1876phae.proj.1483.

KG
11366
v.479

B 3 1876 7
Nov. 12 48 6 18
Observations Reduct
Fundamental Stars
Charles W. Sever, University Bookstore, Cambridge.

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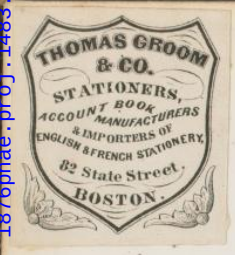
1870phae..proj..1483.



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Constants

1876	15 tan i
Jan. 10 — May 1	0.12495
May 3 — July 23	0.12193
July 24 — Aug 5	0.12516
Aug. 6. 1876 — Jan. 4 1877	0.12236

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Eros Phase May 2

h 2 m 48 s 31

56° 38' 18"

− 14° 15' 30"

1876

Cont dr/dt +2,6605

Cont dδ/dt −19.648

log cosδ 9.74036

15 cosδ sinι 9.86229

tanγδ +1.52 +1.82

sin z −.25

log I 0.57393

I 3.75

½ int 1.87

| | | |

1876phae.proj.1483.

12, Canis Ven. — Nov. 1876

| | | |

1876phae.proj.1483.

Virginis

| | | |

1876phae.proj.1483.

44 H. Cephei α_0

μ 2 May 10 — μ 2 — δ "

1	37.889		15	1	3122	44		42.1	9	log cosδ	9.27995 $_n$	log I	1.03434
	.2		20		3166	48		41.2	9				
	+ .00		25		3214	48		41.4	8	15 constant	940188 $_m$	I	10.82
	.2		30		3265	51		39.7	7			½I	5.41
	+ 4.9306		June 4		3316	54		39.2	5				
	' "		9		3375	56		38.8	4				
	0 45.70		14		3434	59		38.6	2	tang δ	− 5.18 − 5.24		
	59 14.30		19		3494	60		38.5	1				
	+ .7		24		3555	61		38.4	1	sin z	− .85		
			29		3617	62		38.5	1				
	+ 19.302				3679	62		38.8	3				

1876

			−.46						−.68						
			May 16 +						June 13 +						
	0	6.3		39	47.1		2	4.6		1	46				
		13.2			54.8						37.5				
		21.9			38.0						56.9				
					3.0						2.1				
					8.8						7.4				
	0	42.3			14.3						13.0				
		52.2			19.0						18.3				
		1.0			24.3						23.8				
					30.4						29.0				
					25.47						24.81				
	11	13.80			7.67		2	4.60			6.81				
	0	51.83		0	8.67 5.22					2	7.567				
+1		20.98		1	81.29			−36.39		1	34.790				
		+2.37			− 83.21			+3.50			+ 3.278				
					− 83.21						+ 3.278				
		+6.16						+3.10							
+1		29.57						− 29.79							
+1		2.46			38.03			+ 37.78							
		38.03													
					+2.37						+3.50				
		−5.28													
		0.72263 $_m$													
		0.12451			−43.31						+ 2.97				
	E	F			1.63659 $_n$						0.47276				
	G	H			1.03847						9.87464 $_m$				

	'	'													
	25	2		25	2		25	2							
	"	"													
	21.0	20.5		12.4	11.2		30.3	36.8							
	38.2	34.6		28.3	25.4		44.1	34.4							
	59.2	55.1		40.7	34.6		74.4	11.2							
	29.60	27.55		20.35	18.30		37.20	35.60							
	27	28.56		27	17.33		27	36.40							
	7	+ 13.32 1.33		+	1.093		7	− 0.75							
	27	29.91			30.26		27	35.65							
100															
+79	55	18.44			18.09		55	17.70							
−58	34	52		35	02		34	58							
	1.97303			1.97306			1.97306								
	+1150			+1150			−1143								
	1.98453			1.98456			1.96163								
	+96.60			+96.51			+91.57								
	+ .01			+ .19			+ .00								
	− .58			− .53			− .57								
	+ .10			+ .09			+ .14								
	+ 96.03			+96.26			+91.11								
+100	56	54.47			54.35		56	43.81							
+100	56	54.41		+2	24.25						+2 35.54				
	59	18.9			+1.9		59	21.5			+ 1.5				
	+2	24.5			− +4.6		+2	37.7			− +7.2				
		23.8						37.0							
				+2	17.84						+2 29.84				
10															
				+59	12.25						+59 13.65				

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4 Virginis

α_0 — m s: 13 3 29

Cons: $\frac{d\alpha}{dt}$ +3.1003

δ_0 +47° 15′ 40″

Cons: $\frac{d\delta}{dt}$ −19.327

1876

May 28	m	s
	3	31.844
		− .01
25		33.71
30		33.89
June 4		33.86
9		33.83
14		33.80
19		33.74
24		33.72
29		33.67

	2	8.392
	2	51.3
	2	51.1
	2	50.9
	2	50.7
	2	50.5
	2	50.3
	3	50.0
	3	49.7
	3	49.4

log cos δ 9.99842
15 const ann 0.12035
Long δ −.09 + 1.00
sin z. +.73

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43 Comae

$13^h\ 6^m\ 2^s$

$+28^\circ\ 30'\ 45''$

+13 52

Conn

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

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

Cons

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

	m	s
	6	5.150
		+ .01
		+ 2.8071
		30 26.28
		− .6
		−18.831

	m	s			
May 20	6	7.62	30	19.9	
25		7.58	4	20.7	8
30		7.53	5	21.4	7
June 4		7.49	4	22.1	7
9		7.44	5	22.7	6
14		7.39	5	23.2	5
19		7.34	5	23.7	5
24		7.28	6	24.1	4
29		7.21	6	24.5	4

Log cos δ 9.94390

15 Cos δ tan α 0.06583

I 2.35

tan δ +0.54 ∓ 1.14

sin z +.24

1876

May 16 +	May 23 ×	May 24 +	May 31 ×	June 13 ×	June 14 ×
−.46	−.47 −.08	−.47 −.08	−.49 −.08	−.68	−.68
4 26.9	4 32.8 [35.1] 37.4 42.2 44.4	6 37.0 38.9 40.3	6 30.5 32.8 35.3 39.8 42.3	6 30.5 32.8 35.1 39.9 42.1	6 37.0 6 — — — — —
5 21.8 24.4 26.5	47.0 49.2 51.7 53.6 58.7 1.0	44.8 47.1 49.4 54.0 56.4 58.7	7 21.3 23.3 25.7	44.5 46.9 49.2 53.9 56.2 58.6	42.70 42.7 .65 45.0 .60 47.3 .70 52.1 .65 54.4 .60 56.7
4 25.90	6158	6 38.73 49.11	6 36.07 48.97	6 51.00	6 19.73 48.49
5 24.13	4 46891	6 44.645	7 28.43	6 44.578 7	6 42.650 7 3.83
+1 20.98 −.25	6 7650 − 80.76 − 80.77	−36.48 −.25 −.09 −2.44 −39.46 +5.18	6 7594 + 3705 + 37.04 −36.61 −.25 −.09 −2.44 −39.39 +5.13	6 7586 + 36.93 + 36.92 −34.81 −.26 −.09 −2.37 −37.53 +5.12	6 7520 + 3513 + 35.12 −36.39 −.37 −2.25 −39.01 +5.07
−2.50 +1 18.23 +6 5.12					
	−.25	−.25 −.09	−.25 −.09	−.26 −.09	−.37
	+20.49 1.32201 1.38784	−37.24	+ 5.92	+ 8.45	−38.91
	6 3 1.57101 n		0.77232	0.92686	1.59006 n
	4 16 1.63684 n		0.83815	0.99269	1.64589 n
	50 4	55 0	50 4	50 4	55 0
	4.3 1.4 1.8 22.1 8.21 23.5 11.05 11.75 54 11.40	12.2 8.2 25.3 29.8 3.75 3.80 16.75 19.00 55 18.88 − 43.33	22.4 18.2 35.8 39.9 5.82 5.81 29.10 29.05 54 29.08 + 6.89	+ 6.89	23.0 14.5 35.8 41.5 5.88 5.64 29.40 28.20 54 28.70 + 9.83
	+ 24.43 54 35.83	54 35.55	54 35.97		54 38.53
+ 28	28 12.52	12.80	28 12.38		28 9.82
+ 13	51 50 1.15240 +1170 1.16430 −14.60	52 58 1.15330 +1170 1.16500 −14.62	52 08 1.15280 +528 1.15808 −14.39		52 08 1.15280 −244 1.15036 −14.14
	− .10 − .97 + .17	− .31 − .07 + .01	− .01 − 1.03 + .18		− .02 − 1.03 + .18
	−15.50	−14.99	−15.30		−15.06
+28 +28	27 57.02 27 57.42 30 19.2 +2 21.8 21.2	27 57.81 +2 22.87 −0.5 +7.1	27 57.08 30 20.4 +2 23.3 22.7	+2 23.38 −0.5 +5.9	27 54.76 27 54.54 30 20.6 +2 26.1 25.5
		+2 27.14	+2 28.75		+2 30.55
28		+30 24.56	+30 25.86		+30 25.09

	53 03 1.15330 −244 1.15086 −14.15	52 22 1.15290 +413 1.15703 −14.36		51 43 1.15240 −1118 1.14142 −13.85	52 36 1.15310 −1118 1.14192 −13.87
	− .34 − .09 + .02	− .02 − 1.13 + .20		− .18 − .95 + .17	− .09 − .04 + .08
	−14.56	−15.31		−14.76	−13.92
	5432	27 46.81		27 48.10	47.38
	27 54.32 +2 25.35 −0.5 +5.7	30 21.6 +2 34.8 34.2	+2 32.87 −.05 +4.7	27 47.74 30 23.1 +2 35.4 34.8	+2 35.54 −.04 +3.2
	+2 30.55		+2 37.07		+2 38.34
	+30 25.09		+30 23.88		+30 26.08

51 41 1.15240 −1240 1.14020 −13.81	52 37 1.15310 −1240 1.14070 −13.83		
− .18 − .92 + .17	− .07 − .04 + .01		
−14.74	−13.95		
27 46.60 30 23.2 +2 36.5 35.9	27 46.83 +2 36.70 −0.4 +3.0		
+2 38.34	+2 39.30		
+30 26.08	+30 26.02		

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57 Virginis

13 9 13

19° 16′ 35″

+ 61° 39′ 23″

log cos δ 9.97492

15 cos δ tan i 0.09685

tang δ −0.35 +1.06

sin z +.88

1876

	May 16.		May 31		June 13	
	−.46		−.49		−.68	
			−.08			
	m s	m s	m s	m s	m s	
	7 40.4	7 44.5	9 27.2	9 40.2	9 34.0	9 41.6
		46.6	29.4	42.5	35.8	43.8
		48.9	31.1	44.7	38.0	46.0
		53.1		49.1		50.3
		55.4		51.2		52.5
		57.6	10 20.0	53.4		54.7
		59.6	22.3	55.6		56.8
		1.9	24.1	57.7		58.0
		6.3		2.2		3.5
		8.4		4.3		5.6
		10.7		6.5		7.8
		39 3.0		407.4		421.6
	7 40.40	633.0	9 29.23	587.4	9 35.93	601.6
		7 57.636	10 22.13	9 53.406		9 54.691
		545				
+1	20.98		−34.81		−36.39	
	+.16		+.17		+.24	
			−.08			
	−.207		−.201		−1.92	
+1	19.07		−36.73		−38.07	
9	16.61		16.67		16.62	

h m s
13 9 16.633

		+.16		+.17 −.08		+.24
		+17.15	+24.17	−28.73		+18.76
E	F	1.23426	1.28328	1.45834 n		1.27323
G	H	1.33111	1.48011 x3	1.55519 n		1.37008
		40 0	40 0		40 0	
		9.1 59.9	14.5 59.7		29.9 27.8	
		19.7 29.6	25.0 40.4		34.3 39.2	
		28.8 29.5	39.5 40.1		64.2 67.0	
		1460 14.75	1475 2005		3210 3350	
		40 14.58	40 19.90		40 32.80	
		+21.43	+21.43 +30.21	−35.91	+23.45 +23.45	+23.45
		40 36.01	40 50.11		40 56.25	
		−19 17 47.66	18 1.76		18 7.90	
		61 37 54	37 486		37 59	
		2.02620	2.02617		2.02623	
		+1180	+433		−1107	
		2.03800	2.03050		2.01816	
		−109.14	−107.28		−103.55	
		+.05	+.10		+.06	
		−.05	−.07		−.11	
		+.01	+.61		+.02	
		−1 49.13	−1 47.24		−1 43.58	
		−19 19 26.79	19 49.00		19 51.48	
		+2 20.54		+2 32.87		+2 35.54
		−2.0		−1.8		−1.6
		+18.5		+188		+18.8
		+2 37.04		+2 49.87		+2 52.74
		−19 16 59.75		16 59.13		16 58.74

−19° 16′ 59.21

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Polaris Lb

α 1h 12m 59s +88° 39' 17" Jan. 88 38 50 May Corr$_a$ +.64

δ +88° 38' 34" $\frac{d\alpha}{dt}$ +20,9800

+91° 21' 26" δ_0 38 53.22 21 6.78 52.84 7.16

−48° 58' 38" Corr$_\delta$ −.8

$\frac{d\delta}{dt}$ +19.055"

log cosδ 8.37065 8.37306 Jan May log I 1.94123

I 87.34 May 43.67

log R−2 2.99363

R−2 995.461

sin Z −.75

1876

Jan 10.7 L.C +.17 −.04 | Jan. 11 L.C +.06 +.10 | Jan. 13 L.C +.06 +.05 | May 16.4 L.C −.46 | May 21 L.C −.52 −.05 | May 23 L.C −.47 −.68

| | | |

1876phae.proj.1483

	Jan	May	June / July	Oct.	Jan	May / July
δ	88 39 17	88 38 53	88 38 46	88 39 17	δ' 13 20.98	20.99
					N.A. 21.18	
					δ N.A. −20″	−.19″
tang δ	−.4258	−.4235	−.4225	−.4258		
sin z	−.75 z	−.75 z	−.75 z	−.75 z		
Corr z	+.64	+.65	+.65	+.66		
					δ' 38 52″9	
Corr δ	−.3″	−.3″	−.3″	−.3″	N.A. 52.8″	
					δ N.A. +.1″	
log cos δ	8.37065 n	8.37306 n	8.37342 n	8.37065 n		
15 Cor Stani	8.49560 n Jan.	8.49499 n May	8.49535 n June. July 13.17.19 8.49858 n July 26	8.49581 n Oct. Nov.		
	L.C −.47 −.08	L.C −.50 −.08	L.C −.49 −.08	L.C −.50	L.C −.68	
	May 24.4	May 25	May 30	May 31	June 5	June 13.3
	9 38.4	9 41.2 20 19.6	14 2.8	11 25.4	11 17.0 20 23.7	10 28.8
	12 7.7	10 26.8			56.8	10 41.0 5201
		11 9.7			12 45.3	11 23.7 5104
		11 34.0			13 24.4	12 8.0 5167
		12 40.0			14 11.0	12 50.8 5080
		13 21.6	15 45.7	13 32.1	52.8 23 22.8	12 13.0 13 36.7 5343
		14 7.7	14 12.4		15 37.2	14 18.2 5086
		14 48.5	50.7		12 44.34	15 3.4 52.39
		15 33.9	21 23.2 15 32.0		46.47 21 36.0 A	15 45.2 5051
					45.30 24 36.7 A-.3	
			12 45.06		40.73	
			39.69		43.66 12 51.940	
			37.31		41.79	
					42.51	
9 30.40	284.3					
11 49.03	344.3 20 19.00	14 2.80	11 25.70	20 23.70	10 28.80	
12 7.70	12 38.256	12 39.140	15 48.70 12 40.687	13 32.10	12 42.686 23 22.80	12 51.940 12 13.00 12 51.539
	12 28.03	12 28.81	12 32.37		12 33.04	12 37.39 12 44.03
	−36.62	−36.55	−34.58	−34.81	−35.94	−36.39
	+19.90 + 10.23	+20.75 + 10.33	+21.15 + 8.38	+20.75 + 9.65	+21.12 + 14.55	+28.73 + 4.51
	+ 3.41 + 10.42	+ 3.41 + 10.52	+ 3.41 + 8.57	+ 3.41 + 9.84	+ 14.74	+ 4.70
	+53.16	+52.37	+48.88	+48.14	+43.80	+37.85
	+39.85	+39.98	+38.86	+37.49	+28.98	+29.49
12 18.11		19.12	19.55	20.18	20.92	21.03
	+187.86					
	227383					
	0.76882 n					
		+30.56		−16.501		
		+−49.21	−X 39.86	−82.11 −+ 22.11	+X 46.99 −49.41	−X 01.76 −X 30.86 +X 42.74 +38.54
ε Tr		1.48515	2.66263 n	1.91440 n 2.26720 n	1.88643 1.69381 n	2.65491 n 2.79993 n 2.15455 1.58591
γ Ho		9.98014 n	1.15762	0.40939 0.76219	0.38142 n 0.18880	1.15026 1.29528 0.64990 n 0.08126 n
	5 0	5 0 0 4	5 0	5 0 5 0	5 0 5 0	5 0 5 0 5 0 5 0
	7.9 4.6	27.0 4 52.7 47.7	9.9 5.4	7.5 2.7 12.0 7.2	8.2 3.2 8.9 12.7	1.6 6.2 13.7 21.6 10.1 17.9
	27.0 23.8	22.9 19.6 5.5 6.6	25.0 27.3	21.4 24.3 29.8 33.1	25.8 29.1 15.7 7.0	11.4 0.4 2.2 18.4 22.4 16.3
	34.9 28.4	25.7 20.0 118.2 114.3	34.9 32.7	28.9 27.0 41.8 40.3	34.0 32.3 27.6 19.7	13.0 6.6 40.9 40.0 32.5 34.2
	17.45 14.20	12.80 10.00 39.10 57.15	17.45 16.35	14.45 13.50 29.90 20.15	17.00 16.15 13.80 9.85	6.50 3.30 20.45 20.07 16.25 17.10
	5 15.63	3 11.40 4 56.13	5 16.90	5 13.98 5 20.63	5 16.58 5 11.83	3 4.90 5 26.23 5 16.68
	− 5.87	− 0.95 + 14.38	+ −14.91	+ 2.57 + 2.78 − 2.41	+ 1.54 + 14.13	+ 19.74 − 4.47 − 1.21
	6 9.96	5 10.45 5 12.51		5 19.47 5 19.76 5 18.12	5 18.12 5 25.96	5 24.64 5 15.76 5 15.47
	88 17 38.39	37.90 17 35.84	17 28.88	28.59 17 30.23	30.23 17 22.39	23.71 17 32.59 32.88
	−48 57 05	57 10 57 23	57 17	57 20 57 13	57 17 57 22	57 29 57 14 57 17
	1.81970	1.81980 1.81980	1.81980	1.81980 1.81980	1.81980 1.81980	1.81980 1.81980 1.81980
	−2.14	−.214 −.229	+.827	+.827 +.453	+.453 −.477	−.477 −1.095 −1.095
	1.81756	1.81766 1.81751	1.82807	1.82807 1.82433	1.82433 1.81503	1.81503 1.80885 1.80885
	+65.70	+65.71 +65.69	+67.31	+67.31 +66.73	+66.73 +65.32	+66.32 +64.39 +64.39
	+ .15	+ .01 + 2.72	+ .09	+ .44 + .08	+ .03 + 2.63	+ 5.12 + .26 + .02
	− .07	− .05 − .15	− .07	− .05 − .07	− .07 − .05	− .02 − .07 − .07
	+ .01	+ .01 + .20	+ .01	+ .01 + .01	+ .01 + .01	+ .00 + .01 + .04
	+1 6.09	+1 5.68 +1 7.46	+1 7.34	+1 7.71 +1 6.75	+1 6.70 +1 7.91	+1 10.42 +1 4.59 +1 4.35
	18 49.48	43.58 18 43.30	18 36.22	36.36 18 36.98	36.93 18 30.30	18 39.13 18 37.18 35.23
	18 44.03	+2 25.35	18 36.26	+2 32.96 18 36.96	+2 32.87	18 37.20 +2 35.57
	21 11.7	+1.5 21 11.8	21 12.4	+1.4 21 12.6	+1.4	21 13.3 +1.3
	+2 24.7	−4.5 +2 28.5	+2 36.1	−5.2 +2 35.0	−5.5	+2 39.2 +2 36.4 −6.8
	24.6	28.4	36.0	34.9		39.1 36.6
		+2 22.35	+2 23.45	+2 28.26	+2 28.77	+2 37.70 +2 30.04
						+1.4
88 91		+21 6.38	+21 6.75	+21 4.52	+21 5.73	−6.1 +21 7.24
						+2 33.00
						+21 7.13

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1876phae.proj.1483.

July

Oct.
2.100
2
-.18

Log cos δ 9.99988
" cos δ 8.37306 n
" Const. 6.73672

L.C. −.68 — June 14

L.C. −.75 — June 15

L.C. −.91 — July 13

L.C. −.86 — July 17

L.C. −.88 — July 19

L.C. −.07 — July 26.2

L.C. −.76 −.06

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See Supp list page 78 for continuation of this star

L.C. −.72 Col-15.9	L.C. ~~−.74~~ −.66 Col-17.9	L.C. −.68 Col-18.9	L.C. −.80 Col-24.9	L.C. −.66 Col-28.8	L.C. Nov 18
13 50.71	13 35.69	13 34.31	13 26.18	13 29.20	13 16.78
+2.26 14 7.10	+3.28 14 7.48	+3.88 14 7.35	+6.58 14 7.18	+8.82 14 6.30	14 5.82
+30.66 − 16.42	+28.10 − 31.26	+28.95 − 33.04	+34.06 − 41.00	+28.10 − 37.10	− 43.04
− 16.24	− 31.39	− 32.86	− 40.82	− 36.92	− 48.86
−45.94	− 46.08	− 46.16	− 46.00	−45.11	
− 13.02	− 14.69	− 13.33	− 5.38	− 8.19	
13 37.69	13 21.00	20.98	20.80	21.01	
.7 6.83	7 4.57	7. 6.83	7 6.73	7 11.35	7 10.59
+88 15 41.52	15 43.78	15 41.52	15 41.62	15 37.00	15 37.76
−48 56 46					
1.81970	1.81970	1.81970	1.81970	1.81970	1.81970
+781	+750	+974	−729	+1529	−777
1.82751	1.82720	1.82944	1.81241	1.83499	1.81193
+67.22	+67.17	+67.52	+64.92	+68.39	+64.85
− .55	− .55	− .55	− .57	− .59	− .59
+ .08	+ .08	+ .08	+ .08	+ .09	+ .09
+1 6.75	+1 6.70	+1 7.05	+1 4.43	+1 7.89	+1 4.35
16 48.27	16. 50.48	16 48.57	16 46.05	16 44.89	16 42.11
53.95	53.43	53.90	53.05	53.60	53.30
+3 52.75	+3 53.57	+3 53.05	+3 52.82	+3 53.60	+3 53.30
20 45.6	20 44.9	20 44.5	20 42.1	20 40.7	20 39.2
+1.7	+1.7	+1.7	+1.7	+1.7	+1.7
+3 57.3	+3 54.4	+3 55.9	+3 56.0	+3 55.8	+3 57.1
572.	543.	558	559	557	570
+4 1715	+4 1743	+4 1820	+4 1985	+4 2170	
21 5.42	21 7.91	21 6.77	21 5.90	21 6.59	

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α Virginis

13 h 18 m 37 s

− 10 30 47

+ 52° 53′ 35″

1876

Jan. 10

Jan. 11

May 16

May 21

Jan. Mar. June July.

log R+2 1.27277
log R−2 1.27864
R−2 18.995
R+2 18.740
I′ .127
I .209

log cos δ 9.99264
150 sin 1 stars 0.11759
0.11457
tang δ −0.19 + 1.02
sin z +.80

Jan. 10 m 18 39.756 α
Jan. 11 m 18 39.73
Jan. 15 39 91 +18
Jan. 20 40.07 +18
May 19 41.88
May 24 41.87 −1
May 29 41.85 2
June 3 41.83 2
June 8 41.80 3
June 13 41.77 3
June 18 41.73 4

Jan. 10 −30 50.1
Jan. 11 50.7 −6
50.2 −5
May 16 31 43
4.3 0
4.2 1
4.1 2
3.9 2
3.7 2
3.5 2

+3.153 dα/dt
−18.90 dδ/dt
30 47.50
+0.06
+.10
−.17
−.46
−.52
−.08

m s
17 38.1 0.3 2.4
18 1.9 3.8 6.2 8.0
18 12.2 14.4 16.3 20.3
18 0.9 4.1 6.3
18 7.5 3.7 5.7 7.7 9.8 3.92 41.3 43.5 45.7 47.8
18 11.9 14.0 16.1 20.4 22.4 24.6 26.6 28.8 32.8 35.0 37.0
16 53.4 53.5 57.3
16 57.9 59.9 2.0 4.0 6.1 35.6 37.6 39.7 41.9 43.8
17 1.1 10.1 12.4 16.7 18.7 20.9 23.0 24.9 29.2 31.1 33.4
18 59.1 1.5 3.8 18.7 19 54.9 57.4 58.4
18 56.3 58.4 0.6 2.6 4.6 34.0 36.1 38.2 40.2 42.2
19 6.6 8.7 10.7 15.0 17.1 19.3 21.3 23.6 27.6 20.6 21.7

6.060 5.660 43.600 43.500 39.120 1.980 0.500 38.140

2483 2711 2459 2694 3285 2285 3132 2112

18 0.27 18 3.77 16 55.40 19 1.47

18 24.830 18 24.665 .103 18 24.689 18 39.73
18 24.590 18 24.477 .463 18 39.77
17 54.03 17 20.850 20.773 .123 17 20.748 18 41.88
19 54.23 19 19.320 19.285 .193 19 19.196 18 41.88

+15.11 +.03
+14.70 −.01 +.10
+1 20.98 +.09
−37.31 +7.10 −.08 −2.12 −39.41 3.79

+.03
+15.17 18 39.86
+.10 −.01 +14.78 3928
− 2.13 +1 18.94 39.69

−.03
−.01 +.10
+.09
+.10 −.08

η Ursae Majoris: 1.38775 / 1.50534
ε Ursae Majoris: 1.31618 / 1.43377
ζ Ursae Majoris: 1.40398 / ~~1.52157~~ 1.51855
Mizar: 1.52218 / 1.63675
Alkaid: 1.24871 / 1.36328
Unidentified: 1.54444 / 1.65901

+24.42 +20.71 +25.35 −33.28 +17.73 −35.03

50′ 8″ 50′ 3″ 50′ 4″ 55′ 0″ 50′ 4″ 55′ 0″

493 460 530 499 15.7 7.0 35.6 24.2 33.5 20.5 44.5 29.4
490 488 53.4 54.2 104.1 25.9 32.4 43.4 50.0 41.9 49.3 51.9 0.4
,3 14.8 53.0 52.5 41.6 39.4 79.0 74.2 75.4 60.8 96.4 80.8
49.15 47.40 53 48.25 54 55 54 34.05 55 0
53 48.25 53 32.63 20.80 19.70 39.50 37.10 37.70 34.05 48.20 47.40
+32.01 +32.01 +27.15 +27.15 54 20.25 55 38.30 54 36.30 55 44.30

54 24.28 54 19.78 +33.23 −43.33 +23.08 −45.60
54 53.25 54 54.97 54 59.38 54 58.70

−10 31 31.93 31 31.43 32 4.90 6.62 32 11.03 10.35

52 51 48.2 51 47 51 59 53 17 52 15 53 23
1.88010 1.88020 1.88020 1.88060 1.88080 1.88060
−1.32 +36.10 +1.210 +1.210 −7.90 −7.90
1.87878 1.91630 1.89230 1.89270 1.87240 1.87270
−75.64 −82.47 −78.04 −78.11 −74.84 −74.89

+.06 −.27 +.15 +.04 −.27 +.20 +.06 −.99 +.17 +.11 −.14 +.02 +.03 −1.06 +.18 +.12 −.16 +.03
−1 15.70 −1 22.50 −1 14.50 −1 14.12 −1 15.39 −1 14.60

−10 32 47.63 32 53.93 33 23.70 24.74 33 26.42 24.95
30 50.1 +2 5.80 −1.5 +2.6 +2 6.90 30 50.2 +2 3.90 −4.6 +2.7 +2 5.00 33 24.22 +2 20.54 −1.8 +1.68 +2 35.54 31 4.3 +2 22.07 −1.8 +1.68 +2 37.07

−10 30 40.73 30 48.93 30 48.68 30 48.61 −10 30 46.74

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May 23 — −.47 −.08

m	s	m	s
18	47.5	18	55.6
	49.2		57.7
	51.4		59.5
			1.9
			3.8
20	0.6		5.3
			7.5
			9.5
			11.5
18	49.37		
20	0.60	19	18.580

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May 31 −.49 −.08

June 1 −.60

June 5 −.50

June 13 −.68

+.09 −.08

+.11

+.10

+.13

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1876

June 14 — −.68

m	s	m	s	m	s
18	57.0	18	55.2	19	0.7
	53.2		57.3		1.4
	54.7		59.3		0.8
			1.4		1.9
			3.6	59	360
20	05		32.9		18.1
			35.0		20.2
			37.0		22.3
			39.2		24.5
			41.2	37	060
					30.7
			36.21		19.95
18	52.97				
20	0.50	19	18.210		18.136
					.083
				19	18.110
			−36.44	18	41.76
			+.13		
			− 2.01		
			− 38.32		
			18 39.79		
			+.13		

June 15 — −.75

m	s	m	s	m	s
19	17.2	19	5.3	18	31.8
	19.2		7.5		33.6
	20.7		9.5		35.3
			18.8		
19	8.3		15.9		
	32.6		17.9		
	34.8		20.0		
	36.9		22.2		
	39.0		24.3		
	41.0		25.4		
			30.5		
18	59.120				
19	36.860		197.3		
19	19.03			18	33.57
19	17.862	19	17.936		
		19	17.879		
	−36.37	18	41.75		
	+.14				
	− 1.99				
	− 38.22				
	39.68				
	+.14				

July 17 — −.86

m	s	m	s	m	s
18	35.6	18	46.1	18	30.2
	37.8		48.2		31.7
	39.9		50.3		33.6
	42.0		1.45		
	44.1	39	880		56.6
	13.5				58.7
	15.5				0.7
	17.6				2.9
	19.7				7.1
	21.9	17	640		9.1
					11.2
	28.76		34.54		
			64.50	18	31.83
18	58.760		58.673		
			.633		
		18	58.653		
	−17.35	18	41.47		
	+.16				
	− 1.71				
	18.90				
	39.75				
	+.16				

July 19 — −.88, −.07

m	s	m	s	m	s
18	37.8	18	48.9		
	40.0		50.3		
	41.9		52.3		
	44.1		56.5		
	46.2	42	000	58	17
	1.5				0.8
	17.6				2.8
	19.8				4.9
	21.7				9.1
	23.9	19	700		11.2
					13.4
	30.85				30.83
19	0.850				0.755
					.723
				19	0.739
	−19.47	18	41.45		
	+.17				
	−.67				
	− 1.70				
	− 21.07				
	39.67				
				13	h 18 m 39.s 706 / 699
					+.17
					−.07

+25.14
1.40037
1.51464
E 44
G 46
50 4
40.0 35.5
43.0 43.6
83.0 81.1
54
41.50 40.55
54 41.02
+ 32.73
55 13.75
−10 32 25.40
+52 52 07
1.88020
−13.11
−10.07
1.86813
−73.83
+ .06
− 1.03
+ .19
−1 14.57
33 39.97
33 39.84
31 3.7

−42.39
1.62726 w
1.74183 m
55 1
8.7 4.6
10.7 13.2
19.4 17.8
56
9.70 8.90
56 9.30
− 58.19
1411
25.74
53 35
1.88070
−13.17
−12.07
1.86863
−73.90
+ .17
− .26
+ .05
−1 13.93
39.69
+2 36.70
− 1.5
+ 16.2
+2 51.40
−10 30 48.44

−1.13
0.05308 w
0.16765 m
55 0
14.5 9.8
16.9 18.4
31.4 28.2
15.70 14.10
55 14.90
− 1.47
1.47
55 13.43
32 25.08
52 41
1.88040
−14.70
1.86570
−73.40
+ .00
− .04
+ .01
−1 13.43
33 38.51
31 3.6
+2 37.04
− 1.4
+ 16.1
+2 51.74
30 48.77

+25.08
1.39933
1.51390
50 4
59.5 44.4
58.5 58.2
11.0 10.6
39.00 51.83
54 55.42
+ 32.65
55 27.80
32 39.45
51 54
52 21
1.88020
−26.00
1.85420
−71.48
+ .06
− .88
+ .20
−1 12.10
33 51.55
31 2.2
+2 49.78
− 1.4
+ 14.7
+3 3.08
30 48.47

+28.91
1.46105
1.37562
50 4
53.2 38.1
52.7 52.8
10.59 9.09
52.95 45.45
54 47.20
+ 37.64
55 26.84
32 38.49
51 48
52 15
1.88020
−22.22
1.85798
−72.11
+ .08
− .86
+ .19
−1 12.70
33 51.19
31 2.0
+2 49.15
− 1.4
+ 14.5
+3 2.25
30 48.94

−10 30 47.44

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ζ Persei Maj.
3 18 53
+28° 36' 45"

706
699

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Gq. 2001

2 m 3
13 22 57.
+73° 2' 27"
−30° 39' 39"

1876

	May 23 +	May 24 +	June 1 +	June 13 +	June 14 +	June 15 +
	−.47 −.08	−.47 −.08	−.60	−.68	−.68	−.75
	m s	m s				
	22 26.4 31.9 39.2	23 28.3 32.0 35.5 39.0	22 14.7 25.4 27.9	22 49.2 57.1 0.2	23 26.1 30.7 34.4 37.1	22 32.8 38.6 44.0
	24 4.5	42.9 46.2 48.7 53.3 56.4	23 28.6 32.9 39.0	23 38.2 7.5 12.9	41.0 44.5 48.2 53.3	23 56.5 1.3 8.0
	382.2		2.67		369.1	
	22 32.50		22 21.00	22 55.50	22 38.37	
	24 4.50	23 42.467	23 32.50	24 6.20	23 41.011	24 1.93
	−36.68 −1.54	23 38.47 + 38.62	−36.62 −1.54	−35.19 −1.97	23 34.13 + 37.60	−36.38 −2.23
	−.27 −5.89 −44.18	+ 38.30	−.27 −5.64 −44.07	−5.25 −42.41	+ 37.28	−4.58 −43.19
	+22 58.29		+ 58.69	+ 58.60		+ 58.40
		−1.54 −.27		−1.97	−2.23	−2.23
	++ 69.97 1.84491 1.43195		+ 80.09 + 10.26	+ 45.51 + 17.11 + 38.63	− 26.19 − 2.77 − 32.07	+ 63.12 + 34.27
		−22.03				
		1.34301 m	1.90358	1.01115	1.65811	1.40123 m
		0.93005 m	1.49062	0.59819	1.24515	0.98827 m
	20 3	20 3	20 2	20 3	20 3	20 3
	4.0 0.1	40.0 36.3	58.4 53.3	27.1 22.1	21.6 23.5	50.8 52.4
	16.4 15.4	51.8 51.2	12.4 22.5	41.5 40.3	25.8 17.8	53.9 47.2
	20.4 15.5	9.18 8.75	12.8 1.58	6.86 6.24	47.4 41.3	104.7 99.6
	10.20 7.75	43.70 43.75	5.90 7.90	34.30 31.20	23.70 20.65	52.35 49.80
	23 8.98	23 0.483	23 6.90	23 32.75	23 22.18	23 51.08
	+ 27.04	− 22.03	+ 30.95	+ 3.96	+ 17.59	− 9.73
	23 36.02	8.51 36.32	23 37.85	36.71	23 39.77	23 41.35
	+73 59 12.33	12.03	59 10.50	11.44	59 8.58	59 7.080
	−30 39 25	38 49 36	39 14	38 48	39 12	38 43
	1.53300	1.53280	1.53300	1.53280	1.53300	1.53280
	+590	+590	−170	−170	+390 +390	+390 +295
	1.53890	1.53870	1.53130	1.53110	1.53595	1.53576
	+34.59	+34.57	+33.99	+33.97	+34.35	+34.34
	− .75	− .07	− .92	− .02	− .31	− .10
	− .71	− .85	− .71	− .81	− .78	− .87
	+ .12	+ .15	+ .12	+ .14	+ .14	+ .15
	+ 33.25	+ 33.80	+ 32.43	+ 33.28	+ 33.40	+ 33.62
	+72 59 45.58	45.83	59 42.93	44.92	59 41.98	59 40.52
	+72 59 45.70	+ 2 23.38	59 43.94	+ 2 25.35	59 41.25	+ 2 30.70
	2 10.3	+ 0.9	2 10.5	+ 0.9	2 12.0	+ 0.9
	+ 2 24.6	− + 1.7	+ 2 26.6	− + 1.9	+ 2 30.8	− + 3.4
	25.0		27.0		31.2	
		+ 2 22.58		+ 2 24.35		+ 2 28.20
	73	+ 2 8.28		+ 2 8.29		+ 2 9.45

	June 1 +	June 13 +	June 14 +	June 15 +
	22	2	1	
	22	9.6		
	24	10.7 11		
	26	11.6 9		
	28	12.4 8		
	29	13.2 8		
		13.8 6		
	30	14.2 4		
	31	14.5 3		
	31	14.8 3		
		4		
		8		
		374.3	375.0	375.2
		23 14.83	23 4.07	
	24 1.93	23 41.579	24 3.20	23 41.667	24 2.73	23 41.689
	23	2.742	−36.45	23 2.686	−36.37	23 2.625
	+	38.85	−2.23	+ 38.98	−2.46	+ 39.06
	+	38.53	−4.53	+ 38.66	−4.46	+ 38.74
			−43.21		−43.29	
			+ 58.46		+ 58.40	
		−2.23		−2.23		−2.46
		− 20.34	+ 26.84	−21.53	+ 37.62	−21.04
		−59.19	− 12.14	− 0.51	− 1.44	− 0.10
		1.30835 m	1.42848	1.33304 m	1.57542	1.32305 m
		0.89539 m	1.01582	0.92008 m	1.16246	0.91009 m
		20 3	20 3	20 3	20 3	20 3
		47.7 52.4	30.5 35.4	50.2 52.8	26.8 31.2	50.8 52.9
		55.1 49.3	38.5 30.9	53.8 49.0	32.3 26.4	54.0 49.1
		102.8 101.7	9.0 6.3	104.0 101.8	59.1 57.6	4.8 2.0
		51.40 50.85	3.950 3.315	52.00 50.90	24.55 28.50	52.00 51.00
		23 51.13	23 3.83	23 51.45	23 29.18	23 51.70
		− 7.86	+ 10.37	− 8.32	+ 14.84	− 8.13
		43.27	23 44.20	43.13	23 44.02 43.72	43.57
		59 5.08	59 4.15	5.22	59 4.63	4.78
		38 43	39 00	38 43	39 05	38 42
		1.53280	1.53290	1.53280	1.53290	1.53280
		−1060	−1200	−1200	−1460	−1460
		1.52220	1.52090	1.52080	1.51830	1.51820
		+33.28	+33.18	+33.17	+32.98	+32.98
		− .06	− .11	− .07	− .22	− .07
		− .84	− .84	− .84	− .72	− .84
		+ .15	+ .14	+ .15	+ .14	+ .15
		+ 32.53	+ 32.43	+ 32.41	+ 32.13	+ 32.22
		37.61	59 36.58	37.63	59 36.76	37.00
		+ 2 35.54	59 37.10	+ 2 36.70	59 36.88	+ 2 37.04
		+ 0.8	2 13.8	+ 0.8	2 13.9	+ 0.8
		− + 5.1	+ 2 36.7	− + 5.3	+ 2 37.0	− + 5.3
			37.1		37.4	
		+ 2 31.24		+ 2 32.20		+ 2 32.54
		+ 2 9.23		+ 2 9.30		+ 2 9.42

Log cos δ 9.46511
15 cos Δ tan i 9.58704

I' 428

Log δ +3.28 +3.42
sin z −.51

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γ Virginis α_0

1876

May 23		May 24		June 7	June 13	June 14	June 15

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Ga. 2029 — α_0 — m e 34 12306 — May 20 — m e 34 1787 — 52 — 249

13 34 11 — Corr^a — + .12 — 25 — 1767 — 20 — 26.1 12 — log cosδ 9.49308 — log I 0.82121

+ 71 52 43 — $\frac{d\alpha}{dt}$ — + 1.4315 — 30 — June 4 — 1746 — 21 — 27.1 10 — 15 constant 9.61501 — I 663

29 — 9 — 1723 — 23 — 28.0 9 — ½I 331

− 39° 29′ 55″ — δ_0 — 52 25.02 — 14 — 1698 — 25 — 28.8 8

19 — 1672 — 26 — 29.5 7

Corr^n — − .1 — 1645 — 27 — 30.0 5 — tangδ + 3.06 + 3.22

$\frac{d\delta}{dt}$ — − 18.373 — sin z − .49

1876

| | | |

1976phae.proj.1483

η Persei Maj. δ

18 42 37 Cor 2 + .00 | May 20 42 42.4 | 65 55.2

+49 56 16 d1/dt +2.3724 | 25 | 42.36 6 | 54.3 11

" | 30 | 42.29 7 | 55.1 11

− 7 33 28 δ | June 4 | 42.22 7 | 56.3 9

55 51.60 | 9 | 42.14 8 | 57.2 9

Cond + .3 | 14 | 42.05 9 | 57.9 7

d δ/dt −18.94 | 19 | 41.96 9 | 58.6 7

24 | 41.86 10 | 59.2 6

29 | 41.75 11 | 59.7 5

Log cos δ 9.88867

15 Cos Sin 9.93060

Long δ +1.19 +1.55

sin z −.13

I 3.20

1976

	−.47 −.08	−.49 −.08	−.50 −.08	−.62	−.68	−.68
	May 23 +	May 25 +	May 30 +	June 7 ×	June 13 ×	June 14 ×
	42 45.1	42 47.8	42 47.8	42 58.4	42 44.3	42 43.6
	47.4	48.1	57.0	1.5	46.6	46.2
	34.1	37.2	54.1	4.7	48.6	48.9
	43 0.6	43 0.5		14.1	43 —	43 0.0
	3.6	3.6			—	3.2
	6.9	6.8			—	6.5
	13.3	13.1			19.1 12.7	12.9
	16.5	16.4		14.3	18.9 15.7	16.1
	43 45.2	43 38.0	43 43.0	43 53.0	43 48.6	42 37.1
	47.8	41.5	45.0	58.2	37.6	43.4
	22.6	44.9	47.6	1.6	34.4	45.1
	26.1				19.1 22.3	48.2
	32.4				.2 25.6	25.7
	35.7				.2 32.0	32.1
	38.0				.0 35.0	35.9
					.1 38.3	38.5
	216.6	215.4	252.9			212.9
	42 48.7	42 48.7	42 50.97	192.9 42 46.83	42 46.23	42 54.93
	43 48.43	43 19.691	43 41.47	43 19.582	43 45.20	43 17.536
	43 58.27	43 19.086	43 51.53	43 19.227	43 45.47	43 19.355

	−36.67	42 42.381	−36.55	42 42.357	−34.59	42 42.286	−36.16	42 42.168	−36.38	42 42.064	−36.46	42 42.046
	−.56	+ 3.731	−.58	+ 3.722	−.60	+ 3.525	−.74	+ 36.92	−.81	+ 37.16	−.81	+ 37.13
	−.12	+ 37.31	−.12	+ 37.22	−.12	+ 35.25		+ 36.92		+ 37.16		+ 37.13
	−3.18		−3.16		−3.09		−2.97		−2.86		−2.85	
	−40.53		−40.41		−38.40		−39.87		−40.05		−40.12	
+42	39.16		+39.17		+39.14		+39.22		+39.18		+39.05	

	−.56	−.58	−.60	−.74	−.81	−.81
+31.82	−.12	−.12	−.12			
1.50270						
1.43330	−28.44	+31.11 −21.89	+26.57 −27.66	+32.26 −32.18	+33.00 −32.30	+24.24 −26.30
6 ν	1.45393m	1.49290 1.34025m	1.42139 1.41185m	1.50566 1.59306m	1.51851 1.50920m	1.36453 1.41996m
4 Ho	1.38453m	1.42350 1.27085m	1.35499 1.37245m	1.43926 1.52366m	1.44911 1.43980m	1.31513 1.35056m
25 3	25 4	25 3 25 4	25 4 25 4	25 4 30 [3]0	26 4 25 4	25 4 25 4
49.0 (44.0)	41.5 33.1	54.9 48.3 40.6 33.2	32 36.4 49.3 48.7	7.7 59.9 3.1 0.6	0.8 3.4 57.3 58.2	9.2 11.6 5.2 58.8
4.4 3.2	56.1 54.7	7.3 10.6 51.6 53.9	17.3 21.2 1.8 7.7	10.6 0.6 11.9 3.6	8.6 3.2 4.6 59.6	17.1 11.0 58.0 55.2
113.4 107.8	97.6 97.8	122.2 113.9 92.2 89.1	20.5 18.4 111.1 116.4	18.3 0.5 16.0 4.2	9.4 6.6 128.9 117.8	26.3 .6 123.2 108.0
56.70 53.90	48.80 43.90	61.10 59.45 46.10 44.55	10.25 9.30 55.55 58.20	9.15 0.25 7.50 2.10	4.70 3.30 64.45 53.90	13.15 11.30 61.00 54.00
(?) 28 55.30	29 46.25 29	0.28 29 45.33	29 9.78 29 56.88	29 4.70 3.80 4.80	29 4.00 30.95 64.45	29 12.23
					29 50.82	28 54.50
+ 27.12	− 24.24	+ 26.52 − 18.66	+ 22.65 − 23.57	+ 27.50 33.39	+ 28.13 − 27.53	+ 20.66 − 22.42
29 22.42	22.11	29 26.80 26.67	29 32.43 33.31	29 32.20 31.41	29 32.13 29 32.37	29 32.87 29 30.38
+49 53 25.93	26.24	53 21.55 21.68	53 15.92 15.04	53 16.15 16.94	53 16.22 15.94	53 15.46 12.97

−7	33 26	32 35	33 21	32 36	33 24	32 37	33 29	32 29	33 30	32 34	33 22	33 36
	0.88310	0.88230	0.88300	0.88230	0.88310	0.88230	0.88310	0.88220	0.88310	0.88230	0.88300	0.88320
	+675	+675	−54	−54	+957	+957	−570	−570	−975	−975	−1140	−1140
	0.88985	0.88905	0.88246	0.88176	0.89267	0.89187	0.88740	0.87650	0.87336	0.87255	0.87160	0.87180
	+7.76	+7.74	+7.29	+7.27	+7.81	+7.80	+7.54	+7.50	+7.47	+7.44	+7.44	+7.44
	− .28	− .22	− .26	− .13	− .19	− .20	− .28	− .41	− .30	− .29	− .16	− .19
	− .90	− 1.10	− .42	− 1.10	− .97	− 1.13	− 90	− .02	− .90	− 1.10	− .92	− .88
	+ .20	+ .19	+ .16	+ .19	+ .17	+ .20	+ .16	+ .80	+ .16	+ .20	+ .17	+ .16
	+ 6.78	+ 6.61	+ 6.61	+ 6.58	+ 6.82	+ 6.67	+ 6.52	+ 7.10	+ 6.43	+ 6.27	+ 6.54	+ 6.53
+49	53 32.71	32.85	53 28.16	28.26	53 22.74	21.71	53 22.67	24.04	53 22.65	22.23	53 22.00	19.50
+49	53 32.78	+2 23.38	53 28.21	+2 26.65	53 22.23	+2 32.06	53 23.36	+2 34.30	53 22.44	+2 35.54	53 [illegible]	+2 36.70
	55 53.9	+ 0.3	55 54.4	+ 0.3	55 55.5	+ 0.2	55 56.9	+ 0.2	55 57.8	+ 0.2	55 57.9	+ a/
	+2 21.1	+ 3.7	+2 26.2	+ 3.2	+2 33.3	+ 2.1	+2 33.5	+ 0.7	+2 35.4	− 0.2	+2 37.1	− 0.3
	21.4		26.5		33.6		33.8		35.7		37.4	
		+2 27.38		+2 30.15		+2 34.36		+2 35.20		+2 35.54		+2 36.50
+49		+56 0.16		+55 58.36		+55 56.54		+55 58.56		+55 57.98		+55 57.25

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N Bootis

13 48 44
+19 1 30
+ 23° 21' 18"

Conv $\frac{d\lambda}{dt}$ $\frac{d\delta}{dt}$ Conv $\frac{d\rho}{dt}$

m 48 46812 s
+ .03
+ 28570
1 1205
+ .2
−18202

1876

May 20 25 30 June 4 9 14 19 24 29

m	s			
48	4926		1	0.9
	4924	2		1.6 7
	4922	2		2.3 7
	4920	2		3.0 7
	4917	3		3.6 6
	4914	3		4.2 6
	4910	4		4.7 5
	4906	4		5.2 5
	4901	5		5.7

log cos δ 9.97563
15 cos δ tan α 0.09756
tang δ +0.34 +1.06
sin z +.40

		−.47				−.49			−.50			−.62			−.68				−.68
		−.08				−.08			−.08										
May 23 ×				May 25 ×				May 30 ×			June 7 ×			June 13 ×			June 14 ×		
m	s	m	s																
49	8.9	49	13.1	49	7.8	49	12.9	48	57.6	49	11.0	49	11.0	49	12.5	48	58.0	49	12.8	48	57.3	49	12.7
	10.9		15.3		9.6		15.2		59.2		13.1		13.0		14.8		58.8		15.0		58.5		14.9
	12.7		17.5		11.7		17.4		1.3		15.4		15.2		16.9		1.7		17.0		0.3		17.1
			21.9				21.8				19.7				21.2				21.5				21.5
			24.0				23.9				21.9				23.4				23.6				23.7
49	50.2		26.3	49	47.1		26.1	49	46.6		24.1				25.6	49	48.7		25.8	49	44.4		25.9
	51.7		28.4		49.1		28.2		48.2		26.2				27.7		50.4		28.0		45.9		28.0
	53.8		30.5		51.7		30.4		50.7		28.4				29.9		52.2		30.1		48.4		30.2
			34.9				34.8				32.8				34.2				34.5				34.6
			37.2				37.0				34.9				36.5				36.7				36.7
			39.3				39.1				37.3				38.7				39.0				38.9
																							4
			288.4				286.8				264.8				281.4				284.0				284.2
49	10.83			49	9.70			48	59.37			49	13.07			48	59.83			48	59.03		836
49	51.90	49	26.218	49	49.30	49	26.073	49	48.30	49	24.073			49	25.582	49	50.43	49	25.818	49	46.23	49	25.835
	−36.67	48	49.247		−36.55	48	49.239		−34.59	48	49.219		−36.16	48	49.180		−36.38	48	49.142		−36.47	48	49.138
	−.16	+	36.97		−.17	+	36.83		−.17	+	34.85		−.21	+	36.40		−.23	+	36.67		−.23	+	36.70
	−.08	+	36.94		−.08	+	36.80		−.08	+	34.82			+	36.37			+	36.64			+	36.67
	−2.43				−2.43				−2.41				−2.37				−2.33				−2.33		
	−39.34				−39.23				−37.25				−38.74				−38.94				−39.03		
+48	46.88				+46.84				+46.82				+46.84				+46.88				+46.81		
											17												
		−.16				−.17				−. 02				−.21				−.23				−.23	
	+15.39	−.08				−.08				−.08													
	1.18724																						
	1.28480		−25.68		+16.37		−23.23		+24.70		−24.23		+12.58				+25.99		−24.61		+26.81		−20.39
C	F		1.40960 m		1.21405		1.36606 m		1.39270		1.38435 m		1.09726				1.41481		1.39111 m		1.42830		1.30942 m
G	K6		1.50716 m		1.31161		1.46361 m		1.49026		1.48191 m		1.19482				1.51237		1.48867 m		1.52586		1.40698 m
		20	3	20	4	20	3	20	4	20	3	20	4	20	3	20	3	20	4	20	3	20	4
		18.7	10.4	10.0	1.3	24.7	13.5	14.3	2.3	15.9	5.2	17.4	7.6	39.5	33.4		20.5	19.4	23.6	23.2	20.4	19.8	20.0	17.8
		29.4	33.5	20.0	26.2	30.9	37.4	21.1	28.8	25.1	34.7	25.6	35.7	41.9	39.5		23.8	24.8	26.4	26.9	23.9	23.7	22.1	23.8
		48.1	43.9	30.0	27.5	35.6	50.9	35.7	31.1	41.0	39.9	43.0	43.3	84.4	72.9		4.3	4.2	10.0	10.1	4.3	3.5	42.1	41.6
		24.05	21.95	15.00	13.75	22.80	25.45	17.70	15.55	20.02	19.95	21.60	21.65	40.70	36.45		22.15	22.10	25.70	25.65	22.15	21.75	21.05	20.80
		23	23.00	24	14.38	23	26.63	24	16.63	23	20.23	24	21.68	23	38.58		23	22.13	24	25.63	23	21.95	24	20.93
		+	19.27	−	32.15	+	20.49	−	29.08	+	30.92	−	30.33	+	15.66		+	32.54	−	30.81	+	33.56	−	29.53
		23	42.27		42.23	23	47.12		47.55	23	51.15		51.25	23	54.24		23	54.67		54.22	23	55.37		53.40
+18	59		6.08		6.12	59	1.23		0.80	58	57.20		57.10	58	54.11		58	53.68		54.13	58	52.84		52.95
+23	21	02		21	53	21	06	21	56	20	46	21	48	21	05		20	48	21	51	20	48	21	47
		1.39540		1.39580		1.39540		1.39580		1.39580		1.39570		1.39540			1.39530		1.39570		1.39530		1.39570
		+700		+700		−13		+980		+980		+980		−510			−950		−950		−1120		−1120
		1.40240		1.40280		1.39527		1.39567		1.40510		1.40550		1.39004			1.38580		1.38620		1.38410		1.38450
		−25.26		−25.28		−24.85		−24.87		−25.42		−25.44		−24.55			−24.31		−24.33		−24.22		−24.24
		−	.04	−	.10	−	.04	−	.09	−	.10	−	.10	−	.03		−	.11	−	.10	−	.12	−	.07
		−	.78	−	.97	−	.78	−	.99	−	.87	−	.95	−	.79		−	.75	−	.97	−	.84	−	.95
		+	.14	+	.17	+	.14	+	.17	+	.13	+	.17	+	.14		+	.14	+	.18	+	.13	+	.17
		−25.94		−26.18		−25.53		−25.78		−26.15		−26.37		−25.23			−25.03		−25.22		−24.95		−25.09
+19	58	40.14		39.94		58	35.70		35.02	58	31.05		30.73	58	28.88									
+19	58	40.04	+2	23.38		58	35.36	+2	26.65	58	30.89	+2	32.00	58		+2	34.30	58	28.78	+2	35.54	58	27.88	+2	36.70
	1	1.4		−0.8		1	1.56		−0.8	1	2.3		−0.8	1	3.4		−0.8	1	4.1		−0.8	1	4.2		−0.8
+2		21.4		+10.6	+2		26.2		+10.4	+2	31.4		+9.8	+2	34.5		+8.6	+2	35.3		+8.0	+2	36.3		+7.8
		21.6					26.4				31.6				34.7				35.5				36.5		
			+2	33.18				+2	36.25			+2	41.06			+2	42.10			+2	42.74			+2	43.70
+20	−		+1	13.22				+1	11.61			+1	11.95			+1	10.98			+1	11.52			+1	11.58

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50 Cassiop. α_0 — m 52 52819 — May 20 — m 52 4966 — 49 — 10.6

1	52	48 Con$_2$		+ .16		25	49.95	29		9.8	8
						30	50.26	31		9.1	7
+ 71	48	54 $\frac{d\alpha}{dt}$		+4.9838	June 4		50.59	33		8.5	6
					6		50.94	35		8.0	5
+108	11	06 δ_0		49 11.52		14	51.31	37		7.6	4
				10 48.48		19	51.69	38		7.4	2
−65°	48′	18″ Con$_2$		± .2							
				"							
			$\frac{d\delta}{dt}$	+17.694							

log cosδ 9.49424$_n$

15 constant 9.61617$_n$

tangδ −3.04 −3.20

sin z −.91

1876

				−.49						−.68						−.75			
				−.08															
				× May 25						June 13 ×						June 15 ×			
52	27.8	53	11.7		53	7.1			53	12.2		52	45.9		53	12.0		
	34.6		15.0							15.9			53.0			15.6		
	40.0		18.4							19.0			57.9			18.7		
			21.6							22.2						22.1			
	31.4		25.0							25.6						25.6			
53	38.6		28.4							28.7						28.6			
	44.9		31.3							32.0						32.1			
			35.0							35.6						35.3			
			38.1							38.9						38.7			
			224.5							230.1						228.7			
52	34.13				53	7.10						52	52.27						
53	38.30	53	24.944						53	25567					53	25411			
	−36.55	52	.49935			−36.38	52	.51217					−36.36	52	.51367				
	+1.49		+ 35.01			+2.07		+ 34.35					+2.28		+ 34.04				
	+.25		+ 34.85					+ 34.19							+ 33.88				
	+2.88					+1.60							+1.45						
	−31.93					−32.71							−32.63						
+52	53.01					+52.86							+52.78						
			+1.49					+2.07							+2.28				
	+50.81		+.25																
	1.70595																		
	1.32212$_n$		− 13.36			+ 18.47							+ 33.14						
ε	ℑ		1.12581$_n$			1.26647							1.52035						
ℊ	ℌ		0.74198			0.88264$_n$							1.13652$_n$						
15	1		15 1			15 1							15 1						
"	"																		
49.9	47.4		22.8	20.4		39.7	47.8						47.2	54.7					
3.2	4.6		36.6	36.4		50.6	42.6						57.6	51.3					
113.1	112.0		59.4	56.8		90.3	90.4						104.8	106.0					
56.55	56.01		29.70	28.40		45.15	45.20						52.40	53.00					
16	56.28	16	29.05		16	45.18							16	52.70					
		+	21.00	+ 5.62		− 7.63							− 13.69						
		16	35.28	34.57		16 37.55							16 39.01						
+108		6	13.07	13.78		6 10.80							6 9.84						
−65		45	25	45 52		45 49							45 41						
		2.10432		2.10449		2.10446							2.10442						
			+10	+10		−935							−1045						
		2.10442		2.10459		2.09511							2.09097						
			+127.18	+127.23		+124.48							+123.38						
		+	.42	+ .03		+ .06							+ .18						
		−	.44	− .23		− .40							− .37						
		+	.08	+ .06		+ .07							+ .08						
			+2 7.24	+2 6.97		+2 4.21							+2 3.14						
+108		8	20.31	20.75		18 15.01							8 12.48						
+108		8	20.53	+2 28.65		5		+2 35.54							+2 37.04				
		10	50.2	+2.0		10 52.3		+1.7					10 52.5		+1.6				
		+2	29.7	−+1.7		+2 37.3		−+3.8					+2 40.0		−+4.0				
			29.9			37.5							40.2						
				+2 26.95				+2 33.44							+2 34.64				
+108				+10 47.48				+10 48.45							+10 47.12				

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T Virginis

13 55 17
+2 9 0
+410 13 48

Comet
$\frac{d\lambda}{dt}$
δ_0
Corr^d
$\frac{d\delta}{dt}$

m s
55 20177
+ .02
+3.0489
8 42.49
+ .5
−17.630

May 20
25
30
June 4
9
14
19
24
29

m s
55 22.50
22.49 1
22.48 1
22.47 1
22.45 2
22.43 2
22.40 3
22.37 3
22.33 4

8

27.7
28.1 4
28.5 4
28.9 4
29.3 4
29.7 4
30.1 4
30.5 4
30.8 3

log cos δ 9.99969
15 Constant 0.12162
Long δ +0.04 +1.00
Sin z + .65

log R+1 1.01374
R+1 10.322

1876

May 25 +		May 30 +		June 7 +		June 13 +		June 14 +		June 15 +	
−.49		−.50		−.62		−.68		−.68		−.75	
−.08		−.08									
m s	″	m s	″	m s	″	m s	″	m s	″	m s	″
53 53.9		55 46.7		53 29.6		53 45.0		53 32.4		53 46.1	
53.6		48.8		30.5		46.9		34.1		48.5	
57.4		50.9		32.7		49.0		35.8		50.5	
		53.0				53.1				54.5	
		57.1				57.1				56.7	
56 24.0		59.2		56 14.4		57.2		56 18.3		58.6	
26.2		1.2		16.6		59.3		18.8		0.7	
28.1		3.3		18.9		1.4		21.7		2.7	
		7.4				5.5				6.4	
		9.5				7.6				8.9	
		11.6				9.6				11.1	
		350.7				389.7				345.5	
55 55.40		650.5		53 30.73		624.7		53 34.10		645.5	
56 26.10		55 59.155		56 16.63		55 37.245		56 19.43		55 58.682	
−36.55		55 22490		−34.60		55 22489		−36.16		55 22457	
−.02		+ 3666		−.02		+ 3476		−.02		+ 3622	
−.08		+ 3664		−.08		+ 3474				+ 3620	
−2.31				−2.380				−2.28			
−38.96				−37.00				−38.46			
+55 20.20				+20.24				+20.22			
	−.02				−.02				−.02		
+ 3.76	−.08				−.08						
0.57519											
0.69681											
E		−26.94		+26.52		−19.38		+24.58		−21.25	
f		1.43040 n		1.42357		1.28735 n		1.39058		1.32736 n	
g	96	1.55202 n		1.54549		1.40897 n		1.51220		1.44898 n	
	′		′		′		′		′		′
	15 0	15 1		15 0		15 1		15 0		15 1	
462	364	276	171	18.4	9.7	19.2	10.7	29.2	25.0	30.8	25.9
53.6	3.9	33.2	45.0	28.4	40.2	30.3	41.2	34.6	33.8	34.5	33.4
99.8	100.3	60.8	62.1	46.8	49.9	49.5	51.9	63.8	58.8	65.3	67.3
49.90	50.15	30.40	31.05	23.40	24.95	24.75	25.95	31.90	29.40	32.65	29.65
15	50.03	16	30.73	15	24.18	16	25.35	15	30.65	16	31.15
+ 4.98		− 35.65		+ 35.09		− 25.64		+ 32.52		− 28.12	
15	55.01		55.08	15	59.27		59.71	16	3.17		3.03
+2 6	53.94		53.27	6	49.08		48.64	6	46.18		45.32
+40 13 46	29 31	14	10	12	50	13	51	12	57	13	57
	1.68720	1.68740		1.68700		1.68730		1.68710		1.68730	
	+25	+25		+1007		+1007		−510		−510	
	1.68745	1.68765		1.69707		1.69737		1.68200		1.68220	
	−48.69	−48.71		−49.78		−49.82		−48.08		−48.11	
	− .00	− .01		− .01		− .01		− .01		− .01	
	− .18	− .35		− .09		− .32		− .11		− .33	
	+ .03	+ .06		+ .02		+ .06		+ .02		+ .06	
	−48.84	−49.01		−49.86		−50.09		−48.18		−48.39	
+2 6	14.50	04.26	5	59.22		58.55	5	57.00		56.93	5
+2 6	4.38	+2 26.65	5	58.89	+2	32.06	5	56.97	+2	34.30	
8	28.1	−1.4	8	28.5		−1.3	8	29.2		−1.3	8
+2	23.7	+14.4	+2	29.6		+14.0	+2	32.2		+13.3	+2
	24.2			30.1				32.7			
		+2 39.65			+2 44.76				+2 46.30		
+2		+8 44.03			+8 43.65				+8 43.27		

55	54.90										

1876phae.proj.1483.

374

322

α Draconis α

14 1 0 Conv

+64 58 25 $\frac{d\alpha}{dt}$

−22° 35′ 37″ δ_0

Cond°

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

1876

m s
1 − 1972 May 20
s 25
+ .00 30
s June 4
+ 1.6282 9

58′ 7.74″

+ .4

−17.319

m s
1 6.37
6.26 11
6.14 12
6.00 14
5.84 16

58′ 4.5″
5.7 12
6.8 11
7.9 11
8.9 10

log cosδ 9.62649
15 cosδ sinz 9.78842 4

tanδ +2.14 +2.37
sin z −.38

−.50 −.62
May 20 .08 + June 7 X

1 15.0	1 32.2	1 16.0	1 33.7
18.0	34.7	21.5	36.1
22.3	37.3	24.6	38.6
	39.5		40.9
	41.9		43.3
	44.5	2 12.7	45.9
	47.0	16.5	48.4
	49.0	20.5	50.9
	57.7		53.1
	~~6.35~~ 37.8		390.9
1 18.43	~~42.644~~	1 20.70	
	1 ~~41.979~~ 41.979	2 16.57	1 43.433

−34.60	1 6.134	−36.16	1 5.896
−1.07	+ ~~.3657~~ .3584	−1.33	+ .3754
−.19	+ ~~.3657~~ .3584		+ .3754
−4.16		−3.93	
−40.02		−41.42	
+1 1.96		+ 2.01	
~~3.55~~	−1.07		−1.33
+ ~~24.21~~	−.19		
1.37199			
1.12041		+ 22.73	− 33.14
E	F	1.35660	1.52035 m
G	H	1.10502	1.26877 m

′ 25	″ 2	25	2	25	2	25	2
20.2	13.1	47.4	39.7	24.9	22.3	55.3	53.4
30.4	34.4	58.0	2.0	30.4	21.2	1.4	52.1
50.6	47.5	105.4	101.7	55.3	43.5	116.7	105.5
25.30	23.75	52.70	50.85	27.65	21.75	58.35	52.75
27	24.53	27	51.78	27	24.70	27	55.55
+ 13.20				+ 12.74		− 18.57	
27 37.73				27 37.44		36.98	
+64 55 10.62				55 10.91		11.37	
−22 35 09				35 09		34 − 38	
1.37930				1.37930		1.37910	
+1082				−480		−480	
1.38962				1.37450		1.37430	
+24.53				+23.69		+23.68	
− .00				− .10		− .23	
− .55				− .53		− .64	
+ .10				+ .10		+ .08	
+ 24.08				+ 23.16		+ 22.89	
+64 55 34.70				55 34.07		34.26	
+64		+2 32.06		55 34.16		+2 34.30	
58 6.9		+ 0.7		58 8.6		+ .6	
+2 32.2		+ 0.8		+2 34.4		− 0.9	
32.9				35.1			
		+2 33.56				+2 34.00	
+64		+57 58.26				+58 8.16	

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K Virginis

14 6 14

9 41 27

+52° 04' 15"

α_0 m s 6 16.984

Corr^n " −.45

$\frac{d\alpha}{dt}$ +3.1931

δ_0 ' " 41 44 05

Corr^n " −.2

$\frac{d\delta}{dt}$ −16.944

log cosδ 9.99375

15 cosδ tanδ 0.11568

tanδ −0.17 + 1.02

sin z +.79

1876

May 20		June 13		June 14		June 15	
−.50	−.08	−.68		−.68		−.75	
m s	m s	m s		m s		m s	
6 36.5	6 41.4	6 42.4	6 57.3	6 38.4	6 43.1	6 34.1	6 43.0
38.4	43.5	44.1	53.4	40.1	45.3	35.5	45.0
40.5	45.7	45.7	53.6	41.9	47.2	37.3	47.1
	48.8		57.7		51.5		51.4
	51.9		57.9		53.5		53.5
7 31.1	53.9		4.0		53.8		53.3
33.5	56.1		6.0		57.7		57.5
35.1	58.1		8.1		59.8		59.6
	2.2				4.0		3.8
	4.4				6.0		6.0
	6.5				8.1		8.1
6 38.40	413.5	6 44.07	431.0	6 40.13	432.0	6 35.63	430.5
	593.5		611.0		612.0		610.5
7 33.23	6 53.955		6 55.345		6 55.636		6 55.500
−34.60	6 19310	−36.37	6 19273	−36.48	6 19269	−36.36	6 19265
+.08	+ 3464	+.12	+ 3627	+.12	+ 3637	+.13	+ 3629
−.08	+ 3465		+ 36.28		+ 3638		+ 3625
−2.33		−2.29		−2.29		−2.28	
−36.93		−38.54		−38.65		−38.51	
+6 17.03		+17.00		+16.99		+16.99	
	+.08		+.12		+.12		+.13
+ 15.56	−.08						
1.19201							
1.30769	−39.27	+11.48		+15.51		+19.87	
C H	1.59406	1.05994		1.19061		1.29820	
G H	1.70974	1.17562		1.30629		1.41388	
5 0	5 1	5 0		5 0		5 0	
" "							
40.6 25.2	52.3 36.4	55.8 50.6		51.8 46.8		47.1 41.4	
47.6 58.3	58.8 9.9	57.4 0.4		53.2 54.9		47.8 48.6	
88.2 83.5	111.1 106.3	113.2 111.0		105.0 101.7		9.9 10.0	
44.10 41.75	55.55 53.15	56.60 55.50		52.50 50.85		47.45 45.00	
5 42.93	6 54.35	5 56.65		5 51.68		5 46.23	
+ 20.31	− 51.26	+ 14.98		+ 20.24		+ 25.93	
6 3.24	3.09	6 11.03		6 11.92		6 12.16	
−9 43 14.89	24.74	43 22.68		43 23.57		43 23.81	
52 3 09	4 20	3 22		3 18		3 12	
1.86750	1.86780	1.86760		1.86760		1.86750	
+1060	+1060	−880		−1070		−1286	
1.87810	1.87840	1.85880		1.85690		1.85464	
−76.53	−76.58	−72.24		−71.93		−71.55	
+ .02	+ .14	+ .01		+ .02		+ .03	
− .16	− .44	− .20		− .18		− .18	
+ .03	+ .08	+ .04		+ .03		+ .03	
−1 15.64	−1 15.80	−1 12.39		−1 12.06		−1 11.67	
−9 44 30.53	30.54	44 35.67		44 35.63		44 35.48	
−9 44 30.54	+2 32.06		+2 35.54		+2 36.70		+2 37.04
43 2 09	−1.6	43 2 04	−1.5	43 2 04	−1.4	43 2 03	−1.4
+2 29.6	+16.9	+2 34.7	+16.3	+2 35.2	+16.4	+2 35.2	+16.2
29.4		34.5		35.0		35.0	
	+2 47.36		+2 50.34		+2 51.70		+2 ~~52.24~~ 54.84
	−44 43.18						54.84
−9	+44 17.90		−41 44.73		−41 43.93		−41 ~~44.24~~ 43.64
							43.64

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4 Ursae Min.

14 9 22 Corr^{a} − .25

+78 8 5 $\frac{d\alpha}{dt}$ − 0.3339

− 35° 45′ 17″ δ_0 7 47.99

Corr^{n} + .8

$\frac{d\delta}{dt}$ −16.926

1876

−.62 × −.68 × −.75

June 7 June 13 June 15

log cosδ 9.31310

log I 1.50119

1.5 Const. 9.43503

I 10.03

tangδ +4.76 +4.85

sin z −.59

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α Bootis

14 9 58

+19 50 3

+22° 32' 45"

α₀ m 10 0.329
Cons + .03
dα/dt + 2.7338
δ₀ 49 44.19
Cons − .5
dδ/dt −18.881

log cos δ 9.97344
15 Constants 0.09839 Jan
0.09537 May 30 – July 13
0.09860 July 26
tang δ + 0.36 +1.06
sin z + .38

log R-2 1.29784
log I 0.34085
R-2 19854
I 2.19
I' 1.32

1876
Jan. 10 + 46.044 −.17

Jan. 11 Ch. f.

Jan. 13 +.06

Jan. 18 −.06

m s	h m s	m s							
9 17.5	9 214	9 32.0	9 148	9 20.6	9 31.2	9 13.2	9 18.0	9 28.8	
28.0	234	34.2	17.1	23.0	33.4	15.3	20.2	31.1	
21.6	25.6	36.4	19.4	24.6	35.6	17.3	22.3	33.3	
	27.9	40.8		26.8	40.0		24.6	37.7	
	30.0	43.0		29.0	42.2		26.7	39.9	
10 17.5	0.7	45.1		31.8	44.2		28.5	42.1	
19.6	2.8	47.4		2.0	46.1		30.6	44.3	
21.7	5.2	49.6		4.0	48.4		2.0	46.4	
	7.3	51.0		6.2	53.0		4.2	50.7	
	9.4	56.2		8.4	55.1		6.3	53.0	
		58.3			57.3			55.3	
	1537	4970		2047	4865		2414	4626	
9 19.70	45 37			4444			4214		
10 19.60	9 45 370	9 45.182	9 17.10	9 44440	9 44227	9 15.27	9 42.140	9 42055	
		.238			.308			.008	
		9 45.210			9 44268			9 42032	
	+15.13	9 60.254		+16.08 −26.37	9 60.356		+18.54	9 60.526	
	−.06	−15.04		+.02	−.609		−.02	−.849	
		−15.07			−16.12			−18.52	
	+0.08			−.03			−0.20		
	+15.15			+16.07			+18.32		
	+10 0.36			+0.34			+0.35		

−.06 +.02 −.02

−34.39
1.536432
1.63482

+25.51 +27.17 +26.76
1.40671 1.43409 1.42749
1.50510 1.53248 1.52588

	35 0		30 4		30 4		30 4			
	379 379		555 552		213 207		224 217			
	38.2 37.6		54.3 54.8		24.1 25.4		24.9 29.3			
	14.1 17.5		9.8 10.0		4.54 4.61		7.3 8.70			
	3805 3875		5490 5500		2270 2305		2365 2850			
	35 3840		54 5495		34 2288		34 2358			
	+ 43.13				+ 34.08		26.08			
							+ 33.67			
	34 55.27				34 56.96		34 59.64			
+19	47 53.08				47 51.39		47 48.71			+
+22	33 32				32 17		32 20			+
	1.37870				1.37830		1.37830			
	+17.95				+40.90		−7.02			
	−1.32				+47.10					
	1.37738				1.42540		1.37128			
	−23.84				−26.63		−23.81			
	− .20				− .13		− .13			
	− .041		− .34		− .35		− .35			
	+ .02				+ .18		+ .18			
	− 24.06				− 26.93		− 23.81			
+ 19	47 29.02	+2 5.80	+2 3.90		47 24.46	+2 5.90	47 24.90	+2 3.40		
	49 29.8	−0.8	−0.9		49 289	−0.9	49 280	−0.8		
	+2 0.6	+14.6			+2 4.4	+15.3	+2 3.1	+16.2		
	0.1				3.9		2.6			
		19.60				+2 2 0.30		+2 18.82	18.80	
+ 19		49 4862				+49 4476		+49 43.72	43.70	

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		m	s		'	"
Jan	1	9	59.94	17	49	31.7
	6		60.11	17		30.5 12
	11		60.28	17		29.4 11
	16		60.45	17		28.4 10
	21		60.62	17		27.4 10
	26		60.79	17		26.5 9
	31		60.95	16		25.7 8
Feb.	5		61.12	17		25.0 7
	10		61.28	16		24.7 6

Jan. 19								Jan. 20								Jan. 24								Jan. 27							
10	3.2	9	—	9	—			9	12.0	9	17.6	9	28.4	9	12.3	9	16.1	9	27.1	9	52.5	9	—	9	—						
	5.5		—		—				14.0		19.7		30.6		14.4		18.3		29.0		54.2		—		3896	30.2					
	7.8		—		—				15.8		21.9		33.0		15.8		20.4		31.3		56.1		—		3888	34.5					
			—		4168	37.3					24.2		27.2				22.7		33.6				—		3909	36.9					
			—		.69	39.5					26.2		29.4				25.2		37.5				54.6		39.00	39.0					
		57.3			.80	41.8					27.1		31.5				13.6		39.9				56.7		3891	41.1					
		59.4			.81	44.0					29.3		43.8				1.8		42.1				58.6		3902	43.4					
		1.7			.72	46.1					1.5		46.0				0.0		44.4				1.1		3894	47.7					
		3.8			.64	30.4					3.7		30.4				2.1		48.8				3.3		39.15	30.1					
		6.0			.85	52.8					5.8		52.6				4.4		50.9						3908	32.2					
					.86	53.0							54.8						53.0												
											2370		4577				2229		4396				58940								
10	5.50							9	13.93		41.70				14.17		40.29				54.27										
				9	41.756					9	41.700	9	41.609			9	40.290	9	39.964					9	39.086	9	39.073					
													.588						40.158												
				9	41.756							9	41.588					9	40.061							9	39.044				
		+18.85		9	60.560			+19.04		9	60.594			+20.67		9	60.730					+21.79		9	60.830					
		-.02		—	1880			+.00		—	1901			+.00		—	2067					+.00		—	21.79					
				—	18.83					—	19.04					—	20.70							—	21.82					
		-0.263						-0.29						-0.40								-0.50									
		+18.60						+18.75						+20.27								+21.29									
		+0.36						+0.34						+0.33								+0.33									
				-.02						+.00						+.00								+.00							
		-23.74						+27.66						+25.89								+15.23									
		1.37548m						1.44185						1.41313								1.18270m									
		1.47387m						1.54024						1.51152								1.28109m									
		35 0						30 4						35 4 [30]								35 0									
		25.6 30.1						22.1 25.6						23.3 25.4								16.9 17.9									
		30.2 29.8						24.8 24.3						25.3 25.2								21.4 22.6									
		5.8 5.9						6.9 9.9						8.6 6								38.3 40.5									
		27.90 29.95						23.45 24.95						24.30 25.30								19.15 20.25									
		35 28.92						.34 24.20						3.94 24.80								35 19.70									
		— 29.78						+ 34.69						+ 32.47								— 19.70									
		34 59.14						34 59.89						34 57.27								35 0.60									
+19		47 49.21						47 49.46						47 51.08								47 47.75									
+22		33 23						32 18						32 19								33 14									
		1.37870						1.37830						1.37830								1.37860									
		+877						+2498						+4320								+2220									
		1.38747						1.40328						1.42150								1.40080									
		-24.40						-25.81						-26.39								-25.17									
		— .10						— .14						— .12								— .04									
		— .94						— .40						— .44								— .03									
		+ .02						+ .18						+ .18								+ .01									
		-24.52						-25.67						-26.77								-25.23									
+19	47	24.69	+2	3.60	47	23.79	+2	4.10	47	24.31	+2	6.95	47	22.52	+2	4.07															
	49	27.8		-.08	49	27.6		-.03	49	26.8		-.69	49	26.3		-.08															
	+2	3.1		+16.4	+2	3.8		+16.6	+2	2.5		+17.4	+2	3.8		+17.9															
		2.6				3.3				2.0				3.3																	
			+2	19.20			+2	19.90			+2	23.45			+2	21.17															
			+49	43.89			+49	43.69			+49	47.76			+49	43.69															

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1876

May 20 25 30 June 4 9 14 19 24 29 July 4 9 14 19

m 2 10 280 279 278 276 274 271 267 263 258 253 248 242 236

49 31.7 1 325 8 1 33.2 7 2 33.9 7 2 34.6 7 3 35.2 6 4 35.8 6 4 36.4 6 5 36.9 5 5 37.3 4 5 37.7 4 6 38.0 3 6 38.3 3

−.50 −.08 May 30

−.62 June 7

−.68 June 13

−.68 June 14

[5.3]

[15.5]

m 2 10 16.3 18.5 19.9 20.3 22.4 11 12.0 14.0 17.0 18.23 11 14.33

m s 10 13.9 16.0 18.1 20.3 22.4 53.1 55.3 57.5 59.7 2.0 3183. 10 37.830

m 2 10 24.5 26.7 28.9 33.3 35.6 37.6 39.7 42.0 46.3 48.6 50.7 4139 37.627 .698

10 21.0 23.6 26.4 11 19.2 10 23.7

10 17.5 19.6 21.9 23.7 54.7 56.8 59.0 1.1 3.4 2730 3930 10 39.300

10 20.0 28.2 30.4 33.7 34.7 37.0 39.1 41.3 43.7 46.0 50.1 52.3 430.7 39.155 .168

10 23.2 25.1 26.9 10 25.07

10 [15.5] 17.4 19.8 22.0 24.2 54.9 57.0 59.1 1.3 3.6 2750 3950 39.580

10 26.2 28.4 30.6 35.0 37.2 39.4 41.6 43.8 48.0 50.3 52.5 4330

10 9.5 11.0 13.0 11 16.6 18.2 20.6 11 11.17

10 15.4 17.8 19.8 22.1 24.3 54.9 57.1 59.3 1.5 3.7 2759

10 26.3 28.6 30.8 35.1 37.3 39.5 41.7 43.8 48.2 50.4 52.7 4344

11 18.47

10 39.590

10 37.662 10 2.780 + 3.488 + 3.485

10 39.162 10 2.747 + 3.642 + 3.639

10 39.364 .368 10 39.366 10 2.714 + 3.665 + 3.662

10 39.474 10 2.708 + 3.677 + 3.674

39.491 .458

−34.60 −.18 −.08 −2.45 −37.31 +0.35

−36.16 −.22 −2.42 −38.80 +0.36

−36.37 −.24 −2.38 −38.99 +0.38

−36.49 −.24 −2.38 −39.11 +0.36

−.18 −.08

−.22

−.24

−.24

+19.43 1.28447 1.38384

− 36.67 1.56431 n 1.65968 m

+15.49 1.19005 1.28542

−40.04 1.60249 n 1.69786 m

+14.30 1.15534 1.25071

+28.30 1.45179 1.54516

−39.00 1.59106 n 1.68643 m

30 4 35 1 35 0 35 1 35 0 30 4 35 1

49.9 40.7 0.4 9.0 1103 109.7 5575 5485 34 55.00 + 24.24 35 19.20

2.4 53.1 12.9 22.4 15.3 15.5 7.65 7.75 36 7.70 − 45.67 − 22.03

6.4 0.0 9.8 8.1 14.2 8.1 8.10 4.05 35 6.08 + 19.29 35 25.37

14.8 9.0 17.7 14.9 32.5 23.9 16.25 11.95 36 14.10 − 49.87 35 24.23

3.9 5.8 11.2 10.0 15.1 15.8 7.55 7.90 35 7.73 + 17.81 35 25.54

49.5 48.4 52.2 52.3 101.7 100.7 50.85 50.35 34 52.60 + 36.25 35 25.85

12.0 11.8 15.8 16.8 7.8 8.6 13.90 14.30 36 14.10 − 48.58 25.52

+19 47 29.15 26.32 47 22.98 24.12 47 22.81 47 22.50 22.83

+22 32 21 1.37830 +1070 1.38900 −24.49 − .06 − 1.13 + .20 − 25.48

33 34 1.37870 +1070 1.38940 −24.61 − .24 − .25 + .04 − 24.96

32 32 1.37840 −435 1.37405 −23.66 − .04 − .02 + .02 − 23.72

33 40 1.37880 −435 1.37445 −23.68 − .28 − .26 + .05 − 24.17

32 34 1.37840 −865 1.36975 −23.43 − .04 − .02 + .00 − 23.49

32 17 1.37830 −1060 1.36770 −23.32 − .14 − 1.06 + .19 − 24.33

33 40 1.37880 −1060 1.36820 −23.38 − .27 − .26 + .05 − 23.83

+49 47 3.67 +19 47 2.82 49 33.2 +2 30.7 30.2

1.36 +2 32.06 −0.6 +11.0

46 59.26 46 59.60 49 34.4 +2 34.8 34.3

59.95 +2 34.30 −0.6 +9.8

46 59.32 49 35.1 +2 35.8 35.3

+2 35.54 −0.6 +9.0

46 58.17 46 58.58 49 35.2 +2 36.6 36.1

59.00 +2 36.70 −0.6 +9.0

+2 42.46 +49 44.98

+2 43.50 +49 43.10

+2 42.94 +49 42.26

+2 45.20 +49 43.78

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See Supp. List-Page 71 for continuation of this star

Sept. 3 −1.03

Chf.

June 15 + −.75

July 13 + −.91

July 25 + 26 −.76 −.06

June 15				July 13				July 25			
10 14.3	10 15.4	10 26.1	10 30.5	10 —	10 —	9 37.8	10 5.6	10 16.4	
	17.5	28.3	34.6	—	—	53.5	7.6	18.7	
	19.7	30.5		—	—	53.0	9.9	20.8	
	22.0	35.0		—	15.68 11.3		12.0	25.1	
	24.0	37.1		—	.69 13.5		14.3	27.2	
	34.8	89.3		31.0	.70 15.7		44.9	29.5	
	52.0	41.5		33.3	.71 17.9		47.2	31.7	
	52.0	43.8		35.5	.72 20.1		49.3	33.8	
	1.4	48.2		37.7	.64 24.4		51.5	88.3	
	3.6	50.3		39.9	.65 26.6		53.6	404	
		52.5			.66 28.8			42.6	
	2744	4326		35.480			2959	3245	
10 14.30			10 32.55			9 53.43			
	10 39.440	39.327		15.626	10 15.681		10 29.590	29.503	
		.308						.458	
	10 39.316			10 15.654			10 29.479	
	−36.36	10 2.703		−12.88	10 2.429		−26.90	10 2.273	
	−.27	+ 3.662		−.33	+ 13.22		−.27	+ 27.21	−.37
		+ 36.59			+ 13.19		−.06	+ 27.18	
	−2.37			−2.10			−1.94		
	−39.00			−15.31			−29.17		
	+0.82			+ 0.34			+ 0.31		
		−.27			−.33			−.27	−.37

	+25.02	−16.90	+36.05
	1.39829	1.22789n	1.55691
	1.49366	1.32326n	1.65551
	G H		
	' '		
	30 4	35 0	35 0
	55.1 52.9	56.8 52.1	12.4 8.0
	56.7 57.1	56.9 60.3	9.7 8.0
	11.8 10.0	1.7 112.4	22.1
	55.90 55.00	56.85 56.20	1105 8.00
	34 55.45	35 52.53	35 9.53
	+ 31.16	− 21.05	+ 45.24
	35 26.61	35 35.48	35 54.77
+19	47 21.74	47 12.87	46 53.58
+22	32 21	32 56	32 07
	1.37830	1.37850	1.37820
	−1275	−31.94	−900
	1.36555	1.34656	1.36920
	−23.20	−22.21	−23.40
	− .11	− .05	− .23
	− 1.08	− .16	− .03
	+ .20	+ .04	+ .01
	−24.19	−22.38	−23.65
+19	46 57.55	46 50.49	46 29.93
	+2 37.04	+2 48.08	+3 8.58
	49 35.3 −.05	49 38.0 −.07	49 38.5 −.07
	+2 37.7 +8.9	+2 47.5 +6.2	+3 8.6 +5.7
	37.2.	47.0.	8.1.
	+2 45.44	+2 53.58	+3 13.58
	+49 42.99	+49 44.07	+49 43.57

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i Bootis

14 11 45

+ 51 56 39

− 9° 33' 51"

1876

June 13

h	m	s	m	s
14	11	57.1	12	6.6
		59.9		10.0
		2.7		13.3
				20.0
				23.4
	12	5.6.4		26.7
		59.1		30.1
		2.1		33.4
				40.0
				43.4
				46.6
				293.5
	11	59.90		
	12	3.27	12	26.82

α_0	11 46 29.9	11 49.56	5.6 21.0
Corrα	− .02	49.48	21.9
	s	49.39	22.8
$\frac{d\alpha}{dt}$	+ 2.1278	49.29	23.7
	s	49.17	24.7
δ_0	56 22.65		
Corrδ	+ .7		
$\frac{d\delta}{dt}$	− 16.760		

		8	21.9
		9	22.8
		10	23.7
		12	24.7

		14	
		19	
		24	
		29	

log cos δ 9.78999

1/5 Cos Stani 9.91192

tang δ + 1.28 + 1.62

sin z − .17

		−36.37	11 49.492
		− .87	+ 37.19
			+ 37.21
		− 3.03	
		−40.27	
+11		46.41	

− .87

+26.78

1.42781

1.33973 − 32.59

1.51308 n

G R 1.42500 n

25	3	25	4
45.4	46.5	32.7	35.3
51.7	47.1	41.5	35.9
97.1	93.6	74.2	1.3
4855	4680	3710	65.60
28	4.68	29	36.35

	+ 21.87	−	26.61
	29 9.54	29	9.71
+51	53 38.81		38.61
−9	33 46	32	58
	0.98680	0.98620	
	− 855		− 855
	0.97825	0.97765	
	+ 9.51		+ 9.50
	− .19		− .28
	− .84		− 1.01
	+ .15		+ .18
	+ 8.63		+ 8.39
+51	53 47.44		47.00
+51	53 47.22	+ 2	35.54
	56 21.8		+ 0.2
	+ 2 34.6		+ 0.8
	35.3		
		+ 2	36.54
+51		56	23.76

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A Bootis

α_0 14 20 56 Conv. +52 25 44 $\frac{d\alpha}{dt}$ −10° 02′ 56″ δ_0 Conv $\frac{d\delta}{dt}$

1876

June 7 — June 13 — June 14 — July 13

log cos δ 9.78527
15 cos δ tan δ 9.90720
tang δ +1.30 +1.64
sin z −.17

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5 Ursae Min.

14 27 49

+76 15 4

−33° 52′ 16″

1876

−.68

June 13

14 Reject.

	α_0	$\frac{d\alpha}{dt}$	δ_0	$\frac{d\delta}{dt}$
	m 2	s	° ′	″
	27 48.571	−0.207	14 48.35	−16.05

−.68

June 14

m	s
28	15.9
	20.5
	25.0
	29.4
	33.5
	38.0
	42.1
	46.8
	57.0
	302.2
28	4123
28	33.578

−.91

July 13

June	m	s
8	27	54.56
13		54.25
18		53.92
23		53.56
28		53.19
3		52.80
8		52.39
13		51.97
18		51.53

July	m	s
28	3.8	
	10.1	
	18.5	
29	30.0	
	35.4	
	44.7	
28	10.80	
29	36.70	

	m	s
	27	[51.3]
		55.6
		6.3
		4.3
		8.7
		12.6
		17.2
		21.6
		26.0
		1976
		776
28	8.622	

−2.78	−36.51	27 54.18	−12.88	27 51.97
−2.78	−2.78		−3.72	
	−5.61		−3.40	
	−44.90		−20.00	
	27 48.68		48.62	
	−2.78	−2.78		−3.72

	−7.65	−2.18	−88.08
E	0.88366 a_n	0.33846 a_n	1.94488 a_n
G	0.38159 m_n	9.83639 m_n	1.44281 a_n
5	10 1	10 1	10 1
299	11.7 13.4	19.5 16.0	45.7 42.1
36.3	17.3 11.6	24.1 14.6	50.6 40.9
66.2	29.0 27.0	43.6 30.6	96.3 83.0
3310	14.50 13.50	21.80 15.30	48.15 41.50
6	32.40	11 15.55	11 44.83
	−~~34.08~~ 2.41	−~~67.05~~ 0.67 .69	−27.72
	11 11.59	11 17.86	17.11
76	11 ~~36.76~~ 33 ~~59.74~~	11 30.49	31.24
		42	51 16
−33	51 20	57 ~~75~~	~~50~~ ~~47~~
	1.58670	1.58680	1.58670
	−1010	−3158	−3158
	1.57660	1.55522	1.55512
	+37.71	+35.91	+35.90
	− .01	.00	− .98
	− .26	− .23	− .31
	+ .05	+ .05	+ .07
	+37.50	+35.73	+34.68
+76	12 14.26	12 6.22	5 92
+2	~~35.54~~	+2 36.70	12 6.07 +2 48.08
	~~+0.9~~ 14 50.0	+0.9	14 53.1 +1.1
		− 1.7	− 4.7
		+2 35.90	+2 44.48
	+76 14 50.16		14 50.55

h m s
14 27 48.650

+ 76° 14′ 50.36″

Log cos δ 9.97600

15 cos t tan 9.49793

tan δ +4.09 +4.22

sin z −.56

Log I 0.93829

I 8.67

½I 4.34

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ζ Bootis

| | | |

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11 Bootis pr.

14 34 51
+16 57 18
+25° 25' 30"

1876

α_0	m s 34 53.902		
Corrα	s + .04		
$\frac{d\alpha}{dt}$	s + 2.8182		
δ_0	′ ″ 57 2.79		
Corrδ	″ + .1		
$\frac{d\delta}{dt}$	″ −15.649		
	−.68		−.68

June 9 m s
14 19 24 29

m s			
34 56.41		56 52.6	
56.39	2	53.3	7
56.36	3	54.0	7
56.33	3	54.6	6
56.29	4	55.2	6

log cosδ 9.98071
15 corr^{s} tani 0.10264
Long^{s} +0.30 +1.05
sin z +.43

June 13

h	m	s	m	s		
14	35	5.0	20.0	20.5	35	10.1
	35	4.5	22.2	22.7	35	9.7
			24.4	24.8		
			28.6	29.1		
			30.9	31.4		
	36	12.2	33.1	33.5	36	4.5
	36	11.5	35.1	35.6	36	3.8
			37.3	37.7		
			41.6	42.1		
			43.8	44.2		
			46.8	46.4		
		35	368.0	368.0		
		35	33.000	33.458		
			34	56393		
			3661	+3706		
			+ 3657	+3702		
			−2.49			
			−39.05			
			+34 54.41			
			53.95			
			−.20			

June 14

m	s		
35			
20.2	20.6		
22.4	22.8		
24.6	25.0		
28.8	29.2		
31.0	31.4		
33.1	33.5		
35.3	35.7		
37.5	37.9		
41.7	42.2		
43.9	44.3		
46.1	46.4		
36.46	369.0		
33.145	33.545		
34	56389		
3676	+3716		
+ 36.72	+3712		
−2.49			
−39.20			
+34 54.34			
53.94			
−.20			

14 34 54.160
375

+28.00 +28.96
1.44716 | 1.46180
1.57980 | 1.56444

	−39.20	−38.04	+22.45	+23.35	−31.35	−30.25	
E	F	1.59329	1.58024	1.35122	1.37745	1.49624	1.48693
G	H	169393	168288	145384	148013	159888	158537
25	2	25	3	25	2	25	3
25.4	23.1	50.6	48.0	34.4	32.1	43.2	40.1
26.9	27.9	51.8	54.6	35.6	36.8	44.0	46.2
1.3	1.0	2.4	2.6	1.0	0.9	0.2	0.3
26.25	25.50	51.20	51.30	35.00	34.45	43.60	43.15
27	26.05	28	51.25	27	34.73	28	43.38
	25.82	−	−	+	+	−	−
4							
+ 36.47	+36.68	−49.65	−48.18	+28.44	+30.21	−39.71	−38.32
28	129	250	1.60	3.07	3.17	4.94	3.67	5.06
+16	54 47.06	45.85	46.75	45.28	54 45.18	43.41	44.68	43.29
+25	24 52		26 17		25 01		26 09	
	1.43710		1.43760		1.43710		1.43740	
	−760		−760		−970		−970	
	1.42960		1.42990		1.42740		1.42770	
	−26.88		−26.91		−26.75		−26.77	
	−.12	−.13	−.28	−.22	−.07	−.08	−.15	−.14
	−.53	−.53	−.84	−.84	−.57	−.57	−.81	−.81
	+.10	+.10	+.15	+.15	+.10	+.10	+.15	+.15
	−27.43	−27.44						
	−26.78	−26.78	−27.83	−27.82	−27.29	−27.30	−27.58	−27.57
+16	54 19.63	18.41	18.92	17.46	17.89	16.11	17.10	15.72
+16	54 19.28	17.94	+2 35.57		17.49	15.92	+2 36.70	
	56	53.2	−0.8		56	53.3	−0.8	
	2′ 33.9	2′ 33.3	+9.6		2′ 35.8	2′ 37.4	+9.5	
	34.0	33.4			35.9	37.5		
			+2 44.34				+2 35.40	
+16			+57	36.2	+57	22.8	+56 52.89	+56 51.32

+16° 57′ 25.28
1.80

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109 Virginia

14 39 56 Coord

+2 25 15 $\frac{d\alpha}{dt}$

+39° 57' 33" $\frac{d\delta}{dt}$

Coord

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

m 39 58844 — 4.80 +3.0294 24 59.32 + .1 − 15.383

June 9 14 19 24 29 July 4 9 14 19

m 40 12.1 1.30 1.28 1.26 1.23 1.20 1.16 1.11 1.06

1 2 2 3 3 4 5 5

24 45.7 46.2 46.7 47.1 47.5 47.9 48.2 48.6 48.9

5 5 4 4 4 3 4 3

log cos δ 9.99961

15 cos δ tan δ 0.12154

Long δ +0.044 +1.00

sin z +.64

1876

June 13 — .68 — 14.96 1.17493 1.29647 E 46

June 14 — .68 — 14.96 1.17493 1.29647 E 46

July 12 — .87 — .07 — 14.96 1.17493 1.29647 E 46

July 13 — .91 — 14.96 1.17493 1.29647 E 46

14	40	21.0 22.7 24.6	40	25.3 27.4 29.5 33.7 35.7	40	14.4 16.1 18.1	40	25.4 27.6 29.6 33.7 35.8	39	42.0 51.0 52.4	40	0.6 2.7 4.7 8.7 10.9	39	47.3 48.9 50.8	40	1.7 3.8 5.8 9.9 12.0
	41	18.3		37.8 39.7 41.8 46.0 48.0 50.1	41	7.3 9.0 11.3		37.9 39.9 42.0 46.0 48.0 50.2	40	43.8 45.2 47.2		12.9 15.0 17.1 21.1 23.1 25.2	40	32.9 34.4 36.1		14.0 16.1 18.2 22.3 24.3 26.4
				415.0				416.1		53		142.0				154.5
	40	22.77			40	16.20			39	50.57			39	49.00		
	41	18.3	40	37.727	41	9.20	40	37.829	40	45.440	40	12.909	40	34.47	40	14.045
		−36.36	40	1.301		−36.52	40	1.300		−11.63	40	1.128		−12.89	40	1.118
		−.03	+	36.43		−.03	+	36.53		−.03	+	11.78		−.04	+	12.83
			+	36.43			+	36.53		−.07	+	11.78			+	12.83
		−2.46				−2.46				−2.28				−2.28		
		−38.85				−39.01				−14.01				−15.11		
	+39	58.88				+58.82				+58.90				+58.98		
				−.03				−.03				−.03				−.04
												−.07				
		+14.96														
		1.17493														
		1.29647		−40.57		+21.63		−31.37		+22.38		−32.49		+25.05		−20.42
	E			1.60820 n		1.33506		1.49651 n		1.34986		1.51175 n		1.39881		1.31006 n
	G	46		1.72974 m		1.45660		1.61805 m		1.47140		1.63329 m		1.52035		1.43160 m
		55 4	0	0	55	4 0	0		55	4 0	0		55	4 0	0	
		27.8 26.6	39.4	40.8	19.7	18.8	29.3	30.9	30.5	26.7	42.6	39.3	29.7	21.8	31.0	21.2
33		13.3 13.6	45.5	48.2	22.8	26.2	32.2	37.1	31.2	35.4	44.1	47.8	32.6	32.3	32.1	32.7
		[33.3] [33.6]	849	90	425	450	625	80	17	621	67	871	623	541	31	539
		59	0		59		0		59		0		59		0	
3		20.55 34.10	42.15	44.50	21.25	22.50	31.25	34.00	30.85	31.05	43.35	43.05	31.15	27.05	31.55	26.95
		59 32.32	0	43.48	59	21.87	0	32.62	59	30.95	0	43.45	59	29.10	0	29.25
		+ 19.79	−	53.67	+	28.62	−	41.50	+	29.61	−	42.98	+	33.14	−	27.01
		59 40.11	59	49.81	59	50.49	59	51.12	0	6.56	0	0.47	0	2.24	0	2.24
		22														
+2		23 58.24		58.54	23	57.86		57.23	22	47.79		47.88	22	46.11		46.11
+39		56 56	58	09	56	48	57	59	56	30	57	42	56	28	57	28
		1.68300	1.68330		1.68290		1.68330		1.68285		1.68320		1.68285		1.68315	
		−740	−740		−967		−967		−2364		−2564		−3134		−3134	
		1.67560	1.67590		1.67323		1.67363		1.65921		1.65956		1.65151		1.65181	
		−47.38	−47.41		−47.12		−47.17		−45.63		−45.66		−44.82		−44.85	
		− .00	−	.04	−	.01	−	.02	−	.01	−	.02	−	.01	−	.01
		− .99	−	.15	−	.95	−	.11	−	.85	−	.13	−	.85	−	.08
		+ .18	+	.03	+	.17	+	.02	+	.18	+	.03	+	.18	+	.02
				7.57												
		− 48.19	−	47.41	−	47.91	−	47.28	−	46.31	−	45.78	−	45.46	−	44.93
+2	22	10.05		50.07	22	9.95		9.95	22	1.48		2.10	22	0.65	22	1.18
+2	22	10.51	+2	35.54	22	9.95	+2	36.70	22	1.79	+2	47.24	22	0.91	+2	48.08
	24	46.1		−1.2	24	46.2		−1.1	24	48.5		−1.2	24	48.5		−1.2
	+2	35.6		+13.2	+2	36.2		+13.1	+2	46.7		+10.8	+2	47.6		+10.8
		35.7				36.3				46.8				47.7		
			+2	47.54			+2	48.70			+2	56.84			+2	57.68
+2			+24	58.05			+24	58.65			+24	58.63			+24	58.59

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$\lambda' + \lambda^2$ Librae

14 43 58

− 15 31 14

+ 57° 54′ 02″

+.09

Jan. 12

+.06

Jan. 13

N.A.

Jan. 19

Jan. 20

+.01

| | | |

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8153
87940
30441
122
383
.44
30

+.01 | Jan. 24 | −.01 | Jan. 25 | −.68 | June 13 | −.68 | June 14

43 13.4 | 43 17.3 | 43 27.7 | 43 14.5 | 43 16.9 | 43 27.4 | 44 14.7 | 44 16.7 | 44 27.1 | 44 52.2 | 44 — | 44 27.2
15.6 | 19.2 | 29.8 | 16.3 | 19.0 | 29.5 | 16.9 | 18.8 | 29.2 | 54.4 | — | 29.3
18.0 | 21.3 | 32.0 | 18.7 | 21.2 | 31.6 | 19.0 | 20.9 | 31.4 | 56.3 | — | 31.5
23.6 | 36.3 | 23.3 | 36.0 | 23.0 | 35.7 | — | —
25.9 | 38.6 | 25.4 | 38.2 | 25.1 | 37.8 | — | —
53.4 | 40.6 | 55.4 | 40.4 | — | 40.0 | 45 7.4 | 53.2 | 38.0
57.8 | 42.6 | 57.6 | 42.4 | — | 42.1 | 9.0 | 57.3 | 40.0
0.0 | 44.9 | 59.6 | 44.5 | — | 44.3 | 11.6 | 59.5 | 42.2
2.1 | 49.2 | 1.8 | 48.8 | — | — | 1.7 | 44.3
4.3 | 51.3 | 3.9 | 51.0 | — | — | 8.7 | 48.7
53.4 | 53.1 | 50.8
33.9

2272 | 4464 | 2841 | 4429 | 20.900 | 59.480 | 4407
43 15.67 | 4072 | 43 16.50 | 4041 | 44 16.87 | 44 54.30 | 40.64

43 40.720 | 43 40.582 | 43 40.410 | 43 40.264 | 40.022 | 44 39.962 | 45 9.33 | 40.097 | 44 40.064
.590 | .280
43 40.586 | 43 40.272 | 44 39.982 | 44 40.080
+20.66 | 44 1.19 | +20.98 | 44 1.22 | −36.36 | 44 3.71 | 36.52 | 44 3.71
−.00 | +.00 | +.19 | +.19

+.05 | + .02 | − 2.47 | − 2.46
+ 20.71 | 21.00 | −38.64 | − 38.79
1.20 | 1.27 | 1.34 | 1.29
.30

−.00 | +.00 | +.19 | +.19

+24.92
1.39635
1.50538
E F
G H
' '
50 4 | 50 4 | 55 0 | 55 1
14.4" 12.8" | 18.3 17.2 | 9.9 6.7 | 58.9 56.1 | 19.8 14.4
14.1 18.8 | 18.1 22.6 | 13.0 16.8 | 0.5 5.6 | 18.9 25.3
5 11.6 | .4 39.8 | 22.9 23.5 | 1194 121.7 | 18.7 39.7
1425 15.80 | 1820 19.90 | 11.45 11.75 | 5970 6085 | 19.35 19.85
54 15.03 | 54 19.03 | 55 11.60 | 56 0.28 | 56 19.60
+ 32.02 | + 30.54 | + 29.49 | − 18.14 | − 37.32
54 47.05 | 54 49.54 | 55 41.09 | 55 42.14 | 55 42.28

+23.77
1.37603
1.48486

+23.11
1.36380
1.46961

−14.22
1.15290 w
1.25871 w

−29.25
1.46613 w
1.57194 w

−15 | 81 58.70 | 32 1.24 | 32 52.74 | 32 53.79 | 53.93
38

57 | 52 09 | 52 13 | 52 ~~76~~ | 53 26 | 53 46
1.96103 | 1.96106 | 1.96117 | 1.96139 | 1.96150
~~+44690~~ | +2440 | −729 | −960 | −960
+42268 | 1.98746 | 1.95388 | 1.95179 | 1.95190
2.00371 | −97.15 | −89.92 | −89.49 | −89.52
−100.86 | + .08 | + .08 | + .07 | + .03 | + .11
+ .08 | − .43 | − .04 | − .22 | − .29
− .42 | + .17 | + .01 | + .04 | + .65
+ .19
Σ | − 1 41.01 | − 1 37.33 | − 1 29.88 | − 1 29.64 | − 1 29.65

33 39.71 | 32 38.57 | 34 22.62 | 34 23.43 | 23.58
34 23.50
+2 6.95 | +2 8.30 | +2 35.54 | +2 36.70
31 36.9 | 31 36.2 | 31 47.2 | 31 47.2
−1.9 | −1.9 | −1.6 | −1.6
+6.3 | + 6.6 | + 17.5 | + 17.5
+2 11.35 | +2 8.00 | +2 51.44 | +2 52.60

31 28.36 | 31 30.57 | 31 31.18 | 31 30.90

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1876 a_1 −.75

June 15

m	s
44	12.4
	14.4
	16.0

m	s
44	5.1
	7.2
	9.3
	11.4
	13.6
	43.6
	45.7
	47.9
	50.0
	52.1

2859

44 14.27

44 28.570

−36.35
+.21

− 2.48
− 38.62
43 49.86

m	s
44	15.7
	17.7
	19.9
	24.2
	26.3
	28.5
	30.7
	32.8
	37.2
	39.3
	41.3

3136

28.509
.460

44 28.484

44 3.72

+.21

+14.21
1.15259
1.25840
C H
G Fe

55 2

43.5 39.9
43.7 41.3
1.2 89.2
43.60 44.60
57 44.10
+ 18.13
58 22.3

−15 35 13.88

157 55 10
1.96190
−1138
1.95052
−89.23
+ .03
− .59
+ .11
−1 29.68
36 43.56
31 47.2

m	s
44	38.5
	40.1
	42.1

44 40.23

−25.18
1.40106 n
1.50687 m

55 1

25.6 21.4
27.3 29.7
12.9 11.1
26.45 25.55
56 26.00
− 32.13
55 53.87

33 5.82

53 25
1.96139
−2356
1.93783
−86.66
+ .09
− .27
+ .66
−1 26.78
34 32.20

+2 37.04
−1.5
+1.76
+2 53.14

33 50.42

−.87
−.07

July 12

m	s
44	—
	—
	—
15.08	10.8
.04	12.9
.00	13.0
.06	17.2
.02	19.3
.04	23.6
.00	25.7
.16	28.0

44 15.050

44 15.050

−11.64
+.24
−.07
− 2.35
− 13.82
44 1.23

44 3.59

+.24
−.07

m	s
43	48.2
	50.2
	51.7

44 45.6
47.5
49.9

43 50.23

44 47.67

+26.19
1.41814
1.52395

55 0

26.3 14.7
27.4 29.2
13.7 3.9
26.85 21.95
55 24.40
+ 33.41
55 57.81

33 9.46

52 23
1.96111
−3130
1.92981
−86.08
+ .09
− .07
+ .02
−1 25.04

34 34.50
34 34.86
31 46.5

−.91

July 13

m	s
43	52.9
	54.9
	57.1
	59.3
	1.4
	31.4
	33.4
	35.6
	37.8
	39.8

4036

44 16.360

−12.89
+.25
−2.34
− 14.98
1.24

m	s
44	3.4
	5.5
	7.7
	12.0
	14.1
	16.2
	18.3
	20.5
	24.8
	26.9
	29.0

1784

16.218
.230

44 16.224

44 3.58

+.25

m	s
44	4.1
	54.4
	56.4
	58.1

44 4.10

44 56.80

+18.78
1.27370
1.37951

55 0

33.4 21.4
34.3 35.2
7.7 56.6
33.85 28.30
55 31.08
+ 23.96
55 53.04

33 6.69

52 30
1.96114
−2135
1.93979
−87.05
+ .05
− .09
+ .02
−1 27.07

34 33.76
34 34.75
31 46.3

−.88
−.07

July 19

m	s
43	59.4
	1.6
	3.8
	5.9
	8.0
	37.9
	40.1
	42.2
	44.5
	46.4

2900

44 23.600

−19.54
+.25
−.07
−2.24
−21.63
1.25

m	s
44	10.0
	12.2
	14.3
	16.6
	20.8
	22.9
	25.0
	27.1
	31.5
	33.6
	35.8

2578

44 22.891
.870
44 22.861

44 3.52

h m s
14 44 1.11

+.25
−.07

+18.78
−33.42
1.27370
1.52401 n
1.62982 m

55 1

42.4 29.6
42.2 44.0
.6 73.6
42.30 36.80
56 39.55
− 42.64
55 56.91

33 8.56

53 39
1.96149
−2135
1.94014
−87.12
+ .16
− .29
+ .07

−1 27.18

34 33.74
3 35.74
34 34.75
31 46.3

+2 49.92
−1.6
+1.67
+3 5.02

31 29.73

−15 31 41.98

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43 49.860 Δ^1
44 1.266 Δ^2

33 50.42 Δ^1
31 30.23 Δ^2

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Gr. 2164

14 48 16

+59 48 10

− 17° 25' 22"

L_0	m 48	s 17.592	June 29	m 48	s 20.7		′ 47	″ 57			
			July 4		20.52	15		57.4	9	log cos δ	9.70159
Corr^n		+ .03	9		20.37	15		58.0	6		
			14		20.20	17		58.5	5	15 cos δ tan i	9.82352
$\frac{dL}{dt}$		+ 1.5164	19		20.03	17		58.9	4		
δ_0	′ 47	″ 55.24								tan δ	+1.72 +1.99
Corr^n		− .6								sin z	−.30
$\frac{d\delta}{dt}$		− 14.717									

1876
+ − .91
July 13

m	s	m	s
47	36.9	48	10.1
	40.1		14.2
	43.4		18.2
			26.5
			30.8
49	5.4		34.7
	8.5		38.8
	11.7		43.0
			47.1
			55.2
			59.4
			382.0
47	40.13		
49	8.53	48	34.27

−12.89 48 20.26
−1.56 + 14.50
+ 14.47
−2.64
−1.00
48 17.64

+54.60 −1.56
+ 40.10
1.73719 −33.80
1.56071 −48.30
E 11 1.52892 n
G 46 1.35244 n

35	2	35	3
19.1	14.9	18.7	13.1
26.4	16.9	24.9	14.9
45.5	11.8	43.6	8.0
22.75	15.90	21.80	14.00
37	19.33	38	17.90
+	36.37	−	22.51
37	55.70		55.39
−59 44	52.65 7.35		52.96

−17 25 42 24 43
1.25710 1.25670
−3117 −3117
1.21593 1.22553
+16.44 +16.81

− .70	− .27
− .41	− .59
+ .09	+ .13
+ 15.42	+ 16.08

45	8.07		9.04
45	8.55	+2	48.08
47	58.4		+0.4
42	49.8		−3.2
	49.2		
		+2	45.28
+59		+47	53.83

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β Herculis Mira

14 51 5 Const

+74 39 58 d_1

− 32° 17′ 10″ d_0

Const

$\frac{dδ}{dt}$

| | | |

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B Bootis

14 57 14
+40 53 4
+1 29 44

α_0
Const
$\frac{d\alpha}{dt}$
δ_0
Const
$\frac{d\delta}{dt}$

m s
57 14.503
" "
+ .03
" "
+ 2.2606
" "
52 49.29
"
+ .7
"
−14.409

June 29
July 4
9
14
19
24
29
Aug. 3
8

m s
57 19.15
19.07
18.99
18.91
18.82
18.73
18.63
18.52
18.41

52

" "
47.2
48.0 8
48.7 7
49.3 6
49.7 4
50.0 3
50.3 3
50.4 1
50.5 1

log cos δ 9.87855
15 Cos δ tan 0.00048 thru July 19
0.00371 after " " 2.72
tan δ +0.87 +1.32
sin z +.03

1876
July 12
+ −.87 −.07
July 13
× −.91
July 17
+ −.86
July 19
+ −.88 −.07
July 26
+ −.76 −.06

m s
57 25.0 27.8 30.5
57 [15.2] 17.9 20.5 26.0 28.7 31.4 34.1 36.9 42.4 45.1 47.8
56 57.0 59.4 1.5
57 16.3 19.0 21.7 27.1 29.9 32.6 35.4 38.1 43.6 46.3 49.0
56 56.3 58.4 1.0
57 20.6 23.4 26.1 31.4 34.4 37.0 39.7 42.4 48.0 50.6 53.5
57 4.2 5.6 8.5
57 22.8 25.6 28.3 33.8 36.6 39.1 42.0 44.7 50.0 52.7 55.3
57 13.8 16.6 19.0
57 30.1 32.7 35.3 40.8 43.5 46.3 49.0 51.7 57.3 59.8 2.6

58 2.6 4.8 7.3
57 45.2 47.7 50.3
57 37.3 39.3 41.7
58 2.2 4.9 7.3
58 11.5 12.7 14.7

3460
57 27.77 58 4.90
5930
57 47.73
2590
56 58.57 57 32.636
4071
57 39.43 57 37.109
6.10
58 4.80
431.1
57 39.191
16.47
58 12.97
449.1
589.1
57 46.282

−11.66 57 18938 −.76 + 12.52 −.09 + 1249 −2.44 −14.95 57 16.51
−12.89 57 18922 −.79 + 13.71 + 13.68 −2.42 −16.10 +16.54
−17.44 57 18852 −.75 + 1816 + 18.13 −2.35 −20.54 +16.457
+19.55 57 18816 −.76 + 2038 −.09 + 2035 −2.32 −12.72 +16.47
−26.89 57 18685 −.66 + 2760 −.08 + 27.57 −2.18 −29.81 +16.47

−.76 −.09
−.79
−.75
−.76 −.09
−.66 −.08

+3.69 1.52427m
0.56703
0.56751 1.52475m
−33.44 1.52427m 1.52297 1.52345
+33.34 1.52297 1.17869m 1.17917m
−15.09 1.17869m 1.58478 1.58526
+38.44 1.58478 0.38382m 0.38430m
−2.42 0.38382m 1.51970 1.52018
+33.09 1.51970 1.40841m 1.40889m
−25.61 1.40841m 1.47436 1.47807
+29.81 1.47436 1.42635m 1.43006m
−26.69 1.42635m

30 2 30 3 30 2 30 2 30 2 30 2 30 3 30 2 30 3

38.4 39.7 14.9 15.2 9.1 5.9 59.8 54.2 6.1 2.8 49.6 44.2 11.4 5.9 12.3 5.7 36.3 34.5 34.0 31.5
43.1 40.1 21.2 16.6 16.1 9.0 5.8 59.1 13.2 5.1 54.1 47.8 16.9 10.7 17.4 10.6 35.2 27.9 32.5 26.2
8.15 39.8 36.1 31.8 2.52 14.9 12.56 11.33 19.3 2.9 10.37 7.20 8.3 1.6 9.7 16.3
40.75 39.90 18.05 15.90 12.60 7.45 2.80 56.65 9.65 3.95 51.85 46.00 14.15 8.30 14.85 8.15 32 33
33 40.33 33 16.98 32 10.03 32 57.73 32 6.80 32 48.93 32 11.23 33 11.50 35.75 31.20 33.25 28.85
+ 3.69 − 33.48 + 33.38 − 15.11 + 38.48 − 2.42 + 33.13 − 25.64 32 33.48 33 31.08
+ 30.07 − 26.82

32 44.02 43.50 32 43.41 32 44.62 32 45.28 46.51 32 44.36 45.86 33 3.53 4.16

40 56 4.33 4.85 50 4.94 3.73 50 3.07 1.84 50 3.99 2.49 49 44.86 44.19

+1 29 89 30 16 29 09 29 59 29 06 29 48 29 10 30 11 29 32 30 30
0.17640 0.17980 0.17400 0.17840 0.17400 0.17740 0.17450 0.17940 0.17600 0.18080
−2325 −2325 −3099 −3099 −2180 −2116 −2115 −2115 −755 −855
0.15315 0.15655 0.14301 0.14741 0.15284 0.15624 0.15335 0.15825 0.16845 0.17325
−1.42 −1.43 −1.39 −1.40 −1.42 −1.43 −1.42 −1.44 −1.47 −1.49

− .00 − .31 − .24 − .06 − .40 − .00 − .30 − .18 − .24 − .19
− .70 − .63 − .40 − .54 − .38 − .50 − .40 − .58 − .44 − .59
+ .11 + .13 + .09 + .12 + − .08 + .11 + .09 + .13 + .10 + .14

− 1.82 − 2.24 − 1.94 − 1.88 − 2.12 − 1.82 − 2.03 − 2.04 − 2.05 − 2.13

+40 50 2.51 2.61 50 3.00 1.85 50 0.95 0.02 50 1.96 0.42 49 42.75 42.06
+40 50 2.56 +2 47.24 50 2.43 +2 48.08 50 0.48 +2 49.78 50 1.19 +2 49.92 49 42.40 +3 8.58
52 49.1 − 0.1 52 49.2 − 0.1 52 49.6 − 0.1 52 49.7 − 0.1 52 50.2 − 0.1
+2 46.5 + 0.2 +2 46.8 + 0.1 +2 48.7 9.1 + 0.3 +2 48.5 + 0.4 +3 7.7 + 0.8
47.2 47.5 49.8 49.2 8.4

+2 47.34 +2 48.08 +2 49.38 +2 49.42 +3 7.68

+40 +52 49.90 +52 50.51 +52 49.86 +52 50.61 +52 50.08

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V Librae

14 59 39
−15 46 9
+58° 08′ 57″

log cos δ 9.98334
15 Constant 0.10527

I 214

Long δ −0.28 +1.04
sin z +.85

1876

−.91 −.86

	July 13		July 17	
14	59 33.4	59 44.9	59 38.6	59 49.5
	41.0	47.1	40.6	51.6
	43.1	49.2	42.3	53.8
		53.6		58.1
		55.7		0.3
		57.8	0 37.9	2.4
		0.0	39.6	4.5
		2.1	41.0	6.6
		6.4		11.0
		[8.5]		13.0
		[10.6]		15.1
		3359		265.9
	59 44.17	6359	59 40.50	0 25.9
		59 57.809	0 39.50	2655

	−12.89	−17.44	
	+.25	+.24	
	−2.44	−2.41	
	−15.08	−19.61	
	59 42.73	59 42.75	14h 59m 42.740
	+.25		+.24
	+16.64		
	1.22115	+21.86	−37.14
	1.32642	~~+28.14~~	~~−37.14~~
	E H	1.33965	1.56984
	G H	1.44492	1.67511
	10 0	10 0	10 1
	345 234	29.0 17.3	43.9 32.2
	36.7 39.4	29.6 31.6	44.2 46.1
	1.2 62.8	.6 48.9	8.1 78.3
	3560 2140	2930 2945	4405 3915
	10 33.50	10 26.87	11 41.67
	+ 21.20	+ 27.86	− 47.33
	10 54.70	10 54.73	10 54.47
−15	48 6.35	48 6.38	6.12
58	7 33	7 26	8 41
	1.96534	1.96524	1.96548
	−3083	−2102	−2102
	1.93441	1.94429	1.94446
	−86.38	−87.96	−88.04
	+ .04	+ .07	+ .20
	− .11	− .07	− .31
	+ .02	+ .02	+ .07
Σ	−1 26.03	−1 27.94	−1 28.08
−15	49 32.34	49 34.32	37.20
	+2 ~~48.08~~ 54	47 34.28	+2 49.78
	−1.6	8	−1.6
	+1.66		+1.65
	+3 3.08		+3 4.68
	−15 46 29.30		46 29.59 −15° 46′ 29.″45

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1876phae.proj.1483

48 H. Cephei

3 4 32 Conv

+77 16 19 $\frac{d\alpha}{dt}$

+102° 43' 41" δ_0

−60° 20' 58" Corr$^{\delta}$

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

1876

Jan. 27 July 13 July 17

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1876phae.proj.14833

β Librae

15 10 17

−8 55 13

+51° 18′ 01″

α_0 m 10 20144 — June 29 / July 4 / 9 / 14 / 19

Corr^a + .12

$\frac{d\alpha}{dt}$ + 3.2208

δ_0 55 26′ 60″

Corr$^\delta$ − .1″

$\frac{d\delta}{dt}$ −13.545

m 10 22.79 / 22.67 / 22.64 / 22.60 / 22.56 — 55′ 41.5 / 41.2 / 41.0 / 40.7 / 40.5

log cos δ 9.99472

15 cos δ sin 1″ 0.11665

tang −0.16 + 1.01

sin z +.78

I 2.08

1876

July 12: + −.87 −.07

July 13: + −.91

July 17: + −.86

July 19: + −.88 −.07

July 26: −.76 −.06

July 12			July 13			July 17			July 19			July 26
15 10 16.1	10 21.8		10 23.0	10 [22.9]		10 10.0	10 27.3		10 9.6	10 29.6		
18.2	23.9			25.0		12.0	29.5		13.0	31.6		Ch. f.
20.1	25.7			27.0		14.0	31.6		15.0	33.7		
	8.0			31.3			35.7			37.9		
	32.3			33.3			37.8			40.0		
10 52.0	34.2		11 7.4	35.4		11 1.4	39.9			42.1		
0.6	36.3		8.7	37.6		3.0	42.0			44.1		
2.3	38.4		10.4	39.6		5.0	44.1			46.2		
	42.6			43.7			48.2			50.4		
	44.7			45.8			50.4			52.4		
	46.8			47.9			52.4			54.7		
	376.8			389.5			438.9			462.7		
10 18.13	34.255		10 23.00			10 12.00			10 12.53			
11 6.63	10 ~~38.345~~		11 8.83	10 35.409		11 3.13	10 39.900			10 42.064		
−11.67	10 22.614		−12.90	10 22.606		−17.45	10 22.574		−19.56	10 22.558		
+.14	+ 11.64		+.14	+ 12.80		+.14	+ 17.33		+.14	+ 19.50		+.12
−.07	+ 11.62			+ 12.78			+ 17.31		−.07	+ 19.49		−.06
−2.47			−2.486			−2.43			−2.42			
−14.07			−15.22			−19.74			−21.91			
+10 20.19			+20.19			+20.16			+20.15			
	+.14 −.07			+.14			+.14			+.14 −.07		+.12 −.06
+16 13												
1.20763												
1.32428	−26.37		+12.41	−33.42		+27.90	−33.23		+29.53			
f	1.42111 a_M		1.09377	1.52401 a_M		1.44560	1.36605 a_M		1.47026			
g 86	1.53776 a_M		1.21042	1.64066 a_M		1.56225	1.48270 a_M		1.58691			
15 4	20 0		15 4	20 0		15 4	20 0		15 4		15 4	20 1
4.74 39.7	42.2 35.1		56.1 42.5	56.1 41.6		36.4 23.2	43.9 39.5		34.1 19.1		56.2 46.5	18.7 10.4
46.2 46.8	42.1 44.3		55.2 53.6	55.7 55.6		36.3 32.8	43.4 41.7		33.0 31.2		49.1 47.4	13.3 11.0
13.6 86.5	.3 79.4		11.3 96.1	11.8 97.2		.7 37.0	1.3 81.2		.7 50.3		10.3 .8	12.0 1.4
46.80 43.25	42.15 39.70		55.65 48.05	55.90 48.60		36.35 28.00	43.65 ~~42.60~~ 42.17		33.55 25.15		52.65 ~~48.00~~ 48.00	16.00 10.70
19 45.03	20 40.93		19 51.85	20 52.25		19 32.18	20 ~~44.17~~ 39.62		19 29.35		19 50.33	21 13.35
+ 21.10	− 34.80		+ 16.23	− 43.72		+ 36.30	− 30.39		+ 38.63		+ 49.82	+
20 6.13	20 6.43		20 8.08	20 8.53		20 8.68	~~14.74~~ 9.23		20 7.98			
−8 57 17.78	18.08		57 19.73	20.18		57 20.33	~~13.37~~ 2.085		57 19.63			
51 16 44	17 40		16 51	17 51		16 31	17 41		16 28			
1.855550	1.855770		1.855320	1.855580		1.855545	1.855570		1.855345			
−2290	−2290		−3060	−3060		−2050	−2050		−2080			
1.853260	1.853280		1.852490	1.852520		1.853495	1.853520		1.853265			
−68.01	−68.08		−66.82	−66.86		−68.38	−68.42		−68.34			
+ .02	+ .06		+ .01	+ .09		+ .07	+ .04		+ .08			
− .91	− .13		− .86	− .16		− .81	− .13		− .81		− ~~.82~~	− ~~.19~~
+ .19	+ .03		+ .19	+ .04		+ .18	+ .03		+ .18			
−1 8.71	−1 8.09		−1 7.48	−1 6.89		−1 8.94	−1 8.48		−1 8.89			
−8 58 26.49	26.17		58 27.21	27.07		58 29.27	29.36 ~~31.87~~		58 28.52			
−8 58 26.33	+2 47.24		58 27.14	+2 ~~48.07~~ 48.04		58 ~~30.57~~ 29.32				+2 49.92		+3 ~~8.58~~
55 40.8	−1.4		55 40.7	−1.4		55 40.76	+2 ~~49.78~~ 48.7		55 40.5	−1.5		−1.5
+2 45.5	+14.2		+2 46.4	+14.1		+2 ~~50.6~~ 48.6	−1.5		+2 48.0	+13.9		
45.4			46.3				+14.0		47.9			
	+3 0.04			+3 0.78			+3 2.28			+3 2.32		
−8	−55 26.29			−55 26.86			−55 27.04			−55 26.20		

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1 He. Nersae Min ♃

15 13 13 Comet

+67 49 18 $\frac{d\alpha}{dt}$

− 25° 26′ 30″ $\frac{d\delta}{dt}$

Comet

$\frac{d\rho}{dt}$

m R
13 18307
2
− .03
2
+ 0.6602
″
49 4.59
″
− .2
″
− 13.731

June 29
July 4
9
14
19
24
29
Aug 2
8

m 2
13 16.94
16.73
16.51
16.28
16.05
15.80
15.55
15.28
15.00

21 22 23 23 25 25 27 28

49 56
6.1 8
7.1 7
7.7 6
8.2 5
8.5 3
8.7 2
8.8 1
8.8 0

log cos δ 9.57700
15 cos δ sin z 9.69893 time July 17
9.70216 after July 17
tang δ +2.45 +2.65
sin z .43

1876
+ −.87
−.07
July 12

+ −.91
July 13

+ −.86
July 17

+ −.85
July 24

m	s	m	s	m	s	m	s	m	s	m	s	m	s	m	s
13	3.1	13	19.2	12	50.0	13	20.5	13	5.0	13	24.7	13	12.4	13	32.2
	7.8		22.1		54.9		23.4		9.0		27.3		16.7		35.0
	12.1		24.8		59.1		26.1		14.0		30.3		21.5		37.8
			27.5				28.9				32.9				40.6
			30.3				31.6				35.6				43.3
13	55.0		33.0	13	56.9		34.1	13	54.3		38.6	14	13.1		46.0
	59.6		35.8		0.4		37.0		58.9		41.3		15.3		48.7
	1.3		38.4		6.0		39.6		3.5		43.9		19.5		51.5
			41.4				42.5				46.6				54.3
		27	25			28	3.7			32	1.2			38	9.4
13	76.7			12	54.7			13	9.33			13	16.87		
13	54.97	13	30.278	184	1.10	13	31.522	13	58.90	13	35.689	14	15.97	13	43.267
	−11.68	13	16360		−12.90	13	16314		−17.45	13	16130		−25.41	13	15788
	−2.13		+ 13.92		−2.23		+ 15.21		−2.11		+ 19.56		−2.08		+ 27.48
	−.18		+ 13.95				+ 15.24				+ 19.59				+ 27.51
	−3.05				−3.06				−2.82				−2.48		
	−17.04				−18.14				−22.38				−29.97		
+13	13.24				+13.38				+13.31				+13.30		
			−2.13				−2.23				−2.11				−2.08
	+22.61		−.18												
	1.35430														
	1.05323		−29.69		+36.85		−29.58		+26.36		−23.21		+26.40		−32.70
☾	☿		1.47261 w		1.55449		1.47100 w		1.42095		1.36568 w		1.42160		1.51455 w
♃	♅		1.17154 m		1.26537		1.16993 m		1.11988		1.06461 m		1.12376		1.21671 m
35	1	35	2	35	1	35	2	35	1	35	2	35	1	35	2
40.4	44.5	7.5	9.8	36.6	34.0	9.6	6.2	43.7	41.0	9.6	5.6	49.9	49.7	19.0	18.7
47.9	40.1	13.3	6.8	43.8	32.7	16.6	6.4	50.1	40.2	15.0	6.1	50.8	41.1	18.2	9.8
8.3	4.6	20.8	16.6	8.0	4	26.2	.6	9.38	1.23	24.6	1.17	10.07	10.8	17.2	8.5
4415	42.30	1040	8.30	4020	33.35	1310	6.30	4690	40.60	12.30	5.85	50.35	45.40	1860	14.25
36	43.23	37	9.35	36	36.78	37	9.70	36	43.75	37	9.08	36	47.88	37	16.43
+	11.30	−	14.84	+	18.42	−	14.79	+	13.18	−	11.60	+	13.30	−	16.47
86	54.53		54.51	36	53.20	36	54.91	36	56.93	36	57.48	37	1.18	36	59.96
+67	45 53.82		53.84	45	53.15		53.44	45	51.42		50.87	45	47.17	45	48.39
−25	26 18	25	52	26	24	25	51	26	17	25	52	26	13	25	45
	1.43750		1.43750		1.43750		1.43730		1.43750		1.43730		1.43750		1.43730
	−2290		−2290		−3050		−3050		−2050		−2050		−1630		−1630
	1.41460		1.41460		1.40700		1.40680		1.41700		1.41690		1.42120		1.42100
	+25.98		+25.97		+25.53		+25.51		+26.12		+26.12		+26.88		+26.86
	− .09		− .16		− .26		− .18		− .13		− .10		− .14		− .20
	− .32		− .42		− .29		− .41		− .31		− .40		− .32		− .41
	+ .07		+ .09		+ .06		+ .09		+ .07		+ .09		+ .07		+ .09
	+ 25.64		+ 25.48		+ 25.04		+ 25.01		+ 25.75		+ 25.71		+ 25.99		+ 25.84
+67	46 19.46		19.32	46	18.19		18.45	46	17.17		16.58	46	13.16	46	14.23
+67	46 19.39	+2	47.24	46	18.32	+2	48.08	46	16.88	+2	49.78	46	13.40	+2	53.93
	49 7.3		+0.7	49	7.6		+0.7	49	8.0		+0.8	49	8.5		+0.8
	+2 48.1		+2.9	+2	51.3		+3.0	+2	51.1		+3.4	+2	54.8		+3.9
	47.9				51.1				50.9				54.6		
		+2	45.04			+2	45.78			+2	47.18			+2	50.83
+67		+49	4.43			+49	4.10			+49	4.06			+49	4.59

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1876phae.proj - 1483

Perseae Min. 2

15 20 57 Conv

+72 16 44 $\frac{d\alpha}{dt}$

−29° 53′ 56″ $\frac{d\delta}{dt}$

Conv

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

Jan. 21 / Feb. 5 / July 9

log cos δ 9.48351

15 cos δ tan 9.60846 Jan. Feb. / 9.60544 July

tang δ +3.12 + 3.29

sin z −.50

log I 0.83078
log R−1 1.52992
R−1 33.880
I 6.77
½I 3.38

+.01 −.02 −.87 −.07 −.91 −.86

Jan. 27 Feb. 15 July 12 July 13 July 17

See G.L. for July 19

1876phae.proj.1483.

1' Bootis

15 26 26
+41 15 37
+1° 07' 11"

L_0 — Corr^n — $\frac{dL}{dt}$ — β_0 — Corr^n — $\frac{d\beta}{dt}$

	h m s	h m s	h m s
	26 28.508	26 31.24	15 24.7
June 29		31.17 7	22.6 9
July 4	+ .05	31.10 7	22.4 8
9	s	31.02 8	24.1 7
14		30.93 9	24.8 7
19	+ 2.1530		
	′ ″		
	15 24.58		
	″		
	− .7		
	″		
	− 12.440		

log cos δ 9.87613
15 cos Stan 99 9806

tang +.0.88 +1.33
sin z +.02

1876

+	−.87	+	−.91	+	−.86	+	−.88
	−.67						−.07
July 12		July 13		July 17		July 19	
h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
15 26 24.1	26 27.1	26 19.4	26 28.3	26 22.0	26 32.7	26 20.0	26 35.0
28.2	30.1	21.2	31.1	24.1	35.5	22.5	37.8
30.3	32.6	24.5	33.8	26.4	38.2	24.7	40.5
	38.0		39.3		43.6		46.0
	40.9		42.0		46.5		48.7
27 40.0	43.6	27 6.3	44.4		49.2	27 13.0	51.4
	46.4	8.7	47.4		52.0	15.2	54.3
	49.2	11.4	50.2		54.6	18.0	57.0
	54.6		55.7		0.3		2.3
	57.4		58.5		3.0		5.0
	0.2		1.2		5.6		7.8
	42.0.1						
	46.1		432.2		361.2		385.8
26 28.20	47.91	26 21.70	492.2	26 7.47	541.7	26 22.40	565.8
27 40.00	26 43.555	27 8.80	26 44.745		26 49.200	27 13.40	26 51.436
	645						
−11.69	26 31.048	−12.90	26 31.032	−17.46	26 30.962	−19.57	26 30.926
−.76	+ 1.260	−.80	+ 1.371	−.76	+ 1.824	−.77	+ 2.051
−.09	+ 12.55		+ 13.66		+ 18.19	−.09	+ 20.46
−2.54		−2.52		−2.45		−2.42	
+26 +28.86		−16.22		−20.68		−22.85	
		+28.52		+28.583		+28.59	
	−.76		−.80		−.76		−.77
	−.09						−.09
+15.48							
1.18893							
1.18699	−56.35	+23.05	−24.05	+25.03		+29.04	−23.96
ℰ ℱ	1.75088 m	1.36267	1.38112 m	1.39846		1.46300	1.37949 m
G H	1.74895 m	1.36073	1.37918 m	1.39652		1.46106	1.37755 m
5 4	10 1	5 4	10 0	5 4		5 4	10 0
″ ″							
55.6 53.4	6.6 3.4	48.9 42.8	35.2 29.0	49.2 42.3		45.8 39.3	38.4 30.7
58.3 54.7	10.3 6.3	52.4 47.2	40.3 33.2	52.4 45.8		48.8 41.9	42.5 35.0
13.9 8.1	16.9 9.7	13 10.0	55 62.2	1.6 8.1		14.6 1.2	0.9 5.7
56.95 54.05	8.45 4.85	50.65 45.00	37.75 31.10	50.80 44.05		47.30 40.60	40.45 32.85
9 8.55	11 4.65	9 47.83	10 34.43	9 47.43		9 43.95	10 36.65
+ 15.38	− 56.10	+ 22.95	− 23.94	+ 24.92		+ 28.91	− 23.85
10 10.88	10.55	10 10.78	10.49	10 12.35		10 12.86	12.80
+41 12 37.47	37.85	12 37.57	37.86	12 36.00		12 35.49	35.55
+1 6 55	8 06	6 47	7 33	6 46		6 43	7 36
0.04950	0.05720	0.04890	0.05350	0.04890		0.04884	0.05420
− 2250	− 2250	− 3008	− 3008	− 1982		− 2040	− 2040
0.02700	0.03470	0.01882	0.02342	0.02908		0.02790	0.03380
− 1.06	− 1.08	− 1.04	− 1.06	− 1.07		− 1.07	− 1.08
− .07	− .86	− .14	− .16	− .17		− .23	− .16
− .93	− .21	− .86	− .11	− .86		− .85	− .11
+ .20	+ .04	+ .19	+ .02	+ .19		+ .19	+ .02
− 1.86	− 2.11	− 1.85	− 1.31	− 1.91		− 1.96	− 1.33
+41 12 35.61	35.69	12 35.72	36.55	12 34.09		12 33.53	34.22
+41 12 35.65	+2 47.24	12 36.13	+2 48.08		+2 49.78	12 33.88	+2 49.92
15 23.9	−0.1	15 24.0	−0.1	15 24.5	−0.1	15 24.8	−0.1
+2 48.3	+0.7	+2 47.9	+0.6	+2 50.4	+0.1	+2 50.9	−0.2
47.6		47.2		49.7		50.2	
	+2 47.84		+2 48.58		+2 49.78		+2 49.62
+41	+15 23.49		+15 24.71		+15 23.87		+15 23.50

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ζ Coronae Ao

15 29 24 Const
+27 8 12 $\frac{d\alpha}{dt}$
+15° 14' 36" $\frac{d\delta}{dt}$

	m	s
	29	26.27
Const	+	.02
		25.38
$\frac{d\alpha}{dt}$	+	2.538
		7 59.86
Const	−	.7
$\frac{d\delta}{dt}$	−	12.311

Jan. 1 6 11 16 21 26 31 Feb. 5 10

m	s		
29	25.42		
	26.58	16	
	25.74	16	
	25.90	16	
	26.06	16	
	26.22	16	
	26.39	17	
	26.56	17	
	26.73	17	

	7	44.8
	43.4	14
	42.1	13
	40.9	12
	39.8	11
	38.8	10
	37.9	9
	37.1	8
	36.3	8

log cos δ 9.94936
15 cos δ tan 0.07431 Jan.
0.07129 July
tan δ +0.51 + 1.12
sin z +.26

log R−2 1.32192
R−2 20.985
log R+2 1.31606
R+2 20.704
I 140
I 2.32

+.06 × +.09 Jan. 11 Jan. 12 Jan. 13 × +.06 × +.01 Jan. 24

Ch. f.

28	38.2	28	44.8	28	36.3	28	40.1	28	44.3	28	35.7	28	58.2	28	51.6				
	40.7		47.1		38.7		42.1		46.7		38.0				54.0				
	42.1		49.5		1.2		43.9		48.8		0.3				56.4				
			51.8		3.6				51.3		3.0				40.7				
			54.1		7.9				53.7		7.3				3.3				
			26.6		10.3				26.6		9.3				5.6				
			29.1		12.5				28.2		12.0				7.7				
			31.5		14.7				30.7		14.2				10.2				
			33.6		19.4				33.0		18.7				14.9				
			36.0		21.8				35.2		21.1				17.0				
					24.1						23.5				19.6				
			40.41		23.25				39.79		22.53				24.12				
28	40.33		10.41		11.25	28	42.03		9.79		10.53	28	58.20		6.12				
		29	10.410	29	10.227			29	9.790	29	9.573			29	5.564				
					.270						.653								
				29	10.248					29	9.612			29	5.564				
			+15.50	29	25.781				+16.11	29	25.812		+20.64	29	26.164				
			+.04	−	15.53				+.03	−	16.20		+.00	−	20.60				
				−	15.55					−	16.22			−	20.62				
			+0.50						+0.47				+0.12						
			+16.04						+16.61				+20.76						
		+29	26.29						+26.22				+26.32						
					+.04						+.03								+.00

E.	F.		+29.92				+27.58						+27.36						
G.	H.		1.47596				1.44059						0.86688						
			1.55027				1.51490						0.94119						
15	2		15 1				15 1						15 1						
36.4	37.8		14.7	17.2			19.8	21.7					47.8	49.6					
36.9	36.3		18.8	19.1			24.9	24.1					52.2	51.3					
13	14.1		13.5	16.3			44.7	5.8					1000	1009					
36.65	37.05		16.75	18.15			22.35	22.90					59.60	50.45					
17	36.85		16	17.45			16	22.63					16	50.28					
			+	35.50			+	32.73					+	8.73					
			16	52.95			16	55.36					16	59.01					
+27			5	55.46			5	52.99					5	57.34					
+15			14	11			14	17					14	44					
			1.19550				1.19555						1.19575						
			+4060				+4583						+4240						
			1.23610				1.24138						1.23835						
			−17.22				−17.44						−17.81						
			− .20				− .17						− .01						
	− .18		− .09				− .11						− .18						
			+ .05				+ .06						+ .07						
			−17.46				−17.66						−17.43						
+24			5	37.94			5	35.33					5	31.91					
					+2 3.80				/2 5.90						+2 6.95				
	−0.6		7	41.8	−0.6		7	41.5	−0.6				7	39.1	−0.6				
			+2	3.9	+18.1		+2	6.2	+18.4				+2	7.2	+20.8				
				3.2				5.5						6.5					
					+2 21.30				+2 23.70						+2 27.15				
+27					+7 59.24				+7 59.03						+7 59.06				

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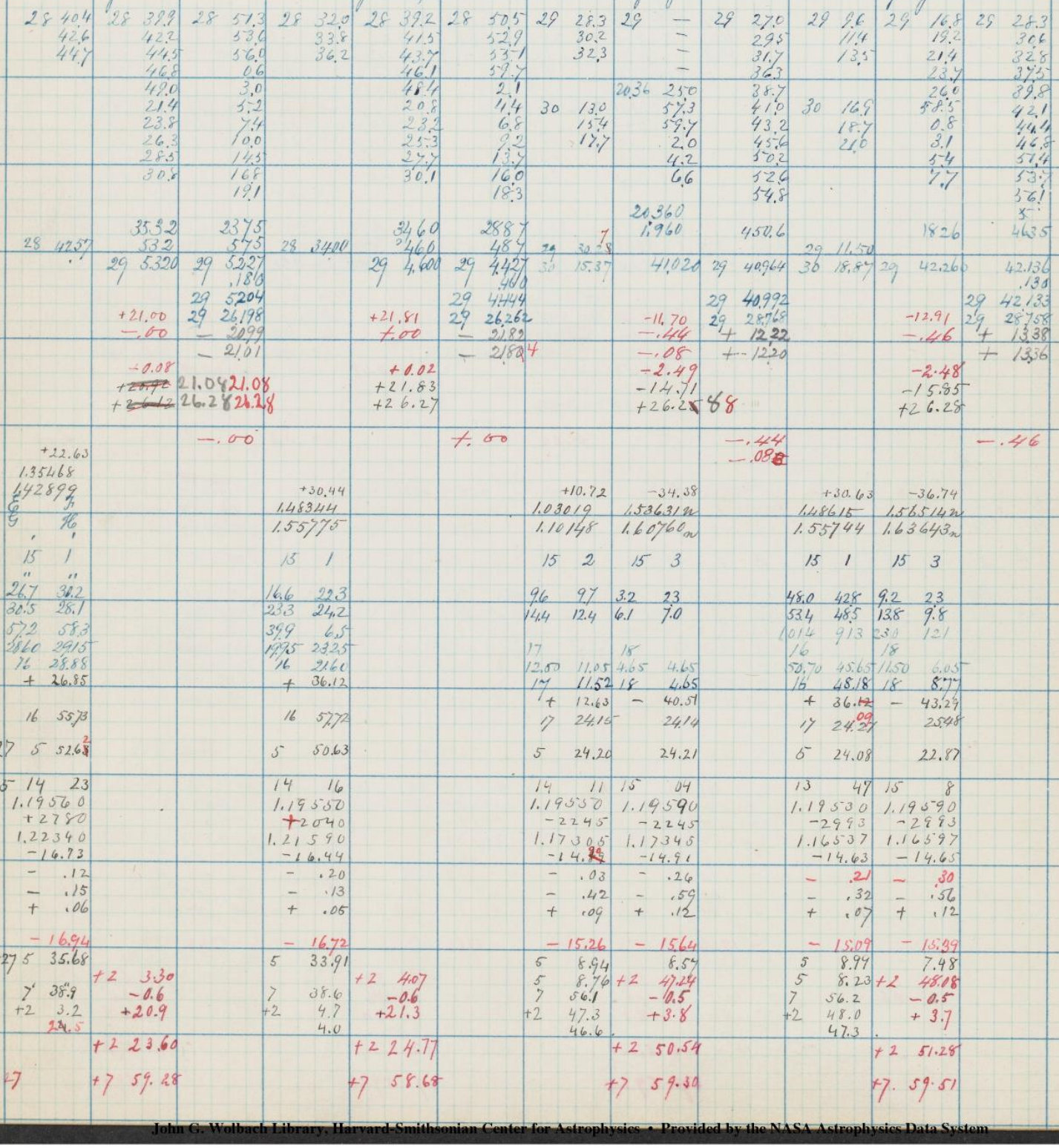
Jan. 25 — −.01

Jan. 27 — ~~−.02~~ +.01

July 12 — −.87 −.07

July 13 — −.91



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φ Bootis

15 33 20 Corr$^{\alpha}$ + 48 45 42 $\frac{d\alpha}{dt}$

+ 1° 37′ 06″ $\frac{d\delta}{dt}$

Corr$^{\delta}$

1876

	July 12	July 13	July 17	July 19	July 24
	× −.87 −.07	× −.91	× −.80	× −.88 −.07	× −.85
	33 22,422	June 29 33 25.16	45 26.8		
	+ .05	July 4 25.10 6	27.7 9		
	+ 2.1535	9 23.03 7	28.6 9		
	45 29.90	14 24.75 8	29.3 7		
	− 1.1	19 24.87 8	30.0 7		
	−11.890	24 24.78 9	30.6 6		
		29 24.68 10	31.0 4		
		Aug 3 24.58 10	31.3 3		
		8 24.47 11	31.6 3		

log cos δ 9.87938

15 cos δ tan i 0.00131 this July 19
0.00454 after July 19

tan δ +0.86 +1.32

sin z +.03

h	m	s	m	s	m	s	m	s	m	s	m	s	m	s	m	s	m	s	m	s
15	33	14.1	33	21.2	33	0.7	33	22.4	33	9.0	33	26.9	33	11.1	33	29.0	33	12.3	33	34.8
		16.0		24.0		3.0		25.0		11.0		28.6		12.6		31.7		14.0		37.3
		18.7		26.6		5.3		27.7		13.0		32.3		15.3		34.7		16.0		40.0
				32.0				33.2				34.9				39.8				45.4
				34.9				36.0				40.4				42.6				48.3
	34	22		37.5	34	1.0		38.6	33	17.4		43.2	34	6.7		45.3				51.0
		5.6		40.1		3.5		41.3		21.2		45.9		9.0		48.0				53.6
		8.4		43.0		6.3		44.1		23.7		48.6		11.8		50.7				56.4
				48.4				49.5				54.1				56.1				1.8
				51.1				52.3				56.8				59.0				4.5
				53.8				55.0				59.5				1.5				7.1
				412.6				425.1				475.2				488.1				380.2
	33	16.27			33	3.00			33	11.00			33	13.80		498.1	33	14.10		560.2
	34	5.73	33	37.509	34	3.61	33	38.445	33	54.43	33	43.200	34	9.17	33	4437.9 5.282			33	50.927
		−11.70	33	24978		−12.91	33	24962		−17.47	33	24898		−19.58	33	24866		−25.42	33	24775
		−.74		+ 1253		−.78		+ 1368		−.74		+ 1830		−.76		+ 2042		−.73		+ 2615
		−.09		+ 1248				+ 1363				+ 1825		−.09		+ 2037				+ 2610
		−2.56				−2.54				−2.48				−2.45				−2.365		
		−11.70		15.09		−1623				−20.69				−22.88				−28.50		
	+33	22.42		22.42		+22.41				+22.51				+22.40				+22.43		
				−.74				−.78				−.74				−.76				−.73
				−.09												−.09				
		+21.24																		
		1.32715																		
		1.32846		−28.22		+35.65		−24.95		+32.20		−13.23		+32.28		−23.89		+36.83		
	E$_6$	F		1.45056$_m$		1.55206		1.39707$_m$		1.50786		1.12156$_m$		1.50893		1.37822$_m$		1.56620		
	G	H$_6$		1.45187$_m$		1.55337		1.39838$_m$		1.50917		1.12287$_m$		1.51024		1.37953$_m$		1.57074		
	35	4	40	0	35	4	40	0	35	4	40	0	35	4	40	0	35	4		
	44.1	43.2	34.1	32.8	29.7	24.9	32.4	26.0	34.8	30.6	22.0	15.7	35.0	29.6	38.1	25.7	36.3	34.0		
	47.6	41.2	37.8	34.3	34.4	26.6	37.4	28.6	40.7	32.3	25.1	18.9	39.7	31.5	37.4	30.0	34.6	27.6		
	91.7	84.4	71.89	67.1	64.1	51.5	69.8	54.6	75.5	62.9	47.1	34.6	74.7	61.1	70.5	55.7	70.9	61.6		
	4585	4220	3594.5	3355	3205	2575	3490	2730	3775	3145	2355	1730	3735	3055	3525	2785	3545	3080		
	39	44.03	40	34.79	39	28.90	40	31.10	39	34.60	40	20.43	39	33.95	40	31.55	39	34.13		
		+ 21.30		− 28.35		+ 35.76		− 25.03		+ 32.30		− 13.27		+ 32.88		− 23.96		+ 37.22		
		40 5.33		6.44	40	4.66		6.07	40	6.90		7.16	40	6.33		7.59	40	10.35		
+ 48	42	43.02		41.91	42	43.69		42.28	42	41.45		41.19	42	42.02		40.74	42	38.00		
+ 1	36	43	37	34	36	28	37	30	36	34	37	19	36	33	37	31	36	32		
	0.20930		0.21360		0.20860		0.21310		0.21350		0.21220		0.20910		0.21310		0.20860			
	−2234		−2234		−29.83		−29.83		−1950		−1950		−2025		−2025		−1515			
	0.18716		0.19126		0.17877		0.18327		0.18960		0.19270		0.18885		0.19285		0.19345			
	−1.54		−1.55		−1.61		−1.63		−1.65		−1.66		−1.56		−1.56		−1.56			
	− .12		− .21		− .34		− .17		− .28		− .05		− .29		− .16		− .37			
	− .89		− .11		− .81		− .09		− .83		− .05		− .83		− .09		− .78			
	+ .19		+ .02		+ .18		+ .02		+ .18		+ .01		+ .14		+ .02		+ .18			
	− 2.36		− 1.85		− 2.48		− 1.77		− 2.48		− 1.65		− 2.53		− 1.79		− 2.53			
+ 48	42	40.66		40.06	42	41.21		40.81	42	38.97		39.54	42	39.49		38.97	42	35.47		
+ 48	42	40.36	+ 2	47.24	42	40.86	+ 2	48.08	42	39.26	+ 2	49.78	42	39.23	+ 2	49.92			+ 2	53.93
	45	29.1		−0.1	45	29.2		−0.1	45	29.8		−0.1	45	30.0		−0.1	45	30.6		−0.1
	+ 2	48.7		+ 0.8	+ 2	48.3		+ 0.7	+ 2	50.5		+ 0.1	+ 2	50.8		+ 0.1	+ 2	55.1		+ 0.7
		47.6				48.2				49.4				49.7				54.0		
			+ 2	47.94			+ 2	48.68			+ 2	49.78			+ 2	49.72			+ 2	53.13
+40			+45	28.30			+45	29.54			+45	29.04			+45	28.95			+45	28.60

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ϕ Ursae Min.

15 85 9
+77 45 54
− 35° 23′ 06″

log cosδ 9.32612 log I 0.98811
15 Cos Stars 9.44805 Hers July 23
9.45128 after July 23
I 9.73
½I 486
Long δ +4.60 +4.73
sin z −.58

1876

July 12		July 13		July 17		July 19		July 24	
−.87		−.91		−.86		−.88		−.85	
−.07						−.07			
m s	m s	m s	m s	m s	m s	m s	m s	m s	m s
35 51.0	35 —	35 53.5	35 —	35 34.0	35 —	35 31.7	35 —	35 5.7	35 20.7
	—	1.9	—		—		—	13.9	25.7
	—	10.4	—		—		3532 25.6	21.4	30.4
	—		2886 24.0		33.16 28.3		.36 30.5		35.7
	—		2900 27.0		.30 33.3		.50 35.3		40.0
	—		2884 33.7		.14 38.0	36 14.9	.04 39.9	36 22.6	45.2
	—		2918 38.9		.18 42.9	23.3	.18 44.9	30.1	49.9
	2764 42.2		2912 43.7		.42 48.0	31.8	.32 49.9	42.0	54.6
	.96 47.4		2896 48.4		.26 52.7		.56 55.0		59.3
									3615
35 51.00		36 2.00		35 34.00		35 31.70		35 13.67	
	35 27.800		35 28.993		35 33.243	36 2.333	35 35.326	36 31.37	35 40.167
−11.71		−12.91		−17.48		−19.58		−25.42	
−4.00		−4.19		−3.96		−4.05		−3.91	
−.33						−.33			
−4.05		−3.96		−3.59		−3.40		−2.91	
−20.09		−21.06		−25.03		−27.36		−32.24	
35 7.71		7.93		8.21		7.97		7.93	
									15 35 7.950
	−4.00		−4.19		−3.96		−4.05		−3.91
−23.20	−.33						−.33		
1.36549n									
9.81354		−33.01		−0.76		+3.63	−48.00	+26.50	−51.40
G H		1.51865n		1.88808n		0.55991	1.68124n	1.42325	1.71096n
		0.96670n		9.32886n		0.00776	1.12929n	9.87458	1.16224n
′ ′									
40 0		40 0		40 0		40 0	40 0	40 0	40 0
″ ″									
35.4 47.6		40.9 38.0		34.6 31.6		33.7 30.4	48.0 44.9	31.3 31.7	53.4 53.1
41.3 32.9		25.6 35.5		39.5 29.2		38.9 27.2	51.5 42.4	30.7 20.1	51.5 42.9
76.7 80.5		66.5 73.5		74.1 60.8		72.6 57.6	99.5 86.8	62.0 51.8	104.9 96.0
38.35 40.25		33.25 36.75		37.05 30.40		36.30 28.80	49.75 43.45	31.00 25.90	52.45 48.00
40 39.30		40 33.00		40 33.73		40 38.55	40 46.70	40 28.45	40 50.23
+−6.81		− 9.26		− 0.21		+ 1.02	− 13.47	+ 8.49	− 14.53
40 32.79		40 25.74		40 33.52		40 33.57	33.23	40 36.94	35.70
77 42 15.56		42 22.61		42 14.83		42 14.78	15.12	42 12.41	12.65
−35 22 22		22 26		22 27		22 28	22 14	22 33	22 11
1.61130		1.61130		1.61180		1.61135	1.61130	1.61185	1.61130
−2228		−2973		−1940		−2013	−2013	−1512	−1560 12
1.58902		1.58157		1.59190		1.59122	1.59117	1.59623	1.59618
+38.82		+38.16		+39.08		+39.01	+39.01	+39.47	+39.46
− .06		− .12		− .00		− .00	− .27	− .08	− .30
− .13		− .11		− .11		− .09	− .14	− .08	− .14
+ .03		+ .02		+ .02		+ .02	+ .03	+ .02	+ .03
+38.66		+37.95		+38.99		+38.94	+38.63	+39.33	+39.05
+77 42 54.22		43 0.56		42 53.82		42 53.72	53.75	42 51.74	51.70
	+2 47.24		+2 48.08		+2 49.78	42 53.73	+2 49.92	42 51.72	+2 53.93
	+1.0		+1.0		+1.1		+1.1		+1.1
	−3.0		−3.1		−3.6		−3.8		−4.2
	+2 45.24		+2 45.98		+2 47.28		+2 47.22		+2 50.83
	+77 45 39.46		45 46.54		45 41.10		45 40.95		45 42.55

+77° 45′ 42.12″
41.02

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α Serpentis α

15h 38m 7s Conα +2.9507

+6° 49' 13" dα/dt

+35° 33' 35" δ0 49 1.46

Conδ − .3

dδ/dt −11.572

Jan. 10 −.17

Ch. f.

Jan. 1 Jan. 12 +.09

Jan. 25 −.01

July 12 −.87 −.07

log cos δ 9.99692

0.12187

0.11885

0.12208

tang δ

sin z +.58

log R-2 1.27436

log I 0.31737

R-2 18.808

I .208

I .126

Jan.

July 12–19

July 24 Aug 1

Safet 3

1.61

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	m	s		'	"
June 29	38	12.27		48	57.1
July 4		12.25	2		51.6 5
9		12.22	3		52.1 5
14		12.19	3		52.6 5
19		12.15	4		53.0 4
24		12.10	5		53.4 4
29		12.05	5		53.7 3
Aug. 3		11.99	6		54.0 3
8		11.93	6		54.3

	m	s		'	"
Aug 28	38	11.64		48	54.9
Sept 2		11.56	8		54.8 1
7		11.49	7		54.8 0
12		11.42	7		54.7 1
17		11.35	7		54.7 0

1876

July 13

| | | |

1876phae.proj: 1483.

Aug. 1 — −.82 −.10

Sept. 3 — −1.08

38
37 2.8 4.2 3.8

87 14.2 16.3 18.4 0.4 2.5 8.6 3.3 3.7 3.8 3.9 — 3504

38 4.4 6.5 8.6 12.4 14.9 17.0 19.0 21.1 25.2 27.3 29.3 — 1860

38 8.8 10.2 12.0 — 38 10.33

88 6.6 8.6 10.6 12.7 14.7 43.8 46.0 48.1 52.1 — 2933

168 188 209 25.1 27.1 29.2 31.3 333 3.75 8.96 41.7 — 3213

37 4.27
38

38 17.040 — 16.909 .914

38 16.912 — 38 12.011

−4.72 −.10 +.10 −2.37 −7.09 +4.62 — 6.19 10.72 9.82

+ 4.90 + 4.88 — 7.09 — 10.72

−.10

38 29.330 — 29.209 .206

38 29.208 — 38 11.542

−17.62 −.12 −1.90 −19.54 +9.67

+ 17.73 + 17.65

−.12

+ 12.64 12.64
1.86118 1.70175
1.98326 1.22383
G H

+18.88
1.27600
1.39528

35 1 — 35 1

10.1 5.3 — 44.1 39.4
6.6 6.7 — 40.6 41.3
16.7 12.0 — 84.7 80.7
8.35 6.00 — 42.35 40.35
36 7.18 — 36 41.35
+ 46.22 + 16.74 — + 24.80
3 6 43.40 23.92 — 37 6.20

+ 6 45 6 4.95 24.93 — 45 42.15

+ 35 33 2 56 — 32 48
1.61410 — 1.61410
−815 — −1600
1.60595 — 1.60810
−40.36 — 57810
− .33 — −39.64
− .17 — − .02
+ .0240 — − .32
− 40.71 — + .07
— − 39.91

+ 6 45 2.411 — 45 2.24
45 43.62 +3 10.98 — +3 52.84
48 53.9 −1.1 — 48 54.8 −1.4
+ 43 29.87 10.3 + 7.6 — +3 52.6 +6.7
10.0 — 52.3

+3 17.48 — +3 58.14

+6 +49 1.10 — +49 0.38

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β Serpentis

15h 40m 8.25 Corr

+15° 48′ 51″ dα/dt

+26 38 57 δ₀

Corr δ

dδ/dt

1876 + July 12 −.87 −.07

	July 12	July 13	July 17	July 24	Aug. 1
	15 40 35.7	40 57.3	40 44.1	40 34.5	40 12.7
	37.6	53.3	45.4	34.2	14.6
	39.7	58.3	47.4	38.0	16.7
	40 22.6	40 —	40 —	40 43.1	40 22.4
	31.8	—	—	45.2	24.7
	34.0	—	—	47.3	26.4
	38.2	4348 39.2	4808 43.8	57.7	30.9
	40.3	.54 41.4	.14 46.0	53.8	33.0
41 11.4	42.5	41 20.2 .60 43.6	.10 48.1 41 27.2	57.0	35.2
	44.6	22.1 .66 45.8	.06 50.2 29.0	58.1	37.4
	46.7	24.1 .72 48.0	.12 52.4 31.6	0.3	39.6
	51.0	.64 52.2	.24 56.8	1.5	43.8
	53.2	.70 54.4	.20 58.9	6.7	45.7
	55.3	.66 56.5	.16 1.0	8.9	48.0
	46.72			375.6	387.6
40 37.67		40 53.30	40 45.63	40 36.23	61.5.6 40 14.67
41 11.40	40 42.473	41 22.13	40 43.625	41 30.27	40 48.138 41 29.27 40 55.964	40 35.236
−11.72	40 30.444	−12.71	40 30.436	−17.48	40 30.404	−25.42	40 30.337	−4.72	40 30.234
−.24	+ 12.03	−.25	+ 13.19	−.24	+ 17.73	−.24	+ 25.63	−.23	+ 5.00
−.07	+ 12.04		+ 13.20		+ 17.74		+ 25.64	−.10	+ 5.01
−2.54		−2.54		−2.50		−2.48		−2.33	
−14.57		−15.69		−20.22		−28.09		−7.38	
+40 27.90		+27.93		+27.92		+27.87		+27.86	
	−.24		−.25		−.24		−.24		−.23
+4.80	−.07								−.10
0.68124			−38.50						
0.78641	−28.93	−9.67	−31.50	+2.61	−42.13	+19.73	−33.31	+20.57	
ε Ir	1.46135m	0.98543m	1.55546m	0.39967	1.62459m	1.29513	1.52257m	1.31323	
G Ho	1.56657m	1.09060m	1.69063m	0.50484	1.72976m	1.40353	1.63097m	1.42163	
	35 1	35 2	35 1	35 2	35 1	35 2	35 1	35 2	35 1
	″ ″								
	27.8 28.6	12.4 6.7	50.2 37.8	26.3 16.6	35.6 26.2	33.2 22.1	17.8 12.2	25.7 20.5	32.2 21.8
	28.1 28.4	11.1 12.9	50.9 44.6	26.2 24.9	37.1 33.6	31.9 31.2	12.6 13.2	20.1 20.8	26.8 25.9
	55.9 52.0	23.5 19.6	10.1 89.4	5 41.5	72.7 57.8	65.1 53.3	30.4 25.4	45.8 41.3	59.0 52.7
	27.95 26.00	11.75 9.80	5055 4470	2625 20.75	3635 2890	3255 26.65	36	37	2950 2635
	36 26.98	37 10.78	36 47.63	37 28.50	36 33.13	37 29.60	15.20 12.70	22.90 20.65	36 27.93
	+ 6.12	− 36.86	− 12.32	− 49.05	+ 3.20	− 53.67	36 13.95	37 21.75	+ 36.40
							+ 25.32	− 42.75	
	36 33.10	33.92	36 35.31	34.45	36 36.33	35.93	36 39.27	39.00	36 57.33
+ 15	46 15.25	14.43	46 13 15.04	13.90	46 12.02	12.42	46 9.08	9.35	45 54.02
+ 26	33 26	34 10	33 47	34 23	33 32	34 29	33 13	34 21	33 27
	1.45900	1.45930	1.45910	1.45930	1.45900	1.45930	1.45900	1.45930	1.45900
	−2220	−2220	−2959	−2959	−1925	−1925	−1490	−1490	−8805
	1.43680	1.43710	1.42951	1.42971	1.43975	1.44005	1.44410	1.44440	1.45095
	−27.34	−27.36	−26.88	−26.90	−27.53	−27.55	−27.80	−27.82	−28.25
	− .00	− .12	− .01	− .21	− .00	− .26	− .05	− .16	− .06
	− .27	− .42	− .32	− .43	− .29	− .45	− .20	− .39	− .26
	+ .06	+ .09	+ .07	+ .10	+ .06	+ .12	+ .05	+ .09	+ .05
	−27.55	−27.81	−27.16	−27.44	−27.76	−28.14	−28.00	−28.28	−28.52
+15	45 47.70	46.62	45 45.88	46.46	45 44.26	44.28	45 41.08	41.07	45 25.50
+15	45 47.16	+2 47.24	45 46.17	+2 46.08	45 44.27	+2 44.78	45 41.08	+2 53.93	+3 10.98
	48 33.3	0.8	48 33.4	−0.8	48 33.9	−0.9	48 34.5	−0.9	48 35.1 −0.9
	+2 46.1	+6.6	+2 47.2	+6.5	+2 49.6	+6.0	+2 53.4	+5.4	+3 9.6 +4.8
	46.5		47.6		50.0		53.8		10.0
		+2 53.84		+2 53.78		+2 54.58		+2 58.43	+3 14.88
+15		+48 40.20		+48 39.96		+48 39.15		+48 39.51	+48 40.68

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U Serpentis

15h 43m 6s
−3° 2′ 46″
+45 25 34

m s
43 9.025
−.03
+31.260
2 56.98
−.5
−11.305

June 29
July 4, 9, 14, 19, 24, 29
Aug. 3, 8

m s
43 11.71
11.69 2
11.67 2
11.64 3
11.60 4
11.56 4
11.51 5
11.45 6
11.39 6

3 9.7
9.2 5
8.8 4
8.5 3
8.3 2
8.0 3
7.8 2
7.5 3
7.3 2

log cos δ 9.99938
15 cos Stani 0.12131 thro' July 23
0.12454
tang δ −0.057 + 1.00
sin z +.71

1876
July 12 + −.87 −.07
July 13 + −.91
July 19 + −.88 −.07
Aug. 1 + −.82 −.10

h m s	m s	m s	m s	m s	m s
15 43 6.8	43 11.0	43 0.4	43 12.0	43 4.9	43 18.8
8.7	13.1	2.2	14.2	6.0	20.9
10.3	15.0	4.1	16.3	7.7	22.9
	19.2		20.3		27.0
	21.3		22.5		29.1
43 49.4	28.3	43 43.6	24.5	43 53.5	31.2
50.6	25.5	45.7	26.4	53.0	33.2
52.6	27.6	47.6	28.4	53.7	35.3
	31.6		32.7		39.4
	33.8		34.8		41.5
	35.8		36.9		43.6
	257.7		269.4		342.9
43 8.60		43 2.23		43 6.10	

h m s	m s	m s	m s	m s	m s
42 48.4	43 3.8				
49.8	6.0				
51.2	8.0				
	12.1				
	14.1				
43 43.7	16.2				
45.7	18.3				
47.3	20.4				
	24.5				
	26.6				
	28.6				
	178.6				
42 49.80					

43 50.87	43 23.382	43 45.63	43 24.491	43 55.17	43 31.173	43 45.57	43 16.236
−11.72	43 11.650	−12.91	43 11.644	−19.59	43 11.598	−4.72	43 11.471
+.04	+ 1.173	+.04	+ 1.285	+.04	+ 1.958	+.04	+ 4.96
−.07	+ 11.76		+ 12.88	−.07	+ 19.61	−.10	+ 4.79
−2.68		−2.62		−2.57		−2.45	
−14.38		~~−15.48~~ 15.49		−22.19		−7.23	
+43 9.00		~~+9.01~~ 9.00		+8.98		+9.01	
	+.04		+.04		+.04		+.04
+14.78	−.07				−.07		−.10
1.16967							
log 29.098	−27.49	+22.26	−21.14	+25.07	−24.00	+26.44	−29.33
C 1.43917	1.43917 m	1.34753	1.32510 m	1.39915	1.38021 m	1.42226	1.46731 m
G 86	1.56048 m	1.46884	1.44641 m	1.52046	1.50152 m	1.54680	1.59185 m
	25 2″	25 3	25 2	25 3	25 2	25 3	25 2	25 3
	28.6 23.7	24.7 19.2	23.1 12.5	20.7 9.8	18.5 8.5	24.5 14.9	38.6 32.6	51.9 45.3
	28.9 30.9	24.1 27.8	24.1 23.8	20.9 21.2	19.3 18.3	23.9 24.0	33.7 32.8	45.9 46.1
	57.5 54.6	.8 4.70	47.2 36.3	1.6 31.0	37.8 26.8	48.4 38.9	72.3 1.4	97.8 91.4
	28.75 27.30	24.40 23.50	23.60 18.15	20.80 15.50	18.90 13.40	24.20 19.45	36.15 32.70	48.90 45.70
	27 28.03	28 23.95	27 20.88	23 18.15	27 16.15	28 21.83	27 34.43	28 47.30
	+ 19.34	− 36.35	+ 23.43	− 27.95	+ 33.15	− 31.73	+ 35.22	− 39.07
	27 47.37	47.60	27 50.31	50.20	27 49.30	50.10	28 9.65	28 8.23
+ −3 4 59.22		59.25	5 1.96	1.85	5 0.95	1.75	5 21.30	19.88
+ +45 24 27	25 23	24 20	25 17	24 15	25 21	24 33	25 46
	1.76600	1.76620	1.76600	1.76620	1.76590	1.76620	1.76600	1.76630
	~~−2110~~	~~−2110~~	−2948	−2948	−2000	−2000	−800	−850
	~~−2212~~	−2212						
	1.74388	1.74408	1.73652	1.73672	1.74590	1.74620	1.75800	1.75830
	−55.45	−55.47	−54.552	−54.584	−55.71	−55.74	−57.28	−57.32
	+ .01	+ .02	+ .01	+ .01	+ .02	+ .02	+ .02	+ .02
	− .48	− .65	− .41	− .59	− .41	− .59	− .44	− .65
	+ .10	+ .14	+ .09	+ .13	+ .09	+ .13	+ .10	+ .15
				4.99				
	−55.82	−55.96	−54.883	−55.102	−56.01	−56.18	−57.60	−57.80
+ −3 5 55.04		55.21	5 56.827	56.88	5 56.96	57.93	6 18.90	17.68
−3 5 55.12	+2 47.24	5 56.852	56.84	5 57.45	+2 49.92	6 18.29	+3 19.98
3′ 8.6	−1.3	3 8.5	+2 48.08	3 8.3	−1.3	3 7.6	−1.4
+2 46.75	+11.6	+2 48.3	−1.3	+2 49.1		+3 10.7	
46.0		47.8	+11.5	48.6	+11.3	10.2	+10.6
	+2 57.54		+2 58.28		+2 59.92		+3 20.18
−3	−2 57.58						
	~~+5 52.66~~		−2 58.54		−2 57.53		−2 58.11

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ζ Ursae Min. L_0 m 48 31.216 July 9 m 48 35.70 10 31.8

h m s
15 48 34 Cond d 2 + .29 14 35.25 45 32.6 8
+78° 10' 41" $\frac{d\lambda}{dt}$ − 2.2947 19 34.77 48 33.2 6
−35° 47' 53" δ_0 24 34.27 50 33.7 5
Cond' $\frac{d\delta}{dt}$ + .3 − 10.899 Aug. 29 33.76 51 34.2 5
3 33.23 53 34.5 3
8 32.69 54 34.6 1

log cos δ 9.31159
15 cos δ tan' 9.43352 tan' July 23
9.43675 after July 23
tang δ +4.77 + 4.89
log cos δ 9.31159
log sin δ 9.99070
const. 6.73762
sin z −.59

1876.0
July 12 × −.87 −.07 | July 13 × −.91 | July 17 × −.86 | July 19 −.88 −.07 | July 24 × −.85 | Aug 1 −.82 −.10

	July 12		July 13		July 17		July 19		July 24		Aug 1	
15	47 28.0	48 31.7	48 10.7	48 32.0	47 37.1	48 36.7	48 14.1	48 39.4	46 10.6	48 44.1	47 36.1	48 22.3
	37.8	37.0	19.3	37.8	3.4	42.2	24.2	44.4	20.4	49.0	44.0	27.6
	47.2	41.9	26.5	42.9	12.9	47.0	35.0	48.3	27.5	54.0	51.2	33.1
		46.7		47.1		51.9		54.6		58.9		37.8
		51.9		52.9		57.0		59.4		4.0		43.0
49	16.8	56.7	49 19.6	57.9	49 27.2	2.0	49 20.0	4.8	52 11.8	9.0	50 9.9	48.0
	24.3	2.2	26.4	2.6	32.7	7.0		9.4		14.1		52.9
	34.5	7.4	36.0	7.9	40.6	12.2		14.8		19.4		57.6
		12.1		12.8		17.3		19.2		24.4		3.0
		28 7.6		29 5.6		27 3.3		29 5.3		27 6.9		32 5.5
47	37.67	46 7.6	48 18.83	47 5.6	48 3.47	51 3.3	48 24.43	53 5.3	41 19.50	36.9	47 43.77	38 5.5
49	25.20	48 51.96	49 27.33	48 52.844	49 33.50	48 57.033	49 20.00	48 54.478	52 11.80	49 4.100	50 9.90	48 42.833
	−11.72	48 35.408	−12.91	48 35.318	−17.49	48 34.938	−19.59	48 34.745	−25.43	48 34.245	−4.72	48 33.422
	−4.15	+ 18.55	−4.34	+ 17.53	−4.10	+ 22.10	−4.20	+ 24.73	−4.05	+ 29.86	−3.91	+ 9.41
	−.34	+ 16.26		+ 17.24		+ 21.81	−.34	+ 24.44		+ 29.57	−.49	+ 9.12
	−4.20		−4.11		−3.73		−3.53		−3.03		−2.21	
	−20.41		−21.36		−25.32		−27.66		−32.51		−11.33	
	+48 31.55		+31.48		+31.71		+31.82		+31.59		+31.50	
		−4.15		−4.34		−4.10		−4.20		−4.05		−3.91
	+74.29	−.34						−.34				−.49
	1.87093											
	1.30445	−33.24	+34.01	−34.49	+33.56	−36.47	+35.05	−20.52	+164.60	−187.70	+57.06	−87.07
	f	1.52166 n	1.53161	1.53769 n	1.72884	1.56194 n	1.54469	1.31216 n	2.21643	2.27346 n	1.77129	1.93987 n
	g	0.95578 n	0.96573	0.97121 n	1.16236	0.99546 n	0.97821	0.74570 n	1.65318	1.71021 n	1.20804	1.37662 n
		15 0	15 0	15 0	15 0	15 0	15 0	15 0	15 0	15 1	15 0	15 1
	20.0	23.9	50.4	63.1	34.2	33.4	53.4	61.3	31.2	30.3	56.3	33.2	37.0	34.9	55.3	52.5	2.9	3.5	35.4	36.1	52.4	51.9	30.2	32.5
	26.7	19.0	54.8	49.8	41.7	29.6	59.0	50.0	36.5	26.3	59.9	52.6	41.6	31.5	58.4	50.1	2.5	53.2	33.8	25.6	31.4	42.7	28.9	20.4
	46.7	42.9	10.52	10.29	7.59	6.30	12.4	1.3	6.77	5.66	16.2	5.8	7.86	6.64	13.7	2.6	5.7	11.87	6.92	6.17	8.8	9.76	5.91	5.29
	23.35	21.45	52.60	51.45	37.95	31.50	56.20	50.65	33.85	28.40	58.10	52.90	39.30	33.20	56.85	51.30	2.85	59.35	34.60	30.85	31.90	42.80	29.55	26.45
	15	22.40	15	52.03	15	34.73	15	53.43	15	34.13	15	55.50	15	36.25	15	57.08	15	1.10	16	32.73	15	53.35	16	28.00
	+	20.16	−	9.02	+	9.23	−	9.36	+	14.53	−	9.90	+	9.51	−	5.87	+	45.08	−	51.31	+	16.15	−	23.80
	15	42.56		43.01	15	43.96		44.07	15	45.61		45.60	15	45.76		48.51	15	46.10		41.42	16	6.50	16	4.20
+78	7	5.79		5.34	7	4.39		4.28	7	2.74		2.75	7	2.59		59.84	7	2.25		6.93	6	41.83		44.15
−35	47	39	47	09	47	26	47	08	47	30	47	05	47	25	47	07	48	0	46	28	47	11	46	33
	1.61800		1.61780		1.61790		1.61780		1.61795		1.61780		1.61790		1.61780		1.61810		1.61770		1.61790		1.61770	
	−22.00		−22.00		−29.83		−28.83		−18.80		−18.80		−19.83		−19.83		−14.44		−14.44		−7.83		−7.80	
	1.69 600		1.59580		1.58857		1.58847		1.59915		1.59900		1.59807		1.59797		1.60366		1.60326		1.61007		1.60987	
	+39.45		+39.43		+38.78		+38.78		+39.73		+39.72		+39.63		+39.63		+40.15		+40.11		+40.74		+40.73	
	−	.60	−	.12	−	.13	−	.13	−	.31	−	.15	−	.14	−	.04	−	2.97		−3.86	−	.38	−	.83
	−	.08	−	.17	−	.11	−	.16	−	.09	−	.16	−	.11	−	.16		.00		−.26	−	.14	−	.25
	+	.02	+	.04	+	.02	+	.04	+	.02	+	.04	+	.02	+	.04		.00		+.06	+	.03	+	.06
	+	38.79	+	39.18	+	38.59	+	38.52	+	39.35	+	39.45	+	39.40	+	39.47	+	37.18	+	36.05	+	40.25	+	39.71
+78	7	44.58		44.52	7	42.96	7	42.82	7	42.04		42.20	7	41.99		39.31	7	39.43		42.98	7	22.10		23.86
+78	7	44.55	+2	47.24	7	42.89	+2	48.08	7	42.14	+2	46.78	7	40.65	+2	44.92			+2	53.08	7	22.98	+3	10.98
	10'	32.43		+4.0	10	32.5		+4.1	10	33.0		+4.1	10	33.2		+4.1	10	33.7		+4.1	10	34.4		+4.2
	+2	47.7		−2.56	+2	49.6		−2.8	+2	50.9		−3.2	+2	52.6		−3.5	+2	54.3		−3.9	+3	11.4		−4.7
		48.0				49.9				51.2				52.7				54.6				11.7		
			+2	45.64			+2	46.38			+2	47.68			+2	47.52			+2	51.13			+3	7.48
+78			+10	30.19			+10	29.25			+10	29.82			+10	28.17			+10	30.56			+10	30.46

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S Scorpii

α 15 32 57
δ −22° 15′ 49″
+ 64° 38′ 37″

1876

	m	s
α	54	0.209
	53	2
dα/dt	+ 3.537	
	0	′
δ	15	59.23
		″
dδ/dt	− 10.55	

July 8

m	s	
53	310	−3
	307	3
	304	4
	300	5
	295	

	13	
	18	
	23	
	28	

N.A.

− 16	16.1	
	16.1	
	16.1	
	16.1	
	16.0	

log cos δ 9.96634
15 cos δ tan i 0.08827 time July 23
0.09150 after July 23
tan δ − 0.41 + 1.08
sin z + .90

	July 12	July 13	July 19	July 24	July 26	Aug. 1
	−.87	−.91	−.88	−.85	−.76	−.82
	−.07		−.07		−.06	−.10
m	s	m s	m s	m s	m s	m s
53	3.8	52 45.0	53 18.8	53 2.0	52 52.1	53 14.6	52 57.0	53 16.1	52 24.8	52 34.0
	6.0	46.7	20.5	11.2	53.8	16.9	58.6	18.4	26.1	36.2
	8.3	48.8	22.5	13.4	55.7	19.0	6.3	20.7	27.9	38.4
				17.9		23.6		25.0		2.8
	12.2	13.2	20.1			25.7		27.3		5.0
53	14.4	53 40.4	53 22.6	53 22.3		28.0	54 6.7	29.6	53 43.0	7.2
	16.7	41.6	27.0	24.5		30.3	8.4	31.7	44.6	9.6
	19.0	44.1	29.0	26.8		32.5	10.5	34.0	46.7	11.8
	23.4		24.4	31.2		37.0		38.6		16.2
	25.6	26.7		33.4		39.2		40.6		18.4
	27.9	29.1		35.7		41.5		43.0		20.7
	159.3	171.0				308.3		325.0		260.3
53	6.03	52 46.83	53 20.60	24.55	52 53.87		52 5[illegible].65		52 26.27	80.3
53	56.07	53 14.82	53 42.03	53 15.375	53 54.37	53 22.318		53 28.027	54 8.53	53 29.545	53 44.77	53 7.300
	−11.73	53 3.08	−12.92	53 3.07	−19.60	53 3.03	−25.43	53 2.99	−26.87	53 2.97	−4.72	53 2.91
	+.36		+.37		+.36		+.35		+.31		+.34	
	−.08				−.08				−.06		−.11	
	−2.87		−2.86		−2.82		−2.78		2.76		−2.71	
	−15.04	14.32	−14.15	15.41	−22.86	14	−26.56	27.86	−30.00	29.38	−28.88	20
	5.44		5.39		5.46		5.47		5.59		5.42	
53	0.16		0.13		0.18		0.17		0.16		0.10	
		−.36		−.37		−.36		−.35		−.31		−.34
	+8.45	−.08				−.08				−.06		−.11
	0.92686											
	1.01573	−41.59	+28.72	−26.48	+1.72	−37.05	+38.16		+3.092	−38.88	+41.03	−37.47
ℰ	ℱ	1.61899m	1.45818	1.42292m	0.23553	1.56879m	1.53352		1.47845	1.59084m	1.61310	1.57368m
ℊ	ℌ	1.70726n	1.54645	1.51119n	0.32380	1.65706n	1.62502		1.58174	1.68234n	1.70460	1.66518n
35	4	40 0	35 4	40 0	35 4	40 0	35 4	40 0	35 4	40 1	35 4	40 1
45.9	41.3	47.7 41.4	27.7 15.9	35.3 23.3	59.5 47.7	48.4 36.8	23.1 36.4	57.2 50.2	38.8 32.7	6.1 59.7	30.7 24.1	8.1 0.9
47.6	51.3	47.1 50.7	28.2 28.8	35.7 36.8	0.4 5.8	49.1 48.7	18.7 18.5	52.9 53.7	34.2 35.5	1.7 0.5	26.3 25.0	3.6 2.0
93.5	92.6	.8 92.1	55.9 54.7	1.0 60.1	11.99 10.75	97.5 86.5	41.8 44.9	10.1 3.9				
47.75	46.30	47.40 46.05	27.95 22.35	35.50 30.05	59.75 53.75	48.5 42.75	20.10 [illegible]	5505 [illegible]	39	41	39	41
39	46.63	40 46.73	39 25.15	40 32.78	39 56.85	40 45.75	39 21.48	40 53.52	36.50	34.10	3.90 0.10	28.50 24.55	5.85 1.45
+	1.65	− 50.96	+ 35.19	− 32.45	+ 2.11	− 45.40	+ 42.17		39	35.30	41 2.00	39 26.53	41 3.65
									4	38.17	− 48.12	4 50.65	− 46.24
39	56.88	55.71	40 0.34	0.33	39 58.96	40 0.35	40 6.35		40	13.47	13.88	40 17.18	17.39
			11				3.85						
−22 17	8.53	7.42	17 24.99	11.98	17 10.61	17 12.00	17 18.00		17	25.12	25.53	17 28.83	29.04
							15.60						
64 36	46	87 46	36 24	87 32	36 56	37 45	36 23		36	04	38 01	36 26	38 03
2.08181		2.08213	2.08168	2.08203	2.08184	2.08213	2.08168		2.08174		2.08220	2.08168	2.08220
−2190		−2190	−2916	−2916	−1948	−1948	−1412		−580		−580	−770	−770
2.05991		2.06023	2.05252	2.05287	2.06216	2.06246	2.06756		2.07594		2.07640	2.07398	2.07450
−114.79		−114.88	−112.85	−112.95	−115.39	−115.46	−116.53		−119.11		−119.23	−118.67	−118.71
+	.02	+ .33	+ .16	+ .13	+ .00	+ .26	+ .22		+	.18	+ .29	+ .32	+ .27
−	.91	− .15	− .79	− .09	− .86	− .14	− .74		−	.78	− .17	− .07	− .19
+	.19	+ .03	+ .18	+ .02	+ .20	+ .03	+ .18		+	.18	+ .04	+ .18	+ .04
Σ	−155.49	−154.67	−153.30	−153.89	−156.05	−155.31	−157.17		−159.53		−159.07	−158.81	−158.59
−22 19	4.02	3.01	19 5.29	4.87	19 6.66	7.31	19 15.77		19	24.65	24.60	19 27.64	27.63
							12.64						
193.	05	+2 47.24	19 5.08	+2 48.08	19 6.98	+2 49.92		+2 53.93	19	24.62	+3 8.58	19 27.64	+3 10.98
		−1.7		−1.7		−1.7		−1.8			−1.8		−1.8
16	16.1	+ 16.9	16 16.1	+ 16.9	16 16.1	+ 16.8	16 16.1	+ 16.9		16.0	+ 16.8	16.0	+ 16.7
		+3 2.44		+3 3.08		+3 5.02		+2 9.03			+3 23.58		+3 25.88
	−22 16	0.61		16 2.00		16 1.96		16 [illegible]			16 1.04		16 1.76
								3.64					

− 22° 16′ 1.83″

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1876phae.proj.1483.

θ Daaconis

13 59 33 Cons

+58 53 58 dδ/dt

−16° 31′ 10″ δ₀

Cons

dδ/dt

1876

July 12 — July 13 — July 19 — July 22 — July 24 — July 26

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1876phae.proj.1483.

B' Scorpii

α 15h 38m 10s
δ +19° 27' 41"

1876

July 12 | July 13 | July 19 | July 22 | July 24 | July 26

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1976phec.proj.1480.

φ Herculis 2

16h 4m 50s Cons
+45° 15′ 49″ dδ/dt
−2 53 1 δ₀
Cons
dδ/dt

m 4 51604 | s 5445 | ″ 358
June 29 | 54.39 6 | 37.0 12
July 4 | 54.32 7 | 38.0 10
9 | 54.24 8 | 38.9 9
14 | 54.15 9 | 39.7 8
19 | 54.05 10 | 40.4 7
24 | 53.95 10 | 41.0 6
29 | 53.84 11 | 41.5 5
Aug. 3 | 53.72 12 | 42.0 5
8

+ .10
+ 1.8790
15 39.03
+ 0.1
− 9.617

log cosδ 9.84745
15 cosδ tan 9.96938 Hrs July 23
9.97261 after July 23
tanδ + 1.01 + 1.42
sin z − .05

1876

July 13	July 19	July 22	July 24	July 26	Aug. 1
+ −.91	+ −.88 −.07	+ −.89	+ −.85	+ −.76 −.06	+ −.82 −.10
16 4 32.5	4 50.1	4 40.8	4 57.4	4 50.3	5 0.7	4 29.7	5 3.0	4 32.1	5 4.3	4 4.7	4 42.2
53.0	58.7	42.4	0.2	53.1	3.6	32.6	6.0	84.7	9.3	6.0	45.0
58.2	56.6	45.0	3.1	53.6	6.5	34.7	8.7	87.6	10.3	8.9	48.0
	2.4		9.2		12.4		14.7		16.1		53.9
	5.3		12.9		15.3		17.6		19.0		56.9
5 30.6	8.2	5 37.3	15.7	5 46.0	18.3	6 10.0	20.6	6 8.0	22.0	5 42.6	59.8
32.6	11.1	40.7	17.8	49.0	21.2	11.9	23.5	10.4	25.0	45.5	2.7
35.2	14.0	42.1	20.8	51.1	24.0	14.9	26.4	13.4	27.4	48.5	5.7
	26.0		26.6		30.0		32.3		33.6		11.6
	23.0		29.5		32.9		35.2		36.5		14.5
	25.9		32.5		35.8		38.1		39.5		17.4
	270.9		224.1		200.7		226.1		241.5		357.7
4 55.23	90.9	4 42.73	164.1	4 53.00		4 32.33		4 34.83		4 6.53	657.7
5 32.80	45 8.264	5 40.10	45 14.98	5 48.70	5 18.245	6 2.27	5 20.555	6 10.67	5 21.955	5 45.53	4 59.794
−12.92	4 54252	−19.61	4 54145	−23.19	4 54085	−25.43	4 54045	−26.87	4 54025	−4.71	4 53878
−.92	+ 1401	−.89	+ 2077	−.90	+ 2416	−.86	+ 2651	−.77	+ 2795	−.83	+ 591
	+ 13.91	−.70	+ 20.67		+ 24.06		+ 26.41	−.08	+ 27.85	−.13	+ 5.81
−2.65		−2.54		−2.48		−2.44		−2.40		−2.28	
−16.49		−23.14		−26.57		−28.73		−30.13		−7.96	
+4 51.77	51.77	+4 51.78		+51.67		+51.82		+51.83		+51.83	
51.77											
	+13.03	−.92	−.89 −.07		−.90		−.86		−.77 −.06		−.83 −.10
	1.11494										
	1.08432	−24.54	+32.19	−25.18	+25.25	−30.45	+48.23	−51.71	+47.13	−48.71	+53.26	−45.74
	ℏ	1.38987 m	1.50772	1.40106 m	1.40226	1.46359 m	1.68332	1.71357 m	1.67330	1.68762 m	1.72640	1.66030 m
	G	1.35925 m	1.47710	1.37044 m	1.37164	1.45297 m	1.65593	1.68618 m	1.64591	1.66023 m	1.69901	1.63291 m
	5 4	10 0	5 4	10 0	5 4	10 0	5 4	10 0	5 4	10 1	5 4	10 1
	″ 496 436	25.2 16.6	32.0 26.4	27.0 19.6	39.6 34.2	31.2 24.9	20.8 18.7	55.6 52.4	37.0 35.5	6.9 6.4	31.9 31.5	5.9 5.1
	53.8 45.7	29.6 20.1	36.5 29.2	29.5 22.3	42.0 33.8	33.9 26.7	19.2 11.5	53.4 48.6	35.9 27.4	6.6 59.7	30.3 23.7	4.4 56.4
	103.4 9.3	14.8 36.7	8.5 15.6	16.5 41.9	8.6 8.0	8.1 1.6						
	51.70 44.65	2.740 18.36	34.25 27.80	28.25 20.35	40.80 34.00	32.58 25.80	9	10	9	11	9	11
	9 48.18	10 22.88	9 31.03	10 24.60	9 37.40	10 29.18	20.80 15.10	54.50 50.50	36.45 31.45	6.75 3.05	31.10 27.60	5.15 0.75
	+ 12.14	− 22.87	+ 30.80	− 23.87	+ 23.63	− 28.38	9 17.55	10 52.50	9 33.95	11 4.90	9 2.35	11 2.95
	10 0.32	0.01	10 1.03	1.13	10 0.93	0.80	+ 4.528	− 48.55	+ 44.25	− 45.53	+ 50.01	− 42.44
							10 2.83	10 3.95	10 18.20	10 19.17	10 19.36	10 20.01
+ 45	12 48.03	48.04	12 47.32	47.22	12 47.42	47.55	12 45.82	44.40	12 30.15	29.18	12 28.99	28.84
− 2	53 13	52 38	53 30	52 36	53 24	52 32	53 56	52 08	53 27	51 56	53 32	51 58
	0.46800	0.46150	0.46370	0.46150	0.46330	0.46120 0.45110	0.46430	0.46020	0.46370	0.45970	0.46370	0.45990
	− 2870	− 2870	−19.60	−19.60	− 860	− 860	− 1860	− 1860	− 845	− 845	− 740	− 740
	043430	043280	−.1738	−.1738	045500	045270	1360	−1360	045825	045125	045630	046250
	+ 2.72	+ 2.71	045432	045212	+ 2.77	+ 2.84	045070	044660	+ 2.87	+ 2.85	+ 2.86	+ 2.84
			+ 2.78	+ 2.77			+ 2.82	+ 2.80				
	− .05	− .16	− .28	− .17	− .17	− .26	− .63	− .73	− .60	− .64	− .77	− .57
	− .86	− .07	− .81	− .07	− .78	− .08	− .73	− .15	− .78	− .19	− .77	− .17
	+ .19	+ .02	+ .18	+ .02	+ .18	+ .02	+ .17	+ .04	+ .18	+ .04	+ .18	+ .04
	+ 2.00	+ 2.50	+ 1.87	+ 2.55	+ 2.08	+ 2.52	+ 1.63	+ 1.96	+ 1.67	+ 2.06	+ 1.50	+ 2.10
+ 45	12 50.03	50.84	12 49.19	49.77	12 49.50	50.07	12 47.15	46.36	12 31.82	31.24	12 30.49	30.48
+ 45	12 50.43	+ 2 48.08	12 49.48	+ 2 49.92	12 49.28	+ 2 50.57	12 46.76	+ 2 53.93	12 31.53	+ 3 8.58	12 30.48	+ 3 10.93
	15 38.8	+ 0.0	15 39.7	+ 0.1	15 40.2	+ 0.1	15 40.4	+ 0.1	15 40.7	+ 0.1	15 41.4	+ 0.4
	+ 2 48.4	+ 0.2	+ 2 50.2	− + 0.7	+ 2 50.4	− + 1.2	+ 2 53.6	− + 1.3	+ 3 9.2	− + 1.7	+ 3 10.9	− + 2.4
	48.5		50.3		50.5		53.7		9.3		11.0	
		+ 2 48.28		+ 2 49.32		+ 2 49.41		+ 2 52.72		+ 3 6.98		+ 3 8.68
	+45	+15 38.71		+15 38.80		+15 39.19		+15 39.49		+15 38.51		+15 39.16

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1876phae.proj.1483.

δ Ophiuchi

α_0 16 h 7 m 48 s

Corr^n $\frac{d\alpha}{dt}$ + 3.1398

δ_0 − 3° 22′ 15″

Corr^n $\frac{d\delta}{dt}$ − 9.756

+ 45° 45′ 03″

log cos δ 9.99925

15 cos δ tan i 0.12118 thro' July 23
0.12441 after July 23

tan β − 0.06 + 1.00

sin z + .72

1876

July 12	July 19	July 22	July 24	July 26	Aug. 1
− .87 − .07	− .88 − .07	− .89	− .85	− .76 − .06	− .82 − .10
m s: 7 42.0, 44.1, 46.2; 8 24.50	m s: 7 53.1, 55.2, 57.3, 1.3, 3.3, 5.4, 7.5, 9.6, 13.6, 15.7, 17.7; 8 5.427	m s: 7 45.1, 47.3, 49.1; 8 30.6, 32.5, 34.0; 8 32.37	m s: 8 1.0, 3.0, 5.0, 9.1, 11.2, 13.2, 15.3, 17.4, 21.5, 23.6, 25.8; 8 13.264	m s: 7 48.7, 57.2, 53.1; 8 43.4, 45.1, 46.9; 8 45.13	m s: 8 4.3, 6.5, 8.5, 12.6, 14.8, 16.9, 18.9, 20.9, 25.0, 27.1, 29.1; 8 16.782	m s: 7 38.9, 41.0, 42.9; 8 33.5, 37.0, 38.7; 8 57.67	m s: 8 6.7, 8.7, 10.8, 14.8, 16.9, 19.0, 21.0, 23.1, 27.2, 29.3, 31.3; 8 18.982	m s: 7 45.9; 8 48.7, 50.5, 52.3; 7 45.90; 8 50.50	m s: 8 8.2, 10.1, 12.1, 16.2, 18.3, 20.4, 22.5, 24.4, 28.7, 30.8, 32.8; 8 20.409; 7 24.50; 224.5	m s: 7 25.1, 26.6, 28.7; 8 25.2, 27.3, 29.3; 7 26.80; 8 27.27	m s: 7 46.0, 48.0, 50.0, 54.1, 56.2, 58.3, 0.3, 2.4, 6.5, 8.5, 10.6; 7 38.264; 341.9; 640.9
− 11.75 + .05	7. 53667	− 19.61 + .05	7. 53628	− 23.19 + .05	7. 53604	− 25.431 + .05	7. 53588	− 26.87 + .04	7. 53572	− 4.71 + .05	7. 53.511
− .07 − 2.75	+ 11.76	− .07 − 2.71	+ 19.64	+ 2.68	+ 23.18	− 2.67	+ 25.39	− .06 − 2.65	+ 26.84	− .10 − 2.59	+ 4.75
− 14.52	+ 11.78	− 22.34	+ 19.66	~~− 25.83~~ 25.82	+ 23.20	− 28.06	+ 25.41	− 29.54	+ 26.86	− 7.35	+ 4.77
7 50.91		50.92		~~+ 50.95~~ 50.96		+ 50.92		+ 50.87		+ 50.91	
+ 21.33	+ .05 − .07		+ .05 − .07		+ .05		+ .05		+ .04 − .06		+ .05 − .10
1.32899											29.
L 4507	− 19.07	+ 26.09	− 19.11	+ 25.78	+ 28.35	+ 38.05	− 38.09	+ 34.51	− 30.09	+ 31.46	− 56.01
E	1.28035 n	1.41647	1.28126 n	1.41128	1.43696 n (43285)	1.58035	1.58081 n	1.53794	1.47842 n	1.49776	1.46255 n
G Ho.	1.40153 m	1.53765	1.40244 m	1.53246	1.55373 m	1.70476	1.70522 m	1.66235	1.60283 m	1.62217	1.58696 m
45 i	45 2	45 1	45 2	45 1	45 2	45 1	45 3	45 1	45 3	45 1	45 3
46.0 42.2	38.9 33.6	43.7 33.8	43.8 34.2	41.8 33.7	55.6 44.8	31.8 27.1	13.1 7.3	48.2 42.1	15.8 11.4	58.1 52.4	18.3 12.1
47.5 48.9	39.3 42.2	44.6 44.3	42.6 42.9	42.2 41.8	53.3 53.9	28.6 26.9	8.1 7.5	43.4 42.0	12.4 11.5	53.1 51.5	13.1 12.9
13.5 11.1	18.2 7.58	8.83 7.81	8.64 7.71	8.40 7.55	10.89 9.87	6.04 5.40	2.12 1.48	9.16 8.41	2.82 2.29	11.12 10.39	3.14 2.50
46.75 45.55	39.10 37.90	46	47	46	47	46	44	46	48	46	48
46 46.15	47 38.50	44.15 39.05	48.20 38.55	42.00 37.75	54.45 48.35	30.20 27.00	10.60 7.40	45.80 42.05	14.10 11.45	55.60 51.95	18.70 12.50
+ 38.20	− 25.21	46 41.60	47 40.88	46 39.88	47 51.90	46 28.60	48 9.00	46 43.92	48 12.78	46 53.48	48 14.10
		+ 34.49	− 25.26	+ 34.08	− 37.47	+ 30.67	− 60.73	+ 48.96	− 40.07	+ 41.90	− 38.63
47 14.35	47 13.29	47 16.09	15.62	47 13.96	14.43	47 19.27	18.27	47 29.88	32.71	47 35.68	35.47
−3 25 26.00		24.94 25 27.74	27.27	25 25.61	26.08	24 30.92	29.92	24 41.63	44.36	24 47.33	47.12
45 43 45	44 38	43 41	44 40	43 39 (80)	44 51	43 28	45 08	43 43	45 12	43 53	45 13
1.77080	1.77100	1.77080	1.77100	1.77080	1.77110	1.77070	1.77110	1.77080	1.77120	1.77090	1.77120
− 21.60	− 21.60	~~− 19.50~~ − 19.25	~~− 18.50~~ − 19.25	− 8.50	− 8.50	− 18.50	− 18.50	− 5.45	− 6.45	− 7.40	− 7.40
1.74920	1.74940	1.76155	1.75175	1.76230	1.76260	1.75720	1.75760	1.76635	1.76675	1.76350	1.76380
− 56.13	− 56.16	− 56.44	− 56.46	− 57.85	− 57.89	− 57.17	− 57.23	− 58.26	− 58.81	− 58.01	− 58.05
+ .01	+ .01	+ .02	+ .01	+ .02	+ .02	+ .04	+ .04	+ .03	+ .03	+ .03	+ .02
− .34	− .49	− .31	− .49	− .29	− .48	− .26	− .53	− .29	− .54	− .32	− .54
+ .07	+ .10	+ .07	+ .11	+ .07	+ .11	+ .06	+ .12	+ .07	+ .13	+ .08	+ .13
− 56.39	− 56.54	− 56.66	− 56.83	− 58.05	− 58.24	− 57.33	− 57.60	− 58.48	− 58.69	− 58.22	− 58.44
−3 25 22.39	21.48	25 24.40	24.10	25 23.66	24.32	25 28.25	27.52	25 39.98	25 43.05	25 45.55	45.56
−3 25 21.94	+ 2 47.24	25 24.25	+ 2 49.92	25 23.99	+ 2 50.57	25 27.88	+ 2 53.92	25		25 45.56	+ 3 10.98
22 36.1	− ✱ 1.3	22 35.7	− ✱ 1.3	22 35.5	− ✱ 1.3	22 35.4	− ✱ 1.3	22 35.3	22 35.3	22 34.9	− 1.4
+ 2 48.8	+ 11.2	+ 2 48.5	+ 10.8	+ 2 48.5	+ 10.6	+ 2 52.5	+ 10.5		+ 3 7.7	+ 3 10.7	+ 10.0
46.0	57.14	48.7		48.7		52.7			7.0	10.9	
	+ 2 ~~57.14~~ 57.14		+ 2 ~~20.2~~ 59.42		+ 3 ~~2.41~~ 5.81		+ 3 ~~5.73~~ 3.13		+ 3 8.58		+ 3 19.58
− 3	~~+ 2 22.~~ ~~− 22.~~ ~~57.14~~		− 22 ~~22.23~~ 24.83		− 22 ~~21.58~~ 24.18		− 22 ~~22.15~~ 24.75		− 1.4 + 10.3		− 22 ~~24.98~~ 25.98
	22.20	~~22.20~~ 24.80							+ 3 17.48 − 22 25.57		

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1876phae.proj.14001

ε Ophiuchi

16h 11m 42s Const

−4° 23′ 10″ dλ/dt

+46° 45′ 58″ δ₀

m s
11 45.648 Const + .03
+ 3.1686
1876 23 1958
Const − .1
dδ/dt − 9.093

June 29 11 48.46 1 23 31.8
July 4 48.45 1 31.4 4
9 4844 1 31.1 3
14 4842 2 30.8 3
19 4839 3 30.5 3
24 4835 4 30.2 3
29 48.31 4 29.9 3
Aug. 3 4826 5 29.6 3
8 48.20 6 29.4 2

log cos δ 9.99873
15 Const ann 0.12066 thru July 23
0.12389 after July 23
tan δ − 0.08 + 1.00
sin z + .73

1876
July 12 × −.87 −.07
July 13 × −.91
July 19 × −.88 −.07
July 22 × −.89
July 24 × −.85
July 26 × −.76 −.06

	July 12	July 13	July 19	July 22	July 24	July 26
16	11 34.1 36.2 38.0	11 48.0 50.0 52.0 54.0 38.2	11 28.7 30.4 32.5	11 49.0 51.0 53.0 55.1 59.2	11 45.8 47.0 49.0	11 55.6 57.7 59.8 0.4 3.9 6.1
	12 18.1 19.6 21.7	03 2.3 4.4 8.5 10.6 12.7	12 20.4 21.8 23.6	1.4 3.4 5.4 7.6 11.7 13.7	12 25.7 27.0 28.2	8.1 10.1 12.2 16.3 18.4 20.4
	11 36.10	303.0 3.0	11 30.53	314.5 14.5	11 42.27	209.7 89.7
	12 19.50	12 02.73	12 21.93	12 13.18	12 26.97	12 8.155
	−11.76 +.07 −.07 −2.78 −14.54 +11 45.73	11 48427 + 11.85 + 11.82	−12.92 +.07 −2.77 −15.62 +45.70	11 48423 + 12.89 + 12.86	−19.61 +.07 −.07 −2.74 −22.35 +45.81	11 48388 + 19.77 + 19.74
		+.07 −.07		+.07		+.07 −.07
	+24.1 1.38328 1.50394	−19.53	+30.79	−20.61	+20.89	−18.81
	ξ 1.290702n	1.488441	1.314082n	1.319044	1.274392n	1.313534
	η 1.41736m	1.60907	1.43474m	1.44660	1.39504m	1.43600
	45 2	45 3	45 2	45 3	45 2	45 3
	33.5 30.3	31.1 36.2	29.1 19.4	37.6 26.7	42.4 32.4	35.0 24.1
	34.4 35.2	30.6 33.8	30.4 29.5	39.1 37.8	43.0 42.0	34.7 33.8
	7.9 1.55	1.7 1.00	5.95 48.9	16.7 6.45	5.4 7.44	9.7 5.79
	3.35 3.85	3085 3500	2975 2405	38.35 32.25	4270 3720	3985 2835
	47 35.85	48 32.93	47 27.10	48 35.30	47 39.35	48 31.90
	+ 31.91	− 28.87 .78	+ 40.65	− 27.21	+ 27.88 .58	− 24.83
	48 27.6 5.26	48 7.15	48 7.75	48 8.09	48 17.53	48 7.07
−4	25 16.97 19.41	18.80	25 19.40	19.74	25 19.18	18.72
+46	44 32	45 32	44 26	45 34	44 39	45 31
	1.78610	1.78640	1.78610	1.78620	1.78620	1.78640
	−2144	−2144	−2836	−2836	−1910	−1910
	1.76466	1.76496	1.75774	1.75804	1.76710	1.76730
	−58.17	−58.20	−57.24	−57.28	−58.39	−58.52
	+ .02	+ .01	+ .04	+ .02	+ .02	+ .01
	− .49	− .67	− .45	− .65	− .49	− .63
	+ .16	+ .14	+ .10	+ .14	+ .11	+ .14
	− 58.54	− 58.72	− 57.53	− 57.79	− 58.85	− 59.00
− 4	26 15.45 17.95	17.52	26 16.95	17.51	26 18.03	17.72
− 4	26 16.49 17.24		26 17.23	+2 46.08	26 17.88	+2 46.92
	23 30.9	+2 47.24	23 30.8	−1.4	23 30.5	−1.4
	+2 45.6 46.8	−1.4	+2 46.4	+11.2	+2 47.4	+10.9
	46.7	+11.3	46.3		47.3	
		+2 57.14		+2 57.88		+2 59.42
−4		−23 20.60		−23 19.35		−23 18.46

	July 24	July 26
	11 48.5 45.2 46.8 48.7 48.7 52.7	12 1.3 3.4 5.5 9.6 11.7 13.8
	12 48.7 50.7 53.0	12 15.9 17.9 22.0 24.1 26.2
	11 45.15	151.4
	12 50.87	12 13.744
	−25.44 +.07 −2.70 −28.07 +45.69	11 48348 + 2.542 + 2.539
	+.07	+.07
	−37.11	1.56949n 1.69338m
	12 13.744	1.64424
	45 4	45 4
	4.9 58.7	38.2 36.6
	5.76 58.6	8.10 7.40
	45	49 48
	2.25 58.65	49
	4 38.19 03	4 44.08
	48 11.09	48 22.83
	25 23.88	22.75
	25 23.88	25 34.48
	48 12.23	48 24.65
	48 12.23	48 11.09
	48	48
	44 33	48.5 59
	1.78620	1.78650
	−1320	−1320
	1.77300	1.77330
	−59.23	−59.33
	+ .03	+ .06
	− .44	− .68
	+ .10	+ .16
	− 59.60	− 59.80
	26 23.48	22.55
	26 23.02	+2 58.93
	23 30.2	−1.4
	+2 52.8	+10.7
	52.7	
	+3 3.23	
	−23 19.79 14.79	

	July 26
	12 2.6 4.9 7.0 11.1 13.2 15.3 17.3 19.3 23.5 25.7 27.7
	167.6
	12 15.236
	11 48332 + 2.690 + 2.687
	+.06 −.06
	−28.23
	1.250712n
	1.57460m
	45 4
	6.4 0.5
	1.7 0.2
	8.1 0.7
	4.05 0.35
	4.9 2.20
	4 37.05
	48 29.65
	36.30
	46 01
	1.78650
	−525
	1.78125
	−60.43
	+ .03
	− .68
	+ .16
	− 60.92
	37.22
	+3 8.58
	−1.4
	+10.5
	+3 17.68
	−23 18.51

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K = 19 Alsace Ini α_0 14 23028 June 29 14 2781 11 184

16 14 22 Corrα − .06 July 4 2751 30 19.5 11

+76° 09 51 $\frac{d\alpha}{dt}$ −1.7972 9 2718 33 21.6 11

− 33° 47′ 03″ δ_0 14 2688 35 21.5 9

19 2645 38 22.4 9

24 2605 40 23.1 7

11 19.46 29 2563 42 23.7 6

Corrδ + .6

$\frac{d\delta}{dt}$ −8.925″

log cosδ 9.37806

15 Cos^{2}3 tanδ .949999 thro July 23

.950322 after July 23

tanδ +4.07 +4.16

log cosδ 9.37806

log sinδ 9.98722

const. 6.73762

sin z −.56

1876

X −.87 −.67 July 12 X −.88 −.07 July 19 + −.89 July 22 X −.84 July 24 + −.79 July 25 + −.76 −.06 July 26

m	s	m	s	m	s	m	s	m	s	m	s	m	s	m	s	m	s	m	s
14	1.9	14	25.4	14	14.0	14	32.6	14	21.6	14	85.4 40.0	14	7.8	14	37.4	14	53.8	14	38.1	14	14.3	14	38.5
	8.4		29.5		18.0		36.8		26.5		44.1		17.0		41.7		6.0		42.2		18.7		42.9
	17.5		33.7		22.2		41.3		34.8		48.4		23.4		46.4		13.0		45.7		81.0		47.4
			38.0				45.7				52.7				50.5				50.7				52.1
			42.6				50.0				57.2				54.8				53.0				56.0
15	6.8		46.8	15	17.2		54.2	15	26.2		2.0	17	22.3		57.1	16	43.1		57.6	15	17.2		0.4
			51.0				58.3		33.5		5.3		31.8		3.8				3.8		57.4		4.8
			53.4				3.3		42.1		10.7		42.2		7.8				6.7		4.3		8.9
			0.0				7.2								12.4				12.4		11.0		13.4
			322.4				329.4				296.1				313.9				31 6.2				264.4
14	9.27		382.4	14	20.07		449.4	14	27.43		476.1	14	1604		493.9	15	4.83		496.2	14	21.67		5044
15	6.80	14	42489	15	17.20	14	49.933	15	33.93	14	52900	17	31.43	14	54878	16	43.10	14	58.133	16	0.98	14	56.044
	−11.76	14	26959		−19.61	14	26430		−23.19	14	26.190		−25.44	14	26029		−26.22	14	25945		−26.87	14	25.861
	−3.54	+	15.53		−3.58	+	23.50		−3.62	+	26.71		−3.46	+	2883		−3.22	+	29.19		−3.09	+	30.18
	−.29	+	16.59		−.29	+	23.56			+	26.77			+	2891			+	29.25		−.25	+	30.24
	−3.93				−3.40				−3.16				−3.08				−2.98				−2.83		
	−19.52				−26.88				−29.97				−31.90				−32.36				−33.04		
14	22.97				+23.05				+22.93				+22.98				+22.78				+23.00		
			−3.54				−3.58				−3.62				−3.46				−3.22				−3.09
	+33.22		−.29				−.29																−.25
	1.52140																						
	1.02139		−24.31		+29.86		−27.27		+25.47		−41.03		+38.81		−156.55		−9.80		−107.97		+34.87		−64.94
E			1.38578$_n$		1.47509		1.43564$_n$		1.40603		1.61310$_n$		1.58894		2.19465$_n$		0.99123$_n$		2.03330$_n$		1.53618		1.81251$_n$
J	16		0.88577$_n$		0.97568		0.93568$_n$		0.90602		1.11309$_n$		1.09216		1.69787$_n$		0.49445$_n$		1.53652$_n$		1.03940		1.31573$_n$
	′		′		′		′		′		′		′		′		′		′		′		′
	10		10		10		15		10		15		10		15		15		15		15		15
	3.2	4.3	5.9	5.8	4.5	4.3	4.4	5.7	4.8	4.2	9.4	6.2	4.8	4.6	4.6	5.3	1.9.5	18.8	4.9.6	4.7.5	3.9	2.9	3.5.2	3.5.6
	43.4	31.7	61.7	55.2	48.4	37.4	6.4.1	58.2	50.5	40.6	12.8	2.3	45.7	37.6	44.6	36.0	18.1	8.8	46.8	38.0	3.4	54.6	33.7	25.3
	8.2.6	7.6.0	12.6.7	113.4	12.9	78.7	11.8.8	17.9.9	98.3	5.8	22.2	8.5.1	138	84.2	10.9	81.3	37.6	27.6	16.4	8.8.5	7.3	11.2.5	6.8.7	6.0.9
	41.30	38.00	60.35	52.90	46.05	37.35	5.4.0	56.25	49.15	42.90	11.10	4.25	46.90	42.10	45.45	40.45	18.80	13.80	48.20	42.75	3.6.5	58.15	34.45	30.05
	14	39.65	14	58.53	14	42.90	15	2.18	14	46.03	15	7.68	14	46.50	15	43.05	15	16.30	15	48.48	15	1.20	15	32.45
	+	10.50	−	7.67	+	9.44 2.44	−	8.62	+	8.05	−	12.97	+	12.46	−	49.87	−	31.22 3.12	−	34.40	+	10.96	−	20.69
	14	50.15	14	50.84	14	52.34	14	53.56	14	54.08	14	54.71	14	56.36 3	14	53.18	15	13.18	15	11.08	15	12.15	15	11.76
+76	7	58.20		57.51	7	56.01		54.79	7	54.27		53.64	7	51.49		55.17	7	35.17		37.27	7	36.20		36.59
		48 21																						
	−33	48 02	48	18	47	59	48	15	47	53	48	16	47	18	47	45	47	16	48	00	47	29
	1.58590	1.58580	1.58590		1.58580		1.58590		1.58580		1.58590		1.58360		1.58570		1.58560		1.58580		1.58565	
	−2135	−2135	−1900		−1900		−847		−847		−1305		−1305		−840		−840		−515		−515	
	1.56455	1.56445	1.56690		1.56680		1.57743		1.57733		1.57285		1.57255		1.57730		1.57720		1.58065		1.58050	
	+36.69	+36.68	+36.89		+36.88		+37.79		+37.79		+37.40		+37.27		+37.28		+37.77		+38.08		+38.07	
	− .14	− .07	− .12		− .09		− .09		− .21		− .19		− 3.11		− .01		− 1.48		− .15		− .54	
	− .89	− .95	− .85		− .00		− .82		− .02		− .80		− .12		− .05		− .14		− .08		− .08	
	+ .19	+ .20	+ .19		+ .00		+ .19		+ .00		+ .19		+ .03		+ .01		+ .03		+ .00		+ .02	
	+ 35.85	+ 35.86	+ 36.11		+ 36.79		+ 37.07		+ 37.56		+ 36.60		+ 34.17		+ 37.73		+ 36.18		+ 37.93		+ 37.46	
+76	8 34.05		33.37	8	32.12		31.88	8	31.34		31.20	8	28.09		29.34	8	12.90		13 45	8	14.13		14.05
+76	8 33.71	+2	47.24	8	31.85	+2	49.92	8	31.27	+2	50.57	8	28.71	+2	53.93	8	13.17	+3	9.42	8	14.09	+3	8.58
	11 20.2	21.2	+0.9	11	22.4		+1.0	11	22.9		+1.0	11	23.1		+1.0	11	23.2		+1.0	11	23.4		+1.0
	+2 47.5		− 1.7	+2	50.6		−2.9	+2	51.6		−3.4	+2 +1	55.0 54.4		−3.6	+3	10.0		−3.7	+3	9.3		−3.9
	48.1				57.2				52.2				55.0				10.6				9.9		
		+2	46.44			+2	48.02			+2	48.11			+2	51.33			+3	6.72			+3	5.68
+76		+11	20.15			+11	19.87			+11	19.38			+11	20.04			+11	19.89			+11	19.77

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N. A.

α Scorpii

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1876phae.proj:1483:

	Jan. 25				Feb. 15				Feb. 16				Feb. 20			
	m	s	m	s	m	s	m	s	m	s	m	s	m	s	m	s
	20	36.2	21	1.6	21	13.0	20	58.1	20	58.8	21	5.2	20	42.2	20	53.5
		38.8		4.1		15.3		0.2		56.2		7.4		44.0		53.9
		1.2		6.2		17.6		2.6		58.6		9.4		46.6		58.2
				8.6		22.2				0.8		14.3				0.5
				11.0		24.5				3.0		16.6				3.0
				43.0		26.7				35.2		19.0				35.3
			[45.3]	46.3		29.2				37.5		21.3				37.8
				47.6		31.5				39.8		23.6				39.8
				48.9		36.0				42.1		28.2				41.8
				52.3		38.3				44.4		30.5				44.3
						40.6						32.7				
				29.06		29.49				37.14		20.85				37.01
	20	58.73					21	0.30		19.14			20	44.27		19.01
	21	26.060	21	26.809					21	19.140	21	18.955			21	19.010
				821								19001				
			21	26.815							21	18.978			21	18.858
		+21.01	21	47.83						+29.52	21	48.58				+29.71
		+.00		+.00						+.01		+.01				-.01
		+.60								-.16						-.18
		+21.61								+29.37						+29.52
		21 48.43								48.35						48.38

	Jan. 25				Feb. 15				Feb. 16				Feb. 20			
	m	s	m	s	m	s	m	s	m	s	m	s	m	s	m	s
	20	36.2	21	1.6	21	13.0	20	58.1	20	58.8	21	5.2	20	42.2	20	53.0
		38.8		4.1		15.3		0.2		56.2		7.4		44.0		53.3
		1.2		6.2		17.6		2.6		58.6		9.4		46.6		57.6
				8.6		22.2				0.8		14.3				0.0
				11.0		24.5				3.0		16.6				2.2
				43.0		26.7				35.2		19.0				84.4
			[45.3]	46.3		29.2				37.5		21.3				36.6
				47.6		31.5				39.8		23.6				38.8
				48.9		36.0				42.1		28.2				41.1
				52.3		38.3				44.4		30.5				43.5
						40.6						32.7				
				29.06		29.49				37.14		20.85				36.25
	20	58.73					21	0.30		19.14			20	44.27		18.35
	21	26.060	21	26.809					21	19.140	21	18.955			21	18.250
				821								19001				
			21	26.815							21	18.978			21	18.091
		+21.01	21	47.83						+29.52	21	48.58				+30.52
		+.00		+.00						+.01		+.01				+.07
		+.60								-.16						-.34
		+21.61								+29.37						+30.25
		21 48.43								48.35						48.35

	Jan. 25				Feb. 15				Feb. 16				Feb. 20			
	m	s	m	s	m	s	m	s	m	s	m	s	m	s	m	s
	20	36.2	21	1.6	21	13.0	20	58.1	20	58.8	21	5.2	20	42.2	20	53.0
		38.8		4.1		15.3		0.2		56.2		7.4		44.0		53.3
		1.2		6.2		17.6		2.6		58.6		9.4		46.6		57.6
				8.6		22.2				0.8		14.3				0.0
				11.0		24.5				3.0		16.6				2.2
				43.0		26.7				35.2		19.0				84.4
			[45.3]	46.3		29.2				37.5		21.3				36.6
				47.6		31.5				39.8		23.6				38.8
				48.9		36.0				42.1		28.2				41.1
				52.3		38.3				44.4		30.5				43.5
						40.6						32.7				
				29.06		29.49				37.14		20.85				36.25
	20	58.73					21	0.30		19.14			20	44.27		18.35
	21	26.060	21	26.809					21	19.140	21	18.955			21	18.250
				821								19001				
			21	26.815							21	18.978			21	18.091
		+21.01	21	47.83						+29.52	21	48.58				+30.52
		+.00		+.00						+.01		+.01				+.07
		+.60								-.16						-.34
		+21.61								+29.37						+30.25
		21 48.43								48.35						48.35

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1876phae.proj.1483

	m	s	′	″	
July 8	21	51.56	−2	−9 · 33.2	−1
13		51.54	3	33.3	1
18		51.51	4	33.4	1
23		51.47	4	33.5	0
28		51.43	5	33.5	0
Aug 2		51.38	6	33.5	0
7		51.32		33.5	

1876

July 12			July 17			July 19			July 22		
	−.87			−.86			−.88			−.89	
	−.07						−.07				
21	30.4		21	54.8		21	45.6		21	14.3	
	31.9			57.1			48.0			13.5	
	34.6			59.5			50.2			17.6	
				4.0			52.5				
				6.3			54.7				
				8.7			—				
				10.9			—				
				13.2			—				
				17.9			—				
				20.1			—				
				22.5							
				27.5			50.20				
21	32.30		21	38.67		21	38.33		21	15.90	
				95.0			118.0				
			22	8.636		22	10.726				22 14.212
			22	8.636							22 14.212
			21	51.52			−19.62			−23.20	21 51.48
							+.43			+.44	
							−.08				
							−3.07			−3.06	
							−22.34			−25.82	
							48.39			48.39	

| | | | | | | |

1876phae.proj.1483.

July 24 — −.85

m	s	m	s
21	41.4	21	51.4
	43.3		53.6
	45.6		56.0
			58.2
			0.5
			82.7
			35.0
			37.4
			39.6
			42.0
			4064
21	43.43		

m	s
22	2.7
	5.0
	7.3
	11.9
	14.2
	16.5
	18.7
	21.1
	25.7
	28.0
	30.3
	1814
	64
21	44.20

m	s
21	42.4
	44.0
	46.2

m	s
22	16.640
	16.494
	501
22	16482
21	51.46
	−25.44
	+.42
	−3.03
	−28.05
21	48.43

July 25 — −.79

m	s
21	52.1
	54.5
	56.8
	59.0
	1.2
	33.4
	35.7
	38.0
	40.3
	42.7
	4137

m	s
22	8.4
	5.7
	8.0
	12.8
	15.0
	17.3
	19.5
	21.7
	26.3
	28.7
	31.0
	1894

m	s
21	38.7
	40.8
	43.0
22	38.4
	0.3
	2.5
21	40.83

m	s
22	17.370
	17.218
	231
22	17224
21	51.45
	−26.22
	+.38
	−3.03
	−26.87
	48.35

m	s
28	0.40

July 26 — −.76, −.06

m	s
22	4.0
	6.3
	8.7
	13.2
	15.5
	17.9
	20.2
	22.5
	27.0
	29.4
	31.6
	196.3

m	s
21	16.7
	19.0
	21.0
21	18.90

m	s
22	17.845
	22 17845
	21 51.45
	−26.86
	+.37
	−.07
	−3.02
	−29.58
	48.26

Aug. 1 — −.82, −.10 — See G.L. for rest. p. 111

m	s
21	30.7
	32.9
	35.3
	37.6
	39.8
	42.0
	44.3
	46.6
	49.2
	51.5
	53.7
	56.1
	58.4
	2591

m	s
21	42.0
	44.3
	46.6
	49.2
	51.5
	53.7
	56.1
	58.4
	0.3
	5.0
	7.2
	9.6
	3735
	64
21	55.799
	471
21	55.772
21	51.39
	−4.71
	+.40
	−.11
	−2.97
	−7.39
	48.38

h m s
16 21 48.382
+.40 48.382 (18)
−.11 48.383 (6)
48.382

+.42 +.38 +.37 −.07

+33.05
1.51917
659743
G 46
30 2
17.2 11.4
12.9 15.4
30.1 26.8
13.05 13.40
32 14.23
+ 39.58
32 53.81
−26 10 5.46
68 29 13
2.16142
−1280
2.14862
−140.81
+ .23
− .37
+ .09
−2 20.86
12 26.82
9 33.5
+2 52.93
−1.9
+16.6
+3 8.63
9 17.69

+33.02
1.51878
1.59704
3
30 2
31.5 25.1
27.2 28.1
58.7 53.2
29.35 26.60
32 27.68
+ 39.54
33 7.52
10 19.17
29 28
2.16153
−835
2.15318
−142.29
+ .23
− .43
+ .10
−2 22.39
12 41.56
9 33.5
+3 7.42
−1.9
+16.6
+3 24.72
.12
9 16.84
17.44

+37.02
1.56844
1.64670
30 2
24.2 19.6
20.9 20.6
45.1 40.2
22.58 20.10
32 21.33
+ 44.33
33 5.66
10 17.31
29 20
2.16146
−500
2.15646
−143.37
+ .29
− .39
+ .09
−3 23.38
12 40.69
12 40.77
9 33.5

−42.55
1.62890 m
1.70716 m
30 3
59.4 54.1
56.1 56.3
115.5 110.4
57.75 55.20
33 54.48
+ 50.95
33 5.53
17.18
30 55
2.16204
− 500
2.15704
−142.56
+ .39
− .66
+ .16
−2 23.67
40 85
+3 8.58
−1.9
+16.6
+3 23.88
28
9 17.49

+36.87
1.56664
1.64493
30 2
28.6 23.1
23.9 24.4
52.5 47.5
26.25 23.75
32 25.18
+ 44.13
33 9.15
10 20.80
29 24
2.16149
−705
2.15444
−142.78
+ .29
− .41
+ .10
−2 22.73
12 43.53
9 33.5
+3 10.98
−1.9
+16.6
+3 25.68
9 17.85

17.73 (12)
17.75 (4)
17.74
73
−26 9 17.52

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1876phae.proj 1483.

η Draconis

16h 22m 18s Corr − .01

+61° 47′ 51″ $\frac{d\alpha}{dt}$ + 0.8065

−19° 25′ 03″ δ_0 47 43.25

Corr − .5

$\frac{d\delta}{dt}$ − 8.194

1876

July 12 — −.87 −.07

July 13 — −.91

July 17 — −.86

July 19 — −.88 −.07

July 22 — −.89

July 24 — −.85

Log cos δ 9.674 45

1 cos δ tan i 9.79638 this July 23
9.79961 after July 23

tang δ + 1.86 f 2.12

sin z − .33

Log I 0.63984
Log A-1 1.33898
" A-2 1.59683
I 4.36
½ I 2.18
A-1 21.825
A-2 39.519

July 12: 16 22 55.8 / 58.7 / 4.0 — A-1 (52.7 / 57.0 / 1.5 / 6.1 / 10.5 / 14.9 / 19.0 / 23.4) — A-2 (22 55.5 / 0.2 / 4.4)

22 57.067 23 14.780
− 21.825 − 39.519
35.242 35.261

July 12: 22 59.50 — 23 0.03 — 22 35.252

July 13: −11.77 22 21.998 / −1.62 + 13.25 / −.15 + 13.26 / −2.96 / −16.50 / +22 18.75 — −1.69

July 17: 22 56.9 / 8.4 / 4.4 — (23 30.4); 40.92 43.1 / .44 45.1 / .66 47.2 / .88 49.6

July 17: −17.52 22 21.852 / −1.60 + 18.95 / + 18.96 / −2.81 / − 21.93 / + 15.57

July 19: 22 57.9 / 57.8 / 1.8 — 22 40.80

July 19: −19.62 22 21.792 / −1.64 + 21.16 / + 21.17 / −2.75 / −24.16 / +18.79

July 19: 22 42.947

July 22: 22 53.8 / 56.6 — [45.88] 43.7 / 46.0 / 48.2 / 50.6 / 52.7 / 53.0

July 22: −23.20 22 21.690 / −1.66 + 24.45 / + 24.46 / −2.65 / −27.51 / +18.63

July 22: 22 46.140

July 24: 23 13.0 / 16.5 / 19.9

July 24: −25.44 22 21.622 / −1.58 + 26.88 / + 26.89 / −2.58 / −29.60 / +18.90

July 24: 23 6.0 / 48.56 10.3 / .50 14.6 / .44

July 24: 22 48.500

July 12: −24.25 / 1.38471n / 1.18109n / 1.39410n / 1.19048n — −1.62 / −.15 / −24.78 — −1.69

July 17: −19.77 / +40.23 / 1.79601n / 1.09239n — −1.60 — −49.60 ? −15.22 / 1.69548n / 1.49186n

July 19: −1.64 — 1.18241n / 0.97879n

July 22: −6.96 / 0.84261n / 0.63899n — −1.66

July 24: −27.97 / 1.44669n / 1.24630n — −1.58

35 3 — 35 4 — 35 2 — 35 4 — 35 3 — 35 3 — 35 3 — 35 3

24.9	24.6	0.8	59.1	46.2	41.6	36.2	30.2	44.6	38.4			21.0	16.5	19.4	14.1			36.2	31.2
30.3	22.1	5.3	59.4	52.1	41.4	44.1	32.9	49.3	40.3			27.9	18.6	23.5	13.5			35.5	26.6
55.2	46.7	6.1	5	98.3	1.0	80.3	3.1	1.39	78.7			51.9	35.1	42.9	27.8			71.7	60.8
2.760	2.335	3.05	59.25	49.15	41.50	40.15	31.55	68.65	39.35			25.95	17.58	24.45	13.80			35.85	30.40
38	2.548	39	1.15	37	45.33	39	35.85	38	4.315	38	43.15	38	21.75	38	17.63			38	33.13
—	15.17	—	15.51					~~+ 25.37~~		−	31.04	—	9.52	~~+~~ −	4.36			—	17.63
	38 14.31		38 45.64					~~38 30.78~~		38	12.11	38	12.23	38	13.27			38	15.50
+61	44 38.04		~~44 2.71~~					~~44 17.57~~		44	36.24	44	36.12	44	35.08			44	32.85
−19	24 36		~~24 00~~					~~24 18~~		24	18	24	39	24	43			24	28
	1.30720									1.30710		1.30720		1.30730				1.30720	
	−2110									−1730		−1876		−840				~~−1280~~	
	1.28610									1.28980		1.28844		1.29890				−1267	
	+19.32									+19.49		+19.43		+19.90				1.29453	
	− .13									− .58		− .05		− .01				+19.70	
	− .65		− .76							− .67		− .56		− .56				− .18	
	+ .14		+ .16							+ .15		+ .13		+ .13				− .61	
	+ 18.68									+ 18.39		+ 18.92		+ 19.46				+ .14	
																		+ 19.05	
+61	44 56.72		A2 47.24		+2 48.08					44 54.63		44 55.04		44 54.54				44 51.90	
	47′ 44.3		+ 0.5		+ 0.5					47 45.3		47 45.4		47 46.2				47 46.4	
	+2 47.6		− 1.1							+2 50.7		+2 50.6		+2 51.7				+2 54.5	
	47.1									50.2		50.1		51.2				54.0	
			+2 46.64							+2 49.78									
										+ 0.6									
										− 2.0									
										+2 48.38									
+61			+47 43.36							+47 43.0		+47 43.16		+47 42.75				+47 43.23	

												+2 49.92							
												+ 0.6							
												− 2.4							
												+2 48.12							

1876phae.proj.1483.

β Herculis

α_0 16h 24m 51s

Corr$_\alpha$

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

δ_0 +21° 45' 49"

Corr$_\delta$

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

+ 20° 36' 59"

1876

July 19: m 24 53.95 s; Corr$_\alpha$ −.01; $\frac{d\alpha}{dt}$ +2.5768; δ_0 45 41.09"; Corr$_\delta$ −1.4"; $\frac{d\delta}{dt}$ −8.018"

log cosδ 9.96788

15 cosδ sin i 0.08981 this July 23

0.09304 after I. 222

tanδ +0.40 +1.08

sin z +.35

	July 19	July 22	July 24	July 25	July 26	Aug. 1
	−.88 −.07	−.89	−.85	−.79	−.76 −.08	−.82 −.10
	h m s	m s	m s	m s	m s	m s
	16 24 49.7	25 2.7	24 54.0	25 6.3	24 41.8	25 8.3
	37.8	5.0	55.7	9.4	43.1	10.6
	33.2	7.2	57.9	10.7	45.2	12.9
		11.6		13.0		17.3
		13.8		17.3		19.5
	25 47.5	16.0	25 48.1	19.5	25 57.6	21.7
	42.7	18.2	50.2	21.7	1.6	24.0
	37.6	20.5	52.3	24.0	8.7	26.1
		24.9		28.4		30.6
		27.1		30.6		32.8
		29.3		32.8		35.0
		176.3		215.7		238.8
	24 51.57		24 55.87		24 43.47	
	25 49.60	25 16.27	25 50.20	25 19.07	26 1.63	25 21.09
	−19.62	24 56.07	−23.20	24 55.71	−25.44	24 58.47
	−.35	+ 20.02	−.36	+ 23.64	−.34	+ 25.76
	−.08	+ 20.73		+ 23.65		+ 25.77
	−2.61		−2.57		−2.55	
	−22.66		−26.13		−28.33	
	24 53.37		+53.48		+53.38	
		−.35		−.36		−.34
	+24.46	−.08				
	1.38846					
	1.47827	−33.57	+23.74	−30.59	+38.24	−39.92
		1.52595	1.37548	1.48558	1.58252	1.60119
		1.61576	1.46529	1.57539	1.67556	1.69423
		40 0	35 4	40 0	35 3	40 0
		23.2 15.6	12.9 7.3	18.9 12.4	59.8 56.7	36.4 33.7
		25.9 23.0	14.5 10.6	20.9 17.2	56.9 54.0	33.9 31.6
		49.1 38.6	27.4 17.9	39.8 30.1	1167 1107	70.3 65.3
		40	39	40	38	40
		24.55 19.30	13.70 8.95	19.90 15.05	58.35 55.35	35.15 32.65
		40 21.92	39 11.32	40 17.48	38 56.85	40 33.90
		− 41.28	+ 29.19	− 37.62	+ 47.38	− 49.46
		40.64	39 40.51	39.86	39 44.23	44.44
		7.71	43 7.84	8.49	43 4.12	3.91
		37 21	36 10	37 16	35 56	37 03
		1.33580	1.33540	1.33580	1.33580	1.33590
		−18 65	−837	−837	−1500	−1500
		1.31715	1.32703	1.32743	1.32272	1.32332
		−20.76	−21.23	−21.25	−21.02	−21.05
		− .21	− .10	− .17	− .27	− .30
		− .05	− .71	− .05	− .66	− .10
		+ .01	+ .17	+ .01	+ .16	+ .02
		− 21.01	− 21.87	− 21.46	− 21.79	− 21.43
		46.70	42 45.97	47.03	42 42.33	42.48
		+ 2 49.92	42 46.50	+ 2 50.51	42 42.40	+ 2 53.92
		− 0.6	45 37.7	−0.6	45 37.9	−0.6
		+3.7	+ 2 51.2	+3.4	+ 2 55.5	+3.2
			49.8		54.1	
		+ 2 53.02		+ 2 53.31		+ 2 56.53
		+45 39.38		+45 39.81		+45 38.93

	July 24	July 25	July 26	Aug. 1
	m s	m s	m s	m s
	24 56.01	25 —	24 44.1	25 9.8
	55.95 6	—	43.6	12.0
	55.89 6	—	47.8	14.2
	55.83 6	22.44 18.0		18.7
	55.77 6	52 20.3		20.9
		40 22.4	26 1.7	23.0
		48 24.7	4.0	25.3
		36 26.8	6.5	27.5
		52 31.4		32.0
		60 33.7		34.2
		60 35.8		36.4
				254.0
	24 45.83			24 33.47
	26 4.07	25 22.90	25 23.09	25 45.40
	−26.86	24 58.35	24 58.93	−4.71
	−.30	+ 26.56	+ 27.17	−.33
	−.06	+ 26.57	+ 27.18	−.10
	−2.58			−2.46
	−29.75			−7.59
	+53.34			+53.37
		−.32	−.30 −.06	−.33 −.10
		−33.81	+37.26	−40.98
		1.52905	1.57124	1.61257
		1.62209	1.66428	1.70561
		40 0	35 4	40 0
		43.4 43.4	13.8 11.8	50.0 47.8
		43.3 40.6	11.4 7.7	47.9 43.5
		895 840	252 195	979 913
		40	39	40
		44.75 42.00	12.60 9.75	48.95 45.65
		40 43.37	39 11.18	40 47.30
		− 41.89	+ 46.16	− 50.77
		40 1.48	39 57.34	39 56.53
		46.87	42 51.01	42 51.82
		37 42	36 10	37 46
		1.33600	1.33540	1.33600
		−825	−490	−490
		1.32775	1.33050	1.33110
		−21.27	−21.40	−21.43
		− .21	− .26	− .32
		− .12	− .71	− .14
		+ .04	+ .17	+ .03
		− 21.56	− 22.20	− 21.86
		25.31	42 28.81	42 29.96
		+ 3 9.42	42 29.39	+ 3 8.58
		−0.6	45 38.2	−0.6
		+3.1	+ 3 8.8	+2.9
			7.4	
		+ 3 11.92		+ 3 10.88
		+45 38.80		+45 40.27

	Aug. 1
	m s
	24 31.6
	33.7
	35.1
	42.9
	45.6
	47.7
	24 33.47
	25 45.40
	4.71
	−.33
	−.10
	−2.46
	−7.59
	+53.37
	−.30 −.06
	+27.49
	1.43917
	1.53221
	35 4
	29.6 26.4
	26.1 21.8
	27.9 23.5
	40
	27.85 24.10
	39 25.98
	−17.67 −4.06
	39 56.53
	42 48.31
	36 25
	1.33550
	−695
	1.32855
	−21.31
	− .14
	− .74
	+ .18
	01
	− 22.37
	42 26.30
	42 26.18
	+ 3 10.98
	−0.6
	+2.3
	11.2
	+ 3 12.68
	+45 38.86

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1876phae.proj.1483.

A Draconis

16h 28m 14s
+69° 2' 18"
−26° 39' 30"

Corr^{n} $\frac{d\alpha}{dt}$ $\frac{d\delta}{dt}$

Corr^{n}

| | m | s | | |

1876phae.proj.1483.

σ Herculis

α 16h 30m 4s
δ +42° 41′ 45″
− 0 18 54

α₀ 30 6365
Corr + .01
dα/dt +1.9325
δ₀ 41 3761
Corr − .3
dδ/dt −7.609

1876

	June 29	30 921	41 334
	July 4	916 5	34.6 12
	9	911 5	35.7 11
	14	905 6	36.7 10
	19	898 7	37.7 10
	24	890 8	38.5 8
	29	881 9	39.3 8
	Aug 3	871 10	40.0 7
	8	860 11	40.6 6

log cos δ 9.86624 — log I 0.44805
15 cos δ tan α 9.98817 — Hmr July 23 — I 2.81
9.99140 after July 23
tan δ +0.92 +1.36
sin z −.01

	July 17	July 22	July 24	July 25	July 26	Aug. 2
	+ −.86	+ −.87	+ −.85	+ −.79	−.78 −.08	+ −.84 −.10
to m s	m s	m s	m s	m s	m s	m s
16 30 35.6	30 —	30 47.9	30 —	29 52.1	30 18.3	30 1.4	30 19.1	29 46.2	30 18.5	29 31.2	29 58.5
37.7	—	50.8	—	54.1	21.1	3.7	21.9	49.0	22.4	33.6	1.2
40.3	—	53.2	—	56.2	24.0	5.9	24.7	51.0	25.4	35.9	3.9
	—		—		28.6		30.3		30.8		9.7
	27.21 24.4	—			32.3		33.0		33.7		12.4
31 14.0	.30 27.3	33.0 33.0			35.2		35.9	31 18.5	36.4	30 57.1	15.2
15.7	.19 30.0	32.9 35.7			38.0		38.7	20.2	39.2	57.4	18.1
18.5	.38 33.0	.88 38.5			40.7		41.5	28.4	42.1	57.9	20.9
	.36 38.6	.86 44.1			46.4		47.0		47.6		26.4
	.35 41.4	.95 47.0			49.2		49.8		50.5		29.2
	.24 44.1	.94 49.8			52.0		52.7		53.3		32.1
				386.8		394.6		400.9			227.6
30 37.87		30 50.63		29 54.13		30 3.67		29 48.73		29 33.57	167.6
31 16.07	30 27.290	30 32.920			30 35.164		30 35.873	31 20.70	30 36.445	30 52.47	30 1.536
−17.53	30 9.004	−23.70	30 8.928	−25.45	30 8.896	−26.23	30 8.878	−26.86	30 8.860	−5.62	30 8.725
−.79	+ 18.29	−.82	+ 23.99	−.78	+ 26.27	−.73	+ 27.00	−.70	+ 27.88	−.77	+ 6.51
	+ 18.28		+ 23.98		+ 26.26		+ 26.99	−.08	+ 27.57	−.14	+ 6.50
−2.64		−2.57	26.59 26.59	−2.53		−2.53		−2.50		−2.36	
−20.96		−2.64		−28.76		−29.47		−30.14		−8.89	
30 6.33		+6.33	6.33 +6.33	+6.40		+6.40		+6.30		+6.35	
	−.79	−.82		−.78		−.73		−.70 −.08		−.77 −.14	
−10.58											
1.02449m											
1.01266m	−48.78	−17.71		+41.03		+32.20		+47.72	−44.25	+41.67	−37.23
	1.68824m	1.24822m		1.61310		1.50786		1.67870	1.64591m	1.61982	1.57089m
	1.67641m	1.23634m		1.60450		1.49926		1.67010	1.63731m	1.61122	1.56229m
	40 4	40 4	40 4	40 3	40 3	40 3	40 3			40 3	40 4
	12.7 7.1	49.8 42.7	20.5 14.7	26.6 22.9		50.9 47.4	32.9 30.8			40.9 37.8	59.9 56.9
	15.4 8.3	49.9 46.2	21.7 14.4	23.9 17.4		46.8 40.6	30.9 24.4			39.9 31.2	57.7 50.2
	28.1 15.4	17 8.9	22 1.1	10.5 4.3		97.7 81.0	3.8 55.2			80.8 11.0	17.0 7.1
	14.05 7.7	4485 4465	21.10 14.55	2525 2085		4885 4400	3190 2760			4090 3550	5862 6355
	44 10.85	44 47.15	44 17.83	43 22.85		43 46.43	43 29.75			43 57.95	44 56.03
	− 10.30	− 47.48	− 17.23	+ 40.23		+ 31.57	+ 46.78	—		+ 46.85	− 36.50
	44 0.58	43 59.67	44 0.60	44 2.98		44 18.00	44 16.53			44 18.80	44 17.53
+42 38 47.77		48.68	38 47.75			38 45.37	38 30.35		38 31.82		38 29.55	28.82
18 50											
−0 47 10	18 14	18 49 43		19 38		19 15		19 31			19 23	18 05
	9.49820	9.48380		9.51600		9.50800		9.51400			9.51200	9.48100
	−1700	−1700		−1230		−810		−470			−725	−725
	9.48120	9.46680	9.48750	9.50370		9.49990		9.50930			9.50475	9.47375
	+0.30	+0.29	+0.31	+0.32		+0.32		+0.32			+0.32	+0.30
	− .03	− .64	− .08	− .46		− .28		− .62			− .47	− .37
	− .76	− .86	− .73	− .58		− .65		− .59			− .61	− .83
	+ .17	+ .19	+ .17	+ .14		+ .15		+ .14			+ .14	+ .20
	−0.32	−1.02	−0.33	−0.58		−0.46		−0.75			−0.62	−0.70
+42 38 47.45		47.66	38 47.42			38 44.79	38 29.89		38 31.07		38 28.93	28.12
+42 38 47.68	+2 49.78		+2 50.51		+2 53.98		+3 9.42		+3 8.58		38 28.52	+3 11.08
41 37.3	+0.0	41 38.3	+0.0	41 38.5	+0.0	41 38.7	+0.0	41 38.9	+0.0	41 39.9	+0.0
+2 49.7	+0.3	+2 50.9	−0.7	+2 53.7	−0.9	+3 8.8	−1.1	+3 7.8	−1.3	+3 11.4	−2.3
49.4		50.6		53.4		8.5		7.5		11.1	
	+2 50.08		+2 49.81		+2 53.08		+3 8.32		+3 7.28		+3 8.78
+42	+41 37.64		+41 37.23		+41 37.82		+41 38.21		+41 38.35		+41 37.30

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Go 848 — α_0 — δ_0 — Corr$_\alpha$ — $\frac{d\alpha}{dt}$ — Corr$_\delta$ — $\frac{d\delta}{dt}$ — log cosδ — log I

α 4 32 3 — +75° 42′ 33″ — +104° 17′ 27″ — −61° 54′ 39″ — 15 cosδ tanα — tanδ — sin z — I — ½I

1876

	July 25	July 26	Aug. 1	Aug. 2	Aug. 3	Aug. 5
	× −.79	× −.78 −.06	× −.82 −.10	× −.84 −.10	× −.88	× −.91
log cosδ	9.39220$_n$					
15 cosδ tanα	9.51443$_n$ (then July 23) / 9.51736$_n$ (after July 23)					
tanδ	✱ 3.92 −4.05					
sin z	−.88					
I						8.36
½I						4.18
4 32 5.0	32 18.2	32 14.2	32 18.8	31 27.5	31 57.0	31 7.0	31 57.9	31 17.0	31 59.3	32 1.7	[+3] [5.5]
13.4	22.8	25.5	23.5	85.2	7.1	14.9	2.3	24.9	8.7		
19.3	26.6	32.2	27.6	42.4	8.6	21.8	6.8	30.1	7.3	32	9.7
	31.2		31.7		9.7		10.7		11.4		13.9
	34.6		36.0		13.6		14.6		15.3		17.9
33 4.9	38.5	33 24.0	40.0	32 42.7	18.1	32 59.7	18.9	32 45.2	20.1	33 16.0	22.6
8.9	43.0	31.1	44.1	57.3	22.0		23.0	48.4	24.3	23.2	27.0
18.6	47.2	38.8	48.0	57.7	26.3		27.4	53.3	28.5	31.4	30.7
	52.0		52.2		30.4		31.7		32.4		84.4
32 12.57	314.1	32 23.97	32.1.9	31 39.03	183.8 / 123.8	31 14.57	193.3 / 133.8	31 24.00	202.3 / 142.3	32 19.70	1630
33 10.80	32 34.900	33 31.20	32 35.767	32 50.57	32 13.756	32 59.70	32 14.811	32 49.63	32 15.811	33 23.53	32 18.111
−26.23	32 11.665	−26.86	32 11.765	−4.71	32 12.370	−5.62	32 12.473	−6.66	32 12.575	−8.76	32 12.782
+3.10	+ 23.24	+2.98	+ 24.00	+3.21	+ 1.39	+3.29	+ 2.34	+3.45	+ 3.24	+3.57	+ 5.33
	+ 23.07	+.24	+ 23.83	+.40	+ 1.22	+.40	+ 2.17		+ 3.07		+ 5.16
−0.92		−1.02		−1.63	2.73 2.73	−1.73		−1.84		−2.04	
−23.05		−24.66		+.72	11.03 11.03	−3.66		−5.08		−7.23	
32 10.85		+11.11		+12.03		+11.15		+10.77		+10.88	
	+3.10		+2.98 +.24		+3.21 +.40		+3.29 +.40		+3.45		+3.57
	+22.33										
	1.34889										
	0.866625$_m$										
	−35.90	+11.80	−55.53	+38.73	−36.81	+60.24	−44.89	+51.81	−33.82	−1.59	−65.42
log $\frac{\varrho}{r}$	1.55509$_n$	1.07188	1.74453$_n$	1.58805	1.56597$_n$	1.77988	1.65215$_n$	1.71441	1.52979$_n$	1.20140$_n$	1.81571$_n$
log ϱ	1.07245	0.58924$_n$	1.26189	1.10541$_n$	1.08333	1.29724$_n$	1.16951	1.23177$_n$	1.04653	8.71876	1.33307
10 0	10 0	10 0	10 0	10 0	10 0	10 0	10 0	10 0	10 0	10 0	10 0
32.3 34.2	13.6 15.1	29.2 30.6	7.4 9.6	40.9 42.7	15.1 16.8	25.9 28.2	12.8 15.0	43.3 45.2	14.1 16.4	24.1 26.2	2.9 5.5
34.1 24.4	15.6 5.6	31.8 18.8	9.9 58.4	42.8 31.6	16.9 6.1	30.4 18.6	16.9 4.8	45.9 34.7	16.9 5.6	28.2 16.7	5.9 54.5
6.4 58.6	29.2 20.7	6.10 49.4	1.73 1.80	3.7 74.3	1.20 22.9	5.63 46.8	9.7 19.8	9.2 79.9	3.10 32.0	13.3 62.9	8.8 0.0
3320 2930	1460 1035	3050 2470	365 400	4185 3716	1600 1145	2515 2340	1435 990	4460 3995	1550 1100	2015 2145	440 000
10 3125	10 1248	10 2760	10 633	10 3950	10 1373	10 2578	10 1238	10 4288	10 1325	10 2380	10 220
− 7.35	+ 11.82	− 3.88	+ 13.28	− 12.75	+ 17.12	− 19.83	+ 14.78	− 17.05	+ 11.13	+ 23.52	+ 21.53
10 23.90	10 24.30	10 23.87 72	10 24.61	10 26.75	10 25.85		10 27.16	10 25.23	10 24.38	10 2403 24.32	10 23.73
+104										25.03	
75 12 24.45	12 24.05	12 24.63	23.74	12 21.60	22.60		21.19	12 23.13	23.97	12 19.02	24.62
−61 52 30	52 49	52 33	52 55	52 21	52 47		52 49	52 19	52 48	52 37	52 59
2.03060	2.03069	2.03060	2.03072	2.03067	2.03069		2.03069	2.03054	2.03069	2.03063	2.03075
−8.10	−8.10	−4.70	−4.70	−6.80	−6.80		−7.25	−7.20	−7.20	−19.00	−19.00
2.02250	2.02259	2.02590	2.02602	2.02377	2.02389		2.02344	2.02334	2.02349	2.01163	2.01175
+105.82	+106.84	+106.15	+106.18	+105.63	+105.46		+105.58	+105.62	+105.56	+102.71	+102.74
+ .06	+ .17	+ .02	+ .40	+ .19	+ .18		+ .27	+ .35	+ .15	+ .00	+ .57
− .08	− .03	− .08	− .02	− .12	− .03	−.04	− .03	− .12	− .03	− .07	− .00
+ .02	+ .01	+ .02	+ .00	+ .03	+ .01	+.02	+ .01	+ .03	+ .01	+ .02	+ .03
+1 45.32	+1 45.49	+1 46.11	+1 46.56	+1 45.73	+1 45.82		+1 45.80	+1 45.78	+1 45.69	+1 42.66	+1 43.31
+104 14 9.77	14 9.54	14 10.74	10.30	14 7.33	8.32		14 6.99	14 8.91	9.66	14 7.69	7.93
+104 14 9.65	+3 4.82	14 10.62	+3 7.55 8.58	14 7.82	+3 10.88			14 9.28	+3 11.57	14 7.81	+3 10.15
17 21.4	+1.8	17 21.5	+1.8	17 22.0	+1.8		17 22.1	17 22.1	+1.8	17 22.2	+1.8
+3 11.8	−1.5	+3 11.0	−1.6	+3 14.2	−2.1		3 1.51	+3 12.8	−2.2	+3 14.4	−2.3
11.7		10.9		14.1			15.0	12.7		14.3	
	+3 9.74		+3 8.78		+3 10.68		+3 11.08		+3 11.37		+3 12.65
							+1.8				
+104	+17 19.67		+17 19.30		+17 18.50		−2.2		+17 20.65		+17 20.46
							+3 10.68				
							+17 17.67				

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η Herculis

α 16 38 37
δ +39° 9' 40"

Cons: +3 13 8

	m	s
α	38	38.742
Cons		+.01
dα/dt		+2.0560
δ	9'	32.71"
Cons		+.2"
dδ/dt		−7.052"

| | | |

1876phae.proj.1463

Ga 2377

α_0 16h 42m 56s

Corr^{n} + .04

$\frac{d\alpha}{dt}$ + 1.1337

δ_0 −14° 37′ 32″

Corr^{n} + ″.5

$\frac{d\delta}{dt}$ − 6.560

log cosδ 9.73611

1/cosδ sec 9.85804 Use July 23

9.86127 after July 23

tangδ + 1.54 + 1.84

sin z − .25

	1876	July 17	July 24	July 26	Aug 1	Aug 2	Aug 3
		−.86	−.85	−.76 −.06	−.82 −.10	−.84 −.10	−.88
16	42 23.4	42 57.9	42 19.0	43 3.3	42 27.4	43 4.6	41 54.3	42 42.5	42 17.0	42 43.5	42 11.6	42 44.3
	26.1	57.6	21.0	7.1	22.6	8.3	53.0	46.3	20.5	47.2	14.7	48.0
	31.0	3.4	22.6	10.9	32.2	12.2	57.0	50.1	22.7	51.0	17.7	51.8
		11.0		18.4		18.8		57.6		58.6		59.6
		14.7		22.2		23.6		1.4		2.3		3.2
43	38.6	18.5	44 18.4	26.0	41 37.8	26.5	43 57.1	5.2	43 56.9	6.1	43 30.2	7.1
	49.6	22.2	20.7	27.8	40.5	31.2	1.2	8.9	0.2	9.9	34.1	10.9
	44.6	26.0	24.6	33.7	44.0	35.1	4.4	12.7	3.1	13.7	37.2	14.7
		33.8		41.3		42.7		20.4		21.2		22.3
		37.6		45.0		46.4		24.1		25.0		26.0
		41.2		48.9		50.1		27.9		28.7		29.9
		322.9		286.6		301.5		297.1		307.2		317.8
42	26.83	203.9	42 21.87		42 29.73		41 54.43	57.1	42 20.07	67.2	42 12.47	72.8
43	41.27	43 18.536	44 21.73	43 26.056	44 41.73	43 27.409	44 0.90	43 5.191	44 0.73	43 6.109	43 33.83	43 7.073
					0.77							
	−17.54	42 59.619	−26.45	42 59.423	−26.86	42 59.367	−4.71	42 59.192	−5.62	42 59.162	−6.67	42 59.132
	−1.32	+ 18.92	−1.31	+ 26.63	−1.17	+ 28.84	−1.26	+ 6.00	−1.29	+ 6.95	−1.36	+ 4.94
		+ 18.88		+ 26.59	−.11	+ 28.80	−.18	+ 5.96	−.18	+ 6.71		+ 4.90
	−2.79		−2.59		−2.54		−2.36		−2.33		−2.30	
	−21.65		−29.35		−30.68		−8.51		−9.42		−10.33	
	+42 56.89		+56.71		+56.78		+56.68		+56.69		+56.74	
		−1.32		−1.31		−1.17 −.11		−1.26 −.18		−1.27 −.18		−1.86
	+51.71											
	1.71357											
	1.57161	−22.73	+64.19	−55.17	+57.68	−73.36	+70.76	−55.71	+46.04	−54.62	+52.60	−26.76
	ξ η	1.35660m	1.80747	1.74170m	1.76103	1.86546m	1.84979	1.74593m	1.66314	1.73735m	1.72069	1.42749m
	G H	1.21464m	1.66844	1.60297m	1.62230	1.72673m	1.71106	1.60720m	1.52441	1.59867m	1.58226	1.28876m
	20 4	25 0	20 4	25 1	25 0	25 1	25 0	25 1	25 0	25 1	25 0	25 1
	59.3 532	522 473	54.8 520	21.4 187	133 124	48.3 461	5.1 36	38.1 364	23.7 226	38.1 363	19.0 172	17.1 150
	2.9 54.5	57.1 51.2	52.6 46.0	19.9 12.6	13.9 6.5	47.6 39.5	4.5 5.2	36.9 28.9	24.9 15.7	37.8 29.8	18.1 12.6	15.7 9.1
	2.2 10.7	9.3 98.5									37.1 29.8	32.8 24.1
	110 53.85	5466 4925	24	26	25	26	25	26	25	26	1655 1490	1640 1205
	24 57.48	25 51.95	53.70 49.80	20.65 15.65	13.60 9.45	47.95 42.80	4.80 0.40	37.50 32.65	24.30 19.15	37.95 33.05	25 16.73	26 14.23
			24 51.35	26 18.15	25 11.52	26 45.38	25 2.60	26 35.08	25 21.72	26 35.50	25	
	+ 37.29	− 16.39	+ 46.64	− 40.08	+ 41.91	− 53.80	+ 51.41	− 40.48	+ 33.45	− 39.68	+ 38.22	− 19.44
	25 34.77	35.56	25 37.99	38.07	25 53.43	52.08	25 54.01	54.60	25 55.17	55.82	25 54.95	54.79
+ 576	57 13.58	12.79	57 10.36	10.28	576 54.92	56.27	576 54.34	53.78	576 53.18	52.53	56 53.40	53.56
−14	38 04	37 09	38 10	36 43	37 49	36 16	37 58	36 26	37 39	36 25	37 44	36 47
	1.17710	1.17670	1.17720	1.17650	1.17700	1.17630	1.17710	1.17630	1.17690	1.17630	1.17695	1.17630
	−1645	−1645	−1160	−1160	−434	−434	−652	−652	−700	−700	−695	−695
	1.16065	1.16025	1.16560	1.16490	1.17246	1.17196	1.17058	1.16978	1.16990	1.16936	1.17000	1.16935
	+14.48	+14.46	+14.64	+14.62	+14.85	+14.86	+14.81	+14.78	+14.79	+14.77	+14.79	+14.78
	− .66	− .13	− 1.02	− .75	− .83	− 1.34	− 1.24	− .74	− .53	− .74	− .69	− .18
	− .90	− .14	− .62	− .22	− .03	− .29	− .60	− .27	− .05	− .27	− .05	− .22
	+ .20	+ .03	+ .19	+ .05	+ .01	+ .07	+ .00	+ .06	+ .01	+ .06	+ .01	+ .05
	+ 13.12	+ 14.22	+ 12.99	+ 13.70	+ 14.03	+ 13.30	+ 13.57	+ 13.81	+ 14.22	+ 13.82	+ 14.06	+ 14.43
+57	57 26.70	27.01	57 23.35	23.98	57 8.95	9.57	57 7.91	7.56	57 7.40	6.35	57 7.46	7.99
+56	57 26.85	+2 49.78	57 23.67	+2 53.93	54 9.26	+3 8.58	57 7.74	+3 10.98	54 6.88	+3 11.08	54 7.72	+3 11.77
	0 15.1	+ 0.5	0 16.4	+ 0.5	0 16.8	+ 0.5	0 17.8	+ 0.5	0 18.0	+ 0.5	0 18.1	+ 0.5
	+2 48.3	− 1.2	+2 52.7	− 2.5	+3 7.5	− 2.9	+3 10.1	− 3.8	+3 11.1	− 4.1	+3 10.4	− 4.2
	48.8		53.2		8.0		10.6		11.6		10.9	
		+2 49.08		+2 51.43		+3 6.18		+3 7.68		+3 7.48		+3 8.07
+57		+0 15.93		+0 15.60		+0 16.44		+0 15.42		+0 14.36		+0 15.79

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κ Ophiuchi

16 51 45

+9° 34' 15"

+32° 48' 33"

1876

July 22 — −.89

July 24 — −.85

July 26 — −.76 −.79 −.06

Aug. 2 — −.84 −.10

Aug. 3 — −.88

Aug. 5 — −.91

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1070phec.proj.1400.

ε Herculis α_0 — m 55 32.758 — July 19 — m 55 35.43 — 6 — 34.5

16h 55m 30s — Conv — + .00 — 24 — 35.36 — 5 — 35.4 9

+31° 6' 42" — $\frac{d\alpha}{dt}$ — + 2.2944 — Aug. 3 — 29 — 35.32 — 6 — 36.2 8

+11° 16' 06" — δ_0 — 6 36.22 — 8 — 35.24 — 8 — 36.9 7

Cond — + .2 — 8 — 35.16 — 8 — 37.5 6

$\frac{d\delta}{dt}$ — − 5.536

log cos δ 9.93253

1 cos δ tan i 0.05446 thru July 23

0.05769 after July 23

tan δ + 0.60 + 1.17

sin z + .20

	July 17	July 22	July 24	July 26	Aug. 2	Aug. 3
	18.6					
	−.86	−.89	−.85	−.76 −.79 −.06	−.84 −.10	−.88
16	55 33.6	55 39.0	55 28.1	55 44.6	55 18.2	55 46.8	55 27.1	55 48.2	55 10.5	55 27.0	55 3.8	55 28.0
	35.7	41.5	30.1	47.0	19.8	49.3	29.4	50.5	12.7	28.5	2.7	30.4
	37.8	44.0	32.0	49.5	21.7	51.7	31.1	53.0	15.0	31.8	9.4	32.8
		48.7		54.3		56.5		58.0		36.6		37.7
		51.2		56.7		59.0		0.2		39.1		40.0
	56 21.0	55.5	56 21.5	59.0	56 33.8	1.3	56 30.6	2.7	56 12.2	41.4	56 9.3	42.4
	22.7	55.1	23.4	1.6	35.7	3.7	32.1	5.0	14.6	43.8	11.4	44.8
	24.9	57.3	25.8	4.0	38.2	6.1	34.4	7.6	16.8	46.2	13.6	47.3
		59.1		8.8		11.0		12.3		51.1		52.0
		55.5		11.2		13.4		14.7		53.4		54.5
		7.9		13.5		15.8		17.1		55.7		56.9
		408.6		350.2		314.6		269.3		455.6		466.8
	55 35.63	588.6	55 30.07	460.7	55 19.90	14.6	55 29.20	24.3	55 12.57		55 7.65	
	56 22.87	55 53.509	56 23.57	55 59.109	56 35.90	56 1.327	56 32.37	56 2.664	56 14.53	55 44.18	56 11.43	55 42.436
	−17.55	55 35.448	−23.22	55 35.598	−25.46	55 35.377	−26.85	55 35.353	−5.61	55 35.252	−6.67	55 35.236
	−.52	+ 1.806	−.53	+ 23.71	−.51	+ 25.95	−.46	+ 27.31	−.50	+ 6.17	−.53	+ 7.20
		+ 1.806		+ 23.71		+ 25.95	−.07	+ 27.31	−.12	+ 6.17		+ 7.20
	−2.70		−2.65		−2.63		−2.60		−2.50		−2.49	
	−20.77		−26.40		−28.68		−29.98		−8.78	8.78	−9.69	
	+55 32.74		+32.71		+32.78		+32.68		+32.68	32.69 32.69	+32.75	
		−.52		−.53		−.51		−.46		−.50		−.53
								−.07		−.12		
	+17.88											
	1.25237											
	1.30683	−29.36	+29.04	−24.46	+41.43	−34.57	+33.46	−29.71	+28.85	−33.11	+34.81	−28.99
	E F	1.46776w	1.46300	1.38846w	1.61731	1.53870w	1.52453	1.47290w	1.46015	1.51996w	1.54170	1.46225w
	G H	1.52222m	1.51746	1.44292m	1.67500	1.59639m	1.58222	1.53059m	1.67784	1.57765w	1.59969	1.51994m
	15 3	15 4	15 3	15 4	15 3	15 4	15 3	15 4	15 3	15 4	15 3	15 4
	32.1 26.3	26.1 20.7	18.0 13.6	19.9 14.7	9.7 6.4	36.9 33.8	32.2 30.7	45.6 43.2	41.0 38.1	52.1 49.1	33.0 30.6	48.0 43.8
	36.5 29.6	30.1 25.4	21.7 16.6	20.0 17.8	14.6 2.8	34.9 26.4	32.1 24.9	43.1 36.7	38.0 33.4	49.8 44.1	31.4 26.8	43.8 40.7
	8.6 18.9	54.2 6.1	39.7 10.2	39.9 12.5								
	34.30 27.93	28.60 23.05	14.85 15.10	19.95 16.25	18	19	18	19	18	19	18	19
	18 31.13	19 25.63 58	18 17.48	19 18.10	8.15 46.0	35.90 30.10	32.15 27.80	44.35 39.95	39.50 35.75	50.95 46.66	32.20 28.70	45.90 42.28
	+ 20.27	− 33.23	+ 32.92	− 27.73	18 63.8	19 33.00	18 26.98	19 42.15	18 37.62	19 48.78	18 30.45	19 44.08
					+ 47.32	− 39.48	+ 38.21	− 33.93	+ 32.95	− 37.81	+ 37.75	− 33.11
	18 51.40	18 52.30	18 52.40	50.37	18 53.70	53.52	19 8.19	8.22	19 10.57	10.97	19 10.20	19 10.97
+ 31	3 56.95	56.05	3 57.95	57.98	3 54.65	54.83	3 40.16	40.13	3 37.78	37.38	3 38.15	37.38
+ 11	15 45 30	16 25	15 16	16 17	15 58	16 32	15 29	16 41	15 37	16 48	15 29	16 43
	1.05930	1.05990	1.05920	1.05980	1.05910	1.06000	1.05930	1.06010	1.05940	1.06020	1.05930	1.06010
	−1590	−1590	−812	−812	−1100	−1100	−400	−400	−668	−668	−668	−668
	1.04340	1.04400	1.05108	1.05168	1.04810	1.04900	1.05530	1.05610	1.05272	1.05352	1.05262	1.05342
	−11.05	−11.07	−11.25	−11.26	−11.17	−11.19	−11.36	−11.38	−11.28	−11.31	−11.29	−11.31
	− .08	− .21	− .20	− .15	− .41	− .24	− .27	− .21	− .20	− .26	− .29	− .20
	− .63	− .79	− .56	− .73	− .53	− .77	− .59	− .80	− .61	− .82	− .89	− .80
	+ .14	+ .18	+ .13	+ .17	+ .12	+ .18	+ .14	+ .19	+ .14	+ .19	+ .14	+ .19
	− 11.62	− 11.89	− 11.88	− 11.97	− 11.99	− 12.07	− 12.08	− 12.20	− 11.96	− 12.20	− 12.03	− 12.12
+ 31	3 45.33	44.16	3 46.07	46.02	3 42.66	42.76	3 28.08	27.93	3 25.82	25.18	3 26.12	25.26
+ 31	3 44.74	+ 2 49.78	3 46.04	+ 2 50.51	3 42.76	+ 2 53.93	3 28.00	+ 3 8.58	3 25.50	+ 3 11.08	3 25.69	+ 3 11.77
	6 34.1	− .04	6 35.1	− 0.4	6 35.4	− 0.4	6 35.8	− 0.4	6 36.8	− 0.4	6 36.9	− 0.4
	+ 2 44.4	+ 2.1	+ 2 49.1	+ 1.1	+ 2 52.7	+ 0.8	+ 3 6.8	+ 0.4	+ 3 11.3	− 0.6	+ 3 11.2	− 0.7
	49.6		49.3		52.9		8.0		11.5		11.4	
		+ 2 51.48		+ 2 51.21		+ 2 54.33		+ 3 8.58		+ 3 10.08		+ 3 10.67
+ 31		+ 6 36.22		+ 6 37.25		+ 6 37.04		+ 6 36.58		+ 6 35.58		+ 6 36.36

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1876phae.proj.1483

E Ursae Minae.

α 16 m 58 s 51
δ +82° 14′ 22″

−39° 51′ 34″

1876

	m	s		m	s
α_0	58	44.399		44.534	
Corr		+ .03			
$\frac{d\alpha}{dt}$		−6.3754			
δ_0	14	16.94		17.48	
Corr		+ .5			
$\frac{d\delta}{dt}$		−5.314			

log cos δ 9.13052 log I 1.18363
log sin p 9.25547 Jul. I 1526
9.25245 July 17–22 II 263
9.25568 July 24– Aug 5
tang δ + 7.34 + 7.37
sin z − .64

+ +.02 Feb. 16.8
+ −.23 Feb. 19
+ −.14 Feb. 20
+ −.86 July 17
+ −.88 July 19
−.07
+ −.89 July 27

See Supp. List page 17 for remainder of this star

Feb. 16.8		Feb. 19		Feb. 20		July 17		July 19		July 27	
m	s	m	s	m	s	m	s	m	s	m	s
57	23.8	57		57	17.5	57	41.0	58	8.1	58	43.0
	22.0		40.5				48.5		19.2		54.8
	48.0		49.0				56.1		37.5		3.7
			56.1				4.3				11.0
							11.5				
			4.1				19.2				18.5
			12.2	59	57.0		27.9	59	16.4		26.0
			18.0		2.1		34.9				34.1
			27.6		14.8		42.6				42.0
			35.3								48.9
			43.3								
			2861				2860				287.2
57	34.60		1061	57	17.51	58	4.740		1060	58	21.70
		58	14.89		2.63	58	5.011	0	5.197	58	11.778
							12.644				

+29.71	58	41.73	+31.27	58	42.18	+30.53	58	42.33	−17.56	58	49.49	−19.65	58	49.23	−23.22	58	48.81
+.15	−	29.84	−1.69	−	37.17	29.54 −1.03	−	30.55	−6.31	+	24.05	−6.46	+	26.47	−6.53	+	29.77
	−	29.84		−	37.07	29.57	−	30.045		+	24.15	−.52	+	26.57		+	29.87
												−4.69					
+2.80			+2.35			+2.21			−4.96			−31.32			−4.28		
+32.66			+31.93			+31.71			−28.83			44.38			−34.03		
58 44.45			+44.57			43.49			+44.71						44.55		

	+.15			−1.69			−1.03			−6.31			−6.46			−6.53	
													−.52				
+37.19																	
1.57043																	
0.82596			+55.14		−109.99												
			+41.61		−117.62	−35.62	−160.19	+51.84	−2.86	+72.07	−35.87	+58.61	−54.42				
			1.74147		2.04166m	1.55169m	2.20646m	1.71466	0.45637m	1.85776	1.55473m	1.76707	1.71132m				
			0.99694		1.29682m	0.80776m	1.46011m	0.96711	9.70882m	1.11020	0.80718m	1.02042	0.96358m				
			10 1		10 2	10 2	10 2	10 1	10 2	10 1	10 2	10 1	10 2				
			42.4 52.4		11.8 21.7	3.8 11.7	25.4 32.3	36.8 46.1	6.6 55	51.6 51.5	11.6 11.7	51.2 57.2	16.3 16.3				
			52.2 46.6		21.2 15.6	11.4 7.2	32.2 27.8	2.2 52.8	11.7 3.7	51.9 48.6	17.4 9.8	1.9 53.4	20.7 12.8				
			946 990		33.0 37.3	15.2 18.9	57.6 60.1	11.90 108.9	183 92	91 100.1	9.0 21.5	11.91 10.6	3.90 2.91				
			4730 4950		16.50 18.65	7.60 9.45	28.80 30.05	59.50 54.45	9.15 46.0	57.50 50.05	1.450 10.75	3.955 5.530	1.350 1.455				
			11 58.43		12 17.58	12 8.53	12 29.43	11 56.98	12 6.88	11 52.43	12 12.63	11 57.43	12 16.53				
			+ 9.93		− 19.81	− 6.41	− 28.85	+ 9.27	− 0.51	+ 12.84	− 6.42	+ 10.48	− 9.20				
			11 58.33		57.77	12 2.12	0.58	12 6.25	6.37	12 5.29	6.21	12 7.91	7.33				
+ 82 10 51.62			10 50.02		50.58	10 46.23	47.77	10 42.10	41.98	10 43.06	42.14	10 40.44	41.02				
−39 50 16			50 18		49 48	49 57	49 37	50 04	50 54	51 09	50 48	51 04	50 44				
1.68130			1.68130		1.68120	1.68120	1.68110	1.68150	1.68150	1.68150	1.68140	1.68150	1.68140				
+1410			+1977		+1977	+3575	+3575	−1565	−1565	−1733	−1733	−806	−806				
1.69540			1.70107		1.70097	1.71695	1.71685	1.66585	1.66585	1.66417	1.66407	1.67344	1.67334				
+49.59			+50.24		+50.23	+52.11	+52.10	+46.33	+46.33	+46.15	+46.14	+47.15	+47.13				
− .10			− .22		− .88	− .09	− 1.88	− .20	− .00	− .38	− .09	− .25	− .19				
− .23			− .25		− .32	− .29	− .35	− .34	− .38	− .52	− .40	− .34	− .39				
+ .07			+ .07		+ .09	+ .08	+ .10	+ .08	+ .08	+ .08	+ .09	+ .08	+ .09				
+ 49.33			+ 49.84		+ 49.12	+ 51.81	+ 49.97	+ 45.87	+ 46.03	+ 45.51	+ 45.74	+ 46.64	+ 46.64				
+82 11 40.95			11 39.86		39.70	11 38.04	37.74	11 27.97	28.01	11 28.57	27.88	11 27.08	27.66				
	+ 2	5.80	11 39.78	+ 2	7.60	11 37.89	+ 2 7.71	11 27.99	+ 2 7.78	11 28.22	+ 2 7.92	11 27.37	+ 2 5.57				
13 48.8		+1.6	13 48.4		+1.6	13 48.3	+1.6	14 18.9	+1.2	14 19.3	+1.2	14 19.9	+1.2				
+ 2 7.8	+	28.87	+ 2 8.6	+	28.57	+ 2 10.4	+ 29.2	+ 2 5.09	− 2.79	+ 2 5.1.1	− 2.27	+ 2 5.2.5	− 3.12.4				
8.3			9.1		29.1	10.9		51.1	1.5	51.1.0	11.8	52.6	2.4				
7.7	+ 2	35.50															
		36.10		+ 2	37.70		+ 2 37.91		+ 2 48.98		+ 2 48.72		+ 2 48.71				
					38.30		38.51		49.48		49.32		49.31				
+82	+14	14.45		+14	17.48		+14 15.70		+14 16.97		+14 16.44		+14 16.68				
		19.05			18.08		16.40		17.47		17.54		16.68				

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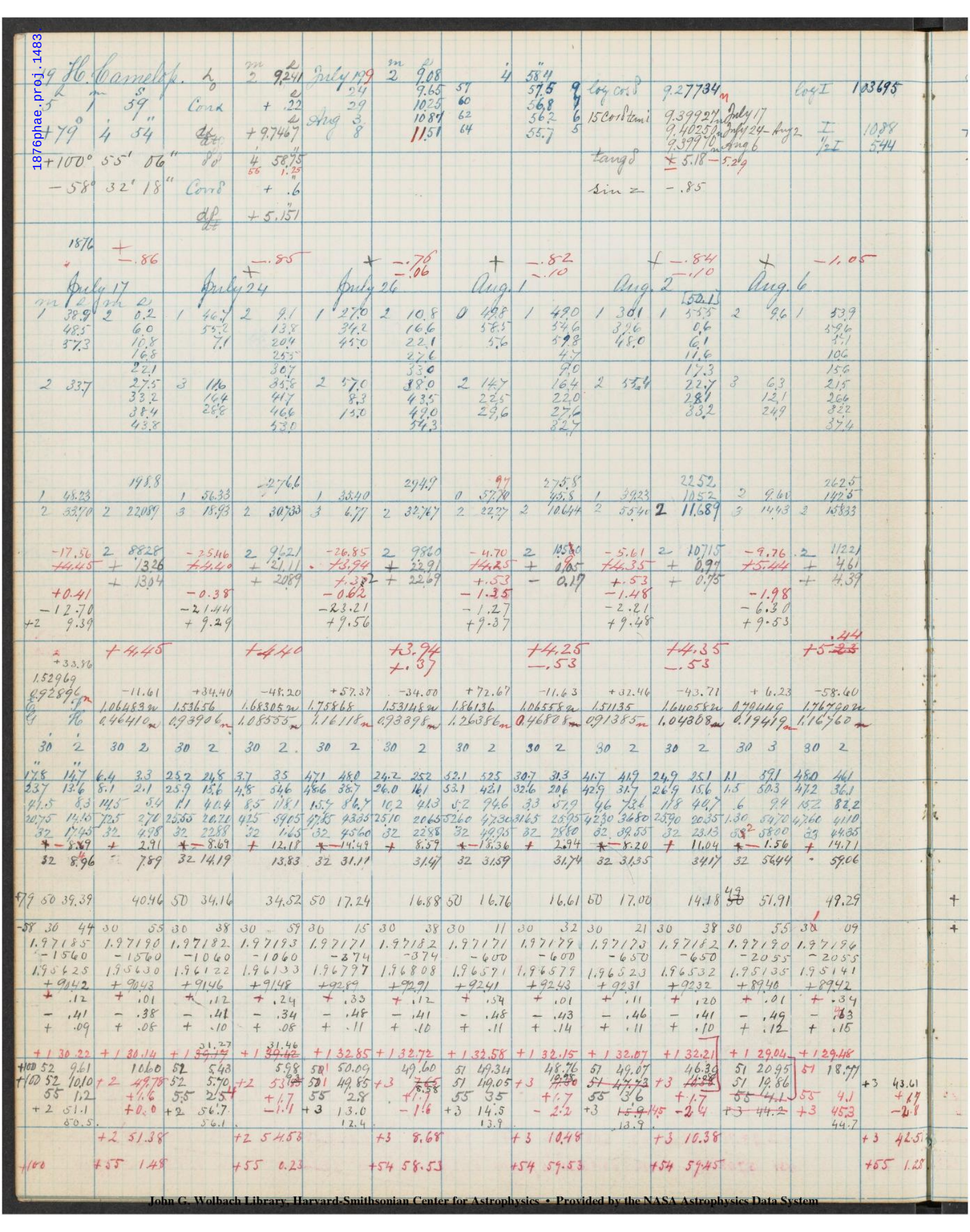
19 H. Camelop. — July 17 — July 24 — July 26 — Aug. 1 — Aug. 2 — Aug. 6



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α Herculis

α_0 17h 8m 57s

Corr$_\alpha$

$\frac{d\alpha}{dt}$ +14° 32' 4"

δ_0 +27 50 44

Corr$_\delta$

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

1876

Jan 19

Jan 21 26 31 Feb 5 10 15 20 25 Mar. 1

Feb. 16

Feb. 19

Feb. 20

Log cos δ 9.99588

15 cos δ sin 1 0.11083 Jan. Feb.

0.10781 Jan 24 17-19-22

0.11104 July 24 Aug 5

0.10824 Aug 6

tan δ +0.26 +.03

sin z +.47

Log R-2 1.28540

Log I 0.32841

R-2 19.294

I 2.13

I' .129

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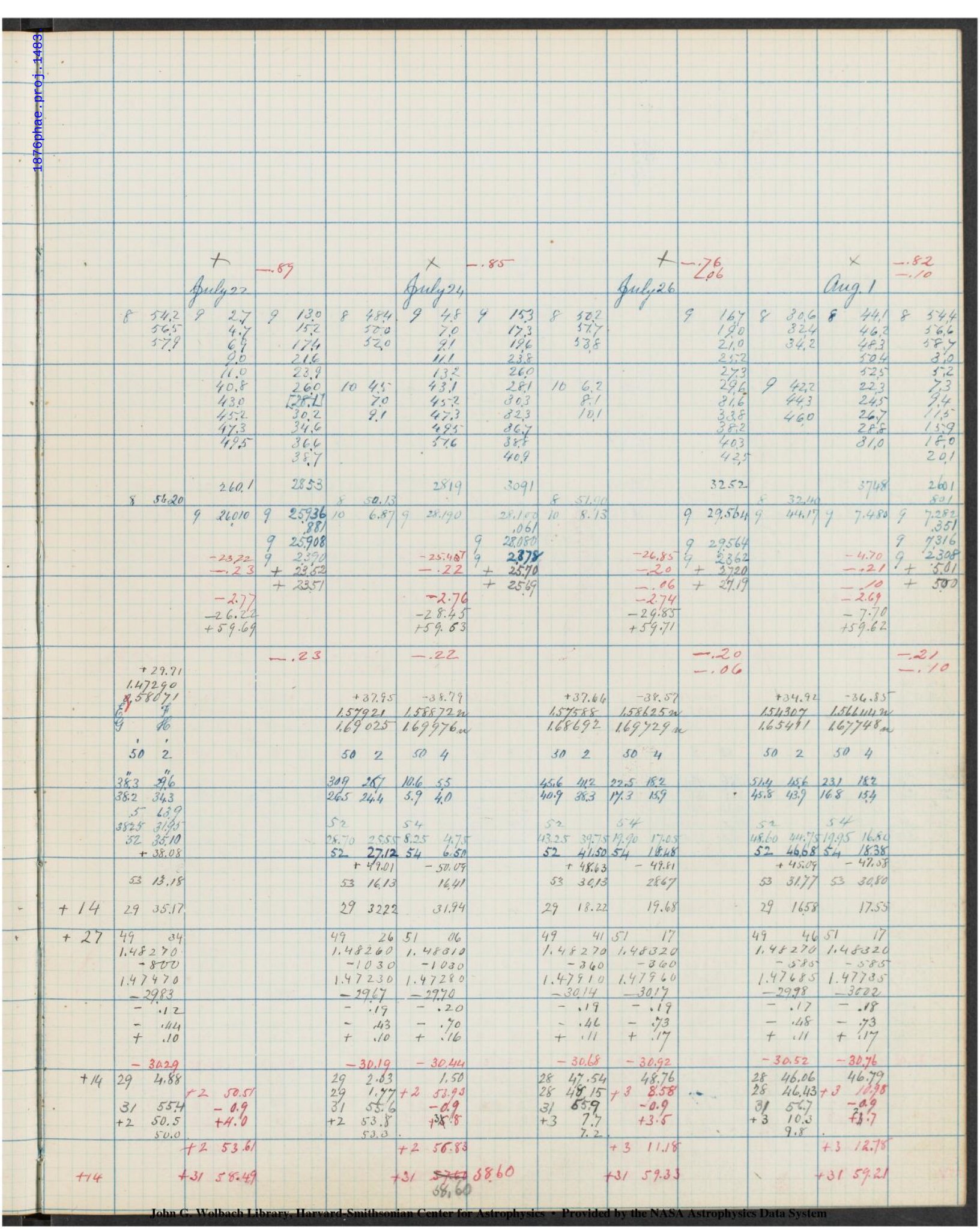
July 22 — July 24 — July 26 — Aug. 1



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See 8 List for Continuation p. 19

1876

Aug. 2 + −.84 −.10

Aug. 3 + −.88

Aug. 5 + −.91

Aug. 6 + −1.05

m	s	m	s	m	s	m	s
8 34.1	8 [45.0]	8 [55.5]	8 34.4	8 —	8 57.4	8 35.8	8 —
35.5	[47.1]	57.5	36.0	—	58.6	37.4	—
37.1	48.2	59.7	37.7	—	0.7	39.7	—
	51.3	4.0		—	4.9		—
	53.5	6.1		—	7.0		—
9 39.3	23.2	8.2	9 41.6	9 24.1	9.2	9 40.2	9 26.1
41.1	25.5	10.5	43.4	26.4	11.4	42.0	28.4
43.9	27.5	12.6	45.0	28.4	13.5	44.2	30.6
	29.6	16.8		30.6	17.7		32.6
	31.8	18.8		32.7	19.9		34.8
		21.0			22.0		
8 35.83	38.37	27.0.7	8 36.03	28440	22.1.3	8 37.63	30.500
	83.4	90.7			101.3		
9 41.43	9 8.370	9 .8245	9 43.33	9.146	9 9209	9 42.13	11.206
		8.241					
		9 8.243			9 9178		
	−5.60	9 2.298		−6.67	9 2288		−8.74
	−.22	+ 5.94		−.23	+ 6.89		−.24
	−.10	+ 5.93			+ 6.88		
	−2.68			−2.67			−2.65
	−8.60			−9.57			−11.63
	+59.64			+59.61			+59.61

m	s	m	s
8 37.6	8 49.1	8 39.4	
39.5	57.2	1.7	
41.3	3.3.3	3.8	
	37.4	8.1	
	37.6	10.7	
9 46.1	27.3	12.3	
48.1	29.5	14.4	
50.7	31.6	16.6	
	33.7	20.8	
	35.5	23.0	
		25.1	
	4245	1954	
		1354	
9 48.13	9 12.45	12.30	
		.321	
	9	12.315	
	−9.76	9 2.258	
	−.27	+ 10.06	
		+ 10.05	
	−2.64		
	−12.67		
	+59.65		

	+32.41		−.22						−.24				−.27		
	1.51068		−.10												
	1.62177		−33.19			+33.18	−34.15		+33.61	−30.89		+32.85	−35.81		
C			1.52101 m			1.52048	1.53339 m		1.52647	1.48982 m		1.51624	1.55400 m		
G	16		1.63205 m			1.63152	1.64443 m		1.63751	1.60086 m		1.62478	1.66224 m		
50	2		50	4		50	2	50	4	50	2	50	4	50	3	50	4
53.9	47.8		19.1	13.3		54.5	48.4	20.7	15.2	56.5	50.0	19.8	13.7	29.2	22.1	57.2	49.7
47.9	46.4		12.8	11.5		48.1	46.5	14.7	12.7	49.7	48.5	12.2	11.9	21.1	18.4	49.4	47.5
101.8	94.2		31.9	24.8		102.6	94.9	35.4	27.9	106.2	98.5	32.0	25.6	50.3	40.5	106.6	97.2
5090	4710		1595	1240		5130	4745	1770	1395	5310	4925	1600	1280	2515	2025	3330	4860
52	4900		54	1418		52	4934	54	1583	52	5118	54	1440	53	2270	54	5095
+	41.85		−	42.86		+	42.81	−	44.10	+	43.40	−	39.87	+	42.15	−	48.95
53	30.85			31.32		53	32.19		31.73	53	34.58		35.51	54	48.5		5.00
+14	29	17.50		17.03		29	16.16		16.62	29	13.77		12.84	~~28~~ 29	43.50		43.35
27	49	48	51	13		49	48	51	15	49	50	51	13	49	30	50	58
	1.48270		1.48320			1.48270		1.48320		1.48270		1.48320		1.48265		1.48310	
	−635		−635			−640		−640		−1764		−1746		−2040		−2040	
	1.47635		1.47685			1.47630		1.47680		1.46504		1.46554		1.46225		1.46270	
	−2995		−2998			−2994		−2998		−29.18		−29.18		−2899		−29.02	
	− .14		− .15			− .15		− .15		− .15		− .12		− .14		− .17	
	− .48		− .71			− .48		− .73		− .48		− .71		− .521		− .77	
	+ .11		+ .17			+ .11		+ .17		+ .11		+ .17		+ .14		+ .19	
	−30.46		−30.67			−30.46		−30.69		−29.70		−29.87		−29.53		−29.77	
+14	28	47.04		46.36		28	45.70		45.93	28	44.07		42.97	28	13.97		13.58
+14	28	46.70	+3	11.08		28	45.82	+3	11.77	28	43.52	+3	13.15	28	13.48	+3	43.61
	31	568		−0.9		31	56.9		−0.9	31	56.1		−0.9	31	54.2		−1.0
	+3	10.1		+2.6		+3	11.1		+2.5	+3	13.6		+2.3	+3	43.4		+2.2
		9.6					10.6				13.1				42.9		
			+3	12.78				+3	13.37			+3	14.55			+3	44.81
+14			+31	59.48				+31	59.19			+31	58.07			+31	58.59

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ξ Ophiuchi

17h 13m 31s

−20° 57′ 47″

+63° 20′ 35″

log cos δ 9.97025

15 constants 0.09541 (Ursa Aug 5)
0.89261 (after Aug 5)

tan δ −0.38 +1.07

sin z +.89

List of Constants

1876

	July 24	July 26	Aug. 2	Aug. 3	Aug. 5	Aug. 8
	−.85	−.74 −.06	−.84 −.10	−.88	−.91	−1.08
	13 27.8	13 26.7	13 17.0	13 4.6	13 29.7	13 6.8
	13 47.6	13 28.6	13 33.2	13 6.2	13 31.9	13 8.8
	13 17.8	13 30.5	13 33.4	13 8.1	13 34.3	13 11.2
	13 13.0		13 33.9		13 38.7	
	13 18.4					
	0.7		2.0		40.7	
	14 38.7	14 38.0	14 42.0	14 9.0	14 43.1	14 9.5
	2.1	40.1	6.5	12.0	45.2	11.2
	5.0	42.0	8.7	14.0	47.3	13.0
	7.3		18.0		51.9	
	11.7		15.4		54.0	
	14.0		17.5		56.2	
	16.3					
	272.5		286.8		473.0	
	13 29.33	13 28.60	13 46.8	13 6.30	13 8.93	13 17.20
	32.5					18
	14 40.87	14 40.03	14 42.55	14 11.67	13 43.000	14 11.23
	29.55					13 43.909
	−25.47	−26.85	−5.60	−6.67	−8.74	−12.16
	+.32	+.29	+.32	+.33	+.34	+.41
		−.06	−.11			
	−3.27	−3.26	−3.21	−3.20	−3.19	−3.16
	−28.42	−29.88	−8.60	−9.54	−11.59	+14.91
	13 34.53	34.38	34.40	34.37	34.33	34.40
						13
	+.32	+.29 −.06	+.32 −.11	+.33	+.34	+.41
	+33.63		7			
	1.52673					
	1.62214	−37.91	+35.66 −35.77	+36.80 −28.67	+34.98 −27.32	+28.72 −24.96
	E F	1.57875n	1.55218 1.55352n	1.54467 1.45763n	1.50382 1.43644n	1.45518 1.39707n
	G 86	1.67416n	1.64759 1.64893n	1.66068 1.55284n	1.63923 1.53189n	1.55359 1.49248n
	20 2	20 3	20 2	20 3	20 2	20 3
	46″ 57.6	32.7 26.2	12.9 6.8	41.5 35.8	16.0 8.9	37.9 30.5
	59.4 59.2	28.0 26.9	8.5 6.4	36.4 35.1	10.3 9.7	32.4 31.3
	4.0 116.8	4.7 1.1	2.4 1.3	7.9 .9	6.3 7.86	10.3 1.8
	2.00 5840	30.35 26.55	10.70 6.60	38.95 35.45	7.315 9.30	35.15 30.90
	22 0.20	23 28.45	22 8.65	23 37.20	22 11.23	23 33.03
	+ 41.89	− 47.22	+ 44.42	− 44.56	+ 45.72	− 35.71
	22 42.09	41.23	22 53.07	52.64	22 56.95	57.32
−20	59 53.74	52.88	0 4.72	4.29	0 8.60	8.87
+63	18 59	20 27	19 08	20 36	19 10	20 32
	2.05712	2.05758	2.05715	2.05761	2.05718	2.05758
	−1012	−1012	−345	−345	−625	−625
	2.04700	2.04746	2.05370	2.05416	2.05093	2.05133
	−11143	−11155	−11316	−11328	−11244	−11254
	+ .21	+ .26	+ .24	+ .24	+ .25	+ .15
	− .34	− .56	− .36	− .61	− .37	− .61
	+ .08	+ .14	+ .08	+ .14	+ .09	+ .14
	−1 51.48	−1 51.74	−1 53.20	−1 53.51	−1 52.47	−1 52.86
−21	1 45.22	44.22	1 57.92	57.80	2 1.07	1.83
	1 44.72	+2 53.93	1 57.86	+3 8.58	2 1.45	+3 11.08
		−1.8		−1.8		−1.8
		+ 11.9		+ 11.9		+ 11.9
		+3 4.03		+3 18.68		+3 21.18
		s				
	−20	58 40.69		58 39.18		58 40.27

	2 3.27	2.10	2 4.40	4.23	2 34.39	35.04
	2 2.68	+3 11.77	2 4.31	+3 13.15	2 34.71	+3 44.51
		−1.8		−1.8		−1.9
		+ 11.9		+ 11.9		+ 11.9
		+3 21.87		+3 23.25		+3 54.51
		58 40.81		58 41.06		58 40.24

h m s
17 13 34.402

− 20° 58′ 40.24
.37

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1876phae.proj.1483.

44 Ophiuchi

1876

α 17h 18m 44s
δ −24° 3' 27"
+46° 26' 15"

α 18h 47.896s
dα/dt +3.659s
δ −3° 30.49"
dδ/dt −3.67"

N.A.

	July 18	Aug 2
m	18	18
s	5128	5124
	51.26	51.20
	23	28
	51.26	51.20
	28	2
	51.24	51.20
	2	4
	51.20	51.16
	4	7
	51.16	
	7	
	51.16	

	−3° 42.7"	−1
	42.8	1
	42.9	1
	43.0	0
	43.0	

log cos δ 9.96056
15 constant 0.08572 thru Aug 5
0.08292 after Aug 5
tang δ −0.457 1.10
sin z +.92

	July 24	July 26	Aug. 2	Aug. 3	Aug. 5	Aug. 6
	−.85	−.76 −.06	−.84 −.10	−.88	−.91	−1.05
m	17	17	17	17	17	17
s	18 40.3	18 36.9	18 22.7	18 43.0	18 43.9	18 34.2
	41.8	38.4	24.6	45.2	46.3	35.8
	44.7	41.2	26.4	47.5	48.4	37.3
				52.0	53.0	
	19 3.0	19 4.3	18 22.7	18 21.3	18 43.9	18 19.7
	5.2	6.5	24.6	22.7	46.3	21.8
	7.5	8.7	26.4	24.5	48.4	23.3
	12.0	13.3			53.0	
	14.1	15.6			53.2	
	16.4	17.8	19 24.8	19 18.3	53.4	19 22.3
	18.7	20.1	27.2	20.4	53.7	23.6
	21.0	22.3	28.4	22.0	1.9	25.2
	23.5	26.7			6.5	
	27.7	29.1			8.8	
	30.1	31.4			11.0	
	181.2	195.8	381.6	392.1	354.2	305.3
	18 42.7	18 38.7	18 24.57	18 22.83	18 35.77	18 21.60
	20 1.70	19 16.73	19 17.800	19 20.23	18 57.44	19 23.70
					19 30.47	18 59.73
						19 0.482
	−25.47	−26.85	−5.60	−6.68	−8.74	−9.77
	+.38	+.34	+.38	+.40	+.41	+.47
		−.07	−.11			
	−3.36	−3.36	−3.30	−3.30	−3.28	−3.28
	−28.45	−29.94	−8.63	−9.58	−11.61	−12.58
	18 48.02	47.86	47.88	47.88	47.86	47.90
		+.38	+.34 −.07	+.38 −.11	+.40	+.41
	+34.20					
	1.53403					
	1.61975	−45.23	+39.03	−33.37	+31.94	−30.46
ℰ		1.65543m	1.59140	1.52336m	1.50433	1.48373m
ℊ		1.74115m	1.67712	1.60908m	1.59005	1.56945m
		25 1	25 3	25 1	25 3	25 1
		39.8 32.8	16.2 9.1	47.1 41.0	14.0 7.5	59.8 51.6
		34.1 34.6	10.4 11.5	41.7 40.4	8.4 9.7	54.1 55.3
		13.9 7.4	6.6 2.6	8.8 1.4	13.9 6.9	22.4 17.2
		34.65 33.70	13.30 10.30	44.40 40.70	11.20 8.10	56.95 53.45
		26 35.33	28 17.80	26 42.55	28 9.65	26 53.20
		+ 41.66	− 55.10	+ 47.55	− 40.90	+ 38.91
		27 16.99	16.70	27 30.10	29.25	27 34.11
		−24 4 28.64	28.35	4 41 47.75	40.96	4 45.76
		166 20 34	25 11	23 42	25 09	23 54
		2.11720	2.11775	2.11724	2.11775	2.11731
		−980	−980	−325	−325	−612
		2.10740	2.10795	2.11399	2.11450	2.11119
		−12806	−12822	−13031	−13017	−12918
		+ .23	+ .41	+ .31	+ .22	+ .21
		− .27	− .54	− .29	− .54	− .32
		+ .06	+ .13	+ .07	+ .13	+ .08
		−2 8.04	−2 8.22	−2 9.92	−2 10.36	−2 9.21
		−246 36.68	36.57	6 51.67	57.32	6 54.97
		6 36.62	+ 2 53.93	6 51.49	+ 3 8.58	6 54.77
		3 42.8	− 1.9	3 42.9	− 1.9	3 43.0
			+ 12.3		+ 12.4	
			+ 3 4.33		+ 3 19.08	
			−24 3 32.29		3 32.41	

	Aug. 2	Aug. 3	Aug. 5	Aug. 6
	18 54.57	18 55.51	18 58.15	19 27.83
	62.1.6	63.02	57.48	28.05
	18 22.83	19 43.0	19 43.0	20 43.0
	19 26.97	18 54.50	19 30.47	19 59.73
	18 54.57	19 20.23	18 57.44	19 23.70
	62.1.6	63.02	57.48	28.03

1876phae.proj.1483

Gr. 966 — 1876

h m s
5 23 1
+74° 57' 22"
+105° 02' 38"
−62° 39' 50"

Corrd
Corrd

July 19.9 / 24 / 29 / Aug. 3 / 8

	July 19.9	24	29	Aug. 3	8
α	23 9.308	23 9.64	10.04	10.47	10.92	11.39
Corrd	− .01				
dα/dt	+ 7.9861				
δ	57 25.6	57 26.1	25.2	24.4	23.7	23.1
	2 34.39					
Corrd	− .1					
dδ/dt	+ 3.229					

	40	43	45	47	9	8	7	6

log cos δ 9.41441
15 cos δ tan 9.53957 attm Aug 5
9.53677 after Aug 5
tang δ *3.72 − 3.86
log cos δ 9.41441
log m δ 9.98484
const. 4.73762
sin z −.89

	July 24	July 26	Aug. 3	Aug. 5	Aug. 6	Aug. 8
	+ −.85	× −.76 −.06	× −.88	× −.91	× −1.05	× −1.08
5	23 8.4 10.9	23 16.4 20.4 24.1 28.7	22 40.5 47.2 57.7	23 18.2 22.2 26.2 30.4 34.3	22 38.6 47.2 53.0	22 58.5 2.6 6.6 10.2 14.7	22 20.9 28.0 35.0	23 0.6 4.3 8.4 12.3 16.3	22 54.5 0.1 7.0	23 1.2 5.3 9.0 13.0 17.0	22 36.8 2.7 11.0	23 3.7 8.0 11.5 15.6 18.5
	24 18.5	24 36.7 40.8 44.5 48.1	24 48.4 54.1 57.3	23 47.0	23 38.3 42.0 46.0 50.0	23 18.4 22.3 26.0 30.8	23 47.6 54.9 0.5	24 2.0 4.3 8.2 12.1	23 54.4 22.3 28.3	24 2.1 4.8 9.0 13.1	24 10.2 18.4 24.0	24 23.4 27.5 31.6 35.4
	9.65	2597	30.76	14.01	13.01	14.67	14.67	16.27	15.35	17.62
	23 4.85	22 46.47	22 46.27	22 27.47	23 10.53	23 3.52
	24 18.50	23 32.462	24 53.93	23 34.78	23 47.00	23 14.451	23 54.33	23 16.300	25 22.00	23 17.056	24 17.53	23 19.578
	−25.47 +3.16	23 10.020 + 2.244 + 2.245	−26.85 +2.83 +.23	23 10.187 + 2.399 + 2.450	−6.68 +3.27	23 10.898 + 3.56 + 3.57	−8.74 +3.38	23 11.081 + 5.22 + 5.23	−9.78 +3.91	23 11.173 + 5.88 + 5.89	−12.16 +4.02	23 11.367 + 8.21 + 8.22
	−0.71 −25.51 +23 10.774	23.022 23.02 9.44	−0.88 −24.67 + 9.51	−1.59 −5.00 +9.46	−1.77 −7.13 +9.17	−1.86 −9.73 +9.33	−2.06 −16.24 +9.39	−10.19
		+3.16	+2.83 +.23	+3.27	+3.38	+3.91	−4.02
	+22.81 1.35813 0.89977	−46.04	+47.71 +23.72	−79.75 −103.34	+28.19	−32.54	+48.33	−38.03	+16.53	−124.94	+16.08	−57.95
	1.66314	1.67861	1.90173	1.45010	1.57242	1.68422	1.58013	1.21827	2.09670	1.20629	1.36305
	Q H 1.20271	1.21818	1.44130	0.98967	1.05199	1.22379	1.11690	0.75564	1.63347	0.74366	0.88882 1.29982
	25 0	20 4	25 0	20 4	25 0	25 0	25 0	25 0	25 0	25 0	25 0	25 0
	8.8 9.4	43.1 43.7	32.8 35.1	49.3 51.0	27.3 28.6	5.8 6.4	32.9 35.6	3.2 3.2	52.4 52.1	5.1 4.8	53.2 53.4	28.7 28.9
	9.9 0.9	43.9 34.6	35.2 22.9	50.5 40.4	28.8 17.5	6.6 55.6	34.6 24.3	3.9 57.3	53.9 42.4	5.9 55.0	54.9 42.2	29.9 18.2
	18.7 12.3	78.3	58.0	90.8 91.4	46.1	12.4 2.0	58.9	1.1 0.5	96.3	10 110.8	8.1 97.6	48.1
	9.35 5.15	4350 39.15	3400 29.00	4470 45.70	2805 2305	620 1.00	3375 2795	350 025	5315 4425	550 59.90	5405 47.80	2930 2355
	25 7.25	24 41.33	25 31.30	24 47.80	25 25.55	25 360	25 31.85	25 190	25 50.20	25 2.70	25 50.93	25 26.43
	− 7.90	+ 15.95	−16.53	+ 27.63	− 9.77	+ 11.27	−16.74	+ 13.17	− 5.69	+ 43.00	− 5.53	+ 2.94 1.94
	24 59.35	5728	25 14.97	1543	25 15.78	1487	25 15.11	1507	25 44.51	4570	25 45.40	3437 46.37
+ 10.5 74 − 62 − 32	57 49.00	51.07	57 33.38	32.92	57 32.57	33.48	57 33.24	33.28	57 3.84	2.65	57 2.95	1 +3.98
	37 54	38 20	37 27	38 13	37 35	37 57	37 29	37 59	38 03	38 50	38 02	38 27
	2.04439 −.952	2.04451 −.952	2.04427 −.306	2.04448 −.306	2.04430 −.600	2.04439 −.600	2.04427 −1.702	2.04442 −1.702	2.04442 −2.000	2.04446 −2.000	2.04442 −1.882	2.04457 −1.882
	2.03487	2.03499	2.04121	2.04142	2.03830	2.03839	2.02727	2.02742	2.02442	2.02446	2.02560	2.02575
	+10836	+10839	+10995	+11031	+10922	+10924	+10648	+10652	+10577	+10584	+10607	+10611
	+ .07	+ .29	+ .31	+ .86	+ .11	+ .16	+ .32	+ .20	+ .03	+ 2.14	+ .03	+ .46
	− .02	− .80	− .10	− .82	− .07	− .02	− .10	− .00	− .13	− .00	− .13	− .06
	+ .00	+ .19	+ .02	+ .19	+ .02	+ .00	+ .02	+ .00	+ .03	+ .00	+ .03	+ .02
	+1 48.41	+1 48.07	+1 50.18	+1 50.24	+1 49.28	+1 49.37	+1 46.72	+1 46.72	+1 43.71	+1 47.98	+1 46.00	+1 46.53
+105	59 37.41	59 39.14	59 23.56	23.16	59 21.85	22.85	59 19.96	20.00	58 49.55	50.63	58 48.95	48.51
+105	59 38.76 27+2	53.29	59 23.36	+3 8.68	59 22.35	+3 11.22	59 19.98	+3 13.15	58 50.09	+3 43.61	58 48.73	+3 43.57 44.51
	2 34.8	+1.8	2 35.1	+1.8	2 36.3	+1.8	2 36.5	+1.8	2 36.6	+1.8	2 36.9	+1.8
	+2 56.5	−0.4	+3 11.7	−0.7	+3 13.9	−1.9	+3 16.5	−2.1	+3 46.5	−2.2	+3 48.2	−2.5
	564	11.8			14.0		16.6		46.6		48.3	
		+2 55.33		+3 9.68		+3 11.67		+3 12.85		+3 43.21		+3 43.91
+106		+2 33.60		+2 33.04		+2 34.02		+2 32.83		+2 33.30		+2 32.64

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1876phae.proj.1483

β Draconis

α 17h 27m 37s
δ +52° 23′ 40″
1876

Corr α
+ .06
dα/dt
+ 1.3510
δ₀ 23° 37′ 31″
Corr δ
+ .7
dδ/dt
− 28.25

log cos δ 9.78543
15 constants 9.91059 (time Aug 5)
9.90479 (after July 5)
tang δ + 1.30 + 1.64
sin z − .17

July 24	July 26	Aug. 2	Aug. 5	Aug. 6	Aug. 8
−.85	−.76 −.06	−.84 −.10	−.91	−1.05	−1.08
Ch. f.	m s	m s	m s	m s	m s
	27 23.2	27 48.3	26 48.2	27 27.0	27 7.1
	25.7	51.7	57.3	30.4	10.5
	28.6	13.0	54.0	33.7	12.9
		1.8		40.5	
		5.0		43.9	
		8.6		47.2	
		12.0		50.6	
		15.6		54.0	
		22.2		0.7	
		25.5		4.1	
		28.8		7.6	
	274.5		339.7		373.1
	27 25.83	144.5	26 51.17	519.4	27 10.17	553.1
		28 5.91		27 47.245		27 50.282

	−26.85	27	40505	−5.59	27	40348	−8.74	27	40272	−9.78	27	48.46	−12.16	27	40193
−1.10	−.99	+	28.09	−1.09	+	6.90	−1.18	+	10.61	−1.36	+	11.22	−1.40	+	13.62
	−.10	+	28.03	−.16	+	6.84		+	9.95		+	11.16		+	13.56
	−2.64			−2.49			−2.41			−2.39			−2.33		
	−29.58			−9.33			−12.33			−13.53			−15.89		
	+27 38.01			+37.91			+37.95			+37.93			+37.92		
	−1.10		−.99 −.10		−1.09 −.16		−1.18		−1.36				−1.40		
			+42.76			+36.08			+40.11			+60.57			+48.14		
E F			1.63104			1.74881			1.60325			1.78240			1.68251		
G H			1.54163			1.65940			1.51384			1.69019			1.59030		
0′ 2′			0 1			0 1			0 1			0 2			0 2		
25.2 21.9			53.7 51.3			42.6 41.0			57.1 55.2			12.4 8.9			22.9 20.1		
25.2 16.1			54.4 45.3			42.8 34.0			56.9 49.3			9.8 3.0			21.4 11.5		
380			8.1 9.6			7.5.0			14.0 10.4.5			22.2 11.9			4.3 3.1.6		
2520 1900			5405 4830			4270 3750			5700 5225			1110 595			2215 1580		
2 22.10			1 51.18			1 40.10			1 54.63			2 8.53			2 18.98		
			+ 34.80			+ 45.65			+ 32.65			+ 49.00			+ 38.93		
			2 25.98			2 25.76			2 27.28			2 57.53			2 57.91		
+52			26 22.37			20 22.60			20 21.07			19 60.82			19 50.44		
−10			1 18.0			1 21			1 06			1 44			1 34		
			1.00750			1.00770			1.00750			1.00790			1.00780		
			− 297			− 590			− 1688			− 1994			− 1872		
			1.00453			1.00180			0.99062			0.98796			0.98908		
			+ 10.10			+ 10.04			+ 9.79			+ 9.43			+ 9.75		
			− .47			− .82			− .42			− .97			− .60		
			− .31			− .29			− .32			− .34			− .37		
			+ .07			+ .07			+ .08			+ .08			+ .09		
			+ 9.39			+ 9.00			+ 9.13			+ 8.50			+ 8.87		
+52			20 31.76			20 31.60			20 30.20			19 59.32			19 59.31		
		+3	8.58	+3		11.08	+3		13.15	+3		43.61	+3		44.57		
	+0.3	23	39.7	+0.3	23	41.1	+0.3	23	41.7	+0.3	23	41.9	+0.3	23	42.3		
		+3	7.9	−2.4	+3	9.5	−3.8	+3	11.5	−4.4	+3	42.6	−4.6	+3	43.0	−5.0	
			8.6			10.2			12.2			43.3			43.7		
+52		+3	6.48	+3		7.58	+3		9.05	+3		39.31	+3		39.87		
		+23	38.24	+23		39.18	+23		39.25	+23		38.63	+23		~~39.44~~ 39.12		

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1876phae.proj.1483

α Ophiuchi

α 17h 29m 7s

+12° 39' 10"

+29° 43' 38"

Corrs

1876

Feb. 15

Feb. 19

Feb. 22

March 4

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1876phae.proj.1483.

	m	"
July 19	29 1357	39 2.5
24	1354 3	3.2 7
29	1351 3	3.9 7
Aug. 3	1347 4	4.5 6
8	1343 4	5.1 6
13	1338 5	5.6 5
18	1332 6	6.0 4
23	1325 7	6.4 4
28	1317 8	6.7 3

X −.17 Mar. 6

m	"
28 8.0	
9.7	
10.4	

m	"
28 9.1	
11.3	
13.5	
15.6	
17.9	
47.3	
49.4	
51.6	
53.7	
55.9	

m	"
28 19.8	
22.0	
24.0	
28.2	
30.3	
32.4	
34.5	
36.7	
40.9	
43.0	
45.1	

	m	"
29.	3.8	
	4.6	
	6.1	
30	7.2	
	8.8	
	10.8	

X −.89 July 22

	"
29 13.8	
16.0	
18.1	
20.2	
22.2	
52.0	
54.1	
56.2	
58.3	
0.3	

	"
29 24.3	
26.5	
28.5	
32.7	
34.8	
37.0	
39.2	
41.4	
45.5	
47.6	
49.8	

−.85 July 24 Ch. J.

	"
29 10.5	
11.8	
13.2	

X J. F. M. −.79 July 25

	"
29 27.2	
29.3	
31.5	
33.8	
38.0	
40.2	
42.1	
44.1	
48.4	
50.5	
52.6	

	m	"
28	4.53	
29	4.83	
29	11.83	
29	18.955	

	m	"
28	32.560	
	32.445	
	.432	
28	32.438	
29	11.128	
	3869	
	3872	
	−0.43	
	+38.30	38.30
	+10.78	10.74 10.74

	m	"
30	8.93	
29	37.120	
	−2.23	
	−.20	
	−2.85	
	−26.28	
	+10.78	

	m	"
	37.036	
	.092	
29	37.064	
29	13.550	
4	2851	
+	23.48	

−.19

	m	"
29	39.955	
29	13.532	
	−26.26	
	−.17	
	−2.83	
	−29.26	
	+10.70	

	m	"
29	39.955	
29	13.532	
	+ 2642	
	+ 2639	

−.04 −.20 −.19 −.17

| | | |

1876phae.proj.1483

July 26 — −.76 −.06

| | | |

1876phae.proj:1483.

See 9 Last for continuation f. 24

1876

Aug. 6 — −1.05 — Aug. 8 — −1.08 — Aug. 9 — −1.05 — Aug. 10 — −1.05

	Aug. 6		Aug. 8		Aug. 9		Aug. 10	
h m s	17 28 44.7	29 0 3	29 10.8	28 37.1	29 2.8	27 13.2	28 55.3	29 4.0	29 14.4	28 54.8	29 5.1	28 15.6
	46.5	2.4	12.9	52.9	4.9	15.3	57.1	6.2	16.5	56.9	7.2	17.6
	48.1	4.6	15.0	54.4	7.0	17.4	58.8	8.2	18.7	58.6	9.3	19.7
		6.7	19.2		9.1	21.7		10.4	22.9		11.4	24.0
		8.8	21.4		11.1	23.8		12.5	25.0		13.6	26.1
	30 0.0	38.3	23.4	30 1.4	40.8	25.8	30 9.4	42.0	27.0	30 3.4	43.1	28.2
	2.0	40.6	25.7	3.3	42.9	28.0		44.1	29.2	5.3	45.2	30.3
	4.0	42.6	27.7	5.7	45.0	30.1		46.3	31.3	7.1	47.3	32.3
		44.7	31.9		47.2	34.3		48.3	35.6		49.6	36.6
		46.8	34.0		49.3	36.4		50.5	37.8		51.7	38.9
			36.1			38.5			39.8			40.9
		2358	2581		2601	2845		2725	2982		2835	3100
	28 46.43			28 52.80								
	30 2.00	29 23.880	23.464	30 3.47	29 26.010	25.864	28 57.07	29 27.250	27.109	28 56.77	29 28.350	28.182
			.452			.882	30 4.7		.122	30 5.47		.222
			29 23.458			29 25.873			29 27.116			29 28.202
		−9.78	24 18.444		−12.17	29 13.428		−13.43	29 13.418		−14.53	29 13.408
		−.23	+ 10.01		−.24	+ 12.44		−.23	4 13.70		−.23	4 14.79
			+ 9.98			+ 12.41			+ 13.67			+ 14.76
		−2.74			−2.73			−2.72			−2.79	
		−12.75			−15.14			−16.38			−17.46	
		+10.71			+10.78			+10.74			+10.74	
			−.23			−.24			−.23			−.23
	+87.03											
	1.56855											
	1.68024	−38.54		+33.07	−37.60		+30.05	−42.58		+31.43	−37.27	
		1.58591 m		1.51043	1.57519 m		1.47784	1.62921 m		1.49734	1.57136 m	
		1.69760 m		1.63112	1.68688 m		1.58953	1.74090 m		1.60903	1.68305 m	
		45 1	45 2	45 1	45 2		45 1	45 2		45 1	45 2	
		13.1 8.1	51.8 46.1	18.2 13.5	49.9 44.3		23.0 17.9	53.3 51.5		20.7 16.1	49.9 44.4	
		7.4 5.6	44.7 43.5	12.1 11.1	43.9 40.7		16.1 14.6	51.8 43.5		14.7 11.5	43.1 41.1	
		46	47	46	47		46	47		46	47	
		10.25 6.85	48.25 44.80	15.15 12.30	46.9 42.5		19.55 16.25	55.05 48.50		17.70 13.80	46.50 42.75	
		46 8.55	47 46.52	46 13.72	47 44.70		46 17.00	47 51.78		46 15.75	47 44.63	
		+ 47.89	− 49.84	+ 42.77	− 48.63		+ 38.86	− 58.07		+ 40.65	− 48.20	
		46 56.41	56.68	46 56.49	56.07		46 56.76	56.71		46 56.40	56.42	
+12		35 51.91	51.67	35 51.84	52.28		35 51.59	51.64		35 51.96	51.93	
+29		42 16	43 54	42 21	43 52		42 25	43 59		42 23	43 52	
		1.51640	1.51690	1.51640	1.51690		1.51640	1.51690		1.51640	1.51690	
		−1985	−1985	−1860	−1860		−1264	−1264		−1220	−1220	
		1.49655	1.49705	1.49780	1.49830		1.50376	1.50426		1.50420	1.50470	
		−3137	−3141	−3146	−3150		−3190	−3193		−3193	−3197	
		− .15	− .17	− .12	− .16		− .10	− .21		− .11	− .16	
		− .18	− .45	− .19	− .43		− .22	− .48		− .20	− .46	
		+ .04	+ .11	+ .05	+ .11		+ .05	+ .11		+ .05	+ .11	
		−31.66	−31.92	−31.72	−31.98		−32.17	−32.51		−32.19	−32.48	
+12	35 20.25		19.75	35 20.14	20.30		35 19.82	19.13		35 19.76	19.45	
+12	35 20.00		+ 3 43.61	35 20.22	+ 3 44.51		35 19.28	+ 3 46.32		35 19.60	+ 3 46.34	
	39 49		−1.0	39 5.1	− 1.0		39 5.2	−1.0		39 5.3	−1.0	
	+3 44.9		+2.0	+3 44.9	+ 1.8		+3 45.9	+ 1.7		+3 45.7	+ 1.6	
	44.3			44.3			45.3			45.1		
			+ 3 44.61			+ 3 45.31			+ 3 47.02			+ 3 46.94
+12			+39 4.61			+39 5.53			+39 6.30			+39 6.54

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J Daconis

λ_0 17h 32m 28s Cons +68° 12' 52" $\frac{d\lambda}{dt}$ −25° 50' 04" δ_0 Cons' $\frac{d\delta}{dt}$ 1876

July 19 … Aug. 3 … Aug. 8 … Aug. 13

Logs r 9.569949
15 Cos δ tan i 9.69465 Aug 5 / 9.69185 after Aug 5
tan q +2.50 +2.69
sin z −.44

	Aug. 5	Aug. 6	Aug. 8	Aug. 9	Aug. 10	Aug. 12
	−.91	−1.05	−1.08	−1.05	−1.05	−1.09
	17h 32m 7.4	32 29.8	31 48.8	32 31.2	32 23.2	32 33.6
	12.6	32.7	53.5	34.0	29.0	36.4
	16.0	35.3	58.3	36.9	32.9	39.2
		38.3		39.4		42.1
		41.0		42.4		44.7
	33 12.4	44.0	33 31.8	45.2	33 28.1	47.4
	17.1	46.6	36.8	47.9	33.0	50.4
	21.9	49.4	40.8	50.7	37.3	53.4
		52.3		53.5		56.0
	32 12.00	369.6	31 53.53	381.2	32 24.37	403.2
	33 17.13	32 41.067	33 36.47	32 42.256	33 32.80	32 44.810
	−8.74	32 30006	−9.79	32 29960	−12.17	32 29868
	−3.28	+ 11.06	−2.62	+ 12.40	−2.70	+ 14.93
		+ 10.86 97		+ 12.30 31	− 2.70	+ 14.73 84
	−2.36		−2.31		−2.22	
	−13.38		−14.72		−17.00	
	+32 27.69		+27.64		+27.71	
		−.33		−.36		−.27
	+29.07					
	1.463444					
	1.158 09	−36.06	+48.83	−54.11	+16.43	−48.00
	☉ ☽	1.55703m	1.68869	1.73328m	1.21564	1.68124m
	☉ ☽	1.25168m	1.38054	1.42513m	0.90749	1.37309m
	10 3	10 3	10 3	10 4	10 4	10 4
	22.4 22.9	54.6 54.3	43.7 42.6	33.8 33.1	0.1 58.5	31.9 31.6
	21.3 12.4	51.9 43.7	41.1 32.2	31.5 23.1	58.8 47.0	30.2 19.7
	3.7 3.53	6.0 9.80	4.8 7.48	5.3 5.62	1.18.9 1.08.5	21 5.13
	21.85 17.65	5325 4900	4290 3740	32.65 28.10	59.45 57.75	30.05 25.65
	13 19.75	13 5113	13 3990	14 30.38	1.3 56.10	14 28.35
	+14.38	−19.07	+24.07	−26.61	+8.08	−23.61
		9 17.85				
	13 34.14	33.28	14 3.92	3.77	14 4.18	4.74
+68	9 14.21	15.07	8 44.43	44.58	8 44.17	43.61
−25	49 41	49 10	50 13	49 23	49 57	49 25
	1.44510	1.44500	1.44530	1.44500	1.44520	1.44500
	−1668	−1668	−1980	−1980	−1850	−1850
	1.42842	1.42832	1.42550	1.42520	1.42670	1.42650
	+2682	+2681	+2664	+2662	+2671	+2670
	− .16	− .25	− .44	− .55	− .05	− .44
	− .56	− .65	− .56	− .72	− .62	− .72
	+ .13	+ .15	+ .15	+ .18	+ .16	+ .18
	+26.23	+26.06	+25.76	+25.53	+26.20	+25.72
+68	9 40.44	41.13	9 10.19	10.11	9 10.37	9.33
+68	9 40.78	+3 13.15	9 10.15	+3 43.61	9 9.85	+3 44.51
	12 54.4	+0.8	12 54.6	+0.8	12 55.0	+0.8
	+3 13.6	−5.1	+3 44.4	−5.3	+3 45.2	−5.7
	14.1		44.9		45.7	
		+3 8.85		+3 39.11		+3 39.61
+68		+12 49.63		+12 49.26		+12 49.46

	Aug. 9	Aug. 10	Aug. 12
	50 09.	49 35	50 10
	1.44520	1.44530	1.44570
	−1257	−1210	−1355
	1.43263	1.43320	1.43175
	+2708	+2711	+2702
	− .39	− .11	− .42
	− .63	− .73	− .63
	+ .15	+ .17	+ .15
	+26.21	+26.43	+26.12
	8.37	8.60	8.26
	8.30	8.34	8.25
	+0.8	+0.8	+0.8
	55.2	55.4	55.1
	+3 46.9	+3 46.4	+3 47.5
	47.4	47.4	48.0
	+3 41.22	+3 41.04	+3 41.17
	+12 49.52	+12 49.53	+12 49.42

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ζ Herculis

| | | |

1970phec.proj.1483

ω Draconis

17h 37m 41s
+68° 48' 55"
−26° 26' 07"

d_0 37 40.679
Corr$_a$ + .08
$\frac{dd}{dt}$ −0.3575
d_0 48 53.33
Corr' + .8
$\frac{dδ}{dt}$ − 1.646

July 19 37 43.79 48 54.6
24 43.60 55.9
29 43.39 57.1
Aug 3 43.17 58.2
8 42.93 59.2
13 42.67 60.1
18 42.40 60.9
23 42.11 61.5
28 41.81 62.1

log cos δ 9.55793
15 cos δ tan δ 9.68309 thru Aug 5
9.68029 after Aug 5
tan δ +2.58 +2.77
sin z −.454

1876

+ −.91 Aug. 5 + −1.04 Aug. 15 + −.96 Aug. 21 + −.85 Aug. 22 × −.95 Aug. 23 + −1.04 Aug. 28

17 37 12.8 17.0 21.8 | 37 42.8 45.8 48.4 51.3 54.1 | 36 54.2 57.7 0.7 | 37 50.5 53.5 56.3 59.3 2.0 | 37 52.7 57.3 2.1 | 38 47.8 50.8 53.7 56.4 59.3 | 37 54.0 57.0 0.6 | 38 48.1 51.0 53.6 56.7 59.5 | 38 13.7 17.4 21.9 | 38 48.5 51.3 54.2 57.0 59.8 | 38 0.4 6.6 10.7 | 38 5.8 54.7 57.7 0.2 3.3
38 11.8 16.4 21.6 | 37 57.0 59.8 2.8 5.6 8.4 | 38 26.8 31.3 37.1 | 38 4.9 7.5 10.9 13.5 16.1 | 38 16.7 23.2 27.6 | 38 2.3 5.1 8.0 10.8 13.7 | 38 18.3 23.6 29.3 | 38 2.3 5.2 7.9 10.6 13.4 | 38 14.4 17.6 24.6 | 38 2.7 5.9 8.7 11.3 14.1 | 38 2.08 24.6 31.8 | 38 6.1 8.8 11.5 14.5 17.4

37 17.20 48.7 | 36 57.53 18.4 | 37 57.60 | 38 29.4.2 34.2 | 37 57.20 | 38 29.4.9 34.9 | 38 17.67 | 38 23.9.6 33.96 | 38 5.73 | 38 20.8.6 28.6
38 16.60 | 37 54.189 | 38 31.73 | 38 20.44 | 39 22.38 | 38 59.356 | 39 23.73 | 38 54.33 | 39 18.87 | 38 59.952 | 39 25.73 | 39 31.78

−8.73 −2.35 | 37 43.062 + 41.18 + 11.05 | −16.80 −2.68 | 37 42.548 + 19.50 + 19.42 | −1 14.66 −2.48 | 37 42.212 + 21.14 + 21.06 | −1 15.08 −2.19 | 37 42.154 + 21.28 + 21.20 | −1 15.36 −2.45 | 37 42.095 + 21.86 + 21.78 | −1 18.57 −2.68 | 37 41.795 + 81.38 + 81.30
−2.38 −13.46 +37 40.73 | −1.87 −21.35 +40.69 | −1.53 −1 18.67 +37 40.69 | −1.47 −1 18.74 +37 40.69 | −1.42 −1 19.23 +37 40.73 | −1.12 −1 22.37 +37 40.81

−2.35 | −2.68 | −2.48 | −2.19 | −2.45 | −2.68

+34.99 1.56808 1.25117 | −22.41 1.35044 | +64.51 1.80963 | −29.69 1.47246 | +61.86 1.79141 | −22.97 1.36116 | +62.23 1.79100 | −24.30 1.38561 | +42.29 1.62624 | −18.91 1.27669 | +57.45 1.75929 | −22.55 1.35315
Eq. ν 1.03353 | G ν0 1.48992 | 1.15290 | 1.47170 | 1.04145 | 1.47429 | 1.06590 | 1.30653 | 0.95698 | 1.43958 | 1.03344

35 2 14.9 15.1 | 35 2 43.2 44.1 12.1 46 27.0 19.7 1.30 9.85 37 11.68 + 17.83 | 35 2 33.1 32.8 31.9 23.1 5.0 7.83 32.50 29.15 37 40.83 − 10.80 | 35 2 18.1 17.5 16.5 7.5 1.46 2.30 32.50 27.95 37 30.23 + 30.90 | 35 3 36.7 37.8 35.9 24.9 1.26 6.27 1.30 1.25 38 14.90 − 14.22 | 35 2 17.4 19.2 16.3 7.8 3.37 2.70 1.36.30 31.35 37 33.83 + 29.63 | 35 3 35.4 37.5 36.5 25.0 11.9 6.25 35.75 31.25 38 15.18 − 11.00 | 35 2 16.7 19.5 18.3 9.2 3.50 28.7 17.50 14.35 37 15.93 + 29.80 | 35 3 46.1 46.7 45.4 35.4 11.6 8.21 45.75 41.05 37 43.40 − 11.64 | 35 2 15.0 16.4 14.9 6.1 .99 22.5 14.95 11.25 38 13.10 + 20.25 | 35 3 38.9 40.5 39.9 29.4 18.8 6.99 39.40 34.95 37 37.18 − 9.06 | 35 2 17.7 19.4 17.7 9.9 29.3 17.70 14.65 38 16.78 + 27.52 | 35 3 − 10.80
37 29.51 | 30.03 | 38 1.13 | 0.68 | 38 3.46 | 4.18 | 38 3.40 | 4.29 | 38 3.65 | 4.04 | 38 4.70 | 5.38

+68 45 18.84 | 18.32 | 44 47.22 | 47.67 | 44 44.89 | 44.17 | 44 44.95 | 44.06 | 44 44.70 | 44.31 | 44 43.65 | 42.97

−26 25 49 | 25 20 | 26 23 | 25 38 | 26 19 | 25 38 | 26 19 | 25 37 | 26 10 | 25 40 | 26 16 | 25 37
1.45660 | 1.45640 | 1.45680 | 1.45650 | 1.45680 | 1.45650 | 1.45680 | 1.45650 | 1.45680 | 1.45650 | 1.45680 | 1.45650
−1650 | −1650 | −1945 | −1945 | −278 | −278 | −965 | −965 | −250 | −250 | −1023 | −1023
1.44010 | 1.43990 | 1.43735 | 1.43705 | 1.45402 | 1.45372 | 1.44715 | 1.44685 | 1.45430 | 1.45400 | 1.44657 | 1.44627
+2755 | +2754 | +2738 | +2736 | +2845 | +2843 | +2580 | +2798 | +2846 | +2844 | +2796 | +2794
− .25 | − .09 | − .76 | − .16 | − .69 | − .10 | − .70 | − .11 | − .33 | − .07 | − .60 | − .10
− .49 | − .46 | − .43 | − .54 | − .46 | − .54 | − .44 | − .54 | − .46 | − .54 | − .47 | − .54
+ .06 | + .11 | + .10 | + .13 | + .10 | + .13 | + .10 | + .13 | + .11 | + .13 | + .10 | + .13

+27.02 | +27.10 | +26.29 | +26.79 | +27.40 | +27.92 | +26.96 | +27.46 | +27.78 | +27.96 | +26.99 | +27.38

+68 45 45.86 | 45.42 | 45 13.51 | 14.46 | 45 12.29 | 12.09 | 45 11.91 | 11.52 | 45 12.48 | 12.27 | 45 10.64 | 10.35
+68 45 45.64 | +3 13.15 | 45 13.98 | +3 46.17 | 45 12.10 | +3 48.27 | 45 11.72 | +3 49.27 | 45 12.38 | +3 49.04 | 45 10.50 | +3 50.24
48 58.6 | +0.8 | 48 6.05 | +0.8 | 48 6.13 | +0.9 | 48 6.14 | +0.9 | 48 6.15 | +0.9 | 48 6.21 | +0.9
+3 13.0 | − 5.3 | +3 46.5 | − 7.2 | +3 49.1 | − 8.0 | +3 49.7 | − 8.0 | +3 49.1 | − 8.2 | +3 51.6 | − 8.6
13.8 | 47.3 | 49.9 | 50.5 | 49.9 | 52.4

+3 8.65 | +3 39.77 | +3 41.17 | +3 42.57 | +3 41.74 | +3 43.34

+68 | +48 54.29 | +48 53.75 | +48 53.36 | +48 54.29 | +48 54.12 | +48 53.84

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ρ Ophiuchi

α_0 17 41 37

Cor^n +2° 45 21"

$\frac{d\alpha}{dt}$ +3.0040

δ_0 +39 37 27

Cor^n +.6"

$\frac{d\delta}{dt}$ −1.694

1876

Aug 5		Aug 15		Aug 21		Aug 22		Aug 23		Aug 28	
−.91		−1.04		−.96		−.85		−.95		−1.04	
17 41 24.3	41 40.0	41 29.9	41 47.9	42 34.0	42 45.7	42 31.2	42 46.0	42 32.7	42 46.2	42 30.0	42 49.4
25.9	41.9	32.0	49.8	36.0	47.6	32.5	48.1	34.3	48.4	32.1	51.5
27.8	44.0	34.0	51.9	37.7	49.7	34.4	50.0	36.7	50.5	34.0	53.6
	48.2		56.1		52.9		54.2		54.5		57.8
	50.1		58.1		55.8		56.3		56.7		59.7
42 27.3	52.3	42 27.5	0.2	43 27.3	58.0	43 34.5	58.3	43 37.6	58.7	43 33.3	1.9
28.7	54.3	29.4	2.3	29.1	0.0	36.4	0.4		0.8	35.2	4.0
30.4	56.3	31.8	4.4	30.6	2.1	38.4	2.4		2.8	37.2	6.0
	0.5		8.5		6.2		6.5		6.9		10.0
	2.5		10.6		8.3		8.6		9.0		12.1
	4.6		12.7		10.3		10.7		11.2		14.1
	394.7		302.3		337.6		348.5		345.7		320.1
41 26.0	574.7	41 31.9	2.6	42 35.9	687.6	42 32.7	648.5	42 34.5	645.7	42 32.03	701
42 28.8	41 52.45	42 29.57	42 02.27	43 29.0	42 57.64	43 36.80	42 58.49	43 37.6	42 58.700	43 35.23	43 18.27
			1.8				3.18				
−8.73	41 43383	−16.80	41 43263	−1 14.66	41 43191	−1 15.08	41 43.44	−1 15.36	41 43167	−1 18.57	41 43087
−.04	+ 8.86	−.95	+ 16.96	−.80	+ 7477	−.00	+ 7514	−.56	+ 7553	−.56	+ 7572
	+ 8.79		+ 16.89	.05	+ 7470	.04	+ 7507	.03	+ 7546	1.05	+ 7465
−2.93		−2.81		−2.74		−2.73		−2.72		−2.66	
−11.70		−19.66	−1 17.45		−1 17.85		−1 18.13		−1 21.28		
+41 40.54		+40.56	+41 40.51		+41 40.47		+41 40.57		+41 40.55		
	−.04		−.95		−.87		−.77		−.86		−.95
+26.25											
1.41913											
1.5143 79	−36.88	+28.25	−29.35	+22.06	−31.04	+25.55	−38.18	+24.13	−38.40	+29.80	−33.40
Eq	1.56289 m	1.45102	1.46761 m	1.34361	1.49192 m	1.40739	1.58184 m	1.38256	1.58995 m	1.47422	1.52378 m
G	1.68755 m	1.57288	1.58947 m	1.46547	1.61378 m	1.52925	1.70370 m	1.50442	1.71181 m	1.59608	1.64561 m
35 4	40 0	35 4	40 1	40 0	40 1	40 1	40 1	40 0	40 1	35 4	40 1
27.1 21.8	51.7 45.4	58.2 51.9	14.9 8.1	5.9 0.5	15.6 11.2	1.5 56.1	26.6 21.8	3.1 57.5	26.4 21.3	58.6 53.1	22.1 17.2
21.9 21.6	45.2 44.5	52.9 50.5	9.1 7.8	0.8 58.0	10.4 9.6	58.6 57.6	23.2 21.9	59.6 57.1	22.2 21.1	53.7 52.7	17.4 17.2
39	40	39	41	40 39	41		41	40 39	41	39	41
24.5 21.7	48.15 44.95	55.55 51.20	12.0 7.95	3.35 59.75	13.0 10.44	0.05 56.85	24.9 21.85	1.35 57.30	24.3 21.2	56.15 52.9	19.75 17.20
39 23.10	40 46.70	39 53.38	41 9.88	40 1.55	41 11.70	40 58.45	41 23.38	39 59.32	41 22.25	39 54.52	41 18.48
+ 34.98	− 48.70	+ 37.40	− 38.86	+ 29.21	− 41.09	+ 33.83	− 30.85	+ 31.95	− 31.50	+ 39.45	− 49.22
39 58.08	58.00	40 30.78	31.12	40 30.76	30.61	410 32.28	40 32.53	40 31.27	31.25	40 33.97	34.26
+2 42 50.27	50.35	42 17.57	17.23	42 17.59	17.74	42 16.07	15.52	42 17.08	17.10	42 14.38	14.09
				09							
+39 36 22	37 46	36 00	37 17	36 07	37 19	36 05	37 30	36 06	37 30	36 01	37 25
1.67770	1.67810	1.67760	1.67800	1.67760	1.67800	1.67760	1.67800	1.67760	1.67800	1.67760	1.67800
−1633	−1633	−1937	−1937	−266	−266	−974	−974	−230	−230	−1007	−1007
1.66137	1.66177	1.65823	1.65863	1.67494	1.67534	1.66786	1.66826	1.67530	1.67570	1.66753	1.66793
−45.85	−45.90	−45.52	−45.57	−47.31	−47.35	−46.54	−46.59	−47.35	−47.39	−46.51	−46.55
− .02	− .04	− .02	− .02	− .01	− .03	− .02	− .04	− .02	− .04	− .03	− .03
− .74	− .11	− .83	− .20	− .00	− .20	− .00	− .24	− .00	− .24	− .88	− .23
+ .18	+ .03	+ .20	+ .05	+ .00	+ .05	+ .04	+ .10	+ .04	+ .10	+ .20	+ .05
−46.43	−46.05	−46.17	−45.74	−47.32	−47.53	−46.52	−46.77	−47.33	−47.57	−47.22	−46.76
+2 42 3.84	430	41 31.40	31.49	41 30.27	30.21	41 29.55	28.75	41 29.75	29.53	41 27.16	27.33
+2 42 4.07	+3 13.15	41 31.45	+3 46.17	41 30.24	+3 48.27	41 29.15	+3 49.67	41 29.64	+3 49.04	41 27.25	+3 51.24
45 15.2	−1.3	45 16.1	−1.3	45 16.4	−1.4	45 16.5	−1.4	45 16.5	−1.4	45 16.8	−1.5
+3 11.1	+3.9	+3 44.7	+3.0	+3 46.2	+2.7	+3 47.3	+2.6	+3 46.9	+2.6	+3 49.6	+2.4
11.7		45.3		46.8		47.9		47.3		50.2	
	+3 15.75		+3 47.87		+3 49.57		+3 50.87		+3 50.24		+3 52.14
+2	+45 19.82		+45 19.32		+45 19.87		+45 20.02		+45 19.88		+45 19.39

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1876phae.proj.14831

ψ' Daaconis

| | | |

1876phae.proj.1483.

ζ Herculis

| | | |

1876phae.proj.1483

ξ Draconis

α 17 51 22
δ +56° 53' 34"
λ −14° 30' 46"

Cons
dα/dt
λ₀
Cons'
dδ/dt

Aug 8 — m 51 23.151 — Cons +.08 — dα/dt +1.0364 — λ₀ 53 33.44 — Cons' −.1 — dδ/dt −0.682

Aug 13 — −1.07

| | | |

1876phae.proj.1483.

Daconia

α 17 53 42
δ + 51° 30' 15"
− 9° 07' 27"

α m s
Corr
dα/dt

δ ' "
Corr
dδ/dt

m s
53 43.69
− .03
+ 1.3958

30 14.32
+ .5
− 0.586

Aug 8

m s
53 46.09
45.78 11
45.85 13
45.71 14
45.55 16

30 19.5
20.4 9
21.3 9
22.0 7
22.7 7

log cos δ 9.79415
15 Constant 9.91651
tang δ + 1.26 + 1.61
sin z − .16

+ −1.05 Aug. 6

h m s
17 53 05
27
55
m s
53 37.3
40.1
43.9
30.6
33.9
37.3
0.2
3.8
10.6
13.8
17.0
32.94
6294
53 2.90
53 57218
−9.80 53 46125
−1.32 + 11.09
+ 11.12
−2.45
−13.57
+53 43.65
+54.32
1.73496
1.65147
G H
55 0
38.1 35.8
37.4 27.9
15.5 6.37
37.75 31.85
55 34.80
+ 44.82
56 19.62
+51 26 28.73
−9 08 18
0.96670
− 1932
0.94738
+ 8.86
− .77
− .10
+ .02
+ 8.01
+51 26 36.74
30 19.1
+3 42.4
42.9
+3 43.61
+ 0.3
− 4.8
+3 39.11
+51 +30 15.85

+ −1.04 Aug. 15

53 10.4
18.2
15.7
53 13.10
−16.81 53 45950
−1.31 + 18.10
+ 18.13
−2.28
−20.40
+43.65
1.32
+50.95
1.70714
1.62365
55 0
44.1 37.9
40.4 31.7
15 9.6
40.75 34.80
55 37.78
+ 43.04
56 19.82
26 28.53
08 15
0.96670
− 1910
0.94760
+ 8.86
− .70
− .10
+ .02
+ 8.08
26 36.61
30 20.8
+3 44.2
44.7
+3 43.61
+ 0.3
− 6.5
+3 39.97
+30 16.58

X −.96 Aug. 21

53 44.2
47.4
50.8
57.4
0.8
4.1
7.4
10.7
17.2
20.6
23.9
28.45
44.5
54 17.70
53 57218
54 4045
−1 10.66
− 1.21
+ 18.13
−2.09
−1 17.96
+54 43.61
1.31
+43.87
1.64217
1.55868
55 0
47.9 47.2
48.1 38.1
16.0 8.53
48.00 42.65
55 48.33
+ 43.20
56 21.53
26 26.82
08 08
0.96660
− 240
0.96420
+ 9.21
− .51
− .11
+ .03
+ 8.59
26 35.41
30 21.8
+3 46.4
46.9
+3 46.17
+ 0.3
− 6.5
+3 39.97
+30 16.58

−.96 Aug. 21

53 41.6
45.0
48.3
53.0
58.2
1.6
5.0
8.2
11.8
18.1
21.5
31.73
17.3
54 20.70
55 1.573
−1 15.08
− 1.07
+ 18.13
−2.06
−1 18.21
+54 43.72
1.21
+41.23
1.61521
1.53172
55 0
50.1 48.9
52.1 44.1
22 13.0
56.10 46.52
55 48.80
+ 34.02
56 22.82
26 25.53
8 04
0.96660
− 978
0.96684
+ 9.05
− .45
− .14
+ .03
+ 8.49
26 34.02
30 21.9
+3 47.9
48.4
+3 48.27
+ 0.3
− 7.5
+3 41.07
+30 16.48

−.85 Aug. 22

53 18.3
20.4
23.4
54 18.70
54 42.0
45.2
48.7
53.4
58.5
1.9
5.2
8.6
13.3
18.6
21.8
32.42
21.2
55 1.927
−1 15.08
− 1.07
+ 18.13
−2.06
−1 18.21
+54 43.72
1.21
+41.23
1.61521
1.53172
55 0
50.1 48.9
52.1 44.1
22 13.0
56.10 46.52
55 48.80
+ 34.02
56 22.82
26 25.53
8 04
0.96660
− 978
0.96684
+ 9.05
− .45
− .14
+ .03
+ 8.49
26 34.02
30 21.9
+3 47.9
48.4
+3 49.67
+ 0.3
− 7.6
+3 42.37
+30 16.39

−.95 Aug. 23

54 32.6
33.3
37.8
54 35.23
55 3611
−1 15.36
− 1.20
+ 18.13
−2.03
−1 18.59
+43.58
1.20
+26.94
1.43040
1.34691
55 1
3.5 2.1
3.9 55.1
1.4 11.2
3.70 58.60
56 2.15
+ 22.23
56 23.38
26 24.97
7 52
0.96640
− 200
0.96440
+ 9.21
− .19
− .17
+ .04
+ 8.89
26 33.86
26 33.90
+3 48.1
48.6
+3 48.27
+ 0.3
+ 7.6
+3 41.64
+30 15.54

−1.04 Aug. 28

54 42.3
45.6
48.8
53.3
57.0
2.1
5.4
8.9
13.3
18.4
22.1
32.39
23.4
54 26.40
55 34.53
−1 18.57
− 1.31
+ 18.13
−1.87
−1 21.75
+43.87
1.31
−33.83
1.52930
1.45881
55 1
53.1 51.5
54.1 52.2
36.0 45.9
10.1 98.1
55.05 49.05
55 52.05
+ 25.36
56 24.41
25.28
7 02
0.96570
− 200
0.96370
+ 9.20
− .30
− .31
+ .07
+ 8.66
26 33.94
26 32.32
+3 47.04
+ 0.3
− 7.7
+3 41.64
+30 15.54

54 23.6
26.4
29.2
54 26.40
55 31.7
34.1
37.8
54 34.53
55 34.53
−1 18.57
− 1.31
+ 18.13
−1.87
−1 21.75
+43.87
1.31
−28.91
1.46105
1.37756
55 1
50.7 49.6
51.7 42.4
24 12.0
56.20 46.00
56 48.60
− 23.88
56 24.75
23.60
7 04
0.96580
− 964
0.95616
+ 9.04
− .22
− .32
+ .07
+ 8.57
32.17
26 32.46
26 32.32
+3 51.24
+ 0.3
− 8.3
+3 43.24
+30 15.56

54 45.4
48.7
52.0
56.6
55 3.4
8.6
12.0
18.6
21.8
25.1
298.2
54 26.40
55 34.53
55 3394
620
−1 18.57
− 1.31
+ 18.13
−1.87
−1 21.75
+43.87
1.31
−28.91
1.46105
1.37756
55 1
50.7 49.6
51.7 42.4
24 12.0
56.20 46.00
56 48.60
− 23.88
56 24.75
23.60
7 04
0.96580
− 964
0.95616
+ 9.04
− .22
− .32
+ .07
+ 8.57
32.17
26 32.46
26 32.32
+3 51.24
+ 0.3
− 8.3
+3 43.24
+30 15.56

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35 Draconis

α 17h 55m 3s

+76° 58' 40"

−34° 35' 52"

1874

Mar. 11 | Aug. 8 | Aug. 3 | Aug. 12 | Aug. 15 | Aug. 21

log cos δ 9.35263

log sin δ 9.98869

const. 6.73762

log I 0.96166

I 9.15

½I 4.58

I' .555

See Sup. List for Aug. 26 page 28

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1876phae.proj.1483.

2 Sagittarii

| | | |

1876phae.proj.1483

72 Ophiuchi

| | | |

1876phae.proj.1483.

44 Sagittarii

α 18 h 6 m 17 s
δ −21° 5′ 21″
+63° 28′ 09″

1876

N.P.

| | m | s | ″ | | |

1876phae.proj.1483

41 Draconis

18 m 9 s 30

+79 59 0

−37° 36′ 12″

log cos δ 9.24037

15 cos δ arc 9.36555 time Aug 5
9.36275 after Aug 5

tang δ + 5.76

sin z −.61

1876

Aug. 5		Sept. 2		Sept. 3		Sept. 6	
	−.91		−1.04		−1.03		−.97
18 9 48	9 17.7	8 50.3	9 24.4	8 45.8	9 24.2	8 14.2	9 15.9 21.9
	23.8	1.0	30.1	54.5	29.6	23.7	21.5 27.9
	29.6	10.3	36.4	5.0	35.5	33.7	27.5 34.0
	35.7		41.7		42.0		33.3 46.0
	41.7		48.3		47.8		39.4 45.1
	47.5		54.2		52.8	9 18.0	45.2 51.5
	53.6		0.1		59.2		51.0 57.3
	59.4		5.8		5.6		56.7 3.5
	5.2		11.8		11.0		3.0 9.5
	1						5
	384.2		252.8		307.7		293.7 291.3
9 48.0	374.2	8 9 0.53	432.8	8 55.10	427.7	8 23.87	353.5 411.3
	9 ~~40.67~~ 41.578		9 48.089		9 47.522	9 18.00	(39.267 78) 45.700
	−8.72 −5.75		−17.74 −5.87		−17.47 −5.83		−16.05 −5.49
	−2.71		+ 0.63		+ 0.77		+ 1.18
	− 16.58		− 23.00		− 22.53		− 20.36
	9 25.00		25.09		24.99		25.34
	+36.78	−5.85		−5.89		−5.83	−5.49
	1.56561						
	0.93116						
			+47.56		+52.42	+15.41	+27.70
	ℰ ℋ		1.67724		1.71950	1.87743	1.44248
	ℊ ℋδ		1.03999		1.08225	1.24018	0.80523
	25 2		25 3		25 2	25 3	
	25.7 28.9		0.0 1.1		59.1 61.9	3.0 6.2	
	24.9 15.9		57.9 48.9		57.5 49.3	3.5 4.0	
	16.6 04.8		17.9 11.0		.6 11.2	5 10.2	
	25.30 22.40		58.95 55.00		57.30 53.60	225 510	
	27 23.85		27 56.98		27 57.45	28 4.18	
	+ 8.53		+ 10.96		+ 12.09	+ ~~17.39~~ 16.39	
	27 32.38		28 7.94		28 9.54	28 ~~21.57~~ 10.57	
79	55 15.97		54 40.41		54 38.81	54 ~~26.78~~ 37.78	
−37	35 37		35 56		35 56	35 49	
	1.64680		1.64640		1.64660	~~1.65656~~ 1.64656	
	−1527		−1195		−970	−680	
	1.63123		1.63465		1.63690	1.63970	
	+42.78		+43.12		+43.34	+43.62	
	− .13		− .21		− .25	− ~~.58~~ .07	
	− .41		− .55		− .57	− .59	
	+ .10		+ .12		+ .12	+ .12	
	+ 42.34		+ 42.46		+ 42.64	+ 43.18	
+79	55 58.31		55 22.89		55 21.45	55 20.85	
		+3 13.15		+3 51.55		+3 52.84	+3 53.14
		+ .12		+ 1.4		+ 1.4	+ 1.4
		− 4.7		− 9.7		− 9.8	− 10.1
		+3 ~~8.65~~ 9.65		+3 ~~9.85~~ 43.25		+4 ~~1.29~~ 3 44.41	+43 ~~4.84~~ 44.44
	+79 59 ~~14.96~~ 7.96		59 ~~22.74~~ 6.14		59 ~~22.69~~ 5.89		59 ~~22.69~~ 5.29

18 h 9 m 25.105 s

+79 ° 59 ′ 6.32 ″

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ζ Ursae Min.

1876 Mar 18 12h 8s 89

+86° 36' 27"

− 44° 13' 39"

Mar. +86 36 0 Mar. Corr. − .04 s.5 log cos 8.77310 Mar. log Kt+2 2.49231 Mar.
Aug. +86 36 34 Aug. " " 8.77189 Aug. K+2 310.680 Mar.
I 2.108 Mar.

	Mar.	Aug.
	+208.61	+209.80
	173.84	174.33
	139.07	139.46
	69.54	69.73
	+34.77	+34.87
	3.477	3.487
	69.54	69.73
	139.07	139.46
	173.84	174.33
	208.61	209.20

dt/dt: −19.4199 s

S₀: 36 28.3 28.53

Corr: + .8

dS/dt: + 1.098

1876

U.C. Mar. 19 −.09 −.02 / −.06 −.06

U.C. Mar. 22 −.06

U.C. Mar. 27 −.25

N.A. 2

m 12 19887 19.893

m 2		m 2																	
8 48.8		5 12.4				3 40.8		5 10.1		8 1.9		10 21.2	=	5 11.7		8 3.3		10 22.2	
		44.7				57.8		44.0		35.7		37.0		44.8		37.9		36.9	
		6 19.6				4 21.1		6 12.2		9 11.7		55.3	−	6 22.2		9 12.7		56.7	
		(48.8)						3.3				11 12.9		56.2		—		11 12.7	
		54.8																	
			10 40.2				7 27.4				2.8.1		7 31.9	11 31.91	—		31.4		
		6 21.94	36.7		18 162		15 34.5				46.5		15 —		.74 —		48.7		
		19.47					16 9.6			12 5.1			—		.77 —	12	5.0		
		19.60					44.7				21.6		—		—		23.3		
		20.13					17 18.7		13 47.7		39.7		—	13	—		40.9		
			12 7.0				52.0		11 21.1				—		—				
									58.4										
		6 20.260	11 32.35										6 21.360						
			31.47																
8 48.80			32.23			3 59.57		31.3.6				26.7.4						27.7.8	
		11 30.940	11 32.017		18 16.20		11 31.358		11 29.467		11 29.711		11 32.040		11 31.807		11 30.867		
									29.242										
			11 31.478						11 29.354 73						11. 31.571				
		+44.50	12 13.85				+46.54		12. 14.94				+49.37		12 16.825				
		− 1.51	— 42.34				− 1.01		— 45.59 47				− 4.21		— 45.25				
		− 1.01	— 42.32						— 45.54 42						— 45.20				
		+ 6.04					+44.95						+3.0 8 76						
		+ 48.02					+ 50.48						+ 48.2 24						
		+2 10.84 50					+ 8.99						+ 19.79 81						
							+ 19.95												

+162.68
2.21133
1.10938

						+449.90		−406.73											
						2.65312		2.60931 2n											
6	°																		
6	46					1.55117		1.50736 2n											
45	4					45 4		50 0					45 4		50 0				
43.0	44.9					10.1	18.2	20.0	27.7				5.8	11.2	18.1	23.8			
48.8	46.2					17.3	14.6	27.8	26.2				17.2	11.4	29.1	25.7			
11.8	11.1					27.4	32.8	7.8	13.9				23.0	6	47.2	9.5			
45.90	45.50					13.70	16.40	23.90	26.95				11.50	11.30	23.60	24.75			
49	45.70					49	15.05	80	25.63				49	11.40	50	24.18			
	+ 10.86						+ 35.58		− 32.16										
49	12 58.58					49	50.63	49	53.27										
86	32	49.77				32	57.72		55.08										
−44	12	20				12	51	11	41										
	1.74780					1.74790		1.74760											
	+ 3415					+ 2793		+ 2793											
	+ 4430					1.77583		1.77553											
	1.79210					+ 5968		+ 5964											
	+ 61.96																		
	~ .85					− 6.54		− 5.34											
	− .93					− .80		− .08											
	+ .90					+ .17		+ .02											
	+ .19																		
+1	0.40					+ 52.47		+ 54.24											
+86	33	50.17				33	50.19		49.32										
			+2 8.70			33	49.76	+2	4.93								+2 5.70		
	36	00	+ 1.8			35	59.9		+ 1.7								+ 1.7		
	+2	9.8	+28.85			+2	10.1		+28.76										
		10.1					10.4												
			+2 38.50						+2 37.47										
			39.00						97										
+86			+36 25.67						+36 27.23										
			29.17						73										

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| | Mar 86 36 0 | Aug+Sept 86 36 36 | | |

1876phae.proj.1483.

1876

U.C. −.05 | U.C. −1.09 | U.C. −1.07 | U.C. −.96 | U.C. −.95 | U.C. −1.06

Aug. 10.4 | Aug. 12 | Aug. 13 | Aug. 21 | Aug. 23 | Aug. 26

Aug. 10.4	Aug. 12	Aug. 13	Aug. 21	Aug. 23	Aug. 26
13 58.7	12 31.2	11 47.1 / 12 4.8 / 21.8 / 40.1 / 56.3	11 [47.9] / 12 5.3 / 22.3 / 39.1 / 56.9	13 52.7 / 12 57.8 / 13 13.7 / 32.5 / 47.4	15 8.6
14 56.4	13 50.8	13 14.0 / 30.1 / 50.4 / 14 6.6	13 [15.2] / 31.0 / 49.6 / 7.1	14 6.7 / 24.0 / 43.1 / 58.0	14 23.7 / 40.7 / 58.3
12 54.80 .57	13 47.1 / 14 4.3				
13 58.70	12 31.20	11 37.90	13 16.70	13 52.70	15 8.60
14 56.40	12 54.685 / 12 22.22	12 56.833 / 12 21.54	12 57.156 / 12 21.17	14 52.40	13 49.40 / 12 18.20	15 7.70	13 48.548 / 12 17.51	17 43.30	13 52.220 / 12 16.40
−14.55 / −17.72	−16.80 / −18.40	−18.00 / −18.86	−1 14.66 / −16.20	−1 15.37 / −16.03	−1 17.60 / −17.89
+ 3246 / + 3251	+ 35.29 / + 35.34	+ 35.99 / + 36.04	+ 91.20 / + 91.25	+ 91.04 / + 91.09	+ 95.82 / + 95.87
− 2.38 / − 34.59 / 12 20.09	− 1.68 / − 36.85 / 19.98	− 1.28 / − 37.33 / 19.83	+ 1.69 / − 1 29.17 / 20.23	+ 2.38 / − 1 29.01 / 19.54	+ 3.48 / − 1 32.00 / 20.22
− 64.01 / 1.80625 / 0.70043					
−121.71	+25.63	−53.97	+59.26	−44.44	+29.70	−63.00	−4.15	−79.15	−76.38	−231.08
2.08533	1.40875	1.73215	1.77276	1.64777	1.47276	1.79934	0.61805	1.89845	1.88298	2.36324
0.97951	0.30293	0.62638	0.66694	0.54195	0.36694	0.69352	95123	0.79263	0.77716	1.25794
50 1	50 1	50 0	50 1	50 0	50 1	50 0	50 1	50 1	50 1	50 1	50 1
6.9 5.3	99 89	591 569	5.1 3.1	54.8 52.6	1.7 0.2	58.1 59.0	5.5 6.1	1.9 1.2	7.0 7.1	5.4 4.1	16.4 15.8
24.9 54.1	6.6 56.9	575 465	3.0 52.8	52.4 42.1	0.7 30.0	58.9 47.1	5.1 54.2	1.2 51.6	7.1 57.9	5.2 54.6	15.2 6.0
9.8 11.94	16.5 5.8	116.6 103.4	5.1 11.59	7.2 9.47	1.4 10.2	1.0 10.61	0.3	11.2.8	.1 5.0	118.7	11.6 21.8
4.90 59.70	8.25 2.90	583.0 51.70	4.05 57.95	3.60 47.35	1.20 55.10	58.50 53.05	5.30 0.15	1.55 56.40	7.05 2.50	5.30 59.35	15.50 10.90
51 2.30	51 3.58	50 55.00	51 1.00	50 50.98	50 55.16	50 55.78	51 2.73	50 58.98	51 4.78	51 2.33	57 13.35
− 5.02	− 9.54	+ 2.01	− 4.23	+ 4.65	− 3.48	+ 2.33	− 4.94	− 0.33	− 6.20	− 5.99	− 18.11
50 57.78	50 56.04	50 57.01	50 56.77	50 55.13	50 54.67	50 58.11	50 57.79	50 58.65	50 58.58	50 56.34	55.24
86 31 50.57	52.31	31 51.34	51.58	31 53.22	53.68	31 60.24	50.56	31 49.76	49.77	31 52.01	53.11
−44 12 50	12 47	12 58	12 52	13 03	12 55	12 57	12 50	12 54	12 48	12 51	12 40
1.74790	1.74790	1.74790	1.74790	1.74790	1.74790	1.74790	1.74790	1.74790	1.74790	1.74790	1.74780
−1083	−1083	−1275	−1275	−1378	−1378	−2050	−2050	−150	−1850	−1800	−1800
1.73707	1.73707	1.73515	1.73515	1.73412	1.73412	1.74590	1.74590	1.74640	1.74640	1.73490	1.73480
+5458	+5458	+5434	+5434	+5422	+5422	+5571	+5571	+5577	+5577	+5431	+5430
− .17	− .48	− .02	− .09	− .11	− .06	− 0.03	− .13	− .00	− .26	− .19	− 1.72
− .17	− .19	− .15	− .19	− .14	− .17	− .15	− .17	− .17	− .19	− .17	− .20
+ .04	+ .04	+ .04	+ .04	+ .03	+ .04	+ .04	+ .64	+ .04	+ .04	+ .04	+ .05
+ 5428	+ 5395	+ 5421	+ 5410	+ 5400	+ 5403	+5557	+5545	+5564	+5542	+ 5399	+ 5243
32 44.85	46.26	32 45.55	45.68	32 47.22	47.71	32 45.81	46.01	32 45.34	45.19	32 46.00	45.54
32 45.56	+3 46.34	32 45.62	+3 46.77	32 47.46	+3 46.36	32 45.91	+3 48.27	32 45.26	+3 44.04	32 45.77	+3 50.37
36 33.8	+1.3	36 39.3	+1.5	36 34.3	+1.3	36 35.9	+1.4	36 36.2	+1.4	36 36.8	+1.5
+3 48.2	−5.7	+3 48.7	−6.3	+3 46.8	−6.3	+3 50.0	−7.94	+3 50.9	−6.3	+3 51.0	−8.8
48.5	49.0	47.1	51.3	50.3	51.2	51.3	51.3
	+3 41.94 / 42.44		+3 41.77 / 42.27		+3 41.36 / 42.27		+3 41.77 / 42.27		+3 42.24 / 42.84		+3 43.47 / 44.7
	+36 27.50 / 28.00		+36 27.68 / 28.18		+36 28.82 / 29.32		+36 27.68 / 28.18		+36 27.50 / 28.10		+36 28.84 / 29.34

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See Suppl. List page 76. for the continuation of this story.

	U.C. −1.04 Aug. 28		U.C. −1.00 Aug. 29		U.C. −1.03 Aug. 30		U.C. −1.04 Sept 2		U.C. −1.03 Sept. 3		U.C. −.97 Sept. 6. 3	
	15 35.2		10 49.3	12 39.8	10 45.7	12 40.3	10 85.3	11 39.2	10 30.9	11 38.1	10 35.0	11 34.9
				58.0		58.5	11 44.1	57.3	12 3.8	37.6	11 45.6	53.3
				13 14.6		13 16.1	12 3.84	12 13.5	49.4	12 13.8	12 50.5	12 10.1
				33.2		32.9		30.8		30.9		26.6
				52.4		51.6		48.7		46.8		44.8
52.87	17 26.7		14 53.6	14 8.6	13 49.2	14 10.0	13 44.0	13 6.0	13 53.3	13 5.7	14 13.2	13 3.6
53.44	[14 10.13]	14 43.0		26.7		26.2	14 22.3	23.1	14 41.4	23.3	15 18.3	19.5
52.49	13 52.07	15 1.8		43.5		43.8	15 11.3	41.8	15 28.2	41.5	16 27.9	37.3
52.10	52.34	16 12.0		15 1.4		58.7	16 53.3	58.3	16 29.0	58.0	17 33.0	54.8
	51.27										18 43.2	
	52.60	17 21.8									19 53.2	
											21 6.2	
	15 35.20		10 49.30	8 276.4 6 486.4	10 45.90	338.1 458.1	11 39.27	318.7 434.7	11 48.03	315.7 435.7	22 10.7	284.9 404.9
	17 26.70	13 52.120	14 53.60	13 51.777	13 49.20	13 50.900	15 2.73	12 48.744	15 7.98	12 48.411	10 42.03	12 44.989
		12 15.57		12 51.822		12 14.71		12 13.51		12 13.14	18 32.84	12 11.97
				12 15.14								
	−1 18.56		−1 18.81		−1 19.05		−17.74		−17.48 6		−16.05	
	−17.56	+ 9655	−16.88	+ 9668	−17.39	+ 9619	−17.56	+ 3523	−17.39	+ 3527	−16.39	+ 33.02
		+ 96.60		+ 9673	9	+ 96.24		+ 35.28		+ 35.32	3	+ 33.01
	+ 4.32		+ 4.75		+ 5.17		+ 6.38		+ 6.75		+ 7.94	
	−1 3180		−1 3094		−1 3125		− 2892		− 2810		− 2513	
	20.32		20.88		19.65		19.82		20.31		19.86	
	−103.08											
	2.013172											
	0.907355	−214.58	+182.52	−61.78	+185.00	+ 1.70	+69.47	−138.99	+ 60.38	−139.57	+122.96	−347.85
		2.331592	2.26131	1.790858	2.26717	0.23045	1.841180	2.127072	1.78089	2.144726	2.08946	2.574139
		1.225772	1.15849	0.685032	1.16135	9.12463	0.735988	1.021252	0.67567	1.038972	0.98364	1.43557
	50 1	50 1	50 0	50 1	50 0	50 0						
	4.5 8.9	16.3 16.7	45.1 44.7	5.0 4.9	43.6 44.2	59.9 59.9						
	9.1 57.5	16.6 6.8	45.9 25.1	5.5 55.4	44.6 34.2	61.2 50.9						
	8.4	2.35	7.98	12.03	8.2 7.84	1.1 11.08						
	9.30 4.20	16.45 11.75	45.30 39.90	5.25 0.55	44.10 39.20	0.55 55.40						
	51 6.75	51 14.10	30 42.70	57 2.70	30 41.65	50 57.98						
	− 8.08	− 16.82	+ 14.31	4.84	+ 14.50	+ 0.13						
	50 58.67	50 57.28	50 57.01	5x0 0.36 57.86	50 56.15	50 58.11	50 58.46		50 59.16		50 59.33	
86	31 49.68	51.07	31 57.34	47.74 50.49	31 52.20	50.24	31 49.89		31 49.25		31 49.02	
−44	12 46	12 39	13 10	12 48	13 11	12 55	12 55					
	1.74790	1.74780	1.74790	1.74790	1.74800	1.74790	1.74790		1.74790		1.74790	
	− 900	− 900	− 933	− 933	− 1404	− 1404	− 1182		− 960		− 669	
	1.73890	1.73880	1.73867	1.73857	1.73396	1.73386	1.73608		1.73830		1.74121	
	+ 5481	+ 5480	+ 5479	+ 5477	+ 5419	+ 5418	+ 54.46		+ 54.74		+ 55.11	
	− .34	− 1.48	− 1.07	− .12	− 1.10	− .00	−					
	− .20	− .22	− .12	− .20	− .13	− .18	− .19		− .19		− 19	
	+ .04	+ .05	+ .03	+ .04	+ .03	+ .04	+ .04		+ .04		+ 04	
	+ 5431	+ 5315	+ 5363	+ 5449	+ 5299	+ 5404	+ 5431		+ 5459		+ 5496	
	32 43.99	44.22	32 44.97	44.98	32 45.19	44.28	32 44.20		32 43.84		32 43.98	
	32 44.10	+ 3 37.24	32 44.98	+ 3 51.41	32 44.74	+ 3 51.41		+ 3 52.55		+ 3 52.84		+ 3 53.14
	36 37.2	+ 1.5	36 37.3	+ 1.5	36 37.4	+ 1.5	36 37.7	+ 1.5	36 37.7	+ 1.5	36 38.1	+ 1.6
	+ 3 5.31	− 9.7	+ 3 5.28	− 9.8	+ 3 52.7	− 9.7	+ 3 53.5	− 9.6	+ 3 53.9	− 9.7	+ 3 54.1	− 9.6
	53.4	8.6	52.6	8.8	53.0	8.9	53.8	9.1	54.2	9.2	54.4	9.6
		+ 3 43.64 44.14		+ 3 43.64 44.14		+ 3 43.51 44.01		+ 3 43.45 .95		+ 3 43.64 45.14		+ 3 43.64 45.14
		+ 36 27.74 28.24		+ 36 28.59 29.09		+ 36 28.25 28.75		+ 36 27.65 28.15		+ 36 28.48 28.98		+ 36 28.62 29.12

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199 Herculis

| | | |

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X Draconis

α 18 m 23 s 18 — Conn

δ +72° 40′ 41″ — dα/dt — dδ/dt — −30° 17′ 53″

Corr^s

1876

Nov. 29 — Aug. 3 — Aug. 6 — Aug. 8 — Aug. 10 — Aug. 12

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Aquilae

α	18 28 24		
δ	−8 19 45		
	+50° 42′ 33″		
m	28	27.490	
dα/dt	+3.264		
δ₀	19	43.11	
dδ/dt	+2.18		

July		m	s		′	″	
28	28	30.99	−1	−19	47.1	−3	
Aug 2		30.78	1		46.8	3	
7		30.77	3		46.5	2	
12		30.74	4		46.3	2	
17		30.70			46.1		

log cos δ 9.99539

1500 sin 1″ 0.12055 (first Aug 5)
0.11775 (after Aug 5)

tang δ −0.15 +1.01

sin z +.77

	Aug. 3	Aug. 6	Aug. 8	Aug. 9	Aug. 10	Aug. 12
	−.88	−1.05	−1.08	−1.05	−1.05	−1.09
18	28 4.1	28 25.0	28 29	28 280	28 13.6	28 30.5	28 20.0	28 31.7	28 15.8	28 32.9	28 16.3	28 33.1
	6.9	27.0	4.6	30.1	15.2	32.6	21.6	33.8	17.3	35.0	18.3	37.1
	8.5	29.0	6.5	32.2	16.9	34.6	23.5	35.9	19.4	37.0	20.1	39.2
		32.3		36.4		38.8		40.0		41.1		43.4
		35.4		38.4		40.8		42.2		43.2		45.5
29	48	37.5	29 44	40.5	29 18.7	42.9	29 20.3	44.2	29 20.0	45.4	29 14.5	47.7
	6.7	39.6	6.2	42.6	21.1	45.1	21.8	46.3	21.7	47.5	16.4	49.7
	8.6	41.7	8.0	44.7	23.0	47.1	23.9	48.4	23.9	49.6	18.7	51.7
		43.8		48.8		51.4		52.6		53.7		56.0
		47.9		51.0		53.5		54.7		55.7		58.0
		50.0		53.0		55.5		56.8		57.8		60.0
				9				50				
		412.2		445.X		472.8		486.6		498.9		463.4
	28 6.70		28 4.67	36	28 15.23		28 21.70	44.055	28 17.50		28 18.23	58.34
	29 6.70	28 37.473	29 6.20	28 49.58	29 20.93	28 42.982	29 22.00	28 44.236	29 21.87	28 45.355	29 16.53	28 47.582
	−6.69	28 30.78	−9.83	28 30.77	−12.22	28 30.76	−13.47	28 30.76	−14.56	28 30.75	−16.83	28 30.74
	+.13		+.16		+.16		+.16		+.16		+.16	
	−3.29		−3.28		−3.27		−3.27		−3.25		−3.25	
	−9.85		−12.95		−15.33		−16.58		−17.65		−19.92	
	28 27.62		27.59		27.65		27.66		27.71		27.66	
		+.13		+.16		+.16		+.16		+.16		+.16
	+30.77						+2.254	−37.76				
	1.48813						+34.36	35.74				
	1.60868	−29.23	+35.87	−25.66	+27.75	−37.95	1.55725	1.55558	+27.86	−36.51	+29.35	−28.95
E	η	1.46583n	1.55473	1.40926n	1.44326	1.57921n	1.38668	1.55558n	1.44498	1.56241n	1.46761	1.46165n
G	H	1.58638n	1.67248	1.52701n	1.56101	1.69696n	1.47070	1.69478n	1.56273	1.68016n	1.58536	1.57940n
		40 4	45 0	40 4	45 0	40 4	45 1	40 4	45 1	40 4	45 1	40 4	45 0
		2.1 52.6	20.6 11.7	31.4 20.4	52.9 41.6	43.2 32.0	9.1 57.9	50.6 39.1	8.9 57.6	43.0 31.8	6.5 56.1	41.6 30.3	59.0 47.2
		54.4 52.2	13.8 11.6	22.8 20.4	43.4 42.9	33.9 30.8	0.6 56.9	40.3 37.2	59.9 55.8	32.5 29.1	58.9 54.2	32.2 27.9	49.6 46.9
		116.5 104.8	34.4 1.3	54.2	96.3 4.5	77.1 2.8	9.7 114.8	90.9 16.3	88 113.4	76.5 60.9	54 110.3	73.8 58.2	108.6 14.1
		5825 5240	1720 1165	2710 2040	4816 4225	3855 3140	485 5740	4545 3815	440 5670	3825 3045	270 5515	3690 2910	5430 4205
		43.1 55.33	45 1443	44 23.75	45 45.20	44 34.98	46 1.13	44 41.80	46 0.55	44 34.35	45 58.93	44 33.00	45 50.68
		+ 40.41	− 38.58	+ 47.04	− 32.65	+ 36.89	− 49.77	+ 31.95	− 47.13	+ 36.53	− 47.88	+ 38.49	− 37.97
								2.954	−4.952				
		44 35.94	35.85	45 10.79	11.55	45 11.37	11.36	45 13.75	11.03	45 10.89	11.05	45 11.49	12.71
								11.36					
−8	21 47.59	47.50	22 22.44	23.20	22 23.02	23.01	22 25.40	25.07	22 22.54	22.90	22 23.14	24.36
								23.01	22.48				
50	40 54	42 13	40 31	41 52	40 42	42 08	40 49	42 08	40 41	42 06	40 40	41 58
	1.84680	1.84660	1.84615	1.84660	1.84620	1.84660	1.84620	1.84660	1.84620	1.84660	1.84620	1.84660
	−463	−463	−1855	−1855	−1665	−1665	−1115	−1115	−1030	−1030	−1240	−1240
	1.84147	1.84197	1.82760	1.82805	1.82955	1.82995	1.83505	1.83545	1.83590	1.83630	1.83380	1.83420
	−6945	−6950	−6724	−6730	−6754	−6760	−6840	−6846	−6853	−6860	−6820	−6826
	+ .07	+ .07	+ .09	+ .05	+ .06	+ .11	+ .05	+ .10	+ .06	+ .10	+ .06	+ .06
	− .66	− .03	− .70	− .13	− .74	− .16	− .80	− .17	− .78	− .17	− .77	− .14
	+ .16	+ .01	+ .18	+ .03	+ .18	+ .04	+ .19	+ .04	+ .16	+ .04	+ .18	+ .03
Σ	−1 09.88	−1 09.45	−1 07.67	−1 07.35	−1 08.04	−1 07.61	−1 8.96	−1 8.49	−1 9.09	−1 8.63	−1 8.73	−1 8.31
−8	22 37.47	5645	23 30.11	3055	23 31.06	30.62	23 31.77	31.17	23 38.63	31.33	23 31.47	32.67
	22 57.21	+3 11.77	23 30.33	+3 43.61	23 30.84	+3 44.51	23 31.57	+3 46.32	23 31.48	+3 46.34	23 32.27	+3 46.77
	19 46.7	−1.6	19 46.6	−1.6	19 46.5	−1.6	19 46.4	−1.6	19 46.4	−1.6	19 46.3	−1.6
		+ 3.6		+ 3.5		+ 3.4		+ 3.3		+ 3.2		+ 3.2
		+3 13.77		+3 45.51		+3 46.31		+3 48.02		+3 47.94		+3 48.37
	−8	19 43.44		19 44.82		19 44.53		19 43.55		19 43.54		19 43.90

h m s
18 28 27.648

− 8 19 43.96

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