		−2 48.64	
44 19.66		44 18.82		44 17.43	
	− 20.39		− 28.19		− 31.99
	−2 30.78		−2 16.34		−2 16.77
	+ 2.05		+ 2.46		+ 2.53
	−2 49.12		−2 42.07		−2 46.23
	44 21.33		44 21.22		44 19.64

v v

ι Arietis.

h m s
2 31 32
2 31 37
+ 21° 24′ ″
+ 21 24 38
λ = +20 58 10
+ ,36

Tang δ = +.39 ·
x = −.017
corr x = −.01
−.05 + 0.4″
α1872 = 33.112 δ = 24′ 22.47″ dα +3.394
dδ = +15.81
α1873 = 36.506 δ = 24 38.28

1872
Dec. 6 31m 36.28s
11 36.27 .7
16 36.25 .5

1873
1720
Jan. 0 31m 36.14s 5
5 .09 5
10 .03 6
15 35.97 6
20 35.91 6
25 .84 7
30 .77 7
Feb. 4 .70 7
9 35.62 8

Sin δ 9.56247
Cos δ 9.96893
.11571n
.08464n

1872

Dec. 3 +257 +.28	1873 Jan. 4 +.356 +.36	Jan. 6 m = +.36 +.350	Jan. 7 +.366 +.38	Jan. 9 +.335 +.33
31 30 54.7 12.2 55.8 15.4 56.6 13.2 17.7 15.4 17.7 19.9 22.1 883 17.660 30 35.70	30 56.6 30 50.2 58.8 57.4 31 0.9 52.2 5.3 7.5 9.8 11.9 14.2 18.7 20.8 22.9 227.4 104.4 9.764 30 51.27	30 56.2 30 48.8 58.3 50.5 31 0.5 51.6 4.9 ~~31 20.6~~ 7.1 9.4 11.5 13.5 18.1 20.3 22.6 222.4 102.4 9.309 30 W ~~37.87~~ 50.30	30 53.8 30 53.3 58.0 31 0.3 4.6 6.9 8.9 11.0 13.2 17.7 20.0 22.2 218.6 98.6 8.964 30 53.30	30 55.3 30 48.9 57.3 50.0 59.7 51.0 31 4.0 6.3 8.4 10.7 13.0 17.3 19.5 21.8 273.3 93.3 8.482 30 49.97
31 17.64 31 36.30 −18.66 −18.65	31 9.75 31 36.10 − 26.35 − 26.30	31 9.29 31 36.08 − 26.79 −26.74	31 8.95 31 36.07 −27.12 −27.07	31 8.47 31 36.04 − 27.57 − 27.52
+18.51 +.01 + .11 +.10 − 3.19 + 1.20 + 15.43 31 17.64 31 33.07 31 33.07 31 36.46 +2.28	+ 26.20 +.02 + .14 +.14 +0.41 +26.75 9.75 +36.50 36.52 +2.56	+26.63 +.00 + .14 +.14 +0.43 +27.20 9.29 +36.49 36.49 +2.51	+ 26.92 +.01 + .15 +.14 +0.44 +27.51 8.95 36.46 36.46 +2.50	+27.48 −.02 + .13 + .13 +0.47 +28.031 8.47 36.50 36.48 +2.47
0 3 9.5 48.9 118.4 2 59.20	55 0 41.5 27.6 69.1 55 34.55	55 0 41.5 0 3.9 27.3 50.1 68.8 114.0 55 34.405 4 57.00	55 0 37.1 22.0 59.1 55 29.55	55 0 40.8 27.1 67.9 ~~55 38.95~~ 55 33.95
+ 21.96 1.34163 1.42627n −26.68 2 59.20 2 32.52 + 21° 20′ 15.83″	+ 18.49 1.26694 1.35158n − 22.47 55 34.55 55 12.08 27 36.27	+ 11.44 19.00 1.05843 1.27875 1.14307n 1.36339n −13.90 −23.09 55 34.40 34.40 55 ~~20.50~~ 11.31 27 ~~27.85~~ 37.04	+ 15.66 1.19479 1.27943n −19.03 55 29.55 55 10.52 27 37.83	+ 18.51 1.26741 1.35205n − 22.49 55 33.95 55 11.46 27 36.89
+20 57 44 1.34370 +17.19 1.36089	+20 57 35 + 24.19 1.36789	+ 29.44 1.37314	+ 38.79 1.38249	+ 25.35 1.36905
∗ − 22.96 − .08 − .06 − 23.10	∗ − 23.33 − .06 − .01 − 24.40	∗ − 23.61 − .02 − .01 − 23.64	∗ − 24.13 − .04 − .01 − 24.18	∗ − 23.39 − .06 − .01 − 23.46
+21 19 52.73 19 52.43 24 41.2 +4 48.5 48.2 +0.4 +4 48.9 −.30 48.6 − 2.89 − 18.70 +4 49.84 − 18.70 +4 31.14 +4 49.47 +21 24 23.87 − .82 +4 24.92 24 22.35	27 11.87 27 11.82 24 41.3 − 2 30.6 30.7 − 2 30.2 −.05 30.3 − ~~3.30~~ 3.00 − 2 31.35 − 3.00 − 2 34.35 − 2 31.44 24 37.52 − .92 − 2 35.36 24 36.46	27 ~~4.21~~ 13.40 13.35 24 41.3 − 2 ~~22.9~~ 32.1 32.1 − 2 ~~22.5~~ 31.7 −.05 31.7 − 3.00 − 2 31.66 − 3.00 − 2 34.66 31.76 24 38.74 − .90 − 2 35.66 24 37.69	27 13.65 13.61 24 41.2 − 2 32.4 32.4 − 2 32.0 −.04 32.0 − 2.90 − 2 31.10 − 2.90 − 2 34.00 30.94 24 39.65 − .89 − 2 34.73 24 38.88	27 13.43 13.38 24 41.2 − 2 32.2 32.3 − 2 31.8 −.05 31.9 − 2.90 − 2 31.29 − 2.90 − 2 34.19 31.51 24 39.24 − .88 − 2 35.29 24 38.09

1873

1872

Dec. 6	31^m	39.86^s		24'	59.6"		Dec. 6	21° 24'	41.2"	Jan 0	24'	41.4"	
11		.85	2		59.6	+0	11		41.2	5		41.3	-.1
16		.83	2		59.7	.1	16		41.3	10		41.2	.1
21		.81	2		59.8	.1	21		41.3	15		41.1	.1
26		39.78	3		59.9	.1	26		41.4	20		40.9	.2
										25		40.7	.2
										30		40.5	.2
										Feb. 4		40.2	.3
										9		39.9	.3

+.413 Jan. 27 +.42	+.325 Feb. 5 +.34	+.179 Dec. 10 +.19	+.251 Dec. 22 +.24
30 51.6 30 47.1	30 49.0 30 53.9	31 33.7 31 25.9	31 28.6 31 18.2
53.8 48.1	51.3	36.0 27.0	30.7 19.4
55.8 49.8	53.5	38.1 28.2	32.9 20.8
31 0.4	57.9	42.6	37.2
1 2.5	31 0.0	44.7	39.7
4.8	2.2	47.0	41.8 32 7.3
7.1	4.6	49.2	44.0 8.4
9.4	6.8	51.5	46.2 9.4
13.5	11.1	55.8	50.6
15.7	13.2	58.0	52.9
18.0	15.4	0.2	55.1
232.8	265.0	456.8	459.7
52.8	25.0	516.8	
4.800 30. 48.33	2.293 30 53.90	46.982 31 27.03	41.791 31 19.47
			32 8.37
31 4.78	31 2.26	31 46.97	31 41.77
31 35.78	31 35.68	31 39.85	31 39.80
- 31.00	-33.42	+7.12	+1.97
- 30.95	-33.37	+7.13	+2.02
+30.85 +.01	+33.26 -.01	- 7.23 +.00	- 2.02 -.02
+ .16 +.16	+ .13 +.13	+ .07 +.07	+ .09 +.10
+0.73	+0.83	-3.34	-3.29
+31.745	+34.221	-10.50	-5.223
31 4.78	2.26	46.97	41.77
36.52	36.48	36.47	36.55
31 36.53	36.47	36.47	36.54
+2.32	+2.26	+2.86	+2.94
55	55	55	55 50
0 39.4	0 28.1	0 39.8	0 41.8 4 44.0
22.1	17.9	25.1	24.0 28.2
1 61.5	46.0	64.9	65.8 72.2
55 30.75	55 23.00	55 32.45	55 32.90 54 36.10
+16.47	+8.37	+19.95	+22.32
1.21669	0.92273	1.29994	1.34869
1.30133n	1.00737n	~~1.28458~~ 1.38458n	1.43333n
-20.01	-10.17	-19.26 - 24.24	-27.12
55 30.75	55 23.00	55 32.45 55 32.45	55 32.90
55 10.74	55 12.83	55 8.21	55 5.78
27 37.61	27 35.52	27 40.14	27 42.57
		+20 57 29 1.34350	
+48.74	+22.41	+27.77	+30.22
1.39244	1.36611	1.37127	1.37372
∓ 24.69	∓ 23.23	∓ 23.51	∓ 23.64
− .04	− .02	− .07	− .08
− .02	− .02	+ .01	+ .02
− 24.75	− 23.27	− 23.57	− 23.70
27 12.86 27 12.82	27 12.25 12.22	27 16.57 16.53	27 18.87 18.83
24 40.5	24 40.1	24 59.6	24 59.8
−2 32.4 32.4	−2 32.1 32.1	−2 17.0 17.0	−2 19.1 19.1
−2 32.0 −.04 32.0	−2 31.7 −.03 31.7	−2 16.6 −.04 16.6	−2 18.7 −.04 18.7
− 2.20	−1.80	−21.30	−21.50
−2 31.09 − 2.20	−2 30.22 − 1.80	−2 16.47 − 21.30	−2 16.65 − 21.50
−2 33.29 −2 30.94	−2 32.02 −2 30.35	−2 37.77 −2 16.34	−2 38.15 −2 16.77
24 39.54 − 83	24 40.23 − 84	24 38.80 − 1.02	24 40.72 − 1.05
−2 32.97	−2 32.99	−2 38.66	−2 39.32
24 38.85	24 39.23	24 37.87	24 39.51

θ Persei

h	m	s
2	35	28
2	35	32
+48°	41′	″
+48	41	22

z = −6 18 . 34
sin z = −.11

tang δ = +1.14
x = −.023
cos α = +.00
α 1872 = 28.021 δ = 41 6.29
α 1873 = 32.080 δ = 41 2.80
dα = +4.059
dδ = +15.508

1872	m	s	
Dec. 6	35	31.97	
11		94	3
16		90	4
21		85	5
26		31.78	7

1873 ~~1872~~	m	s	
Jan. 0	35	31.70	10
5		31.60	10
10		31.50	10
15		31.40	10
20		31.29	11
25		31.18	11
30		31.07	11
Feb. 4		30.96	11
9		30.84	12

Sin δ 9.87568
cos δ 9.81969
.11571
9.93540n

1872 Dec. 3	+.257 +.28	Dec. 23	+.413 +.42	1873 Jan. 9	+.335 +.33	Jan. 12	+.351 +.33	Jan. 29	+.413 +.42	Feb. 2	+.483 +.49
34 54.6	34 50.2	34 49.7	34 53.1	34 45.2	34 38.0	34 44.4	34 44.9	35 41.2	34 30.6	34	34 30.3
57.6	51.3	52.9		48.3	40.8	47.7		44.2	32.5	52.2	31.5
0.7	52.6	55.9		51.4	42.6	50.6		47.2	34.4	53.8	32.6
6.9		2.1		57.6		56.9		53.5		55.5	
10.0		5.5		0.8		35 0.0		56.8		57.0	
13.1		8.5		3.8		3.3		35 0.0		58.5	
16.3		11.6		6.9		6.4		3.1		35 0.0	
19.4		14.8		10.1		9.4		6.2		1.4	
25.7		21.0		16.3		15.7		12.3		3.3	
28.8		24.1		19.5		18.9		15.5		4.9	
32.0		27.2		22.5		22.0		18.7			
2651		273.3		282.4		275.3		298.7		2866	
1451		93.3		42.4		35.3		658.7		5266	
13.191	34 51.37	8.482	34 53.10	3.855	34 40.80	3.209	34 49.90	59.88	34 32.50	58.511	34 31.47
35 13.16		35 8.46		35 3.88		35 3.19		36 59.86		35 58.49	
35 31.99		35 31.83		35 31.51		35 31.46		35 31.08		35 31.00	
−18.83		−23.37		−27.68		−28.27		−31.22		−32.51	
+18.51 +.01		+22.89 +.03		+17.43 −.02		+27.87 −.02		+30.85 +.01		+32.06 +.01	
+ .32	+.29	+ .48	+.47	+ .38	+.38	+ .38	+.40	+ .48	+.47	+ .56	+.55
−3.97	+0.09	−3.81	+0.25	+0.57		+0.62		+1.00		+1.08	
+14.864		+19.568		+18.386		+28.87		+32.33		+33.70	
35 13.16		8.46		3.83		3.19		34 59.86		58.49	
35 28.02		28.02		32.21		32.06		32.19		32.19	
35 28.00	35 32.06	28.04	32.10	32.19		32.06		32.19		32.19	
+2.28		~~+2.70~~		+2.47		+2.40		2.32 ~~+3.22~~		+2.34	
45		35		35		35		35		35	
1 47.0		4 13.2		4 18.0		4 9.3		4 20.6		4 21.5	
21.9		59.3		5.3		53.7		6.2		6.7	
689		182.5		233		1230		268		282	
46 34.45		39 6.25		39 11.65		39 1.50		39 13.40		39 14.10	
+21.82		+15.38		+23.05		+13.31		+27.38		+27.04	
1.33885		1.18696		1.36267		1.12418		1.43743		1.43201	
1.27425n		1.12236n		1.29807n		1.05958n		1.37283n		1.36741n	
−18.80		−13.25		−19.86		−11.47		−23.60		−23.30	
46 34.45		39 6.25		39 11.65		39 1.50		39 13.40		39 14.10	
46 15.65		38 53.00		38 51.79		38 50.03		38 49.80		38 50.80	
+48° 36′ 32.70″		43 55.35		43 56.56		43 58.32		44 0.55 43 58.55		43 58.55	
−6 18 32	0.80390n	−6 18 36									
+17.20		+31.04		+25.47		+45.23		+48.89		+42.78	
0.82110n		0.83494n		0.82937n		0.84913n		0.85279n		0.84668n	
+ 6.62		+ 6.84		+ 6.75		+ 7.06		+ 7.12		+ 7.03	
± .13		± .06		± .14		± .05		± .20		± .20	
− .03		− .04		− .04		− .04		− .21		− .21	
+ 6.46		+ 6.74		+ 6.57		+ 6.97		+ 6.71		+ 6.62	
+48 36 39.16	36 39.00	44 20.9		44 3.13	44 2.79	44 5.29	4.97	44 5.26	4.93	44 4.17	3.84
41 28.7		41 31.3		41 32.9		41 33.0		41 33.1		41 33.0	
+4 49.5 −.16	49.3	−2 30.8 −.16	31.0	−2 30.2 −.34	30.5	−2 32.3 −.32	32.5	−2 32.2 −.33	32.5	−2 31.2 −.33	31.5
− 6.89											
− 22.40		− 25.00		− 11.10		− 11.20		− 11.30		− 11.20	
+4 49.84		−2 31.07		−2 31.29		−2 31.98		−2 31.09		−2 30.59	
+4 27.44 −	22.40	−2 55.07		−2 42.39 −	11.10	−2 43.18 −	11.20	−2 42.39 −	11.30	−2 41.79 −	11.20
+48 41 6.60 +4	49.47	41 17.02 −2	30.26	41 20.71	31.51	41 22.11	32.27	41 22.87	30.94	41 22.38	30.78
−.13 +	25	−.13 +	.29	−.24 +	.27	−.24 +	.26	−.24 +	.25	−.24 +	.25
+48 41 6.47 +4	27.32			41 20.50 −2	42.34	41 21.87 −2	43.21	41 22.63 −2	41.99	41 22.14 −2	41.73
	41 6.32 41 2.83				41 20.45		41 21.76		41 22.94		41 22.11

θ Persei
2 35 28
+ 48 41

1873	m	s		′	″	
Dec. 6	35	36.16		41	47.1	
11		36.13	3		47.8	+.7
16		36.09	4		48.5	.7
21		36.04	5		49.2	.7
26		35.99	5		49.9	.7

Sin δ 9.87568
Cos δ 9.81969
1.1571
9.93540 n

1872		°	′	″	
Dec.	6	48	41	29.0	
	11			29.6	+.6
	16			30.3	.7
	21			31.0	.7
	26			31.7	.7

1873		′	″	
Jan	0	41	32.2	
	5		32.6	+4
	10		32.9	3
	15		33.1	2
	20		33.2	1
	25		33.2	+0
	30		33.1	−1
Feb.	4		32.9	2
	9		32.7	2

	+.325		+.179		+.251
Feb. 5	+.34	Dec 10	+.19	Dec. 22	+.24
2 34	34.44.9 35	35	15.8 35	19.1 35	4.2
57.1		24.4	17.0	22.4	6.1
52.8		27.5	18.8	25.3	9.5
54.2		30.7		31.4	
55.8		36.8		34.9	
57.3		40.0		37.8	
58.9		43.2		41.0	
0.5		46.3		44.3	
2.1		49.4		50.3	
3.6		55.5		53.4	
		58.8		56.5	
33.63		2.0		416.4	
516.3		474.6			
57.36	34 44.90	43.145	35 17.20	37.856	35 6.60
34 57.34		35 43.12		35 37.83	
35 30.93		35 36.14		35 36.03	
−33.59		+6.98		+1.80	
+33.26 −.01		−7.23 +.00		−2.02 −.02	
+ .39	+.37	+ .22	+.20	+ .27	+.29
+1.15		−4.06		−3.95	
+34.80 77		−11.07 9		−5.70	
34 57.34		35 43.12		37.83	
32.14		32.05		32.13	
32.11		32.03		32.13	
+2.36		+ 2.80		+2.88	
35		35		35	
3 30.8		4 18.9		4 24.2	
22.2		6.5		8.8	
53.0		25.4		33.0	
38 26.50		39 12.70		39 16.50	
+12.47		+25.94		+31.25	
1.09587		1.41397		1.49485	
1.03127n		1.34937n		1.43025n	
−10.75		−22.35		−26.93	
38 26.50		39 12.70		39 16.50	
38 15.75		38 50.35		38 49.57	
+44 32.60		43 58.00		43 58.78	
		−6 18 49	0.80430n		
+22.57		+27.87		+30.26	
0.82687		0.83217n		0.83456n	
0.82647n					
+ 6.71		+ 6.79		+ 6.83	
− .04		− .18		− .26	
− .17		+ .13		+ .17	
+ 6.50		+ 6.74		+ 6.74	
44 39.10		44 4.74	44 4.40	44 5.52	5.18
41 32.9		41 47.7		41 49.4	
		−2 17.0	−.34 17.3	−2 16.1	−.34 16.4
−11.10		−25.90		−27.60	
−2 30.22		−2 16.47		−2 16.65	
−2 41.32		−2 42.37 −	25.90	−2 44.25 −	27.60
41 57.78 −2	30.35	41 22.37 −2	16.34	41 21.27	16.77
− .24 +	.25	−.24 +	.30	−.24 +	.31
		41 22.13 −2	41.94	41 21.03 −2	43.06
			41 22.46		41 22.12

1872.0 α	1872.0 δ	1873.0 α	1873.0 δ
28.00	6.47	32.19	20.50
.04		.06	21.87
		.19	22.63
		.19	22.14
		.11	22.13
		.03	21.03
		.13	
28.020	6.47 +26	32.129	21.72 +.48
.021	6.29	.080	21.80
−.001	+.18	+.049	−.08
	+.26		+.48
	+.44		+.40

1872 1873 ~~1872~~ 1873

γ Ceti. Tang δ = +.05 Dec. 6 36m 43s.18 Jan 0 36m 43s.05 Dec. 6 46s.49
h m s 11 .16 5 .01 4 11 .48 1
2 36 37 x = −.015 16 .15 + 10 96 5 16 47 +
2 36 43 15 91 5 21 45 2
+ 2° 41′ 41″ Corr = +.03 20 42.85 6 26 46.42 3
+ 2 41 57 25 79 6
λ = +39 40 5′ α1872 = 40.184 δ = 41 41.37 dα = +3.102 30 .72 7
+ .64 dδ = +15.40 Feb. 4 .65 7
α 1873 = 43.286 δ = 41 56.78 9 42.58 7

1872 1873

Dec. 3 +.257 +.28 Dec. 22 +.413 +.42 Jan. 7 +.366 +.38 Feb. 5 +.325 +.34 Dec. 10 +.179 +.19

36 12.435 59.8 | 36 7.7 36 5.0 | 36 3.8 35 58.4 | 35 56.9 35 54.3 | 36 41.4 36 35.3
14.4 0.7 | 9.7 7.0 | 5.9 | 59.1 58.2 | 43.4 36.7
16.5 1.7 | 11.9 ~~7.0~~ | 8.1 | 36 1.2 56.1 | 45.6 37.9
20.7 | 16.2 | 11.9 | 5.3 | 49.6
22.7 | 18.0 | 13.9 | 7.3 | 51.6
24.8 | 20.2 | 16.2 | 9.4 | 53.7
26.8 | 22.3 | 18.0 | 11.5 | 55.8
28.8 | 24.4 | 20.3 | 13.6 | 57.9
32.8 | 28.4 | 24.3 | 17.6 | 2.0
35.0 | 30.5 | 26.2 | 19.7 | 4.0
37.1 | 32.5 | 28.4 | 21.8 | 6.1
272.0 | 221.8 | 177.0 | 223.4 | 411.1
24.727 36 0.73 | 20.164 36 6.00 | 16.091 35 58.40 | 103.4 35 53.20 | 591.1 36 36.63
9.400 | 53.436

36 24.71 | 36 20.15 | 36 16.08 | 36 9.39 | 36 53.72
36 43.19 | 36 43.14 | 36 42.99 | 36 42.63 | 36 46.48
−18.48 | −22.99 | −26.91 | −33.24 | +7.24
~~−18.51~~ | ~~−23.02~~ | ~~−26.94~~ | ~~−33.27~~ | ~~+7.27~~

+18.51 +.01 | +22.89 +.03 | +26.92 +.01 | +33.26 −.01 | −7.23 +.00
+ .01 +.01 | + .02 +.02 | + .02 +.02 | + .02 +.02 | + .01 +.01
−3.01 +0.09 | −2.96 +0.14 | +0.30 | +0.66 | −3.19
+15.51 2 | +19.98 8 | +27.24 5 | +33.94 3 | −10.41
36 24.71 | 20.15 | 16.08 | 9.39 | 53.72
36 40.22 | 40.10 | 43.32 | 43.33 | 43.31
36 40.23 36 43.33 | 40.13 43.23 | 43.33 | 43.32 | 43.31

+228 | +270 | +250 | +25 | +280
45 | 45 | 35 | 35 | | 35
0 18.8 | 0. 29.1 | 2 57.9 | 3 0.8 | | 2 55.9
6.6 | 12.1 | 42.9 | 3 45.2 | | 42.0
25.4 | 41.2 | 100.8 | 106.0 | | 97.9
45 12.70 | 45 20.60 | 37 50.40 | 36 53.00 | | 37 48.95

+24.00 | +14.16 | +17.69 | +14.20 | +17.11
1.38021 | 1.15106 | ~~1.15106~~ 1.24773 | 1.15229 | 1.23325
1.49514n | 1.26629n | ~~1.26629~~ 1.36296n | 1.26752n | 1.34849n
−31.29 | −18.46 | ~~−18.46~~ −23.06 | −18.52 | −22.31
45 20.60 | 37 50.40 | ~~36 53.00~~ 36 53.00 | | 37 48.95
44 49.31 | 37 31.94 | ~~34.54~~ 36 29.94 | | 37 26.64
(37)
+ 2° ~~24~~ 37′ 59.04″ | 45 16.41 | 46 18.41 | | 45 21.71

+39 40 1 1.67860 | +39 40 3 | +39 39 52 | | +39 39 48
+17.20 | +31.04 | +38.99 | +22.57 | +27.87
1.69580 | 1.70964 | 1.71759 | 1.70117 | 1.70647

+− 49.64″ | +− 51.24 | +− 52.19 | +− 50.25 | +− 50.87
− .01 | − .01 | − .01 | − .01 | − .01
− .01 | − .03 | − .02 | | + .08

− 49.66 | − 51.28 | − 52.22 | | − 50.80
+2 37 9.38 37 9.35 | 44 25.13 44 24.85 | 45 26.19 44 25.96 | | 44 30.91 44 30.69
41 56.1 | 41 54.7 | 41 53.7 | 41 52.1 | 42 13.8
+4 46.7 −.03 46.7 | −2 30.1 −.28 30.7 | −2 32.5 −.23 32.7 | | −2 17.1 −.22 17.3
+0.70 | +2.10 | | |
−14.70 | −13.30 | +3.10 | | −17.00
+4 49.84 | −2 30.07 | −2 31.10 | −2 30.22 | −2 16.47
+4 35.14 − 14.70 | −2 43.37 − 13.30 | −2 28.00 + 3.10 | | −2 33.47 − 17.00
+2 41 44.52 +4 49.47 | 41 41.76 −2 30.26 | 57.39 −2 30.94 | 30.35 | 41 57.44 −2 16.34
− 1.45 | − 1.72 | − 1.60 | − ~~1.60~~ | − 1.78
+4 33.32 | −2 45.28 | −2 29.44 | | −2 35.12
41 42.67 | 41 39.57 | 41 56.52 | | 41 55.57

γ Ceti

2 36 37

+2 41

Sin δ 8.67308

Cos δ 9.99952
.11571
.11523n

1872	° ′ ″	
Dec. 6	2 41 55.9	
11	55.6	−.3
16	55.2	.4
21	54.9	.2
26	54.5	.4

1873	′ ″	
Jan. 0	41 54.2	
5	53.8	−.4
10	53.5	.3
15	53.2	.2
20	52.9	.3
25	52.6	.3
30	52.4	.2
Feb 4	52.2	2
9	52.0	.2
Dec. 6	74.0	
11	73.7	+.3
16	73.3	4
21	73.0	.3
26	72.6	.4

+.251
Dec. 22 +.24
36 36 28.9
36.0 30.4
38.1 32.0
40.2
44.3
46.3
48.5
50.6
52.6
56.6
58.8
0.8
472.8
532.8
48.436 36 30.43

3 36 48.42
3 36 46.44
+1.98
+1.95

−2.02 −.02
+ .01 +.01
−3.15
3 51.68
36 48.42
43.26
43.24

+1.93

35
2 58.5
41.2
99.7
3 37 49.85

+ 18.01
1.25551
1.37074n
− 23.48
37 49.85
37 26.37

+ + 45 21.98

+30.26
1.70886

− ~~+~~ − 51.15
− − .01
− + .11

− 51.05
44 30.93 44 30.71
42 12.9
− 2 18.0 −22 18.2

− 16.10
− −2 16.65
− −2 32.75 − 16.10
41 58.18 −2 16.77
− 18.7
−2 34.74
41 55.97

Sep. 853
h m s
2 37 30
2 37
+80° 11′ ″
+80 12 30

Reject: Too incomplete

1873
Jan. 7
Losh

Chf
Jan. 29

Feb. 2
36 49.5
37 14.5

Feb. 5
37 24.3

Dec
~~Feb.~~ 22
38
37 33.4

36
46.3
51.9
57.2
37 2.6
9.3
16.73
28.73
57.460

37 7.00

37
1.9
8.2

37 24.30

38 0.3
12.4
24.6

37 33.40

30		30		30		30		30	
3	0.4	4	21.4	4	21.4	4	16.1	4	20.5
	50.0		10.1		7.2		8.7		7.1
	11.04		315		286		248		276
32	55.20	34	15.75	34	14.30	34	12.40	34	13.80

954
0.97955m

η Persei

	h	m	s
	2	41	18
	2	41	27
+	55°	22′	″
+	55	21	59

z = −12 59 11

sin. z = −.23

tang δ = +1.45

x = −.42

Cos x =

α 1872 = 22.466 δ = 21 44.16

α 1873 = 26.794 δ = 21 59.44

dα = +4.327

dδ = +15.28

1872	m	s	
Dec. 6	41	26.81	
11		.77	4
16		.72	5
21		.65	7
26		26.58	7

1873 (1872.0)	m	s	
Jan. 0	41	26.48	
5		26.37	11
10		26.26	11
15		26.14	12
20		26.02	12
25		25.88	14
30		25.73	15
Feb. 4		25.59	14
9		25.44	15

1873	s	
Dec. 6	31.26	
11	22	4
16	17	5
21	11	6
26	31.04	7

1872 Dec. 23 +.413 +.42	1873 Jan. 7 +.366 +.38	Jan. 9 +.335 +.33	Jan. 12 +.351 +.33	Jan. 14 +.356 +.35	Feb. 2 +.483 +.49
40 41.3 40 37.0 44.8 38.5 48.6 56.0 59.6 3.1 6.8 10.4 17.5 21.2 24.8 334.1 34.1 3.100 40 37.75	40 37.3 40 29.8 40.8 30.9 44.5 32.5 51.5 55.0 58.7 41 2.5 6.0 13.3 17.0 20.6 347.2 647.2 58.836 40 31.07	40 36.5 40 32.0 40.2 33.1 43.8 34.2 51.0 54.8 58.3 41 2.0 5.4 12.9 16.6 20.2 342.0 642.0 58.364 40 33.10	40 36.3 40 36.9 39.6 43.3 50.7 54.0 58.1 41 1.4 5.1 12.3 15.9 19.8 336.5 636.5 57.864 40 36.90	40 35.3 40 26.5 39.0 27.9 42.6 29.5 49.9 53.4 57.2 41 1.0 4.4 11.7 15.2 18.7 328.4 628.4 57.127 40 27.97	40 31.2 40 35.2 34.9 35.9 38.5 45.8 49.3 53.0 56.5 41 0.1 7.4 11.2 14.7 342.6 582.6 52.964 40 35.55
41 3.07 41 26.62 −23.55	40 58.81 41 26.32 −27.51	40 58.34 41 26.28 −27.94	40 57.84 41 26.21 −28.37	40 57.10 41 26.16 −29.06	40 52.94 41 25.64 −32.70
+22.89 +.03 + .61 +.60 − 4.15 + 0.18 +19.357 41 3.07 41 22.42 41 22.44 41 26.77	+26.92 +.01 + .55 +.53 + 0.47 +27.943 58.81 26.75 26.74	+27.43 −.02 + .48 +.48 + 0.51 +28.420 58.34 26.76 26.74	+27.87 −.02 + .48 +.51 + 0.58 +28.934 57.84 26.77 26.78	+28.51 +.00 + .51 +.52 + 0.63 +29.656 57.10 26.75 26.76	+32.06 +.01 + .71 +.70 +1.85 +33.92 52.94 26.86 26.86
55 +2.70 3 46.5 33.9 80.4 58 40.20	55 +2.50 3 47.9 35.3 83.2 58 41.60	55 +2.47 3 44.2 32.3 76.5 58 38.25	55 +2.40 3 41.8 26.5 68.3 58 34.15	55 +2.39 3 44.8 35.7 80.5 58 40.25	55 +2.34 3 41.2 25.5 66.7 58 33.35
+25.35 1.40398 1.27428n −18.80 58 40.20 58 21.40 +55° +24 26.95	+27.77 1.44358 1.31388n −20.60 58 41.60 58 21.00 24 27.35	+25.26 1.40243 1.27273n −18.74 58 38.25 58 19.51 24 28.84	+20.96 1.32139 1.19169n −15.55 58 34.15 58 18.60 24 29.75	+29.16 1.46479 1.33509n −21.63 58 40.25 58 18.62 24 29.73	+17.41 1.24080 1.11110n −12.92 58 33.35 58 20.43 24 27.92
−12 59 8 1.12310n +31.06 1.15416n	−12 59 16 1.12330n +39.18 1.16248n	+25.58 1.14888n	+45.35 1.16865n	+22.78 1.14608n	+42.95 1.16625n
+ 14.26 − .16 − .04	+ 14.54 − .20 − .04	+ 14.09 − .16 − .04	+ 14.75 − .11 − .04	+ 14.00 − .22 − .22	+ 14.66 − .07 − .18
+ 14.06 24 41.01 24 40.64 22 10.1 −2 30.9 −.37 31.3 + 10.62 −25.90 −2 30.07 −2 55.97 − 25.90 21 45.04 −2 30.26 −.27 + .62 21 44.77 −2 55.54 21 45.10 22 0.38	+ 14.30 24 41.65 41.35 22 12.0 −2 29.6 −.30 29.9 −12.60 −2 31.10 −2 43.70 − 12.60 21 57.95 30.94 −.51 + .57 21 57.44 −2 42.47 21 58.38	+ 13.89 24 42.73 42.44 22 12.1 −2 30.6 −.29 30.9 −12.70 −2 31.29 −2 43.99 − 12.70 21 58.74 31.51 −.51 + .56 21 58.23 −2 43.65 21 58.79	+ 14.60 24 44.35 44.06 22 12.3 −2 32.0 −.29 32.3 −12.90 −2 31.98 −2 44.88 − 12.90 21 59.47 32.27 −.51 + .55 21 58.96 −2 44.62 21 59.14	+ 13.54 6 24 43.27 9 42.99 22 12.5 −2 30.8 −.30 31.1 −13.10 −2 31.05 −2 44.15 − 13.10 21 59.14 31.46 −.51 + .54 21 58.63 −2 44.02 21 58.97	+ 14.21 24 42.13 41.84 22 12.7 −2 29.4 −.29 29.7 −13.30 −2 30.59 −2 43.89 − 13.30 21 58.24 30.78 −.51 + .53 21 57.73 −2 43.55 21 58.29

Sin δ 9.91530
Cos δ 9.75459
,11571
9.87030 n

1872				1873				1873			
Dec. 6	55° 21′	67.2″		Jan. 0	22′	11.2″		Dec. 6	22′	25.0″	
11		68.0	+8	5		11.8	+6	11		25.9	+.9
16		68.9	9	10		12.2	.4	16		26.8	9
21		69.7	8	15		12.5	.3	21		27.7	9
26		70.6	9	20		12.7	.2	26		28.5	.8
				25		12.8	.1				
				30		12.8	+ 0				
				Feb. 4		12.7	− 1				
				9		12.5	2				

1872.0 α		α	1873.0
22.44	44.77	26.74	57.44
		.74	58.23
		.78	58.96
		.76	58.63
		.86	57.73
		.79	58.21
22.440	44.77 +54	26.778 (+1.02	58.20
.466	4.16	.794	59.44
−.026	+.61	−.016	−1.20
	+.54		+1.02
	~~+.27~~		−.18
	+1.15		

1873 +.251
Dec 12 +.24

11.3 14.8 18.3
25.3 414.2
29.1 7.8
32.8 10.0
36.6
40.0
47.2
51.8
54.7

3609
8
32,809 41 7.53

41 32.78
41 31.10
+1.68

− 2.02 −.02
+ 35 +.36
−4.31
+ 5.89
41 32.78
2680
26.79

+288
55
3 44.6
30.3
′ 74.9
58 37.45

+ 25.28
1.40278
1.27308 n
− 18.75
58 37.45
58 18.70

+ 55 24 29.65

−12 59 20
+ 3.030
1.15360 n

+ 14.24
.16
∓ .14

+ 14.22
24 43.87 43.58
22 27.9
−2 16.0 −.29 16.3

− 28.50
−2 16.65
−2 45.15 − 28.50
21 58.72 −2 16.77
−.51 + 66
21 58.21 −2 44.61
21 58.97

P Persei.
h m s
2 45 10
2 45 16
+ 52° 14′ ″
+ 52 14 26
η = -9 51 38
− .17

tang δ = +1.29
x = −.025
Corr α = +.05

α 1872 = 11.610 δ = 14′ 11″.08 dα = +4.209
dδ = +15.04
α 1873 = 15.819 δ = 14 26.13

1872
Dec. 6 45m 15s.79
11 .76 3
16 .73 3
21 .68 5
26 15.61 7

1873
1872.0
Jan. 0 45m 15s.52
5 .42 10
10 32 10
15 21 11
20 15.10 11
25 14.97 13
30 14.84 13
Feb. 4 14.71 13
9 14.58 13

1872 Dec. 23	+.413 +.42	1873 Jan. 7	+.366 +.38	Jan. 9	+.335 +.33	Jan. 12	+.351 +.33	Jan. 14	+.356 +.35	Jan. 29	+.413 +.42
44 31.9 35.4 38.8 45.5 48.9 52.4 55.4 59.2 5.8 9.2 12.5 395.0 575.0	44 30.6 32.2 34.0	44 27.8 31.1 34.5 41.0 44.8 48.0 51.3 54.7 45 1.6 5.0 8.3 348.1 528.1	44 35.2	44 27.4 30.8 34.0 40.9 44.3 47.6 51.0 54.4 45 1.0 4.4 7.9 343.7 523.7	44 33.4	44 26.8 30.2 33.8 40.3 43.7 47.2 50.4 53.8 45 0.8 4.2 7.3 338.5 518.5	44 25.3	44 26.1 29.4 33.0 39.6 43.0 46.3 49.7 53.0 59.9 45 3.2 6.6 389.8 509.8	44 14.4 15.6 17.0	45 23.5 26.8 30.2 37.2 40.3 43.5 47.0 51.2 57.0 46 0.5 4.0 360.2 480.2	45 16.6 18.3 20.3
52.273	44 32.27	48.009	44 35.20	47.609	44 33.40	47.136	44 25.30	46.345	44 15.67	45 43.655	45 18.40
44 52.25 45 15.66 −2341 ~~−2346~~		44 47.98 45 15.38 −27.40 ~~−27.45~~		44 47.58 45 15.34 −27.76 ~~−27.81~~		44 47.11 45 15.27 −28.16 ~~−28.21~~		44 46.32 45 15.23 −28.91 ~~−28.96~~		45 43.63 45 14.86 −31.23 ~~−31.28~~	
+22.89 +.03 + .54 − 4.05 +19.38 40 44 52.25 45 11.63 45 11.65	+.53 + 0.16 45 15.86	+ 26.92 +.01 + .49 + 0.44 +27.85 4 47.98 15.83 15.82	+.47	+ 27.43 −.02 + .43 + 0.48 +28.34 2 47.58 15.92 15.90	+.43	+ 27.87 −.02 + .43 + 0.55 +28.85 47.11 15.96 15.96	+.45	+ 28.51 +.00 + .45 + 0.59 +29.55 6 46.32 15.87 15.88	+.46	+ 30.85 +.01 + .54 +0.96 +32.35 43.63 15.98 15.98	+.53
+2.70		+2.50		+2.47		+2.40		+2.39		+2.32	
5 1 12.0 0.9 129 6 6.45		5 1 6.2 51.9 1181 5 59.05		5 1 7.3 55.2 1225 6 1.25		5 1 12.9 58.1 1310 6 5.50		5 1 17.1 8.7 258 6 12.90		5 1 16.7 2.2 189 6 9.45	
+ 2000 1.30103 1.20381n − 1599 6 645 5 5046		+ 1281 1.10755 1.09033n ~~−1289~~ ~~5 59.05~~ ~~5 46.16~~	−1024 5 59.05 5 48.81	+ 1421 1.15259 1.05537n − 1136 6 1.25 5 49.89		+ 2184 1.33925 1.24203n − 17.46 6 5.50 5 48.04		+ 3067 1.48671 1.38949n − 24.52 6 12.90 5 48.38		− ~~34.75~~ 1.54095n 1.44373 +2778 6 9.45 ~~−6 41.67~~	+25.25 1.40226 1.30504 −2019 9.45 5 49.26
+16 5789		166 59.54		16 48.46 5		17 0.31		16 49.97 5		16 6.68	√6 59.09
−9 51 39 +3109 1.03149n	1.00040	−9 51 48 +3937 1.03987n	1.00040 5	+ 2570 1.02620n		+4547 1.04597n		+2311 1.02361n		+4919 1.04969n	
+ 10.75 − .11 − .01		+ 10.96 − .05 − .01		+ 10.62 − .05 − .01		+ 11.12 − 13 − .01		+ 10.56 − .26 − .07		+ 11.21 − .32 − .06	
+ 10.63 17 852 14 36.1 −2 32.4 − 9.96 − 25.00 −2 30.07 −2 55.07 14 13.45	17 8.41 −.11 32.5 − 2500 −2 30.26 + .45 −2 54.81 14 13.60 14 28.64	+ 10.90 17 10.44 14 38.0 −2 32.4 −11.90 −2 31.10 −2 43.00 14 27.44	10.36 −.08 32.5 − 11.90 30.94 + .42 −2 42.42 14 27.94	+ 10.56 17 9.02 14 38.1 −2 30.9 − 12.00 −2 31.29 −2 43.29 14 25.73	8.94 −.08 31.0 − 12.00 31.51 + .41 −2 43.10 14 25.84	+ 10.98 17 11.29 14 38.3 −2 33.0 − 12.20 −2 31.98 −2 44.18 14 23.19	11.20 −.09 33.1 − 12.20 32.27 + .40 −2 44.07 14 24.13	+ 10.23 17 10.20 14 38.5 −2 31.7 −12.40 −2 31.05 −2 43.45 14 26.75	10.10 −.10 31.8 − 12.40 31.46 + .10 −2 43.46 14 26.64	+ 10.83 16 ~~17.51~~ 9.92 14 38.8 −2 31.1 − 12.70 −2 31.09 −2 43.79 14 26.13	9.82 −.10 31.2 − 12.70 30.94 + .39 −2 43.25 14 25.57

1878

Sin δ 9.89791 1872 1873

		m	s		′	″									′	″	
♀	Dec. 6	45	20.14		14	51.2		Cos δ 9.78707	Dec. 6	52	14	33.5		Jan. 0	14	37.3	
	11		11	3		52.1	+9	1.1571	11			34.3	+.8	5		37.8	+5
	16		.08	3		52.9	.8	9.90278 n	16			35.1	.8	10		38.2	4
	21		.03	5		53.7	.8		21			35.9	.8	15		38.5	3
	26		19.97	6		54.5	.8		26			36.7	.8	20		38.7	2
														25		38.8	1
														30		38.8	+0
														Feb. 4		38.6	−2
														9		38.4	4. 2

+.483 +.251

Feb. 2 +.49 Dec. 22 +.24

44 44 32.9 45 1.8 44 56.3
35.4 34.2 4.9 58.4
37.2 34.9 8.4 0.4
38.9 15.0
40.5 18.5 46
42.1 21.7 9.6
43.9 25.1 12.6
45.6 28.5 14.3
47.3 35.3
49.0 38.7
41.8

379.9 239.7

42.211 44 34.00 21.791 44 58.37
46 12.47

44 42.19 45 21.77
44 − 14.65 45 20.02
− 32.46 +1.75
− ~~32.51~~ ~~+1.70~~

+32.06 +.01 − 2.02 −.02
+.63 +.62 + .31 +.32
+1.17 − 4.20
33.86 − 5.78 +92
44 42.19 45 21.77
16.05 15.86
16.05 15.85

+2.34 +2.88

5 5
0 4.1 1 14.8 0 14.2
48.6 0.0 0.9
112.7 1.48 1.51
5′ 56″.35 6 7.40 5 7.55

+ 8.21 + 23.42
0.91434 1.36959
0.81712 n 1.27237 n
− 6.56 − 18.72
5 56.35 6 7.40
5 49.79 5 48.68

+ 52 16 58.56 16 59.67

−9 51 56
+ 43.13 + 30.34
1.04363 n 1.03084 n

+ 11.06 + 10.74
± .03 ∓ .14
− .04 + .04

+ 10.99 + 10.64
17 9.55 9.48 17 10.31 10.22
14 38.7 14 53.9
− 2 30.9 −.07 31.0 − 2 16.4 −.09 16.5

− 12.60 − 27.80
− 2 30.59 − 2 16.65
− 2 43.19 − 12.60 − 2 44.45 − 27.80
14 26.36 − 2 30.76 14 25.86 − 2 16.77
+ .39 + .48
− 2 42.97 − 2 44.09
14 26.51 14 26.13

1872   1873 / 18729   1873

47 H Cephei. long = +5.10   Dec. 16   49m 19.74s / 21   19.47   27 / 26   19.16   31

h m s
2 49 10
2 49 18
+ 78° 54' ″
+ 78 54 47
z = −36 31 59
− .59

x = −.079

corr = +.20 +1.4

α 1872 = 10.532

α 1873 18.176

δ 1872 = 54' 31″.69   dα = +7641   dδ = +14.83

δ 1873 = 54 46.52

Dec. 16   78° 54' 58″.0
21   59.3 +13
26   60.5 12 Feb.

Jan. 0   49m   18.79   54' 61″.5
5   62.5 +1.0
10   17.98   63.3 .8
15   17.53   .45   64.0 .7
20   17.06   .47   64.6
25   16.56   .50   65.0
30   16.05   .51   65.2
4   15.54   .51   65.3 .1
9   15.02   .52   65.3 .0

Dec. 16   27.33s   54 75.4
21   27.06 .27   76.7   +13
26   26.76 .30   77.9   12

sin δ 9.99182
cos δ 9.28384
.11571
9.39955n

1872 Dec. 23 +.413 +.42	1873 Jan. 12 +.351 +.33	Jan. 14 +.356 +.35	Jan. 29 +.413 +.42	Feb. 2 +.483 +.49	Dec. 22 +.251 +.24
48 33.0 38.5 43.9 48.9 54.7 59.8 5.5 10.8 16.0 47 27.4 33.5 38.2	48 26.5 31.9 38.0 43.5 48.0 53.0 59.3 49 4.6 10.1 48 23.7	48 26.1 31.5 35.9 42.5 47.8 52.7 58.3 49 3.7 8.8 47 53.3 57.4 0.7	49 21.3 27.7 33.0 38.6 43.0 49.0 53.4 59.5 50 5.4 46 45.2	48 20.2 25.8 31.1 36.4 41.5 46.9 52.2 57.0 49 3.1 48 0.2 6.7 11.3	49 6.0 12.2 17.0 22.4 27.9 33.6 39.0 44.3 49.5 48 34.6 37.2 40.5
311.1 491.1 54.567 47 33.03	316.9 436.9 48.544 48 23.70	307.3 427.3 47.478 47 57.13	320.9 390.9 43.433 46 45.20	314.2 374.2 41.578 48 6.07	251.9 27.989 48 37.50
48 54.49 49 19.34 −24.85 −26.05	48 48.47 49 17.78 −29.31 −29.51	48 47.40 49 17.60 −30.20 −30.40	48 43.35 49 16.12 −32.77 −32.97	48 41.50 49 15.72 −34.22 −34.42	49 27.91 49 27.00 +0.91 +0.71
+22.89 +.03 + 2.14 +.210 − 8.81 − 1.17 +16.22 1 48 54.49 49 10.71 49 10.70 49 18.34	+27.87 −.02 + 1.68 +1.79 +0.40 +~~29.95~~ 30.04 48.47 18.42 18.51	+28.51 +.00 + 1.79 +1.81 + 0.58 +30.88 90 47.40 18.28 18.30	+ 30.85 +.01 + 2.14 +2.10 +2.06 +35.05 2 43.35 18.40 18.37	+ 32.06 +.01 + 2.50 +2.46 +2.46 +~~37.02~~ 36.99 41.50 18.52 18.49	+ 2.01 −.02 + 1.22 +1.28 − 8.82 − 9.61 .57 49 27.91 18.50 18.34
+2.70 25 1 30.9 15.2 46.1 26 23.05	+2.40 25 1 13.1 58.9 13.2 0 26 6.00	+2.39 25 1 14.4 5.8 20.2 26 10.10	+2.32 25 1 35.4 22.1 57.5 26 28.75	+2.34 25 1 17.1 −0.5 16.6 26 8.30	+2.88 25 1 19.8 4.7 24.5 26 12.25
+81.54 1.91137 1.31092n −20.46 26 23.05 26 2.59 +78° +56 45.76	+ 24.84 1.39515 0.79470n − 6.23 26 6.00 25 59.77 56 48.58	+ 50.35 1.70200 1.10155n −12.63 26 10.10 25 57.47 56 50.88	+ 118.23 2.07274 1.47229n − 29.67 26 28.75 25 59.08 56 49.27	+ 35.51 1.55035 0.94990n − 8.91 26 8.30 25 59.39 56 48.96	+ 50.49 1.70321 1.10276n − 12.67 26 12.25 25 59.58 56 48.77
−36 31 27 1.62960n +31.09 1.66069n	−36 31 37 1.62970n +45.47 1.67587n 1	+23.11 1.65271n 8	+49.19 1.67879n 8	+ 43.13 1.67273n 8	−36 31 39 + 30.34 1.65994n 1.66004
+ 45.78″ − .66 − .01	+ 47.33 − .07 − .01	+ 44.96 − .26 − .07	+ 47.74 − .22 − .07	+ 47.08 − .13 − .05	+ 45.71 − .27 + .05
+ 45.11 57 30.87 57 30.73 54 59.8 − 2 31.1 31.2 +14 −2 29.7 −.14 29.8 − 13.27 − 28.10 −2 30.07 − 28.10 −2 58.17 −2 30.26 54 32.70 + 1.59 −2 56.77 54 33.96 54 48.79	+ 47.25 57 35.83 57 35.74 55 3.6 −2 32.2 32.3 −2 30.8 −.09 30.9 −17.10 −2 31.98 − 17.10 −2 49.08 32.27 54 46.75 + 1.41 −2 47.96 54 47.78	+ 44.63 57 35.51 35.41 55 3.9 −2 31.6 31.7 −2 30.2 −.10 30.3 − 17.40 −2 31.05 − 17.40 −2 48.45 31.46 54 47.06 + 1.41 −2 47.45 54 47.96	+ 47.37 57 36.64 36.52 55 5.2 −2 31.4 31.5 −2 30.0 −.12 30.1 −18.70 −2 31.09 − 18.70 −2 49.79 30.94 54 46.85 + 1.36 −2 48.28 54 48.24	+ 46.90 57 35.86 35.77 55 5.3 −2 30.6 30.7 −2 29.2 −.09 29.3 −18.80 −2 30.59 − 18.80 −2 49.39 30.78 54 46.47 + 1.38 −2 48.20 54 47.57	+ ~~44.49~~ 45.49 57 ~~33.26~~ 34.26 34.16 ~~55 57.6~~ 56 17.0 −2 ~~26.3~~ 17.3 17.4 −2 ~~25.9~~ 15.9 −10 16.0 − ~~20.50~~ 13.00 −30.50 −2 16.65 −2 16.65 − 30.50 −2 ~~34.15~~ ~~29.85~~ 47.15 −2 16.77 54 ~~57.11~~ 47.11 + 1.69 −2 45.58 54 48.58

75.4
76.7 +1.3
77.9 1.2

1872 1873 1873

1872.0

B. Urs. Min. tang δ = −3.65 Dec. 16 51m 2.82s Jan 10 51m 4.60s Dec. 16 2.98s

h m s
2 51 06
14 51 06
105° 19′ 27″
+ 74 40 27
~~+ 05~~ 19 33
~~2~~ − 62 56 45

α = +.27

Cos α = +.08

21 3.12 30
26 3.45 33

15 5.02 42
20 5.46 44
25 5.91 45
30 6.36 45

21 3.28 30
26 3.61 33

Sin δ 9.98426

α 1872 = 6.061 δ = 40′ 42.14″ = 19′ 17.86″ dα = −0.248
dδ = −14.76

Cos δ 9.42232n
.11571n
9.53803

α 1873 = 5.813 δ = 40 27.38 = 19 32.62

cm2 −.89

1872 +413 Dec 23 +42	1873 +366 Jan 7 +38	+335 Jan. 9 +33	+351 Jan. 12 +33	+356 Jan 14 +35	+412 Jan. 19 +42
50 49 54.5	50 49 2.4	50 49 36.8	50 50 16.6	50 49 54.8	50 50 48.1
26.5 57.8	23.3 7.8	22.9 39.3	22.3 18.2	22.2 57.5	(24.5) 50.7
28.6 3.3	26.8 13.4	27.2 46.3	26.8 20.4	26.2 50 2.5	25.4 53.4
34.0	30.5	30.8	30.4	30.4	28.8
38.1	34.3	34.7	34.5	33.9	33.0
41.9	38.3	38.5	38.1	37.9	37.5
45.8	42.4	42.1	41.5	41.6	40.5
49.5	46.5	46.2	43.6	45.3	44.6
53.8	51.0	50.1	50.0	49.4	48.9
57.6	54.1	54.0	54.0	53.3	52.8
375.8	347.2	346.5	343.2	340.2	333.0
41.755 49 58.53	38.578 49 7.87	38.500 49 40.80	38.133 50 20.17	37.800 49 58.27	37.000 50 50.73
50 41.81	50 38.63	50 38.56	50 38.19	50 37.86	50 37.06
57 3.23	57 4.34	57 4.50	51 4.74	51 4.91	51 5.35
−21.42	−26.71	−25.94	−26.55	−27.05	−28.29
−21.50	−25.79	−26.02	−26.63	−27.13	−28.37
+22.89 +03	+26.92 +01	+27.43 −.02	+27.87 −.02	+28.51 +00	+30.05 +01
−1.53 −1.51	−1.39 −1.33	−1.20 −1.22	−1.20 −1.28	−1.28 −1.30	−1.53 −1.50
+2.83 +2.38	+1.47	+1.31	+1.07	+0.90	+0.46
+24.~~19~~ 24	27.07	+27.50	+27.~~74~~ .64	+28.18	~~+28.98~~ 29.02
50 41.81	38.63	38.56	38.19	37.86	37.06
51 6.00	5.63	6.10	5.93	5.99	6.04
51 6.05 51 5.80	5.70	6.06	5.83	5.97	6.08
+2.70	+2.50	+2.47	+2.40	+2.39	+2.34
0	0	0	0	0	0
2 25.2	2 9.0	2 14.1	2 32.1	2 14.2	2 40.1
12.9	59.8	3.0	20.3	7.8	29.3
38.1	12.88	17.1	52.4	22.0	6.94
2 19.05	2 4.40	2 8.55	2 26.20	2 11.00	2 34.70
+43.22	+90.71	+57.70	+17.96	+39.53	+ ~~46.27~~ 13.73
1.63568	1.95766	1.76118	1.25431	1.59693	1.66530 1.13767n
1.17371	1.49569	1.29921	0.79234	1.13496	1.20333 67570n
+14.92	+31.31	+19.92	+6.20	+13.64	~~+15.97~~ −4.74
2 19.05	2 4.40	2 8.55	2 26.20	2 11.00	2 34.70 34.70
2 33.97	2 35.71	2 28.47	2 32.40	2 24.64	2 ~~50.67~~ 29.96
+105° 20 14.38″	20 12.64	20 19.88	20 15.95	20 23.71	+19 20 ~~57.68~~ 18.39
−62 54 55 2.04968	−62 55 1 n				
+31.12	+39.57	+25.82	+45.59	+23.44	+30.62
2.08075n	2.08920n	2.07545n	2.09522n	2.07307n	2.08025n
+ .04	+ .04	+ .03	+ .05	+ .01	+ .04
+2 0.43	+2 2.80	+1 58.97	+2 4.51	+1 58.32	+2 0.29
+ .26	+ 1.14	+ .46	+ .04	+ .22	+ .30
− .02	− .02	− .02	− .02	− .13	− .16
+2 0.71	+2 3.96	+1 59.44	+2 4.58	+1 58.42	+2 0.47
+105 22 15.09 22 14.86	22 16.60 16.33	22 19.32 19.15	22 20.53 20.34	22 22.13 21.95	22 ~~58.15~~ 18.86 18.65
19 45.6	19 49.85	19 50.2	19 50.9	19 51.3	19 52.2
−2 29.5 −23 29.7	−2 ~~26.8~~ 27.1 −16 27.3	−2 29.1 −17 29.3	−2 29.6 −19 29.8	−2 30.8 −18 31.0	−2 26.7 −21 26.9
−12.94					
−27.70	−16.90	−17.60	−18.30	−18.70	−19.60
−2 30.07	−2 31.10	−2 31.29	−2 31.98	−2 31.05	−2 30.22
−2 57.77 − 27.70	−2 48.00 − 16.90	−2 48.89 − 17.60	−2 50.28 − 18.30	−2 49.75 − 18.70	−2 49.82 − 19.60
+105 19 17.32 −2 30.26	19 28.60 30.94	19 30.43 31.51	19 30.25 32.27	19 32.38 31.46	19 29.04 30.49
−1.03 + 2.40	−1.96 + 2.22	−1.96 + 2.19	−1.96 + 2.13	−1.96 + 2.12	−1.96 + 2.08
19 16.29 −2 55.56	26.64 −2 45.62	28.47 −2 46.92	28.29 −2 48.44	30.42 −2 48.04	27.08 −2 48.01
19 19.30	19 30.71	19 32.23	19 31.90	19 33.91	19 30.64

30.50
16.77
1 69
4.58
48.58

1872				
Dec. 16	74°	40′	16.5″	
21			15.0	−1.5
26			13.4	1.6

1873			
Jan 10	39′	69.5″	
15		68.5	−1.0
20		67.7	.8
25		67.0	.7
30		66.5	.5
Feb 4		66.2	.3
9		66.0	.2

1873			
Dec. 16	39′	59.1″	
21		57.5	−1.6
26		55.9	1.6

α Ceti = $2^h\ 55^m\ 35^s$

1872.0 α	δ	1873.0 α	δ
35.42	9.66	38.41	25.88
		.49	27.80
		.48	27.56
		.54	25.88
		.42	27.62
35.420	9.66 −1.46	38.468	26.95 −2.78
.378	8.90	.507	23.24
+.042	+.76	−.039	+3.71
	−1.46		−2.78
	−.70		+.93

β Ursæ Min.

1872.0 α	δ	1873.0 α	δ
6.05	16.29 +2.06	5.70	26.64
6.061	17.86	6.06	28.47
		5.83	28.29
−.011	−1.57	5.97	30.42
	+2.06	6.08	27.08
	+.49	5.87	25.24
		6.13	28.74
		5.94	26.26
		5.948	27.64 +3.92
		5.813	32.62
		+.135	−4.98
			+3.92
			−1.06

Jan 29 +.42 (+.413)		Feb. 2 +.49 (+.483)		Dec. 22 +.24 (+.251)	
50	50 100	50	50 58.1	50	50 25.8
21.4	11.5	21.0	59.2	50.4	31.4
25.8	12.5	24.9	51 0.1	54.7	38.5
29.2		28.5		58.5	
32.3		32.3		2.8	
37.2		36.6		6.6	51 35.8
41.2		40.8		10.3	38.0
45.0		44.9		14.1	43.6
48.3		48.1		17.8	
52.5		51.8		22.0	
3321				2372	
				54.2	
36.900 50	11.50	36.555	50 59.13	6.3 55	50 31.90
50	11.33				51 39.13
50 36.96		50 36.61		51 6.41	
51 6.25.		51 6.60		51 3.33	
−29.29		−29.99		+3.08	
−29.37		−30.07		+3.00	
+30.85 +.01		+32.06 +.01		−2.01 −.02	
−1.53	−1.51	−1.79	−1.76	−.88	−.92
−0.44		−0.79		+2.48	
+28.88 91		+29.48 .52		−0.44 47	
50 36.96		36.61		51 6.41	
5.84		6.09		6.00	
5.87		6.13		5.94	
+232		+234		+288	
0		0		0	
2 32.8		2 45.0		2 29.1	2 51.2
19.3		30.2		14.9	38.9
521		752		440	901
2 26.05		2 37.60		2 22.00	45.05
+2557		−2258		+3445	−35.8
1.40773		1.35872n		1.53719	1.55388n
0.94576		0.89175n		1.07522	1.09191n
+883		−7.79		+11.89	+12.33
2 26.05		2 37.60		2 22.00	45.05
2 34.88		2 29.81		2 33.89	32.72
′ ″					
+20 13.47		20 18.54		20 14.46	
				−62 55 5	
+4934		+4330		+3038	
2.09897n		2.09293n		2.08001n	
+ .06		+ .05		+ .02	
+2 5.59		+2 3.86		+2 0.23	
+ .09		+ .07		+ .16	
− .12		− .13		+ .10	
+2 5.62		+2 3.85		+2 0.51	
22 19.09	22 18.90	22 23.39	22.18	22 14.97	14.78
19 53.4		19 53.7		20 52.7	
−2 25.7 −.19	25.9	−2 28.7 −.21	28.9	−2 22.3 −.19	22.5
−20.80		−21.10		−30.10	
−2 31.09		−2 30.59		−2 16.65	
−2 51.89 −	20.80	−2 51.69 −	21.10	−2 46.75 −	30.10
19 27.20 −2	30.94	19 30.70	30.78	19 28.22 −2	16.77
−1.96 +	2.06	−1.96 +	2.08	−1.96 +	2.56
25.24 −2	49.68	28.74 −2	49.80	26.26 −2	44.31
19	29.22	.19	32.38	19	30.47

1872 1873 1873

a Ceti

h m s
2 55 35
2 55 39
+3° 35′ 23″
+3 35 23
z = +38 47 25
sin. z = +.63

Tang δ = +.06
x = −.015
corr = +.00
α1872 = 35.378
α1873 = 38.507
δ1872 = 35′ 8.90″
δ1873 = 35 23.24

	m s			m s	′ ″		s		′ ″
Dec. 6	55 38.45		Jan. 0	55 38.36	35 21.4	Dec. 6	41.79		35 40.1
11	45	0	5	32	4 21.0	−4 11	79	0	−.3 39.8
16	44	1	10	28	4 20.7	3 16	78	1	.4 39.4
21	42	2	15	23	5 20.4	3 21	76	2	.3 39.1
26	38.40	2	20	38.17	6 20.1	3 26	41.74	2	.4 38.7
			25	38.11	6 19.8	3			
			30	38.04	7 19.6				
			Feb. 4	37.97	7 19.4	2			
			9	37.90	7 19.2				

2 sin δ 8.79688
2 cos δ 9.99915
.11571
.11486n

	° ′ ″	
Dec. 6	+3 35 23.1	
11	22.8	−.3
16	22.4	.4
21	22.1	.3
26	21.7	.4

dα = +3.128
dδ = +14.34

1872 +413 Dec. 23 +.42	1873 +351 Jan. 12 +33	Jan. 14 +356 +35	Jan. 19 +412 +42	Dec. 18 +179 +16	Dec. 22 +251 +24
55 3.1 5.2 7.3 14.8 16.9 19.7 23.7 25.9 28.0 54 56.1 57.3 59.3 Obs. 2 144.6	54 57.8 59.8 55 2.1 6.4 8.3 10.3 12.3 14.5 18.6 20.6 22.7 233.4 113.4 54 52.6 54.3 55.9	54 57.3 59.3 55 1.5 5.6 7.8 9.8 11.7 18.8 17.9 20.0 22.1 226.8 106.8 54 53.3 54.2 55.1	55 8.8 6.1 8.0 10.2 12.3 404 55 7.3	55 32.8 34.9 37.0 41.1 43.2 45.2 47.3 49.5 53.5 55.6 57.8 497.9 55 26.1 27.1 28.2	55 31.3 33.5 35.5 39.6 41.6 43.7 45.8 47.8 52.0 54.0 56.0 480.8 55 21.9 23.1 24.1
15.53 54 57.57	10.309 54 54.27	9.709 54 54.20	8.080 55 7.30	45.264 55 27.13	43.709 55 23.03
55 15.33 55 38.41 −23.06	55 10.29 55 38.26 −27.97	55 9.69 55 38.24 −28.55	55 8.07 55 38.18 −30.11	55 45.25 55 41.77 +3.48	55 43.69 55 41.76 +2.13
+22.89 +.03 + .03 +.02 −3.03 + 0.10 +19.89 .91 55 15.31 55 35.44 40 55 35.45 42 55 38.55	+27.87 −.02 + .02 +.02 +0.25 +28.14 2 10.29 38.43 38.41	+28.51 +.00 + .02 +.02 +0.27 +28.80 9.69 38.49 38.49	+30.05 +.01 + .03 +.02 +0.33 +30.41 8.07 38.48 38.48	−3.51 +.02 + .01 +.01 −3.26 −6.76 4 45.28 38.52 38.54	−2.01 −.02 + .01 +.01 −3.25 −5.27 43.69 38.44 38.42
+270 40 4 36.2 21.9 58.1 44 29.05	+2.40 40 4 32.0 16.0 48.0 44 24.50 44 24.00	+2.39 40 4 30.7 19.4 50.1 44 25.05	+2.34 40 4 15.6 56.9 127.5 44 6.75	+2.86 40 4 32.9 20.0 52.9 44 26.45	+2.88 40 4 35.5 18.9 54.4 44 27.20
+17.96 1.25431 1.38917n −23.40 44 29.05 44 6.65 5	+16.04 1.20520 1.32006n −20.90 44 24.00 44 3.10	+15.51 1.19061 1.31547n −20.21 44 25.05 44 4.84	+0.78 9.89209 0.00695n −1.02 44 6.95 44 5.93 5.20	+18.13 1.25840 1.37326n −23.62 44 26.45 44 2.83	+20.68 1.31555 1.43041n −26.94 44 27.20 44 0.26
+3° 38′ 41.50″ 42	3 38 45.25 +38 46 26 1.66480	3 38 43.51	3 38 45.62 43.12	3 38 45.52	3 38 48.09 +38 46 21
+31.12 1.69592	+45.59 1.71039	+23.44 1.68824	+30.62 1.69542	+18.87 1.68367	+30.38 1.69518
−49.65 − .01 − .04	*− 51.33 − .01 − .04	*− 48.78 − .01 − .26	*− 49.59 − .00 − .24	*− 48.27 .01 + .26 +17	+− 49.57 − .01 + .26 +17
−49.70 37 53.00 37. 54.55 35 21.6 −2 30.1 −45 30.6	− 51.38 37 53.87 53.52 35 20.6 −2 33.3 −35 33.7	− 49.05 37 54.46 54.11 35 20.4 −2 34.1 −35 34.4	− 49.83 49.93 37 55.79 55.29 52.96 35 20.1 −2 35.4 33.1 −33 36.0 33.5	− 48.11 37 57.41 57.06 35 39.3 −2 18.1 −35 18.5	− 49.41 37 58.68 58.32 35 39.0 −2 19.7 −36 20.1
+ 1.34 − 13.00 −2 30.07 −2 43.07 − 13.00 +3 35 8.93 −2 34.26 +.73 − 1.69 +3 35 9.66 −2 44.95 35 26.60	− 57.40 +2.60 −2 31.98 −2 29.38 + 2.60 35 24.49 32.27 +1.39 − 1.51 35 25.88 −2 31.18 35 22.34	− 57.20 +2.80 −2 31.05 −2 28.25 + 2.80 35 26.41 31.46 +1.39 − 1.50 35 27.80 −2 30.16 35 23.95	− 56.90 +3.10 −2 30.22 −2 27.12 + 3.10 35 28.67 26.17 30.49 +1.39 − 1.47 35 27.56 −2 28.86 35 24.10	− 16.10 −2 16.82 −2 32.92 − 16.10 35 24.49 −2 17.06 + 1.39 − 1.80 35 25.88 −2 34.96 35 22.10	− 15.80 −2 16.65 −2 32.45 − 15.80 35 26.23 16.77 + 1.39 − 1.81 35 27.62 −2 34.38 35 23.94

1872 1873 1873

28 Persei.

h m s
2 56 54
2 57 03
+38° 20′
+38 20 47″

η = +4 02 01
+ .07

tan δ = +.79
x = −.020
cos x = −.03

α 1872 = 58.821
α 1873 = 2.640
δ 1872 = 20′ 32.66″
δ 1873 = 20 46.92

	m	s				m	s	20″		s	′	″
Dec. 6	57	2.52		Jan. 20	57	2.11	55.6	Dec. 6	6.51		20.	69.5
11		51	+2	25		2.02	55.5	11	51	0		70.0 +5
16		51	−1	30		1.93	55.4	16	50	1		70.5 5
21		49	2	Feb. 4		1.84	55.3	21	47	3		71.0 5
26		2.46	3	9		1.74	55.2	26	6.44	3		71.5 5

Dec. 6 38° 20′ 52.5″
11 53.0 +5
16 53.5 5
21 54.0 5
26 54.5 5

dα = +3.820
dδ = +14.27

Sin δ 9.79272
Cos δ 9.89445
.11571
.01016 n

1872 +.413 Dec. 23 +.42		1873 +.413 Jan. 27 +.42		Feb. 1	+.179 Dec. 18 +.16		+.251 Dec. 22 +.24	
56 23.3	56 19.0	57 15.0	57 10.3	57 Lost	56 54.2	56 43.8	56 52.5	56 43.8
26.0	20.0	17.5	6 11.5		56.8	44.9	55.1	45.7
28.6		6 20.4	13.1		59.4	46.1	57.7	47.0
34.0		25.6			57 4.6		1.3	
36.6		28.1			7.3		3.0	
39.2		30.7			9.8	57 42.0	5.6	57 43.0
41.8		33.5			12.4	43.8	8.2	44.4
44.6		36.2			15.1	45.0	11.0	45.8
49.7		41.2			20.5		13.6	
52.4		43.9			23.0		18.7	
55.0		46.6			25.6		21.5	
		338.7			288.7		24.0	
431.4					108.7		270.9 90.9	
39.218	56 19.50	30.791	56 11.63		9.882	56 44.93 57 43.43	8.26	56 45.50 57 44.67

56 39.20 56 30.77 57 9.86 57 8.24
57 2.48 57 1.94 57 6.49 57 6.46
−23.26 −31.17 +3.37 +1.78
~~−23.23~~ ~~−31.14~~ ~~+3.40~~ ~~+1.61~~

+22.89 +.03 +30.85 +.01 −3.51 +.02 −2.01 −.02
+ .33 +.33 + .33 +.33 + .13 +.14 + .19 +.20
−3.66 +0.16 +0.70 −3.85 −3.82
+19.569 +31.889 −7.230 −5.645
56 39.20 30.77 57 9.86 8.24
56 58.76 2.65 2.63 2.60
56 58.79 57 2.61 2.66 2.66 2.59

+2.70 +2.32 +2.86 +2.88
0 55 55 55
4 45.5 4 46.0 4 48.2 3 48.5 4 48.1 3 48.8
31.0 29.1 37.9 37.6 32.1 33.1
76.5 75.1 86.1 86.1 80.2 81.9
4 38.25 59 37.55 59 43.05 58 43.05 59 40.10 58 40.95

+24.95
+19.72 +19.16 +14.95 +22.76
1.29491 1.28240 1.39707 1.35717
1.30507 n 1.29256 n 1.40723 n ~~1.45833 n~~ 1.36733 n
−20.19 −19.61 −25.54 ~~−28.73~~ −23.30
4 38.25 59 37.55 59 43.05 ~~59 40.10~~ 59 40.10
4 18.06 59 17.94 59 17.51 59 16.80
+38°
18 30.29 23 30.41 23 30.84 23 31.55

+4 6 49 0.61750 +4 1 41 +4 1 38 0.60790
+3112 +4934 +1887 +3038
0.64822 0.66644 0.62677 0.63828

+− 4.45 +− 4.64 +− 4.23 +− 4.35
− .11 − .10 − .17 − .14
− .05 − .23 ∓ .19 ∓ .19

− 4.61 − 4.97 − 4.21 − 4.30
18 25.68 18 25.22 23 25.44 25.07 23 26.63 26.25 23 27.25 26.87
20 54.2 20 55.4 21 10.7 21 11.1
−2 28.5 −.46 28.0 −2 30.0 −.37 30.4 −2 15.9 −.38 16.3 −2 16.1 −.38 16.5
− 7.23
− 21.50 − 8.50 − 23.80 − 24.20
−2 30.07 −2 31.09 −2 16.82 −2 16.65
−2 51.57 − 21.50 −2 39.59 − 8.50 −2 40.62 − 23.80 −2 40.85 − 24.20
+38 15 34.11 −2 30.26 20 45.85 30.94 20 46.01 17.06 20 46.40 16.77
− 19 − 16 − 20 − 20
−2 51.95 −2 39.60 −2 41.06 −2 41.17
15 33.27 20 45.47 20 45.19 20 45.70
15 47.5

1872 1873 1873

β Persei

h m s
2 59 50
2 59 55
+40° 27′ ″
+40 27 52
n=+1 54 56
sin. z = +.03

tang δ = +.85
x = −.020
cos α = −.01

α 1872 = 50.803 δ = 27° 37.82″ dα = +3.876 dδ = +14.19
α 1873 = 54.679 δ = 27 52.01

1872	m s		1873	m s	
Dec. 6	59 54.58		Jan. 0	59 54.44	
11	57	1	5	.38	6
16	56	1	10	.31	7
21	53	3	15	.24	7
26	50	3	20	54.16	8
			25	.07	9
			30	53.97	10
			Feb. 4	.87	10
			9	53.47	10

1873	s	
Dec. 6	58.63	
11	.62	1
16	62	0
21	59	3
26	58.56	3

sin δ 9.81225
cos δ 9.88126
.11571
9.99697n

1872 Dec. 23	+.413 +.42	1873 Jan. 7	+.366 +.38	Jan. 9	+.335 +.33	Jan. 12	+.351 +.33	Jan. 14	+.356 +.35	Jan. 16	+.370 +.37
59 (15.1159	14.2	59 11.0	58 58.1	59 10.5	59 1.4	59 9.9	59 6.4	59 9.3	59 2.3	59 8.6	58 53.3
17.8	15.1	13.6	58.3	13.2	2.8	12.7	7.6	12.0	3.4	11.4	54.7
20.5	15.8	16.5	59 0.3	15.9	4.5	15.3	9.0	14.8	4.5	14.0	56.1
25.9	17.0	21.8		21.2		20.7		20.2		19.4	
28.7		24.4		23.9		23.4		22.8		22.2	
31.4		27.2		26.7		26.1		25.5		25.0	
34.1		29.4		29.4		28.9		28.3		27.6	
36.7		32.4		32.1		31.5		31.0		30.3	
42.0		38.0		37.5		37.0		36.3		35.7	
44.8		40.7		40.2		39.6		39.0		38.4	
47.5		43.5		42.8		42.4		41.8		41.1	
344.9		298.8		293.4		287.5		281.0		273.7	
31.318	59 15.52	27.164	58 59.23	26.673	59 2.90	26.136	59 7.67	25.545	59 3.40	24.882	58 54.70
59 31.30		59 27.14		59 26.65		59 26.12		59 25.53		59 24.86	
59 54.57		59 54.35		59 54.32		59 54.28		59 54.25		59 54.22	
−23.21		−27.21		−27.67		−28.16		−28.72		−29.36	
~~−23.24~~		~~−27.20~~		~~−27.66~~		~~−28.45~~		~~−28.71~~		~~−29.35~~	
+22.89 +.03		+26.92 +.01		+27.43 −.02		+27.87 −.02		+28.51 +.00		+29.04 +.01	
+.36	+.35	+.32	+.31	+.28	+.28	+.28	+.30	+.30	+.30	+.31	+.31
−3.71	+0.17	+0.33		+0.36		+0.40		+0.43		+0.46	
+19.546		+27.50		+28.05		+28.55		+29.24		+29.82	
59 31.30		27.14		26.65		26.12		25.53		24.86	
59 50.84		54.71		54.72		54.67		54.77		54.67	
59 50.86	59 54.74	54.71		54.70		54.67		54.77		54.68	
+2.70		+2.50		+2.47		+2.40		+2.39		+2.38	
50		50		50		50		50		50	
2 37.8		2 48.9		2 44.8		2 38.3		2 40.4		2 49.8	
23.0		34.2		32.2		23.9		31.1		37.2	
6.08		8.31		7.70		6.22		7.15		8.70	
52 30.40		52 41.55		52 38.50		52 31.10		52 35.75		52 43.50	
+15.80		+27.93		+23.77		+18.47		+22.14		+30.18	
1.19866		1.44607		1.37603		1.26647		1.34518		1.47972	
1.19563n		1.44304n		1.37300n		1.26344n		1.34215n		1.47669n	
−15.69		−27.74		−23.61		−18.34		−21.99		−29.97	
52 30.40		52 41.55		52 38.50		52 31.10		52 35.75		52 43.50	
52 14.71		52 13.81		52 14.89		52 12.76		52 13.76		52 13.53	
+40° 30′ 33.64″		30 34.54		30 33.46		30 35.59		30 34.59		30 34.82	
+1 54 46	0.28 ~~300~~ 410	+1 54 37	0.28340								
+31.15		+39.77		+25.95		+45.71		+23.76		+10.56	
0.33525		0.32317		0.30935		0.32911		0.30716		0.29396	
+− 2.07		+− 2.10		+− 2.04		+− 2.13		+− 2.03		+− 1.97	
− .07		− .20		− .14		− .09		− .13		− .23	
− .02		− .03		− .03		− .03		− .16		− .16	
− 2.16		− 2.33		− 2.21		− 2.25		− 2.32		− 2.36	
+40 30 31.48	30 31.23	30 32.21	31.99	30 31.25	31.04	30 33.34	33.14	30 32.27	32.06	30 32.46	32.24
27 59.6		28 0.8		28 1.0		28 1.1		28 1.2		28 1.2	
−2 31.9 −.25	32.2	−2 31.4 −.22	31.6	−2 30.2 −.21	30.4	−2 32.2 −.20	32.4	−2 31.1 −.21	31.3	−2 31.3 −.22	31.5
− 7.61											
−21.80		−8.80		−9.00		−9.10		−9.20		−9.20	
−2 30.07		−2 31.10		−2 31.29		−2 31.98		−2 31.05		−2 31.54	
−2 51.87 −	21.80	−2 39.90 −	8.80	−2 40.29 −	9.00	−2 41.08 −	9.10	−2 40.25 −	9.20	−2 40.74 −	9.20
+40 27 39.61 −2	30.26	27 52.31	30.94	27 50.96	31.51	27 52.26	32.27	27 52.02	31.46	27 51.72	31.65
+ .03 −	.08	+.07 −	.07	+.07 −	.07	+.07 −	.07	+.07 −	.07	+.07 −	.07
+40 27 39.64 −2	52.14	27 52.38 −2	39.81	27 51.03 −2	40.58	27 52.33 −2	41.44	27 52.09 −2	40.73	27 51.79 −2	40.92
	27 39.09		27 52.18		27 50.46		27 51.40		27 51.33		27 51.32

	1872	1873 ~~1872~~	1873
48 H Cephei tang δ = +4.42	Dec. 16 4^m 18.89	Jan 0 4^m 18.15	Dec. 16 26.27
h m s	21 .69 .20	5 17.84 31	21 .67 20
3 04 16	26 18.45 .24	10 17.50 34	26 25.84 23
3 04 17		15 17.13 37	
+77° 13' "		20 16.74 39	
+77 15 51		25 16.33 41	
z = -34 53 3		30 15.90 43	
sin. z = -.57		4	

δ x = -.069

corr α = +.10 +1''

α1872 = 10.062 δ = 15 37.03''

α1873 = 17.411 δ = 15 50.87

dα = +7.348

dδ = +1385

1872 Dec. 22 +.413 +42	1873 Jan. 1 +.500 +50	Jan. 12 +.351 +33	Jan. 14 +.356 +35	Jan. 16 +.370 +37	Jan. 19 +.412 +42
03 — 03 19.2	3 — 3 24.2	3 — 3 26.3	3 — 3 28.4	3 1.0	3 — 3 10.2
35.3 — 22.5	31.8 — 25.3	28.5	28.4 — 24.2	2.3	26.6 — 12.9
39.6 — 28.8	37.2	34.3	33.4	2.8	31.1 — 16.9
44.5	41.5	38.3	38.0	3 42.0	35.9
49.4	46.0	43.3	43.0	46.4	40.2
53.8	50.5	47.7	47.5	51.2	45.3
58.4	55.4	52.2	52.0		49.6
3.4	4 0.2	56.9	57.0		54.6
8.0	4.9	4 1.2	4 1.6		58.8
12.7	9.2	5.5	5.9		4 3.7
3051	2767	3179	3068	1396	3458
485.1	485.7	427.9	426.8		405.8
53.900 3 23.50	50.744 3 24.75	47.544 3 26.30	47.422 3 23.80	46.533 3 2.03	45.089 3 √13.00 3 13.33
3 53.83	3 50.68	3 47.48	3 47.35	3 46.46	3 45.02
4 18.59	4 18.07	4 17.34	4 17.18	4 17.03	4 16.84
-24.76	-27.39	-29.86	-29.83	-30.57	-31.78
-24.86	-27.49	-29.96	-29.93	-30.67	-31.88
+22.84 +.03	+25.04 +.00	+27.87 -.02	+28.51 +.00	+29.04 +.01	+30.05 +.01
+1.86 +1.82	+2.21 +2.21	+1.46 +1.55	+1.55 +1.57	+1.64 +1.63	+1.86 +1.82
-8.53 -1.18	-0.66	+0.07	+0.23	+0.38	+0.61
+16.21	+26.59	+29.40	+30.29 .31	+31.06	+32.52 49
3 53.83	50.68	47.48	47.35	46.46	45.02
4 10.05	17.27	(16.88)	17.64	17.52	17.54
4 10.04 4 17.39	17.27	(16.95)	17.66	17.52	17.51
+2.70	+2.60	+2.40	+2.39	+2.38	+2.34
5	5	5	5	5	5
0 13.8	0 10.8	0 8.2	0 4.5	0 8.4	0 9.0
57.1	55.9	52.8	4 53.9	55.3	4 55.8
130.9	126.7	121.0	118.4	123.7	124.8
5 5.45	5 3.35	5 0.50	4 59.20	5 1.85	5 2.40
+30.40					
~~+0.40~~	+25.99	+21.24	+23.62	+44.50	+31.76
1.48287	1.41481	1.32715	1.37328	1.64836	1.50188
0.94182n	0.87376n	0.78610n	0.83223n	1.10731n	0.96083n
-8.75	-7.48	-6.11	-6.80	-12.80	-9.14
5 5.45	5 3.35	5 0.50	4 59.20	5 1.85	5 2.40
4 56.70	4 55.87	4 54.39	4 52.40	4 49.05	4 53.26
+77° 17' 51.65''	17 52.48	17 53.96	17 55.95	17 59.30	17 55.09
-34 52 32 1.60320n	34 52 41 1.60330n				
+31.47	+40.29	+45.83	+24.08	+10.49	+30.71
1.63467n	1.64359n	1.64913n	1.62738n	1.61379n	1.63401n
+ 43.12	+ 44.01	+ 44.58	+ 42.40	+ 41.10	+ 43.06
- .10	- .07	- .05	- .07	- .29	- .12
- .00	.00	.00	- .30 .00	- .30 .00	- .30 .00
+ 43.02	+ 43.94	+ 44.53	+ 42.83	+ 40.86	+ 42.84
77 18 34.67 18 34.66	18 36.42 36.41	18 38.49 38.49	18 ~~37.98~~ 38.28 38.28	18 ~~39.86~~ 40.16 40.16	18 ~~37.73~~ 38.03 38.03
16 3.7	16 5.6	16 7.7	16 8.0	16 8.2	16 8.6
" -2 31.0 31.0	-2 30.8 30.8	-2 30.8 30.8	-2 30.0 30.0	-2 31.7 31.7	-2 29.1 29.1
+1.1 -2 29.9 -.01 29.9	-2 29.7 -.01 29.7	-2 29.7 .00 29.7	-2 28.9 -.00 28.9	-2 30.6 -.00 30.6	-2 28.0 -.00 28.0
- 12.85					
- 26.70	- 14.70	- 16.80	- 17.10	- 17.30	- 17.70
-2 30.07 - 26.70	-2 30.82 - 14.70	-2 31.98 - 16.80	-2 31.05 - 17.10	-2 31.54 - 17.30	-2 30.22 - 17.70
-2 56.77 -2 30.26	-2 45.52 30.86	-2 48.78 32.27	-2 48.15 31.46	-2 48.84 31.65	-2 47.92 30.49
+77 15 37.90 + 1.53	15 50.90 + 1.47	15 49.71 + 1.37	15 49.83 + 1.36	15 51.02 + 1.35	15 49.81 + 1.33
-.66 -2 55.43	-1.25 -2 44.09	-1.25 -2 47.70	-1.25 -2 47.20	-1.25 -2 47.60	-1.25 -2 46.86
+77 15 37.24 15 39.23	15 49.65 15 52.32	15 48.46 15 50.79	15 48.58 15 51.08	15 49.77 15 52.56	15 48.56 15 51.17
15					

Sin δ 9.98719
Cos δ 9.34324
,11571
9.45895 n

1872			1873			1873		
Dec. 16	77° 15′ 61.″8		Jan. 0	15′ 65.″4		Dec. 16	15′ 78.″3	
21	63.1	+1.3	5	66.4	+1.0	21	79.6	+1.3
26	64.4	1.3	10	67.3	.9	26	80.9	1.3
			15	68.1	.8			
			20	68.7	.6			
			25	69.2	.5			
			30	69.6	.4			
			Feb. 4	69.8	.2			
			9	69.8	.0			

1872.0 α	1872.0 δ	1873.0 α	1873.0 δ
10.04	37.24	17.27	49.65
		16.95	48.46
		17.66	48.58
		17.52	49.77
		17.51	48.56
		.60	47.98
		.66	49.17
		.38	49.96
10.040	37.24 +1.32	17.444	49.02 +1.53
.062	37.03	.411	50.57
−.022	+.21	+.033	−1.85
	+1.32		+2.50
	+1.53		+0.65

Dec. 16 +.21 +.221	Dec 18 +.16 +.179	Dec. 29 +.26 +.257
4 4 35.9 04	03 57.7	4 4 1.9
11.7	10.5 0.2	5.0
16.9	15.0 5.1	9.8
20.9	19.6	14.3
25.6	24.7	19.0
30.5	29.1	24.2
35.3	34.0	28.6
39.8	38.7	33.5
44.5	43.3	37.9
49.1	48.0	42.6
273.4	262.9	214.9
30.348 4 35.90	29.211 4 1.00	23.878 4 1.90
4 30.31	4 29.14	4 23.81
4 26.26	4 26.19	4 25.69
+4.05	+2.95	−1.88
+3.95	+2.85	−1.98
−4.85 +.01	−3.51 +.02	+0.71 +.01
+ .93 +.98	+ .71 +.79	+1.15 +1.13
~~+.885~~ −8.85	−8.78	−8.28
−12.781	−11.58 .48	−6.423
4 30.31	29.14	23.81
17.54	17.56	17.39
17.60	17.66	17.38
+2.85	+2.86	+2.94
5	5	5
0 0.2	0 9.0	0 6.4
50.3	4 57.5	55.2
110.5	126.5	121.6
4 55.25	5 3.25	5 0.80
−5.52	+28.21	+21.98
0.74194n	1.45040	1.34203
0.20089	0.90935n	0.80098n
+1.59	−8.12	−6.32
4 55.25	5 3.25	5 0.80
4 56.84	4 55.13	4 54.48
+77° 17′ 51.″51	17 53.22	17 53.87
−34 52 42		
+31.41	+19.07	+17.49
1.63471n	1.62237n	1.62079n
+ 43.12	+ 41.91	+ 41.76
− .01	− .09	− .05
+ .14 .00	+ .20 .00	+ .20 .00 ~~(all wrong after Jan. 12)~~
+ 43.25 11	+ ~~42.02~~ 41.82	+ 41.84

18 34.76 62	34.62 18 35.24	35.04 18 35.77 .58	35.58
16 18.4	16 18.9	16 21.7	
−2 16.4	16.4 −2 16.3	16.3 −2 14.1	14.1
−2 15.3 −.00	15.3 −2 15.2 −.00	15.2 −2 13.0 −.00	13.0
−27.50	−28.00	−30.80	
−2 17.03 −	27.50 −2 16.82 −	28.00 −2 13.77 −	30.80
−2 44.53 −2	17.39 −2 44.82	17.06 −2 44.57	14.12
15 49.23 +	1.62 15 50.42 +	1.63 15 51.21 +	1.67
−1.25 −2	43.27 −1.25 −2	43.43 −1.25 −2	43.25
15 47.98 15	51.35 15 49.17 15	51.61 15 49.96 15	52.33

Gr. 2213 = 51
h m s
04 14
15 04 15
84 26
+ 84° 26' 14"
95 33 46
ʒ = −53 10 58
− .80

Red.
d
4247
3185
2.123
10.61

A.,
8490
106.15
127.42

Sin δ 9.99795 Tang δ' = −10.268
Cos δ 8.98679 K = + .158
.11571
9.10250

Sec. Red. to app. place in α and δ

? 1872 Dec 23 +.413	1873 Jan. 1 +.500	Jan. 7 +.366	Jan. 9 +.335	Jan. 14 +.356	Jan. 19 +.412
04 0[4] 19.5 27.1 271 25.0 38.6 280 29.2 49.6 284 59.9 281 12.6 30.1	4 — 4 58.0 — — — — — 38.1 16.9 51.2 19.4 5 1.8 18.8	4 26.4 15.8 36.2 15.0 — —	4 26.5 — 28.2 — 30.5 3 53.2 14.4 4 5.3 15.9 15.7 14.7 25.7 15.1 36.0 14.8 46.6 14.8 57.3 14.8	4 48.0 −10.61 4 36.5 25.9 46.1 24.9 57.3 25.5 5 5.7 23.2	4 59.4 5 5.2 10.3 4 25.2 14.6 35.9 14.7 46.5 14.7 56.8 14.3
4 28.34 5 24.57	4 18.37 4 58.00	4 15.40	4 15.07 4 28.40	4 14.24 4 48.00	4 14.58 5 4.97
4 28.50	4 18.53	4 15.56	4 15.23	4 14.40	4 14.74
+22.92	+25.04	+26.93	+27.41	+28.51	+30.06
−4.24	−5.13	−3.76	−3.44	−3.66	−4.23
+11.91	+4.28	+3.18	+2.80	+1.79	+0.73
4 59.07	4 42.72	4 41.91	4 42.08	41.04	4 41.30

+2.70	+2.60	+2.50	+2.47	+2.39	+2.34
45	45	45	45	45	45
3 15.1	3 10.8	3 10.2	2 59.9	2 58.9	3 6.0
1.1	57.1	1.8	49.2	51.2	54.7
1 16.2	12.79	1.20	10.91	11.01	12.07
48 8.10	48 3.95	48 6.00	47 54.53	47 55.05	48 0.35
−56.23	−39.63		−13.33	−23.15	−50.39
1.74997n	1.59802n		1.12483n	1.36455n	1.70234n
0.85247n	0.70052n		0.22733n	0.46705n	0.80484n
−7.12	−5.02		−1.69	−2.93	−6.38
48 8.10	48 3.95		47 54.53	47 55.05	48 0.35
47 50.88	47 58.93		47 52.84	47 52.12	47 53.97
~~+95 34 57.47~~ +95 34 57.47	34 49.42		34 55.51	34 56.23	34 54.38
−53 9 46 1.88480n	−53 9 38				
+31.47	+40.29	+39.96	+26.06	+24.08	+30.71
1.91627	1.92509	1.92476	1.91086	1.90888	1.91551
.01	.01	.01	.01	.01	.00
+ 1 22.46	+ 1 24.16	+ 1 24.09	+ 1 21.44	+ 1 21.07	+ + 1 22.32
+ .17	+ .08	+	+ .01	+ .03	+ .13
− .03 −.31	− .03 −.24	− .03 −.25	− .03 −.23	− .17 −.23	− .18 −.24
+1 22.61	+1 24.22		+1 21.43	+1 20.94	+1 22.27
95 36 20.08 36 19.77	36 13.64 13.40		36 16.94 16.71	36 17.17 16.94	36 16.65 16.41
+	+ 15.64		+ 17.57	+ 18.58	+ 19.46
−2 30.07	−2 30.82		−2 31.29	−2 31.05	−2 30.22
	−2 15.18		−2 13.72	−2 12.47	−2 10.76
	33 58.48		34 3.22	34 4.70	34 5.89
h m s −2 30.26 15 4 38+ 2.15 ° ' " " +84 26 11 9	− 15.64 −2 30.86 + 2.07 −2 44.43 33 28.97	30.94 + 2.00	− 17.57 31.51 + 1.98 −2 47.10 33 29.61	− 18.58 31.46 + 1.91 −2 48.13 33 28.81	− 19.46 30.49 + 1.87 −2 48.08 33 28.33

δ

~~α 1872 = 4^m $59^s.090$~~

33 28.66 26 31.34 α 1873 = 4 41.762

Dec. 18 +1.79
05 10.2

Dec. 29
5 9.4
23.2
26.4
32.0

Rej. Dans. moluc. ? out

0.5 59.1 34.2
20.5 34.4
41.0 33.9

5
4.3
16.7

34 19 5 10.20
4 34.33
− 3.49
− 1.84
+ 12.60

4 41.60

+2.86
45
3 7.2
57.8
125.0
48 2.50

45
3 7.3
58.9
26.2
48 3.10

− 36.03
1.55666n
0.65916n
− 4.56
48 2.50
47 57.94

34 50.41

− 53 9 41
+ 19.07
1.90387
.00
+1 20.14
+ .07
+ .12 −.24

+1 20.33
36 10.74 10.50
+ 28.14
− 2 16.82
− 1 48.68

− 28.14
− 2 17.06
+ 2.28
− 2 42.92
33 27.58

ζ Arietis N.A. Tan δ = +0.384

h m s
3 7 33
3 07 36
+ 20° 34′ ″
+ 20 34 21
2 = +21 48 27
+ .37

x = − .016

h m s
α1872 3 7 32.832
δ1872 20 34 7.24

α1873 3 7 36.269
δ1873 20 34 20.89

Sin δ 9.54567
Cos δ 9.97140
.41157
.08711n

1872 Dec. 23	+.413	1873 Jan. 1	+.500	Jan. 12	+.351	Jan. 14	+.356	Jan. 16	+.370	Jan. 19	+.412
06 59.8	06 56.1	6 57.8	6 51.6	6 54.8	6 44.3	6 54.2	6 41.0	6 53.4	6 41.2	6 52.5	6 47.4
2.0	57.8	59.8	53.0	57.0	45.5	56.3	42.0	55.6	42.5	54.7	48.4
4.3	59.1	7 2.0	54.8	59.3	46.7	58.6	43.0	57.8	43.6	57.0	49.5
8.8		6.5		7 3.6		7 2.8		7 2.1		7 1.3	
10.9		8.8		5.7		5.0		4.4		3.4	
13.2		10.7		7.8		7.2		6.6		5.6	
15.3		12.9		10.2		9.4		8.8		7.8	
17.4		15.3		12.4		11.8		11.0		10.0	
21.8		19.7		16.7		16.1		15.5		14.5	
24.1		21.8		19.1		18.3		17.6		16.7	
26.3		24.1		21.2		20.4		19.7		18.9	
203.9		239.4		217.8		260.1		252.5		242.4	
143.9		119.4		84.8		80.1		72.5		62.4	
13.082	6 57.67	10.855	6 53.13	7.982	6 45.50	7.282	6 42.00	6.591	6 √42.10	5.693	6 4843
7 13.07		10.84		7.97		7.27		6.58	6 42.43	5.66	
+22.92		+25.04		+27.85		+28.51		+29.05		+30.06	
+.15		+.18		+.13		+.13		+.14		+.15	
−3.30		+0.18		+.28		+.30		+.32		+.36	
7 32.84		7 36.24		7 36.23		7 36.21		7 36.09		7 36.23	

+270		+260		+240		+2.39		+2.38		+2.34	
45		45		45		45		45		45	
0 57.2		0 57.8		1 2.9		1 6.9		1 6.9		0 57.8	
41.1		43.2		46.0		55.2		51.9		41.7	
98.3		101.0		108.9		122.1		118.8		99.5	
45 49.15		45 50.50		45 54.45		46 1.05		45 59.40		45 49.75	
+15.41		+17.72		+22.48		+25.28		+24.16		+17.24	
1.18780		1.24846		1.35180		1.40278		1.38310		1.23654	
1.27491n		1.33557n		1.43891n		1.48989n		1.47021n		1.32365n	
−18.83		−21.65		−27.47		−30.89		−29.53		−21.07	
45 49.15		45 50.50		45 54.45		46 1.05		45 59.40		45 49.75	
45 30.32		45 28.85		45 26.98		45 30.16		45 29.87		45 28.68	
+20° 37′ 18.03″		~~37 24.50~~ 19.50		37 21.37		37 18.19		37 18.48		37 19.67	
+21 48 1	1.36230	+21 47 52									
+31.47		+40.29		+45.83		+24.08		+10.49		+30.71	
1.39377		1.40259		1.40813		1.38638		1.37279		1.39301	
+− 24.76		+− 25.27		+− 25.59		+− 24.34		+− 23.59		+− 24.72	
− .04		− .06		− .08		− .11		− .10		− .05	
− .01	−.08	− .01	−.06	− .01	−.07	− .06	−.08	− .05	−.08	− .05	−.06
− 24.81		− 25.34		− 25.68		− 24.52		− 23.74		− 24.82	
20 36 53.22	36 53.14	36 54.16	54.10	36 55.69	55.62	36 43.67	53.67 53.59	36 44.74	54.74 54.66	36 44.85	54.85 54.79
34 24.10		34 24.20		34 24.10		34 24.0		34 24.0		34 23.9	
− 16.90		− 3.3		− 3.2		− 3.1		− 3.1		− 3.0	
−2 30.07		−2 30.82		−2 31.98		−2 31.05		−2 31.54		−2 30.22	
−2 46.97		−2 34.1		−2 35.2		−2 34.1		−2 34.6		−2 33.2	
34 06.25	− 16.90	34 20.06	− 3.30	34 20.49	− 3.20	34 20.67	− 3.10	34 20.14	− 3.10	34 21.65	− 3.00
	−2 30.26		30.86		32.27		31.46		31.65		30.49
	− 1.50		− .96		− .89		− .88		− .88		− .86
	−2 48.16		−2 35.12		−2 36.36		−2 35.44		−2 35.63		−2 34.35
	34 4.98		34 18.98		34 19.26		34 18.15		34 19.03		34 20.14

Feb. 1 +330	Dec. 16 +221		Dec. 18 +179		Dec. 29 +257	
6 50.7	7 31.2	7 22.6	07 30.0	07 25.2	7 25.7	7 12.2
53.0	33.5	23.9	32.3	26.3	27.7	13.4
55.1	33.6	25.0	34.4	27.6	30.0	14.5
59.3	40.0		38.8		34.5	
7 1.7	42.2		41.0		36.7	
3.9	44.5		43.2	08 20.5	39.0	7 55.3
6.1	46.8		45.5	21.8	40.2	56.5
8.3	48.9		47.7	23.0	43.4	57.5
12.8	53.2		52.1		47.6	
15.1	55.4		54.2		49.9	
17.7	57.6		56.6		52.2	
283.1	488.9		475.8		427.1	
43.1						
3.918	44.445	7 23.83	43.2557	7 26.37	38.827	7 13.37
3.90	44.43		43.24	8 21.77	38.81	7 56.43
+31.83	−4.84		−3.49		+0.72	
+ .12	+ .08		+ .07		+ .10	
+ .54	−3.53		−3.52		−3.46	
7 36.39	7 36.14		7 36.30		7 36.17	

+233	+285		+286		+294	
	45		45	40	45	
	1 0.7		0 54.9	4 47.1	1 7.30	0 14.7
	48.5		43.2	35.7	56.2	4.3
	109.2		98.1	82.8	123.5	19.0
	45 54.60		45 49.05	44 41.40	46 1.75	45 9.50
	+20.61		+16.88		+25.46	
	1.31408		1.22737		1.40586	
	1.40119n		1.31448n		1.49297n	
	−25.19		−20.63		−31.11	
	45 54.60		45 49.05		46 1.75	
	45 29.41		45 28.42		45 30.64	
	37 18.94		37 19.93		37 17.71	
	+21 47 50					
	+31.41		+19.07		+17.49	
	1.39371		1.38137		1.37979	
	+− 24.76		+− 24.10		+− 23.98	
	− .08		− .05		− .11	
	+ .03	−.07	+ .03	−.06	+ .04	−.08
	− 24.81		− 24.08		− 24.05	
	36 54.13	54.06	36 55.85	55.79	36 53.66	53.58
	34 40.4		34 40.4		34 40.5	
	−19.5		−19.5		−20.0	
	−2 17.03		−2 16.82		−2 13.77	
	−2 36.5		−2 36.3		−2 33.8	
	34 17.63		34 19.55		34 19.86	
		− 19.50		− 19.50		− 20.00
		−2 17.39		17.06		14.12
		− 1.05		− 1.05		− 1.08
		−2 37.94		−2 37.61		−2 35.20
		34 16.12		34 18.18		34 18.38

BAC 35058 = F = 1 11 hr. Im.
~~1 70 Hor. Inn. Ep.~~

Sin δ 9.96665 Tang δ = −2.453
Cos δ 9.57669 κ = +.039
.11571
9.69240

h m s
15 ~~8~~ 13 08
~~15 15 16~~
° ′ ″
67 49 40
+ ~~49 24 24~~
112 10 20
n = −69 47
− .94

Δα = −.03
Δδ = −0.6

α 1872 = 10.669 δ = 49 59.52 = 10 0.48 dα = +0.659
dδ = −13.73
α 1873 = 11.328 δ = 49 45.79 = 10 14.21

1872 Dec 23 +.413		ch. failed Dec 30	1873 Jan 12 +.351		Jan 14 +.356		Jan 19 +.412		Dec. 16 +.221	
12? 36.1	12 19.4	12	12	11 42.1	12	11 27.3	12	11 11.5	13	12 34.8
39.0	23.0		31.9	43.5	31.8	32.5	30.4	14.2	3.8	36.5
41.7	25.0		35.2	45.8	34.5	36.3	33.3	18.4	6.8	40.8
44.3			37.7		37.2		36.1		9.4	
47.0			40.3		39.6		38.7		12.2	
49.7			43.0		42.4		41.3		14.8	
52.7			45.4		45.0		44.1		17.5	
55.4			48.6		47.6		46.8		20.2	
58.0			51.2		50.5		49.3		23.0	
			54.0		53.3		52.3		25.9	
423.9			3873		3819		3723		1336	
47.100	12 22.47		48.033	11 43.80	42.433	11 32.03	41.367	11 14.70	14.844	12 37.03 12 37.37
12 47.14			12 48.07		12 42.47		12 41.41		13 14.89	
+22.92			+27.85		+28.51		+20.06		−4.84	
−1.01			±.86		±.87		−1.01		−.54	
+1.75			+1.31		+1.25		+1.10		+1.74	
13 10.80			13 11.37		13 11.47 36		13 11.56		13 11.25	

+2.70		+2.40	+2.39	+2.34	+2.85
10	10	10	10	10	10
31.8	2 6.0	2 16.1	1 58.1	1 53.0	2 20.7
22.0	50.9	4.1	52.2	45.8	15.2
53.8	1169	202	1103	988	359
12 26.90	11 58.45	12 10.10	11 55.15	11 49.40	12 17.95
+2463		+5923	+7040	+8667	+3747
1.39146		1.77254	1.84757	~~1.83787~~ 1.93787	1.57368
1.08386		1.46494	1.53997	~~1.53027~~ 1.63027	1.26608
+12.13		+29.17	+34.67	~~+33.90~~ +42.68	+18.45
12 26.90		12 10.10	11 55.15	~~11 49.40~~ 11 49.40	12 17.95
12 39.03		12 39.27	12 29.82	12 32.08	12 36.40
° ′ ″ +2 112 10 9.32		10 9.08	10 18.53	10 16.27	10 11.95
−69 45 00 2.18974n		−69 44 58			−69 45 3
+3180		+4595	+2440	+3075	+3187
2.22154n		2.23569n	2.21414n	2.28049n	2.22161n
+ .12		+ .14	+ .06	+ 2 .10	+ .04
+2 46.55		+2 52.06	+2 43.73	+2 46.15	+2 46.58
+ .12		+ .67	+ .44	+ 1.43	+ .27
− .02 −.24		− .02 −.18	− .11 −.15	− .11 −.14	+ .07 −.18
+2 46.77		+2 52.85	+2 44.62	+2 47.57	+2 46.96
2 112 12 56.09 12 55.85		13 1.93 13 1.75	13 3.15 3.00	13 3.84 3.70	12 58.91 12 58.73
~~+~~ 25.33		−+ 17.78	~~+~~ − 18.02	~~+~~ − 18.58	~~+~~ − 25.55
+0.6 −2 36.07 −2 55.40		−2 31.98 −2 49.76	−2 31.05 −2 49.07	−2 30.22 −2 48.80	−2 17.03 −2 42.58
~~−2 44.4~~		~~−2 14.20~~	~~−2 13.03~~	~~−2 11.64~~	~~−1 51.48~~
112 10 51.35 10 0.69		~~10 47.73~~ 10 12.17	~~10 50.12~~ 10 14.08	~~10 52.90~~ 10 15.04	10 16.33
− 25.33		− 17.78	− 18.02	− 18.58	− 25.55
h m s −2 30.26		30.27	31.46	30.49	17.39
15 13 10 + 2.51		+ 2.23	+ 2.22	+ 2.17	+ 2.65
° ′ ″ −2 53.08		−2 45.82	−2 47.26	−2 46.90	−2 40.29
+67 49 21 10 2.77		10 15.93	10 15.74	10 16.80	10 18.44

Dec. 18 +179
13 12 36.5 12
2.7 40.1
5.4 42.8
8.1
10.9
13.6 13 29.0
16.6
19.0
22.0
24.0

1223

13.589 12 39.83
13 13.63 13 29.00
− 3.48
− .44
+ 1.66 :

13 11.37

Dec. 29 +.257
12 12 22.9
59.2 24.9
13 1.7 31.0
4.3 33.5
7.7
10.3
12.7
15.6
18.2
21.4

1511
91.0
10.111 12 √28.08
13 10.15
+ 0.72
− .63
+ 1.178

13 11.42

+.286
10 13
2 22.0
5.9
2.79
12 13.95

+ 3376
1.52840
1.22080
+ 16.63
12 13.95
12 30.58

10 17.77

+ 1917
2.20891
+ .05
+ 2 41.77
+ .22
+ .09 −.18

+ 2 42.13
12 59.90 59.72
− + 26.26
− 2 16.82 − 2 43.08
~~— 1 52.56~~ − 10 16.82

− 26.26
− 2 17.06
+ 2.65
− 2 40.67
10 19.05

+294
10
2 15.7
11.1
2.68
12 13.40

+ 4203
1.62356
1.31596
+ 20.70
12 13.40
12 34.40

10 13.95

+ 1749
2.20723
+ .05
+ 2 41.15
+ .34
+ .09 −.18

+ 2 41.63
12 55.58 55.40
− + 29.91
− 2 13.77 − 2 43.68
− 1 ~~42.86~~ − 10 11.90

− 29.91
14.12
+ 2.73
− 2 41.30
10 14.10

1873

α Persei.

h	m	s
3	15	10
3	15	16
+ 49°	14'	"
+ 49	24	24

z = −7 1 36

sin. z = −.12

tang δ = +1.17

x = −.023

cos α = −.~~10~~

α 1872 = 11.698

α 1873 = 15.947

δ 1872 = 24' 11.27"

δ 1873 = 24 24.42

1873 1872.0	m	s	
Jan. 0	15	15.84	
5		.77	7
10		15.69	8
15		.60	9
20		15.51	9
25		.40	10
30		15.29	12
Feb. 4		.17	12
9		15.05	12

	m		
Dec. 16	15	20.48	
21		.38	2
26		20.33	5

dα = +4.249
dδ = +13.15

sin δ 9.88040
cos δ 9.81343
.11571
9.92914 n

Rej. only 2 obs. this date

Ch. failed 1872 Dec. 30	1873 Jan. 1 +.50	+.500	Jan. 4 +.36	+.356	Jan. 6 m = +.36	+.350	Jan. 14 +.35	+.356	Feb. 1 +.45	+.330
	14 31.1	14 39.1	14 30.2	14 38.7	14 29.7	14 24.7	14 27.6	14 22.6	14 23.9	14 17.5
	34.4	41.1	33.2	40.1	32.8	25.8	30.8	24.0	27.2	19.2
	34.6	42.7	36.6	41.2	36.0	26.8	34.0	25.9	30.3	21.0
	43.8		42.6		42.3		40.3		36.6	
	46.9		45.9		45.6		43.5		39.8	
	50.8		49.2		48.7		46.6		42.9	
	53.4		52.4		51.8		49.8		46.2	
	56.4		55.5		55.0		53.0		49.5	
	15 2.8		15 1.7		15 1.2		59.3		53.5	
	6.0		5.0		4.5		15 2.6		59.0	
	9.2		8.2		7.7		5.8		15 2.0	
	371.6		360.5		355.3		393.3		412.9	
	551.6		540.5		535.3		513.3		472.9	
	50.145	14 40.97	49.136	14 40.00	48.664	14 25.77	46.664	14 24.17	42.991	14 19.23
	14 50.12		14 49.11		14 48.64		14 46.64		14 42.97	
	15 15.82		15 15.78		15 15.75		15 15.61		15 15.24	
	−25.70		−26.67		−27.11		−28.97		−32.27	
	~~−25.60~~		~~−26.67~~		~~−27.01~~		~~−28.87~~		~~−32.17~~	
	+25.04 +00		+26.20 +02		+26.63 +00		+28.51 +00		+31.80 +02	
	+ .59	+.59	+ .42	+.42	+ .42	+.41	+ .41	+.42	+ .53	+.38
	+0.13	4.38	+0.17		+0.20		+0.34		+0.71	
	+25.76		+26.~~79~~81		+27.2~~8~~4		+29.2~~8~~7		+~~32.04~~ 32.91	
	14 50.12		49.11		48.64		46.64		42.97	
	15 15.88		15.90		15.89		15.90		16.01	
	15 15.88		15.92		15.88		15.91		15.88	
	+2.60		+2.56		+2.51		+2.39			
55	55		55		55		55		55	
1 14.0	1 4.0		1 2.2		1 14.2		1 10.8		1 14.3	
56.2	50.9		49.8		2.2		2.0		1.5	
1 130.2	114.9		112.0		16.4		12.8		15.8	
56 5.10	55 57.45		55 56.00		56 8.20		56 6.40		56 7.90	
	+9.17		+9.14		+22.89		+22.49		+23.76	
	0.96237		0.96095		1.35965		1.35199		1.37585	
	0.89151 n		0.89009 n		1.28879 n		1.28113 n		1.30499 n	
	−7.79		−7.76		−19.44		−19.11		−20.18	
	55 57.45		55 56.00		56 8.20		56 6.40		56 7.90	
	55 49.66		55 48.24		55 48.76		55 47.29		55 47.72	
+ 49°	26' 58.69"		27 0.11		26 59.59		27 1.06		27 0.63	
	−7 1 47	0.85140 n								
	+40 47		+25 68		+30 49		+24 73			
	0.89187 n		0.87708 n		0.88189 n		0.87613 n			
	+ 7.80"		+ 7.53		+ 7.62		+ 7.52			
	− .03		− .03		− .14		− .13		− .15	
	− .01		− .01		− .01		− .07		− .05	
	+ 7.78 6		+ 7.49		+ 7.47		+ 7.32			
+49	27 6.47 5	27 6.38	27 7.60	7.53	27 7.06	6.97	27 8.38	8.29	24 36.8	
	24 34.8		24 35.2		24 35.4		24 36.1			
	−2 31.7 −.07	31.8	−2 32.4 −.07	32.5	−2 31.1 −.09	31.2	−2 32.3 −.09	32.4		
	−10.40		−10.80		−11.00		−11.70		−12.40	
	−2 30.82		−2 31.35		−2 31.66		−2 31.05			
	−2 41.22 −	10.40	−2 42.15 −	10.80	−2 42.66 −	11.00	−2 42.75 −	11.70		
+49	24 25.23 −2	30.86	24 25.45 −2	31.44	24 24.90	31.76	24 25.63	31.46		
	−.26 +	31	−.26 +	30	−.26 +	30	−.26 +	28		
+ 49	24 24.97 −2	40.95	24 25.19 −2	41.94	24 24.14 −2	42.46	24 25.37 −2	42.88		
		24 25.43		24 25.59		24 24.51		24 25.41		

1873		′	″	
Jan	0	24	34.7	
	5		35.3	+.6
	10		35.8	.5
	15		36.2	.4
	20		36.5	.3
	25		36.7	.2
	30		36.8	.1
Feb.	4		36.8	.0
	9		36.8	.0

1873		′	″	
Dec.	6	24	46.7	
	11		47.6	+.9
Dec.	16		48.4	.8
	21		49.2	.8
	26	24	50.0	.8

1872.0

α	1873.0 δ
15.88	24.97
.92	25.19
.88	24.14
.91	25.37
~~.88~~	24.38
.90	25.48
.95	25.23
.92	
15.909	24.97 +.52
.947	24.42
−.038	+.55
	+.52
	+1.07

Dec. 16 +.221 +.21	Dec. 18 +.179 +.16	Dec 29 +.257 +.26
15 6.0 14 53.8	15 4.8 14 49.2	15 0.3 14 53.5
9.1 53.8	8.0 50.7	3.4 54.8
12.4 57.4	11.0 52.7	6.5 56.3
18.6	17.2	13.0
21.9	20.5	16.0
25.0	23.7 16 5.9	19.4 15 42.2
28.0	26.8 7.6	22.4 44.0
31.2	30.0 9.3	25.7 46.0
37.6	36.4	31.9
40.7	39.5	35.0
43.9	42.6	38.3
274.4	260.5	211.9
24.945 14 55.67	23.682 14 50.87 16 7.60	19.264 ~~14~~ 14 ~~54.53~~ 54.87 15 44.07
15 24.92	15 23.66	15 19.24
15 20.40	15 20.39	15 20.30
+4.52	+3.27	−1.06
~~+4.62~~	~~+3.37~~	~~−0.96~~
−4.84 +.01	−3.50 +.02	+0.72 +.01
+ .25 +.26	+ .19 +.21	+ .30 +.30
−4.45	−4.44	−4.35
−9.04 .02	−7.75 .1	−3.33 2
15 24.92	23.66	19.24
15.~~96~~ .88	15.91	15.91
15.~~98~~ .90	15.95	15.92
+2.85	+2.86	+2.94
55	55	55
1 19.2	1 20.80 16.2	1 14.80 33.1
10.8	12.1 7.7	7.2 25.4
30.0	32.9 23.9	22.0 55.5
56 15.00	56 16.45 55 11.95	56 11.00 55 29.25
+ 29.27	+ 32.81	+24.39
+ ~~28.27~~	+ ~~22.81~~	~~+14.39~~
1.46642	1.51601	1.38721
1.39556n	1.44515n	1.31635n
−24.86	−27.87	−20.72
56 15.00	56 16.45	56 11.00
55 50.14	55 48.58	55 50.28
26 58.21	26 59.77	26 58.07
−7 1 49		
+3233	+1927	+1749
0.88373∼	0.87067∼	0.86889∼
+ 7.65	+ 7.42	+ 7.39
− .23	− .30	− .15
+ .04	+ .05	+ .05
+ 7.46	+ 7.17	+ 7.29
27 5.67 5.57	27 6.94 6.84	27 5.36 5.26
24 48.4	24 48.8	24 50.5
−2 17.3 −.00 17.4	−2 18.1 +.10 18.2	−2 14.9 −.10 15.0
−24.00	−24.40	−26.10
−2 17.03	−2 16.82	−2 13.77
−2 41.03 − 24.00	−2 41.22 − 24.40	−2 39.87 − 26.10
24 24.64 2 17.39	24 25.74 17.06	24 25.49 14.12
−.26 + .34	−.26 + .34	−.26 + .35
24 24.38 −2 41.05	24 25.48 −2 41.12	24 25.23 −2 39.87
24 24.52	24 25.72	24 25.39

B A C 5140 = 5'2
Uti Min.
h 18m 58s
3 ~~19 26~~
15 18 58
87° 43' "
+ 87 43 06
92 16 54
δ = −49 54 6
− .76

Red.
1 43.6
1 17.7
51.8
25.9
0.0

Sin δ 9.99966 Tang δ = −25.264
−25.227
Cos δ 8.60033
11571
8.71604

k = + .384

α 1872 = 19m 25.180s
α 1873 = 19 3.865
δ 1872 15' 37.50" 44' 22.50"
1873

1872 Dec. 23 +413
17 44.3
58.0
18 9.6 35.5
33.0 35.0
2.4 36.5
28.0 36.2
53.2 35.5
20 20.2 36.6
18 35.88 17 51.15
18 36.26
+22.92
−10.43
+36.43
19 25.18

Ch failed Dec. 30

1873 Jan. 1 +500
17 16 49.4
50.5
49.0
18 12.9
48.8
19 14.7
30.6
139.0
195.0
18 39.80 16 49.95
18 40.18
+25.04
−12.60
+10.80
19 3.42

Jan. 6 +350
17
48.1
18 10.8
37.1
19 2.3
28.2
126.5
186.5
18 37.30 17 44.70
18 37.68
+26.63
−8.80
+8.80
19 4.31

17 43.6
44.3
46.2

Dec. 16 +221
17 42.5 26.1
18 7.8 25.5
32.8 24.6
59.6 25.5
19 25.42
19 25.80
−4.83
−5.57
+37.41
17 46.5
49.0
53.0
17 49.50

Reg. Wormy #

+270
0
4 28.3
14.8
43.1
4 21.55
+44.73
1.65060
0.36664
+2.33
4 21.55
4 23.88
92° 17' 18 24.47"
−49 53 5 1.83400n
+32.12
0.86612n
+ .01
+ 7.35
+ .04
− .04 −.43
+ 7.36
92 18 31.83 18 31.40
− * 25.66
−2 30.07 −2 55.73
~~−2 4.41~~
92 16 ~~2.42~~ 15 36.10 Sw.
* 25.66
−2 30.26
+ 2.02
−2 58.90
15 ~~34.50~~

+260
0
4 22.5
10.5
33.0
4 16.50
+109.85
2.04082
0.75686
+5.71
4 116.50
4 22.21
17 18 26.14
−49 53 5
+40.47
0.87487n
+ .01
+ 7.49
+ .26
− .04 −.34
+ 7.72
18 33.86 33.52
− * 15.29
−2 30.82
−2 ~~15.53~~ −2 46.11
16 ~~18.33~~ 15 47.55 Ci.
* 15.29
30.86
+ 1.95
−2 44.20
~~15 49.32~~

+251
0
4 16.6
6.7
23.3
4 11.65
+52.60
1.72099
0.43703
+ 2.74
4 11.65
4 14.39
17 18 33.96
+30.49
0.86449n
+ .01
+ 7.32
+ .06
− .04 −.34
+ 7.35
18 41.31 40.97
− * 16.55
−2 31.66
~~−2 15.11~~ −2 48.21
16 ~~21.20~~ 15 53.10 Sw.
* 16.55
31.76
+ 1.88
−2 46.43
~~15 54.54~~

+95.92
1.98191
0.69795
+4.99
+10.35
0.84435n
+ .00
+ 6.99
+ .20

~~1873~~
1872.0

γ2 Urs. Min.　Tang δ = −3.13　Jan. 0　20m 54s.69
h m s　δ x = +.049　5　54.99 .30
3 21 00　10　55.32 .33
15 20 54
72° 18′ ″　cos x = −.10
+ 72 17 09
107 42 51　α 1872 = 57.129　δ = 17′ 22″.08 = 42′ 37″.92 =　dα = −0.135
η = −65 20 3　dδ = −12.81
−.91　α 1873 = 56.994　δ = 17 9.27 = 42 50.73 = 17 9.27

Sin δ　9.97890
Cos δ　9.48332　16′ 54″.5
.11571　53.2　−.13
9.59903　51.8　.14

1873　+500　+350
Jan. 1　~~+50~~　Jan. 6　.34　Ch. f.　Dec. 16

20	20 16.5	20	19 55.9
17.6	26.2	15.7	58.4
21.0	28.9	19.1	20 0.7
24.3	33.5	22.7	
27.8		25.8	
31.2		29.2	
34.6		32.6	
37.8		35.9	
40.8		39.4	
44.2		42.8	

2793　2632
31.033　20 √2628　29.244　19 58.33

20 31.08　20 29.29
20 54.74　20 55.04
−23.66　−25.75
−23.56　−25.65

+ 25.04 +00　+ 26.63 +00
− 1.57　−1.57　− 1.13　−1.09
+ 2.25　+ 1.95
+ 25.72　+ 27.45 9
20 31.08　29.29
20 56.80　56.74
20 56.80　56.78

+2.60　+2.51
35　35　35
4 36.7　4 18.3　4 13.8
25.1　7.5　5.8
1 61.8　25.8　19.6
39 30″.90　39 12.90　39 9.80

+ 4.75　+ 30.91
0.67669　1.49010
0.27572　1.08913
+ 1.89　+ 12.28
39 30.90　39 12.90
39 32.79　39 25.18

+ 107° 43′ 15″.56　43 23.17

−65 17 56　2.09523 n
+ 40.57　+ 30.62
2.13579 n　2.12584 n
+ .06　+ .04
+ 2 16.71　+ 2 13.61
+ .00　+ .15
− .04　− .04

+2 16.73　+2 13.66
+107　45 32.29　45 31.93　45 36.83　36.59
43 5.7　43 7.0
− 2 26.6　− .36　27.0　− 2 29.89　− .34　~~28.3~~ 30.2

− 15.00　− 16.30
− 2 30.82　− 2 31.66
− 2 45.82　− 15.00　− 2 47.96　− 16.30
+107 42 46.47　− 2 30.86　42 48.94　31.76
+ 2.36　+ 2.28
− 2 43.50　− 2 45.78
42 48.43　42 50.81

Gr. 642 = 5.3 Tangl = +15.243 Sin δ = 9.99906

h m s

3 23 57 k = −.234 Cos δ = 8.81752

3 23 56 11571

86° 16′ ″ 8.93323n

86 13 55

z = −43 57 7

Sin z −0.69

α 1872 = 24ᵐ 48.ˢ470

α 1873 = 25 7.347 14′ 28.″48

1872 +.534 Dec.10	1873 +.500 Jan.1		Jan.6 +.350		Jan.28 +.384		Ch.f. Dec.16
23 36.3	23 38.1	22 9.8	23 35.1	22 57.3	23 27.5	23 59.5	
54.0	53.3	26.0	52.1	23 6.4	43.2		
10.6	24 8.5	36.2	24 8.5	28.0	57.6		
26.7	23.8		25.3		24 12.8		
41.6	40.7		39.2		30.0		
57.3	55.0		56.6		46.3		
12.2	25 12.8		25 11.1		25 1.4		
29.0	26.7		26.6		17.0		
44.4	43.7		42.5		33.4		
31.21	30.26		29.49		26.92		
372.1	362.6		350.9				
41.344	40.289	22 24.00	39.766	23 (10.57)	29.911	23 59.50	
24 41.11	24 40.05		24 39.53		24 29.68		
+23.97	+25.04		+26.63		+30.67		
+8.14	+7.62		+5.32		+5.87		
−24.~~75~~ 76	−5.52		−4.40		+1.55		
24 48.47	25 7.19		25 7.08		25 7.77		

+260		+251		+232		
5		5		5		5
1 55.0		1 45.6		1 35.3		1 51.7
42.1		33.1		25.2		42.4
97.1		78.7		60.5		94.1
6 48.55		6 39.35		6 30.25		6 47.05
+136.29						
~~+76.29~~		+88.96		+30.41		
~~2.13131~~	2.13449	1.94919		1.48302		
1.06454n	1.06772n	0.88242		0.41625n		
~~−11.60~~	−11.69	−7.63		−2.61		
~~6 48.55~~	6 48.55	39.35		6 30.25		
	6 36.86	6 31.72		6 27.64		
86° 16′ 11.″49		16 16.63		16 20.71		
−43 51 00	1.74240n					
+40.57		+30.62		+27.11		
1.78297n		1.77302n		1.76951n		
+1 0.67		+0 59.30		+0 58.82		
− 66		− 35		− 04		
− .02 −.14		− .02 −.14		− .07 −.12		
+~~1~~0 0.59	57.99	+0 58.93		+0 58.71		
+86 17 12.08	11.48	~~+0 58.93~~	17 15.56	17 19.42		
− 14.99	17 11.34	− 16.19	15.42	− 20.00	19.30	
−2 30.82		−2 31.66		−2 31.78		
−2 45.81		−2 47.85		−2 51.78		
+86 14 25.67		14 27.71		14 27.64		
	− 14.99		− 16.19		− 20.00	
	−2 30.86		31.76		31.94	
	+ 1.79		+ 1.73		+ 1.60	
	−2 44.06		−2 46.22		−2 50.34	
	14 27.28		14 29.20		14 28.96	

h m s

3 25 8

° ′ ″

+86 14 49

28.48″

ε Eridani.

h	m	s
3	26	55
3	26	57,

−9° 54′ ″
−9 53 23
3 = +52 16 11
+.79

Red.

	s
1	12.54
2	10.45
3	8.36
4	4.18
5	2.09
6	0.00

tan γ δ = −1.7
x = −.016
cos α = ~~+.06~~

δ = 53′ 35.63″ α 1872 = 54.017
δ = 53 23.24 α 1873 = 56.840

dα = +2.823
dδ = +12.40

1872

	m		
Dec 6	26 57.03		
11	.03	0	
16	.04	1	
21	.02	2	
26	57.00	2	
31	56.97	3	

Sin δ 9.23462 n
Cos δ 9.99351
.14571
.10922 n

1873
~~1872~~

	m	s		′ ″
Jan 0	26	56.96	4	53 27.8
5		.92	4	
10		.88		

1873

Jan 20	56.77		29.8	
25	.71	6	30.1	∓3
30	.64	7	30.4	.3
Feb. 4	.57	7	30.7	.3
9	.49	8	30.9	.2

1872

Dec. 6	−9° 53′ 24.3″	−
11	25.0	∓7
16	25.7	7
21	26.4	7
26	27.1	7
31		

1872 +.534 1873 +.500 +.345
Dec. 30 +.53 Jan. 1 +.50 Feb. 4 +.36

26 20.4 ~~26~~ 26 ~~20.8~~ 26 44.1 26 26 34.8
22.6 28.8 45.3 — 36.0
24.7 29.9 46.6 — 37.0
28.8 30.9 22.0 24.18
31.0 31.9 24.0 −.19
33.0 916 33.1 26.0 .00
35.1 34.1 28.2 .09
37.3 35.2 —
41.4 36.1 —
43.5 28.78
45.5
36.33 ~~25~~ 29.0

33.027 31.978 26 45.33 24.090 26 35.93

26 33.01 26 31.98 26 24.07
26 56.98 26 56.95 26 56.57
−23.97 −24.97 −32.50
~~−24.03~~ ~~−28.03~~ ~~−30.86~~

+23.96 +.01 +25.04 +.00 +~~32~~.56 +.00 ~~+.02~~
− .09 −.09 − .09 −.09 − .06 −.06
−2.96 −0.14 −0.11 +0.27
+20.91 2 +24.84 +~~32.23~~ 32.77
26 33.01 31.98 ~~32.78~~ 24.07
26 53.92 56.80 ~~24.07~~ ~~0.68~~ 56.84
26 53.93 26 56.75 56.80 56.~~85~~84

+2.60 +2.35
10 10
2 13.2 2 24.9
56.2 8.2
129.4 33.1
12′ 4.70″ 12 16.55

− 13.35 − 11.84
1.12548 n 1.07335 n
1.23470 1.18257
+17.17 +15.22
12 4.70 12 16.55
12 21.87 12 31.77

−9° 49′ 33.52″ 49 43.42

+52 14 45 1.87050
+4057 +327
1.91107 1.87377

∓1 21.48 ∓1 14.78
+ .01 + .01
− .02 − .11

−1 21.49 −1 14.88
−9 50 55.01 50 55.18 50 58.30 58.48
53 27.8 53 30.7
−2 32.8 −.17 33.0 −2 32.4 −.18 32.6

+4.60 +7.50
−2 30.82 −2 31.34
−2 26.22 + 4.60 −2 23.84 + 7.50
−9 53 21.23 −2 30.86 53 22.14 31.41
− 2.05 − 1.85
−2 28.31 −2 25.76
53 23.49 53 24.24

1872 1873 1873
1872.0

Gr. 716 tang δ = +1.95 Dec. 6 31m 9s.63 Jan. 0 31m 9s.40 48' 19".8 Dec. 26 14s.83 48' 33".8

h m s
3 31 02 x = −.034 11 .62 1 5 9.29 11 20.7 +9 31 19.74 9 34.8 +15
3 31 09 16 9.60 2 10 9.18 11 21.5 8 6 19.65 9 35.7 9
62° 48' " 21 9.56 4 15 9.05 13 22.2 7
+ 62 48 07 corr = +12 +03" 26 9.50 6 20 8.90 15 22.8 sin δ 9.94911
31 9.43 7 25 8.73 17 23.2 4
δ = −20 25 19 α1872 = 4.024 30 8.56 17 23.5 cos δ 9.66001
− .35 Dec. 6 62° 47' 74".3 Feb. 4 8.38 18 23.7 2 11571
α1873 = 9.163 11 75.4 +11 9 8.19 19 23.9 2 9.77572 n
16 76.6 12
δ1872 = 47' 55".26 21 77.7 11 dα = +5.139
26 78.9 12 dδ = +12.19
δ1873 = 48 7.46 31

1872 Dec. 30 +534 +53 1873 Jan. 1 +500 +50 Jan. 28 +384 +34 Feb. 4 +345 +36 Dec. 29 +257 +26

30 30 30 17.2 30 30 20.4 30 30 21.4 31 30 45.1
35.3 34.4 18.8 28.2 23.7 26.1 22.4 4.8 47.9
37.9 36.8 21.0 30.4 26.3 28.5 6.9 51.0
40.0 39.0 32.6 30.6 9.0
42.4 41.2 35.0 32.8 11.6
44.6 43.4 37.3 35.2 13.8
46.6 45.7 39.4 37.4 16.0
48.9 47.9 41.7 39.6 18.3
51.2 50.3 43.9 42.0 20.5
53.6 52.5 46.5 44.2 22.6

400.5 391.2 335.0 316.4 123.5

44.500 43.467 30 18.67 37.222 30 23.47 35.155 30 21.90 13.722 30 48.00

30 44.47 30 43.43 30 37.19 30 35.12 31 13.69
31 9.44 31 9.37 31 8.62 31 8.37 31 14.77
−24.97 −25.94 −31.43 −33.25 −1.08
−25.09 −26.06 −31.55 −33.37 −1.20

+ 23.96 +.01 + 25.05 +.00 + 30.67 +.00 + 32.56 +.00 + 0.72 +.01
+ 1.03 +1.04 + .98 +.98 + .66 +.75 + .70 +.67 + .51 +.50
− 5.42 − 0.28 − 0.21 + 0.54 + 0.79 − 5.61
+19.579 +25.82 +31.87.96 +34.052 − 4.38
30 44.47 43.43 37.19 35.12 31 13.69
31 4.04 9.25 9.06 9.17 9.31
31 4.06 31 9.20 9.25 9.15 9.14 9.31

+2.60 +2.32 +2.35 +2.94
30 30 30 30
2 42.2 2 30.1 2 27.8 2 42.7 2 8.7
28.9 28.1 18.3 33.6 58.9
71.1 58.2 46.1 77.3 127.6
32 35.55 32 29.10 32 23.05 32 38.65 32 3.80

+ 24.80 + 13.75 + 13.25 + 25.72
1.39445 1.13830 1.12222 1.41027
1.17017 n 0.91402 n 0.89794 n 1.18599 n
− 14.80 − 18.20 − 7.90 − 15.34
32 35.55 32 24.10 32 23.05 32 38.65
32 20.75 32 15.90 32 15.15 32 23.31

+ 62° 50' 27".60 50 32.45 50 33.20 50 25.04

− 20 25 16 1.33120 n −20 25 16
+ 40.66 + 27.10 + 3.27 + 17.49
1.37186 n 1.35830 n 1.33447 n 1.34869 n

"
+ 23.54 + 22.82 + 21.60 + 22.32
− .14 − .04 − .03 − .15
− .03 − .12 − .12 + .10

+ 23.37 + 22.66 + 21.45 + 22.27
+62 55.0 50.97 .50 50.76 50 55.11 54.91 50 54.65 54.46 50 47.31 47.10
48 20.0 48 23.4 48 23.7 48 34.4
" − 2 31.0 31.2 − 2 31.7 31.9 − 2 30.9 31.1 − 2 12.9 13.1
+03 − 2 30.7 −.21 30.9 − 2 31.4 −.20 31.6 − 2 30.6 −.19 30.8 − 2 12.6 −.21 12.8

− 12.50 − 15.90 − 16.20 − 26.90
− 2 30.82 − 12.50 − 2 31.78 − 15.90 − 2 31.34 − 16.20 − 2 13.77 − 26.90
− 2 43.32 − 2 30.86 − 2 47.68 31.94 − 2 47.54 31.41 − 2 40.67 − 2 14.12
+ 62 48 7.65 + .90 48 7.43 + .81 48 7.11 + .82 48 6.64 + 1.02
− 2 42.46 − 2 47.03 − 2 46.79 − 2 40.00
48 8.30 48 7.88 48 7.67 48 7.10

S Persei

h m s
3 33 48
3 33 53
+47° 23' "
+47 22 44
η = −4 59 56
sin. z = −.09

Tang δ = +1.08
δ x = −.022
Corr = +.01
α 1872 = 49.129 δ = 22 32.33
α 1873 = 53.368 δ = 22 44.21

1872	m	s	
Dec 6	33	53.44	
11		.45	+1
16		.46	+1
21		.44	−2
26		53.42	

1873 (1872.0)	m	s	
Jan 0	33	53.37	
5		.31	6
10		.25	6
15		.17	8
20		53.09	8
25		52.99	10
30		52.89	10
Feb. 4		52.78	11
9		52.67	11

1873	s
Dec 26	57.87
31	.88
4	.86

Sin δ 9.86682
Cos δ 9.83065
.11571
9.94636 n

dα = +42.39
dδ = +11.88

1872 Dec 23 +.413 +42	Dec 30 +.534 +.53	1873 Jan 1 +.500 +.50	Jan 14 +.356 +.35	Jan 28 +.384 +.34	Feb 4 +.345 +.36
33 12.0 33 8.8	33 10.6	33 9.6 33 5.4	33 6.1 32 53.7	33 3.7 33 0.1	33 1.6 Sidel tm
14.8 10.6	13.7	12.6 6.7	9.1 55.2	6.6 1.2	4.8
18.0 12.5	16.7	15.7 8.4	12.3 56.6	9.7 2.3	7.5
24.0	22.7	21.7	18.4	15.8	13.8
27.1	25.8	24.9	21.3	18.8	16.6
30.1	28.9	28.0	24.4	22.0	19.9
33.2	31.9	30.8	27.5	24.8	23.0
36.3	35.1	34.0	30.5	28.2	26.1
42.3	41.0	39.9	36.5	34.1	32.2
45.4	44.1	43.1	39.7	37.1	35.0
48.4	47.1	46.2	42.7	40.2	38.1
331.6	317.6	306.5	268.5	241.0	218.6
30.145 33.10.63	28.873	27.864 33 6.83	24.409 32 55.17	21.909 33 1.17	19.873
33 30.12	33 28.85	33 27.84	33 24.39	33 21.89	33 19.85
33 53.43	33 53.41	33 53.36	33 53.18	33 52.93	33 52.47
−23.31	−24.56	−25.52	−28.79	−31.04	−32.92
~~−23.32~~	~~−24.57~~	~~−25.53~~	~~−28.80~~	~~−31.05~~	~~−32.93~~
+22.90 +.03	+23.96 +.01	+25.05 +.00	+28.52 +.00	+30.67 +.00	+32.56 +.00
+ .45 +.45	+ .57 +.58	+ .54 +.54	+ .38 +.38	+ .37 +.41	+ .39 +.37
− 4.30 − 0.06	− 4.28 − 0.04	+ 0.01	+ 0.19	+0.44	+0.60
+19.058	+20.257	+25.60	+29.09	+31.48 .52	+33.553
33 30.12	28.85	27.84	24.39	21.89	19.85
33 49.17	49.10	53.44	53.48	53.37	53.40
33 49.20 33 53.44	49.12 53.36	53.44	53.48	53.41	53.38

Dec 23	Jan 1	Jan 14	Jan 28	Feb 4
+270	+260	+239	+232	+235
55	55	55	55	55
2 56.2	2 55.8	2 58.2	2 49.8	2 39.6
41.5	41.9	48.3	36.9	30.9
97.7	97.7	106.5	86.7	70.5
57 48.85	57 48.85	57 53.25	57 43.35	57 35.25
+ 19.51	+ 21.03	+ 29.24	+20.74	
1.29026	1.32284	1.46598	1.31681	
1.23662 n	1.26920 n	1.41234 n	1.26317 n	
−17.24	−18.59	−25.84	−18.33	
57 48.85	57 48.85	57 53.25	57 43.35	
57 31.61	57 30.26	57 27.41	57 25.02	
+47° 25' 16.74"	25 18.09	25 20.94	25 23.33	
−4 59 57 0.70230 n	−5 0 7			
+33.16	+40.75	+25.72	+27.09	
0.75540 n 3	0.74305 n	0.72802 n	0.72939 n	
+ 5.44	+ 5.53	+ 5.35	+ 5.36	
− .11	− .12	− .23	− .12	
− .03	− .03	− .17	− .13	
+ 5.30	+ 5.38	+ 4.95	+ 5.11	
+47 25 22.04 25 21.76	25 23.47 23.25	25 25.89 25.66	25 28.44 28.22	
22 52.8	22 52.9	22 55.2	22 56.1	
−2 29.2 −28 29.5	−2 29.6 −22 29.8	−2 30.7 −23 30.9	−2 32.3 −22 32.5	
− 8.62				
− 20.50	− 9.70	− 11.00	− 11.90	
−2 30.07	−2 30.82	−2 31.05	−2 31.78	
−2 50.57 − 20.50	−2 40.52 − 9.70	−2 42.05 − 11.00	−2 43.68 − 11.90	
+47 22 31.47 −2 30.26	22 42.95 30.86	22 43.84 31.46	22 44.76 31.94	
−.10 + .24	−.20 + .23	−.20 + .21	−.20 + .20	
+47 22 31.37 −2 50.52	22 42.75 −2 40.33	22 43.64 −2 42.25	22 44.56 −2 43.64	
22 31.24	22 42.92	22 43.41	22 44.58	

δ Persei

3 33 48

+47 23

Sin δ 9.86682
Cos δ 9.83065
.11571
9.94636

1872					1873							
Dec. 6	47° 22′	50″.0			Jan	0	22′	53″.8		Dec. 26	22′ 67″.8	
11		50.8	+.8			5		54.4	+.6	31		+.7
16		51.6	.8			10		54.9	.5	4		
21		52.4	.8			15		55.3	.4			
26		53.2	.8			20		55.7	.4			
						25		56.0	.3			
						30		56.2	.2			
					Feb.	4		56.3	.1			
						9		56.3	.0			
					March 1			55.4				

1872.0		1873.0	
α	δ	α	
49.20	31.37	53.44	42.75
.12		.48	43.64
		.41	44.56
		.38	43.54
		.38	
49.160	31.37 +.20	53.418	43.62 +.40
129	32 33	.368	44.21
+.031	−.96	+.050	−.59
	+.20		+.40
	−.76		−.19

+.257

Dec. 27 +.26

3 33 38.8 33 27.2
41.7 29.4
44.7 31.0
50.7
53.9
56.8 34 38.0
59.9 40.2
34 3.0 42.0
9.0
12.0
15.4
38 5.9
623.9
56.90 33 29.20
34 40.07

33 56.88
33 57.88
−1.00
~~−4.01~~

+ 0.72 +.01
+ .28 +.28
− 4.51
− 3.51 +0
33 56.88
53.37
53.38

+2.94
55

29 1.41 58.3
51.5 48.1
1129 1064
56.7 56.45 56. 53.20

+27.70
1.44248
1.38884n
− 24.48
56.7 56.46
~~56 24.95~~ 56 31.97

+26° 5 16″.38

−5 1 17 0.70410n
+17.49
0.72159n

+ 5.27
− .21
+ .08

+ 5.14
26 21.52 25 21.29
23 8.2
−2 13.3 −.23 13.5

−24.00
−2 13.77
−2 37.77 − 24.00
22 43.74 −2 14.12
−.20 + .26
22 43.54 −2 37.86
22 43.93

√

Θ 15 Uhr. Min. = 54
h m s
3 35 25
15 35 14
+ 77° 46′ ″
+ 77 46 13
102 13 47
η = −59 50 59
− 0.86

Sin δ 9.99002
Cos δ 9.32612
.11571
9.44183

Tang δ = ~~−25.661~~ −4.61
−25.642

K = ~~+.392~~ +.072

α 1872 = 35 16.120
α 1873 = 35 13.617
δ 1872 = 13 31.11 28.89
δ 1873 = 13 42.47 17.53

1872 +413 Dec. 23		Dec. 30 +534	1873 +500 Jan. 1		Jan. 14 +356		Jan. 28 +304		Dec. 2? +257
34	34 26.5	34	34	34 15.5	34	34 8.1	34	34 17.6	35 38.1
29.2	27.4	29.0	28.3	18.1	24.9	11.4	24.5	22.8	39.6
34.4		34.1	33.2	20.5	30.0	18.5	29.1	25.7	
39.6		39.0	38.5		34.6	21.6	33.6		
44.0		43.8	43.0		39.7		39.4		
48.8		48.3	47.8		44.5		43.6		
53.9		54.0	52.9		49.2		48.9		
59.0		58.1	57.9		54.4		54.2		35 47.8
3.8		3.3	35 2.2		59.2		58.3		58.0
8.8		8.8	7.7		35 4.1		35 3.3		36 9.4
321.5		318.4	311.5		340.6		334.9		
441.6		438.4	431.5		400.6		394.9		
49.055	34 27.45	48.264	47.944	34 18.03	44.511	34 14.90	48.878	34 22.03	35 38.85
34 49.13	34 26.95	34 48.74	34 48.02		34 44.58		34 43.95		
+22.92		+23.97	+25.15		+28.52		+30.67		
−1.50		−2.46	−2.30		−1.64		−1.77		
+5.63		+5.17	+3.12		+2.02		+0.63		
35 15.78		16.46 5	13.89		13.48		13.48		

+.270	+260	+239	+232	
5	5	5	5	5
3 11.6	3 9.1	2 57.8	2 56.7	3 20.2
59.8	57.5	50.8	49.1	13.7
1 131.4	126.6	108.6	105.8	33.8
8 5.70	8 3.30	7 54.30	7 52.90	8 16.85
+22.10	+29.91	+29.61	+21.85	
1.34439	1.47582	1.47144	1.33945	
0.78622	0.91765	0.91327	0.78128	
+6.11	+8.27	+8.19	+6.04	
8 5.70	8 3.30	7 54.30	7 52.90	
8 11.81	8 11.57	8 2.49	7 58.94	
° ′ ″				
+102 14 36.54	14 36.78	14 45.86	14 49.41	
−59 49 17 1.99428n	−59 49 25			
+33.10	+40.75	+25.72	+27.09	
2.02738n	2.03503n	2.02000n	2.02137n	
+ .03	+ .03	+ .02	+ .03	
+1 46.51	+1 48.40	+1 44.71	+1 45.04	
+ .06	+ .10	+ .10	+ .05	
− .03 −.31	− .03 −.25	− .11 −.23	− .09 −.23	
+1 46.57	+1 48.50	+1 44.72	+1 45.03	
+102 16 23.11 16 22.80	16 25.28 25.03	16 30.58 30.35	16 34.44 34.21	
★ − 23.75	− ★ 14.79	− ★ 18.31	− ★ 21.08	
−2 30.07 −2 53.82	−2 30.82 −2 45.61	−2 31.05 2 49.36	−2 31.78 −2 52.86	
~~−2 6.32~~	~~−2 16.03~~	~~−2 11.74~~	~~−2 16.40~~	
+102 14 ~~16.79~~ 13 29.29	14 ~~9.25~~ 13 39.67	14 ~~18.84~~ 13 41.22	14 ~~23.74~~ 13 41.58	
− 23.75	− 14.79	− 18.31	− 21.08	
−2 30.26	~~30.86~~ 30.86	31.46	31.94	
+ 2.32	+ 2.23	+ 2.05	+ 1.99	
−2 51.69	−2 43.42	−2 47.72	−2 51.03	
13 31.11	13 41.61	13 42.63	13 43.18	

h m s
15 35 0
+ 77 46 8

5 H Camel.
h m s
3 36 40
3 36 59
+ 70° 56′ ″
+ 70 56 15
ʒ = -28 33 27
− 48

Red. s
1′ 12.61
2 9.46
3 6.30
4 3.15
5 0.00

tan γ δ = +2.89
x = −0.44
Corr = +.12 − 0!″

α 1872 = 52.916 δ = 56′ 2.89″
α 1873 = 59.126 δ = 56 14.56
dα = +6.209
dδ = +11.67

1872
Dec. 16 36m 60.14s
21 :07 .07
26 59.97 .10

1873 ~~1872~~
Jan. 0 36m 59.82s
5 .66 16
10 59.48 18
15 .28 20
20 59.06 22
25 58.82 24
30 58.56 26

1872 Dec. 23 +.413 +.42
36 23.5 35 53.0
26.6 56.5
30.0 0.4
33.0
36.0
39.1
42.5
45.5
48.6
3248
36.084 35 56.63

Dec. 30 +534 +.53
36 22.2
25.0
28.3
31.6
34.5
37.7
40.8
43.4
47.1
3166
34.511

1873 Jan. 1 +500 +.50
36 . 35 45.6
21.1 48.1
24.2 49.7
27.5
30.5
33.3
36.5
40.0
42.9
45.7
3017
33.522 35 47.80

Jan. 12 +351 +.33
Rej
36 33.8
36.4
38.7
40.6
43.6
36 49.6
50.9
52.1
36 50.87

Jan. 14 +356 +.35
36 .
17.2
20.5
23.6
27.0
30.0
33.2
36.5
39.5
42.6
35 48.7
51.4
54.1
2701
30.011 35 51.40

Jan. 28 +384 +.34
36
14.3
19.7
20.8
24.3
27.3
30.4
33.4
36.6
39.9
36 4.7
7.5
10.3
2447
27.189 36 7.50

36 36.05
37 0.04
−23.99
−24.11
+22.90 +.03
+ 1.21 +1.19
−7.12 − 0.91
+ ~~16.99~~ 17.00
36 36.05
36 53.04
36 53.05 36 59.26

36 34.47
36 59.88
−25.41
−25.53
+23.96 +.01
+ 1.53 +1.54
− 6.96 − 0.75
+18.535
34.47
53.00
53.02 59.23

36 33.48
36 59.78
−26.30
−26.42
+ 25.05 +.00
+ 1.45 +1.45
−0.65
+25.85
33.48
59.33
59.33

+1.01

36 29.97
36 59.31
−29.34
−29.46
+28.52 +.00
+ 1.01 +1.03
− 0.18
+ 29.357
29.97
59.32
59.34

36 27.15
36 58.65
−31.50
−31.62
+ 30.67 +.00
+ .98 +1.11
+0.48
+32.26
27.15
59.28
59.41

+2.70
25
0 52.3
4 36.9
89.2
24 44.60
+ 39.46
1.59616
1.22598n
−16.82
24 44.60
24 27.78
70° 58 20.57″
−28 33 1 1.49580n
+33.16
1.52890n
+ 33.80
− .26
− .05
+ 33.49
+70 58 54.06 58 53.59
56 25.9
.1 − 2 28.2 28.7
−0.1 − 2 28.3 −.47 28.8
− 11.33
−23.00
− 2 30.07 − 23.00
− 2 53.07 − 2 30.26
+70 56 0.99 + 1.29
− 2 51.97
56 1.62
56 13.29

+2.60
20
4 53.3
4 38.8
92.1
24 46.05
+45.72
1.66011
1.28993n
− 19.50
24 46.05
24 26.55
58 21.80
−28 33 10 1.49 ~~600~~ 590
+40.75
1.53665n
+ 34.41
− .34
− .05
+ 34.02
58 55.82 55.44
56 27.9
− 2 27.9 28.3
− 2 28.0 −.38 28.4
− 13.30
− 2 30.82 − 13.30
− 2 44.12 − 30.86
56 11.70 + 1.24
− 2 42.92
56 12.52

20
4 21.1
5.0
26.1
24 13.05
+ 46.43
1.54233n
+ 34.86
−
− .04

+2.39
20
4 42.7
31.1
73.8
24 36.90
+ 38.61
1.58670
1.21652n
− 16.46
24 36.90
24 19.44
58 28.91
+ 25.72
1.52162n
+ 33.24
− .27
− .28
+ 32.69
59 1.60 59 1.22
56 30.4
− 2 31.2 31.6
− 2 31.3 −.38 31.7
− ~~13.80~~ 15.80
− 2 31.05 − 15.80
− 2 46.85 31.46
56 14.75 + 1.14
− 2 46.12
56 15.10

+2.32
20
4 33.9
20.7
54.6
24 27.30
+ 19.69
1.29425
0.92407n
− 8.40
24 27.30
24 18.90
58 29.45
+ 27.09
1.52299n
± 33.34
.07
− .22
+ 33.04 5
59 2.49 2.50 2.15
56 32.2
− 2 30.3 30.7
− 2 30.4 −.35 30.8
− 17.60
− 2 31.78 − 17.60
− 2 49.38 31.94
56 13.12 + 1.11
− 2 48.43
56 13.72

1873

Dec 26 37^{m} 6^{s}.37
31 26 .11
36 6.11 .15

Sin δ 9.97550
Cos δ 9.51411
,11571
9.62982$_n$

1872
Dec. 16 70° 55′ 84″.0
21 85.3 +13
26 86.6 1.3

1873
Jan. 0 56′ 27″.7
5 28.7 +10
10 29.7 10
15 30.5 .8
20 31.3 .8
25 31.9 .6
30 32.4 .5

1873
Dec. 26 56′ 40″.9
31 42.1 +1.2
36 43.2 1.1

Dec. 29 +.257
+.26
36 36 44.9
52.5 49.5
55.4 53.1
58.7
20
5.1
8.3
11.5
14.8
17.9

2262
46.2
5.133 36 49.17

37 5.09
37 6.36
−1.27
−1.39

+0.72 +.01
+ .75 +.74
−7.23
−5.76
37 5.09
59.33
59.33

+294
20
4 39.1
27.9
6.70
24′ 33″.50

+1596
1.20303
0.83285$_n$
−6.80
24 33.50
24 26.70

58 21.65

−28 33.12
+1749
1.51339$_n$

+ 3261
± .04
+ .18

+ 32.75
58 54.40 58 54.03
56 41.7
−2 12.7 13.1
−2 12.8 −37 13.2

−27.10
−2 13.77 − 27.10
−2 40.87 −2 14.12
56 13.53 + 1.41
−2 39.81
56 14.22

1872　　　1873 1872.0　　　1873

χ² Tauri.

h m s
3 39 50
3 39 56
+ 23° 42′ ″
+ 23 42 37
ϑ = + 18 40 11
+ .32

tang δ = + 44
x = - .017
cos x = + .00

α 1872 - 52.695 δ = 42′ 25.95″ dα = + 3.553
dδ = + 11.47
α 1873 - 56.248 δ = 42 37.42

Dec. 16 39ᵐ 56.24ˢ 2
21 ~~22~~
26 20 2

Jan. 0 39ᵐ 56.22
5 19 3
10 .15 4
15 10 5
20 56.05 5
25 55.99 6
30 55.92 7

Dec. 16 40ᵐ 0.02
21 0.02
26 0.01

1872 Dec. 23 +42	+.413	Dec. 30 +.53	+.534	1873 Jan. 1 +.50	+.500	Jan. 12 +.33	+.351	Jan. 14 +.35	+.356	Jan. 28 +.34	+.384
39	39 10.8	39		39	39 14.7	39 14.6	39 10.3	39 14.0	39 3.1	39 11.5	39 6.1
19.7	12.4	18.7		26.4	16.2	16.8	11.4	16.3	6.2	13.9	7.4
22.0	13.7	20.8		28.7	17.4	19.1	12.4	18.5	7.0	16.2	9.0
24.3		23.0		A 31.0		23.7		23.0	~~11.2~~	20.7	
30.9 28.6		27.5		33.2		26.0		25.3		22.9	
33.1		29.7		35.5		28.3		27.5		25.1	
35.5		32.1				30.4		29.7		27.4	
37.7		34.4				32.6		32.0		29.5	
42.2		36.6				37.1		36.5		34.2	
44.5		41.0				39.3		38.8		36.3	
46.7		43.2				41.5		41.0		38.5	
365.2		45.5				309.4		302.6		276.2	
		352.5									
33.200	39 12.30	32.045		30.960	39 16.10	28.127	39 11.37	27.509	39 ✓ ~~7.38~~ 6.10	25.109	39 7.50
39 33.18		39 32.03		39 30.94		39 28.11		38 27.49		39 25.09	
39 56.22		39 56.21		39 56.21		39 56.13		39 56.11		39 55.95	
-23.04		-24.18		-25.27		-28.02		-28.62		-30.86	
+22.90 +.03		+23.96 +.01		+25.05 +.00		+27.88 -.02		+28.52 +.00		+30.67 +.00	
+ .18	+.18	+ .23	+.23	+ .22	+.22	+ .15	+.15	+ .15	+.16	+ .15	+.17
-3.53	+ 0.02	-3.52	+ 0.03	+ 0.04		+ 0.12		+ 0.14		+ 0.30	
+19.558		+20.678		+25.31		+28.153		+28.812		+31.124	
39 33.18		32.03		30.94		28.11		27.49		25.09	
39 52.73		52.70		56.25		56.26		56.30		56.21	
39 52.76	39 56.31	52.71	56.26	56.25		56.24		56.31		56.23	
+270				+260		+240		+239		~~+232~~	
35				35		35		35		35	
2 48.7				2 37.9		2 40.4		2 45.1		2 41.3	
33.8				21.5		24.1		34.9		28.9	
82.5				59.4		64.5		80.0		70.2	
37 41.25				37 29.70		37 32.25		37 40.00		37 35.10	
+20.90				+14.86		+16.76		+20.13	+21.41	+17.61	
1.32015				1.17202		1.22427		1.30384	1.33062	1.24576	
1.39754ₙ				1.24941ₘ		1.30166ₙ		1.38123ₘ	1.40801	1.32315ₙ	
-24.98				-17.76		-20.03		-24.06	-25.59	~~-21.54~~	-21.05
37 41.25				37 29.70		37 32.25		37 40.00	40.00	~~37 35.10~~	37 35.10
37 16.27				37 11.94		37 12.22		37 15.94	14.41	~~37 13.56~~	37 14.05
23° 45′ 32.08″				45 36.41		45 36.13		45 32.41	33.94	45 34.30	
+18 39 47	1.28890			+18 39 35	1.28880						
+33.42				+40.85		+46.55		+26.05		+27.08	
1.32232				1.32965		1.33535		1.31485		1.31588	
+- 21.00″				+- 21.36		+- 21.64		+- 20.65		+- 20.70	
- .09				- .15		- .06		- .08		- .07	
- .03				- .03		- .03		- .16		- .13	
				~~- 21.44~~							
- 21.12				- 21.44		- 21.73		- 20.89	~~+3.05~~	- 20.90	
23 45 10.96	45 10.69			45 14.97	14.77	45 14.40	14.20	45 11.52	13.05 12.83	45 13.40	13.19
42 41.5				42 41.7		42 41.9		42 41.9		42 41.9	
-2 29.5	-.27 29.8			-2 33.3	-.20 33.5	-2 32.5	-.20 32.7	-2 29.6	-.22 29.8	-2 31.5	-.21 31.7
- 4.13											
- 15.60				- 4.30		- 4.50		- 4.50		- 4.50	
-2 30.07				-2 30.82		-2 31.98		-2 31.05		-2 31.78	
-2 45.67	- 15.60			-2 35.12	- 4.30	-2 36.48	- 4.50	-2 35.55	- 4.50	-2 36.28	- 4.50
+23 42 25.29	-2 30.26			42 39.85	30.86	42 37.92	32.27	42 ~~35.91~~ 37.50	31.46	42 37.12	31.94
	- 86				- 83		- 77		- 76		- 74
	-2 46.72				-2 35.99		-2 37.54		-2 36.72		-2 37.18
	42 23.97				42 38.78		42 36.66		42 36.11		42 36.01
	42 35.44										

Sin δ 9.60446
Cos δ 9.96168
,11571
,07739m

1872	°	'	"	
Dec. 6	23	42	41.1	
11			41.3	+ 2
Dec. 16			41.4	1
21			41.5	1
26			41.6	1

1873	'	"	
Jan. 0	42	41.7	
5		41.8	+ .1
10		41.9	.1
15		41.9	0
20		41.9	0
25		41.9	+ 0
30		41.8	− 1
~~Fit~~ 4		41.7	1
Feb. 9		41.6	1

	'	"	
Dec. 6	42	55.3	
11		55.4	+ 1
Dec. 16		55.6	2
21		55.7	1
26	42	55.9	2

Feb. 4

Dec. 29 +.257 +.26

39 45.5 39 38.8
47.8 40.2
50.2 41.4
54.6
56.8
59.1
40 1.4
3.7
8.1
10.4
12.8
350.4
650.4
59.127 39 40.13

39 59.11
40 0.00
− 0.89

+ 0.72 +.01
+ .11 +.11
− 3.75
− 2.921
39 59.11
55.19
56.20

+2.94

35
2 78
26.9
1 947
36 47.35

35
2 45.3
35.1
80.4
37 40.20

+ 19.00
1.27875
1.35614m
− 22.71
37 40.20
37 17.49

45 30.86

+118 39 38
+ 17.49
1.30629

★ − 20.24
− .08
+ .11

− 20.21
45 10.65 10.43
42 56.0
− 2 14.6 − .22 14.8

− 18.60
− 2 13.77
− 2 32.37 − 18.60
42 38.28 − 2 14.12
− .94
− 2 33.66
42 36.77

1872 1873 1873
18X28

27 Tauri
α m s
3 41 32
3 41 37
+ 23° 39′ ″
+ 23 39 47
ʒ = +18 43 1
+.32

tang δ = +.44
x = −.017
Corr = +.13

α 1872 = 33.188
α 1873 = 36.741
δ 1872 = 39′ 35.″26
δ 1873 = 39 46.58

Dec. 16 41m 36.75s 1
21 36.74
26 36.72 2

Dec. 6 23 39 50.3
11 +.1 50.4
16 .2 50.6
21 .1 50.7
26 .2 50.9

Jan. 0 41m 36.72s 39 50.9″
5 36.68 51.0
10 36.64 51.1
15 36.60 51.1
20 36.56 51.1
25 36.50 51.1
30 36.43 51.0
Feb. 4 50.9
9 50.8

dα = +3553
dδ = +11.33

Dec. 26 40 57 39′ 65.″0
+.1 31 50 65.1
.1 36 48 65.2
.0 46
.0

Log δ 9.60359
−.1
Cos δ 9.96185
.1 .11571
.07756n

1872 +.413 Dec. 23 +.42	1873 +.500 Jan. 1 +.50	+.351 Jan. 12 +.33	+.384 Jan. 28 +.34	−s +.345 Feb. 4 +.36	+.257 Dec. 29 +.26
41 0.2 40 56.0 2.4 57.5 4.7 58.7 9.2 11.4 13.7 16.0 18.2 22.7 25.0 27.2 150 7	41 8.1 40 56.2 9.2 57.2 A 11.6 58.4 13.8 16.1	40 55.2 40 45.6 57.6 46.9 59.8 48.3 41 4.1 6.5 8.7 10.9 13.3 17.8 20.1 22.6 2766 96.6	40 52.2 40 45.5 54.4 46.8 56.6 48.2 41 1.1 3.4 5.7 7.9 10.3 14.7 16.9 19.2 2424 62.4	40 51.4 40 50.0 53.6 51.9 55.9 52.0 41 0.3 2.6 4.8 7.0 9.4 13.9 16.1 18.4 2334 53.4	41 27.4 41 20.6 29.6 22.1 32.0 23.0 36.5 38.7 41.6 43.3 45.5 50.0 52.3 54.4 450 7
13.700 40 57.40	11.56 40. 57.27	8.782 40 46.93	5.673 40 46.83	4.855 3 40 50.97	40.973 41 21.90
41 13.68 41 36.73 −23.05 −23.18	41 10.54 41 36.71 −26.17 −26.30	41 8.77 41 36.62 −27.85 −27.98	41 5.66 41 36.45 −30.79 −30.92	41 3.84 41 36.36 −32.52 −32.65	41 40.96 41 40.50 +0.46 +0.33
+22.90 +03 + .18 +.18 −3.54 +0.01 +19.57 41 13.68 41 33.242 41 33.245 41 36.80	+25.05 +08 + .22 +.22 +0.03 +25.30 11.54 36.84 36.84	+27.88 −02 + .15 +.15 +0.12 +28.158 8.77 36.92 36.90	+30.67 +00 + .15 +.17 +0.29 +31.113 5.66 36.77 36.79	+32.57 +00 + .16 +.15 +0.38 +33.110 33.84 36.95 36.94	+ 0.73 +01 + .11 +.11 −3.76 −3.971 40.96 37.04 37.05
+270 40 0 31.9 18.2 ′ 50.1 40 25.″05	+260 40 0 28.0 15.1 43.1 40 21.55	+240 40 0 36.8 20.9 57.7 40 28.85	+232 40 0 32.9 21.0 53.9 40 26.95	+225 35 0 26.1 15.6 41.7 35 20.85	+2.94 35 30? 0 35.2 4 44.4 25.0 35.6 60.2 80.0 35 30.10 34 40.00
+16.30 1.21219 1.28975n −19.49 40 25.05 40 5.56 23° 42′ 42.79″	+14.29 1.15503 1.23259n −17.08 40 21.55 40 4.47 42 43.88	+21.85 1.33945 1.41701n −26.12 40 28.85 40 2.73 42 45.62	+18.84 1.27508 1.35264n −22.52 40 26.95 40 4.43 42 43.92	+13.88 1.14239 1.21995n −16.59 35 20.85 35 4.26 47 44.09	+19.07 1.28035 1.35791n −22.80 35 30.10 35 7.30 47 41.05
+18 42 37 1.29000 +3342 1.32342	+18 42 27 +4085 1.33085	+4655 1.33655	+2708 1.31708	+327 1.29327	+18 37 28 +1749 1.30749
*− 21.06 − .05 00	*− 21.42 − .04 00	*− 21.70 − .09 00	*− 20.75 − .07 − .02	*− 19.65 − .04 − .01	+− 20.30 − .07 + .02
− 21.11 23 42 21.68 42 21.64 39 50.8 − 2 30.9 −.04 30.9 − 4.17 − 15.50 − 2 38.07 − 2 45.57 − 15.50 +23 39 36.11 − 2 30.26 − 86 − 2 46.62 39 35.02 39 46.35	− 21.46 42 22.42 22.40 39 50.9 − 2 31.5 −.02 31.5 − 4.30 − 2 30.82 − 2 35.12 − 4.30 39 47.30 30.86 − 83 − 2 35.99 39 46.41	− 21.79 42 23.83 23.79 39 51.1 − 2 32.7 −.04 32.7 − 4.50 − 2 31.98 − 2 36.48 − 4.50 39 47.35 32.27 − 77 − 2 37.54 39 46.25	− 20.84 42 23.08 23.05 39 51.0 − 2 32.1 −.03 32.1 − 4.40 − 2 31.78 − 2 36.18 − 4.40 39 46.90 31.94 − 74 − 2 37.08 39 45.97	− 19.70 47 24.39 24.37 39 50.9 − 33.5 −.02 33.5 3 4.30 − 2 31.34 − 2 35.64 − 4.30 48.75 31.41 − 75 − 2 36.46 47.91	− 20.35 47 20.70 20.66 40 5.1 − 15.6 −.04 15.6 − 18.50 − 2 13.77 − 2 32.27 − 18.50 47.43 − 2 14.12 − 94 − 2 33.56 47.10

9 H. Camel. tang δ = +1.78

h	m	s
3	46	12.
3	46	19
+60°	44′	″
+60	44	02

3 = −18 21 14
−.31

x = −.0325

corr = −.04 −.07

α1872 = 14.354 δ = 43′ 51.42″

α1873 = 19.415 δ = 44 2.46

dα = +5.061
dδ = +11.05

Red. s
1 8.43
2 6.32
3 4.22
4 2.11
0.00
″

1872

	m	s	
Dec. 16	46	19.87	
21		.85	2
26		19.81	4

	°	′	″	
Dec. 6	60	43	68.5	
11			69.7	+1.2
16			70.8	1.1
21			72.0	1.2
26			73.1	1.1

~~1873~~ 1872.0

	s	
Jan. 0	19.73	
5	.65	8
10	.56	9
15	.45	11
20	19.32	13
25	.17	15
30	19.01	16
Feb. 4	18.85	16
9	18.68	17

	′	″	
Jan 0	44	14.0	
5		14.9	+.9
10		15.8	.9
15		16.5	.7
20		17.1	.6
25		17.6	.5
30		18.0	.4
Feb 4		18.3	.3
9		18.5	

1873

	s	
Dec 26	25.08	
31	25.03	5
36	24.97	6

Sin δ 9.94069
Cos δ 9.68920
.11571
9.80491n

	′	″	
Dec. 26	44	26.9	
31		27.9	+1.0
36		28.9	1.0

1872 Dec. 23	+413 +42	1873 Jan. 12	+351 +33	Jan. 28	+384 +34	Feb. 4	+349 +36	Dec. 29	+257 +26
45	45 32.2	45	45 27.8	45	45 58.4	45	45 28.5	46	45 42.0
47.7	34.5	42.8	29.3	—	46 0.6	37.3	30.0	15.5	44.0
49.9	36.2	45.0	30.6		2.2	39.3	32.2	17.5	46.8
51.8		46.9		43.5 47.7		41.4		19.5	
54.1		49.1		45.6 47.7		43.5		21.7	
56.4		51.0		47.6 47.6		45.6		23.8	46 43.5
58.3		53.1		49.7 47.6		47.8		26.0	45.3
0.4		55.0		52.1 47.9		50.0		28.1	48.1
2.5		57.3		54.0 47.7		52.1		30.3	
4.6		59.4		56.5 48.1		54.2		32.3	
3257 505.7		4596				4112		2147	
56.189	45 34.30	51.067	45 29.23	47.765	46 0.50	45.689	45 30.23	23.855	45 44.27 46 45.63
45 56.16		45 51.03		45 47.73		45 45.66		46 23.82	
46 19.84		46 19.52		46 19.06		46 18.84		46 25.05	
−23.68		−28.49		−31.33		−33.18		−1.23	
−23.64		−28.45		−31.29		−33.14		−1.19	
+22.90 +.03		+27.88 −.02		+30.67 +.00		+32.57 +.00		+0.73 +.01	
+ .75	+.74	+ .59	+.62	+ .61	+.68	+ .64	+.61	+ .46	+.46
−5.49	− 0.43	−0.11		+0.35		+0.57		−5.64	
+18.168		+28.387		+31.63 .70		+33.78 5		−4.45 4	
45 56.16		51.03		47.73		45.66		46 23.82	
46 14.32		19.39		19.36		19.44		19.39	
46 14.34	46 19.40	19.40		19.43		19.41		19.38	
+2.70		+2.40		+2.32		~~+2.35~~ +2.35		+2.94	
35		35		35		35		35	
1 50.2		1 43.7		1 16.9		1 31.6		1 58.3	1 18.9
35.0		27.9		5.1		25.0		48.7	9.7
85.2		71.6		22.0		56.6		107.0	28.6
36 42.60		36 35.80		36 11.00		36 28.30		36 53.50	36 14.30
								+39.58	
+21.89		+21.84		−12.74		+15.46		− ~~20.42~~	
1.34025		1.33925		1.10517n		1.18921		1.59748	
1.14516n		1.14416n		0.91008		0.99412n		1.40239n	
−13.97		−13.94		+8.13		−9.86		−25.26	
36 42.60		36 35.80		36 11.00		36 28.30		36 53.50	
36 28.63		36 21.86		36 19.13		36 18.44		36 28.24	
+60° 46′ 19.72″		46 26.49		46 29.22		46 29.91		46 20.11	
−18 21 00	1.28100n	18 21 15						−18 21 11	
+33.75		+46.67		+27.07		+32.7		+17.49	
1.31475n		1.32767n		1.30807n		1.28427n		1.29849n	
+ 20.64		+ 21.27		+ 20.33		+ 19.24		+ 19.88	
− .11		− .11		− .04		− ~~.05~~		− .36	
− .02		− .02		− .06		− .07		+ .08	
+ 20.51		+ 21.14		+ 20.23		+ 19.12		+ 19.60	
+60 46 40.23	46 40.06	46 47.63	47.50	46 49.45	49.35	46 49.03	48.91	46 39.71	39.56
44 12.5		44 16.1		44 17.8		44 18.3		44 27.6	
−2 27.7	27.9	−2 31.5	31.6	−2 31.6	31.7	−2 30.7	30.8	−2 12.1	12.3
−.07 −2 28.4 −.17	28.6	−2 32.2 −.13	32.3	−2 32.3 −.10	32.4	−2 31.4 −.12	31.5	−2 12.8 −.15	13.0
− 10.05									
− 21.10		− 13.60		− 15.30		− 15.80		− 25.11	
−2 30.07	− 21.10	−2 31.98	− 13.60	−2 31.78	− 15.30	−2 31.34	− 15.80	−2 13.77	− 25.11
−2 51.17	−2 30.26	−2 45.58	32.27	−2 47.08	31.94	−2 47.14	31.41	−2 38.88	−2 14.12
+60 43 41.06	+ .83	44 2.05	+ .74	44 2.37	+ .71	44 1.89	+ .72	44 0.83	+ .91
	−2 50.53		−2 45.13		−2 46.53		−2 46.49		−2 38.32
	43 49.53		44 2.37		44 2.82		44 2.42		44 1.24
	44 4.58								

~~18~~ Urs. Min. = ζ = R

3h m s
~~15~~ 48 ~~38~~ 40.40
15 48 ~~38~~ 38.10
+ 78° 11′ ″
+ 78 11 02
101 48 58
z = − 59 26 10
. cniz −.86

tan δ = −4.78
x = +.075
Δα = +.82

α 1872 = 40.405 δ = 11′ 13.33″ = 48′ 46.67″
α 1873 = 38.104 δ = 11 2.44 = 48 57.56

Sin δ 9.99070
Cos δ 9.31129
.11571
9.42700

dα = −2.303
dδ = −10.89

1873

		h m s		° ′ ″	
Jan 10	15 48	35.37		+78 10 45.4	
15		35.81	44	44.1	1.3
20		36.29	48	42.9	1.2
25		36.77	50	41.9	1.0
30		37.22	59	41.1	.8
Feb. 4		37.85	.53	40.4	.7
9		38.42	.57	39.8	.6
Dec 26		32.19		36.3	
31		32.54	.35	34.8	1.5
36		32.89	.35	33.2	1.6

1872 Dec. 23 +413 +42		1873 Jan. 12 +351		Feb. 4 +345		Dec. 29 +.257	
47	47 8.0	47	46 46.0	47	47 21.6	48	47 31.0
53.0	15.9	49.5	48.1	47.0	26.7	12.9	34.6
58.4	21.7	53.1	51.5	51.7	31.8	18.4	40.8
3.6		48 0.1	56.9	56.9		23.0	
8.3		4.4		48 1.9		28.1	
13.3		9.5		7.1		32.9	
18.3		15.0		11.8		37.8	
23.7		19.8		17.0		42.8	
28.8		25.4		21.6		48.1	
33.8		29.8		27.1		53.4	
241.2		208.6		232.1		297.4	
121.2		88.6		52.1			
13.467	47 15.20	9.~~622~~ .844	46 50.62	6.900	47 26.70	33.044	47 35.47
13.54		48 9.92		6.98		33.12	
34.06		48 35.52		37.88		32.38	
−20.52		−25.60		−30.87		+0.74	
−20.84		−25.92		−31.16		+0.42	
48 13.54		48 9.92		48 6.98		48 33.12	
+22.92		+27.86		+32.57		+0.73	
−1.97		−1.68		−1.65		−1.23	
+6.34		+2.58		+0.27		+5.72	
47 40.83	48 38.53	38.68		38.17		38.34	

1872.0		1873.0	
α	δ	α	δ
40.83 s	42.55″ +2.00	38.68 s	52.50
		38.17	53.30
		38.34	52.10
		38.397	52.63 3.78
40.405	46.67	38.104	57.56
+.425	−4.12	+.293	−4.93
	+2.00		+3.78
	−2.12		−1.15

+270	+240	+235	+294
30	30	30	30
2 48.9	2 38.3	2 28.9	2 43.2
35.2	25.9	25.2	36.5
84.1	64.2	54.1	79.7
32 42.05	32 32.10	32 27.05	32 39.85
+58.27	+79.22	+40.20	+57.57
1.76545	1.89883	1.60423	~~1.75967~~ 1.76020
1.19245	1.32583	1.03123	1.18667 1.18720
+15.58	+21.18	+10.75	+15.37 +15.39
32 42.05	32 32.10	32 27.05	32 39.85 32 39.85
32 57.63	32 53.28	32 37.80	32 55.24
101° 49′ 50.72″	49 55.07	50 10.55	49 53.11
−59 24 31 1.98715n	−59 24 44		−59 24 44
+33.75	+46.67	+32.7	+17.49
2.02090n	2.03382n	1.99042n	2.00464n
+ .03	+ .04	+ .00	+ .02
+1 44.93	+1 48.10	+1 37.82	+1 41.07
+ .37	+ .69	+ .18	+ .36
− .03	− .03	− .12	+ .10
+1 45.30	+1 48.80	+1 37.98 37.88	+1 41.55
101 51 36.02 51 35.75	51 43.87 43.67	51 48.53 48.43 48.23	51 34.66 34.44
49 9.1	49 15.1	49 19.5	49 24.5
−2 26.9 −.27 27.2	−2 28.8 −.20 29.0	−2 ~~28.9~~ −.20 29.1	−2 10.2 −.22 10.4
−11.51			
−22.40	−17.50	−21.90	−26.90
−2 30.87	−2 31.98	−2 31.34	−2 13.77
−2 52.47 − 22.40	−2 49.48 − 17.50	−2 53.24 − 21.90	−2 40.67 − 26.90
+101 48 43.55 −2 30.26	48 54.39 − 32.27	48 55.19 31.41	48 53.99 −2 14.12
h m −1.00 s + 2.32	−1.89 + 2.06	−1.89 + 2.02	−1.89 + 2.52
15 48 −2 50.34	52.50 −2 47.71	53.30 −2 51.24	52.10 −2 38.50
78° 10′ 48 45.41	48 55.96	48 56.94	48 55.94
48 57.30			

1872

ξ δ Persei.
h m s
3 50 36
3 50 44
+ 35° 25′
+ 35 25 25″
ɳ = + 6 57 23
+.12

Tang δ = +.71
x = −.019
Corr =

α 1872 = 39.812
α 1873 = 43.686
δ 1872 = 25′ 14″.10
δ 1873 = 25 24.80

1872 Dec. 6	50m 43s.79		
11	.72	2	
16	.74	0	
21	.74	0	
26	.74	0	

Dec. 6 35° 25′ 29″.5
11 30.0 +5
16 30.5 5
21 31.0 5
26 31.4 4

1873 1872.0	m s						
Jan. 0	50 43.71	25′ 31″.9	Dec. 6			47.75	25′ 42″.9
5	.68	3	32.2	+ 3	11	81	3 43.4
10	.64	4	32.5		.276	83	2 43.9
15	.59	5	32.8		.320	83	0 44.4
20	.53	6	33.0		.226	.83	0 44.9
25	.46	7	33.1	+	.131		
30	.38	8	33.2		.1		
Feb. 4	.30	8	33.3		1		
9	.21	9	33.3	+	0		

dα = +3.874
dδ = +10.71

Sin δ 9.76307
Cos δ 9.91114
.11571
.02685m

1872 Dec. 23 +.413 +.42	1873 Jan. 12 +.351 +.33	Jan. 28 +.384 +.34	Feb. 4 +.345 +.36	Dec. 29 +.257 +.26
50 5.3 50 3.2	50 0.6 49 58.0	49 57.3 49 51.4	49 55.3 49 52.0	50 31.8 50 25.9
7.8 4.2	3.0 54.5	59.8 52.4	57.8 53.0	34.5 27.0
10.4 4.8	5.5 55.7	50 2.5 54.0	50 0.4 54.3	36.9 28.2
15.4	9.9	7.3	5.4	41.8
18.1	13.1	10.0	8.1	44.5
20.8	15.5	12.6	10.5	47.0
23.1	18.3	15.7	13.1	49.5
25.7	20.5	17.7	15.7	52.0
30.8	25.7	22.7	20.7	57.0
33.2	28.2	25.2	23.0	59.7
35.8	30.6	27.7	25.7	57 2.2
226.4	170.9	257.9	235.7	456.9
		131.9	115.7	676.9
20.582 50 4.07	15.536 49 54.40	12.536 49 52.67	10.518 49 53.10	46.991 50 27.03
50 20.56	50 15.52	50 12.52	50 10.50	50 46.97
50 43.79	50 43.62	50 43.41	50 43.30	50 47.83
−23.18	−28.10	−30.89	−32.80	−0.86
+22.90 +.03	+27.88 −.02	+30.67 +.00	+32.57 +.00	+0.73 +.01
+ .30 +.29	+ .33 +.25	+ .24 +.27	+ .26 +.24	+ .18 +.18
−3.93 −0.06	+0.07	+0.28	+0.39	÷4.14
+19.27	+28.18	+31.19 .22	+33.22 0	−3.282
50 20.56	15.52	12.52	10.50	46.97
50 39.83	43.70	43.71	43.72	43.74
50 39.85 50 42.72	43.70	43.74	43.70	43.75
+270	+240	+232	+235	+294
55	55	55	55	55
0 5.0	0 6.1	0 3.1	0 59.8	0 8.1
4 51.1	4 50.3	4 51.0	50.1	58.5
116.1	116.4	114.1	109.9	126.6
54 58.05	54 58.20	54 57.05	55 54.95	55 3.30
+ 16.51	+ 21.14	+ 19.87	+ 17.42	+ 19.96
1.21775	1.32510	1.29820	1.24105	1.30016
1.24460n	1.35195n	1.32505n	1.26790n	1.32701n
−17.56	−22.49	−21.14	−18.53	−21.23
54 58.05	54 58.20	54 57.05	55 54 54.95	55 3.30
54 40.49	54 35.71	54 35.91	55 4 36.42	54 42.07
+35° 28′ 7″.86	28 12.64	28 12.44	27 8 11.93	28 6.28
+6 57 11 0.84650	+6 56 59			+6 57 3
+3375	+4667	+2707	+ 327	+1749
0.88025	0.89317	0.87357	0.84977	0.86399
*− 7.59	*− 7.82	*− 7.47	*− 7.08	*− 7.31
− .07	− .11	− .10	− .07	− .10
− .05	− .05	− .24	− .04	+ .00
− 7.71	− 7.98	− 7.81	− 7.19	− 7.41
+35 28 0.15 28 0.15	28 4.66 4.66	28 4.63 4.63	28 4.74 4.74	27 58.87 27 58.87
25 31.2	25 32.7	25 33.2	25 33.3	25 45.2
−2 28.9 −.00 28.9	−2 32.0 −.00 32.0	−2 31.4 −.00 31.4	−2 31.4 −.00 31.4	−2 13.7 −.00 13.7
− 6.39				
− 17.10	− 6.90 7.90	− 8.40	− 8.50	−20.40
−2 30.07	−2 31.98	−2 31.78	−2 31.34	−2 13.77
−2 47.17 − 17.10	−2 39.88 − 7.90	−2 40.18 − 8.40	−2 39.84 − 8.50	−2 34.17 − 20.40
+35 25 12.98 −2 30.26	25 24.78 32.27	25 24.45 31.94	25 24.90 31.41	25 24.70 −2 14.12
− 32	.28	.27	.28	− .35
−2 47.68	−2 40.45	−2 40.61	−2 40.19	−2 34.87
25 12.47	25 24.21	25 24.02	25 24.55	25 24.00
25 23.18				

1873
~~11720~~

λ Tauri.
h m s
3 53 32
3 53 39
+ 12° 07' "
+ 12 07 46
λ = +30 15 02
+ .50

tang δ = +.22
x = -.016
Con α = +.00

	m s	' "		s	' "		
δ Jan. 0	53 38.82	7 47.6	Dec. 6	42.32	7 61.8		Sin δ 9.32261
5	.80	2 47.5 I!	11	.35	61.7	+.1	Cos δ 9.99019
10	.77	3 47.3	2 16	.37	61.5	.2	.11571
15	.73	4 47.1	2 21	.38	61.3	.2	.10890n
20	38.69	4 46.9	2 26	.38	61.1	.2	
			31	.38			

α 1872 = 35.441 δ = 7' 35.41"
α 1873 = 38.757 δ = 7 45.90
dα = +3.316
dδ = +10.49

1873 Jan. 6 +.36	+.350	Jan. 12 +.33	+.357	Dec. 29 +.26	+.257
53	53	52 58.2	52 49.3	53 28.9	53 17.3
7.8	36.6	53 0.4	50.6	31.0	18.5
8.9	37.8	2.4	51.9	33.0	19.5
10.0	38.8	6.7		37.3	
11.0		8.8		39.5	
12.0		10.8		41.6	
13.0		13.0		43.6	
14.2		15.0		45.8	
15.2		19.2		49.9	
16.3		21.2		52.0	
		23.4		54.2	
1084		179.1		456.8	
		119.1			
12.044	53 37.73	10.827	52 50.60	41.527	53 18.43

53 12.03		53 10.81		53 41.51	
53 38.79		53 38.76		53 42.38	
-26.76		-27.95		-0.87	
+26.64 +.00		+27.88 +.02		+0.73 +.01	
+ .08	+.08	+ .07	+.08	+ .06	+.06
-0.03		0.00		-3.62	
+26.69		+27.954		-2.882	
53 12.13		53 10.81		41.51	
53 38.72		38.76		38.68	
53 38.72		38.75		38.69	

+.251	+.240	+.294	
10	10	10	
1 26.9	2 25.0	2 33.9	1 38.9
11.1	6.0	20.9	26.1
1 38.0	31.0	54.8	65.0
11 19.00	12 15.50	12 27.40	11 32.50

-25.69	+20.23	+23.10
1.40976n	1.30600	1.36361
1.51566n	1.41190n	1.46951n
+32.78	-25.82	-29.48
11 19.00	12 15.50	12 27.40
11 51.78	11 49.68	11 57.92
12° 10' 56.57"	10 58.67	10 50.63

+30 14 15	1.52580			+30 14 19	
+3127		+4679		+1749	
1.55707		1.57259		1.54329	
+- 36.06		+- 37.38		+- 34.94	
- .07		- .04		- .06	
- .01		- .02		+ .09	.10
- 36.14		- 37.44		- 34.90	
+12 10 20.43	10 20.33	10 21.23	21.05	10 15.73	15.54
7 47.5		7 47.2		8 1.0	
-2 32.9	-.10 33.0	-2 34.0	-.18 34.2	-2 14.7	-.19 14.9
-1.60		-1.30		-15.10	
-2 31.66		-2 31.98		-2 13.77	
-2 33.26	- 1.60	-2 33.28	- 1.30	-2 28.87	- 15.10
+12 7 47.17	-2 31.76	7 47.95	32.27	7 46.86	-2 14.12
	- 1.25		- 1.20		- 1.47
	-2 34.61		-2 34.77		-2 30.69
	7 45.72		7 46.28		7 44.85

392 obs.
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