KG
11366
v.506

[illegible] [illegible] 1510

Fundamental Stars
Observations and Reductions
B 3.
From May 10 1880 to June 24 1880

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1880phas.proj..1510.

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1880phae.proj.1510

777

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1880phae.proj.1510.

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1000phoenix.proj 1510.

S

Sun C = 44,338

h m s
3 15 37
° '
+18 6

0,10908

1880
May 10–11

166

γ Urs. Maj.

h m s
11 47 28
° '
+54 22

0,10908

May 11

h	m	s															
3	13	37.56			15	51.19			11	46	—			46	55.5		
		39.66	41.854			53.39	5.5610				—				57.9		
		41.84	41.86			55.57	5.561				—				0.7		
		44.04				57.90			+24.80	9.08	18.01	44.28			3.4		
	20929	46.19			27805	0.00			21.25	8.93	9.005	47.68		35	6.0		
		9.29				2.805									35		
		50.48				4.20			14.17	9.17	83.46	55.00		47	0.70		
		52.72				6.45			10.63	9.23	9.273	58.60			+8.56		
		54.85				8.68			7.68	9.33		2.25					
		57.20	59.220			10.90	12.976		+3.50	9.27		5.77	9.280				
		59.40	59.23			13.00	12.97		-0.40	9.25		9.25	9.28	47	58.2		
		1.45	59.25			15.16	13.01		3.53	9.27		12.80			58.8		
		3.57				17.30			7.05	9.29		16.38			1.6		
		5.70				19.45			10.63	9.31		20.00			4.0		
	53307	7.70			11678	21.64			14.19	9.28	8352	23.47		71	6.5		
		8.307				2.678						8.352			71		
		12.26				26.00			21.25	9.30	46.78	30.55		48	1.42		
		14.58	16.648			28.28	30.410		24.73	9.42	9.354	34.15	37.684		-52.16		
		16.60	16.65			30.42	30.41		28.04	9.34		37.68	37.68				
		18.90	11.857			32.55	14.602		31.88	9.36		41.24					
	8324	20.90			15205	34.80		90	35.44	9.20	8842	44.80		47	0.70		
		3.324	13 59.240			205	16 12.985					3842		48	1.42		

9.211
9.265

11 47 84.41

In AR only

W	58	—	
W	59	16.20	
R	59	16.12	16.16
R	59	15.78	15.84
W	59	15.88	
	59	15.99	

3-4 21 39.8

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2

β Cass. L. C.

h m s
0 2 44
° ′
+58 29

0,10908

1880 May. 11

h m s
12 35 32
° ′
−0 47

1.17609 0,10908
999996
1.17605

172

γ Virgin's

13

γ Cass. L. C.

h m s
0 49 25
° ′
+60 4

0,1090

h m s

M1	38.8			0	59.6	2	22.0	12	34	49.70	50.10	34	50.0	0	48	17.40			47	41.8	48	48.2			
	42.00	4	59.60		2.2		24.0			52.16	54132		51.5			21.33	25482			44.2		51.0			
	46.00		4596		4.9		26.2			54.28	5413		52.8			25.52	2528			48.2		54.0			
	49.90				7.0		28.6			56.32			54.5			29.46				51.3		56.4			
2980	53.90			240	10.3	1327	31.9		2066	58.20		2653	06.5		12641	33.70			2395	54.0	2701	0.5			
	2987				240		327			2066			153			2741				395		401			
	1.75			1	4.80	2	26.54			2.50		34	53.06			42.10				47.90	48	54.02			
	6.00			1	12.80		−8.94			4.55			+17.58			46.35			+1	10.67		+4.55			
	9.65									6.55						50.52									
	13.85	1	7652							8.60	10.661					54.68	58.743								
	17.63	1	1465	3	3.8	3	35.2			10.65	1066	35	39.8			58.60	58.63		44	56.3	50	18.4			
	21.62	17	54		7.5		38.8			12.70	10.63		41.1			2.88	58.52			54.1		22.7			
	25.80				10.6		41.8			14.75			43.0			7.00				2.8		26.1			
	29.80				14.2		44.8			16.75			44.4			11.10				6.0		29.0			
15887	33.27			527	16.6	2086	48.0		9595	18.90		2140	48.7		52769	15.26			127	8.5	1284	32.2			
	6887				527		86			9595			1.40			7869				127		284			
	41.42			3	10.54	3	41.72			22.95		35	4.280			25.60			50	2.54	50	2.568			
	45.20	49	124		−32.94	−1	24.12			26.00	27.730		−32.16			27.65	31.770		−1	9.97	−1	27.11			
	49.00	49	12							27.20	27.13					31.75	31.77								
	53.00	15	608							29.23	14126					35.85	11705								
24562	57.00			1	4.80	2	26.54		23365	31.27		34	53.06		15885	40.00			47	47.90	48	54.02			
	4562	2	17.595	3	10.54	3	41.72			3565	35 10.646	35	42.80			885	48 58.575		50	2.54	50	25.68			
				+1	12.80	−	8.94					+	17.58							+	10.67					
				−	52.94	−	84.12						32.16						−	1	3.97					
					125.74		93.06						49.74								74.64					

12 35 37.91

1.69671
1.17605
2.87276
1.50161
8.92885
4 ~~57 8~~ 52 11

W 54 43.15
W ~~57~~ 51.40
W ~~54~~ 22.92
− ~~58~~ 1.118

W h 36.82
W 7 40.20
R 7 40.10
R 7 40.10
W 7 40.20
7 40.15
63.33

W 28 54.10
W ~~28~~ 14.45
W ~~46~~ 32.18
W ~~28~~ 17.60

0 47 46.3

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176		20		294	
ε Virginis		δ Cass. L.C.		α Cygni	
h m s 12 56 9		h m s 1 17 55		h m s 20 37 18	
° ′ +11 37	1.17609 0,10908 9.99101 1.16710	° ′ +120 24	0,10908	° ′ +44 51	0,10908

ε Virginis

12 55 27.35
29.47 31546
31.57 3155
33.64
15773 35.70
773
40.00
42.05
44.20
46.38 48380
48.52 48.38
50.45 48.37
52.55
54.67
43542 56.80
7542
1.00
3.02 5194
5.20 519
7.30 9674
2597 9.45
2597 55 48.375

55 13.8
15.4
17.3
18.8
857 20.4
357
55 1714
+31.23

56 21.7
23.3
25.0
26.5
1245 28.0
245
56 2490
−36.53

55 17.14
56 2490
+ 31.23
− 36.53
66.76
1.82452
1.16710
2.99162
1.93008
8.93846
4 57 37

δ Cass.

1 16 48.00
52.00 56214
56.25 5621
0.45
28107 4.37
3107
12.60
16.75
20.77
24.82 28867
28.88 2887
32.90 2886
37.00
40.90
25980 45.18
7980
53.25
57.50 1510
1.37 151
5.73 17772
755 9.70
755 17 28.865

16 26.0
28.2
31.5
36.0
1637 42.0
137
16 3274
+56.12

18 16.3
20.2
23.5
27.4
1176 30.2
176
18 2352
−54.66

17 10.5
13.8
17.0
19.0
820 21.7
320
17 1640
+12.46

18 48.8
52.0
55.0
58.4
2770 2.8
270
18 5540
−1 26.54

16 3274 17 1640
18 23.52 18 5540
+ 56.12
− 5466
110.78
2.04446

α Cygni

20 36 27.90
30.70 33570
33.60 3357
36.42
16785 39.23
1786
44.95
48.00
51.17
53.80 56769
56.67 5677
59.73 56.82
2.50
5.55
51092 8.55
6092
14.22
17.17 20.078
20.00 20.08
23.00 11365
10039 26.00
1039 36 56.795
1804

37 32.0
35.2
37.3
39.4
1856 41.7
356
37 3712
− 30.33

37 37.12

20 37 22.24

W 42 49.22
W 44 14.22
R 44 14.48

44 14.35
85.13

W 1 36.60
W 1 7.42
W + 24.28
W + 4.78

R 29 43.82
R 29 43.80
43.81

44 50 58.4

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298		303		306	
ε Cygni		ζ Cygni		α Cephei	
h m s 20 41 19	0,10908	h m s 21 7 47	0,10908	h m s 21 15 41	0,10908
° ′ +33 81		° ′ +29 44		° ′ +62 4	

1880 May. 11

ε Cygni

h	m	s			
20	40	32.60		40	18.4
		35.00	37.500		20.1
		37.50	37.50		21.4
		39.90			23.0
	18750	42.50		1076	24.7
		37.50			276
		47.45		40	21.52
		50.00			35.72
		52.50			
		54.80	57.350		
		57.30	57.35		
		59.85	57.14		
		2.25			
		4.75			
	51615	7.25			
		6615			
		12.33			
		14.66	17.186		
		17.18	1679		
		19.62	11′429		
	8393	22.14		40	21.52
		3593	40 57.245		

ζ Cygni

21	7	1.80		6	49.8
		4.20	6.534		61.5
		6.52	6.53		53.5
		8.90			55.3
	3267	11.25		2669	56.8
		3267			769
		16.00		6	53.38
		18.55			+32.17
		20.90			
		23.19	25.551		
		25.50	25.55		
		28.00	25.55		
		30.20			
		32.62			
	22996	35.00			
		4996			
		39.66			
		42.28	44.578		
		44.60	44.58		
		47.00	5111		
	22289	49.35		6	53.38
		2289	7 25.556		

α Cephei

21	14		—			13	49.8
			—				53.2
			—				56.3
			—				0.0
			—			2823	3.0
							2823
+17.62	19.62	179.20	2.00			13	56.46
13.21	19.46	19.911	6.75			+1	23.51
8.80	20.00		11.20				
+4.30	19.82		15.62	19.924			
−0.20	19.87		19.87	19.92		16	20.5
4.34	19.94		24.33				24.5
8.81	20.04		28.90				27.5
13.21	19.99		33.20				31.4
17.64	19.91	17932	37.55			1387	34.8
			8932				387
26.42	20.18	100.34	46.60			16	27.74
30.82	20.00	20.068	50.82	55.328		−1	7.77
35.24	20.16		55.40	55.33			
−39.64	20.18		59.82				
−44.18	19.82	27664	4.00			13	56.46
			2664			16	27.74

19.484
19.967
21 15 43.95

R 17 5.18
R 17 5.15
5.16

R 35 10.68
R 35 10.48
10.58

R 15 2.85
R 16 34.88
R 16 34.90

16 34.89
92.04

62 4 26.6

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1880phaed.proj.1510.

2

B Cass.

h m s
b 2 44
° ′
+58 29

0.10908

0	1	43.43					
		47.35	51.346				
		51.35	51.35				
		55.30					
	25673	59.30					
		673					
		7.17					
		11.00					
		15.00					
		18.90	22.891				
		22.90	2289	3	6.7		
		26.80	22.94		10.5		
		30.75			13.5		
		34.78			16.5		
	20602	38.75			668 19.6		
		2602			168		
		46.55			3 13.36		
		50.55	54.530		÷ 50.45		
		54.55	54.53				
		58.50	16588				
	27265	2.50					
		2265	2 22.915	3	13.36		

R 51 38.20 .
R 51 38.32 .

51 38.26 .

13

J. Cass.

h m s
0 49 25
° ′
+60 4

1.17609
9.69809
8.87418

0.10908

ex. minute

0	49	23.20			48	34.5	
		27.30	31434			36.2	
		31.45	3143			39.7	
		35.48				42.8	
	15717	39.77			1992	46.0	
		717				492	
		48.14			48	39.84	
		52.20			+ 1	24.64	
		56.17					
		0.46	4.533				
		4.50	4.53		50	53.0	
		8.60	4.53			55.1	
		12.65				58.6	
		16.90				1.8	
	4080	21.18			2930	4.5	
		4080				430	
		29.38			50	5860	
		33.40	37.636			− 54.07	
		37.70	37.64				
		41.80	12907				
	18818	46.90			48	39.84	
		3818	50	4.530	50	58.60	
					+ 1	24.69	
					−	54.07	
						13776	
						2.142276	
						8.87418	
						~~1.95429~~	3.01644
						~~0.09011~~	1.95429
							8.93785
							457 12

R 15 25.85 .
R 16 55.95 .
R 16 55.78 .

16 55.86
90.01

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1880phae.proj.1510.

303

ζ Cygni

h m s
21 7 47
o ′
+29 44

0.10908

306

χ Cephei

h m s
21 15 41
o ′
+62 4

0.10908

309

ε Pegasi.

h m s
21 38 14
o ′
+9 19

0.10908

1880

May 12

h	m	s																			
21	7	28.0			6	41.9			21	14	—					21	37	—			
		47.0	7.020			44.3					—							—			
		7.00	7.02			46.7					—							—			
		9.30				48.7					—							—			
	3510	11.80			2319	50.3					—							—			
		3510				319															
		16.54			6	46.38	+17.02	20.42	183.10	2.80			+8.36	53.28	47.264	44.92					
		18.86			+	39.60	13.22	20.42	20.344	7.20			6.27	53.42	53.294	47.15					
		21.20					8.80	20.38		11.70			4.18	53.38		49.20					
		23.55	2.598	9			+ 4.36	20.36		16.00	20.350		+ 2.87	53.30		51.22	53.303				
		25.88	2.599				− 0.70	20.30		20.30	20.35	16	14.2	− 0.80	53.30		53.30	5.330	38	3.0		
		28.85	25.98				4.39	20.11		24.50			17.7	2.69	53.14		56.23			4.7		
		30.77					8.81	20.39		29.20			21.1	4.18	53.27		57.46			6.3		
		33.15					13.21	20.29		33.50			24.5	6.27	53.28		59.55			8.2		
	23390	35.60					17.69	20.31	18315	37.95		1061	28.6	8.38	53.32	47973	1.70		321	9.9		
		5390								315			61				2973			32.1		
		40.27					26.42	20.49	101.75	46.95		16	21.22	12.54	53.21	265.82	5.75		28	6.42		
		42.60	4.495	4			30.82	20.28	20.35	51.10	55.610	− 1	0.87	14.63	53.27	53.104	7.90	9.940		−13.19		
		44.90	4.495				35.24	20.16		55.40	55.61			16.73	53.12		9.85	9.94				
		47.88	5.197				39.64	20.46		0.10				18.82	53.18		12.00					
	22477	49.62			6	46.38	− 44.18	20.42	27805	4.60				−21.46	52.74	4970	14.20					
		2477	7 25.985							2805		16	21.22				4970		38	6.42		

20.347
20.346
21 15 48.02

53.201
53.229

R 35 1.88.
R 35 1.60.

1.74

R 16 31.60.
R 16 31.38.

31.49

62 4 26.7

R 0 4.98.
R 0 4.95.

0 4.96

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172 | 173 | 176

γ Virginis
h m s
12 35 32
° ′
−0 47
1.17609 0.10908
9.99996
1.17605

1880.
May 15

ε Urs. Maj.
h m s
12 48 42
° ′
+56 37
1.17609 0.10908
9.74055
0.91664

ε Virginis
h m s
12 56 9
° ′
+11 37
0.10908

12 34 51.00		34 30.8	12 47 47.20		47 20.4			12 55	—			55 54.1
53.05	55.144	32.7	50.80	54610	23.0				—			55.4
55.20	55.14	34.0	54.57	54.61	25.3				—			57.0
57.22		35.4	58.38		28.1				—			58.5
27572 59.25		1695 36.6	27305 2.10		1282 31.4				—			2850 0.0
2572		195	2305		282							350
3.32		34 33.90	9.66		47 25.64				—			55 57.00
5.37		+37.74	13.40		+58.96				—			−7.48
7.43			17.04						—			
9.63	11.687		20.90	24.588		+2.08	49.43	247.07	47.35			
11.60	11.64	35 40.0	24.50	24.59	49 11.0	−0.00	49.50	49.511	49.50			56 29.0
13.71	11.65	41.4	28.30	24.61	13.1	2.10	49.55		51.65			30.5
15.80		43.4	32.05		15.8	4.21	49.62		53.83			31.8
17.85		44.9	35.82		18.7	6.47	49.40		55.87			33.4
10473 20.02		2160 46.3	22129 39.72		808 22.2	8.43	49.57		58.00			1601 35.4
1473		160	4129		308							101
24.05		35 43.20	47.00		49 16.16	12.64	49.56	247.70	2.20			56 32.02
26.00	28.170	−31.56	50.78	54610	−51.56	14.74	49.51	49.54	4.25	6.404		42.50
28.20	28.17		54.66	54.61		16.85	49.59		6.44	6.40		
30.27	143.31		58.38	16922		18.96	49.54		8.50			
14085 32.33		34 33.90	27305 2.23		47 25.64	21.13	49.50	3202	10.63			55 57.00
4085	35 11.645	35 43.20	2305	48 24.600	49 16.16				3202			56 32.02
		+ 37.74			+ 58.96							
		− 31.56			− 51.56	49.525						
		69.30			110.52	49.524						
12 35 37.90		1.84073			2.04344							
		1.17605			0.91664							
		3.01678			2.96008							
		1.94429			1.89009							
		8.92751			8.93001							
		45014			45154							

W	6 3.50 ·	W	42 57.40 ·	W	43 36.18 ·
W	7 31.56 ·	W	44 15.08 ·	W	44 19.98 ·
R	7 31.30 ·	R	44 15.15 ·	R	44 20.18 ·
R	7 31.38 ·	R	44 15.00 ·		
W	7 31.62 ·	W	44 14.92 ·		
	7 31.46		44 15.04		44 20.08
	87.96		77.64		

0 47 46.2

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1880

587 α Virginis
h m s
13 18 49
° ′
−10 32

1.17609
9.99262
1.16871

0.10908

May. 15

h	m	s			
13	18	8.27		17	53.5
		10.40	12458		55.0
		12.47	1246		57.0
		14.55			58.4
	6229	16.60		2814	0.5
		1229			344
		20.85		17	5688
		22.95			+ 32.37
		25.00			
		27.20	29.229		
		29.30	2923	18	57.0
		31.35	29.27		58.6
		33.35			59.8
		35.53			1.4
	26306	37.53		2993	2.5
		8306			493
		41.90		18	59.86
		44.00	46076		−30.61
		46.00	46.08		
		48.18	5854		
	23038	50.30		17	56.28
		3038	18 29.250	18	59.86
				+	32.97
				−	30.61
					63.58

13 18 55.57

1.80332
1.16871
2.97203
1.90320
8.93117
4.5241

W 50 28.78
W 51 48.20
R 51 49.40

51 48.80
80.02

10 32 29.2

309 ε Pegasi
h m s
21 38 14
° ′
+9 19

0.10908

h	m	s			
21	37	33.00		37	18.6
		35.00	37.146		20.3
		37.15	37.09		21.9
		39.23			23.8
	18543	41.35		1101	25.5
		3573			101
		45.58		37	2202
		47.60			+ 31.86
		49.70			
		51.84	53900		
		53.93	5390		
		56.00	53.87		
		58.00			
		0.10			
	48510	2.35			
		3510			
		6.50			
		8.57	10.656		
		10.66	1066		
		12.70	10775		
	5328	14.85		37	22.02
		5328	37 53.885	+	31.86

R 59 9.15
R 59 9.52

59 9.33

311 α Aquarii
h m s
21 59 34
° ′
−0 54

0.10908

h	m	s			
21	58	53.75		58	37.5
		55.75	57.850		38.9
		57.85	57.85		40.3
		59.90			41.7
	28925	2.00		2014	43.0
		3925			14
		6.00		58	4028
		8.15			+34.06
		10.30			
		12.22	14.328		
		14.28	14.33		
		16.35	14.36		
		18.55			
		20.50			
	12895	22.60			
		3895			
		26.77			
		28.80	30.880		
		30.86	30.88		
		32.97	14873		
	15440	35.00		58	40.28
		440	59 14.345	+	34.06

21 59 38.82

R 12 23.05
R 12 22.90

12 22.97
0 54 0.4

+16.66
14.92
9.48
7.11
4.74
+2.35
+0.00
2.36
4.74
7.11
9.50
14.22
16.59
18.97
21.34
−23.71

5
5

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322 | η Pegasi | 9.93970 | | 619. | α Piscis | | | 329 | ι Pegasi | |
---|---|---|---|---|---|---|---|---|---|---|---
| | | | | | | | | | | |

322 — η Pegasi 9.93970

h m s
22 37 20
° ′
+29 30

0.10908

	22	36	—			
			—			
			—			
+16.60	59.07	118.12	42.47			
14.22	59.05	59.06	44.83			
9.48	59.21	53231	49.73			
7.11	59.11	59.145	52.00			
4.74	59.14		54.40			
+2.35	59.13		56.78	59.149		
0.00	59.15		59.15	59.16	37	26.1
2.36	59.09		1.45			28.0
4.74	59.26		4.00			29.9
7.11	59.14		6.25			31.7
9.50	59.08	53234	8.58		1494	33.7
			8234			494
14.22	59.13	295.85	13.35		37	29.88
16.59	59.21	59.17	15.80	18150		−30.74
18.47	59.03		18.00	20.15		
21.34	59.26		20.60			
−23.78	59.22	10075	23.00			
			4075		37	29.88

59.125
59.141

R 44 44.65.
R 44 44.75.

44 44.70

619. — α Piscis

h m s
22 50 58
° ′
−20 16

0.10908

22	50	12.45		50	23.4
		14.70	17.162		25.5
		17.16	17.16		27.3
		19.60			29.5
	8581	21.90		1369	31.2
		3581			369
		26.75		50	27.38
		29.00			+8.87
		31.65			
		33.90	36.258		
		36.30	36.26		
		38.57	36.25		
		41.00			
		43.40			
	32632	45.75			
		5632			
		50.50			
		53.00	55.340		
		55.37	55.34		
		57.73	7250		
	27670	0.10		50	27.38
		2670	50 36.255	+	8.87

22 51 2.96

R (36/46) 59.05.
R 58.98.

59.01 (2)
30 14 69.5

329 — ι Pegasi

h m s
22 58 44
° ′
+14 33

0.10908

22	58	1.82		57	49.9
		3.93	6.040		51.8
		6.00	6.04		53.4
		8.16			54.8
	3020	10.30		2661	56.2
		3020			161
		14.48		57	53.22
		16.67			+29.86
		18.85			
		21.00	23.069		
		23.00	23.07		
		25.17	23.10		
		27.35			
		29.45			
	20762	31.65			
		2762			
		35.90			
		38.00	40.160		
		40.15	40.16		
		42.30	4620		
	20080	44.45		57	53.22
		080	58 23.085	+	29.86

22 58 48.70

R 45 14.10.
R 45 14.12.

45 14.13
14 33 41.1

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166

y Ues. Maj.

h m s
11 47 28
+54 22 1.17609 0.10908
9.76537
0.94146

1880
May-16

2

β Cass Lo.

h m s
0 2 44
+121 54

0.10908

13

γ Cass Lo.

h m s
0 49 25
+119 56

0.10908

h	m	s																					
11	48	34.85			46	11.3		0	1	39.60		1	48.3		0	48	18.88			47	50.7		
		38.80	41.890			14.0				43.60	47.560		50.8				22.90	27.046			53.8		
		41.90	41.69			16.3				47.60	47.56		53.2				27.00	27.05			56.2		
		45.40				18.7				51.60			56.9				31.20				58.9		
	20845	49.00			819	21.6			23780	55.40		2684	59.2			18523	35.25			2804	1.3		
		945				319				3780			184				3523				809		
		56.15			46	1638				3.15		1	59.68				43.65			47	56.18		
		59.56				+ 53.81				7.15			+ 25.34				47.75						
		3.15								11.00							51.95						
		6.62	10.233							14.90	18.9861						56.17	0.300					
		10.27	1023		47	57.9				19.00	18.96	2	22.7				0.43	0.30		49	9.2		
		13.70	10.15			0.5				23.25	19.08		26.1				4.38				12.0		
		17.35				3.0				26.85			31.1				8.52				13.3		
		20.80				4.7				30.80			33.4				12.85				19.4		
	9210	24.50			141	8.6			17065	34.85		1491	36.8			270	17.00			770	23.1		
		9210				147				8085			01				270				270		
		31.40			48	294				42.68		2	30.02				25.30			49	15.40		
		35.10	38.626			- 52.75				46.88	50.600		- 11.00				29.15						
		38.68	38.62							50.50	5060						33.38	3334					
		42.20	14031							54.34	15816						37.42						
	19313	45.75			46	1638			25300	58.60		3	24.5				41.46	49 0.23		50	3.4		
		431.3	47 10.190		478	2.82				300	2 19.020		28.0								5.6		
						+ 53.87							29.5								9.0		
						- 7.37	52.63						32.5								12.8		
						61.18	106.44					1505	36.0								460	15.2	
11	47	84.29				1.78661	2.02710						05								460		
						0.94146	0.94846					3	30.10								50	9.20	
						2.72807	2.96856					- 1	11.08										
						1.89889	1.89884																
						9.17082	8.93033																
						825546	4527																

W 57 51.45
W 59 10.72
R 59 10.55
R 59 10.65
W 59 10.78
59 10.68
79.23

W 54 19.50
W 53 54.90
W 53 15.00

W 28 55.72
W 28 2.40
W 28 29.98

54 21 40.6

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176 ε Virginis h m s 12 56 9 ° ' +11 37

1.17609 0.10908
9.99101
1.16710

20 δ Cass Lo. C. h m s 1 17 55 +59 36 0.10908

322 η Pegasi h m s 22 37 20 +29 30 0.10908

12 55	28.60		55 17.0	1 16	49.35		16 22.2	17 16.0	22	—		
	30.60	32740	19.0		53.75	57.670	24.0	19.7		—		
	32.70	3274	20.5		57.65	57.67	26.9	23.0		—		
	34.82		21.9		1.70		29.8	25.0		—		
16370	36.98		1018 23.4	28835	5.90		1349 31.0	1109 27.2		—		
	1370		18		3835		349	109				
	41.15		55 2036		14.00		16 2698	17 2218		—		
	43.28		+29.24		18.20		+1 3.36	+8.16		—		
	46.37				22.20					—		
	47.40	49.589			26.18	30.328				—		
	49.60	49.59	56 19.0		30.37	3033	17 55.0	18 34.8		—		37 19.0
	51.70	49.61	20.4		34.39	30.35	2.2	36.9		—		21.0
	53.90		22.2		38.48		6.8	38.4		—		22.7
	55.90		23.7		42.55		8.7	42.0		—		24.5
44630	58.00		1106 25.3	27295	46.68		294 10.7	1973 45.2		—		1134 26.2
	8630		106		295		294	473				134
	2.20		56 2212		54.90		18 5.88	18 3946	14.22 59.43	37 13.65		37 2268
	4.32	6.490	−32.52		58.90	3.030	−35.54	−1 9.12	16.59 59.41	297.75 16.00	18410	+36.87
	6.48	6.49			3.00	303			18.97 59.48	59.55 18.45	1841	
	8.65	9923			7.35	18070			21.34 59.41	20.75		
3245	10.80		55 2036	1515	11.00		16 2698	17 2218	23.18 60.02	9205 23.20		
	3245	55 49.600	56 22.12		1515	17 30.340	17 5.88	18 39.46		4205		37 2268
			+ 2924				+ 63.36	+ 8.16	36 59.55			
			− 3252				+ 24.46	− 69.12				
			61.76				87.82	77.28				
			1.79071									
			1.16710									
			2.95781									
			1.89154									
			8.93373									
			45424									

W 42 50.00
W 44 7.80
R 44 8.00

44 7.90
77.90

W 1 44.58
W 1 8.00
W 1 40.35
W 1 20.15

R 44 35.78
R 44 35.72

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1

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h m s
0 2 8
+28° 25'

0.10908

1880
May 16

h m s
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Const read

3 37 19.40
21.47 23.780
23.83 23.78
26.00
11890 28.20
1890
32.60
35.00
37.00
39.18 41.384
41.32 4139
43.50 41.36
45.70
48.00
37250 50.20
1250
54.50
56.70 58950
57.00 5895
1.15 8273
29475 3.40
4475 37 41.375

0 2 12.45

R 53 35.78
R 53 35.82

28 25 43.4

S

Sun. e = 44,348

h m s
3 39 18
+19° 32'

0,10908

May 16-17

38 29.0
30.7
32.0
33.8
1615 35.8
115
38 32.30
−50.93
38 32306777
− 50.93

39 —
— 39 8.7
— 10.2
— 11.6
— 13.8
— 594 15.1
— 94
— 39 11.88
— +44.07
— 53.43 +2.17 55.60 385.36
— 55.95 −6.00 55.95 55.843
58.20 2.18 56.02
0.35 4.38 55.97
2.38 6.51 55.87
4.92 8.77 55.85
6.18 13.13 56.05 280.13
11.30 13554 −15.32 55.98 56.026
13.57 13.55 +7.52 3605
15.72 19.71 5601
18.00 21.86 56.04 39 11.88
1777

55.959
55.954

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172

γ Virginis

h m s
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May - 17

12	34	51.00			34	31.6		12	47	47.28			47	19.7
		53.10	55.160			34.2				51.00	54.846			21.5
		55.20	55.16			36.5				55.00	54.85			24.5
		57.30				38.4				58.50				27.9
	27580	59.20			1806	39.9			27423	2.45			1245	31.9
		2580				306				2423				2495
		3.45			34	36.12				9.85			47	2510
		5.55				+35.57				13.55				24.90
		7.60								17.30				+59.98
		9.68	11.712							21.27	24.877			
		11.75	11.71							24.78	24.88			
		13.75	11.68							28.66	24.88			
		15.77								32.28				
		17.88								36.20				
	10541	19.98							22389	40.00				
		1541								4384				
		24.20								47.38				
		26.00	28.204							51.23	54922			
		28.20	2820							55.00	5492			
		30.27	14336							58.50	16477			
	14102	32.35			34	36.12			27461	2.50			47	2.490
		4102	35	11.695		+35.57				2461	48	24.880		+5998

12 35 37.87

W 6 6.82
W 6 7.10
W 6 7.12

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173

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12	47	47.28			47	19.7								
		51.00	54.846			21.5								
		55.00	54.85			24.5								
		58.50				27.9								
	27423	2.45			1245	31.9								
		2423				2495								
		9.85			47	2510								
		13.55				24.90								
		17.30				+59.98								
		21.27	24.877											
		24.78	24.88											
		28.66	24.88											
		32.28												
		36.20												
	22389	40.00												
		4384												
		47.38												
		51.23	54922											
		55.00	5492											
		58.50	16477											
	27461	2.50			47	2.490								
		2461	48	24.880		+5998								

W 42 57.18
W 42 57.40

57.44

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S

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1880 May 18-19

h m s																
45 17.69			46 26.6	47 32.95			46 44.0		3 49 17.80			50 32.5	51 32.82			51 5.5
20.00	22.162		28.2	35.18	37.272		45.5		20.00	26.70		34.0	35.00	37.274		7.0
22.25	2216		29.9	37.30	37.27		46.8		22.25	22.17		36.2	37.28	37.27		8.8
24.40			31.3	39.37			48.8		24.40			38.2	39.57			10.0
11081 26.57			1489 32.9	18636 41.56			2351 50.0		11085 26.40			1809 40.0	18637 41.70			428 11.5
1081			489	3636			351		3085			309	3637			428
31.00			46 29.78	46.00			46 4702		31.00			50 36.18	46.25			51 8.56
33.27			- 50.05	48.25			+1 7.83		33.20			- 56.38	48.35			+ 46.43
35.43				50.40					35.30				50.55			
37.50	39.783			52.65	54.844				37.55	39.797			52.75	54.967		
39.80	39.78			54.90	54.84				39.65	39.79			54.87	54.97		
42.00	39.68			57.10	54.86				41.90	39.81			57.15	55.01		
44.20				59.30					44.32				59.43			
46.30				1.40					46.55				1.55			
35805 48.55			49360	3.60					35817 48.70			49470	3.80			
8805				4360					8817				4470			
52.90				8.18					53.00				8.28			
50.16	57.400			10.20	12.450				55.19	57.450			10.60	12.680		
57.38	5720			12.45	12.45				57.40	57.45			12.70	12.76		
59.75	7936			14.60	10.972				59.76	7962			14.82	11.003		
28600 1.81			46 29.78	6225 16.82			46 4702		28725 1.90			50 36.18	6380 17.00			51 8.56
3700	45 39.730			1225	47 54.850				3725	49 39.800			1340	51 54.990		46.43
			- 50.05				+ 67.83					- 56.38				+ 46.43

S

Sun. c = 44.364

h m s
3 57 16
o '
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1880 May 19-20

W 6 16.12 · W 38 21.88 · W 53 59.33 · W 26 22.78 ·

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155

ψ x Ursæ Maj.

h m s
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+45 9

1880
May. 20.

0.10908

11	2	4.64			1	55.8		11	46	19.23			46	47.0		12	34	51.95			34	38.6	
		7.66	10.560			58.0				22.60	26222			49.3				53.95	5.6074			40.0	
		10.55	1056			0.2				26.18	2622			51.5				56.00	56.07			41.6	
		13.50				2.4				29.70				53.8				58.17				42.7	
	5280	16.45			04	4.0			13111	33.40			2570	55.4			28037	0.30			2072	44.3	
		5280				04				3111				70				3037				72	
		22.30			2	9.08				40.40			45	51.40				4.30				34 41.44	
		25.17			+	33.84				43.90			+1	3.20				6.38				+31.08	
		28.00								47.48								8.40					
		30.90	33.939							51.17	54614							10.48	12526				
		33.93	3394							54.75	5461		47	38.2				12.52	12.52		35	41.9	
		36.93	34.01							58.10	54.60			41.9				14.52	12.53			43.5	
		39.82								1.65				44.2				16.66				45.0	
		42.80								5.18				47.1				18.66				46.7	
	30545	45.60							49153	8.90			2217	50.3			11273	20.81			2252	48.1	
		3545								4153				217				2273				252	
		51.50								15.85			48	44.34				24.87			35	45.04	
		54.53	57.460							19.35	22993		−1	49.74				26.95	29.000			−32.52	
		57.55	5746							23.00	2299							29.00	29.00				
		0.40	6802							26.50	1921							31.00	14507				
	28730	3.30			2	0.08			11495	30.25			46	51.40			14500	33.18			34 41.44		
		3730	2 33.975		+	33.89				1495	46 54.605		48	44.34				4500	35 12.525		35	45.064	
													+	3.20							+	3.08	
													−	49.74							−	32.52	
														52.94								63.60	
							11 47 84.18							1.72378				12 35 37.85				1.80346	
														0.94146								1.17605	
														2.66524								2.97951	
														1.92706								1.91094	
														9.26182 ?								8.93143	
														1021 20								4 52 51	

R	10	39.38	.					W	57	42.93	.					W	6	12.68	.				
R	10	42.03	.					W	59	7.70	.					W	7	34.05	.				
								R	59	7.28	.					W	7	34.18	.				
		40.71						R	59	7.45	.					W	7	34.18	.				
								W	59	7.45	.												
									59	7.47							7	34.14					
										84.54								81.46					
							54 21 41.0										0	47 45.8					

166

γ Ursæ Maj.

h m s
11 47 28
° ′
+54 22

1.17609 0.10908
9.76537
0.94146

172

γ Virginis

h m s
12 35 32
° ′
−0 47

1.17609 0.10908
9.99996
1.17605

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173. 1 3

ε Urs. Maj α Andrum γ Pegasi

h m s
12 48 42
° '
+56 37

1.17609 0.10908
9.74055
0.91664

h m s	° '
0 2 8	+28 25

0.10908

h m s	° '
0 7 0	+14 31

0.10908

1880
May. 20

ε Urs. Maj

h m s					
12 47 48.18		47 42.0			
51.95	55.570	44.6			
55.52	55.57	47.5			
59.18		50.4			
27785 3.02		2379 53.4			
2785		379			
10.48		47 47.58			
14.17		+37.93			
17.90					
21.70	25.459				
25.55	25.46	49 19.3			
29.15	25.57	22.9			
32.90		26.0			
36.70		28.6			
22913 40.58		1280 31.2			
4913		280			
48.00		49 25.60			
51.88	55.566	−1 :09			
55.55	55.57				
59.40	171'14				
27783 3.00		47 47.58			
2783	48 25.515	49 25.60			
		+ 37.93			
		− 59.91	60.08		
		97.84	98.01		
		1.99052	1.99127		
		0.91664	91		
		2.90716	2.90791		
		1.82814			
		8.92098	8.92023		
		44555	26		

α Andrum

0 1 24.82		1 18.3	
27.19	29.492	20.1	
29.48	29.49	21.7	
31.79		23.8	
14746 34.18		1091 25.2	
4746		91	
38.90		1 2.182	
41.20		+ 26.39	
43.50			
45.80	48.194		
48.20	48.19		
50.52	48.24		
52.85			
55.28			
43375 57.50			
43375			
2.20			
4.58	6.986		
7.00	6.99		
9.37	9648		
3493 11.78		1 2.182	
3493	1 48.215	+ 2639	

0 2 12.57

γ Pegasi

0 6 18.80		6 2.4	
20.90	23.090	4.3	
23.15	23.09	6.1	
25.32		7.7	
11545 27.28		298 9.3	
1545		298	
31.60		6 5.96	
33.90		+ 34.14	
35.90			
38.00	40.109		
40.00	40.11		
42.18	40.09		
44.33			
46.50			
36098 48.57			
098			
52.85			
55.00	57.090		
57.00	57.09		
60.20	8018		
28545 1.40		6 5.96	
3545	6 40.100	+ 34.14	

0 7 4.98

W 43 11.13 ·
W 44 18.48 ·
W 44 18.45 ·
W 44 18.43 ·

44 18.45
6732

R 53 34.60 ·
R 53 34.45 ·
34.52

28 25 43.6

R 47 43.70 ·
R 47 43.50 ·
47 43.60

14 31 5.1

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1880phae.proj.1510.

1880phaej.proj.1510.

13.

γ Cas.

h m s
0 49 25
° ′
+60 4

0.10908

30

β Arietis

h m s
1 47 58
° ′
+20 13

0.10908

33

α Arietis

h m s
2 0 21
° ′
+22 53

0.10908

JJ

0	48	25.43		48 1.2	1
		29.49	33.578	4.2	
		33.50	33.58	7.3	
		37.67		9.5	
	16789	41.80		352 13.0	
		1789		352	
		50.14		48 7.04	
		54.00		+59.58	
		58.37			
		2.55	6.594		
		6.53	6.59		
		10.70	6.66		
		14.90			
		18.86			
	5935	23.30			
		5935			
		31.66			
		35.66	39.740		
		39.60	39.74		
		43.78	13332		
	19870	48.00		48 7.04	
		4870	49 6.625		
				+ 59.58	

R 15 42.10 .
R 15 42.28 .

42.19

R 352780

R 264280
35.38

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1880phae.proj.1510.

S

Sun e = 44,364

h m s
3 55 16
° '
+20 22

0.10908

1880 May 20-21

Ex. sun

h	m	s							
3		18.00					—		
		20.18	22.332				—		
		22.40	22.33				—		
		24.38					—		
	11166	26.70					—		
		1166							
		31.16		+3.80	55.20	496.32	46.40		
		33.35		6.60	55.10	55.146	48.50		
		36.67		4.40	55.20		50.80		
		37.70	39.997	+2.18	55.06		52.88	55.150	
		40.00	40.00	−0.00	55.17		55.17	55.15	
		42.20		2.19	55.13		57.32		
		44.40		4.40	55.13		59.53		
		46.60		6.60	55.22		1.82		
	35997	48.90		8.82	55.11	4635	3.93		
		89.97				4635			
		53.66		13.21	55.29	276.11	8.50		
		55.60		15.40	55.27	55.222	10.67	12.844	
		58.00		17.61	55.15		12.76	12.84	
		0.11		18.81	55.14		15.00		
		2.22		22.08	55.21	6422	17.20		
						6422			

55.184
55.173

Reject

172

γ Virginis

h m s
12 35 32
° '
−0 47

0.10908

May-21

h	m	s							
12	34	51.65							
		53.76	55.860						
		55.82	55.86						
		57.97							
	27930	0.10							
		29.30							
		4.20							
		6.22							
		8.29							
		10.29	12.379						
		12.39	12.38					35	39.4
		14.40	12.40						41.2
		16.52							42.9
		18.55							44.3
	11141	20.55						2141	46.3
		2141							141
		24.75						35	4282
		26.80	28.940						− 30.43
		28.90	28.94						
		31.00	14480						
	14470	33.25							
		4470	35 12.390					35	42.82

− 30.43

12 35 37.85

W ? 29.48
W 32.00

0 47 45.8

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173

E Ursae Maj

h m s
12 48 40.
° '
+56 37

0,10908

12	47	47.90			47	19.05					
		51.90	55530			22.6					
		55.50	5553			25.0					
		59.35				27.9					
	27765	3.00			1258	30.8					
		2765				258					
		10.48			47	25.16					
		14.34			+1	0.33					
		17.92									
		21.80	25497								
		25.50	25.46								
		29.28	25.52								
		33.00									
		36.77									
	22917	40.88									
		4047									
		47.90									
		51.70	55.508								
		55.57	5551								
		59.37	17104								
	27754	3.00			47	2516					
		2754	48	25.490							
					+	60.33					

W 42 54.43 .
W 42 54.28 .

54.35

176

E Orionis

h m s
12 56 9
° '
+11 37

0.10908

12	55	30.10			55	15.9					
		31.25	33330			17.5					
		33.30	3333			19.4					
		35.40				21.0					
	16665	37.60			967	22.9					
		1665				467					
		41.70			55	19.34					
		43.90				+30.83					
		46.00									
		48.10	50161								
		50.20	5016								
		52.27	50.18								
		54.38									
		56.40									
	45145	58.50									
		145									
		2.80									
		4.90	7030								
		7.00	703								
		9.20	10036								
	3515	11.25			55	19.34					
		3515	55	50.170		3					
					+	30.83					

W 42 48.30 .
W 42 48.45 .

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166 — γ Urs. Maj. — 172 — γ Virginis — 176 — ε Virginis

1880 May 22.

γ Urs. Maj.

h m s
11 47 28
+54 22 (° ′)

1.17609 0,10908
9.76537
0.94146

h	m	s				
11	46	35.10		46	12.5	
		38.55	42060		15.4	
		41.85	4206		17.4	
		45.60			19.5	
	21030	49.20		870	22.2	
		1030			370	
		56.20		46	17.40	
		59.80			+53.01	
		3.20				
		6.83	10406			
		10.44	1040	47	57.8	
		14.00	10.42		1.5	
		17.43			4.2	
		21.15			6.6	
	9365	24.60		191	9.0	
		365			191	
		31.75		48	3.82	
		35.35	38.784		−53.41	
		38.75	38.78			
		42.20	14084			
	19392	45.87		46	17.40	
		4392	47 10.410	48	3.82	
				+	53.01	
				+	6.59	−53.41
					59.60	106.42

11 47 34.15

1.77525 | 2.06602
0.94146 | 2.02702
2.71671 | 2.96848
1.89393 | 1.89393
9.17722 | 8.92545
8.3310 | 4 249
 | 4 4852

W 57 50.65
W 59 9.10
R 59 8.90
R 59 8.90
W 59 9.00
59 8.98
78.33

54 21 41.2

γ Virginis

h m s
12 35 32
−0 47 (° ′)

1.17609 0,18908
9.99996
1.17605

12	34	51.50		34	37.7	
		53.50	55.620		39.6	
		55.65	55.62		41.0	
		57.70			42.7	
	27810	59.75		2054	44.4	
		2810			54	
		3.78		34	41.08	
		5.95			+30.98	
		7.90				
		9.97	12.036			
		12.00	12.04	35	44.3	
		14.00	12.09		45.8	
		16.20			47.2	
		18.25			49.1	
	10832	20.27		2371	50.7	
		1832			371	
		24.36		35	47.42	
		26.39	28.560		−35.36	
		28.67	28.56			
		30.70	14418			
	14280	32.68		34	41.08	
		4280	35 12.065	35	47.42	
				+	30.98	
				−	35.36	
					66.34	

12 35 37.84

1.82178
1.17605
2.99783
1.92773
8.92990
4 5150

W 6 15.75
W 7 40.53
R 7 40.38
R 7 40.48
W 7 40.30
7 40.42
84.67

0 47 45.6

ε Virginis

h m s
12 56 9
+11 37 (° ′)

0,10908

12	55	28.80		55	26.6	
		31.00	33010		28.0	
		33.00	33.01		30.0	
		35.00			31.7	
	16505	37.25		1494	33.1	
		1505			494	
		41.40		55	29.88	
		43.46			+19.92	
		45.68				
		47.70	49.784			
		49.80	49.78			
		51.92	49.82			
		54.00				
		56.00				
	44806	58.20				
		8806				
		2.40				
		4.50	6634			
		6.55	6.63			
		8.80	9964			
	3317	10.92		55	29.88	
		3317	55 49.800	+	19.92	

W 43 0.68

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20

δ Cass Sd C.

h m s
1 17 55
+ 120 24

0.10908

1	16	50.00		16 37.3	17 35.9
		53.90	58010	41.3	40.4
		57.80	58.01	43.7	44.8
		2.00		47.5	47.3
	29005	6.35		2201 50.3	2176 49.2
		4005		201	176
		14.30		16 4402	17 4352
		18.18		+ 46.65	− 12.85
		22.65			
		26.88	30690		
		30.92	3069		
		34.60	30.66	18 25.3	19 1.3
		38.80		29.4	2.7
		42.98		34.1	3.8
				38.3	5.0
	27621	47.00		1688 41.7	190 6.2
		621		188	190
		55.18		18 3376	19 380
		59.20	3326	−1 3.09	−1 33.13
		3.38	3321		
		7.40	18133		
	1663	11.47		16 44.07	17 4352
		1663	17 30.675	18 33.76	19 3.80
				+ 46.65	− 12.85
				− 63.09	− 93.13
				109.74	105.98

W 1 33.38
W 1 36.20
W 1 21.38
W 1 1.75

181

η Urs. Maj.

h m s
13 42 46
° ′
+ 49 35

0.10908

13	41 56.30		41 23.3	
	59.40	2690	26.0	
	2.60	269	28.7	
	6.00		30.5	
	1345 9.15		1412 32.7	
	1345		412	
	15.40		41 2824	
	18.68		+1 60.00	
	21.80			
	25.19	28200		
	28.25	28.20	43 10.0	
	31.28	28.29	11.4	
	34.50		15.0	
	37.80		17.0	
	25380 40.90		732 19.8	
	7380		232	
	47.48		43 1464	
	50.65	53892	−46.40	
	53.90	5389		
	57.10	5658		
	26946 0.33		41 2824	
	1946	42 28.245	43 14.64	
			+ 60.00	
			− 46.40	
			106.40	

13 49 1.59

W 24 36.88
W 20 6.13
R 6.28
R 6.20
W 6.20

6.20

182

η Bootis

h m s
13 48 55
° ′
+ 19 0

0.10908

13	48 14.42		48 0.7	
	16.60	18780	2.4	
	18.70	1878	4.0	
	21.00		5.6	
	9390 23.18		200 7.3	
	4390		200	
	27.60		48 400	
	29.70		+32.16	
	31.90			
	34.00	36267		
	36.33	36.27	49 7.9	
	38.50	36.06	9.5	
	40.57		10.8	
	42.80		12.6	
	32640 45.00		552 14.4	
	5640		552	
	49.45		49 1104	
	51.55	53750	−34.88	
	53.70	5335		
	55.70	7213		
	26675 58.15		48 4.00	
	1875	48 36.165	49 11.04	
			+ 32.16	
			− 34.88	
			67.04	

W 19 9.45
W 15 30.55
R 30.60
R 30.73
W 30.78

15 30.66

18 59 47.2

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1880phae.proj.1510.

183 T Virginis 9.99970

h m s
13 35 29
° '
+2 8

0.10908

193 γ Bootis

14 27 12
° '
+38 50

0.70908

1880 May. 22.

h	m	s											
13	54	—			55	5.2		14	26	27.22		26	6.8
		—				7.0				29.75	32420		8.9
		—				8.5				32.38	32.42		10.8
		—				9.7				35.00			12.5
		—			418	11.4			16210	37.75		539	11.9
						418				1210			3.9
+8.26	10.08	91.30	1.82		55	836				43.00		26	10.78
6.19	10.19	10.144	4.00			+ 1.76				45.60			+ 42.74
4.13	10.13		6.00							48.29			
+2.00	10.15		8.15	10.147						50.87	53588		
-0.00	10.20		10.20	1015	55	43.9				53.08	53.59	27	29.7
2.01	10.16		12.17			45.3				56.22	53.55		32.0
4.13	10.25		14.38			47.0				58.95			34.0
6.19	10.11		16.30			48.7				1.48			36.4
8.27	10.03	9132	18.30		2353	50.4			47729	4.30		1704	38.3
		9132				353				3229			2.04
12.34	10.11	10.44	22.50		55	47.06				9.57		27	34.080
14.46	10.12	10.088	24.60	24620		− 36.94				12.00	14.684		−40.51
16.52	10.13		26.65	2662						14.67	14.68		
18.58	10.06		28.65							17.38	10710		
20.71	9.99	3310	30.79		55	836			7342	20.00		26	10.78
			3310		55	47.06				2342	26 53.570	27	34.08
												+	42.51
												−	40.79
													83.30

10.116
10.124

W	11	51.43			W	29	21.03		
W	12	47.53			W	25	44.43		
R	12	47.60			R		44.25		
R	12	47.63			R		44.40		
W	12	47.82			W		44.25		
	12	47.64					4433		

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154						155						166		
α Urs. Maj.						ψ Urs. Maj.						γ Urs. Maj.		
h m s 10 56 15						h m s 11 2 51						h m s 11 47 28		
° ′ +62 24			0.10908			° ′ +45 9			0.10908			° ′ +54 22		0.10908

1880 May 23

h	m	s			s	h	m	s			s	h	m	
10	55	41.00		56	22.7	11	2	4.00		1	55.0	11	46	Can't read
		42.70			25.7			6.90	9.790		56.5			
		44.00	55 44.04		28.5			9.80	9.79		59.0			
		45.50			32.0			12.65			1.0			
		47.00		1441	35.2		4895	15.60		2957	4.2			
		48.55			441			4895			457			
		50.00		56	28.82			21.50		1	59.14			
		51.55	51.55					24.40			+34.06			
		53.00						27.30						
		54.45						30.30	33.178					
		56.00		57	16.7			33.20	33.18					
		57.40			20.0			36.18	33.22					
		58.90	58.94		23.2			39.00						
		0.45			26.2			41.90						
		2.00		1167	30.6		29860	44.82						
		3.37			167			2860						
		4.88		57	23.34			50.87						
		6.45	6.42					53.73	56.660					
		8.00						56.60	5666					
		9.40						59.58	6645					
		10.80		56	28.82		28330	2.52		1	59.14			
		12.17		57	23.34			3330	2 33.200	+	34.06			
		13.60	13.67											
		15.20												
		16.70												
			55 58.92											

10 56 21.84

R 56 42.15 ·	R 10 37.05 ·	W - 0.43 ·
R 12.18 ·	R 10 36.95 ·	W 59 4.58 ·
R 12.25 ·		W 59 4.50 ·
12.22	37.00	4.54
62 23 55.0		

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1880phae.proj.1510

-2

β Cass S.C.

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1880 May 23.

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m	s	m	s																				
1	39.70			1	12.0	1	36.0	12	34	51.30		34	41.9	0	48	18.90		47	47.0	49	6.7
	43.75	47.520			15.3		40.7			53.30	55.360		43.6			28.50	27.456		50.7		9.6
	47.40	47.52			17.9		43.2			55.35	55.36		48.1			27.65	27.46		53.3		14.0
	51.40				19.8		46.0			57.40			46.7			31.60			56.0		17.7
23760	55.35			893	24.3	2153	49.4		27680	59.45		2258	48.5		13728	35.63		2660	59.0		21.3
	3760				393		153			2680			258			3728			160		693
	3.53			1	17.86	1	43.06			3.50		34	45.16			43.67		47	53.20		13.86
	7.40			+1	1.29		+36.09			5.60			+26.66			48.30		+1	7.32		
	11.37									7.65						52.40					
	15.15	19.167								9.78	11.797					56.36	0.514				
	19.15	19.17		3	10.0	3	33.6			11.84	11.80					0.48	0.51	49	45.4	50	16.4
	23.20	19.13			13.0		36.6			13.90	11.85					4.37	0.53		47.7		13.0
	27.00	1			17.6		38.6			15.90						8.75			51.3		20.3
	30.90				21.4		41.3			18.00						12.90			53.8		22.4
17250	34.80			893	25.3	1947	44.6		10617	20.00					54463	17.20		2555	57.3		25.5
	82.50				373		447			1617						463			55		102.6
	43.00			3	17.46	3	38.94			24.18						25.40		49	50.10		20.52
	46.70	50.750			−58.31	−1	19.79			26.28	28.336					29.40	33.604		−50.58		
	50.70	5075								28.34	28.34					33.60	3360				
	54.65	15827								30.38	14370					37.87	12106				
25375	58.70			1	17.86	1	43.06		14168	32.50		34	45.16		16802	41.75		47	53.20	49	13.86
	375	2	19.160	3	17.46	3	38.94			4168	35 11.825			49		1802	0.520	49	51.10	50	2.052
				+	61.29	+	36.09					+	26.66					+	67.32		
				−	58.31	−	79.79											−	50.58		
					119.60		115.88												117.90		

13 35 37.84

W 54 42.33.
W 54 25.18.
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W 54 8.03.

W 6 20.48.
W 6 20.55.
6 20.51
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W 28 53.80.
W 28 0.68
W 27 37.78 omit 27
W 26 19.73

172

γ Virginis

h m s
12 35 32
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176		2		13	
ε Virginis		β Cass		γ Cass	
h m s 12 56 9	1.17609 0,10908	h m s 0 2 44	0,10908	h m s 0 49 25	0,10908
° ′ +11 37	9.99101 1.16710	° ′ +58 29		° ′ +60 4	

ε Virginis

12 55 28.50		55 43.8		
30.55	32740	45.7		
32.75	3274	47.1		
34.90		48.8		
16370 37.00		2354 50.0		
1370		354		
41.24		55 47.08		
43.30		+ 2.53		
45.43				
47.56	49.626			
49.67	49.63	56 21.5		
51.80	49.60	23.3		
53.75		24.8		
55.88		26.4		
44663 58.00		1245 28.5		
8663		245		
2.31		56 24.90		
4.40	6470	−35.29		
6.45	6.47			
8.57	9921			
3235 10.62		55 47.08		
3235	55 49.615	56 24.90		
		+ 2.53		
		− 35.29		
		37.82		
		1.57772		
		1.16710		
		2.74482		
		2.02987		
		9.28505 ?		
		10 54 41		

β Cass

0 1 45.00		0 56.7	2 9.3			48 —		
49.00	52880	59.1	11.6			—		
52.95	52.88	2.2	13.8			—		
56.75		5.3	17.5			—		
26440 0.70		123 9.0	734 21.2			—		
1440		123	234					
8.70		1 246	2 1468	16.54	6.04	54.82 49.50		
12.72		+1 22.06	+9.84	12.41	6.07	6.091 53.66		
16.75				8.26	5.98	57.72		
20.70	24.558			4.09	6.09	2.00	6.098	
24.68	24.56	3 13.5	3 46.5	0.10	6.10	6.00	6.10	50 23.5
28.46	24.48	15.5	47.4	4.12	6.16	10.28		27.0
32.44		20.0	48.5	8.27	6.30	14.57		31.0
36.30		23.2	50.0	12.41	5.94	18.35		34.0
22102 40.27		980 25.8	2437 51.3	16.56	6.24	5488 22.80		1527 37.2
4102		480	437			5488		27
48.20		3 1960	3 48.74	24.81	3.89	11.21 28.70		50 3054
52.15	56.090	−55.08	−1 24.22	28.94	3.11	2.242 32.05	35350	−1 26.25
56.00	56.09			33.04	2.18	35.27	35.35	
0.10	16897			37.22	1.18	38.40		
28045 4.00		0 2.46	2 14.68	−41.48	.85	17675 42.33		50 30.54
3045	2 24.520	3 19.60	3 48.74			2675		
		+ 82.06	+ 9.84					
		− 55.08	− 84.22	4.166				
		37.14	94.08	4.288				

W 43 21.38
W 45 8.45
R 45 8.55

45 8.50
107.12

W 50 9.33 No name
W 56.55 given in
W 3 48.93 Circle Reading
W 58.10 → prob 51

R 16 38.35
R 17 12.10
R 17 11.83

17 11.96

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5

Sun – c = 44.366

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1880
May 23–24

h	m	s																					
4	5	21.00			6	25.1	7	36.60		7	1.8			9	24	—							
		23.18	25.290			27.3		38.85	41.030		3.2					—							
		25.22	2529			29.6		41.00	41.03		4.6					—							
		27.37				31.5		43.20			5.9					—							
	12645	29.68			1468	33.3	20515	45.50		225	7.0					—							
		2645				468		515			225												
		34.30			6	2936		50.10		7	450	+	13.47	27.47	248.45	14.00							
		36.47				−46.30		52.20		7	+ 54.32		10.11	27.61	27.605	17.50							
		38.63						54.47					6.73	27.68		20.95							
		40.85	4 3083					56.67	58.854			+	3.33	27.93		24.20	27.610						
		43.00	4308					58.78	58.85			−	0.00	27.67		27.67	27.61	25	8.2				
		45.20	43.05					1.00	58.80				3.36	27.70		30.86			11.3				
		47.50						3.20					6.74	27.54		34.33			13.7				
		49.80						5.47					10.11	27.69		37.80			16.2				
	38775	52.00					52969	7.80					13.49	27.69	24849	41.18			678	18.4			
		2775						7969								6849				178			
		56.50						12.10					20.21	27.56	137.79	47.75			25	13.56			
		58.60	0.810					14.40	16580				23.39	27.53	27.558	51.10	54.520			−45.97			
		0.70	0.81					16.70	16.58				26.90	27.60		54.50	54.52						
		3.00	8610					18.70	11761				30.31	27.64		57.95							
	405	5.25			6	2936	82902	21.00		7	4.50	−	33.79	27.46	27260	1.25			25	13.56			
		405	5 43.065					3290	7 58.825							2260							
					−	4630				+	54.32												

27.581
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W 7 10.95.

W 40 5.98.

R 7 18.48.
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140

Ω Ues. Maj.

h m s
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+52 14

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May 24

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153 β Urs. Maj. h m s 10 54 32 ° ' +57 02 — 0.10908

154 α Urs. Maj. h m s 10 56 15 ° ' +62 24

155 Ch. not read — ψ Urs. Maj. 11 28 51 +45 9 — 0.10908

166 γ Urs. Maj. h m s 11 47 28 ° ' +54 22 — 0.10901

10	53 36.70		53 17.0	10	55 —			11	46 34.40		45 59.0
	40.45	44280	19.5		—				37.85	41440	1.4
	44.30	4428	22.5		—				41.40	4144	3.6
	48.15		25.0		—				45.00		6.3
22140	51.80		1117 27.7		—			20720	48.55		192 8.9
	2140		117						720		192
	59.47		53 2234	+17.81 58.41	526.68 40.60				55.60		46 3.84
	3.20		+52.27	13.36 58.63	58.52 45.27				59.00		+1 5.95
	7.00			8.40 58.50	49.60				2.80		
	10.80	14.611		4.41 58.41	54.00	58.528			6.25	9.772	
	14.58	1461		−0.00 58.55	58.55	58.53	56 47.5		9.75	9.77	47 55.0
	18.40	1462		4.44 58.56	3.00		50.9		13.28	9.81	57.8
	22.20			8.91 58.49	7.40		54.6		16.82		1.0
	25.95			13.36 58.57	11.93		57.5		20.45		3.9
13150	29.90			17.84 58.56	52675 16.40		2715 1.0	8795	24.00		40 6.3
	4150				7675		215		8795		40
	37.45			26.72 58.51	292.59 25.23		56 5430		31.00		48 0.80
	41.20	44970		31.17 58.63	58.518 29.80	34176	−55.78		34.70	38190	−51.01
	44.95	4497		35.63 58.57	34.20	34.18			38.20	38.19	
	48.70	14925		40.09 58.41	38.50				41.75	13963	
22485	52.55		53 2234	−44.68 58.47	17088 43.15		56 5430	19095	45.30		45 3.84
	2485	54 14.615			2088				4095	47 9.790	47 0.80
			+ 52.27								+ 125.95
				58.519							+ 8.99
				58.519	55 58.530						134.94
					−.033						
					55 58.497						
					56 25.21						

10 56 21.80

ψ Urs Maj — γ Urs Maj

R −2 4.55 no stroke	R 56 55.85	R 11 36.18	W 57	38.80
	R 56 55.68	R 11 35.20	W 58	6.05
	55.76		R	6.40
			R	6.38
			W	6.10
				6.23

62 28 56.1

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1880
May 24

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1	39.34			1	14.6	2	23.4	12	47	46.80			47	49.0	12	55	28.20			55	25.2		
	43.24	47180			19.2		25.6			50.80	54370			52.3			30.35	32440			26.3		
	47.22	47.16			22.0		27.4			54.46	54.37			54.7			32.45	32.44			28.5		
	51.00				24.3		30.0			57.95				57.2			34.55				30.6		
23580	55.10			1074	27.3	1393	32.9			27185	1.84		2731	59.9		16220	36.65			1426	32.0		
	3590				74		393				2185			231			1220				426		
	3.15			1	2.148	2	27.86				9.28		47	54.62			40.78			55	28.52		
	6.95				+57.40		−8.98				13.00			+29.70			42.87				+20.71		
	11.00										16.80						45.00						
	15.00	18.944									20.55	24.306					47.17	49.204					
	19.00	18.94		3	8.0	3	39.0				24.30	24.31	49	7.3			49.20	49.20		56	17.6		
	23.00	18.83			4.5		41.5				28.00	24.33		9.6			51.33	49.27			19.2		
	27.00				6.5		43.3				31.80			12.8			53.39				20.7		
	30.75				9.6		46.7				35.65			15.3			55.50				22.0		
17950	34.65			360	12.4	2196	49.1			21875	39.37		634	18.4		44284	57.60			1035	24.0		
	8050				3600		196				3875			134			8284				35		
	42.53			3	7.20	2	43.92				46.80		49	12.68			1.80			56	20.70		
	46.50	50500			−48.32		−25.04				50.50	54.286		−48.36			4.00	6.110			−31.47		
	50.57	5050									54.33	54.29					6.15	6.11					
	54.40	15766									58.00	16866					8.25	9855					
25256	58.50			1	21.48	2	27.86			27143	4.80		47	54.62		3053	10.35			55	28.52		
	250	2	18.885	3	7.20	3	43.92				2143	48	24.320	49	12.68		3085	55	49.235	56	20.70		
	47.180										54.370						32.440			+	20.71		
	80500										54.280						6.110			−	31.47		
	18.680										24.328						49.275				52.18		
	18944										24.306						49.204				1.71750		
	18.892										24.317						49.240				1.16710		
	+29										−027						— 15				2.88460		
	18.921										24.290						49.225				1.82210		
																					8.93750		
																					4 56 57		

173

E Urs. Maj

h m s
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0.10908

W	54	30.00						W	—	1398													
W	54	45.43						W	44	8.40	8.35												
W	54	19.03						R	44	8.30													
W	54	54.30						R	44	8.65	8.70												
W	54	13.98						W	44	8.75													
									44	8.52													

176

E Virginis

h m s
12 56 9
0 ′
+11 37

0.70908

W	42	59.53																					
W	44	5.80																					
R	44	5.98																					
R	44	5.90																					
W	44	6.00																					
	44	5.92																					
		66.39																					

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307		309		311	
β Aquarii		ε Pegasi		α Aquarii	
h m s		h m s		h m s	
21 25 11		21 38 14		21 59 34	
° ′		° ′		° ′	
Ex. Min −6 6	0,10908	+9 19	0,10908	−0 54	0,10905

examined for stars which have been observed twice on one date

on May 27 1880 Landrum

Look up Chronograph Sheets & Record Books. & Examine whether civil or Ast. date used

1880phae.proj.1510

307 β Aquarii

h m s
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−6° 6′

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26	29.75			26	16.3	21	39	33.00		39	26.5	22	0	32.50		0	42.9
	31.85	33900			16.5			35.00	37090		25.8			34.60	56640		44.3
	34.00	3390			17.7			37.00	3709		24.0			36.60	5664		46.0
	35.90				19.0			39.25			32.4			38.70			47.2
16950	38.00			892	20.7	18545		41.20		1529	34.2	28320		0.80		2290	48.6
1950					392			3545			29			3320			290
	42.16			26	17.84			45.40		39	30.58			4.80		0	45.80
	44.20				+32.62			47.65			+23.20			6.95			+27.32
	46.33							49.58						9.00			
	48.46	50491						51.67	53778					11.10	13131		
	50.42	5049						53.80	5378					13.15	1313		
	52.68	50.46						55.80	53.79					15.20	13.12		
	54.73							58.00						17.28			
	56.75							0.00						19.30			
45442	58.70					18400		2.20				11818		21.40			
	442							3400						2818			
	2.90							6.30						25.45			
	5.00	7030						8.35	10500					27.60	29610		
	7.00	703						10.42	1050					29.65	2961		
	9.00	1093						12.58	10759					31.65	14625		
3515	11.25			26	17.84	5250		14.88		39	30.58	14805		33.70		0	45.80
	3515	26	50475	+	32.63		5250		39	53.785			4805	1	13.125		
										+	23.20					+	27.32

21 59 89.60

R 23 58.13
R 23 57.98

23 58.05

R 59 17.55
R 59 17.50

59 17.52

R 52 32.18
R 52 31.98

52 32.08
0 53 59.1

309 ε Pegasi

h m s
21 38 14
+9° 19′

0,10908

311 α Aquarii

h m s
21 59 34
−0° 54′

0,10905

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322			329			33		
η Pegasi			ζ Pegasi			ζ Arietis		
h m s			h m s			h m s		
22 37 20			22 58 44			2 0 21		
° ′			° ′			° ′		
+29 35	1.17609	0.10908	+14 23		0.10908	+22 53		0.10908
	993934							
	1.11543							
1880								
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h m s								
22 38 35.40	38 24.2	38	0 1.70		59 48.0	1 59 37.88		59 26.3
37.80 40080	25.5		3.80 5.920		46.4	40.00 42312		28.0
40.80 4008	27.2		5.90 5.92		48.0	42.28 42.31		29.7
42.40	29.0		8.00		49.4	44.60		31.1
20040 44.80	1369 31.0		2960 10.20		2402 51.4	21156 46.80		1478 32.7
040	369		2960		402	1156		478
49.50	38 27.38		14.50		59 48.04	51.15		59 29.56
51.90	+31.65		16.65		+34.94	53.78		+30.67
54.32			18.75			55.97		
56.65 59024			20.90 22.983			58.00 0.281		
59.00 59.02	39 32.7		23.00 22.98		0 53.3	0.18 0.28		
1.40 59.04	34.3		25.00 22.98		55.3	2.42 0.18		
3.73	36.4		27.23		57.0	4.85		
6.17	37.7		29.32		687	7.00		
53122 8.55	1808 39.7		20685 31.50		2848 0.5	54253 9.18		
812 4	308		2685		348	253		
13.30	39 36.16		35.78		0 56.96	13.50		
15.60 18.010	−37.13		37.87 40.054		−33.98	15.80 18036		
18.00 18.01			40.00 40.05			18.00 18.04		
20.40 11809			42.25 4597			20.30 12035		
9005 22.75	38 27.38		20029 4437		59 48.04	9018 22.38		59 29.56
4005 38 59.030	39 36.16		027	0 22.980	0 56.96	4018 0 0.230		
	+ 31.65				+ 34.94			+ 30.67
	37.13 ~~82.87~~				− 33.98			
	68.78 ~~+1452~~				68.92			
	~~2.05588~~	1.83746	22 58 48.98		1.83835	2 0 25.87		
	1.11543	295289						
	~~3.17431~~							
	1.87973							
	~~8.70642~~	8.92684						
	~~2 54419~~	4 49 47						
W 43 33.55 ·			W 45 6.30 ·			R 25 20.13 ·		
W 44 49.58 ·			W 41 31.20 ·			R 25 20.45 ·		
R 44 49.25 ·			R 31.50 ·					
R 44 49.38 ·			R 31.45 ·					
W 44 49.23 ·			W 31.38 ·					
44 49.36			41 31.38			25 20.44		
75.81								
		14 33 42.5				22 58 45.0		

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h m s
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1880

May 24–25

4	9	23.00			10	36.1	11	38.89			10	57.9			10	13	20.30			13	12.0
		25.15	2.7340			38.0		41.00	4.3260			0.8					20.10	2.5824			14.0
		27.22	27.34			39.7		43.20	4.326			1.5					25.80	25.82			15.5
		29.55				41.6		45.46				3.6					28.55				17.2
	13670	31.78			1988	43.4	21630	47.75				88 5.0				12912	31.37			780	19.3
		3670				488		1630				88					29.12				280
		36.18			10	39.76		52.00			11	1.76					37.00			13	15.60
		38.40				− 54.67		54.10				+ 59.15					39.85				+ 32.43
		40.40						56.85									42.65				
		42.70	44.983					58.86	0914								45.38	48.114			
		46.03	45.09					0.92	0.91								48.00	48.11			
		47.00	45.16					3.30	0.91								50.75	47.95			
		49.47						5.38									53.70				
		51.80						7.42									56.45				
	40585	53.90					823	9.70								43303	59.25				
		4485						823									7303				
		58.40						14.17									4.86				
		0.58	2.860					16.33	18.560								7.44	10.282			
		2.77	286					18.50	18.56								10.23	10.08			
		5.20	9020					20.70	12182								13.02	9590			
	1430	7.35			10	39.76	9280	26.10			11	1.76				5141	15.86			13	15.60
		1430	9 45.095			− 54.67		4280	12 0910			+ 59.15					5141	13 48.030			+ 32.43

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May. 25

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		β Urs. Maj.				α Urs. Maj.				ψ Urs. Maj.		
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10 52	36.57		52 15.3	10	54 —			11	1 3.45		0 41.2	0
	40.38	44190	17.7		—				6.30	9.234	42.7	
	44.20	44.19	20.2		—				9.25	9.23	44.3	
	48.00		23.3		—				12.17		46.5	
	22095 51.80		1032 26.7		—				4617 15.00		2237 49.0	
	2095		32						4617		237	
	59.33		52 2064	+17.81 58.46	526.22 40.65				20.90		0 44.74	
	3.00		+ 53.82	17.36 58.58	58.464 45.22				23.90		+ 47.91	
	7.00			8.90 58.50	49.60				26.78			
	10.72	14513		+4.41 58.31	53.90	58.487			29.70	32626		
	14.50	1451		−0.00 58.40	58.40	58.26	55 48.0		32.60	3262		
	18.38	14.42		4.44 58.56	3.00		51.1		35.58	32.68		
	22.14			8.91 58.59	7.50		55.8		38.42			
	25.85			13.36 58.40	11.76		59.4		41.40			
	13062 29.70			17.84 58.415	2438 16.35		2773 3.0		29363 44.35			
	4062				7638		273		2363			
	37.30			26.72 58.48	292.36 25.20		55 55.46		50.38			
	41.00	44.846		31.17 58.53	58.472 29.70	34.130	−56.99		53.18	56146		
	44.85	4465		35.63 58.42	34.05	34.13			56.17	56.14		
	48.68	14884		40.09 58.46	38.55				59.00	6537		
	22323 52.40		52 2064	44.68 58.51	7065 43.15		5 85 55.46		28073 2.00		0 44.74	
	2423	53 14.465	+ 53.82		2065				3073	1 32.650	+ 47.91	
				58.470 58.470	58.480 − 33 58.46							
				10 56	21.77							
	R 31.55 ·			R 56	57.40 · 57.25 ·				R 10 25.45 · R 10 25.40 ·			
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β Cass. L.C.

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γ Cass. L.C.

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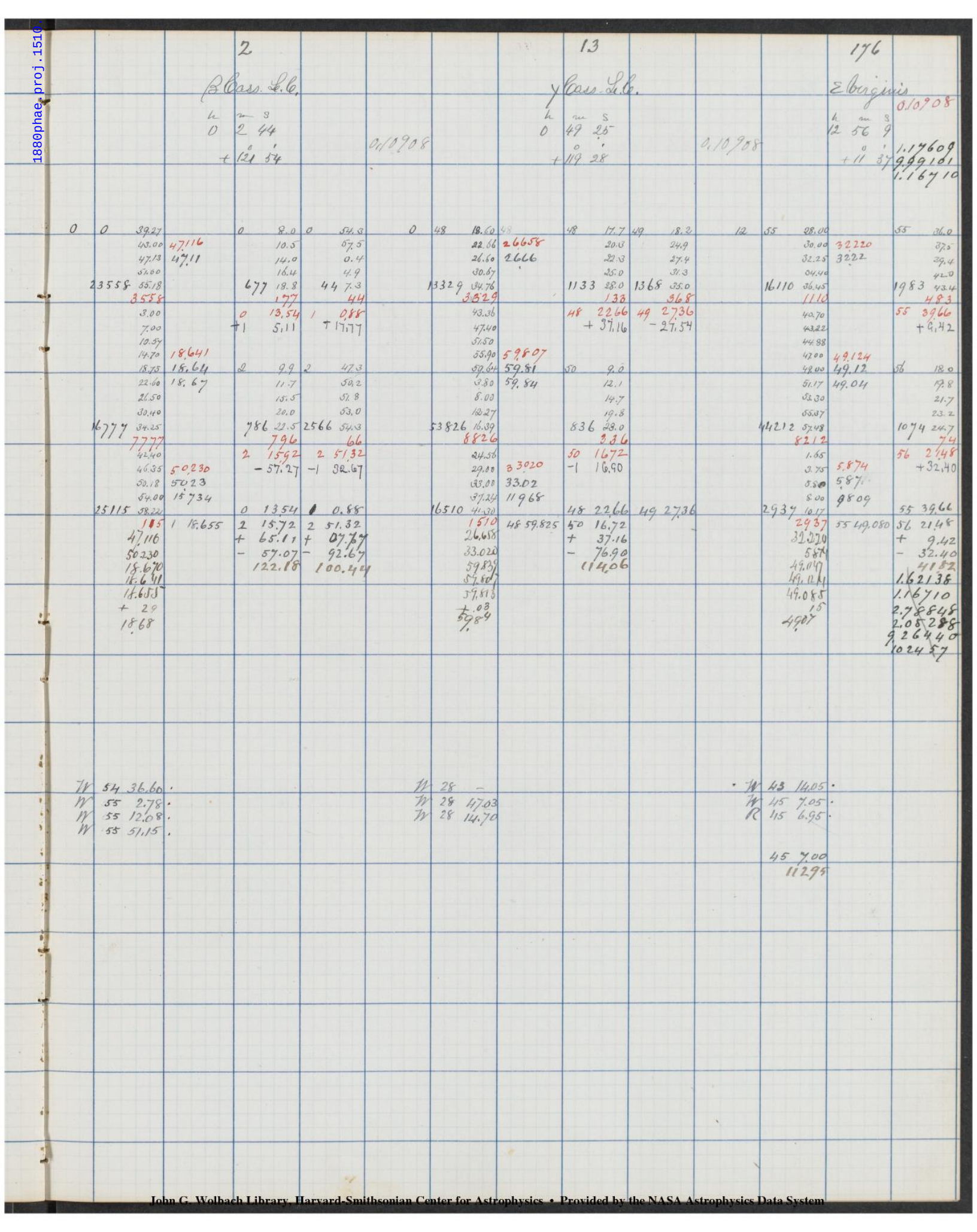
176

ε Virginis

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20 — δ Cass. L.C. — h m s 1 17 55 — ° ' +120 24 — 0.10908

181 — η Urs. Maj. — h m s 13 42 46 — ° ' +49 55 — 0.10908

182 — η Bootis — h m s 13 48 55 — ° ' +19 0 — 0.10908

1880 May 25.

h	m	s												
				17 24.0	18 22.4	13 41 55.40		41 30.5	13 48 13.70		48 3.0
				27.2	26.0	58.65	1.830	35.6	15.90	18.060	4.6
				30.7	28.8	1.90	1.83	37.8	18.00	18.06	6.2
				32.7	33.0	5.00		40.5	20.20		7.7
				1504 35.8	1466 36.4	915 8.20		1908 43.4	9030 22.50		305 9.0
				04	466	915		408	4030		305
+16.33	30.09	17 13.76		17 3008	18 2932	14.70		41 3816	26.72		48 6.10
12.23	29.83	269.06 17.60		− 0.22	− 59.46	17.85		+ 49.31	28.92		+ 29.40
8.16	29.98	29.895 21.82				21.00			31.10		
4.07	29.85	25.78	29888			24.30	27480		33.28	35.477	
−0.00	30.00	30.00	29.89	19 2.1		27.48	27.48	43 18.8	35.44	35.48	49 3.8
4.03	29.94	33.97		3.8		30.64	27.47	21.0	37.68	35.52	5.2
8.15	29.73	37.88		6.0		33.85		23.0	39.90		6.9
12.23	29.77	42.00		8.0		37.15		25.5	42.00		8.3
16.31	29.87	6899 46.18		300 10.1		24732 40.35		1166 28.3	31929 44.25		340 9.8
		6899		300		24732		1.66	4929		340
24.46	29.74	149.05 54.20		19 600		46.65		43 2332	48.57		49 6.80
28.56	29.84	29.81 58.40	2436	−1 36.14		49.98	53112	− 55.85	50.75	52.984	31.30
32.64	29.80	2.44	2.44			53.00	53.11		53.00	5298	
36.68	29.82	6.50				56.33	5494		55.20	7104	
40.79	29.85	1218 10.64		17 3008	18 2932	26556 59.60		41 3816	26492 57.40		48 6.10
		1218		19 6.00		1556	42 27475	43 23.32	1492	48 35.500	49 6.80
						1.830		+ 49.31	18.060		+ 29.40
29.852						53.112		− 55.85	52.984		− 31.30
29.865						27.471		105.16	35.822		60.70
						27.480			35.477		
						27.475			35.500		
						− 23			− 16		
						27.45			33.48		

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13 54	48.60		54	47.7
	50.65	52710		49.1
	52.71	52.71		51.0
	54.73			52.4
26355	56.86		2542	54.0
	1355			42
	0.90		54	50.84
	3.00			+18.35
	5.00			
	7.15	9.184		
	9.17	9.17	55	36.9
	11.26	9.21		38.1
	13.30			39.8
	15.28			41.8
8256	17.50		1998	43.2
	8266			498
	21.48		55	3996
	23.63	25.708		30.77
	25.80	25.71		
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12857	29.86		54	50.84
	2854	55 9.190	55	39.96
			+	18.35
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				21.4
14 9	26.68		9	28.0
	28.90	31046		24.9
	31.00	31.05		26.4
	33.25		1237	28.0
15523	35.40			237
	523		9	2474
	39.80			+23.85
	42.00			
	44.25			
	46.38	48.589		
	48.60	48.59	10	19.9
	50.77	48.59		21.6
	53.00			23.4
	55.20			25.3
43730	57.30		1175	27.3
	7730			175
	1.86		10	23.50
	3.97	6.134		−34.91
	6.02	6.13		
	8.32	9718		
3067	10.50		9	2474
	3067	9 48.590	10	23.50
			+	23.85
			−	34.91
				58.76

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22 36	35.37		36	20.0
	37.70	40.050		21.9
	40.00	40.05		23.7
	42.40			25.4
20025	44.78		1180	27.0
	025			180
	49.60		36	2 360
	51.90			35.45
	54.30			
	56.65	59.049		
	59.00	59.05		
	1.47	59.05		
	3.75			
	6.17			
53144	8.60			
	8144			
	13.26			
	15.67	18.050		
	18.00	18.05		
	20.42	11810		
9025	22.80		36	2360
	4025	36 59.050		
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22 58 1.63				0						0 48 24.32			48	12.9
3.60	5.876									28.35	32.604			15.0
5.85	587									32.60	32.60			18.3
8.00										36.87				21.0
2938 10.80										16302 40.90			907	23.5
2938										1302			411	
14.46										49.20			48	1824
16.50										53.45				+47.51
18.73										57.50				
20.84	22.934									1.40	5.720			
20.95	22.93	58	52.9							5.68	5.72		49	39.9
25.00	22.90		54.2							9.80	5.78			42.3
27.20			55.8							14.00				46.5
29.30			57.5							18.20				50.3
20641 31.43		2794	59.0							5148 22.25			2316	52.6
2641		294								5148			316	
85.67		58	55.88							30.60			49	4632
37.80	39.944		-32.97							34.80	38.966			-40.57
39.90	39.94									39.00	38.97			
42.15	4581									43.25	131.57			
19972 44.20					0 7 5.15					19483 47.18			50	30.7
4972	58 22.915	58	55.88							4483	49 5.750			31.3
														31.9
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			~	32.97										33.2
22 58 49.01													1935	33.9
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													50	32.25
R 116 30.42.					R 47 48.47.					R 39 45.00.				
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46 30.51										R 41 12.45.				
14 83 42.7					14 81 5.8					41 12.50				
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+	16.31	35.86	820.69	19.55				18	2.78	+	1.86	8.21	74.42	57.15					
	12.23	35.71	35.632	23.48					−27.10		8.30	8.38	8.269	0.08					
	8.15	35.60		27.45							5.53	8.23		2.70					
+	4.03	35.59		31.50		35.640				+	2.74	8.20		5.46		8.273			
−	0.70	35.62		35.62		3564		18	04.2	−	0.50	8.37		8.37		8.27		55	41.4
	4.07	35.60		39.67					55.3		2.76	8.24		11.00					43.2
	8.16	35.64		43.70					56.8		5.53	8.29		13.82					46.2
	12.23	35.60		47.83					58.7		8.30	8.20		16.50					47.3
	16.33	35.57	32076	51.90				2850	0.0		11.08	8.30	7446	19.38				2264	49.3
				5076					350					7446					264
	24.46	35.79	17882	0.25				18	5700		16.54	8.31	41.59	24.90				55	45.28
	28.54	35.76	35.764	4.30		8412		−1	21.32		19.36	8.29	8.318	27.65		30460			+ 23.01
	32.63	35.85		8.48		8.41					22.13	8.42		30.55		3046			
	36.70	35.78		12.48							24.69	8.36		33.25					
−	40.91	35.64	4206	16.55				18	2.78	−	27.74	8.27	15230	35.95					
				4206				18	57.00					230				55	45.28

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22.75 25500 — 18.5 — 40.03 43740 — 8.2 — 18.00 22456 — 11.2 — 55.5
25.50 25.50 — 20.9 — 43.70 43.74 — 11.0 — 22.50 22.46 — 14.4 — 59.5
28.25 — 23.0 — 47.50 — 13.6 — 26.85 — 17.3 — 2.9
12750 31.00 — 10.35 24.8 — 21870 51.30 — 540 17.0 — 11228 31.28 — 732 21.3 — 2977 7.1
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36.58 — 13 20.70 — 58.58 — 52 4.80 — 40.28 — 54 14.64 — 55 57.54
39.30 — +26.97 — 2.75 — +1 3.30 — 44.70 — +43.44 —
42.00 — — 6.52 — — 49.20 — — —
44.90 47.668 — — 10.83 14.1114 — — 53.60 58072 — — —
47.70 47.67 — — 14.00 1411 — — 58.00 58.05 — 56 16.6
50.48 47.68 — — 18.00 14.09 — — 2.50 58.11 — — 20.6
53.25 — — — 21.70 — — — 7.00 — — — 28.2
56.00 — — — 25.55 — — — 11.37 — — — 36.13
42901 58.80 — — 12703 29.30 — — 52245 16.00 — 1168 39.1 —
6901 — — — 3703 — — — 7265 — — 168 —
4.02 — — — 36.88 — — — 24.80 — — 56 23.36 —
7.18 9.860 — — 40.67 44.440 — — 29.30 33.774 — −1 25.28 —
9.90 9.86 — — 44.40 44.44 — — 33.75 33.77 — — —
12.70 9.536 — — 48.25 14818 — — 38.17 11623 — — —
49.30 5.50 — 13 20.70 — 22220 52.00 — 52 10.80 — 16884 42.85 — 54 14.64 — 55 59.54
15 49.30 — 13 47.675 — 2220 53 114.100 — 1887 54 58.080 — 56 23.36 —
47.30 — + 26.97 — 43.740 — + 63.30 — 22.456 — + 43.44 —
— — — — 44.440 — — — 33.774 — − 85.28 — 6146
— — — — 14.090 — — — 58.115 — 128.72 —
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6.00	8.896	42.4		
8.90	889	44.7		
11.80		46.9		
4448 14.78		2242 49.4		
4448		242		
20.56		0 4484		
23.60		+47.44		
26.50				
29.40	32296			
32.30	3229	2 11.5		
35.15	32.28	14.0		
38.15		16.5		
41.00		18.7		
29066 44.00		816 20.9		
2066		316		
49.90		2 1632		
52.85	55.670	−44.04		
55.80	55.67			
58.60	6456			
27835 1.60		0 44.84		
2835	1 32.285	2 16.32		
8.896		+ 47.44		
55.670		− 44.04		
32.283		91.48		
32.295		1.96133		
32.289		1.02444		
22		2.98577		
3226		1.91249		
		8.92672		
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41.44	45.930	13.4		
45.95	45.93	16.4		
50.30		19.6		
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2965		326		
3.55		14 1652		
7.86		+1 464		
12.35				
16.68	21.152			
21.26	21.15			
25.55	21.18			
29.95				
34.33				
19037 38.90				
1037				
47.57				
52.00	56.430			
56.40	56.43			
0.90	16236			
28215 35.28		14 1652		
3215	15 21.165			
45.930		+ 6464		
56.430				
21.180				
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31.40	33534	17.8		
33.57	33.53	19.5		
35.57		21.0		
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1767		480		
41.72		24 1960		
43.90		+30.51		
46.00				
48.00	50099			
50.00	50.10			
52.20	50.13			
54.33				
56.38				
45089 58.86				
089				
2.60				
4.65	6.742			
6.70	674			
8.84	10027			
3371 10.92		24 19.60		
3371	24 50.115			
33.534		+ 30.51		
6.742				
50.138				
50.099				
50.119				
15				
50.10				

R 24 2.03
R 24 2.50

24 2.26

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311

α Aquarii

h m s
21 59 34
0 '
−0 54

0.10908

322

γ Pegasi

h m s
22 37 20
0 '
+29 35

0.10908

2

β Cass.

0.10908

h m s
0 2 44
0 '
+58 29

1.17609
9.71829
0.89438

1880
May 26

h	m	s																					
21	58	52.22			58	37.3		22	36	35.13		37	7.4	0	1	44.70		1	3.3				+41
		54.30	56296			39.3				37.52			9.4			48.35	52396		6.8				37.
		56.30	56.29			40.6				39.73			11.3			52.30	52.39		9.3				33.
		58.30				42.0				42.17			13.4			56.38			11.7				28.
	28148	0.46			2029	43.7				44.58		565	15.0		26198	0.25		459	14.8				24.
		3148				29							565			1198			459				
		4.50			58	4058				49.30		37	11.30			8.00		1	9.18				16.
		6.63				+3223				51.77						12.02		+1	14.77				12.
		8.70								54.00						16.00							8.
		10.70	12811							56.47	58.822					20.00	23927						+4.0
		12.80	12.81							58.81	58.82	37	35.8			24.00	2393	3	43.7				− 6
		14.92	12.81							1.20			37.7			27.90	23.97		45.0				4.1
		16.87								3.55			39.3			31.75			47.2				8.2
		19.00								6.00			41.4			35.90			48.9				12.4
	11530	21.18						52940	8.30			1973	43.1		21534	39.77		2352	50.4				−16.5
		2530							7440				1973			3534			352				
		25.20							13.00			37	39.46			47.65		3	47.04				
		27.30	29338						15.60	17.760						51.67	55.564	−1	23.09				
		29.30	29.34						17.80	17.76						55.55	55.56						
		31.36	14563						20.00							59.45	16795						
	14669	33.53			58	4058		8850	22.50			37	11.30		27782	3.50		1	9.18				
		4669	59 12.810						3880	36	59.123	37	39.46			2782	2 23.950	3	49.04				
		56.296			+	32.23										52.396		+	74.77				
		29.334														55.564		−	8304				
		12.811														23.780			157.86				
		12.811														23.927			2.19827				
		12.814														23.953			0.89438				
		÷ 15														27			3.09265				
		12.81														23.926			1.99957				
																			5.90692				?
																			436.51				

21 59 89.65

R	12	25.53			W	44	22.70					R	55	12.00									
R	12	25.60			W	44	53.65					R	56	51.90									
						44	53.40																
		12, 25.56				44	53.52																
0	53	58.4											56	51.90									
														99.90									

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13

p Cass.

h m s
0 49 29
+60 ° ' 4

0.10908

20

S Cass.

h m s
1 17 55
+59 ° ' 36

0.10908

+41.26	5.360	48	24.10		47	48.4			1	17	—		17	2.9
37.22	5.52	27.35	28.30	3 2.400		52.0					—			5.5
33.10	5.45	5.470	32.95	32.40		54.0					—			8.0
28.96	5.53		36.57			58.9					—			10.7
24.81	5.48	16200	40.68		2712	0.9					—		409	13.8
			1200			212								409
14.54	5.44	49.09	48.80		47	54.24	+	16.31	35.54	319.49	19.23		17	8.18
12.41	5.41	5.454	53.00		+1	11.22		12.23	35.53	35.499	23.30			+26.32
8.26	5.26		57.00					8.15	35.51		27.37			
+4.09	5.36		1.27	5.461				4.03	35.53		31.50	35.508		
−0.00	5.38		5.38	5.46	50	8.9		0.00	35.47		35.47	35.51	18	36.1
4.12	5.48		9.60			11.5		4.07	35.53		39.60			39.2
8.27	5.58		13.85			15.3		8.16	35.54		43.70			41.7
12.41	5.59		18.00			18.6		12.23	35.37		47.60			44.9
−16.56	5.59	4915	22.15		768	22.5		16.33	3547	31957	51.80		2112	49.3
			4915			268					49.57			112
			—		50	15.36					—		18	42.24
			—		−1	9.90					—		−1	6.74
	5.462		—								—			
	5.460		—						35.53		—			
			—		47	54.24					—		17	8.18
					50	15.36							18	42.24

5.461
— .027
5.4[illegible]
5.43

R	15	34.35	.	R	43	21.78	.
R	16	3.40	.	R	44	20.45	.
R	16	3.75	.	R	44	20.52	.
		3.58				20.48	

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S

Sm. C = 44,366 9.96883

h m s
4 19 29
° '
+21 27

0.10908

1880
May 26-27

153

B Mes. Maj. 4.72582

h m s
10 54 22
° '
+67 2

0.10908

May 27

ex.

h	m	s																
4	17	28.55	+22.17	50.72	18	29.9	19	44.55		19	1.2			10	53	—		
+15.95		30.85	30.90	23030		253.85	31.7	46.95	49.074		3.0					—		
17.75		30.75	33.00	33.03		50.77	33.0	49.00	49.07		5.0					—		
			35.25	+15.33	50.78		34.4	51.37			6.8					—		
	16515		37.45	13.30	50.75	1663	37.3	24537	53.50		246 8.6					—		
	1515						2.53		4537		246							
			42.00	8.87	50.87	18	35.060		38.02		19 4.92		+15.52	14.32	124.61	58.80		+17.8
			44.15	6.65	50.80	203.39	44.21		0.28		+1 1.97		11.64	14.24	13.845	2.60		13.34
			—			50.847			2.53				7.75	14.07		6.82		6.90
			—						4.67	6.917			+3.84	13.84		10.00	13.852	4.51
			—						6.90	6.92			13.88	13.88		13.88	13.85	.000
			—						9.00	6.86			3.87	13.70		17.87		4.44
			—						11.37				7.16	13.59		21.05		6.91
			57.55	6.65	50.90				13.58				11.69	13.51		25.15		1.336
			59.70	8.88	50.82			6225	15.90				15.54	13.46	12467	29.00		1.783
									6225							3467		
			—						20.20				23.28	13.52	65.76	36.80		2.671
			6.58	15.52	51.06	203.82			22.40	24.660			27.15	13.25	13.152	40.40	44.214	31.166
			8.74	17.74	51.00	50.955			24.60	24.66			31.04	13.13		44.17	44.21	3.562
			10.85	14.55	50.90				26.88	13 373			34.92	12.88		47.90		4.807
			13.00	9.27	50.86	18	33.26	12330	29.22			19 492	38.42	12.58	22107	51.80		44.664
									2330	20 6.890						2107		
												+ 61.97						
				50.857									13.498					5
				50.851									13.598			13.852		5
																- 3		
																13.82		

W 36 47.95. W 9 7.90. H Rowley

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1880phae.proj.1510

154 — α Urs. Maj.

h m s
10 56 15
° ′
+62 24

0.10908

10 55 — — — — —

+17.84	57.98	520.76	40.17		
13.36	57.86	57.862	44.50		
8.90	57.90		49.00		
4.41	57.87		53.46	57.869	
−0.00	57.88		57.88	57.87	56 48.6
4.44	57.84		2.28		52.5
8.91	57.84		6.75		56.1
13.36	57.82		11.18		59.7
17.83	57.77	52082	15.60		2802 3.3
			7082		302
26.71	57.81	289.23	24.52		56 56.04
31.16	57.84	57.846	29.00	33.490	−58.18
35.62	57.91		33.53	33.49	
40.07	57.93		38.00		
44.66	57.74	16745	42.40		
			1745		56 56.04

57.854
57.856

57.869
− 3

− 3
57.84

10 56 21.71

~~Rej~~ R 56 57.95 · Rej 1.5
R 57 56 58.02 ·

57.98
57 ~~58.02~~
60.07

62 28 65.1

155 — χ Urs. Maj

h m s
11 2 51
° ′
+45 9

0.10908

11 2	2.77		1	37.3	
	5.60	8.584		39.7	
	8.55	8.58		41.8	
	11.50			44.0	
4292	14.50		2088	46.0	
	4292			88	
	20.30		1	41.76	
	23.16			+50.25	
	26.18				
	29.00	32.013			
	32.00	32.01			
	35.00	32.01			
	37.90				
	40.80				
28812	43.78				
	1812				
	49.60				
	52.50	55.440			
	55.40	55.44			
	58.40	6.402			
27720	1.80		1	41.76	
	2720	2 32.010	+	50.25	

8.584
55.449
32.012
32.014
32.013
− .02
31.99

R 10 23.25 ·
R 10 22.72 ·

22.99 ·

1 — α Androm.

h m s
0 2 8
° ′
+28 25

0.10908

0 1	23.50		1	3.8	
	25.75	28.130		5.9	
	28.15	28.13		7.4	
	30.45			9.1	
14065	32.80		372	11.0	
	4065			372	
	37.55		1	7.44	
	39.60			+39.45	
	42.20				
	44.60	46.898			
	46.80	46.90			
	49.28	46.89			
	51.50				
	54.00				
42208	56.35				
	42208				
	1.00				
	3.30	5.660			
	5.67	5.66			
	8.00	9.379			
2830	10.33		1	7.44	
	2830	1 46.895	+	39.45	

28.130
5.660
46.895
46.889
46.892
− 16
46.87

0 2 12.80

R 53 19.52 ·
R 53 19.52 ·

28 25 44.3

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3		1	3
β Pegasi		α Androm.	β Pegasi
h m s		h m s	h m s
0 7 0		0 2 8	0 7 0
° ′	0,10908	° ′	° ′
+14 31		+28 25	+14 31

No Sheet.

1880 May 27

h m s			
0 6 17.38		6 7.1	0
19.55	21.646	8.8	
21.65	21.64	10.4	
23.70		9.8	
10823 25.95		493 13.2	
823		9.3	
30.10			
32.28		+28.80	
34.40	661 38.~~77~~ 66		
36.55			
38.67	38.~~79~~		
40.75	38.67		
42.90			
45.00			
35095 47.30			
~~8035~~			
51.42			
53.55	55710		
55.68	55.71		
57.90	7735		
27855 0.00		6 9.86	
2855	6 38.~~77~~ 665		
21.646		+ 28.80	
55.710			
38.679			
38.~~67~~ 68			
38.~~67~~ 69			
16			
38.64			

07 5.19

R 47 51.28		R 54 55.05	R 50 21.90
R 47 50.78		R 54 54.95	R 50 22.22
47 51.03		54 55.00	50 22.06

14 81 6.1

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S

Sun c = 46,495

h	m	s
4	35	48
°	′	
+22	3	

0.10908

1880

May 30 – 31

4	33	46.80		34	49.0	36	2.75		35	38.9
		48.60	50.770		51.1		6.00	7.276		40.3
		50.70	50.77		53.0		7.25	7.28		41.8
		53.10			54.6		9.58			43.3
	25385	55.15		2643	56.6	3638	11.80		2090	44.7
		385			143		3638			90
		59.53		34	5286		16.18		35	41.80
		1.85			−44.28		18.50			−43.36
		4.22					20.60			
		6.38	8.519				22.95	25.172		
		8.57	8.52				25.10	25.17		
		10.77	8.64				27.37	25.15		
		12.90					29.75			
		15.00					31.90			
	7667	17.45				22655	34.20			
		7667					4655			
		22.00					38.53			
		24.35	24.524				40.75	43.026		
		26.52	26.52				43.00	43.02		
		28.75	13729				45.35	5030		
	13262	31.00		34	5286	21513	47.50		35	41.80
		2262	34 8.580				1513	36 25.160		
				−	44.28				−	43.36

W 2 26.42

W 19 6.42

1

α Androm.

h	m	s
0	2	8
°	′	
+28	25	

0.10908

May 31

0	1	23.29		1	33.21
		25.50	27.938		34.5
		27.95	27.94		36.0
		30.30			37.7
	13969	32.65		1804	39.1
		3969			304
		37.30		1	3608
		39.70			+10.62
		42.00			
		44.35	46.709		
		46.70	46.71		
		49.00	46.69		
		51.38			
		53.80			
	42038	56.15			
		6038			
		0.70			
		3.00	5440		
		5.50	544		
		7.80	9338		
	2720	10.20		1	36.08
		2720	1 46.700		
		27.938		+	10.62
		5.440			
		46.689			
		46.709			
		46.699			
		16			
		46.68			

0 2 12.94

R 55 25.05

R 55 25.32

25.18

28 25 44.8

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1880phae.proj.1510.

3

p Pegasi

h m s
0 7 0
° '
+14 31

0.10908

1880

May 31

h m s
0 6 17.15

19.30	21.450		8.8
21.45	21.45		10.2
23.60			11.6
10725	25.75	512	13.4
	7.25		12
	29.98	6	10.24
	32.87		+28.30
	34.24		
	36.40		38.558
	38.06		38.56
	40.70		38.53
	42.80		
	45.00		
34702	47.17		
	7702		
	51.37		
	53.50		55.624
	55.65		5562
	57.70		7707
27812	59.90	6	10.24
	28.12	6	38.545
	21.450		+ 28.30
	55.624		
	38.587		
	38.558		
	38.547		
	3 1/6		
	38.53		

0 7 6.32

R 49 22.95
R 49 22.85

49 22.90
14 81 6.7

30

B Arietis

h m s
1 47 58
° '
+20 13

0.10908

June 2

Ex. minute

1	48	14.40			
		16.64	18.828		
		18.88	18.83		
		21.00			
		23.22			
9414		4414			
		27.60			
		29.86			
		32.16			
		34.30	36.459		
		36.43	36.46	49	14.4
		38.62	36.42		18.5
		40.91			18.6
		43.00			19.8
32813		45.25		908	21.5
		5813			408
		49.62		49	18.16
		51.90	54.014		-41.72
		54.00	54.01		
		56.20	7284		
27007		58.35			
		2007		48	36.4140
		18.828		49	18.16
		54.014			- 41.72
		36.421			- 41.72
		36.460			
		36.491			
		15			
		36.43			

R 8 42.42
R 8 42.30

8 42.36

32

γ Andromedae

h m s
1 56 29
° '
+41 45

0.10908

June 2.

1	56	40.90			
		43.80	46.540		
		46.60	46.54		
		49.40			
23270		52.00			
		32.70			
		57.48			
		0.36			
		3.00			
		5.85	8.648		
		8.80	8.65	57	44.0
		11.40	8.69		46.4
		14.25			48.2
		16.90			50.4
7783		19.80		2416	52.6
		7783			416
		25.27		57	48.32
		28.00	30.846		- 39.65
		30.86	30.85		
		33.78	13739		
15423		36.32			
		423	57 8.670	57	48.32
		46.654			
		30.846			4
		8.750			- 39.65
		8.648			
		8.699			
		16			
		8.68			

W 37 0.25
W 37 0.30

0.28

+16.34
12.41
8.26
+4.04
-6.10
4.12
8.27
12.91
16.36
24.11
28.94
33.09
37.22
41.48
9.5
2.5

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1880phae.proj.1510

908

1880

13 — γ Cass. — h m s: 0 49 25 — ° ′: + 119 56 — June 9

176 — ε Virginis — h m s: 12 56 9 — ° ′: + 11 37

1.17609
9.99101
1.16710

0,10908

181 — η Urs. Maj. — h m s: 13 42 46 — ° ′: + 49 33

0,10908

0,10908

13 γ Cass.

0	48	—		
		—		
		—		
		—		
		—		
+16.54	2.54	22.72	46.00	
12.41	2.41	2524	50.00	
8.26	2.51		54.25	
+4.04	2.67		58.58	2531
-0.00	2.52		2.52	2.53
4.12	2.46		6.58	
8.27	2.51		10.78	
12.41	2.46		14.87	
16.56	2.64	2278	19.20	
			2278	
24.81	2.56	12.50	27.37	
28.94	2.59	2.50	31.53	35608
33.09	2.55		35.64	35.61
37.22	2.50		39.72	
41.48	2.30	17804	43.78	
			2804	

2.572
2.515

47	54.9	48	58.9
	57.5		1.3
	2.0		4.7
	5.4		7.0
86	8.8	212	9.3
	86		212
48	1.72	49	4.24
+1	0.79		− 1.73
50	14.5		
	17.2		
	21.0		
	25.2		
1056	27.7		
	056		
50	21.12		
−1	18.61		
48	1.72	49	4.24
50	21.12	−	63.07

176 ε Virginis

12	55	29.58	
		31.60	33768
		33.78	33.77
		35.88	
	16884	38.00	
		1884	
		42.12	
		44.23	
		46.30	
		48.50	50.616
		50.68	50.62
		52.76	50.62
		54.85	
		57.00	
	15554	59.15	
		554	
		3.30	
		5.40	7.480
		7.45	7.48
		9.60	10125
	3740	11.65	
		3740	55 50.620

55	13.5
	14.7
	16.0
	17.4
811	19.5
	311
55	1622
+	34.20
56	28.5
	31.0
	32.6
	34.4
1628	36.3
	128
56	3256
	−41.94
55	1622
56	32.56
+	34.40
−	41.94
	76.34

1.88275
1.16710
3.04985
1.99392
8.94407
5 1 28

181 η Urs. Maj.

13	41	56.90	
		0.20	3.310
		3.30	3.31
		6.55	
	1653	9.60	
		1655	
		16.00	
		19.18	
		22.52	
		25.67	28.858
		28.85	28.86
		32.00	28.91
		35.17	
		38.45	
	25972	41.78	
		7972	
		48.27	
		51.27	54.508
		54.60	54.51
		57.90	5782
	27254	0.50	
		2254	42 28.885

41	45.7
	47.9
	50.0
	52.2
2508	55.0
	08
41	5016
	+ 38.72
42	53.6
	56.3
	58.5
	0.5
2923	3.4
	423
42	5846
	− 29.58
41	50.16
42	58.46
+	38.72
−	29.68
	68.30

13 42 51.88

W 30 28.13
W 30 44.98
W 30 55.95

W 44 10.95
W 45 49.50
R 45 49.62

45 49.56
98.61

W 26 25.28
W 27 23.08
R 27 23.22
R 27 23.20
W 27 23.12

23.16

49 54 43.1

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1880

June 9

182 η Bootis

h m s
13 48 55
° ′
+19 0

0.10968

h	m	s			
13	48	15.25		49	11.8
		17.45	19.648		13.5
		19.67	19.65		15.5
		21.87			17.0
	9824	24.00		768	19.0
		4824			268
		28.37		49	1536
		30.56			38.23
		32.75			
		35.00	37.153		
		37.30	37.15	49	25.7
		39.35	37.12		27.1
		41.50			28.5
		43.70			29.5
	33438	45.85		1415	30.7
		6438			415
		50.30		49	2830
		52.43	54.590		− 51.17
		54.55	54.59		
		56.77	7424		
	27295	58.90		49	1536
		2295	48 37.135	49	28.30
				−	38.22
				−	51.16
					89.38

18 49 150

W 22 5.05
W 22 22.25
R 22 22.58
R 22 22.35
W 22 22.45
22 22.41

18 59 49.7

183 τ Virginis

h m s
13 35 29
° ′
+2 8

1.17609
9.99970
1.17579

0.10908

13	54	50.33		54	40.8
		52.35	54.396		42.2
		54.38	54.39		43.8
		56.42			45.4
	27198	58.50		2192	47.0
		2198			192
		2.55		54	4384
		4.82			+27.08
		6.78			
		8.88	10.928		
		10.88	10.93	55	40.0
		12.90	10.92		41.2
		15.12			42.4
		17.12			43.6
	9835	19.30		2122	45.0
		9835			122
		23.25		55	4244
		25.40	27.464		− 31.52
		27.47	27.46		
		29.55	14185		
	13732	31.65		54	4384
		3732	55 10.925	55	4244
				+	27.08
				−	31.52
					58.60

1.76790
1.17579
2.94369
1.87858
8.93489
45511

W 12 49.18
W 14 4.75
R 14 4.78
R 14 4.70
W 14 4.95
14 4.79
75.61

187 α Bootis

h m s
14 10 8
° ′
+19 49

1.17609
9.97349
1.14958

0.10908

14	9	28.20		9	23.0
		30.36	32620		24.4
		32.70	32.62		26.2
		34.84			27.8
	16310	37.00		1308	29.4
		1310			308
		41.35		9	2616
		43.63			+ 24.07
		45.97			
		48.17	50.260		
		50.25	50.26	10	22.7
		52.30	50.20		24.2
		54.63			25.7
		56.88			27.3
	45231	59.18		1291	29.2
		234			291
		3.45		10	2582
		5.60	7.780		− 35.59
		7.80	7.78		
		9.90	10040		
	3890	12.15		9	26.16
		3890	9 50.230	10	25.82
				+	24.07
				−	35.59
					59.66

14 10 14.41

1.77568
1.14958
2.92526
1.86255
8.93729
45649

W 32 22.12
W 33 34.92
R 33 35.05
R 33 35.00
W 33 34.98
33 34.99
72.87

19.47 78.9

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193

γ Bootis

L — S
14 27 12
° ′
+38 33

1.17609 0.10908
9.89152
1.06761

14	26	28.00			26	13.9	14	39	0.90			38	58.3	14	43	31.74			43	25.4	
		30.60	33.290			16.2			3.23	5.506			0.1			33.72	35.900			26.9	
		33.30	33.29			17.6			5.50	5.51			2.0			35.88	35.90			28.6	
		35.98				19.7			7.75				3.8			38.00				30.5	
	16645	38.57			891	21.7		2753	10.15			100	6.8		17950	40.16			1434	32.0	
		1645				391			2753				100			2960				434	
		44.00			26	1782			14.87			39	2.00			44.66			43	2868	
		46.60				+36.72			17.28				+22.15			46.58				+24.34	
		49.30							19.55							48.80					
		51.90	54.546						21.84	24.208						51.00	53.091				
		54.66	54.54		27	19.0			24.25	24.21		39	53.5			53.00	53.09		44	23.7	
		57.17	54.54			21.5			26.56	24.09			55.5			55.18	53.06			24.2	
		59.90				23.3			28.83				57.8			57.40				25.5	
		2.38				25.2			31.15				59.2			59.55				27.0	
	49091	5.00			1164	27.4		21787	33.54			2868	0.8		47782	1.65			1283	28.9	
		4091				164			3787				368			2782				283	
		10.45			27	2328			37.95			39	57.36			5.97			44	2566	
		13.20	15.780			−28.74			40.40	42.676			−33.21			8.00	10.230			−32.59	
		15.75	15.78						42.68	42.68						10.18	10.23				
		18.50	10.907						45.00	4819						12.42	10613				
	7890	21.00			26	17.82		21338	47.35			39	2.00		5115	14.58			43	28.68	
		2890	26 54.540		27	23.28			1338		39	24.150	39	57.36		5115	43 53.075		44	25.66	
						+ 36.72								+ 22.15						+ 24.39	
						− 28.74								− 33.21						− 32.59	
						65.46								55.36						5698	
						1.81598								1.74320						1.75572	
						1.06761								1.12369						1.15993	
						2.88359								2.86689						2.91565	
						1.82640								~~1.03796~~	1.80611					1.65800	
						8.94281								~~9.07104~~	8.93922					8.94235	
						5035								~~6432~~	4588					5016	

14 44 18.12

W	30	56.35	.				W	46	8.00	.				W	52	17.52	.				
W	32	3.45	.				W	47	12.02	.				W	53	29.50	.				
R	32	3.42	.				R	47	12.08	.				R	53	29.58	.				
R	32	3.35	.				R	47	11.88	.				R	53	29.68	.				
W	32	3.40	.					47	11.99	.				W	53	29.75	.				
	32	3.40	.						6399						53	29.63	.				
		67.05														72.11					

15 32 47.7

ε Bootis

L — S
14 39 42
° ′
+27 35

1.17609 0.10908
9.94760
1.12369

~~59~~ 590 α² Librae

L — S
14 44 11
° ′
−15 32

1.17609 0.10908
9.98384
1.15993

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199	201	1
β Boötis	δ Boötis	α Androm
h m s 14 57 23 ° ′ + 40 52	h m s 15 10 37 ° ′ + 33 46	h m s 0 2 8 ° ′ + 28 25
0.10908	0.10908	0.10908

1880 June 9

β Boötis

h m s			
14 56 38.27		56 18.8	
41.00	43.748	20.9	
43.67	43.75	22.3	
46.50		23.6	
21874 49.30		1113 25.7	
1874		113	
54.80		56 22.26	
57.65		+ 43.32	
0.39			
3.00	5.657		
5.62	5.66	57 40.8	
8.40	5.60	42.7	
11.00		44.5	
13.60		47.0	
5091 16.45		2245 49.5	
5091		245	
21.88		57 44.90	
24.60	27.260	− 39.32	
27.30	27.26		
30.02	13101		
136.30 33.50		56 22.26	
3630	57 5.580	57 44.90	
		+ 43.32	
		− 39.32	
		82.64	
		1.91719	

δ Boötis

15 9 54.80		9 40.2
57.00	59.710	42.7
59.90	59.71	45.0
2.30		46.5
29855 4.55		2224 48.0
4855		224
9.68		9 44.48
12.34		+ 35.14
14.80		
17.20	19.677	
19.65	19.68	10 45.9
22.28	19.57	47.7
24.54		49.4
27.00		51.0
17709 29.60		2467 52.7
8709		467
34.43		10 49.34
36.97	39.440	− 29.72
39.55	39.44	
41.79	15915	
19720 44.46		9 44.48
4720	10 19.625	10 49.34
		+ 35.14
		− 29.72
		64.86

α Androm

0 1 26.00		1 13.0
28.36	30.698	14.8
30.68	30.69	16.3
33.00		17.9
15349 35.45		814 19.4
349		314
40.00		1 16.28
42.53		+ 33.23
44.87		
47.28	49.543	
49.56	49.54	
51.90	49.48	
54.25		
56.58		
44589 58.92		
8589		
3.55		
5.95	8.280	
8.24	8.28	
10.66	9897	
4140 13.00		1 16.28
4140	1 49.510	+ 33.23
30.698		
8.280		
49.489		
49.543		
49.516		

0 2 18.24

β Boötis	δ Boötis	α Androm
W 29 1.05	W 35 3.20	R 54 55.05
W 25 24.22	W 31 16.00	R 54 54.94
R 24.10	R 15.98	
R 23.98	R 15.98	54.99
W 24.00	W 15.72	
24.08	15.98	28 25 46.1

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3

γ Pegasi

h m s
0 7 0
° ′
+14 31

0.10908

13

γ Cass.

h m s
0 49 25
° ′
+60 4

0.10908

20

δ Cas.

h m s
1 17 53
° ′
+59 36

0.10908

0	6	20.00				0	48	27.00		48	4.8	48	52.6	1	16	57.40			16	27.0	17	33.3
		22.00	24216					31.10	35.250		6.3		55.3			1.45	5.560			29.5		38.0
		24.25	24.21					33.30	35.25		8.9		58.4			5.48	5.56			32.7		41.0
		26.35						39.40			12.0		1.2			9.72				35.2		43.5
	12108	28.48					17625	43.45			474 15.4		2914 3.9		2780	13.75			1621	37.7	2048	47.0
		2108						2625			474		414			2780				121		48
		32.86						52.00		48	9.48	48	58.28			22.00			16	3.242	17	4096
		35.00						56.00			+58.91		+10.11			26.20			+1	5.184		− 2.65
		37.20						0.30								30.00						
		39.29	41.388					4.15	8.428							34.30	38.347					
		41.39	41.39	6	39.0			8.35	8.43	49	58.5	50	40.8			38.37	38.35		18	30.0	19	8.6
		43.45	41.33		1.2			12.60	8.36		58.5		41.5			42.40	38.27			32.9		9.7
		45.65			2.4			16.60			2.8		42.5			46.65				35.5		11.2
		47.80			4.0			20.90			5.4		43.7			50.50				38.4		13.0
	37249	49.95			121 5.5		7585	24.95			107 8.5	2131	44.6		34512	54.70			1786	41.8	572	14.7
		1249			121			7585			107		131			7512				286		72
		54.14		7	2.42			33.20		50	2.14	50	42.62			2.70			18	36.72	19	11.44
		56.25	58.462		−21.06			37.20	41.470		− 53.75	−1	34.23			7.00	10.480			−57.41	−1	33.13
		58.37	58.46					41.40	41.47							11.00	10.98					
		0.75	8267					45.65	13672							15.00	76.54					
	29231	2.80					20735	49.90		48	9.48	48	58.28		5490	19.20			16	32.42	17	4096
		4231	6 41.360	7	2.42			735	49 8.395	50	2.14	50	42.62			490	17 38.310		18	35.72	19	11.44
		24.216								+	8.91	+	10.11						+	65.89	+	2.65
		58.462								−	53.74	−	94.22						−	57.41	−	93.13
		41.339			− 21.06						62.65		104.33							123.30		95.78
		41.388																				
		41.363																				

0 7 5 59

R	50	21.90	·				W	16	11.92	·					111	29.00	·								
R	50	22.22	·				W	16	17.78	·					111	16.12	·								
	50	22.06	·				W	16	28.85	·					111	51.40	·								
							W	16	54.02	·					111	13.20	·								

14 31 8.3

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52 | ℓ Persis | h m s: 3 15 41 | + 49 26 | 0,10908

5 | Sun. c = 45,572 | h m s: 5 17 0 | + 23 5 | 0,10908

1882

June 9

h	m	s		m	s
3	14	52.80		14	55.5
		53.20	58.820		57.7
		58.90	58.82		59.3
		2.00			2.6
	29410	5.20		99	4.8
		4410			499
		11.75		14	59.98
		14.73			+ 24.43
		18.14			
		21.42	24.461		
		24.40	2446		
		27.78	24.37		
		30.85			
		33.90			
	22015	37.18			
		4015			
		43.45			
		46.68	49.926		
		50.00	49.92		
		58.20	16874		
	24963	56.30		15	1.98
		4963	15 24.415		
				+	22.43

June 9–10

h	m	s		m	s	m	s		m	s
5	15	0.75		16	4.2	17	18.30		16	43.7
		3.15	5.240		6.0		20.50	22.862		45.6
		5.20	5.224		7.7		22.85	22.86		47.3
		7.40			9.3		25.30			49.0
	2620	9.70		382	11.0	11431	27.36		2361	50.5
		2620			382		1431			361
		14.00		16	764		31.90		16	47.22
		16.15			− 44.45		34.10			+ 53.71
		18.70					36.35			
		21.00	23.157				38.63	40.956		
		23.30	2316				40.90	4096		
		25.28	23.22				43.32	40.91		
		27.68					45.50			
		29.90					47.70			
	20841	32.40				36860	50.20			
		2841					860			
		36.65					54.58			
		39.00	41.200				56.70	58.964		
		41.25	4120				59.00	5896		
		43.38	4644				1.04	8182		
	20600	45.72		16	764	29482	3.50		16	47.22
		600	15 23.190	−	44.45		4482	17 40.935	+	53.71

R 56 20.38
R 56 20.78
20.58

W 59 49.22

W 32 17.48

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154

d Usa. Maj

h m s
10 56 15
+62 24

June 10

0.12060

155

γ Usa. Maj

h m s
11 2 37
+45 9

0.12060

172

γ Virginis

h m s
12 35 32
−0 4

1.17609 0.12060
0.99996
1.17605

10 55 —
— —
— —
— —
— —

56 22.9
25.5
29.5
32.5
1464 36.0
464

11 2 —
— —
— —
68.19 13.48
34.096 76.65

12 34 32.35
54.35 5.6440
56.40 56.44
58.50
28220 0.60
3220

34 44.5
45.8
47.3
48.7
2363 50.0
3.63

+ 17.87 54.56 537.20 41.75
23.56 54.86 59.688 46.50
5.90 54.70 50.80
+ 3.41 54.68 55.27 59697
÷ 0.78 54.73 59.73 59.70

56 29.28
−29.53

11.70 34.23
8.78 34.36
5.85 34.19
+2.59 34.16
−0.00 34.17

307.33 22.53
34.147 25.48
28.30
31.27 34164
34.17 34.15

3 4.4
6.2
7.8
10.8

4.76
6.80
8.90
10.90 13.006
13.04 13.01

34 47.26
+25.72

35 38.5

− 4.44 54.71 4.15
8.41 54.71 8.62
13.36 54.84 13.00
17.84 54.61 537.27 17.45
8727

56 49.8
53.7
56.0
58.9
2818 3.4
318

2.92 34.26
5.85 34.13
8.78 33.97
11.72 34.03
2739 45.75
3739

424 13.2
424

15.00 12.96
17.16
19.20
11705 21.30
2705

40.0
41.5
43.0
2077 44.7
77

26.72 54.88 299.26 26.60
31.17 54.83 59.852 31.00 35510
35.63 54.57 35.60 35.51
40.09 54.81 39.90
− 44.68 54.77 7735 44.45
2755

56 56.36
56.61

17.33 34.13
20.98 34.08
23.41 33.96
26.33 34.12
26.78 34.12
170.44 51.68
34.088 54.56 57512
57.37 57.51
0.45
8756 3.50
3756

3 8.48
− 34.36

3 8.48

25.35
27.37 29.498
29.50 29.49
31.60 14593
14749 33.67
4749

35 41.54
− 28.56

34 47.26

35 12.985

35 41.54
+ 25.72
− 28.56
54.28

59.770
59.747

10 56 21.22

84.110
84.122

12 85 87.70

1.73464
1.17605
2.91069
1.85570
8.945 01
5 2 7

R 58 31.00 .
R 58 31.22 .
31.11 .

62 28 56.1

R 13 13.18 .
R 13 13.02 .
13.10 .

W 7 31.40 .
W 9 6.00 .
R 9 6.15 .
R 9 6.28 .
W 9 6.10 .
9 6.13 .
71.73

0 47 44.5

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174 δ Virginis

h m s
12 49 30
° ′
+4 3

1.17609 0.12060
9.99891
1.17500

1880
June 10

h	m	s		h	m	s		h	m	s		h	m	s	
12	48	51.35			48	51.6		13	41	57.00			41	40.0	
		53.30	55394			52.8				0.20	3.430			42.1	
		55.38	55.39			54.1				3.48	3.43			44.5	
		57.47				55.7				6.57				46.5	
	27697	59.47			2712	57.0			1715	9.90			2220	48.9	
		2697				212				1715				220	
		1.7			48	5424				16.35			41	4440	
		3.60				+17.62				19.43				+44.66	
		5.65								22.70					
		7.68								25.70	29.070				
		9.70	11.851							29.20	29.07		43	4.0	
		11.80	11.85		49	40.6				32.40	29.06			5.7	
		13.90	11.88			42.2				35.50				8.8	
		16.00				43.7				38.50				12.2	
		18.15				45.2									
	10666	20.18			2185	46.8			26163	41.85			441	14.4	
		1666				185				8163				441	
		24.35			49	43.70				48.40			43	8.82	
		26.30	28.380			−31.84				51.47	54.694			−39.76	
		28.33	28.38							54.70	54.69				
		30.45	14377							57.90	5812				
	14190	32.57			48	5424			27347	1.00			41	44.40	
		4190	49 11.865		49	43.70				2347	42 29.065		43	8.82	
						+ 17.82								+ 44.66	
						− 31.84								− 39.76	
						49.82								84.42	
						1.69425		18	42	51.81				1.92645	
						1.17500								0.98491	
						2.86925								2.91136	
						1.81418								1.85956	
						8.94493								8.94820	
						5 2 3								5 4 19	

W	17	41.22	·	W	26	18.12	·	N	20	51.30	·				
W	18	46.38	·	W	27	30.40	·	W	22	3.08	·				
R	18	46.48	·	R	27	30.65	·	R	22	3.08	·				
R	18	46.42	·	R	27	30.55	·	R	22	3.18	·				
W	18	46.38	·	W	27	30.35	·	W	22	3.08	·				
	18	46.41	·		27	30.49	·		22	3.10	·				
		65.19				72.37				71.80					

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181 η Ursæ Maj.

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1.17609 0.12060
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182 η Bootis

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9.97567
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13	48	15.43			48	12.0									
		17.67	19800			13.4									
		19.75	19.81			14.8									
		22.00				16.2									
	9905	24.20			745	18.1									
		4900				345									
		28.52			48	1490									
		30.70				+22.35									
		32.80													
		35.00	37237												
		3725	3724		49	8.5									
		39.38	37.26			10.0									
		41.60				11.8									
		43.88				13.6									
	33513	46.00			594	15.5									
		6513				494									
		50.38			49	11.88									
		52.46	54.706			−34.63									
		54.76	54.71												
		56.94	7452												
	27353	59.00			48	1490									
		2353	18 37.250		49	11.88									
						+ 2235									
						− 34.63									
						56.98									
						1.75572									
						1.15176									
						2.90748									
						1.85612									
						8.94864									
						5 4 38									

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183 T Virginis

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13	54	50.38			54	37.7		14	9	28.43			9	15.2		14	26	28.15			26	36.6	
		52.50	54544			39.2				30.57	34820			17.0				30.60	33364			38.3	
		54.60	54.521			40.4				32.90	32.82			18.5				33.37	33.36			40.3	
		56.64				41.7				35.00				20.0				36.00				42.5	
	27272	58.60			2022	43.2			16410	37.20			924	21.7			16682	38.70			2023	44.6	
		22.72				22				2.410				4.24				1.682				2.3	
		2.77			54	40.44				41.56			9	18.48				44.00			26	40.46	
		4.90				+ 30.63				43.70				+ 31.90				46.60				+ 14.12	
		6.95								45.98								49.30					
		9.00	11.081							48.18	50370							51.88	54.597				
		11.00	11.08		55	31.5				50.32	5037		10	19.6				54.60	54.60		27	32.1	
		13.18	17.07			33.0				52.58	50.39			21.3				57.29	54.56			04.0	
		15.25				34.5				54.74				23.2				59.90				36.1	
		17.33				36.0				57.00				25.0				2.55				38.0	
	9973	19.35			1728	37.8			45333	59.27			1159	26.8			49137	5.25			1801	39.9	
	9.973					228				333				159				4137				301	
		23.38			55	8456				3.54			10	23.18				10.63			27	36.02	
		25.60	27586			−23.49				5.73	7.972			−32.80				13.20	15770			− 41.44	
		27.60	27.59							7.90	797							15.60	15.77				
		29.60	14213							10.19	10079							18.42	10913				
	1379.3	31.78			54	40.44			39.86	12.50			9	18.48			7885	21.00			26	40.46	
		3.793	55	11.075	55	34.56				3.986	9	50.380	10	23.18				2.885	26	54.580	27	36.02	
					+	30.63							+	31.90							+	14.12	
					−	23.49							−	32.80							−	41.44	
						54.12								64.70								55.56	
						1.73336			14	10 14.41				1.81090								1.74476	
						1.17579								1.14958									
						2.90915								2.96048									
						1.85679								1.90064									
						8.94764								8.94016									
						5356								4.5846									

W	12	45.95	·		W	32	12.20	·				W	31	16.65	·								
W	13	57.88	·		W	33	31.70	·				W	32	15.88	·								
R	13	57.95	·		R	33	31.72	·				R	32	15.68	·								
R	13	57.75	·		R	33	31.70	·				R	32	15.52	·								
W	13	57.88	·		W	33	31.88	·				W	32	15.68	·								
	13	57.86	·			33	31.75	·						15.69	·								
		71.91					79.55																

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187 α Bootis

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193 γ Bootis

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June 10

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14	39	0.88			38	45.8		14	43	31.70			43	31.4		14	49	31.45			48	28.1	49	8.2
		3.22	5.186			47.5				33.90	36.050			32.9				40.00	47.370			32.2		11.6
		5.65	5.19			49.4				36.15	36.05			34.5				47.45	47.37			37.9		17.2
		7.90				50.9				38.24				36.6				55.00				41.8		21.9
	2593	8.28			2463	52.7			18025	40.26			1734	38.0			23685	2.95			1894	49.4	883	29.4
		2593				463				3025				234				3685				394		383
		14.95			38	49.26				44.80			43	34.68				18.40			48	47.88	49	17.66
		17.30				+34.84				46.90								26.50			+2	1.90	+1	32.12
		19.67								49.00								34.35						
		21.90	24.280							51.00								42.00	49.812					
		24.30	24.28		39	56.6				53.12			44	20.4				49.80	49.81		50	13.6	51	7.6
		26.55	24.03			58.6				55.23				22.1				57.68	49.75			17.7		12.3
		29.00				1.2				57.40				23.7				5.40				24.5		18.5
		31.25				2.8				59.55				25.4				13.18				29.3		25.5
	21852	33.60			37	4.5				1.65			1192	27.6			26831	21.00			1208	35.7	969	33.0
		3852				37								192				8831				208		469
		38.18			40	0.74				5.95			44	23.84				36.30			50	24.16	51	19.38
		40.55	42.874			−96.59				8.15	10.260							44.60	52.130			+45.62		−29.60
		42.90	42.87							10.20	10.26							51.87	52.13					
		45.19	4.806							12.38								0.10	28.950					
	21437	47.55			38	49.26			5130	14.62			43	34.68			26065	7.78			51	49.2	52	27.5
		1437	39 24.155		40	0.74				130	43 53.174		44	23.84				1065	50 49.780			54.3		33.2
						34.89																1.6		39.3
						36.59																5.8		45.3
						71.48															52	13.8	1991	53.8
						1.85418		14	44	18.13						14	51	8.22			52	1.04		491
						1.12369																	52	39.82
						2.97787																	−1	20.04
						1.91415																		
						8.93658																		
						4 56 20																		

W	45	53.62	·				W	57	25.95	·					W	42	37.05	·				
W	47	15.68	·				W	58	29.68	·					W	42	52.32	·				
R	47	15.80	·				R	58	29.50	·					W	42³	16.30	·				
R	47	15.62	·				R	58	29.55	·					W	42³	35.08	·				
W	47	15.85	·												W	42³	48.85	·				
	47	15.74	·					58	29.58	·					W	43⁴	1.30	·				
		82.12							63.63														

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199

β Bootis

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1.17609 0.12060
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δ Bootis

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8.2	14	56	38.35			56	33.9		15	9	54.80			9	41.4		0	1	47.60			1	15.5	2	49.9
1.6			41.00	4.730			36.0				57.32	59.828			43.5				51.55	57.440			19.5		53.0
17.2			43.67	4.373			38.8				59.87	59.83			45.0				55.42	55.441			22.6		56.2
21.9			46.40				40.0				2.35				47.0				59.30				24.9		59.0
29.4		21865	49.23			1910	42.3			29914	4.80			2254	49.0			27720	3.33			1103	27.8	2810	2.9
3.83			1865				410				4514				259				3720				103		3.10
7.66			54.64			56	38.20				9.80			9	45.18				11.16			1	22.06	2	56.20
1.12			57.35				+ 27.41				12.25				+ 34.52				15.00			+ 1	4.97		− 29.20
			0.30								14.65								19.00						
			2.95	5.613							17.26	19.723							23.00	26.996					
7.6			5.58	5.61		57	19.8				19.77	19.42		10	52.6				27.00	26.99		3	20.7	3	59.0
2.3			8.36	5.61			22.5				22.20	19.69			54.7				30.90	27.02			23.9		0.3
18.5			11.00				24.4				24.70				56.5				34.90				27.5		1.2
25.5			13.77				26.2				27.28				58.4				39.00				30.0		2.6
33.0		5052	16.57			1211	26.2			17751	29.60			2824	0.2			24296	43.00			1357	33.6	69	3.8
69			5052				211				8751				324				6296				357		69
38			22.00			57	24.22				34.65			10	56.48				30.70			3	27.14	4	1.38
60			24.80	2.7486			− 18.61				37.00	39.556			− 36.78				34.65	58.616		− 1	0.14	− 1	34.38
			27.60	2.749							39.55	39.56							38.65	58.61					
			30.18	13122							42.00	159.39							2.58	17.405					
27.5		13743	33.95			56	38.20			19778	44.58			9	45.18			29308	6.50			1	22.06	2	56.20
33.2			2743	57	5.610	57	24.22				4778		10	10	19.705	10	56.48			4308	2	27.005	3	27.14	4	1.38
39.3						+	27.41									+	34.52						+ 64.94	−	29.20
45.3						−	18.61									−	36.78						− 60.14	−	94.38
53.8							46.02										71.30						125.08		123.58
1.91							1.64295								1.85309										
9.82							1.05475																		
17.04							2.71770																		
							2.02296																		
							9.30506																		
							11 2445																		

W	28	17.10	·						W	35	6	5.40	·						W	1	52.98	·			
W	30	2.55	·						W	34	36	23.98	·						W		55.15	·			
R	30	2.45	·						R			23.90	·						W	2	16.12	·			
R	30	2.32	·						R			23.82	·						W		38.42	·			
W	30	2.62	·						R			23.92	·												
	30	2.48	·									23.90	·												
		10538																							

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1880 June 10

h	m	s			h	m	s			h	m	s		
0	6	20.32			6	20.7	3	14	52.75		14	36.4		
		22.36	2450			22.0			55.98	59.088		38.0		
		24.48	24.50			23.7			59.17	59.09		40.3		
		26.62				25.4			2.10			42.8		
	12250	28.72			1189	27.1		29544	5.44		2029	45.4		
		2250				189			4544			29		
		33.00			6	23.78			11.86		14	40.58		
		35.15				+17.74			15.00			+43.95		
		37.29							18.10					
		39.40	41517						21.35	24.533				
		41.48	41.52		7	14.4			24.55	24.53				
		43.60	41.52			16.5			27.87	24.53				
		45.83				18.3			30.87					
		47.90				20.1			34.00					−6.73
	37365	50.00			912	21.9		22080	37.20					8.99
		1365				412			4080					
		54.28			7	18.24			43.60					13.96
		56.40	58.526			−36.72			46.70	49.966				15.71
		58.48	58.53						50.00	49.97				17.46
		0.67	8303						53.15	16906				20.20
	29263	2.80			6	23.78		24983	56.38		14	40.58		23.54
		4263	6 41.520		7	18.24			4983	15 24.530	+	43.95		
					+	17.74								92.
					−	36.72								92.
						54.46								

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8 15 47.26

W	49	32.18	·	R	55	2.15	·
W	45	41.10	·	R	55	2.65	·
R		41.35	·		55	2.55	·
R		41.42	·				
W		41.25	·				
	45	41.28		49	25	58.3	

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June 10–11

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5	19 —		20 13.0	21 27.60		20 57.3	+32.64	28.849	23 55.15		23 43.8
	—		15.0	29.40	31.690	59.6	30.30	29.10	145.15 58.80	2.080	47.0
	—		17.0	31.65	31.69	1.0	26.96	29.16	29.03 2.20	2.08	49.7
	—		18.4	33.80		2.6	23.54	28.94	5.40		52.4
	—		831 19.7	15845 36.00		58 4.5	20.21	29.04 –	1040 8.85		2476 54.7
			331	845		50			1040		476
	—		20 1662	40.65		21 1.00	13.47	29.12	175.34 15.65		23 49.52
	—		− 44.30	42.90		+ 48.74	10.11	29.26	29.218 19.15		+ 39.60
	—			45.18			6.73	29.18	22.45		
	—			47.50	49.733		+2.83	29.23	25.90		
	—			49.67	49.73		−4.70	29.28	29.28		
	—			52.00	49.76		−3.36	29.24	32.60		
	—			54.28					—		
−6.73 32.97	65.33 39.70			56.57					—		
8.99 32.36	32.66 41.35			44760 58.85					—		
				8760							
13.46 32.29	160.91 45.75			3.25					—		
15.71 32.29	32.182 48.00	50.150		5.70	7.840				—		
17.46 32.14	50.10	50.15		7.90	7.84				—		
20.20 32.35	52.25			10.00	9953				—		
22.37 32.14	25075 54.65		20 1662	3920 12.35		21 1.00			—		23 49.52
	075			3920	21 49.745	+ 48.74					
32.421								29.124			
32.321								29.132			

W 55 45.30

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R 7 46.15 ·
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1880
June 11

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+11.72	48.62	447.61	38.50	
8.34	48.71	49.734	41.37	
5.56	48.74		44.18	
2.75	48.88		46.80	49.739
-0.10	48.85		49.85	49.74
2.77	48.81		52.58	
5.36	48.74		55.30	
8.34	48.86		58.20	
11.14	48.73	44765	0.87	
			8765	
16.68	48.72	24848	6.40	
14.76	48.74	49.696	9.20	1.1960
22.25	48.75		12.00	1.196
25.03	48.67		14.70	
27.90	48.60	5980	17.50	
			980	

49.715
49.721

153

β Urs. Maj

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0,12060

h	m	s
10	53	37.90
		41.68
		45.38
		49.40
	22775	53.19
		2775

		0.70	
		4.38	
		8.13	
		12.00	15.883
		15.88	15.88
		19.85	15.89
		23.50	
		27.27	
	14295	31.24	
		5295	
		38.70	
		42.40	46.234
		46.19	46.23
		50.00	15178
	23117	53.88	
		3117	

h	m	s
54	20.2	
	22.9	
	25.5	
	28.2	
1284	31.6	
	284	

54	25.68		
	-9.80		
54	25.68		
	+- 9.80		

154

α Urs. Maj

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+62 24

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10	55	—
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		—

17.81	59.81	537.93	42.00	
13.36	59.81	59.77	46.45	
8.90	59.80		51.00	
4.41	59.71		55.30	59.778
-0.10	59.80		59.80	59.78
4.49	59.71		4.15	
8.91	59.74		8.65	
13.36	59.64		13.00	
17.84	59.81	53800	17.65	
			8800	
26.72	59.83	298.57	26.55	
31.17	59.38	59.714	30.55	35.372
35.63	59.81		35.44	35.37
40.09	59.85		39.94	
43.68	59.70	17686	44.38	
			2686	

59.742
59.750

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h	m	s
56	31.0	
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	40.4	
1865	44.0	
	365	
56	3730	
	37.55	
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R 16 6.92 .
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	11	2 5.00		1 53.0	0	1 26.25		1 18.0	0	2 —		2 43.5	
		7.87	10830	55.3		28.70	31020	19.3		—		47.6	
		10.90	10.83	57.3		31.00	31.02	21.0		—		49.7	
		13.68		59.3		33.40		22.5		—		52.8	
		5415 16.70		2857 0.8		15510 35.75		1053 24.5		—		2489 55.3	
		415		357		510		53				489	
		22.53		1 57.14		40.40		1 21.06		—		2 49.78	
		25.50		+ 37.15		42.80		+ 28.74		—		−22.73	
		28.44				45.15				—			
		31.40	34297			47.43	49.826			—			
		34.30	34.30			49.83	49.83			—		3 20.8	
		37.25	34.28			52.15	49.78		−3.94 26.83	108.15 30.77		24.5	
		40.25				54.50			7.90 27.00	27.037 34.90		28.2	
		43.00				56.90			11.84 27.16	39.00		31.5	
		30867 46.00				14843 59.27			15.84 27.16	43.00		1396 34.6	
		3867				8843						396	
		51.90				3.82			23.68 27.82	135.35 50.80		3 27.92	
		54.90	57.740			6.25	8.530		27.63 27.23	27.070 54.90	58654	−1 0.87	
		57.60	57.74			8.48	8.53		31.58 26.99	58.57	58.65		
		0.65	6857			10.85	9955		35.53 26.97	2.50			
		28870 3.65		1 57.14		4265 13.25		1 21.06	−34.60 26.90	29327 6.50		2 49.78	
		3870	2 34.290			4265	1 49.805	+ 28.74		4327		3 27.92	
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1880 June 12

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0	6	20.30		6	10.5	0	48	27.44		48	48.3	49	1	16	57.90			16	37.0
		22.35	24.526		12.0			31.31			51.3				2.00	6.010			39.6
		24.50	24.53		13.3			35.60	35.586		54.3				6.00	6.01			42.5
		26.68			14.8			39.88			56.9				10.00				45.1
	12263	28.80		670	16.4		17793	44.00		2717	0.9		3005		14.15			2130	48.8
		2263			170						217				3005				130
		33.00		6	13.40			52.30		48	54.34				22.40			16	42.60
		35.20			+28.21			56.39							26.48				+ 56.11
		37.35						0.57							30.52				
		39.46	41.613					4.60	8.808						34.75	38.750			
		41.60	41.61	7	13.1			8.90	8.81	49	57.9				38.85	38.75		18	32.6
		43.73	41.62		14.8			12.88			1.0				42.80	38.67			35.9
		46.00			16.5			17.26			4.2				46.95				38.8
		48.00			18.3			21.00			7.7				51.00				41.6
	37452	50.18		827	20.0		7927	25.37		221	11.3		34875		55.00			1945	45.6
		1452			327			7927			221				7875				45
		54.45		7	1654			33.58		50	44.2				3.25			18	40.90
		56.55	58.710		-34.93			37.70	41.856						7.28	11.332		-1	2.19
		58.75	58.71					41.90	41.86						11.30	11.33			
		0.80	8324					45.90							15.38	7734			
	29355	3.00		6	13.40		20928	50.20		50	34.9		5666		19.45			18	52.8
		4355	6 41.615	7	16.54			0928	49 8.75		36.9				666	17 38.710			56.0
				+	28.21						39.9				1				59.3
				−	34.93						43.0								1.6
					63.14					1997	45.0							2957	6.0
2	7	5.68									497								457
										50	39.94							18	59.14
											11							-1	20.43

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	—			48.5		—				35.4				—				48.6		22.0	
	—			50.2		—				37.0				—				52.7		29.6	
	—			52.0		—				38.7				—				55.5		32.5	
	—		2513	54.0		—			1852	40.3				—			2601	58.9	1377	34.6	
				13						352								1.01		3.47	
	—		28	50.26		—			29	37.04				—			17	52.02	18	27.54	
	—					—				+ 36.86				—				+ 41.10		+ 3.51	
	—					—								—							
	—					6.28	+ 2.22	8.50	47.28												
	—					7.78	− 0.00	7.78	7.88		− 5.00	22.40	165.41	33.00			18	57.3			
	—					10.00	2.24	7.76			4.03	32.13	33.0823	7.16				58.2			
	—					12.27	4.49	7.78			8.15	32.99		41.14				59.3			
	—					14.50	6.74	7.76			12.23	33.15		45.38				0.2			
	—					16.70	9.00	7.78			16.31	33.14		49.45			2965	1.5			
									39.68									4.65			
	—					21.40	13.48	7.92	7.936		24.46	33.39	165.84	57.85			18	59.30			
	—					23.70	2.5920	15.72	7.88		28.56	33.29	33.1681.	85	5.764			− 26.18			
	—					25.95	25.92	17.97	7.88		32.64	33.03		5.67	5.49						
	—					28.15	28.22	7.93			36.48	32.92		9.60							
	—		28	50.26	12960	30.48	29.53	7.87	29	37.04	40.79	33.21	2897	14.00			17	52.02			
					29.60									2897			18	59.30			
									7.908		33.125										
									7.905		33.125										
W	49	15.15			−	21	44.18						W	2	7.68						
													W	2	45.98						
													W	2	25.45						

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51.70	52.946	
54.97	54.95	
58.20	58.53	
27473 1.36		
1473	42 29.250	

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2614	57.6	
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41	52.38	
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43	02.0	
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1865	42.6	
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43	37.30	
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41	52.38	
43	37.30	
+	36.87	
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17.86	19.984	
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4992		
28.78		
30.95		
33.16		
35.32	37.506	
37.54	37.50	
39.66	37.45	
41.85		
44.03		
33755 46.26		
6765		
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52.65	54.920	
56.00	54.92	
57.13	7490	
27460 59.30		
2460	48 37.475	

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	2.9	
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235	8.0	
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	+32.77	
49	5.8	
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	11.3	
476	13.2	
476		
49	9.52	
	−32.05	
48	4.70	
49	9.52	
+	32.77	
−	32.05	
	64.82	
	1.811171	
	1.15176	
	2.96347	
	1.90644	
	8.94297	
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W 20 36.08 .
W 21 59.58 .
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52.60	54.700	
54.70	54.70	
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9.30	11.229	
11.30	1123	
13.35	11.26	
15.33		
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10106 19.48		
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23.53		
25.78	2.7826	
27.90	27.83	
29.90	142.53	
13413 32.02		
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2224	48.0	
224		
54	44.48	
	+26.76	
55	38.0	
	39.8	
	41.7	
	43.8	
2077	44.9	
77		
55	41.54	
	− 30.30	
54	44.48	
55	41.54	
+	26.76	
−	30.30	
	58.06	
	1.75633	
	1.17579	
	2.93212	
	1.86853	
	8.93641	
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W 12 52.78 .
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14	9	28.65			9	17.9	14	26	28.20			26	16.7	14	39	1.00		38	48.6
		30.77	33.016			19.6			30.95	33.592			18.8			8.50	5.780		50.0
		33.00	3.301			21.3			33.61	3.359			20.9			5.80	5.78		51.9
		35.28				22.7			36.20				22.8			8.17			53.5
	16508	37.38			1060	24.5		16796	38.90			1039	24.7		2890	10.43		2597	55.7
		1508				60			1796				39			2890			97
	4178	42.24			9	21.20			44.15			26	20.78			16.00		38	51.94
		44.00				+29.41			46.75				+34.00			17.42			+32.50
		46.26							49.40							19.70			
		48.30	50.638						52.15	54.772						22.11	24.439		
		50.63	50.64		10	16.4			54.80	54.77		27	31.0			24.47	24.444	39	59.1
		52.70	50.58			17.8			57.43	54.79			34.5			26.75	24.45		1.1
		55.00				19.3			0.12				36.2			29.20			2.8
		57.21				20.9			2.60				37.8			31.43			4.6
	45574	59.40			969	22.5		49295	5.55			1818	40.3		21995	33.87			141 6.5
		874				469			4295				318			3995			141
		3.70			10	19.38			10.73			27	36.36			38.44		20	2.82
		5.90	8.160			−28.77			13.38	15.998			−41.58			40.80	43.122		−38.38
		8.27	8.16						16.00	15.99						43.12	43.12		
		10.33	10.117						18.60	10.958						45.45	4.890		
	4080	12.60			9	21.20		7999	21.28			26	20.78		21561	47.80		38	51.94
		4080	9 50.610		10	19.38			2999	26.54.780		27	36.36			1561	39 24.445	20	2.82
					+	29.41						+	34.00					+	32.50
					−	28.77						−	41.58					−	38.38
						58.18							75.58						70.88
14	10	14.89				1.76477							1.87841						1.85052
						1.14958							1.06761						1.12369
						2.91435							2.94602						2.97421
						1.85248							1.88773						1.91413
						8.93813							8.94171						8.93992
						45723							45950						45836

W	32	16.58	·				W	30	58.43	·				W	45	56.52	·		
W	33	27.80	·				W	32	15.65	·				W	47	18.55	·		
R	33	27.80	·				R	32	15.58	·				R	47	18.50	·		
R	33	27.65	·				R	32	15.65	·				-	47	18.70	·		
W	33	27.88	·				W	32	15.72	·									
	33	27.78	·					32	15.65	·					47	18.58	·		
		77.20							77.22							82.06			

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41.75 4186
43.95 41.88
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48.27
37674 50.35
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54.65
56.88 58.964
59.00 58.96
1.00 8.377
29482 3.29
4482 43 41.870

W 49 55.72
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R 53.75
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15	9	51.18		9	39.1		0	1	—		1	8.7	0	6	20.60			6	51.0
		53.30	55350		41.2				—			11.4			22.68	24,830			52.5
		55.32	5535		43.0				—			13.7			24.74	24.83			54,3
		57.42			44.8	+2764	27.49	54187	39.85			16.2			27.00				56.3
	27675	59.53		2148	46.7	23.68	27.38	27.435	3.70		697	19.7		12415	29.13			2720	57.9
	2675				148							197			2415				220
		3.65		9	42.96	15.76	27.49	247,42	11.70		1	13.94			33.38			6	54,40
		5.67			+29.08	11.84	27.37	27.491	15.73		+1	13.55			35.50				−12.47
		7.75				7.89	27.37		19.58						37.68				
		10.00	12,049			3.91	27.76		23.55	27.501					39.75	41.918			
		12.16	12.05	10	42.44	+0.10	27.42		27.42	27.50	1	59.3			41.96	4192			
		14.20	12.04		44.2	3.48	27.61		31.55			1.7			44.00	41.94			
		16.26			45.8	7.50	27.48		35.38			6.1			46.19				
		18.28			47.5	11.49	27.41		39.25			9.0			48.30				
	10844	20.47		22 93	49.4	15.58	27.51	24751	43.35		270	10.9		37726	50.50				
	1844				20.3				6751			270			1726				
		24.50		10	45.86	23.68	27.82	137.38	51.20		2	5.40			54.88				
		26.60	28,734		− 33.82	27.63	27.55	27.476	55,18	57,080		+ 22.09			56.90	59.036			
		28.77	28,73			31.58	27.57		59.13	59.08					59.00	5904			
		30.80	14408			35.03	27.37		2.90						1.15	8387			
	14367	33.00		9	42.96	39.60	27.48	29540	7.00		1	13.94		29518	3.20			6	54440
	4367		10 12.045	10	45.86				3540		1	5.110			4518	6 41.930			*− 12.47
				+	29.08														
				−	33.82	27,467													
					62.90	27,466													
				1.79865															
				1.17079															
				2.96944															
				1.91360															
				8.94416															
				~~4.54442~~		5 1 31													

W	16	21.05	·					R	51	44.08	·			R	55	10.38	·		
W	17	43.18	·					R	52	20.62	·			R	55	10.55	·		
R	17	43.02	·												55	10.46	·		
R	17	43.00	·																
W	17	42.85	·																
	17	43.01	·																
		8196																	

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13

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1880 June 13

h	m	s												
0	48	27.64			49	32.3			1	16	38.20		16	40.7
		31.88				35.0					2.28	6.390		42.8
		36.02				37.6					6.55	6.39		45.9
		40.00	35.968			40.6					10.42			49.3
	179.84	44.30			1899	44.2				3195	14.50		2312	52.5
						39.7					3195			31.2
		52.55			49	37.94					22.77		16	46.24
		56.68									26.87			+ 52.82
		0.92									31.00			
		5.17	9.127								35.00	39.089		
		9.02	16.43		50	4.7					39.00	39.09	19	0.5
		13.22				7.7					43.00	39.04		3.5
		17.32				10.9					47.36			6.7
		21.53				13.5					51.40			9.0
	8214	25.73			541	17.3				35180	55.40			11.5
		8214				41					8180		442	13.0
		34.00			50	10.82					3.57			~~442~~
		38.00	42.208								7.50	11.680		7.34
		42.28	42.21								11.65	11.68		
		46.88									15.80	7.807		
	21104	50.88			49	37.94				5840	19.88		16	46.24
		1104	49 9.101		50	10.82					5840	17 39.065	19	~~0.24~~
														+ 52.82

R	18	11.88	.			R	44	36.95	.
R	18	33.25	.			R	45	9.12	.
R	18	33.28	.			R	45	11.90	.
		33.26	.					10.56	

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1880

June 13–14

5	31	37.40			32	46.21	33	54.95		33	21.0
		39.70	41.956			49.7		57.17	59.488		23.0
		41.98	41.96			51.5		59.60	59.49		24.5
		44.20				53.0		1.72			26.2
	20978	46.50			2573	54.9	29744	4.00		1224	27.7
		978				73		4744			224
		51.00			32	5.146		18.65		33	24.48
		53.33				− 51.51		10.90			53.09
		55.49						13.10	17.597		
		57.55	59.949					15.25	~~18.108~~		
		0.00	50.95					17.60	17.60		
		2.00	59.96					19.82	17.54		
		4.50						22.00			
		6.65						24.38			
	53954	9.02					16837	26.67			
		8954						6837			
		13.33						31.25			
		18.72	17.960					33.35	35.598		
		18.00	17.96					35.52	35.60		
		20.25	11.992					37.70	15.509		
	8980	22.50			32	5.146	17795	40.17		33	24.48
		3980	31 59.955			− 51.51		2799	34 17.570		+ 53.09

−	46	12.62					−	18	32.20		

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June 15

h	m	s							
5	35	47.00			36	48.7	38	4.50	
		49.27	51526			50.7		6.70	9.006
		51.56	5152			52.2		9.03	9.00
		53.80				54.3		11.27	
	25763	56.00			2621	56.2	4503	13.53	
		763				121		4503	
		0.53			36	5242		18.00	
		2.73				− 42.64		20.25	
		5.00						22.45	
		7.26	9458					24.67	26,980
		9.40	9.46					26.90	2698
		11.65	9.50					29.15	27.03
		13.85						31.60	
		16.20						33.80	
	8512	18.50					24282	36.00	
		8512						6282	
		23.00						40.55	
		25.25	27.476					42.85	45060
		27.55	27.48					45.00	4506
		29.66	139.00					47.35	5406
	13738	31.92			36	5242	22530	49.55	
		3738	36 9.480					2530	38 27.005
						− 42.94			

R 43 40.72

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June 15

0	1	27.33			1	17.0			
		29.68	32012			18.0			
		32.00	32.01			19.5			
		34.35				21.2			
	16006	36.70			990	23.3			
		1006				490			
		41.35			1	1480			
		43.70				+ 30.94			
		46.00							
		48.50	50764						
		50.85	50.76						
		53.15	50.72						
		55.46							
		57.70							
	45688	0.18							
		688							
		4.67							
		7.00	9.430						
		9.50	9.43						
		11.80	101441						
	4715	14.18			1	19.80			
		4715	1 50.740			+ 30.94			

0 2 13.45

R 54 58.95
R 54 59.38

~~5947~~ 59.16

28 25 47.0

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3	13	198
γ Pegasi	γ Cass.	β Ursae Min.
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Ex.

3 γ Pegasi

0 6 21.30
23.30 25.550
25.55 25.55
27.80
12775 29.80
2775
34.00
36.25
38.25
40.40 42.549
42.55 42.55
44.58 42.54
46.87
48.85
38294 51.19
2294
55.17
57.40 59.518
59.55 59.52
1.67 8.507
29759 3.80
4759 6 42.545

0 7 5.78

14 81 9.6

13 γ Cass.

0 48 28.28
32.30 36.436
36.25 36.46
40.65
18228 44.70
3218
52.36
56.34
1.57
5.53 9.483
9.65 9.48
13.90 9.60
18.00
22.00
8535 26.00
8535
34.30
38.72 42.748
42.72 42.75
47.00 13.921
21374 51.00
1374 49 9.540

48 26.0
30.7
33.4
35.9
1647 38.7
147
48 32.94
+36.60
49 28.0
30.3
34.0
37.2
1702 40.7
202
49 34.04
− 24.20
50 22.5
25.9
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1425 34.3
425
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−1 18.96

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198 β Ursae Min.

14
+70.15 38.15
62.36 38.26
54.53 37.43
46.76 38.36
31.22 38.42
23.38 38.33
15.59 38.09
+7.77 38.82
+4.00 38.62
7.71 38.29
15.57 38.23
23.28 38.10
31.17 38.63
98.340
98.355

49 20.36 +78.18 38.74
191.44 28.00 35.888
38.288 35.90 35.88
43.38
17944 51.60
2944
346.53 7.70
38.392 14.95
22.50
30.55 38.378
38.62 38.38
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34540 9.80
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14 51 7.96

48 55.4
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84 12.3
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49 1.68
+1 96.67
52 10.4
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1168 34.8
168
52 23.36
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53 5.8
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461 13.2
461
53 9.22
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R 2 46.80
R 1 36.32
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74 38 44.1

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48 γ Persei — h m s 2 56 3 — ° ′ +53 2 — 0,12060

57 δ Persei — h m s 3 34 19 — ° ′ +47 24 — 0,12060

63 ζ Persei 9.93069 — h m s 3 46 32 — ° ′ +31 31 — 0,12060

1880 June 15

h m s										
2 55 12.37		56 6.3	3 33 32.08			3 45 —				
16.00	19.510	9.0	35.19			—				
19.60	19.51	11.6	38.30	38.33		—				
22.98		13.9	41.52			—				
9755 26.40		576 16.8	44.55			—				
4755		76								
33.30		56 11.52	50.68			+9.68 14.98	129.49 4.60			
36.65		− 24.55	53.66			7.26 14.43	14.389 7.17			
40.05			56.72			4.84 14.26	9.42			
43.40	46.933		59.75	2.854		+2.39 14.29	11.90	14.391		
46.80	4693	57 1.2	2.82	2.854	34 35.0	−0.77 14.42	14.42	14.39	46 42.9	
50.38	47.01	2.9	6.00		36.0	2.41 14.39	16.80		45.4	
53.82		5.2	9.00		37.2	4.84 14.42	19.26		47.3	
57.30		7.4	12.02		39.4	7.26 14.49	21.75		49.9	
42240 0.70		270 10.3	2567 15.02		1889 41.3	9.69 14.51	12952 24.20		2368 51.3	
6240		270	2567		389		3952		363	
7.65		57 5.40	21.02		34 37.78	14.86 14.14	71.9.92 29.00		46 47.26	
11.17	14520	−1 18.43	24.02	2.7234		16.84 14.56	14.384 31.40	33.800	− 32.87	
14.50	1452		27.20	2723		16.51 14.44	33.75	33.80		
18.00	9403		30.38			21.79 14.41	36.20			
7260 21.28		56 11.52	13617 33.55			−24.28 14.37	1900 38.65			
2260	55 46.970	57 5.40	3617	34 2.881	34 37.78		1900		46 47.36	
		+ 24.55				14.386				
		− 78.43				14.386				
		102.98								

R 24 57.02 ·
R 0 38.75

R 58 2.22 ·
R 58 2.35 ·
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R 50 24.45 ·
R 50 24.32 ·
24.38 ·

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73

α Leonis

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4	28	19.00					
		21.00	23.280				
		23.40	23.28				
		25.45					
	11640	27.55					
		1640					
		32.10					
		34.25					
		36.00					
		38.00	40.491				
		40.53	40.49	29	8.0		
		42.70	40.44		9.7		
		44.82			11.0		
		47.00			12.5		
	36442	49.00		558	14.6		
		442			58		
		52.40		29	11.16		
		55.40	57.610		−30.70		
		57.65	5761				
		57.68	8089				
	2880.5	1.92					
		3805	28 40.465	29	11.16		
					−30.70		

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86

α Aurigae

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5	6	50.87		6	40.8		5
		2.28	5.280		43.2		3
		5.30	5.28		45.1		4
		8.30			47.0		2
	2640	11.25		2255	49.4		2
		2640			255		1
		17.15		6	4510		
		20.00					1
		23.10					
		26.20					
		29.00	2.902				3
		32.00					3
		34.85					2
		37.91					2
		41.00					2
		47.00					
		49.80	5.2790				
		52.75	5.279				
		55.70					
	26395	58.70		6	4510		
		1395	7 29.03				

R 28 30.48 ·
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☉ Sun C = 45.489

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1880 June 15–16

h	m	s					
5	39	56.47		41 5.7	42 14.35		41 37.8
		58.73	1.044	7.0	16.85	18.950	39.5
		1.20	1.04	8.6	19.00	18.95	40.9
		3.27		10.1	21.20		42.9
	522	5.55		431 11.7	9475 23.35		2059 44.8
		522		431	4475		59
		10.10		41 8.62	27.70		41 41.18
		12.30		−49.55	30.40		+ 55.70
		14.50			32.37		
		16.90	19.089		34.68	36.850	
		19.10	19.09		36.95	36.85	
		21.40	19.06		39.00	36.92	
		23.60			41.30		
		25.90			43.55		
	17180	28.00			33165 45.70		
		8180			6165		
		32.58			50.20		
		34.68	37.092		52.60	54.890	
		37.00	37.09		55.00	54.89	
		39.50	38.13		57.25	73.84	
	18546	41.70		41 8.62	27445 59.40		41 41.18
		3546	40 19.075		2445	42 36.885	
				−49.55			+ 55.70

41 45.40 — 14 6.35

d

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h m s: 14 39 42; ° ′: +27 35 — 0.12060

June 16

h	m	s			
14	39	2.00		38	55.3
		4.28	6.644		57.0
		6.68	6.84		58.3
		9.00			59.8
	3422	11.26		2916	1.2
		3322			416
		16.00		38	58.32
		18.48			+ 26.88
		20.65			
		23.00	25.312		
		25.28	25.31	39	43.3
		27.70	25.50		45.0
		30.00			46.0
		32.20			47.5
	22781	34.50		2312	49.4
		4781			315
		39.50		39	46.30
		42.00	44.160		−21.10
		44.00	44.16		
		46.65	51.00		
	22080	48.65		38	58.32
		2080	39 25.205	39	46.24
				+	26.88
				−	21.04
					47.92

+4.28
+2.32
−0.00
2.14
4.28
6.43
8.58
12.85
14.99
17.14
19.28
−21.49

W 46 2.12
W 46 58.40
R 46 58.68
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58.63

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198 min β Urs. Maj. 2 — h m s 14 31 7, +74 39 — 0,12060

199 β Bootis — h m s 14 57 23, +40 32 — 0,12060

14	43 —		44 4.3	14	49 32.87		48 22.7	49 21.3	14	56 39.48		56 21.5
	—		6.0		40.72	48.438	25.4	24.4		42.04	44814	24.8
	—		7.8		48.65	48.44	30.0	30.0		44.85	4481	26.4
	—		9.7		56.00		34.0	34.0		47.40		28.2
	—		394 11.6		24219 3.95		1518 39.7	1513 41.6		22407 50.30		1311 30.2
			394		4219		18	13		2407		311
	—		44 7.88		20.00		48 3036	49 3026		55.80		56 2622
	—		−13.59		27.42		+2 20.49	+1 20.59		58.42		+40.47
+4.28 54.50	380.14 50.22				35.00					1.33		
+2.32 54.62	54.305 52.30				43.00	50.858				3.90	6.760	
−0.00 54.00	54.00		44 36.7		51.00	50.86	50 33.2	51 28.6		6.80	6.76	57 41.3
2.14 54.21	56.35		38.0		58.50	5085	38.6	35.4		9.55	6.62	43.8
4.28 54.07	58.35		39.3		6.55		44.5	41.6		12.27		46.2
6.43 53.82	0.75		40.8		14.25		49.3	47.6		15.00		48.0
8.58 54.42	3.00		1970 42.2		45772 22.00		2210 55.4	2078 54.6		6084 17.77		2293 50.0
			470		772		210	78		6084		293
12.85 54.51	271.40 7.36		44 39.40		37.70		50 4420	51 4156		23.00		57 45.86
14.99 54.35	54.28 9.34	11.430	−45.11		45.50	53.270	+6.55	−58.71		25.85	28.440	−39.17
17.14 53.21	11.35	11.43			53.40	53.27				28.55	28.44	
19.28 54.12	13.40				1.00	22.171				31.00	13325	
−21.49 54.21	5715 15.70		44 7.88		26635 8.75		52 22.5	53 20.7		14220 33.80		56 2622
	715		44 39.40		1635	50 50.855	28.0	29.3		4220	57 6.690	57 45.86
54.292							36.5	37.0				+40.47
54.295							41.0	41.3				−39.17
							1755 47.5	1755 47.2				79.64
							255	255				
							52 3510	3510				
							−1 44.25	−2 44.25				

W 53 8.42	W 42 36.18	W 29 3.62
W 53 47.10	W 42 44.98	W 29 22.95
R 53 47.20	W 42 22.90	R 29 23.35
R 53 47.10	W 42 42.65	R 29 23.38
53 47.13	W 43 0.02	W 29 23.20
	W 43 18.20	23.22

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2 β Cass.

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+58 29

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13 γ Cass.

h m s
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1880 June 16

h m s																			
9 56.00			10 1.7		0 1 48.00			1 13.0		2 00		0 43 28.78			47 54.9		49 19.0	
58.65	1.130		4.2		53.22	6698		15.5		3.1		33.00	37006		57.6		21.7	
1.00	1.11		5.0		56.92	57.00		18.9		7.0		37.00	37.01		1.0		23.5	
3.70			7.7		0.85			21.8		10.5		41.00			4.5		28.3	
555 6.30			291 9.5		28499 5.00			932 24.0		13.7		18503 45.80			60 8.0		1266 32.1	
565			291		3499			432		34.3		345 03			60		266	
11.20			10 5.82		13.00			1 18.64		2 6.86		53.65			48 1.20		49 2532	
13.50					16.85			+1 9.94				57.70			+1 8.97			
16.00					20.76							1.95						
18.40					24.55	28.578						6.00	10212					
20.86	21.417		10 59.2	10	28.45	28.58		3 0.8		3 38.7		10.16	1021		49 34.9		50 22.2	
23.37			1.5		32.65	28.58		5.0		42.2		14.35	10,14		58.3		24.4	
25.30			3.2		36.55			8.7		45.7		18.50			2.2		27.0	
30.86			5.2		40.28			10.7		48.8		22.70			4.7		29.8	
33.87			166 7.5		25720 44.22			399 14.7		2282 52.8		9191 26.90			80 7.4		1374 33.9	
			166		7720			399		282		4191			80		374	
85.77			11 3.32		52.15			2 7.98		2 45.64		35.00			50 1.60		50 27.48	
88.22	40.720				55.20	0220		− 39.40		−1 17.06		39.00	43280		− 51.43			
40.70	40.72				0.05	016						43.30	4328					
43.21	4183				4.40	17716						47.50	14029					
20360 45.57			10 582		080 8.30			1 18.64				21640 51.60			48 120		49 2532	
360	1021.089		11 3.32		110	2 28.580		3 7.98		3 45.64		1640	49 10,175		50 1.60		50 27.48	
								− 69.94		− 77.06					+ 68.97			
								+ 39.40							− 50.43			
								109.34							119.40			

W 35 26.08.
W 36 29.20.
R 36 29.22.
W 36 29.38.
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27.29.

W 51 47.52.
W 22.95.
W 3.20.
W 27.92.

W 17 8.72.
W 17 5.18.
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	20 Cass		198 β Cas. Wm		48 χ Per.	
	h m s 1 17 55		h m s 14 37 4		h m s 2 56 3	
	° ′ +59 36	0,12060	° ′ +105 21	0,12060	° ′ +58 2	0,12060
			Ex.			
	1 16 39.30	16 35.5	14	2 55 13.17		
	3.28 7.380	38.0		18.55 19.910		
	7.30 7.38	42.0		19.85 19.91		
	11.47	44.9		23.20		
	3690 15.55	2083 47.9		9955 26.78		
	2690	83		4955		
	23.80	16 41.66		33.54		
	27.78	+58.42		37.15		
	31.87			40.53		
	36.04 40.083			43.97 47.334		
	40.16 40.08	18 5.0		47.30 47.33	56 24.7	
	44.28 40.09	7.4		50.80 47.30	27.3	
	48.32	10.4		54.20	29.4	
	52.28	13.3		57.52	32.2	
	36075 56.22	526 16.5		42601 1.00	1487 35.1	
	075	526		6601	487	
	4.78	18 1052		7.80	56 29.74	
	8.75 #12816	−30.44		11.20 14.700	−42.63	
	12.80 12.81			14.75 14.70		
	16.80 80.19			18.20 9461		
	6408 20.95	18 28.9		73.50 21.55		
	6408	31.5		2350	55 47.315	56 29.74
	17 40085	35.7				− 4243
		38.6				
		1770 42.3				
		270				
		18 3540				
		−55.32				
	W 49 37.85 ·		R 2 0.85 ·		R 20 12.10 ·	
	W 49 34.68 ·		R 2 36.92 ·		R 20 11.58 ·	
	W 49 50.82 ·		R 2 22.82 ·		1.84 ·	

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		57 δ Persei				61 Tauri η Persei				73 d Tauri		
		h m s 3 34 19 ° ' +47 24		0,12060		h m s 3 40 18 ° ' +23 44		0,12060		h m s 4 28 59 ° ' +16 16		0,12060
	1880	June 16										
h 3	m s 33 32.67		34 4.9	3	39 37.42		40 5.4	4	28 —			
	35.67	38824	6.8		39.80	41.990	7.2		—			
	38.88	3882	9.0		42.00	4199	9.0		—			
	41.90		11.4		44.23		10.5		—			
	19412 45.00		455 13.4		20995 46.50		444 12.3		—			
	4412		455		995		444					
	51.00		34 9.10		51.00		40 8.88	+8.60 40.60	965.19 32.00			
	54.00		− 5.83		53.30		− 8.80	6.45 40.45	40.577 34.00			
	57.22				55.50			4.24 40.64	36.40			
	0.26	3.314			57.90	0.103		+2.12 40.67	38.55	40.581		
	3.35	331			0.08	0.10		−0.00 40.55	40.55	4058		
	6.38	3.24			2.37	0.07		2.19 40.41	42.55			
	9.52				4.60			4.30 40.38	44.68			
	12.65				6.90			6.45 40.75	47.20			
	2983 15.45				54093 9.28			8.61 40.69	36523 49.30			
	2983				093				523			
	21.68				13.68			12.90 40.60	203.75 53.50			
	24.50	27.660			15.92	18.150		15.04 40.76	40.75 55.80	57.960		
	27.60	2766			18.20	18.15		7.20 40.80	58.00	5796		
	30.72	12648			20.35	12014		19.35 40.75	0.10			
	13830 33.80		34 9.10		9073 22.60		40 8.88	−21.56 40.84	28980 2.40			
	3830	34 3.275	− 5.82		4075	40 0.085			3980			
			− 5.82				− 8.80	40.663				
								40.638				
	R 57 35.45 ·				R 37 22.18 ·				R 5 13.02 ·			
	R 57 35.35 ·				R 37 23.35 ·				R 5 12.82 ·			
	57 35.40 ·				2276 ·							
									5 12.92 ·			

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June 17

5	44	6.18			45	9.3	46	33.90			45	50.3	13	41	5.85			41	46.21
		8.32	10662			11.0		26.25	28424			52.0			1.00	4300			47.5
		10.86	10.66			12.9		28.35	28.42			53.7			4.87	4.30			49.5
		13.00				14.5	1	30.39				55.3			7.38				51.5
	5331	15.30			639	16.2	14212	33.00			2681	56.8		2150	10.70			2490	54.3
		331				134		4212				181			2150				490
		19.70			45	1278		37.40			45	5362			17.15			41	49.80
		22.00				−44.06		39.70				+ 52.84			20.50				+ 40.23
		24.23						41.95							23.68				
		26.40	28.737					44.25	46494						26.90	30.070			
		28.78	2874					46.50	46.49						30.00	3007		43	12.0
		31.00	28.70					48.80	46.441						33.33	30.00			14.0
		33.28						50.92							36.40				16.5
		35.50						53.28							39.78				18.7
	25863	37.77					41845	55.65						27063	42.95			825	21.3
		7863						5845							063				225
		42.00						58.90							47.32			43	16.50
		44.37	46738					2.30	4464						52.42	55.704			− 46.47
		46.90	46711					4.45	4.46						55.80	55.70			
		49.00	5740					6.67	4.288						58.80	6000			
	23369	51.21			45	1278	2232	9.00			45	5362		27852	2.18			41	49.80
		3369	44 28.720					2232	46 46.465						2852	42 30.035		43	16.50
						−44.06						+ 52.84							+ 40.23
																			− ~~40.23~~ 46.47
																			~~8046~~ 8670
																			~~1.90558~~ 1.93802
																			~~0.98491~~ 0.98491
																			~~2.89049~~ 2.92293
																			~~1.86261~~ 1.86261
																			~~3.97728~~ 3.93968
																			~~5.24128~~ 4.58227

W 40 2.28

W 12 31.60

W 26 23.88.
W 27 36.70.
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R 27 36.45.

27 36.76.
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182.

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+19 0 9 9 7 5 6 7 1.17609 0,12060
1.15176

1880
June 17

h	m	s															
13	48	16.50			48	9.6	13	54	31.50		54	37.6	14	9	29.48		9	20.7
		18.70	28870			11.9			63.60	55630		39.3			31.70	33860		22.5
		20.90	20.87			13.9			55.60	55.63		42.4			33.82	33.86		24.0
		23.00				15.7			57.70			44.2			36.00			25.8
	10435	25.25			681	17.0		27815	59.75					16930	38.30		1210	28.0
		435				181			2815						1930			210
		29.60			48	1362			3.83						42.48		9	24.20
		31.80				+24.74			5.80						44.30			+27.19
		34.00							7.95						47.00			
		36.20	38.381						10.15	12123					49.15	51.401		
		38.38	38.38		49	4.7			12.17	12.12	55	39.6			51.40	51.40	10	21.8
		40.60	38.35			6.7			14.20	12,12		41.2			53.68	51.39		23.6
		42.70				8.7			16.25			42.8			55.87			26.0
		46.00				10.5			18.38			44.4			58.00			26.4
	34543	47.15			430	12.4		10911	20.38		2142	46.2		46261	0.23		1255	28.7
		7543				430			19.18			142			1261			255
		51.41			49	8.60			24.50		55	42.84			4.60		10	25.10
		53.65	58842			−30.24			26.50	28618		−30.72			6.64	8.930		−33.71
		55.90	55841						28.62	2862					9.00	8.93		
		58.00	7671						30.67	14425					11.00	102.79		
	27921	0.25			48	1362		14309	32.80		54			4463	1341		9	24.20
		2921	48 38365		49	8.60			4309	55 12.120	55	42.841			4465	9 51.395	10	25.10
						+24.74						−30.72						+27.20
						−30.24												−33.70
						54.98												60.91
						1.74020												1.78469
						1.15176												1.14958
						2.89196												2.93427
						1.83493												1.87116
						8.94297												8.93689
						5042												4 5633

W 20 49.10 .
W 21 57.90 .
R 21 38.08 .
R 21 58.12 .
W 21 57.82 .
21 57.88
68.88

W 12 45.88 .
W 111 7.12 .
R 111 7.30 .
R 111 7.28 .
− 111 7.48 .
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81.41

W 32 19.20 .
W 33 33.42 .
R 33 33.53 .
R 33 33.45 .
W 33 33.70 .
33 33.53 .
74.33

183

T Virginis

h m s
13 33 29
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+2 8 0,12060

187

2 Bootis

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14 10 8
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+19 49 1.17609 0,12060
9.97349
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193

γ Boötis

h m s
14 27 12
+38 60 ° '

1.17609 0.12060
.989152
1.06761

14	26	29.20			26	16.6	14	39	2.00			38	49.5	14	43	21.40		43	31.6
		31.70	34380			18.5			4.45	6704			51.2			23.30	25674		33.5
		34.35	34.38			20.5			6.77	6.70			53.0			25.67	25.67		35.4
		37.00				22.2			9.00				54.7			27.80			37.4
	17190	39.65			1017	23.9		3352	11.30			2654	57.0		12837	30.00		1768	38.9
		2190				07			3352				154			2837			268
		45.00			26	2014			16.00			38	53.08			34.22		43	3536
		47.70				+ 35.52			18.42				+ 92.24			36.33			+ 7.41
		50.40							20.80							38.50			
		53.00	55.706						23.00	25352						40.68	4277		
		55.70	55.70		27	31.2			25.25	25.35		39	56.5			42.65	42.77	44	12.3
		58.40	55.63			33.3			27.68	25.30			58.3			44.92	42.78		13.7
		1.00				35.4			30.00				0.4			47.14			15.7
		3.80				37.3			32.35				2.3			49.20			17.0
	50135	6.35			1761	38.9		22817	34.67				17 4.2		38494	51.38			772 18.5
		5135				261			4817			40	17			2494			272
		11.60			27	35.22			38.27			39	0.34			55.60		44	15.44
		14.20	16.880			− 94.56			41.30	43914			−35.02			57.70	59900		−32.67
		16.80	16.88						43.90	43.91						60.95	5990		
		19.55	11126						46.30	5061						2.00	8557		
	8440	22.25			26	20.34		21957	48.60			38	53.08		29950	4.25		43	3536
		3440	26 55.665		27	35.22			1957	39 25.325		8.10	0.34			4950	43 42.775	44	15.444
						+ 35.32							+ 32.24						+ 17.42
						− 39.56							− 35.02						− 32.66
						74.88							67.26						50.08
						1.87437							1.82776						1.69966
						1.06761							1.12369						
						2.94198							2.95145						
						1.88235							1.88728						
						8.94037							8.93583						
						45855							45549						

W 30 56.95 ·
W 32 13.25 ·
R 32 13.25 ·
R 32 13.25 ·
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32 13.22 ·
7627

W 45 57.72 ·
W 47 14.75 ·
R 47 14.85 ·
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47 14.86 ·
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W 50 0.85 ·
W 45 52.10 ·
R 52.48
R 52.35
W 52.10
45 52.26

δ Boötis

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+ 27 35 ° '

1.17609 0.12060
.994760
1.12369

584. 590 ζ² Librae

h m s
14 44 11
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0.12060

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198 β Urs. Min. — h m s 14 51 7, ° ′ +74 39 — 0.12060

199 β Bootis — h m s 14 57 23, ° ′ +40 52 — 1.17609 / 9.87866 / 1.05475 — 0.12060

200 β Librae — h m s 15 10 30, ° ′ −8 56 — 0.12060

1880 June 17

β Urs. Min.

h	m	s					
14	49	32.18		48	36.0	49	52.0
		40.60	48526		40.8		57.1
		48.60	4852		45.5		3.6
		56.70			50.5		11.3
	24263	4.55		2294	56.6	2979	13.9
		4263			294		
		19.90		48	4588		179
		27.30				50	3.58
		3525					
		42.75					
		51.20	50.933	50	56.2	51	48.4
		58.70			1.0		55.7
		6.90			7.4		2.7
		14.40			12.7		7.6
		22.00			19.4	00	15.6
				641	27.4		100
		37.40			641	52	200
		45.45	53370	51	1282		
		52.90	5337				
		1.70					
	26685	9.40		52	37.8	53	14.3
		1685	50 50.94		42.9		21.8
					48.7		30.2
					68.9		36.0
				2521	3.8	1454	43.1
					21		1454
				52	40.42	53	29.08

β Bootis

h	m	s			
14	56	39.30		56	25.4
		42.00	44810		26.6
		44.78	4481		29.0
		47.70			31.0
	22405	50.27		1460	34.0
		2405			460
		56.00		56	29.20
		58.58			+ 37.50
		1.17			
		3.90	6.770		
		6.88	677	57	26.6
		9.50	6.63		29.2
		12.22			31.4
		14.98			33.4
	6093	17.70		1555	34.9
		6093			75
		23.00		57	3150
		26.00	28450		−24.80
		28.58	2845		
		31.25	13326		
	14223	33.40		56	29.20
		4223	57 6.700	57	31.10
				+	37.50
				−	24.40
					61.90

13.005
12.977

1.79169
1.05475
2.84644
1.78803
8.94159
4 5945

β Librae

15	9	52.00	+20.84	12.89		9	51.4
+18.83	13.20	64.70	54.37	56388			53.4
16.72	13.27	12.94	56.55	5639			55.0
14.63	13.16		58.53				56.1
11.69	12.18	28194	0.49			2736	57.7
			3194				236
8.35	13.01	26.14	4.66			9	54.72
6.27	13.23	13.07	6.86				+18.26
						9	54.72

W	42	39.40
W	43	7.98
W	43	30.60
W	43	44.12
W	44	4.02
W	44	16.18
	43	44.58
		65.18

W	29	7.08
W	30	8.30
R	30	8.38
R	30	8.48
W	30	8.68
	30	8.46
		61.38

W 16 33.18

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α Andromedæ						γ Pegasi				β Ursæ Min.			
h m s						h m s				h m s			
0 2 8				0.12060		0 7 0			0.12060	14 31 4			0.12060
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+28 25						+14 31				+105 21			
										Sheets not numbered			
0 1 27.42		1 19.0		0 6 21.26		6 12.7		14 7.15		83.3	3.9
29.78	32.118	20.6		23.40	25.580	14.0		14.70		0.6	9.5
32.17	32.12	22.5		25.62	25.58	16.4		22.55		5.2	16.5
34.42		24.3		27.80		17.0		30.20	38.147	11.4	25.0
16059 36.80		1124 26.0		12790 29.82		777 18.6		38.20		275 17.0	843 19.4
1059		124		2790		277		45.60		275	343
41.55		1 27.48		34.20		6 15.54		53.80		5.80	16.86
43.93		+ 28.42		36.20		+ 27.12		1.75			
46.17				38.50				34332 9.37			
48.50	50.911			40.65	42.643			7332			
51.00	5091	2 29.0		42.68	42.69	7 14.1		38.147		4.2	
53.35	50.89	30.9		44.76	42.64	16.3				7.3	
55.60		32.2		47.00		17.9				9.5	
57.80		33.7		49.00		19.5				13.4	
45820 0.30		1609 35.1		38424 51.25		890 21.2				504 16.0	
820		109		2424		390				504	
5.00		2 32.18		53.30		7 1780				1 008	
7.40	9.670	− 41.28		57.53	54.702	− 35.41					
9.65	9.67			59.78	59.70						
12.00	10179			1.90	8 528						
48351 14.30		1 22.48		24851 4.00		6 1554				550	16.86
4835	1 50,900	2 32.18		4851	6 42.665	7 1780				10.08	
		+ 28.42				+ 27.12					
		− 41.28				− 35.14					
		49.70				62.26					
		1.843 23									
W 55 0.98				W 49 2008				R 2 23.22			
W 56 21.38				W 49 38.85				R 2 40.22			
R 56 21.65				R 49 39.10				R 2 22.35			
R 56 21.70				R 49 39.03							
21.58				W 49 39.10							
				49 39.02							

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1880phae.proj.1510.

S

Sun - C = 45.458

h m s
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+23 26

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Sime 18

h	m	s															
5	48	15.60			49	12.7	50	33.40									
		17.90	20.060			14.0		35.80									
		20.00	20.06			15.9		38.00									
		22.25				17.7		40.00									
	10030	24.55			796	19.3		42.35									
		030				296											
		28.90			49	1592		46.85									
		31.29				−37.91		49.17									
		33.47						51.41									
		35.86	38.009					53.64	55842								
		37.90	38.01					55.78	55.84								
		40.35	38.02					57.96									
		42.43						0.42									
		44.88						2.55									
	34208	47.00					50258	4.80									
		7208						5258									
		51.33						9.44									
		53.69	55984					11.55	13864								
		56.17	5598					13.90	1387								
		58.33	7604					16.00									
	27992	0.40			49	1592	6934	18.45									
		2992	48 38.015					1934									
						−37.91											

W − 44.40

										12	47	49.00					
												52.70	56500				
												56.50	5650				
												0.130					
											28250	4.00					
												3250					
												11.65					
												15.35					
												19.00					
												22.50	26550				
												26.45	26.55	49	12.1		
												30.25	26.52		14 5		
												34.00			17.9		
												37.90			21.5		
											23895	41.55			908 24.8		
												5895			408		
												49.20		49	18.16		
												52.75	56540		−51.63		
												56.55	5654				
												0.130	17304				
											28270	3.40					
												3270	48 26.535	49	18.16		
															+ 51.62		

W 45 43.78

W 45 43.42

43.60

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1880phae.proj.1510

182					182					30				
29 Ursae Majoris					29 Bootis					β Aquilae				
h m s					h m s					h m s				
13 42 46				0.12060	13 48 55				0.12060	1 47 38				0.12060
° ′					° ′					° ′				
+49 55					+19 0					+20 13				
13 41 57.92					13 48 16.36					1 47 17.80				
1.00	4332				18.65	2092				20.00	22306			
4.40	4.33				20.77	2.079				22.38	22.31			
7.54					23.00					24.60				
2166 10.80					10396 25.18					11153 25.90				
2166					396					1153				
17.22					29.50					31.25				
20.48					31.68					33.83				
23.34					33.90					35.52				
26.95	30064				36.00	38.259				37.75	39950			
30.10	30.06	43	8.6		38.20	38.26	49	3.5		39.90	39.95	48	19.5	
33.25	30.02		11.4		40.40	38.29		4.8		42.16	39.94		20.7	
36.47			14.8		42.65			6.9		44.28			22.3	
39.67			17.2		45.00			9.0		46.38			23.7	
27058 42.90			719 19.9		34433 47.00		350	10.8		35955 48.78			1119 25.7	
058			219		7433			350		8955			119	
49.25		43	1438		51.35		49	700		53.23		48	2238	
52.52	5571		−4434		53.60	55.790		−28.73		55.46	57.562		− 42.44	
55.73	5571				55.85	5579				57.52	57.56			
58.92	6004				57.95	7658				59.70	7987			
27858 2.18					27895 0.20					28781 1.90				
2858	42 30.040	43	14.38		2895	48 38.275	49	7.00		3781	47 39.945	48	22.38	
			+ 44.34					+ 28.73					+ 42.44	
W 27 34.52					W 26 56.10					W 8 40.72				
W 27 34.68					W 26 55.88					W 8 40.98				
34.60					55.99					40.85				

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1880phae.proj.1510.

32

γ Andromedæ

h m s
1 56 29
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+41 53

0,12060

1880
June 18

h	m	s									
1	55	44.68					1	59	41.29		
		47.38	50232					43.57	45.872		
		50.30	50.23					45.92	45.87		
		53.00						48.20			
	25116	55.80					22936	50.38			
		116						2936			
		1.20						54.78			
		3.80						57.19			
		6.83						59.50			
		9.70	12361					1.64	3820		
		12.40	12.36	56	44.8			3.88	382	0	36.0
		15.18	12.38		47.5			6.00	3.83		38.0
		17.90			49.2			8.28			39.7
		20.77			51.0			10.51			41.4
	11125	23.47			2457	53.2	3438	13.80		1981	43.0
		2125				457		3438			481
		29.00		56	49.14			17.21		0	39.62
		31.83	34522		-36.77			19.60	21800		-35.80
		34.50	3452					21.85	2180		
		37.28	14475					24.00	12767		
	17261	40.00					10900	26.34			
		2261	56 12.370	56	49.111			900	0 3.825	0	39.62
					-36.77						-35.80

W	36	56.85	.				W	27	10.95	.	
W	36	56.82	.				W	27	10.92	.	
		56.83	.						10.94	.	

33

ζ Arietis

h m s
2 0 21
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+22 53

0,12060

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1880phae.proj.1510

8

Sem c = 45,45-8

h m s
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+23 27

1880

Sime 18-19

0.12060

176

ε Virginis

h m s
12 36 9

+11 37

Sime 19

0.12060

5	52	25.20					54	—			53	34.7	12	55	30.67				
		27.45	29.650					—				37.0			32.85	34.966			
		29.80	29.65					—				39.8			34.97	34.97			
		31.80						—				2.0			37.15				
		14825 34.00						—			2984	4.9			17483 39.19				
		4825										484			2483				
		38.60						—			53	59.68			43.40				
		40.85						—			+1	5.89			45.58				
		43.27						—							47.60				
		45.30	47.726					—							49.72	51.870			
		47.88	47.73		0.8-9	5.720	28.10	5.75							51.90	51.87	38	24.0	
		50.00	47.72		2.24	5.61	5.62	7.85							54.00	51.86		25.4	
		52.30			4.50	5.50		10.00							56.20			27.0	
		54.58			6.75	5.65		12.40							58.13			28.6	
		42953 56.80			9.01	5.54		14.60							46683 0.30			1355 30.5	
		6953													1683			3.55	
		1.29			13.44	5.51	27.61	19.00							4.55			56 27.10	
		3.43	5.806		15.74	5.58	5.522	21.32	23530						6.60	8764		— 35.24	
		5.83	5.80		18.00	5.40		23.40	2353						8.80	8.76			
		8.23	9545		20.24	5.50		25.75							10.90	10373			
		2903 10.25			22.136	5.62	11765	28.18			53	59.68			4382 12.97				
		2903	52 47.725				1765								4382	55 51.865	56	27.10	
					5.571													— 35.24	
					5.571														

W 10 17.18

W 45 43.82
W 45 44.15
46 43.98

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1880phae.proj.1510.

181					182					30				
ν Ursæ Maj					ν Bootis					β Arietis				
h m s					h m s					h m s				
13 42 46				0,12060	13 48 33				0,12060	1 47 58				0,12060
° ′					° ′					° ′				
+49 35					+19 0					+20 13				
1860														
June 19														
h m s														
13 41 57.92					13 48 16.30					1 47 17.65				
1.20	4.344				18.57	20.784				19.85	22.030			
4.35	4.34				20.90	20.78				22.00	22.03			
7.48					22.95					24.20				
2172 10.77					10392 25.20					11015 26.45				
2172					392					1015				
17.17					29.50					30.92				
20.30					31.80					33.23				
23.57					34.00					35.30				
26.70	29.978				36.02	38.322				37.53	39.744			
30.00	29.98	43	5.5		38.36	38.32	49	12.8		39.73	39.74	48	4.0	
33.20	29.93		8.0		40.60	38.27		14.5		41.95	39.70		6.5	
36.28			11.0		42.82			16.7		44.10			7.3	
39.78			13.7		44.80			18.4		46.40			8.9	
26980 42.80		543	16.3		34490 47.00		828	20.4		35770 48.55		362	10.5	
8980			45		7490			328		8770			342	
49.30		43	1090		51.40		49	1656		53.00		48	724	
52.27	55520		− 40.95		53.57	55760		− 37.27		55.15	57380		−27.52	
55.47	5552				55.77	5576				57.45	5738			
58.70	5986				58.00	7654				59.55	7941			
27760 1.86					27880 0.06					28690 1.75				
2760	42 29.955	43	10.86		2880	48 38.295	49	16.56		3690	47 39.720	48	7.24	
			− 40.91					− 38.26					− 27.52	
W 27 31.98 .					W 22 7.72 .					R 5 22.30 .				
					W 27 8.00 .					R 5 22.50 .				
					7.81 .					22.40 .				

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1880phae.proj.1510.

32					33					198		
β Andromedæ					α Arietis					β Urs. Min.		
h m s					h m s					h m s		
1 56 29					2 0 21					14 51 4		
° ′					° ′							
+41 45				0,12060	+22 53				0,12060			0,12060
1 55 44.47					1 59 41.27		59 26.0	14	49 19.62	+74.18 37.80	49 55.8	
47.13	49.996				43.50	45.770	28.0	+70.15 37.80	187.90 27.70	35.180	1.0	
50.00	49.99				45.78	45.77	29.41	62.36 37.86	37.580 35.50	3.518	4.2	
52.80					48.00		30.6	54.95 37.00	42.45		12.6	
24998 55.58					22885 50.30		1464 32.4	46.76 37.39	17590 50.63		326 18.0	
4998					2885		464		2590		326	
1.00					54.65		29.28	31.22 37.62	341.81 6.70		50 6.52	
3.95					57.00		+34.42	22.34 37.38	37.579 14.00		+ 31.27	
6.55					59.20			15.34 37.05	22.46			
9.34	12.156				1.40	3.686		+ 7.77 37.23	30.46	37.967		
12.16	12.15	56	55.3		3.70	3.68		− 6.80 37.40	38.00	37.97	52 27.0	
15.00	12.15		57.3		6.00	3.72		7.71 36.29	46.00		30.8	
17.72			59.3		8.18			15.34 37.71	53.30		37.0	
20.42		+	0.3		10.36			23.38 38.90	1.78		43.0	
10940 23.26			1		3317 12.68			31.17 37.83	34170 9.00		1863 48.5	
1940		56	58.8		3317				7170		363	
28.30					17.18				—		52 37.26	
31.60	34.312				19.42	21.670			—		− 1 59.47	
34.26	34.31				21.60	21.67			—			
37.00	14430				24.00	12.44			—			
17156 39.90					10835 26.15		59 29.28		—		50 6.52	
2156	56 12.150	56			835	0 3.700	+ 34.42				52 37.26	
								37.779				
								37.793				
R 37 22.32 ·					R 26 47.50 ·				R 2 22.98 ·			
					R 26 47.58 ·				R 8' 32.08 ·			
					47.54 ·							

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1880phae.proj.1510.

8

Sun ☉ – 45,458

h m s
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+23 27

0,12060

1880

June 19–20

h m s
5

– 13.54	14.78	59	28.27	
15.74	14.83	74.08	30.57	32.24
18.00	14.88	14.818	32.88	33.42
20.25	14.75		35.00	
– 22.56	14.84	16712	37.40	
			1412	

Moonly

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1880phae.proj.1510

S

Sun c = 45.458

h m s
6 2 43
+23° 27'

1880

June 20 −21

0.12060

193

γ Boötis

0.12060

h m s
14 27 12
+38° 50'

1.17609
9.89152
1.06761

June 21.

+22.38	6.655	59	44.15		0	39.5	2	1.90		1	17.6	+22.50	24.40	14	26	29.35		26	21.0
20.24	6.79	33.93	46.55	4790		41.4		4.20	6.414		19.1	20.24	24.44	122.05		32.02	34668		22.7
18.00	6.83	6.786	48.83	4879		43.0		6.40	6.41		20.5	18.00	24.40	24.41		34.64	34.67		25.0
15.75	6.75		51.00			44.9		8.67			22.3	15.75	24.42			37.38			26.5
13.44	6.91	24395	53.42		2157	46.9	3207	10.90		1035	24.0	13.44	24.34		17334	39.95		1242	29.0
			4395			157		3207			35					2334			242
9.00	6.90	13.70	57.90		0	4314		15.42		1	2070	9.00	24.42	146.23		45.13		26	2484
6.75	6.80	6.85	0.05			−37.30		17.70		+1	3.73	6.75	24.45	24.371		47.90			+30.99
			—					20.00				4.44	24.49			50.50			
			—					22.20				+2.23	24.43			53.18	55.837		
			—					24.50				−0.00	24.60			55.82	55.84	27	33.4
			—					26.18				2.24	23.94			58.60	55.82		35.5
			—					—								1.16			37.5
			—					—								3.78			39.4
			—					—							50253	6.47		1869	41.1
																5253			360
−13.44	6.84	34.48	20.38					38.00				13.44	24.37	122.66		11.60		27	37.38
15.74	6.86	6.896	22.60	24.904				40.20	42540			15.74	24.46	24.532		14.35	16.580		−41.55
18.00	6.95		24.95	2490				42.57	4254			18.00	24.57			17.00	16.98		
20.25	6.94		27.19					44.78				20.26	24.53			19.45	11165		
−22.56	6.84	12452	29.40		0	4314	21270	47.15		1	2070	22.56	24.59		8490	22.50		26	24.84
			2452					1270								3490	26 55.830	27	37.38

6.844
6.843

24.437
24.433

+ 30.99
− 41.55
72.54
1.86058
1.06761
2.92819
1.86823
8.94004
4.5841

W 37 39.80
39

W 10 1.75

W 31 1.85
W 32 15.58
R 32 15.58
R 32 15.70
W 32 15.88
32 15.68
73.83

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1880phae.proj.1510.

1880 June 21

ε Boötis

h m s
14 39 42
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+27 35

0.12060

h m s			
14 39 2.26		38 55.8	
4.60	6.918	0.0	
6.98	6.82	1.7	
9.18		3.0	
3409 11.57		85 5.0	
3459		85	
16.27		39 1.70	
18.53		+23.79	
20.75			
23.16	25517		
25.58	25.52	39 56.5	
27.82	25.46	57.0	
30.25		59.2	
32.04		1.1	
22965 34.75		60 3.2	
4965		460	
39.42		39 5920	
41.78	44100	−33.71	
44.10	44.10		
46.50	5092		
22050 48.70		39 1.70	
2050	39 25.490	40 1.20	
		+ 23.79	
		− 35.71	
		59.50	
		1.77452	

Ex.

14 43 21.50	
23.60	
25.65	25.711
27.90	
12855 29.90	
~~43.90~~	
46.00	
48.13	
50.15	
52.25	
54.40	
56.45	
58.55	
0.75	
7.18	
9.25	11446
11.45	1145
13.65	
5723 15.70	
723	

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h m s
14 44 11
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−15 32

0.12060

43 43.0
45.0
46.5
48.4
2333 50.4
333
43 4666
44 25.8
27.5
29.0
30.5
1448 32.0
448
44 2896
43 4666
44 2896

198 β Urs. Min

h m s
14 51 7
° ′
+74 39

0.12060

14 49 32.65		48 40.2	49 10.3
40.57	48.362	44.7	15.3
48.25	48.36	50.5	20.6
56.34		54.5	26.2
24181 4.00		2481 58.2	1040 31.6
4181		481	~~2~~40
19.47		48 4962	~~2050~~
27.25		+2 1.08	49 2080
35.00			+ 30.10
43.00	50688		
50.55	50.69	50 38.2	51 26.3
58.88	50.72	43.7	31.3
6.20		48.7	38.3
14.02		53.2	46.0
25619 21.82		2439 0.1	1930 51.1
619		439	430
37.65		50 4878	51 3860
45.40	53086	+1.92	− 47.90
52.95	53.09		
0.75	22145		
26543 8.68		52 24.3	53 11.1
1543	50 50.705	29.5	15.5
		35.1	20.1
		40.4	24.0
		1770 47.7	985 27.8
		270	485
		52 35.40	53 19.70
		−1 44.70	

W 46 7.05
W 46 13.32
R 46 13.42
R 46 13.42
1339

W 52 43.98
W 53 37.22
R 53 37.22
R 53 37.32
W 53 37.20
53 37.24

W 42 40.10
W 42 51.50
W 42 22.60
W 42 39.72
W 42 58.12
W 42 13.00

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1880phae.proj.1510.

199
β Boötis

h m s
14 57 23
° ′
+40 52

0,12060

201
δ Boötis

h m s
15 10 37
° ′
+33 46

1.17609 0,12060
.99197 6
1.09585

209
α CrB.

h m s
15 29 34
° ′
+27 7

1.17609 0,12060
.99494 3
1.12552

14	56	39.64			56	24.3	15	9	56.16			9	38.7	15	28	64.10			28	40.8
		42.44	45118			23.3			58.59	1.140			40.8			56.35	58720			42.4
		45.14	4512			25.0			1.16	114			42.41			58.70	58.72			44.1
		47.80				27.0			3.64				43.8			1.00				45.7
	22559	50.57			1256	29.0		570	6.15			2114	45.7		29360	3.45			2207	47.7
		2559				256			570				114			4360				207
		56.00			56	25.12			11.10			9	42.28			8.00			28	44.14
		58.70				+41.80			13.60				+38.70			10.36				+33.15
		1.38							16.00							12.50				
		4.00	6878						18.50	20978						15.00	17328			
		7.00	680		57	44.2			21.00	2098		10	49.6			17.35	1729		29	52.4
		9.65	6.94			43.0			23.45	20.98			51.3			19.65	17.29			54.4
		12.30				44.6			25.90				53.2			21.95				56.3
		15.15				46.4			28.45				54.8			24.30				58.0
	6208	17.90			2234	48.2		18880	30.80			2657	36.8		15565	26.55			2808	59.7
		6208				234			880				157			6805				308
		23.48			57	44.68			35.70			10	53.14			31.18			29	56.16
		26.00	28770			− 37.76			38.40	40830			− 32.16			27.60	35860			− 38.87
		28.77	2877						40.90	4083						35.82	3586			
		31.40	13389						43.30	4197						38.10	15458			
	14385	34.20			56	25.12		20415	45.85			9	42.28		17930	40.50			28	44.14
		4385	57 6920		57	44.68			415	10 20.980		10	53.14			2930	29 17.290		29	56.16
			+ 41.80										+ 38.70							+ 33.15
			− 37.76										− 32.16							− 38.87
			79.56										70.86							72.62
													1.85040							1.85745
													1.09585							1.12552
													2.94625							2.98297
													1.89481							1.92080
													8.94856							8.93783
													5 4 35							4 5 7 11

W	29	1.88	·				W	35	0.28	·				W	13	35.32	·		
W	29	21.42	·				W	36	18.65	·				W	14	58.70	·		
R	29	21.12	·				R	36	18.58	·				R	14	58.62	·		
R	29	21.25	·				R	36	18.70	·				R	14	58.58	·		
W	29	21.25	·				W	36	18.85	·				W	14	58.72	·		
		21.26	·					36	18.77	·					1458.65		·		
									78.49						83.33				

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212
α Serpentis

h m s
15 38 18
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+6 48

1.17609 0.12060
9.99693
1.17302

1880
June 21

h	m	s									
15	37	41.15		37	29.0		59	42.00		59	26.0
		43.17	45272		30.6			44.25	46470		27.5
		45.24	45.27		32.2			46.42	46.47		29.3
		47.35			33.8			48.68			31.1
	22636	49.45		1614	35.5		23235	51.00		1468	32.9
		2636			111			3235			468
		53.63		37	3222			55.48		59	29.36
		55.70			+29.70			57.72			+35.05
		57.70						0.00			
		59.80	1.917					2.19	4.433		
		1.85	192	38	34.8			4.40	443		
		4.00	1.92		36.4			6.63	4.39		
		6.15			38.0			8.90			
		8.22			39.5			11.18			
	1725	10.20		1897	41.0		3990	13.40			
		1725			397			3990			
		14.44		38	37.94			17.80			
		16.57	18562		−36.02			20.00	22310		
		18.60	1856					22.40	22.31		
		20.50	12383					24.50	12878		
	9281	22.70		37	3228		11155	26.85		59	2936
		4281	38 1.920	38	37.911			1155	0 4.410		
					+ 29.64						+ 35.05
					− 36.02						
					6 5.66						
					1.81730						
					1.17302						
					2.99032						
					1.93186						
					8 94154						
					4 5943						

33
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W	32	8.70		R		45.88				R	1 43.15
W	33	34.02		R		45.60				R	25.40
R	33	34.28									
R	33	34.05									
W	33	34.35									
	33	34.18				45.74					
		8548									

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1880
June 21—22

6	3	54.27			4	99.5	6	11.88			5	37.4	9	23	57.43			23	47.6
		56.40	58.700			1.4		14.02	1.6356			39.0			0.30	3.676			49.0
		58.63	58.70			3.0		16.35	1.636			40.7			3.65	3.68			51.7
		1.00				4.4		18.58				42.6			7.00				54.6
	29350	3.20			143	6.0	8178	21.00			2037	44.0		1838	10.30			2603	57.5
		4350				143		3178				37			1838				103
		7.80			5	2.86		25.40			5	40.74			17.13			23	52.06
		10.00				−46.07		27.67				+ 53.72			20.50				+ 38.59
		12.27						29.93							23.87				
		14.50	16.800					32.27	3.4460						27.30	3.0654			
		16.83	16.80					34.50	3.446						30.64	3.065			
		19.00	16.78					36.71	3.4216						34.00	3.065			
		21.32						39.00							37.42				
		23.58						41.18							40.80				
	15120	2.690					31014	43.48						27589	44.25	?			
		6120						4014							589				
		30.30						48.00							50.85				
		32.60	3.4850					50.28	5.2574						54.20	5.7626			
		34.90	3.485					52.58	5.257						57.60	5.763			
		37.15	1.5355					54.86	6893						1.00	6131			
	17425	39.30			5	2.86	26287	57.15			5	40.74		28813	4.48			23	52.06
		2425	4 16.790					1287	6 3.4460						3813	24 3.0650			
						−46.07						+ 53.72							+ 38.59

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		149				153				154		
		ω Urs. Maj.				β Urs. Maj.				α Urs. Maj.		
		h m s 10 15 7		0,12060		h m s 10 54 32		0,12060		h m s 10 56 15		0,12060
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	1880 .	June 22										
h	m s											
10	14 23.41		14 14.4	10	53 39.50	+34.81 18.31	53 16.9	10	55 16.80		55 21.9	11
	26.37	29030	16.2	+34.90 18.05	90.65 43.15	47070	19.4		21.40	25826	24.6	
	29.00	29.03	17.9	31.05 18.20	18.130 47.15	47.07	22.3		25.95	25.82	27.5	
	31.80		20.0	27.17 18.02	50.85		24.5		30.28		30.6	
	14515 34.57		909 22.4	23.37 18.07	23535 54.70		1105 27.4		12913 34.70		1385 33.9	
	4515		409		3535		105		2913		385	
	40.03		14 18.18	15.52 17.72	157.57 2.20		53 22.10		43.60		55 27.70	
	43.00		+33.09	11.64 17.79	17.508 6.15		+55.63		48.00		+33.66	
	45.70			7.75 17.70	9.95				52.55			
	48.50	51.292		+3.84 17.52	13.68	17514			57.00	1367		
	51.25	51.29		−0.20 17.60	17.60	17.51			1.30	137		
	54.17	51.26		3.87 17.53	21.40				5.60	1.36		
	56.88			7.76 17.24	25.00				10.30			
	59.60			11.64 17.26	28.90				14.80			
	46163 2.50			15.54 17.21	15763 32.75				1230 19.15			
	1163				6763				1230			
	8.00				—				28.00			
	10.80	13560			—				32.42	36910		
	13.30	13.50			—				36.90	36.91		
	16.32	10253			—				41.33	12273		
	6730 19.18		14 18.18		—		53 22.10		18455 45.90		55 27.70	
	1780	14 51.275							3455	56 1.365		
			+ 33.09								+ 33.66	
				17.819								
				17.730								

R 14 57.12 .
R 14 57.40 .

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R 57 40.10 .
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155

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E Ues. Maj.

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12 48 42
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Y Ues. Maj

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11	2	6.82		1	56.4	12	47	49.66		47	35.3	13	41	58.60		41	37.4		
		9.48	12412		58.0			53.40	57160		37.9			1.81	5020		39.8		
		12.40	12411		59.8			57.17	57.16		40.5			5.00	502		42.2		
		15.33			1.8			0.92			42.8			8.24			44.6		
	6206	18.27		00	4.0		28580	4.65		2021	45.6		2510	11.45		2112	47.2		
		1206			00			3580			21			2510			112		
		24.37		2	0.00			12.16		47	4042			17.90			41 4224		
		27.17			+35.86			16.00			−46.76			21.00			+48.42		
		30.00						19.67						24.28					
		32.95	35879					23.50	27162					27.58	30690		•		
		35.90	35.88					27.00	2719					30.70	30.69	43	6.0		
		38.80	35.84					31.00	27.17					34.00	30.64		8.0		
		41.75						34.70						37.10			10.9		
		44.65						38.50						40.20			13.0		
	32291	47.52					24473	42.20					27621	43.45			535 15.6		
		5291						6473						621			3.5		
		53.40						49.74						49.95			43 10.70		
		56.32	59272					53.30	57184					53.00	56270		−40.04		
		59.26	5927					57.20	5718					56.20	5627				
		2.18	7158					0.95	17434					59.50	6129				
	29636	5.20		2	0.00		28592	4.78		47	40.42		28135	8.70			41 42.24		
		4636	2 35.860					3592	48 27180		−46.76			3135	42 30.665		43 10.70		
				+	35.86					−	46.76						+ 48.42		
																	− 40.04		
																	88.46		
																	1.94675		
																	0.98491		
																	2.93166		
																	1.87589		
																	8.94423		
																	5 1 34		

		12 10.28	·				R	44 33.08	·				W	26 16.28	·				
		12 10.52	·				R	44 33.18	·				W	27 31.65	·				
													R	27 31.40	·				
Mean		10.40	·					33.13	·				R	27 31.38	·				
		13 10.52											W	27 31.35	·				
		60.24												27 31.441					
														75.16					

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182

η Bootis

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1.17609 0.12060
9.97567
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1880
June 22

h	m	s																					
13	48	17.20				48	2.0		18	54	52.00			54	37.3		14	9	30.18			9	12.1
		19.39	21.518				3.8	5.260			54.20	56238			38.8				32.48	34622			13.4
		21.45	21.52				5.2	5.26			56.27	56.24			40.3				34.65	3462			15.2
		23.72					6.8				58.35				41.7				36.80				16.8
	10759	25.93				263	8.5			28119	0.37			2013	43.2			17311	39.00			759	18.4
		789					263				3119				13				2381				259
		30.23				48	5.26				4.50			54	40.26				43.84			9	15.18
		32.40									6.58				+ 32.52				45.65				+ 36.97
		34.60									8.63								47.75				
		36.80	38.972								10.72	12792							50.00	52144			
		39.00	38.97			49	9.0				12.80	12.79		55	38.9				52.15	52.14		10	24.0
		41.20	38.98				10.9	1.266			14.90	12.77			40.2				54.33	52.17			25.6
		43.32					12.8	1.266			17.00				41.4				56.46				27.1
		45.35					14.4				19.00				42.5				58.62				29.0
	35075	47.65				633	16.2			11513	21.00			2070	44.0			46930	1.00			1367	31.0
		8075					133				2513				70				1430				367
		52.00									25.17			55	41.40				5.30			10	27.34
		54.25	56450			49	12.66				27.20	29304			−28.62				7.50	9730			−35.19
		56.50	5645								29.30	29.30							9.72	9.73			
		58.63	7797								31.35	14554							11.98	10435			
	28225	0.87				48	5.260			11652	33.50			54	40.26			4865	14.15			9	15.18
		3225	48 38.975			49	12.660				4652	55 12.780		55	41.40				4865	9 52.155		10	27.34
							+ 33.71								+ 32.52								+ 36.97
							− 33.69								− 28.62								− 35.19
							67.40								62.14								72.16
							1.82866								1.78633								1.85830
							1.15176								1.17579								1.14958
							2.98042								2.96212								3.00788
							1.92993								1.90488								1.95318
							8.94951								8.94276								8.94530
							5 5 14								5 0 33								5 2 19

W	20	37.95	.						W	12	115.12	.					W	32	7.75	.		
W	22	3.12	.						W	14	5.50	.					W	33	37.50	.		
R	22	2.92	.						R	14	5.38	.					R	33	37.65	.		
R	22	3.10	.						W	14	5.48	.					R	33	37.48	.		
W	22	3.08	.														W	33	37.50	.		
	22	3.05	.							14	5.45	.						33	37.53	.		
		85.10									80.33								89.78				

183

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1.17609 0.12060
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187

ζ Bootis

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1.17609 0.12060
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1.14958

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193

y Bootis

h m s
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1.17609 0,12060
9.89152
1.06761

14 26 30.00
32.60 35260
36.20 35.26
38.00
17630 40.30
2630
46.70
48.40
51.00
53.68 56.330
56.40 56.33
58.92 56.40
1.67
4.30
50697 6.90
5697
12.17
14.90 17.540
17.58 17.541
20.20 11280
8770 22.85
3770 26 56.365

26 27.0
29.0
30.5
32.1
1531 34.5
31
26 3062
+ 25.74
27 31.5
33.7
35.7
37.5
1783 39.9
283
27 35.66
− 39.30
26 3062
27 35.66
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65.04
1.81316
1.06761
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1.17609 0,12060
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1.12369

14 39 2.70
5.00 7.360
7.37 7.36
9.78
3680 11.95
3680
16.75
19.00
21.30
23.68 26.003
24.00 26.00
28.35 25.99
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33.00
23403 35.30
5403
39.95
42.30 44.630
44.60 44.63
47.00 51.99
22315 49.30
2315 39 25.995

38 47.5
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2538 54.0
38
38 5076
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39 63.2
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58.5
0.1
2925 2.0
42.5
39 58.50
− 32.51
38 50.76
39 58.50
+ 3523
− 32.51
67.74
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1.12369
2.95454
1.89845
8.94391
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1.17609 0,12060
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1.15993

14 43 33.57
35.65 37.804
37.65 37.80
40.00
18902 42.15
3902
46.35
48.50
50.60
52.80 54883
54.90 54.88
57.00 54.90
59.12
1.28
49395 3.40
4395
7.75
9.80 12.00
12.00 12.00
14.15 10980
6000 16.30
6000 43 54.890

43 27.2
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1283 29.0
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43 2566
+ 29.23
44 20.1
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1178 27.0
178
44 2356
− 28.67
43 2566
44 2356
+ 29.23
− 28.67
57.90
1.76268
1.15993
2.92261
1.86976
8.94715
5 3 36

W 31 8.18'
W 32 14.38'
R 32 14.30'
R 32 141.38'
W 32 14.62'
32 14.42'
66.24

47
W 50 54.20'
W 51 13.35'
R 52 13.42'
R 52 13.28'
47
52 13.35'
79.15

W 52 17.60'
W 53 31.55'
R 53 31.62'
R 53 31.70'
W 53 31.90'
53 31.69'
74.09

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198

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1880

June 22

h m s					
14 49 32.38		48 36.2	49 11.6		
41.00	48800	39.4	17.8		
48.50	4880	45.0	23.4		
56.68		50.7	27.4		
24400 4.44		2295 58.2	1144 34.2		
4400		295	144		
20.00		48 4590	49 2288		
27.75		+2 5.25	+1 28.27		
35.80					
43.60	51.166				
51.00	5111	50 44.5	51 30.4		
58.68	51.19	48.6	34.4		
6.80		54.5	40.7		
14.50		59.8	46.5		
45999 22.36		2749 7.5	2060 54.0		
46049		249	60		
38.00		50 5498	51 4120		
45.80	53580	−3.83	−50.05		
53.65	5358				
1.25	10238				
26790 9.20		52 29.8	53 28.3		
26790	~~49~~ 50 51.150	34.0	32.4		
		42.9	38.3		
		47.9	42.5		
		2093 54.7	1927 51.2		
		93	427		
		52 41.86	53 3854		
		−1 50.71	−2 47.39		

W 42 40.05 ·
W 42 53.12 ·
W 42 26.38 ·
W 42 41.88 ·
W 43 1.50 ·
W 43 18.98 ·

0,12060

199

β Bootis

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+40 52

14 56 40.00		56 19.00	
42.70	45450	20.8	
45.45	4545	22.7	
48.20		24.4	
22725 50.90		1128 25.9	
2725		128	
56.45		56 2256	
59.15		+44.76	
1.85			
4.55	7.324		
7.32	7.32	57 34.7	
10.00	7.33	36.8	
12.70		38.7	
15.55		40.6	
6592 18.35		42.3	
6592		2376 44.5	
23.70		~~476~~	
26.50	29216	37.60	
29.20	2921		
32.00	13466		
14608 34.68		56 2256	
4608	57 7.325	~~57 47.52~~	
		+44.76.	

W 29 0.12 ·
W 25 17.70 ·
R 30 18.02 ·
R 33 17.95 ·
W 30 14.90 ·
17.89 ·

0,12060

200

β Librae 0,12060

h m s
15 10 30
° '
−8 36

1.17609
9.99470
1.17079

15 9 52.78		9 42.6
54.68	56928	44.4
57.00	5693	45.9
59.00		47.3
28464 1.18		2287 48.5
3464		287
5.30		9 4574
7.30		+27.92
9.55		
11.58	13668	
13.68	1367	10 41.2
15.80	13.65	43.0
17.85		44.5
19.95		46.0
12301 22.00		2219 47.2
3301		219
26.20		10 4438
28.23	30376	−30.72
30.45	3038	
32.40	14731	
15188 34.60		9 45.74
188	10 13.660	10 44.38
		+27.92
		−30.72
		58.64
		1.76819
		1.17079
		2.93898
		1.87927
		8.92029
		4 58 52

W 16 22.95 ·
W 17 38.72 ·
R 17 38.62 ·
R 17 38.58 ·
W 17 38.82 ·
17 38.68 ·
75.73

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1880phae.proj.1510.

		209				212				154	Maj	
		α Cor. Bor.				α Serpentis				α Ursæ	Min. L. C.	
		h m s				h m s				h m s		
		15 29 34				15 38 18				22 56 15		
		° ′ +27 7	1.17609 9.94943 1.12552	0.12060		° ′ +6 48	1.17609 9.99693 1.17302	0.12060		° 117 36		0.12060
15	28 54.75		28 42.0	15	37 4.66		37 33.2	22	55 10.68	+44.68 55.36	55 22.8	
	57.00	59.326	43.5		43.70	45.820	34.6	+40.04 54.69	274.61 14.60	19.274	25.0	
	59.33	59.32	45.1		45.80	45.82	36.0	35.64 54.84	54.922 19.20	19.27	28.7	
	1.65		46.6		47.94		37.0	34.17 54.74	23.57		31.3	
	29663 3.90		2255 48.3		22910 50.00		1799 39.1	26.72 55.04	9637 28.32		1405 32.7	
	4663		255		2910		299		4637		405	
	8.60		28 45.10		54.00		37 35.98	17.89 54.78	491.06 36.94		55 28.10	
	10.90		+32.78		56.27		+26.45	13.36 54.84	54.562 41.48		+26.59	
	13.30				58.38			8.91 54.47	45.56			
	15.55	17.883			0.30	2.443		+4.44 54.94	50.50	54.567		
	17.88	17.88	29 49.0		2.50	2.44	38 29.0	+0.00 54.75	54.75	54.57	56 59.4	
	20.20	17.88	50.7		4.60	2.43	30.7	4.41 54.39	58.90		3.8	
	22.55		52.4		6.54		32.0	8.40 53.42	2.32		9.5	
	24.82		54.1		8.70		33.7	13.36 54.64	8.00		13.6	
	16095 27.15		2620 55.8		2199 10.70		1607 35.3	17.82 54.83	49110 12.65		429 16.6	
	7095		120		2199		107		4110		429	
	31.85		29 52.40		14.80		38 32.14		—		57 8.58	
	34.15	36.456	−34.52		17.00	19.050	−29.71		—		−13.89	
	36.48	36.45			19.00	19.05		54.742	—			
	38.80	15577			21.18	12487		54.691	—			
	18228 41.00		28 45.10		9525 23.27		37 35.98		—		55 28.10	
	3228	29 17.880	29 52.40		4525	38 2.435	38 32.14				56 8.58	
			+ 32.78				+ 26.45					
			− 34.52				− 29.71					
			67.30				56.16					
			1.82802				1.74943					
			1.12552				1.17302					
			2.95354				2.92245					
			1.89746				1.86415					
			8.94392				8.94170					
			51 21				45 50					

W	13 36.65	W	32 14.20	R	48 23.18
W	14 55.75	W	33 27.32	R	47 21.90
R	14 55.55	R	33 27.28		
R	14 55.38	R	33 27.30		
W	14 55.80	W	33 27.48		
	14 55.62		33 27.34		
	78.97		73.14		

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52 α Persei			73 α Tauri			86 α Aurigae		
	h m s 3 15 41			h m s 4 28 59			h m s 5 7 46	
	° ' +49 26	0.12060		° ' +16 16	0.12060		° ' +45 52	0.12060

1880 June 22 — Ex minute

h m s								
3 14 55.30		14 35.0	4 28 20.18		28 9.4	5 7 24.80		
58.46	1630	37.2	22.30	24420	10.8	27.75	30.670	
1.56	1.63	39.4	24.30	24.42	12.5	30.55	30.67	
4.85		41.9	26.55		13.9	33.60		
815 7.48		1979 44.4	12210 28.77		618 15.2	15335 36.65		
815		479	2210		118	335		
14.27		14 39.58	33.00 33.28		28 1236	42.45		
17.55		+ 47.48	35.17		+ 29.28	45.35		
20.75			37.25			48.45		
24.00	27.070		39.50	41.659		51.38	54.361	
27.00	27.07		41.70	41.66		54.40	54.36	8 33.1
30.30	27.06		43.80	41.63		57.32	54.44	35.0
33.43			45.95			0.30		37.1
36.57			48.00			3.40		39.0
24363 39.76			37493 50.28			48925 6.20		1860 41.8
6363			1493			3925		360
46.15			54.55			12.17		8 3720
49.34	52.490		56.70	58840		15.13	18.220	− 42.80
52.36	52.49		58.84	58.84		18.30	18.22	
55.60	54.12		0.96	8326		21.20	10889	
26245 59.00		14 39.58	29420 3.15		28 1236	9110 24.30		
1245	15 27.065	8	4420	28 41.645		4110	7 54.400	8 37.20
		+ 47.48			+ 29.28			− 42.80

R 55 3.85	R 4 26.75	R 29 51.58
R 55 3.60	R 4 26.82	R 29 51.88
3.72	26.78	51.73

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Sun c = 45,458

h m s
6 11 1
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+23 26

0,12060

1880

June 22 – 23

6	9	3.90			10	13.0	11	21.60			10	40.4		13	41	58.97			41	40.9
		6.00	8.354			14.9		23.80	2.6080			42.0				2.20	5.384			42.2
		8.37	8.35			16.4		26.00	2.608			43.9				5.40	5.38			44.4
		10.60				18.0		28.40				45.5				8.60				46.5
	4177	12.90			821	19.3	13040	30.60			2188	47.0			2692	11.30			2223	48.3
		4177				321		3040				188				2692				223
		17.30			10	16,42		35.00			10	43,76				18.00			41	44,46
		19.62				– 50.00		37.87			+1	00.37				21.35				+46.54
		21.90						39.73								24.45				
		24.15	26.428					41.90	44,161							27.50	30.972			
		26.85	26.43					44.20	44,16							31.00	30.97		42	51.0
		28.68	26.42					46.50	444,10							34.20	31.044			54.0
		31.00						48.60								37.40				57.0
		33.30						50.90								40.65				58.9
	23785	35.50					39745	53.25							27875	43.90			2820	1.1
		5785						3745								875				32.0
		40.00						57.67								50.30			42	56,40
		42.30	44,500					59.93	2126							53.50	56,700			– 25.40
		44.50	4450					2.00	2.13							56.70	5670			
		46.75	5285					4.38	.8821							0.00	6208			
	22250	48.95			10	16,42	1063	6.65			10	43,76			28350	3.00			41	4446
		2250	9. 26.425					1063	11 44,130							350	42 31.005		42	56.40
						– 50.00						+ 60.37								+ 46.54
																				– 25.40
																				71.94

W 39 17.30

W 11 27.88

R 27 19.28'
R 24 19.25'

1926.

N Occ. Asc.

h m s
13 42 46
° '
+44 55

0,12060

June 23

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1880phae.proj.1510.

182

η Bootis

h m s
13 48 55
° ′
+19 0

0,12060

1880

June 23

h	m	s						
13	48	17.48			48	1.8		
		19.60	21820			3.5		
		21.80	2182			5.0		
		24.00				6.8		
		10910 26.22				256 8.5		
		910				256		
		30.55			48	5.12		
		32.80				+34.20		
		35.00						
		37.20	39.339					
		39.38	39.34					
		41.52	39.30					
		43.70						
		45.90						
		35405 48.00						
		8405						
		52.42						
		54.60	56780					
		56.78	5678					
		58.95	7860					
		28390 1.15			48	5.12		
		3390	48 39.320			+34.20		

R 20 39.12
R 20 39.08
20 39.10

183

γ Virginis

h m s
13 55 29
° ′
+2 8

0,12060

h	m	s						
13	54	52.44			54	38.7		
		54.56	56586			40.0		
		56.65	5659			41.0		
		58.80				42.3		
		28293 0.68				2060 44.0		
		3293				60		
		4.80			54	41.20		
		7.00				+31.91		
		9.00						
		11.00	13139					
		13.16	1314					
		15.25	13.09					
		17.29						
		19.32						
		11825 21.43						
		2825						
		25.55						
		27.50	29606					
		29.60	2960					
		31.68	14619					
		11803 33.70			54	41.20		
		4803	55 13.115			+31.91		

R 12 49.48
R 12 49.58
12 49.53

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S

Sun. ⊙ = 45,394

h	m	s
6	15	10
	°	′
+	23	25

0,12060

187

α Boötis

h	m	s
14	10	8
	°	′
+	19	48

0,12060

1880

June 23–24

6	13	13.50		14	86.4	15	31.12		14	56.0
		15.70	17.910		38.0		33.38	35.568		57.4
		17.88	17.91		40.0		35.54	35.57		58.7
		20.12			41.7		37.80			0.5
	8955	22.35		1991	43.0	17784	40.00		2945	1.9
		39.55			491		2784			445
		26.80		14	39.82		44.60		14	58.90
		29.15		−1	3.94		46.80			+54.78
		31.37					49.20			
		33.65	35.850				51.60	53.718		
		35.90	35.85				54.00	53.72		
		38.00	35.92				56.00	53.64		
		40.28					58.16			
		42.60					0.40			
	32265	44.90				48346	2.70			
		5265					3346			
		49.45					7.15			
		51.70	53.930				9.50	11.720		
		53.90	53.93				11.70	11.72		
		56.25	7184				13.97	10729		
	26965	58.35		14	39.82	5860	16.28		14	58.90
		1965	13 35.885				860	15 53.680		
				− 63.94					+ 54.78	

June 24.

14	9	30.75			
		32.80	35.054		
		35.00	35.05		
		37.25			
	17527	39.47			
		2527			
		43.78			
		46.00			
		48.30			
		50.42	52.594		
		52.57	52.71	10	20.2
		54.78	52.56		22.0
		57.00			24.2
		59.20			26.0
	47435	1.30		1204	28.0
		2335			204
		5.70		10	2408
		7.95	10.074	−	31.45
		10.00	10.07		
		12.27	10512		
	5037	14.45			
		037	9 52.635	10	24.08
				−	3145

− 40 51.82

− 12 53.20

R 33 32.12

R 33 32.15

32.14

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193

J Bootis

h m s
14 27 12
° '
+38 30

0,12060

1880
Sme 24

h	m	s																					
14	26	30.30			26	20.5		14	39	3.25			38	53.7		14	43	33.98			43	35.4	
		33.00	35.636			22.3				5.50	7.460			55.0				36.00	38250			26.9	
		35.68	3564			24.2				7.90	786			56.8				38.30	3825			29.0	
		38.30				26.0				10.15				58.5				40.37				31.0	
	17818	40.90			1210	28.0			8930	12.50			2842	0.2			19125	42.60			1447	32.4	
		2818				210				3930				342				4125				447	
		46.30			26	2420				17.20			38	56.84				46.80			43	28.94	
		48.85				+ 32.67				19.47				+29.65				48.90				+ 26.42	
		51.56								21.83								51.00					
		54.24	56882							24.25	26500							53.20	55364				
		56.82	5688							26.50	2650							55.30	5536				
		59.53	56.86							28.85	2648							57.60	55.36				
		2.20								31.00								59.80					
		5.00								33.50								1.34					
	51194	7.44							23850	35.90							49828	4.00					
		6194								5850								4828					
		12.50								40.38								8.20					
		15.45	18090							42.77	45110							10.35	12482				
		18.20	18.09							45.00	4511							12.46	12.48				
		20.70	11373							47.85	5297							14.62	11073				
	9045	23.30			26	2420			22555	49.85			38	5684			6241	16.78			43	2894	
		4045	26	56870	+	32.67				2555			39	26.490	+	29.65		1241	43	55.360			
					+	32.67									+	29.65					+	26.42	

R 31 0.05 ·
R 31 0.20 ·

0.12 ·

Moonrise given

R 36 1.32 ·
R 36 0.92 ·

1.12 ·

R 52 22.30 ·
R 52 22.35 ·

52 22.32 ·

d

E Bootis

h m s
14 39 42
° '
+27 35

0,12060

589 590

d² Librae

h m s
14 44 11
° '
−15 32

0.12060

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	198		201		32	
	β Urs. Min.		δ Boötis		γ Androm.	
	h m s 14 51 7 ° ' +74 39	0.12066	h m s 15 10 37 ° ' +33 46	0.12060	h m s 1 56 29 ° ' +41 45	0.12060

14 50 20.43
28.34
36.00
44.00 52.141
52.00
59.30
7.95
15.55
23.70
1927

48 35.9 50 11.0
39.4 14.9
44.1 19.0
49.7 26.4
2243 55.2 1042 32.9
243 1042
48 4486 50 2084

+6.93 21.43 197.21 12.00
7.45 21.85 21.912 14.40
4.86 21.96 17.00
2.46 21.86 19.40 21917
0.00 21.90 21.90 2192
2.48 22.02 24.50
4.87 21.88 26.85
7.45 21.85 29.30
9.94 21.96 19725 31.90
1725
14.84 22.71 110.00 37.00
17.37 21.94 22.00 39.36 41872
19.86 22.04 41.95 4187
22.34 22.01 44.05
24.40 21.80 20936 46.70
936

15 10 —

51 36.3 52 44.5
50.0
56.4
0.3
2802 9.0
302
52 56.04

48 4486 50 2084
52 5604
— 9598
1.00
21.956
21.944

10 38.9
41.0
42.3
44.6
2128 46.0
128
10 4256
— 20.61

10 4256

1 55 46.30
48.96 51732
51.70 5173
54.42
866 57.28
866
2.92
5.58
8.34
11.25 14000
13.95 1400
16.70
20.00
22.26
12600 25.00
3600
30.54
33.27
36.00 3603
38.78
41.35 3603
56 13.92

55 33.7
35.3
37.4
38.9
1861 40.8
361
55 3722

55 37.22

Strike (40 s ?)
- 47? 35.10
- 48? 38.72
- 49? 3.98

R 36 1.08 ·
R 35 55.80 ·

~~58.44~~

R 35 46.15 ·
R 35 46.00 ·

4608 ·

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1880phae.proj.1510.

33

α Arietis

h m s
2 0 21
° ′
+22 53

0.12060

1880
June 24

h m s
1 59 42.96
45.00 47.374
47.46 47.37
49.57
23687 51.88
3687
56.40
58.65
0.50
3.00 5.324
5.30 5.32
7.60 5.31
9.85
12.00
4792 14.32
4792
18.75
21.00 2.3246
23.20 2.325
25.48 1.3062
11623 27.80
1623 0 5.315

59 33.5
34.9
36.0
37.5
1813 39.4
313
59 3626
+29.05
59 3626
+ 29.05

6 17 22.90
25.00 2.7300
27.38 2.730
29.87
13650 31.65
3650
36.30
38.50
40.80
43.12 4.5338
45.30 4.534
47.60 4.530
49.90
52.22
40804 54.30
4804
58.90
1.18 3.310
3.32 3.31
5.40 9.061
1655 7.75
1655

h m s
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+23 23

S Sun - C = 45,458

June 24 - 5

18 23.3
24.8
26.3
28.3
1329 30.2
329
18 2658
− 41.26
18 2658
− 41.26

19 40.45
42.66 4.4946
44.90 4.495
47.17
22473 49.35
2473
54.00
56.25
58.60
0.73 3.087
3.19 3.09
5.25 2.99
7.67
9.90
2778 12.16
2778
16.60
18.90 2.1040
20.95 2.104
23.20 1.4599
1052.0 25.55
520
17 45.320

20 3.040

- 26 53.65
26 53.95

R 42 6.68

53.80

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1880phae.proj.15102

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