KG
11366
v.492

13

Coast Survey Catalogue
Observations and Reductions
From 0h 6m to 14h 59m
B5 1878

Charles W. Sever, University Bookstore, Cambridge.

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1878phae.proj.1496.

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For an explanation of the arrangement of the computation, see the Introductory page to Book I.

In the plate used after Feb. 6, only the three central groups were regarded, giving 15 readings in R.A. for stars below 60° in Dec. and 27 for those above 60°. In part of the computation where the means of the separate groups are taken without summing, they are placed at the left of the middle reading of each group. Where the sums are given, the means are collected under the readings of the inclined lines.

The final results in both R.A. and Dec. are collected at the top of each page and the means taken. The copy of the results sent to the U.S. Coast Survey Office was made independently of the above and the means of the two sets then compared, which was a check upon both copies.

Observations made by Prof. Wm. A. Rogers,
assisted by J. F. McCormack.
Chronograph sheets read by Mrs. Wm. A. Rogers.

Computations made by Winslow Upton,
assisted by Miss R. G. Saunders.
J. F. McCormack.
Miss E. C. Upton.
Miss S. C. Bond.

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12

D.M. 14 — 1878.0 — Ingram

0h 5m.8 — +22° 49' — +20 4 — 1878

| | | |

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1878.0

Pegasi (452 B) m 8

α 37.25 +21 36 21.8 log sin δ

.22 .4 " cos δ 9.96833

.34 .9

.23 .0 " 15 cos δ tan μ 0.07440n

.32 21.7

.28 22.3

I 2.23

δ +20 46 tan δ +0.40

0 8 37.273 +21 36 21.78 sin z + .35

Oct. 29 Nov. 23 Nov. 30 Dec. 1 Dec. 7 Dec. 8

| | | |

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4

1878

Androm. (76B)

| | | |

1878phae.proj.1496.

1878.0

Cassiop. — h 0, m 23, s 32.08, δ +59° 18′ 11.7″ — hyperb.

| | | |

1878phae.proj.1496.

16

1878.0

Androm. (117 B)

| | | |

1878phae.proj.1496:

1878.0

67 Piscium K 49 — 24.89 +26 32 51.5 — hydrin δ

0h 48.m5 — .88 — 50.8 — · cos δ — 9.95160
+26° 33′ — .92 — 50.7
25.94 — 50.0 — ·15 cos Stand — 0.05767n
.01 — 51.6
24.94 — 50.8

+15 50 — tan δ — + 0.50
sin z — + .27

0 √49 — 24.95 — +26 32 50.98

Nov. 23 — Nov. 24 — Nov. 26 — Dec. 1 — Dec. 7 — Dec. 14

h m s	m s																		
0 53 28.7	53 53.60	53 32.2	53 57.92	53 40.4	53 57.42	53 37.0	54 2.70	53 48.9	54 10.35	53 53.6	54 17.50								
30.7	55.90	34.2	57.36	42.1	59.68	38.6	5.00	50.4	12.55	55.2	19.60								
32.2	58.10	36.4	57.60	44.2	1.95	41.4	7.45	52.1	14.82	57.3	22.50								
34.2	0.40	38.0	1.99	46.3	4.30	43.8	9.65	54.5	17.10	58.1	24.40								
121 863	4075 2.75	308 40.0	4815 4.28	209 47.9	995 6.60	65 45.7	3675 11.95	126 52.7	2425 19.43	367 1.5	1010 26.60								
	6.30	54 37.9	7.72	54 40.1	10.18	54 [illegible].9	15.45		22.85	54 56.7	30.08								
	8.55	40.3	10.00	42.3	12.42	1.0	17.73		25.28	58.5	32.42								
	10.80	42.0	12.16	43.8	14.78	2.3	19.90		27.39	55.9	34.50								
	13.12	43.8	14.55	45.5	17.00	3.8	22.30		29.83	1.8	37.20								
420 15.43	95 45.5	1138 16.95	193 47.6	2365 19.27	110 6.0	4993 24.55		3742 32.07	07 3.8	2410 39.50									
	18.70		20.35		22.80		28.00		35.47		42.37								
58.15	21.20	59.63	22.68	1.99	25.10	7.35	30.30	14.85	37.88	22.02	45.20								
10.84	23.40	12.28	24.95	14.73	27.25	1999	32.70	27.48	40.05	34.82	47.45								
23.48	25.85	24.97	27.28	27.35	29.80	32.67	35.00	40.15	42.35	47.54	49.95								
1740 28.25		2486 29.60		3675 32.00		1335 37.35		075 45.00		3772 52.15									
3247	3688		4407		6001		8248		10438										
53 32.42	53 36.16		53 44.18		53 41.30		53 52.52		53 57.34										
54 10.823	54 41.90	54 12.293	54 43.86	54 14.690	55 2.20	54 20.003		54 27.493	55 0.14	54 34.793									
−4 40.96		−4 42.43		−4 44.77		−4 57.04		−4 57.60		−5 5.04									
−0.54		−0.56		−0.57		−0.55		−0.57		−0.56									
∴ −4.43		−4.42		−4.41		−4.38 37		−4.37 31		−4.34 25									
−4 45.93		−4 47.41		−4 49.77		−4 52.96		−5 2.48		−5 9.85									
49 24.89		24.88		24.92		25.01		25.01		24.94									

+3840		+3613	−2961	+3051	−2917	+3870	−4220	+3497		+2745	−2535								
1.58433		1.55787	1.47144n	1.48444	1.46494n	1.58771	1.62531n	1.54370		1.57345	1.40398n								
1.64200n		1.61554n	1.52911	1.54121n	1.52261	1.61538n	1.68298	1.60137n		1.63112n	1.46165								
50 3		50 3	50 2	50 3	50 2	50 3	50 2	50 3		50 3	50 2								
50.8 +.24		48.1 +.29	33.6 +.49	43.7 +.37	35.9 +.44	53.7 +.21	21.1 +.49	50.1 +.25		50.9 +.24	38.4 +.41								
55.2 +.26		53.2 +.30	38.9 +.27	48.1 +.34	40.2 +.29	57.9 +.21	25.7 +.25	53.1 +.30		55.8 +.25	42.9 +.37								
5.9 +.14		3.8 +.17	49.4 −.55	56.9 +.01	50.0 −.54	5.8 +.14	34.3 −.08	59.9 +.16		4.1 +.17	52.5 −.46								
4.6 +.18		3.4 +.14	48.8 +.28	56.2 +.03	47.2 +.31	6.8 +.21	34.2 +.46	58.4 +.02		3.4 +.14	49.9 +.27								
2365 +.82		2285 +.90	1707 +.49	2049 +.75	1733 +.50	42 +.78	1153 +.42	215 +.73		2342 +.80	1837 +.59								
53 59.12		53 57.12	52 42.67	53 51.22	52 43.32	54 [illegible]	52 28.82	53 55.37		53 58.55	52 45.92								
−43.85		−41.26	33.81	−34.84	33.31	−44.19	48.19	−39.94		−42.77	+28.95								
+2 53 15.27		15.86	18.48	16.38	16.63	16.86	17.01	15.43		15.78	14.87								
+26 29 33.08		32.40	31.87	31.97	31.72	31.49	31.34	32.92		32.57	33.48								
+15 49 5																			
1.21250																			
+171		+1164		+2289		+2789		+3006		+2403									
1.21421		1.22414		1.23539		1.24039		1.24256		1.23683									
−16.38		−16.75		−17.19		−17.39		−17.48		−17.24									
−.33		−.29	−.20	−.21	−.19	−.33	−.39	−.27		−.31	−.14								
−.48	−1.02	−.48 −1.00	−.32 −0.64	−.43 −0.85	−.30 −0.62	−.40 −0.93	−.25 −0.92	−.39 −0.84		−.44 −0.95	−.31 −0.60								
−.21		−.23	−.12	−.19	−.13	−.20	−.28	−.18		−.20	−.15								
−17.40		−17.75	−17.39	−18.02	−17.81	−18.32	−18.31	−18.32		−18.19	−17.84								
29 15.68		14.74	14.48	13.95	13.91	13.17	13.03	14.60		14.38	16.64								
		14.61		13.93		13.10				15.01									
−.28		−.29		−.29		−.32		−.34		−.36									
−34.00		−34.05		−34.35		−34.38		−34.46		−34.58									
+4 10.14	+4 9.82	+4 10.48	+4 10.37 19	+4 11.24	+4 10.95	+4 11.52	+4 11.20	+4 11.82	+4 11.48	+4 [illegible]	+4 10.17								
+3 35.82		+3 36.14		+3 36.80		+3 36.87		+3 37.08		+3 35.69									
32 51.50		50.75		50.73		49.97		51.63		50.76									

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8

1878.0

Cassiopeia

α 0h 50m 48s.78 δ +65° 41′ 32″.1 log sin δ log R_1 1.444100

α 0h 51.0m δ +65° 42′ $\log R_2$

R_1 R_2 $\frac{1}{2}I$ 27.61 3.50

α −23 19 δ 0 50 48.68 +65 41 32.02 tan δ +.222 sin z −.40

1878

Nov. 30 Dec. 7 Dec. 7 Dec. 8 Et Dec. 8 Dec. 16 Dec. 14

| | | |

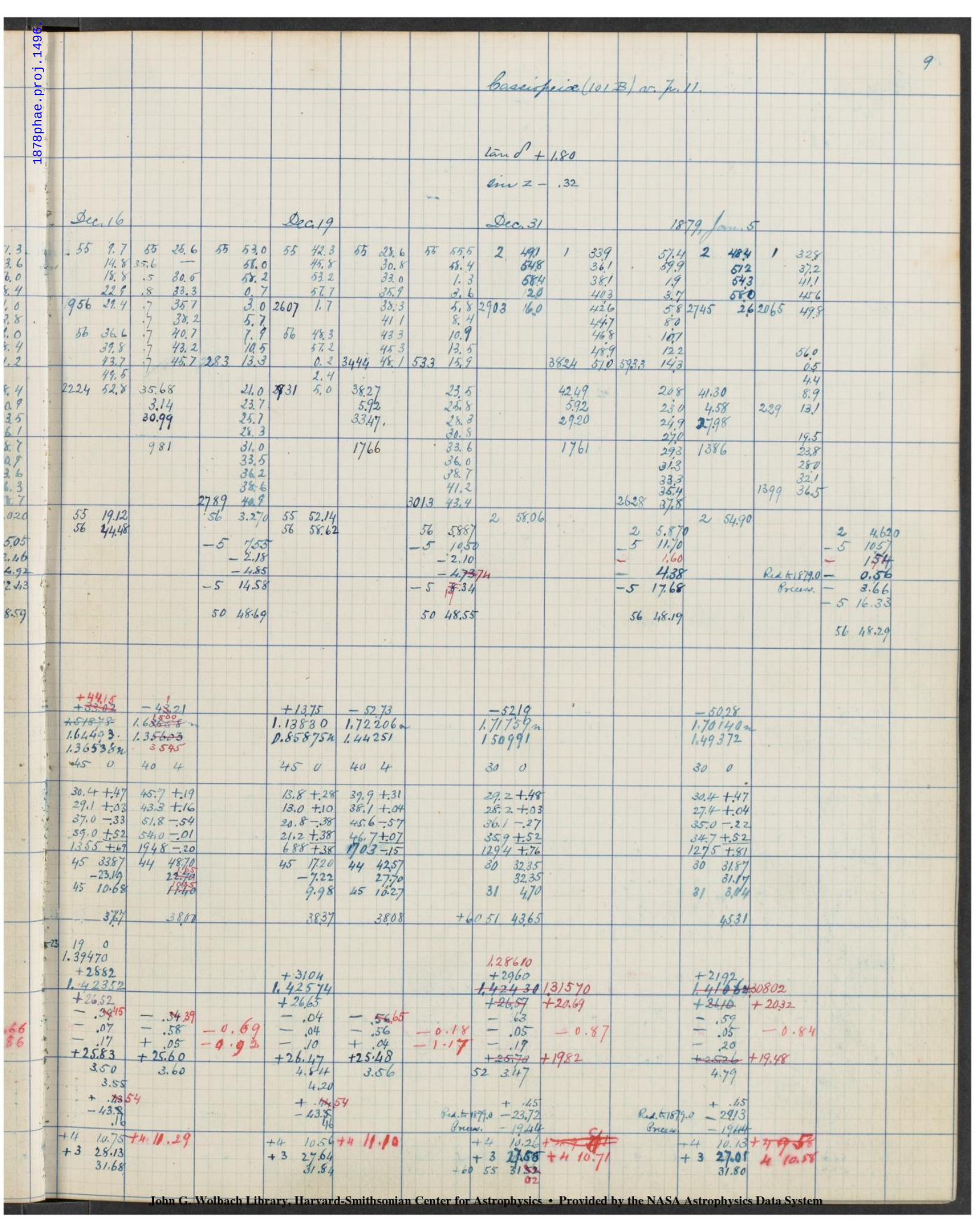
1878phae.proj.1496:

Cassiopeia (101 B) cr. fr. 11.

tan δ + 1.80

sin z − .32

Dec. 16 | Dec. 19 | Dec. 31 | 1879, Jan. 5



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1878phae.proj.1496.

10

Piscium σ'

1878.0

	α	δ	log cos δ	log 1500 sin 1″
	0h 56m 8.42	+31° 8′ 55.8″		
	44	56.2		
	41	55.4		
	39	.1		
	55	.6		
	48	.2		
			9.93230	0.03837n

0h 56.2m
+31° 10′
+11 13
1878

	α	δ	tan δ	lin z
	0 56 8.45	+31 8 55.5	+ 0.60	+ .19
	48	55		

	Dec. 8	Dec. 14	Dec. 16	Dec. 18	Dec. 19	Dec. 23
	h m s	m s	m s	m s	m s	h m s
	0 0 30.0	0 54.00	0 43.2 / 0.50	0 50.3 / 2.72	3 41.9 / 31.20	0 55.7 / 5.00	0 51.9 / 7.50	0
	32.2	56.38	45.8 / 2.80	52.5 / 5.30	44.0 / 33.70	59.2 / 8.30	54.0 / 10.00	
	34.0	58.77	48.7 / 5.20	54.7 / 7.66	46.9 / 36.00	2.0 / 10.70	56.0 / 12.34	
	36.7	1.20	52.4 / 7.60	56.8 / 10.00	48.6 / 38.40	3.6 / 13.20	58.1 / 14.80	
	219 39.0	1397 3.70	411 53.0 / 2608 9.98	237 59.4 / 3813 12.45	2308 50.4 / 18020 40.90	63 5.8 / 280 15.60	2800 0.1 / 6184 17.20	12.83
		7.15	13.67	16.14	48 / 46.8	1 13.5 / 19.20	20.73	
		9.66	16.08	18.50	7.20	[21.55] 22.55	23.20	
		12.07	18.53	20.90	9.62	24.03	25.56	
		14.50	20.86	23.27	11.95	26.37	28.00
	6028 16.90	4244 23.30	451 25.70	4785 14.40	2700 28.85	2894 30.45
		20.48	27.03	29.40	18.00	32.48	34.00
	5879	2292	29.40	31.70	20.45	10.56	39.75	12.37	36.50
	12.06	25.35	31.88	34.06	22.84	24.80	37.07	25.39	38.82
	25.35	27.80	34.25	36.56	25.20	37.22	39.60	38.88	41.30
	2670 30.15	913 36.60	2072 39.00	11416 27.67	7198	3609 42.25	7744	14442 43.80
	36.20	5554	6267	6844			
	0 34.38	1 12.07	0 48.22 / 1 18.13	0 54.74 / 1 20.90	8 46.16 / 48 22.83	1 1.26 / 1 13.50 / 1 23.98	0 56.02 / 1 25.59	1
	−4 58.62	−5 5.05	−5 7.56	−5 9.59	−5 10.51	−5 12.28
	− 0.61	− 0.67	− 0.59	− 0.52	− 0.57	− .61
	− 4.42	− 4.35	− 4.33	− 4.31	− 4.30	− 4.24
	−5 3.65	−5 10.07	−5 12.48	−5 14.42	−5 15.38	−5 17.13
	56 8.42	8.44	8.41	8.39	8.64	8.48
	+37.69	+30.29	+26.15	−23.35	+36.65	+22.67	+10.49	+29.66	
	1.57623	1.48130	1.41747	1.36829n	1.56407	1.35660	1.02078	1.47217	1.43
	1.61460n	1.51967n	1.45584n	1.40666	1.60244n	1.39492n	1.05985n	1.50951	1.22
	15′ 2″	15 2	15 2	15 2	15 2	15 2	15 2	30
ζ	50.6 +.20	39.9 +.38	37.5 +.42	48.8 +.23	33.1 +.50	26.9 +.54	41.4 +.36	23
F	54.1 +.37	44.3 +.40	40.2 +.29	52.7 +.39	37.1 +.23	29.9 +.22	45.5 +.42	22
g	1.1 +.08	52.5 −.46	48.9 −.56	59.8 +.05	44.8 −.53	38.8 −.31	52.2 −.48	29
H	59.1 +.22	51.5 +.25	47.3 +.31	57.2 +.20	42.1 +.36	35.9 +.44	50.3 +.27	26
	2249 +.87	1882 +.57	1739 +.46	2185 +.87	1571 +.56	1315 +.89	1894 +.57	22
	17 56.22	17 47.05	17 43.47	17 54.62 51.62	17 39.27	17 32.87	17 47.35	31
	−41.17	−33.08	−28.54	28.51 −40.03	−24.76	− 11.46	− 32.40	
	17 15.05	13.97	14.40	+817 20.13 14.59	17 14.51	21.41	14.95	+60 31
+31°	5′ 33.30	34.38	33.45	28.27 33.76	33.84		33.32	+60 51
+11	13 5							−15 33
	1.05770							1.28
	+ 3301	+ 2412	+ 2896	+ 2190	+ 3116	+ 2632	+
	1.09071	1.08182	1.08666	1.07960	1.08886	1.08402	1.3
	−12.32	−12.07	−12.21	−12.01	−12.27	−12.13	+
	− .34	− .22	− .16	− .32	− .13	− .21	−
	− .29 −6.85	− .31 −0.67	− .32 −0.60	− .35 −0.89	− .32	− .30	− .34 −0.69	−
	− .22	− .14	− .12	− .22	− .14	− .22	− .14	−
	−13.17	−12.74	−12.81	−12.90	−12.86	−12.82	+
31°	5 20.13	21.64	20.64	20.96	20.98	20.50	
	− .24	− .25	− .25	− .26	− .26	− .26	
	− 35.55	− 35.57	− 35.69	− 35.70	− 35.70	− 35.57	−
	+4 11.46 +4 11.22	+4 10.53 +4 10.28	+4 10.75 +4 10.50	+4 10.24 +4 9.98	+4 10.56 +4 10.30	+4 10.61 +4 10.35	+4
	+3 35.67	+3 34.71	+3 34.81	+3 34.28	+3 34.60	+3 34.68	+3
	8 55.80	56.25	55.45	49.79 55.14	55.55	55.18	55

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1880

Cassiop. (107 B) 2h 56m

0h 57.0m
+60° 57'
−18 34 0 56

Dec. 24

Dec. 25

Dec. 26

For Dec. 31, Jan 5
see p. 9.

log R, 1.66980
" R₂ 1.36913

R₁ 46.75
R₂ 23.40
½ I

log sin δ 9.68625
" cos δ
" 15 cos δ tan α 9.79232n
tan δ + 1.80
sin z − .32

Dec. 7

h m s
0 1 18.1
21.6
25.0
30.6
12.85 33.2

1 25.70

+27.34
1.43680
1.22912n

30 1

23.9 +.53
22.1 +.22
29.8 −.03
26.9 +.65
22.7 +1.37
31 25.67
−16.95
+60 31 8.72
+60 57 39.63

−18 33 2
1.28610
+3019
1.31629
+20.72
− .18
− .14 −0.66
− .34
+20.06
51 59.69

+ .40
−41.20

+4 11.82 +4 12.22
+3 31.02
55 30.71

1 53.045
−4 54.67
−2.07
−5.06.07
−5 4.76
56 48.28

−1.69
−4.60

1 2.0
6.0
11.2
15.3
535 19.0

1 10.70

+56.79
1.75427
1.54659n

30 1

36.9 +.39
34.8 +.18
42.3 −.47
40.6 +.52
1546 +.62
31 38.65
−35.20
31 3.45

51 44.90

+2251
1.30861
+20.35
− .74
− .18 −1.08
− .16
+19.27
52 4.17

+ .45
−43.00

+4 9.96 +4 10.41
+3 27.41
31.58

1 12.00
16.6
20.6
25.1
1036 29.3

20.72 7.47
44.10 .50
7.50 .50

1 35.8
39.9
44.0
48.3
2205 52.5
58.9
3.3
7.8
11.5
3875 16.0

1 24.36

+33.10
1.51983
1.31215n

30 1

20.6 +.50
19.3 +.24
27.1 −.09
26.8 +.65
938 +1.30
31 23.45
−20.52
31 2.93

45.42

+2303
1.30913
+20.58
− .25
− .17 −0.75
− .33
+19.63
5.05

+ .45
−43.05

+4 9.80 +4 10.25
+3 27.20
32.25

1 27.1
29.7
34.5
38.1
1718 42.4

1 35.6
37.6
40.0
42.0
3969 52.6

44.10 7.50
7.43 .43

2 7.490
−5 12.98
−1.63
−4.30.57
−5 19.18
56 48.31

2 7.465
−5 13.11
−1.57
−4.54
−5 19.22
48.24

A−1 44.2
46.2
48.3
51.4
669 16.0

A. 7.3
9.4
11.6
13.8
16.0

For Dec. 31, Jan 5
see p. 9.

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DM. 220

0h 57.m0

+ 51° 51'

− 9 28

1878

Dec. 7 | Dec. 8 | Dec. 19 | Dec. 23 | Dec 25 | Dec. 26

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Piscium

1878.0

$1^h\ 3.8^m$
$+24^\circ\ 50'$
$+17\ 3.3$

	1	2	112.50	$+24^\circ$	48 39.94	logarithmic						
			51		38.8	" cos δ	9.95786					
			51		39.1							
			53		39.8	" 15 cos δ sin z	0.06393 n					
			44		39.0							
			60		38.5							
	1	3	42.52/15	$+24$	48 39.2/15	tan δ	+0.46					
						2 sin z	+ .30					

	Dec. 1	Dec. 7	Dec. 8	Dec. 12	Dec. 16	Dec. 18	
	h m s / m s	h m s	h m s	h m s	h m s	h m s	h m s
1	8 36.1 / 8 —	8 42.4	8 —	8 9.8	8 28.87	8 5.0	8 33.46
	38.3 / —	44.0	32.62 30.34	11.6	31.15	6.8	35.61
	40.0 / 25.15 24.15	45.7	.60 22.60	13.2	33.33	8.7	37.82
	42.0 / 24.92 27.20	48.3	.67 24.96	14.5	35.64	10.8	40.10
	10 44.6 / 25.06 29.62	304 50.0	.66 37.22	671 17.0	1727 38.06	445 13.2	3957 42.48
	9 1.2 / 32.90	9 2.3	40.55	9 10.9	41.52	9 24.1	45.90
	3.3 / 35.37	2.8	42.90	12.5	43.78	25.7	48.16
	5.3 / 37.58	2.3	—	14.4	46.02	27.4	50.39
26.30	7.3 / 36.85	81.0	47.40	16.2	48.20	29.5	52.70
29.72	269 9.8 / 3801 42.37	479 88.5	2062 49.77	219 17.9	3005 50.53	384 31.7	212 54.97
8292			53.00		53.85		58.47
36.27	25.04 / 47.85	32.64	55.22	33.45	56.40	3791	0.90
41.52	37.60 / 49.90	45.15	57.57	46.01	58.65	60.42	3.00
4460	50.04 / 52.28	57.54	59.83	58.62	0.90	3.01	5.20
4880	0.20 / 54.62		3772 2.10		4310 3.20		1507 7.50
5162							
5460	112.68	13533		13808		15134	16444
	8 40.20	8 46.08		8 13.42		8 8.90	8 25.12
11.280	9 5.38 / 8 37.568	9 29.58	8 45.110	9 14.38	8 46.027	9 27.68	8 50.447
	/ −4 58.15		−4 57.63		−4 58.62		−5 3.05
13.11	/ −0.52		− 0.53		− 0.47		− 0.47
1.11	/ −4.49		−4.46		−4.43		−4.40
4.38	/ −4 55.06		−5 2.60		−5 3.52		−5 7.92
18.81							
2.6	/ 3 42.50		3 42.51		42.51		42.53
58.21							

	−2.64	−2.82	− 0.97	−44.47	+32.61	− 28.35	+41.55	− 37.23	+29.69	− 29.53	+15.89	− 32.07
	0.42160n	1.44486 n	9.98677 n	1.64807 n	1.51335	1.45255 n	1.61857	1.57089 n	1.47261	1.47026 n	1.20112	1.50610 n
	0.48553 x	1.50829	0.05070	1.71200	1.57728 n	1.51648	1.68250 n	1.63482	1.53654 n	1.53419	1.26505 n	1.57003
	35 2	35 1	35 2	35 1	35 2	35 1	35 3	35 1	35 2	35 1	35 2	35 1
	15.8 +.37	46.4 +.21	21.1 +.49	29.9 +.50	58.5 +.16	47.4 +.19	4.7 +.21	33.2 +.48	53.8 +.16	45.3 +.23	38.3 +.41	42.6 +.28
	20.6 +.30	51.2 +.42	25.2 +.25	33.1 +.18	3.0 +.27	50.9 +.12	10.1 +.30	38.7 +.24	57.8 +.30	48.8 +.43	42.4 +.35	46.4 +.41
	30.0 +.04	59.2 +.09	31.1 +.03	39.3 −.37	7.9 +.01	57.1 −.03	19.5 −.30	48.0 −.57	5.1 +.08	57.3 −.02	50.1 −.54	54.4 −.31
	28.8 +.48	59.2 +.30	29.1 +.48	37.8 +.36	6.5 +.40	56.2 +.30	16.9 +.36	46.3 +.43	3.8 +.33	56.0 +.30	488 +.28	52.6 +.34
	9 51 +1.21	216.0 +1.02	1065 +1.25	1701 +.87	2559 +.84	2116 +.88	51.2 +.57	1662 +.58	2405 +.87	74 +.94	1796 +.80	1960 +.72
	37 23.77	36 54.00	37 26.62	36 42.52	38 3.97	36 52.90	38 12.80	36 41.55	38 0.12	36 51.85	37 44.90	36 49.60
	3.66	32.23	1.12	51.52	−37.48	32.84	−48.14	43.13	−34.40	34.21	−18.41	34.16
+.34	37 26.83	37 26.23	37 27.74	37 26.52	37 26.19	37 25.74	37 24.66	37 24.68	37 25.72	37 26.06	37 26.47	26.16
+.24	45 21.52	22.12	20.61	21.83	22.18	22.61	23.69	23.67	22.63	22.29	21.86	22.19
+17	33 16											
	1.26050											
	+.2858		+.3029		+.3366		+.2167		+.2989		+.2197	
	1.28864		1.29079		1.29366		1.28277		1.28967		1.28447	
	−19.44		−19.53		−19.66		−19.15		−19.48		−19.16	
	− .00	− .16	− .00	− .40	− .22	− .16	− .35	− .28	− .18	− .18	− .05	− .21
	− .24	− .19	− .24	− .16	− .31	− .19	− .35	− .19	− .36	− .23	− .32	− .22
	− .30	− .26	− .31	− .22	− .21	− .22	−19.14	− .15	− .22	− .24	− .13	− .18
	−19.98	−20.05	−20.08	−20.31	−20.40	−20.23	−19.91	−19.77	−20.24	−20.13	−19.66	−19.77
	45 1.54	2.07	0.53	1.50	1.76	2.38	3.70	3.90	2.39	2.16	2.20	2.42
	1.80		1.02		2.07		3.80		2.28		2.31	
			33.68						33.64		66	
	− 33.54		− 33.X		− 33.70		− 33.71		− 33.X		− 33.X	
	− .35		− .37		− .38		− .39		− .40		− .41	
10.02	+4 11.52	+4 11.17	+4 11.82	+4 11.45	+4 11.46	+4 11.08	+4 10.07	+4 9.68	+4 10.75	+4 10.30	+4 10.24	+4 9.83
	+ 3 37.63		+ 3 37.77		+ 3 37.38		+ 3 36.97		+ 3 36.67		+ 3 36.17	
	48 39.43		38.79		39.45		34.77		38.95		38.48	

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	Dec. 7		Dec. 11		Dec. 12		Dec. 14		Dec. 16		Dec. 19	
h	m s	m s										
1	24 42.0	25 44.5	24 48.5	25 8.60	25 23.6	25 9.78	25 12.7	25 11.70	25 11.8	25 14.16	25 41.0	—
	44.8	7.24	51.0	11.35	26.5	12.49	15.0	14.48	12.6	17.69	43.3	—
	47.0	9.86	53.6	14.00	28.7	15.10	16.7	17.20	15.9	—	45.0	—
	50.0	12.58	56.2	16.75	30.5	17.80	20.5	20.00	19.5	22.30	47.9	—
	2367 52.9	4931 15.18	172 57.9	2015 17.45	428 33.5	2592 20.65	870 22.1	1868 22.70	832 22.4	7826 24.80	2272 50.0	—
		19.40	25 51.9	23.45	26 11.0	24.60	26 0.3	26.77	25 54.3	28.03		25 32.00
		21.92	54.1	26.40	57.8	27.43	2.6	29.35	57.0	31.80		34.63
		24.70	56.3	28.85	2.3	30.02	5.2	32.28	58.4	34.40		37.32
		27.63	58.7	31.70	4.5	32.98	7.6	34.70	1.1	37.25		40.10
	2399 30.34	324 1.4	4487 34.37	117 7.1	053 35.50	261 10.4	1059 37.49	452 3.4	2222 39.77		18688 42.83	
		34.40		38.40		38.75		41.73		44.80		46.90
9.86		37.00	14.03	41.18	15.18	42.39	17.22	44.40	19.57	46.70	—	49.58
24.80		39.78	28.97	43.90	30.11	44.98	32.12	46.90	34.44	49.40	37.38 37.58	52.10
39.71		42.28	43.89	46.60	45.06	47.72	47.06	49.72	49.44	52.08	52.25 .31	55.00
7436	4886 45.10		8689	1943 49.35	9035	2532 50.48	9640	3530 52.55	10345	4719 55.00		26126 57.68
24 47.34			24 53.44		25 28.56		25 17.40		25 16.64		25 45.44	
	25 24.78		25 56.48	25 28.963	26 2.34	25 30.117	26 5.22	25 32.133	25 59.04	25 34.483		25 37.345
	−1 5.76			−5 1.97		−5 3.08		−5 5.09		−5 7.58		−5 10.52
	−0.98			−0.90		−0.88		−0.94		−0.83		−0.81
	−4.84			−4.80		−4.79		−4.78		−4.74		−4.70
	−5 3.48		−5 7.67		−5 8.75		−5 10.80		−5 13.15		−5 16.03	
	20 21.31		20 21.29		20 21.34		21.33		21.33		21.31	
	+3745		+3552	−2752	+186	−3222	+1473	−3309	+1784	−2456	−810	
	1.57345		1.55047	1.43965m	0.19312	1.50813m	1.16820	1.51970m	1.25139	1.39023m	0.90849m	
	1.56067m		1.53766m	1.42687	0.18034m	1.49535	1.15542m	1.50692	1.23861m	1.37745	0.89571	
	55 3		55 3	55 2	55 3	55 2	55 3	55 2	55 3	55 2	55 3	55 2
E	55.1 +.21		48.4 +.28	46.7 +.27	16.5 +.48	42.9 +.32	29.1 +.60	42.2 +.34	33.6 +.55	52.2 +.18	8.5 +.30	52.2 +.18
F	57.1 +.23		51.9 +.31	50.4 +.42	19.4 +.26	46.1 +.42	32.0 +.15	45.3 +.41	35.7 +.15	54.2 +.37	11.6 +.30	54.2 +.37
G	4.3 +.17		3.4 +.18	1.4 +.08	30.2 +.06	57.1 −.07	42.4 −.40	55.7 −.20	44.9 −.47	3.8 +.10	21.0 −.26	3.8 +.10
H	1.9 +.09		2.2 +.10	59.7 +.23	27.9 +.34	54.1 +.23	46.2 +.24	55.4 +.23	43.1 +.19	1.7 +.27	19.3 +.35	1.7 +.27
	2384 +.70		2259 +.87	2182 +1.00	940 +1.14	02 +.70	1437 +.89	1986 +.78	1573 +.42	2319 +.92	6044 +.69	2319 +.92
	58 59.60		58 56.47	57 54.55	58 23.50	57 50.05	58 35.92	57 49.65	58 39.32	57 57.97	58 15.10	57 57.97
	−36.38		−34.10	26.72	−1.52	31.29	−14.30	32.13	−17.32	23.85	7.87	
	58 23.24		21.98	21.27	21.98	21.34	21.62	21.78	22.00	21.82	58 22.97	
+40°	24 25.11		26.37	27.08	26.37	27.01	26.73	26.57	26.35	26.53	25.38	
+1	54 13											
	0.28190											
	+3054		+1076		+2183		+2438		+2962		+3162	
	0.31244		0.29266		0.30373		0.30628		0.31152		0.31352	
	−2.05		−1.96		−2.01		−2.02		−2.05		−2.06	
	−.38		−.34	−.21	−.00	−.28	−.06	−.30	−.09	−.16	−.02	−
	−.40	−0.96	−.39	−.29	−.37	−.31	−.40	−.31	−.44	−.36	−.40	−.36
	−.18		−.22	−.25	−.29	−.23	−.15	−.20	−.11	−.23	−.17	−.23
	−3.01		−2.91	−2.71	−2.67	−2.83	−2.63	−2.83	−2.69	−2.80	−2.65	
40°	24 22.10		23.46	24.37	23.70	24.18	24.10	23.74	23.66	23.73	22.73	
			23.92		23.94		23.92		23.70			
	−36.77		−37.09		−37.16		−37.28		−37.40		−37.54	
	−.04		−.04		−.04		−.04		−.04		−.04	
	+4 11.82	+4 11.78	+4 10.45	+4 10.41	+4 10.07	+4 10.03	+4 10.53	+4 10.49	+4 10.75	+4 10.71	+4 10.56	+4 10.52
	+3 35.01		+3 33.32		+3 32.87		+3 33.21		+3 33.31		+3 32.98	
	27 57.11		57.24		56.81		57.13		57.01		55.71	

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	Dec. 25			Dec. 26		
h	m s	m s	m s			
1	27 22.9	27 5.1	32.4	27 18.4	27 5.3	32.8
	26.6	15.1 —	35.0	23.0	15.3 —	35.3
	31.0	.0 10.0	37.7	27.1	.0 10.0	37.8
	36.0	.0 12.5	40.0	30.9	.4 12.9	40.3
	1575 41.0	.1 15.1	42.4	1352 35.8	.4 15.4	42.5
		.3 17.8	45.0		.6 18.1	45.1
	28 37.8	.2 20.2	47.2	28 27.3	.4 20.4	47.6
	40.8	.2 22.7	49.9	32.0	.1 22.6	51.0
	46.0	.0 25.0	3819 52.3	35.5	.2 25.2	3840 52.6
	50.2			410		
	2288 54.0		54.7	1803 44.5		0.0
		15.11	2.2		15.30	2.2
		42.43	4.8		42.67	4.9
		9.64	7.0		9.93	7.4
			9.4			9.9
		12.718	12.1		12.790	12.5
			14.5			15.0
			17.1			17.5
	27 31.50		868 20.0	27 27.04		894 20.0
	28 45.76		27 42.393	28 36.06		27 42.633
			−5 12.99			−5 13.12
			− 1.98			− 1.91
			− 5.47			− 5.43
			−5 20.44			−5 20.46
			22 21.95			22.17

	s	s			
	+10.89	−63.37		+15.59	−53.43
	1.03703	1.80188n		1.19285	1.72779n
	0.76110n	1.52595		0.91692n	1.45186
	′ ″	′ ″		′ ″	′ ″
	55 3	55 3		55 3	55 3
E	43.9 +.36	4.4 +.20		45.1 +.34	7.2 +.26
F	41.2 +.24	1.7 +.27		42.1 +.26	5.8 +.30
G	48.3 −.50	7.1 +.05		49.6 −.48	13.0 −.21
H	49.3 +.11	8.9 +.41		51.2 +.09	14.8 +.38
	227 +.21	221 +.93		1880 +.21	408 +.73
	58 45.67	58 6.52		58 47.00	58 10.20
	− 5.77	+33.57		− 8.26	28.30
	58 39.90	39.09		58 38.74	38.50
	′ ″	″		′ ″	″
	24 8.45	9.26		24 9.61	9.85
	+2290			+2350	
	1.412290			1.413350	
	+25.88	″		+25.91	
	− .03	− .82		− .05	− .59
	− .42	− .34	−1.39	− .42	− .35 −1.12
	− .05	− .23		− .05	− .18
	+25.38	+24.49		+25.39	+24.79
	24 33.83	33.75		35.00	34.64
	33.79			34.82	
	−42.45				
	−43.0			−43.05	
	+ .55	10.51		+ .55	10.35
	+4 9.96	+4 9.41		+4 9.82	+4 9.25
	+3 27.56			+3 27.36	
	28 1.35			2.12	

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Piscium

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α 1 34 30.27 δ +25° 7' 43.2 — logarithms

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Arietis (70B)

α_0 2m 12 4.77 + 22° 36 15.5 log sin δ 9.58497

2h 12.2m

+22° 37'

+19 46

1878 Jan. 13

corr. α 12 .82 14.1 " cos δ 9.96525

dα/dt .82 12.7

.82 14.4 " 1500 s/sun 009 003 Paris Feb. 6

.68 14.4 0.07132 n after June 6 I 2.24

δ₀ .75 13.6

tan δ + 0.42

corr. δ 12 4.78 22 36 14.2 .17

dδ/dt .77 Dec. 7 Dec. 8 sin z + .34 Dec. 14 Dec. 16 Dec. 18

| | | |

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1878.0

9 Persei ν do 13 $\frac{h}{m}$ 51.2 $\frac{s}{s}$ + 55° 17' 10.4 "

2h 14.0m

+55° 18'

−12 55

1878 Jan. 13

log sin δ 9.91495

" cos δ 9.75533

" 1500 Stand 9.88011 (Prior Feb. 6)

9.86140n (after June 6)

tan δ +1.44

com z −.22

am

log R_1 / R_2 1.30005

R_1 / R_2 19.96 / 3.63

I

com. α 81 ½ 10.4 / .72 11.2 / .61 ½ 10.4 / .68 10.1 / .76 10.7

da 13 51.72 18

do

com. δ 13 51.72 55 17 10.6 58

dδ

dt

Dec. 7 — Dec. 8 — Dec. 16 — Dec. 18 — Dec. 19

2	12	44.7	12	52.60	19	15.3	18	—	18	35.5	18	30.82	19	4.5	18	—	21	59.9	21	41.50	18	6.5	18	42.70
		47.5		56.28		18.0		—		40.4		34.50		8.6		—		2.3		45.10		11.5		46.00
		50.0		59.70		21.6		—		43.0		38.20		11.9		—		7.4		48.80		15.7		49.90
				7.15		25.5		—		46.2		41.70		15.4	46.77	50.40		10.0		52.44		19.0		53.50
				10.62	1094	29.0		—	2151	50.0	4067	45.45	585	18.1	.42	54.18	326	13.0	2184	56.00	771	22.4	2940	57.30
				14.22																				
	13	36.3		17.90	19	36.0		5020	19	31.7		40.70	20	4.2		58.55	22	48.0		1.50	19	47.8		2.50
		38.4		21.59		38.7		13.78		34.5		54.60		8.4		3.37		61.0		5.10		49.6		6.10
		40.7		28.72		13		5.745		36.7		58.10		12.0		6.90		54.0		8.75		52.3		9.90
				32.29		6.4		100		39.6		1.75		14.7		10.72		57.5		12.70		55.7		13.30
				36.00	117	9.3	28700	457	1865	44.0	4045	5.30	572	17.9	3442	13.88	2709	0.4	4405	16.00	2687	58.3	4880	17.00
				33707	—			1022				10.85				19.45				21.43				22.63
	12	47.40		15707	5740	57.40		14.00		36.13		14.55		46.84		23.25		48.77		25.00		49.88		26.00
	13	38.47	13	14.279		17.54		17.50		58.09		18.12		6.88		26.85		8.81		28.67		9.76		29.70
						.58		2110		18.10		21.67		26.81		30.48		28.67		32.25		29.75		33.40
				+39.17			8770	2488			4050	25.31			13405	34.10			14335	36.00			14873	37.00
				− .44						17432								20625				20939		
					19	21.88				18 43.02				19 11.70				22 6.52				18 15.42		
					20	2.34	18	57.490	19	37.30	18	58.107	20	11.44	19	6.843	22	54.18	22	8.750	19	52.74	19	9.797
				+39.19				−4 57.76				−4 58.68				−5 7.65				−5 9.67				−5 10.56
				− 0.80				− 1.66				− 1.46				− 1.432				− 1.26				− 1.36
				− 0.95				− 6.26				− 6.25				− 6.16				− 6.14				− 6.12
				+ 38.44				− 5 5.68				− 5 6.39				− 5 15.23				− 5 17.07				− 5 18.04
				13 51.72				13 51.81				51.72				51.61				51.68				51.76

	+ 2688		− 24.19		− 24.39		− 6485		+ 1809		− 3919		− 486		− 64.60		+ 223		− 46.43		+ 54.38		− 4294	
	1.42943		1.38864n		1.38721n		1.81191n		1.17869		1.59318n		0.68664n		1.81023n		0.34830		1.65734n		1.73544		1.63286n	
	1.30954		1.26375n		1.24861		1.67331		1.04009n		1.45458		0.54804		1.67163		0.20970n		1.51874		1.59684n		1.49426	
	10	0	10	1	5	4	5	3	5	4	5	3	5	4	5	3	5	4	5	3	10	0	5	3
	20.0	+42	1.3	+14	8.6	+29	38.2	+47	35.5	+41	56.4	+20	18.5	+49	34.8	+52	22.6	+53	47.5	+30	0.7	+01	49.6	+26
	32.1	+03	12.2	+26	8.1	+19	37.9	+18	34.6	+01	55.5	+25	18.3	+15	34.2	+14	22.7	+09	47.1	+34	1.4	+01	48.8	+34
	23.1	−30	2.2	−01	14.1	−20	42.3	−40	42.1	−47	1.1	+17	25.9	−06	40.3	−33	29.6	+02	54.3	−26	7.8	−06	56.2	−06
	35.9	+52	20.4	+66	11.0	+23	42.1	+21	39.6	+16	0.5	+05	25.6	+22	41.1	+23	30.1	+23	54.2	+05	7.8	+27	56.8	+01
		+67		+1.05		+.51		+.46		+.11		+.67		+.80		+.56		+.87		+.43		+.28		+.56
	10	27.78	11	9.03	9	10.45	8	40.12	9	37.95	8	58.37	9	22.07	8	37.60	9	26.25	8	50.77	10	4.42	8	52.85
		20.40		−18.85		17.73		47.13		−10.97		28.48		23.53	35.32	46.95		−1.62		33.02		−39.52		31.21
	10	48.18	10	50.68	9	28.18	9	27.25	9	26.98	9	26.85	9	25.60	9	24.55	9	24.63		23.79		24.90		24.06
+55	12	0.17	11	57.67	13	20.17		21.10		21.37		21.50		22.75		23.80		23.72		24.56		23.45		24.29
−12	54	31			54	42																		
	1.12050																							
	+1723				+ 3135				+ 3145				+ 3105				+ 2263				+ 3265			
	1.13773				1.15185				1.15495				1.15155				1.14313				1.15318			
	+13.73				+14.19				+14.29				+14.18				+13.90				+14.23			
	− .19		− .15		− .15		− 1.08		− .06		− .39		− .02		− 1.07		− .01		− .53		− .76		− .47	
	− .05		− .12		− .42		− .37		− .46		− .40		− .58		− .43		− .53		− .58		− .01		− .47	
	− .17		− .26		− .13		− .12		− .03		− .17		− .20		− .14		− .22		− .11		− .06		− .14	
	+13.32		+13.20		+13.49		+12.62		+13.74		+13.33		+13.43		+12.54		+13.14		+12.68		+13.40		+13.15	
12	13.49		10.87		13 33.66		33.72		35.11		34.83		36.18		36.34		36.86		37.24		36.85		37.44	
	12.18				33.69				34.97				36.26				37.05				37.14			
	−22.52				− 35.38				− 35.55				− 36.85				− 37.16				− 37.30			
	+ .30				+ 28				+ 28				+ .29				+ 30				+ .30			
	+5 20.47	+5	20.71	+4	11.82	+4	11.54	+4	11.46	+4	11.74	+4	10.75	+4	10.44	+4	10.24	+4	9.96	+4	10.56	+4	10.86	
	+4 58.19			+3	36.72			+3	36.19			+3	34.19			+3	33.38			+3	33.56			
	17 10.37				10.41				11.16				10.45				10.43				10.70			

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Arietis (85 B)

1878

Jan. 1 | Jan. 5 | Jan. 13 | Jan. 16 | Jan. 19 | Jan. 29

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Perseï — α 2h 43m 43.7 — δ +46° 21′ — 1878 — Jan. 5 / Jan. 13 / Jan. 16 / Jan. 19 / Jan. 23 / Jan. 24

	Jan. 5	Jan. 13	Jan. 16	Jan. 19	Jan. 23	Jan. 24
	h m s	m s				
	2 42 40.2	42 47.20	42 29.5	42 36.80	42 15.25	42 34.45
		50.00	31.9	39.75	18.4	37.38
		53.15	33.9	42.78	20.4	40.37
		59.10		48.80		46.28
		1.85		51.80		49.32
		4.98		54.70		52.20
	43 34.0	7.98	43 17.9	57.75	42 53.0	55.42
	36.5	11.12	20.2	0.80	55.4	58.28
	38.9	16.95	22.7	6.58	57.6	4.12
		19.85		9.58		7.20
		23.00		12.56		10.20
		29518		36190		39522
	42 43.10	8518	42 31.77	60190	42 18.10	57522
	43 36.47	43 5.016	43 20.27	42 54.718	42 55.33	42 52.293
		+29.08 12		+39.19 20		+41.63
		− .75 72		− .61 58		− .69 64
		− 1.40		− 1.27		− 1.22
		+ 27.80		+ 37.35		+ 39.77
		43 32.02		32.07		32.06

	Jan. 19	Jan. 23	Jan. 24	
	42 8.5	42 30.10	42 22.7	42 26.82
	11.1	32.95	25.0	29.90
	14.3	36.00	28.4	32.88
		42.00		38.58
		45.15		41.80
		48.18		44.83
	46.6	51.18	43 12.6	47.75
	52.0	54.10	16.9	50.72
		59.95	19.0	56.70
		3.00		59.82
		8.98		2.72
		40859		43252
	42 11.30	52859	42 25.87	49252
	42 49.40	42 48.054	43 16.17	42 44.775
		+ 45.74 68		+ 48.99 49
		− .66 58		− .79 75
		− 1.16		− 1.08
		+ 43.94		+ 47.23
		31.99		32.01

	Jan. 24	
	42 5.67	42 [5.55] [28.55]
	59.2	
	2.6	31.52
		37.32
		40.53
		43.56
	43 31.8	46.68
	33.2	49.43
	35.3	55.70
		58.56
		1.60
		419.02
	42 59.58	47902
	43 33.43	42 43.547
		+ 50.26 31
		− .74 72
		− 1.06
		+ 48.53
		32.08

	+21.92	−31.45	+22.95	−25.55	+34.19	− 3.04	+36.75	−1.35	+19.41	−31.39	−15.95	−49.88
	1.34084	1.49762n	1.36078	1.40739n	1.53390	0.48287n	1.56526	0.13033n	1.28803	1.49679n	1.20276n	1.69793n
	1.30463	1.46141n	1.32457	1.37118n	1.49769	0.44666n	1.52905	0.09412n	1.25182	1.46058n	1.16655n	1.66172n
	5′ 2′	5 3	5 2	5 2	5 2	5 2	5 1	5 2	5 2	5 3	5 2	5 3
	14.7+36	4.6+21	8.1+19	53.1+17	3.4+10	36.2+44	57.9+07	33.1+50	18.7+45	6.8+25	52.7+17	23.3+57
	25.1+25	14.1+29	20.4+30	5.3+29	14.1+33	47.1+43	0.1+29	35.2+21	21.7+18	7.8+30	53.9+27	23.8+19
	9.9−04	58.5+06	11.4−11	55.8−18	58.9+08	30.3+04	11.9−14	46.9−67	28.7+01	15.5−29	58.9+02	28.1+02
	13.3+49	3.9+34	26.9+47	10.2+40	10.4+50	46.2+32	8.1+49	42.1+36	24.0+47	11.9+40	55.1+23	26.0+34
	+1.06	+.90	+.85	+.68	+1.01	+1.23	+.71	+.50	+1.21	+.66	+.79	+.44
	7 15.75	8 5.28	7 16.70	8 1.10	7 6.70	7 39.95	7 4.50	7 39.32	7 23.28	8 10.50	7 55.15	8 25.30
	20.17	− 28.93	21.11	− 23.51	31.46	− 2.80	33.81	− 1.24	17.86	− 28.88	− 14.67	− 45.89
	7 35.92	7 36.35	7 37.81	7 37.59	7 38.16	7 37.15	7 38.31	7 38.08	7 41.14	7 41.62	7 40.48	7 39.41
+46	15 12.43	15 12.00	15 10.54	15 10.76	15 10.19	15 11.20	15 10.04	15 10.27	15 7.21	15 6.73	15 7.87	15 8.94
−3	57 44											
	0.60080											
	+3260		+1765		+4113		+1581		+4117		+3455	
	0.63340		0.61845		0.64193		0.61661		0.64277		0.63535	
	+4.30		+4.15		+4.38		+4.14		+4.39		+4.32	
	− .13	− .27	− .14	− .18	− .32	− .01	− .36	− .00	− .10	− .27	− .07	− .68
	− .23	− .31	− .23	− .30	− .19	− .24	− .17	− .22	− .19	− .26	− .20	− .24
	− .27	− .23	− .21	− .17	− .25	− .31	− .18	− .13	− .30	− .17	− .20	− .29
	+3.67	+3.49	+3.57	+3.50	+3.62	+3.82	+3.43	+3.79	+3.80	+3.69	+3.85	+2.11
	15 16.10	15.49	14.11	14.26	13.81	15.02	13.47	14.06	11.01	10.42	11.72	12.05
	15.80		14.18		14.42		13.76		10.72		11.88	
	− 19.61		− 20.00		− 20.08		− 20.14		− 20.16		− 20.16	
	+ .10	18.19	+ .10		+ .10	5 21.03	+ .09	20.10	+ .09	69	+ .09	30
	+5 18.09	+5 17.99	+5 20.41	+5 20.51	+5 20.93	+5 20.93	+5 20.01	+5 19.92	+5 20.60	+5 20.51	+5 22.21	+5 22.72
	+ 4 58.58		+ 5 0.51		+ 5 0.95		+ 4 59.96		+ 5 0.53		+ 5 2.04	
	20 14.38		14.69		15.37		13.72		11.25		14.02	

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22

D.M. 591

2h 46.4m

+61° 2'

−18 39

1878

Jan. 1 | Jan. 5 | Jan. 13 | Jan. 16 | Jan. 19 | Jan. 23

	Jan. 1	Jan. 5	Jan. 13	Jan. 16	Jan. 19	Jan. 23
α₀	46m 17s.46		18s.50	log cos δ	9.94196	
corr. α	59		17.8	" cos δ	9.68512	
dα/dt	42		18.7	" 1520 tan i	9.80990	
dδ/dt	62		17.8			
δ₀	50		16.8			
	60		13.5			
				tan δ	+1.806	
corr. α	46 17.532	+61 1	17.13			
dδ/dt				tan ∞ / 2m	− 32	

	Jan. 1	Jan. 5	Jan. 13	Jan. 16	Jan. 19	Jan. 23
	2h 45m 12.2	45m 29.8	45 22.2	45 25.82	44 58.8	45 14.20	45 7.1	45 29.89	44 48.6	45 8.62	45 21.5	45 22.66
	16.2	34.1	25.0	29.90	0.7	19.30	10.3	32.22	52.0	12.80	24.6	25.80
	18.8	38.2	29.5	34.58	2.9	23.70	13.3	34.22	55.7	17.00	27.7	26.88
		46.7		42.78		32.30		36.30		25.715		26.74
		49.0		47.30		36.50		38.64		29.90		30.98
		51.3		51.55		40.60		40.67		34.10		32.95
	46 21.1	53.3	46 22.9	55.56	45 53.5	44.90	45 54.7	42.68	45 23.0	38.40	45 49.8	35.26
	24.0	55.3	26.0	59.79	55.8	49.40	57.5	44.90	26.2	42.60	52.7	37.25
	27.0	57.5	29.9	8.55	59.3	58.20	0.0	47.00	31.1	51.20	57.1	39.58
		59.8		12.74		2.20				55.46		
		1.8		16.90		6.45				59.68		
		4.0										
		12.2		38.547		32.775		34.652		37.551		27.915
	45 15.73	16.8	45 25.57	56.547	45 0.80	44.775	45 10.23		44 52.10		45 24.60	33.715
	46 24.03	18.8	46 26.27	45 51.486	45 56.20	45 40.705	45 57.40	45 38.502	45 26.77	45 34.137	45 53.20	45 30.832
												31.017
				+29.09 12		+39.19 20		+41.63		+45.74 68		+28.99 4886
		5286		− 1.84 24		− 1.32 00		− 1.78 11		− 1.74 01		− 1.37 30
		8286										
		45 55.240										
		+25.37 30										
		− 1.30 29										
		− 1.79		− 1.69 70		− 1.48		− 1.39 40		− 1.381		− 1.198
		+ 24.22 2		+ 27.18 8		+ 36.72		+ 39.12		+ 43.36		+ 46.58
		46 17.46		17.59		17.42		17.62		17.50		17.60

	Jan. 1	Jan. 5	Jan. 13	Jan. 16	Jan. 19	Jan. 23
	+39.s51	−28.s79	+25.84	−34.86	+39.90	− 15.50	+28.27	− 18.90	+42.04	+7.37	+6.42	−22.18
	1.59671	1.45924n	1.41229	1.54233n	1.60097	1.19033 n	1.45133	1.27646 n	1.62366	0.86747	0.80754	1.34596 n
	1.40661	1.26914n	1.22219	1.36223n	1.41087	1.00023n	1.26123	1.08636n	1.43356	0.67737	0.61744	1.15586n
								[1]				
	25° 1'	25° 2'	25 1	25 2	25 1	25 1	25 1	25 2	25 1	25 1	25 1	25 2
ε	21.4+50	6.3+16	31.1+51	9.3+23	14.4+39	50.2+14	27.7+53	59.2+07	15.0+48	38.0+37	46.9+20	4.7+12
F	30.1+17	13.9+33	38.2+23	16.6+32	24.4+20	0.3+29	36.8+21	7.9+34	15.1+25	38.2+23	45.1+40	34+31
G	19.6−39	0.3+12	23.8−24	2.2+14	15.8−39	51.9−47	22.7−29	53.9−36	28.0−07	49.9−53	54.9−25	11.6−12
H	21.4+66	4.7+44	27.2+65	7.2+48	28.5+65	4.8+44	32.9+62	7.2+48	23.6+66	45.9+44	49.5+38	6.4+47
	+194	+1.05	+1.15	1.17	+1.85	+1.40	+1.07	27 +1.83	+1.24	+1.51	+1.73	+1.78
	26° 23.12	27' 6.30	26 30.08	27 8.82	26 20.78	26 56.80	26 30.02	28 2.05	26 20.42	26 43.00	26 49.10	27 6.65
	25.50	− 18.58	16.68	−22.50	25.76	− 10.01	18.25	− 12.20	27.14	4.76	4.14	−14.32
	26 48.62	26 47.72	26 46.76	26 46.32	26 46.54	26 46.79	26 48.27	26 49.85	26 47.56	26 47.76	26 53.24	26 52.33
+60°	55' 59."73	56' 0."63	56 1.59	56 2.03	56 1.81	56 1.56	56 0.08	55 58.80	56 0.79	56 0.59	55 55.11	55 56.02
−18	38 31											
	1.28840											
	+2210		+32.76 64		+1767		+4117		+1584		+4201	
	1.31050		1.32107		1.30607		1.32957		1.30424		1.33041	
	+20.44	"	+20.94		+20.23		+21.36		+20.15		+21.40	
	− .36	− .19	− .16	− .28	− .37	− .06	− .18	− .08	− .41	− .01	− .01	− .11
	− .14	− .21	− .15	− .21	− .13	− .19	− .14	− .18	− .10	− .14	− .14	− .17
	− .24	− .26	− .29	− .29	− .21	− .10	− .27	− .13	− .31	− .13	− .18	− .20
	+19.70	+19.78	+20.34	+20.06	+19.52	+19.88	+20.77	+20.97	+19.33	+19.87	+21.17	+20.92
60°	56 19.43	20.41	21.93	22.19	21.33	21.44	20.85	19.47	20.12	20.46	16.18	16.94
	19.92		22.06		21.38		20.16		20.29		16.56	
	24		76									
	− 22.3		− 22.8		− 23.53		− 23.74		− 23.90		− 24.07	
	+ .46	20.57	+ .45	18.54	+ .44	20.85	+ .44	21.37	+ .43	20.44	+ .42	21.02
	+5 20.11	+5 19.65	+5 18.09	+5 17.64	+5 20.41	+5 19.97	+5 20.93	+5 20.49	+5 20.01	+5 19.58	+5 20.60	+5 20.18
	+4 58.30		+4 55.78		+4 57.32		+4 56.63		+4 56.54		+4 56.95	
	1 18.22		17.84		18.70		20.79		16.83		13.51	
							19					

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1878

Cassiop. α_0 2h 57m $+63^\circ 36'$ δ_0 −21 13

	Jan. 1		Jan. 5		Jan. 13		Jan. 16		Jan. 19		Jan. 23	
	2h 56m 20.7	56 36.4	55 47.0	56 32.4	55 37.3	56 3.3	55 46.0	56 1.3	55 22.5	55 56.8	55 37.4	55 53.6
	24.6	39.0	53.6	34.6	41.2	7.9	49.5	5.8	27.0	1.3	41.2	57.6
	27.0	41.1	56.2	37.0	44.6	12.6	52.7	10.5	31.4	6.0	45.6	3.0
		43.5		39.6		318		14.6		15.2		11.9
		45.6		41.8		26.7		24.4		19.8		16.4
		48.1		44.2		28.8		28.8		24.6		21.5
	56 59.6	61.4	56 55.5	46.6	56 34.0	31.2	56 36.6	33.6	56 28.1	29.3	56 12.9	25.7
	3.8	52.7	1.9	46.7	38.7	33.7	41.7	38.4	31.7	33.8	16.0	30.5
	6.5	56.1	6.2	51.1	41.2	35.8	45.5	47.5	37.3	43.0 ~~37.3~~	20.6	39.9
						38.1		52.1		47.6		44.4
						40.4		56.7		52.4		48.9
						49.6						
						54.4						
		4119		3760				3187		3298		3534
	56 24.10		55 52.27		55 41.03	57.1	55 49.40	~~258~~ 473	55 26.97	2698	55 41.40	~~334~~ 474
	57 3.30	56 45.767	57 1.20	56 41.778	56 37.97		56 41.27	56 28.444	56 32.37	56 23.371	56 16.30	56 ~~11.267~~ 21.218
		+25.28 30		+29.N 13				+41.64		+45.56 68		+49.08 6
		− 1.~~75~~ 44		− 1.~~74~~ 39		4678		− 1.82 23		− 1.~~27~~ 12		− 1.~~53~~ 44
						56 31.187						
						+39.20						
						− 1.~~78~~ 11						
		− 2.0~~56~~		− 1.95		− 1.~~773~~		− 1.63		− 1.53		− 1.39
		+ 21.80		+ 25.79		+ 36.36		+ 38.78		+ 43.03		+ 46.23
		57 7.57		7.57		07.55		0775		7.56		7.45

	+21.67	− 17.53	+49.51	− 19.42	+50.16	− 6.78	+39.57	− 12.30	+57.54	− 7.84	+39.82	+ 4.92
	1.33586	1.24878n	1.69469	1.28825n	1.70036	0.83123n	1.59737	1.08991n	1.76012	0.89432n	1.60010	0.69197
	1.10864	1.01656n	1.46747	1.06103n	1.47314	0.60401n	1.37015	0.86269n	1.53290	0.66710n	1.37288	0.46475
	50 2	50 3	50 2	50 3	50 2	50 3	50 2	50 3	50 2	50 3	50 2	50 3
	58.9+16	23.6+60	42.2+34	24.4+60	35.7+45	8.9+31	48.9+23	18.9+53	33.1+50	11.3+36	51.1+20	12.2+38
	7.1+30	31.7+15	48.5+43	32.1+15	45.0+41	19.8+25	57.2+32	26.9+17	32.9+21	11.8+30	49.8+42	10.7+30
	53.6−40	19.4−31	34.6−09	16.0−30	34.9−10	9.1−03	41.9−44	11.2−12	44.1−51	22.8−20	57.3−06	17.9−32
	0.0+23	24.4+34	40.8+37	23.3+34	51.8+25	27.9+34	57.1+20	26.5+34	41.4+37	30.7+35	53.9+23	141.54.38
	+.29	+.78	+1.05	+.79	+1.01	+.87	+.31	+.92	+.57	+.81	+.79	+.74
	52 59.90	53 24.28	52 41.52	53 23.95	52 41.85	53 16.42	52 51.28	53 20.88	52 37.88	53 16.65	52 53.02	53 13.82
	12.84	− 10.29	29.34	− 11.51	29.73	− 4.02	23.145	− 7.29	34.11	− 4.65	23.60	2.92
	53 12.74	53 13.89	53 10.86	53 12.44	53 11.58	53 12.40	53 14.73	53 13.59	53 11.99	53 12.00	53 16.62	53 16.74
	+63 29 35.61	29 34.46	29 37.49	29 35.91	29 36.77	29 35.95	29 33.62	29 34.76	29 36.36	29 36.35	29 31.73	29 31.61
	−21 12 7											
	1.34890											
	+2232		+3294		+1783		+4132		+1602		+4227	
	1.37122		1.38184		1.36673		1.34022		1.36492		1.39147	
	+23.51		+24.09		+23.27		+24.56		+23.17		+24.61	
	− .10	− .07 .61	− .53	− .08	− .54 .06	− .01	− .34	− .03	− .71 .06	− .02	− .34	− .01 .56
	− .30	− .34 .0	− .27	− .34	− .27 .1	− .33	− .26	− .30	− .21 .06	− .26	− .23	− .26 .0
	− .07	− .20	− .26	− .20	− .25	− .22	− .08	− .23	− .14	− .20	− .20	− .19
	+23.04	+22.90	+23.03	+23.47	+22.21	+22.71	+23.88	+24.00	+22.11	+22.69	+23.84	+24.15
	29 58.65	57.36	60.52	59.38	58.98	58.66	57.50	58.76	58.47	69.04	55.57	55.76
	58.00		54.95		58.82		58.13		58.76		55.66	
	− 22.32		− 22.91		− 23.83		− 24.10		− 24.32		− 24.54	
	+ .52	20.63	+ .50		+ .50		+ .49	21.42	+ .48	20.49	+ .48	21.08
	+5 20.11	+5 ~~17.69~~	+5 18.09	+5 18.59	+5 20.41	+5 ~~17.91~~ 20	+5 20.93	+5 ~~20.44~~	+5 20.01	+5 ~~19.53~~	+5 20.66	+5 ~~20.12~~
	+ 4 58.20		+ 4 55.68		+ 4 57.08		+ 4 57.32		+ 4 56.17		+ 4 55.54	
	34 56.30		55.63		55.90		55.45		54.93		52.20	

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24

Cassiopeia

α_0 2h 58m 1878.0 log cos δ 9.98270

2^h 58.9m corr. α .09 .09 38.0 " cos δ 9.44210

+73° 56′ $\frac{d\alpha}{dt}$ .16 .24 39.5 39.8 39.6 " 15 cos δ tan 1 9.56658

−31 33 δ_0 +73 44.92 39.1

1878 corr. δ 58 45.145 +73 55 39.08 tan δ +3.472

$\frac{d\delta}{dt}$ $\frac{\tan z}{\sin 1''}$ − .52

	Jan. 28		Jan. 29		Jan. 30		Feb. 2		Feb. 3		Feb. 5	
	h m s	m s										
	2 56 54.2	57 40.0	57 6.3	57 38.0	57 1.5	57 36.9	56 8.5	57 32.0	56 13.2	57 30.5	57 1.7	57 28.0
	0.3	43.3	12.7	41.6	5.8	40.7	14.1	36.4	8.2	34.0	2.0	32.0
	6.0	47.3	21.3	45.3	14.1	43.9	20.5	40.0		37.9	23.6	33.5
		50.8		49.2		47.7		43.6		41.4		39.2
		54.1		52.7		51.0		47.8		45.3		42.7
		58.3		56.5		54.9		50.9		49.4	54.0	47.0
		2.4	58 20.1	0.6	58 3.0	58.8	56 57.2	54.7	57 22.3	53.1	57 57.3	80.4
		6.0	26.6	3.8	10.0	2.6	4.5	57.9	28.0	56.7	7.8	53.7
		10.0	38.5	7.5	16.5	6.2	9.4	2.0	32.4	0.3		47.8
		3122		2952		3427		3653		3489		3863
	57 0.17	4922	57 13.43	4752	57 7.13	4627	56 14.37	4253	56 59.43	4089	57 19.13	
		57 54.689	58 26.73	57 52.800	58 9.83	57 51.411	57 3.70	57 47.282	57 27.57	57 45.433	57 60.37	57 42.922
		+ 54.914		+ 56.17		+ 57.63		+ 61.66		+ 63.08		+ 65.34
		− 3.08 2.85		− 2.54		− 2.67		− 2.68		− 2.26		− 2.16
		− 1.48 1		− 1.34		− 1.298		− 0.078		− 1.001		− 0.818
		+ 50.78		+ 52.29		+ 54.68		+ 57.40		+ 59.81		+ 62.00
		6				3						2
		58 45.37 ✓		45.09		45.09		45.16		45.24		44.92
		+54.52		+3937	−3393	+4428	−1842	+9289	+43.86	+46.00	+17.86	+23.79	−17.45
		1.73656		1.59517	1.53058n	1.64621	1.26529n	1.96797	1.63909	1.66276	1.25188	1.37639	1.24180n
		1.30344		1.16205	1.39746n	1.21309	0.83214n	1.53485	1.20594	1.22964	0.81876	0.94327	0.80868n
		30′ 2′		30 2	30 2	30 2	30 2	30 2	30 2	30 2	30 2	30 2	30 2
6		17.3+.42		28.3+.54	55.4+.16	26.9+.54	48.7+.23	4.9+.13	23.9+.53	20.9+.49	31.1+.52	26.9+.54	42.6+.33
47		16.8+.32		26.8+.24	52.3+.40	24.1+.26	46.1+.42	3.1+.30	22.1+.28	21.1+.29	31.1+.21	27.4+.24	43.2+.37
4		24.9−.10		32.2−.00	57.7−.03	29.9+.04	53.7−.39	9.7−.04	29.0+.02	28.8+.02	38.6+.30	37.2−.23	53.3+.42
11		24.1+.47		31.2+.48	58.3+.21	28.8+.48	50.7+.26	7.9+.49	27.2+.47	26.1+.47	36.1+.44	36.6+.43	51.0+.26
		+1.11		1.26	+.74	1.32	+.52	+.88	+1.30	+1.27	+.87	+.98	+.54
	32′ 20.78		32 29.62	32 55.92	32 27.42	32 49.80	32 6.40	32 25.55	32 24.22	32 34.22	32 32.02	32 47.52	
	20.11		14.52	−16.26 12.52	16.33	− 6.80	34.26	+16.04	16.97	6.59	8.78	− 6.44	
	32 40.89		44.14	40.76	43.75	43.00	40.66	41.58	41.19	40.81	40.80	41.08	
				43.40				41.62					
+73°	50 7.46		4.21	8.16	4.60	5.35	7.69	6.73	7.16	7.54	7.55	7.27	
				4.95				4.89					
−31	32 39												
	1.54820												
	+ 2282		+340		+4121		+3693		+2775		+2064		
	1.57102		1.58227		1.58941		1.58513		1.57595		1.56884		
	+ 37.24		+38.22		+38.85		+38.47		+37.67		+37.06		
	− .43		− .22	− .17	− .28	− .05	− 1.25	− .28	− .31	− .05	− .08	− .04	
	− .16		− .20	− .23	− .20	− .22	− .17	− .19	− .22	− .23	− .25	− .28	
	− .28		− .32	− .19	− .33	− .13	− 6.22	− .33	− .32	− .22	− .25	− .14	
	+36.37		+37.48	+37.63	+38.04	+38.45	+38.83	+37.54	+36.82	+37.17	+36.48	+36.60	
73	50 43.83		41.69	42.58	42.64	43.80	44.52	44.40	43.98	44.71	44.03	43.87	
			42.14		43.22		44.46		44.34		43.95		
	− 26.98		− 26.90		− 26.93		− 27.02		− 27.05		− 27.10		
	+ .67	21.64	+ .66	5 22.71	+ .66	23.22	+ .65	23.36	+ .64	22.35	+ .63	22.19	
	+5 20.97	+5 20.30	+5 22.05	+4 21.39	+5 22.56	+5 21.90	+5 21.71	+5 21.06	+5 21.71	+5 21.07	+5 21.56	+5 20.93	
	+4 54.77		+4 55.81		+4 56.29		+4 54.34		+4 55.80		+4 55.09		
	55 38.60		37.95		39.51		39.80		39.65		39.04		
							5		4				

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280
32.0
33.5
39.2
42.7
47.0
50.4
53.7
+78

863

42.922

-65.34
2.46
-0.818
62.00
2
4492

7.45
180 n
868 n

2

2.6 ±33
3.2±37
3.3±42
1.0±26
±84

47.52
- 6.44
41.08

7.27

.04
.28
.14
6.60
±3.87

2.19
±.93

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26

Arietis (147 B)

$2^h\ 59.8^m$

$+12°\ 44'$

$+29\ 39$

1878

18/80

do	59	41.94 + 12° 42′ 56.0″	log sin δ 9.34824
bon.a		42.02 54.3	" cos δ 9.98919
da		41.91 55.2	
25		42.02 56.0	" 1800 tan 0.11397
δo		41.87 54.5	
		42.00 54.0	
			tan δ +0.23
bon.δ	59	41.960 +12 42 55.7	
			cos z + .49
δ do			

Jan. 1	Jan. 5	Jan. 13	Jan. 16	Jan. 19	Jan. 23
2 m s δ					
2 59 16.3	58 51.1	59 1.90	58 37.1	58 51.42	58 36.0	58 48.98	58 38.0	58 44.95	58 31.2	58 41.60
18.6	53.2	3.90	39.7	53.56	38.5	51.12	40.0	46.95	33.5	43.62
20.7	54.7	6.00	41.0	55.58	39.9	53.47	41.4	49.10	36.0	45.88
59 7972		10.12		59.70		57.60		53.30		50.00
9.72		12.37		2.00		59.92		55.48		52.28
13.98		14.56		4.12		1.85		57.54		54.25
16.00										
18.10										
59 51.3	59 44.0	59 17.6	59 18.9	59 28.2	59 12.8
53.4	46.4	19.3	20.7	30.0	14.7
58.3	48.4	20.8	22.3	31.7	16.5
20.47		16.58		6.39		3.98		59.65		56.44
22.42		18.62		8.65		6.00		1.78		58.60
26.68		22.80		12.50		10.20		5.97		2.76
28.78		24.80		14.75		12.30		8.05		4.93
30.95		26.95		16.90		14.50		10.30		6.96
20025		15860		28555		31969		39304		41732
59 18.53	58 53.00	58 39.27	58 38.13	58 39.80	58 33.57
59 53.33	59 18.205	59 46.27	59 14.418	59 19.23	59 41.41	59 20.63	59 1.790	59 29.97	58 57.549	59 14.67	58 54.302
	+25.28 30		+29.70 13		+39.20		+41.64		+46.75 68		+49.06
	− .17 16		− .16		− .13		− .15 14		− .15 13		− .17
	− 1.40		− 1.37		− 1.30		− 1.27		− 1.23		− 1.19
	+ 23.74		+ 27.60		+ 37.77		+ 40.23		+ 44.32		+ 47.70
	59 41.94		42.02		41.91		42.02		41.87		42.00

	− 0.33	− 35.13	+21.42	−31.85	+24.87	−15.09	+23.66	−18.84	+17.75	−32.42	+20.73	−20.37
	9.5185 n	1.54568 n	1.33082	1.50311 n	1.39568	1.17869 n	1.37401	1.27508 n	1.24920	1.51081 n	1.31660	1.30594 n
	9.63248 n	1.65965 n	1.44479	1.61708 n	1.50965	1.29266 n	1.48798	1.38905 n	1.36317	1.62478 n	1.43057	1.42296 n
	40′ 4″	45′ 0″	40′ 3″	45′ 0″	40′ 3″	40′ 4″	40′ 3″	40′ 4″	40′ 3″	45′ 0″	40′ 3″	40′ 4″
δ	22.2+.52	6.2+.08	52.3+.22	0.8+.01	45.3+.34	37.7+.36	50.2+.25	45.1+.20	56.8+.20	2.9+.02	54.1+.21	47.6+.15
π	37.1+.03	22.2+.06	7.1+.19	14.6+.09	2.2+.12	54.0+.13	6.1+.20	0.2 .00	3.7+.18	8.1+.08	0.0+.16	57.8+.16
ζ	24.5−.12	10.1−.16	53.2−.35	1.9+.03	53.3−.34	45.7−.57	50.9−.43	43.0−.50	16.3−.28	22.1−.34	6.5+.13	58.9−.04
μ	25.8+.22	10.9+.31	53.8+.05	2.2+.08	3.9+.16	57.3−.03	59.6+.04	54.7−.01	8.1+.21	15.5+.23	59.1+.03	53.3 .00
	+.65	+.29	+.11	+.21	+.28	−.11	+.06	−.31	+.31	+.09	+.53	+.27
	44′ 27.40	45′ 12.35	43 56.60	45 4.88	43 56.18	44 48.68	43 56.70	44 50.75	44 6.22	45 12.15	43 59.92	44 52.90
	− .43	− 48.67	27.85	− 41.41	32.33	− 19.62	30.76	− 24.49	23.08	− 42.15	26.95	− 26.48
	44 26.97	44 26.68	44 24.45	44 23.47	44 28.51	44 29.06	44 27.46	44 26.26	44 29.30	44 30.00	44 26.87	44 26.42
+12°	38′ 21.38″	38′ 21.67″	38 23.90	38 24.88	38 19.84	38 19.29	38 20.89	38 22.09	38 19.05	38 18.35	38 21.48	38 21.93

+29 39 7

1.51550

	+2238		+3302		+1787		+4136		+1606		+4233	
	1.53788		1.54852		1.53337		1.55686		1.53156		1.55783	
	−34.50		−35.36		−34.15		−36.05		−34.01		−36.13	
	− .00	− .15	− .05	− .12	− .07	− .03	− .07	− .04	− .04	− .12	− .05	− .05
	− .45	− .02	− .39	− .01	− .34	− .48	− .35	− .43	− .33	− .02	− .32	− .39
	− .16	− .07	− .03	− .05	− .07	+ .03	− .02	+ .08	− .08	− .02	− .13	− .07
	−35.11	−34.74	−35.83	−35.54	−34.68	−34.63	−36.49	−36.44	−34.46	−34.17	−36.63	−36.64
12°	37′ 46.27	46.93	48.07	49.34	45.16	44.66	44.40	45.65	44.59	44.18	44.85	45.29
	46.00		48.70		44.91		45.02		44.88		45.07	
	−10.00		−9.84		−9.48		−9.33		−9.20		−9.00	
	− .71		− .69		− .68		− .67		− .66		− .65	
	+5 20.11	+5 19.40	+5 18.09	+5 17.40	+5 20.41	+5 19.73	+5 20.93	+5 20.26	+5 20.01	+5 19.35	+5 20.60	+5 19.95
	+5 9.39		+5 8.56		+5 17.25		+5 11.03 1093		+5 10.15		+5 10.95	
	42 55.99		56.24		55.16		55.98		54.53		56.02	

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Perrei (222 B)

$3^h\ 6.7^m$

$+56^\circ\ 41'$

$-14\ 18$

1878

	Jan. 1	Jan. 5	Jan. 13	Jan. 16	Jan. 19	Jan. 22
	3 6 2.0	5 57.90	5 20.0	5 54.4	5 10.4	5 28.56
	4.8	59.86	23.4	56.0	13.3	32.34
	7.4	1.64	25.4	57.7	15.8	35.90
		3.70		59.5	17.8	48.42
		5.62		1.4		47.37
		7.65		3.3		51.00
	6 31.0	9.32	6 24.6	5.3	6 14.8	55.00
	34.4	11.22	27.5	7.3	17.5	58.65
	39.3	13.10	30.0	9.2	20.3	6.00
						9.70
						13.70
		17001	2541			38164
	6 4.73	5001	5 22.93	141	5 14.32	56164
	6 34.90	6 5.557	6 27.37	6 1.567	6 17.53	5 51.058
		+25.28.30		+29.18.3		+39.20
		− 1.09		− 1.08 05		− .89 84
		− 1.92		− 1.85		−1.68 89
		+ 22.39		+ 26.23		+ 37.67
		6 27.85		6 27.80		27.73

	Jan. 1	Jan. 5	Jan. 13	Jan. 16	Jan. 19	Jan. 22
	5 8.0	5 26.40	5 0.2	5 22.00	5 0.0	5 19.00
	11.7	30.10	3.5	25.69	3.1	22.83
	14.5	33.70	6.3	29.40	6.2	26.62
		41.10		36.80		33.96
		44.95		40.68		37.80
		48.72		44.40		41.50
	6 10.1	52.45	6 12.6	48.15	5 52.8	45.40
	12.7	56.35	15.5	51.95	56.6	49.10
	15.5	3.76	18.5	55.50	59.2	57.15
		7.65		3.30		0.33
		11.48		6.98		4.20
		35666		36885		33789
	5 11.40	53666	5 3.33	48885	5 3.10	45789
	6 12.77	5 48.769	6 15.53	5 44.441	5 56.20	5 41.626
		+ 41.64		+ 45.75.68		+ 48.52.57
		− .93		− .76 84		− .72 54
		− 1.61		− 1.54		− 1.46
		+ 39.09		+ 44.30		+ 46.20
		27.88		27.74		27.83

	+ 0.83	−29.34	+38.64	−25.80	+36.74	−26.47	+37.39	−23.98	+41.11	−31.09	+38.53	−14.57
	9.91908	1.46746n	1.58704	1.41162n	1.56514	1.42275n	1.57276	1.37985n	1.61395	1.49262n	1.58580	1.16346n
	9.78364	1.33202n	1.45160	1.27618n	1.42970	1.28731n	1.43732	1.24441n	1.47851	1.35718n	1.45036	1.02802n
	45 1	45 2	45 1	45 2	45 1	45 2	45 1	45 2	45 1	45 2	45 1	45 2
	53.9+.08	19.2+.46	28.1+.53	15.9+.39	22.0+.51	10.2+.25	29.4+.51	14.9+.37	22.2+.51	14.9+.37	23.7+.53	2.7+.09
	5.8+.34	28.6+.23	37.5+.22	25.3+.24	33.4+.18	21.1+.29	38.1+.23	24.7+.25	33.1+.21	16.1+.33	25.3+.19	4.8+.32
	52.7+.44	14.7+.25	22.8+.29	7.7+.06	23.9+.24	11.3+.10	23.5+.26	8.5+.02	34.8+.14	27.8 00	36.9+.24	15.1+.26
	56.0+.30	19.3+.46	26.5+.66	13.6+.49	38.1+.55	27.1+.47	38.6+.55	23.3+.47	31.1+.44	22.8+.47	30.4+.65	10.7+.49
	+.28	+.90	+1.12	+1.19	+1.00	+.91	+1.03	+1.11	+1.22	+1.17	+1.13	+.65
	46 57.60	47 20.45	46 28.72	47 15.62	46 29.48	47 17.42	46 32.40	47 17.85	46 27.80	47 20.40	46 29.08	47 8.38
	.61	− 21.48	28.29	−18.89	26.90	−19.38	27.37	− 19.56	30.10	− 22.76	28.21	− 10.67
	46 58.21	46 58.97	46 57.01	46 56.73	46 56.38	46 58.04	46 59.77	47 0.29	46 57.90	46 57.64	46 57.29	46 57.71
+56	35 50.14	35 49.38	35 51.34	35 51.62	35 51.97	35 50.31	35 48.58	35 48.06	35 50.45	35 50.71	35 51.06	35 50.64
−14	18 21											
	1.16690											
	+ 22.51		+3318		+1796		+4144		+1617		+0844	
	1.18941		1.20005		1.18486		1.20834		1.18307		1.17534	
	+15.47		+15.85		+15.31		+16.16		+15.24		+14.97	
	− .00	− .21	− .37	− .17	− .34	− .17	− .35	− .14	− .42	− .24	− .37	− .06
	− .20	− .23	− .15	− .23	− .15	− .23	− .14	− .21	− .12	− .18	− .12	− .17
	− .07	− .23	− .28	− .30	− .25	− .23	− .26	− .28	− .31	− .29	− .28	− .16
	+15.20	+14.80	+15.05	+15.15	+14.87	+14.78	+15.41	+15.53	+14.39	+14.53	+14.20	+14.68
56	36 5.34	4.18	6.39	6.77	6.54	4.99	3.99	3.59	4.84	5.24	5.26	5.22
	4.76		6.58		5.76		3.79		5.04		5.24	
	− −20.82		− 21.33		− 22.13		− 22.36		− 22.58		− 22.72	
	+ .36	20.67	+ .35	18.44	+ .35		+ .34	21.27	+ .34	20.35	+ .33	21.28
	+5 20.11	+5 19.75	+5 18.09	+5 17.74	+5 20.41	+5 20.76	+5 20.93	+5 20.59	+5 20.01	+5 19.67	+5 20.95	+5 20.62
	+4 59.65		+4 57.11		+4 58.63		+4 58.91		+4 57.79		+4 58.56	
	41 4.41		3.69		439		2.70		2.83		3.80	

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128

Perseï (1468)

$3^h\ 17.^m0$
$+33°\ 6'$
$+9\ 17$
1878

	Jan. 1		Jan. 5		Jan. 13	Jan. 16	Jan. 19	Jan. 22	
	h m s	m s							
3	16 39.8	—		—	16 8.7	16 0.32	16 28.4	16 —	15 39.3	15 53.48	16 1.3	15 [50.55]
	41.7	—	c.f.	c.f. -	11.2	2.70	30.6	—	41.5	56.00	3.9	53.00
	43.7	—		-	13.7	5.15	32.6	—	43.6	58.36	6.2	55.48
		—		16 20.12		10.10		—		3.30		0.52
		—		25.05 22.62		12.70		—		5.70		3.00
		—		25.09				—		8.10		5.45
	17 9.7	—	17 3.5	25.15 27.62	16 48.1	[14.90] — 17.10	16 47.6	12.41 14.88	16 30.1	10.63	16 24.3	7.72
	11.7	—	6.0	24.87 29.80	50.7	20.00	48.5	.45 17.38	32.1	13.12	26.5	10.30
	13.0	16 38.80	7.9	24.93 34.80	53.1	24.47	50.6	.41 20.28	34.1	18.05	28.6	15.15
		28.93 .88 41.22		24.91 37.25		27.35		.42 24.76		20.36		17.62
		.85 42.75 [43]		24.98 39.78		29.60		.52 27.32		22.90		20.10
				798		16467				27000		23889
	16 41.73				16 11.20		16 30.53		15 41.47	9000	16 3.80	5889
	17 11.47	16 28.920	17 5.80	16 24.998	16 50.63	16 14978	16 48.90	16 12.442	16 32.10	16 8.182	16 26.47	16 5.363
		+25.39 30		+29.14		+39.20		+41.65		+45.77 69		+48.58 1
		− .47 46		− .76 405		− .38 36		− .43 0		− .71 [48.36]		− .38 36
		− 1.59		− 1.56 1		− 1.48		− 1.45		− 1.41		− 1.37
		+ 23.25		+ 28.18 7		+ 37.36		+ 39.80		+ 43.92		+ 46.78
		16 52.17		15 52.18		52.33 √		52.24		52.10		52.14

	− 12.81	−42.55		−40.80	+ 3.77	−35.66	− 18.09	− 36.46	+26.71	− 23.92	+ 1.56	− 21.11
	1,10755 n	1,62690 n		1,61066 n	0.57634	1,55218 n	1,25744 n	1,56182 n	1,42667	1,37876 n	0,19312	1,32449 n
	1,15543 n	1,67678 n		1,65854 n	0,62422	1,60006 n	1,30532 n	1,60970 n	1,47455	1,42664 n	0,24100	1,37237 n
	20 1	20 2	20 1	20 2	20 1	20 2	20 1	20 2	20 1	20 1	20 1	20 1
	"	"										
E	43.8+26	17.5+42	19.1+47	16.4+40	23.2+52	4.6+12	57.6+12	10.3+25	0.0+13	56.0+08	27.9+58	52.7+10
F	55.4+37	29.7+22	30.1+17	27.7+23	36.6+20	18.4+31	3.4+30	21.8+28	3.1+19	4.7+29	31.3+17	56.2+36
G	44.8−54	17.7−31	17.6−41	14.2−24	28.1−07	9.5−02	49.9−53	6.1+10	16.6−41	12.3−16	[45.5] 15.8−55	8.8+01
H	46.2+44	21.9+44	20.2+44	17.2+47	41.9+49	24.1+48	1.7+35	20.3+46	12.0+72	8.2+49	35.8+55	3.7+41
	+53	+79	+87	+86	+114	+89	+24	+109	+63	+70	+79	+88
	21 47.55	22 21.70	21 21.75	22 18.88	21 32.45	22 14.42	21 56.65	22 14.62	21 7.92	22 4.15	21 28.45	22 0.35
	− 14.30	− 47.51		− 45.56	4.21	− 34.82	− 20.20	− 40.71	29.82	− 26.71	01.74	− 23.57
	21 33.25	21 34.19		21 33.32	21 36.66	21 34.60	21 36.45	21 33.91	21 37.74	21 37.44	21 30.19 37.69	21 36.78
+33°	1 15.10	1 14.16		1 15.03	1 11.69	1 13.75	1 11.90	1 14.44	1 10.61	1 10.91	1 10.66	1 11.57
+9	16 14											
	0.97310											
	− +2272		+3337		+1810		+4157		+1634		+0860	
	0.99582		1.00647		0.99120		1.01467		0.98944		0.98170	
	− 9.90	"	− 10.15	− 9.80		− 10.34		− 9.76		− 9.59		
	− .04	− .45		− .42	− .01	− .32	− .08	− .33	− .18	− .14	− .00	− .11
	− .18	− .24	− .14	− .23	− .15	− .22	− .17	− .20	− .09	− .17	− .13	− .16
	− .13	− .20	− .22	− .32	− .29	− .22	− .06	− .27	− .16	− .18	− .15	− .22
	−10.25	−10.79		−10.97	−10.25	−10.56	−10.65	−11.14	−10.10	−10.09	−9.90	−10.08
33	1 14.85	3.37		4.01	1.44	3.19	1.25	3.30	0.42	0.66	0.76	1.49
	4.11		4.01		2.32		2.28		0.54		1.12	
	− 15.35		− 15.50		− 15.70		− 15.74		− 15.77		− 15.77	
	− .23		− .22		− .22		− .22		− .21		− .21	
	+5 20.11	+ 5 19.88	+5 18.09	+ 5 17.87	+5 20.41	+5 20.19	+5 20.93	+5 20.71	+5 20.01	+ 5 19.80	+5 20.95	+5 20.74
	+ 5 4.53		+ 5 2.37		+ 5 4.49		+ 5 4.97		+ 5 4.03		+ 5 4.97	
	6 8.64 √		6.38		6.81		7.25		4.57 √		6.09	

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Tauri 8B

$3^h\ 17.^m6$
$+12^\circ\ 12'$
$+30\ \ 11$

1878

	α	δ
1878	17	27.47 +12° 11 42.5
Jan. 14	17	27.540 +12 11 42.5
Jan. 23		
Jan. 28		
Jan. 29		
Feb. 5		
Feb. 6		

log sin δ 9.32495
" cos δ 9.99008
" 15208 tan δ 0.11486
tan δ +0.22
log 2 sin 50 +.50

| | | |

1878phae.proj.1496.

Persei (152 B)

$3^h\ 20.8^m$
$+33°\ 23'$
$+9\ \ 0$
1878

1878.0

| | | |

1878phae.proj.1496.

Tauri Σ401 — 1878

3h 24.1m +27° 9'

+ 15 14

1878 Jan. 1 — Jan. 5 — Jan. 14 — Jan. 16 — Jan. 19 — Jan. 22

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1878phae.proj.1496.

32

Camelop.

3h 24.m5

+54° 33'

−12 10

1878

| | | |

1878phae.proj.1496

1878.0

Perseï (1878) — α 3h 25.0m, δ +35° 3′ — 1878 Jan. 16 — +7 20

| | | |

1878phae.proj.1496.

134

Tauri

3h 32.0m

+20° 31'

+21 52

1878

1878.0

α_0	h 3	1 55.34	+ 20° 30' 58.8"
borr. a		45	57.7
$\frac{d\alpha}{dt}$		46	58.0
		42	58.0
		41	58.5
δ_0		42	57.6
borr. δ 31		55.4	+20 30 58.1
$\frac{d\delta}{dt}$			

log a sin 1" 9.54466
" cos δ 9.97154
" sin 1" cos δ tan δ 0.09632 this Feb. 6
0.07704 2 after "
tan δ +0.37
$\frac{\tan\delta}{\sin 1''}$ + .37

	Jan. 28		Jan. 30		Feb. 2		Feb. 3		Feb. 5		Feb. 7		
h	m	ρ	m	δ									h
3	30	41.6	30	48.80	30 38.7	30 46.20	30 27.3	30 42.10	30 28.3	30 40.60	30 29.7	30 38.40	31 20.6	31 35.10	3
		43.4		50.96	40.5	49.30	29.7	44.33	29.6	42.80	31.6	40.60	22.4	37.28	
		45.1		53.25	42.2	50.70	31.8	46.60	31.1	45.00	33.6	42.76	24.4	39.51 39.52	
				57.60		54.90		50.95		49.35		47.10	25.8	41.70	
				59.90		57.33		53.30		51.61		49.42	27.8	43.95	
				2.00		59.40		55.30		53.80		51.45			
	31	22.3		4.16	31 15.2	1.64	31 34.0	57.80	31 27.6	56.07	31 19.9	53.72		47.20	
		24.3		6.48	16.5	3.70	35.8	59.85	29.9	58.20	21.6	55.95		49.39	
		26.3		10.98	18.2	8.20	37.8	4.15	31.6	2.50	23.8	0.35		51.60 51.60	
				13.20		10.28		6.28		4.85		2.53		53.82	
				15.32		12.65		8.40		7.20		4.83		56.00	
				32.265		65		60		41238		38711		59.34	
	30	43.37		22.65	30 40.47	38350	30 29.60	42876	30 29.67	59238	30 31.63	56711	31 24.20	3 1.50	
	31	24.30	31	2.054	31 16.63	30 59.409	31 35.87	30 55.342	31 29.70	30 53.855	31 21.77	30 51.555		3.75 3.73	
														6.00	
				+ 5492		+ 5764		+ 6167		+ 6309		+ 6535		1.5484 8.10	
				− 0.30		− 0.28		− 0.27		− 0.24		− .26			
				− 1.35		− 1.32		− 1.28		− 1.27		− 1.24			
				+ 5338		+ 56.04		+ 60.12		+ 61.58		+ 63.85		31 51.620	
			31	55.34		55.45		55.46		55.42		55.41		+ 527	
														− .25	
														− 42.4	
														+ 3.81	
														55.42	

	+ 18.69	− 22.24	+ 18.94	− 17.22	+ 25.74	− 40.53	+ 24.18	− 35.85	+ 19.92	− 30.22	+ 27.42		
	1.27161	1.34713n	1.27738	1.23603n	1.41061	1.60 27.8 5n	1.38376	1.55446n	1.29929	1.48029n	1.48700	43791	
	1.36793	1.44345n	1.37370	1.33232n	1.50693	1.70 57.4 4.1.0 n	1.47960	1.65098n	1.39561	1.57661n	1.57458n		
	55 1'	55 1'	55 1	55 1	55 0	55 2	55 0	55 2	55 1	55 2	55 0		
	"	"											
δ	3.7+.16	55.4+.09	6.9+.21	53.1+.10	56.9+.13	20.1+.48	59.7+.13	13.9+.36	2.6+.15	5.1+.13	44.1+.27		
F	8.1+.24	0.3+.25	11.0+.25	56.1+.36	1.1+.17	24.2+.26	3.7+.20	17.8+.32	7.1+.24	9.9+.34	49.9+.30		
q	16.9-.42	8.2+.04	17.8-.41	2.9+.14	8.3-.10	30.9+.03	11.9-.25	25.5-.08	17.9-.41	20.3-.28	14.2-.01		
H	11.6+.72	4.9+.45	12.1+.72	57.2+.30	2.9+.65	26.2+.47	6.5+.72	21.6+.46	13.3+.72	16.8+.47	59.8+.57		
	+.70	+.87	+.77	+.90	+.85	+1.24	+.80	+1.05	+.70	+.66	+1.13		
	56 10.08	57 2.20	56 11.95	56 57.32	56 2.30	57 25.35	56 5.45	57 19.70	56 10.22	57 13.02	55 54.50		
	23.33	− 27.76	23.64	−21.0450	32.13	−50.72 59	30.17	− 44.74	24.87	− 37.42	− 32.73		
	56 33.41	56 34.44	56 35.59	36.31 35.82	34.43	34.83 76	35.62	34.93	35.09	35.30	55 21.77		
+20°	26 14.94	26 13.91	12.76	12.01 53	13.92	13.72 59	12.73	13.42	13.26	13.05	27 26.58		
+21	51 14												
	1.36350												
	+ 2458		+ 4175		+ 3782		+ 2852 60		+ 2164		+ 1067		
	1.38808		1.40525		1.40132		1.39210		1.38514		1.37417		
	−24.44	"	−25.42		−25.20		−24.67		−24.27		−23.67		
	− .06	− .08	− .06	− .05	− .12	− .29	− .10	− .23	− .07	− .16	− .13		
	− .08	− .14	− .10	− .16	− .08	− .19	− .10	− .21	− .12	− .22	− .10		
	− .18	− .22	− .19	− .23	− .21	− .31	− .20	− .26	− .18	− .17	− .28		
	−24.76	−24.88	−25.77	−25.86	−25.61	−25.99	−25.07	−25.37	−24.64	−24.82	−24.18		
20°	26 30.18	49.03	46.99	46.67	48.31	47.60	47.67 6	48.05	48.62	48.23	27 2.40		
	49.64		46.83		47.96		47.86		48.42				
	− 11.30		− 11.25		− 11.16		− 11.12		− 11.04		− 10.97		
	− .48		− .47		− .46		− .46		− .45		− .44		
	+5 20.97	+5 20.49	+5 22.56	+5 22.09	+5 21.71	+5 21.25	+5 21.71	+5 21.25	+5 21.56	+5 21.11	+4 6.64	+4 6.20	
	+ 5 49.19		+ 5 10.84		+ 5 10.09		+ 5 10.13		+ 5 10.07		+ 3 55.23		
	30 58.79		57.67		58.05		57.99		58.49		57.63		

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1878phae.proj.1496

18780

Camelop. (4 B) α 32 40.27 δ +59 34 27.7 log a 9.93569 I 4.072

3h 32.8m

+59° 35'

bor α .25 .27 .18 .13 .41 27.4 28.0 26.8 27.1 24.9 " cos δ 9.70439 " sin δ 9.82917

$\frac{d\alpha}{dt}$

δ_0

− 17 12

tan δ + 1.70

bor. δ 32 40.302 +59 34 27.0 26.98 sin α − .30

1878

$\frac{d\delta}{dt}$

	Jan. 1	Jan. 5	Jan. 14	Jan. 16	Jan. 22	Jan. 23	
	h m s	m s					
	3 31 52.4	32 54.20	31 33.4	31 50.12	31 17.4	31 38.58	31 21.1
	565	—	38.1	54.15	21.8	42.90	24.8
	58.7	18.63	41.0	58.30	24.4	46.82	27.3
		.52 10.38		6.56		54.82	
		.55 14.48		10.60		58.90	
		.34 18.34		14.78		2.92	
	32 34.7	.58 22.65	32 27.6	18.98	32 28.5	6.98	32 29.0
	37.1	.56 26.70	? 39.6	22.90	30.9	11.00	31.1
	42.0	—		30.50	34.1	19.00	35.6
				34.70		23.46	
				38.98		27.62	
		18					
				34.037		33.292	
	31 55.87		31 37.80	16.037	31 21.20	33.292	31 24.40
	32 37.93	32 18.530	32 33.60	32 14.579	32 31.17	32 2.943	32 31.90
		+25.38 1		+29.18 4		+40.33 76	
		− 1.23 21		− 1.24 17		− 1.08 0.94	
		− 2.36		− 2.30		− 2.36 12	
		+ 21.74		+ 25.67		+ 37.20	
		40.27		40.25		40.20	

	Jan. 22	Jan. 23	
	31 37.49	31 34.0	31 30.00
	41.52	37.1	34.00
	45.77	39.6	38.15
	53.80	42.6	46.40
	57.78		50.40
	1.95		54.52
	6.00	32 27.9	58.67
	10.10	32.2	2.62
	18.05	35.0	10.74
	22.36		14.90
	26.38		18.88
	32120		35939
	2120	31 39.77	57939
	32 1.927	32 31.70	31 54.490
	+41.66		+48.58 1
	− 1.74 04		− 1.47 0.95
	− 2.06		− 1.92
	+ 38.55		+46.64
	40.18		40.13

	Jan. 23	
	14.5	
	31 34.5	31 30.00
	38.1	34.00
	42.5	38.10
		46.00
		50.40
		54.52
	31 10.1	58.52
	13.7	2.86
	18.0	11.15
		14.60
		19.00
		35915
	31 18.37	57915
	32 13.93	31 54.468
		+49.07 5
		− 1.29 22
		− 1.88
		+48.94
		40.41

	+22.66	−19.40	+37.08	−19.02	+41.80	−28.17	+37.53	−29.97	+14.72	−37.21	+36.10	−19.46
	1.35526	1.28780 m	1.56914	1.27921 m	1.62118	1.44970 m	1.57438	1.47667 m	1.16791	1.57066 m	1.55757	1.28914 m
	1.18443	1.11697 m	1.39831	1.10838 m	1.45035	1.27896 m	1.40355	1.30586 m	0.99708	1.39983 m	1.38668	1.11831 m
	50 3	50 3	50 3	50 3	50 3	50 3	50 3	50 3	50 3	50 3	50 3	50 3
	21,8+.58	51.3+.23	12.4+.39	50.7+.24	1.4+.17	47.5+.30	11.2+.36	57.9+.20	21.8+.58	57.2+.20	15.6+.46	53.2+.22
	32.1+.15	1.3+.14	21.1+.24	58.7+.19	12.8+.30	58.2+.20	20.7+.24	6.3+.20	23.4+.20	58.1+.21	14.1+.29	57.2+.33
	17.9−.32	47.4−.50	6.2+.07	42.5−.40	1.6+.09	48.8−.49	4.9+.08	51.0−.43	35.0−.07	9.3+.02	20.2−.25	56.8−.01
	21.8+.34	52.1+.07	9.5+.40	47.8+.13	16.9+.36	2.9+.13	18.8+.35	4.6+.18	29.1+.34	4.9+.19	15.5+.38	53.4+.06
	+.75	−.06	+1.10	+.16	+.92	+.14	+1.03	+.15	+1.05	+.62	+.85	+.60
	53 2.40	53 53.02	53 12.30	53 49.92	53 8.18	53 54.35	53 13.90	53 59.95	53 27.32	54 2.38	53 16.35	53 53.65
	15.29	− 13.09	25.02	− 12.83	28.21	− 19.07	25.32	−20.22	9.93	−25.11	24.36	− 13.13
	53 38.69	53 39.93	53 37.32	53 37.09	53 36.39	53 35.34	53 39.22	53 39.73	53 37.25	53 37.27	53 40.71	53 40.52
+59	29 9.66	29 8.42	29 11.03	29 11.26	29 11.96	29 13.01	29 9.13	29 8.62	29 11.10	29 11.08	29 7.64	29 7.88
+17	11 41											
	1.25090											
	+2303		+3368		+0946		+4176		+0883		+1306	
	1.27393		1.28458		1.26036		1.29266		1.25973		1.29396	
	+18.79		+19.26		+18.21		+19.62		+18.19		+19.68	
	− .12	− .06	− .32	− .08	− .42	− .18	− .33	− .21	− .05	− .32	− .31	− .08
	− .34	− .39	− .32	− .38	− .31	− .39	− .29	− .36	− .28	− .32	− .26	− .31
	− .19	+ .02	− .28	− .04	− .23	− .04	− .26	− .04	− .26	− .16	− .21	− .15
	+18.14	+18.14	+18.34	+18.76	+17.25	+17.60	+18.84	+19.01	+17.60	+17.39	+18.90	+19.14
59	29 27.80	+26.86	29.37	30.02	29.21	30.61	27.87	27.63	28.70	28.47	26.54	26.97
	27.38	26.86	29.70		29.91		27.75		28.58		26.76	
	− 20.21		− 20.84		− 22.03		− 22.25		− 22.81		− 22.89	
	+ .43	20.54	+ .42	18.51	+ .41	20.07	+ .41	21.34	+ .40	26.00	+ .40	26.00
20	+5 20.11	+5 19.68	+5 18.09	+5 17.67	+5 19.66	+5 19.26	+5 20.93	+5 20.52	+5 20.95	+5 20.35	+5 20.60	+5 20.26
	+5 0.33		+4 57.67		+4 58.04		+4 59.09		+4 58.54		+4 58.11	
	34 27.60		27.37		27.95		26.84		27.12		24.87	

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36

16 Camelop.

3h 36.8m

+70° 30′

−28 7

1878

| | | |

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38

Camelop.

α 3h 54.0m

δ +68° 20′

−25 57

1878

$d\alpha$ 53

$\frac{d\alpha}{dt}$

$d\delta$

1878.0

α 49.64 +68° 20′ 24.6″

.63 24.5

.59 24.6

.94 23.9

.47 24.3

.51 21.2

δ 53 49.67 +68 20 23.85

35

log sin δ 9.96818

" cos δ 9.56727

" log tan δ 9.69265

tan δ +2.517

tan z − .44

	Jan. 1		Jan. 5		Jan. 14		Jan. 16		Jan. 22		Jan. 23	
	m δ	m δ	m δ	[52.0]	52 26.2	53 2.4	52 13.0	52 39.1	52 42.4	52 54.1	52 49.0	52 53.7
	52 48.3	53 18.2	52 57.0	57.5	31.9	5.3	17.1	45.1	48.0	56.4	54.7	56.5
	51.3	20.9	9.2	3.3	36.7	8.0	22.9	50.5	51.6	59.3	59.9	59.2
	54.4	23.6	13.5	14.0		11.0		1.6		2.3		2.4
		26.4	17.0	20.0		13.5		7.0		5.0		5.3
		29.5		25.6		16.2		12.6		7.9		7.7
		32.5										
	53 36.5	35.2	54 24.5	31.1	53 37.7	19.4	53 27.2	18.3	53 22.4	10.6	53 29.4	10.8
	44.0	38.5	29.9	36.6	42.6	22.2	32.5	24.0	26.0	13.6	35.5	13.5
	47.5	40.6	33.9	47.9	46.0	25.0	38.0	35.2	31.7	16.4	42.1	16.1
				53.3				40.8				
				59.1				46.3				
		2654		4004		1230		3205		2259		2252
	52 51.33		53 13.23	2804	52 31.60		52 17.67	1405	52 47.33	459	52 54.53	452
	53 42.67	53 29.489	54 29.43	53 25.491	53 42.10	53 13.667	53 32.57	53 12.773	53 26.70	53 5.100	53 35.67	53 5.022
		+25.321		+29.145		+40.36 33 28		+41.68 7		+48.55 1		+49.04
		− 1.82 80		− 1.94 74		− 1.80 39		− 1.85 54		− 1.50 40		− 1.91 81
		− 3.35 6		− 3.27		− 3.02		− 2.95 6		− 2.74		− 2.78 1
		+20.145 15		+24.14		+35.52 92		+38.17 37		+44.87		+44.52
		53 49.64		49.63		49.54 59		49.94		49.47		49.54

	+38.16s	−13.18s	+12.26	−63.94	+42.07	−28.43	+55.10	−19.80	+17.77	−21.60	+10.49	−30.65
	1.58161	1.11992n	1.08549	1.80577n	1.62397	1.45378n	1.74115	1.29667n	1.24969	1.33445n	1.02078	1.48643n
	1.27366	0.81197n	0.78054	1.49782n	1.31602	1.14583n	1.43320	0.98872n	0.94174	1.02650n	0.71283	1.17848n
	5′ 2	5′ 2	5 2	5 3	5 2	5 2	5 2	5 3	5 2	5 2	5 2	5 3
δ	33.3+49	59.7+16	45.1+29	22.5+68	21.9+50	57.2+16	24.3+53	2.2+17	36.0+44	55.1+16	50.4+21	9.9+33
T	40.5+30	6.8+30	52.2+40	30.2+15	32.1+21	6.3+30	31.2+21	9.6+30	36.4+22	55.2+35	46.1+42	6.1+30
l	27.8 00	51.9−48	37.1−22	13.0−21	21.4−25	54.9−29	16.1−29	52.2−47	48.6−56	5.5+08	53.1−43	10.8−10
H	35.9+44	0.8+25	44.8+33	24.0+34	37.8+42	15.6+37	28.9+48	10.9+40	45.0+33	4.8+36	50.5+26	10.8+40
	+1.23	+.23	+.80	+.86	+.88	+.54	+.93	+.40	+.43	+.95	+.46	+.93
	7 34.38	7 59.80	7 44.80	8 22.42	7 28.30	8 3.50	7 25.12	8 3.72	7 41.50	8 0.15	7 50.02	8 9.40
	18.78	− 6.49	6.03	− 31.46	20.70	− 13.99	27.11	− 9.74	8.74	− 10.63	5.16	− 15.08
	7 53.16	7 53.31	7 50.83	7 50.96	7 49.00	7 49.51	7 52.23	7 53.98	7 50.24	7 49.52	7 55.18	7 54.32
+68°	14′ 55.19″	14′ 55.04″	14 57.52	14 57.39	14 59.25 35	14 58.84	14 56.12	14 54.37	14 58.11	14 58.83	14 53.17	14 54.03
−25	57 26											
	1.44760		−		+							
	+2347		+3411	+0946		+4203		+0915		+4354		
	1.47107		1.48171	1.45706		1.48963		1.45675		1.49114		
	+29.59	"	+30.32	+28.65		+30.88		+28.63		+30.98		
	− .27	− .03	− .03	− .78	− .33	− .15	− .57	− .08	− .06	− .09	− .02	− .18
	− .26	− .30	− .27	− .34	− .25	− .31	− .22	− .28	− .22	− .24	− .22	− .26
	− .31	− .06	− .20	− .22	− .22	− .14	− .23	− .10	− .11	− .24	− .12	− .23
	+28.75	+29.20	+29.82	+28.08	+27.85	+28.05	+29.86	+30.42	+28.24	+28.06	+30.62	+30.31
68°	15 23.94	24.24	27.34	26.37	27.20	26.89	25.98	24.79	26.35	26.89	23.79	24.34
	24.09		26.86		27.04		25.38		26.62		24.06	
	− 20.71		− 21.10		− 22.72		− 23.03		− 23.88		− 24.00	
	+ .64	20.75	+ .62	18.71	+ .60	20.26	+ .60	21.53	+ .58	21.53	+ .55	21.18
	+5 20.11	+5 19.47	+5 18.09	+5 17.47	+5 19.66	+5 19.06	+5 20.93	+5 21.32	+5 20.95	+5 20.97	+5 20.60	+5 20.02
	+ 5 0.51		+ 4 57.61		+ 4 57.52		+ 4 58.50		+ 4 56.65		+ 4 57.18	
	20 24.60		24.47		24.58		23.88		24.27		21.24	

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18780

Tauri (167 B)

3h 55.2m
+9° 39'
+32 44
1878

do	d 55	6.90	+9 39 15.7
bor. α		6.98	16.2
		6.88	15.1
do		7.04	15.2
		6.88	15.4
δ		6.89	15.2
bor. δ	55	6.98/28	+9 39 15.7/47
δ			

log sin δ 9.22435
" cos δ 9.99381
" 15 cos δ tan 0.11859
tan δ +0.17
" z +.54

	Jan. 24		Jan. 30		Feb. 2		Feb. 4		Feb. 5		Feb. 6	
h	m s	m s										
3	53 56.7	54 5.63	53 44.7	53 58.42	53 46.2	53 37.20	53 4.14	53 37.80	53 58.6	53 50.50	54 50.7	54 50.38
	59.2	7.70	46.4	0.50	48.5	36.20	3.33	53.80	0.4	52.52	53 52.8	53 52.58
	0.8	9.92	48.3	2.48	50.7	58.45	4.48	55.92	2.2	54.68	54.1	54.47
		14.88		6.70		2.67		0.10		59.00		58.68
		16.10		8.82		4.70		2.06		1.00		0.85
		18.31		11.00		6.72		4.15		2.86		2.90
	54 34.8	20.37	54 30.0	13.00	54 41.7	8.90	54 3.58	6.25		5.10		3.00
	36.8	22.37	33.4	15.20	43.3	10.95	37.5	8.43		7.30		7.07
	38.5	26.88	34.9	19.20	45.7	14.91	39.7	12.50		11.40		11.26
		28.65		21.30		17.16		14.60		13.27		13.27
		30.77		23.37		19.20		16.70		15.40		15.46
		20048		17999		25406		22631		27312		27192
	53 58.90		53 46.47	11999	53 48.47	7406	53 43.17	4631	54 0.40	3312	53 52.53	3192
	54 36.70	54 18.225	54 32.77	54 10908	54 43.67	54 6.733	54 37.67	54 4.210		54 3.011		54 2.902
		+50.321		+57.64		+61.68		+64.32		+65.25		+54.5
		−0.12.16.12		− .13		− .13		− .12		− .12		− .11
		− 1.51		− − 1.44		− 1.39.40		− 1.37		− 1.36		− 1.33 5
		+48.68		+56.07		+ 60.15		+62.83		+ 63.87		+ 3.99
		55 6.90		6.98		6.88		7.04 ✓		6.88		6.89

	+ 19.32	− 18.48	+2444	−2186	+18.26	−3684	+2104	−3346	+ 261	+ 1037
	1.28601	1.26670n	1.38810	1.33965n	1.26150	1.56632n	1.32305	1.52453n	0.41664	1.01578
	1.48460	1.38529n	1.50669	1.45824n	1.38009	1.68491n	1.44164	1.64312n	0.53523	1.13437
	45' 2"	45 3	45 2	45 3	45 2	45 3	45 2	45 3	45 2	45 2
6	35.9+4.44	25.8+6.1	27.9+5.4	29.9+5.8	36.4+4.4	49.6+2.6	32.2+5.1	44.2+3.6	55.6+1.6	44.0+3.1
7	41.1+3.1	30.0+1.5	32.1+4.2	34.5+1.4	41.1+3.1	54.7+2.7	37.9+2.5	49.4+3.4	0.9+2.6	50.0+4.2
9	47.1−.5	35.1−.08	38.7−.3	41.1−.36	49.0−.56	0.7+.17	47.1−.5	57.8+.07	11.5−.14	1.74.09
11	40.1+.39	29.2+.34	31.9+.47	34.6+.31	41.2+.37	54.9+.04	41.4+.37	54.8+.04	8.0+.40	58.1+.21
	+.57	+1.02	+.91	+.67	+.56	+.74	+.56	+.81	+.68	+1.03
	47' 41.05	48' 30.05	47 32.65	48 35.02	47 41.92	48 54.98	47 39.65	48 51.55	48 4.00	47 53.45
	25.39	− 24.28	32.11	−28.72	23.99	−48.41	27.65	−43.97	3.43	13.63
	48 6.44	48 5.77	4.76	6.30	5.91	6.57	4.30	7.58	7.43	7.08
+9°	34' 41.91	34' 42.58	43.59	42.05	42.44	41.78	41.05	40.77	40.92	41.27
+32	42 47									
	1.56780									
	+ 3438		+4212		+3844		+2258		+2134	+2021
	1.60218		1.60992		1.60624		1.54038		1.57014	1.58801
	−40.01		−40.73		−40.39		−38.94		−38.92	−38.78
	− .03	− .03 −0.36	− .05	− .04	− .03	− .13	− .04	− .10	− 50	− .01
	− .19	− .25 −0.34	− .20	− .29	− .22	− .31	− .24	− .35	− .31	− .29 −0.56
	− .14	− .26 −0.1	− .23 −0.3	− .17 −0.1	− .14 −0.3	− .19 −0.6	− .14 −0.1	− .20 −0.6	− .17 −0.7	− .26
	−40.37	−40.55	−41.21	−41.23	−40.78	−41.02	−39.36	−39.59	−39.40	−39.29
9°	34' 1.54	2.03	2.38	0.82	1.66	0.76	1.69	1.18	1.52	1.98
	1.78		1.60		1.21		1.44			
	− 7.87		− 7.28		− 7.13		− 7.05		− 7.01	− 6.96
	− .41		− .69		− .68		− .66		− .66	− .65
	+5 22.21	+5 21.50	+5 22.56	+5 21.87	+5 21.71	+5 21.03	+5 21.49	+5 20.88	+5 21.56	+5 20.90 +5 20.86 +5 20.21
	+5 14.93		+5 14.59		+5 13.90		+5 13.78		+5 13.89	+5 14.25
	39 15.69		16.19		15.11		15.22		15.41	15.23

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18780

Tauri (171 B)

3h 57.m5

+2° 30'

+39 53

1878

| | | |

1878phae.proj.1496.

42

Dec. 740

3 h 59.9 m

+54° 30′

−12 7

1878

Jan. 24

18750

log sin δ 9.91069

log cos δ 9.76395

log tan δ 9.88873

I 3.548

δ₀ 59 44.965 +54 30 15.3

tan δ +1.40

− .21

Jan. 28 Jan. 29 Feb. 3 Feb. 4

h	m	s	m	s																
3	58	30.4	58	36.23	58	17.9	58	32.00	58	9.9	58	30.40	59	10.5	58	—	58	34.3	58	—
		35.0		39.90		22.3		35.72		13.5		34.05		13.5		—		38.4		—
		38.8		43.50		25.0		39.10		18.6		37.61		17.1		—		41.5		43.63 2.934
				51.42				46.15				44.60			44.55	37.45				.67 36.57
				54.00				49.58				48.50			.46	40.90				.71 40.16
				57.52				53.32				51.80			.50	44.50				.60 43.50
	59	19.5		1.10	59	15.1		56.80	59	6.4		55.23	59	27.6	.25	47.80	59	32.0		.45 47.00
		22.2		4.47		19.0		0.36		8.8		58.90		31.9	.55	51.65		35.4		.70 50.80
		24.8		11.77		22.1		7.48		12.4		6.05		34.6	.41	58.60		38.5		.43 57.62
				15.50				10.98				9.36			.48	2.22				.56 1.30
				18.98				14.53				13.14			.71	6.00				.61 4.80
				33349				34699				38964			390				616	
	58	34.73		63349	58	21.73		58699	58	13.67		56964	59	13.70			58	38.07		
	59	25.17	58	57.590	59	18.73	58	53.362	59	9.20	58	51.785	59	31.37	58	44.488	59	35.30	58	43.573
		22.17						272												
				+58.281				+5493				+5620				+6310				+6432
				−1.05 0.96				−1.24 15				−1.03				−0.91				−1.03
				−2.089				−1.992.00				−1.97				−1.85				−1.82
				+48.26				+51.78				+53.20				+60.34				+61.47
				7				05												
			59	44.85				45.14				44.98				44.83				45.04

						54		46		37.78										
	+22.86		−24.58		+31.63		−25.29		+38.11		−17.42		−29.21		−46.88		+5.50		−51.73	
	1.38908		1.39058n		1.40870		1.40422n		1.38104		1.24105n		1.46553n		1.67099n		0.74036		1.71374n	
	1.24781		1.27931n		1.38863		1.29365n		1.46599		1.12978n		1.35426n		1.55972n		0.62909		1.60247n	
					759		457													
	55′	2′	55′	3′	55	2	55	3	55	2	55	2	55	3	55	3	55	2	55	3
6	29.1	+.53	51.7	+.22	17.6	+.43	2.2	+.17	16.2	+.39	58.7	+.16	5.5	+.22	19.0	+.53	37.9	+.41	21.9	+.58
7	29.4	+.23	4.1	+.28	17.2	+.32	2.1	+.27	15.3	+.33	58.2	+.30	4.8	+.29	18.9	+.26	38.4	+.26	22.9	+.21
9	35.4	−.13	8.9	−.03	24.9	−.10	8.9	−.03	22.2	−.22	3.0	+.09	12.1	−.16	25.9	−.04	47.8	−.57	30.1	+.06
H	29.9	+.48	6.0	+.39	21.9	+.46	7.7	+.40	17.9	+.47	0.7	+.24	8.1	+.40	22.1	+.34	44.0	+.34	28.1	+.34
		+1.11		+.86		+1.11		+.81		+.97		+.79		+.75		+1.09		+.44		+1.19
	57′	30.95	58′	6.18	57	20.40	58	5.22	57	17.90	58	0.15	58	7.62	58	21.48	57	42.02	58	25.75
		17.69		−19.02		24.48 1		−19.84 71		29.24		−13.48		−22.61		−36.28		4.26		−40.84
	57	48.64	58	47.16	57	44.88 1	57	45.58 1		47.14		46.67		45.01		45.20		46.28		45.71
+54°	24′	59.71	24′	1.19	25	3.47	25	2.77		1.21		1.68		3.34		3.15		2.07		2.64
			5′			54		84												
−12	7	31																		
	1.09240																			
	+3437				+2608				+3479				+2935				+2277			
	1.12677				1.11848				1.12719				1.12175				1.11517			
	+13.39				+13.14				+13.40				+13.24				+13.04			
	− .14		− .16		− .26		− .17		− .38		− .07		− .22		− .57		− .02		− .70	
	− .17		− .22		− .16		− .22		− .18		− .24		− .28		− .31		− .24		− .31	
	− .28		− .22		− .28		− .20		− .24		− .20		− .19		− .27		− .11		− .30	
	+12.80		+12.79		+12.44		+12.55		+12.60		+12.89		+12.55		+12.09		+12.67		+12.73	
54	25	12.51	25	13.18		15.98		15.38		13.81		14.57		15.89		15.24		14.34		14.37
		13.24				15.64				14.19				15.66				14.56		
		−20.85				−21.84				−21.21				−21.48				−21.52		
		+ .28		22.49		+ .27		21.24		+ .27		22.32		+ .26		97		+ .26		75
	+5	22.21	+5	21.93	+5	20.97	+5	20.70	+5	22.05	+5	21.78	+5	21.71	+5	21.45	+5	21.49	+5	21.23
	+5	1.64			+5	50.10			+5	1.11			+5	0.49			+5	0.23		
	30	14.88				15.74				15.30				16.05				14.79		

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1878

Cephei α_0 0 α 6.20 $+83°$ 30 1/2 43.3 hyp log δ 9.99721 I 9.122

4^h 0.4m $+83°$ 31′ — 41 8

bor. α .08 1/2 vt 15.5 1/2 vt 16.3 $n \cos\delta$ 9.05275

$\frac{d\alpha}{dt}$ 7.26 1/2 vt 16.1 1/2 vt 16.4 n 1500 stant 9.17753

δ_0 5.65 1/2 vt 13.7 6.48

bor. δ 0 6.37 .118 $+83$ 30 15.5 $\tan\delta$ +8.804

$\frac{d\delta}{dt}$ $\tan z$ $\sin z$ — .66

	Jan. 1		Jan. 6		Jan. 14		Jan. 16		Jan. 22		Jan. 23	
	m A	m D	α	δ								
3	59 37.0	59 —	59 —	0 3.9	58 43.7	59 2.7	59 29.5	59 [7.3]	59 13.0	59 —	59 8.2 ✓	58 55.6
	55.2	59.9 29.5	—		58.4	12.3		39.0 11.6	25.8			2.2
		55.4 37.2	—		14.2	20.3		40.1 21.9	44.9	29.3 11.1		11.5
		57.4 48.3	—			30.5		39.5 31.4		29.2 20.1		23.3
		56.8 56.8	53.5 53.5			39.3		~~38.1~~ 38.1		30.0 30.0	✓	30.8
		56.9 6.0	51.7 0.8			47.7		~~39.0~~ 48.1		30.2 39.3		40.3
	0 31.5	58.8 17.0	52.9 11.1	1 7.9	59 44.5	57.6	0 17.0	39.2 57.4	0 19.8	29.6 47.8	59 52.8 ✓	49.5
	[1. 11.8]	56.8 24.2	52.1 19.5		2.3	6.0		39.6 7.0	26.7	28.7 56.1		57.9
		57.2 33.7	52.2 28.7		17.1	16.6		39.3 15.8	47.9	29.3 5.8		8.4
			n4									
		562						18		663		
						2330			27.90			2795
	59 46.10		0 3.90		58 58.77	3530	59 29.50		59 ~~14.40~~		59 8.20	~~11.05~~
	~~14.80~~	59 57.025	1 7.90	59 52.480	0 1.30	59 39.222	0 17.00	59 89.225	59 ~~77.90~~	59 29.471	59 52.80	59 31.845
	0 31.50								6 31.47			
		+25.32		+29.15		+40.36 33 29		+41.68 7		+48.55 7		+49.104
		− ~~6.35~~ 6.28		− ~~6.28~~ 6.07		− 5.61 4.84		− 5.77 38		− ~~6.25~~ 4.89		− 6.64 32
		− 9.83 5		− 9.48 ~~8~~		− 8.48 50		− 8.18 25		− 7.42 4		− ~~7.24~~ 30
		+ ~~16~~ 18		+13.60		+26.92		+28.04		+ ~~40~~ 18		+ 35.42
		9				6				36		
		00 6.20		6.08		6.44		7.26 ✓		5.65 ✓		6.48
						18						

	− ~~34~~48										
+10.92	− ~~14~~78	− 11.42	−75.42	+40.45	− 22.08	+ 9.72	− 37.78	+ 1.57	− 62.00	+22.86	− 21.74
1,03822	1,87879 n	1,05767 n	1,87749 n	1,60692	1,34400 n	0.98767	1,57726 n	0.19590	1.79239 n	1.35908	1.38726 n
0.21575	1.05132 n	0.23520 n	1.05502 n	0.78445	0.52153 n	0.16520	0.75479 n	9.37343	0.96992 n	0.53661	0.51479 n
55 3	55 3	55 3	55 3	55 3	55 3	55 3	55 3	55 3	55 3	55 3	55 3
24.2+60	32.6+56	25.7+61	33.9+54	6.8+25	15.5+46	20.7+56	27.9+61	14.1+48	22.0+58	22.9+59	27.1+61
34.2+14	41.8+25	35.1+14	43.1+29	17.9+27	27.4+17	30.0+15	37.1+16	15.9+28	24.0+19	21.5+23	25.6+18
17.9−32	24.2−13	17.1−31	25.1−08	3.9+10	13.5−23	10.8−10	17.4−31	23.9−15	32.0+03	24.7−10	27.9+02
25.1+34	33.3+33	24.5+34	33.3+33	23.9+34	32.0+33	28.5+34	37.4+28	22.1+34	30.9+24	22.9+34	26.8+34
+.76	+1.01	+.78	+1.08	+.96	+.73	+.95	+.74	+.90	+1.14	+1.06	+.15
58 25.35	58 32.98	58 25.60	58 33.85	58 13.12	58 22.10	58 22.50	58 29.95	58 19.00	58 27.22	58 23.00	58 26.85
1.64	− ~~11.25~~ 5.79	− 1.72	− 11.35	6.09	− 3.32	1.46	− 5.69	0.24	− 9.33	3.44	− 3.27
58 26.99	58 ~~21.73~~ 27.19	58 23.88	58 22.50	58 19.21	58 18.78	58 23.96	58 24.26	58 19.24	58 17.89	58 26.44	58 23.58
+83 24 21.36	24 20.56	24 24.47	24 25.85	24 29.14	24 29.87	24 24.39	24 24.09	24 29.61	24 30.46	24 21.91	24 24.77
−41 ~~8~~6 53											
1.70140 1.70090											
+2359		+3424		+0946		+4210		+0924		+4367	
1.72449		1.73514		1.71036		1.74300		1.71014		1.74457	
+53.03	.08	+54.34		+51.33		+55.34		+51.30	24	+55.53	
− .01	− ~~.37~~ .6	− .01	− .37	− .11	− .03	− .01	− .10	− .00	− ~~.37~~ .5	− .03	− .03
− .34	− .35 0	− .34	− .36	− .32	− .34	− .31	− .31	− .26	− .28	− .27	− .27
− .19	− .25	− .20	− .27	− .24	− .18	− .24	− .19	− .23	− .29	− .27	− .29
+52.49	+ 52.85	+53.79	+53.34	+50.66	+50.78	+54.78	+54.74	+50.80	+50~~.80~~.49	+54.96	+54.94
83 25 13.85	1291	18.56	19.19	19.80	20.35	19.17	18.83	~~18.63~~ 19.92	~~14.17~~ 20.95	16.87	19.71
12.38		18.72		20.08		19.00		20.44		~~18.14~~ 29	
14						72					
− 21.2		− 22.20		− 24.30		− 24.5		− 25.96		− 26.03	
+ .96	21.07	+ .92	19.01	+ .90	20.56	+ .90	21.83	+ .87	21.82	+ .87	21.47
+5 20.11	+ 5 ~~19.15~~	+5 18.59	+ 5 ~~17.11~~	+5 19.66	+ 5 ~~18.76~~	+5 20.93	+ 5 ~~20.03~~	+5 20.95	+ 5 ~~20.08~~	+5 20.60	+ 5 ~~20.73~~
+ 4 55.93		+ 4 55.81		+ 4 ~~46~~.26		+ 4 57.11		+ 4 55.96		+ 4 55.44	
30 13.31		15.53		16.34		16.11		16.40		~~12.31~~ 13.58	✓
										73	

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18780

153 Cephei.

α 3 19.70 $+83^\circ$ 2 28.6 log emi δ 9.99680

bar. α 2058 25.3 " cos δ 9.08280

$\frac{d\alpha}{d\alpha}$ [21.25] 27.1 " 15 cos δ tan i 9.20758

19.84 24.3

δ_0 [24.74] 23.8

tan δ +8.204

bar. δ 3 20[illegible] +83 2 26.48 $\frac{\tan z}{2m}$ − .65

$\frac{d\delta}{dt}$ 20.98

4h 3.8m

+83° 3'

−40 40

1878

Jan. 1				Jan. 5				Jan. 14				Jan. 16				Jan. 22				Jan. 23			
m		p	m	p																			
4	2	31.2	2	35.4	2	25.1	2	31.6	0	56.3	2	18.2	1	8.2	2	17.9	1	46.4	2	9.5	0	44.1	2	15.0
		45.3		43.7		38.4		40.7		11.7		26.9				26.8		2.6		18.0		59.2		18.1
		49.5		51.6		54.5		49.6		23.8		34.8				36.0		17.2		26.6		18.5		27.3
		2.7		1.0				57.1				44.2				44.4				34.4				36.1
				9.3				6.6				53.1			✓	52.6			✓	43.3				44.6
				17.9				14.4				1.5				0.3				50.7				52.9
	3	38.2		26.6	3	51.9		23.0	1	44.6		9.4	2	21.4		10.2	2	40.4		59.5	1	37.7		29
		59.5		36.3		9.5		31.7		58.8		18.3				18.4		54.7		9.2		49.1		11.1
		5.5		45.0		24.4		40.7		8.4		26.6				26.3		9.8		16.8		5.6		19.1
				2668				2954				2330				2329				2680				2221
	2	47.18		86.8	2	39.33		554	1	10.60		4730	1	8.20		4729	2	2.07		3880	1	0.60		4021
	3	54.40	3	9.644	4	8.60	3	6.156	1	57.27	2	52.556	2	21.40	2	52.544	2	54.97	2	43.111	1	50.80	2	44.687
				+25.321				+29.15				+40.36 33 29				+41.64 7				+48.55 1				+49.04
				− 5.92 85				− 5.85 66				− 6.23 4.53				− 5.37 .01				− 4.89 56				− 6.22 5.89
				− 9.38 40				− 9.06 7				− 8.16 7				− 7.93 5				− 7.28 2				− 7.07 9
				+14.06 0				+14.42				+27.54 63				+33.71 28				+36.73				+36.86
			3	19.70				20.58				20.15 19				21.25 ✓				19.84 ✓				20.74

	s		s																				
	+22.46		−44.76		+26.83		−62.44		+101.96		+55.29		+104.34		+31.14		+41.04		−11.86		+104.08		+53.88
	1.35141		1.65089 n		1.42862		1.79546 n		2.00843		1.74265		2.01845		1.49332		1.61321		1.07408 n		2.01737		1.73143
	0.55899		0.85847 n		0.63620		1.00304 n		1.21601		0.95023		1.22603		0.70090		0.82079		0.28166 n		1.22495		0.93901
	25	1	25	1	25	1	25	1	25	0	25	0	25	0	25	1	25	0	25	1	25	0	25	1
	"		"																				
C	6.7	+.20	18.0	+.45	8.9	+.26	23.5	+.52	44.2	+.27	51.7	+.15	54.3	+.13	6.44	+.21	56.4	+.13	5.1	+.18	58.5	+.13	5.2	+.18
F	16.2	+.25	28.44	+.18	16.5	+.25	31.9	+.18	55.1	+.25	2.7	+.19	2.9	+.19	14.9	+.25	58.2	+.21	6.3	+.23	55.2	+.25	3.4	+.19
G	59.9	−.05	10.8	−.20	59.2	−.08	14.1	−.34	42.9	−.58	50.3	−.62	45.1	−.64	55.8	−.29	6.44	−.05	16.0	−.40	57.8	−.14	5.9	−.04
H	8.2	+.73	19.2	+.67	8.7	+.73	24.2	+.66	0.5	+.54	8.1	+.73	59.1	+.55	12.9	+.72	5.4	+.70	13.8	+.71	58.9	+.55	5.9	+.71
		+1.13		+1.10		+1.16		+1.22		+1.42		+1.43		+1.23		+1.88		+1.99		+1.72		+1.79		+1.04
	26	7.75	26	19.10	26	8.32	26	23.42	25	50.58	25	58.20	25	55.35	26	7.50	26	1.60	26	10.30	25	57.60	26	5.10
		3.62		− 7.22		4.38		− 10.07		16.44		8.92		16.83		5.02		6.62		− 1.91		16.79		8.69
	26	11.37	26	11.88	26	12.65	26	13.35	26	7.02	26	7.12	26	12.18	26	12.52	26	8.22	26	8.39	26	14.39	26	13.79
+82°	56'	36.98	56'	36.47	56	35.70	56	35.00	56	41.33	56	41.23	56	36.17	56	35.83	56	40.13	56	39.96	56	33.96	56	34.56
−40	39	8																						
	1.69370																							
	+2366				+3430				+0946				+4214				+0927				+4373			
	1.71736				1.72800				1.70316				1.73584				1.70247				1.73743			
	+52.16		"		+53.46				+50.48				+54.43				+50.46				+54.63			
	− .03		− .13		− .05		− .25		− .68		− .20		− .71		− .06		− .11		− .01		− .71		− .19	
	− .11		− .13		− .11		− .14		− .08		− .10		− .08		− .10		− .08		− .10		− .08		− .09	
	− .28		− .28		− .29		− .26		− .14		− .11		− .06		− .22		− .25		− .18		− .20		− .26	
	+51.24		+51.62		+53.01		+52.81		+49.59		+50.07		+53.58		+54.05		+50.02		+50.17		+53.64		+54.09	
82°	57'	28.72		28.09		28.71		27.81		30.92		31.30		29.75		29.88		30.15		30.13		27.60		28.65
		28.40				28.24				31.11				29.82				30.14				28.12		
						− 21.96																		
		− 20.90				− 22.0				− 24.87				− 24.50				− 25.5 64				− 25.87		
		+ .04		21.05		+ .91		19.00		+ .89		20.55		+ .88		21.81		+ .86		21.81		+ .86		21.46
	+5	20.11	+5	19.17	+5	18.09	+5	17.19	+5	19.66	+5	19.77	+5	20.93	+5	20.05	+5	20.95	+5	20.09	+5	20.60	+5	19.74
	+ 4	59.15			+ 4	57.04			+ 4	56.48			+ 4	57.31			+ 4	56.17			+ 4	55.65		
+83	13	25.55 ✓				25.30 ✓				27.59				27.13				26.31				23.77 ✓		
	2	28																						

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Tauri (193 B)

$4^h\ 5.^m6$
$+16°\ 58'$
$+25\ 25$
1878

1878.0

$\alpha_0 = \alpha/5$ 31.66' $\quad \delta$ $+16°\ 57'\ 42.''8$ $\quad \log \sin \delta$ 9.46511 $\quad$ I 2.154

bm α 60 $\quad$ 40.9 $\quad$ " $\cos\delta$ 9.98067
$\frac{d\alpha}{dt}$ 57 $\quad$ 42.6
$\frac{d\delta}{dt}$ 54 $\quad$ 42.5 " $15\sin\delta\tan i$ 0.10545
75 $\quad$ 43.0
δ_0 65 $\quad$ 43.1

$\tan\delta$ +0.31

bm δ 5 31.6 ± 28 $\quad +16\ 57\ 42.''8 \pm 58$ $\quad \frac{\text{bm}\,z}{2\sin}$ + .43

$\frac{d\delta}{dt}$

Jan. 1				Jan. 5				Jan. 14				Jan. 22		Jan. 23		Jan. 24			
h	m	δ	m	δ				h	δ			h	δ	h	δ	h	δ	h	δ
4	5 21.0		—	5 10.0		—		4 26.7		4 40.0		4 18.1		4 31.90	4 20.7	4 31.68	4 25.8	4 30.38	4
	25.0		—	11.7		—		28.3		42.30		19.9		34.00	24.0	33.68	28.6	32.40	
	26.9		—	13.5		—		30.2		44.58		21.6		36.20	26.3	35.85	30.9	34.52	
			—		5	0.10				48.70				40.55		40.32		38.80	
			—		4.41 4.50	2.35				50.95				42.77		42.38		41.00	
			—		.32	4.32				53.10				44.83		44.52		43.20	
	5 48.6		—	5 43.8	.50	6.65		5 11.5		55.30		5 9.1		46.97	5 17.0	46.60		45.32	
	50.5		—	46.0	.42	8.73		13.8		57.45		11.3		49.10	19.4	48.80		47.38	
	52.4	5 8.36	16.98	48.4	.53	13.15		15.2		1.73		13.5		53.42	21.8	53.22		51.78	
		8.23	19.00		.51	15.28				3.95				55.60		55.40		53.83	
		8.33	21.25		.33	17.25				6.10				57.70		57.50		56.60	
			92		352					40416				49304		48995		47461	
	5 24.80			5 11.73				4 28.40		58416		4 19.87			4 23.67		4 28.43		4
	5 50.50	5 8.307		5 46.07	5	4.400		5 13.50	4	53.105		5 11.30		4 44.822	5 19.40	4 44.541		4 43.146	
		+25.32	1		+29.15					+40.36	30			+48.58	1	+49.04		+50.38	1
		− 0.22	21		− 0.22	21				− 0.24	17			− 0.28	17	− 0.33	22	− 0.38	21
		− 1.75			− 1.74					− 1.64				− 1.62		− 1.61		− 1.60	
		+23.35			+27.20					+38.47				+46.72		+47.21		+48.50	
		5 31.66			31.60					31.54				31.54		31.75 ✓		31.65	

	− 15.99	− 42.19	− 7.33	− 41.67	+ 24.70	− 20.40	+ 24.95	− 26.48	+ 20.87	− 34.86	+ 14.72		
	1,20385 n	1,62521 n	0.86510 n	1,61982 n	1,39270	1,30963 n	1,39707	1,42292 n	1,31952	1,54283 n	1,16791		
	1,30930 n	1,73066 n	0.97055 n	1,72527 n	1,49815	1,41508 n	1,50252	1,52837 n	1,42497	1,64778 n	1,27336		
	30 0	30 0	25 4	30 0	25 4	30 0	25 4	30 0	25 4	30 0	25 4		
ℰ	0.7+.01	34.3+.44	48.1+.14	34.7+.44	4.5+.22	2.3+.01	7.8+.28	12.1+.23	14.0+.41	24.7+.48	24.0+.54		
ℱ	14.2+.09	47.8+.30	1.9+.01	47.5+.30	19.4+.14	17.2+.09	13.6+.18	18.0+.09	16.9+.16	27.2+.04	28.0+.04		
ℊ	3.5+.03	36.4+.29	49.1−.60	35.1−.22	12.2−.12	8.9−.11	26.9−.02	32.1−.11	23.9−.14	33.6−.16	33.9−.07		
ℋ	5.2+.21	38.2+.57	52.0+.02	38.4+.52	25.1+.22	20.1+.37	19.1+.21	22.9+.41	16.9+.21	28.6 38.6+.48	27.1+.22		
	+.34	+.97	−.43	+1.04	+.46	+.36	+.65	+.62	+.64	+.84	+.73		
	30 5.90	30 39.18	29 52.78	30 38.92	29 15.30	30 12.12	29 16.85	30 21.28	29 17.92	30 28.62	29 28.25		
	− 20.38	− 53.78	− 9.34	− 53.12	31.49	− 26.01	31.81	− 33.76	26.61	− 46.44	18.17		
	29 45.52	29 45.40	29 43.44	29 45.80	29 46.79	29 46.11	29 48.66	29 47.52	29 44.53	29 44.08 ✓	29 47.02		
+16°	53 2.83	53 2.95	53 4.91	53 2.55	53 1.86	53 2.24	52 59.69	53 0.83	53 3.82	53 4.27	53 1.33		
+25	24 26												
	1.43690												
	+ 2370		+ 3434		+ 0946		+ 0929		+ 4370		+ 3436		
	1.46060		1.47124		1.44636		1.44619		1.48069		1.47126		
	− 28.88		− 29.60		− 27.95		− 27.94		− 30.25		− 29.60		
	− .04	− .27	− .02	− .27	− .10	− .06	− .18	− .10	− .07	− .19	− .03		
	− .01	− .07	− .49	− .06	− .43	− .02	− .34	− .03	− .34	− .04	− .31		
	− .09	− .24	+ .11	− .26	− .12	− .09	− .16	− .16	− .16	− .21	− .18		
	− 29.02	− 29.46	− 30.00	− 30.19	− 28.60	− 28.12	− 28.54	− 28.23	− 30.82	− 30.69	− 30.12		
16°	52' 33.81	33.49	34.91	32.36	32.96	34.12	31.15	32.60	33.00	33.58	31.21		
	33.65		33.64		33.54		31.88		33.29				
									76				
	− 10.32		− 10.24		− 10.00		− 9.78		− 9.8		− 9.73		
	− .62		− .60		− .59		− .57		− .54		− .57		
	+5 20.11	+5 19.49	+5 18.09	+5 17.49	+5 19.66	+5 19.07	+5 20.95	+5 20.38	+5 20.60	+5 20.63	+5 22.21	+5 21.64	
	+5 9.17		+5 7.25		+5 9.07		+5 10.60		+5 10.27		+5 12.91		
	57 42.82		40.89		42.61		42.48		43.56		43.12		

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1878.0

Perseï

α_0 δ_0

5 53.11 +37 39 39½+10.7

4h 6.1m

+37° 39′

+4 44

Jan. 29

bow. δ .19 12.6
$\frac{d\alpha}{d\alpha}$ .14 11.1
.14 12.1
δ_0 .11 12.1
.11 11.5

bow. δ 5 53.133 +37 39 11.8
$\frac{d\delta}{dt}$ .77

Jan. 30

log a δ 9.78592 I 2.602 Feb. 7 I 2.607 R' 14.35
" cos δ 9.89859 R'' 28.67
" 1500 δ tan' 0.02337 third Feb. 6
0.00409 n after "
tan δ +0.77
tan z +.08

Feb. 2 Feb. 4 Feb. 5 Feb. 7

| | | |

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48

Cephei

4^h 6.2
$+80°$ 32'
-38 9
1878

1878.0

α_0 α / 5 — 53.70 — $+80$ 31 42.0
borr α — 53.81 — 41.5
$d\alpha$ / $d\delta$ — 54.00 — 41.41
— 53.69 — 42.3
δ_0 — 53.52 — 41.7
— 54.01 — 41.5
borr. δ 5 — 53.7 — $+80$ 31 41.4
$d\delta$ / $d\alpha$

Jan. 24 — Jan. 29 — Jan. 30 — Feb. 2 — Feb. 6

| | | |

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Feb. 11

6	1.8	5	–	6	43.7
			60.5 41.7		50.0
			59.6 47.0		56.6
			59.6 8.33		3.0
			59.3 59.3		9.7
7	11.5		59.9 6.2		16.0
			59.1 11.7		21.6
			58.9 17.7		29.0
			60.5 23.6		34.0
			4774		2636
		5	59.68		836
			60.22	7	9.29
6	1.80				
79	11.50	5	59.950		
	+266				
	−4.60				
	−4.00				
	5.94				
		5	54.01		

−1.85	−191.55	−71.55
0.26717m	2.28228m	1.85461m
9.58874	1.60388	1.17621
55 0	55 0	
31. 47.47	18.1+.38	
31.3+.03	18.2+.09	
36.5−.30	22.8−.32	
36.3+.32	25.0+.44	
+.72	+.59	
55 34.38	55 21.02	55 21.02
+ .39	+ 40.17	15.00
55 34.77	56 1.19	36.02
27 13.58	26 4.76	27 12.33

+2725	
1.68235	
+48.12	
− .00	−0.46
− .08	− .06
− .18	− .15
+47.86	+47.45
27 61.44	59.78
60.61	
− 27.22	
+ .71	80.8
+4 7.37	+4 ~~8.66~~
3 40.86	
31 41.47	

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50

85 Tauri

$4^h\ 13.^m4$

$+18°\ 26'$

$+23\ \ 57$

1878

1878.0

α_0 α 13 19.76 $+18°\ 26'\ 53''6$ δ

bor. α .82 53.2

$\frac{d\alpha}{dt}$ .77 51.8

.82 55.3

.82 52.7

δ_0 .98 54.8

bor. δ 13 19.8 $\frac{3}{28}$ $+18\ 26\ 53''6$ 57

$\frac{d\delta}{dt}$

log sin δ 9.49996

" cos δ 9.97713

" 15 cos δ sin 1' 0.10191

tan δ +0.33

$\frac{\tan^2}{\sin 1'}$ +.41

	Jan. 1	Jan. 5	Jan. 14	Jan. 16	Jan. 22	Jan. 23
h m s	m s					
4 12 31.2	12 43.50	12 27.2	12 39.68	12 15.7	12 28.38	12 12.1	12 26.95	12 23.8	12 20.15	12 10.8	12 19.70
33.3	45.85	29.0	41.75	15.0	30.52	15.6	29.20	25.7	22.30	13.2	21.92
35.0	47.90	30.7	44.00	20.2	32.68	17.6	31.38	27.7	24.48	15.4	24.20
	52.20		48.36		36.95		35.72		28.85		28.70
	54.42		50.52		39.22		38.00		30.98		30.72
	56.50		52.64		41.30		40.00		33.18		32.90
13 10.9	58.80	13 26.6	54.78	13 19.0	43.63	13 6.2	42.20	13 3.4	35.37	12 57.2	34.98
12.6	1.00	29.4	57.10	20.9	45.80	8.9	44.60	5.7	37.60	59.3	37.32
14.0	5.28 ~~5.60~~	30.7	1.40	22.7	50.10	10.8	48.80	7.3	41.73	1.8	41.55
	6.32		3.63		52.20		50.95		44.00		43.62
	9.60		5.77		54.40		53.10		46.27		45.78
	38137		39963		45500		44090		36491		36139
12 33.17	62137	12 28.97	57963	12 17.97		12 15.10		12 25.73		12 13.13	
13 12.50	12 56488	13 28.90	12 52.694	13 20.87	12 41.364	13 8.63	12 40.082	13 5.47	12 33.174	12 59.43	12 32.854
	+25.381		+29.185		+40.3~~8~~ 3		+41.6~~8~~ 7		+48.581		+49.0~~3~~ 4
	− 0.24		− 0.23		− 0.~~24~~ 18		− 0.~~22~~ 20		− 0.~~20~~ 18		− 0.~~25~~ 24
	− 1.80		− 1.79		− 1.74		− 1.73		− 1.~~68~~		− 1.67
	+23.27		+27.13		+38.~~38~~ 41		+39.74		+46.65		+47.13
	13 19.76		19.82		19.7~~7~~ 77		19.82		19.82		19.98 ✓

	+23.32	−16.07	+23.72	−36.21	+23.39	−39.51	+24.98	−28.55	+7.44	−32.30	+19.72	−26.58
	1.36773	1.20489m	1.37511	1.55883m	1.36903	1.59671m	1.39759	1.45561m	0.87157	1.50920m	1.29491	1.42455m
	1.46964	1.30630m	1.47702	1.66074m	1.47094	1.69862m	1.49950	1.55752m	0.97348	1.61111m	1.39682	1.52646m
	0′ 0″	0′ 0″	0 0	0 1	55 4	0 1	55 4	0 1	0 0	0 1	0 0	0 1
E	1.7+.01	51.6+.15	0.3 00	15.2+.40	59.0 00	17.3+.44	58.1 00	6.3+.20	20.9+.44	10.6+.29	6.44.09	4.6+.18
F	17.1+.09	6.2+.23	15.0+.09	28.9+.18	15.0+.05	33.6+.18	12.2+.06	20.1+.23	28.1+.03	17.3+.25	10.3+.09	7.3+.24
G	4.6+.02	53.6−.51	1.1+.02	16.5−.41	4.4+.02	24.5−.20	54.9−.54	4.3−.02	41.0−.52	29.0−.05	17.1−.42	12.9+.30
H	5.9+.23	55.2+.52	3.1+.12	16.9+.68	20.4+.18	36.3+.58	6.6+.18	11.9+.72	32.9+.51	22.3+.65	8.6+.28	7.8+.78
	+.35	+.40	+.23	+.85	+.25	+1.00	−.10	+1.13	+.46	+1.14	+.04	+.85
	0 7.32	0′ 56.″65	0 4.88	1 19.38	0 9.70	1 27.92	0 2.95	1 10.65	0 30.72	1 19.80	0 10.60	1 8.15
	29.49	−20.24	29.99	−45.79	29.88	−49.96	31.59	−36.10	9.41	−40.84	24.94	−33.61
	0 36.81	0 36.41	0 34.87	0 33.59	0 39.28	0 37.96	0 34.54	0 34.55	0 40.13	0 38.96	0 35.54	0 34.54
+18°	22′ 11.″54	22′ 11.″94	22 13.48	22 14.76	22 9.07	22 10.39	22 13.81	22 13.80	22 8.22	22 9.39	22 12.81	22 13.81

$+23\ \ 55\ \ 17$

1.40750

+2385

1.43105

+3446

1.44166

+0946

1.41666

+42.24

1.44944

+0935

1.41655

+4396

1.45116

	−26.98		−27.65	−26.10		−28.15		−26.09		−28.26	
	− .08	− .04	− .09	− .21	− .08	− .25	− .10	− .13	− .01	− .16	− .06	− .12
	− .01	− .09	− .01	− .13	− .02	− .15	− .45	− .11	− .04	− .10	− .02	− .09
	− .09	− 7.10	− .06	− .21	− .06	− .25	+ .03	− .28	− .12	− .29	− .01	− .21
	−27.16	−28.24	−27.81	−28.20	−26.75	−26.75	−28.~~70~~	−28.67	−26.26	−26.64	−28.35	−28.68
18° 21	44.38	43.73	45.67	46.56	42.32	43.64	45.14	45.13	41.96	42.75	44.46	45.13
	44.56		46.12		42.98		46.14		42.36		44.80	
	−10.46		−10.40		−10.23		−10.20		−10.07		−10.05	
	− .59		− .57		− .56		− .56		− .54		− .54	
	+5 20.11	+5 19.52	+5 18.09	+5 17.52	+5 19.60	+5 19.10	+5 20.93	+5 20.37	+5 20.95	+5 20.41	+5 20.60	+5 20.06
	+ 5 9.06		+ 5 7.12		+ 5 8.87		+ 5 10.17		+ 5 10.34		+ 5 10.01	
	26 53.62		53.21		51.85		55.31 ✓		52.70		54.81	

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1878.0

Tauri

$4^h\ 21.3^m$

$+30°\ 7'$

+12 16

1878

	α		δ		
21	9.94	+30	5'	19.8	
	10.03			17.6	
	9.97			18.1	
	9.93			20.1	
	10.13			19.9	
	9.96			18.6	

bor. α

$\frac{d\alpha}{dt}$

$\frac{d\delta}{dt}$

bor. δ 21 9.993 +30 5 19.02

$\frac{d\delta}{dt}$

log a δ	9.70050
" cos δ	9.93702
" 15 cos δ tan i	0.06180
tan δ	+0.58
$\frac{\tan z}{\sin z}$	+.21

Jan. 1 | Jan. 5 | Jan. 14 | Jan. 16 | Jan. 23 | Jan. 29

h	m	s	m	s																											
4	20	21.0	20	32.75	20	25.3	20	29.00	20	16.6	20	17.60	20	0.2	20	16.16	20	4.8	20	9.10	19	42.4	20	16.9							
		23.3		36.20		27.7		31.35		18.8		20.10		2.9		18.62		7.6		11.52		44.1		4.03							
		24.9		37.52		29.6		33.70		22.0		22.48		4.8		20.95		10.2		13.70		46.8		6.50							
				42.20				38.48				26.98				25.76				18.60				11.20							
				44.68				40.85				29.50				28.16				20.90				13.50							
				46.98				43.18				31.80				30.42				23.40				16.05							
	21	8.3		49.35	21	15.9		45.55				34.20	20	58.4		32.90	20	44.9		25.70	20	42.7		18.23							
		9.8		51.75		18.0		48.00				36.60		0.2		35.28		48.0		28.00		45.2		20.73							
		12.0		56.42		19.9		52.78				41.32		2.0		40.50		50.5		32.90		47.2		23.48							
				58.85				55.00				43.80				42.40				35.15				27.80							
				1.35				57.55				46.10				44.74				37.87				30.18							
				45705				47544				35048				33539				25684				17539							
	20	23.07		51705	20	27.53			20	19.13			20	2.63			20	7.53			19	44.43									
	21	10.03	20	47.005	21	17.93	20	43.222			20	31.862	21	0.20	20	30.490	20	47.80	20	23.349	20	45.03	20	15.945							
				+25.331				+29.186				+40.032				+41.698				+49.053				+56.21							
				− 0.441				− 0.440				− 0.432				− 0.398				− 0.442				− 0.43							
				− 1.96				− 1.95				− 1.960				− 1.89				− 1.83				− 1.76							
				+22.94				+26.81				+38.19				+39.41				+46.78				+54.02							
			21	9.94				10.03				9.96				9.93				10.13				9.96							

		+23.03		− 23.03		+15.69		−34.71		+12.73				+27.86		−29.71		+15.82		−24.45		+31.51		− 29.09							
		1.37894		1.36229 n		1.19562		1.54045 n		1.10483				1.44498		1.47290 n		1.19921		1.38828 n		1.49845		1.46374 n							
		1.44074		1.42469 n		1.25742		1.60225 n		1.16663				1.50678		1.53470 n		1.26101		1.45006 n		1.56025		1.52554 n							
		20 1		20 2		20 2		20 2		20 1				20 1		20 2		20 2		20 2		20 1		20 2							
		58.44.14		45.8+28		1.4+08		59.3+16		59.3+07				46.9+20		51.7+19		0.6+08		47.7+25		44.5+25		54.2+16							
		4.1+31		58.5+29		13.8+33		9.9+30		14.4+33				58.4+32		3.3+27		1.7+30		48.7+43		47.3+42		58.3+33							
		49.8−53		44.1−51		57.8+02		55.2−26		2.57.14				40.9−43		45.2−58		6.0+10		53.0−44		52.4+45		59.8+05							
		52.4+34		47.5+30		2.1+36		1.2+25		18.0+47				51.1+36		2.7+30		0.9+33		49.8+27		47.3+42		58.6+22							
		+.26		+.36		+.79		+.45		+1.01				+.45		+.23		+.81		+.51		+.64		+.76							
	21	54.18	22	48.98	22	3.78	23	1.40	22	8.55			21	49.32	22	53.72	22	2.30	22	49.80	21	47.88	22	57.22							
		27.59		− 26.55		18.09		− 4.02		14.68				32.12		− 34.25		18.24		− 28.19		36.33		− 33.51							
	22	21.77	22	22.43	22	21.87	22	21.38	22	23.23			22	21.44	22	21.47	22	20.54	22	21.61	22	24.21	22	23.68							
+30	0	26.58	0	26.92	0	26.48	0	26.97	0	25.12			0	26.91	0	26.88	0	27.81	0	26.74		24.14		24.67							

+12 17 2

1.09820

		+2401				+3459				+0946				+4233				+4414				+3505									
		1.12221				1.13279				1.10766				1.14053				1.14234				1.13325									
		− 13.25				− 13.58				− 12.81				− 13.82				− 13.88				− 13.59									
		− .14		− .13		− .06		− .28		− .04				− .18		− .21		− .06		− .14		− .24		− .20							
		− .19		− .28		− .21		− .30		− .21				− .16		− .26		− .16		− .22		− .14		− .24							
		− .07		− .09		− .20		− .11		− .25				− .11		− .06		− .20		− .13		− .16		− .19							
		− 13.65		− 13.75		− 14.05		− 14.27		− 13.31				− 14.27		− 14.35		− 14.30		− 14.37		− 14.13		− 14.22							
30	0	12.93		12.17		12.43		12.70		11.81				12.64		12.53		13.51		12.37		12.01		10.45							
		12.55				12.56								12.58				12.94				10.23									
		− 12.58				− 12.35				− 13.08				− 13.15				− 13.36				− 13.41									
		− .30				− .29				− .29				− .29				− .28				− .27									
	+5	20.11	+5	19.81	+5	18.09	+5	17.80	+5	19.66	+5	19.37	+5	20.93	+5	20.64	+5	20.60	+5	20.32	+5	22.05	+5	21.78							
	+ 5	7.23			+ 5	5.05			+ 5	6.36			+ 5	7.49			+ 5	6.96			+ 5	8.34									
	5	19.78				17.61				18.70				20.07				19.90				18.60									

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1878.0

Tauri (280 B)

$4^h\ 27.^m8$
$+5°\ 19'$
$+37\ \ 4$
1878

α_0	27	39.14	$+5°\ 18'\ 39.3''$
bore α		.17	40.7
$\frac{d\alpha}{dc}$		.13	39.8
		.08	39.3
		21½ int	42.4
δ_0		.15	40.4
bor. δ	27	39.123	+5 18 40.37

$\log a\cos\delta$ 8.96689
$a\cos\delta$ 9.99813
$a\sin\delta\cos\delta$ 0.12291
$\tan\delta$ +0.09
$\frac{\tan z}{\sin}$ + .60

I 2.07

Jan. 1	Jan. 5	Jan. 14	Jan. 16	Jan. 23	Jan. 29
2 m s	m s				
4 26 51.7	27 3.28	26 45.4	26 59.30	26 35.5	26 48.10	26 34.4	26 46.71	27 1.9	26 —	26 21.2	26 32.7
53.3	5.40	47.6	1.42	37.2	50.41	36.3	48.78	3.6	—	22.8	34.30
54.6	7.25	49.1	3.50	38.7	52.30	37.9	50.90	6.0	—	24.5	36.26
	11.58		7.50		56.43		55.08		51.71 47.57		40.42
	13.65		9.70		58.60		56.94		.92 49.85		42.60
	15.70		11.85		0.62		59.15		.80 51.80		44.67
	17.68	27 42.3	13.80		2.60		1.14	27 19.6	.93 54.00	26 59.9	46.60
	19.82	45.3	15.85		4.82		3.55	21.8	61.86 56.00	1.6	48.70
	24.80	46.7	19.95		8.76		7.45	24.1	52.02 0.30	3.8	52.90
	26.00		22.00		10.92		9.60		.05 2.40		55.00
	28.00		24.40		12.95		11.73		.10 4.52		57.15
	17236		18927		30651		35103		739		49087
26 53.20		26 47.27	12927	26 37.07	651	26 36.20	65103	27 3.83		26 22.83	
	27 15.669	27 44.77	27 11.752		27 0.592		26 59185	27 21.83	26 51.923	27 1.77	26 44.625
	+25.371		+29.176		+40.382		+41.768		+49.083		+ 56.21
	− .06		− 0.06		− 0.06 .05		− 0.06 .05		− 0,07		− 0.08
	− 1.78		− 1.78		− 1.71		− 1.73		− 1.67		− 1.61
	+ 23.47		+ 27.32		+ 38.53		+ 39.90		+ 47.39		+ 54.53
	27 39.14		39.07		39.13		39.08		39.21		39.15

	+22.47			+24.38		−33.02		+23.52			+22.98			−11.91		−29.91		+2179		−1715	
	1.35160			1.38703		1.51878	n	1.37144			1.36135			1.07591	n	1.47582	n	1.33826		1.23426	n
	147451			150994		1.64169	n	1.49435			1.48426			1.19882	n	1.59873	n	1.46117		1.35717	n
	5′ 2″			5 2		5 4		5 2			5 2			5 3		5 4		5 3		5 3	
E	58.9	+.16		54.0	+.16	8.7	+.29	53.4	+.17		58.2	+.16		44.0	+.36	6.4	+.25	1.3	+.17	53.2	+.22
F	16.1	+.28		10.1	+.30	24.8	+.07	12.4	+.30		12.9	+.30		48.9	+.34	10.8	+.19	8.3	+.30	59.8	+.16
G	0.6	+.07		54.1	−.36	7.6	+.10	0.1	+.06		55.6	−.21		53.8	−.30	15.1	−.24	13.8	−.24	2.9	+.18
H	2.4	+.29		56.1	+.22	11.4	+.23	13.1	+.39		9.1	+.41		45.7	+.16	8.0	+.21	6.6	+.40	58.8	+.03
		+.80			+.32		+.69		+.92			+.66			+.56		+.41		+.63		+.59
	8′ 4.80			7 58.88		9 13.12		8 4.75			8 3.95			8 48.10		9 10.08		8 7.50		8 58.68	
	29.82			32.36		−43.82		31.21			30.50			− 15.81		−39.69		28.92		− 22.76	
	8 34.32			8 30.94		8 29.30		8 35.96			8 34.45			8 32.29		8 20.39		36.42		35.92	
+5°	14′ 14.″03			14 17.41		14 19.05		14 12.39			14 13.90			14 16.06		14 17.96		11.93		12.43	
+37	3 15																				
	1.63800																				
	+2415			+3471				+0946			+4239			+4429				+3512			
	1.66215			1.67271				1.64746			1.68039			1.68239				1.67312			
	− 45.94			− 47.07				− 44.41			− 47.90			− 48.12				− 47.11			
	− .02			− .03		− .05		− .03			− .03			− .01		− .04		− .02		− .01	
	− .31	−0.53		− .30	−0.44	− .42	−0.61	− .31	−0.57		− .28	−0.45		− .30	−0.45	− .34	−0.48	− .25	−0.43	− .32	−0.48
	− .20			− .08		− .17		− .23			− .17			− .14		− .10		− .16		− .15	
	− 46.47			− 47.48		− 47.71		− 44.98			− 48.38			− 48.57		− 48.60		− 47.54		− 47.59	
5°	13′ 27.″56			29.93		31.34		27.41			28.52			27.49		29.36		24.39		24.84	
				30.64										28.42				24.62			
	− 7.48																	− 5.47			
	− .84			− 7.15				− 6.44			− 6.30			− 5.83				− .76			
				− .84				− .82			− .82			− .79							
	+5 20.11	+5 19.24		+5 18.09	+5 17.26			+5 19.66	+5 18.84		+5 20.93	+5 20.11		+5 20.60	+5 19.81			+5 22.05	+5 21.29		
	+ 5 12.76			+ 5 10.10				+ 5 12.40			+ 5 13.81			+ 5 14.98				+ 5 16.82			
	18 39.32			40.74				39.81			39.33			42.40				40.44			

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18780

Tauri

$4^h\ 31.2^m$

$+20°\ 27'$

$+21\ 56$

1878

α_0 $\frac{d}{31}$ 4.15 $+20$ 26 15.1 — log sin δ 9.54331 — I 2.197

bore. d .11 .10 .09 .20 .08 — 13.6 15.3 16.1 16.4 15.4 — " cos δ 9.97173

$\frac{d\alpha}{dt}$ — " 15 cos δ tan i 0.09651

δ_0

bor. δ 31 4.129 +20 26 15.32 — tan δ +0.37

$\frac{d\delta}{dt}$ — $\frac{\tan z}{\sin}$ + .37

	Jan. 1		Jan. 5		Jan. 14		Jan. 16		Jan. 23		Jan. 24	
L	m s	m s										
4	30 43.5	—	30 14.9	30 23.90	30 2.6	30 12.73	29 59.5	30 11.30	30 3.3	30 4.80	29 53.3	30 2.62
	45.0	—	16.7	26.00	5.0	14.72	1.1	13.56	5.4	6.25	55.2	4.74
	47.2	—	18.6	28.22	6.5	16.98	2.9	15.80	7.6	8.48	57.0	6.95
		—		32.62		21.50		20.04		12.85		11.50
		—		34.85		23.60		22.15		14.90		13.60
		30) 41.0		37.16		25.80		24.55		17.30		15.90
	31 16.3	41.00 43.24	31 18.9	39.38.32	30 53.2	28.05	30 47.1	26.60	30 45.5	19.42	30 35.1	18.00
	19.0	41.04 48.25	20.6	41.62	55.2	30.28	49.0	28.80	47.4	21.60	37.4	20.16
	20.5	40.86 49.85	22.7	46.00	57.6	34.63	51.0	33.20	49.2	25.90	38.9	24.55
		41.06 52.00		48.15		36.90		35.52		28.10		26.78
		40.92 54.10		50.30		38.98		37.68		30.42		29.00
		589		40814		28417		26916		18952		17380
	30 45.23		30 16.73		30 4.70		30 1.17		30 5.43		29 55.17	
	31 18.60	30 40.982	31 20.73	30 37.104	30 55.33	30 25834	30 49.03	30 24.469	30 47.37	30 17.229	30 37.13	30 15.800
		+25.342		+29.186		+40.383		+41.768		+49.083		+50.361
		− 0.276		− 0.266		− 0.274		− 0.274		− 0.283		− 0.285
		− 1.86		− 1.89		− 1.86		− 1.84		− 1.79		− 1.78
		+23.17		+27.01		+38.27		+39.62		+46.97		+48.28
		31 4.15		4.11		4.10		4.09		4.20		4.08

rej.

	− 4.25	− 37.62	+ 20.37	− 43.63	+ 21.13	− 29.50	+ 23.30	− 24.56	+ 11.79	− 30.14	+ 20.63	− 21.33
	0.62839 n	1.57542 n	1.30899	1.63979 n	1.32490	1.46982 n	1.36736	1.39028 n	1.07188	1.47914 n	1.31450	1.32899 n
	0.72490 m	1.67193 m	1.40550	1.73630 m	1.42141	1.56633 m	1.46387	1.48674 m	1.16839	1.57565 m	1.41101	1.42550 m
	0 1	0 2	0 0	0 2	0 0	0 1	0 0	0 1	0 0	0 1	0 0	0 1
	17.9+1.45	0.4+4.07	47.7+1.21	7.4+1.18	41.5+1.31	43.7+1.26	43.2+1.28	23.3+1.52	59.6+1.13	49.8+1.14	50.1+1.17	41.7+1.30
	33.1+1.18	14.2+1.33	1.2+1.17	30.7+1.29	57.9+1.21	59.8+1.29	56.8+1.22	36.7+1.20	1.2+1.17	52.3+1.42	53.1+1.28	45.5+1.40
	19.4−1.39	0.3+1.12	47.1−1.68	4.3+1.13	48.4−1.68	49.7−1.54	41.0−1.52	20.2−1.37	5.6−1.04	56.2−1.10	58.1−1.13	49.8−1.53
	20.4+1.46	2.8+1.38	48.8+1.51	9.6+1.50	1.1+1.59	2.7+1.38	48.9+1.51	30.8+1.64	1.9+1.62	57.3+1.36	52.5+1.51	44.8+1.45
	+.30	+.90	+.21	+1.10	+.43	+.39	+.49	+.99	+.88	+.82	+.83	+.62
	1 22.70	2 4.42	0 51.20	2 10.50	0 52.22	1 53.98	0 47.48	1 27.75	1 2.08	1 52.40	0 53.45	1 45.45
	− 5.31	− 46.98	25.44	− 54.49	26.39	− 36.84	29.10	− 30.67	14.74	− 37.64	25.76	− 26.44
	1 17.39	1 17.44	1 16.64	1 16.01	1 18.61	1 17.14	1 16.58	[0 57.08]	1 16.82	1 14.76	1 19.21	1 16.81
+20	21 30.96	21 30.91	21 31.71	21 32.34	21 29.74	21 31.21	21 31.77	[21 31.27]	21 31.53	21 33.59	21 29.14	21 29.54

+21 55 58

1.36520

	+2421		+3476		+0946		+4243		+4436		+3430	
	1.38941		1.39996		1.37466		1.40763		1.40956		1.39950	
	− 24.51		− 25.12		− 23.70		− 25.57		− 25.68		− 25.09	
	− .01	− .25	− .07	− .33	− .08	− .16	− .09	− .11	− .02	− .16	− .08	− .08
	− .14	− .21	− .09	− .22	− .09	− .19	− .07	− .14	− .08	− .15	− .06	− .13
	− .23	− .23	− .05	− .28	− .11	− .10	− .12	− .25	− .22	− .21	− .21	− .16
	− 24.89	− 25.20	− 25.33	− 25.95	− 23.98	− 24.15	− 25.85	− 26.07	− 26.00	− 26.20	− 25.44	− 25.46
20	21 6.07	5.71	6.38	6.39	5.76	7.06	5.92	rej.	5.53	7.39	3.70	4.08
	5.89		6.38		6.41		5.92		6.46		3.89	
	− 10.81		− 10.85		− 10.88		− 10.84		− 10.20		− 10.18	
	− .54		− .52		− .51		− .50		− .49		− .49	
	+5 20.11	+5 19.57	+5 18.09	+5 17.57	+5 19.66	+5 19.15	+5 20.93	+5 20.43	+5 20.66	+5 20.11	+5 22.21	+5 21.72
	+ 5 9.20		+ 5 7.22		+ 5 8.87		+ 5 10.17		+ 5 9.91		+ 5 18.54	
	26 15.09		13.60		15.28		16.09		16.37		15.43	

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Orionid

1878

	Jan. 1	Jan. 5	Jan. 14	Jan. 16	Jan. 23	Jan. 24
α	4h 39m.4	39 14.73				
δ	+11° 29′	+11 28 50.5				
log rad		9.29903				
log cos δ		9.99122				
log 15 cos δ dt		0.11600				
tan δ	+30 54	+0.20				
tan z		+.51				
corr. α		.63				
$\frac{d\alpha}{dt}$		.71				
		.74				
		.79				
δ_0		.67				
corr. δ		39 14.712				
$\frac{d\delta}{dt}$		+11 28 50.7				
		18				
	4 38 26.8	38 38.80	38 27.0	38 34.96	38 13.5	38 23.66
	28.8	40.92	28.7	36.95	15.6	25.82
	30.9	42.95	30.5	38.13	17.5	27.95
		47.15		43.30		32.00
		49.35		45.52		34.30
		51.42		47.60		36.28
	39 14.4	53.55	39 6.7	49.58	38 53.6	38.36
	15.5	55.70	8.2	51.88	55.4	40.55
	17.1	59.78	10.4	55.92	57.0	44.62
		1.85		58.00		46.93
		4.02		0.28		48.97
		44547		46212		39944
	38 28.83	56547	38 28.73	52212	38 15.53	
	39 15.67	38 51.406	39 8.43	38 47.465	38 55.33	38 36.313
		+25.352		+29.186		+40.387
		−0.14		−0.14		−0.13
		−1.86		−1.85		−1.82
		+ 23.32		+27.17		+38.40
		39 14.73		14.63		14.72
					38 12.47	38 58.90
						38 34.987
					38 3.50	38 59.23
						38 27.667
					38 7.70	38 44.23
						38 26.261
						+41.768
						−0.72
						−1.81
						+39.75
						+49.073
						−0.85
						−1.77
						+47.12
						+50.361
						−0.85
						−1.76
						+ 48.41
						14.79
						14.67

	Jan. 1	Jan. 5	Jan. 14	Jan. 16	Jan. 23	Jan. 24
	+22.58	−24.26	+18.73	−20.97	+20.78	−19.02
	1.35372	1.38489	1.27254	1.32160	1.31765	1.27921
	1.46972	1.50089	1.38854	1.43760	1.43365	1.39521
	55′ 2″	55′ 3″	55 3	55 3	55 2	55 3
6	58.4+1.16	58.8+1.20	1.4+1.17	53.4+1.22	56.1+1.16	48.2+1.20
7	12.0+1.30	13.1+1.19	15.1+1.24	7.3+1.19	12.5+1.30	4.3+1.18
9	58.9+1.02	58.9+1.13	0.9+1.08	53.0+1.35	1.9+1.09	54.4+1.26
11	0.4+1.24	2.3+1.10	2.9+1.31	5.5+1.20	14.6+1.38	7.6+1.21
	+1.72	+1.62	+1.85	+1.76	+1.93	+1.73
	58′ 2.42	59′ 3.28	58 5.08	58 59.80	58 6.28	58 58.62
	29.49	−31.69	24.46	−27.39	27.14	−24.84
	58 31.91	58 31.59	58 29.54	58 32.41	58 33.42	58 33.78
+11°	24′ 16.″44	24′ 16.″76	24 18.81	24 15.94	24 14.93	24 14.87
+30	53 1.2					
	1.53700					
	+2438		+3490		+0946	
	1.56138		1.57190		1.54646	
	−36.42		−37.32		−35.19	
	− .05	− .06	− .04	− .05	− .05	− .04
	− .30	− .41	− .31	− .40	− .31	− .40
	− .18	− .16	− .21	− .07	− .23	− .11
	−36.95	−37.05	−37.88	−37.52	−35.78	−35.74
11°	23 39.49	39.71	40.93	38.10	39.15	38.83
	39.60		39.52		38.99	
	− 8.47		− 8.25		− 7.80	
	− .74		− .71		− .70	
	+5 20.11	+5 19.37	+5 18.09	+5 17.38	+5 19.64	+5 18.96
	+5 1.90		+5 9.13		+5 11.16	
	28 50.50		48.65		50.15	

	Jan. 16	Jan. 23	Jan. 24
	−22.52	−23.91	+24.17
	1.35257	1.37858	1.38328
	1.46857	1.49458	1.49928
	55 2	55 3	55 1
6	58.8+1.16	58.9+1.20	55.1+1.16
7	10.9+1.30	11.9+1.19	58.0+1.30
9	55.8−1.18	55.0−1.18	4.9+1.08
11	6.1+1.39	7.1+1.22	56.7+1.21
	+1.67	+1.43	+1.75
	58 2.90	59 3.22	57 58.68
	29.42	−31.23	31.87
	58 32.32	58 31.99	58 30.28
+11°	24 16.03	24 16.36	24 18.10
	+4250	+4453	
	1.57950	1.58153	
	−37.98	−38.15	
	− .05	− .06	− .10
	− .27	− .37	− .34
	− .17	− .11	− .10
	−38.47	−38.52	−38.64
	37.56	37.84	39.46
	37.70		39.61
	− 7.70		− 7.38
	− .69		− .67
	+5 20.93	+5 20.24	+5 21.60
	+5 13.54		+5 12.55
	50.24		52.16

	Jan. 24
	−23.91
	1.49914
	1.61514
	55 4
6	8.1+1.28
7	10.2+1.19
9	17.1−1.29
11	9.1+1.22
	+1.40
	58 11.12
	−41.22
	29.90
+11°	24 18.45
	−38.69
	39.76
	19.93
	+5 22.21
	+5 14.20
	49.44

	Jan. 24
	+18.56
	1.26858
	1.38458
	55 3
6	7.8+1.28
7	11.1+1.30
9	17.8−1.32
11	9.6+1.41
	+1.66
	58 11.58
	24.24
	35.82
+11°	24 12.53
	−37.26
	− .04
	− .22
	− .17
	−37.69
	34.84
	25.24
	− 7.34
	− .67
	+5 22.21
	+5 14.20
	49.44

	Jan. 24
	−17.97
	1.25455
	1.37055
	55 3
6	54.5+1.21
7	58.8+1.19
9	3.2+1.18
11	57.3+1.02
	+1.68
	58 58.45
	−23.47
	34.98
+11°	24 13.37
	−37.72
	− .03
	− .28
	− .15
	−37.72
	35.65
	+5 21.54
	+5
	+

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Auriga

α_0 4h 41m 23.74 (18.80) δ_0 +31° 13′ 24″0 log sin δ 9.71456

4h 41.5 corr. α .81 23.8 " cos δ 9.93207

$\frac{d\alpha}{dt}$ +31° 13′ .80 23.2 " 15 cos δ tan 0.05685

+11 10 .70 23.9

.73 24.4

$\frac{d\delta}{dt}$ .74 25.8 tan δ + 0.61

corr. δ 41 23.753 +31 13 24.52 $\frac{\tan\pi}{\sin 1''}$ + .19

1878

	Jan. 14	Jan. 16	Jan. 23	Jan. 24	Jan. 28	Feb. 5
h m s						
4	40 22.7	40 31.34	40 19.8	40 29.77	40 19.7	40 22.60
	24.7	33.73	22.8	32.55	22.0	25.20
	26.9	36.20	24.9	34.90	24.5	27.50
		40.97		39.82		32.10
		43.42		42.10		34.78
		45.72		44.60		37.33
	40 59.7	48.10	41 4.8	46.90	40 56.8	39.80
	3.0	50.66	6.5	49.29	59.0	42.00
	5.5	53.47	8.7	54.32	1.5	46.80
		57.84		56.81		49.33
		0.40 ~~59.72~~		58.85		51.67
		44385		48991		40911
	40 24.77	50385	40 22.50		40 22.07	
	41 2.73	40 45.805	41 6.67	40 44.537	40 59.10	40 37.192
		+40.39 3/4		+41.74 68		+49.07 03
		− 0.39 34		− 0.46 34		− 0.46 44
		− 2.05		− 2.04		− 1.98
		+37.95 3/4		+39.24		+47.61 6
		41 23.78 3/4		23.81		23.80

	Jan. 16	Jan. 23	Jan. 24	Jan. 28	Feb. 5
	+21.03	−16.93	+22.04	−22.13	+15.12	−21.91	+21.38	−20.09	+26.04	−22.93	+29.07	−26.26
	1.32284	1.22866 m	1.34321	1.34498 m	1.17955	1.34064 m	1.33001	1.33298 m	1.41564	1.36640 m	1.46345	1.41929 m
	1.37969	1.28551 m	1.40006	1.40183 m	1.23640	1.39749 m	1.38686	1.35983 m	1.47249	1.41725 m	1.52030	1.47614 m
	10 3	10 4	10 3	10 4	10 3	10 4	10 3	10 4	10 3	10 4	10 3	10 4
	46.1+.33	28.9+.52	49.8+.25	41.3+.28	59.5+.20	39.7+.32	53.8+.21	39.8+.31	43.9+.36	39.6+.32	38.9+.46	41.9+.26
	1.1+.16	44.2+.17	2.1+.12	52.3+.16	0.9+.16	40.8+.10	56.8+.23	42.9+.15	47.9+.34	42.6+.14	41.7+.25	44.5+.18
	49.7+.46	31.3+.01	45.4+.47	34.7−.10	4.9+.16	43.8−.53	0.7+.16	46.3−.59	54.8+.21	49.3−.59	47.4+.42	53.8+.43
	4.2+.17	47.9+.06	59.8+.04	51.3+.03	0.14.04	41.6+.13	56.8+.03	43.4+.12	52.4+.07	47.3+.07	49.6+.11	58.2+.04
	+.18	+.76	−.06	+.37	+.56	+.02	+.62	−.01	+.56	−.06	+.40	+.05
	13 58.28	14 38.08	13 54.28	14 44.90	14 1.25	14 41.48	13 56.88	14 43.10	13 49.75	14 44.70	13 45.40	14 47.60
	23.97	− 19.30	25.12	− 25.22	17.23	−24.97	24.37	− 22.90	29.68	− 26.14	33.14	− 29.93
	14 19.25	14 18.78	14 19.40	14 19.68	14 18.58	14 16.51	14 21.25	14 20.20	14 19.43	14 18.56	14 18.54	17.67
+31	8 29.10	8 29.67	8 28.95	8 28.67	8 29.77	8 31.84	8 27.10	8 28.15	8 28.92	8 29.79	8 29.81	30.68
+11	9 0											
	1.05500											
	+.0945		+.4254		+.4461		+.3427		+.2827		+.2376	
	1.06447		1.09754		1.09961		1.08927		1.08327		1.07876	
	−11.60		−12.52		−12.58		−12.28		−12.11		−11.99	
	− .11 −.07		− .12	− .12	− .05	− .12	− .11	− .10	− .16	− .13	− .20	− .16
	− .39 − .46 −0.32		− .35 −0.23	− .42 −0.63	− .32 −0.31	− .38 −0.31	− .27 −0.34	− .33 −0.32	− .27 −0.37	− .33 −0.34	− .38 −0.66	− .48 −0.65
	− .05 − .19		+ .02	− .09	− .14	− .01	− .16	+ .00	− .14	+ .02	− .10	− .01
	−12.15	−12.32	−12.94	−13.15	−13.09	−13.09	−12.82	−12.71	−12.68	−12.55	−12.67	−12.64
31	8 16.95	17.25	15.68	15.52	16.68	18.75	14.28	15.44	16.24	17.24	17.14	18.04
	17.10		15.75		17.72		14.86		16.74		17.59	
	−12.53		−12.61		−12.96		−12.40		−13.02		−13.32 .17	
	− .26		− .26		− .25		− .25		− .25		− .23	
	+5 19.66	+5 19.40	+5 20.93	+5 20.67	+5 20.60	+5 20.35	+5 22.21	+5 21.94	+5 20.97	+5 20.72	+5 21.56	+5 21.33
	+ 5 6.87		+ 5 8.06		+ 5 7.59		+ 5 9.06		+ 5 7.70		+ 5 8.16	
	13 23.97		23.81		25.21		23.92		24.44		25.30	

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Orionid (38-B)

α_0 4h 59.2m
+1° 1'
+41 22
1878 Jan. 14

δ_0 59 5.69 +1° 0' 29.0
bm. α 83 30.4
85 29.5
$\frac{d\alpha}{dt}$ 68 30.3
91 28.7
δ_0 88 30.2
bm. δ 59 5.807 +1 0 29.78
$\frac{d\delta}{dt}$ Jan. 23

log em δ 8.24903
" cos δ 9.99993
" 15 cos $\tan\iota$ 0.12471
$\tan\delta$ + 0.02
$\frac{\tan\Pi}{\sin i}$ + .66

Jan. 24 Jan. 28 Jan. 30 Feb. 2

	Jan. 14		Jan. 23	Jan. 24	Jan. 28	Jan. 30		Feb. 2	
h	m ρ	m ρ							
4	58 1.4	58 14.90	57 56.7	58 6.32	57 54.3	58 4.95	57 47.0	58 0.30	57 37.6	57 57.60	57 46.8	57 53.60	5
	3.5	16.98	1.1	8.20	56.8	7.10	49.0	2.16	33.9	57.70	49.1	53.70	
	6.3	19.05	3.0	10.15	58.4	9.10	50.5	4.42	37.0	1.81	51.3	57.70	
		23.10		14.40		13.30		8.40		57.0		1.74	
		25.12		16.60		15.36		10.40		8.20		3.87	
		27.27		18.63		17.28		12.50		10.18		6.00	
	59 5.3	29.20	58 44.4	20.60	58 35.6	19.39	58 32.3	14.58	58 40.5	12.00	58 41.4	7.80	
		31.30	46.5	22.85	37.4	21.42	34.5	16.65	43.3	14.10	44.5	9.99	
		35.37	49.0	26.92	38.9	25.53	36.6	20.80	45.9	18.22	46.5	14.18	
		37.58		29.00		27.62		22.78		2.010		16.00	
		39.60		31.10		29.65		24.92		2.240		18.40	
		29947		20477		19070		13791		23021		24498	
	58 3.73		58 0.93		57 56.50		57 48.83		57 54.17	11021	57 49.07	6498	
	59 5.30	58 27.223	58 46.63	58 18.615	58 37.30	58 17.336	58 34.47	58 12.537	58 43.23	58 10.019	58 44.13	58 5.907	
		+40.40		+49.08		+50.38		+ 54.92		+57.65		+61.70	
		−0.01		− 0.02		− 0.02		− 0.02		− 0.02		− 0.02	
		− 1.85		− 1.80		− 1.79		− 1.76		− 1.74		− 1.73	
		+ 38.54		+ 47.21		+ 48.51		+ 53.14		+ 55.89		+ 59.95	
		59 5.74		5.83		5.85		5.68 ✓		5.91		5.88	

	+23.49	−38.08	+17.69	−28.01	+20.84	−19.96	+23.71	−21.93	+15.85	−33.21	+16.84	−38.22
	1.87088	1.58070 n	1.24773	1.44781 n	1.31890	1.30086 n	1.37493	1.34104 n	1.20003	1.52127 n	1.22634	1.58229 n
	1.49559	1.70541 n	1.37244	1.57202 n	1.44361	1.42487 n	1.49964	1.46575 n	1.32474	1.64598 n	1.35105	1.70706 n
	25° 0'	25° 2'	25° 1'	25° 2'	25° 1'	25° 2'	25° 1'	25° 2'	25° 1'	25° 2'	25° 1'	25° 2'
E	58.1+.13	20.3+.48	9.7+.25	10.6+.26	7.8+.23	2.1+.08	1.2+.14	2.1+.08	14.8+.40	19.3+.47	10.7+.28	24.1+.53
F	16.1+.25	38.3+.26	13.9+.28	14.9+.33	14.2+.25	8.2+.34	8.1+.24	9.2+.35	21.0+.22	25.0+.25	17.0+.25	36.1+.22
G	6.2-.04	27.8 ov	19.7-.39	20.2-.29	19.9-.38	12.3-.16	15.2-.38	14.9-.26	27.0-.09	30.2+.04	24.5-.20	37.2-.23
H	17.2+.68	40.9+.37	10.2+.78	12.2+.44	12.5+.72	6.4+.47	9.1+.73	10.4+.49	20.9+.66	25.3+.46	17.9+.67	30.3+.48
	+1.02	+1.41	+.84	+.74	+.82	+.73	+.78	+.66	+1.19	+1.24	+1.00	+1.00
	26 9.40	27 31.82	26 13.38	27 14.48	26 13.60	27 7.25	26 8.40	27 9.22	26 20.92	27 24.95	26 17.52	27 30.42
	31.30	− 50.75	23.57	− 37.33	27.77	−26.60	31.60	−29.22	21.12	−44.26	22.44	− 50.93
	26 40.70	26 41.07	26 36.95	26 37.15	26 41.37	40.65	26 40.00	26 40.00	42.04	40.69	39.96	39.49
+0°	56' 7.65"	56' 7.28"	56 11.40	56 11.20	56 6.98	56 7.70	56 8.35	56 8.35	6.21	7.66	8.39	8.86
+41	1.70480											
	+0947		+4501		+3423		+2921		+4319		+4020	
	1.71397		1.74951		1.73873		1.73371		1.74789		1.74470	
	− 51.76		− 56.17		− 54.79		− 54.17		− 55.94		− 55.55	
	− .01	− .01	− .00	− .01	− .00	− .00	− .01	− .00	− .00	− .01	− .00	− .01
	− .12	− .25	− .10	− .18	− .08	− .15	− .08	− .15	− .10	− .19	− .10	− .20
	− .26	− .28	− .21	− .20	− .21	− .18	− .18	− .17	− .30	− .31	− .25	− .25
	− 52.15	− 52.30	− 56.48	− 56.56	− 55.08	− 55.12	− 54.44	− 54.49	− 56.34	− 56.45	− 55.90	− 56.01
0°	55 15.50	14.98	14.92	14.64	11.90	12.58	13.91	13.86	9.97	14.21	12.49	12.85
	15.24		14.78		12.24		13.88		10.59		12.67	
	− 4.97		− 4.12		− 4.05		− 3.73		− 3.58		− 3.36	
	− .90		− .87		− .87		− .85		− .84		− .82	
	+5 19.66	+5 18.76	+5 20.60	+5 19.78	+5 22.21	+5 21.34	+5 20.97	+5 20.12	+5 22.56	+5 21.72	+5 21.71	+5 20.89
	+5 13.79		+5 15.61		+5 17.29		+5 16.39		+5 18.12		+5 17.53	
	0 29.03		30.39		29.53		30.27		28.71		30.20	

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18/80

Tauri

α_0 $\frac{h}{2}$ 2, 563 +27° 52' 23.4" begin δ 9.66994 I 2.334

5h 2.2m — bm. α .67 — 26.2 — " cos δ 9.94640

+27° 53' — $\frac{d\alpha}{dt}$ .17 — 24.5

$\frac{50}{24.7}$ " 15 cos tan i 0.07118

$\frac{18}{25.3}$

δ0 .64 — 25.6

+14 30 — tan δ +0.53

1878 — bm. δ 2 5.565 +27 52 25.0 — 24.95 — tan z +.25

$\frac{d\delta}{dt}$ ein

	Jan. 14		Jan. 23		Jan. 24		Jan. 28		Feb. 3		Feb. 4	
	h m s	m s										
	5 1 2.6	1 13.68	0 56.7	1 5.28	0 46.5	1 3.57	0 50.1	0 59.06	0 41.9	0 50.70	0 48.3	0 49.60
	4.5	16.07	59.1	7.50	48.8	5.78	52.5	1.40	44.3	52.90	50.3	52.10
	7.5	18.20	1.0	9.90	50.7	8.40	55.0	3.70	46.5	55.35	52.5	54.51
		22.91		14.26		12.90		13.00 −		59.90		58.85
		25.19		16.67		15.10		.07 −		2.30		1.28
		27.60		19.18		17.52		.04 c.f. −		4.70		3.60
		29.88		21.38		19.95		−		7.05		5.83
		32.30		23.68		22.26		−		9.40		8.25
		37.98		28.40		26.88		−		14.00		13.00
		39.34		30.71		29.20		−		16.30		15.28
		41.61		33.12		31.50		−		18.70		17.60
		30469		21008		19306				29130		27990
	1 4.87		0 58.93		0 48.67		0 52.53		0 44.23	51.30	0 50.37	39.90
		1 27.699		1 19.098		1 17.557		1 13.037		1 4.664		1 3.627
		+40.70 3.5		+49.08 2		+50.38 7		+54.92		+ 63.12		+ 64.34
		− 0.34 29		− 0.40 38		− 0.40 33		− 0.47 44		− 0.34		− 0.39
		− 2.11		− 2.07		− 2.06		− 2.02		− 1.96		− 1.94
		+ 37.90 53		+46.57		+ 47.92		+52.46		+ 67.82 0		+ 62.01
		2 5.65 3		5.67		5.47		5.50		5.48		5.64

	+22.83		+20.17		+28.88		+20.51			+2043		+1326
	1.35851		1.30471		1.46060		1.31197			1.31027		1.12254
	1.42969		1.37589		1.53178		1.38315			1.38145		1.19372
	36 4		30 4		30 4		30 4		30 4		30 4	
	42.4+26		48.9+.11		41.1+.29		48.1+.14		48.5+.12		55.7+.01	
	55.2+.11		50.2+.19		43.7+.16		50.2+.19		50.3+.19		58.1+.05	
	45.9−.58		53.4−.46		48.1−.61		57.8−.07		56.9−.14		6.2+.01	
	59.9−.01		49.8+.04		43.1+.12		53.9−.01		54.5−.01		3.9+.12	
	−.21		−.12		−.04		+.25		+.16		+.19	
	34 50.78		34 50.58		34 44.00		34 52.50		34 52.55		35 0.72	
	26.90		23.76		34.02		24.16		24.07		15.62	
	35 17.68		35 14.34		35 18.02		35 16.66		35 16.62		35 16.34	
+27	47 30.67		47 34.01		47 30.33		47 31.69		47 31.73		47 32.01	
+14	36 29 58											
	1.17350 290		1.17290									
	+0947		+4506		+3423		+2931		+3097		+2501	
	1.18737		1.21796		1.20710		1.20221		1.20387		1.19791	
	− 15.22		− 16.17 52		− 16.11		− 15.93		− 15.99		− 15.77	
	− .12		− .09	− 0.441	− .19		− .10		− .09	− .09	− .04	− .04
	− .48	− 0.55	− .38	− 0.50	− .33	− 0.53	− .34	− 0.50	− .44	− 0.57	− .45	− 0.54
	+ .05		+ .03		+ .01		− .06		− .04		− .05	
	− 15.77		− 16.96		− 16.62		− 16.43		− 16.56		− 16.31	
27	47 14.90		17.05		13.71		15.26		15.17		15.70	
	− 10.84		− 11.08		− 11.11		− 11.20		− 11.31		− 11.32	
	− .34		− .33		− .33		− .32		− .31		− .31	
	+5 19.64	+5 19.32	+5 20.60	+5 20.27	+5 22.21	+5 21.88	+5 20.97	+5 20.65	+5 21.71	+5 21.40	+5 21.49	+5 21.18
	+5 8.48		+5 9.19		+5 10.77		+5 9.45		+5 10.39		+5 9.86	
	52 23.38		26.24		24.48		24.71		25.26		25.56	

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Camelop. (65B)

1878.0

$5^h\ 3.6^m$
$+73°\ 8'$
$-30\ 45$
1878

α	$\frac{d}{3}$	s	$\frac{d}{s}$	log cos δ	9.98090
corr. α	11.23	+73	7 25.9	" cos δ	9.46262
$\frac{d\alpha}{d\alpha}$	11.37		25.7	" sec δ tan δ	9.58740
	10.94		25.9		
	11.04		26.9		
δ_0	11.00		26.7		
	10.91		27.0		
corr. δ	3 11.082	+73	7 26.4 35	tan δ	+3.298
$\frac{d\delta}{d\alpha}$				$\frac{\sin z}{\sin}$	− .51

Jan. 14			Jan. 23			Jan. 24			Feb. 3			Feb. 4			Feb. 5		
h	m	s	m	s		m	s		m	s		m	s		m	s	
5	2	21.9	2	24.0	1	53.9	2	15.3	2	6.6	2	13.7	1	41.9	2	0.81	1	44.8	1	59.5	0	49.7	1	58.3
		27.7		27.2		57.3		19.3		14.2		17.2		49.2		4.30		51.0		2.6		58.3		0.7
		33.0		30.8		59.4		22.8		19.1		20.8		53.5		7.70		57.3		6.7		1.9		5.3
				34.5				26.2				24.0				11.00				10.0				9.0
				38.0				29.7				28.0				14.00				13.7				12.4
				41.5				32.4				31.3				17.70				16.8				13.6
	3	8.0		44.9	2	49.6		36.7	3	5.4		34.8	2	49.8		21.20	2	56.9		20.3	1	47.6		19.3
		15.1		48.3		51.6		40.4		11.0		38.4		53.0		23.70		1.8		24.3		54.0		23.1
		19.9		52.1		53.4		44.0		14.9		41.7		0.0		28.90		8.6		27.5		0.7		26.3
				3413				2668				2499				13071				1814				1702
	2	27.53			1	56.87			2	13.30			1	48.87			1	51.03		12.14	0	56.63		1102
	3	14.33	2	37.922	2	51.53	2	29.644	3	11.43	2	27.767	2	54.93	2	14.523	3	2.43	2	13.469	1	54.10	2	12.244
				+40.70				+49.08				+50.38				+ 6312				+ 6434				+ 6536
				− 2.20				− 2.50				− 2.25				− 2.15				− 2.43				− 2.34
				− 5.20				− 4.92				− 4.889				− 4.445				− 4.390				− 4.385
				+33.33				+41.73				+43.17				+56.52				+57.51				+58.67
			3	11.25				11.37				10.94				11.04				11.00				10.91

		s		s																				
		+10.39		−36.41		+32.77		−21.89		+14.47		−43.66		+25.65		−40.41		+22.46		−48.94		+75.61		+18.14
		1.01662		1.56122n		1.51548		1.34025n		1.16047		1.64008n		1.40909		1.60649n		1.35141		1.68966n		1.87858		1.25864
		0.60402		1.14862n		1.10288		0.92765n		0.74787		1.22748n		0.99649		1.19389n		0.93881		1.27706n		1.46598		0.84604
		20	0	20	1	20	0	20	1	20	0	20	1	20	0	20	1	20	0	20	1	20	0	20	0
		"		"																				
&		47.9+.21		7.6+.22		49.1+.19		11.2+.31		55.8+.13		17.3+.44		45.9+.24		11.1+.30		45.4+.25		11.9+.33		22.5+.46		45.2+.25
F		57.6+.21		17.2+.25		44.1+.25		6.3+.23		52.9+.28		14.4+.25		44.1+.25		8.8+.25		44.0+.25		10.8+.25		22.2+.06		44.3+.26
G		48.1−.68		7.1−.06		50.9−.63		11.9−.26		58.8−.10		19.3−.39		51.1−.63		16.4−.41		52.7−.56		19.8−.28		30.8−.08		54.8−.41
H		1.8+.61		21.9+.65		46.9+.51		9.2+.73		55.8+.52		18.1+.67		50.0+.51		14.6+.70		51.1+.51		18.9+.67		30.0+.50		52.9+.51
		+.35		+1.06		+.32		+1.01		+.83		+.87		+.37		+.84		+.45		+.87		+.94		+.61
	20	53.85	21	13.45	20	47.75	21	9.65	20	55.82	21	17.42	20	47.78	21	12.72	20	48.30	21	15.35	20	26.38	20	49.30
		4.02		−14.08		12.67		− 8.47		5.60		−16.88		9.92		−15.63		8.69		−18.93		29.24		7.02
	20	57.87	20	59.37	21	0.42	21	1.18	21	1.42	21	0.54		57.70		57.09		56.99		56.42		55.62		56.32
+73°	1	50.48	1	48.98	1	47.93	1	47.17	1	46.93	1	47.81		50.65		51.26		51.36		51.93		52.73		52.03
−30	44	22																						
	1.53440																							
	+0947					+4509				+3423				+3101				+2507				+2436		
	1.54387					1.57949				1.56862				1.56541				1.55947				1.55879		
		+34.98		"		+37.97				+37.04				+36.76				+36.25				+36.21		
		− .02		− .20		− .17		− .07		− .03		− .29		− .10		− .25		− .07		− .37		− .87		− .05
		− .09		− .12		− .06		− .10		− .06		− .09		− .07		− .11		− .07		− .12		− .04		− .08
		− .09		− .27		− .08		− .25		− .21		− .24		− .09		− .21		− .11		− .22		− .24		− .15
		+34.78		+34.39		+37.66		+37.55		+36.74		+36.42		+36.50		+36.19		+36.01		+35.55		+36.06		+35.93
73°	2'	25.26		23.87		25.59		24.72		23.67		24.23		27.15		27.145		27.87		27.48		27.79		27.96
		24.32				25.16				23.95				27.30				27.42				27.88		
		− 18.77				− 20.74				− 20.94				− 22.72				− 22.97				− 23.02		
		+ .70		20.36		+ .67		21.27		+ .67		22.84		+ .73		22.34		+ .63		22.12		+ .62		22.15
	+5	19.66	+5	16.96	+5	20.60	+5	19.93	+5	22.21	+5	21.51	+5	21.71	+5	21.65	+5	21.49	+5	20.86	+5	21.56	+5	20.94
	+5	1.59			+5	0.53			+5	1.94			+	59.62			+4	59.25			+4	59.86		
	7	25.91				25.69				25.89				26.92				26.67				27.04		

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Camelop — α 8h 59m.65 +62° 31' 13".1 — log cos 9.94799 — I 4.462

5h 9m.2 — bor α 45 46 34 61 62 — 12.4 13.6 13.1 14.2 13.9 — log cos 9.66416 — t±1 17.8 22.3 26.8 — log sin 9.78894

+62° 31'

−20 8 — tan δ +1.922

1878 — bor δ 8 59.52 +62 31 13.4 38 — tan z/sin − .34

Jan. 23 — dδ/dt Jan. 30 — Feb. 2 — Feb. 4 — Feb. 5 — Feb. 6

h	m	s	m	s																				
5	7	57.9	8	—	7	55.4	7	—	7	44.2	7	—	7	19.8	7	59.6	30.7	8	6.0	7	—	9	33.2	9	16.6
		1.7		—		0.7		—		49.5		—		24.1			—		9.0		—		38.2		20.9
		5.5		—		1.8		6.60	48.75	54.3		—		26.5			59.8	33.3	12.5		58.8	43.2		25.3
				15.38	6.46			.52	57.60			2.92	54.00				59.5	57.3			.6	56.4			
				.32	10.86			.66	2.20			.51	58.05				59.5	59.5			.7	58.7		8	58.8
				.42	15.42			.36	6.36			.60	2.60				59.6	1.8			.8	1.0			.6
	8	49.4		.54	20.00	8	49.0	.24	10.70	8	38.2	.44	6.90	8	58.0		59.5	4.0	8	42.3	.9	3.4			.5
		52.5		.60	24.52		53.6	.48	15.40		40.5	.28	11.20		2.0		59.7	6.4		47.0	.8	5.5			
		57.4		.71	33.56		58.1	.75	24.60		47.6	.15	2.000		6.1		59.8	8.7		50.0	.8	7.7			
				.24	37.55			.89	29.20			.37	24.68					50							
				.67	42.44			.78	33.33			.53	29.30								54				
				388				528				380													
	8	1.70				8	0.63			7	49.33			7	23.47				8	9.17			7	59.20	8	58.633
	8	53.10	8	15.485	8	53.57	8	6.587	8	42.10	8	2.475	9	2.03	7	59.625		8	46.43	7	58.771	9	38.20	7	57.651
				+49.092				+57.66				+ 61.70				+ 64.34					+ 65.36				+ 5.39
				− 1.4438				− 1.48				− 1.48				− 1.41					− 1.36				− 1.27
				− 3.47				− 3.31				− 3.24				− 3.18					− 3.156				− 3.183
				+44.17				+52.86				+56.98				+59.732					+60.84				+ 0.99
			8	59.65			8	59.45				59.46				59.34					59.61				59.62

	+ 13.78		− 37.62		+ 5.96		− 46.98		+ 13.14		− 39.63		+ 36.15		− 62.41		− 104.0		− 47.66		− 1.60		− 39.57	
	1.13925		1.57542n		0.77525		1.67191n		1.11860		1.59802n		1.55811		1.79525n		1.01703n		1.67815n		0.20412n		1.59737n	
	0.92819		1.36436n		0.56419		1.46085n		0.90754		1.38696n		1.34705		1.58419n		0.80599n		1.46709n		9.92308		1.38631n	
	55	1	55	2	55	1	55	2	55	1	55	2	55	1	55	2	55	1	55	2	55	2		
	53.6	+0.09	25.4	4.84	58.7	+0.7	29.3	+0.83	60.1	+1.14	22.6	+0.51	32.8	4.48	33.1	+0.50	59.5	+0.7	23.0	+0.51	15.9	+0.89		
	48.4	4.43	21.8	4.28	56.0	+0.36	27.1	+0.24	47.6	+0.43	20.3	+0.30	32.2	0.18	32.1	+0.21	59.2	+0.31	21.7	+0.28	15.1	+0.33		
	54.9	+0.25	27.5	+0.01	2.6	+0.14	33.3	+0.03	55.3	+0.20	27.4	+0.01	40.3	+0.41	40.2	+0.39	9.4	+0.02	31.9	+0.00	27.1	+0.02		
	50.1	+0.38	21.9	+0.46	59.2	+0.30	30.1	+0.48	51.6	+0.35	25.5	+0.48	39.8	+0.53	39.9	+0.39	7.0	+0.48	29.4	+0.48	24.7	+0.48		
		+65		+1.27		+.87		+1.22		+.72		+1.28		+.78		+.71		+.84		+1.27		+1.18		
	56	51.75	57	24.15	56	59.12	57	29.95	56	51.15	57	23.95	56	36.28	57	36.32	57	3.78	57	26.50	57	20.70	57	20.70
		8.48		− 23.14		3.67		−28.90		8.08		−24.38		22.24		−38.39		−6.40		−29.32		− 9.84		−24.34
	57	0.23	57	1.01		2.79		1.05		59.23		59.57		58.52		57.93		57.38		57.18		10.86	56	56.36
																						19.72		
+62	25	48.12	25	47.34		45.58		47.30		49.12		48.78		49.83		50.42		50.97		51.17		37.49		51.99

−20 8 19

1.32460

+4521

1.36981

			+4334				+4044				+2527				+2455				+2102					
			1.36794				1.36504				1.34987				1.34915				1.34562					
	+23.43		+23.33				+23.18				+22.38				+22.34				+22.16					
	− .04	− 0.36	− .01	− 0.39	− .50	− 0.86	− .04	− 0.37	− .35	− 0.86	− .29	− 0.63	− .88	− 1.89	− .02	− 0.54	− .51	− 1.07	− 0.35					
	− .15	− .19	− .16	− .20	− .20	− .31	− .15	− .18	− .19	− .32	− .14	− .20	− .23	− .18	− .21	− .21	− .24	− .32	− .23	− .30		− 0.88		
	− .16	− .32	− .22	− .31	− .31	− .32	− .18	− .32	− .32	− .20	− .20	− .18	− .21	− .21	− .32	− .30								
	+23.08	+22.60	+22.94	+22.32	+22.81	+22.32	+22.81	+22.32	+22.32	+21.45	+21.95	+22.09	+21.51	+21.90	+21.27	+21.28								
62	26	11.20	9.94	8.50	9.62	11.93	11.10	11.58	11.51	12.87	12.44	13.62												
		10.57		9.06		11.52		11.54		12.66		27												
		53		67				34		48														
	− 18.84		− 19.84			− 20.09		− 20.24		− 20.85		− 20.61												
	+ .15	21.05	+ .43	99		+ .42	22.13	+ .42	91	+ .41	97	+ .41	21.27											
	+5	20.60	+5	22.56	+5	21.71	+5	21.49	+5	21.83	+5	21.56	+5	20.86										
	+5	2.52	+5	3.32	+5	2.04	+5	1.57			+5	1.49	+5	0.66										
	31	13.09		12.38		13.56		13.11				14.15		13.93										

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62

Aurigae

5h 11.8

+40° 58'

+1 25

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α 11 40.71 +40 57 29.3

log cos δ 9.81665

I 2.738

bore. α .70 30.0

da .67 .0

dt .76 .5

δa .68 30.9

δδ .76 29.9

log cos δ 9.87800

" 15 cos δ tan 0.00278

tan δ +0.87

bor. δ 11 40.75 +40 57 30.10

δδ +.02

dt

	Jan. 14		Jan. 23		Jan. 24		Jan. 28		Feb. 5		Feb. 6	
	m	ρ	m	ρ	m	ρ	m	ρ	m	ρ	m	ρ
	5 10	35.0	10 46.90	10 29.0	10 38.40	10 46.1	10 36.97	10 22.1	10 32.52	10 40.0	10 —	11 4.3	11 21.85
		37.8	49.61	32.5	41.10	49.3	39.55	24.5	35.33	42.5	—	7.0	24.93
		39.7	52.43	35.1	44.00	52.0	42.52	26.7	38.00	45.0	—	9.6	27.22
			57.92		49.27		48.90		43.42		38.16 3270		32.73
			0.60		52.05		53.70		46.10		.15 3542		35.52
			3.33		54.90		53.46		49.00		.20 3820		38.15
	11 23.5		6.00	11 17.7	57.66	11 19.4	56.00	11 14.8	51.60	11 19.2	.27 4100	12 12.3	40.90
		26.4	8.70	20.6	0.40	21.6	58.83	17.2	54.42	21.3	.16 4362	14.8	43.61
		28.8	14.37	23.8	6.00	24.1	4.10	19.3	59.98	24.3	.19 4900	16.8	49.18
			16.95		8.50		7.00		2.53		.36 5200		47.87
			19.70		11.56		9.73		5.34		.85 5442		54.30
			27651		36384		40688		41804		154		41996
	10 37.50		3651	10 32.20	60384	10 49.13	58688	10 24.43	53804	10 42.50	192	11 6.97	
	11 26.23		11 3319	11 20.70	10 54895	11 21.70	10 53.353	11 17.10	10 48.913	11 21.60	10 38.385	12 14.63	11 38.178
			+40.44 36		+49.08 2		+50.381		+54.92		+65.36		+5.39
			−0.55 48		−0.86 62		−0.82 60		−0.77 72		−0.62		−0.58
			−2.46		−2.40		−2.39		−2.35		−2.25		−2.23
			+37.42 39		+46.00		+47.32		+51.85		+62.49		+2.58
			11 40.74 1		11 40.90		40.67		40.76		40.68		40.76

	+25.82	−22.91	+22.70	−25.80	+4.22	−28.35	+24.48	−28.19	−4.72 31	−43.22 41	+3.21	−36.45
	1.41196	1.36083 m	1.35603	1.41162 m	0.62531	1.45255 m	1.38881	1.45010 m	0.63148 m	1.63450 m	1.49429	1.56170 m
	1.41474	1.36281 m	1.35881	1.41440 m	0.62809	1.45533 m	1.39159	1.45288 m	0.63426 m	1.64034 m	1.49704	1.56448 m
	25 4	30 0	25 4	30 0	30 0	30 0	25 4	30 0	30 0	30 1	25 4	30 0
ζ	49.2+.11	38.0+.37	58.2 00	48.1+.21	17.8+.38	51.2+.16	54.3+.03	46.2+.24	20.0+.42	0.7+.13	43.9+.22	50.9+.16
f	2.1+.02	51.4+.30	58.1+.05	47.4+.29	18.4+.09	51.8+.29	55.1+.11	47.2+.29	22.5+.06	1.8+.18	46.1+.19	54.1+.27
g	52.6−.51	42.1−.55	4.4+.02	53.3−.52	24.6−.23	56.8−.21	3.1+.03	56.0−.27	32.9−.14	12.9−.30	58.7−.05	6.7−.05
H	7.8+.19	55.1+.52	58.1−.02	49.1+.51	19.7+.37	54.9+.32	59.8 00	53.2+.51	29.9+.50	9.2+.73	55.6−.02	2.5+.64
	−.19	+.64	+.05	+.49	+.61	+.76	+.17	+.77	+.84	+.74	+.34	+1.02
	29 57.92	30 46.65	29 59.70	30 49.48	30 20.12	30 53.68	29 58.08	30 50.65	30 26.32	31 6.07	29 51.08	30 58.55
	25.99	−23.06	22.85	−25.97	4.25	−28.53	24.64	−28.37	−4.34	−43.69	31.41	−36.68
	30 23.91	30 23.59	30 22.55	30 23.51	30 24.37	30 25.15	30 22.72	30 22.28	21.98	22.31	22.49	21.87
+40°	52 24.44	52 24.76	52 26.80	52 24.84	52 23.98	52 23.20	52 25.63	52 26.07	26.37	26.04	25.86	26.48
+1	25 4											
	0.15 350 400											
	+0947		+4528		+3420		+2982		+2467		+2105	
	0.16347		0.19928		0.18820		0.18382		0.17867		0.17505	
	− 1.46	"	− 1.58		− 1.54		− 1.53		− 1.51		− 1.50	
	− .18	− .14 −0.38	− .14	− .18 −0.36	− .01 −0.18	− .22 −0.17	− .16 −0.15	− .21 −0.16	− .01 −0.26	− .51 −0.81	− .26 −0.54	− .36 −0.78
	− .50	− .08	− .40	− .06	− .02	− .06	− .35	− .06	− .04	− .11	− .49	− .10
	+ .05	− .16	− .01	− .12	− .15	− .19	− .04	− .19	− .21	− .19	− .09	− .26
	− 2.09	− 1.88 84	− 2.13	− 1.94	− 1.72	− 2.01	− 2.08	− 1.99	− 1.77	− 2.32	− 2.34	− 2.22
+40	52 22.35	22.92	23.67	22.90	22.26	21.19	23.55	24.08	24.68	23.72	23.52	24.26
	22.64		23.28		21.72		23.82		24.16		23.89	
	−12.98											
	−25.03		−26.03		−26.03		−26.03		−24.02		−24.04	
	−5 19.66	+5 19.68	+5 20.67	+520.57	+5 22.24	+522.18	+5 20.97	+520.94	+5 21.56	+5 21.54	+5 20.56	+5 20.84
	+5 6.65		+5 6.74		+5 8.27		+5 6.71		+5 6.76		+5 6.00	
	57 29.29		30.02		29.99		30.53		30.92		29.89	

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$5^h\ 26.7^m$

$-1°\ 41'$

$+44\ 4$

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	Jan. 12		Jan. 14	Jan. 23	Jan. 24	Jan. 28	Feb. 2	
	h m ρ	m ρ						
	5 25 53.1	—	25 29.5	25 40.24	25 20.6	25 31.58	25 17.2	25 30.28	25 20.6	25 25.48	25 28.0	25 18.89
	56.1	—	32.0	42.38	23.5	33.60	19.1	32.30	23.3	27.60	29.9	20.85
		—	33.5	44.40	25.5	35.90	21.4	34.28	25.2	29.70	32.1	22.80
		25 50.60		48.45		39.82		38.55		33.95		27.36
		54.72 52.62		50.57		42.00		40.63		35.97		29.17
		.68										
		.80 54.80		52.65		44.00		42.65		38.00		31.19
	26 27.3	.72 56.78	26 11.1	54.66	26 3.0	46.00	25 57.8	44.70	26 6.0	40.00	26 3.3	33.33
	28.6	.76 58.88	13.4	56.81	5.6	48.10	1.1	46.80	8.1	41.90	5.0	35.60
	29.7	.76 3.00	15.4	0.82	7.5	52.10	2.4	50.82	9.6	45.93	7.6	39.40
		.78 5.08		2.86		54.60		52.95		48.32		41.60
		.72 7.08		4.96		56.55		54.96		50.46		43.60
		34		398 74		48425		46892		41731		34381
	25 54.60		25 31.67	578 74	25 23.20		25 19.23		25 23.03		25 30.00	
	26 28.53	25 54.742	26 13.30	25 52.613	26 5.37	25 44.023	26 1.10	25 42.629	26 7.90	25 37.937	26 5.30	25 31.255
		+38.31		+40.42		+49.18		+50.40		+54.72		+61.71
		+ 0.02		+ 0.02		+ 0.02		+ 0.02		+ 0.02		+ 0.02
		− 1.94		− 1.93		− 1.90		− 1.89		− 1.86		− 1.82
		+36.39		+38.47		+47.14		+48.64		+53.08		+59.91
		26 31.43		31.08		31.16		31.07		31.02		31.17
		+ 0.14	− 33.79	+ 20.95	− 20.68	+ 20.82	− 21.35	+ 23.40	− 18.47	+ 14.91	− 29.96	+ 1.25	− 34.05
		9.14613	1.52879m	1.32118	1.31555m	1.31848	1.32940m	1.36922	1.26647m	1.17348	1.47654m	0.09691	1.53212m
		9.27072	1.65338m	1.44577	1.44014m	1.44307	1.45399m	1.49381	1.39106m	1.29807	1.60113m	0.22150	1.65671m
		5 2	5 3	5 2	5 3	5 2	5 3	5 2	5 3	5 2	5 3	5 2	5 3
		46.1+.28	33.2+.86	21.1+.49	16.0+.47	24.1+.53	18.6+.52	24.7+.54	19.0+.53	32.6+.50	32.0+.57	52.1+.18	37.7+.47
		2.9+.27	49.8+.34	38.8+.27	33.8+.14	27.7+.23	22.5+.22	31.0+.21	25.3+.18	38.8+.27	38.3+.19	58.0+.30	43.8+.31
		54.7−.31	41.2−.37	29.8+.04	24.4−.12	34.8−.10	27.2−.00	36.6−.20	29.7+.05	47.9−.57	46.5−.49	58.4−.07	51.7−.41
		6.9+.40	55.2+.04	41.1+.37	36.9+.25	23.9+.47	19.3+.35	28.1+.47	21.8+.34	38.9+.41	40.2+.24	56.9+.20	42.7+.20
		+.64	+.57	+1.17	+.77	+1.13	+1.09	+1.02	+1.10	+.61	+.51	+.75	+.57
		7 57.65	8 44.85	7 32.70	8 27.78	7 27.62	8 21.90	7 30.10	8 23.95	7 39.55	8 39.25	7 58.20	8 43.98
		.18	− 45.02	27.91	− 27.55	27.74	− 28.44	31.18	− 24.61	19.86	− 39.91	1.66	− 45.36
		7 57.83	7 59.83	8 0.61	8 0.23	7 55.36	7 53.46	8 1.28	7 59.34	7 59.41	7 59.34	59.86	58.62
−1		45 9.48	45 11.48	45 12.26	45 11.88	45 7.01	45 5.11	45 12.93	45 10.99	45 11.06	45 10.99	11.51	10.27
+44		2 38											
		1.74530											
		+1626		+0947		+4562		+3416		+3060		+4093	
		1.76156		1.75477		1.79092		1.77946		1.77590		1.78623	
		− 57.75		− 56.85		− 61.49		− 60.18		− 59.69		− 61.13	
		00	+ .01	00	00	00	00	+ .01	00	00	+ .01	00	+ .01
		− .30	− .37	− .25	− .35	− .20	− .27	− .17	− .24	− .19	− .26	− .24	− .30
		− .16	− .14	− .29	− .19	− .28	− .27	− .26	− .28	− .15	− .13	− .19	− .14
		− 58.21	− 58.25	− 57.39	− 57.39	− 62.27	− 62.33	− 60.90	− 60.40	− 60.03	− 60.07	− 61.56	− 61.56
−1		46 7.69	9.73	9.65	9.27	9.28	7.44	13.53	11.69	11.01	11.06	12.07	11.83
		8.71		9.46		8.36		12.61		11.08		11.95	
		− 4.25		− 4.01		− 3.00		− 2.90		− 2.50		−	− 2.05
		− 10.97		− 10.97		− 09.93		− 09.93		− 09.91		−	− 09.88
		+5 20.56	+5 19.59	+5 19.66	+5 18.69	+5 20.60	+5 19.67	+5 22.21	+5 21.28	+5 20.97	+5 20.66		+5 21.71 +5 20.83
		+5 15.34		+5 14.68		+5 16.67		+5 18.38		+5 17.56			+5 18.48
		5 24.05		24.14		25.03	✓	30.99		28.64			30.61
−		1 40 53.37		54.78		51.69		54.28		53.52			52.17

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24

Orionis

α 5h 40.3m

δ +9° 29'

+32 54

1878

1878.0

α 5h 40m

	α	10.33	+9° 28'	30.7"
Jan. 12		.21		31.5
Jan. 14	$\frac{d\alpha}{dt}$	.26		32.5
Jan. 24		.38		32.0
Jan. 30		.32		32.1
Feb. 3	$\delta\alpha$	.43		31.8
Feb. 4				

log cos δ 9.99402

" $\frac{15 \cos\delta}{\sin 1''}$ 011880

log sin δ 9.21685

tan δ +0.17

$\frac{\tan\delta}{\sin 1''}$ + .54

| | | | |

1878phae.proj.1496

1878.0

Orionis (200B) α 43 δ +4° 23′ 8″

$5^h\ 43.9^m$

$+4°\ 23'$

$+38\ \ 0$

1878

log r·sin 8.88326 I 2.07

" cos δ 9.99873

" 15 cos δ tan α 0.12351

tan δ +0.08

tan z +.62

	Jan. 12	Jan. 14	Jan. 24	Jan. 30	Feb. 2	Feb. 6
h	m s	m s	m s	m s	m s	m s
5	42 46.3	42 56.90	42 50.5 —	42 32.6	42 44.90	42 31.2 42 37.65	42 26.5	42 33.35	43 25.5	43 29.80
	48.0	59.08	52.6 —	34.7	46.96	33.1 38.89	29.5	35.53	27.1	31.90
	50.8	1.00	54.7 —	36.4	48.67	34.7 41.79	32.0	37.74	28.6	33.93
		5.05	43) 3.15		53.35	46.08		41.63		38.00
		7.12	7.29 5.20		55.22	48.10		43.90		40.14
		9.20	.27 7.30		57.38	50.05		46.00		42.15
	43 14.2	11.38	.30 9.46	43 12.6	59.40	52.10		48.00		44.15
	16.2	13.52	.39 11.50	14.5	1.50	54.29		49.88		46.18
	18.4	17.64	.36 15.53	16.0	5.58	58.18		54.15		50.38
		19.64	.25 17.52		7.62	0.41		56.32		52.48
		21.70	.17 19.72		9.92	2.60		58.28		54.50
		22215	233		39080	43114		50478		46365
	42 48.37	10215	42 52.60	42 34.57	63080	42 33.00	55114	42 29.33		43 27.07	
	43 16.27	43 9.286	43 7.291	43 14.37	42 57.345	42 50.104		42 45.889		43 42.150
		+38.32.1	+40.43.40 33		+50.44.31	+57.65		+61.72		+ 5.37
		− 0.05	− 0.05 04		− 0.06 05	− 0.06		− 0.06		− 0.05
		− 2.02	− 2.02		− 1.99	− 1.96		− 1.93		− 1.90
		+ 36.24	+ 38.31 27		+ 48.27	+ 55.63		+ 59.73		+ 3.42
		43 45.53	45.63 56		45.61	45.73		45.62		45.57

	+20.92	− 6.98	+14.69		+22.77	− 17.03	+17.10		+16.56		+15.08	
	1.32056	0.84386n	1.16702		1.35736	1.23121 n	1.23300		1.21906		1.17840	
	1.44407	0.96737n	1.29053		1.48087	1.35472 n	1.35651		1.34257		1.30191	
	0 3	0 4	0 3		0 3	0 4	0 3		0 3		0 3	
	28.2+.61	4.9+.23	36.1+.50		30.5+.58	22.9+.53	36.9+.48		37.9+.47		36.9+.48	
	46.8+.34	23.2+.09	54.0+.28		38.0+.18	29.8+.02	43.4+.20		43.9+.31		45.9+.33	
	35.3−.08	11.6−.09	43.2−.43		41.0−.36	32.2−.01	48.8−.49		48.2−.50		55.8−.09	
	47.8+.13	25.2+.22	55.6+.03		34.0+.32	25.9+.22	41.9+.21		42.2+.21		49.1+.12	
	+1.00	+.45	+.38		+.72	+.76	+.80		+.49		+.84	
	3 39.52	4 16.22	3 47.22		3 35.88	4 27.70	3 42.75		3 43.05		3 46.92	
	27.80	− 9.28	19.52		30.26	− 12.63	22.73		22.01		20.04	
	4 7.32	4 6.94	4 6.74		4 6.14	4 5.07	5.48		5.06		6.96	
+4	18 41.03	18 41.41	18 41.61		18 42.21	18 43.28	42.87		43.29		41.39	
	37 58 48											
+38	0 57											
	1.65310 250											
	+1632		+0947		+3413		+4391		+4139		+ 2140	
	1.66882		1.66197		1.68663		1.69641		1.69389		1.67390	
	−46.65		−45.92		−48.60		−49.71		−49.42		−47.20	
	− .02	− .00	− .01		− .02	− .01	− .01		− .01		− .01	
	− .37	− .43 −0.54	− .38 −0.49		− .25 −0.46	− .31 −0.51	− .30 −0.44		− .30 −0.43		− .38 −0.60	
	− .25	− .11	− .10		− .18	− .19	− .13		− .12		− .21	
	−47.29	−47.19	−46.41		−49.05	−49.11	−50.15		−49.85		−47.80	
+4	17 53.74	54.22	55.20		53.16	54.17	52.72		53.44		53.59	
	53.98				53.66							
	− 4.90		− 4.69		− 3.82		− 3.38		− 3.47		− 2.90	
	− .86		− .85		− .82		− .79		− .78		− .74	
	+5 20.56	+5 19.70	+5 19.66	+5 18.81	+5 22.21	+5 21.39	+5 22.56	+5 21.77	+5 21.71	+5 20.93	+5 20.86	+5 20.12
	+5 14.80		+5 14.12		+5 17.57		+5 18.39		+5 17.76		+5 17.22	
	23 08.78		9.32		11.23		11.11		11.20		10.81	

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66

Sm. 1110

5^h 45.3^m

+19° 50′

+ 22 33

1878

18780

α 45 9.78 +19 50 3.2 — log sin δ 9.53056

bor. α 7.1 4.1 — cos δ 9.97344

dα/dt .76 4.0

dα .84 5.7 — 15 cos δ sin 1 0.09822 Pair Feb. 6

dt .81 4.4 0.07894n after 11

dδ .80 4.7

tan δ +0.36

bor. δ 45 9.783 +19 50. 4.4

dδ .35 — sin z +.38

dt

Jan. 24

	Jan. 12		Jan. 30	Feb. 2	Feb. 7	Feb. 11	
h	m ρ	m ρ					h
5	44 37.0	[20.73]	44 14.0	44 8.60	43 54.4	44 1.52	43 45.3	43 57.30	44 42.0	44 58.50	44 42.8	44 53.00	5
	39.1	[22.92]	15.9	10.78	56.2	3.62	47.8	59.73	43.7	90 52.71	45.0	53.24
	41.4	44 25.18	17.8	13.16	57.9	5.42	49.6	1.72	45.6	54.89	47.0	57.43 57.47
		29.40		17.50		10.00		6.15	47.7	57.10	49.0	59.65
		31.70		19.64		12.38		8.27	49.7	59.29	51.3	1.78
		33.80		21.90		14.57		10.40				
	44 56.8	36.10	44 53.4	24.00	44 34.8	16.70	44 37.3	12.75	45 34.4	2.55	45 38.7	45 5.13
	58.7	38.26	55.5	26.00	36.7	18.90	39.3	14.77	36.4	4.76	40.7	.743
	0.8	42.66	58.0	30.56	38.8	23.24	41.5	19.18	38.4	6.97 7.00	42.3	9.58 .958
		44.88		32.78		25.30		21.45	40.0	9.20	44.4	11.78
		46.98		35.00		27.78		23.70	42.2	11.32	46.7	14.00
		37261		23992		15973		23564		14.63		17.10
	44 39.17		44 15.90		43 56.17		43 47.63	11564	44 45.74	16.67	44 47.02	18.33
	44 58.77	44 33.874	44 55.63	44 21.811	44 36.77	44 14.521	44 39.37	44 10.513	45 38.28	18.99 19.00	45 42.60	21.63 21.61
										21.23		24.00
		+38.332		+50.431		+67.65		+ 61.72		2086 23.40		2864 26.10
		− 0.23		− 0.31 25		− 0.28		− 0.28				
		− 2.18		− 2.16		− 2.13		− 2.11				
		+ 35.91		+ 47.90		+ 55.24		+ 59.33		45 6.953		45 9.547
		45 9.78		9.71		9.76		9.84		+ 516		+ 2.55
										− 0.24		− 0.28
										− 2.06		− 2.02
										+ 2.86		+ 0.25
										9.81		9.80

	− 5.30	− 24.90	+ 5.91	− 33.82	+18.35	− 22.25	+22.88	− 28.86	+ 21.21	− 31.33	+22.43 53	− 32.95
	0.72428n	1.39620n	0.77159	1.52917n	1.26364	1.34733n	1.35946	1.46030n	1.32654	1.49596n	1.35 876	1.51786n
	0.82250n	1.49442n	0.86981	1.62739n	1.36186	1.44555n	1.45768	1.55852n	1.40482	1.57490	1.43 954	1.59680
											170	
	35 1′	35 1′	35 2	35 3	35 2	35 2	35 1	35 3	35 1	35 0	35 1	35 0
E	28.9″+.53	53.7+.16	20.6+.49	11.1+.36	5.9+.15	56.2+.16	56.4+.08	2.1+.17	32.9+.48	29.1+.48	38.0+.37	31.8+.46
F	45.5+.42	9.9+.30	25.4+.25	15.1+.29	9.0+.35	58.4+.29	59.5+.30	5.6+.30	39.1+.28	35.9+.06	42.3+.34	36.5+.06
G	36.5−.19	59.4+.04	29.8+.04	19.1−.31	16.1−.29	4.8+.08	6.9+.08	12.1−.16	54.9−.25	51.6.61	57.5−.49	45.7−.65
H	46.6+.31	11.2+.48	23.9+.47	14.0+.39	8.8+.50	59.9+.23	1.0+.33	5.8+.39	48.0+.41	44.0+.51	44.4+.46	39.6+.57
	+1.07	+.90	1.25	+.72	+.71	+.76	+.79	+.70 6.48	+.89	+.43	+.68	+.38
	37 39.38	38 3.55	37 24.92	38 14.82	37 9.95	37 59.82	37 0.95	38 5.90	36 43.72	35 40.15	36 44.05	39 38.40
	−6.65	−31.22	7.41	−42.40	23.01	−27.90	28.69	−36.18	−25.44	37.58	−27.07 2	39.52
	37 32.73	37 32.33	37 32.33	37 32.42	32.96	31.92	29.64	30.22	36 18.28	17.73	17.04 3	17.92
+19°	45′ 15.62	45′ 16.02	45 16.02	45 15.93	15.39	16.43	18.71	18.13	46 30.07	30.62	31.31 2	30.48
+22	32 13											
	33 22											
	1.37870 30											
	+1632		+3413		+4393		+4141		+1389		+2953	
	1.39462		1.41243		1.42223		1.41971		1.39219		1.40783	
	−24.81		−25.85		−26.44		−26.29		−24.67		−25.58	
	− .01	− .11	− .01	− .20	− .06	− .08	− .09	− .15	− .08	− .17	− .09	− .19
	− .27	− .31	− .17	− .22	− .18	− .24	− .16	− .25	− .19	− .08	− .24	− .08
	− .27	− .23	− .31	− .18	− .18	− .19	− .20	− .18	− .22	− .11	− .17	− .10
	−25.36	−25.46	−26.34	−26.45	−26.86	−26.95	−26.74	−26.87	−25.16	−25.03	−26.08	−25.95
+19°	44 50.20	50.56	49.68	49.48	48.53	49.48	51.97	51.26	46 4.91	5.59	5.29	4.48
	50.41		49.68		49.00		51.62		5.25		4.86	
	− 7.25		− 7.16		− 7.12		− 7.11		− 7.09		− 7.08	
	− .52		− .50		− .48		− .48		− .45		− .43	
	+5 20.64	+5 20.04	+5 22.21	+5 21.71	+5 22.56	+5 22.08	+5 21.71	+5 21.23	+4 6.64	+4 6.19	+4 7.37	+4 6.94
	+5 12.79		+5 14.55		+5 14.96		+5 14.12		+3 59.10		+3 59.86	
	49 3.20		4.13		3.96		5.74		4.35		4.72	
	56											

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Orionid

α 6h 58.7m
δ +29° 31'

1878 Jan. 12

| | | |

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Auriga

1878

	Jan. 12		Jan. 24		Jan. 30		Feb. 2	Feb. 3	Feb. 4
α_0	4 20.66	+32 43 3.3							
log sin δ	9.73278							I 2.456	
bor. α	55	43							
" cos δ	9.92498								
dα/dt	.82	49							
" sin cos tan i	0.04976								
dδ/dt	.73	5.4							
δ₀	.74	5.5							
	.9	4.1							
tan δ	+0.64								
bor. δ	4 20.715	+32 43. 4.6							
sin z	+ .17	58							

	h	m	s		m	s		m	s		m	s		m	s		m	s		m	s
	6	3	49.8			—		3	11.6		3	18.50		3	8.93		3	—		3	11.6		3	7.40		2	53.3		3	5.75		2	44.7		3	4.60
			52.1			—			14.0			20.95			41.7			—			14.1			9.78			53.2			8.15			46.4			7.12
			54.6			—			16.2			23.38			44.0		26.12	16.30			17.5			12.10			52.6			10.70			47.9			9.62
					3	40.30						25.18					25.81	20.90						14.00						15.35						14.29
					45.21	42.83						30.82					26.11	23.65						19.54						17.94						16.84
					.29	45.20						33.18					26.19	26.19						22.00						20.50						19.35
	4	16.6			.24	47.70		3	53.8		4	35.60		4	3.0		26.24	28.70		4	0.1			24.38		3	51.8			22.82		3	37.4			21.75
		18.8			.29	50.20			55.8			38.00			6.3		26.31	31.22			2.4			26.75			53.6			25.48			39.4			24.35
		21.0			.18	55.00			57.9			42.87			7.7		25.98	33.80			5.7			31.75			55.2			30.28			40.9			29.20
					.26	57.66						45.50					26.17	38.45						34.22						32.70						31.51
					.22	59.46						48.00					26.21	40.95						36.50						35.19						34.05
					189							36498					114							24142						22506						21268
	3	52.17						3	13.93					3	41.67					3	14.40					2	55.03					2	46.33			
	4	18.80		3	45.236			3	55.83		3	33.180		4	6.33		3	26.127		4	2.72		3	21.947		3	53.53		3	20.460		3	39.23		3	19.385
					+38.34	2						+50.43	31					+ 5765						+ 61.73						+ 6314						+ 6436
					− 0.42	40						− 0.48	44					− 0.49						− 0.50						− 0.42						− 0.47
					− 2.50							− 2.50						− 2.47						− 2.45						− 2.44						− 2.44
					+35.42							+47.37						+ 54.79						+58.78						+60.28						+61.45
					4 20.66							20.55 ✓						20.82						20.73						20.74						20.79

	− 6.93																			
	−53.07		−33.356		+ 19.25		− 22.65		− 15.54		− 4020		+ 755		− 4087		+ 2543		− 33.07		+ 33.00		− 19.90	
	0.84073 n		1.52582 n		1.28443		1.35507 n		1.19145 n		1.60423 n		0.87795		1.61279 n		1.40535		1.51943 n		1.51851		1.29885 n	
	0.89049 n		1.57558 n		1.33419		1.40483 n		1.24121 n		1.65399 n		0.92771		1.66178 n		1.45511		1.56919 n		1.56827		1.34861 n	
	40	4′	45	0′	40	4	45	0	40	4	45	0	40	4	45	0	40	4	45	0	40	4	45	0
ε	44.7	+.21	14.2	+.29	21.6	+.52	9.8	+.18	59.1	.00	27.6	+.49	32.0	+.48	25.9	+.49	11.1	+.34	16.5	+.34	2.8	+.21	2.1	+.01
F	58.1	+.05	28.3	+.03	22.6	+.09	10.4	+.09	1.1	.00	28.4	+.03	33.9	+.01	27.2	+.04	13.1	+.19	17.5	+.09	5.2	+.19	4.0	+.04
G	50.5	−.57	19.7	+.41	28.1	.00	16.8	−.42	5.9	.00	35.5	+.24	40.2	+.41	34.3	−.18	21.2	+.24	27.4	+.12	14.1	−.20	13.5	+.32
A	3.8	+.11	36.1	+.52	23.5	+.21	12.7	+.83	1.9	+.05	32.8	+.51	36.0	+.26	30.2	+.80	15.5	+.22	22.9	+.41	11.1	+.23	10.2	+.30
		−.20		+.43		+.82		+.18		+.05		+.79		+.28		+.85		+.51		+.72		+.43		+.03
	44′	54.28	45′	24.58	44	23.95	45	12.42	45	2.00	45	31.08	44	35.52	45	29.40	44	15.22	45	21.08	44	8.30	45	7.45
		−7.77		−37.63		21.59		−25.40		−17.43		−45.08		8.14		−45.83		28.52		−37.08		37.01		−22.32
	44	46.51	44	46.95	44	45.54	44	47.02		44.57		46.00		43.99		43.57		43.74		46.00		45.31		45.13
+32°	38′	1.84	38′	1.40	38	2.81	38	1.33		3.78		2.35		4.36		4.76		4.61		4.35		3.04		3.22
+9	39	27																						
	40	36																						
	0.99210																							
	+ 1639				+ 3408				+ 4425				+ 4197				+ 3262				+ 2730			
	1.00759				1.02528				1.03545				1.03317				1.02382				1.01850			
	− 10.18				− 10.60				− 10.85				− 10.79				− 10.56				− 10.44			
	− .02		− .28		− .09		− .13		− .06		− .40		− .02		− .42		− .16		− .27		− .27		− .10	
	− .49		− .04		− .31		− .01		− .40		− .04		− .37		− .04		− .39		− .04		− .37		− .01	
	+ .05		− .11		− .21		− .05		− .01		− .20		− .07		− .21		− .13		− .18		− .11		− .01	
	− 10.64		− 10.65		− 11.21		− 10.79		− 11.32		− 11.49		− 11.25		− 11.46		− 11.24		− 11.05		− 11.19		− 10.56	
+32°	37	51.20	50.79		51.60		50.54		51.46		50.86		53.11		53.21		53.37		53.30		51.85		52.66	
		51.00			51.07				51.66				53.16				53.34				52.26			
					77												37							
	−	8.01			− 8.58				− 9.13				− 9.31				− 9.34				− 9.43			
	−	.23			− .22				− .22				− .21				− .21				− .21			
	+5	20.56	7 5	20.33	+5	22.21	+5	21.99	+5	22.56	+5	22.34	+5	21.71	+5	21.50	+5	21.71	+5	21.50	+5	21.49	+5	21.28
	+5	12.32			+5	13.22			+5	13.21			+5	12.19			+5	12.13			+5	11.85		
		43	3.32			4.29				4.87				5.35				5.47				4.11		

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DM. 1235 α_0 18 h 18 m 80 s λ 8.93 + 14° 25' 32.7 log ani δ 9.39664 log R_1 1.36998 log R_2 1.06931

6h 11.3m corr. α 9.05 9.03 8.97 9.05 8.97 333 333 325 338 337 " cos δ 9.98607 R_1 23.44 R_2 11.73

+14° 26' $\frac{d\lambda}{dt}$ " 15 cos beta 0.11085 Hor. Par. Feb. 6 I 2.14

δ_0 0.09157n after "

+27 57 tan δ +0.26

1878 corr. δ 11 9.000 +14 25 33.22 tan z +.47

$\frac{d\delta}{dt}$

	Jan. 12		Feb. 11		Feb. 28		Mar. 6		Mar. 16		Mar. 19	
h	m	s	m	s	m	s	m	s	m	s	m	s
6	10 14.9	10 20.24	10 39.3	10 52.83	10 40.5	10 38.54	10 45.3	11 0.30	11 38.4	11 —	10 48.7	11 6.85
	16.9	22.43	41.0	54.90	42.7	0.60	47.3	2.54	40.5	1850	50.8	8.90
	18.5	24.46	43.1	57.07 57.10	44.5	2.75 2.70	49.5	4.68 4.67	42.8	2085	52.3	11.05 11.00
		28.79	44.8	59.18	46.5	4.90	51.4	6.91	44.5	22.94	54.5	13.20
		30.83	46.6	1.34	48.4	7.00	53.0	9.00	46.0	24.99	56.5	15.30
		32.94										
	10 53.3	35.07		11 4.30		10.18		12.20		28.27		18.50
	55.4	37.12		6.86		12.30		14.32		30.35		20.60
	57.6	41.40		8.84 8.82		14.43 14.42		16.44 16.39		32.51 32.50		22.73 22.70
		43.52		11.00		16.53		18.57		34.63		24.85
		45.66		13.00		18.71		20.70		36.82		27.00
		36246		16.30		21.92		23.82		40.04		30.22
	10 16.77		10 42.96	18.36		24.06		25.90		42.04		32.30
	10 55.43	10 32.951		20.54 20.47		26.19 26.22		28.05 28.06		44.27		34.47 34.50
				22.69		28.23		30.19		46.50		36.55
		+48.35 38.32		26.45 24.50		43.37 30.50		49.17 32.30		48.53		68.25 38.78
		− 0.17 16										
		− 2.18			10 44.52		10 49.30		11 42.44		10 52.56	
		+ 35.98		11 8.17		11 14.457		11 16.390		11 20.818		11 22.750
		11 8.93		+ 2.52		− 3.36		− 5.47		− 9.73		− 12.01
				− 0.20		− 0.20		− 0.17		− 0.22		− 0.20
				− 2.09		− 1.87		− 1.78		− 1.61		− 1.58
				+ 0.23		− 5.43		− 7.42		− 11.76		− 13.78
				9.05		9.03		8.97		9.05		8.97

	+16.18	− 22.48	+2586		+2994		+2709		−2163		+3019	
	1.20898	1.35180 n	1.41263		1.47625		1.43281		1.33506n		1.47986	
	1.31983	1.46265 n	1.50420n		1.56782n		1.52438n		1.42663		1.57143n	
	0 1	0 2	0 1		0 1		0 1		0 0		0 1	
	26.14.53	16.4+4.0	9.7+.27		13.8+.37		11.4+.31		8.9+.16		15.7+.41	
	43.5+.37	33.2+.21	15.3+.25		20.3+.23		18.1+.25		15.2+.09		23.2+.21	
	34.2+.11	23.4+.18	23.6+.25		34.2+.11		30.1+.03		32.9+.14		36.3+.22	
	44.9+.45	35.0+.45	16.1+.69		27.8+.65		23.9+.66		25.9+.45		30.4+.65	
	+124	+88	+96		+114		+119		+56		+115	
	1 37.18	2 27.00	1 16.18		1 24.02		1 20.88		0 20.72		1 26.40	
	20.88	− 29.02	− 31.93		− 36.9		− 33.45		26.71		− 37.28	
	1 58.06	1 57.98	0 44.25		47.05		47.43		47.43		49.12	
	+14 20 50.29	20 50.37	22 4.10		1.30		0.92		0.92		59.23	
	+27 57 36 48											
	1.48520 480											
	+1641		+3012		+0878		+1421		+1515		+0521	
	1.50121		1.51492		1.49358		1.49901		1.49995		1.49001	
	−31.71		−32.73		−31.16		−31.55		−31.62		−30.90	
	− .03	− .06	− .09		− .12		− .09		− .06		− .12	
	− .16	− .25	− .18		− .20	−0.61	− .18	−0.57	− .04	−0.24	− .18	−0.56
	− .31	− .22	− .24		− .29		− .30		− .14		− .26	
	−32.21	−32.24	−33.24		−31.77		−32.12		−31.86		−31.46	
	+14 20 18.08	18.13	21 30.86		29.53		28.80		29.06		27.77	
	18.10											
	− 5.30		− 4.35		− 4.11		− 4.05		− 4.00		− 4.00	
	− .65		− .51		− .90 .43		− .86 .39		− .81 .34		− .84 .34	
	+5 20.56	+5 19.91	+4 7.37	+4 6.83	+4 8.30	+4 7.87	+4 8.10	+4 7.71	+4 9.13	+4 8.79	+4 10.25	+4 9.91
	+5 14.71		++ 2.48		+4 .376		+4 3.66		+4 4.79		+4 5.91	
	25 32.71		33.34		33.29		32.46		33.85		33.68	

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Orionid (291B)

1878

α_{2000} 6h 13.2m
δ_{2000} +14° 43′
+27 40
1878 Jan. 12

α	6h 13m 6.73	+14° 42′ 19″
bom. α	.72	28
$\frac{d\alpha}{dt}$	.75	1.7
	.86	2.3
	.81	2.0
$\delta\alpha$	.77	2.2
bom. δ	13	6.773 +14 42 28/15
$\frac{d\delta}{dt}$ Feb. 11		Mar. 6

log cos δ	9.40490
" cos δ	9.98551
" 15 cos δ sin 1′	0.11029 thro' Feb. 6
	0.09101 m after "
tan δ	+0.26
~~tan~~ z ein	+ .46
Mar. 16	

| Jan. 12 | | |

1878phae.proj.1496.

1878.0

5 Lyncis — α_0 — α — δ — log sin δ 9.93069 — I 3.942 — After Feb. 7 I 3.948 R 21.73

$6^h\ 16.6^m$ — bor. $d\alpha$ .74 .82 .63 .69 — 625 527 612 527 — α cos δ 9.71 — 15 cos δ tan α 9.84307 — 9.81379n

$+58°\ 29'$ — $\frac{d\alpha}{dt}$ — $\frac{d\delta}{dt}$

α_0 16 9.712 $+58\ 28\ 52.02$ — tan δ +1.63 — $\frac{\tan z}{2m}$ −.28

$-16\ 6$ — bor. δ

1878

Jan. 12	Feb. 11	Feb. 14	Feb. 18	Feb. 19	Feb. 24
h m ρ — m ρ	h m ρ	h m ρ	h m ρ	h m ρ	h m ρ
6 15 41.6 — 15 —	15 51.6	15 42.20 Ch. f.	15 59.8	15 14.5	15 44.42	16 29.0 —
45.4 —	53.3	46.28	48	17.3	48.60	32.3 —
48.4 —	57.3	50.37 50.53	14.9	22.0	52.40 52.52	36.0 —
35.94 28.80	8.2	54.66		24.8	56.10	38.5 —
36.08 32.14	7.1	58.20		28.7	0.37	42.4 —
36.38 36.38						
16 17.5 .54 40.28	16 51.0	16 4.08				
21.1 .27 44.15	53.3	[8.04] —			6.47	—
24.7 .18 51.95	58.3	12.06 12.10			10.22	—
.24 55.95	16	16.10			14.18 14.22	—
.35 0.00	54	20.10			18.00	—
					22.00	—
178		26.00				
15 45.13		29.70			28.00	16 29.65
16 21.10	15 36.222	33.76 33.70			32.00	33.63
		37.63		35.8	35.88 36.00	37.69 37.70
	+38.382	36.19 41.77		37.8	39.67	21.73 41.70
	− 1.06 02			35.96 40.0	42.46 43.75	45.79
	− 3.84 15 59.30		16 6.54	41.9		
	+33.46 16 58.36	16 12.063	15 [9.80]	32.36 44.0	15 21.46	16 35.64
				16 14.310	16 14.153	16 15.96
		+ 2.51		+ 0.28	+ 0.02	− 1.73
		− 1.25	− 1.41	− 1.35	− 1.15	− 1.28
		− 3.578	− 3.582	− 3.42	− 3.39	− 3.26
		+ 2.32		− 4.49	− 4.52	− 6.24
	16 9.68	16 9.74		9.82	9.63	9.69

− 8.91	− 44.88	+ 12.76	− 46.30	+ 44.81	7.81	+ 52.69	− 19.68
0.94988n	1.65205n	1.10585	1.66358n	1.16167	0.89265	1.72.173	1.29403n
0.79295n	1.49512n	0.91964n	1.47937	0.97846n	0.76644n	1.53552n	1.10782
55 4	55 4	55 3	55 2	55 2	55 3	55 3	55 2
23.5+54	48.3+13	11.5+36	31.8+51	47.4+25	7.1+26	37.1+48	43.6+31
34.2+01	59.3+01	11.2+30	31.0+21	47.2+43	6.1+30	37.2+16	45.0+41
24.8−11	49.8−58	18.1−32	37.6−26	55.1−27	13.9−25	43.9−45	56.5−12
40.5+14	7.6+19	15.0+38	35.9+44	51.1+26	9.6+40	40.1+24	53.1+24
+58	−25	+72	+90	+67	+71	+43	+84
59 30.75	59 56.25	58 13.95	57 34.08	57 50.20	58 9.18 9.18	58 39.58	57 49.55
− 6.21	− 31.27	− 8.31	30.16		−9.15 − 5.09	− 34.32	13.12 12.82
59 24.54	59 24.98	58 5.64	4.24		58.73 4.09	5.26	2.67
							2.37
+58 23 23.81	23 23.37	24 42.71	44.11		48.62 44.26	43.09	45.78
							45.98
−16 5 55							
1.22060							
+1643		+3025	+3075	+3485		+3435	+1340
1.23703		1.25085		1.25545		1.25495	1.23400
+17.26		+17.82		+18.01		+17.99	+17.14
− .02	− .50	− .04	− .53	− .06 02		− .68	− .10
− .45	− .49	− .45	− .36	− .54	− 0.74	− .63	− 1.42	− .45	− 0.76
− .15	+ .06	− .18	− .23	− .18		− .11	− .21
+16.64	+16.33	+17.15	+16.70	+17.237		+16.57	+16.38
+58 23 40.45	39.70	24 59.86	60.81	65.85	61.53	59.66	62.36
40.08		60.34					
		.53					
− 10.04		− 15.8	− 16.0	− 16.50		− 16.63	− 17.22
+ .39		+ .32	+ .31	+ .29		+ .29	+ .27
+5 20.56	+5 20.47	+4 7.37	+4 7.85	+4 7.44	+4 7.43	+4 7.88	+4 7.58	+4 7.33	+4 7.06
+5 10.91		+3 52.16		+3 51.54		+3 51.54		+3 52.38	
28 50.99		52.50		47.08	52.73	51.20		52.74	

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Camelop. (121B)

6h 22.1m
+78° 6'
−35 43
1878

Jan. 12

Feb. 7

Feb. 11

Feb. 14

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1878phae.proj.1496:

Feb. 18

Feb. 19

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1878phae.proj.1496.

Camelop. 6 22 30.22 +73 47 8.6 Trapezoid

6h 22.8m
+73° 46'
−31 23
1878

| | | |

1878phae.proj.1496.

Mar. 5

21	25.3	21	47.2	22	27.8	21	27.6	21	47.5	22	28.5
	28.0		57.0		31.5		34.2		57.1		31.9
	37.0		54.7		83.2		43.9		53.0		85.7
	42.1		58.4		38.8		48.2		58.4		39.5
	51.5		1.8		43.1		55.4		2.2		42.9
			5.4		46.5				5.5		46.5
22	41.2		9.3		50.4	23	22.2		9.7		50.3
	46.9		12.9		57.4		28.7		13.3		54.0
	54.8	25.95	16.8	38.55	57.8		83.4	25.49	17.2	38.68	57.5
	04						39.9				
	7.3		1.94	23	8.7		46.6		2.21	23	8.6
			42.83		12.6				42.98		12.3
			23.44		15.9				23.46		16.0
					19.8						19.8
			12.821		23.8				12.865		23.5
					27.0						27.1
					80.8						30.8
					34.3						84.7
21	36.78			21.10	88.1	21	41.86			21.11	38.3
22	54.12			22	42.737	23	34.16			22	42.863
					−5.25						−5.48
					−2.28						−2.30
					−4.80 90						−4.83 4
					−12.43						−12.62
					30.31						30.26

+6546	−1138		+6102	−5128	
1.81928	0.05614n		1.78547	1.70995n	
1.37124n	0.60810n		1.32743n	1.26191	
			1.33743		
40 0	35 4		40 0	35 4	
21.0+.44	54.9+.02		19.1+.40	38.0+.35	
20.6+.07	54.9+.11		19.1+.09	39.3+.07	
31.2−.09	3.8+.23		30.5−.08	49.1−.60	
30.1+.50	3.1+.09		29.9+.50	48.2+.06	
+.92	+.25		+.91	−.12	
40 25.72	39 59.18		40 24.65	39 43.65	
−23.51	4.06		−21.25 75	18.28	
2.21	3.24		3.40 2.90	1.93	
46.14	45.11		44.95 45.45	46.42	
1.54580					
+2124			+1423		
1.56704			1.56003		
+3690			+3631		
−.63	−.02		−.54	−.38	
−.06	−.70		−.06	−.66	−1.07
−.23	−.06		−.23	+.03	
+35.98	+36.12		+35.48	+35.24 30	
22.12	21.23		20.93	21.72	
22.18			21.32		
−21.74			−21.54		
+.44	8.46		+.43	8.53	
+4 8.02	+1 7.58		+4 8.10	+1 7.67	
+3 47.02			+3 46.99		
9.20			8.31		

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16

Monoc. (508)

$6^h\ 25.1^m$

$+11°\ 38'$

$+30\ 45$

1878

1878

| | | |

1878phae.proj.1496.

1878.0

Camelop. for mid α 6 26 6.77 | +71 51 49.2 | log sin δ 9.97784 | log R 1.56191

6h 26m.4 | .70 | 48.3 | " cos δ 9.49347 | R 36.47

+71° 51′ | .59 ½ int | 50.0 | I 3.30

| .66 | 49.5 | " 15 cos δ tan i 9.59897n

−29 28 | .90 ½ int | 48.9

| .67 | 48.3

tan δ + 3.050

6 26 6.709 | +71 50 49.03 | − .49

Feb. 24 | Feb. 26 | Feb. 27 | Feb. 28

| h m s | | |

1878phae.proj.1496.

	Mar. 5				Mar. 16			
h	m s	m s	m s					
6	25 45.8	25 —	26 5.6		25 6.7	25 33.4	26 10.1	
	49.2	—	8.9		13.0	36.7	13.2	
	50.7	42.3 35.7	12.0		17.5	40.3	16.7	
	21	42.3 39.0	15.3		23.8	43.4	20.0	
	9.4	42.3 42.3	18.6		29.0	46.7	23.2	
		42.1 45.4	22.0			49.9	26.4	
		42.3 48.9	25.6			53.1	30.2	
		42.2 52.1	28.8			56.4	33.2	
		42.6 53.8	1686 31.8			4200 0.1	2098 36.8	
		42.30	—			46.67	46.3	
		36.47	—			23.31	49.8	
		18.77	—			59.53	52.9	
		18.73	—				56.1	
			—			6951	57.5	
			—				2.9	
			—				6.0	
			—				9.5	
	25 56.68		—		25 18.00		2958 12.8	
			26 18.75				26 23.170	
			— 5.25				— 9.95	
			— 2.02				— 2.60	
	— 1.		— 4.58				— 3.975	
			— 11.85				— 16.50	
			26 6.90				6.67	
	s							
	+22.07				+65.17			
	1.34380				1.81405			
	0.94277n				1.41302n			
	35′ 1″				35 1			
	"							
ε	23.9+.53				37.7+.38			
ζ	25.4+.19				39.2+.25			
η	34.7−.14				54.9−.25			
H	34.1+.61				53.8+.32			
	+1.19				+.70			
	36 29.45				36 46.40			
	− 8.76				− 25.88			
	36 20.69				20.52			
	46′ 27.″66				27.83			
	−29 27 50							
	1.51210							
	+2133				+1544			
	1.53343				1.52754			
	+34.15				+33.69			
	− .08				− .66			
	− .21				− .23	−1.09		
	− .30				− .18			
	+33.56				+32.60			
	47′ 1.″22				0.43			
	− 20.78				− 21.61			
	+ .41				+ .36			
	+4 8.82	+4 ~~7.61~~ 8.43			+4 9.13	+4 ~~8.77~~ 9.49		
	+3 47.65				+3 47.76			
	50 48.87				4831			

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Geminorum (48 B)

α 6h 26.8m
δ +14° 14'

1878 Jan. 12

| | | |

1878phae.proj.1496.

Monoc. (58B) — 1878.0

| | | |

1878phae.proj.1496

Geminorum (76 B)

| | | |

1878phae.proj.1496. 82

Geminorum (110 B)

1878

| | | |

1878phae.proj.1496

1878.0

Geminorum (111B)

| | | |

1878phae.proj.1496.

84

Auriga

$6^h\ 59.5^m$
$+34°\ 11'$
$+8\ \ 12$
1878

1878.0

	α	δ
	$5^m\ 59$	$+34°\ 11'\ 43''6$
bor.	50	44.5
$\frac{d\alpha}{dt}$	52	44.4
	47	44.1
δ_0	47	43.7
	46	44.3
bor. δ	59 21.472	+34 11 44.3
$\frac{d\delta}{dt}$		.15

log sin δ 9.74961
" cos δ 9.91763
" 1500 sin 1" 0.04241 Privo Feb 6
0.02313n after "
tan δ +0.68
sin 1" + .14

	Jan. 12	Feb. 7	Feb. 11	Feb. 13	Feb. 14	Feb. 24
	m s	m s				
	6 58 16.0	58 31.29	58 46.7	59 0.88	58 48.6	59 3.63	58 49.5	59 4.10	58 44.5	59 4.54	58 56.5	59 7.72
	18.5	33.80	49.0	3.27	50.5	6.05	51.3	6.52	46.7	7.00	58.2	10.18
	21.0	36.20	51.5	5.85	53.0	8.52	53.6	9.00	48.5	9.60	59.4	12.61
		41.22	53.4	8.42	53.0	11.05	53.8	11.50	50.5	12.00	2.4	15.10
		43.68	56.0	10.95	57.0	13.50	57.6	14.05	53.1	14.53	5.5	17.62
		46.10										
	59 4.8	48.77		14.63		17.27	59 3.44	17.86	59 4.88	18.20		21.40
	6.8	51.18		17.16		19.78	6.20	20.33	50.9	20.79		23.90
	9.0	56.12		19.62 19.63		22.31 22.32	8.91	22.80 22.76	53.27	23.27 23.38		26.34 26.27
		58.69		22.10		24.83	1.3	25.32	56.47	25.90		28.83
		1.17		24.58		27.33	3.7	27.73	57.2	28.20		31.32
		48.22		28.42		31.05		31.36		31.92		35.13
	58 18.50	58.22		30.90		33.66		34.05		34.33		37.50
	59 6.87	58 46.202		33.33 33.25		36.05 36.00		36.52 36.56		36.91 36.84		40.08 40.00
				35.90		38.56		39.05		39.46		42.53
		+38.39		5884 38.20		6691 41.00		68.35 41.36		6971 42.00		7907 45.20
		− 0.46										
			58 51.32	59 19.613	58 52.82		58 53.56		58 48.66		59 58 0.60	
						59 22303	59 59.10	59 22.783	59 52.86	59 23.237		59 26.357
		+38.33		+ 5.10		+ 2.46		+ 1.90		+ 1.52		− 1.78
		− 0.43		− 0.46		− 0.52		− 0.50		− 0.59		− 0.53
		− 2.69		− 2.75		− 2.72		− 2.71		− 2.80		− 2.59
		+35.21		+ 1.89		− 0.78		− 1.31		− 1.77		− 4.90
		59 21.41		21.50		21.52		21.47		21.47		21.46

	+27.70	−20.67	+ 28.29		+ 29.18		+ 28.22	− 36.32	+34.58	− 29.62	+ 25.76	
	1,44248	1,31534m	1.45163		1.46953		1.46568	1.560152	1.53882	1.47159n	1.41095	
	1.48489	1,35775m	1.47476n		1.49266n		1.48881n	1.58328	1.56195n	1.49472	1.43408n	
	15′ 0″	15′ 1″	15 0		15 0		15 0		15 0		15 0	
E	32.8+.46	24.7+.53	32.8+.31		21.8+.45		19.9+.42		27.2+.44		13.9+.29	
F	46.8+.29	39.1+.25	19.8+.08		23.2+.06		24.0+.05		30.7+.03		18.9+.09	
G	36.8−.32	29.3−.04	34.6−.20		31.4−.09		32.5−.12		37.9−.38		29.8−.07	
H	50.5+.81	43.9+.47	30.8+.50		29.2+.49		29.9+.50		34.8+.52		25.9+.45	
	+.94	+1.21	+.69		+.91		+.85		+.66		+.76	
	15′ 41.72	16′ 34.25	15 25.08		15 26.40		15 27.08		15 32.65		15 25.12	
	30.54	− 22.79	− 29.84		− 31.09		− 30.82	38.31	−36.47		−27.17	
	16 12.26	16 11.46	14 55.24		55.31		55.76		56.18		54.95	
			7 53.11		53.04		52.59		52.17		53.40	
+34°	6′ 36.09	6′ 36.89										
+8	12 10 45 2											
	0.91900 0.91790											
	+1658		+1570		+3123		+2056		+3216		+1439	
	0.93448		0.93370		0.94913		0.93846		0.95006		0.93229	
	− 8.60		− 8.58		− 8.59		− 8.68		− 8.91		− 8.56	
	− .19	− .11	− .20		− .22		− .21	− .33	− .30	− .28	− .17	
	− .07	− .16	− .04		− .06		− .06		− .08		− .06	− 0.42
	− .24	− .30	− .17		− .23		− .21		− .17		− .19	
	− 9.10 − 0.50	− 9.17 − 0.51	− 8.99 − 0.41		− 9.40 − 0.51		− 9.16 − 0.48		− 9.46 − 0.50		− 8.98	
+34′	6″ 26.99	27.72	7 44.12		43.64		43.43		42.71		44.42	
	27.36											
	− 4.13		− 6.08		− 6.40		− 6.55		− 6.63		− 7.35	
	− .19		− .17		− .16		− .15		− .15		− .14	
	+8′ 20.56	+8 20.37	+4 6.64	+46.47	+4 7.37	+47.21	+4 7.13	+47.47	+4 7.75	+47.60	+4 7.33	+47.19
	+5 16.24		+4 0.39		+4 0.81		+4 0.92		+4 0.97		+3 59.84	
	11 43.60		44.51		44.45		44.35		43.68		44.26	

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Monoc. (32 B) 1878 Jan. 12 — 18780 — Feb. 7 — Feb. 11 — Feb. 13 — Feb. 14 — Feb. 24

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86

18780

D.M. 1744 — 7h 25m 31.83 — +23° 8′ 44.2″ — log sin δ

γ² 25.7m — 25 31.86 — 44.6 — " cos δ 9.96354

+23° 9′ — .70 — 43.8

.80 — 44.8 — " 15 cos tan 0.06904n

.88 — 44.0

.88 — 44.4

+19 14 — tan δ + 0.43

1878 — 7 25 31.82 (18 25) — +28 — 8 44.30 — sin z + .33

	Feb. 13	Feb. 18	Feb. 19	Feb. 24	Feb. 26	Feb. 27	
h	m s	m s					h
7	24 57.6	25 16.00	25 4.4	25 17.65	25 9.5	25 17.26	25 3.4	25 19.67	24 57.2	25 20.35	25 9.3	25 20.80	7
	0.3	18.20	6.0	19.91	11.0	20.00	3.8	21.76	1.1	22.69	11.1	23.00	
	1.6	20.47 2046	8.1	22.15 22.12	13.5	2224 2225	8.1	24.06 24.00	2.9	24.93 25.00	13.4	25.30 25.35	
	4.1	22.70	9.8	24.36	15.7	24.46	10.0	26.36	4.7	27.20	18.3	27.35	
	6.0	25.00	11.6	26.69	17.3	26.72	12.2	28.50	6.5	29.40	17.0	29.82	
	26 1.3	28.37	26 0.7	30.00	25 59.4	30.19	26 3.3	31.87	26 3.0	32.80	26 2.0	33.17	
	3.6	30.54	3.0	32.45	1.4	32.33	5.1	34.05	4.7	35.00	3.6	35.37	
	5.7	32.80 32.63	5.3	34.55 34.67	3.1	3458 34.50	7.0	36.40 36.41	6.4	37.25 37.27	5.7	37.60 37.60	
	7.4	35.70	7.1	36.63	5.0	36.76	10.2	38.78	8.4	39.48	7.5	39.78	
	9.2	37.34	9.0	39.00	6.2	39.10	12.1	40.80	10.5	41.72	9.4	42.09	
		40.60		42.46		42.46		44.26		45.10		45.55	
		42.90		44.52		44.72		46.43		47.30		47.59	
		45.18 45.22		46.85 46.83		46.99 47.10		48.76 48.72		49.59		49.94 49.99	
		47.43		49.00		49.10		51.10		51.95		52.18	
		98.45 49.76		10.355 51.46		10.381 51.53		10.922 53.24		11.179 54.12		11.284 54.40	
	25 1.92		25 7.98		25 13.40		25 7.90		25 28.8		25 13.22		
	26 5.44	25 32.17	26 5.02	25 34.57	26 3.02	25 34.63	26 7.54	25 36.40	26 6.60	25 37.263	26 5.64	26 37.613	
		+ 1.88		+ 0.22		− 0.09		− 1.81		− 2.63		− 2.97	
		− 0.32		− 0.36		− 0.30		− 0.34		− 0.31		− 0.33	
		− 2.56		− 2.52		− 2.51		− 2.46		− 2.44		− 2.43	
		− 0.99		− 2.66		− 2.90		− 4.61		− 5.38		− 5.73	
		25 31.83		31.86		31.70		31.80		31.88		31.88	
	+ 3090	− 3262	+ 2654	− 3050	+ 2120	− 2842	+ 2851	− 3113	+ 3438	− 2934	+ 2439	+ 3197 (−2803)	
	1.48.996	1.51348n	1.42390	1.48 8230 n	1.32634	1.45362n	1.48500	1.49318n	1.53631	1.46746n	1.38721	1.44762	
	1.55900n	1.58252	1.49294n	1.55405 834	1.39538n	1.52266	1.55 2 40 48n	1.56222	1.60535n	1.53650	1.45625n	1.51666	
	15 1′ 3′	15 1′ 2′	15 3	15 2	15 3	15 2	15 3	15 2	15 3	15 2	15 3	15 2	
E	16.9+4.49	2.4+.08	12.5+.39	5.4+.14	7.1+.26	10.2+.25	11.9+.38	1.3+.08	20.0+.55	6.3+.16	8.3+.29	6.3+.16	
F	22.9+.21	8.1+.34	17.0+.27	8.7+.35	11.2+.30	14.0+.33	18.2+.27	7.3+.34	26.1+.18	11.8+.34	13.9+.29	11.9+.34	
G	27.9+.02	14.7−.25	21.8−.24	13.6−.21	15.1−.28	18.0−.31	27.4 .00	15.7−.28	32.4+.02	18.0−.31	23.2−.18	21.3−.25	
H	25.6+.34	11.2+.46	18.3+.36	11.2+.49	12.2+.40	16.3+.47	23.6+.34	13.7+.49	29.9+.34	16.3+.47	20.5+.35	19.8+.46	
	+.06	+.66	+.78	+.77	+.68	+.68 74	+.99	+.63	.09	+.66	+.75	+.91	
	18′ 23.32	17′ 9.10	18 17.40	17 9.72	18 11.40	17 14.62	18 20.28	17 9.50	18 27.10	17 13.10	18 16.48	17 14.82	
	− 36.22	38.24	−31.11	35.81 76	−24.85	33.32	−35.81	+36.19	−40.30	34.40	−28.57	32.86	
	17 47.10	47.34	46.29	45.53 48	46.55	47.94	44.47 46	45.99	46.80	47.50	47.89	47.68	
+23°	5′ 01.25	1.01	2.06	2.82 87	1.80	0.41	3.88 1.49	2.36	1.55	0.85	0.46	0.67	+23
+19	13 37												+19
	1.30280												
	+2191		+3689		+3568		+1500		+1567		+1111		
	1.32471		1.33969		1.33848		1.31780		1.31847		1.31391		
	− 21.12	"	− 21.86		− 21.86		− 20.79		− 20.82		− 20.60		
	− .19	− .21	− .14	− .19	− .09	− .15	− .16	− .19	− .23	− .17	− .11	− .15	
	− .51	− .33	− .56	− .37	− .54	− .37	− .53	− .35	− .53	− .33	− .50	− .33	
	− .27	− .17	− .20	− .19	− .17	− .18	− .25	− .16	− .27	− .17	− .19	− .18	
− 22.09	− 21.12	− 21.83	− 21.96	22.76	− 22.61	− 22.60	− 22.50	− 21.73	− 21.49	− 21.85	− 21.49	− 21.40	− 21.26	
+ 23	4 39.16	39.18	39.30	40.26	39.20	37.91	39.76	40.87	39.70	39.36	39.06	39.41	+ 23
	39.17		39.78		38.56		40.32		39.53		39.24		
	− 2.14		− 2.32		− 2.35		− 2.54		− 2.58		− 2.62		
	− .34		− .34		− .34		− .32		− .31		− .30		
	+4 7.62	+4 7.25	+4 7.44	+4 7.16	+4 7.88	+4 7.64	+4 7.33	+4 7.01	+4 7.34	+4 7.03	+4 8.06	+4 7.76	
	+4 5.08		+4 4.78		+4 5.19		+4 4.49		+4 4.45		+4 5.14		
	8 44.25		44.56		43.75		44.81		43.98		44.38		

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1878

Geminorum m 33 40.11 +23° 17' 54.9" Argelander

7h 33m.8 +23° 19'

+19 4

	Feb. 24		Feb. 26		Feb. 27		Feb. 28		Mar. 5		Mar. 19	
	h m s	m s	m s	m s	m s	m s	m s	m s	m s	m s	m s	m s
	7 33 11.6	33 28.00	33 10.0	33 28.77	33 10.0	33 24.30	33 11.0	33 29.60	33 9.5	33 31.45	33 24.9	33 38.00
	13.5	30.23	11.9	31.00	11.9	31.40	13.7	31.79	11.2	33.60	24.6	40.08
	15.3	32.43	14.3	33.30	14.0	33.66	15.6	34.05	12.9	35.80	28.9	42.49
	16.8	34.63	16.0	35.52	16.0	35.90	17.2	36.20	14.8	38.05	31.0	44.62
	19.0	37.00	18.0	37.75	18.3	38.08	19.0	38.40	16.7	40.30	32.9	46.85
	34 10.5	40.22		41.00		41.50		41.90	34 14.2	44.70	34 15.7	50.28
	12.1	42.46		43.34		43.77		44.10	16.1	46.00	17.9	52.55
	13.9	44.76		45.62		46.06		46.40	17.9	48.22	19.8	54.80
	13.5	47.10		47.86		48.20		48.60	19.6	50.40	22.3	57.00
	18.3	49.24		50.07		50.53		50.85	21.5	52.70	24.0	59.37
		52.63		53.50		53.83		54.28		56.05		2.50
		54.86		55.80		56.07		56.30		58.30		4.88
		57.09		58.01		58.32		58.75		0.59		7.13
		59.29		0.26		0.60		0.97		2.80		9.40
		13431 1.67		13686 2.49		13800 2.80		13913 3.30		14457 5.20		16434 11.67
	33 15.24		33 14.02		33 14.04		33 15.30		33 13.02		33 28.86	
	34 14.06	33 44.770		33 45.620		33 46.800		33 46.377	34 17.86	33 48.190	34 19.94	33 54.780
		− 1.82		− 2.63		− 2.98		− 3.43		− 5.29		− 12.09
	− 0.34	− 0.34		− 0.31		− 0.33		− 0.34		− 0.29		− 0.33
	− 2.50	− 2.50		− 2.48		− 2.47		− 2.46		− 2.41		− 2.20
		− 4.66		− 29.42		− 5.78		− 6.23		− 7.99		− 14.62
		38 40.11		40.20		40.22		40.15		40.22		40.16
	+ 29.53	− 29.29	+ 31.60		+ 31.96		+ 31.08		+ 35.17	− 29.67	+ 25.92	− 25.16
	1.47026	1.46652 n	1.49941		1.50461		1.49248		1.54642	1.47202 n	1.41363	1.40071 n
	1.53876 n	1.53502 n	1.56791 n		1.57311 n		1.56098 n		1.61492 n	1.54052	1.48213 n	1.46921
	5 4		5 4		5 4		5 4	5 2	5 4	5 2	5 4	5 3
	3.7 +.22		6.9 +.26		6.4 +.25		5.4 +.24		10.8 +.34	54.8 +.16	0.5 +.20	0.9 +.17
	9.2 +.19		12.8 +.19		12.1 +.19		10.4 +.19		17.0 +.16	0.4 +.26	6.0 +.20	6.7 +.30
	18.1 −.30		20.5 −.26		21.9 −.22		21.4 −.24		24.9 −.10	7.7 +.04	16.9 −.29	16.3 −.30
	14.7 +.23		16.0 +.21		19.9 +.21		18.9 +.21		22.1 +.20	6.3 +.39	14.8 +.23	16.2 +.37
	+.34		+.40		+.43		+.40		+.60	+.85	+.34	+.54
	9 11.42		9 14.05		9 15.08		9 14.02		9 18.70	8 2.30	9 9.55	8 10.02
	−34.58	34.28	−36.98		−37.42		−36.39		−41.20	34.72	−30.35	29.46
	8 36.84		8 37.07		37.66		37.63		37.50	37.02	39.20	39.48
	14 11.51		11.28		10.60		10.72		10.85	11.33	9.15	8.87
	4 26											
	1.29910											
	+ 15.19		+ 15.76		+ 11.29		+ 10.70		+ 23.10		+ 06.56	
	1.31429		1.31489		1.31039		1.30980		1.32220		1.30566	
	− 20.62		− 20.65		− 20.44		− 20.41		− 21.00		− 20.21	
	− .17		− .20		− .20		− .19		− .24	− .17	− .13	− .12
	− .67		− .63	− 0.93	− .64	− 0.95	− .59	− 0.88	− .60	− .42	− .55	− .42
	− .09		− .10		− .11		− .10		− .15	− .21	− .09	− .14
	− 21.55		− 21.58		− 21.39		− 21.29		− 21.99	− 21.80	− 20.98	− 20.84
	13 49.96		49.70		49.30		49.43		48.86	49.53	48.17	41.98
									49.20		48.08	
	− 2.03		− 2.10		− 2.13		− 2.17		− 2.35		− 2.87	
	− .32		− .31		− .30		− .30		− .28		− .24	
	+4 7.33	+4 7.01	+4 7.34	+4 7.03	+4 8.06	+4 7.76	+4 8.30	+4 8.06	+4 8.02	+4 7.74	+4 10.25	+4 10.01
	+4 4.98		+4 4.93		+4 5.63		+4 5.83		+4 5.39		+4 7.14	
	17 54.94		54.63		54.93		55.26		54.59		55.22	

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188

Geminorum (89 B) m 35 α 10 43 18780 δ +14° 28' 31.6" log n δ I 2.14

γ 35.3
+14° 29'
+27 54
1878

| | | |

1878phae.proj.1496

Lyncis 7 α 38 3062 1878.0 +37° S 48 38.8 ligenis

7h 38.6m
+37° 48'
+ 4 35

| | | |

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Bancri (28) — 1878 — Feb. 13 — Feb. 24 — Feb. 26 — Feb. 27 — Feb. 28 — Mar. 16

	Feb. 13	Feb. 24	Feb. 26	Feb. 27	Feb. 28	Mar. 16
	7h 51m 18s	7 51 33.830	+16° 50′ 44.87			
	51 18	51 14.8	51 22.10	51 8.7	51 22.99	51 0.6	51 23.30	51 8.6	51 23.80	51 10.3	51 30.20
	3.5	20.72	16.5	24.20	10.4	25.20	8.2	25.47	5.6	26.00	12.0	32.30
	6.0	22.86	22.84	18.7	26.41	26.45	12.4	27.32	27.80	4.7	27.64	27.62	7.4	28.09	28.07	14.2	34.57	34.45
	8.0	25.00	21.0	28.56	14.5	29.47	6.7	29.80	9.2	30.15	16.4	36.70
	98	27.10	23.0	30.74	16.5	31.65	8.7	32.00	11.1	32.44	18.3	38.90
	51 57.3	30.32	52 4.0	33.90	52 8.6	34.75	52 2.7	35.18	52 3.1	35.38	52 8.6	41.90
	1.0	32.45	5.7	36.00	10.1	36.90	6.0	37.33	4.8	37.76	10.8	44.39
	8.1	34.63	34.64	8.6	38.21	38.24	11.8	39.12	39.18	7.5	39.50	39.40	6.7	39.90	39.90	13.0	46.42	46.50
	3.3	36.75	10.5	40.39	13.4	41.30	9.2	41.70	8.4	42.08	14.9	48.55
	7.1	39.00	12.6	42.30	15.2	43.48	11.2	43.90	10.6	44.20	16.9	50.77
		42.23		45.80		46.60		47.00		47.30		58.32	54.00
		44.33		47.84		48.79		49.26		49.69		.33	56.17
		46.49	46.47		50.06	50.00		50.99	51.00		57.38	57.48		57.80	57.73		58.34	—	—
		48.61			52.30			53.20			53.53			53.90			34.0	50
		10.398	30.79		11.468	34.34		11.743	35.38		11.852	35.95		11.979	56.16		13.927	.38	2.70
	51 5.82		51 18.80		51 12.50		51 4.78		51 7.38		51 14.24	
	52 3.16	51 34.660	52 8.28	51 38.227	52 11.82	51 39.143	52 7.32	51 39.507	52 6.72	51 39.930	52 12.84	51 46.423
		+ 1.86		− 1.84		− 2.64		− 2.99		− 3.44		− 10.04
		− 0.22		− 0.23		− 0.22		− 0.23		− 0.24		− 0.26
		− 2.51		− 2.41		− 2.43		− 2.42		− 2.41		− 2.22
		− 0.86		− 4.51		− 5.29		− 5.64		− 6.09		12.52
		51 33.80		33.72		33.85		33.87		33.84		33.90
		+ 2.84		− 2.50		+ 1.43		− 30.05		+ 2.64		− 32.68		+ 34.73		− 27.81		+ 32.55		− 26.79		+ 32.18		− 26.42
		1.46000		1.45484n		1.28847		1.47784n		1.42553		1.51428n		1.54070		1.44420n		1.51255		1.42794n		1.50759		1.42193n
		1.54648n		1.54132		1.37495n		1.56432n		1.57201n		1.60076		1.62718n		1.53068		1.59903n		1.57445		1.59402n		1.60841
		35 1′		35 0′		35 0		30 4		35 1		30 4		35 1		35 0		35 1		35 0		35 1		35 0
ξ		10.″8+.30		0.″2+.01		57.2+.13		57.1+.01		8.3+.24		55.4+.02		16.2+.41		hit 0.0 .00		13.1+.35		0.8+.01		12.7 +.34		0.0 .00
η		[16.4] 6.4+.25		hit		6.4+.07		3.9+.20		3.2+.01		14.2+.25		1.3 .00		22.5+.22		5.3+.06		19.6+.23		6.9+.07		19.1 +.24		7.1 +.07
ℓ		25.2−.16		tot?		15.8−.39		16.4−.41		15.2−.37		24.2−.22		10.3−.16		35.9−.20		tot. 19.2−.42		33.6−.09		21.7−.35		35.3 −.16		23.3−.30
14		19.1+.67				8.9+.24		9.8+.73		9.7+.20		18.8+.67		6.4+.17		29.9+.68		14.3+.33		27.2+.65		14.8+.33		29.2 +.65		17.2+.34
		+.106				−.01		+.65		−.15		+.94		+.03		+ 1.08		−.03		+1.14		+.06		+1.07		+.11
		1.688				.782																				
		36′ 15.38		35′ 8.32		36 6.82		35 6.30		36 16.38		35 3.35		36 26.12		35 9.70		36 23.38		35 11.05		36 24.08		35 11.90
		− 35.20		34.78		− 23.71		36.67		− 32.51		39.88		−42.38		33.94		− 39.72		32.69		− 39.27		32.24
		35 42.68		4260		43.11		42.97		43.87		43.23		43.74		43.64		43.66		43.74		44.81		44.14
	+16°	47′ 5.″67		5.″75		5.24		5.38		4.48		5.12		4.61		4.71		4.60		4.61		3.54		4.21
	+25	31 32																						
		1.43920																						
		+2327				+1559				+1605				+1174				+1112				+1712		
		1.46247				1.45479				1.45525				1.45094				1.45032				1.45632		
		− 29.00				− 28.98				− 28.53				− 28.24				− 28.20				− 28.60		
		− .13		− .13		− .06		− .14		− .11		− .17		− .19		− .12		− .17		− .11		− .16		− .10
		− .19		− .01		− .18		− .02		− .19		− .01		− .21		− .03		− .20		− .03		− .18		− .03
		− .27		+ .01		− .16		+ .04		− .24		− .01		− .27		+ .01		− .29		− .02		− .27		− .03
		− 29.59		− 29.13		− 28.90		− 29.42		− 29.07		− 29.48		− 28.91		− 28.38		− 28.86		− 28.36		− 29.21		− 28.76
	+16°	46′ 38.08		36.62		36.34		35.96		35.41		35.64		35.70		36.33		35.83		36.25		34.33		35.45
		36.35				36.15				35.52				36.02				36.04				34.89		
		+ 0.[illegible]				+ 0.72				+ 0.70				+ 0.[illegible]				+ 0.[illegible]				+ 0.40		
		− .47				− .42				− .40				− .40				− .39				− .31		
		+4′ 7.62		+4 7.16		+4 7.33		+4 6.91		+4 7.34		+4 6.94		+4 8.06		+4 7.66		+4 8.30		+4 7.91		+4 9.13		+4 8.82
		+4 7.92				+4 7.63				+4 7.64				+4 8.35				+4 8.59				+4 9.22		
		50 44.27				43.78				43.16				44.37				44.63				44.11		

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Lyncis (107 B) 8h 17m 16.14s +35° 24' 14.7" 1878.0 Argand

8h 17.4m +35° 24'

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	Feb. 24	Feb. 26	Feb. 28	Mar. 5	Mar. 6	Mar. 16
	h m s / m s	h m s / m s	h m s / m s	h m s / m s	h m s / m s	h m s / m s
	8 16 32.7 / 17 2.40	16 57.1 / 17 3.55	16 57.0 / 17 4.30	16 44.5 / 17 6.05	17 2.12 / 17 6.31	16 57.2 / 17 10.82
	41.5 / 5.22	53.4 / 5.98	53.3 / 6.84	48.4 / 8.62	23.1 / 8.80	57.0 / 13.30
	44.0 / 7.68 7.70	53.7 / 8.53 8.55	53.3 / 9.35 9.33	50.9 / 11.14 11.00	25.8 / 11.31 11.29	56.3 / 15.86 15.86
	46.1 / 10.10	57.8 / 11.00	57.7 / 11.86	53.0 / 13.78	27.2 / 13.75	58.2 / 18.30
	48.8 / 12.76	59.6 / 13.57	0.0 / 14.42	56.4 / 16.25	30.7 / 16.38	0.0 / 20.90
	17 3.33 / 16.57	17 5.13 / 17.40	/ 18.25	/ 19.99	18 8.2 / 20.20	/ 24.70
	5.37 / 19.10	5.37 / 19.90	/ 20.72	/ 22.50	10.2 / 22.70	/ 27.25
	5.76 21.59 21.60	5.60 22.45 22.48	23.27 23.30	24.99 25.00	13.2 25.30 25.35	29.75 29.82
	0.0 / 24.10	5.83 / 24.90	/ 25.72	/ 27.40	15.2 / 27.80	/ 32.20
	2.1 / 26.38	0.5 / 27.37	/ 28.36	/ 30.05	17.4 / 30.47	/ 34.78
	/ 30.40	/ 31.35	/ 32.05	/ 33.95	/ 34.00	/ 38.60
	/ 32.82	/ 32.90	/ 34.68	/ 36.27	/ 36.66	/ 41.28
	35.49 35.42	36.39 36.35	37.22 37.25	38.92 38.80	39.16 39.10	43.75 43.79
	/ 38.00	/ 38.86	/ 39.80	/ 41.48	/ 41.70	/ 46.20
	64.76 40.53	67.37 41.50	69.84 42.30	75.05 44.08	75.77 44.34	89.36 48.90
	16 43.02	16 55.52	16 55.46	16 50.64	17 25.60	16 55.94
	17 57.74 / 17 21.587	17 55.96 / 17 22.45	17 23.280	17 25.017	18 12.84 / 17 25.257	17 29.788
	−1.87	−2.64	−3.46	−5.31	−5.58	−10.27
	−0.56	−0.52	−0.56	−0.47	−0.47	−0.61
	− −3.02	−3.00	−2.99	−2.94	−2.93	−2.80
	−5.45	−6.16	−7.01	−8.72	−8.98	−13.48
	17 16.14	16.30	16.27	16.30	16.24	16.30
	+37.57	+26.94	−33.50	+27.82	+34.38	−0.34 +59.66	−47.58	+33.85
	1.57415 1.57484	1.43040 1.44713	1.52504 1.54177	1.44436 1.46109	1.53631 1.55304	0.00000 9.53148 9.54821	1.67742 1.69415	1.52943 1.54616
	0 3	0 1	0 2	0 1	0 2	0 3	0 2	0 1	0 2
	2.14.17	45.8+.22	53.5+.16	50.2+.14	52.0+.18	0.1 +.16	22.9 +.51	33.8 +.46	55.1 +.16
	7.1+.30	49.6+.43	56.9+.32	53.5+.40	56.4+.33	3.9 +.28	27.1 +.24	38.2 +.23	1.1 +.26
	16.9−.31	0.2+.11	5.3+.08	2.2+.14	7.8+.02	13.6 −.23	37.5 −.25	49.9 −.53	14.8 −.27
	14.2+.39	59.2+.30	3.2+.32	1.0+.33	7.0+.40	11.8 +.40	35.9 +.44	48.0 +.41	12.2 +.40
	+.55	+1.06	+.88	+1.01	+.93	+.61	+.94	+.57	+.55
	3 10.08 / 1 53.70	2 59.72 / 1 56.72	3 0.80	3 7.35	2 30.85 / 1 42.48	3 5.80
	−38.98 39.45 / 37.54	−28.00 / 34.82	−28.91	−35.73	49.45 / 49.45	−35.17
	2 31.10 .03 / 31.27	31.72 / 31.54	31.89	31.62	31.20 .35 / 31.93	30.63
	+35 20 17.25 17.32 / 17.08	16.53	16.81	16.46	16.73	17.15	16.42	17.72
	+6 58 28							
	0.84780							
	+1621	+1640	+1173	+2424	+1438	+1762
	0.86401	0.86420	0.85953	0.87204	0.86218	1.86542
	−7.31	−7.31	−7.24	−7.15	−7.28	−7.33
	−.86 −.33	−.19 −.29	−.20 −.20	−.30 −.43	−.00 −.58	−.30 −.40
	−.51 −.30	−.45 −.30	−.42 −.23	−.43 −.15	−.35 −.22	−.40 −.14
	−.14 −.27	−.22 −.25	−.23 −.23	−.15 −.24	−.14 −.14
	−8.32 −8.21	−8.17 −8.15	−8.09 −8.33	−7.87 −8.22	−8.17
	+35 20 9.00 / 8.87	8.46	8.66	8.37	8.40	9.28 / 8.74	8.20	9.55
	8.94	8.56
	−1.41	−1.41	−1.82	−2.34	−2.44	−3.40
	−.12	−.11	−.11	−.10	−.10	−.09
	+4 7.33 +47.21	+4 7.34 +47.28	+4 8.30 +48.19	+4 8.02 +47.92	+4 8.10 +48.00	+4 9.13 +49.04
	+4 5.80	+4 5.62	+4 6.37	+4 5.58	+4 5.56	+4 5.64
	24 14.74	14.18	14.74	13.98	14.30	15.19

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Mar. 19

87	8.3	87	24.6	87	53.6	87	12.7	87	25.8	87	54.5
	12.0		27.3		56.4		16.6		28.6		57.1
	18.6		29.9		59.0		24.8		31.1		0.4
	23.8		32.5		1.8		27.3		33.6		2.8
	28.8		35.2		4.4		32.8		36.3		5.8
			37.7		7.0				38.7		8.2
38	39.5		40.4		9.7	38	54.1		41.3		10.7
	43.0		43.2		12.4		57.0		44.0		13.3
	48.3	3166	45.8	2193	14.0		0.3	3267	47.3	1698	16.4
	52.4						7.8				
	56.9		35.18		38 22.9		11.0		36.30		38 24.0
			4.37		25.7				5.53		27.1
			33.62		28.4				34.84		29.9
					30.7						32.4
			1317		33.7				1669		35.2
					36.3						37.4
					39.0						39.9
					41.6						42.3
37	18.30			3026	443	37	23.04			3137	45.3
38	48.02			38	43.90	39	2.16			38	5.63
					−12.16						−13.23
					− 1.82						− 2.07
					− 5.23						− 5.16
					−19.21						−20.46
				37	45.18						45.10

	+46.09		−43.63				+42.52		−56.60		
	1.66361		1.63979n				1.62859		1.75282n		
	1.35860n		1.33478				1.32358n		1.44781		
	15 3		15 2				15 3		15 2		
	19.4	+.54	35.1	+.46			22.1	+.58	32.7	+.50	
	19.9	+.25	36.1	+.22			22.1	+.22	32.6	+.21	
	30.4	+.06	47.0	−.57			29.1	+.04	39.9	−.36	
	31.7	+.33	47.1	+.31			29.2	+.34	42.1	+.36	
		+1.18		+.42				+1.18		+.71	
	18 25.28		17 41.32				18 25.62		17 36.82		
	−22.83		21.62				−21.07		28.04		
	18 2.45		2.94				4.55		4.86		
+67	4.45.90										
			~~46.47~~ 45.41				43.80		43.69		
−24											
	142430										
	+0759						+2430				
	1.43189						1.44860				
	+27.03						+28.09				
	− .42		− .37				− .36		− .63		
	− .44		− .35		− 6.83		− .44		− .34		− 1.15
	− .30		− .11				− .30		− .18		
	+25.87		+26.20				+26.99		+26.94		
	11.77		~~11.61~~				10.79		10.48		
	11.69						10.61				
							.77				
	−10.42						−10.8				
	+ .30		10.55				+ .30		11.41		
+4	10.25		~~+4 9.95~~			+4	11.11		~~+4 10.81~~		
+4	0.13					+4	0.64				
	11.82						11.25				

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Apr. 2 | Apr. 3

h	m	s	m	s	m	s	m	s	m	s	m	s
9	3	43.5	3	9.5	3	49.0	2	42.0	3	10.0	3	50.4
		50.1		13.0		53.9		49.3		13.7		54.2
		56.6		16.3		56.3		54.2		17.6		56.9
		14		20.1		01		58.4		21.4		0.8
		8.5		23.6		3.4		2.9		24.4		4.7
				27.2		7.3		10.4		28.0		8.2
	5	13.2		31.0		10.8				32.0		12.5
		17.8		34.7		14.4	4	4.9.0		36.4		15.8
		24.0	213.5	38.1	2136	18.1		53.6	2229	39.4	2228	19.3
		30.3						57.8				
		36.4		23.72	4	28.8		7.1		24.77	4	29.8
				3.62		32.6		14.4		4.76		33.5
				43.49		36.2				44.50		37.2
						39.9						40.9
				1083		43.6				1403		44.5
						47.4						48.0
						50.6						51.8
						54.4						33.7
	3	56.02			3914	57.9	2	56.25			4005	59.2
	5	24.40			4	3.610	5	0.44			4	4.677
						−19.12						−19.84
						−3.24						−3.57
		−1				−6.38						−6.323
						−28.74						−29.74
					3	34.87						34.94

	s	s		s	s
	+7.59	−80.79		+68.43	−55.76
	0.88024	0.90736 n		1.83525	1.74632 n
	0.44078 n	1.46790		1.39579 n	1.30836
	′ ′	′ ′			
	0 0	55 4		0 0	55 4
	″	″			
G	23.3 +.46	51.0 +.07		44.9 +.25	58.7 .00
F	23.4 +.06	57.4 +.17		45.1 +.27	59.5 +.01
g	37.5 −.36	4.0 +.03		57.8 −.06	12.4 −.26
H	36.1 +.52	5.6 +.16		59.6 +.56	13.0 +.20
	+.36	+.43		+1.02	−.05
	0 30.08	59 58.00		0 52.35	0 5.90
	−2.76	29.37		−24.88	20.27
	0 27.32	0 27.37		27.47	26.17
+73°	22′ 21.″03	20.″98		20.88	22.18
−31	3 43				
	1.54000				
	+674			+763	
	1.54674			1.54763	
	+3522			+3529	
	−.02	−1.00		−.12	−.48
	−.06	−.65		−.12	−.06
	−.07	−.11		−.26	+.01
	+34.07	+34.46		+34.19	+34.16
	22′ 56.″0	54.14		55.07	56.34
	55.22			55.70	
	−11.70			−11.84	
	+.35	11.44		+.35	10.58
	+4 11.″09	+4 10.74		+4 10.23	+4 9.88
	+3 59.74			+3 58.74	
	26 54.96			54.44	

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	Mar. 30	Mar. 31	Apr. 2	Apr. 8	Apr. 13	Apr. 14
h	m s	m s				
10	39 34.7	39 54.35	39 41.9	39 37.90	39 36.0	39 56.20
	36.6	56.66	43.8	5.12	37.9	58.38
	38.5	58.81 58.84	45.5	59.31 59.30	39.5	0.53 0.55
	40.6	0.99	47.7	1.50	41.3	2.62
	42.5	3.19	49.4	3.43	44.2	4.90
40	42.8	6.45	40 33.5	7.00	40 34.7	8.05
	44.8	8.55	35.4	9.16	36.3	10.35
	46.4	10.78 10.75	38.5	11.36 11.33	38.5	12.48 12.40
	48.2	13.00	40.5	13.53	40.3	14.70
	49.7	15.17	42.4	15.77	42.7	16.90
		18.48		19.00		20.20
		20.58		21.20		22.37
	39 38.58	39 45.66		39 39.78		39 43.32
	40 46.38	40 10.797	40 38.06	40 11.363	40 38.50	40 12.527
		22.80 22.80		23.42 23.40		24.57 24.56
		24.94		25.60		26.70
		32.39 27.19		34.09 27.90		37.88 29.00
		− 17.70		− 18.14		− 19.26
		− 0.31		− 0.33		− 0.34
		− 2.78		− 2.78		− 2.76
		− 20.79		− 21.25		− 22.36
		39 50.01		50.01		50.17
		+ 32.22		− 35.58		+ 25.70
		1.50813		1.55121n		1.40993
		1.58789n		1.63097		1.48969n
		55 0′		50 3′		55 0
6		9.1 +.16		47.7 +.30		1.3 +.01
F		15.9 +.09		53.2 +.26		8.1 +.08
g		29.8 −.07		6.8 +.12		21.9 −.34
H		23.9 +.42		2.7 +.12		16.9 +.34
		+.60		+.80		+.09
		55′ 19.68		53′ 58.10		55 12.05
		− 38.72		42.75		− 30.58
		54 40.96		40.85		41.17
+19°		28′ 7.″39		7.″50		7.18
		+ 12.16				+ 11.29
		1.39646				1.39609
		− 21.94				− 24.89
		− .17		− .22		− .11
		− .04		− .52		− .03
		− .15		− .20		− .02
		− 25.30		− 25.88		− 25.05
+19		27 42.09		41.62		42.13
		41.86				42.25
		+ 10.30				+ 10.21
		− .27				− .27
		+4 10.60	+4 10.38	+4 10.78	+4 10.37	+4 10.72
		+4 20.68		+4 20.72		+4 20.88
		32 2.54		2.97		2.87
		+ 32.75		− 25.97		+ 33.32
		1.51521		1.41447n		1.52270
		1.59497n		1.49423		1.60246n
		55 0		50 3		55 0
6		9.1 +.16		58.7 +.20		10.7 +.19
F		15.9 +.09		5.2 +.19		17.0 +.09
g		30.9 −.08		20.2 −.27		31.9 −.11
H		25.7 +.45		15.8 +.21		26.6 +.46
		+.62		+.33		+.63
		55′ 20.40		54 9.98		55 21.55
		− 39.35		31.21		−40.04
		41.05		41.19		41.51
		7.30		7.16		6.84
		+ 7.68				+ 13.48
		1.39238				1.39828
		− 24.68				− 25.02
		− .18		− .11		− .18
		− .04		− .55		− .05
		− .16		− .08		− .16
		− 25.06		− 25.42		− 25.41
		− .27				− .26
		+4 11.09	+4 10.82	+4 10.78	+4 10.52	+4 10.52
		+4 20.88		+4 20.06		+4 19.41
		2.87		1.75		2.67
		− 26.06		+ 31.63		− 26.87
		1.41597n		1.50010		1.42927n
		1.49573		1.57986n		1.50903
		50 3		55 0		50 3
6		59.1 +.20		7.6 +.12		57.9 +.20
F		4.7 +.19		12.9 +.10		3.2 +.17
g		19.0 −.29		29.1 −.09		18.3 −.30
H		14.7 +.23		22.9 +.41		13.4 +.23
		+.33		+.54		+.30
		54 9.38		55 18.12		54 8.20
		31.31		− 38.01		32.29
		40.69		30.11		40.49
		7.06		8.24		7.86
		+ 7.73				+ 8.74
		1.38553				1.38954
		− 24.30				− 24.52
		− .17		− .12		− .20
		− .03		− .45		− .04
		− .14		− .08		− .16
		− 24.64		− 24.95		− 24.92
		− .26				− .26
		+4 10.57	+4 10.31	+4 10.80	+4 10.54	+4 10.54
		+4 19.41		+4 19.56		+4 19.56
		2.67		3.24		3.24

| | | | |

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1878.0

Ursae Maj.

$10^h\ 52.2^m$

$+52°\ 32'$

$-10\ \ 9$

| | | |

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Ursae Maj.

| | | |

1878phae.proj.1496.

1878

Ursae May. α 11 53 0.80 δ +33° 50' 46.7

| | | |

1878phae.proj.1496.

202

18780

Comae (36 B) h 12 m 11 s 21.73 +29° 36 5.01 log sin δ

48.9 " cos δ 9.939220

48.6

49.5 " 15 cos δ sin t 0.044702 n

12h 10.5m

+29° 37'

12 11 21.692 +29 36 49.8

.28 tan δ +0.57

+12 46

1878 sin z +.22

May 2 May 5 May 6 May 8

h	m	s	m	s	m	s	m	s	m	s	m	s	m	s
12	11	30.0	11	43.36	11	39.7	11	44.40	11	21.3	11	45.20	11	25.3	11	46.90
		32.3		45.62		42.4		46.83		25.0		47.60		26.9		49.25
		34.3	48.02	48.00		44.7	49.21	49.30		27.0	50.00	50.07		29.2	51.63	57.70
		36.3		50.38		46.3		51.53		29.9		52.38		32.2		54.00
		38.7		52.74		47.8		54.00		31.1		54.75		34.0		56.30
	12	27.0		56.37				57.49	12	38.5		58.30	12	33.9		0.05
		28.5		58.95				59.80		41.3		0.70		35.8		2.30
		30.8	1.04	1.00			2.15	2.05		42.8	3.06	3.00		37.6	4.71	4.60
		33.0		3.40				4.55		44.5		5.45		39.4		7.10
		34.6		5.78				6.88		46.0		7.85		41.7		9.50
				9.40				10.47				11.46				13.00
				11.83				12.80				13.64				15.68
			14.15	14.05			15.22	15.30			16.09	16.05			17.81	17.80
				16.47				17.60				18.45				20.00
			3.21	19.00			6.58	12.95			9.15	20.85			14.15	22.55
	11	34.32			11	44.18			11	26.86			11	29.52		
	12	30.78	12	1.070			12	2.193	12	42.62	12	3.050	12	37.68	12	4.717
				−3.571				−3.667				−3.761				−3.948
				−0.63				−0.76				−0.74				−0.74
				−3.00		−2.98		−2.98		−2.98		−2.98		−		−2.96
				−39.34				−40.41				−41.33				−43.18
				11 27.73				20.78				21.72				21.54 ✓

	+26.75s	−29.71s	+18.01	+36.19	−39.57	+35.20	−32.96	
	1.42732	1.47200 n	1.25551	1.55859	1.59737 n	1.54654	1.51799 n	
	1.47202 n	~~1.47737~~ 1.51760	1.30021 n	1.60329 n	1.64267	1.59124 n	1.56266	
	50 0	45 4	50 0	50 0	45 4	50 0	45 4	
ξ	25.3 +.48	22.5 +.53	15.3 +.32	36.1 +.40	12.8 +.38	33.1 +.46	19.8 +.51	
η	28.1 +.03	25.0 +.07	20.5 +.07	41.1 +.16	18.4 +.17	38.2 +.09	23.2 +.09	
ζ	46.5 −.67	41.0 −.44	37.3 −.33	57.7 −.15	31.1 +.02	54.2 −.46	37.9 −.29	
H	42.5 +.51	40.0 +.15	35.3 +.52	52.9 +.51	29.3 +.23	51.2 +.51	37.4 +.19	
	+.35	+.31	+.88	+.92	+.80	+.60	+.50	
	50 35.60	49 32.12	50 27.10	50 46.95	49 22.15	50 44.18	49 29.58	
	−29.65	~~30.02~~ 32.13	−19.96	−40.11	43.86	−39.02	36.53	
	50 5.95	~~2.11~~ 5.05	7.14	6.84	6.01	5.16	6.11	
+29°	32' 42".40	~~46".21~~ 43.30	41.21	41.51	42.34	43.19	42.24	

+12 45 55

1.11540

	−560		−653	−326		−128		
	1.10980		1.10887	1.11214		1.11412		
	−12.88		−12.85	−12.95		−13.01		
	− .17	− .21	− .08	− .31	− .37	− .29	− .26	
	− .05	− .36	− .04	− .06	− .35	− .06	− .36	
	− .09	− .08	− .15	− .23	− .20	− .15	− .13	
	−13.19	−13.53	−13.12	−13.55	−13.87	−13.51	−13.76	
+29°	32' 29.21	29.77	28.09	27.96	28.47	29.68	28.48	
	29.49			28.22		29.08		
	+ 9.81		+ 9.30	+ 9.14		+ 8.85		
	− .15		− .15	− .15		− .15		
	+4 10.92	+4 10.77	+4 11.65	+4 11.38	+4 11.23	+4 11.76	+4 11.61	
	+4 20.58		+4 20.80	+4 20.87		+4 20.46		
	36 50.07		48.89	48.59		49.54		

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Comae (36B)

12h 14m.3

+27° 44'

+14 39

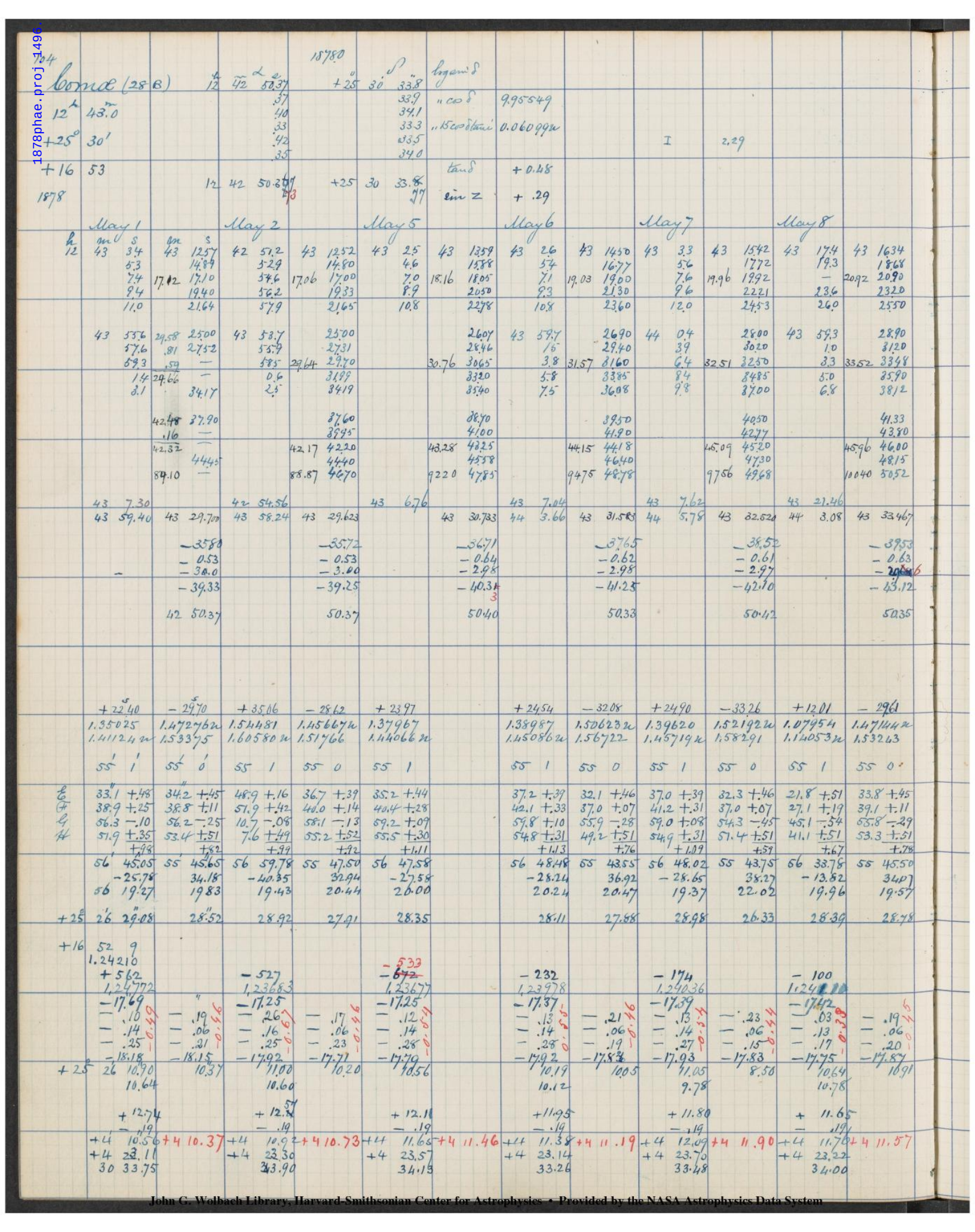
1878

18780

| | | |

1878phae.proj.1496.

Comae (28 B) — 1878 — May 1, May 2, May 5, May 6, May 7, May 8



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1878phae.proj.1496:

70 Ursæ Maj.

$12^{h}\ 50^{m}.0$

$+58^{\circ}\ 32'$

$-\ 43\ \ 51$

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1878phae.proj.1496.

406

18781

Virginid (485B) 13 11 13.65 +14 19 5.0 Ingmid

13 11.3 .53 4.3 " cos δ 9.98633

.62 4.7

+14° 18' .66 3.8 " sin δ tanι 0.09183n Hiro June 5

.61 5.4 0.09240n after "

.62 5.6

+28 5 tanδ + 0.25

1878 13 11 13.68 +14 19 5.13 cin z + .47

15

May 7 May 8 June 3 June 5 June 6 June 9

h	m	s	m	s	m	s	m	s	m	s	m	s	m	s	m	s	m	s
13	11	18.7	11	39.43	11	19.3	11	40.45	11	49.0	12	8.28	12	12.6	12	10.90	11	58.2	12	12.32	11	56.7	12	17.44
		21.7		41.50		21.0		42.50		51.4		10.50		14.6		13.00		0.0		14.42		58.8		19.22
		23.9	43.67	43.71		23.5	44.66	44.70		53.0	12.58	12.65		16.9	15.18	15.20		1.8	16.56	16.60		0.2	21.35	21.33
		25.9		45.83		25.3		46.80		54.8		14.68		18.7		17.42		3.7		18.60		2.9		23.47
		28.0		47.90		26.7		48.85		57.0		16.80		20.8		19.40		5.1		20.85		4.3		25.60
																22.57								
				51.15				52.00				20.10				22.57				24.00				28.70
				53.28				54.25				22.20				24.80				26.15				30.85
			55.44	55.50			56.33	56.35			24.24	24.18			26.89	26.88			28.27	28.28			32.98	33.00
				57.60				58.40				26.25				29.00				30.40				35.10
				59.65				0.65				28.45				31.20				32.50				37.25
																				33.73				
			7.16	2.90				2.85				31.77				34.30				33.73				40.41
			7.13	5.00				5.90				33.80				36.45				37.90				42.58
			7.10	7.10			8.02	8.00			35.95	36.00			38.88	38.85			40.02	40.05			44.66	44.55
			7.13	—				10.15				37.99				40.70				42.15				46.80
			16.24	—			169.01	12.20			7277	40.20			8065	42.90			8485	44.25			9899	48.98
	11	23.64			11	23.16			11	53.04			12	16.72			12	1.70			12	0.58		
			11	55.413			11	56.337			12	24.257			12	26.883			12	28.283			12	32.997
				38.54				39.58			−1	7.53			−1	10.11			−1	11.58			−1	16.32
				− 0.32				− 0.33				− 0.33				− 0.35				− 0.34				− 0.33
				− 2.90				− 2.90				− 2.78				− 2.76				− 2.75				− 2.73
				− 41.76				− 42.81			− 1	10.64			− 1	13.22			− 1	14.67			− 1	19.38
																								+2.62
			11	13.65				13.53				13.62				13.66			11	13.61				13.62

	+ 31.77				+ 33.18				+ 31.22				+ 10.16				+ 26.58				+ 32.42			
	1.50202				1.52088				1.49443				1.00689				1.42455				1.51081			
	1.59385n				1.61271n				1.58626n				1.09872n				1.51685n				1.60324n			
	5	3			5	3			5	3			5	2			5	2			5	3		
	h m s																							
6	6.4	+.24			8.3	+.29			3.7	+.19			37.4	+.42			54.1	+.16			0.9	+.17		
7	13.1	+.30			15.0	+.29			9.9	+.30			43.7	+.38			1.8	+.27			8.9	+.31		
9	30.8	+.06			32.9	+.01			27.9	+.02			0.9	+.08			17.9	−.32			25.5	−.06		
11	23.8	+.34			25.9	+.34			22.0	+.34			54.8	+.23			13.1	+.39			20.0	+.35		
		+.94				+.93				+.85				+1.11				+.50				+.77		
	8	18.52			8	20.52			8	15.88			7	49.20			8	6.72			8	13.82		
		−39.25				−40.99				−38.57				−12.55				−32.88				−40.11		
	7	39.27				39.53				37.31				36.65				33.84				33.71		
+14°	1°	5' 9.08				8.82				11.04				11.70				14.51				14.64		
+28	3	29																						
	1.48700																							
	− 125				− 76				− 581				− 764				− 352				− 693			
	1.48575				1.48624				1.48119				1.47936				1.48348				1.48007			
	−30.60				−30.64				−30.28				−30.15				−30.44				−30.20			
	− .13				− .14				− .12				− .01				− .09				− .13			
	− .26		−0.63		− .26		−0.63		− .16		−0.49		− .11		−0.40		− .12		−0.34		− .13		−0.45	
	− .24				− .23				− .21				− .28				− .13				− .19			
	−31.23				−31.27				−30.77				−30.55				−30.78				−30.65			
+14°	14'	37.85				37.55				46.27				41.15				43.73				43.99		
		+ 15.40				+ 15.27				+ 12.24				+ 12.04				+ 11.93				+ 11.62		
		− .31				− .31				− .32				− .32				− .32				− .32		
	+4	12.09	+11.78		+4	11.76	+11.45		+4	12.47	+12.15		+4	12.90	+12.58		+4	10.04	+9.72		+4	10.28	+9.96	
	+4	27.18			+4	26.72			+4	24.41			+4	24.62			+4	21.65			+4	21.58		
	19	5.03				4.27				4.68				5.77				5.38				5.57		

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Draconids

1878.0

α 18h 12m.5
δ +69° 2'

log sin δ
" cos δ
" 15 cos Δα

log R₁
" R₂

1.50171

R₁
R₂
I

31.75
5.77
2.58

tan δ
sin z

+2.60
− .45

	May 2			May 5		June 9		June 13			
L	m s										
13	12 57.4	12 —	13 0.3	13 52.4	—	13 1.8	13 38.1	13 —	13 40.0	12 53.8	13 —	13 48.8
	2.0	—	3.2	53.3	—	5.3	48.1 41.9	19.9 11.2	42.7	59.3	—	48.6
	7.4	—	6.2	4.5	—	7.6	46.9 46.4	19.8 14.0	43.9	4.0	25.7 19.9	8.18
	12.4	—	9.0	9.8	—	10.3	48.4 58.4	19.8 16.9	48.6	10.8	25.8 22.9	8.44
	16.5	—	12.0	13.5	—	13.3	—	20.0 20.0	8.18	16.0	25.6 25.6	8.73
		—	14.9		—	16.0		19.6 22.8	37.4		25.6 28.8	0.4
	14 10.2	39.8 45.6	17.8		—	19.0	14 42.8	19.8 25.6	8.17.5	14 5.45	25.7 31.5	3.3
	13.8	39.8 48.5	20.7		—	22.0	48.2	19.7 28.4	0.2	59.3	25.7 34.4	3.9
	18.3	40.0 57.6	10.76 23.5		—	12.06 25.3	53.2	19.9 31.3	4637 2.9	6.6	25.8 37.4	5760 8.8
	23.0	39.87					57.3			12.4		
	28.5	11.96 39.87	32.0		—	45.3 33.7	4.0	19.81	11.7	18.9	25.70	17.4
		43.59 4	35.0		13.40 4515	—		51.52	14.8		57.33	20.4
			37.8		44.80 4460	44.8 39.0		23.27	17.8		29.09	23.2
		3542	40.7		13.40	45.1 42.2			20.4			26.2
			43.3		13.05	45.0 45.0		16.460	23.2		17.212	29.2
			46.4			45.0 47.9			26.4			32.0
			49.5			44.7 50.5			29.0			35.0
			52.4			45.0 53.7			31.8			37.7
	13 7.14		3923 55.2	14 3.10		44.8 56.4	13 47.45	2092 34.7		13 4.78	2618	40.7
	14 18.76		13 11.807			13 44.975 13.225	14 53.10	13 51.633		15 5.74		13 57.373
			− 35.73			− 36.74		− 1 16.32				− 1 22.43
			− 2.87			− 3.45		− 3.42				− 3.11
			− 5.46			− 5.44 39		4 5.13				− 3.94.5
			− 44.06			− 45.58		− 1 23.87				− 1 29.44
			12 27.75			27.614		27.66				27.88

	+ 4.67	− 66.95		− 49.88			+ 4 3.08	− 61.57		+ 52.59	− 68.37		
	0.66932	1.82575n		− 18.13	1.69793	0.61066	0.48855	1.78937n		1.72090	1.83487n		
	0.32849n	1.48492		1.25840n	1.35710	0.27640	0.17772n	1.44854		1.38004n	1.49404		
				0.91754				911		64	61		
	20 4	20 4 [3]		20 4			20 4	20 3		20 4	20 3		
	24.5 +.54	50.6 +.08		1.3 +.20			15.2 +.43	43.2 +.38		34.9 +.42	38.9 +.46		
	23.2 +.09	49.4 +.19		58.6 +.19			15.9 +.17	44.7 +.32		35.9 +.02	40.2 +.21		
	42.3 −.48	7.2 −.03		17.8 −.30			30.9 +.02	59.2 +.14		52.9 −.49	56.2 −.06		
	39.9 +.15	7.0 +.18		16.1 +.21			32.9 +.22	0.6 +.05		52.9 +.01	57.0 +.02		
	+.30	+.42		+.30			+.84	+.89		−.04	+.63		
	24 32.48	24 58.55		24 8.45			24 23.72	23 51.92		24 44.16	23 48.08		
	− 21.31	[23] 30.54		8.27	22.76		− 1.40	28.09 .18		24.02 23.99	31.19 23.		
	24 11.17	29.09		16.72	31.21		22.32	20.07		20.16	19.27		
	80.36						21.86	3		13	31		
	18.00						49						
+68	58 37.18	19.26		31.63	17.14		26.03	28.37		28.19	29.08		
								.30		22	.04		
	−26 39 40												
	1.46100												
	− 497			− 430			− 689			− 475			
	1.45603			1.45670			1.45411			1.45625			
	+28.58			+28.62			+28.45 6			+28.89			
	− .01 4	− .82		− .06			− .01 4	− .69		− .50	− .85		
45	− .36 0	− .40	−1.33	− .01 40	−0.54		− .18 0	− .16	−1.07	− .19	− .15	−1.16	
	− .08	− .11		− .08			− .21	− .22		+ .01	− .16		
	+28.13	+27.25		+28.08			+28.05	+27.38		+27.81	+27.63		
+68	58 46.13	4651		4522			54.54	55.68		56.13	56.47		
	46.32						55.11			56.30			
							− 1.64						
	+ 6.32			− + 5.53			+ .31	10.57		− 2.12	10.04		
	+ .30	11.22		+ .30						+ 32			
.96	+4 10.92	+4 10.62		+4 11.65	+4 11.95		+4 10.28	+4 4.97		+4 9.72	+4 9.46		
	+4 17.54			+4 17.48			+4 8.95			+4 7.92			
	3 3.86			2.70			4.06			4.22			

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Virginis

18h 80

	h	m	α		δ	log cos δ		log R_1	1.35654
	13	15	29.68	+ 2°	43	43.7		R_2	1.05587
			.51			41.8	" cos δ	9.99951	
	13h 15.6m		.60			43.7			
	+2° 43′		.57			45.0	" 15 cos δ and α	0.10501 n	Thro' June 5
			.56			45.2		0.10558 n	after "
			.56			44.1		R_1	22.73
	+39 40		7					R_2	11.57
		13	15 29.58	+ 2	43	44.42	tan δ	+ 0.05	I
							sin z	+ .64	

	May 5		May 8		June 3		June 5		June 6		June 9	
h	m	s										
13	16	293	15 37.6	15 56.8	16 19.4	16 24.23	16 11.4	16 26.97	16 11.6	16 28.42	16 30.3	16 33.7
		31.4	39.2	58.60	21.0	26.40	14.0	29.05	13.8	30.49	32.2	35.35
		33.4	41.6	0.65 0.67	22.6	28.49 28.50	15.7	31.15 31.20	15.6	32.52 32.50	34.8	37.39 37.50
		35.3	43.3	2.70	24.6	30.60	17.5	33.25	17.3	34.60	36.1	39.39
		37.1	45.5	4.70	26.8	32.79	19.1	35.30	18.9	36.60	37.9	41.45
			16 55	7.95	17 7.6	28.85		38.40	17 12.8	39.65	17 13.8	44.50
			18.50	9.95	9.2	37.90		40.35	14.3	41.95	15.0	46.85
		20.67	20.67	8.98 12.03	12.00 11.2	39.99 39.99		42.47 42.45	16.4	43.95 44.00	16.6	48.64 48.68
			22.77	41.7	14.05	13.0	42.05		44.50	17.9	46.05	18.4	50.69
			24.85	44.0	16.20	14.9	44.15		46.60	19.2	48.08	20.4	52.78
		9.38			19.20		47.20		49.72		51.19		53.91
		.30			21.32		49.30		51.80		53.28		55.93
				23.33	23.33	51.36	51.35	53.85	53.75	55.34	55.38	59.97	0.00
					25.40		53.44		55.60		57.40		2.02
				3601	27.40	11984	55.50	12747	57.80	13181	59.45	14600	4.00
	16	33.30	15 41.44		16 22.68		16 15.54		16 15.44		16 34.26	
			16 9.340	16 12.003	17 11.18	16 39.947		16 42.490	17 16.06	16 43.937	17 16.74	16 48.667
			−36.75	−39.58		−1 7.54		−1 10.12		−1 11.58		−1 16.33
			− 0.07	− 0.07		− 0.07		− 0.07		− 0.07		− 0.07
			− 2.84	− 2.84		− 2.74		− 2.73		− 2.73		− 2.51
			−39.66	−42.49		−1 10.35		−1 12.92		−1 14.38		−1 19.11
			15 29.68	29.51		29.60		29.57		29.56		29.56

	−23.96		+30.56	−27.72	+17.27	−31.23	+26.95		+28.50	−32.12	+14.41	−28.07
	1.37949 n		1.48515	1.44279 n	1.23729	1.49457 n	1.43056		1.45784 n	1.50678 n	1.15866	1.44824 n
	1.48450		1.59016 n	1.54780	1.34230 n	1.59958	1.53557 n		1.56042 n	1.61236	1.26424 n	1.55382
	40	2	40	3 40 1	40 2	40 1	40	3	40	3 40 1	40 2	40 1
	2.3	+.08	10.6	+.34 56.7 +.07	53.9	+.16 52.2	+.11 [70]	12.0 +.26	5.0	+.21 46.1 +.22	47.8	+.24 52.9 +.10
	10.5	+.34	18.5	+.26 4.8 +.33	1.2	+.26 59.8	+.29 13.6	+.29	13.1	+.30 [55.0] 45.0 +.37	56.2	+.34 1.7 +.30
[27.5]	17.5	−.31	35.2	−.08 20.6 −.27	18.7	−.31 16.2	−.29 28.9	+.04	27.2	−.01 8.8 +.01	11.1	−.11 16.2 −.29
	22.2	+.46	29.9	+.34 16.1 +.47	14.2	+.39 13.4	+.49 24.4	+.34	24.9	+.34 6.0 +.47	7.8	+.40 14.0 +.49
		+.57		+.86 +.60		+.50 +.60		+.93		+.84 +.07		+.87 +.60
	42	13.12 15.62	43	23.65	42 9.65	43 7.00	42 5.40	43 18.48	43	17.55	41 58.98	43 0.72	42 6.20
	23.96	30.51 30.51		−38.92	35.30	−21.99	39.77	−34.32		−36.34	40.96	−18.38	35.80
	42 3.08	46.13		44.63	44.85	45.01	45.17	44.16		41.21	39.94	42.34	42.00
	43.63											
+2	40 11.27	2.22		3.72	3.50	3.31	3.18	4.19		7.14	8.41	6.01	6.35
	4.92											
+39	38 27.34											
	1.67830											
	− 419			− 64		− 576		− 749		− 334		− 678	
	1.67411			1.67766		1.67254		1.67081		1.67496		1.67152	
	−47.22			−47.61		−47.05		−46.86		−47.31		−46.94	
	− .02			− .03 −0.39	− .02 −0.35	− .01 −0.29	− .03 −0.29	− .02 −0.38		− .02 −0.36	− .03 −0.38	− .01 −0.35	− .02 −0.35
	− .18	− 0.34		− .27	− .18	− .15	− .11	− .13		− .13	− .08	− .12	− .08
	− .14			− .22	− .15	− .13	− .15	− .23		− .21	− .27	− .22	− .15
	−47.56			− 48.13	−47.96	−47.34	−47.34	−47.24		−47.67	−47.69	−47.29	−47.19
+2	39 17.76	14.66		15.59	15.54	16.00	15.84	16.95		14.17	20.72	18.72	19.16
				15.56		15.92				20.10		18.94	
	+ 17.84			+ 17.86		+ 15.75		+ 15.60		+ 15.57		+ 15.29	
	− .42			− .42		− .44		− .44		− .44		− .44	
	+4 11.65	+4 11.23	+4	11.76 +4 11.34	+4	12.47 +4 12.03	+4	12.90 +4 12.46	+4	10.84 +4 9.60	+4	10.28 +4 9.84
	+4 29.07		+4	29.20	+4	27.78	+4	28.06	+4	25.11	+4	25.13
	43 46.23	43.73		44.76		43.70		45.01		45.21		44.07

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Comae

$13^h\ 31^m.3$

$+25°\ 13'$

$+17\ 10$

1878

1878.0

13h 31m 14.73 +25° 14' 9.4 — logarithmic

59 8.7 " cos δ 9.95651

76 9.2

67 9.0 " 15 cos Stars 0.06201n Strs June 5

68 9.0 0.06258n after "

66 10.0

13 31 14.682 +25 14 9.22 tan δ +0.47

lin z +.30

May 1 | May 2 | May 5 | May 7 | June 3 | June 6

h	m	s	m	s	m	s	m	s	m	s	m	s	m	s	m	s	m	s	h
13	31	27.8	31	37.00	31	19.8	31	36.87	31	43.7	31	38.05	31	18.4	31	38.80	31	54.3	32	8.68	31	53.6	32	12.84	13
		30.0		39.40		22.0		39.10		45.3		40.33		20.3		42.05		56.6		10.95		55.4		15.00	
		32.3		41.64 41.68		24.0	41.38	41.42		47.9	42.70	42.80		22.2	44.32	44.30		58.6	18.25	13.20		57.8	17.31	17.30	
		34.4		43.92		26.0		43.62		49.6		45.00		23.9		46.60		0.7		15.60		59.4		19.50	
		36.3		46.20		27.7		45.70		51.9		47.30		25.7		48.85		2.7		17.80		1.2		21.90	
	32	20.8		49.62				49.37	32	29.7		50.70				52.37	32	54.2		21.29	32	53.0		23.80	
		22.5		51.80				51.52		32.3		52.83				54.60		56.2		23.40		54.6		27.80	
		25.8	54.12	54.04			53.88	53.95		34.0	55.20	55.20			56.92	56.95		58.0	25.77	25.70		57.2	29.80	29.75	
		28.0		56.43				56.06		36.0		57.50				59.20		0.4		28.05		59.8		32.05	
		30.0		58.70				58.50		37.8		59.79				1.50		2.6		30.40		1.8		34.38	
				2.12				1.93				3.00				4.80				33.77				37.73	
				4.84				4.16				3.42				7.18				36.65				40.00	
			6.66	6.65			6.46	6.40			7.71	7.70			9.40	9.40			38.31	38.35			42.32	42.34	
				8.88				8.73				10.00				11.80				40.45				44.60	
			16.42	11.30			16.12	11.10			16.61	12.43			17.04	14.02			77.33	42.98			89.43	46.92	
	31	32.16			31	23.90			31	47.68			31	22.10			31	58.68			31	57.48			
	32	25.42	31	54.140			31	53.907	32	33.96	31	55.203			31	56.880	32	58.28	32	25.777	32	57.28	32	29.810	
				−35.83				−35.74				−36.76				−38.56				−1 7.56				−1 11.61	
				−0.52				−0.52				−0.62				−0.60				−0.62				−0.64	
				−3.06				−3.06				−3.06				−3.05				−2.92				−2.90	
				−39.41				−39.32				−40.44				−42.21			−1	11.10			−1	15.15	
			31	14.73				14.59				14.76				14.67				14.68				14.66	

	s	+21.98	s	−31.28		+30.01			+.752		−.3876		+.3478			+27.20		−.3250		+.3233		−.2747		
		1.34203		1.49527n		1.47727			0.87622		1.58838n		1.54133			1.43457		1.51188n		1.50961		1.43886n		
		1.40404n		1.55728		1.53925n			0.93823n		1.65039		1.60334n			1.49658n		1.57389		1.57289		1.50144		
		10′ 3′		10′ 1′		10 3			10 2		10 1		10 3			10 3		10 1		10 3		10 1		
ζ		0.5 +.17		58.1 +.07		10.7 +.34			43.6 +.31		49.7 +.15		16.2 +.47			2.7 +.18		54.6 +.09		4.9 +.21		56.1 +.08		
ζ		4.7 +.29		3.2 +.30		14.1 +.29			48.8 +.43		55.5 +.36		20.5 +.24			8.1 +.30		58.8 +.31		10.4 +.30		2.7 +.30		
ζ		22.9 −.19		20.2 −.28		32.8 +.01			7.2 +.04		13.4 −.21		37.1 −.18			25.3 −.07		15.7 −.28		25.9 −.04		17.1 −.30		
ζ		18.4 +.36		16.3 +.47		28.8 +.34			2.9 +.31		9.3 +.50		34.1 +.32			22.9 +.34		13.7 +.49		23.9 +.34		15.1 +.48		
		+.63		+.56		+.98			+1.09		+.80		+.85			+.75		+.61		+.81		+.56		
		13 11.″62		12 9.″45		13 21.60			12 55.62		12 1.98		13 26.98			13 14.75		12 5.55		13 16.28		12 7.75		
		−25.35		36.08		−34.62			−8.67		44.71		−40.12			−31.37		37.49		−37.34		31.73		
		12 46.27		45.53		46.98			46.95		46.69		46.86			43.38		43.04		38.94		39.48		
+25°		1.0 2.08		2.82		1.37			1.40		1.66		1.49			4.07		5.31		9.41		8.87		+31
+17		8 36																							+10
		1.24950																							
		+.538				−.477			−.362				−.92			−.566				−.266					
		1.25488				1.24473			1.24588				1.24858			1.24394				1.24684					
		−17.98				−17.57			−17.61				−17.72			−17.54				−17.65					
		−.10		−.20		−.14			−.02		−.32		−.26			−.15		−.22		−.22		−.15			
		−.26		−.18		−.27			−.23		−.16		−.27			−.16		−.11		−.13		−.08			
		−.16		−.14		−.25			−.27		−.20		−.21			−.19		−.15		−.20		−.14			
		−18.50		−18.50		−18.28			−18.13		−18.29		−18.46			−18.04		−18.02		−18.20		−18.02		
+25°	9′	43.58		44.32		43.09			43.27		43.37		43.03			46.93		47.29		51.21		50.85		+3
		43.95							43.32							47.11				51.03					
						14.92																			
		+15.09				+15.7			+14.40				+14.04			+9.63				+9.18					
		−.20				−.20			−.20				−.20			−.20				−.20					
		+4 10.56	+4	10.36	+4	10.92	+4	10.72	+4 11.65	+4	11.45	+4	12.09	+4	11.89	+4 12.47	+4	12.27	+4	10.04	+4	9.84		
		+4 25.45			+4	25.64			+4 25.85				+4 25.93			+4 21.90				+4 19.02					
		14 9.40				8.73			9.17				8.96			9.01				10.05					

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α 13h 34m 8

δ +31° 37'

+10 46

	May 1	May 2	May 3	June 3	June 6	June 9
	13 34 43.7	35 4.00	35 3.0	35 3.63	34 47.6	35 4.98
	45.9	6.34	4.9	6.20	49.8	7.39
	48.0	8.79 8.73	7.8	8.59 8.60	52.8	9.79 8.82
	50.4	11.18	9.5	11.02	53.1	12.20
	52.8	13.70	12.0	13.50	56	14.58
	35 52.0	17.00		17.12	35 49.2	18.28
	54.3	19.63		19.60	51.2	20.70
	56.4	22.03 22.03		21.92 21.93	53.5	23.18 23.30
	58.3	24.52		24.33	53.9	25.60
	0.8	26.95		26.60	58.0	28.00
		30.35		30.21		31.50
		32.90		32.75		34.07
		35.40 35.30		35.22 35.30		36.49 36.50
		37.72		37.75		38.90
		6622 40.31		6573 40.09		6946 41.48
	34 48.16		35 7.44	34 52.58	35 19.80	
	35 56.36	35 22.073		35 21.910	35 53.56	35 23.153
		− 35.83		−35.74		−36.76
		− 0.69		− 0.69		− 0.82
		− 3.16		− 3.16		− 3.16
		−39.68		−39.59		−40.74
		34 42.39		42.32		42.41

	June 3	June 6	June 9
	35 15.3	35 20.1	35 39.74	35 35.4	35 44.38
	17.7	22.6	42.05	37.2	4679
	19.7	40.30 40.30	28.0	44.47 44.40	39.3	49.18 4920
	22.1	42.74	27.3	4680	41.4	8162
	24.2	48.10	29.1	49.38	43.2	8390
	36 19.2	48.83	36 22.2	52.90	36 26.00	87.65
	22.1	51.30	24.0	55.30	27.3	0.10
	23.7	53.70 53.67	28.8	57.80 57.80	28.8	2.45 2.45
	25.4	56.20	28.0	0.30	30.6	4.80
	27.6	58.50	30.6	2.70	32.8	7.25
		2.20		6.25		10.88
		4.51		8.75		13.30
		7.00 7.00		11.13 11.15		15.75 15.75
		9.40		13.50		18.10
		161.00 11.90		17340 16.00		738 20.70
	35 19.80		35 24.82		35 39.30	
	36 23.60	35 53.667	36 26.12	35 57.800	36 28.90	36 2.460
		− 1 7.56		− 1 11.62		− 1 16.35
		− 0.81		− 0.85		− 0.82
		− 3.00		− 2.97		− 2.94
		− 1 11.37		− 1 15.44		− 1 20.11
		42.30		42.36		42.35

	May 1	May 2	May 3	June 3	June 6	June 9
	+33.91	−34.29	+14.47	+30.57	−30.41	+33.87	−29.93	+32.98	−28.32	+23.16	−26.44
	1.53033	1.53517 n	1.16047	1.48530	1.48302 n	1.52982	1.47611 n	1.51825	1.48209 n	1.36471	1.42226 n
	1.56605 n	1.57089	1.19619 n	1.52102 n	1.51874	1.56514 n	1.51183	1.55454 n	1.48838	1.40103 n	1.45855
	45 4	45 3	45 4	45 4	45 3	45 4	45 3	45 4	45 3	45 4	45 3
	47.5 +.15	33.0 +.56	27.0 +.54	43.0 +.24	37.6 +.47	43.6 +.23	34.0 +.54	38.8 +.33	32.1 +.57	28.0 +.53	34.4 +.53
	50.9 +.18	37.3 +.17	30.1 +.02	47.2 +.20	42.8 +.28	47.9 +.20	38.2 +.18	44.9 +.18	38.2 +.18	33.8 +.01	39.7 +.21
	8.9 −.10	5.43 −.26	48.8 −.60	6.1 +.00	0.2 +.16	4.9 +.01	54.7 −.22	59.2 −.04	52.5 −.38	49.4 −.59	55.2 −.17
	4.6 +.14	51.8 +.07	44.5 +.10	1.9 +.05	57.8 +.02	3.1 +.09	53.7 +.05	57.7 −.02	51.7 +.08	47.0 +.07	54.2 +.05
	+.37	+.54	+.06	+.49	+.93	+.53	+.55	+.45	+.45	+.02	+.62
	49 57.98	48 44.10	49 37.60	49 54.55	48 49.60	49 54.88	48 45.15	49 50.15	48 43.62	49 39.55	48 45.88
	−36.82	37.23	−15.71	−33.19	33.02	−36.78	32.50	−35.85	30.79	−25.18	28.74
	49 21.16	21.33	21.89	21.36	22.62	18.10	17.65	14.30	14.41	14.37	14.62
+31	33 27.19	27.02	26.46	26.94	25.73	30.25	30.70	34.05	33.94	33.98	33.73

+10 45 11

1.03880

	May 1	May 2	May 3	June 3	June 6	June 9
	− 536	− 473	− 348	− 551	− 249	− 607
	1.03344	1.03407	1.03532	1.03329	1.03631	1.03273
	−10.80	−10.82	−10.85	−10.80	−10.87	−10.78
	− .28 − .28	− .05	− .23 − .23	− .28	− .22	− .27 − .20	− .13 − .17
	− .40 − .30	− .37	− .39 − .30	− .25	− .19	− .19	− .15
	− .09 − .14	− .02	− .12 − .23	− .13	− .14	− .11	− .01 − .16
	−11.57 −11.52	−11.26	−11.59 −11.61	−11.46	−11.35	−11.44	−11.33	−11.11	−11.26
+31	33 15.62	15.50	15.20	15.40 14.12	18.79	19.35	22.61	22.61	22.87	22.47
	15.56			14.76	19.07		22.61		22.67	
	+ 14.26		+ 14.06	+ 13.44	+ 8.05		+ 7.57		+ 7.12	
	− .12		− .13	− .13	− .13		− .13		− .13	
	+4 10.56	+4 10.44	+4 10.92	+4 10.79	+4 11.65	+4 11.52	+4 12.47	+4 12.34	+4 10.04	+4 9.91	+4 10.28	+4 10.15
	+4 14.70		+4 24.85		+4 24.96		+4 20.39		+4 17.48		+4 17.27	
	37 40.26		40.05		39.72		39.46		40.09		39.94	

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12

Cam. Ven.

1878.0

	α		δ		log a	log δ
	13	45	46.30	+35	16	14.3
			.16			14.2
13h 45.9m			.32			13.8
+35° 16′			.24			14.4
			.18			.1
			.16			14.5
+7 7						
1878	13	45	46.23	+35	16	14.3
			27			.38

log a
log δ
9.91194 " cos δ
0.01744n " 15 cos δ tan α
0.01801n after "
tan δ + 0.71
sin z + .12

This June 5

May 1		May 2		May 5			May 7		June 3		June 6		
h m s	m s	h m s	h m s	h m s	45 46	h m s	h m s	h m s	h m s	h m s	h m s	h m s	
13 46 0.1	46 7.16	46 6.5	46 6.92	46 11.5	34.32 8.35	46 29.8	46 10.005	46 32.7	46 38.85	46 21.5	46 42.95	13
2.2	9.80	8.7	9.40	13.7	36.86 10.80	32.4	12.62	34.9	41.40	24.0	45.44	
5.7	1224 12.19	11.6	11.98 12.03	15.3	39.67 13.27	34.3	15.11 15.15	37.9	43.89 43.88	26.3	47.98 48.00	
7.7	14.69	14.2	14.60	17.2	1.98 15.90	36.3	17.69	40.3	46.40	28.3	50.50	
10.2	17.34	16.4	16.95	19.5	4.40 18.32	39.3	20.03	42.0	48.90	30.3	53.00	
46 56.9	21.10	46 49.7	20.92		46 50.00 22.20	46 57.8	23.79	47 29.6	52.70	47 29.8	56.65	
59.1	23.55	57.5	23.46		52.45 24.60	57.4	26.30	32.5	55.19	32.2	59.30	
2.2	26.14 26.00	5.32	25.95 26.00		55.15 27.27	56.7	28.93 29.00	34.5	57.76 57.78	34.6	1.77 1.72	
4.5	28.72	5.49	28.40		57.55 29.77	58.8	31.55	36.8	0.29	37.3	4.40	
6.9	31.34	56.8	30.97		0.25 32.34	1.4	34.02	38.8	2.85	39.2	6.80	
	35.70		34.69	59.45	2.95 36.18		37.80		6.60		10.68	
	37.59		37.25	13.33	3.85 38.68		40.40		9.00		13.12	
	40.06 40.20		39.79 39.83	27.24	25 41.20		42.82 42.72		11.60 11.60		15.67 15.65	
	42.30		42.32	41.23	43.70		45.30		14.20		18.20	
	78.44 45.12		77.72 44.84	55.08	46.38		86.86 47.88		173.25 16.60		542 20.70	
46 5.18		46 11.48		46 15.44		46 34.42		46 37.56		46 26.98		
47 1.92	46 26.147	46 53.22	46 25.907		46 27.266	46 56.62	46 28.953	47 34.44	46 57.759	47 34.62	47 1.807	
	− 35.83		− 35.74		− 36.78		− 38.58		− 1 7.58		− 1 11.64	
	− 0.79		− 0.78		− 0.94		− 0.90		− 0.93		− 0.97	
	− 3.23		− 3.23		− 3.23		− 3.23		− 3.06		− 3.04	
	− 39.85		− 39.75		− 40.95		− 42.71		− 1 11.57		− 1 15.65	
	45 46.30		46.16		46.32		46.24		46.18		46.16	

	s +20.97	s −35.77	+14.43	−27.31	+11.83	−5.47	−27.67	+20.19	−36.69	+35.73	−32.81
	1.32160	1.55352n	1.15927	1.48632n	1.07298	0.73799n	1.44201n	1.30514	1.56455n	1.55303	1.51601n
	1.33904n	1.57096	1.17671n	1.45376	1.09042n	0.75543	1.45945	1.32258n	1.57199	1.57104n	1.53402
	10 1	10 0	10 0	10 0	10 0	10 0	10 0	10 0	5 4	10 1	5 4
ℰ	2.9 +.15	2.8 +.02	56.8 +.13	12.2 +.24	53.2 +.14	35.8 +.41	12.2 +.24	56.9 +.13	56.8 +.01	9.4 +.27	57.8 +.00
ℱ	6.3 +.23	5.9 +.07	58.2 +.21	14.7 +.09	56.9 +.22	38.9 +.11	14.9 +.09	0.9 +.17	59.9 +.00	14.1 +.25	2.1 +.01
𝒢	24.5 −.20	24.7 −.22	18.0 −.41	33.2 −.15	17.1 −.42	56.6 −.32	32.5 −.13	18.9 −.40	16.8 −.41	29.9 −.03	4.8 −.40
ℋ	19.8 +.66	20.8 +.38	14.5 +.70	31.2 +.50	12.2 +.72	52.9 +.51	30.0 +.50	16.8 +.68	16.2 +.18	28.2 +.65	17.2 +.18
	+.84	+.25	+.63	+.68	+.66	+.71	+.70	+.58	−.22	+1.14	−.21
	11′ 13.38	10′ 13.55	11 6.88	10 22.82	11 4.85	10 46.05	10 22.40	11 8.38	10 7.42	11 20.40	10 8.98
	−21.83	37.24	−15.02	28.43	−12.31	5.69	28.80	−21.02	37.32	−37.24	34.20
	10 51.55	56.79	51.86	51.25	52.54	51.74	51.20	47.36	44.74	43.16	43.18
+35°	1′ 56.80	57.56	56.69	57.10	55.81	56.61	57.15	12 0.99	45.61 3.61	5.19	5.17
									2.74		

+7	6 41										
	0.85640										
	+ 531		− 461		− 307	− 65		− 537		− 202	
	0.86171		0.85149		0.85333	0.85575		0.85103		0.85438	
	− 7.27		− 7.11		− 7.13	− 7.17		− 7.10		− 7.15	
	− .11	− .33	− .05	− .19	− .04	− .02	− .20	− .10	− .34	− .33	− .28
	− .10	− .02	− .09	− .03	− .09	− .06	− .03	− .06	− .00	− .05	− .00
	− .21	− .06	− .16	− .17	− .17	− .18	− .18	− .15	+ .06	− .29	+ .05
	−7.69	−7.68	−7.41	−7.50	−7.43	−7.43	−7.58	−7.41	−7.38	−7.82	−7.38
+35° 11′	49.31	49.88	49.08	49.60	48.38	49.18	49.57	53.58	55.36	57.37	57.77
	49.50		49.34			49.38		54.47		57.58	
	+ 14.28		+ 14.06		+ 13.40	+ 12.96		+ 7.51		+ 7.00	
	− .08		− .08		− .08	− .08		− .08		− .08	
	+4 10.56	+4 10.48	+4 10.92	+4 10.84	+4 11.65	+4 12.09	+4 12.01	+4 12.47	+4 12.39	+4 10.04	+4 9.96
	+4 24.76		+4 24.90		+4 24.97	+4 24.87		+4 19.90		+4 16.96	
	16 14.26		14.24		13.35	14.35		14.37		14.34	

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Bootis (58B) 13h 55m 18.28 +9° 29' 8.1 1878.0 logarithms

13h 55.4m
+9° 29'
+32 54

13 55 18.28 +9 29 8.14

| | | |

1878phae.proj.1496.

144

18780

Can. Ven. — 13 h 57 m 21.39 s — +46° 20' 40.1" — legend

13 h 57.4 m
+46° 20'
−3 57

1878

| | | |

1878phae.proj.1496.

1878.0

Draconis (248 B)

28 ~~41.75~~ e +55 56 — log sin δ

14h 28m.8 — 65 — 10.8 " cos δ — 9.74831

+55° 56′ — .72 — 11.5 " 15 cos δ sin t — 9.85381n — Obs. June 5

— 13 33 — .77 — 11 — 9.85438n — after "

— .77 — .7

— .74 — 4

tan δ + 1.48

28 41.730 +55 56 11.30 — log z — 9.74831 — 9.85381n — 9.85438n

— 23

June 4		June 5		June 6		June 9		June 19		June 20	
29 2.9	29 28.50	28 56.2	29 30.00	29 19.9	29 31.49	29 23.6	29 36.20	29 43.3	29 49.80	29 19.8	29 31.00
6.0	32.18	59.3	33.70	22.1	35.16	27.7	39.80	48.8	53.30	22.4	34.80
9.7	35.85 35.75	30.3	37.35 37.40	26.4	38.78 38.74	30.5	43.44 43.40	50.8	57.00 56.95	26.8	58.45 58.68
12.9	39.60	6.5	41.00	29.6	42.52	33.8	47.00	52.6	0.85	29.7	2.10
15.2	43.20	9.0	44.65	38.4	46.06	37.8	50.72	55.0	44.40	32.9	5.67
2.	48.85	30 22.6	50.20	30 34.8	51.55		56.28	30 51.7	9.95	30 37.0	11.40
	52.50	26.8	53.93	37.6	55.38		59.98	54.2	13.60	39.6	14.98
56.15	56.17	29.9	57.61 57.70	41.0	59.04 59.10		3.61 3.60	56.7	17.29 17.50	42.9	18.66 18.70
	59.80	34.0	1.20	44.3	2.75		7.23	59.3	20.80	46.2	22.20
	3.43	37.0	5.00	48.0	6.40		10.99	5.1	24.58	48.8	26.00
	8.96		10.48		12.00		16.40		30.65		31.50
	12.67		14.20		15.68		20.18		33.60		38.30
16.36	16.30		17.90 17.90		19.26 19.20	23.87	24.27 23.90		37.37 37.35		38.99 38.90
	20.08		21.63		22.80	109	27.60		41.00		42.80
16836	23.80		17286 25.28		17708 26.60	1132	31.29		5166 44.87		5610 46.45
29 9.84		29 2.80		29 26.48		29 30.68	6.40	29 50.70		29 26.82	
29	56.120	30 30.06	29 57.620	30 41.14	29 57.027		30 ~~37.73~~	30 57.40	30 17.220	31 3.10	30 18.700
	— 1 8.86		— 1 10.32		— 1 11.71		— 1 16.41		— 1 30.57		— 1 31.67
	— 1.93		— 2.07		— 2.03		— 1.95		— 2.18 .07		— 2.00
	— 3.60		— 3.58		— 3.57		— 3.51		— 3.31		— 3.29
	— 1 14.39		— 1 15.97		— 1 17.31		— 1 21.87		— 1 35.45		— 1 36.96
	28 41.73		41.65		41.72		41.90 77		41.77		41.74

+ 46.78		+ 54.82	— 32.41	+ 32.55	— 42.11	+ 32.96 ~~33.09~~		+ 26.52	— 40.18	+ 52.38	— 44.40
1.67006		1.73891	1.51108n	1.51255n	1.62439n	1.51970	1.51799	1.42357	1.60401n	1.71917	1.64738n
1.52387n		1.59275n	1.36489	1.36693n	1.47877	1.37408n	1.37237n	1.27795n	1.45839	1.57355n	1.50176
Annual		30 1	30 0	30 1		30 1		30 1	30 0	30 1	30 0
		38.9 +.35	36.2 +.40	19.0 +.47		19.8 +.49		13.0 +.35	24.3 +.47	30.9 +.51	21.8 +.45
		40.2 +.28	38.9 +.11	22.1 +.22		21.1 +.22		12.6 +.26	24.9 +.04	30.2 +.17	22.0 +.06
		55.9 —.13	54.0 —.48	35.9 —.20		36.0 —.20		29.9 —.03	40.9 —.52	47.2 —.56	38.3 —.41
		54.2 +.32	52.1 +.51	35.2 +.60		35.8 +.59		27.8 +.65	40.2 +.51	46.4 +.43	37.1 +.52
		+.82	+.54	+1.09		+1.10		+1.23	+.50	+.55	+.62
		31 47.30	30 45.30	31 28.05		31 28.18	28.18	31 20.82	30 32.58	31 38.68	30 29.80
— 33.41		— 34.15	23.17	—23.28	30.11	—33.66	23.57	— 18.97	28.73	— 37.46	31.75
		31 8.15	8.47	4.77		4.52	4.61	1.85	1.31	1.22	1.55
	+55	51 40.20	39.88	43.58		43.83	43.74	46.50	47.04	47.13	46.80
	— 13	33 2									
		1.14230									
— 1361		— 477		— 13		— 394		— 1116		— 1500	
		1.13753		1.14217		1.13836		1.13114		1.12730	
		+ 13.73		+ 13.87		+ 13.75		+ 13.52		+ 13.41	
— .55		— .76	— .27	— .27	— .45	— .28		— .18	— .41	— .69	— .50
		— .07	— .03	— .06		— .06		— .05	— .02	— .08	— .03
		— .21	— .14	— .27		— .28		— .31	— .13	— .14	— .16
		+12.69	+13.29	+13.27		+13.13		+12.98	+12.96	+12.50	+12.72
	+55	51 5289	53.17	56.85		~~56.96~~	56.87	59.48	60.00	59.63	59.52
		53.03						59.74		59.58	
+ 4.92		+ 4.66		+ 4.43		+ 3.76		+ 1.74		+ 1.56	
+ .16	64	+ .16	1306	+ .16	10.20	+ .16	44	+ .17	10.19	+ .17	10.22
+4 13.48	+4 13.32	+4 12.90	+4 ~~12.74~~	+4 10.04	+4 ~~9.88~~	+4 10.28	+4 10.12	+4 10.03	+4 ~~9.83~~	+4 10.05	+4 ~~9.84~~
+4 18.56		+4 17.72		+4 14.63		+4 14.28		+4 11.93		+4 11.78	
		56 10.44		11.48		+16 11.07		11.67		11.36	
		75									

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1878.0

Bootis — α 14 34 49.44 — +22° 29′ 57.6″ — log sin δ

| | | |

1878phae.proj.1496.

1878

Virginis (718 B)

α 38 55.14 −0° 54′ 3.6 log r δ

14h 39m.0 .11 .8 " cos δ 9.99995
−0° 54′ .20 .7
.22 .8 " 15 cos δ tan i 0.10545n Str. June 5
.16 3.9 0.10602n after "
.09 2.6

+43 17 tan δ −0.02
14 38 55.15 −0 54 3.6
57 sin z +.69

June 4			June 5		June 6			June 9			June 19			June 20		
40 10.6	39 51.58		39 41.7		39 53.00	39 37.2	39 07.40	39 44.5	39 39.57		40 0.0			40 12.70	39 56.6		40 14.30	
12.3	53.69		44.3		53.00	39.8	06.45	46.4	12.3		1.3			14.73	55.0		16.42	
14.9	55.73	55.70	46.3	57.15	57.20	41.4	58.55	08.60	48.4	3.89	3.38		16.83	16.80	57.9		18.43	18.41
16.6		57.80	48.4		59.20	42.8		06.4	50.4		5.51			18.90	1.4			20.45
18.0		59.90	50.0		1.33	44.8		2.65	52.1		7.45			21.00	3.6			22.55
		2.92	40 31.4		4.40	40 34.5		6.00	40 41.7		10.60		40 57.4	24.05	40 52.8		25.60	
		4.95	33.2		6.44	36.1		8.00	43.2		12.60		59.4	26.25	55.4		27.86	
	7.04	7.04	34.8	8.53	8.53	37.7	10.02	10.00	44.9	14.71	14.70		1.4	28.31	28.35		29.81	29.88
		9.00	37.5		10.60	39.0		12.00	46.4		16.80		3.5	30.40	58.8		31.88	
		11.30	39.5		12.67	40.1		14.10	48.1		18.85		5.3	32.50	0.8		33.90	
		14.30			15.75			17.86			21.95			35.45			36.98	
		16.39			17.80			19.40			24.00			37.60			38.95	
	18.43	18.40		19.84	19.85		21.36	21.30		26.02	26.05			39.68	39.80		41.12	41.17
		20.50			21.89			23.48			28.05				41.73			43.20
	2120	23.55		25.52	23.90		29.93	25.48		44.12	30.03			8482	43.82		89.36	45.35
40 14.48			39 46.14			39 41.20			39 48.36			40 3.76				39 59.90		
	40 7.067		40 35.28	40 8.507		40 37.48	40 9.977		40 44.86	40 14.707		41 1.40		40 28.273		40 56.96	40 29.787	
	−1 8.87			−1 10.34			−1 11.72			−1 16.43				−1 30.08			−1 31.68	
	+0.03			+0.03			+0.03			+0.03				+0.03			+0.03	
	−3.09			−3.09			−3.09			−3.09				−3.06			−3.05	
	−1 11.93			−1 13.40			−1 14.78			−1 19.49				−1 33.11			−1 34.70	
	38 55.14			55.11			55.20			55.27				55.16			55.09	
−7.41			+22.37		−26.77	+28.78		−27.50	+26.35		−30.15	+24.51		+33.13		+29.89		−27.17	
0.86982n			1.34967		1.42765n	1.45909		1.43933n	1.42078		1.47929n	1.38934		1.52022n		1.47553		1.43109n	
0.99727			1.45512n		1.53310	1.56511n		1.54535	1.52680n		1.55531	1.49536n		1.62624n		1.58155n		1.54011	
20 0			20 0		15 4	20 0		15 4	20 0		15 4	20 0		15 4		20 0		15 4	
5.7	+.07		42.9	+.28	40.3	+.30	46.9	+.22	35.6	+.41	44.1	+.27	32.0	+.48	42.9	+.28	29.1	+.52	51.1	+.16	37.4	+.36
11.7	+.10		50.9	+.30	47.7	+.20	56.1	+.24	43.3	+.16	51.9	+.29	40.2	+.08	48.4	+.30	35.1	+.01	55.1	+.25	42.8	+.14
31.8	−.10		8.5	−.11	3.2	+.03	12.2	−.27	58.0	−.06	9.9	−.17	56.2	−.19	8.2	−.10	53.0	−.49	15.9	−.40	0.0	+.00
27.3	+.46		0.8	+.59	58.3	−.02	6.9	+.72	54.4	−.01	4.1	+.67	53.0	+.01	1.0	+.59	48.8	+.05	9.1	+.73	45.7	+.09
	+.53			+1.06		+.51		+.91		+.50		+1.06		+.38		+1.07		+.09		+.74		+.59
20 19.12			20 55.78		19 52.38		21 0.52		19 47.82		20 57.50		19 45.35		20 55.12		19 41.50		21 2.80		19 46.48	
9.45			−28.52		34.13		−36.74		35.10		−33.63		38.46		−31.29		+42.29		−38.16		34.68	
20 28.57			27.26		26.51		23.78		22.92		23.87		23.84		23.83		59.21		24.64		21.16	
																	23.79					
57 40.22			38.91		38.16		35.43		34.57		35.52		35.49		35.48		35.44		36.29		32.81	
																	10.86					

+43 16 18
1.71850 1.73370

	−1331			−437			+31			−352			−1078			−1470						
	1.72039			1.73233			1.73401			1.72018			1.72292			1.71900						
	−52.53			−53.62			−54.20			−53.72			−52.84			−52.36						
	00			00		+.01	+.01		+.01	+.01		+.01	+.01		+.01	+.01		+.01	+.01				
	−.01			−.04		−.20	−.04		−.19	−.04		−.19	−.04		−.19	−.05		−.24				
	−.13			−.27		−.13	−.23		−.13	−.27		−.10	−.27		−.02	−.19		−.15				
	−52.67			−53.93		−53.94	−54.46		−54.51	−54.02		−54.00	−53.14		−53.08	−52.59		−52.74				
58 32.89			32.84		32.10	29.89		29.08	29.52		29.49	28.62		28.48	28.88		25.55					
			32.47			29.48			29.52			28.55			27.22							
	+ 16.33			+16.25			+16.32			+15.93			+15.14			+15.06			+15.0			
	− .47			− .47			− .47			− .48			− .50			− .50						
+4 13.48	+4 13.01		+4 12.90	+4 12.43		+4 10.04	+4 9.57		+4 10.28	+4 9.80		+4 10.02	+4 9.52		+4 10.05	+4 9.53						
+4 29.34			+4 28.68			+4 25.74			+4 25.73			+4 24.66			+4 24.61							
3 2.23			+.15			55.22			55.25			53.21			51.83							
−0 58.4 3.55			3.79			3.74			3.79			3.89			2.61							

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α 14h 58m.6 +60° 41'

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