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KG
11366
v.495

Miscellaneous Stars -
Observed with Meridian Circle
1878 -

Observations and Reductions

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Comparison Stars for Eva (164) March 4, 1878

	log cos δ	9.86873			9.86632			9.86591			9.86626	log R_1 / R_2	1.48979 / 1.18912
	" 15 sec Stars	9.97158n			9.96917n			9.96876n			9.96911		
	tan δ	+.91			+.92			+.92			+.92	R_1 / R_2 / I	δ 30.89 / 15.46 / 2.81
	D.M.	+42°, 1560		1565			1575			1577			
h	m s	m s	m s						[8.7]				
6	21 9.0	21 10.0	21 25.6	22 53.4	22 39.2		25 56.3	25 53.4	26 —	27 46.6	—	—	
	12.3	13.4	28.6	58.9	42.0		58.6	56.1	11.5	49.0	—	—	
	15.5	16.0	31.2	59.7	44.8	44.84	2.7	59.0	14.2	52.0	—	—	
	17.8	18.6	34.3	2.0	47.8		6.0	1.5	16.9	54.4	—	—	
	20.3	21.3	36.9	5.0	50.4		13.8	4.6	19.9	56.0	—	—	
		22 11.8	41.2	23 31.0	22 54.7			26 54.7	26 24.0	28 7.8	27 49.9	27 —	
		14.5	43.9	34.0	57.7			57.7	26.7	12.0	53.0	—	
		17.3	46.6	37.1	0.4	0.86		0.6	29.8	16.6	56.6	24.8	24.5
		20.2	49.4	39.0	3.2			3.4	32.6		58.4	.6	27.4
		23.1	52.2	42.2	5.8			6.5	35.3		1.1	.5	30.1
		15.86	56.4		23 10.1			58.90	26 39.6		24.83	24.83	34.4
		31.32	59.2		12.9			14.24	42.3		.68	40.14	37.2
		46.66	2.0		15.8	15.70		29.68	45.3		.71	58.60	40.0
		2.00	4.8		18.4			45.20	47.9				43.1
		17.38	7.6		21.3	60.90		0.58	50.9				46.0
Is	21 14.98	113.22	m s	22 59.20			26 3.48	148.60		27 51.88			
		Im	21 46.644	23 36.72		23 0.300			26 29.720	28 12.13			27 24.640
		Δ Im	−5.080			−5.080			−5.080				−5.080
		n tan δ	−.728			−.736			−.736				−.736
		Σ	−5.808			−5.816			−5.816				−5.816
		App α	21 40.84			22 54.48			26 23.90				27 18.82
		Red	−2.41			−2.42			−2.45				−2.48
		α 1878.0	21 38.43			22 52.06			26 21.45				27 16.34
Im − Is	+31.66			+1.10	−36.42		+26.24			−26.94	−47.49		
log (u / Rm	1.50051			0.04139	1.56134n		1.41896			1.43040n	1.67660n		
" Rm	1.47209n			0.07056n	1.53051		1.38772n			1.39951	1.6467		
	5′ 1′			45 0	40 4		40 2			40 3	43 3		
ε	30.6 +.41			6.2 +.08	30.1 +.51		21.0 +.49			42.6 +.36	21.6 +.68		
ζ	35.1 +.18			9.8 +.09	33.0 +.01		25.0 +.25			45.3 +.32	24.7 +.18		
η	47.7 −.87			21.9 −.34	46.1 −.56		36.4 −.18			57.9 +.09	37.2 −.19		
H	43. +.41			18.5 +.35	41.1 +.14		33.3 +.47			54.9 +.04	33.4 +.33		
Mean	6′ 39.12			45 14.10	44 37.32		42 25.92			43 50.18	43 29.22		
Rm.	−29.65			−1.02	33.92		−24.42			25.09	44.23		
Σ	6 9.47			45 13.08	45 11.24		42 4.50			44 15.27	44 13.45		
δ +42°	16′ 38.88			37 35.27	37 37.11		40 43.86			38 33.08	38 34.90		
Ref.	−.01			+.31	+.31		+.38			+.33	+.83		
Rmd.	−.16			00	−.35		−.18			−.20	−.62		
Rso.	−.28			−.03	−.78		−.36			−.66	−.60		
Rdv.	−.12			−.014	−.02		−.26			−.20	−.22		
Σ	−.67			+.24	−.84		−.42			−.73	−1.11		
δ 42°	16′ 38.31			37 35.51	36.27		40 43.43			38 32.35	33.79		
				36.27						33.79			
δ	16 38.31			37 35.89			40 43.43			38 33.07			
Red. to 1878.0	−12.69			−12.67			−12.62			−12.60			
Rtg + Rfl.	+ 4 6.5			4 6.5			4 6.5			4 6.5			
1878.0 δ 42°	20 32.1			41 29.7			44 37.3			42 27.0			

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Reduction to
Apparent place.

Mar. 4, 1878.

δ	42° 20'.5	42° 41'.8
$\mathcal{G}$	21h 8m.6	21h 8m.5
α	6 21.6	6 27.2
$\mathcal{H}$	19 7.9	19 7.9
$\mathcal{G}+\alpha$	3 27.1	3 32.7
$\mathcal{H}+\alpha$	1 29.5	1 35.1
log tang δ	9.9596	9.9650
" $\frac{1}{15}$	8.8239	8.8239
" sin$(\mathcal{G}+\alpha)$	9.8952	9.9033
" ϱ	1.0443	1.0443
" cos$(\mathcal{G}+\alpha)$	9.7915	9.7777
" sec δ	0.1313	0.1387
" $\frac{1}{15}$	8.8239	8.8239
" sin$(\mathcal{H}+\alpha)$	9.5805	9.6065
" ϱ	1.2761	1.2761
" cos$(\mathcal{H}+\alpha)$	9.9660	9.9615
" sin δ	9.8234	9.8313
" i	0.8942n	0.8942n
" cos δ	9.8687	9.8663
" $I\alpha$	9.7230	9.7365
" $II\alpha$	9.8118	9.8392
" $I\delta$	0.8358	0.8220
" $II\delta$	1.0655	1.0689
" $III\delta$	0.7629n	0.7605n
f	+ 1.s232	+ 1.s282
$I\alpha$	.528	.545
$II\alpha$	.648	.691
Σ	2.408	2.468
$I\delta$	6".85	6".64
$II\delta$	11.63	11.72
$III\delta$	−5.79	−5.76
Σ	12.69	12.60

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Comp. Star (Peters)

log sin δ	9.30826
" cos δ	9.99083
" 15 cos δ sin 1"	0.09368n
tan δ	+.21

α 10 h 43 m 49 s
δ +11° 44'

1878

	Apr. 8			Apr. 13			Apr. 14		
	h m s	m s							
	10 43 58.3	44 0.1		43 47.3	44 3.3		44 11.0	44 4.0	
	1.1	2.2		50.0	5.6		14.3	6.1	
	3.6	4.5	4.46	52.3	7.4	7.54	18.6	8.2	8.30
	6.8	6.8		54.3	9.6			10.5	
	7.6	8.7		56.3	11.8			12.7	
	44 41.3	11.6		44 42.9	14.9			15.6	
	43.4	13.8		45.1	17.1			18.0	
	45.8	15.9	15.86	47.6	19.0	19.12		19.8	19.88
	48.0	18.0		49.8	21.2			22.0	
	50.6	20.0		51.2	23.4			24.0	
		23.2			26.5			27.1	
		25.1			28.5			29.4	
		27.0	27.26		30.6	30.70		31.5	31.48
		29.3			32.9			33.6	
		31.7			35.0			35.8	
I δ	m s 44 3.26		m s	43 52.04			44 14.63		
I δ	44 45.82	I m	44 15.860	44 47.32		44 19.120			44 19.887
ΔI+m			s -23.518			-26.890			-27.718
n tan δ			-.189			-.195			-.186
Σ			-23.707			-27.085			-27.904
App α			m s 43 52.15			43 52.024			43 51.98
Red.			-2.60			-2.56			-2.55
α 1878.0			43 49.55			49.48			49.43

Im-I δ	s +12.60	s -29.96		+27.08	-28.20		+5.26		
log(")	1.10037	1.47654n		1.48265	1.45025n		0.72099		
" Rin	1.19405n	1.57022		1.52633n	1.54393		0.81467n		
	40' 3"	40' 2"		40 3	40 2		40 2		
ε	7".2 +.26	11".3 +.28		22.7 +.59	15.3 +.38		57.1 +.16		
F	13.2 +.30	17.6 +.32		29.8 +.15	22.1 +.28		3.8 +.28		
G	27.7 +.01	32.1 .00		44.4 -.46	36.5 -.19		18.1 -.32		
H	21.7 +.34	25.6 +.47		38.9 +.26	31.1 +.48		11.5 +.40		
	+.91	+1.07		+.54	+.95		+.52		
Mean	43' 17".45	42' 21".65		43 33.95	42 26.25		43 7.62		
Rim.	-15.64	37.17		-33.60	34.99		-6.53		
Σ	43 1.81	42 58.82		43 0.35	43 1.24		43 1.09		
δ +11°	39' 46".64	39' 49".53		39 48.01	39 47.11		39 47.26		
z +30°	39' 8"	38 .13		39 25	38 17		38 59		
μ+log πz	1.53294	1.53266		1.53302	1.53269		1.53290		
B+H+γ	+1361	+1351		+79	+79		+480		
Σ	1.54645	1.54617		1.53381	1.53348		1.53770		
Rst	-35".19	-35".17		-34.18	-34.16		-34.49		
Rnd	-.01	-.09		-.08	-.08		.00		
Rns	-.33	-.24		-.36	-.24		-.31		
Rdn	-.23	-.27		-.14	-.24		-.13		
Σ	-35.76	-35.77		-34.76	-34.72		-34.93		
δ 11°	39' 10".78	13".76		39 13.24	12.39		39 12.33		
Mean δ	39 12.27			39 12.82					
Reg+Rf2	4 10.5			4 10.5			4 10.5		
App δ 11°	43 22.8			43 23.3			43 22.8		
Red. to 1876.0	+11.7			+11.4			+11.3		
1878.0 δ	43 34.5			34.7			34.1		

Mean place 1878.0

α	δ
h m s	° ' "
10 43 49.55	+11 43 34.5
.48	34.7
.43	34.1
10 43 49.49	+11 43 34.4

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Comp. Star (Upton)

α 10h 28m 39s

δ + 15° 14'

log cos δ 9.41951

" cos δ 9.98447

" 15 cos δ tan 0.08732n

" tan δ +.27

Apr. 8

h	m	s	m	s			
10	28	37.8	28	38.8	50.6		
		40.0		41.2	52.6		
		42.1		43.1	54.8		
		43.9		48.2	57.2		
		46.0		47.1	59.0		
	29	37.5	29	2.3	14.0		
		39.2		4.2	16.0		
		41.1		6.5	18.2		
		44.4		8.8	20.4		
		46.5		11.0	22.7		
				43.08	25.8		
				54.84	27.9		
				6.56	30.0		
				18.26	32.2		
				30.04	34.3		
	m	s			m	s	
	28	41.96			29	6.556	
	29	41.74				s	
						-23.512	
						- .243	
						-23.755	
					m	s	
					28	42.80	
						- 2.60	
					28	40.20	

	s	s	
	+24.60	-35.18	
	1.39094	1.54680n	
	1.47826n	1.63362	
	10' 3'	10' 2'	
	17.9 +.51	6.0 +.13	
	23.6 +.20	10.8 +.34	
	39.4 -.29	26.4 -.04	
	32.9 +.33	19.8 +.46	
	+.75	+.89	
	13' 28.45	12' 15.50	
	- 30.08	43.02	
	12 58.37	12 58.52	
+15°	9' 45.98	9' 49.83	
+27°	9' 19"	8' 7"	
	1.47030	1.46993	
	+1328	+1328	
	1.48358	1.48321	
	- 30.45	- 30.42	
	- .08	- .17	
	- .35	- .23	
	- .19	- .22	
	- 31.07	- 31.04	
15°	9' 18.91	18.79	
	9 18.85		
	4 10.4		
15°	13' 29.2		
	+ 9.9		
	13 39.1		

Apr. 13

28	37.5	28	42.3
	40.0		44.3
	42.6		46.3
	43.6		48.4
	48.8		50.6
29	38.4		29.0
	40.3		31.2
	42.9		33.3
	44.6		35.6
	46.6		37.8
			46.38
			58.12
			9.92
			21.76
			33.38
28	41.90		
29	42.56		

	s	s	
	+28.01	-32.65	
	1.44731	1.51388n	
	1.53463n	1.60120	
	10 3	10 2	
	22.2 +.58	7.9 +.19	
	28.8 +.16	14.5 +.38	
	44.5 -.46	30.0 +.04	
	37.2 +.28	22.9 +.47	
	+.56	+1.03	
	13 33.18	12 18.82	
	-34.25	39.92	
	12 58.93	12 58.74	
	9 49.42	9 49.61	
	9 24	8 10	
	1.47032	1.46995	
	+47	+47	
	1.47079	1.47042	
	-29.57	-29.54	
	- .11	- .15	
	- .36	- .23	
	- .14	- .26	
	- 30.18	- 30.18	
	9 19.24	19.43	
	9 19.34		
	4 10.4		
	13 29.7		
	+ 9.6		
	39.3		

Apr. 14

28	35.2	28	43.0
	37.0		45.1
	39.4		47.2
	41.5		49.3
	43.8		51.6
29	50.0		30.0
	52.0		32.0
	54.1		34.1
	56.0		36.2
	57.6		38.5
			47.24
			58.96
			10.68
			22.50
			34.16
28	39.38		
29	53.94		

	s	s	
	+31.33	-43.23	
	1.49596	1.63579n	
	1.58328n	1.72311	
	10 3	10 1	
	26.9 +.61	84.8 +.09	
	33.6 +.14	0.4 +.29	
	49.4 -.48	17.8 -.31	
	42.7 +.20	9.8 +.50	
	+.47	+.57	
	13 38.15	12 5.70	
	-38.31	52.86	
	12 59.84	12 58.56	
	9 48.51	9 49.79	
	9 29	7 57	
	1.47035	1.46988	
	+442	+442	
	1.47477	1.47430	
	- 29.84	- 29.81	
	- .13	- .26	
	- .36	- .21	
	- .12	- .14	
	- 30.45	- 30.42	
	9 18.06	19.37	
	9 18.72		
	4 10.4		
	13 29.1		
	+ 9.5		
	38.6		

Mean Place 1878.0

	α			δ		
h	m	s	°	'	"	
10	28	40.20	+15	13	39.1	
		.22			37.3	
		.21			38.6	
10	28	40.21	15	13	39.0	

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Hourly rate - L.

	ΔT+m	Δ	Intvl hours	k	n
	s			s	
Apr. 8.40	-23.490				-.900
		-3.387	120.6	-.028	
13.43	-26.877				-.927
		-0.82	23.8	-.034	
14.42	-27.698				-.885

Flexure and Eq. Joint Corr.

Star	z	sin z	+Hfl sin z	Apr. 8	13	14
	° ′		"	′ "	′ "	′ "
ε Hydrae	+35 30.7	+.581	+.64	4 10.2		
κ Ursa Maj.	-5 15.4	-.091	-.10	8.6		
1 H Drac	-39 29.0	-.636	-.70	10.6		
ε Leonis	+18 2.7	+.310	+.34		4 10.8	4 10.2
χ Ursa Maj.	-17 13.9	-.296	-.33	7.9	7.9	8.6
α Leonis	+29 49.0	+.497	+.58	10.9	10.7	10.6
μ Ursa Maj.	+0 16.1	+.004	00	10.7	9.9	9.8
9 H Drac.	-33 57.6	-.559	-.62		9.6	9.9
46 Leon Min	+7 30.4	+.131	+.14	10.5		11.0
β Ursa Maj	-14 37.3	-.253	-.27		8.6	
δ Leonis	+21 11.3	+.361	+.40		10.1	
				Mean 4′ 9.9	4 9.7	4 10.0
South Joint	Notfz.	sin z	sin z′	9.7		
				10.0		
4′ 9.6	4′ 12.0	.581	-.636			
10.3	11.7	.497	-.559	4′ 9.9	Adopted	
10.1	10.2	.361				
10.8	10.5					
9.7						
9.94		+.483	-.598			
11.10						

	z	sin z	Hfl sin z	Eq. corr. + Reffl.
Peters's Star	30° 38′	+.51	+.6	4′ 10.5
Upton's Star	27° 9′	+.46	+.5	4′ 10.4

1.081) +1.160 / +1.08 = Hfl.

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Reduction to Apparent Place

	Apr. 8		Apr. 13		Apr. 14	
δ	11° 43′.4	15° 13′.5				
$\odot$	h m 21 28.5	h m 21 28.5	h m 21 32.6	h m 21 32.5	h m 21 33.4	h m 21 33.4
~~$\odot$~~ α	10 43.9	10 28.7	10 43.9	10 28.7	10 43.9	10 28.7
$\mathcal{H}$	16 37.1	16 37.1	16 16.3	16 16.3	16 12.2	16 12.2
$\odot+\alpha$	8 12.4	7 57.2	8 16.4	8 1.2	8 17.3	8 2.1
$\mathcal{H}+\alpha$	3 21.0	3 6.8	3 0.2	2 45.0	2 56.1	2 40.9
log tan δ	9.3170	9.4348	9.3170	9.4348	9.3170	9.4348
" 1/15	8.8239	8.8239	8.8239	8.8239	8.8239	8.8239
" sin($\odot+\alpha$)	9.9231	9.9406	9.9181	9.9362	9.9169	9.9352
" q	1.0826	1.0826	1.0873	1.0873	1.0883	1.0883
" cos($\odot+\alpha$)	9.7373n	9.6896n	9.7487n	9.7029n	9.7512n	9.7058n
" sec δ	0.0092	0.0155	0.0092	0.0155	0.0092	0.0155
" 1/15	8.8239	8.8239	8.8239	8.8239	8.8239	8.8239
" sin($\mathcal{H}+\alpha$)	9.8888	9.8602	9.8499	9.8191	9.8420	9.8101
" k	1.2775	1.2775	1.2798	1.2798	1.2803	1.2803
" cos($\mathcal{H}+\alpha$)	9.8058	9.8382	9.8491	9.8761	9.8568	9.8828
" sin δ	9.3079	9.4193	9.3079	9.4193	9.3079	9.4193
" i	0.8860n	0.8860n	0.8713n	0.8713n	0.8679n	0.8679n
" cos δ	9.9908	9.9845	9.9908	9.9845	9.9908	9.9845
" I α	9.1466	9.2819	9.1463	9.2822	9.1461	9.2822
" II α	9.9964	9.9771	9.9628	9.9383	9.9554	9.9298
" I δ	0.8199n	0.7722n	0.8360n	0.7902n	0.8395n	0.7941n
" II δ	0.3912	0.5350	0.4368	0.5752	0.4450	0.5824
" III δ	0.8768n	0.8705n	0.8621n	0.8558n	0.8587n	0.8524n
	s	s	s	s	s	s
f	+1.464	1.464	+1.500	1.500	1.507	1.507
I α	.140	.191	.140	.192	.140	.192
II α	.992	.949	.918	.868	.902	.851
Σ	+2.596	2.604	+2.558	2.560	2.549	2.550
	"	"	"	"	"	"
I δ	−6.61	−5.92	−6.85	−6.17	−6.91	−6.22
II δ	+2.46	+3.43	+2.73	+3.76	+2.79	+3.82
III δ	−7.53	−7.42	−7.28	−7.17	−7.22	−7.12
Σ	−11.68	−9.91	−11.40	−9.58	−11.34	−9.52

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D.M. +51°, 2954.

α 20h 44m 14s

δ +51° 58'

Σ − 9 35

1878

log sin δ 9.78967

" cos δ sin 1' 9.89469n

tan δ + 1.28

	Sept. 2			Sept. 9			Sept. 14		
	h m s	m s	s						
20	45 19.2	45 27.3	45.5	45 35.6	45 45.6	3.9	46 46.2	45 58.00	16.6
	22.0	30.6	49.0	38.6	49.2	7.2	6.8	1.60	20.0
	26.2	33.8	52.3	42.0	52.3	10.6	9.6	4.8	23.4
	29.2	37.2	55.6	46.7	55.4	14.0	12.8	8.3	26.8
	32.3	40.4	59.0	50.9	59.0	17.4	15.9	11.6	30.0
	46 38.30	41.0	3.9	46 31.3	59.0	22.2	47 10.8	12.0	35.2
	42.3	44.1	7.2	33.4	2.4	25.5	13.3	15.3	38.5
	46.1	47.5	10.6	36.2	5.8	29.0	16.4	18.7	41.9
	48.6	51.0	14.0	39.4	9.2	32.1	20.0	22.1	45.1
	51.2	54.2	17.4	42.7	12.5	35.9	22.7	25.3	48.5
		33.92	22.4		52.30	40.9		4.86	53.6
		52.28	25.7		10.62	44.0		23.36	56.8
		10.62	29.0		28.74	47.4		41.84	0.2
		29.10	32.5		47.46	50.9		0.22	3.6
		47.56	35.9		5.78	54.1		18.68	6.9
Iδ	45m 25.78	5348	m s	45 42.64	14510		46 6.26	20896	
Is	46 45.30	Im	46 10.696	46 36.60		46 29.020	47 16.64		46 41.792
		I 3	II 3	III Sept. 2	I 32	II 3	III Sept. 9	I	II 814	III Sept. 14
Δ Is−m	I	II III	−111.497	−111.472	111.486	−130.067	−130.052	130.053	−142.865	−142.780	142.860
n tan δ	from five stars	from all nine stars	1.843	1.843	1.843	−1.786	−1.786	1.786	−1.779	−1.779	1.779
Red to 1878.0			3.122	3.122	3.122	−3.002	−2.994	3.002	−2.902	−2.902	2.902
Σ			1m 56.462	1m 56.437	55.451	2 14.855	2 14.882	14.841	2 27.546	2 27.461	27.541
α 1878.0			44m 14.23	44m 14.26	14.24	44 14.16	44 14.28	14.18	44 14.25	44 14.33	14.25

Results 1878.0

	I	II	III
α =	44m 14.23	14.26	14.24
	14.16	14.21	14.18
	14.25	14.33	14.25
	44 14.21	14.27	14.22

Im − Iδ	+ 44.92	− 34.60		+ 46.38	− 7.58		+ 35.53	− 34.85			
log (")	1.652444	1.53908 n		1.66633	0.87967 n		1.55060	1.54220 n		δ =	' "
" Rin	1.54713 −	1.43377		1.56188	0.77436		1.44529 n	1.43689			57 52.6 44.9
				102							52.8 45.3
	25 4	25 3		25 4	25 3		25 4	25 3			53.5 46.0
Rf	29.1 +.52	26.3 +.61		27.3 +.54	46.0 +.33		15.9 +.44	22.3 +.58			
Rud	28.9 +.03	27.3 +.17		29.6 +.02	48.3 +.34		17.2 +.16	24.9 +.18			
Rm	51.4 −.55	49.8 −.47		49.4 −.54	8.0 +.09		38.0 −.30	46.3 −.49			
Rdr	45.0 +.10	43.1 +.14		42.3 +.13	[1.0] +.06		29.2 +.22	36.5 +.24			
	+.10	+.50		+.10	+.82		+.53	+.56			
Mean	29 38.60	28 36.62		29 37.15	28 55.82		29 25.05	28 32.50			57 52.9 45.4
Rin	−35.25	27.15		−31.88	6.95		−29.88	27.35			
Σ	29 3.35	3.77		29 0.79	1.77		28 57.20	59.85			
δ +51°	53' 45.0"	44.58		47.59	46.58		51.15	48.50			
z − 9°	35' 6"										
μ + log z	0.9879										
B+J+γ	− 165			− 018			− 061				
Σ	0.9714			0.9861			0.9818				
Rrf	+ 9.36			+ 9.68			+ 9.59				
Rud	− .54	− .31		− .57	− .02		− .33	− .32			
Rm	− .41	− .32		− .41	− .35		− .40	− .32			
Rdr	− .02	− .12		− .02	− .20		− .13	− .14			
Σ	+ 8.39	+ 8.61		+ 8.68	+ 9.11		+ 8.73	+ 8.81			
δ	53' 53.39"	53.19		56.27	55.69		59.88	57.31			
Mean	53' 53.29"			55.98			58.60				
Red. to 1878.0	−11.61	− 19.09		−13.46	− 21.01		− 14.80	− 22.27			
Req + Rπ	+ 4 10.7	+4 10.7		+4 10.3	+4 10.3		+4 9.7				
δ 1878.0 51°	57' 52.5"	57' 44.9"		52.8"	45.3"		53.6"	46.0"			

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D. M. +51° 2957.

α 20h 45m 0s

δ +51° 27'

z −9 4

1878.

log sin δ

" cos δ 9.79463

" 15 sin Stand 9.89965m

tan δ +1.25

log R1 1.56142

" R2 1.26075

R1 36.43

R2 18.26

I

	Sept. 15			Sept. 16			Sept. 17		
	h m s	m s	s						
	20 46 44.5	46 49.10	7.3	46 46.4	46 51.9	9.5	46 44.0	46 53.8	12.0
	47.9	52.4	10.8	49.7	54.9	13.0	47.3	57.0	15.2
	50.8	55.9	14.0	53.5	58.1	16.2	50.3	0.4	18.6
	53.5	59.0	17.1	56.4	1.3	19.3	53.1	3.8	22.0
	57.6	2.2	20.5	0.1	4.6	22.9	55.7	7.1	25.3
		—	25.3		—	27.9		—	30.1
		—	28.8		—	31.1		—	33.6
		—	32.3		—	34.5		—	36.9
		—	35.4		—	38.0		—	40.0
		—	38.9		—	41.0		—	43.4
		55.72 32.15	43.7		58.16 34.59	46.0		0.42 36.85	48.4
		13.94 .20	47.0		16.18 .44	49.5		18.62 .88	51.9
		32.14 .14	50.3		34.50 .50	52.8		36.80 .80	53.0
		50.34 .08	53.7		52.78 .52	56.0		55.08 .82	58.3
		—	57.0		—	59.6		—	1.8
	m s	m s		46 53.22		47 34.512	46 50.08		47 36.838
	46 50.86	47 32.142		III Sept. 15		III Sept. 16			III Sept. 17
		−145.s712	−145.s654	145.s715	−148.154	−148.153	148.164	−150.597	−150.596	150.627
		−1.712	−1.712	1.712	−1.656	−1.656	1.656	−1.600	−1.600	1.600
		−2.899	−2.899	2.899	−2.877	−2.878	2.877	−2.856	−2.856	2.856
		m s 2 30.323	m s 2 30.265	30.326	2 32.687	2 32.687	32.697	2 35.053	2 35.052	35.083
			45m s 1.88	1.82		45 1.82	1.81		45 1.79	1.76
		45m s 1.82			45 1.82			45 1.78		

Results 1878.0

					I	II	III
	+ 41.s28		+ 41.29	+ 46.76			
	1.61574		1.61584	1.66987	α =	45m 1.s82	1.s88	1.s82
	1.51539m		1.51549m	1.56982m		1.82	1.82	1.81
						1.78	1.79	1.76
	55′ 4′		55 4	55 4				
						45 1.81	1.83	1.80
	37.″8 +.35		37.3 +.36	40.4 +.30	δ =	27′ 37.″3	29.9	
	40.4 +.09		39.2 +.06	42.4 +.13		37.6	30.2	
	59.1 −.04		57.9 −.07	2.2 +.03		38.6	31.2	
	51.8 +.02		50.4 +.04	55.2 −.01				
	+.42		+.39	+.45				
	59′ 47.″28		59 46.20	59 40.05		27 37.8	30.4	
	−32.76		−32.77	−37.11				
	59 14.52		59 13.43	59 12.94				
+51°	23′ 33.″83		23 34.92	23 35.41				
−9°	4′ 55″							
	0.9640							
	+028		+ 052	− 032				
	1.9668		0.9692	0.9608				
	+ 9.″26		+ 9.32	+ 9.14				
	− .45		− .45	− .57				
	− .43		− .43	− .43				
	− .10		− .10	− .11				
	+ 8.28		+ 8.34	+ 8.03				
	23′ 42.″11		43.26	43.44				
	23′ 42.″11		43.26	43.44				
	−15.″11	22.54	−15.38	22.77	−15.63	23.00			
	+4 10.3	+4 10.3	+4 9.7	+4 9.7	+4 10.5	+4 10.8			
+51°	27′ 37.″3	27′ 29.″9	37.″6	30.″2	38.″6	31.″2			

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St. M. +50°, 3209.

α 20h 45m 48s

δ +50° 19'

z −7 56

1878

log sin δ

" cos δ 9.80519

" .15 cos δ tan i 9.91021 n

tan δ +1.21

log R1 1.55086

" R2 1.28019

R1 35.55

R2 17.79

I 3.23

	Sept. 9			Sept. 14			Sept. 17			
h	m s	m s	s							
20	47 24.1	47 36.0	53.8	47 50.7	47 —	49.0	48 20.0	—	—	
	36.7	39.6	57.1	53.9	—	52.2	22.9	—	—	
	40.2	42.7	0.4	56.8	37.60 37.6	55.6	25.9	—	—	
	43.6	45.9	3.5	59.5	.67 40.9	58.7	29.2	—	—	
	46.1	49.0	6.9	2.5	.54 44.0	2.0	32.3	—	—	
	48 44.7		11.7	48 56.5	42.3	6.7	49 11.6	50.0	48 14.2	
	47.2		14.9	59.1	45.5	10.0	14.2	53.1	17.6	
	49.8		18.1	1.6	48.7	13.1	16.3	56.4	20.6	
	52.5		21.3	4.2	51.9	16.4	20.2	59.8	24.1	
	55.0		24.7	7.0	55.3	19.7	22.9	3.0	27.4	
		42.64			37.60	24.3		—	32.0	
		0.34			55.50	27.8		—	35.3	
		18.14			13.18	30.9		20.78 20.78	38.6	
					30.92	34.1		38.60 .81	42.0	
		112			48.74	37.5		56.86 20.91	45.1	
	m s									
	47 40.14		m s	47 56.62	6594		48 26.06			
	48 49.84		48 0.373	49 1.68		48 13.188	49 17.04		48 20.833	
		I s	II s	III	I	II	III	I	II	III
		−130.067	−130.032	130.054	−142.865	−142.817	142.865	−150.597	−150.598	150.629
		1.688	−1.688	1.688	1.682	− 1.682	1.682	1.549	− 1.549	1.549
		3.046	−3.046	3.046	− 2.952	− 2948	2.952	2.890	− 2.896	2.890
				III Sept. 14			III Sept. 14			III Sept. 17
		m s	m s	s						
		2 14.801	2 14.766	14.788	2 27.499	2 27.447	27.499	2 35.036	2 35.037	35.068
		m s	m s	s						
		45 45.57	45 45.61	45.58	45 45.69	45 45.74	45.69	45 45.80	45 45.86	45.76

Results 1878.0

	s	s				s	s								
	+20.23	−49.47	+16	+16.57	−48.50	23 −5.76	21 −56.74				I s	II s	III	
	1.30600	1.69434 n		1.21932	1.68574 n	0.71850 n	1.74981 n		a =	m	45.57	46.61	45.58	
	1.21621 n	1.60455		1.12953 n	1.59595	0.62871	1.66002				45.69	45.74	45.69	
	' '	' '									45.80	46.80	45.76	
	5 2	5 1		5 2	5 1	5 1	5 0							
	" "	" "									45 45.69	45.72	45.68	
ξ	5.0 +.13	7.5 +.22		0.3 +.07	6.4 +.20	41.1 +.31	58.7 +.13							
η	6.1 +.34	8.4 +.24		0.7 +.24	7.2 +.24	42.8 +.35	1.1 +.17		δ =	°	' "			
ζ	2.58 −.06	28.0 −.07		22.8 −.21	28.7 −.06	2.1 +.13	21.2 −.36			19	55.1	47.5		
H	20.2 +.46	22.7 +.66		13.4 +.49	20.6 +.66	55.9 +.30	14.2 +.71				54.9	47.5		
	+.87	+1.05		+.64	+1.04	+1.09	+.65				56.1	48.7		
	7' 14.28	6' 16.65		7 9.30	6 15.72	6 50.48	6 8.80			19	55.3	47.9		
	− 16.45	40.23		− 13.48	39.44	4.25	45.71							
	6 57.83	56.88		6 55.82	55.16	6 54.73	54.51							
+50°	15' 52.52	51.47		52.53	53.19	53.62	53.84							
−7°	57' 12"													
	0.90555													
	−.017			−.061		−.032								
	0.9038			0.8994		0.9023								
	+8.01			+7.93		+7.99								
	−.11	−.66		−.08	−.63	−.02	−.87							
	−.20	−.12		−.19	−.11	−.16	−.16							
	−.22	−.26		−.16	−.26	−.27	−.16							
	+7.48	+6.97		+7.50	+6.93	+7.54	+6.86							
+50°	15' 58.00	58.44		16 0.03	0.12	1.16	0.70							
	15 58.22			16 0.08		0.93								
	−13.64	21.04		−14.84	22.30	−15.65	23.00							
	+4 10.3	+4 10.3		+4 9.7	+4 9.7	+4 10.8	+4 10.8							
+50°	19' 47.5"			54.9"	47.6"	58.7"	48.7"							

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D. M. +50° 32 11.

log sin δ

log R₁ 1.55593
" R₂ 1.25526

α 20h 45m 50s

" cos δ 9.80012

R₁ 35.97
R₂ 18.00

δ +50° 52'

" 15 cos δ tan i 9.90514n

I 3.27

z − 8 29

tan δ +1.23

1878

	Sept. 2			Sept. 15				Sept. 16			
h m s		m s									
20 47 18.1		47 23.9	48 27.0	—	—	48 35.3	—	48 —	
22.0		27.0	30.3	—	—	38.5	—	—	
25.4		30.34 30.3	35.0	—	4.33 —	41.8	—	—	
29.1		33.6	(38.9?	—	7.6	44.8	—	6.73 10.0	
31.9		36.9		—	.36 10.9	47.2	—	.66 13.2	
48 18.9		41.8	49 4.5	52.0	15.7	49 8.3	54.1	18.0	
21.9		45.0	6.6	53.1	19.2	11.2	57.4	21.3	
24.0		48.32 48.4	9.0	58.3	22.4	13.6	06	24.6	
27.3		51.6	11.3	1.8	25.7	17.0	4.0	28.0	
30.2		54.8	14.3	4.9	28.9	19.1	7.1	31.1	
		59.7		—	33.9	—		36.0	
		3.0		4.34 22.34	37.3		6.70 24.70	39.3	
		6.24 6.3		22.38 .38	40.4		24.60 .60	42.6	
		9.4		40.42 .42	43.5		42.60 .60	46.0	
		14.90 12.8		58.42 .45	47.0		0.64 .67	49.1	
m s									
47 25.30		m s	48 30.77			48 41.52			
48 24.46		47 48.300	49 9.14		48 22.398	49 13.84		48 24.342	
~~111.586~~	I s	II s E7	III s	I	II	III	I	II	III
	−111.497	−111.586	111.490	−145.712	−145.654	145.715	−148.154	−148.156	148.166
	1.771	− 1.771	1.771	1.685	− 1.685	1.685	− 1.630	− 1.630	1.630
	3.151	− 3.151	3.151	− 2.920	− 2.916	2.920	− 2.898	− 2.898	2.898
			III s Sept.2			III Sept. 15			III Sept. 16
	m s	m s	56.412	2 30.317	−2 30.255	30.320	2 32.682	−2 32.684	32.694
	1 56.419	−1 56.398							
	m s	m s							
	45 57.88	45 51.90	57.89	45 52.08	45 52.14	52.08	45 51.96	45 51.96	51.95

Results 1878.0

	+23.00	−36.16		−8.37	−46.74		−16.88	−49.20		m s	s s
	1.36173	1.55823n		0.92273n	1.66969n		1.22737n	1.69197n	α =	45 51.88	51.90 51.89
	1.26687n	1.46337		0.82787	1.57483		1.13251	1.59711		52.08	52.14 52.08
										51.96	51.96 51.95
	35 0	30 4		30 4	30 4		30 4	30 4			
										45 51.97	52.00 51.97
[33]	43.3 +.27	25.8 +.54		44.6 +.21	13.9 +.40		37.9 +.35	10.1 +.32		"	
	13.1 +.10	25.9 +.06		46.2 +.19	15.6 +.17		39.8 +.08	12.3 +.19	δ =	51 ~~50.5~~	42.9
	36.2 −.28	48.9 −.60		4.2 +.03	34.6 −.10		58.4 −.05	31.3 +.01		~~50.8~~	43.4
	30.4 +.50	41.6 +.13		58.8 −.01	28.6 +.23		52.6 +.01	25.0 +.22		~~50.4~~	43.1
	+.59	+.13		+.42	+.70		+.34	+.74			
	35 23.25	34 25.55		34 53.45	34 23.18		34 47.18	34 19.68		51 ~~50.6~~	43.1
	−18.49	29.06		6.73	87.57		13.57	39.55			
	35 4.76	4.61		35 0.18	0.75		35 0.75	34 59.23			
+50°	47' 43.57"	43.74		48.17	47.60		47.60	49.12			
−8°	29' 5"										
	a 9340										
	−165			+028			+052				
	0.9175			0.9368			0.9392				
	+8.27			+8.65			+8.69				
	−.14	−.35		−.02	−.58		−.08	−.65			
	−.04	−.41		−.44	−.40		−.43	−.39			
	−.15	−.03		−.10	−.18		−.10	−.18			
	+7.94	+7.48		+8.09	+7.49		+8.08	+7.47			
	47' 51.53	51.22		56.26	55.09		55.68	56.59			
	47' 51.38"			55.68			56.14				
	~~+11.62~~	19.14		~~−15.14~~	22.55		~~−15.40~~	22.79			
	+4 ~~10.7~~	+4 10.7		+4 ~~10.3~~	+4 10.3		+4 ~~9.7~~	+4 9.7			
+50°	51' ~~50.5~~"	51' 42.9"		~~50.8~~"	43.4"		~~50.4~~"	43.1"			

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Values from all the stars observed on the given dates.

	Sidt. h m	ΔT+m s	Δ	Int. in hours	h s	h °	n	Revised values ΔT+m	Revised values h
Sept. 2	19 54	−111.380						−111.380	−.127
		129	18.598	168.35	.110	−.110	−1.440		
9	20 15	129.978				.108	1.395	129.980	.147
			12.708	119.25	.106				
14	19 36	142.686				.112	1.390	142.687	.153
			2.778	23.45	.118				
15	19 3	146.464				.112	1.370	145.465	.147
			2.519	24.07	.105				
16	19 7	147.983				−.104	1.325	147.983	.111
			2.496	24.48	.102				
17	19 36	−150.479				−.102	−1.280	150.479	.129

Values from five stars nearest the Sun stars to be compared.

								Flexure. No. of Zenith	Flexure. No. of Zenith		
Sept. 2	20 4	−111.420						So. of Zenith	No. of Zenith	ei z	ei z'
			18.658	168.80				4 10".1	4 9".2	.236	.159
9	20 52	−130.078						4 08.8	9.3	.711	.187
			12.798	120.00				9.5	9.0	.353	.464
14	20 52	−142.876						10.4	11.4	.159	.770
			2.724	23.93		1.081	.63 (.59 = Hfl.	10.2	10.8	.253	.697
15	19 48	−145.600						10.0	9.8	.531	.726
			2.450	23.92				8.8		.557	
16	19 43	−148.050						9.4		.473	
			2.470	24.27				10.2		.219	
17	19 59	−150.520						4′ 9".62	4′ 10".25	.417	.664

Flexure and Equator Point correction.

Star	z	ei z	− Rfl = + Hfl ei z	Sept. 2	9	14	15	16	17
	° ″		″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
γ Drac.	−9 7.4	−.159	−.09	4′	4′	4′ 8.8	4′ 9.3	4′	4′
ο Herc.	+13 38.0	+.236	+.14			9.3	11.0	10.2	
η Serp.	+45 18.5	+.711	+.43			8.7	9.6	9.4	
109 Herc.	+20 39.9	+.353	+.21			9.4	10.5	9.2	
α Lyrae	+38 42.5	+.065	+.04						10.8
β Lyrae	+33 9.5	+.159	+.09					10.0	11.0
ζ Lyrae	+36 28.2	+.113	+.07	10.7	9.9				11.5
κ Cygni	−10 45.8	−.187	−.13	8.8	9.6	9.7	9.1	8.6	
β Cygni	+14 40.5	+.253	+.15	10.6	10.4	10.1	10.5	9.9	
γ Aquilæ	+32 3.8	+.531	+.32				10.1	10.1	10.6
α Aquilæ	+33 50.0	+.557	+.33			8.5	8.8	9.3	9.7
31 Cygni	− 3 59.5	−.070	−.04	10.5					
β Delph.	+28 12.5	+.473	+.28		10.5	9.7		8.4	10.0
α Cygni	− 2 27.9	−.043	−.03	11.7	10.8	10.7			
ν Cygni	+1 40.9	+.029	+.02	11.4	11.3	10.7	10.5		11.2
4 Cygni	+12 39.2	+.219	+.13		10.8	9.8			
τ Cygni	+4 51.3	+.085	+.05		9.0	10.0			
β Cephei	−27 38.7	−.464	−.28			8.7			
51 Cephei	−50 23.3	−.770	−.46	10.5	~~10.5~~	10.5	12.1	10.7	10.8
δ Ursa Min.	−44 13.7	−.697	−.42			10.1	10.8	10.4	10.5
2 Ursa Min.	−46 33.5	−.726	−.44		9.4				
			R_{eq}	4′ 10".60	4′ 10".14	4′ 9".65	4′ 10".21	4′ 9".65	4′ 10".68

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Reduction Mean to Apparent Place.

	Sept. 2	Sept. 2	9	Sept. 9	Sept. 14	14	Sept. 15	Sept. 16	15	Sept. 17	Sept. 17	16
δ	51° 58′	50° 52′	51° 58′	50° 19′	51° 58′	50° 19′ 51 27	51° 27′	50° 52′	50° 52′	51° 27′	50° 19′	51° 27′
$\mathcal{G}$	h m 22 43.1	h m 22 43.1	h m 22 44.0	h m 22 44.0	h m 22 44.7	h m 22 44.7	h m 22 44.9	h m 22 45.1	h m 22 44.9	h m 22 45.3	h m 22 45.3	h m 22 45.1
α	20 44.2	20 45.8	20 44.2	20 48.7	20 44.2	20 45.7	20 45.0	20 45.8	20 45.8	20 45.0	20 45.7	20 45.0
$\mathcal{H}$	7 24.5	7 24.5	6 55.4	6 55.4	6 34.3	6 34.3	6 30.1	6 25.8	6 30.1	6 21.6	6 21.6	6 25.8
$\mathcal{G}+\alpha$	19 27.3	19 28.9	19 28.2	19 29.7	19 28.9	19 30.4	19 29.9	19 30.9	19 30.7	19 30.3	19 31.0	19 30.1
$\mathcal{H}+\alpha$	4 8.7	4 10.3	3 39.6	3 41.1	3 18.5	3 20.0	3 15.1	3 11.6	3 15.9	3 6.6	3 7.3	3 10.8
log tan δ	0.1067	0.0896	0.1067	0.0811	0.1067	0.0811	0.0986	0.0896	0.0896	0.0986	0.0811	0.0986
" $\frac{1}{15}$	8.8239	8.8239	8.8239	8.8239	8.8239	8.8239	8.8239	8.8239	8.8239	8.8239	8.8239	8.8239
" sin(H+α)	9.9677 n	9.9665 n	9.9670 n	9.9659 n	9.9665 n	9.9653 n	9.9657 n	9.9649 n	9.9651 n	9.9654 n	9.9648 n	9.9655 n
" $\mathcal{G}$	1.2991	1.2991	1.3057	1.3057	1.3101	1.3101	1.3109	1.3117	1.3109	1.3126	1.3126	1.3117
" cos (")	9.5708	9.5778	9.5746	9.5815	9.5778	9.5847	9.5824	9.5869	9.5860	9.5842	9.5874	9.5883
" sec δ	0.2103	0.1999	0.2103	0.1948	0.2103	0.1948	0.2054	0.1999	0.1999	0.2054	0.1948	0.2054
" $\frac{1}{15}$	8.8239	8.8239	8.8239	8.8239	8.8239	8.8239	8.8239	8.8239	8.8239	8.8239	8.8239	8.8239
" sin(H+α)	9.9466	9.9482	9.9128	9.9148	9.8819	9.8843	9.8763	9.8704	9.8776	9.8616	9.8629	9.8690
" $\mathcal{G}$	1.2776	1.2776	1.2751	1.2751	1.2739	1.2739	1.2737	1.2735	1.2737	1.2734	1.2734	1.2735
" cos (")	9.6691	9.6633	9.7597	9.7556	9.8114	9.8081	9.8189	9.8264	9.8172	9.8366	9.8352	9.8280
" sin δ	9.8963	9.8997	9.8963	9.8863	9.8963	9.8863	9.8932	9.8897	9.8897	9.8932	9.8863	9.8932
" i	0.8847	0.8847	0.8998	0.8998	0.9064	0.9064	0.9074	0.9082	0.9074	0.9089	0.9089	0.9082
" cos δ	9.7897	9.8001	9.7897	9.8052	9.7897	9.8052	9.7946	9.8001	9.8001	9.7946	9.8052	9.7946
" Ia	0.1974 m	0.1791 m	0.2033 m	0.1766 m	0.2072 m	0.1804 m	0.1991 m	0.1903 m	0.1895 m	0.2005 m	0.1824 m	0.1997 m
" IIa	0.2584	0.2496	0.2221	0.2086	0.1900	0.1769	0.1793	0.1677	0.1751	0.1643	0.1550	0.1718
" I δ	0.8694	0.8769	0.8802	0.8872	0.8879	0.8948	0.8933	0.8986	0.8969	0.8968	0.8990	0.8950
" II δ	0.8430	0.8306	0.9311	0.9170	0.9816	0.9683	0.9858	0.9896	0.9806	1.0032	0.9949	0.9947
" III δ	0.4558 m	0.4287 m	0.4254 m	0.3852 m	0.3972 m	0.3573 m	0.3784 m	0.3578 m	0.3646 m	0.3374 m	0.3716 m	
	0.6744	0.6848	0.6895	0.7050	0.6961	0.7116	0.7020	0.7083	0.7075	0.7035	0.7141	0.7028
	s	s	s	s	s	s	s	s	s	s	s	s
f	2.884	2.884	2.931	2.931	2.964	2.964	2.970	2.976	2.970	2.983	2.983	2.976
Ia	− 1.575	− 1.510	− 1.597	− 1.502	− 1.611	− 1.515	− 1.582	− 1.549	− 1.547	− 1.587	− 1.522	− 1.584
IIa	1.813	1.777	1.668	1.617	1.549	1.503	1.511	1.471	1.497	1.460	1.429	1.485
Σ	3.122	3.151	3.002	3.046	2.902	2.952	2.899	2.898	2.920	2.856	2.890	2.877
	"	"	"	"	"	"	"	"	"	"	"	"
I δ	7.40	7.53	7.59	7.71	7.72	7.85	7.82	7.92	7.89	7.88	7.94	7.85
II δ	6.97	6.77	8.53	8.26	9.58	9.30	9.68	9.76	9.56	10.07	9.88	9.88
III δ	+4.72	+4.84	+4.89	+5.07	+4.97	+5.15	+5.04	+5.11	+5.10	+5.05	+5.18	+5.04
Σ	19.09	19.14	21.01	21.04	22.27	22.30	22.54	22.79	22.55	23.00	23.00	22.77

			Sept. 2	9	14	15	16	17
Dm. 51°	2954							
	sin z	−.166						
	Rfl.	+".10						
	Reg + Rfl.		4′ 10".7	10".2	9".7	10".3	9".7	10".8
51°	2957							
	sin z	−.157						
	Rfl	+".09						
	Reg + Rfl		4′ 10".7	10".2	9.7	10.3	9.7	10.8
50°	3209							
	sin z	−.138						
	Rfl	+".08						
	Reg + Rfl		4′ 10".7	10".2	9.7	10.3	9.7	10.8
50°	3211							
	sin z	−.148						
	Rfl	+".09						
	Reg + Rfl		4′ 10".7	10".2	9.7	10.3	9.7	10.8

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71 Aquarii.

log sin δ	9.39071 n	log R_1	1.36959
" cos δ	9.98646	" R_2	1.06892
" 15 cos δ tan	0.09253 n	R_1	23.42
		R_2	11.72
		I	2.13
tan δ	− 0.25		
sin z	+ .83		

h m s
22 43 8
° ′
−14 14
+56 37

1878

Gill's Record
Lill [?] perpendicular symmetric between bright and faint stars.

	Nov. 2			Nov. 4			Nov. 6			Nov. 10		
h 22	46 49.2, 57.0, 53.1, 35.0	47 6.00, 8.23, 10.43, 12.50	47 13.8, 15.6, 17.7, 20.0	46 58.34, 0.53, 2.56, 4.70	10.10, 12.33, 14.40, 16.58	46 51.8, 55.0, 56.5, 58.0	47 1.93, 4.00, 6.25, 8.26	13.70, 15.87, 17.97, 20.02	46 16.3, 18.6, 20.7, 22.0	47 13.13, 13.00, 13.07	11.00, 13.00, 15.20	47 20.40, 22.60, 24.75, 26.85
	26.49 56.6	51.79 14.63	89.1 22.0	18.95 6.82	72.03 18.62	281.4 0.1	30.94 10.50	89.78 22.22	100.6 23.0	13.14 17.40		23.53 28.93
	47 43.7, 45.6, 47.6, 49.4	17.78, 19.85, 22.05, 24.30	47 59.6, 1.6, 3.4, 5.2	45.27, 47.33, 49.37, 57.62	21.73, 24.00, 26.05, 28.20	48 4.0, 5.5, 7.1, 9.0	48.88, 50.96, 53.00, 55.18	25.38, 27.48, 29.60, 31.80	48 9.3, 11.5, 12.9, 14.9		55.55, 57.60, 59.90, 1.90	32.10, 34.30, 36.40, 38.50
	23.79 57.6	110.41 26.43	1.68 7.0	247.29 53.70	130.31 30.33	36.7 11.1	265.42 57.40	148.30 34.04	65.6 17.0	298.95	40.00	182.05 40.75
	10.36, 22.08, 33.83	29.63, 31.67, 33.72, 36.00, 38.10	2.59, 14.41, 26.06, 37.77, 49.46		33.50, 35.68, 37.84, 39.85, 42.00		6.19, 17.96, 29.66, 41.35, 53.08	37.10, 39.21, 41.25, 43.38, 45.80		24.71, 13.12.08, 36.41, 48.16, 59.79		44.00, 46.00, 48.10, 50.20, 52.50
		169.14			188.87			206.74				240.50
Σδ	h m s 22 46 52.98	66.27	m s 47 22.09	47 17.82	130.29		46 56.28	148.24		46 20.12	182.17	
Σδ	47 47.58			48 3.36		47 26.458	48 7.34		47 29.648	48 13.12		47 36.43
ΔT + m			−4 10.35			−4 14.34			−4 17.84			−4 24.75
m tan δ			+ .28			+ .28			+ .28			+ .27
Red. to 1878.0			− 4.15			− 4.12			− 4.10			− 4.05
			43 7.87			7.88			7.99 / 8.01			7.90 / 7.89
			ref.									

	Nov. 2		Nov. 4		Nov. 6		Nov. 10	
Tm − Tδ	+ 29.11	−25.49	+8.24	−37.30	+33.37	−37.69	+16.38	−36.69
log (")	1.46404	1.40637 n	0.91593	1.57171 n	1.52336	1.57623 n	1.21245	1.56455 n
" Ri.	1.55657 n	1.49890 x	1.00846 n	1.66424	1.61589 n	1.66876	1.30498 n	1.65708
	35 4	35 3	35 4	35 3	35 4	35 3	35 4	35 3
E	42.1 + .26	33.0 + .56	15.9 + .44	20.1 + .55	49.1 + .11	20.3 + .55	29.2 + .52	23.6 + .60
F	52.6 + .15	42.5 + .28	26.5 + .06	28.9 + .16	57.7 + .06	29.1 + .16	38.5 + .05	31.9 + .15
G	9.2 − .11	59.9 + .16	35.7 − .16	41.2 − .37	9.1 − .10	40.4 − .34	51.8 − .54	46.0 − .48
H	1.2 + .03	52.8 + .06	28.5 + .22	32.3 + .33	1.5 + .04	33.0 + .33	44.3 + .11	38.2 + .27
	+ .33	+ 1.06	+ .56	+ .67	+ .11	+ .70	+ .14	+ .54
Mean	39 56.28	38 4.04	39 26.65	38 30.62	39 59.35	38 30.70	39 40.95	38 34.92
Ri	− 36.02	+ 31.54	− 10.20	46.16	− 41.29	46.64	− 20.18	45.40
Σ	39 20.26	18.58	39 16.45	16.78	39 18.06	17.34	39 20.77	20.32
δ − 14	16 31.91	30.23	16 28.10	28.43	16 29.71	28.99	16 32.42	31.97
z + 56	35 10							
μ + log tan z	1.93981							
B + I + γ	+ 574		+ 2097		+ 1705		+ 1261	
Σ	1.94555		1.96078		1.95686		1.95242	
Rr f	− 88.22		− 91.36		− 90.54		− 89.62	
Rr t	+ .11	+ .08	+ .01	+ .18	+ .14	+ .18	+ .03	+ .18
Rr o	+ .54	+ .42	+ .48	+ .38	+ .60	+ .42	+ .61	+ .47
Rr dr	+ .08	+ .26	+ .14	+ .17	+ .03	+ .17	+ .04	+ .13
Δy − y	— .00	.00	− .01	− .01	.00	.00	.00	.00
ξ	− 1 27.49	− 1 27.46	− 90.74	− 90.64	− 89.77	− 89.77	− 88.94	− 88.84
δ	17 59.40	57.69	58.84	59.07	59.48	58.76	1.36	0.81
Mean	58.54		58.96		59.12		1.08	
Reg + Rf	+ 4 10.42		10.72		10.77		12.29	
Red. to 1878.0	− 20.23		− 20.08		− 19.93		− 19.63	
Σ	+ 3 50.19		50.64		50.84		52.66	
δ, 1878.0 − 14	14 8.35	−1.30 + .24	8.32	−1.17 + .31	8.28	−1.22 + .26	8.42	−1.25 + .30
	ref.		9.2		9.2		9.4	

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1878.0

α

h	m	s	s		
22	43	7.88	7.88	−14	
		7.99	8.01		
		7.90	7.89		
		8.05	8.05		
		7.88	7.84		
		7.88	7.93		
		7.99	8.01		
		7.95	7.95		
		8.07	8.04		
		7.87	7.90		
		7.946	7.950		

δ

°	′	″	″
14	8.3		9.2
	8.3		9.2
	8.4		9.4
	8.6		9.8
	6.8		7.7
	8.7		9.4
	6.8		7.6
	9.3		10.2
	8.2		9.1
	8.7		9.9
	8.21		9.15

For Notes, v. p. 55.

Nov. 12

47	24.4	47	—	47	23.63	48	1.9		—		—	47	25.8	47	—	47	26.45	47	22.8	47	33.60	47	45.50
	26.7		—		25.62		3.7		—		—		27.9	18.90	16.77		28.58		24.9		35.87		47.60
	28.5	16.00	16.0		27.98		6.0		—		—		30.3	19.00	19.00		30.70		26.7		38.10		49.84
	30.2	16.07	18.20		29.98		7.7		—		—		32.2	18.97	21.10		32.90		28.3		40.00		51.97
141.4	31.6	16.04	20.30	189.21	32.07	28.6	9.3		—		—	150.6	34.4	18.84	23.10	153.63	35.00	132.9	30.2	189.82	42.25	249.02	54.15
48	10.0		58.54		35.25			48	0.20		—	48	16.3		1.50		38.05	48	34.1		20.40		57.20
	11.2		0.75		37.27				2.30		—		18.0		3.60		40.30		36.1		22.70		59.29
	14.3		2.86		39.40				4.58		—		19.5		5.80		42.35		39.1		24.90		1.45
	16.4		5.10		41.55				6.58		—	7	21.0		7.87		44.53		41.1		27.00		3.67
703	18.1	14.49	7.24	197.04	43.57			22.36	8.78		—	98.7	22.9	28.87	10.10	211.90	46.65	193.2	42.8	124.24	29.24	307.34	5.73
			16.04		47.00				—	47	48.40				18.93		49.75				37.96		8.80
			27.84		49.00				—	40.94	50.55				30.73		50.95				49.80		11.00
			39.41		51.25				—	41.05	52.63				42.38		54.00				1.47		13.05
			51.22		53.30			52.66			54.80				53.80		56.10				13.09		15.20
			2.89	256.08	55.53			4.47		263.28	56.90				5.77	269.00	58.20				24.85	65.45	17.40
47	28.28		19.7		48.8	48	5.72	204.79			95	47	30.12		211.89		322			47	26.58		7.17
48	14.06			47	39.4					47	40.95	48	19.74			47	42.375	48	38.64			48	1.434
				− 4	27.70					− 4	29.37					− 4	30.73					− 4	50.01
				+	.30					+	.28					+	.29					+	.26
				−	4.03					−	4.02					−	4.00					−	3.80
					8.05						7.89						7.88						7.88
																	7.84						7.93

rej.

	20		58				2						22										
	+11.15		−34.60				−24.76						+12.20		−37.42				+34.84		−37.22		
	1.04922		1.53882 m				1.39305 m						1.08636		1.57078 m				1.54208		1.57078 m		
	1.14175 m		1.63135				1.48558						1.17889 m		1.66331				1.63461 m		1.66331		
	35	4	35	3			35	3					35	4	35	3			35	4	35	3	
	21.6	+.52	26.2	+.61			35.8	+.50					19.0	+.49	18.8	+.53			49.9	+.09	20.8	+.56	
	31.9	+.02	35.7	+.15			45.7	+.19	33				29.3	+.03	28.8	+.16			57.9	+.05	29.3	+.16	
	48.9	−.60	52.0	−.40			0.1	+.16					43.1	−.50	42.1	−.39			11.7	−.22	41.8	−.38	
	41.4	+.14	45.4	+.17			51.1	+.09					32.7	+.22	33.8	+.32			5.1	+.15	35.3	+.31	
		+.08		+.53				+.74	108					+.23	4	+.62				+.07		+.65	
	39	35.95	38	39.82			38	48.18					39	31.02	38	30.88			40	1.15	38	31.80	
		−13.86		42.79				30.59						−15.10		46.06				−43.11		46.06	
	39	22.09		22.61			39	18.77					39	15.92		16.94			39	18.04		17.86	
−14	16	33.74		34.26			16	30.42					16	27.57		28.54			16	27.69		29.32	
		−.282						+.879						+.2169						+.2598			
		1.93699						1.94860						1.96150						1.96544			
		−86.49						−88.84						−91.52						−92.42			
		+.02		+.16				+.08						+.02		+.18				+.16		+.18	
		+.60		+.48				+.19						+.59		+.45				+.60		+.35	
		+.02		+.13				+.24	7					+.06		+.15				+.02		+.16	
		.00		.00				.00						−.01		−.01				−.01		−.01	
		−85.85		−85.72				−88.00						−90.86		−90.75				−91.95		−91.74	
		59.59		59.98				58.42						58.43		59.34				1.44		1.25	
		59.78						58.42						58.88						1.34			
		1062						9.78						1145						10.90			
		−1949						−1942						−1935						−18.23			
		51.13						50.36						52.10						52.67			
		8.65	−1.23	+.06				8.06						6.78	−1.25	+.29				8.67	−1.03	+.29	
		9.8						rej.						7.7						9.4			

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Dec. 7

h	m	s	m	s	m	s
22	47	30.8	47	40.95		52.85
		32.3		43.25		55.00
		34.4		45.30		57.00
		35.7		47.60		59.25
	170.4	37.2	226.70	49.60	285.45	1.35
	48	41.8		28.00		4.52
		43.1		30.12		6.80
		44.7		32.20		8.85
		46.5		34.30		11.00
	224.4	48.3	161.15	36.53	44.27	13.10
				45.22		16.30
				57.09		18.40
				8.85		20.50
				20.53		22.65
				32.23	102.65	24.80

h	m	s	m	s	m	s
22	47	34.85	43.92			
	48	44.88			48	8.784
					−4	57.37
					+	.28
					−	3.73
					43	7.99
						8.01

Dec. 12

47	35.6	47	46.70		58.29	
	36.9		48.75		0.50	
	38.3		50.85		2.60	
	39.7		53.00		4.69	
192.4	41.9	254.42	55.12	12.88	6.80	
48	40.4		33.40		10.10	
	42.6		35.60		12.23	
	44.2		37.73		14.37	
	47.0		40.00		16.50	
223.4	49.2	188.73	42.00	71.80	18.60	
			50.88		21.77	
			2.58		23.85	
			14.36		26.10	
			26.04		28.10	
			37.75	130.22	30.30	

47	38.5	48	7.161			
48	44.7	48		48	14.322	
				5	.295	
				+	.26	
				−	3.698	
					7.95	

Dec. 14

47	36.3	47	48.62		0.27	
	40.1		50.82		2.40	
	42.0		52.80		4.60	
	44.0		54.85		6.70	
210.2	45.8	264.09	57.00	22.72	8.75	
48	45.0		35.60		12.08	
	47.4		37.61		14.18	
	49.3		39.70		16.53	
	51.1		41.80		18.60	
246.3	53.5	198.71	44.00	82.11	20.72	
			52.82		23.68	
			4.54		26.00	
			16.42		27.85	
			27.99		30.05	
			39.775	139.97	32.39	

47	42.05		8.152			
48	49.26			48	16.304	
				5	4.85	
				+	.28	
				−	3.66	
					8.07	
					8.04	

Dec. 16

48	45.0	48	51.20		2.60	
	47.9		53.30		4.78	
	49.9		55.30		6.87	
	51.8		57.57		9.05	
248.3	53.7	276.87	59.50	34.50	11.20	
			37.80		14.48	
			40.00		16.40	
			42.10		18.52	
			44.10		20.68	
		210.25	46.25	92.60	22.60	
			55.37		26.10	
			6.90		28.47	
			18.52		30.40	
			30.48		32.66	
			42.05	152.43	34.80	

[47]						
48	49.66		93.33			
				[48]	18.664	
				−5	7.40	
				+	.24	
				−	3.63	
					7.87	
					7.40	

	+34.78		−36.10		+35.84	−30.36
	1.54070		1.55715n		1.55437	1.48230n
	1.63323n		1.64968		1.64690n	1.57483
	35	4	35	3	35	4 35 3
E	49.9	+.09	22.3	+.58	51.8	+.06 31.0 +.58
I	58.1	+.05	30.3	+.15	1.3	+.00 40.0 +.21
e	7.8	−.05	40.8	−.35	13.3	−.30 51.5 −.42
4	1.3	+.03	32.1	+.33	5.9	+.17 44.9 +.17
		+.12		+.71		−.07 +.54
	39	59.28	38	31.62	40	3.08 38 41.85
		−42.98		44.64		−44.35 37.57
	39	16.30		16.26	39	18.73 19.42
−14	16	27.75		27.91	16	30.38 31.07
		+2819				+1932
		1.968.00				1.95913
		−92.90				−91.02
		+ .16		+ .17		+ .17 +.12
		+ .50		+ .35		+ .55 +.41
		+ .03		+ .18		− .02 + .13
		− .01		− .01		.00 .00
		−92.22		−92.21		−90.32 −90.36
	18	0.17		0.12		0.70 1.43
		0.14				1.06
		+4 1128				941
		− 1990				− 1964
		+3 5338				5177
−14	14	6.76	−1.05	+.21		9.29 −1.07 +.19
		7.6				10.2

				6		
	+34.28		−32.96			
	1.53479		1.51799n			
	1.62732n		1.61052			
	35	4	35	3		
	49.0	+.11	27.2	+.61		
	57.8	+.06	35.7	+.15		
	9.4	−.12	47.2	−.50		
	2.3	+.06	40.7	+.23		
		+.11		+.49		
	39	59.62	38	37.70		
		−42.40		40.79		
	39	17.22		18.49		
	16	28.87		30.14		
		+2270				
		1.962.51				
		−91.73				
		+ .15		+ .14		
		+ .55		+ .40		
		+ .03		+ .12		
		− .01		− .01		
		−91.01		−91.08		
		59.88		1.22		
		0.55				
		9.94				
		− 1755				
		5239				
		8.16	−1.10	+.20		
		9.1				

					+29.01	
					+30.99	
					−31.00	
					1.46255	
					1.55508n	
					35	4
					44.1	+.22
					53.2	+.15
					3.6	+.03
					56.3	−.02
						+.38
					39	54.30
						−35.90
					39	18.40
					16	30.05
						+2539
						1.96520
						−92.30
						+ .11
						+ .59
						+ .10
						− .01
						−91.51
						1.56
						1.56
						1029
						− 1946
						5283
						8.73 −1.38 +.18
						9.9

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73 Aquarii.

h m s 22 46 15	log sin δ 9.15683n	log R_1 1.36057		α h m 22 46	s s 14.92 14.92 8	δ ′ ″ 13 40.4
−8° 15′	" cos δ 9.99548	" R_2 1.05990			14.96 14.98	41.4 40.3 39.2
	" 15 cos δ tan i 0.10155n	R_1 22.94			15.00 14.99	41.3 40.1
		R_2 11.48			.08 15.08	41.5 40.1
		I			.00 15.00	41.2 40.2
+50 38	tan δ −0.15				.03 14.99	39.8 38.6
	sin z +.77				.07 15.12	40.9 40.2
					.14 15.16	39.0 38.1
					.13 15.10	41.2 40.1
					.00 15.03	41.3 40.2
					15.033 15.037	40.79 39.72

Nov. 2 — Nov. 4 — Nov. 6 — Nov. 10

h m s	m s	m s	Nov. 4			Nov. 6			Nov. 10		
22 49 55.1	50 2.00	13.52	50 28.2	50 —	50 17.52	50 0.8	50 9.60	50 21.00	50 7.5	50 16.40	50 27.90
57.0	4.10	15.55	30.2	—	19.65	2.1	11.55	23.10	9.0	18.50	29.90
59.0	6.18	17.72	32.5	—	21.90	3.8	13.68	25.10	11.0	20.65	32.05
1.0	8.27	19.78	34.6	—	23.87	5.6	15.86	27.17	12.7	22.75	34.20
294.3 2.2	30.88 10.83	58.57 22.00	161.7 36.2	—	108.79 25.85	20.1 7.8	68.53 17.84	125.71 29.34	54.5 14.3	103.13 24.83	160.35 36.30
51 1.3	48.00	25.05	51 12.5	52.00	29.00		55.45	32.55		2.28	39.35
3.0	50.05	27.10	14.2	54.18 [31.28]	30.28		57.50	34.52		4.37	41.47
4.9	52.08	29.18	15.8	56.15	33.24		59.59	36.63		6.50	43.60
6.7	54.10	[31.16 33.26] 82.46	17.7	58.10	35.33		1.72	38.70		8.55	45.70
24.5 8.6	260.50 56.27	~~143.75~~ ~~35.26~~	79.8 19.6	280.65 0.22 ~~165.21~~	37.36		298.01 3.75	183.18 40.78		32.40 10.70	217.92 47.80
	6.18	36.46		—	40.48		13.71	49.00		20.63	50.90
	17.71	38.57		21.76 33.24	42.60		25.14	46.00		32.07	53.00
	29.75	40.70		33.24 .24	44.72		36.64	48.00		43.58	55.10
	40.69	42.72		44.67 .19	46.72		48.13	50.26		55.06	57.10
	52.10	203.45 45.00		56.13 223.35	48.83		59.60	240.66 52.40		6.48	275.30 59.20
49 58.86	146.58	166	50 32.34	~~165.90~~ ~~155.60~~	215	50 4.02	183.22		4 50 10.90	217.82	
51 4.90		50 29.166	51 15.96		50 33.215	—		50 36.644	—		50 43.564
		−4 10.36			−4 14.35			−4 17.84			−4 24.75
		+ .17			+ .17			+ .17			+ .16
		− 4.06			− 4.04			− 4.01			− 3.97
		46 14.92			15.00			14.96 ~~15.26~~ 14.98			15.00 14.99
					rej.						

rej.

	Nov. 2		Nov. 4		Nov. 6	Nov. 10
	+30.31	−35.73	+0.88	−42.74	+32.62	+32.66
	1.48159	1.55303n	9.94448	1.63083n	1.51348	1.51402
	1.58314n	1.65458	0.04603n	1.73238	1.61503n	1.61557n
	35 4	35 3	35 3	35 3	35 4	35 4
	32.5 +.48	8.7 +.31 +30	56.3 +.20	0.8 +.20	36.0 +.40	38.9 +.33
	39.7 +.07	15.4 +.33 +29	2.5 +.14	7.9 +.19	42.2 +.13	45.1 +.18
	58.4 −.05	34.1 −.07 −.02	16.8 −.28	20.7 −.26	56.1 −.20	59.8 −.01
	49.8 +.04	27.0 +.47 +34	8.1 +.21	13.1 +.23 +39	47.7 +.06	52.1 +.02
	+.54	+1.04 +91	+.27	+.36 52	+.39	+.52
	39 45.10	37/38 21.30	39 5.92	38 10.62	39 45.50	39 48.98
	−38.29	45.14	−1.11	54.00	−41.21	−41.26
	39 6.81	6.44	39 4.81	4.62	39 4.29	39 7.72
−8	16 18.46	18.09	16 16.46	16.27	16 15.94	16 19.37
+50	34 67					
	1.84480					
	+579		+2103		+1710	+1264
	1.85059		1.86583		1.86190	1.85744
	−70.89		−73.42		−72.76	−72.02
	+ .07	+ .09	+ .00	+ .14	+ .08	+ .08
	+ .53	+ .26 37	+ .45	+ .35	+ .58	+ .62
	+ .13	+ .26 23	+ .07	+ .09 .13	+ .10	+ .13
	.00	.00	− .01	− .01	.00	.00
	−70.16	−70.20	−72.91	−72.81	−72.00	−71.19
	17 28.62	28.29	29.37	29.08	27.94	30.56
	28.46		29.22		27.94	30.56
	+4 10.42		10.72		10.77	12.29
	− 22.31		− 22.19		− 22.07	− 21.83
	+3 48.11		48.53		48.70	50.46
−8°	13 40.35	−1.26 +.24	40.69	−1.00 +.31	39.24 −1.36 +.26	40.10 −1.50 +30
	41.4		rej.		40.3	41.3

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Nov. 12 | Nov. 13 | Nov. 14 | Dec. 1

h	m	ρ	m	ρ	m	ρ	m	ρ	m	ρ	m	ρ	m	ρ	m	ρ	m	ρ	m	ρ
22	50	9.4	50	19.39	50	31.00	50	13.7	50	21.80	50	32.50	50	10.2	50	22.46	50	33.95	50	36.0	50	41.50	50	52.90
		11.0		21.50		33.10		15.3		23.12		34.55		12.0		24.40		36.00		37.4		43.56		53.70
		12.7		23.60		35.00		17.1		25.25		36.65		14.1		26.47		38.00		38.9		45.75		57.20
		14.7		25.63		37.25		18.6		27.25		38.80		16.3		28.82		40.00		40.7		47.90		59.20
	64.0	16.2	117.92	27.80	175.73	39.38	85.2	20.5	125.97	29.35	183.38	40.88	70.7	18.1	132.97	30.82	190.15	42.20	195.3	42.3	228.57	49.86	285.60	1.30
	51	18.7		5.40		42.35	51	15.8		6.88		43.95	51	22.3		8.40		45.30	51	43.0		2.78		4.50
		20.3		7.40		44.39		17.6		9.01		46.00		24.2		10.40		47.27		44.7		29.58		6.50
		22.3		9.52		46.53		19.7		11.00		48.20		26.4		12.50		49.52		46.9		31.65		8.60
		24.0		11.60		48.65		21.4		13.15		50.20		28.3		14.45		51.61		48.4	3	33.65		10.80
	110.7	25.4	47.62	13.70	232.62	50.70	98.2	23.7	55.38	15.35	240.70	52.35	131.6	30.4	6233	16.58	247.40	53.70	233.2	50.2	158.03	35.75	43.18	12.78
			23.58			53.82			25.19			55.45			26.59			56.70				45.71			15.90
			35.15			58.93			36.68			57.50			38.03			58.95				57.12			18.00
			46.52			58.00			48.14			59.60			49.48			1.00				8.64			20.10
			57.99			0.10			59.62			1.72			1.00			3.20				20.10			22.20
			9.52		289.97	2.12			11.08		296.11	3.84			12.47		500	5.15				31.61		100.50	29.30
h	m	ρ																						
22	50	12.80	232.76		m	ρ	50	17.04	240.71				50	14.14	247.57				50	39.06	43.18			
	51	22.14			50	46.552	51	19.64			50	48.142	51	26.32			50	49.544	51	46.64			51	8.696
					−4	27.71					−4	29.38					−4	30.73					−4	50.01
					+	.18					+	.17					+	.17					+	.16
					−	3.94					−	3.93					−	3.92					−	3.72
					46	15.08						15.00						15.23						15.07
																		14.99						15.12

		+33.574		−35.60				+31.10		−31.50				+35.36		−36.82				+29.58		−38.00		
		1.52827		1.55133 m				1.49276		1.49831 m				1.54851		1.56608 m				1.47100		1.57978 m		
		1.62982 m		1.65288				1.59431 m		1.59986				1.65006 m		1.66763				1.57255 m		1.68133		
		35 4		35 3				35 4		35 3				35 4		35 3				35 4		35 3		
E		39.1 +.33		11.2 +.36				33.9 +.45		14.5 +.44				37.9 +.35		6.9 +.26				32.5 +.48		7.2 +.26		
F		46.1 +.19		17.3 +.27				40.9 +.10		21.8 +.22				44.4 +.17		13.8 +.29				38.2 +.04		13.2 +.30		
G		3.9 +.03		35.9 −.12				57.8 −.07		37.9 −.23				0.4 +.00		29.0 +.04				53.4 −.46		27.0 −.01		
H		57.3 −.03		29.3 +.34				46.6 +.05		30.5 +.34				51.3 +.03		21.7 +.34				46.6 +.07		21.0 +.35		
		+.52		+.85				+.53		+.77				+.55		+.93				+.13		+.90		
		39 51.60		38 23.42				39 45.30		38 26.18				39 48.50		38 17.85				39 42.68		38 17.10		
		−42.64		44.97				−39.29		39.80				−44.67		46.52				−37.37		48.01		
		39 8.96		8.39				39 6.01		5.98				39 3.83		4.37				39 5.31		5.11		
c																								
−8		16 20.61		20.04				16 17.66		17.63				16 15.48		16.02				16 16.96		16.76		−8
		71																						
		−24						+ 885						+ 2178						+2603				
		1.843						1.85365						1.86658						1.87083				
		−69.26		"				−71.39						−73.55						−74.27				
		+ .09		+ .09				+ .07		+ .07				+ .09		+ .10				+ .09		+ .11		
		+ .62		+ .44				+ .62		+ .44				+ .62		+ .43				+ .44		+ .33		
		+ .13		+ .21				+ .13		+ .19				+ .14		+ .23				+ .03		+ .22		
		.00		.00				.00		.00				.00		.00				− .01		− .01		
		−68.66		−68.46				−70.57		−70.69				−72.40		−72.79				−73.71		−73.62		
		1' 29.21		28.80				28.23		28.32				28.18		28.81				30.67		30.38		
		29.04						28.28						28.60						30.52				
		+4 10.62						978						1145						1090				
		− 21.71						− 2165						− 2159						− 2054				
c		+3 48.91						4813						4986						5036				
−8		13 40.13		−1.40 +.06				40.15		−1.38 +.28				38.64		−1.42 +.29				40.16		−1.05 +.29		
		41.6						41.2						39.8						40.9				

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50	39.1	50	48.78		0.40	50	41.6	50	54.36		5.80	50	46.3	50	56.18		7.70	51	47.7	51	58.80		10.30
	40.9		50.80		2.49		43.0		56.37		7.87		48.3		58.32		10.00		50.0		0.85		12.25
	42.5		53.00		4.60		44.7		58.50		10.00		50.0		0.50		12.00		52.5		3.05		14.40
	43.8		55.05		6.72		46.5		0.60		12.05		51.8		2.55		14.05		54.2		4.97		16.37
212.1	45.8	264.83	57.20	22.79	8.68	224.0	48.2	172.56	2.79	49.87	14.15	250.1	53.7	122.20	4.65	59.85	16.10	260.4	56.0	74.67	7.00	71.82	18.50
51	49.6		34.90		12.05	51	52.3		40.20		17.25	51	49.6		42.15		17.17	52	45.0		41.55		21.70
	50.9		36.71		14.00		54.1		42.25		19.40		51.6		44.30		21.30		46.4		46.88		23.67
	53.0		38.85		16.00		55.9		44.37		21.50		53.2		46.35		23.40		48.3		48.70		25.50
	54.6		41.10		18.10		57.4		46.40		23.57		55.4		48.40		25.63		50.3		50.67		27.80
264.8	56.7	194.83	43.27	80.35	20.20	279.2	59.5	221.82	48.60	107.27	25.55	267.2	57.4	231.75	50.55	117.25	27.75	242.2	52.2	243.80	53.00	128.77	30.10
			52.97		23.33				58.51		28.60				0.44		30.67				2.93		33.10
			4.58		25.40				9.97		30.70				11.97		32.65				14.36		35.20
			16.07		27.43				21.45		32.90				23.45		35.00				25.75		37.40
			27.48		29.53				32.86		35.00				34.83		36.84				37.30		39.30
			38.96	137.39	31.70				44.36	164.30	37.10				46.35	174.16	39.00				48.76	186.50	41.50
50	42.42		8.07			50	44.80		10.15			50	50.23		117.04			[50] 51	52.08		129.10		
51	52.96			51	16.014	51	35.84			51	21.430	51	53.44			51	23.408	[52] 51	48.44			51	25.820
				−4	57.38					−5	2.95					−5	4.86					−5	7.41
				+	.17					+	.15					+	.17					+	.15
				−	3.66					−	3.61					−	3.57					−	3.56
					15.14						15.02						15.13						15.80
					15.16						rej.						15.10						15.85

	+33.58		−36.96				+36.62		−34.42				+33.39		−30.04				+33.74		−22.62		
	1.52608		1.56773m				1.56372		1.53681m				1.52362		1.47756m				1.52815		1.35449m		
	1.62763m		1.66928				1.66527m		1.63836				1.62517m		1.57911				1.62970m		1.45604		
	35	4	35	3			35	4	35	3			35	4	35	3			35	4	35	3	
	38.0	+.35	9.1	+.31			42.1	+.26	12.7	+.39			37.5	+.36	19.2	+.53			38.8	+.33	27.8	+.61	
	43.9	+.17	13.7	+.29			48.5	+.20	19.1	+.26			43.4	+.16	24.8	+.18			45.2	+.18	33.4	+.15	
	55.2	−.31	26.9	−.04			1.9	+.03	32.3	+.02			57.8	−.07	37.4	−.20			58.6	−.05	47.2	−.50	
	47.4	+.07	17.9	+.36			54.4	−.01	27.0	+.34			50.2	+.04	31.9	+.33			50.2	+.04	40.8	+.23	
		+.38		+.98				+.48		+1.01				+.49		+.84				+.50		+.49	
39	46.12	38	16.65			39	51.72	38	22.78			39	47.22	38	28.32			39	48.20	38	37.30		
	−42.43		46.70				−46.27		43.49				−42.19		37.94				−42.63		28.58		
39	3.69		3.35			39	5.45		6.27			39	5.03		6.26			39	5.57		5.88		
−8	16	15.34		15.00			16	17.10		17.92			16	16.68		17.91			16	17.22		17.53	
		+2824						+1934						+2273						+2547			
		1.87304						1.86414						1.86753						1.87027			
		−74.65						−73.14						−73.41						−74.18			
		+ .09		+ .10				+ .10		+ .09				+ .08		+ .07				+ .09		+ .04	
		+ .48		+ .33				+ .53		+ .37				+ .53		+ .37				+ .68		+ .43	
		+ .07		+ .23				+ .12		+ .25				+ .12		+ .21				+ .12		+ .12	
		− .01		− .01				− .01		− .01				− .01		− .01				− .01		− .01	
		−74.02		−74.00				−72.40		−72.44				−72.99		−73.07				−73.90		−73.60	
		29.36		29.00				29.60		30.36				29.67		30.98				30.62		31.13	
		29.18						29.93						30.32						30.88			
		11.28						9.41						9.94						10.29			
		− 20.17						− 19.87						− 19.74						19.61			
	+3	51.41						49.54						50.20						50.68			
		38.07		−1.11	+.21			40.39						40.12		−1.23	+.20			40.20		−1.25	+.18
		39.0						rej.						41.2						41.3			

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log sin δ 9.31008n log R₁ 1.36520
" cos δ 9.99075 " R₂ 1.06463
" 15 cos δ sin i 0.09682n R₁ 23.19
R₂ 11.60
I 2.11

α h m s 22 51 40
δ −11° 47′
z +54 10
tan δ −0.21
sin z +.81
1878

	Nov. 2			Nov. 4			Nov. 5			Nov. 6		
h	m s	m s	m s	m s	m s		m s			m s	m s	
22	55 24.2	53 23.58	53 41.22	53 21.6	53 33.68		55 29.4	55 —		55 47.00	55 33.0	55 37.00 —
	26.0	31.72	43.32	27.0	35.68		31.2	39.76 37.65		49.15	35.7	39.10 —
	28.1	34.00	45.43	28.6	37.83		33.0	.90 39.90		51.25	37.2	41.00 —
	30.0	35.90	47.62	30.7	39.96		35.0	.59 41.70		53.28	39.4	43.00 —
	140.6 32.3	169.25 38.05	227.19 49.60	145.0 33.1	189.20 42.05		247.30 52.78	165.4 36.8	221.55 43.80	256.18 55.50	189.1 43.8	203.76 44.36 —
	56 33.9	1.82	53.00	56 33.3	19.93		56.78	56 42.0	21.90	58.39	56 41.0	22.40 0.30
	35.6	18.05	53.00	33.0	22.10		57.00	43.8	23.90	0.70	43.0	25.54 2.30
	37.5	20.10	57.10	37.6	24.05		1.05	45.5	26.05	2.90	44.4	27.70 4.50
	39.8	22.27	59.15	39.6	26.20		3.20	47.4	28.05	4.95	46.1	29.90 6.90
	188.3 42.0	100.77 24.43	285.55 1.30	186.9 41.4	120.61 28.33		5.48 3.41	228.1 49.4	129.90 30.20	13.34 7.00	222.3 47.8	138.24 31.90 22.70 8.70
		33.85	4.57		37.84		8.43		39.70	10.30	40.59 4.08	11.80
		45.44	6.58		49.46		10.48		51.24	12.36		14.00
		57.11	8.76		1.07		12.69		2.79	14.40	4.54 4.64	16.33
		8.75	10.86		12.68		14.83		14.42	16.40	16.12 .52	18.17
		20.15	43.77 13.00		24.12		63.43 17.00		25.98	72.11 18.65	27.65 .46	80.58 20.28
h	m s		m s									
22	55 28.12	285.30	55 29.00	5.19			55 33.08	14.16		55 37.82		4.80
	56 37.66		55 57.04	56 37.38			56 1.08	56 45.62		56 2.832	56 44.46	56 4.356
			−4 10.37				−4 14.36			−4 16.13		−4 17.85
			+ .24				+ .24			+ .23		+ .23
			− 4.14				− 4.12			− 4.10		− 4.09
			51 42.79				42.80			42.83		42.69 42.71 ref.
	+28.94	−40.60		+32.04	−36.34		+29.74	−42.56		+26.56	−40.08	
	1.46150	1.60853n		1.50509	1.56038n		1.47349	1.63184n		1.42455	1.60271n	
	1.55832n	1.70535		1.60251n	1.65720		1.57041n	1.72816		1.52137n	1.69953	
	10 2	10 1		10 2	10 1		10 2	10 1		10 2	10 1	
E	39.6 +.39	13.2 +.36		45.9 +.28	19.7 +.48		44.1 +.31	13.1 +.35		42.5 +.33	16.0 +.41	
H	48.5 +.48	20.9 +.22		54.1 +.37	28.0 +.18		50.8 +.41	21.0 +.22		50.5 +.42	23.1 +.21	
δ	7.4 +.03	40.2 −.41		7.4 +.03	41.0 −.43		4.2 +.10	34.2 −.11		5.1 +.08	37.9 −.30	
H	58.2 +.21	31.2 +.64		58.4 +.21	34.1 +.61		55.2 +.23	26.3 +.66		55.9 +.22	30.0 +.65	
	+.06	+.81		+.69	+.84		+.05	+1.12		+.05	+.97	
	12 53.42	11 26.38		12 56.45	11 30.70		12 53.58	11 23.65		12 58.50	11 26.75	
	−36.17	50.74		−40.04	45.41		−37.19	53.48		−33.22	50.06	
	12 17.25	17.12		12 16.41	16.11		12 16.39	17.13		12 20.28	16.81	
−11	49 28.90	28.77		49 28.06	27.76		49 28.04	28.78		49 31.93	28.46	+114
+54	8 7											
	1.90620											
	+.588			+2114			+2025			+1717		
	1.90708			1.92134			1.92045			1.91737		
	−80.55			−83.43			−83.26			−82.67		
	+ .09	+ .19		+ .11	+ .14		+ .10	+ .21		+ .08	+ .18	
=	+ .32	+ .15		+ .32	+ .16		+ .34	+ .17		+ .34	+ .17	
=	+ .26	+ .20		+ .22	+ .21		+ .26	+ .28		+ .26	+ .24	
	.00	.00		− .01	− .01		− .01	− .01		.00	.00	
	−79.88	−80.01		−82.79	−82.93		−82.57	−82.61		−81.99	−82.08	
	50 48.78	48.78		50.85	50.69		50.61	51.39		53.92	50.54	
				50.77			51.00			52.23		
	+4 10.42			10.72			11.53			10.77		
	− 2.53			− 2.39			− 2.32			− 2.25		
	+3 48.89			49.33			50.21			49.52		
−11	46 57.89	−.93 +.24		1.44	−.91 +.31		0.79	−1.05 +.23		2.71		
	60.6			2.0			1.6			ref.		

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	α h	m	s		δ °	′	″	
	22	51	42.79	42.79 − 11	46	59.9	11	0.6
			.80	.80		61.4		2.0
			.83	.83		60.8		1.6
			.87	8.6		61.7		2.4
			.89	.89		62.1		3.0
			.80	.80		61.2		1.9
			.92	.88		61.2		1.9
			.94	.96		60.5		1.0
			.80	.80		61.6		2.5
			42.82	.85		60.8		1.9
			42.846	42.846	47	1.12		1.88

Nov. 10

55	36.6	55	44.27	55	55.50	55	42.0	55	47.00	55	58.62	55	40.9	55	48.60	55	0.10	55	43.3	55	58.10	56	1.55	
	39.4		46.20		57.80		43.6		49.15		0.90		43.0		50.60		2.25		45.4		59.20		3.78	
	41.8		48.20		59.82		45.7		51.15		3.00		44.8		52.79		4.45		47.7		54.10		6.00	
	43.8		50.31		1.94		48.0		53.23		5.00		46.5		55.00		6.50		49.4		56.15		8.10	
207.3	45.7	241.57	52.59	299.26	42.0	229.3	58.0	256.03	55.50	14.62	4.10	223.5	48.3	263.89	56.90	21.85	8.35	237.0	51.2	270.55	58.20	29.43	10.00	
56	46.4		30.39		7.30	56	48.9		33.52		10.30	56	48.4		34.92		11.60	56	52.4		36.30		13.20	
	48.5		32.55		9.40		51.6		35.38		12.29		49.8		37.01		13.80		54.6		38.48		15.48	
	51.4		34.65		11.60		52.2		36.52		14.37		52.0		39.10		15.90		56.7		40.50		17.53	
	53.5		36.75		13.57		54.1		39.70		16.50		54.2		41.40		18.05		58.7		42.70		19.55	
254.7	54.9	173.07	38.73	57.47	15.60	262.1	56.3	186.92	41.80	72.16	18.70	260.9	56.5	195.90	43.48	77.50	20.15	222.6	0.2	202.80	44.82	87.56	21.80	
			48.31		18.74				51.21		21.60				52.78		23.22				54.11		24.80	
			50.85		20.86				2.92		23.89				4.37		25.43				5.89		26.87	
			11.49		22.95				14.43		26.05				15.90		27.65				17.51		29.00	
			22.98		25.10				25.96		28.00				27.56		29.70				29.03		31.25	
			34.61	114.90	27.25				37.38	129.78	30.24				39.18	137.80	31.80				40.56	145.14	33.20	
55	41.46		57.24			55	45.86		7.190			55	44.70		7.979			55	47.40		8.710			
56	50.94			56	11.448	56	52.42			56	14.380	56	52.18			56	15.958	56	56.52			56	17.480	
				− 4	24.76					− 4	27.71					− 4	29.38					− 4	30.74	
				+	.23					+	.25					+	.24					+	.24	
				−	4.05					−	4.03					−	4.01					−	4.00	
					42.87						42.89						42.80						42.92	
					42.86																		42.88	

Nov. 12

Nov. 13

Nov. 14

	+29.98		−37.56		+28.52		−38.04		+31.26		−36.22		+27.02		−39.10									
	1.47698		1.59649 m		1.45515		1.58024 m		1.49499		1.55895 m		1.47741		1.59218 m									
	1.57380 m		1.69331		1.55197 m		1.67706		1.59181 m		1.65577		1.57423 m		1.68900									
	10 2		10 1		10 2		10 1		10 2		10 1		10 2		10 1									
	47.1	+.26	18.9	+.47	44.3	+.30	20.0	+.49	45.4	+.29	19.3	+.48	43.2	+.32	17.5	+.44								
	54.1	+.37	27.2	+.19	52.4	+.40	28.1	+.18	53.4	+.38	28.8	+.18	50.6	+.41	25.6	+.19								
	9.6	−.05	42.1	−.46	12.1	−.17	47.9	−.57	10.4	−.08	45.3	−.54	5.5	+.08	41.2	−.44								
	0.8	+.25	34.1	+.61	2.2	+.29	39.8	+.53	0.9	+.25	36.2	+.59	56.6	+.21	32.9	+.62								
		+.83		+.81		+.82		+.63		+.84		+.71		+1.02		+.81								
	12 57.90		11 30.58		12 57.75		11 33.95		12 57.52		11 32.40		12 53.75		11 29.30									
	−37.48		49.35		−35.64		47.54		−39.07		46.27		−37.52		48.87									
	12 20.42		19.93		12 22.11		21.49		12 18.45		17.67		12 16.46		18.17									
−11.49	32.87		31.58		49 33.76		33.14		49 30.10		29.32		49 28.11		29.82									
	+12.71				257 405				+8.96				+21.92											
	1.91241				1.89 495				1.90916				1.92212											
	−81.83				−79.87				−81.13				−83.88											
	+ .10	+ .18			+ .87	+ .16			+ .11	+ .14			+ .10	+ .17										
	+ .38	+ .19			+ .38	+ .21			+ .38	+ .19			+ .38	+ .19										
	+ .21	+ .20			+ .20	+ .16			+ .21	+ .18			+ .25	+ .20										
	.00	.00			.00	.00			.00	.00			− .01	− .01										
	−81.14	−81.26			−78.34	−78.48			−80.43	−80.62			−82.86	−83.03										
	53.21	52.84			52.10	51.62			50.53	49.94			50.97	52.85										
	52.02				51.86				50.24				51.91											
	12.29				10.62				9.78				11.46											
	− 2.97				− 2.83				− 2.76				− 2.69											
	51.32				49.79				49.02				50.76											
	1.70	−.98 +.30			2.07	−.95 +.06			1.22	−.93 +.28			1.15	−1.02 +.29										
	2.4				3.0				1.9				1.9											

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Dec. 7

h	m	s
22	56.	4.6
		6.4
		7.8
		9.7
	41.0	12.5
	57	12.5
		14.9
		16.1
		17.6
	80.5	19.4
	57	16.10

m	s
56	16.44
	18.47
	20.69
	22.70
103.15	24.85
57	2.79
	4.88
	6.90
	9.10
34.97	11.30
	20.63
	32.21
	43.84
	55.43
	6.98

m	s
56	27.95
	30.10
	32.15
	34.34
161.04	36.50
	39.60
	41.70
	43.80
	46.00
219.20	48.10
	57.12
	53.37
	55.48
	57.49
277.13	59.67

h	m	s
22	56	8.20
	57	16.10

m	s
56	43.818
− 4	57.39
+	.24
−	3.73
51	42.94
	42.96

Dec. 12

56	16.0
	18.0
	20.0
	22.8
101.5	24.7
	8.20
	10.40
	12.51
	14.50
62.17	16.56
	26.04
	25.84
	37.64
	49.21
	0.79
	12.43

56	20.80
[21.52]	
	23.90
	26.10
	28.10
129.20	30.30
246.03	53.43
123.97	5.19
	56.40
	58.68
	0.70
	3.00
	5.19

56	20.30
	24.91
56	49.188
− 5	2.96
+	.22
−	3.68
	42.80

Dec. 14

56	42.9
	45.4
	47.6
	49.0
235.4	50.5
145.0	31.8
56	47.08
57	29.00

56	—
	—
28.00	28.00
.07	30.18
.03	32.25
72.10	18.80
	28.07
	39.81
	51.52
	2.78
	14.42
	256.57

	35.53
	37.75
	39.75
	42.00
199.03	44.00
257.60	55.60
	58.38
	0.80
	2.82
	4.90
73.90	7.00
56	51.306
− 5	4.88
+	.23
−	3.66
	43.02
	42.99
	rej.

Dec. 16

57.	23.2
	25.1
	27.3
	29.3
136.3	31.4
	12.63
	14.70
	16.74
	18.76
83.83	21.00
	30.55
	42.04
	53.70
	5.30
	16.77
[56]	
57	27.28
	38.36
[56]	53.672
− 5	7.41
+	.20
−	3.64
	42.82
	42.55

57.	26.50
	28.63
	30.35
	32.55
152.78	34.70
	46.26
	49.26
	51.60
	53.70
	55.78
268.52	58.18

	97.57
	39.76
	42.10
	44.27
210.18	46.28

+35.62 / −32.28 / +28.92 / +4.28 / −37.69 / +26.41 / +33.60

	1.55169		1.50893 m		1.46120		0.62634		1.57623 m		1.42177								
	1.64851 m		1.60575		1.55802 m		0.72316 m		1.67305		1.51859 m								
	10	2	10	1	10	2	10	2	10	1	10	2							
E	60.4	+.21	27.8	+.53	44.8	+.29	13.6	+.34	21.1	+.50	40.3	+.37							
F	68.2	+.30	35.1	+.18	52.6	+.39	21.8	+.28	29.3	+.18	47.1	+.43							
G	10.9	−.11	47.1	−.56	5.4	+.08	34.8	−.10	43.0	−.49	6.4	+.07							
H	1.1	+.25	38.7	+.55	58.6	+.22	27.5	+.47	83.9	+.61	52.8	+.24							
		+.65		+.70		+.28		+.94		+.80		+.11							
	13	0.15	11	37.18	12	55.35	12	24.42	11	31.82	12	50.16							
		−44.52		40.34		−36.14		−52.56	529	47.10		−33.01							
	12	15.63		17.52	12	19.21	12	31.56		18.92	12	17.14							
								19.13											
−11°	49	27.28		29.17	49	30.86	49	30.78		30.57	49	28.79							
		2831																	
		+ 1877				+ 1940		+ 2279				+ 2562							
	1.92	2.85			1.91	1.960	1.92	2.299			1.92	2.582							
		− 8268				−83.10		−83.75				−84.30							
		+ .74	+	.11		+ .09	+		+	.16		+ .07							
		+ .30	+	.16		+ .32		+ .26	+	.16		+ .34							
		+ .16	+	.17		+ .24		+ .25	+	.20		+ .28							
		− .01	−	.01		.00		− .01	−	.01		− .01							
		−84.23		−84.39		−82.45		−83.25		−83.24		−83.62							
	60	51.51		52.56		53.31		54.03		53.81		52.41							
		52.54				53.31		53.92				52.41							
	+4	11.28				10.62		9.94				10.29							
		− 1920				− 18.91		− 1881				− 18.71							
	+3	5208				51.71		5113				51.58							
−11°	47	0.46	−.79	+.21		1.60	−1.12	+.19		2.79		0.83	−1.24	+.18					
		1.0				2.5				rej.		1.9							

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β		log sin δ	9.31490 n
α	h m s: 22 56 7	log cos δ	9.99054
δ	−11° 55′	log 15 cos δ tan i	0.09661 n
z	+54 18	tan δ	−0.21
		sin z	+.81

log R_1	1.36551
log R_2	1.06484
R_1	23.20 s
R_2	11.61
I	

1878.0 — α: h m 22 56; δ: −11° 55′ 23″

α s	α s (red)	δ ″ (red)	δ ″
8.77	8.77	16.0	14.6
.76	.76	15.0	14.5
.79	.79	14.8	14.2
.79	.81	16.1	15.8
.84	.83	16.0	15.2
.86	.86	16.5	15.5
.77	.77	16.1	15.3
.90	.86	14.9	14.4
.91	.93	14.8	14.4
.96	.93	14.7	14.0
8.835	8.831	15.49	14.79

Nov. 2	Nov. 2		Nov. 4	Nov. 4		Nov. 5	Nov. 5		Nov. 6		
h m s	m s	m s									
22 59 54.6	59 55.57	7.26	59 34.0	59 59.55	11.12	59 55.2	0 1.54	0 13.00	59 0.8	0 3.22	0 14.67
56.0	57.73	9.28	36.0	1.80	13.36	57.2	3.54	15.12	2.1	5.33	16.96
58.1	0.07	11.47	58.5	3.78	15.43	59.3	5.66	17.38	4.4	7.47	18.90
0.2	2.00	13.53	0.6	5.92	17.63	0.9	7.81	19.45	6.4	9.48	21.00
171.1 2.2	~~0.42~~ 4.05	57.25 15.71	171.5 2.4	79.05 8.00	77.29 19.76	175.2 2.6	28.43 9.88	86.35 21.40	22.2 8.5	37.05 11.55	94.53 23.00
1 2.7	42.05	18.82	1 2.7	46.00	22.86	1 8.3	47.70	24.57		49.55	26.20
4.3	44.05	21.00	4.2	48.05	25.00	10.3	49.89	26.60		51.55	28.53
6.2	46.30	23.05	6.0	50.18	27.05	13.0	52.05	28.85		53.74	30.50
8.1	48.33	25.23	7.9	52.28	29.18	15.0	54.05	31.00		55.80	32.60
31.6 10.3	231.10 50.87	115.48 27.38	30.6 9.8	250.95 54.44	135.28 31.20	63.4 16.8	259.74 56.05	144.02 33.00		268.61 57.97	152.53 34.70
	59.88 ~~0.08~~	30.33		3.81	34.40		5.69	36.29		7.41	37.88
	11.45	32.66		15.46	36.54		17.27	38.29		18.91	40.00
	23.10 ~~.07~~	34.70		27.06	38.60		28.80	40.44		30.51	42.10
	34.70 ~~.69~~	36.80		38.63	40.78		40.42	42.48		42.13	44.25
	46.22	173.49 39.00		50.19	193.15 42.80		51.95	202.12 44.62		53.72	210.66 46.43
59 58.22	115.35 ~~.33~~		59 58.30	135.15		59 59.04	144.13		59 4.44	152.68 ~~.71~~	
1 6.32		0 23.070 ~~.106~~	1 6.12		0 27.030	1 12.68		0 28.826			0 30.536 ~~.542~~
		−4 10.38			−4 14.37 ~~.38~~			−4 16.140			−4 17.863
		+ .24			+ .24			+ .228			+ .233
		− 4.16			− 4.14			− 4.124			− 4.113
		56 8.77			8.76			8.79			8.79 / 8.81

Nov. 2		Nov. 4		Nov. 5		Nov. 6	
+24.85 ~~.88~~	−43.25 ~~.24~~	+28.73	−39.09	+29.79 ~~.78~~	−43.85 ~~.86~~	+26.10	
1.39533	1.63599 n	1.45834	1.59207 n	1.47407	1.64197 n	1.41664	
1.49194 n	1.73260	1.55495 n	1.68868	1.57068 n	1.73858	1.51325 n	
20 0	15 4	20 0	15 4	20 0	15 4	20 0	
48.8 +.20	23.2 +.53	54.2 +.13	28.7 +.52	57.1 +.13	23.2 +.53	52.8 +.14	
58.0 +.21	32.0 +.02	2.8 +.18	36.1 +.02	4.2 +.20	30.9 +.02	0.0 +.17	
17.3 −.42	49.0 −.60	17.4 −.42	49.1 −.60	19.7 −.39	43.2 −.51	[14.9] 4.9 −.37	
7.1 +.72	42.1 +.13	7.4 +.72	41.6 +.13	9.9 +.73	37.0 +.19	5.5 +.70	
+.71	+.08	+.61	+.07	+.67	+.23	+.64	
21 2.80	19 36.58	21 5.45	19 38.88	21 7.72	19 33.58	21 3.30	
−31.04	54.03	−35.89	48.83	−37.21	54.77	−32.60	
20 31.76	30.61	20 29.56	27.71	20 30.51	28.35	20 30.70	
−11 57 43.41	42.26	57 41.21	39.36	57 42.16	40.00	57 42.35	
+54 16 21							
1.90240							
+596		+2122		+2032		+1724	
1.90836		1.92362		1.92272		1.91964	
−80.97		−83.87		−83.70		−83.11	
+ .07	+ .21	+ .09	+ .17	+ .10	+ .22	+ .07	
+ .11	+ .51	+ .12	+ .51	+ .13	+ .55	+ .13	
+ .18	+ .02	+ .15	+ .02	+ .17	+ .06	+ .16	
− .00	− .00	− .01	− .01	− .01	− .01	.00	
−80.61	−80.23	−83.52	−83.18	−83.31	−82.88	−82.75	
59 4.02	2.49	4.73	2.54	5.47	2.88	5.10	
3.26		3.64		4.76		5.10	
+4 10.42		10.72		11.53		10.77	
− 21.76		− 21.61		− 21.54		− 21.47	
+3 48.66		49.11		49.99		49.30	
−11° 55 14.60	−1.64 +.24	14.53	−.80 +.31	14.17	−.91 +.23	15.80	−.58 +.26
16.0		15.0		14.8		16.1	

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	Nov. 10						Nov. 12						Nov. 13						Nov. 14					
h	m	s	m	s	m	s																		
23	0	1.1	0	10.10	0	21.66	0	16.4	0	12.95	0	24.54	0	11.2	0	14.60	0	26.15	0	36.6	1	—	0	27.60
		2.9		12.05		23.60		18.2		15.20		26.70		12.8		16.65		28.20		38.4		—		29.71
		4.3		14.13		25.87		20.6		17.17		28.79		15.2		18.80		30.30		40.0		—		31.71
		5.9		16.29		28.00		22.4		19.48		31.00		17.0		20.90		32.40		42.1		—		34.00
	22.2	8.0	70.97	18.40	129.13	30.00	102.4	24.8	86.32	21.52	144.03	33.00	74.4	18.2	93.95	23.00	151.62	34.57	202.1	45.0		—	159.35	36.33
	1	14.1		56.40		33.30	1	16.8		59.37		36.05	1	13.8		0.93		87.65	1	17.2		2.50		39.10
		15.8		58.55		35.35		18.9		1.40		38.20		15.2		3.00		39.90		18.7		4.40		41.39
		17.5		0.60		37.57		21.0		3.60		40.30		16.7		5.20		42.00		21.3		6.52		43.52
		19.8		2.88		39.67		22.5		5.70		42.40		18.2		7.28		44.00		23.0		8.47		45.55
	89.2	22.0	123.31	4.88	187.59	41.70	103.7	24.5	77.87	7.80	201.35	44.40	84.3	20.4	25.80	9.39	209.77	46.22	104.6	24.4	33.01	10.82	217.26	47.70
			14.19			44.80			17.26			47.60			18.79			49.35			—			50.85
			25.83			46.85			28.81			49.75			30.32			51.50			31.87	43.48		53.00
			37.52			49.00			40.27			52.02			41.95			53.60			43.45	.45		54.95
			49.04			51.20			52.00			54.20			53.58			55.64			55.00	.40		57.00
			0.66		245.20	53.35			3.57		260.02	56.45			5.16		267.92	57.83			6.60	.40	275.03	59.23
h 23	m 0	s 4.44	187.24		m	s	0	20.48	201.91				0	14.88	209.80				0	40.42	217.31			
	1	17.84			0	37.448	1	20.74			0	40.382	1	16.86			0	41.960	1	20.92			0	43.432
					−4	24.767					−4	27.726					−4	29.395					−4	30.748
					+	.229					+	.250					+	.237					+	.241
					−	4.069					−	4.046					−	4.035					−	4.024
					56	8.84						8.86						8.77						8.90
						8.83																		8.86

	Nov. 10				Nov. 12				Nov. 13				Nov. 14			
	+33.06		−40.40 (39)		+19.90		−40.36		+27.08		−34.90		+3.08		−37.49	
	1.51865		1.60627n		1.29885		1.60595n		1.43265		1.54283n		0.47857		1.57392n	
	1.61526n		1.70288		1.39546n		1.70256		1.52926n		1.63944		0.57518n		1.67053	
	20′	1′	15′	4′	20	0	15	4	20	0	15	4	20	0	15	4
ε	3.4″	+.16″	31.6″	+.49″	46.8	+.22	30.1	+.51	52.9	+.14	35.1	+.42	21.9	+.45	31.9	+.48
♃	11.3	+.25	39.1	+.06	54.7	+.26	38.2	+.04	1.4	+.17	43.7	+.16	30.1	+.03	39.9	+.08
♄	26.4	−.11	52.2	−.32	14.6	−.36	55.3	−.29	18.9	−.40	59.2	−.03	45.6	−.65	53.5	−.45
♃	17.7	+.67	46.2	+.08	5.1	+.70	50.0	+.04	9.8	+.73	62.2	+.02	35.9	+.52	46.8	+.07
		+.97		+.11		+.82		+.30		+.64		+.57		+.35		+.18
	21′	14.70″	19′	42.28	21	0.30	19	43.40	21	5.75	19	47.55	20	33.38	19	43.02
		−41.23		50.45		−24.86		50.42		−33.83		43.60		−37.68		46.83
	20	33.47		32.73	20	35.44		33.82	20	31.92		31.15	20	55.78 / 29.62		29.85
−11°	57′	45.12		44.38″	57	47.09		45.47	57	43.57		42.80	57	41.27		41.50

	Nov. 10			Nov. 12			Nov. 13			Nov. 14		
	+1277			−236			+905			+2204		
	1.91514			1.90004			1.91145			1.92444		
	−82.26	″		−79.44			−81.55			−84.03		
	+ .12	+ .18		+ .04	+ .18		+ .08	+ .14		+ .00	+ .15	
	+ .16	+ .61		+ .13	+ .61		+ .14	+ .62		+ .08	+ .61	
	+ .24	+ .03		+ .20	+ .08		+ .16	+ .14		+ .09	+ .04	
	.00	.00		.00	.00		.00	.00		− .01	− .01	
	−81.74	−81.44		−79.07	−78.57		−81.17	−80.65		−83.87	−83.24	
	59′ 6.86″	5.82		6.16	4.04		4.74	3.45		5.14	4.74	
	6.34			5.10			4.10			4.94		
	+4′ 12.29″			10.62			9.78			11.45		
	− 21.18			− 21.03			− 20.96			− 20.89		
	+3 51.11			49.59			48.82			50.56		
−11°	55 15.23	−1.04 +30		15.51	−1.02 +.06		15.28	−1.06 +.28		14.38	−.82 +.29	
	16.0			16.5			16.1			14.9		

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Dec. 7

0 38.7 0 42.30 54.11
40.4 44.50 56.10
42.0 46.50 58.28
44.0 48.70 0.35
211.2 46.1 232.80 50.80 171.34 2.50

5.60
7.58
9.90
12.05
49.18 14.05
46.56 9.76
58.27 .88 17.28
9.84 .84 19.21
21.44 .83 21.50
23.50
107.19 25.70

0 42.44 ~~77.18~~
1 9.8~~36~~ 28

−4 57.399
\+ .239
− 3.758

8.91
8.93

Dec. 12

0 41.2 0 48.10 59.34
42.9 50.00 1.66
46.0 52.00 3.90
48.5 54.10 6.00
228.9 50.3 260.40 56.20 1910 8.20

— 11.40
— 13.21
— 15.56
— 17.58
— 78.38 (7) 19.63
52.08 15.28 23.30
3.82 .43 —
15.68 (4) .48 —
—
—

0 45.78 ~~77.23~~
1 15.~~476~~ 397

−5 2.966
\+ .216
− 3.703

8.94
rej.

Dec. 14

0 51.5 0 50.07 1.27
53.3 51.90 3.70
55.3 54.00 5.77
57.0 56.00 7.80
276.1 59.0 270.27 58.30 28.54 10.00

1 49.9 36.20 13.10
51.4 38.23 15.20
53.0 40.45 17.30
54.7 42.55 19.47
265.2 56.2 202.23 44.80 86.49 21.42
54.05 24.64
5.71 26.80
17.~~29~~ 30 29.00
28.92 31.00
40.45 144.58 33.14

0 55.22 86.4~~2~~ 3
1 53.04
1 17.~~284~~ 286

−5 4.873
\+ .233
− 3.682

8.96
8.93

Dec. 7

+27.~~40~~ 39
1.43759
1.53420n

20 0

55.1 +.13
1.0 +.17
14.8 −.36
5.0 +.70
+.64

21 3.98
−34.21
20 29.77

−11 57 41.42

+2838
1.93078
−8527
\+ .08
\+ .11
\+ .16
− .01
−8493
6.35
6.35

11.28
− 19.38
51.90
14.45 −.54 +.21
14.8

Dec. 12

+29.6~~6~~ 2
1.47159
1.56820n

20 0

57.4 +.13
5.1 +.22
19.9 −.38
11.6 +.72
+.69

21 8.50
−37.00
20 31.50

57 43.15

+1944
1.92184
−8353
\+ .10
\+ .12
\+ .17
.02
−8314
6.29
6.29

9.41
− 19.09
50.32
15.97
rej.

Dec. 14

+22.0~~6~~ 7 −35.7~~6~~ 5
1.34380 1.55328n
1.44041n 1.64989

20 0 15 4

49.1 +.19 35.6 +.41
55.8 +.24 42.2 +.13
10.0 −.17 54.0 −.42
1.4 +.60 49.1 +.05
+.86 +.17

20 59.08 19 45.22
−27.57 44.66
20 31.51 29.88

57 43.16 41.53

+2284
1.92524
−8419 + .14
\+ .05 + .53
\+ .11 + .04
\+ .21 − .01
− .01
−8383 −8349
6.99 5.02
5.00

9.94
− 18.99
50.95
14.05 −.89 +.20
14.8

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26

y

α h m s 23 0 33

δ −13° 23′

z +55 46

1878

log sin δ 9.36449n

" cos δ 9.98804

" .15 cos δ tan i 0.09411n

tan δ − 0.24

sin z +.83

log R₁ 1.36801

" R₂ 1.06734

R₁ 23.84

R₂ 11.68

I 2.13

	Nov. 2				Nov. 4				Nov. 5				Nov. 6			
h	m s	m s	m s		4 1.80	4 25.53	37.20		4 1.58	4 27.42	4 39.00		4 22.6	4 29.00	4 40.50	
23	4 17.4	4 21.73	33.22		20.0	27.73	39.33		17.9	29.50	41.20		24.3	31.15	42.72	
	19.8	25.77	35.44		22.0	29.77	41.45		20.2	31.61	43.46		26.0	33.22	44.87	
	22.0	26.60	37.46		23.9	32.00	43.60		22.2	33.71	45.52		27.6	35.32	47.07	
	24.0	28.05	39.51													
	109.6 26.4	129.75 30.20	187.35 41.72		109.7 25.8	149.03 34.00	207.28 45.70		100.0 23.9	158.14 35.90	216.72 47.60		130.3 29.8	166.27 37.58	224.24 49.85	
	5 22.2	8.28	45.05		5 30.5	1.31	48.83		5 30.3	1.05	50.78		5 35.3	15.82	52.35	
	24.7	10.34	47.05		32.4	1.32	50.00		32.4	16.15	52.78		37.3	17.93	54.40	
	26.5	12.37	49.23		34.5	16.50	53.10		34.3	18.38	55.02		39.7	20.20	56.60	
	28.5	14.50	51.32		36.3	18.67	55.28		36.2	20.43	57.18		41.4	22.10	58.70	
	131.9 30.0	162.25 16.74	246.10 53.41		172.2 38.2	82.33 20.63	265.66 57.43		171.2 38.0	91.51 22.50	274.98 59.74		197.2 43.5	100.15 24.30	222.90 0.85	
		25.95	56.47			29.81	0.58			31.63	2.42			33.25	4.10	
		37.47	58.73			41.46	2.75			43.34	4.70			44.85	6.15	
		49.22	0.85			53.13	4.79			54.77	6.70			56.58	8.22	
		0.78	2.74			4.81	6.88			6.70	8.70			8.29	10.37	
		12.45	4.70	3.89		16.47	9.05	24.05		18.30	11.07	33.52		20.03	12.60	41.44
h	m s	24	m s		4 21.94	265.68			4 20.00	274.96			4 26.06	283.00		
23	4 21.92	185.87														
	5 26.38		4 49.174		5 34.44		4 53.136		5 34.24		4 54.992		5 39.44		4 56.600	
			− 4 10.386				− 4 14.382				− 4 16.144				− 4 17.868	
			+ .269				+ .274				+ .262				+ .266	
			− 4.198				− 4.176				− 4.166				− 4.155	
			0 34.86				34.85				34.95				34.84	
															34.86	

	+27.25	−37.21			+31.20	−41.30			+34.98	−39.26			+30.54	−42.84		
	1.43537	1.57066n			1.47495	1.61595n			1.54394	1.59384n			1.48487	1.63185n		
	1.52948n	1.66477			1.50906n	1.71006			1.63805n	1.68795			1.57898n	1.72596		
					1.58826											
	45 1	45 2			45 3	45 2			45 3	45 2			45 3	45 2		
ε	40.3 +.43	19.2 +.46			45.8 +.33	15.6 +.38			50.9 +.24	18.8 +.46			44.9 +.34	13.2 +.33		
F	49.7 +.34	28.2 +.23			55.0 +.26	24.1 +.26			59.1 +.18	26.9 +.24			53.1 +.30	20.8 +.29		
g	6.6 +.13	46.2 −.55			63 +.13	35.9 −.16			12.1 −.12	38.9 −.32			5.6 +.15	34.2 −.07		
4	59.7 +.04	38.6 +.41			57.0 +.02	28.6 +.48			3.6 +.15	32.3 +.47			58.0 +.02	26.9 +.47		
	+.44	+.55			+.74	+.96			+.45	+.85			.81	+1.02		
	48 54.08	47 38.05			48 56.02	47 26.05			49 1.42	47 29.22			48 55.40	47 23.78		
	−33.84	46.21			−32.29 38.75	51.29			−43.46	48.75			−37.93	53.21		
	48 20.24	19.26			48 23.73	17.34			48 17.96	17.97			48 17.47	16.99		
					17.27											
−13°	25′ 31.89	30.91			25 [37.98]	28.99			25 29.61	29.62			25 29.12	28.64		
					28.92											
+55°	44′ 10″															
	1.92600															
	+603				+2130				+2039				+1730			
	1.93203				1.94730				1.94639				1.94330			
	−88.51				−88.57				−88.39				−87.76			
	+ .09	+ .16			+ .12	+ .20			+ .15	+ .18			+ .11	+ .22		
	+ .43	+ .29			+ .43	+ .26			+ .48	+ .30			+ .47	+ .29		
	+ .23	+ .14			+ .18	+ .24			+ .11	+ .21			+ .20	+ .26		
	.02	.10			− .01	− .01			− .01	− .01			− .01	− .01		
	−84.76	−84.92			−87.85	−87.88			−87.66	−87.71			−86.99	−87.00		
	26 56.65	55.83			56.77	56.87			57.27	57.33			56.11	55.64		
	56.24				56.82				57.30				56.88			
	+4′ 10.42				10.72				11.53				10.77			
	− 21.56				− 21.41				− 21.33				− 21.25			
	+3 48.86				49.31				50.20				49.52			
−13°	23 7.38	−1.09 +.24			7.51	−1.11 +.31			7.10	−1.10 +.23			6.36	−1.22 +.26		
	8.2				8.3				8.0				7.3			

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h	m	s		°	′	″	
23	0	34.86	34.86	−13	23	7.4	8.2
		.85	.85			7.5	8.3
		.95	.95			7.1	8.0
		.84	.86			6.4	7.3
		.88	.87			8.1	8.9
		.92	.92			7.8	8.8
		.83	.83			9.3	8.2
		.93	.89			6.6	7.4
		35.15	.12			7.3	8.2
		34.90	.93			8.9	9.9
		34.911	34.908			7.44	8.32

Nov. 10

4	25.4	4	36.00	4	47.50	4	33.4	4	38.93	4	50.60	4	30.5	4	40.50	4	52.15	4	48.9	4	41.80	4	53.53		
	27.5		38.05		49.74		35.0		41.50		52.63		32.4		42.50		54.20		50.7		44.10		55.44		
	30.0		40.05		51.70		36.6		43.00		54.82		34.5		44.60		56.40		52.0		46.30		57.17		
	31.8		42.28		53.95		38.3		45.12		57.00		36.3		46.83		58.57		54.3		48.60		59.00		
148.7	34.0	200.88	44.50	258.94	56.05	183.9	40.6	215.42	47.37	274.25	59.20	171.9	38.2	223.34	48.91	221.92	60.2	262.3	56.4	231.15	50.35	169.07	2.00		
5	35.0		22.36		59.25	5	43.2		25.60		2.36	5	41.0		27.86		3.83	5	44.5		28.39		5.15		
	36.7		24.70		1.40		44.8		27.65		4.36		42.8		29.20		6.03		46.5		30.49		7.37		
	38.5		26.87		3.48		46.4		29.70		6.40		45.6		31.45		8.00		48.8		32.69		9.50		
	40.0		29.00		5.56		48.2		31.80		8.64		47.3		33.45		10.20		50.5		34.90		11.60		
191.9	41.7	134.13	31.20	17.44	7.75	282.9	50.3	146.77	34.02	32.38	10.62	226.2	49.5	156.90	35.74	240.26	12.20	242.3	52.0	163.47	37.00	47.42	13.80		
			40.18		10.90				43.08		13.96				44.67		15.40				46.23		16.85		
			51.79		13.00				54.85		15.95				56.38		17.52				57.81		19.00		
			3.48		15.30				6.48		18.17				8.05		19.62				9.48		21.16		
			15.23		17.35				18.11		20.18				19.67		21.80				21.15		23.35		
			26.83	76.15	19.60				29.75	30.56	22.30				31.38	98.33	23.99				32.69	105.76	25.40		
4	29.74		17.51			4	36.78		32.27			4	34.38		40.15			4	52.46		47.36				
5	38.38			5	3.502	5	46.58			5	6.454	5	45.24			5	8.030	5	48.46			5	9.472		
				−4	24.771					−4	27.731					−4	29.400					−4	30.752		
				+	.262					+	.286					+	.271					+	.276		
				−	4.111					−	4.088					−	4.076					−	4.065		
					3488						34.92						34.83						3493		
					34.87																		34.89		

Nov. 12

Nov. 13

Nov. 14

+32.76		−34.88				+29.67		−40.13				+33.65		−37.21				+17.02		38.99	−29.00				
1.52840		1.54258 m				1.47232		1.60347 m				1.52699		1.57066 m				1.23070		1.59095 m					
1.62251 m		1.63669				1.56643 m		1.69758				1.62110 m		1.66477				1.32481 m		1.68506					
45	3	45	2			45	3	45	2			45	3	45	2			45	3	45	2				
52.6	+.22	26.2	+.54			46.1	+.33	18.9	+.46			48.4	+.28	19.3	+.47			27.1	+.41	17.3	+.42				
1.4	+.14	34.2	+.21			54.9	+.26	28.8	+.23			58.6	+.19	29.3	+.23			36.4	+.15	26.8	+.24				
15.7	−.26	49.0	−.56			12.9	−.16	45.4	−.54			13.9	−.20	44.9	−.53			50.2	−.46	39.8	−.96				
6.8	+.22	41.8	+.36			4.6	+.18	38.6	+.41			5.0	+.19	37.5	+.42			41.7	+.22	33.0	+.47				
9	+.32		+.55				+.61		+.56				+.46		+.54				+.52		+.77				
48	4.12	47	37.80			48	59.62	47	32.92			49	1.48	47	32.75			48	38.86	47	29.22				
	−41.93		43.32				−36.85		49.84				−41.79		46.21				−21.13		48.42				
48	22.19		21.12			48	22.77		22.76			48	19.69		18.96			48	17.72		17.64				
−13	25	33.84		32.77			25	34.42		34.41			25	31.34		30.61			25	29.37		29.29				
	+1282						−222						+914						+2216						
	1.93882						1.92378						1.93514						1.94816						
	−86.86						−83.90						−86.13						−88.75						
	+ .14		+ .15				+ .11		+ .19				+ .14		+ .16				+ .03		+ .18				
	+ .53		+ .34				+ .52		+ .32				+ .52		+ .32				+ .47		+ .32				
	+ .08		+ .14				+ .15		+ .14				+ .11		+ .15				+ .13		+ .19				
	.00		.00				.00		.00				.00		.00				− .01		− .01				
	−86.11		−86.23				−83.12		−83.25				−85.36		−85.50				−88.13		−88.07				
	59.95		59.00				57.54		57.66				56.70		56.11				57.50		57.36				
	59.48						57.60						56.40						57.43						
	12.29						10.62						9.78						11.45						
−	20.95					−	20.80					−	20.72					−	20.65						
	51.34						49.82						49.06						50.80						
	8.14	−1.09	+.30				4.78	−1.23	+.06				7.34	−1.10	+.28				6.63	−1.11	+.29				
	8.9						2.8						8.2						7.4						

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Dec. 7

h	m	s	m	s	m	s
23	5	20.5	—		—	
		21.7	—		—	
		24.0	—		—	
		26.0	—		—	
	120.5	28.3	—		—	
	5	48.0	25.60	5	2.10	
		49.9	27.55		4.35	
		52.2	29.55		6.55	
		54.1	32.00		8.47	
	260.7	56.5	148.80 34.10	32.12	10.65	
			—		14.00	
			— 6.42		16.10	
			6.42 .53		18.28	
			18.21 .42		20.30	
			29.76	91.05	22.37	
h	m	p		m	p	
23	5	24.10	32.39		57	
	5	52.14		5	6.47	

wrong star.

Dec. 12

5	4.0	5	13.70		25.57		
	5.6		15.85		27.70		
	8.0		18.10		29.80		
	10.3		20.12		31.95		
39.9	12.0	90.22	22.45	14881	33.79		
		4.86	0.60	41.08	36.82		
		4.73	2.60		—		
		5.17	5.17	41.57	—		
			—	.54	43.70		
			—		45.80		
		18.04			48.90		
		29.76			51.00		
		41.40			53.10		
		53.17			55.30		
		4.55/92		265.85	57.55		
5	7.98	207.29					

Dec. 14

5	5.8	5	15.83		27.40		
	8.7		18.00		29.74		
	10.5		20.05		31.86		
	12.6		22.30		33.98		
51.6	14.0	10046	24.28	15403	36.05		
6	15.0		2.50		37.25		
	16.9		4.70		41.52		
	18.8		6.75		43.60		
	20.6		8.90	[45]	44.67		
93.8	22.5	3385	11.00	21678	47.74		
			20.09		50.80		
			31.81		53.00		
			43.86		55.25		
			55.15		57.30		
			6.77	27575	59.40		
5	10.32		21.38				
6	18.76			5	43.48		
5	41.458						
−5	2970			−5	4.877		
+	.247			+	.266		
−	3.743			−	3720		
0	34.99				35.18		
					35.12		

rej.

Dec. 16

6	10.7	6	—		29.70		
	12.8	2253	20.46		32.05		
	14.9	25	22.25		34.10		
	17.2	37	24.50		36.30		
74.9	19.3	144	26.70	17055	38.40		
7	24.0		4.90		41.60		
	26.0		7.00		43.70		
	28.6		9.10		46.00		
	30.6		11.20		48.00		
141.3	32.1	45.45	13.25	22940	50.10		
			2240		53.15		
			34.11		55.55		
			45.88		57.50		
			57.48		59.50		
			9.09	227.40	1.70		
[5] 6	14.98		228.97				
7 [6]	28.26			6 [5]	45.744		
				−5	7.424		
				+	.233		
				−	3.780		
					34.90		
					34.93		

	−17.6		−45.66		+33.48		
	1.24650		1.65973		1.52479		
	1.34061		1.75384		1.61890		
	45	4	45	3	45	3	
6	12.0	+.36	36.8	+.48	49.9	+.25	
7	21.5	+.10	45.8	+.33	58.4	+.20	
8	33.3	−.04	54.0	−.29	11.3	−.08	
14	22.4	+.20	47.7	+.13	4.1	+.16	
		+.62		+.67		+.53	
	49	22.30	48	46.08	49	0.92	
		+21.91		56.73		−41.58	
		0.39		42.81		19.34	
0	1	"	'	"			
−13	26	12.04	25	54.46	26	30.99	
						.5	

wrong star

	+33.12		−35.32		+30.88		−42.48
	1.52009		1.54802		1.48869		1.62848
	1.61420		1.64213		1.58280		1.72229
	45	3	45	2	45	3	45 2
	49.9	+.25	23.2	+.51	48.3	+.28	16.8 +.41
	58.1	+.21	31.7	+.21	55.9	+.25	26.1 +.25
	10.2	−.03	44.4	−.33	7.8	+.10	37.1 −.26
	3.9	+.16	37.2	+.43	1.1	+.06	30.8 +.48
		+.59		+.62		+.69	+.88
	49	0.52	47	34.12	48	58.28	47 27.70
		−41.13		43.87		−38.27	52.76
	48	19.39		17.99	48	20.01	20.46
	25	31.04		29.64	25	31.66	32.17

	+1948				+2584		
	1.94548				1.95184		
	−88.20				−89.50		
	+ .13				+ .12		
	+ .44				+ .48		
+ .15	+ .13	+ .16	+ .15	+ .29	+ .17	+ .30	
	− .01		− .01		− .01		
	−87.51		−88.19	−88.32	−88.74	−88.78	
	26 38.50		59.23	58.96	0.48	0.88	
	58.50		58.60		0.67		
	+4 9.41		994		1029		
	− 18.77		− 1867		− 1867		
	+3 50.64		51.27		51.72		
	23 7.86		7.33	−1.03+.20	8.92	−1.17+.18	
			8.2		9.9		

rej.

−13°

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δ

α h 23 m 5 s 6

δ −11 10

z +53 33

log ρ sin δ 9.28705n

" cos δ 9.99170

" 1500 stani 0.09777n

tan δ −0.20

sin z +.80

I 2.11

α h 23 m 5

1878.0 δ 29

s	s	o	′	″
7.21	7.21	11	12.6	12.0
.12	.12		13.5	12.8
.20	.20		12.8	12.0
.24	.26		12.2	11.5
.22	.21		12.0	11.4
.25	.25		12.6	11.6
.15	.15		12.5	11.8
.23	.19		12.4	11.8
.30	.32		11.2	10.6
.26	.21		12.2	12.2
7.236	7.232		12.4	11.77
	220			

Nov. 20 | Nov. 4 | Nov. 5 | Nov. 6

h	m	s	m	s	m	s																				
23	8	43.0	8	34.20	9	5.86	9	3.8	8	58.10	9	9.60	8	48.0	9	0.04	9	11.60	8	56.2	9	1.70	9	13.30		
		45.1		34.23		8.00		3.7		0.20		11.72		49.8		2.04		13.64		57.9		3.86		15.30		
		47.5		34.40		10.00		7.8		2.43		13.92		51.6		4.50		15.60		59.5		3.88		17.40		
		49.2		34.97		12.18		10.0		4.52		16.00		53.6		6.02		17.98		1.0		8.00		19.70		
		236.2		137.93		35.84		24.5		15.25		51.24		203.1		12.60		58.33		177.8		17.24		71.40		
	9	3.64		40.46		17.28	10	4.7		44.18		21.18	10	4.7		46.20		23.00	10	6.7		48.02		24.77		
		3.86		42.52		19.47		6.1		46.32		23.30		6.7		48.28		25.12		8.5		50.00		26.83		
		4.07		44.72		21.49		8.2		48.48		25.30		8.6		50.52		27.30		10.4		52.17		29.00		
		28		46.79		23.66		10.3		50.63		27.38		10.5		52.53		29.40		12.1		54.26		31.13		
		123.2		174.19		81.90		36.3		189.81		97.20		39.4		199.53		105.22		38.8		206.75		111.30		

			9	58.38		29.00				2.37		32.80				4.08		34.73				5.91		36.42		
				10.05		31.05				13.90		34.82				15.76		36.75				17.46		38.46		
				21.51		33.10				25.43		37.00				27.26		38.85				29.00		40.64		
				33.21		35.36				37.03		39.30				38.88		40.90				40.66		42.90		
				44.64		37.56				48.49		41.23				50.42		43.15				52.15		44.90		
			80																							
	8	47.24		107.77			9	7.72		127.22			8	51.66		136.40			8	59.56		145.18				
	9	0.64			9	21.558	10	8.30			9	25.444	10	8.46			9	27.280	10	10.86			9	29.036		
	10				−4	10.397					−4	14.394					−4	16.151					−4	17.878		
					+	.224					+	.228					+	.218					+	.222		
					−	4.179					−	4.158					−	4.148					−	4.138		
					5	7.21						7.12						7.20						7.24		
																								7.26		

	+34.32		−39.08	+20.92			+17.72		−42.86			+35.62		−41.18				2 +39.48		−41.82						
	1.53555		1.59195n				1.24846		1.63205n		+4695	1.55169		1.61469n		1.46953		+.59638		1.61616n						
	1.63332n		1.68972				1.34623n		1.72982			1.64946n		1.71246		1.56730n		1.64415n		1.71393						
	35	1	30	4			35	0	30	4		35	1	30	4			35	0	30	4					
	0.6	+.14	27.4	+.54			42.1	+.30	23.7	+.54		4.2	+.17	26.1	+.54			56.4	+.13	25.2	+.54					
	8.4	+.24	34.6	+.01			49.3	+.30	30.1	+.02		10.1	+.25	34.3	+.01			2.5	+.18	31.8	+.02					
	27.8	−.07	53.4	−.46			3.9	−.01	43.1	−.50		24.5	−.20	47.5	−.61			18.1	−.41	45.4	−.57					
	18.2	+.67	45.7	+.09			54.1	+.51	35.5	+.20		15.9	+.69	39.7	+.16			8.2	+.73	37.8	+.18					
		+.98		+.18				+1.10		+.26			+.91		+.10				+.63		+.17					
	36	13.75	34	40.28			35	52.35	34	33.10		36	13.68	34	36.90			36	6.30	34	35.05					
		−42.99		48.95				−22.19		53.68			−44.61		51.58			−36.92	−49.75		51.75					
	35	30.76	29	23			35	30.16		26.78		35	29.07		28.48				−1653		26.80					
																		35	29.38							
−11	12	42.41		40.88			12	41.81		38.43		12	40.72		40.13			12	41.03		38.45					
	+53	31	20																							
		1.89060																								
		+613						+2142					+2049						+1739							
		1.89673						1.91202					1.91109						1.90799							
		−78.84						−81.66					−81.49						−80.91							
		+ .12	+	.16				+ .03	+	.19			+ .13	+	.17				+ .09	+	.17					
=		+ .13	+	.51				+ .10	+	.50			+ .14	+	.55				+ .13	+	.53					
=		+ .24	+	.04				+ .27	+	.06			+ .18 .23	+	.02				+ .16	+	.04					
		.00		.02				− .01	−	.01			− .01	−	.01				− .01	−	.01					
		−78.35		−78.13				−81.27		−80.92			−81.80		−80.76				−80.54		−80.16					
	14	0.76		59.01				3.08		59.35			1.72		0.89				1.57		58.61					
	13	59.88					14	1.22					1.90						0.09							
	+4	10.42						10.72					11.53						10.77							
	−	22.49						− 22.35					− 22.28						− 22.21							
	+3	47.93						48.37					49.25						48.56							
−11°	10	11.95	−.92	+.24				12.85	−.93	+.31			12.65	−.94	+.23				11.53	−.88	+.26					
		12.6						13.5					12.8						12.2							

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1878

Nov. 10 | Nov. 12 | Nov. 13 | Nov. 14

h	m	s	m	s	m	s	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s
23	9	3.5	9	8.60	9	20.0	9	8.2	9	11.65	9	22.80	9	2.50	9	—	9	24.60	9	12.0	9	14.55	9	26.00
		5.3		10.69		22.26		10.2		13.82		25.78		2.72		17.21	15.10	26.80		14.0		16.68		28.33
		7.3		12.75		24.36		12.8		15.88		27.18		2.94		.25	17.25	29.00		15.9		18.65		30.10
		8.6		14.80		26.40		15.0		18.00		29.30		3.13		.13	19.24	31.00		18.2		20.75		32.29
	34.4	9.7	6384	17.00	12136	28.40	63.5	17.3	79.27	19.92	43596	31.50	145.7	32.8		27	21.49	14440	33.00	80.2	20.1	9353	22.90	150.95	34.53
		10	12.6		5485		3180	10	12.0		5780		3450	10	19.9		5930		36.10	10	17.7		8.70		37.38
			14.4		56.92		33.80		13.7		59.78		36.60		21.7		1.42		38.27		20.1		2.85		39.81
			17.0		5900		35.75		16.3		2.03		38.80		23.3		3.40		40.40		23.0		4.85		41.35
			18.6		1.00		38.05		18.3		4.03		40.85		25.0		5.60		42.50		25.7		6.95		43.90
	83.5	24.9	17505	32.5	179.40	40.00	80.6	20.3	129.74	6.10	193.70	42.98	117.4	27.5	77.42	4.70	201.96	44.65	114.5	28.0	24.45	9.10	203.24	46.20
				12.77		43.10				15.85		46.18				17.22				47.80				18.71		49.22
				24.27		45.70				27.19		48.35				28.88				49.90				30.19		51.20
				25.88		47.45				38.74		50.35				40.39				52.00				41.85		53.42
				47.47		48.65				50.39		52.40				51.99				54.10				53.40		55.46
				59.01		51.75	237.35			1.95		54.65	251.93			3.48		259.95		56.15				4.89	267.00	57.70
h	m	s																							
23	9	6.88	179.40		m	s	9	12.70	194.11				9	29.16					9	16.04					
	10	16.70			9	35.80	10	16.12			9	38.82	10	23.48				9	40.392	10	22.90			9	41.7
					−4	24.778					−4	27.741						−4	29.409					−4	30.760
					+	.218					+	.238						+	.226					+	.230
					−	4.096					−	4.073						−	4.062					−	4.051
					5	7.22					7.25							7.15						7.23
						7.21																		7.19

	+29.00		−40.82				+26.12		−37.30				+11.28		−43.10				+25.74		−41.12			
	1.46240		1.61087m				1.41697		1.57171m				1.05115		1.63438m				1.41111		1.61374m			
	1.56017m		1.70864				1.51474m		1.66948				1.14892m		1.73215				1.50888m		1.71151			
	35	0	30	4			35	0	30	4			35	0	30	4			35	0	30	4		
E	56.9	+.13	28.2	+.58			51.7	+.15	32.0	+.48			32.1	+.46	21.3	+.52			51.5	+.16	24.7	+.54		
F	3.9	+.19	34.4	+.01			58.9	+.19	39.8	+.08			40.2	+.14	29.8	+.02			58.3	+.20	32.2	+.02		
G	20.1	−.38	49.6	−.59			19.0	−.40	58.4	−.05			58.1	−.13	46.2	−.58			14.9	−.37	47.1	−.60		
H	10.2	+.73	42.3	+.13			9.7	+.73	51.2	+.03			49.7	+.51	38.0	+.18			5.1	+.70	39.2	+.17		
	1	+.67	1	+.08				+.67		+.54				+.98		+.14				+.64		+.13		
	36	7.78	34	38.62			36	4.82	34	45.35			35	45.02	34	33.82			36	2.45	34	35.80		
	−36.32		51.13				−32.71		46.72				−14.09		53.97				−32.28		51.46			
	35	31.46	29.75				35	32.11	32.07				38	30.93	27.77				35	30.17	27.26			
−11	12	43.11		41.40			12	43.76		43.72			12	42.58		39.44			12	41.82		38.91		−11
	+	12.90					−	2.01					+	9.26					+	22.33				
	1.90350						1.88859						1.89986						1.91293					
	−80.08						−77.37						−79.41						−81.83					
	+	.09	+	.17			+	.07	+	.14			+	.01	+	.19			+	.07	+	.17		
	+	.14	+	.60			+	.14	+	.62			+	.10	+	.60			+	.13	+	.60		
	+	.17	+	.02			+	.17	+	.13			+	.24	+	.03			+	.17	+	.03		
		.00		.00				.00		.00				.00		.00				.00		.01		
	−79.68		−79.29				−76.99		−76.48				−79.06		−78.59				−81.47		−81.04			
	14	2.9		0.69				0.75		0.20				1.64		58.03				3.29		59.95		
		1.74						0.48						59.84						1.62				
	+4	12.29						10.62						9.78						11.45				
	−	2.93					−	21.78					−	21.71					−	21.64				
0	+3	50.36						48.84						48.07						49.81				
−11	10	11.38	−.93	+.30				11.64	−1.06	+.06				11.77	−.97	+.28				11.81	−.98	+.29		
		12.0						12.6						12.5						12.4				

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Dec. 7

	m	s	m	s	m	s
23	9	29.0	9	40.90		52.50
23		31.2		42.90		54.55
		33.6		45.19		56.65
		35.8		47.20		58.70
	167.1	37.5	225.49	49.30	22328	0.88
	10	46.2		27.37		4.10
		47.7		29.32		6.30
		49.3		31.53		8.30
		51.0		33.58		10.32
	247.7	53.5	57.40	35.60	41.34	12.32
			45.69 10			15.75
			56.66			17.85
			8.27			19.90
			19.90			21.90
			31.48		99.50	24.10
	9	33.42	41.48 1			
	10	49.54			10	8.28 3
					−4	57.415
					+	.228
					−	3.790
						7.30
						7.32

Dec. 14

	m	s	m	s	m	s
	9	45.0	9	48.72		0.00
		47.3		50.90		2.27
		49.7		52.85		4.25
		52.2		54.80		6.50
	247.9	53.7	26407	56.80	21.57	8.55
	10	52.0		34.70		11.72
		53.8		36.80		13.70
		55.8		38.80		15.85
		57.8		40.90		17.85
	278.9	59.5	194.20	43.00	77.02	19.90
			52.81			23.00
			4.31			25.40
			15.80			27.30
			27.34			29.50
			38.84		13668	31.48
	9	49.58	77.10			
	10	55.78			10	15.820
					−5	4.886
					+	.222
					−	3.714
						7.44
						7.41
						Ref

Dec. 16

	m	s	m	s	m	s
	10	46.3	10	51.00		2.40
		48.2		52.95		4.62
		49.7		55.15		6.73
		51.4		57.15		8.85
	249.6	54.0	275.52	59.27	33334	10.74
	11	51.0		37.10		13.80
		52.4		39.59		15.85
		55.1		41.10		18.10
		56.9		43.20		20.17
	274.0	58.6	20637	45.38	90.22	22.30
			55.10			25.50
			6.67			27.75
			18.04			29.90
			29.87			32.00
			41.27		149.35	34.20
	[9] 10	49.92	90.95		[10]	
	11 [10]	54.80			11	18.190
					−5	7.431
					+	.194
					−	3.693
						7.26
						7.29
						Ref

+34.86	−41.26		+26.24	−39.96	+28.27	−36.61
1.54233	1.61553 m		1.41896	1.60163 m	1.45133	1.56360 m
1.64010 m	1.71330		1.51673 m	1.69940	1.54910 m	1.66137
35 1	30 4		35 0	30 4	35 0	30 4
3.2 +.15	26.8 +.54		53.2 +.14	28.8 +.52	57.7 +.13	32.2 +.48
9.4 +.25	34.1 +.01		59.2 +.19	35.2 +.01	3.3 +.19	38.2 +.04
21.2 −.34	44.2 −.54		14.1 −.34	48.0 −.61	18.1 −.41	50.5 −.57
12.7 +.72	27.8 +.18		5.8 +.71	41.8 +.13	8.8 +.73	45.0 +.10
+.78	+.19		+.70	+.05	+.64	+.05
36 11.62	34 35.72		36 3.08	34 38.45	36 6.98	34 41.48
−43.66	51.68		−32.86	50.05	−35.41	45.85
35 27.96	27.40		35 30.22	28.50	35 31.57	27.33
−11 12 39.61	39.05		12 41.87	40.15	12 43.22	38.98
+2853			+2294		+2600	
1.91913			1.91354		1.91660	
−83.01			−81.95		−82.53	
+ .13	+ .17		+ .07	+ .16	+ .08	+ .14
+ .12	+ .96		+ .11	+ .51	+ .13	+ .56
+ .19	+ .05		+ .17	+ .01	+ .16	+ .01
− .01	− .01		− .01	− .01	− .01	− .01
−82.58	−82.34		−81.61	−81.28	−82.17	−81.83
2.19	1.39		3.48	1.43	5.39	6.81
1.79			2.46		3.10	
11.28			994		1029	
− 2035			− 1964		− 1953	
51.23			50.30		50.76	
10.56	−.82 +.21		12.16	−.80 +.20	12.34	−.80 +.20
11.2			12.8	Ref	12.9	

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91 Aquarii

α 23h 9m 29s

δ −9° 45′

z +52 8

1878

log sin δ 9.22878n

" cos δ 9.99368

" 15 cos δ tan i 1.09975n

tan δ −0.17

sin z +.79

log R₁ 1.36287

" R₂ 1.06170

R₁ 23.03

R₂ 11.53

I

Nov. 2

h	m	s	m	s	m	s
23	13	1.06	13	17.25	13	28.42
		12.0		19.18		30.73
		14.2		21.36		32.81
		15.7		23.43		34.87
		69.9		17.4	106.76	25.37
		14		16.2		32.0
				18.1		20.1
				20.1		23.3
				21.7		25.8
		100.1		24.0	37.01	11.62
					21.35	
					32.83	
					44.34	
					55.88	
					7.40	
h	m	s				
23	13	13.98			221.78	
	14	20.02				

Nov. 4

m	s						
13	12.2	13	21.10		32.63		
	14.2		23.26		34.70		
	15.8		25.47		36.78		
	17.8		27.46	393	38.82		
13	20.0	12.89	29.60	18403	41.00		
14	25.4		7.10		44.03		
	27.2		9.26		46.18		
	29.1		11.40		48.28		
	30.7		13.44		50.35		
145.1	82.7	56.83	15.63	24.136	52.50		
			25.38		8.63		
			36.82	79	57.65		
			48.27		57.83		
			59.81		1.88		
			11.37	17.04	4.05		
m	s						
13	16.00		24.68				
14	29.02				48.330		

Nov. 5

m	s						
13	16.2	13	23.00				
	17.9		25.00				
	19.3		27.00				
	21.3		29.15				
13	23.5	13.52	31.10	192.80	42.80		
	26.1		8.98		45.98		
	28.2		11.00		48.05		
	30.9		13.20		50.20		
	32.5		15.08		52.24		
65.90	17.34	25.07	3.54	250.73	54.30		
			27.05		57.40		
			38.56		59.55		
			50.15		1.55		
			1.62		3.75		
			13.18	128.10	5.85		
13	19.64	25.056					
14	30.54						

Nov. 6

m	s						
13	18.3	13	24.63	13	36.12		
	20.0		26.70		38.18		
	22.0		28.80		40.25		
	23.9		30.92		42.35		
10.1	25.7	14.08	32.98	20.148	44.58		
14	24.5		10.65		47.70		
	26.8		12.80		49.70		
	29.3		14.90		51.72		
	30.9		17.00		54.00		
144.0	32.5	74.50	19.15	259.28	56.16		
			28.83		59.27		
			40.2930		1.26		
			51.86		3.32		
			3.40		5.50		
			14.90		7.65		
13	22.02	25.228					
14	28.80						

	+30.38		−35.66			+32.37		−40.69			+30.48		−40.47			+29.84		−36.94					
	1.48259		1.55218n			1.50947		1.60959n			1.48377		1.60670n			1.47465		1.56761n					
	1.58234n		1.65193			1.60922n		1.70934			1.58348		1.70645			1.57440n		1.66736					
	10	0	5	4		10	0	5	4		10	0	5	4		10	0	5	4				
ε	53.6	+.13	29.0	+.52		57.2	+.13	22.8	+.53		55.4	+.13	25.0	+.54		54.9	+.13	29.0	+.52				
ζ	0.4	+.17	35.6	+.02		4.4	+.21	29.0	+.03		1.9	+.18	31.1	+.02		59.6	+.15	35.6	+.02				
η	20.9	−.35	54.8	−.35		18.7	−.40	43.7	−.53		16.8	−.42	45.0	−.56		16.1	−.40	48.8	−.60				
H	11.6	+.72	47.0	+.07		9.7	+.73	36.2	+.20		6.9	+.72	37.2	+.19		7.3	+.72	42.3	+.13				
		+.67		+.26			+.67		+.23			+.61		+.19			+.63		+.07				
	11	6.62	9	41.60		11	7.50	9	32.92		11	5.25	9	34.58		11	4.48	9	38.92				
	−38.22		44.87			−40.66		51.21			−38.34		50.87			−37.53		46.49					
	10	28.40		26.47		10	26.84		24.13		10	26.91		25.45		10	26.95		25.41				
−9°	47′	40.05		38.12		47	38.49		35.78		47	38.56		37.10		47	38.60		37.06			−9	4
+52°	6′	17″																					
	1.86830																						
	+619					+2149					+2054					+1744							
	1.87449					1.88979					1.88884					1.88574							
	−74.90					−77.59					−77.42					−76.87							
	+ .08		+ .12			+ .09		+ .16			+ .08		+ .15			+ .08		+ .13					
	+ .12		+ .62			+ .12		+ .49			+ .13		+ .55			+ .13		+ .55					
	+ .17		+ .06			+ .17		+ .06			+ .15		+ .05			+ .16		+ .02					
	.02		.02			− .01		− .01			− .01		− .01			− .01		− .01					
	−74.53		−74.20			−77.22		−76.89			−77.07		−76.68			−76.51		−76.18					
	48	54.58		52.32			55.71		52.67			55.63		53.78			55.11		53.24					
		53.45					54.19					54.70					54.18							
	+4′	10.42					10.72					11.53					10.77							
	−	23.16					− 23.02					− 22.95					− 22.88							
	+3°	47′	26				47′	0				48′	58				47′	89						
−9°	45′	6.19	−.87	+.24			6.49	−.84	+.31			6.12	−.88	+.23			6.29	−.86	+.26					
		6.8					8.0					6.8					8.9							
							7.0										7.1							

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1878.0

h	m	s	α	δ	″
23	9	29.97		−9° 45′ 6.2	6.8
		.96		6.5	7.0
		30.00		6.1	6.8
		.02		6.3	6.9
		.00		6.3	7.0
		.06		6.8	7.8
		29.98		6.7	7.4
		30.08		6.4	7.0
		.11		5.7	6.3
		9)48		6.6	7.2
		30.036		6.36	7.02
		.016			

Nov. 10

12	13	21.8	13	31.52	13	42.90	13	24.9	13	34.47	13	45.95	13	26.0	13	36.08	13	47.53	13	28.3	13	37.50	13	48.93							
18		24.9		33.74		45.00		27.0		36.56		48.05		28.1		38.18		49.65		29.9		39.55		51.04							
25		26.6		35.72		47.24		28.4		38.75		50.17		29.4		40.20		51.70		31.5		41.67		53.15							
35		28.7		37.74		49.35		29.9		40.77		52.19		31.4		42.27		53.90		33.5		43.75		55.35							
58	132.3	30.3	17859	39.87	23587	51.58	141.9	31.7	19340	42.85	25070	54.34	148.9	33.7	20117	44.94	25878	56.00	158.5	35.3	20827	45.80	26580	57.37							
70	14	32.4		17.45		54.50	14	41.1		20.55		57.42	14	37.3		22.05		59.01	14	40.1		23.70		0.39							
70		35.1		19.57		56.56		43.3		22.68		59.52		38.9		24.20		1.10		41.6		25.70		2.65							
72		36.9		21.77		58.80		45.3		24.75		1.73		40.8		26.30		3.30		43.7		27.90		4.78							
100		38.6		23.76		0.80		46.9		26.79		3.75		42.6		28.40		5.39		45.2		29.80		6.80							
16	183.4	40.4	10845	25.90	17356	2.90	225.3	48.7	12367	28.90	12832	5.90	204.3	44.7	13142	30.47	7627	7.48	217.8	47.2	13880	31.90	23.62	9.00							
27				35.72		4.00				38.68		9.00				40.23		10.57				41.65		12.10							
26				47.17		8.00				50.14		11.12				51.76		12.68				53.16		14.11							
32				58.71		10.00				1.66		13.16				3.25		14.79				4.72		16.20							
50				10.14		12.36				13.18		15.20				14.78		16.88				16.22		18.25							
65				21.69	5070	14.90				24.73	6588	17.40				26.28	73.90	18.98				27.76	8110	20.45							
4	13	26.46	29343				13	28.38		~~28.39~~			13	29.78		16.30			13	31.70		23.51									
350	14	36.68			13	58.686	14	45.06			14	1.678	14	40.86			14	3.260	14	43.56			14	4.702							
884					−4	24.782					−4	27.747					−4	29.414					−4	32.764							
189					+	.183					+	.202					+	.192					+	.195							
134					−	4.093					−	4.072					−	4.061					−	4.050							
02						30.870						30.336						29.98						30.08							
04						29.99																		30.04							

Nov. 12

	3		37.99																												
	+32.22		−38.08						+38.30		−43.38																				
	1.50826		1.57967	m					1.52244		1.63729	m																				
	1.60801	m	1.67942						1.62219	m	1.73704																				
	10	0	5	4					10	1	5	4																			
	59.7	+.13	29.2	+.52					0.2	+.13	21.9	+.52																			
	6.1	+.23	36.2	+.02					6.9	+.24	28.7	+.03																			
	21.9	−.32	50.1	−.58					27.2	−.09	48.3	−.61																			
	14.2	+.71	44.9	+.10					18.5	+.67	41.3	+.14																			
	11	+.75		+.06						+.95		+.08																			
	~~10~~	10.48	9	40.10					11	13.20	9	35.05																			
		−40.55		47.80						−41.90		54.58																			
	10	29.93		27.90					10	31.30		29.63																			
−9	47	41.88		39.85					47	42.95		41.28																			
		+1294								−188																					
		1.88124								1.86642																					
		−46.07								−43.52																					
		+ .09		+ .14						+ .10		+ .17																			
		+ .16		+ .61						+ .16		+ .60																			
		+ .19		+ .02						+ .24		+ .02																			
		.00		.00						.00		.00																			
		−75.63		−75.30						−73.02		−72.73																			
		57.21		54.85						55.97		54.01																			
		56.03								54.99																					
		12.29								10.62																					
		−22.60								− 22.46																					
		49.69								48.16																					
		6.34		−.98 +.30						6.83		−1.02 +.06																			
		7.0								7.8																					

Nov. 13

									+33.48		−37.60																				
									1.52479		1.57519	m																			
									1.62454	m	1.67494																				
									10	0	5	4																			
									58.4	+.13	27.8	+.53																			
									5.4	+.22	34.7	+.01																			
									23.2	−.27	52.0	−.53																			
									14.2	+.71	44.1	+.11																			
										+.74		+.12																			
									11	10.30	9	39.65																			
										−42.18		47.31																			
									10	28.12		26.96																			
									47	39.77		38.61																			
										+934																					
										1.88764																					
										−45.45																					
										+ .10		+ .14																			
										+ .16		+ .61																			
										+ .20		+ .03																			
										.00		.00																			
										−74.99		−74.67																			
										53.82		53.28																			
										54.05																					
										9.78																					
										− 22.39																					
										47.39																					
										6.66		−1.00 +.28																			
										7.4																					

Nov. 14

									+33.00		−38.86																				
									1.51851		1.58950	m																			
									1.61826	m	1.68925																				
									10	0	5	4																			
									57.1	+.13	26.2	+.54																			
									4.4	+.19	83.7	+.01																			
									20.3	−.37	49.0	−.60																			
									10.9	+.72	42.1	+.13																			
										+.67		+.08																			
									11	8.18	9	37.75																			
										−41.52		48.89																			
									10	26.66		26.64																			
									47	38.31		38.29																			
										+ 2243																					
										1.89073																					
										−47.75																					
										+ .10		+ .14																			
										+ .14		+ .60																			
										+ .17		+ .02																			
										− .01		− .01																			
										−77.38		−77.03																			
										55.66		55.29																			
										55.48																					
										11.45																					
										− 22.32																					
										49.13																					
										6.35		−.98 +.29																			
										7.0																					

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Dec. 7

h	m	s	m	s	m	s
23	13	55.7	14	4.07		15.48
		57.1		6.05		17.52
		58.8		8.00		19.60
		0.8		10.20		21.80
	174.8	2.4	4055	12.30	9823	23.83
	15	4.5		49.92		26.90
		5.9		52.00		29.10
		7.4		54.10		31.10
		8.8		56.10		33.30
	36.6	10.0	27047	58.35	15570	35.30
				8.11		38.40
				19.65		40.50
				31.14		42.70
				42.65		44.80
				54.89	21325	46.85

h	m	s
23	13	58.96
	15	7.32

	m	s
	14	31.148
	−4	57.420
	+	.194
	−	3.794
	9	30.11
		30.13

Dec. 12

14	3.6		9.40			
	5.5		11.75			
	7.7		13.70			
	9.7		15.75			
38.5	12.0	6860	18.00			
		13.72	36.75			
14	7.70					

14	36.750	
−5	2982	
+	.715	
−	3.739	

Rej.

Dec. 14

14	3.9	14	11.40		22.80	
	5.2		13.45		24.88	
	8.0		15.50		27.00	
	10.2		17.70		29.13	
39.0	11.7	7775	19.70	135.08	31.27	57.3
15	15.5		57.32		34.30	16
	16.8		59.80		36.40	
	18.4		1.90		38.50	
	20.0		3.70		40.65	
92.3	21.6	857	5.85	192.56	42.68	65.5
			15.55		45.90	
			27.02		48.20	
			38.51		50.20	
			50.20		52.30	
			1.71	251.00	54.40	

14	7.80	
15	18.46	

193.99		
14	38.598	
−5	4.890	
+	.189	
−	3.718	
	3018	
	30.15	
	Rej	

Dec. 16

15	8.0	15	13.86		25.10	
	9.9		15.75		27.40	
	11.4		17.90		29.37	
	13.0		20.10		31.54	
57.3	15.0	8966	22.05	14698	33.57	
16	9.5		59.70		36.70	
	11.3		1.80		38.80	
	13.1		4.00		40.90	
	14.6		6.15		43.00	
65.5	17.0	1990	8.25	20445	45.05	
			17.93		48.25	
			29.89		50.25	
			40.89		52.60	
			52.46		54.60	
			3.98	26230	56.60	

[14]		
15	11.46	
	204.65	6
[15]		
16	13.10	

[14]		
15	40.930	2
−5	7.435	
+	.165	
−	3.697	
	2996	
	29.99	

	7	9						
	+32.18	−36.18	+29.05	+30.80	−39.86	+29.47	−32.17	
	1.50745	1.55859m	1.46315	1.48855	1.60054m	1.46938	1.50745m	
	1.60720m	1.65834	1.56290m	1.58830m	1.70029	1.56913m	1.60720	
	′ ′	′ ′						
	10 0	5 4	10 0	10 0	5 4	10 0	5 4	
	″	″	″	″	″	″	″	
E	57.6 +.13	32.6 +.47	53.1 +.14	56.6 +.13	26.8 +.54	55.4 +.13	37.1 +.37	
F	3.5 +.20	38.7 +.05	59.8 +.17	2.1 +.18	33.2 +.01	0.5 +.17	42.3 +.13	
G	17.2 −.42	49.3 −.59	15.1 −.37	17.4 −.42	46.6 −.59	15.9 −.40	56.1 −.20	
H	7.8 +.73	42.8 +.12	7.3 +.72	10.2 +.73	39.2 +.17	7.8 +.73	48.6 +.05	
	+.64	+.05	+.66	+.62	+.13	+.63	+.35	
	11 6.52	9′ 40.85	11 3.82	11 6.58	9 36.45	11 4.90	9 46.02	
	−40.48	45.53	−36.55	−38.75	50.15	−37.08	40.48	
	10 26.04	26.38	10 27.27	10 27.83	26.60	10 27.82	26.50	
−9°	47′ ″ 37.69	″ 38.03	47 38.92	47 39.48	38.25	47 39.47	38.15	
	+2858		+1951	+2298		+2610		
	1.89188		1.88787	1.89128		1.89440		
	−78.86		−77.24	−77.85		−78.41		
	+ .09	+ .12	+ .08	+ .09	+ .15	+ .08	+ .09	
	+ .11	+ .47	+ .12	+ .12	+ .57	+ .13	+ .58	
	+ .16	+ .01	+ .17	+ .15	+ .03	+ .16	+ .09	
	− .01	− .01	.60	− .01	− .01	− .01	− .01	
	−78.51	−78.27	−76.87	−77.50	−77.17	−78.05	−77.66	
	48 56.20	56.30	55.79	56.98	55.42	57.32	55.81	
	56.25		55.79	56.20		56.66		
	+4 ′ ″ 11.28		9.41	9.94		10.29		
	− 20.77		− 20.46	− 20.34		− 20.23		
	+3 50.51		48.95	49.60		50.06		
−9°	45 5.74	−.75 +.21	6.84	6.60	−.81 +.20	6.60	+.18	
	6.3		adj.	7.2	Rej	7.20		

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94 Aquarii

	h m s
α	23 12 21
δ	−14° 7′
z	+56 30

log sin δ 9.38721n
" cos δ 9.98668
" 15 cos δ tan i 0.09275n

tan δ −0.25
sin z +.83

1878.0

h m	α (s)		δ	″	
23 12	41.66	41.66	−14° 7′	18.5	19.1
	.63	.63		21.2	21.7
	.66	.66		19.3	19.9
	.68	.70		19.0	19.6
	.62	.61		18.6	19.3
	.71	.71		19.6	20.5
	.65	.65		18.5	19.1
	.62	.58		17.7	18.4
	.74	.76		18.2	18.8
	.83	.80		19.1	19.8
	41.680	41.676		18.97	19.62

Nov. 2 / Nov. 4 / Nov. 5 / Nov. 6

Nov. 2 h m s		m s		m s		Nov. 4						Nov. 5						Nov. 6					
23 16	17.0	16	28.82		40.00	16	22.7	16	32.24		44.10	16	28.0	16	34.25	16	45.75	16	25.0	16	35.80	16	47.50
	19.3		30.40		42.16		24.2		34.38		46.25		30.2		36.27		47.90		27.0		37.90		49.70
	21.2		32.57		44.30		26.0		36.50		48.23		32.0		38.32		50.20		28.3		40.00		51.78
	23.0		34.72		46.47		27.6		38.73		50.43		33.7		40.45		52.34		30.1		42.10		53.90
105.3	24.8	162.86	36.83	221.50	48.57	130.2	29.7	182.76	40.88	241.66	52.65	159.1	35.2	191.97	42.68	250.69	54.50	142.2	31.8	200.15	44.35	259.02	56.14
17	30.4		15.05		51.74	17	35.5		19.23		55.73	17	35.0		21.00		57.50	17	35.8		22.57		59.34
	32.1		17.28		54.94		37.2		21.33		57.80		36.8		22.95		59.68		37.6		24.88		1.38
	33.8		19.52		56.05		39.2		23.37		59.84		39.1		25.00		1.74		38.9		26.80		3.65
	35.6		21.48		58.10		41.0		25.48		2.15		41.0		27.28		3.85		41.0		29.00		5.70
169.9	38.0	97.04	23.71	281.10	0.27	195.9	43.0	117.06	27.65	179.74	4.22	194.8	42.9	125.60	29.37	8.77	6.00	196.7	43.4	134.35	31.10	17.87	7.80
			32.57		3.40				36.55		7.43				38.39		9.87				40.03		11.00
			44.30		5.64				48.33		9.60				50.14		11.40				51.80		13.00
			56.22		7.66				59.95		11.62				1.75		13.45				3.57		15.15
			7.71		9.84				11.69		13.81				13.45		15.60				15.21		17.35
			19.41	38.54	12.00				23.41	58.43	15.97				25.12	67.27	17.65				26.87	76.05	19.55
16	21.06	280.21				16	26.04	299.93				16	31.82	8.85				16	28.44	17.48			
17	33.98			16	56.042	17	39.18			16	59.986	17	38.96			17	1.770	17	39.34			17	3.496
				−4	10.409					−4	14.406					−4	16.158					−4	17.888
				+	.280					+	.285					+	.272					+	.278
				−	4.250					−	4.230					−	4.220					−	4.210
				12	41.66						41.63						41.66						41.68
																							41.70

Declination reductions

Nov. 2		Nov. 4		Nov. 5		Nov. 6	
+34.98	−37.94	+33.95	−39.19	+29.95	−37.19	+35.06	−35.84
1.54382	1.57910n	1.53084	1.59318n	1.47640	1.57043n	1.54481	1.55437n
1.63657n	1.67185	1.62359n	1.68593	1.56915n	1.66318	1.63756n	1.64712
30 2	30 1	30 2	30 1	30 2	30 1	30 3	30 1
57.9 +.16	26.8 +.53	58.6 +.16	27.2 +.53	54.9 +.16	29.6 +.51	0.2 +.16	36.9 +.51
8.2 +.30	36.5 +.20	8.3 +.30	37.7 +.22	3.4 +.27	38.9 +.25	9.2 +.31	40.2 +.28
24.2 −.13	63.6 −.38	19.2 −.31	47.6 −.57	14.2 −.26	49.3 −.54	20.3 −.28	51.9 −.47
16.4 +.37	44.9 +.45	10.4 +.40	40.3 +.52	6.4 +.39	43.9 +.47	12.8 +.39	44.9 +.45
+.70	+.80	+.55	+.70	+.56	+.69	+.58	+.77
33 11.68	31 40.45	33 9.12	31 38.20	33 4.72	31 40.42	33 10.62	31 41.98
−43.31	46.97	−42.03	48.52	−37.08	46.04	−43.41	44.37
32 28.37	27.42	32 27.09	26.72	32 27.64	26.46	32 27.21	26.35
−14 9 40.02	39.07	9 38.74	38.37	9 39.29	38.11	9 38.86	38.00

+56 28 18
1.93792
+624
1.94416

Nov. 2		Nov. 4		Nov. 5		Nov. 6	
		+2153		+2059		+1748	
		1.95945		1.95851		1.95540	
−87.93		−91.09		−90.89		−90.24	
+ .16	+ .18	+ .15	+ .19	+ .12	+ .18	+ .16	+ .17
+ .35	+ .19	+ .35	+ .18	+ .37	+ .20	+ .38	+ .20
+ .17	+ .20	+ .14	+ .17	+ .14	+ .17	+ .15	+ .19
.00	.00	− .01	− .01	− .01	− .01	− .01	− .01
−87.25	−87.36	−90.46	−90.56	−90.27	−90.35	−89.56	−89.69
11 7.27	6.43	9.20	8.93	9.56	8.46	8.42	7.69
6.85		9.06		9.01		8.06	
− 22.03		− 22.87		− 21.78		− 21.70	
+4 10.42		10.72		11.53		10.77	
+3 48.39		47.85		49.75		49.07	
−14° 7 18.46	−.91 +.24	21.21	−.84 +.31	19.26	−.88 +.23	18.99	−.92 +.26
19.1		21.7		19.9		19.6	

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	Nov. 10			Nov. 12			Nov. 13			Nov. 14		
h	m	s	m	s	m	s	h	m	s	h	m	s
23	16	32.7	16	42.70	16	54.34	16	44.4	16	45.74	16	57.35
		35.0		44.77		56.36		47.1		47.87		59.52
		37.0		46.90		58.53		49.1		49.90		1.60
		38.6		47.00		0.69		50.8		52.00		3.60
	183.3	40.0	234.52	51.15	172.76	2.84	244.2	52.8	244.75	54.24	8.02	5.75
	17	45.1		29.40		6.02	17	48.0		32.50		9.00
		45.0		31.66		8.10		50.0		34.55		11.20
		52.3		33.80		10.32		52.3		36.74		13.25
		54.9		35.85		12.40		54.0		38.80		15.41
	249.3	54.0	168.71	38.00	51.49	14.65	260.5	56.2	183.54	40.95	66.47	17.55
				46.90		17.70				49.95		20.70
				58.55		17.92				1.60		22.74
				10.29 30		22.00				13.29		25.10
				22.02		24.20				25.01		27.20
				33.74	110.12	26.36				36.71	125.04	29.30
h	m	s		1								
23	16	36.66		51.52	m	s	16	48.84		66.56		
	17	49.86			17	10.30 3	17	52.10			17	13.312
					−4	24.785					−4	27.751
					+	.272					+	.298
					−	4.169					−	4.147
					12	41.62						41.71
						41.61						

	Nov. 13			Nov. 14		
h	m	s	h	m	s	
16	38.9	16	47.30	16	59.00	
	40.5		49.45		7.00	
	42.3		51.50		3.28	
	44.4		53.65		5.39	
213.0	46.6	257.77	55.87	16.14	7.47	
17	50.9		34.04		10.57	
	52.5		36.29		12.79	
	55.0		38.36		14.88	
	56.7		40.40		17.00	
273.9	58.8	191.63	42.60	74.42	19.18	
			51.55		22.38	
			3.23		24.50	
			14.88		26.55	
			26.60		28.70	
			38.32 3	133.00	30.87	
			7458 9			
16	42.60			16	32.66	
17	54.78			17	55.98	
			14.918 8			
−4	29.419					
+	.282					
−	4.135					
	41.65					

	Nov. 10		Nov. 12		Nov. 13		Nov. 14	
	+33.64	−39.56	+24.46	−38.80	+32.32	−39.86	+36.56	−39.76
	1.52686	1.59726 m	1.38863	1.58872 m	1.50947	1.60054 m	1.56312	1.59934 m
	1.61961 m	1.69001	1.48138 m	1.68147	1.60222 m	1.69329	1.65587 m	1.69209
	30 3	30 1	30 2	30 1	30 2	30 1	30 3	30 1
ζ	0.3 +.16	28.3 +.53	48.7 +.23	29.4 +.51	55.7 +.16	26.9 +.53	0.6 +.17	23.3 +.32
ε	9.5 +.30	37.2 +.21	58.4 +.29	39.7 +.26	5.8 +.30	27.2 +.19	9.6 +.30	34.3 +.18
β	21.9 −.23	50.1 −.53	15.1 −.28	56.0 −.12	20.6 −.26	50.9 −.51	22.6 −.21	47.0 −.56
η	13.1 +.39	44.0 +.47	6.0 +.39	48.9 +.39	11.9 +.40	43.9 +.47	14.4 +.39	39.2 +.55
	+.62	+.68	+.63	+.104	+.60	+.68	+.65	+.69
	33 11.20	31 39.90	33 2.05	31 43.60	33 8.50	31 37.22	33 11.80	31 35.95
	−41.65	48.98	−30.30	48.03	−40.01	49.35	−45.28	49.21
	32 29.55	28.88	32 31.75	31.53	32 28.49	26.57	32 26.52	25.16
−14°	9′ 41.20″	40.53	9 43.40	43.18	9 40.14	38.22	9 38.17	36.81
	+1298		−179		+939		+2250	
	1.95090		1.93613		1.94731		1.96042	
	−89.31		−86.32		−88.57		−91.29	
	+ .15	+ .20	+ .07	+ .19	+ .13	+ .21	+ .18	+ .21
	+ .42	+ .22	+ .39	+ .22	+ .40	+ .21	+ .42	+ .21
	+ .15	+ .17	+ .16	+ .26	+ .15	+ .17	+ .16	+ .17
	.00	.00	.00	.00	.00	.00	− .01	− .01
	−88.59″	−88.72″	−85.70	−85.65 8	−87.89	−87.98	−90.54	−90.71
	11 9.79	9.25	9.16	8.83	8.03	6.20	8.71	7.52
	9.52		8.96		7.12		8.12	
	+4′ 12.29″		10.62		9.78		11.45	
	− 2.37		− 2.21		− 2.12		− 2.04	
	+3 50.92		49.41		48.66		50.41	
−14°	7 18.60	−.96 +.30	19.55	−1.03 +.06	18.46	−.93 +.28	17.71	−.96 +.29
	19.3		20.5		19.1		18.4	

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	Dec. 7						Dec. 14					
h	m	s	m	s	m	s						
23	17	9.3	17	15.22		26.78	17	14.9	17	22.50		34.30
		11.7		17.33		29.00		17.3		24.55		36.45
		13.7		19.30		31.10		18.7		26.78		38.50
		16.0		21.30		33.15		20.4		28.90		40.70
	69.0	18.3	96.75	23.60	155.43	35.40	93.1	21.8	133.73	31.00	19265	42.70
	18	15.3		1.90		38.48	18	27.4		9.52		45.90
		17.0		4.00		40.60		29.7		11.60		48.05
		18.6		6.17		42.60		31.7		13.70		50.22
		20.5		8.30		44.82		34.0		15.90		52.26
	94.0	22.6	30.87	10.50	213.40	46.90	158.6	35.8	6872	18.00	25083	54.40
			19.35			50.15			26.75			57.75
			31.08			52.23			38.53			59.80
			42.68			54.45			50.17			1.98
			54.39			56.47			1.98			4.05
			6.17		271.98	58.68			13.74		988	6.30
	17	13.80	21367				17	18.62	25117			
	18	18.80			17	42.734	18	31.72			17	50.234
					−4	57.426					−5	4.895
					+	286					+	.278
						−3.861					−	3.783
						41.74						4183
						41.76						41.80

		+28.92		−36.08				+31.66		−41.56		
		1.46150		1.55703m				1.49982		1.61794m		
		1.55425m		1.64978				1.59257m		1.71069		
		30	2	30	1			30	2	30	1	
		53.7	+.16	31.4	+.50			56.3	+.16	25.2	+.53	
		2.1	+.27	40.4	+.28			5.0	+.29	34.8	+.18	
		12.3	−.17	49.8	−.53			16.3	−.30	45.8	−.55	
		3.4	+.32	43.1	+.48			9.2	+.41	39.9	+.53	
			+.58		+.78				+.56		+.69	
		38	2.88	31	41.18			33	6.70	31	36.42	
			−35.83		44.65				−39.14		51.37	
		32	27.05		25.83			32	27.56		27.79	
	−14	9	38.70		37.48			9	39.21		39.44	
			+2862						+2301			
			1.96654						1.96093			
			−9258						−9140			
			+ .11		+ .17				+ .13		+ .21	
			+ .30		+ .17				+ .34		+ .18	
			+ .15		+ .18				+ .14		+ .17	
			− .01		− .01				− .01		− .01	
			−9203		−9207				−9080		−9085	
			10.73		9.55				1001		10.29	
			10.14						10.15			
			11.28						994			
			− 1934						− 1893			
			5194						5101			
			1820		−.80 +.21				19.14		−.83+.20	
			18.8						19.8			

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λ

log sin δ 9.29779n

" cos δ 9.99127

" 1/2 cos δ sin i 0.09734n

δ −11 27

tan δ −0.20

z +53 50

sin z +.81

1878

	Nov. 2			Nov. 4			Nov. 5			Nov. 6		
h	m s	m s	m s	m s		m s	m s		m s	m s		m s
23	20 19.5	20 27.64	20 39.24	20 23.2		20 31.72	20 43.31		20 25.9	20 33.60		20 45.15
	21.0	29.83	41.34	24.7		33.83	45.41		28.0	35.62		47.20
	23.0	32.05	43.56	26.6		35.90	47.50		30.2	37.71		49.40
	24.8	34.05	45.72	28.3		38.00	49.63		32.4	39.81		51.33
	114.9	266 15975	86.18	21761	47.73	132.8	30.0 17963	40.18	23759	51.71	151.7	84.9 18879
	21 26.2		13.88		50.84	21 34.0		18.05		54.83	21 37.9	19.80
	28.0		16.05		53.05	35.7		20.10		56.93	40.0	21.90
	29.6		18.28		53.70	37.6		22.32		59.02	41.9	23.95
	31.1		20.26		57.22	39.6		24.25		1.10	43.8	26.19
	147.9	330 9090	224.32	27559	53.38	188.4	41.5 111.13	26.41	29511	32.20	209.6	46.0 19.99
		31.95			2.46		35.93			6.33		37.76
		43.52			4.63		47.52			8.48		49.31
		55.12			6.66		59.02			10.66		0.89
		6.68			8.81		10.62			12.73		12.41
		18.18		33.38	10.82		22.23		53.08	14.89		23.99
												24.50
	20 22.98	275.44				20 26.56	28.32				20 30.34	4.36
	21 29.58			20 55.08		21 37.68			20 59.064		21 41.72	
				−4 10.418					−4 14.417			
				+ .224					+ .228			
				− 4.224					− 4.205			
				16 40.67					40.67			

	+32.18	−34.50			+32.50	−38.62			+30.52	−41.06			+31.78	−35.64
	1.50664	1.53769n			1.51188	1.58681n			1.48473	1.61331n			1.50229	1.55157n
	1.60398n	1.63503			1.60922n	1.68415			1.58207n	1.71065			1.59963n	1.64891
	50 2'	50 0'			50 2	50 0			50 2	50 0			50 2	50 0
E	14.1 +.35	50.8 +.16			15.9 +.39	46.0 +.24			14.6 +.37	43.3 +.28			14.3 +.36	50.1 +.17
F	22.4 +.28	57.6 +.21			23.6 +.26	52.3 +.29			21.3 +.24	49.9 +.30			21.1 +.29	56.5 +.23
B	41.8 −.43	18.0 −.41			37.6 −.26	6.1 −.04			34.5 −.09	3.9 −.01			35.4 −.13	11.8 −.25
H	31.7 +.47	9.2 +.73			28.4 +.47	59.0 +.55			26.8 +.47	56.9 +.52			26.6 +.47	3.1 +.65
	+.67	+.69			+.86	+1.14			+1.04	+1.09			+.99	+.80
	52 27.50	51 3.90			52 26.38	50 55.85			52 24.30	50 53.60			52 24.25	51 0.38
	−40.18	43.16			−40.66	48.32			−38.20	51.36			−37.78	44.56
	51 47.32	47.06			51 45.72	44.17			51 46.10	44.86			51 46.57	44.94
−11°	28 58.97	58.71			28 57.37	55.82			28 57.75	56.51			28 58.22	56.59
+53°	47' 37"													
	1.89480													
	+632				+2162				+2067				+1755	
	1.90112				1.91642				1.91547				1.91235	
	−79.64	"			−82.49				−82.31				−81.72	
	+ .10	+ .12			+ .10	+ .15			+ .10	+ .17			+ .10	+ .13
−	+ .27	+ .12			+ .26	+ .10			+ .29	+ .11			+ .29	+ .12
−	+ .17	+ .17			+ .21	+ .26			+ .26	+ .27			+ .25	+ .20
	.60	.60			− .01	− .01			− .01	− .01			− .01	− .01
	−79.10	−79.23			−81.93	−81.99			−81.67	−81.77			−81.09	−81.28
	20" 18.07	17.94			19.30	17.81			19.42	18.28			19.31	17.87
	18.00				16.56				18.85				18.59	
	+4' 10.42				10.72				11.53				10.77	
	− 23.04				−22.89				− 22.81				− 22.79	
	+3 47.38				47.83				48.72				48.04	
−11°	26 30.62	−.73 +.24			30.73	−.83 +.31			30.13	−.93 +.23			30.55	−.86 +.26
	31.1				31.2				30.8				31.2	

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Nov. 10 — Nov. 12 — Nov. 13 — Nov. 14

	h	m	s	s	δ	°	′	″	″
	23	16	40.67	40.67		−11	26	30.6	31.1
			.67	.67				30.7	31.2
			.73	.73				30.1	30.8
			.73	.75				30.6	31.2
			.70	.69				29.8	30.4
			.79	.79				30.8	31.6
			.69	.69				30.3	30.8
			.74	.70				30.5	31.0
			.84	.86				29.0	29.7
			.9372	.9475				31.9	30.7
			40.749	40.745				30.42	30.85

20	34.1	20	42.18	20	53.70	20	38.3	20	48.19	20	56.66	20	36.2	20	46.53	20	58.23	20	36.8	20	48.80	20	59.70	
	35.9		44.15		55.70		40.1		47.20		58.70		37.9		48.75		0.33		38.9		50.20		1.76	
	38.0		46.31		57.95		42.0		49.40		0.83		39.7		50.80		2.40		40.8		52.25		3.79	
	40.4		48.30		59.97		44.5		51.30		2.80		41.9		53.00		4.50		43.1		54.30		5.88	
190.6	41.9	231.22	50.38	289.32	2.00	211.4	46.5	246.54	53.48	259.99	5.00	198.4	42.7	254.08	55.00	1206	6.60	204.3	44.7	261.35	56.60	191.3	8.00	
21	44.4		28.28		5.23	21	47.6		31.50		8.18	21	46.6		32.97		9.78	21	51.4		34.30		11.15	
	46.6		30.36		7.35		49.5		33.48		10.32		48.2		35.10		11.97		53.8		36.37		13.25	
	48.7		32.48		9.40		51.8		35.58		12.48		50.5		37.18		14.05		55.5		38.66		15.34	
	51.3		34.70		11.58		53.8		37.75		14.53		52.2		39.30		16.10		57.6		40.65		17.48	
244.1	53.1	16251	36.6	4716	13.60	258.1	55.4	17813	39.82	52.17	16.66	251.6	54.1	186.00	41.45	70.00	18.10	277.7	59.4	19283	42.85	7669	19.52	
			46.26		16.80				49.31		19.70				50.82		28.40				52.27		22.53	
			57.86		18.90				0.7980		21.98				2.41		23.40				3.83		24.70	
			9.43		21.80				12.43		24.04				14.00		25.53				15.34		27.00	
			21.053		23.15				24.02		26.13				25.59		27.16				26.91		29.10	
			32.50	105275	25.30				35.63	12012	28.27				37.20	127.94	29.85				38.57	134.53	31.20	
			50						9															
			08																					
20	38.12		47.40		16	20	42.88		62.18		8	20	39.68		70.02			20	40.86		76.92			
21	48.82			21	9.420	21	51.62			21	12.436	21	30.32			21	14.004	21	55.54			21	15.384	
				−4	24.7921					−4	27.762					−4	29.426					−4	30.735	
				+	.218					+	.238					+	.226					+	.230	
				−	4.147					−	4.125					−	4.114					−	4.104	
					40.70						40.79						40.69						40.74	
					40.69																		40.70	

	+31.30		−39.40				+30.16		−39.18				+34.32		−36.32				+34.52		−40.16			
	1.49554		1.59550m				1.47943		1.59306m				1.53555		1.56015m				1.53807		1.60277			
	1.59288m		1.69284				1.57677m		1.69040				1.63289m		1.65749				1.63541m		1.70005			
																					113			
	50	2	50	0			50	2	50	0			50	2	50	0			50	2	50	0		
	16.1	+.39	47.0	+.22			14.8	+.37	47.3	+.22			17.9	+.44	48.4	+.20			18.8	+.46	44.1	+.27		
	23.6	+.26	54.2	+.27			22.5	+.27	54.9	+.25			25.7	+.25	56.1	+.24			26.4	+.25	57.3	+.30		
	38.9	−.32	9.1	−.18			41.9	−.44	14.1	−.34			42.7	−.47	13.4	−.32			42.9	−.48	5.9	−.04		
	30.2	+.48	2.2	+.63			32.3	+.47	5.8	+.71			32.9	+.47	5.3	+.70			32.3	+.47	58.2	+.53		
		+.81		+.99				+.67		+.84				+.69		+.82				+.70		+1.06		
	52	27.20	50	58.12			52	27.88	51	0.52			52	29.80	51	0.80			52	30.10	50	54.88		
		−39.16		49.30				−37.74		49.02				−42.94		45.45				−43.19		50.12		
	51	48.04		47.42			51	50.14		49.54			51	46.86		46.25			51	46.91		45.00		
																						.13		
−11	28	59.69		59.07			29	1.79		1.19			28	58.51		57.90			28	58.56		56.65		
																						78		
		+1304						−162						+949						+2263				
		1.90484						1.89318						1.90429						1.91743				
		−80.88						−78.20						−80.22						−82.69				
		+ .10		+ .16				+ .09		+ .16				+ .12		+ .13				+ .12		+ .16		
		+ .33		+ .13				+ .23		+ .13				+ .33		+ .13				+ .33		+ .12		
		+ .20		+ .25				+ .17		+ .21				+ .17		+ .20				+ .17		+ .26		
		.00		.00				.00		.00				.00		.00				− .01		− .01		
		−80.25		−80.34				−77.61		−77.70				−79.60		−79.76				−82.08		−82.16		
		19.94		19.41				19.90		18.89				18.11		17.66				20.64		18.94		
		19.68						19.14						17.88						19.79				
		12.29						10.62						9.78						11.45				
		− 22.43						− 22.28						− 22.20						− 22.12				
		49.86						48.34						47.58						49.33				
		29.82		-91 +.30				30.80		-84+.06				30.30		-83+.28				30.46		-88+.29		
		30.64						31.6						30.8						31.0				

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Dec. 7 | Dec. 14 | Dec. 16

h	m	s	m	s	m	s	m	s	m	s	m	s	m	s	m	s	m	s
23	21	9.5	21	14.40		26.05	21	10.4	21	22.00		33.70	22	20.0	22	24.29		35.80
		11.6		16.74		28.15		12.2		24.05		35.68		22.2		26.53		38.10
		13.7		18.79		30.30		13.9		26.15		37.70		25.1		28.48		40.20
		15.5		20.92		32.40		15.7		28.20		39.95		26.9		30.57		42.30
	67.5	17.2	9370	22.85	15135	34.45	70.9	18.7	130.70	30.30	8903	42.00	123.4	29.2	14255	32.62	20070	44.30
	22	19.2		0.80		37.60	22	25.4		8.35		45.20	23	20.8		10.57		47.42
		21.1		3.00		39.80		26.8		10.55		47.25		22.4		12.80		49.49
		23.1		5.17		41.87		28.3		12.80		49.28		24.2		15.00		51.60
		24.7		7.26		44.00		30.9		14.70		51.60		26.0		17.00		53.95
	114.7	26.6	2559	9.36	20137	46.10	144.3	32.9	63.40	17.00	247.00	53.67	121.1	27.7	7442	19.05	258.30	55.84
				18.74		49.20				26.14		56.70				28.51		59.17
				30.27		51.40				37.81		58.85				40.14		1.25
				41.87		53.45				49.40		1.00				51.66		3.10
				53.46		55.50				0.90		2.85				3.32		5.48
				5.12	26728	57.78				12.68	4.50	5.10				14.88	1662	7.62
L													[21]					
23	21	13.50	209.46				21	14.18	246.93				22	24.68	258.51			
	22	22.94			21	41.872	22	28.86			21	49.386	23	24.22			[21]	51.702
													[22]					
					−4	57434					−5	4.902					−5	7.448
					+	.228					+	.222					+	.194
					−	3.849					−	3.772					−	3.731
					16	4084						40.93						40.72
						40.86						40.90						40.75
												Rej						Rej

			19	25			1		7									
			+28.38	−41.04			+35.28		−39.48				27.02 +32.98		−32.52			
			1.45317	1.61331 m			1.54667		1.59627 m				1.43169		1.51215 m			
			1.55051 m	1.71065			1.64401 m		1.69361				1.52903 m		1.60949			
			′	′			′		′				′		′			
			50	2			50	2	50	0			50	2	50	0		
E			12.4	+.31	44.8	+.25	19.7	+.47	46.7	+.23			10.1	+.24	55.4	+.13		
F			18.2	+.32	51.2	+.30	26.8	+.25	54.1	+.27			17.1	+.32	1.3	+.17		
G			29.3	+.03	3.0	−.01	44.4	−.52	11.6	6.6	−.24		30.5	+.03	15.2	−.38		
H			21.9	+.46	54.9	+.52	32.9	+.47		0.8	+.59		23.1	+.47	[78]	17.8	+.72	
				+1.12		+.06		+.67			+.85			+1.06			+.64	
			52	20.45	50	53.48	52	30.96	50	59.65			52	20.20	51	4.92		
				−35.52		51.36		−44.06		49.39				−33.81		40.69		
			51	44.93		44.84	51	46.89		48.94			51	46.39		45.61		
			°	′	″	″												
			−11	28	56.58	56.49		28	58.54	29	0.59			28	58.04	57.26		
				+2869				+2306						+2629				
				1.92344				1.91486						1.92169				
				−83.85				−82.77						−83.39				
				+ .08		+ .17		+ .13		+ .16				+ .04		+ .10		
				+ .23		+ .08		+ .27		+ .11				+ .28		+ .13		
				+ .28		+ .26		+ .17		+ .21				+ .26		+ .16		
				− .01		− .01		− .01		− .01				− .01		− .01		
				−83.27		−8334		−8221		−8280				−8279		−8301		
				30.85		1983		2075		2289				2083		2027		
				14.84				21.82						20.55				
				+4 11.28				9.94						10.29				
				− 20.86				− 20.03						− 19.91				
				+3 50.82				49.91						50.38				
			−11°	26 29.02	−.86	+.21		31.91	−.76	+.20				30.17				
				29.7				32.5						30.7				
								Rej										

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η
α 23 20 17
δ −10 43
+53 6

log sin δ 9.26940
" cos δ 9.99236
" 1500 δ tan i 0.09843 n

tan δ −0.19
sin z +.80

I 2.11

h α m		1878.0	δ ° ′ ″
23 20	16.51	16.51 −10 42	16.6
	.50	.50	17.5 17.2 16.5
	.62	.62	17.1 16.4
	.50	.52	16.9 16.0
	.59	.58	17.0 16.2
	.58	.58	18.9 17.7
	.50	.50	18.0 17.1
	.61	.57	17.2 16.5
	.71	.73	16.2 15.5
	.7849	.7652	16.3 16.8
	16.590	16.5~~60~~ .563	17.23 16.53

Nov. 2

h	m	s	m	s	m	s
23	23	54.6	24	3.68	24	15.72
		57.0		5.78		17.30
		59.1		7.84		19.43
		1.3		10.00		21.53
	295.0	3.0	39.35	12.05	97.04	23.66
	25	5.8		50.00		26.72
		7.6		52.00		28.77
		9.7		54.00		30.87
		11.4		56.10		33.10
	47.5	13.0	270.38	58.28	154.56	35.70
			7.87			38.15
			19.41			40.40
			30.91			42.48
			42.47			44.62
			54.08		212.33	46.68
	23	59.00	154.74			
	25	9.50			24	30.948
					−4	16.423
					+	213
					−	4.226
					20	16.51

Nov. 4

m	s	m	s		s
23	56.2	24	7.56		19.10
	58.0		9.67		21.35
	59.7		11.83		23.53
	1.8		13.88		25.72
299.8	4.1	58.88	15.94	117.28	27.58
25	10.8		53.78		30.73
	12.3		55.90		32.80
	14.3		57.80		35.00
	16.2		0.04		37.05
71.9	18.3	289.62	2.10	174.76	39.18
		11.78			42.28
		23.46			44.47
		34.95			46.49
		46.48			48.52
		57.92		232.40	50.64
23	59.96	174.59			
25	14.38			24	34.918
				−4	14.423
					+.217
					−4.208
					16.50

Nov. 5

m	s	m	s	m	s
23	59.3	24	9.55	24	21.00
	1.3		11.60		23.18
	3.3		13.64		25.18
	5.4		15.60		27.35
17.1	7.8	68.23	17.84	128.26	29.55
25	17.3		55.69		32.50
	19.3		57.77		34.80
	21.8		59.79		36.70
	24.9		1.80		39.00
110.9	27.6	299.00	3.95	183.85	40.85
		13.65			44.05
		25.65			46.17
		36.77			48.60
		48.51			50.68
		59.80		242.07	52.57
24	3.42	184.38			
25	22.18			24	36.876
				−4	16.168
				+	.207
				−	4.199
					16.62

Nov. 6

m	s	m	s	m	s
24	20	24	11.00	24	22.55
	3.5		13.15		24.68
	5.5		15.33		26.75
	7.5		17.42		28.97
27.9	9.4	76.45	19.55	133.95	31.00
2	—		57.15		34.17
	—		59.40		36.32
	—		1.40		38.42
	—		3.70		40.48
	—	7.35	5.70	191.97	42.58
		15.29			45.97
		26.79			47.85
		38.39			49.96
		49.99			52.05
		1.47		249.95	54.32
24	5.58	191.93			
	—			24	38.386
				−4	17.902
				+	.211
				−	4.190
					16.50
					16.52

Nov. 2		Nov. 4		Nov. 5		Nov. 6
+31.94 (5)	−38.56 (5)	+34.96	−39.46	+33.46 (3)	−45.80 (4)	+32.84 (1)
1.50447	1.58602 n	1.54357	1.59616 n	1.52323	1.65706 n	1.51601
1.60290 n	1.68445	1.64200 n	1.69459	1.62166 n	1.75549	1.61444 n
5 3	5 1	5 3	5 1	5 3	5 1	5 3
2.4 +.17	33.8 +.46	7.4 +.27	32.3 +.49	6.1 +.23	26.1 +.53	4.2 +.20
9.1 +.31	40.5 +.29	13.1 +.30	39.0 +.25	12.4 +.30	32.8 +.18	10.4 +.30
29.1 +.04	0.3 +.12	27.8 +.02	54.0 −.35	26.0 −.04	47.2 −.56	25.3 −.07
19.4 +.35	52.9 +.33	19.2 +.35	45.2 +.45	18.0 +.36	39.3 +.54	17.1 +.36
+.87	+1.20	+.94	+.84	+.85	+.69	+.79
8 15.00	6 46.88	8 16.88	6 42.62	8 15.62	6 36.35	8 14.25
−40.08	48.36	−43.85	49.50	−41.85	56.95	−41.16
7 34.92	35.24	7 33.03	32.12	7 33.77	33.30	7 33.09
−10 44 46.57	46.89	44 44.68	43.77	44 45.42	44.95	44 44.74

Nov. 2		Nov. 4		Nov. 5		Nov. 6
+53 3 25						
1.88320						
+638	+2170	+2170		+2073		+1761
1.88958		1.90490		1.90393		1.90081
−7755		−8033		−8015		−7958
+ .10	+ .16	+ .13	+ .16	+ .11	+ .21	+ .11
+ .35	+ .20	+ .36	+ .19	+ .40	+ .19	+ .38
+ .22	+ .30	+ .23	+ .21	+ .21	+ .17	+ .20
.00	.00	− .01	− .01	− .01	− .01	− .01
−76.88	−76.89	−79.62	−79.78	−79.44	−79.59	−78.90
46 3.45	3.78	4.30	3.55	4.86	4.54	3.64
3.62		3.92		4.70		3.64
+4 10.42		10.72		11.53		10.77
− 23.44		− 23.29		− 23.21		− 23.14
+3 46.98		47.43		48.32		47.63
−10° 42 16.64	−1.07 +.24	16.49	−.99 +.31	16.38	−.97 +.23	16.01 −1.16 +.26
17.5		17.2		17.1		16.9

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1878

Nov. 10

h	m	s
23	24	19.5
		21.6
		24.7
		26.0
	25	16.5
		17.9
		19.4
		20.8
	24	23.96
	25	19.34

m	s
24	18.00
	20.35
	22.35
	24.51
	4.20
	6.25
	8.35
	10.47
	22.6

m	s
24	29.60
	31.60
	33.75
	35.90
	41.20
	43.20
	45.34
	47.35
	49.49

h	m	s
24	7.5	
	9.4	
	12.0	
	13.8	
	10.7	
	12.6	
	14.5	
	16.4	
	18.3	

h	m	s
24	20.93	
	23.00	
	25.10	
	27.30	
	7.16	
	9.29	
	11.30	
	13.44	
	15.5	

h	m	s
24	32.50	
	34.75	
	36.70	
	38.80	
	44.04	
	46.20	
	48.28	
	50.32	
	52.45	

h	m	s
24	17.9	
	19.4	
	21.4	
	23.4	
	26.77	
	28.26	
	29.88	
	31.37	
	32.92	

h	m	s
24	22.75	
	24.72	
	26.72	
	28.80	
	8.82	
	10.80	
	12.96	
	14.94	
	17.10	

h	m	s
24	34.03	
	36.07	
	38.37	
	40.39	
	47.10	
	49.23	
	51.40	
	52.03	
	54.10	

Nov. 12

h	m	s
24	11.72	
	—	

m	s
24	45.328
−4	24.795
+	.204
−	4.151
20	16.59
	16.58

m	s
24	48.258
−4	27.765
+	.226
−	4.131
	16.58

Nov. 13

h	m	s
24	21.56	
	—	

m	s
24	49.840
−4	29.430
+	.215
−	4.120
	16.50

Nov. 14

h	m	s
24	16.0	
	18.0	
	20.0	
	21.9	
	23.9	
	25.7	
	27.6	
	29.5	
	31.4	

h	m	s
24	24.20	
	25.92	
	28.10	
	30.19	
	10.20	
	12.18	
	14.34	
	16.40	
	18.4	

h	m	s
24	35.54	
	37.65	
	39.62	
	41.80	
	47.10	
	49.22	
	51.32	
	53.47	
	55.53	

h	m	s
24	51.278	
−4	30.778	
+	.218	
−	4.109	
	16.61	
	16.57	

	A7	A1
	+21.36	−34.02
	1.32980	1.53161 m
	1.42823 m	1.63004
	′ ″	′ ″
	5 2	5 1
E	51.9 +.18	42.9 +.27
F	58.5 +.29	49.2 +.43
G	13.7 −.24	4.4 +.13
H	5.9 +.39	57.2 +.30
	+.62	+1.13
	8 ′ 2.50	6 ′ 53.42
	−26.81	42.66
	7 35.69	36.08
−10	44 ′ 47.34	″ 47.73
	+1308	
	1.89628	
	−78.15	"
	+ .05	+ .12
	+ .39	+ .25
	+ .15	+ .28
	.00	.00
	−78.16 "	−78.10
	4/6 5.50	5.83
	5.66	
	+4 ′ 12.29	
	− 2284	
°	+3 4945	
−10	42 16.21	−1.07 +.30
	17.0	

		36.53
		+16.58
		1.56265
		1.66108 m
		5 3
		11.5 +.37
		18.7 +.26
		38.3 −.25
		29.1 +.34
		+.72
		8 24.40
		−45.82
		7 38.58
		44 50.23
		− 150
		1.88140
		−76.15
		+ .13
		+ .44
		+ .18
		.00
		−75.40
		5.63
		5.63
		10.62
		− 2269
		4793
−10		17.70 −1.24 +.06
		18.9

		+28.28
		1.45148
		1.54991 m
		5 2
		58.9 +.16
		6.3 +.30
		23.4 −.17
		14.1 +.39
		+.68
		8 10.68
		−35.47
		7 35.21
		44 46.86
		+956
		1.89246
		−78.12
		+ .08
		+ .42
		+ .17
		.00
		−77.45
		4.31
		4.31
		9.78
		− 2261
		4917
		17.14 −1.18 +.28
		18.0

		+31.18	−42.90
		1.49388	1.63246 m
		1.59231 m	1.73089
		5 3	5 1
E		3.1 +.18	28.9 +.52
F		8.9 +.31	36.3 +.20
G		25.2 −.08	57.4 −.19
H		16.1 +.37	42.2 +.49
		+.78	+.72
		8 13.32	6 39.70
		−39.11	33.81
		7 34.21	33.51
		44 45.86	45.16
		+2277	
		1.90593	
		−80.53	
		+ .10	+ .19
		+ .42	+ .22
		+ .19	+ .18
		− .01	− .01
		−79.83	−79.95
		5.69	5.11
		5.40	
		11.45	
		− 2254	
		4891	
		16.49	−1.01 +.29
		17.2	

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Dec. 7

h	m	s	m	s	m	s
23	24	45.6	24	50.45		2.14
		47.6		52.79		4.20
		49.7		54.60		6.35
		51.7		56.70		8.35
	248.4	53.8	27339	58.85	3154	10.50
				36.58		13.70
				38.75		15.65
				40.83		17.70
				43.00		19.75
			20416	45.00	8890	22.10
				54.68		25.05
				6.31		27.20
				17.78		29.40
				29.34		31.50
				40.83	14670	33.55
	24	49.68		88.94		
					25	17.788
					−4	57.439
					+	.217
					−	3.858
						16.71
						16.73

+28.18

1.44886

1.54729m

5 3

0.4 +.16
6.2 +.30
18.9 −.31
8.1 +.40
+.55

8 8.40
−35.26
7 33.14

−10 44 44.79

+.2875
1.91145
−81.65
+ .08
+ .31
+ .14
− .01
−81.13
5.92
5.92
11.28
− 2087
5041
15.57 −.90 +.21
16.2

Dec. 14

h	m	s	m	s	m	s
	25	4.4	24	58.05		9.40
		6.0		0.00		11.70
		7.3		2.05		13.75
		8.8		4.20		15.72
	36.9	10.4	1075	6.45	6838	17.81
	25	59.5		44.35		21.00
		1.4		46.28		23.18
		3.6		48.52		25.25
		5.1		50.50		27.24
	18.0	8.4	24223	52.58	12607	29.40
				2.15		32.58
				13.68		34.80
				25.21		36.90
				36.80		38.84
				48.45	18401	40.89
	25	7.38	12629			
	26	3.60			25	25.258
					−5	4.907
					+	.211
					−	3.782
						16.78
						16.75

+17.88

1.25237

1.35080m

5 2

48.3 +.24
53.9 +.37
8.7 −.02
0.2 +.23
+.82

7 57.78
−22.43
7 35.35

44 47.00

+.2310
1.90630
−80.59
+ .03
+ .33
+ .20
− .01
−80.04
7.04
6.26
9.94
− 2044
49.50
16.76 −.95 +.20
17.5

−38.34

1.58365m

1.68208

5 1

35.8 +.41
41.9 +.33
65.3 −.20
49.8 +.38
+.92

6 45.70
48.04
33.79

45.44

+.15
+ .19
+ .23
− .01
−80.03
5.47

Dec. 16

h	m	s	m	s	m	s
	26	7.7	26	—	15.93	11.71
		10.0	4.26	2.15	16.08	14.07
		12.0	.45	4.45	16.00	16.00
		13.4	54	6.65		—
	58.1	15.0	83	8.55	15.98	20.20
				46.48		23.50
				48.56		25.47
				50.50		27.55
				52.67		29.70
			25301	54.80	13781	31.57
				4.40		34.68
				16.00		36.90
				27.56		39.02
				39.01		41.20
				50.60	19807	43.39
	[25] 26	11.62	13757		[26]	
					26	27.514
					−5	7.448
					+	.184
					−	3.760
						16.49
						16.51

+15.89

1.20112

1.29955m

5 2

44.2 +.31
49.6 +.42
3.0 +.09
56.1 +.22
+1.04

7 53.22
−19.93
7 33.29

44 44.94

+.2638
1.90958
−81.20
+ .03
+ .35
+ .26
− .01
−80.57
5.51
5.51
10.29
− 2032
4997
15.54
15.3

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log a 9.20922
" cos δ 9.99423
" 1.5 cos δ tang i 0.10030n
tang − 0.16
sin i +.78

α 23 31 55
δ −9° 19'
z +51 42
1878

	Nov. 2				Nov. 4				Nov. 5				Nov. 6			
h	m	s	m	s	m	s										
23	35	33.2	35	41.87	35	53.32	35	35.4	35	45.73		57.23	35	40.15	35	47.59		59.00	35	37.7	35	49.37	36	0.64
		35.3		43.92		55.36		37.2		47.77		57.33		41.7		49.68		1.00		39.5		51.30		2.80
		37.2		45.90		57.43		39.0		48.92		1.40		43.7		51.70		3.17		41.2		53.40		4.88
		38.8		48.05		59.66		40.7		52.00		3.47		45.5		53.80		5.43		43.4		55.54		7.00
	185.0	40.5	22994	50.20	28747	1.70	195.1	42.8	24952	54.10	692	3.49	218.1	47.0	25867	55.90	1615	7.55	207.2	45.4	26728	57.61	2445	9.13
	36	45.2		27.63		47.0	36	48.1		31.67		8.73	35	47.4		33.54		10.53	36	48.3		35.20		12.30
		47.8		29.88		67.8		50.0		33.78		10.77		49.8		35.60		12.63		50.6		37.37		14.29
		49.7		31.90		89.2		52.4		35.92		12.88		51.9		37.70		14.78		52.8		39.40		16.40
		57.3		34.00		110.0		54.5		37.87		15.05		53.7		39.80		16.80		54.8		41.55		18.61
	247.2	53.2	15951	36.10	4450	13.10	262.0	56.0	17926	40.02	6443	17.00	258.5	55.7	18856	41.92	7365	18.89	262.8	56.3	19718	43.66	8215	20.55
																		2.40						
				45.99		16.17				49.90		20.20				51.73		21.90				53.46		23.77
				57.44		18.36				1.38		22.26				3.23		24.03				4.89		25.80
				8.90		20.46				12.89		24.37				14.73		26.20				16.43		27.90
				20.43		22.52				24.37		26.49				26.16		28.28				27.87 90		29.98
				31.90	10216	24.61				35.85	12185	28.53				37.71	13078	30.37				39.44	13948	32.03
h	m	s																						
23	35	37.00		44.71	m	e	35	39.02		64.39			35	43.62		72.56			35	41.44		82.11 12		
	36	49.44			36	8.942	36	52.40			36	12.878	36	51.70			36	14.712	36	52.56			36	16.42 4
					− 4	10.414					− 4	14.444					− 4	16.180					− 4	17.920
					+	.179					+	.182					+	.174					+	.178
					−	4.248					−	4.231					−	4.222					−	4.214
					31	54.43						54.38						54.48						54.47 54.49

			Δ		Δ																			
			+31.94		−40.50				+33.86		−39.52				−31.08	36.99 −37.00				+34.98		−36.14			
			1.50433		1.60746n				1.52969		1.59682n				1.49262n	1.56808n				1.54882		1.55799n			
			1.60463n		1.70776				1.62799n		1.69712				1.59292	1.66838				1.64412n		1.65829			
			40'	3'	40'	2'			40	4	40	2			40	3	40	2		40	4	40	2		
			"	"	"				"		"				"					"		"			
8			56.8	+.20	24.1	+.53			0.6	+.20	26.7	+.54			57.8	+.20	30.6	+.52		2.8	+.21	32.2	+.51		
F			3.4	+.17	32.1	+.21			6.8	+.19	32.9	+.21			4.1	+.18	36.3	+.22		6.9	+.19	38.0	+.25		
L			22.5	−.20	50.0	−.54			19.7	−.28	46.5	−.56			17.4	−.29	50.2	−.54		21.6	−.23	52.3	−.47		
H			14.6	+.23	42.8	+.35			12.6	+.23	38.9	+.41			9.5	+.23	42.9	+.35		13.9	+.23	45.3	+.33		
				+.40		+.55				+.34		+.60				+.32		+.55			+.40		+.62		
			44'	9.32	42'	37.25			44	9.92	42	36.25			44	7.20	42	40.00		44	11.30	42	41.95		
				−40.24		81.72				−42.66		49.79				−38.28		46.60			−44.07		45.53		
			43	29.08		28.37			43	27.26		26.04			43	28.92		26.60		43	27.23		27.48		
						39.92 37																			
−9			20'	40.73		40.62			20	38.91		37.69			20	40.57		38.25		20	38.88		39.13		−9
+51°	39'	19"																						
	1.86140																							
	+658								+2191						+2091					+1778				
	1.86498								1.88331						1.88231					1.87918				
	−73.09								−76.44						−76.26					−75.71				
	+ .09		+ .13						+ .10		+ .13				+ .08		+ .12			+ .10		+ .11		
−	+ .45		+ .29						+ .45		+ .29				+ .49		+ .32			+ .50		+ .32		
−	+ .10		+ .14						+ .08		+ .15				+ .08		+ .14			+ .10		+ .15		
	.50		.00						− .01		− .01				− .01		− .01			− .01		− .01		
	−73.15		−73.23						−75.82		−75.88				−75.62		−75.69			−75.02		−75.14		
	21' 53.88		53.15						54.73		53.67				56.19		53.94			53.90		51.27		
	53.52								54.15						55.06					54.08				
	+4' 10.42								10.72						11.53					10.77				
	− 24.41								− 24.26						− 24.19					− 24.11				
	+3 46.01								46.46						47.34					46.66				
−9°	18 7.51		−.98+.24						7.69		−.97 −1.07+.31				7.72		−1.03+.23			7.42		−1.07+.26		
	8.2								8.3						8.5					8.2				

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α h	m	s	s	δ °	'	"	"
23	31	54.43	54.43	−9	18	7.5	8.2
		.38	.38			7.7	8.3
		.48	.48			7.7	8.5
		.47	.49			7.4	8.2
		✓ .62	.62			7.0	8.3
		.46	.46			7.3	8.2
		.54	.50			7.6	8.6
		.47	.45			7.1	7.6
		✓ .65	.67			6.4	7.2
		.51	.54			6.3	7.1
		54.501	54.502			7.20	8.02

Nov. 12

35	50.0	35	59.20	36	10.70
	51.6		1.27		12.80
	53.3		3.30		14.80
	54.9		5.45		16.97
266.7	56.9	1672	7.50	7427	19.00
			45.15		22.20
			47.28		24.30
			49.40		26.39
			51.58		28.48
		24701	53.60	13187	30.50
			3.34		33.70
			14.85		35.85
			26.37		37.88
			37.89		40.00
			49.40	18943	42.00
35	53.34	131.85			
				36	26.370
				−4	27.783
				+	.190
				−	4.160
					54.62

Nov. 13

35	50.4	36	0.70	36	12.20
	52.5		2.90		14.24
	53.7		4.90		16.36
	55.6		7.00		18.40
270.2	58.0	2450	9.00	8175	20.55
37	1.3		46.75		23.70
	3.2		48.70		25.82
	5.4		50.75		28.00
	6.8		52.97		30.00
25.5	8.8	254.17	55.00	139.62	32.10
			4.90		35.18
			16.35		37.30
			27.92		39.47
			39.41		41.46
			50.83	197.03	43.62
35	54.04	139.41			
37	5.10			36	27.882
				−4	29.448
				+	.181
				−	4.151
					54.46

Nov. 14

35	50.9	36	2.00	36	13.66
	52.7		4.20		15.72
	54.3		6.38		17.90
	56.1		8.34		19.80
272.4	58.4	3142	10.50	8898	21.90
			48.00		25.00
			50.20		27.13
			52.33		29.33
			54.33		31.47
		26136	56.50	14643	33.50
			6.28		36.60
			17.79 80		38.68
			29.29		40.82
			40.80		42.91
			52.27	20401	45.00
35	54.48	146.43 4			
				36	29.286 8
				−4	30.794
				+	.184
				−	4.141
					54.54
					54.50

Nov. 30

36	14.8	36	20.00	36	31.60
	16.3		22.30		33.69
	18.5		24.28		35.88
	20.4		26.27		38.00
91.8	21.8	12123	28.38	17912	39.95
37	24.9		6.00		43.20
	26.4		8.00		45.33
	28.5		10.30		47.38
	30.0		12.37		49.42
141.6	31.8	5122	14.55	23675	51.42
			24.24		54.58
			35.82		56.72
			47.35		58.90
			58.82		0.88
			10.24	29408	3.00
36	18.36	236.47			
37	28.32			36	47.294
				−4	48.935
				+	.184
				−	4.075
					54.47
					54.48

Nov. 12	Nov. 13		Nov. 14	Nov. 30	
+33.03	+33.84	−37.22	+34.81	+28.93	−41.03
1.51891	1.52943	1.57078n	1.54170	1.46135	1.61310n
1.61921n	1.62973n	1.67108	1.64200n	1.56165n	1.71340
40 3	40 4	40 2	40 4	40 3	40 2
59.6 +.20	0.1 +.20	28.9 +.53	1.6 +.20	53.4 +.21	25.0 +.54
6.3 +.20	7.4 +.19	36.6 +.23	8.1 +.19	0.4 +.16	31.6 +.21
24.6 −.12	23.4 −.17	52.0 −.48	22.6 −.20	16.8 −.29	46.5 −.56
18.3 +.21	15.0 +.23	45.0 +.33	14.9 +.23	8.4 +.21	41.9 +.36
+.49	+.45	+.61	+.42	+.29	+.55
44 12.20	44 11.48	42 40.62	44 11.80	44 4.75	42 36.25
−41.61	−42.63	46.89	−43.85	−36.45	51.69
43 30.59	43 28.85	27.51	43 27.95	43 28.30	27.94
−9 20 42.24	20 40.50	39.16	20 39.60	20 39.95	39.59
−110	+980		+2305	+1938	
1.86030	1.87120		1.88445	1.88078	
−7249	−7434		−7664	−7599	
+ .10	+ .10	+ .12	+ .10	+ .07	+ .14
+ .55	+ .55	+ .35	+ .55	+ .33 .41	+ .34 .26
+ .12	+ .11	+ .15	+ .10	+ .07	+ .14
.00	.00	.00	− .01	.00	.00
−7172	−7358	−7372	−7590	−7544	−7545
21 53.96	54.08	52.88	55.50	55.39	55.04
53.96	53.48		55.50	55.22	
10.62	9.78		11.45	10.94	
− 23.68	− 23.60		− 23.54	− 22.82	
46.94	46.19		47.91	48.12	
7.02 −1.34 +.06	7.31 −1.16 +.28		7.59 −1.30 +.29	7.10 −.88 +.41	
8.3	8.2		8.6	7.6	

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Dec. 7

h	m	s	m	s	m	s
23	36	23.3	36	28.50		40.20
		24.9		30.50		42.20
		26.4		32.70		44.35
		28.2		35.00		46.40
	133.0	30.2	163.55	36.85	22170	48.55
	37	21.4		14.65		51.65
		23.5		16.80		53.65
		25.3		18.90		55.88
		26.9		20.80		57.88
	126.5	29.4	9429	23.14	27916	0.10
				32.71		3.27
				44.36		5.34
				55.83		7.37
				7.39		9.36
				18.86	3694	11.60

h	m	s				
23	36	26.60	27918			
	37	25.30			36	55.830
					−4	57.459
					+	.182
					−	3.899
					31	54.65
						54.67

	A		A	
	+29.23		−29.47	
	1.46583		1.46938 m	
	1.56613 m		1.56968	
	40	3	40	2
E	56.3	+.20	42.3	+.33
F	1.7	+.12	47.8	+.43
G	11.5	−.09	58.2	−.01
H	4.9	+.19	52.7	+.24
		+.42		+.99
	44	3.60	42	50.25
		−36.82		37.13
	43	26.78		27.38
−9	20	38.43		39.03
		+2892		
		1.89032		
		−77.68		
		+ .07		+ .07
		+ .41		+ .28
		+ .10		+ .25
		− .01		− .01
		−77.11		−77.09
	21	55.54		56.12
		55.83		
	+4	11.28		
		2182		
0	+3	49.46		
−9	18	6.37	−1.04	+.21
		7.2		

Dec. 14

		ch. f.	ch. f.	ch. f.
		0.4	+.20	32.8 +.50
		6.4	+.20	39.9 +.29
		20.6	−.26	52.5 −.46
		13.1	+.23	46.9 +.31
			+.37	+.64
		44	10.12	42 43.02
			+ .09	+ .16

Dec. 16

	37.	30.4	37	38.60 49.90
		32.4		40.57 52.18
		34.4		42.45 54.09
		36.1		44.62 56.38
	172.2	38.9	21304	46.80 27075 58.20
	38	33.7		24.30 1.40
		35.0		26.40 3.40
		37.4		28.43 5.57
		38.9		30.60 7.60
	186.5	41.5	14278	33.05 2789 9.92
				42.61 13.12
				54.15 15.05
				5.58 17.17
				17.17 19.20
				28.56 85.84 21.30

[36]				
	37	34.44	28.07	[37]
[37]	38	37.30		38 5.614
				−5 7.462
				+ .155
				− 3.801
				54.151
				54.53
				.54

		7	69
		+31.16	−31.70
		1.49374	1.50092 m
		1.59404 m	1.60122
		[3]	
		40 4	40 2
		57.4 +.01	37.3 +.42
		2.9 +.01	42.7 +.36
		16.4 −.40	56.3 −.14
		9.1 +.20	51.1 +.26
		−.18	+.70
		45 6.45	42 46.85
		−39.27	39.92
		43 27.18	26.77
		20 38.83	38.42
		+2669	
		1.88809	
		−77.28	
		+ .08	+ .09
		+ .49	+ .34
		− .04	+ .22
		− .01	− .01
		−76.76	−76.84
		5559	5506
		55.32	
		1029	
	−	2123	
		4906	
		6.26	−1.09 +.18
		7.1	

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10.5 Aquarii.

α 23 36 23

δ −15 13

z +57 36

1878.0

log cos δ 9.41908

" cos δ 9.98450

" 15 cos δ tan 0.09057 n

tan δ −0.27

sin z +.84

log R_1 1.87155

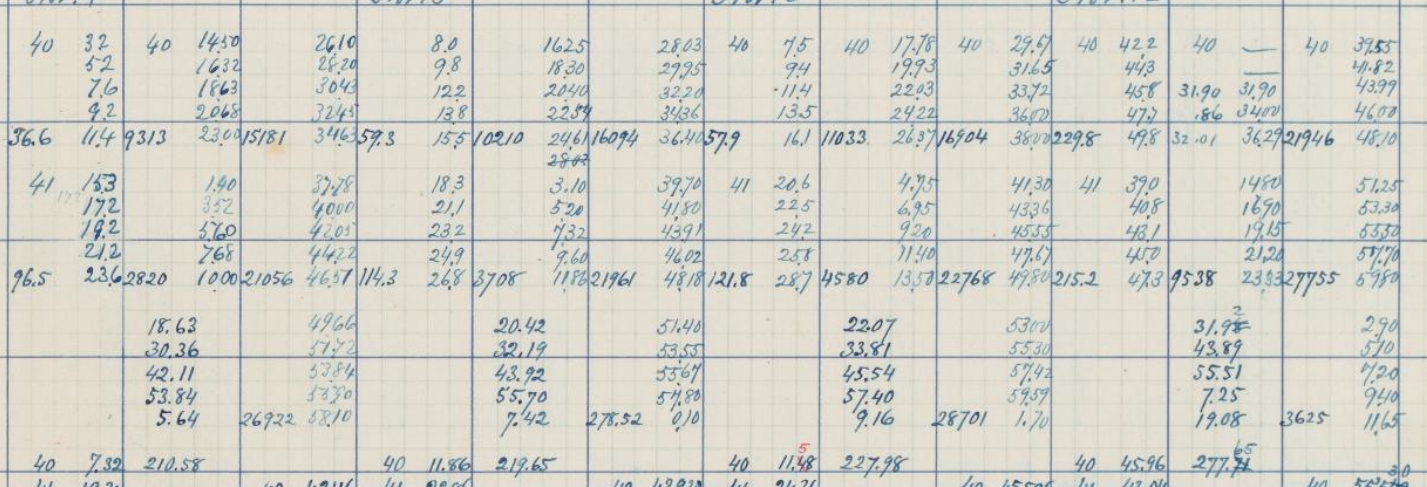
" R_2 1.07088

R_1 23.53

R_2 11.77

I 2.14

Nov. 4 | Nov. 5 | Nov. 6 | Nov. 12



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Nov. 13 | Nov. 14 | Nov. 30 | Dec. 1

h	m	s	m	s	m	s	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s
23	40	40.1	40	—	40	41.17	40	41.5	40	30.60	40	42.58	40	46.9	40	48.95	41	0.40	41	47.1	40	—	41	—
		41.6		31.42		43.27		43.3		32.90		44.60		49.8		50.90		2.50		49.2		—		5.79
		43.8		33.50		45.39		45.1		35.80		46.85		51.7		53.00		4.60		50.8		—		.76
		45.7		35.70		47.56		46.5		37.20		48.85		53.4		55.10		6.88		52.4		—		.96
	90																							
	218.9	27.8	.60	37.88	22701	49.62	225.5	49.1	17505	37.35	23375	50.95	256.2	54.1	26515	57.20	2348	9.10	252.8	53.3		—		.92
	41	31.5		16.35		52.80	41	38.0		17.67		54.34	41	55.1		3.580		12.22				3.668		13.33
		33.4		18.45		54.88		39.4		19.86		56.44		56.8		3.800		14.34				3.886		15.43
		35.6		20.60		57.13		41.0		22.00		58.60		58.4		4.000		16.55				4.093		17.67
		37.5		22.35		59.27		43.1		24.30		0.69		0.7		4.200		18.81				43.12		19.75
	177.5	39.5	10312	24.97	28545	1.37	206.2	44.7	11021	26.38	29292	2.85	293.5	2.5	20017	44.31	8278	20.86	2048.9	45.30	88.18	2.200		
			56																					
			38.63			4.54				35.01		6.60				53.03		24.05		.86				25.80
			45.40			6.40				46.75		8.22				4.67 70		26.05		5.76	17.63			27.15
			57.09			8.87				58.58		10.28				16.56		28.25		17.64	.64			29.30
			8.86			11.07				10.28		12.40				28.26		30.40		29.29	.52			31.40
			20.62		4431	13.20				22.04	5138	14.48				40.03	14128	32.53		40.98	.45			46.45	33.60
	81		53												8									
23	40	43.78	285.60		m	s	40	45.10	29266				40	51.24	82.57		6		41	50.56	87.75			
	41	35.50			40	57.120	41	41.24				40 58.532	41	58.70			41	16.514					41	17.544
					−4	29.456					−4	30.801					−4	48.938					−4	50.045
					+	.305					+	.310					+	.310					+	.286
					−	1.240					−	4.230					−	4.057					+	1.046
					36	23.72						23.81						23.83						23.76
												23.77						23.87						23.75
																								1.81

	1		9			3		1			8		18											
	+13.34		−38.38			+13.42		−42.28			+25.26		−42.28			−32.00							
	1.12418		1.58422m			1.12808		1.63053m			1.40278		1.62511m			1.51851m							
	1.21475m		1.67479			1.21865m		1.72110			1.49335m		1.71568			1.60908							
	′	″	′	″		′	″				′	″				′	″						
	35	3	35	2		35	3	35	2		35	3	35	2		35	2						
	″	″	″	″		″	″				″	″				″	″						
	17.3	+.50	12.9	+.32		16.6	+.48	5.9	+.15		30.6	+.38	8.1	+.19		17.0	+.41						
	25.2	+.16	24.4	+.26		26.6	+.17	15.8	+.33		41.1	+.23	17.8	+.32		26.9	+.24						
	41.5	−.38	37.0	−.22		38.6	−.20	25.2	+.00		54.2	−.27	29.9	+.04		38.0	−.28						
	33.6	+.32	30.3	+.48		31.9	+.33	21.1	+.46		47.1	+.14	25.0	+.48		33.3	+.47						
		+.60		+.64			+.72		+.94			+.68		+1.03			+.84						
	′	″	′	″																				
	38	30.15	37	26.15		38	28.42	37	17.75		38	43.25	37	20.20		37	28.80						
		−16.40		47.29			−16.54		52.61			−31.14		51.96			40.65						
	38	13.75		13.44		38	11.88		10.36		38	12.11		12.16		38	9.45						
	°	′	″																					
−15	15	2.540		2.509		15	2.353		2.201		15	2.376		2.381		15	2.110							
		+.989					+.2317					+.1954					+.2679							
		1.96589					1.94917					1.97554					1.98279							
		−.9245					−.9532					−.9452					−.9611							
		+.02		+.20			+.02		+.25			+.08		+.24			+.15							
		+.45		+.31			+.45		+.30			+.37		+.23			+.25							
		+.15		+.21			+.18		+.23			+.17		+.26			+.21							
		−.01		−.01			−.01		−.01			−.01		−.01			−.01							
		−.9184		−.9174			−.9468		−.9455			−.9391		−.9380			−.9551							
		16″ 57.24		5683			58.21		5686			57.67		57.61			5661							
		57.04					57.38					57.64					56.61							
		+4 9.78					11.45					10.44					10.90							
		21.95					−2.185					−2.043					−2.036							
		+3 4.783					.4960					5.001					5.054							
−15	13	9.21		−1.12+.28			7.78		−1.16+.29			7.63		−1.03+.41			6.07		−.92+.29					
		10.0					8.6					8.2					6.7							

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Dec. 7						Dec. 14			Dec. 16	
h	m	s	m	s	m	s	ch. f.	ch. f.	ch. f.	Sheet plotted
23	40	56.5	40	57.32		9.00				
		58.6		59.34		11.22				
		0.0		1.51		13.20				
		2.5		3.75		15.30				
	2.5	4.9	782	5.90	6622	17.50				
	41	57.0		44.29		20.70				
		58.4		46.55		22.88				
		59.6		48.65		25.00				
		1.1		50.68		27.20				
	299.0	2.9	24297	52.80	12508	29.30				
				1.56		32.40				
				13.24		34.68				
				25.02		36.80				
				36.74		38.84				
				48.59	18372	41.00				
	40	0.50		125.15						
	41	59.80			41	25.030				
					−4	57.469				
					+	.308				
					−	3.978				
						23.89				
						23.91				

	+24.53		−34.77											
	1.38970		1.54120n											
	1.48027n		1.63177											
	35	3	35	2			35	3	35	2		35	3	35	2
	32.7	+.56	20.2	+.48			44.2	+.36	34.0	+.48		32.6	+.56	14.0	+.35
	41.5	+.25	28.8	+.23			53.4	+.29	43.7	+.38		41.7	+.25	22.6	+.27
	51.1	−.43	37.2	−.23			4.7	+.16	54.8	−.30		52.4	−.38	33.7	−.05
	43.5	+.18	31.8	+.47			56.9	+.02	48.2	+.30		45.9	+.08	28.1	+.47
		+.56		+.95				+.83		+.86			+.81		+1.04
	38	42.20	37	29.50			38	54.80	37	45.18		38	43.15	37	24.60
		−30.22		42.83											
	38	11.98		12.33											
−15	15	23.63		23.98											
		+2898													
		1.98498													
		−96.60													
		+ .08		+ .17											
		+ .37		+ .25											
		+ .14		+ .24				+ .21		+ .21			+ .13		+ .26
		− .02		− .02											
		−9603		−9596											
		59.66		59.94											
		59.80													
		1128													
		− 1991													
		51.37													
		8.43		−90+21											
		9.2													

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150

2 Capricorni

log sin δ 9.34950n

" cos δ 9.98886

" 1500 Stars 0.09493n

I 2.12

α h m s 20 11 23

δ −12° 55' 17"

z +55 18

1878

tm. α +.038

tm. δ −.93

tm δ −.23

Sirius +.82

Nov. 2 Nov. 3 Nov. 4 Nov. 5

	Nov. 2		Nov. 3		Nov. 4		Nov. 5	
h	m s	m s	m s	m s	m s	m s	m s	m s
20	15 15.0	15 2.72	15 14.53	14 56.3	15 4.80	15 16.36	15 6.4	15 6.80
	17.7	4.83	16.57	58.9	6.87	18.48	8.6	8.90
	19.3	7.00	18.47	0.3	9.00	20.64	10.7	10.63
	21.2	9.10	20.76	1.9	11.05	22.67	12.3	12.92
	23.3	11.30	22.82	3.3	13.10	24.91	14.6	15.10
	16 5.6	4.42	26.05	16 8.0	51.30	28.05	16 12.1	53.32
	7.6	51.49	28.30	9.6	53.63	30.10	13.9	55.40
	9.6	53.57	30.35	11.1	55.67	32.34	15.6	57.50
	11.5	55.77	32.45	13.0	57.67	34.48	17.3	59.70
	13.2	57.73	34.63	14.5	[59.88] 0.88	36.63	20.0	1.78
		6.99	37.72		8.96	39.68		10.87
		18.69	39.78		20.61	41.87		22.60
		30.36	41.90		32.30	43.91		34.28
		41.90	44.00		43.91	46.00		45.92
		53.60	46.10		55.83 63	48.10		57.54
	h m s							
20	15 19.30	15 15.4	m s	15 0.14	16 14.1		15 10.52	17 12.1
	16 9.50		15 30.308	16 11.24		15 32.282	16 15.78	
			11 20.43			11 20.42		
			+4 9.88			+4 11.86		
			9.84			11.82		

	Nov. 2		Nov. 3		Nov. 4		Nov. 5	
	A	A						
	+11.00	−39.20	+32.14	−38.96	+23.72	−41.54	+35.74	−38.06
	1.04139	1.59329m	1.50705	1.59062m	1.37511	1.61847m	1.55315	1.58047m
	1.13632m	1.68822	1.60198m	1.68555	1.47004m	1.71340	1.64808m	1.67540
	20 0	15 4	20 1	15 4	20 0	15 4	20 1	15 4
	″	″	″	″	″	″	″	″
ε	43.9 +.27	40.0 +.31	7.5 +.22	39.3 +.32	58.2 +.13	37.0 +.37	15.2 +.40	43.8 +.22
f	52.0 +.24	48.2 +.20	16.4 +.25	48.0 +.20	64 +.23	45.1 +.18	23.7 +.20	51.7 +.17
g	12.5 −.28	9.4 −.12	36.4 −.22	8.0 −.06	23.6 −.26	57.8 −.01	38.4 −.32	3.4 +.03
h	5.4 +.70	0.8 .00	26.4 +.66	57.2 −.12	15.0 +.70	54.3 −.01	29.8 +.65	56.7 −.03
	+.98	+.39	+.91	.34	+.80	+.53	+.93	.34
	20′ 58.45	19′ 54.60	21 21.68	19 53.12	21 10.80	19 49.05	21 26.78	19 53.90
	−13.69	48.78	−39.99	48.48	−29.51	51.69	−44.47	47.36
	20 44.76	43.38	20 41.69	41.60	20 41.29	40.74	20 42.31	41.26
	° ′ ″	″						
−12	57 56.41	55.03	57 53.34	53.25	57 52.94	52.39	57 53.96	52.91
	° ′ ″							
+55	16 34							
	1.91850							
	+313		+1628		+1804		+1760	
	1.92163		1.93478		1.93654		1.93610	
	−83.49		−86.06		−86.41		−86.32	
	+ .01	+ .18	+ .12	+ .18	+ .07	+ .21	+ .15	+ .17
−	+ .11	− + .54	− + .14	− + .54	− + .18	− + .53	− + .17	− + .59
−	+ .24	− + .10	− + .23	− + .08	− + .20	− + .13	− + .23	− + .10
	.57	− .00	− .01	− .01	− .01	− .01	− .01	− .01
	−83.13	−82.67	−85.58	−85.27	−86.02	−85.55	−85.78	−85.47
	59 1954	1770	1892	1852	1896	1794	1974	1838
	18.92 −.99		18.72 −.99		18.45 −.99		19.06 −1.09	
− 12	55 8.5		8.5		8.6		8.6	
	′ ″							
	+4 10.1		4 10.2		4 9.8		4 10.5	
	11.3		11.1		18.7		21.4	
	12.0		12.1		11.7		12.5	

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From Nautical Almanac — Washington.

	α m s		δ ′ ″	
Oct. 26	11 20.54		55 8.3	
31	.46	8	8.4	1
Nov. 5	.39	7	8.6	2
10	.33	6	8.7	1
15	.27	6	8.9	2

Nov. 6

20	15	30.1	15 —	15	22.00	
		32.4	—		24.00	
		34.3	14.56 14.56		26.25	
		36.8	.48 16.60		28.40	
		39.0	.56 18.80		30.40	
	16	12.6	56.87		33.62	
		15.1	59.00		35.77	
		18.1	1.10		37.80	
		19.5	3.20		39.85	
		21.7	5.30		42.05	
			14.53		45.30	
			26.23		47.25	
			37.82		49.43	
			49.44		51.50	
			1.09		53.70	
	15	34.58	18.911			
	16	17.40		15	37.822	
				11	20.38	
				+4	17.44	
					17.40	

+3.30 −39.58

0.51851 1.59748m

0.61344m 1.69241

20 0 15 4

35.3	+.42	41.3	+.28
43.3	+.23	48.8	+.19
57.8	−.14	1.0	+.02
48.7	+.51	55.6	−.02
	+1.02		.47
20 46.28		19 51.68	
−4.46		49.25	
5.12		40.93	
20 42.16			
−12 57 53.81		52.58	

+1478

1.93328

−8576

+ .00	+ .19
−+ .10	−+ .58
−+ .25	−+ .12
− .01	− .61
−8542	−8488
19.23	17.46
18.34	−1.05
8.6	

4 9.7

15.6

11.7

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ΔI + m.

for Gill Stns.

New values from pp. 58-62

	h 22	h 23	h 24	h 22	h 23	h 24	New − Old
	m s	s	s	m s	s	s	s
Nov. 2	+4 10.272	10.386	10.500	4 10.27			.00
	114	114					
4	+4 14.260	14.382	14.504	14.26			.00
	122	122					
5	+4 16.072	16.144	16.216	16.07			.00
	72	72					
6	+4 17.766	17.868	17.970	17.75			−.02
	102	102					
10	+4 24.699	24.771	24.843	24.71			+.01
	72	72					
12	+4 27.629	27.731	27.833		27.73		.00
	102	102					
13	+4 29.307	29.400	29.498		29.40		.00
	93	93					
14	+4 30.670	30.752	30.834		30.79		+.04
	82	82					
30	+4 48.~~9~~	+4 48.918	48.982		48.94		+.02
		34					
Dec. 1	+4 49.983	50.022	50.061		49.97		−.05
	39	39					
7	+4 57.296	57.404	57.512			57.49	−.02
	108	108					
12	+5 2.892	2.970	3.048			3.05	.00
	78	78					
14	+5 4.787	4.877	4.967			5.00	+.03
	90	90					
16	+5 7.350	7.424	7.498			7.47	−.03
	74	74					

Horizontal Flexure.

sin z	l − s	N − s	sin z′	sin z	l − s	N − s	sin z′
	Nov. 2				Nov. 3		
.59	10.6			.59	12.0		
.56	4 10.6	4 10.7	.46	.56	4 11.4	4 12.3	.46
.69	11.1 ~~10.4~~	10.2	.73	.55	10.5	11.9	.73
.70	10.9 ~~9.9~~			.69	10.1 ~~9.3~~		
.22	11.2			.70	10.2 ~~9.2~~		
.24	10.9			.33	12.0		
.47	10.5			.47	12.1		
.82	12.0 11.0			.24	12.0		
.54	98			.47	11.1		
~~.53~~	10,~~64~~	10.45	.60	.82	12.1 ~~11.1~~		
	11 53				35		
sin z + sin z′ = + 1.~~13~~ / 4	− .~~19~~			.54	11.~~37~~	12.10	.60
Δl =	− .~~17~~			114	+ 1.~~03~~	.75	
	− .46			Δl =	+ .~~90~~	.~~66~~	
	Nov. 4				Nov. 5		
.56	4 11.4	4 11.9	.39	.59	12.0		
.47	10.6	11.4	.73	.53	4 11.7	4 12.5	.46
.69	10.2 ~~9.3~~			.56	12.0	12.5	.39
.70	11.0 ~~10.0~~			.55	10.5	12.5	.73
.22	11.4			.69	11.8 ~~10.9~~		
.24	11.2			.22	11.8		
.47	10.6			.24	12.2		
.82	11.7 ~~10.7~~			.47	11.3		
	11.21			.82	12.5 ~~11.4~~		
.52	~~10.65~~	11.65	.56		75		
				.52	11.~~63~~	12.50	.53
108	+ .~~02~~ .64			104	+ .~~97~~	.75	
Δl =	+ .~~02~~ .59			106	+ .~~93~~		
				Δl =	.~~92~~	.71	

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Horizontal Flexure

Nov. 6

ρ in z	S. 7 3/4 in.	N. 7 3/4 in.	ρ in z'
	′ ″	′ ″	
.59	11.1		
.22	4 11.0	4 12.6	46
.69	11.3 ~~10.3~~	11.7	34
.22	11.1	10.9	23
.24	10.5	11.1	26
.82	11.6 ~~10.6~~		
	11.10		
446	~~10.77~~	11.58	32
	″		
.76	~~+.81~~	.48	
.78	~~+1.07~~	.62	
Hfl =	1.04		

Nov. 10

ρ in z	S. 7 3/4 in.	N. 7 3/4 in.	ρ in z'
	′ ″	′ ″	
.55	4 12.6	4 12.5	.57
.69	12.2 ~~11.3~~		
.70	13.7 ~~12.6~~		
.22	13.0		
.38	12.7		
	84		
.50	~~12.44~~	12.50	.57
	″		
.107	~~+.06~~	-.34	
Hfl =	+.06	-.32	

Nov. 12

ρ in z	S. 7 3/4 in.	N. 7 3/4 in.	ρ in z'
.22	4 11.3	4 10.7	.57
.33	11.2		
.24	10.4		
.47	11.4		
.32	11.08	10.70	.57
.89	-.38		
	~~-.44~~		
Hfl =	.43		

Nov. 13

ρ in z	S. 7 3/4 in.	N. 7 3/4 in.	ρ in z'
.55	4 9.2	4 10.2	.46
.69	10.1 ~~9.3~~	10.2	.57
.70	10.7 ~~9.9~~	11.6	.72
.22	10.4	9.7	.23
.33	11.4		
.24	10.5		
.47	10.2		
.46	10.2		
	34		
.46	~~10.14~~	10.42	.49
.95	+ ~~.28~~	.08	
Hfl =	+ ~~.29~~	.08	

Nov. 14

ρ in z	S. 7 3/4 in.	N. 7 3/4 in.	ρ in z'
	10.8		
.70	4 ~~9.3~~	4 13.6	.46
.33	11.3	11.2	.57
.24	12.2		
.47	12.4		
	68		
.44	~~11.30~~	12.40	.52
.96	+ ~~1.10~~	.72	
Hfl =	+ ~~1.16~~	.75	

Nov. 23

ρ in z	S. 7 3/4 in.	N. 7 3/4 in.	ρ in z'
.24	4 10.1	4 10.2	.72
.47	9.9	9.8	.34
.46	10.8	10.0	.23
		10.2	.26
.39	10.26	10.05	.39
.78	-.21		
Hfl	-.27		

Nov. 24

ρ in z	S. 7 3/4 in.	N. 7 3/4 in.	ρ in z'
		10.8	.30
.33	4 10.9	4 10.2	.39
.47	10.6	11.6	.72
~~.30~~	~~—~~	10.5	.34
.56	10.4	9.3	.23
.38	10.7	10.5	.26
.44	10.65	10.48	.37
.81	-.17		
Hfl =	~~-.20~~		
	.21		

Nov. 26

ρ in z	S. 7 3/4 in.	N. 7 3/4 in.	ρ in z'
		12.2	.30
.22	4 10.1	4 11.0	.39
.33	10.2	13.1	.72
.47	10.2	12.1	.34
~~.30~~	~~—~~	10.4	.23
.56	11.0	11.0	.26
.38	11.9		
.39	10.68	11.63	.37
.76	+.95		
Hfl =	+1.23		

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Horizontal Flexure for Gill Stars.

Nov. 30

sin z	S. of zen.	N. of zen.	sin z'
		10.9	30
.69	4108 ~~9.8~~ 10.8	4 11.9	.57
.70	11.5 ~~10.7~~	13.1	.72
.64	8.7	11.7	.34
.47	10.9	11.0	.28
~~30~~	~~10.5~~	11.8	.26
.56 62	10.~~22~~ 47	11.73	.40
1.02	+1.~~71~~ 26		
Hf.I =	+~~1.68~~ 1.23		

Dec. 1

sin z	S. of zen.	N. of zen.	sin z'
		11.8	.30
.22	4 11.8	4 13.7	.72
.33	11.0	11.8	.34
.47	11.5	11.2	.23
.64	9.6	12.0	.26
~~.30~~	~~11.5~~		
.42	10.98	12.10	.37
.79	+1.12		
Hf.I =	+1.42		

Dec. 7

sin z	S. of zen.	N. of zen.	sin z'
.22	4 12.0	4 12.6	.57
.33	11.9	13.4	.72
.47	11.0	12.1	.34
.56	11.4	11.4	.23
.38	11.7	12.4	.26
		12.4	.49
.39	11.60	12.38	.44
.83	+.78		
Hf.I =	+.94		

Dec. 12

sin z	S. of zen.	N. of zen.	sin z'
.22	4 9.6	4 11.1	.72
.33	10.5	9.4	.23
.47	9.3		
.47	9.6		
.46	9.7		
.39	9.74 (9.92)	10.25	.48
.87	−.51		
Hf.I =	−.59		

Dec. 14

sin z	S. of zen.	N. of zen.	sin z'
		11.1	30
.22	4 9.8	4 11.8	.72
.33	10.4	10.1	.23
.47	11.5	11.1	.26
~~.30~~	~~—~~		
.46	9.6		
.56	8.9		
.41	10.04	11.02	.38
.79	+.98		
Hf.I =	+1.24		

Dec. 16

sin z	S. of zen.	N. of zen.	sin z'
		11.4	
.33	4 11.4	4 10.9	.57
.47	10.3	11.8	.72
~~.30~~	~~11.5~~	10.7	.23
.56	9.8	12.0	.26
.38	10.3	11.2	.49
.44	10.45	11.33	.45
.89	+.88		
Hf.I =	+.99		

Summary.

	"	"	
Nov. 2	−.84	−.17	−.46
3	+.22	+.90	+.66
4	+.34	.00	+.59
5	+.42	+.93	+.71
6	+.32	+1.04	+.62
10	−.26	+.06	−.32
12	−.79	−.43	−.43
13	−.34	+.29	+.08
14	+.47	+1.15	+.75
23	−.64	−.27	−.27
24	−.78	−.21	−.21
26	+.22	+1.23	+1.23
30	+1.76	+1.68	+1.23
Dec. 1	+.87	+1.42	+1.42
7	+.55	+.94	+.94
12	−.02	−.59	−.59
14	+.82	+1.24	+1.24
16	+.47	+.99	+.99
18)	+1.99	+10.19	+8.18
	+.11	~~+.56~~ = Hf.I adopted	
		+.45	

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The reduction for runs and division errors were computed with the ~~wrong signs~~ in the Gill stars and the fundamental stars having a south declination. The correction of this mistake produced a change in the values of the flexure and and Reg which are here computed with red ink.

The two corrections in red ink applied to the final declinations of the Gill's stars are

(1) the correction for the error in Rns and Rds

(2) the correction to Reg + Rfl as given by the new computation.

The values of R.A. given in red ink are the results by using the new values of $\Delta T + m$ obtained by neglecting the north fundamentals, the computation of which is given on pp 58 – 62, and the corrections to the old values when all the fundamentals are employed being collected on p. 52.

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Computation of Reg used

Star	R.A. h m	sin z.	−Refr. = +Hz sin z	Nov. 2	3	4	5	6	10
			"	4′ + "	"	"	"	"	"
α Lyræ	18 33	+.06	.00						13.2
β "	18 46	+.16	+.01						13.0
γ Aquilæ	19 40	+.53	+.03 .02				11.9 ~~12.0~~		
α "	19 45	+.56	+.03	10.9	11.7	11.7	12.3		
λ Ursæ	19 46	+.73	+.03	9.9	11.6	11.1	12.2		
β "	19 49	+.59	+.03	~~10.4~~	12.3		12.3	11.4	
31 Cygni	20 10	−.07	.00					10.7	
β Delph.	20 32	+.47	+.03 .02			10.8 ~~10.9~~			
α Cephei	20 11	+.82	+.05 .04	12.4 ~~11.5~~	12.5 ~~11.6~~	12.1 ~~11.2~~	12.8 ~~11.9~~	12.0 ~~11.1~~	
ε Cygni	20 37	−.04	.00			12.5			
ξ "	21 08	+.22	+.01					11.1	
ι "	21 10	+.09	+.01				13.0	12.4	
β Cephei	21 27	−.46	−.03 .02	10.4 5	12.0 1		12.8 3	12.3 4	
ε Pegasi	21 38	+.55	+.03 .02		10.8 7		10.8 7		12.9 5
α Aquarii	21 59	+.69	+.04 .03	11.4 ~~10.8~~	10.46 ~~9.7~~	10.5 ~~9.7~~	12.1 ~~11.3~~	11.6 ~~10.7~~	12.5 ~~11.7~~
γ "	22 15	+.70	+.04 .03	11.2 ~~10.3~~	10.5 ~~9.6~~	11.3 ~~10.4~~			14.8 ~~13.8~~
η Pegasi	22 37	+.22	+.01	11.3		11.5	11.9	11.2	13.1
λ "	22 41	+.33	+.02 .01		12.2 1				12.7 5
ν Cephei	22 45	−.39	−.02			11.7	12.3		
α Pegasi	22 59	+.47	+.03 .02		12.4 3				
γ Piscium	23 11	+.64	+.04 .03						
ψ Cephei	23 34	−.67	−.03						12.2
α Androm.	0 2	+.24	+.01	11.0	12.1	11.3	12.3	10.6	
γ Pegasi	0 7	+.47	+.03 .02	10.5 7	11.4 3	10.9 5	11.6 5		
κ Cass.	0 26	−.34	−.02					11.5	
α "	0 34	−.23	−.01					10.8	
η "	0 42	−.26	−.01					11.0	
β Androm.	1 3	+.13	+.01						
ε Ursæ	1 14	−.72	−.03						
δ Cass.	1 18	−.30	−.02 −.01						
η Piscium	1 25	+.46	+.03 .02						
ι Persei	1 30	−.10	−.01						
σ Piscium	1 39	+.56	+.03						
β Arietis	1 48	+.38	+.02						
δ Cass.	1 63	−.49	−.03 .02						
β Trianguli	2 2	+.14	+.01						
θ Persei	2 36	−.11	−.01						
				Mean Reg + 4′	"	"	"	"	"
				Refr	10.88 11.02	11.44 .63	11.18 .39	11.99 12.12	11.28 39	12.75 .95
				Σ +	− .46 .36	− .46 .36	− .46 .36	− .46 .36	− .46 .36	− .46 .36
				+ 4′	10.42	10.98	10.72	11.53	10.74	12.29
					10.66	11.27	11.03	11.76	11.08	12.59

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in reduction of Gill Stars. 57

12	13	14	23	24	26	30	Dec. 1	7	12	14	16	16
"	"	"	"	"	"	"	"	"	"	"	"	
		13.0										
	10.0 9.9 9.5	13.3										
	10.4 9.7 11.0 10.3	11.6 9.7				11.1 10.2 11.8 11.7						
11.4	10.5				10.2		11.9	12.1	9.7	9.9		
11.4	11.6	11.5		11.7	10.4		11.2	12.9	10.7	10.6	11.6	
				10.0	10.8							
				10.9	10.5		11.8	11.3	9.6	12.8	10.6	
						9.7	10.0					
10.4	9.9	10.9				11.6		12.3			10.6	
10.5	10.6	12.3	10.2									
11.7	10.5	12.7	10.2			11.2			9.9			
			9.6	10.3	11.9	11.5	11.6	11.9				
	9.6		9.9	9.2	10.3	10.9	11.1	11.3	9.3	10.0	10.6	
			10.1	10.4	10.9	11.7	11.9	12.3		11.0	11.9	
					12.1			11.6		10.3		
	11.3		9.9	11.3 7 10.6	12.8 1 12.0	12.8 8 10.7	13.4 7 11.6	13.1	10.8	11.8 11.9 10.9	11.5 3 11.2	
	10.5		11.0						9.9 10.0	9.5		
			10.2			11.0	11.1					
				10.7	11.3			11.7		9.2	10.1	
				10.9	12.1			11.9			10.5	
								12.1 2			11.0 10.9	
											11.1	
								10.3			9.2	
"	"	"	"	"	"	"	"	"	"	"	"	
11.08 .04	10.24 .42	11.91 12.10	10.19 .12	10.46 .54	11.11 .25	10.90 11.21	11.36 .55	11.74 .85	9.87 .96	10.40 .50	10.75 .83	
− .46 .36	− .46 .36	− .46 .36	− .46 .36	− .46 .36	− .46 .36	− .46 .36	− .46 .36	− .46 .36	− .46 .36	− .46 .36	− .46 .36	
10.62	9.78	11.45	9.73	10.00	10.68	10.44	10.90	11.28	9.41	9.94	10.29	
10.68	10.06	11.74	9.76	10.18	10.92	10.85	11.19	11.49	9.60	10.14	10.47	

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1878

New determination of ΔT+m for Gill Stars, by rejecting

Nov. 2 — L + .114

19	45	+4	10.16	+.15 m	−.17	+4	9.99	+.24	10.23	19	45	+5	9.23	+.24	9.47	+54.30 m
19	49		10.14	+.11	−.12		10.02	+.24	.26	21	27	4	13.34	+.05	13.39	+ 2.75
20	11		9.84	−.23	+.26		10.10	+.19	.29							
21	0		10.27	−.02	+.02		.29	−.02	.27							
21	15		10.24	−.03	+.03		.27	−.05	.22	0	=	+59.03		+54.13 m		n = −1.09
22	37		11.03	+.57	−.64		.39	−.09	.30			2.95		+ 2.58		1.14
0	2		11.10	+.54	−.60		.50	−.25	.25							1.115
0	7		10.78	+.26	−.29		.49	−.26	.23							
										0	=	+59.21		+54.30 m		n = −1.09
21	51	+4	10.44	+.17 m	−.19	+4	10.256		10.256			3.13		+ 2.75		1.14
					10.25											1.115

Nov. 3 — L + .122

19	45	+4	12.18	+.15 m	−.18	+4	12.00	+.27	12.27	19	45	+5	16.05	+.27	16.32	+54.29 m
19	49		12.20	+.11	−.13		.07	+.26	.33	21	27	+4	15.64	+.06	15.70	+ 2.75
20	11		11.82	−.23	+.28		.10	+.21	.31							
21	38		12.33	+.16	−.19		.14	+.04	.18 ✓							
22	0		12.34	−.02	+.02		.36	−.01	.35	0	=	+63.84		+54.13 m		n = −1.18
22	15		12.34	−.03	+.04		.38	−.04	.34			3.22		2.59		1.24
22	41		12.87	+.42	−.51		.36	−.09	.27							1.210
22	59		12.67	+.26	−.31		.36	−.12	.24							
0	2		13.23	+.54	−.65		.58	−.26	.32							
0	7		12.84	+.26	−.31		.53	−.27	.26	0	=	+64.03		+54.29 m		n = −1.18
												3.41		2.75		1.24
21	57	+4	12.48	+.16 m	−.19	4	12.288		12.287							1.210
					12.29											

Nov. 4 — L + .122

19	45	+4	14.10	+.15 m	−.17	+4	13.93	+.27	14.20	19	45	+5	13.28	+.27	13.55	+54.29 m
20	11		13.80	−.23	+.26		14.06	+.21	.27	22	45	4	16.98	−.10	16.88	+ 2.20
20	32		14.36	+.25	−.29		.07	+.17	.24							
22	0		14.30	−.02	+.02		.32	−.01	.31							
22	15		14.30	−.03	+.03		.33	−.04	.29	0	=	+59.08		+ 54.10 m		n = −1.09
22	37		15.00	+.57	−.65		.35	−.08	.27			2.41		2.01		1.20
0	2		15.14	+.54	−.62		.52	−.26	.26							1.145
0	7		14.76	+.26	−.30		.46	−.27	.19							
21	56	+4	14.47	+.19 m	−.22	+4	14.255		14.254							
					14.25											

Nov. 5 — L + .072

19	40	+4	16.09	+.18 m	−.20	+4	15.89	+.14	16.03	19	45	+5	14.97	+.13	15.10	+54.29 m
19	45		16.05	+.15	−.16		.89	+.13	.02	21	27	4	19.05	+.01	19.06	+ 2.75
19	49		16.02	+.11	−.12		.90	+.13	.03	22	45	4	18.53	−.09	18.44	+ 2.20
20	11		15.74	−.23	+.25		.99	+.10	.09							
21	38		16.25	+.16	−.18		16.07	−.01	.06	0	=	+58.85		+54.10 m		n = −1.09
22	0		16.13	−.02	+.02		.15	−.04	.11			2.81		2.56		1.10
22	37		16.70	+.57	−.62		.08	−.08	.00			2.19		2.01		1.09
0	2		16.80	+.54	−.59		.21	−.18	.03							1.095
0	7		16.46	+.26	−.28		.18	−.19	15.99							
21	32	+4	16.25	+.19 m	−.21	+4	16.040		16.040							
					16.04											

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North star

Stor. 6 — l + .102

19	49	+4	17.64	+.11 m	−.13	+4	17.51	+.18	17.69	21	27	+4	20.89	+.02 20.91	+2.75 m
20	11		17.40	−.23	+.27		.67	+.15	.82 √						
21	8		18.34	+.57	−.66		.68	+.05	.73						
22	0		17.81	−.02	+.02		.83	−.04	.79	0	=		+2.90	+2.49 m	n = −1.16
22	37		18.38	+.57	−.66		.72	−.10	.62						
0	2		18.49	+.54	−.63		.86	−.24	.62						
21	38	+4	18.01	+.26 m	−.30	+4	17.712		17.712						

17.71

Stor. 10 — l + .072

~~18~~	~~46~~	~~+4~~	~~25.17~~							23	34	+4	29.52	−.10 29.42	+4.32 m
21	38	+4	24.86	+.16 m	−.17	+4	24.69	+.04	24.73						
22	0		24.73	−.02	+.02		.75	+.01	.76						
22	15		24.70	−.03	+.03		.73	.00	.73	0	=		+4.45	+4.10 m	n = −1.09
22	37		25.35	+.57	−.62		.73	−.03	.70						
22	41		25.19	+.42	−.46		.73	−.03	.70						
22	14	+4	24.97	+.22 m	−.24	+4	24.726		24.724						

24.73

Stor. 12 — l + .102

22	37	+4	28.36	+.57 m	−.68	+4	27.68	+.08	27.76	23	34	+4	32.92	−.02 32.90	+4.32 m
22	41		28.21	+.42	−.50		.71	+.07	.78						
0	2		28.46	+.54	−.64		.82	−.07	.75						
0	7		28.17	+.26	−.31		.86	−.08	.78	0	=		+4.60	+3.87 m	n = −1.19
23	22	+4	28.30	+.45 m	−.54	+4	27.768		27.768						

27.76

Stor. 13 — l + .093

21	38	+4	~~29.44~~	+.16 m	−.18	+4	29.26	+.11	29.37	21	27	+4	32.28	+.12 32.40	+2.75 m
22	0		~~29.82~~	−.02	+.02		.34	+.07	.41	23	34		4 34.32	−.07 34.25	4.32
22	15		29.81	−.03	+.03		.34	+.05	.39	1	15		5 19.15	−.23 18.92	43.02
~~22~~	~~37~~		29.96	+.57	−.64		.32	+.01	.33						
22	41		29.86	+.42	−.47		.39	+.01	.40						
0	2		30.09	+.54	−.61		.48	−.12	.36	0	=		+2.71	+2.48 m	n = −1.09
0	7		29.83	+.26	−.29		.54	−.12	.42				4.56	4.05	1.13
~~1~~	~~25~~		~~29.91~~										49.23	42.75	1.15
															1.128
22	46	+4	29.69	+.27 m	−.30	+4	29.381		29.383						

29.39

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Nov. 14 — l + .082

22	15	+4	30.68	−.03 m	+.03	+4	30.71	+.08	30.79	broken wire	21	27	+4	33.60	+.15	33.75	+2.75 m
22	41		31.30	+.42	−.47		.83	+.07	.90 ✓		23	34		36.01	−.02	35.99	+4.32
2	2		31.40	+.54	−.61		.79	−.07	.72 ✓								
2	7		31.22	+.26	−.29		.93	−.07	.86								
											0	=	+2.60		+2.45 m		n = −1.06
23	16	+4	31.15	+.30 m	−.34	+4	30.815		30.818				4.84		4.02		1.20
					30.81												1.180

Nov. 23 — l + .086

0	2	+4	41.42	+.54 m	−.58	+4	40.84	+.04	40.88	1	15	+5	27.59	−.06	27.53	+43.04 m
0	7		41.16	+.26	−.28		.88	+.03	.91							
1	25		41.34	+.26	−.28		41.06	−.08	.98	0	=	+46.22		+42.69 m		n = −1.08
0	31	+4	41.31	+.35 m	−.38	+4	40.927		40.923							
					40.93											

Nov. 24 — l + .044

22	41	+4	42.76	+.42 m	−.47	+4	42.29	+.07	42.36	22	45	+4	44.69	+.07	44.76	+2.20 m
22	59		42.65	+.26	−.29		.36	+.06	.42	1	15	5	32.83	−.04	32.79	+43.04
1	39		42.63	+.15	−.17		.46	−.06	.40							
1	48		42.88	+.37	−.41		47	−.07	.40							
										0	=	+2.03		+ 1.90 m		n = −1.07
0	17	+4	42.73	+.30 m	−.34	+4	42.395		42.395			+50.06		+42.74		1.17
					42.39											1.120

Nov. 26 — l + .078

22	37	+4	45.25	+.57 m	−.66	+4	44.59	+.12	44.71	22	45	+4	47.08	+.11	47.19	+2.20 m
22	41		45.13	+.42	−.48		.65	+.11	.76	1	15	5	37.08	−.09	36.99	+43.05
22	59		44.96	+.26	−.30		.66	+.09	.75							
1	3		45.57	+.70	−.80		.77	−.07	.70							
1	39		45.13	+.15	−.17		.90	−.12	.84	0	=	+1.96		+ 1.79 m		n = −1.89
1	48		45.33	+.37	−.43		.90	−.13	.77			51.76		42.64		1.21
0	8	+4	45.23	+.41 m	−.47	+4	44.755		44.755							1.150
					44.76											

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Nov. 30 — $l + .034$

22 0	+4 48.89	−.02 m	+.02	+4 48.91		+.03	48.94	23 34	+4 53.76	−.02	53.74	+4.32 m	
22 15	48.85	−.03	+.03	.88		+.02	.90	1 15	5 40.42	−.08	40.34	+43.06	
23 11	48.98	+.05	−.06	.92		−.01	.91						
0 7	49.33	+.26	−.30	49.03		−.04	.99						
								0 =	+4.73	+4.26 m		n = −1.11	
22 53	+4 49.01	+.06 m	−.07	+4 48.935			48.935		51.33	43.00		1.19	
			48.94									1.158	

Dec. 1 — $l + .039$

22 37	+4 50.53	+.57 m	−.63	+4 49.90		+.01	49.91	23 34	+4 54.63	−.03	54.60	+4.32 m	
22 41	50.53	+.42	−.46	50.07		+.01	50.08	1 15	5 38.81	−.09	38.72	+43.06	
22 59	50.24	+.26	−.29	49.95		.00	49.95						
23 11	50.00	+.05	−.06	.94		−.01	49.93						
								0 =	+4.28	+4.00 m		n = −1.07	
22 52	+4 50.32	+.32 m	−.35	+4 49.965			49.968		48.40	42.74		1.13	
			49.97									1.100	

Dec. 7 — $l + .108$

22 37	+4 57.97	+.57 m	−.66	+4 57.31		+.16	57.47	23 34	+5 2.41	−.06	2.35	+4.32 m	
22 41	57.86	+.42	−.48	.38		+.15	.53	1 15	48.04	−.12	47.92	43.07	
22 59	57.70	+.26	−.30	.40		+.12	.52	1 53	1.20	−.19	1.01	3.05	
1 3	58.30	+.70	−.80	.50		−.10	.40						
1 39	57.92	+.15	−.17	.75		−.16	.59						
1 48	58.10	+.37	−.42	.68		−.18	.50	0 =	+4.37	+3.91 m		n = −1.12	
									49.94	42.66		1.17	
0 8	+4 57.98	+.41 m	−.47	+4 57.503			57.502		3.03	2.64		1.15	
			57.51									1.147	

Dec. 12 — $l + .078$

22 37	+5 3.53	+.57 m	−.59	+5 2.94		+.07	3.01	1 15	+5 47.35	−.13	47.22	+43.08 m	
22 41	3.38	+.42	−.43	.95		+.07	.02						
22 59	3.22	+.26	−.27	.95		+.05	.00						
0 7	3.33	+.26	−.27	3.06		−.04	.02	0 =	+43.84	+42.73 m		n = −1.03	
1 25	3.46	+.26	−.27	3.19		−.14	.05						
23 34	+5 3.38	+.35 m	−.36	+5 3.018			3.020						
			3.02										

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Dec. 14 — L+.090

22	37	+5	5.47	+.57 m	−.63	+5	4.84		+.13	4.97	1	15	+5	52.96	−.11	52.85	+43.09 m
22	41		5.29	+.42	−.47		.82		+.13	4.95							
22	59		5.22	+.26	−.29		.93		+.10	5.03							
1	3		5.82	+.70	−.78		5.04		−.09	4.95	0	=		+47.41		+42.70 m	m = −1.11
1	25		5.48	+.26	−.29		.19		−.12	5.07							
1	39		5.36	+.15	−.17		.19		−.14	5.05							
0	4	+5	5.44	+.39 m	−.43	+5	5.002			5.003							
					5.01												

Dec. 16 — L+.074

22	41	+5	7.73	+.42 m	−.41	+5	7.32		+.14	7.46	23	34	+5	11.48	+.08	11.56	+4.82 m
22	59		7.65	+.26	−.25		.40		+.12	.52	1	15		50.13	−.04	50.09	+43.09
1	39		7.76	+.15	−.15		.61		−.07	.54	1	53		10.65	−.09	10.56	+ 3.05
1	48		7.96	+.37	−.36		.60		−.09	.51							
2	2		8.29	+.68	−.66		.63		−.10	.53							
											0	=		+3.68		+3.94 m	m = −.93
0	38	+5	7.88	+.38 m	−.37	+5	7.512			7.512				42.21		42.71	.99
					7.51									2.68		2.67	1.00
																	.973

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Observations for personal equation between bright and faint wires.

1879

	75		83		88		85		80		82	
Apr. 9	m s		m s		m s		m s		m s		m s	
	42 1.92		43 33.95		45 17.00		47 5.35		48 51.00		49 54.05	
	3.84		36.05		19.23		7.23		53.00		56.44	
	6.00		38.10		21.20		9.27		55.05		58.70	
	8.01		40.14		23.32		11.44	3.645	57.05		0.41	
	10.05		42.40		25.48		13.57	7.298	59.18		2.52	
	2981		19.064	38.128	10623	21.246			25 28	55.056	29212	58.424
	5.96	0.96	38.13									
	14.14		46.37		29.52		15.57		4			
	16.20		48.41		31.47		17.65		49 3.33		6.77	
	18.30		50.43		33.68		19.65		5.37		8.78	
	20.36		52.50		35.68		21.80		7.42		10.90	
	22.46		54.57		37.85		23.86		9.42		13.00	
	24.53		56.71		39.77		25.90		11.63		15.04	
	26.55		58.73		41.92		27.97		13.70		17.14	
	28.63		0.83		44.00		30.12		15.76		19.19	
	30.75		2.91		46.20		32.17		17.85		21.20	
	20192	~~22.32~~	49146	54.607	34009	37.788	21469	23.854	19.90		23.27	
	22436	22.436	54.61						10438	11.598	13529	15.032
	35.22		7.23		41.83		36.33		24.00		27.62	
	36.84		9.14		43.34		~~38.37~~		25.95		29.65	
	39.20		11.15		5440		40.37		28.17		~~31.39~~	
	41.22		13.20		56.68		42.50		30.05		33.62	
	4342		15.30		58.73		44.48		32.25		35.72	
	19590	39.18	5602	11.204	27198	54.396	20205	40.410	14042	28.084	12661	31.652
	39.18	-	1420									
		47.57		54.660		37.821		23.854		11.570		15.038
		+.134		.059		+.033		+.000		-.028		6 +.006
	84		73		63		64		90		82	
	58 31.22		89 35.83		0 51.28		2 20.20		3 26.47		4 51.70	
	33.23		37.92		53.38		22.05		28.60		53.83	
	3523		39.90		55.45		24.05		30.70		55.87	
	37.30		42.00		57.54		26.18		32.81		58.00	
	39.40		44.10		59.55		28.30		35.00		0.10	
	2638	35.276	19975	39.950	2720	55.440	2058	24.116	15358	30.716	27950	55.900
	4334		4836		3.72		32.33		34.00		~~2.80~~	
	45.61		50.39		5.83		34.42		41.05		4.26	
	47.62		52.42		7.79		36.47		43.36		6.39	
	49.85		54.40		9.90		38.62		45.38		8.44	
	51.93		5643		12.05		40.70		47.42		10.32	
	54.02		58.62		14.05		42.90		4941		12.50	
	56.05		0.68		16.10		44.90		51.66		14.63	
	58.05		2.77		18.05		46.70		53.68		16.82	
	0.32		5.00		20.32		48.95	6	55.70		19.00	
	46677	51.863	50907	56.563	10777	11.974	36599	40.665	42666	47.407	20.92	12.587
											12328	
	423		9.00		24.38		53.22		59.88		25.05	
	6.31		11.05		26.51		55.30		2.00		27.10	
	8.37		13.05		28.50		57.28		4.05		29.20	
	10.37		15.15		30.72		59.42		6.18		31.30	
	12.43		17.10		32.73		1.56		8.20		33.44	
	4171	8.342	6535	13.070	14284	28.568	28678	57.356	2031	4.062	14609	29.218
		51.809		56.510		12.004		40.736		47.389		12.559
		-.054		-.053		+.030		+.07[6]		-.018		-.028

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88			91			80			85		
m	s		m	s		m	s		m	s	
51	14.20		52	44.50		54	11.48		55	47.18	
	16.28			46.38			13.50			50.00	
	18.17			48.50			15.73			52.05	
	20.17			50.90			17.63			54.05	
	22.27			52.84						56.05	
	9109	18.218		24312	48.624		6756	13.512		25993	51.986
	2640			57.05			21.80		56	0.32	
	28.59			59.14			23.90			2.27	
	30.58			1.15			25.93			4.32	
	32.60			3.00			28.00			6.45	
	34.70			5.27			30.16			8.60	
	36.90			7.42			32.05			10.64	
	38.93			9.44			34.05			12.70	
	41.00			11.32			36.25			14.70	
	43.05			13.41			38.32			16.88	
	31275	34.739 (50)		4720	5.244		27046	30.051		7688	8.542
	4724			1800 2000			42.51			21.16	
	47.29			21.92			44.65			23.05	
	51.27			23.92			46.73			25.05	
	53.33			26.00			48.93			27.20	
	55.37						51.05			29.23	
	25650	51.300		10984	21.968		23387	46.774		2569	25.138
		34.759			5.296			30.143			8.562
		+.084 (09)			+.052			+.092			+.020

Order.
A_{+1} = bright = b
A = faint = f
A_{-1} = bright = b

$= +.039$ (04)

Q.C			P.C			P.C			S.C		
6	55.90		8	20.67		10	8.24		12	10.22	
	58.11			22.67			10.30			12.33	
	0.18			24.69			12.28			14.42	
	2.14			26.80			14.40			16.43	
	4.23			28.77			16.50			18.54	
	30056	0.112		23600	24.720		6172	12.344		2196	14.392
	8.40			33.18			20.79			22.86	
	10.43			35.05			22.83			24.68	
	12.37			37.12			24.80			26.83	
	14.67			39.20			26.72			29.02	
	16.62			41.50			28.72			31.00	
	18.80			43.44			30.79			33.10	
	20.79			45.72			33.18			35.10	
	22.90			47.60			35.05			37.15	
	25.00			49.50			37.24			39.20	
	14998	16.664		37231	41.368		26011	28.901		27862	30.958
	29.05			53.74			41.32			43.36	
	31.26			55.76			43.30			45.38	
	33.30			57.85			45.43			47.46	
	35.35			59.76			47.53			49.71	
	37.42			2.00			49.61			51.70	
	16638	33.276		28911	57.822		2719	45.438		23761	47.522
		16.694			41.271			28.891			30.957
		+.030			−.097			−.010			−.001

Order
A_{+1} = f
A = b
A_{-1} = f

$= -.013$

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May. 8.2

1879

April 14

		8.4		7.2		9.0		8.3		8.8		
m	s	m	s	m	s	m	s	m	s	m	s	
17	13.90	20	25.70	21	28.35	22	59.63	25	20.72	26	20.50	
	16.00		27.60		30.20		1.67		22.75		22.57	
	18.05		29.66		32.38		3.90		24.90		24.57	
	20.27		31.70		34.28		5.93		27.23		26.70	
	22.37	9049	33.80	14806	36.46	16167	7.95	1908	29.25	2485	28.82	2310
		18.098		29.612		32.334		3.816		24.970		24.620
	26.56		38.00		40.50		12.55		33.32		32.80	
	28.50		40.05		42.60		14.30		35.49		35.18	
	30.60		42.20		44.73		16.55		37.65		37.35	
	32.70		44.40		46.90		18.60		39.75		39.48	
	36.00		46.45		48.87		20.70		41.78		41.60	
	37.10		48.60		51.20		22.76		43.85		43.75	
	39.10		50.78		53.26		24.98		46.00		45.80	
	41.00		52.76		55.30		27.10		48.05		47.95	
	43.15	31371	55.00	41824	57.45	44091	29.30	18684	50.18	37607	50.05	37396
		34.857		46.471		48.990		20.760		41.786		41.551
	47.68		58.32		1.60		33.49		54.53		54.38	
	49.65		1.40		3.85		35.64		56.57		56.47	
	51.80		3.65		6.90		37.70		58.70		58.58	
	53.90		5.65		8.00		40.00		0.75		0.70	
	56.00	25903	7.75	1767	10.02	2935	42.05	18888	2.90	29345	2.80	29293
		51.806		3.534		5.870		37.776		58.690		58.586
		34.952		46.573		49.102		20796		41.830		41.603
		+.095		+.102		+112		+036		+044		+052

		8.2		8.5		8.8		9.1		8.3		8.5	
m	s	m	s	m	s	m	s	m	s	m	s		
34	25.80	35	52.45	38	6.68	39	20.68	41	37.97	43	6.50		
	28.05		54.68		8.75		22.90		39.90		8.50		
	30.05		56.85		10.79		25.00		42.00		10.60		
	32.05		58.95		13.00		27.60		44.20		12.77		
	34.25	15020	1.00	28393	15.27	8449	29.18	12476	46.30	21037	14.90	5327	
		30.040		56.786		10.898		24.952		42.074		10.654	
	38.48		5.23		19.38		33.50		50.40		19.12		
	40.55		7.38		21.50		35.50		52.60		21.20		
	42.70		9.50		23.65		37.48		54.65		23.40		
	44.71		11.60		25.70		39.69		56.75		25.45		
	46.92		13.76		27.90		41.90		58.89		27.60		
	49.00		15.90		29.90		43.95		0.95		29.60		
	51.27		18.00		32.15		46.10		3.10		31.84		
	53.30		20.15		34.40		48.40		5.20		33.90		
	55.40	42233	22.30	12381	36.45	25103	50.40	37682	7.25	52979	36.04	24815	
		46.926		13.757		27.892		41.869		58.866		27.572	
	57.70		26.34		49.60				11.40		40.14		
	1.67		28.50		42.65				13.44		42.02		
	3.70		30.68		44.80				15.70		44.25		
	5.88		32.76		46.95				17.58		46.40		
	8.00	31895	35.00	15327	49.00	2400			20.00	7812	48.56	2137	
		3.790		30.654		44.800				15.624		44.274	
		46.905		13.720		57.849				58.849		27.464	
		−.011		−.037		−.043				−.017		−108	

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f.4		9.0		f.c		f.6		
m s		m s		m s		m s		m s
27 54.48		29 14.50		30 31.30		32 6.70		
56.60		16.45		33.48		8.88		
58.67		18.65		35.60		11.50		
0.70		20.80		37.70		13.00		
2.80	29325	22.85	9.325	39.90	17758	15.17	5475	
	58650		18.650		35896		10.950	
7.15		27.00		44.10		19.20		
9.25		29.00		46.30		21.25		
11.30		31.20		48.33		23.32		
13.35		33.35		50.55		25.35		
15.66		35.50		52.65		27.57		
17.73		37.50		54.78		29.70		
19.88		39.60		56.85		31.90		
22.00		41.85		58.95		33.76		
24.04	14036	44.00	31.900	1.00	47351	35.80	24785	
	15596		35.444		52611		27.539	
28.40		48.00		5.35		40.15		
30.45		50.20		7.58		42.20		
32.50		52.45		9.80		44.45		
34.65		54.40		11.90		46.50		
36.70	16270	56.50	26155	14.20	4883	48.60	22190	
	32540		52310		9766		44380	
	15998		35480		52611		27665	
	−.001		+.036		+.070		4.126	= +.067

f.5		8.8		8.2		9.0		
m s		m s		m s		m s		
44 34.95		46 3.00		47 12.15		49 1.44		
37.35		5.29		14.18		3.76		
39.20		7.37		16.45		5.75		
41.10		9.33		18.48		7.90		
43.45	19605	11.67	3660	20.60	8186	10.60	2885	
	39210		7.320		16372		5770	
47.73		15.88		24.90		14.05		
49.85		17.90		27.00		16.45		
52.03		20.00		29.20		18.49		
54.03		22.18		31.28		20.67		
56.20		24.30		33.47		22.78		
58.33		26.45		35.55		24.85		
0.50		28.60		37.68		27.10		
2.68		30.72		39.83		29.10		
4.70	50605	32.88	21841	42.00	30096	31.27	20476	
	56228		24323		33440		22751	
8.90		36.80		46.00		35.52		
10.92		38.90		48.15		37.58		
12.90		41.45		50.35		39.65		
15.20		43.38		52.85		41.80		
17.40	6532	45.56	20678	54.60	25165	44.05	18760	
	13064		4276		50330		39720	
	56137		24398		38351		22945	
	−.091		+.079		−.089		−.006	= −.047

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819 May 67

	7.0		8.3		8.2		7.7		8.4	
	m S		m S		m S		m S		m S	
	46 9.35		47 9.80		48 32.50		50 30.60		52 41.00	
	11.52		11.98		34.40		32.60		43.20	
	13.43		14.04		36.63		34.62		45.27	
	15.45		16.13		38.65		36.70		47.45	
	17.52	6727	18.15	7010	40.70	18308	38.80	17332	49.50	22642
		13454		14.020		36616		34.664		45.284
	21.50		22.26		44.82		42.90		53.56	
	23.50		24.30		46.82		44.80		55.60	
	25.96		26.20		48.93		47.00		57.55	
	27.90		28.27		51.00		49.23		59.65	
	29.94		30.40		53.00		51.18		1.65	
	32.00		32.48		55.00		53.25		3.70	
	34.00		34.55		57.37		55.40		5.88	
	36.04		36.75		59.38		57.51		7.80	
	38.22	26966	38.75	27396	1.38	47770	58.52	46078	10.00	55539
		29.962		30.440		53.078		51.198		61.710
	42.38		42.90		5.57		3.62		14.24	
	44.40		45.00		7.65		5.70		16.33	
	46.50		47.00		9.75		7.88		18.38	
	48.50		49.25		11.70		9.80		20.48	
	50.63	28241	51.30	23535	13.80	4847	11.90	38910	22.55	9198
		46.482		47.070		9.694		7.780		18.396
		29.968		30.545		53.155		51.222		1.840
		+ 0.006		+ .105		+ .077		+ .024		+ .130

	6.7		7.9		8.8		6.7		7.7		8.6	
	m S		m S		m S		m S		m S		m S	
	18 6.60		19 12.78		20 14.90		21 27.00		22 27.70		23 41.35	
	8.67		14.92		17.20		29.30		29.20		43.50	
	10.73		17.33		19.20		31.50		31.20		45.65	
	12.80		19.40		21.30		33.53		33.30		47.67	
	14.90	5370	21.57	8600	23.35	9595	35.65	15698	35.45	15625	50.00	22837
		10.740		17.200		19.190		31.396		31.250		45.674
	19.30		25.61		27.75		29.75		39.70		54.00	
	21.37		27.74		29.90		41.95		41.80		56.07	
	23.45		29.80		32.03		44.00		44.00		58.00	
	25.60		32.00		34.20		46.04		46.10		0.30	
	27.80		34.03		36.36		48.27		48.27		2.40	
	29.80		36.07		38.44		50.25		50.30		4.45	
	31.90		38.20		40.60		52.40		52.45		6.40	
	34.10		40.38		42.70		54.50		54.60		8.50	
	36.20	24952	42.45	30628	44.80	32679	56.55	43371	56.80	43402	10.68	20493
		27724		34.031		36.310		48.190		48.224		2.303
	40.07		46.70		49.00		0.70		1.00		14.80	
	42.35		48.90		51.25		2.90		3.00		16.90	
	44.50		50.78		53.40		4.85		5.30		19.10	
	46.55		52.85		55.45		7.50		7.30		21.80	
	48.64	22211	55.18	25451	57.67	26677	9.20	2465	9.40	2600	23.20	
		44422		50.902		53354		4930		5.200		
		27.581		34.051		36.272		48.163		48225		4505
		− .143		+ .020		− .038		− .027		+ .001		19.010
												2.342
												+ 038

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8.5

m	s				
56	8.80				
	10.90				
	12.90				
	15.00				
	17.10	6480	18473	22192	28545
		12.960	36.946	44.384	57.090
	21.30				
	23.30				
	26.25				
	27.40				
	29.50				
	31.70				
	33.65				
	35.95				
	37.85	26590	48201	54763	6808
		29.544	53.557	60848	7.564
	41.90				
	44.05				
	46.05				
	48.20				
	50.25	23045	5010	8791	12048
		46.090	10.020	17.582	24096
		29.525	53.483	0.983	7.593
		− .019	− .074	+ .135	+ .029 = +.050

7.7

m	s				
57	32.30				
	34.85				
	36.90				
	39.00				
	41.18				
	43.28				
	45.30				
	47.30				
	49.45				
	51.55				
	53.45				
	55.60				
	57.80				
	59.70				
	1.88				
	5.90				
	8.05				
	10.00				
	12.05				
	14.10				

7.5

m	s				
58	40.20				
	42.35				
	44.40				
	46.47				
	48.50				
	52.72				
	54.63				
	56.70				
	58.73				
	0.80				
	2.80				
	5.00				
	7.00				
	9.20				
	13.48				
	15.58				
	17.60				
	19.60				
	21.65				

8.5

m	s				
59	46.75				
	48.60				
	51.00				
	53.20				
	55.27				
	59.30				
	1.40				
	3.40				
	5.48				
	7.62				
	9.78				
	11.70				
	13.70				
	15.70				
	18.95				
	22.00				
	24.03				
	26.22				
	28.28				

$A_{+1} =$ f

$A =$ f

$A_{-1} =$ f

8.5

m	s				
25	10.20				
	12.40				
	14.62				
	16.73				
	18.65	7260	11838	18858	21868
		14.520	23.676	37.716	43.736
	22.85				
	25.00				
	27.10				
	29.30				
	31.40				
	33.40				
	35.60				
	37.60				
	39.80	28205	36613	49058	54609
		31.339	40.681	54.567	0.677
	44.00				
	46.00				
	48.04				
	50.26				
	52.35	24065	28870	55.97	8753
		48.130	57.620	11.154	17.506
		31.325	40.648	54.455	0.621
		− .014	− .233 .0	− .054	− .056

8.5

m	s				
26	19.50				
	21.40				
	23.30				
	25.30				
	27.38				
	32.00				
	34.30				
	36.50				
	38.58				
	40.61				
	42.80				
	44.78				
	47.19				
	49.35				
	53.66				
	55.47				
	57.60				
	59.75				
	1.73				

8.5

m	s				
27	33.63				
	35.65				
	37.74				
	39.70				
	41.86				
	46.00				
	48.28				
	50.30				
	52.45				
	54.55				
	56.60				
	58.70				
	0.80				
	2.80				
	6.75				
	8.70				
	11.17				
	13.25				
	15.58				

8.5

m	s				
28	39.32				
	41.61				
	43.70				
	45.90				
	48.15				
	52.24				
	54.30				
	56.40				
	58.60				
	0.70				
	2.75				
	5.00				
	7.00				
	9.10				
	13.38				
	15.58				
	17.90				
	21.65				

P.6

m	s				
29	52.39				
	54.48				
	56.46				
	58.80				
	0.85	28298			
		56.596			
	5.20				
	7.30				
	9.60				
	11.65				
	13.80				
	16.00				
	18.00				
	20.20				
	22.35	12410			
		13.789			
	26.60				
	28.70				
	31.00				
	33.20				
	35.45	15515			
		31.030			
		13.823			
		+ .084	= −.028		

$A_{+1} =$ f

$A =$ f

$A_{-1} =$ f

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m	S			m	S			m	S			m	S			m	S		
18	6.30			19	12.60			21	1.38			22	14.68			24	11.90			25	57.70		
	8.30				14.46				3.38				16.80				14.00				59.70		
	10.60				16.74				5.40				18.98				16.15				1.75		
	12.65				18.85				7.45				21.00				18.22				3.95		
	14.70	5255			20.90	8375			9.80	2761			23.19	9465			20.28	8055			6.00	910	
		10.510				16.750				5.522				18.930				16.110				1.820	
	18.88				25.20				13.98				27.45				24.60				10.25		
	20.95				27.00				16.00				29.60				26.80				12.23		
	23.00				29.46				18.28				31.60				28.90				14.30		
	25.20				31.70				20.30				33.67				30.95				16.46		
	27.50				33.70				22.50				35.58				33.00				18.67		
	29.45				35.98				24.70				38.00				35.20				20.60		
	31.37				38.00				26.75				40.08				37.30				22.75		
	33.70				40.05				28.30				42.30				39.63				24.88		
	35.30	24575			42.40	30349			30.90	20221			44.40	32298			41.70	29808			26.90	16693	
		27.306				33.727				22.468				35.887				33.120				18.548	
	39.90				46.30				35.20				48.40				45.70				31.10		
	42.00				48.30				37.23				50.58				47.80				33.30		
	44.05				50.40				39.40				52.80				50.00				35.25		
	46.24				52.60				41.55				54.70				52.65				37.40		
	48.34	22053			54.75	25235			43.70	19708			57.00	26348			54.20	24975			39.42	2657	
		44.106				50.470				39.416				52.696				49.930				35.314	
		27.308				[33.610				22.469				35.813				33.020				18.567	
		+ .002				[- .132				+ .021				- .073				- .090				+ .019	

7.7 8.2 8.2 8.7 8.7 8.0

m	S			m	S			m	S			m	S			m	S			m	S		
44	57.70			46	1.68			47	10.80			48	7.80			49	50.80			51	24.60		
	59.80				3.85				12.80				8.10				52.97				26.90		
	2.20				6.20				15.20				10.70				55.00				29.00		
	4.30				8.20				17.30				12.92				57.00				31.30		
	6.65	31065			10.28	3021			19.40	2560			15.25	3553			59.40	2517			33.30	14510	
		2.130				6.042				15.120				11.046				55034				29.020	
	10.70				14.40				23.55				19.30				3.60				37.75		
	12.90				16.60				25.70				21.50				5.80				39.85		
	14.80				18.78				27.83				23.37				8.05				41.98		
	17.00				20.83				29.97				25.55				10.38				44.20		
	19.20				22.80				32.10				27.70				12.33				46.40		
	21.20				25.00				34.20				29.85				14.45				48.53		
	23.42				27.23				36.30				32.00				16.60				50.69		
	25.50				29.27				38.50				34.04				18.87				52.80		
	27.78	17270			31.50	20651			40.60	28875			36.20	24954			21.00	11123			54.88	41718	
		19.189				22.946				32.183				27.727				12.359				46.353	
	31.88				35.45				44.98				40.00				25.24				58.30		
	34.08				37.80				46.30				42.53				27.30				1.47		
	36.06				39.80				48.99				44.60				29.40				3.34		
	38.05				42.05				51.12				46.35				31.56				5.70		
	40.00	18017			44.20	19950			53.50	24539			48.90	2348			33.58	14748			8.60	1781	
		36.034				39.900				49.078				46.96				29.496				3.562	
		19.082				22.971				32.099								12.265				46.291	
		- .107				+ .025				- .084								- .094				- .062	

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7.4			6.4			8.6			8.7		
m	s		m	s		m	s		m	s	
27	53.24		28	52.80		30	1.50		31	20.56	
	55.36			54.85			2.70			22.70	
	57.50			57.00			4.70			24.80	
	59.60			59.00			6.75			27.00	
	1.70	28740		0.97	28462		9.00	2365		29.00	2406
		57.480			56.924			4.730			24.812
	6.00			5.25			13.20			33.20	
	8.15			7.40			15.20			35.40	
	10.28			9.32			17.20			37.37	
	12.20			11.50			19.34			39.50	
	14.38			13.50			21.46			41.66	
	16.47			15.57			23.70			43.81	
	18.64			17.82			25.85			45.80	
	20.70			19.70			27.80			48.00	
	22.80	12962		21.90	12196		30.00	19385		50.20	37493
		14.402			13.551			21.539			41.659
	27.10			26.00			34.00			54.40	
	29.20			28.25			36.20			56.43	
	31.30			30.20			38.28			58.62	
	33.40			32.37			40.37			0.75	
	35.54	15654		34.48	15130		42.40	19125		2.85	29305
		31.308			30.260			38.250			58.610
		14.394			13.592			21.490			41.711
		− .008			+.041			− .049			+ .052

$A_{+1} = h$

$A = f$

$A_{-1} = h$

$= -.028$

7.8 ~~8.3~~			7.8 8.3			~~7.8~~			8.8			8.5		
m	s		m	s		m	s		m	s		m	s	
53	7.90		54	38.36		56	11.18		57	37.22		59	45.40	
	10.05			40.55			13.30			39.26			47.53	
	12.15			42.65			15.35			41.45			49.80	
	14.35			44.80			17.50			43.55			51.90	
	16.53	6098		46.82	21318		19.64	2697		45.90	20738		54.06	24869
		12.196			42.636			15.394			41.476			49.738
	20.67			51.13			23.90			50.00			58.07	
	22.38			53.15			26.05			52.18			0.45	
	25.00			55.33			28.05			54.23			2.45	
	27.17			57.38			30.47			56.40			4.60	
	29.28			59.60			32.53			58.62			6.65	
	31.40			1.70			34.71			0.75			8.80	
	33.50			3.80			36.90			2.85			10.90	
	35.60			5.87			39.00			5.00			13.00	
	37.73	26333		8.04	53600		41.24	29285		7.14	52717		15.27	6019
		29.259			59.556			32.539			58.574			6.688
	41.82			12.20			45.70			11.45			19.28	
	44.33			14.23			47.75			13.50			21.38	
	46.38			16.40			49.82			15.65			23.33	
	48.60			18.40			51.90			17.70			25.70	
	50.85	23208		20.70	8198		54.20	24950		20.00	7830		27.87	11756
		46.416			16.396			49.900			15.660			23.512
		29.306			59.516			32.647			58.568			6.625
		+ .047			− .040			+ .108			− .006			− .063

$A_{+1} = h$

$A = f$

$A_{-1} = h$

$= -.024$

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1879 April 23

	83		88		82		73		87		77	
m s												
	43 38 33		47 8 77		48 41 40		49 42 28		51 13 42		52 29 00	
	40 56		10 76		48 42		44 32		13 50		31 00	
	42 62		13 00		45 54		46 33		17 59		33 05	
	44 67		15 70		47 60		48 40		19 60		35 28	
	46 82	21300	17 24	6487	49 75	22794	50 52	23185	21 72	8783	37 39	16572
		42.600		12.974		45.588		46.370		17.566		33.144
	37 10		21 20		53 80		37 65		25 90		41 59	
	53 10		23 39		53 90		56 73		27 97		48 63	
	53 25		25 64		58 00		58 83		30 00		45 53	
	57 48		27 30		0 00		1 00		33 23		47 72	
	59 47		29 77		2 00		3 05		34 27		49 75	
	1 63		32 00		4 28		5 70		36 20		52 00	
	3 72		34 05		6 40		7 30		38 30		54 01	
	5 73		36 05		8 50		9 40		40 30		56 05	
	7 92	53540	38 30	26810	10 52	1940	11 48	2756	42 63	30800	58 30	44857
		59.600		29.789		2.156		3.062		34.222		49.841
		.489										
	12 00		42 40		14 67		15 67		46 60		2 62	
	14 20		44 65		16 93		17 72		49 00		4 83	
	16 33		46 63		18 82		19 73		51 00		6 72	
	18 40		48 72		20 85		21 64		53 05		8 80	
	20 51	8147	50 85	23325	23 00	9409	23 78	9897	55 10	25475	11 00	3379
		16.294		46.650		18.818		19.794		50.950		6.758
		59.447		29.812		2.203		3.082		34.258		49.951
		− .153		+ .023		+ .047		+ .020		+ .036		+ .110
		.041										
		2										

	78		80		78		91		75		80	
m s												
	18 5 80		19 12 00		20 12 60		21 20 22		22 25 88		23 40 46	
	8 05		14 18		14 60		22 10		28 00		42 70	
	10 05		16 45		16 74		24 42		30 28		44 80	
	12 38		18 60		18 75		26 58		32 61		47 00	
	14 40	5068	20 80	8203	20 90	8359	28 62	2194	34 68	150	49 28	2424
		10.136		16.406		16.718		24.388		30.300		44.848
	18 40		24 86		25 30		32 80		39 00		53 36	
	20 67		27 00		27 32		35 00		41 22		53 82	
	22 92		29 10		29 52		37 10		43 27		57 42	
	24 77		31 10		31 62		39 10		45 34		59 64	
	26 70		33 33		33 68		41 25		47 27		1 63	
	29 00		35 40		35 77		43 38		49 56		3 72	
	31 05		37 45		37 82		45 52		51 65		5 81	
	33 28		39 60		39 85		47 55		53 86		7 88	
	35 32	24231	41 72	29956	42 00	30288	49 86	37166	56 05	42722	10 00	55478
		26.923		33.284		33.653		41.296		47.469		61.642
	29 50		45 80		46 10		57 10		0 22		14 10	
	41 64		47 80		48 32		56 10		2 32		16 87	
	43 72		49 90		50 33		58 15		4 87		18 28	
	45 80		52 35		52 50		0 20		6 53		20 39	
	47 97	21855	54 40	25035	54 52	25177	2 25	29080	8 70	22214	22 48	9162
		43.710		50.070		50.354		58.160		4.428		18.324
		26.923		33.238		33.536		41.274		47.364		1.586
		+ .000		− .046		− .117		− .022		− .103		− .056
										7		

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		6.0			8.2			8.9			9.8		
	54	0.08		55	37.00		57	0.00		58	35.00		
		2.05			39.10			2.12			37.10		
		4.15			41.28			4.23			39.13		
		6.34			43.33			6.20			41.28		
72		8.40	2102		45.40	20611		8.25	2080		43.38	19591	
.144			4.204			41.222			4.160			39.182	
		12.53			49.60			12.44			47.60		$A = b$
		14.58			51.79			14.63			49.68		$+1$
		16.63			53.80			16.70			51.74		$A = b$
		18.72			53.90			18.90			53.90		
		20.90			57.99			20.92			56.00		
		22.70			0.18			23.05			58.10		
		24.70			2.26			25.45			0.25		$A_{-1} = b$
		27.10			4.42			27.28			2.45		
57		29.38	18764		6.61	52255		29.38	18875		4.55	50427	
.842			20.849			58.061			20.972			56.030	
		33.48			10.70			33.42			8.77		
		35.38			12.83			35.70			10.90		
		37.38			15.00			37.78			13.10		
		39.62			17.10			39.80			15.24		
79		41.72	18795		19.30	7493		41.85	18850		17.43	6546	
758			37.590			14.986			37.700			13.092	
.951			20.897			58.104			20.930			56.137	
.110			+ .048			+ .043			− .042			+ .107	$= +.035$
		8.0			6.0			8.2			7.8		
	25	9.47		26	37.33		27	32.67		29	33.40		
		11.70			39.53			35.00			35.49		
		13.80			41.55			37.10			37.33		
		16.00			43.65			39.15			39.58		
24		18.05	6902		45.75	20783		1.30	28522		1.45	28777	$A_{+1} =$
.848			13.804			41.566			57.044			57.554	
		22.28			49.86			5.55			6.00		$A = b$
		24.20			52.00			7.60			8.05		
		26.32			54.20			9.65			10.27		
		28.48			56.30			11.82			12.30		$A_{-1} =$
		30.63			58.32			14.00			14.33		
		32.73			0.42			16.10			16.58		
		34.80			2.56			18.25			18.60		
		36.85			4.70			20.33			20.74		
78		39.05	27534		6.73	52509		22.47	12577		22.90	12977	
642			30.593			58.343			13.974			14.419	
		42.05			11.00			26.68			27.10		
		45.10			13.00			28.70			29.10		
		47.34			15.10			31.00			31.30		
		49.50			17.10			33.00			33.32		
62		51.60	23659		19.15	2535		35.22	15460		35.48	15630	
324			47.318			15.070			30.920			31.260	
586			30.561			58.318			13.982			14.407	
.056			− .032			− .025			+ .008			− .012	$= -.041$

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Personal Equation between bright and faint fields of telescope.

Recapitulation of results of observations on preceding pages.

By bright-field is meant a field illumination as nearly as possible like that used in the zone observations. With this field an 8.6 mag. can be easily seen and observed. By a faint-field is meant one with an illumination as is required to observe a 9.6 magnitude.

Each night's work consists of two series. In the first series of 10 stars, taken at random near the equator, the order of observation was as follows.

A_{+1} = bright = b A = faint = f A_{-1} = bright = b.

In the second series of 10 stars the order was reversed, standing as follows.

A_{+1} = f A = b A_{-1} = f.

By combining the two series, any error arising from the unequal values of the reduction of the separate groups to the mean of the whole group is eliminated.

Apr. 9 1879

A_{+1} = b	A_{+2} = f
A_{+1} = f	A = b
A_{-1} = b	A_{-1} = f
s	s
+0.134	−0.054
+.059	−.053
+.033	+.030
+.000	+.076
−.028	−.018
+.006	−.028
+.009	+.030
+.052	+.097
+.092	−.010
+.020	−.1
+.940	−.013
−.013	
+.053	
+.026	

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A_{-1} = b	A_{+1} = f
A_{+1} = f	A = b
A_{-1} = b	A_{-1} = f
s	s
+.095	−.011
+.102	−.037
+.112	−.043
+.036	−.017
+.044	−.108
+.052	−.051
−.001	−.019
+.036	−.089
+.070	−.006
+.126	
.067	−.047
−.047	
104	
+.057	

Apr. 21

A_{+1} = b	A = f
A_{+1} = f	A = b
A_{-1} = b	A_{-1} = f
s	s
+.026	−.143
+.105	+.020
+.077	−.038
+.024	−.027
+.130	+.001
+.092	+.039
−.019	−.014
−.074	−.033
+.135	−.054
+.029	−.056
+.051	+.024
−.026	−.026
77	
+.039	

Apr. 22

A_{+1} = b	A = f
A_{+1} = f	A = b
A_{-1} = b	A_{-1} = f
s	s
+.002	−.107
+.001	+.025
−.074	−.084
−.090	−.094
+.019	−.062
−.008	+.047
+.041	−.040
−.049	+.108
+.052	−.006
	−.063
−.001	−.028
−.028	
.027	
+.014	

Apr. 23

A_{-1} = b	A = f
A_{+1} = f	A = b
A_{-1} = b	A_{-1} = f
s	s
−.042	+.000
+.023	−.046
+.047	−.117
+.020	−.022
+.036	−.107
+.110	−.056
+.048	−.032
+.043	−.025
−.042	+.008
+.107	−.012
+.035	−.041
−.041	
76	
+.038	

Apr. 9	b = f + .026
14	b = f + .057
21	b = f + .039
22	b = f + .014
23	b = f + .038

Mean

b = f + .035 s

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Combine above results in the order of magnitude.

Order $= A + b$
$A' = f$
$A_{-1} = b$

Order $A = f$
$A' = b$
$A_{-1} = f$

Mag.	—7.0	7.0 to 7.5	7.5 to 8.0	8.0 to 8.5	8.5 to 9.0	—7.0	7.0 to 7.5	7.5 to 8.0	8.0 to 8.5	8.5 to 9.0
	+.006	+.134	+.070	+.059	+.033	+.030	−.053	−.097	−.054	−.018
	+.029	+.112	+.130	+.000	+.009	−.108	+.020	−.037	+.076	+.030
	+.041	−.008	−.019	−.028	+.052	−.143	+.047	+.001	−.028	−.043
	+.048	+.020	−.094	+.006	+.020	−.027	−.107	−.107	−.010	−.091
			+.135	+.092	+.086	−.028	−.012	−.084	−.001	−.019
			+.002	+.091	+.052			−.062	−.011	−.006
			+.110	+.102	+.036			+.108	−.017	−.038
				+.044	+.126			+.000	−.089	+.089
				−.001	+.105			−.046	−.014	−.054
				+.077	−.090			−.117	−.033	+.024
				+.024	−.049			−.032	−.056	−.044
				+.092	+.052				+.025	−.006
				+.001	+.023				−.040	−.022
				−.044	+.036				−.063	−.056
				+.089	−.042				+.008	
				−.042	+.107					
				+.047						
				+.043						
	+.031	+.065	+.058	+.031	+.032	−.054	−.023	−.043	−.021	−.025
	−.054	−.023	−.043	−.021	−.025					
	85	88	94	82	87					
	+.043	+.048	+.046	+.026	+.028	+.037				

Mean

From — to 7.0 $b = f + .043$
" 7.0 to 7.5 $b = f + .043$
" 7.5 to 8.0 $b = f + .047$
" 8.0 to 8.5 $b = f + .026$
" 8.5 to 9.0 $b = f + .028$

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Special series of Observations for the determination of the error of Collimation

(R)	α Cephei 21h 18m 41s +11° 56′	(R)	γ Draco 9h 20m 10s +81° 54′	(R)	α Kaidae 9h 21m 46s −8° 9′	(R)	δ Ursæ Maj 9h 21m 31s +70° 21′	(R)	δ Ursæ Maj 8 24 47 +52 13	(R)	β Cephei 21 27 5 +69 57	(R)
15	25.4			21	—		—				—	
	29.8				—		—				—	
	34.0				57.8		—				—	
	38.2				59.7		—				—	
	43.0				1.9		—				—	
	51.9				6.0	25	13.0			27	5.5	
	56.3				8.0		16.3				12.0	
	0.5				10.2		19.5				18.0	
	4.9				12.3		23.0				24.2	
	9.3				14.1		26.4				30.2	
	13.4				16.4		29.5				36.3	
	18.2				18.5		33.0				41.9	
	22.5				20.5		36.4				48.1	
	27.0				22.6		39.9				54.2	
	35.8				26.8		46.7				6.0	
	40.2				28.9		50.2				12.0	
	44.8				31.0		53.3				18.6	
	49.3				33.0		56.9				24.0	
	53.5				35.1		0.1				30.9	

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(R) Ge. 1564	(R) O Loco.	(R) ε Loco.	(R) 11 Cephei	(R) b Ursæ Maj.	(R) Gr. 1586
9 32 7	9 34 50	9 39 8	21 40 8	9 42 34	9 47 48
+69 46	+10 26	+24 19	+109 14	+59 36	+73 26
31 38.6	Cl. F.	39 14.1			47 8.3
44.7		16.4			15.6
50.5		18.6			22.5
56.6		21.0			30.4
2.7		23.2			37.2
14.8		27.7		42 48.4	52.2
20.6		29.9		52.7	59.6
26.5		32.2		56.8	6.4
32.4		34.6		0.8	13.5
38.4		36.8		4.6	20.7
44.3		39.0		9.0	28.2
50.4		41.3		13.0	35.2
56.4		43.6		17.0	41.9
2.4		45.9		21.3	48.7
14.1		50.4			4.4
20.2		52.7			11.8
26.2		54.9			19.0
32.2		57.2			26.0
38.2		59.5			33.1

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(R)	79 Draco 21 51 20 +104 41	(R)	π Sco. 9 53 57 +8 37	(R)	α Leo 10 2 4 +12 33	(R)	20 Cephei 22 1 22 +117 48	(R)	24 Cephei 22 7 29 +108 14	(R)	ζ Sco. 10 9 57 +24 1
			54 5.0		2 11.5				6 46.2		10 12.7
			7.2		13.6				53.4		15.0
			9.3		15.8				0.1		17.2
			11.4		17.9				6.8		19.4
			13.4		20.0				13.3		21.7
	57 16.0		17.6		24.2				26.6		26.2
	23.0		19.7		26.4				32.8		28.5
	29.4		21.8		28.5				39.4		30.7
	37.2		23.9		30.6				46.0		32.9
	44.3		25.9		32.6				52.7		35.4
	51.1		28.0		34.8				59.2		37.6
	58.6		30.0		37.0				6.0		39.9
	55.5		32.2		39.0				12.6		42.0
	12.8 ?		34.3		41.1				19.2		44.4
			38.4		45.3				32.4		48.9
			40.5		47.5				39.0		51.0
			42.7		49.5				45.7		53.4
			44.8		51.8				52.4		55.6
			46.8		53.7				58.5		57.9

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(R)	ν Leo. 10 13 18 +20 27	(R)	μ Ursa Maj. 10 15 7 +42 6	(R)	31 Leo. 10 21 2 +37 19	(R)	36 Ursa Maj. 10 23 3 +56 35	(R)	9 H Draco 10 25 1 +76 19	(R)	37 Ursa Maj. 10 27 33 +57 42
	13 33.5		15 18.3				22 56.0				26 42.5
	35.8		31.2				0.1				44.5
	38.0		23.9				3.7				46.6
	40.2		26.6				7.4				48.7
	42.4		29.5				11.0				50.9
	46.8		35.0				18.7		25 1.6		55.0
	49.0		37.9				22.5		9.8		57.0
	51.3		40.6				26.2		19.2		59.2
	53.4		43.4				29.9		28.1		1.2
	55.5		46.2				33.8		36.9		3.4
	57.9		48.8				37.5		45.0		5.4
	0.1		51.6				41.2		54.0		7.5
	2.1		54.5				45.0		2.9		9.6
	4.4		57.3				48.6		11.7		11.8
	8.8		2.9				56.1				16.0
	11.0		5.6				0.0				18.0
	13.2		8.4				3.7				20.0
	15.4		11.2				7.4				22.1
	17.6		14.0				11.0				24.2

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(R)	31 Cephei 22 32 48 +106 58	(R)	42 Leo. 10 39 14 +31 18	(R)	ℓ Leo. 10 43 2 +11 10	(R)	i Cephei 22 45 26 +114 25	(R)	46 Leo. 10 46 41 +34 37	(R)	Bo. 1508 10 50 28 +78 24
	31 59.4		39 22.0		43 9.8				46 45.9		49 22.2
	6.9		24.0		11.9				48.4		32.4
	14.0		27.0		14.0				50.9		43.0
	20.8		29.3		16.0				53.3		53.0
	27.8		31.7		18.2				55.9		3.5
	42.0		36.6		22.5		45 30.3		0.9		24.0
	49.4		39.0		24.5		35.3		3.4		34.3
	56.0		41.5		26.8		40.2		6.0		44.4
	3.5		43.9		28.9		45.1		8.3		55.5
	10.4		46.2		31.0		50.3		10.8		5.5
	17.5		48.7		33.0		55.1		13.5		15.7
	24.5		51.2		35.2		0.0		16.0		25.6
	31.5		53.5		37.2		5.4		18.6		36.3
	39.0		56.0		39.4		10.4		21.0		47.0
	52.9		0.8		43.5				26.0		4.3
	59.9		3.2		45.6				28.6		17.4
	7.4		5.6		47.6				31.2		27.6
	14.0		8.0		49.8				33.8		37.8
	21.6		10.5		51.9				36.1		48.1

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(R)	β Ursæ Majoris 10 54 32 +57 2	(R)	α Ursæ Majoris 10 56 25 +62 23	(R)	χ Leonis 10 58 24 +7 59	(R)	φ Ursæ Majoris 11 3 0 +45 8	(R)	σ Leonis 11 7 40 +21 11
	54 35.3		56 12.5		59 2.7		3 1.4		7 55.8
	38.7		16.9		4.8		4.3		58.0
	42.5		21.5		6.9		7.2		0.3
	46.2		26.0		8.9		10.0		2.4
	50.2		30.2		11.0		13.0		4.6
	57.5		39.5		15.1		18.8		9.0
	1.4		43.7		17.3		21.7		11.3
	5.5		48.2		19.3		24.7		13.5
	9.2		52.6		21.4		27.7		15.7
	13.4		57.0		23.5		30.7		18.0
	16.7		1.5		25.5		33.6		20.2
	20.7		6.0		27.7		36.4		22.3
	24.0		10.2		29.8		39.4		24.6
	28.0		15.0		31.8		42.4		26.7
	35.7		23.7		36.0		48.1		31.1
	39.3		28.5		38.0		51.0		33.5
	43.4		32.8		40.0		54.0		35.7
	46.8		37.4		42.1		57.0		37.9
	50.8		41.7		44.3		0.0		40.0

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(R)	α Cephei 21 14 41 +117 56	(R)	9 H Draconis 9 20 10 +81 57	(R)	α Hydrae 9 21 46 −8 9	(R)	d Ursæ Maj 9 24 21 +70 21	(R)	S Ursæ Maj 9 24 57 +52 13	(R)	β Cephei 21 27 5 +109 57
	15 23.6										26 28.1
	28.0										34.0
	32.4										40.0
	36.8										46.2
	41.0										52.4
	50.1										4.3
	54.3										10.3
	58.8										16.5
	3.2										22.5
	7.7										28.5
	12.0										34.3
	16.4										40.7
	20.8										46.7
	25.3										52.6
	34.0										5.0
	38.6										10.9
	43.0										16.9
	47.5										22.8
	52.0										28.8

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(R) Gr. 1564			(R) O Leo.			(R) ε Leo.			(R) b Ursa Maj			(R) Gr. 1586			(R) 79 Draco		
9	32	7	9	34	50	9	39	8	8	42	34	9	47	48	21	57	20
	+69	46		+10	26		+24	19		+59	36		+73	26		+106	57
31	35.5		34	54.9		39	11.6		42	21.2		47	4.7		50	31.9	
	41.6			57.0			13.8			25.0			12.0			39.0	
	47.7			59.2			16.1			29.4			19.3			45.9	
	53.6			1.2			18.3			33.5			26.4			52.7	
	59.6			3.4			20.6			37.7			33.7			0.1	
	11.5			7.5			25.0			45.8			48.4			14.3	
	17.4			9.6			27.4			50.0			—			21.5	
	23.5			11.8			29.7			53.9			—			28.4	
	29.5			13.8			32.0			58.0			10.3			35.5	
	35.6			16.0			34.3			2.3			17.5			42.8	
	41.4			18.0			36.4			6.0			24.8			50.0	
	47.4			20.0			38.7			10.2			32.1			57.0	
	53.6			22.3			41.0			14.3			39.0			4.0	
	59.5			24.4			43.4			18.3			46.6			11.0	
	11.5			28.4			47.8			26.5			1.0			25.9	
	17.3			30.5			50.1			30.5			8.3			32.4	
	23.3			32.5			52.3			34.7			15.4			39.8	
	29.4			34.8			54.6			38.7			22.1			46.9	
	35.2			36.8			56.9			42.8			30.0			54.0	

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April 21 – 1881

(R)	π Leo. 9 53 57 +8 37	(R)	20 Cephei 22 1 22 +117 48	(R)	α Leo. 10 2 4 +12 33	(R)	24 Cephei 22 7 29 +108 14	(R)	ζ Leo 10 9 57 +24 1	(R)	χ' Leo. 10 13 18 +20 27	(R)
54c	2.5	1		2	—			10	10.2	13	31.0	
	4.5				—				12.4		33.1	
	6.4				—				14.8		35.3	
	8.9				—				16.9		37.6	
	10.9				—				19.2		39.8	
	15.0	1	28.9		21.7	4	24.9		23.7		44.2	
	17.1		33.3		23.4		31.4		26.0		46.4	
	19.2		37.8		25.9		37.7		28.2		48.7	
	21.3		42.1		28.0		44.8		30.5		51.0	
	23.4		46.4		30.1		51.2		32.8		53.0	
	25.6		51.0		32.2		57.9		35.0		55.2	
	27.7		55.0		34.3		4.3		37.2		57.4	
	29.7		59.4		36.4		10.8		39.5		59.7	
	31.7		4.3		38.7		17.0		41.8		1.8	
	35.9				43.0				46.4		6.0	
	38.0				45.0				48.6		8.4	
	40.0				47.0				50.8		10.6	
	42.1				49.0				53.2		12.9	
	44.3				51.3				55.4		15.0	

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(R) μ Ursæ Majoris	(R) 31 Leonis	(R) 36 Ursæ Majoris	(R) 94 Draconis	(R) 37 Ursæ Majoris	(R) 31 Cephei
10 15 7	10 21 2	10 23 30	10 25 1	10 27 33	22 32 48
+42 6	+37 19	+56 35	+76 19	+57 42	+106 68
15 15.7	21 3.2	22 53.4			
18.4	5.9	57.5			
21.3	8.3	1.0			
24.0	11.0	4.8			
26.8	13.6	8.2			
32.3	18.8	16.0	24 57.4	27 44.8	32 55.4
35.2	21.4	19.7	6.7	48.5	2.3
38.0	24.0	23.6	15.8	52.4	9.5
40.7	26.6	27.0	24.3	56.3	16.4
43.5	29.0	31.0	32.8	0.4	23.4
46.4	31.8	34.6	41.8	4.0	30.7
49.1	34.3	38.4	50.4	7.9	37.6
51.9	37.0	42.1	59.5	11.8	
54.7	39.6	45.8	4.9	15.7	
0.3	44.7	53.5			
3.0	47.3	57.1			
5.8	50.0	1.0			
8.5	52.5	4.6			
11.4	55.0	8.6			

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April 21 – 1881

(R)	42 Leo. 10 39 17 +31 18	(R)	ℓ Leo. 10 43 2 +11 10	(R)	46 Leo. 10 46 41 +34 51	(R)	Ba. 1508 10 50 28 +78 24	(R)	β Ursæ Maj. 10 54 32 +57 2	(R)	α Ursæ Maj. 10 56 25 +62 23
	39 19.5		43 7.4		46 43.2		49 18.7		57 32.6		56 9.4
	22.0		9.7		45.7		28.8		36.0		13.9
	24.5		11.5		48.2		38.8		39.1		18.6
	26.8		13.5		50.7		49.9		43.6		23.1
	29.2		15.8		53.2		0.1		47.5		27.6
	34.0		20.1		58.2		20.5		54.9		36.6
	36.5		22.1		0.8		31.2		58.7		41.0
	39.0		24.1		3.3		41.0		2.5		45.4
	41.3		26.2		5.9		51.6		6.3		49.6
	43.8		28.4		8.3		2.0		10.2		54.2
	46.1		30.5		10.8		12.2		14.0		58.7
	48.7		32.6		13.4		22.5		17.6		3.0
	51.0		34.7		16.0		33.3		21.5		7.7
	53.5		36.7		18.5		42.9		25.3		12.1
	58.1		40.9		23.4		4.0		33.0		20.8
	0.6		43.0		26.0		14.4		36.7		25.4
	3.0		45.3		28.4		24.4		40.4		29.7
	5.5		47.4		31.0		34.2		44.0		34.4
	1.9		49.6		33.5		44.7		48.3		38.8

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(R) χ Leo. 10 38 24 +7 59	(R) φ Ms. Maj 11 3 0 +45 8	(R) σ Leo. 11 7 40 +21 11	(B) λ Draco 11 24 25 +69 59	(B) υ Leo. 11 30 53 −0 10	(B) χ Ms. Maj. 11 39 50 +48 26
59 0.1	2 58.7	7 53.1	23 52.8	30 58.7	39 44.6
2.0	1.3	55.5	57.0	0.9	47.9
4.2	4.5	57.5	5.4	3.0	51.0
6.3	7.5	59.8	11.0	4.9	54.0
8.4	10.2	2.0	17.0	7.1	57.3
12.7	16.3	6.5	29.3	11.2	3.4
14.8	19.2	8.6	35.0	13.3	6.5
16.8	22.1	10.8	41.1	15.4	9.9
19.0	25.0	13.0	47.0	17.4	13.0
21.0	28.0	15.2	53.3	19.4	16.0
23.0	31.0	17.4	59.3	21.4	19.0
25.0	33.9	19.6	5.5	23.5	22.2
27.1	36.9	21.9	11.2	25.5	25.4
29.2	39.7	24.1	17.3	27.7	28.2
33.5	45.5	28.5	29.4	31.8	34.6
35.4	48.5	30.8	35.5	34.0	38.0
37.6	51.2	33.0	41.8	36.0	40.8
39.7	54.3	35.3	47.5	38.0	44.0
41.8	57.2	37.5	53.8	40.0	47.0

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(B)	β Leo 11 42 53 +15 15	(B)	γ Ursæ Maj. 11 47 35 +54 21	(B)	Lu. 1852 11 59 12 +17 34	(B)	ε Corvi 12 3 54 −21 56	(B)	2 Com. Ven. 12 10 10 +41 19	(B)	γ Virginis 12 13 50 −0 1
	43 6.6		47 29.2		[illegible]		4 5.8		10 11.9		13 56.6
	8.6		32.4		12.6		8.0		14.5		58.4
	10.9		36.3		24.9		10.3		17.2		0.8
	12.9		39.9		38.2		12.5		19.9		2.8
	15.0		43.4		49.7		14.7		22.8		4.9
	19.3		50.4		59 10.4		19.0		28.2		9.0
	21.5		54.0		19.6		21.4		31.0		11.0
	23.6		57.4		29.9		23.6		33.7		13.2
	25.7		1.3		39.2		25.9		36.5		15.3
	27.9		4.8		48.7		28.0		39.3		17.2
	30.0		8.2		57.8		30.3		42.1		19.3
	32.0		11.7		8.0		32.6		44.8		21.5
	34.2		15.0		18.0		34.9		47.5		23.4
	36.5		18.9		27.5		36.9		50.2		25.6
	40.7		25.8				41.5		55.9		29.6
	42.9		29.7				43.9		58.5		31.9
	45.0		33.0				45.9		1.2		33.9
	47.1		36.4				48.0		4.0		35.9
	49.2		40.0				50.4		6.8		38.0

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(B)	6 Camelop. 12 20 0 +39 40	(B)	δ Corvi 12 28 37 −15 50	(B)	β Corvi 12 28 2 −22 44	(B)	γ Virginis 12 35 32 −0 47	(B)	γ Cassiop. 0 49 28 +119 56	(B)	ε Virginis 12 56 9 +11 37
	20 1.7		23 48.9		28 13.7		35 45.5		49 12.3		56 22.6
	4.4		51.1		15,8		47.4		17.5		24.6
	7.2		53.2		18.2		49.6		21.7		26.8
	9.8		55.4		20.5		51.6		25.8		28.9
	12.5		57.6		22.4		53.6		29.7		31.0
	17.8		1.8		27.0		58.0		38.3		35.3
	20.5		3.9		29.3		0.0		42.6		37.4
	23.3		6.3		31.7		1.9		46.4		39.5
	26.0		8.4		33.8		4.0		50.7		41.8
	28.6		10.5		36.2		6.1		55.0		43.7
	31.4		12.5		38.4		8.1		59.0		45.7
	34.0		14.9		40.6		10.3		3.2		47.9
	36.6		16.9		42.9		12.4		7.4		50.0
	39.3		19.0		45.1		14.4		11.6		52.2
	44.7		23.4		49.5		18.7		19.5		56.4
	47.4		25.5		51.9		20.5		23.8		58.6
	50.0		27.6		54.0		22.6		27.8		0.6
	52.7		29.7		56.3		24.8		31.9		2.6
	55.6		32.0		58.6		26.7		36.2		4.7

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(R)	α Cephei 21 15 41 +117 56	(R)	9 H Draco 9 20 10 −81 57	(R)	α Hydrae 9 21 46 −8 9	(R)	β Cephei 21 27 5 +109 57	(R)	Gr. 1864 9 32 7 +69 46	(R)	O Leo. 9 34 50 +10 26
	15 20.1						26 24.2				34 51.3
	24.0						30.0				53.5
	28.4						36.2				55.6
	32.9						42.0				57.8
	37.1						48.3				59.8
	46.2						0.4		32 8.0		4.0
	50.4						6.5		14.2		6.2
	54.6						12.7		20.1		8.2
	59.0						18.2		26.1		10.3
	3.8						24.5		32.0		12.3
	8.0						30.0		37.8		14.4
	12.5						36.4		44.0		16.6
	16.9						42.4		50.0		18.7
	21.3						49.1		56.0		20.9
	30.2						0.7				25.0
	34.5						6.8				27.0
	39.2						13.0				29.2
	43.4						19.0				31.3
	47.8						24.9				33.5

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(R)	b UMa Maj 9 42 24 +59 36	(R)	Gr. 1586 9 47 48 +73 26	(R)	79 Draco 21 51 20 +106 51	(R)	π Leo. 9 53 57 +8 87	(R)	20 Cephei 22 1 22 +117 48	(R)	α Leo. 10 2 4 +12 33
	42 17.8		47 1.7		50 27.8		53 59.0				—
	22.0		9.0		34.7		1.0				—
	26.0		16.6		41.6		3.2				—
	30.4		23.9		49.2		5.3				—
	34.0		31.2		56.0		7.4				—
	42.4		45.9		10 4		11.5		1 25.0		2 18.3
	46.6		53.1		17.5		13.6		29.4		20.4
	50.6		0.1		24.4		15.7		33.7		22.6
	54.8		7.4		31.5		17.8		38.2		24.6
	58.6		14.5		38.4		20.0		42.4		26.7
	3.0		21.8		46.0		22.0		46.7		28.9
	7.0		28.9		53.0		240		50.7		30.9
	10.9		36.1		0.2		26.0		55.3		33.0
	15.0		43.7		7.2		28.2		59.8		35.1
	23.1		58.1		22.0		32.4				39.4
	27.3		5.0		28.5		34.5				41.5
	31.3		12.4		35.5		36.6				43.5
	35.7		19.6		42.5		38.8				45.8
	39.8		26.9		49.5		40.9				47.7

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(R)	24 Cephei	(R)	3 Leo.	(R)	ν Leo.	(R)	μ Ursæ Maj.	(R)	31 Leo	(R)	36 Ursæ Maj.
	22 7 29		10 9 57		10 13 18		10 15 7		10 21 2		10 23 3
	+108 14		+24 1		+20 27		+42 6		+37 19		+56 35
	6 41.3		10 6.6		13 27.4		15 12.2		20 59.7		22 50.0
	47.9		8.8		29.8		14.9		2.0		53.9
	54.2		11.1		32.0		17.8		4.9		57.6
	0.4		13.4		34.2		20.8		7.4		1.3
	7.7		15.5		36.4		23.4		10.0		5.0
	20.6		20.2		40.8		29.0		15.4		12.4
	26.8		22.4		43.0		31.8		—		16.1
	34.0		24.5		45.0		34.5		20.4		20.0
	40.6		27.0		47.2		37.4		23.0		23.7
	47.2		29.4		49.5		40.2		—		27.5
	53.8		31.4		51.8		42.9		28.0		31.5
	0.2		34.0		54.0		45.7		31.0		35.0
	7.0		36.0		56.0		48.5		33.5		38.8
	13.6		38.2		58.3		51.4		36.0		42.7
	26.8		42.8		2.8		56.8		41.0		50.0
	33.0		45.0		4.9		59.7		—		52.9
	39.8		47.3		7.2		2.4		46.3		57.7
	46.0		49.7		9.4		5.3		49.0		1.4
	52.7		51.9		11.6		8.0		51.8		5.0

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(R)	η H Draco	(R)	37 Mrs. Maj	(R)	31 Cephei	(R)	42 Leo	(R)	l Leo.	(R)	i Cephei
	10 25 1		10 27 33		22 32 48		10 39 17		10 48 2		22 45 26
	+76 19		+57 42		+106 58		+31 18		+11 10		+114 25
			27 18.2		31 54.7		39 16.0		43 3.9		
			22.4		1.5		18.5		5.9		
			26.0		8.5		20.9		7.9		
			30.0		15.7		23.5		10.0		
			33.9		22.3		25.8		12.0		
	24 55.4		41.5		36.8		30.5		16.3		45 24.6
	4.3		45.4		43.8		33.0		18.4		29.5
	12.9		48.9		50.8		35.4		20.6		34.8
	21.8		52.9		58.1		37.6		22.6		39.7
	30.5		56.9		5.0		40.1		24.8		44.6
	38.8		0.8		12.0		42.5		26.9		49.9
	47.7		4.7		19.0		45.0		29.0		54.4
	56.3		8.4		26.4		47.4		31.0		59.6
	4.8		12.2		33.4		49.9		33.3		4.8
			20.0		47.8		54.7		37.5		
			23.9		54.2		57.2		39.5		
			27.4		1.4		59.6		41.7		
			31.8		8.4		2.0		43.8		
			35.5		15.4		4.4		45.9		

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(R) 46 Leo. 10 46 41 +34 51	(R) B1.1508 10 50 28 +78 24	(R) β Ursa Maj. 10 54 32 +57 2	(R) α Ursa Maj 10 56 25 +62 23	(R) χ Leo. 10 58 24 +7 59	(R) φ Ursa Maj. 11 2 0 +45 8
46 39.7	49 16.0	54 28.6	56 5.9	58 56.5	2 55.1
42.3	26.7	32.6	10.41	58.5	58.0
44.4	36.7	36.0	15.7	0.4	1.0
47.2	47.5	40.0	19.5	2.9	3.9
49.8	57.3	43.9	24.0	4.7	6.8
54.9	18.0	51.5	33.0	9.0	12.6
57.4	28.0	55.3	37.5	11.0	15.8
59.9	38.5	59.3	41.8	13.3	18.7
2.4	48.8	3.0	46.5	15.4	21.7
5.0	59.4	6.8	51.0	17.3	24.5
7.5	9.7	10.6	55.5	19.4	27.3
9.8	19.7	14.4	59.8	21.6	30.2
12.6	29.9	18.1	4.1	23.6	33.1
15.0	40.0	22.0	8.6	25.7	36.0
20.0	1.0	29.3	17.7	29.9	41.9
22.7	11.4	33.3	22.0	32.0	44.8
25.0	21.4	37.0	26.4	34.0	47.9
27.6	31.0	40.5	31.0	36.0	50.7
30.0	42.0	44.5	35.4	38.2	53.8

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(B) δ Leo.	(B) π Cephei	(B) δ Crateris	(B) 4 Cassiop	(B) λ Draco	(B) ν Leo.
11 7 40	23 4 5	11 13 20	23 19 85	11 24 25	11 30 53
+21 11	+105 15	−14 6	+118 22	−68 89	−0 10
7 49.5		13 26.2	19 8.3	23 49.4	30 55.4
51.9		28.7	12.7	55.3	57.4
54.0		30.8	17.0	2.1	59.4
56.7		32.9	21.3	7.9	1.5
58.4		34.9	25.7	13.8	3.6
2.9		39.2	34.6	25.8	7.7
5.2		41.4	38.9	32.1	9.7
7.3		43.4	43.1	38.4	12.0
9.5		45.7	47.5	44.0	13.9
11.8		47.8	52.0	50.0	16.0
14.0		49.9	56.4	56.0	18.1
16.2		51.9	0.8	2.2	20.0
18.4		54.0	4.8	8.5	22.1
20.7		56.0	9.2	14.4	24.1
24.9		0.6	17.9	26.4	28.4
27.2		2.6	22.4	32.7	30.4
29.6		4.8	27.0	38.4	32.4
31.8		6.9	31.1	44.5	34.5
34.0		9.2	35.3	50.8	36.6

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(B)	χ Cephei 23 34 30 +103 02	(B)	χ Ursæ Maj 11 39 56 +48 26	(B)	β Leo. 11 42 53 +15 15	(B)	χ Ursæ Maj 11 47 35 +54 21	(B)	Gr. 1852 11 59 12 +77 84	(B)	ε Corvi 12 3 54 −21 52
	33 9.2		39 41.4		43 3.0		47 25.8				4 2.5
	18.7		44.4		5.1		29.1				4.5
	27.0		47.4		7.2		32.8				6.9
	34.0		50.8		9.3		36.4				9.0
	45.9		53.9		11.7		39.9				11.2
	4.2		0.1		15.9		47.0		59 7.8		15.6
	13.2		3.1		18.0		50.6		17.2		18.0
	22.7		6.2		20.0		54.3		26.7		20.1
	31.6		9.1		22.2		57.8		36.7		22.4
	40.7		12.5		24.9		1.3		46.0		24.5
	50.1		15.6		26.5		4.9		53.5		26.9
	59.1		18.8		28.7		8.2		4.9		29.0
	8.6		21.9		30.8		11.9		14.6		31.4
	17.2		24.9		33.0		15.4		24.3		33.7
	25.5		31.3		37.2		22.5				38.0
	44.8		34.2		39.3		26.1				40.1
	54.0		37.4		41.4		29.5				42.3
	2.9		40.5		43.6		33.2				44.6
	12.6		43.8		46.0		36.8				47.0

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(B)	44 Draco 12 6 40 +78 16	(B)	2 Cam. Ven. 12 10 10 +41 19	(B)	η Virginis 12 18 30 −0 1	(B)	6 Cam. Ven. 12 20 0 +39 40	(B)	S Corvi 12 23 37 −15 50	(B)	B Corvi 12 28 2 −22 44
			10 8.3		13 53.2		19 58.4		23 45.4		28 10.0
			11.1		55.3		1.0		47.5		12.4
			13.8		57.2		3.8		49.7		14.5
			16.5		59.4		6.3		51.8		16.9
			19.3		1.3		9.0		54.0		19.0
	6 30.8		24.6		5.4		14.3		58.2		23.5
	41.4		27.6		7.5		17.1		0.5		25.9
	51.7		30.5		9.6		19.9		2.6		28.0
	2.0		33.0		11.7		22.3		4.8		30.2
	12.0		35.8		13.4		25.2		6.8		32.6
	22.4		38.6		15.8		27.9		8.9		34.7
	32.0		41.3		17.9		30.5		11.0		37.0
	42.2		44.1		19.9		33.2		13.3		39.3
	52.7		46.8		21.9		36.0		15.4		41.5
			52.4		26.2		41.0		19.7		46.0
			55.1		28.1		44.0		21.9		48.1
			58.0		30.2		46.5		24.0		50.6
			0.6		32.4		49.3		26.1		53.0
			3.5		34.4		51.9		28.3		55.0

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(B)	χ Virginis	(B)	χ Corvi	(B)	ε Virginis
	12 35 32		0 49 25		12 56 9
	−0 47		+119 56		+11 37
	35 42.0	49	9.4	56	19.2
	44.0		13.3		21.2
	46.1		17.4		23.4
	48.1		21.5		25.4
	50.3		25.8		27.5
	54.5		34.2		31.9
	56.3		38.4		33.9
	58.4		42.7		36.0
	0.6		46.7		38.2
	2.7		50.9		40.4
	4.6		54.9		42.2
	6.6		59.2		44.5
	8.8		3.3		46.5
	10.9		7.4		48.6
	15.0		15.3		52.8
	17.0		19.7		55.0
	19.0		23.6		57.0
	21.1		28.1		59.1
	23.2		32.0		1.2

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(B)	O Leon. 9 34 50 +10 26	(R)	11 Cephei 21 40 8 +109 14	(R)	b Urs. Maj. 9 42 34 +59 36	(R)	Gr. 1586 9 47 48 +73 26	(R)	79 Draco 21 51 20 +106 51	(R)	20 Cephei 22 1 22 +117 48
	34 47.6		39 20.3		42 14.0		46 58.3		50 23.2		
	49.8		27.0		18.0		5.7		30.5		
	52.0		33.0		22.4		13.4		37.4		
	54.0		39.7		26.4		20.2		44.9		
	56.0		45.4		30.6		27.5		51.8		
	0.3		58.0		38.7		42.0		6.0	1	20.7
	2.5		4.5		43.0		49.0		13.1		24.8
	4.5		10.5		47.0		56.6		20.6		29.5
	6.6		17.0		51.1		3.8		27.3		33.8
	8.6		23.4		55.4		11.3		34.6		38.2
	10.8		29.5		59.2		18.8		41.9		42.4
	12.8		36.0		3.3		25.5		48.3		47.1
	15.0		42.0		7.5		33.0		56.0		51.6
	17.0		48.6		11.7		40.2		3.2		56.0
	21.0		1.1		19.7		54.8		17.4		
	23.3		7.4		23.7		1.7		24.2		
	25.5		13.4		27.9		9.6		31.2		
	27.6		19.4		32.0		16.4		38.5		
	29.7		26.0		36.0		23.8		46.0		

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(R)	α Leo. 10 2 4 +12 33	(R)	24 Coeli 22 7 29 +108 14	(R)	ζ Leo. 10 9 57 +24 1	(R)	χ' Leo 10 13 18 +20 27	(R)	μ Ursæ Maj 10 15 7 +42 6	(R)	31 Leo. 10 21 2 +37 19
	—		6 37.3		10 3.0		13 23.9		15 8.7		20 56.0
	—		43.9		5.2		26.1		11.5		58.6
	—		50.6		7.4		28.3		14.2		1.2
	—		56.9		9.7		30.5		17.0		3.9
	—		3.4		12.0		32.6		19.8		6.4
	2 14.5		16.6		16.6		37.0		25.4		11.8
	16.5		23.1		18.8		39.3		28.0		14.3
	18.8		29.4		21.0		41.5		31.0		16.8
	20.9		36.9		23.2		43.7		33.4		19.6
	23.0		42.9		25.5		45.9		36.5		22.2
	25.0		49.4		27.8		48.1		39.3		24.8
	27.1		55.9		30.0		50.2		42.3		27.4
	29.3		2.4		32.3		52.5		45.0		30.0
	31.3		9.5		34.7		54.8		47.9		32.5
	35.6		22.4		39.0		59.1		53.4		37.8
	37.7		29.1		41.4		1.3		56.0		40.4
	39.8		35.9		43.6		3.5		58.9		42.9
	41.9		42.0		45.9		5.7		1.6		45.5
	44.0		49.2		48.1		7.9		4.5		48.0

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(R)	36 Ursæ Maj. 10 23 3 +56 86	(R)	9 H Draco 10 25 1 +76 19	(R)	37 Ursæ Maj. 10 27 33 +57 42	(R)	31 Cephei 22 32 48 +106 58	(R)	42 Leo. 10 39 17 +31 18	(R)	l Leo. 10 43 2 +11 10
	22 46.6				27 15.0		31 50.0		39 12.3		43 0.1
	50.3				18.5		57.0		14.7		2.2
	54.2				22.5		4.0		17.1		4.3
	58.0				26.0		10.9		19.6		6.4
	1.6				30.0		18.4		22.0		8.4
	9.0		24 51.9		38.0		32.7		26.9		12.8
	12.8		1.2		41.7		39.5		29.3		14.8
	16.6		9.9		45.7		46.4		31.7		16.8
	20.5		18.8		49.7		53.8		34.0		19.0
	24.2		26.9		53.5		0.7		36.5		21.0
	28.0		35.7		57.4		8.0		38.9		23.3
	31.6		45.0		1.0		14.7		41.3		25.4
	35.4		53.7		5.0		22.0		43.8		27.6
	39.2		2.4		9.0		28.9		46.0		29.5
	46.6				16.7		43.1		51.0		33.9
	50.3				20.7		50.0		53.5		35.9
	54.0				24.3		57.3		56.0		38.0
	58.0				28.0		4.6		58.4		40.0
	1.9				32.0		12.0		0.9		42.0

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(R)	ι Cephei 22 45 26 +114 25	(R)	46 Leon. 10 46 41 +34 51	(R)	B.A. 1508. 10 50 28 +78 24	(R)	β Ursæ Maj. 10 54 32 +57 2	(R)	α Ursæ Maj. 10 56 25 +62 23	(R)	δ Leon. 11 7 40 +21 11
			46 36.0		49 —		54 25.2		56 2.5		7 46.0
			38.7		23.0		29.0		7.7		48.1
			41.2		34.0		33.0		11.4		50.5
			43.4		43.7		36.7		16.6		52.6
			46.1		54.2		40.5		21.0		54.9
	215 20.9		57.2		15.2		48.2		29.8		59.4
	25.9		53.8		24.8		51.9		34.5		1.5
	31.0		56.3		35.6		55.8		38.8		3.7
	35.6		58.8		45.7		59.4		43.1		6.0
	40.1		1.4		56.0		3.5		47.6		8.3
	45.4		3.9		6.2		7.3		52.1		10.6
	50.8		6.3		16.0		10.7		56.5		12.7
	55.7		8.8		26.7		14.6		0.9		15.0
	0.4		11.4		36.9		18.5		5.3		17.1
			16.4		57.8		26.0		14.3		21.4
			19.0		7.8		30.0		18.6		23.6
			21.5		18.4		33.7		23.0		25.9
			24.0		28.0		37.5		27.5		28.0
			26.5		38.7		41.3		32.2		30.3

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(R) 11 Aeschei

(R) 11 Aeschei 21 40 8 +109 14			(R) b UrsMaj 9 42 34 +59 36			R 40 1586 9 47 48 +73 26			(R) π Leo 9 53 57 +8 37			(R) L Leo 10 2 4 +12 33			(R) 24 Aeschei 22 7 29 +103 14		
h	m	s	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s
21	39	14.64	9	42	7.3	9	46	50.5	9	53	48.8	10	1	55.0	22		—
		21.02			11.4			58.6			50.8			57.2			—
		27.13			15.5			5.6			53.0			59.3			—
		33.46			19.7			13.3			54.9			1.5			—
		39.60			23.8			20.5			57.0			3.6			—
		52.28			31.9			34.8			1.2			7.8	7	10.8	
		58.40			35.9			41.9			3.4			9.9		17.5	
		4.67			39.9			49.4			6.4			11.9		24.0	
		10.70			44.1			56.6			7.4			14.1		30.6	
		17.02			48.1			3.9			9.5			16.3		37.1	
		23.30			52.1			11.0			11.7			18.3		44.0	
		29.50			56.4			18.4			13.7			20.4		50.3	
		35.85			0.5			25.4			15.9			22.5		57.0	
		42.37			4.4			32.9			17.9			24.7		3.4	
		54.88			12.7			47.4			22.0			28.9		—	
		1.26			16.8			54.7			24.2			31.0		—	
		7.20			20.8			1.9			26.2			33.2		—	
		13.50			24.8			9.2			28.4			35.3		—	
		20.00			29.0			16.2			30.4			37.4		—	

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(R)	ζ Leo 10 9 57 +24 1			(R)	γ Leo 10 13 18 +20 27			(R)	μ Ursæ Maj 10 15 76 +42 6			(R)	31 Leo 10 21 2 +37 19			(R)	36 Ursæ Maj 10 23 3 +56 35			(R)	9 H Draco 10 25 1 +76 19		
h	m	s		h	m	s		h	m	s		h	m	s		h	m	s		h	m	s	
10	9	56.3		10	13	17.1		10	15	2.0		10	20	49.3		10	22	39.8		10	24	—	
		58.5				19.4				4.7				51.8				43.5				—	
		0.8				21.4				7.7				54.5				47.3				—	
		3.0				23.8				10.3				57.0				51.0				—	
		5.3				26.0				13.2				59.7				54.8				—	
		9.9				30.4				18.6				4.9				2.2				44.8	
		12.0				32.6				21.4				7.4				6.0				53.4	
		14.4				34.8				24.3				10.0				9.7				2.4	
		16.6				37.0				27.0				12.6				13.5				11.0	
		18.9				39.2				29.7				15.1				17.2				20.0	
		21.1				41.5				82.5				17.8				21.0				28.6	
		23.4				43.6				35.3				20.4				24.8				37.0	
		25.6				45.8				38.1				23.0				28.5				45.9	
		27.8				48.0				41.0				25.6				32.1				54.7	
		32.3				52.4				46.5				30.8				39.8				—	
		34.7				54.7				49.2				33.4				43.6				—	
		37.0				56.9				52.0				36.0				47.2				—	
		39.2				59.0				54.7				38.6				51.0				—	
		41.4				1.3				57.6				41.3				54.8				—	

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37 Ursa (R)	37 Ursa Maj	(R)	31 Cephei	(R)	42 Leo	(R)	l Leo	(R)	L Cephei	(R)	46 Leo
	10 27 38		22 32 48		10 39 17		10 43 2		22 45 26		10 46 41
	+57 42		+106 58		+31 18		+11 10		+114 25		+34 51
h	m s	h	m s	h	m s	h	m s	h	m s	h	m s
10	27 7.7	22	31 44.4	10	39 5.6	10	42 58.4	22	—	10	46 29.4
	11.6		51.4		8.1		55.4		—		31.9
	15.6		58.5		10.5		57.6		—		34.4
	19.4		5.7		12.8		59.7		—		36.9
	23.2		12.7		15.4		1.8		—		39.4
	30.9		26.7		20.1		5.9	45	14.3		44.4
	34.6		33.6		22.5		8.0		19.3		47.0
	38.7		40.8		25.0		10.1		24.3		49.4
	42.6		48.2		27.4		12.2		29.7		52.0
	46.5		54.6		29.8		14.4		34.2		54.5
	50.3		2.0		32.2		16.5		39.5		57.0
	54.0		9.1		34.7		18.6		44.4		59.5
	57.9		15.9		37.0		20.7		49.3		2.0
	1.8		23.2		39.3		22.8		54.4		4.6
	1.8										
	4.6		37.7		44.3		27.2		—		9.6
	13.4		44.0		46.6		29.2		—		12.1
	17.3		51.7		49.0		31.3		—		14.3
	21.2		58.4		51.6		33.4		—		17.2
	24.9		5.7		54.0		35.4		—		19.8

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(R)	Br 1508 10 50 28 +78 24		(R)	B Ursa Maj 10 54 37 +57 2		(R)	α Ursa Maj 10 56 25 +62 23		(R)	ψ Ursa Maj 11 3 0 +45 8		(R)	S Leo 11 7 40 +21 11		(B)	λ Draco 11 24 25 +69 59	
h.	m	s	h.	m	s	h.	m	s	h.	m	s	h.	m	s	h.	m	s
10	49	6.0	10	54	18.4	10	55	55.8	11	2	44.4	11	7	39.3	11	23	39.2
		16.0			22.1			0.3			47.7			41.4			45.4
		26.3			26.0			5.0			50.7			43.7			51.6
		36.5			29.8			9.5			53.6			46.0			57.6
		46.9			33.5			18.7			56.6			48.1			3.5
		7.8			41.2			22.8			2.4			52.5			15.5
		18.3			45.0			27.1			5.3			54.8			21.5
		28.3			48.8			31.5			8.3			57.0			27.6
		38.5			52.6			36.0			11.2			59.3			33.8
		49.2			56.5			40.4			14.0			1.5			39.7
		59.0			0.1			44.9			17.0			3.6			45.8
		9.5			4.0			49.2			20.0			5.8			51.8
		19.7			7.7			53.7			22.9			8.0			57.7
		30.3			11.6			58.3			25.9			10.2			3.7
		50.1			19.1			7.2			31.7			14.6			15.8
		0.3			23.0			11.6			34.6			16.8			21.9
		10.7			26.7			16.1			37.5			19.0			27.7
		21.3			30.5			20.5			40.5			21.2			34.0
		31.6			34.3			24.8			43.4			23.5			39.9

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May 3 – 1881

(B) π Leo 9 53 57 +8 87		(B) 24 Cephei 22 7 29 +108 14		(R) γ' Leo 10 13 18 +20 27		(R) u Ursæ Maj 10 15 7 +42 6		(R) 31 Leo 10 21 2 +37 19		(R) 36 Ursæ Maj 10 23 3 +56 35	
h	m s	h	m s	h	m s	h	m s	h	m s	h	m s
9	53 36.1	22	6 20.4	10	13 4.7	10	14 49.4	10	20 36.8	10	22 26.8
	38.2		26.2		6.8		52.0		39.5		30.7
	40.4		33.2		9.0		54.9		42.0		34.5
	42.6		40.2		11.2		57.6		44.6		38.0
	44.6		46.5		13.4		0.6		47.2		42.1
	42.6		59.8		17.7		6.0		52.4		49.6
	51.0		6.3		20.1		8.6		55.2		53.3
	52.7		12.7		22.3		11.7		57.7		57.0
	55.0		19.8		24.5		14.4		0.3		0.9
	57.0		25.7		26.7		17.2		2.8		4.5
	57.1		32.6		28.9		20.0		5.3		8.2
	1.1		39.5		31.2		22.9		8.0		12.0
	3.3		45.6		33.3		25.4		10.5		15.7
	5.4		52.6		35.5		28.2		13.1		19.5
	9.7		5.7		39.9		33.9		18.3		27.0
	11.8		12.4		42.0		36.9		20.8		30.6
	13.8		18.8		44.3		39.4		23.4		34.6
	15.9		25.3		46.4		42.2		26.0		38.0
	18.0		31.8		48.7		45.0		28.7		42.1

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(R)	9 H Draco 10 25 1 +76 19		(R)	37 Ursæ Maj 10 27 33 +57 42		(R)	31 Cephei 22 32 48 +106 58		(R)	42 Leo 10 39 17 +31. 18		(R)	ℓ Leo 10 48 2 +11 10		(R)	ι Cephei 22 45 26 +114 25	
h	m	s	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s
10	24	—	10	26	55.0	22	31	33.2	10	38	53.2	10	42	41.0	22	44	33.5
		—			58.8			40.2			55.5			43.1			38.2
		—			2.7			47.3			58.0			45.2			42.3
		—			6.5			54.2			0.4			47.3			48.5
		—			10.4			1.3			2.9			49.4			53.5
		30.9			18.0			15.7			7.5			53.7			3.3
		40.0			22.0			22.5			10.2			55.7			8.0
		48.9			26.1			30.1			12.6			57.9			13.1
		57.3			30.0			36.5			15.0			59.9			18.3
		6.2			33.9			43.5			17.4			2.0			23.0
		14.8			37.7			51.3			19.8			4.2			28.0
		23.7			41.3			57.7			22.2			6.2			33.2
		32.2			45H			5.0			24.6			8.3			38.3
		40.9			49.2			12.4			27.2			10.5			43.1
		—			56.9			26.6			31.8			14.7			52.1
		—			0.7			33.4			34.3			16.7			58.1
		—			4.5			40.2			36.8			18.9			3.3
		—			8.6			47.7			39.1			20.9			8.3
		—			12.4			54.7			41.6			23.1			13.4

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(R) 46 Leo			(2) Br 1508			(R) B Ursæ Maj			(R) ξ Ursæ Maj			(R) S Leo			(R) π Aphei		
10 46 41			10 50 28			10 54 82			10 58 25			11 7.140			23 4 5		
+34 51			+78 24			+57 2			+62 28			+21 11			+105 15		
h	m	s	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s
10	46	—	10	48	52.2	10	54	5.9	10	55	43.2	11	7	26.9	23	2	41.6
		—			2.6			9.5			47.4			29.0			49.2
		—			12.8			13.3			52.2			31.2			56.8
		—			22.6			17.2			56.8			33.5			4.9
		—			33.2			21.0			1.0			35.7			12.8
	3																
	31.8				53.7			28.5			9.9			40.1			28.0
	34.5				4.5			32.4			14.2			42.3			36.1
	37.0				14.6			36.0			18.6			44.5			44.4
	39.5				24.9			40.0			22.9			46.7			52.5
	42.0				35.6			43.8			27.7			49.0			59.7
	44.7				45.4			47.6			32.1			51.2			8.0
	46.9				55.5			51.3			36.5			53.4			15.4
	49.5				5.8			54.9			41.0			55.7			23.6
	52.2				16.0			58.9			45.6			58.0			32.0
		—			86.7			6.4			54.4			2.3			47.5
		—			47.2			10.3			58.8			4.7			55.2
		—			57.0			14.0			3.3			6.7			2.9
		—			7.3			17.7			7.6			9.0			10.6
		—			18.4			21.6			12.3			11.2			18.3

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(R)	S Crateris			(R)	Gr. 1771			(R)	4 Cassiop.			(R)	λ Draco			(B)	V. Cephei			(B)	X Ursæ Majoris		
	11h 13m 20s				11 14 30				23 19 35				11 24 25				23 24 30				11 39 80		
	−14° 6′				+6° 41′				+118 22				+69 39				+103 02				+48 26		
h.	m.	s.		h.	m.	s.		h.	m.	s.		h.	m.	s.		h.	m.	s.		h.	m.	s.	
10	48	3.5		11	14	41.1		23		—		11	23	26.0		23		—		11	39	18.5	
		5.7				43.1				—				82.7				—				21.6	
		8.0				45.3				—				38.2				—				24.9	
		10.1				47.4				—				44.6				—				27.8	
		12.2				49.5				—				50.5				—				31.0	
		16.4				53.5				—				2.8			83	43.5				37.1	
		18.4				55.6			19	17.3				9.0				52.1				40.2	
		20.6				57.8				21.4				14.7				1.4				43.6	
		22.8				59.9				26.1				20.8				9.6				48.6	
		24.9				1.9				30.1				27.0				19.9				48.8	
		27.0				3.9				34.2				32.7				28.9				52.8	
		29.2				6.0				39.1				38.9				37.3				56.0	
		31.4				8.0				43.1				45.5				47.5				59.2	
		33.5				10.2				47.8				51.2				56.3				2.1	
		37.6				14.2				—				2.6				—				8.5	
		39.9				16.4				—				9.0				—				11.4	
		42.0				18.6				—				15.4				—				14.5	
		44.0				20.5				—				21.6				—				17.9	
		46.3				22.6				—				27.3				—				20.9	

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(B)	β Lεο. 11 42 53 +15 15		(B)	χ Urs. Maj. 11 47 35 +54 21		(B)	Gr. 1852 11 59 12 +77 34		(B)	β Cassiop. 0 2 44 +121 31		(B)	η Virginis 12 13 50 −0 1		(B)	6 Com. Ber. 12 20 0 +39 40	
h	m	s	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s
11	42	40.0	11	47	2.8	11		—	10	2	7.7	12	13	30.5	12	19	35.6
		42.4			6.5			—			11.8			32.4			38.1
		44.4			10.1			—			15.6			34.5			41.0
		46.5			13.7			—			19.3			36.7			43.7
		48.6			17.3			—			23.7			38.7			46.4
		53.0			24.3	58		49.0			31.1			42.8			52.0
		55.3			27.6			53.4			35.4			44.8			54.7
		57.4			31.4			3.0			39.4			47.0			57.2
		59.6			34.9			12.9			43.3			49.1			59.9
		1.6			38.6			22.8			47.4			51.2			2.5
		3.8			42.0			32.3			51.0			53.2			5.2
		5.9			45.6			42.1			53.3			55.3			7.9
		8.1			49.0			51.4			59.1			57.4			10.5
		10.4			52.9			1.0			3.0			59.6			13.3
		14.4			59.8			—			10.6			3.3			18.8
		16.6			3.2			—			14.9			5.5			21.3
		18.9			6.6			—			18.7			7.6			24.0
		21.0			10.3			—			22.4			9.7			26.8
		23.3			13.8			—			26.4			11.7			29.4

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(B)	δ Corvi 12 23 37 −15 30		(B)	β Corvi 12 28 2 −22 44		(B)	χ Virginis 12 38 32 −0 47		(B)	χ Cass. 0 49 25 +119 36		(B)	ε Virginis 12 56 9 +11 37	
h	m	s	h	m	s	h	m	s	h	m	s	h	m	s
12	23	22.8	12	27	47.3	12	35	19.2	0	48	47.4	12	55	56.3
		24.9			49.7			21.4			51.2			58.5
		27.0			51.9			23.5			55.9			0.6
		29.0			54.1			25.5			0.1			2.9
		31.2			56.4			27.5			4.0			4.8
		35.4			0.8			31.6			12.3			9.0
		37.7			3.0			33.6			16.5			11.4
		39.8			5.4			35.7			20.4			13.5
		42.0			7.5			38.0			24.7			15.6
		44.1			9.8			40.0			29.0			17.6
		46.2			12.0			42.0			32.9			19.7
		48.6			14.2			44.0			37.0			21.7
		50.7			16.4			46.1			41.4			23.9
		52.8			18.8			48.3			45.5			26.0
		37.0			23.3			52.3			53.7			30.3
		59.3			25.5			54.3			58.0			32.4
		1.4			27.9			56.3			1.9			34.5
		3.5			30.0			58.5			6.5			36.6
		5.7			(32.7)			0.6			10.5			38.6

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(R)	O Leo. 9 34 50 +10 26		(R)	11 Cephei 21 40 8 +109 14		(R)	b Ursæ Maj 9 42 34 +59 36		(R)	Gr. 1586 9 47 48 +73 26		(R)	π Leo. 9 53 37 +8 34		(R)	20 Cephei 22 1 22 +117 48	
h	m	s	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s
9	34	27.1	21	39	0.5	9	41	53.7	9	46	37.6	9	53	34.8	22		—
		29.1			7.2			57.8			44.6			36.9			—
		31.2			13.4			1.8			51.9			39.0			—
		33.4			19.7			5.7			59.2			41.1			—
		35.5			25.9			9.8			6.3			43.1			—
		39.7			38.1			18.0			21.1			47.3	1	0.9	
		41.8			44.7			22.3			28.4			49.4		5.2	
		44.0			51.0			26.2			35.3			51.5		10.0	
		46.0			57.1			30.4			42.8			53.6		14.3	
		48.1			0.6			34.4			50.0			55.6		18.7	
		50.2			9.6			38.5			57.4			57.7		23.0	
		52.3			15.9			42.6			4.6			59.9		27.6	
		54.5			22.2			46.7			12.1			1.9		32.0	
		58.5			28.6			50.9			18.9			4.0		36.4	
		0.8			41.4			58.8			32.3			8.2		—	
		2.8			47.7			3.0			40.8			10.3		—	
		4.9			53.7			7.3			48.0			12.4		—	
		7.0			0.1			11.3			55.2			14.5		—	
		9.0			6.3			15.4			2.4			16.5		—	

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(R)	χ Lεο. 10 2 4 +12 33		(R)	24 Cephei 22 7 29 +108 14		(R)	ζ Lεο. 10 9 57 +24 1		(R)	ξ' Lεο. 10 13 18 +20 27		(R)	μ Ursæ Maj. 10 15 7 +42 6			31 Lεο. 10 21 2 +	
h	m	s	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s
10			22	6	—	10	9	42.4	10	13	3.4	10	14	48.2	10	20	35.7
					28.8			44.7			5.5			50.9			28.1
					30.8			47.0			7.7			53.8			40.8
					37.6			49.2			10.0			56.5			43.3
					43.9			51.4			12.1			59.3			46.0
					56.9			56.0			16.6			4.8			51.2
					3.7			58.3			18.7			7.7			53.6
					9.9			0.5			21.0			10.4			56.2
					16.9			2.8			23.1			13.2			59.0
					23.2			5.2			25.4			16.0			1.6
					30.1			7.3			27.6			18.9			4.1
					36.9			9.6			29.9			21.6			6.7
					43.0			12.0			32.0			24.3			9.4
					50.0			14.1			34.3			27.1			11.9
											3						
					3.1			18.7			38.6			32.7			17.0
					9.8			20.9			41.2			35.6			19.8
					16.5			23.2			43.0			38.3			22.2
					22.9			25.5			45.2			41.1			24.9
					29.4			27.7			47.4			43.9			27.4

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(R)	36 Ursæ Majoris			(R)	9 H Draconis			(R)	37 Ursæ Majoris			(R)	31 Cephei			(R)	42 Leonis			(R)	l Leonis		
	10 23 8				10 25 1				10 27 33				22 32 48				10 39 17				10 48 2		
	+56 85				+76 19				+57 42				+106 58				+31 18				+11 10		
h	m	s		h	m	s		h	m	s		h	m	s		h	m	s		h	m	s	
10	22	25.9		10	24	—		10	26	54.0		22	31	30.6		10		—		10	42	39.5	
		29.7				—				57.9				37.4				—				41.8	
		33.2				—				1.8				44.4				—				43.9	
		37.1				—				5.7				51.7				—				45.9	
		40.8				—				9.6				58.6				—				48.0	
		48.5				30.4				17.4				13.1			39	—				52.1	
		52.2				39.8				21.1				20.1				—				54.3	
		55.9				48.2				25.0				27.0				11.3				56.4	
		59.7				57.3				29.0				34.0				13.8				58.5	
		3.4				5.9				32.9				41.1				16.0				0.6	
		7.2				14.8				36.7				47.8				18.4				2.7	
		10.9				23.4				40.5				55.1				21.0				4.8	
		14.6				32.0				44.4				2.0				23.4				7.0	
		18.4				40.5				48.1				9.3				25.7				9.0	
		26.0				—				56.0				23.6				—				13.3	
		29.8				—				59.8				30.8				—				15.4	
		33.4				—				3.6				37.8				—				17.5	
		37.3				—				7.6				44.7				—				19.6	
		41.0				—				11.2				52.0				—				21.7	

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(R)	ι Cephei 22 45 26 +114 25		(R)	Br 1508 10 50 28 +78 24		(R)	β Ursæ Majoris 10 54 32 +57 2		(R)	α Ursæ Majoris 10 56 25 +62 23		(R)	χ Leonis 10 58 24 +7 59		(R)	ζ Ursæ Majoris 11 5 0 +45 8	
h	m	s	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s
22	44	30.7	10	48	52.1	10	54	4.8	10	55	42.4	10	58	32.3	11	2	31.2
		35.5			2.2			8.5			46.6			34.5			34.1
		40.7			12.6			12.4			51.2			36.6			37.0
		45.7			23.2			16.0			55.7			38.6			39.9
		50.7			33.1			19.8			0.0			40.8			42.8
		0.6			53.8			27.4			8.9			44.9			48.4
		5.7			4.1			31.2			13.2			47.0			51.6
		10.7			14.2			35.0			17.8			49.0			54.6
		15.9			24.6			38.8			22.3			51.0			57.5
		20.8			35.2			42.7			26.8			53.3			0.5
		25.8			45.3			46.2			31.3			55.4			3.3
		30.6			55.1			50.0			35.8			57.4			6.2
		35.6			6.0			54.0			40.4			59.4			9.2
		40.4			16.2			57.6			44.4			1.5			12.0
		50.7			36.4			5.4			53.7			5.7			18.0
		55.4			46.4			9.0			58.0			7.9			20.7
		0.7			56.7			12.8			—			9.9			23.8
		5.4			7.5			16.6			7.0			12.0			26.7
		10.5			17.6			20.6			11.0			14.0			29.6

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(R)	S 280		(R)	S Crateris		(R)	9 Ursæ Min		(R)	4 Cassiop		(R)	λ Draco		(B)	χ Ursæ Maj	
	11 7 40			11 13 20			11 14 50			23 19 35			11 24 25			11 47 35	
	+21 11			−14 6			+6 41			+118 32			+69 59			+54 21	
h	m	s	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s
11	7	25.5	11	13	2.2	11	14	39.8	23	18	44.7	11	23	25.4	11	47	1.6
		27.9			4.3			41.8			49.0			31.5			5.1
		30.0			6.4			43.8			53.6			37.8			8.7
		32.2			8.5			46.0			57.7			43.9			12.0
		34.3			10.7			48.0			2.0			49.5			15.6
		38.9			15.0			52.1			10.8			1.7			22.9
		41.0			17.2			54.2			15.1			7.9			26.5
		43.3			19.2			56.4			19.3			13.8			29.9
		45.5			21.4			58.5			23.6			19.7			33.5
		47.7			23.8			0.6			28.2			26.0			37.1
		50.0			25.7			2.6			32.3			32.0			40.7
		52.1			27.8			4.6			36.6			38.0			44.0
		54.3			30.0			6.7			41.2			44.1			47.8
		58.5			32.0			8.8			45.5			50.0			51.2
		0.8			36.3			13.0			54.2			2.0			58.4
		3.2			38.5			15.0			58.5			8.0			2.0
		5.4			40.5			17.0			2.8			14.4			5.4
		7.6			42.6			19.2			7.0			20.4			9.0
		9.8			44.8			21.3			11.4			26.2			12.6

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(B) β Cass 0 2 44 +121 31			(B) 2 Can Vnn 12 10 10 +41 19			(B) M Virginis 12 13 50 −0 1			(B) 6 Can Vnn 12 20 0 +39 40			(B) S Corvi 12 23 37 −15 50			(B) B Corvi 12 28 2 −22 44			γ C.
h	m	s	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s	
0	2	6.2	12	9	44.0	12	13	29.0	12	19	34.2	12	23	21.4	12	27	—	
		10.0			46.9			31.0			36.8			23.4			48.0	
		13.9			49.8			33.1			39.8			25.4			50.4	
		17.7			52.8			35.0			42.0			27.4			52.7	
		21.7			55.2			37.2			44.8			29.9			54.9	
		29.6			0.4			41.2			50.0			34.0			59.4	
		33.6			3.5			43.3			53.0			36.1			1.5	
		37.5			6.2			45.5			55.7			38.3			3.9	
		41.5			9.0			47.6			58.2			40.6			6.0	
		45.4			11.7			49.7			1.0			42.7			8.2	
		49.2			14.4			51.7			3.6			44.7			10.6	
		53.1			17.0			53.7			6.1			47.0			12.9	
		57.3			19.8			55.7			9.0			49.0			15.0	
		1.4			22.6			57.9			11.7			51.3			17.2	
		9.3			28.1			1.9			17.0			55.4			21.9	
		13.0			30.8			4.0			19.7			57.7			24.0	
		17.0			33.7			6.0			22.4			59.8			26.2	
		20.9			36.5			8.1			25.2			2.0			28.5	
		24.9			39.3			10.2			27.8			4.1			30.8	

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(B) γ Virginis 12 35 B2 −0 47			(B) γ Cass 0 49 25 +119 56			(B) b Ursæ Maj 9 42 34 +59 36			(R) 24 Cephei 22 7 29 +108 14			(R) ζ Leo 10 9 57 +24 1			(R) γ' Leo 10 13 18 +20 27		
h	m	s	h	m	s	h	m	s	h	m	s	h	m	s	h	m	s
12	35	17.6	0	48	45.5	9		—	22	6	—	10	9	41.1	10	13	2.1
		19.8			49.8			—			—			43.4			4.3
		21.9			54.0			—			—			45.8			6.5
		24.0			57.9			—			—			48.0			8.6
		26.0			2.0			—			—			50.3			10.9
		30.0			10.7		42	16.7			56.9			54.8			15.2
		32.2			14.8			20.8			0.4			57.0			17.4
		34.2			18.9			24.8			9.9			59.3			19.7
		36.3			23.0			29.0			16.7			1.5			21.9
		38.4			26.9			33.2			23.4			3.8			24.1
		40.4			31.0			37.2			29.8			6.0			26.3
		42.6			35.8			41.3			36.2			8.3			28.5
		44.7			39.4			45.4			42.9			10.6			30.7
		46.7			43.8			49.4			49.7			12.9			33.0
		50.7			52.0			—			2.9			17.4			37.4
		53.0			56.3			—			9.7			19.6			39.5
		55.0			0.3			—			15.6			21.9			41.7
		57.0			4.3			—			22.6			24.0			44.0
		59.0			8.4			—			29.2			26.3			46.2

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May 5 – 1881

(R)	U Ursæ Majoris 10 15 7 +42 6			(R)	31 Leonis 10 21 2 +37 19			(R)	36 Ursæ Majoris 10 23 3 +56 35			(R)	9 H Draconis 10 25 1 +76 19			(R)	37 Ursæ Majoris 10 27 33 +57 42			(R)	31 Capricorni 22 32 48 +106 58		
h	m	s		h	m	s		h	m	s		h	m	s		h	m	s		h	m	s	
10	14	46.8		10	20	84.3		10	22	24.5		10	24	—		10	26	52.6		22	82	—	
		49.5				86.8				28.3				—				56.5				—	
		52.4				89.4				32.0				—				0.3				—	
		55.2				42.0				35.7				—				4.0				—	
		58.0				44.6				37.4				—				8.1				—	
		3.5				49.9				47.0				28.8				15.9				12.7	
		6.3				52.4				50.8				31.5				19.7				19.3	
		9.0				55.0				54.5				46.4				23.5				26.8	
		11.9				57.7				58.2				54.9				27.5				34.0	
		14.8				0.3				2.0				3.6				31.3				41.0	
		17.4				2.8				5.8				12.5				35.1				47.8	
		20.2				5.4				9.6				21.5				39.0				55.1	
		23.0				8.0				13.3				29.9				43.0				2.1	
		25.8				10.6				17.0				38.9				46.7				9.6	
		31.4				15.8				24.5				—				54.4				—	
		34.3				18.4				28.2				—				58.3				—	
		37.0				20.9				32.0				—				2.2				—	
		39.7				23.6				35.8				—				6.0				—	
		42.5				26.0				39.5				—				10.0				—	

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