KG
11366
v.562

Astrophys. Data 1566.

Polaris
Observations and Reductions
From Nov. 12 1883 to Apr. 11 1884
B 3

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Observations of Polaris from Nov 12 1883
to Apr 11 1884

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Observations of Polaris from Nov 12 1883 to Apr 1 1884

1883 Nov. 12. 4 W.C.

	h	m	s								
	1	10	48.5		6	53.7					
			52.7								
			58.8	-	7	57.8	10	53.8	16	1.2	16	54.2
		11	1.5.5								
			22.2		8	54.0					
			31.4	-			11	23.0	5	31.1	16	54.1
			48.0		9	50.3					
			54.9								
		12	0.7	-			11	54.5	5	1.0	16	55.5
			18.7								
			22.5								
			30.8	-			12	~~24.3~~ ~~23.0~~	4	30.7	16	55.2
			47.7								
			54.4								
		13	1.7	-			12	54.6	4	0.8	16	55.4
			20.3								
			24.0								
			32.0	-			13	25.4	3	30.7	16	56.1
			48.4								
			55.0								
		14	1.9	-			13	55.1	3	0.6	16	55.7
			19.0								
			24.5								
			32.4	-			14	25.3	2	30.5	16	55.8
			49.0								
			53.9								
		15	2.2	-			14	55.0	2	0.4	16	55.4
												55.74
											m	s
											16	55.27

	h	m	s		°	′	″
N.A.	1	15	52.079	+	88	41	5.91
B.J.		15	51.879			41	5.90
N.A.–B.J.			+0.200			+	0.01

Red to B.J. −.20

	h	m	s
Tm	1	16	55.27
K			−.67
Tm+K	16	54.60	
R.A.	17	24.57	
T−R.A.			−29.97

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2

tan δ / sec δ / u / c — 1883 Nov 12 9 L.C

				43	11	42.5	
						49.0	
		11	48.3			53.5 –	
					12	14.2	
						20.5	
		12	20.3			26.2 –	
						44.3	
						51.5	
R.A + K		12	51.1			57.5 –	
(ΔT + m)					13	13.5	
u tan δ						19.4	
c sec δ		13	19.2			24.7 –	
Red to beginning year						43.2	
Sum						49.2	
α	12	49.58	13	49.0		54.7 –	
					14	14.3	
						20.0	
		14	19.8			25.2 –	
						43.9	
						49.2	
		14	49.4			55.0 –	
					15	14.2	
						19.5	
		15	19.5			24.8 –	
						42.2	
						48.2	
		15	48.4			54.8 –	
					16	14.5	
						18.7	
	15	19.20	16	18.9		23.5 –	
						43.0	
						49.2	
		16	48.7			53.8 –	
					17	12.7	
						18.0	
		17	18.8			25.8 –	
						42.7	
						48.7	
		17	48.9			55.2 –	
					18	12.9	
						20.3	
		18	19.8			26.1 –	
						44.2	
						49.2	
	17	49.18	18	49.7		55.7 –	
					19	14.4	
						30.4	
		19	20.1			25.6 –	
						44.5	
						50.2	
		19	50.6			57.2 –	
					20	13.7	
						20.5	
		20	20.2			26.3 –	
						45.5	
						50.7	
		20	50.7			56.0 –	
					21	15.8	
						21.3	
	20	20.62	21	21.5		27.4 –	
						45.3	
						49.8	
		21	50.2			55.5 –	
					22	13.7	
						19.8	
		22	19.4			34.7 –	
						45.0	
δ						51.7	
Ray		22	51.6			58.2 –	
Rfr					23	16.7	
Red to beginning of year						21.5	
Sum		23	21.7			26.9 –	
δ L.C						45.9	
δ U.C						51.2	
Corr to U.C	22	50.80	23	51.1		56.3 –	

17m 49.88 ckK

5	42.0
7	8.2
8	0.2
8	53.8
9	36.3
10	35.6
11	29.9
24	5.0
26	18.3
27	0.1
27	57.1
28	59.5
29	37.1
30	34.0

	h	m	s
T_m	13	17	49.88
K			+ 67
T_m + K		17	50.55
R.A		17	24.44
T − R.A			+ 26.11

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+ 43.82
+ 43.82
+ .58
− .06

1883 Nov. 14/15 U.C.

1	10	53.0		6	20							h m s	
		57.2										1 16 59.74	
	11	2.7		7	34.7	+						− .67	
		21.8					10	57.6	6	1.2	16 58.8	16 59.07	
		26.8		8	33.7							17 24.26	
		35.6					11	28.1	5	31.1	16 59.2	− 2.19	
		50.7		9	27.9							+ 24.99	
		57.2											
	12	4.8		10	22.5		11	57.6	5	1.0	16 58.6	1 16 59.07	
		24.4										+ 4.82	
		28.5										+ 25.42	
		34.6					12	29.2	4	30.9	17 0.1	− 2.63	
		52.7										− 1 32.18	
		58.3										− 1 4.57	
	13	7.0					12	59.3	4	0.8	17 0.1	15 54.50	
		23.0											
		29.5											
		34.7					13	29.1	3	30.7	16 59.8		
		55.5											
		59.7											
	14	3.9					13	59.7	3	30.6	17 0.3		
		23.7											
		29.1											
		35.9					14	24.6	2	30.5	17 0.1		
		53.3											
		57.5											
	15	5.9					14	58.4	2	0.4	16 59.3		
		24.5											
		32.3											
		37.3					15	31.4	1	30.3	17 1.7		
		51.8											
		59.3											
	16	7.8					15	59.6	1	0.2	16 59.8		
		24.8											
		29.0											
		35.4					16	29.7	0	30.1	16 59.8		
		54.0											
		57.7											
	17	4.0					16	58.6	−	−	16 58.6		
											16 59.14		

δ = +91 18 25 L.C
δ = +88 41 35 U.C

Cor δ 8.85810
sin δ 9.99989
tan δ 1.64179
log 44.183 1.37811

tan δ 43.83

Rit −72 U.C
−75 L.C

+717.74	+565.04	+506.04	+451.84	+397.24
2.85594	2.75208	2.70418	2.65498	2.59905
1.32485	1.22396	1.17606	1.12686	1.07093
24 9.05	9.52 ×	7.72	7.18	6.28
− 21.27	16.75	− 15.00	−13.39	−11.77
23 47.78	52.77	52.72	53.79	54.51
+88 59 0.57	55.58	55.63	54.56	53.84

46 17 29				
1.77940				
+2177				
1.80117				
+6327				
+ 6.41	+ 3.97	+ 3.18	− 2.54	− 1.96
− .82	− .82	− .82	− .82	− .82
+ 56.04	+ 58.48	+ 59.27	+ 59.90	+ 60.49
59 56.61	54.03 ×	54.90	54.56	54.33

+ 66				
59 57.27	54.69	55.56	55.22	54.99
41 34.3				
−18 23.0	20.4 ×	21.3	20.9	20.7 ×

+ 88	59	54.03
−	18	20.16
+		.66
−		28.40
−	18	47.90
+ 88	41	6.13

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4

1883 Nov: 14.9 S.C.

− 43.82
− 43.82
+ .58
+ .00 5

	13	13	43.1	56	0.8
			50.6	58	(6.3)
	11	49.6	55.0	58	54.6
		12	11.9		
			17.8	59	46.0
	12	17.6	23.0		
			45.1	0	(46.0)
			48.9		
	12	49.4	54.3	1	50.4
		13	12.7		
			18.4	3	40
	13	18.4	24.2		
			42.6	4	32
			49.6		
12 48.82	13	49.1	55.0	5	(56)
		14	10.7		
			16.4	5	59.2
	14	17.0	23.9		
			40.2	6	54.0
			45.9		
	14	46.3	52.7	7	57.1
		15	12.7		
			17.3	8	56.1
	15	17.3	22.0		
			41.9	10	07
			48.2		
	15	48.2	54.5	~~10~~	~~52.7~~
		16	13.5		
			17.7		
15 17.40	16	18.2	23.4		
			41.8		
			46.4		
	16	47.2	53.3		
		17	10.0		
			14.7		
	17	15.8	22.6		
			40.0		
			47.8		
	17	47.3	54.0		
		18	11.3		
			16.5		
	18	17.4	24.3		
			41.0		
			47.0		
17 47.20	18	48.3	56.8		
		19	13.1		
			18.3		
	19	18.3	23.6		
			42.4		
			47.7		
	19	48.0	54.0		
		20	13.2		
			20.1		
	20	19.6	25.4		
			42.2		
			48.0		
	20	47.7	53.0		
		21	12.8		
			18.1		
20 18.44	21	18.6	35.0		
			38.8		
			46.6		
	21	46.3	53.5		
		22	12.3		
			17.6		
	22	17.2	21.8		
			40.7		
			44.7		
	22	46.0	52.7		
		23	10.2		
			17.1		
	23	17.3	24.7		
			45.0		
			49.8		
22 47.34	23	49.9	54.9		

17 47.84 Chk

	h	m	s
T_m	13	17	47.84
K		+	67
T + K		17	48.51
R.A		17	23.92
T − R.A		+	24.59

13 17 48.51
+ 4.28
− 25.42
× − 2.19
− 1 32.04
− 1 55.37
15 53.14

+1307.04	+1181.54	+1113.24	+1081.84	+1021.84	+957.44	+467.14
3.11629	3.07244	3.04659	3.03416	3.00938	2.98111	2.66945
1.58817	1.54432	1.51847	1.50604	1.48126	1.45299	1.18133
~~46 53.20~~	54.28	53.80 5288	52.88	53.62	53.85	47 0.45
+ 38.74	+ 35.02	+ 33.00	+ 32.07	+ 30.29	+ 28.38	+ 15.18
47 32.04	29.30	28.80	24.95	23.91	22.23	47 15.63
+91 35 16.31	19.05	19.5	23.40	24.44	24.15	35 32.72
48 54 45						48 54 38
1.81910						1.81910
+ 2848						+ 2848
1.84758						1.84758
+ 70.40	+ 70.40	+ 70.40	+ 70.40	+ 70.40	+ 70.40	+ 70.40
+ 21.25	+ 17.36	+ 15.41	+ 14.56	+ 12.99	+ 11.40	+ 2.71
− .38	− .38	− .38	− .38	− .38	− .38	− .40
+ 91.27	+ 87.38	+ 85.43	+ 84.58	+ 83.01	+ 81.42	+ 72.71
36 47.58	46.43	44.8	42.98	47.15	47.57	36 45.43
+ .88						
36 48.26	47.11	45.24	48.66	48.13	48.25	36 46.11
18 25.6						18 25.6
−18 22.7	21.5	20.0	23.1	22.5	22.6	20.5
		− 8				− 8
		20.8				21.3

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1883 Nov. 16, 4 W.C.

1	*	—	25	12.7					
		—	27	3.5					
11	18.4								
	21.8		28	39.0					
	24.9				11	21.7	5	31.1	16 52.8
	42.7		28	51.0					
	49.4								
	54.2		31	16.2	11	48.8	5	1.0	49.8
12	12.2								
	20.7		33	9.8					
	24.8				12	19.2	4	30.9	50.1
	42.3								
	47.8								
	50.2								
	55.2				12	48.9	4	0.8	49.7
13	16.6								
	21.3								
	25.8				13	21.2	3	30.7	51.9
	41.2								
	46.8								
	53.3				13	47.1	3	0.6	47.7
14	17.6								
	23.7								
	27.9				14	23.1	2	30.5	53.6
	47.4								
	52.8								
	59.0				14	53.1	2	0.4	53.5
15	18.0								
	22.2								
	26.3				15	22.2	1	30.3	52.5
	46.3								
	51.0								
	57.4				15	51.6	1	0.2	51.8
16	17.0								
	21.5								
	26.6								
	29.9				16	23.7	0	30.1	53.8
	46.5								
	52.3								
	58.8				16	52.5	–	–	52.5
21	19.3								
	22.5								
	29.3				21	23.7	4	30.9	52.8
	45.2								
	51.4								
	57.8				21	51.5	5	1.0	50.5
22									

16 51.64

h	m	s
1	16	51.64
		– .67
	16	50.97
	17	23.49
	–	32.52

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Olz. doubtful.

1883 Nov. 16.9 S.C

13	11	46.0	9	7.5									
		51.6											
		56.9	10	51.3	11	57.5	6	1.2	17	52.7			
	12	12.7											
		19.6	27	10.8									
		26.3			12	19.5	5	30.1		50.6			
		44.5	29	8.3									
		51.0											
		57.8	30	49.9	12	56.1	5	1.0		52.1			
			32	20.6									
			34	25.4									
			36	11.6									
	14	15.5											
		20.0	37	58.4									
		26.9			14	20.8	3	30.7		51.5			
		51.9	38	2.4									
		57.0											
	15	1.0			14	56.6	3	0.6		57.2			
		17.4											
		23.0											
		29.2			15	23.2	2	30.5		53.7			
	16	18.8											
		23.9			16	23.9	1	30.3		54.2			
		50.3											
		56.0											
		59.2			16	55.2	1	0.2		55.4			
	17	11.0											
		29.5			17	20.2	10	30.1		50.3			
	31	49.3											
		54.4			21	53.3	4	0.4	17	52.5			
									17	53.2 02			

Π_m h m s
13 17 53.02
K + 6.7
$\Pi_m + K$ 17 53.69
R.A 17 23.31
Π R.A + 30.38

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+ 43.83
+ 43.83
+ .68
− .05

1883 Nov. 17.4 2UC.

1	10	46.9		6	58.4								
		52.3											
		56.0		8	45	10	51.7	6	1.2	16	52.9		
	11	15.7											
		19.1		8	55.3								
		26.2				11	20.3	5	31.1		51.4		
		45.6		9	57.9								
		50.6											
		58.1				11	54.4	5	1.0		52.4		
	12	15.2											
		20.8											
		26.1				12	20.7	4	30.9		51.6		
		47.0											
		52.2											
		58.2				12	52.5	4	0.8		53.3		
	13	11.4											
		19.6											
		26.5				13	19.2	3	30.7		49.9		
		43.7											
		51.2											
		57.2				13	50.7	3	0.6		51.3		
	14	19.2											
		33.1											
		29.2				14	23.8	2	30.5		54.3		
		45.0											
		52.1											
		58.7				14	54.9	2	0.4		52.3		
	15	18.5											
		22.3											
		29.7				15	23.5	1	30.3		53.8		
		46.7											
		52.2											
		58.3				16	52.4	1	0.2		52.6		
	16	15.5											
		20.3											
		27.5				16	21.1	0	30.1		51.2		
		48.1											
		49.5											
		53.6				16	48.7	−	−		48.7		

16 ~~52.28~~ 51.98

+5978.58	+5292.48	+476.68	+41408
2.77348	2.72221	2.67823	2.64708
1.24536	1.19409	1.15011	1.08896
24 7.62	7.12	~~5.657~~ 12 5.18	
+ 12.59	− 16.63	− 14.13	− 12.27
23 59.03	51.49	~~51.52~~ 99 52.91	
+88 58 58.32	52.86	~~56.83~~ 55.36 ×	55.44

46 17 31		46 17 31	
1.77940		1.77940	
+ 2520		+ 2520	
1.80460		1.80460	
+ 63.77	+ 63.77	+ 63.77	+ 63.77
− 1.38	− 3.46	− 2.83	− 2.13
− .82	− .82	− .82	− .82
+ 58.37	+ 59.49	+ 60.12	+ 60.82
59 56.89	56.35	~~56.95~~ 55.48 ×	56.26

+ .69			
59 57.58	57.04	~~57.64~~ 56.17	56.95
41 35.3			
22.3	21.7 ×	~~22.3~~ 20.9 ×	21.6 ×

	1	16 51.98
		− .67
		16 51.31
		17 23.13
		− 31.82

	1	16 51.31
+		6.32
+		29.80
−		2.19
−	1	31.25
−		57.32
	15	53.99

+88	59	55.48
−	18	19.82
+		.69
−		29.40
	18	18.53
+88	41	6.95

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1883 Nov 17.9 S.C.

− 43.83
− 43.83
+ .68
+ .08

	13	11		448
				490
	11	49.3		540
			12	124
				169
	12	17.8		242
				406
				484
	12	47.9		546
			13	130
				190
	13	19.2		255
				413
				475
12 48.22	13	46.9		520
			14	117
				176
	14	17.8		240
				410
				457
	14	46.4		525
			15	113
				161
	15	16.7		328
				432
				485
	15	48.3		532
			16	117
				178
15 17.38	16	17.7		237
				430
				482
	16	48.5		543
			17	112
				176
	17	17.7		242
				422
				476
	17	48.2		548
			18	121
				200
	18	19.2		255
				428
				482
17 48.18	18	47.3		510
			19	103
				156
	19	15.8		214
				427
				484
	19	48.5		545
			20	128
				175
	20	19.0		268
				408
				478
	20	47.9		550
			21	162
				195
20 18.16	21	19.6		230
				475
				528
	21	52.5		571
			22	132
				220
	22	21.1		280
				472
				507
	22	51.3		560
			23	154
				223
	23	21.7		275
				453
				500
22 51.52	23	51.0		576

~~12 49.89~~
48.69

8	216
10	452
24	120
29	522
31	105
32	485
35	404
36	508 ✗
+38	320 ✗

	h	m	s
T m	13	17	48.69
K		+	67
T m + K		17	49.36
R. A		17	22.92
T − R.A		+	26.44

13 17 49.36
+ 6.65
− 29.80
− 1 ~~00~~ 351
− 1 31.04
− 1 53 ~~29~~ 59.76
15 ~~56.07~~
52.56
.66

− 383.31	− 723.51	− 801.86	− 899.81	− 1071.71	− 1142.11	− 1243.31
2.58355n	2.85944n	2.90410n	2.95415	3.03008	3.05771	3.09459
1.05543n	1.33132n	1.37598n	1.42603n	1.50196n	1.52959	1.56647n
47 24.62	39.58	43.82	49.98	58.08	48 3.20	8.38 ✗
− 11.36	− 21.44	− 23.77	− 26.67	− 31.77	− 33.85	− 36.85
47 13.26	18.14	20.05	23.31	26.31	29.35	31.53
+91 35 35.09	30.21	28.30	25.04	22.04	19.00	16.82
48 54 23				48 53 40		
1.81910				1.81890		
+ 2129				+ 2129		
1.84033				1.84019		
+ 69.24	+ 69.24	+ 69.24	+ 69.23	+ 69.21	+ 69.21	+ 69.21
+ 1.83	+ 6.51	+ 8.00	+ 10.07	+ 14.28	+ 16.22	+ 19.23
− .48	− .52	− .54	− .54	− .60	− .62	− .62
+ 70.59	+ 75.23	+ 76.70	+ 78.76	+ 82.89	+ 84.81	+ 87.82
36 45.68	45.44	45.00	43.80	44.93	43.81	44.64 ✗
+ .72						
36 46.40	46.16	45.72	44.52	45.65	44.53	45.36
18 24.5						
− 18 21.9	21.7	21.2	20.0	21.1	20.0 ✗	19.9 ✗

− .8
20.7 ✗

+91 36 44.64
− 18 19.82
+ .72
+ 29.60
− 17 49.50
+91 18 55.14
+88 41 4.86
− 7.7
4.09

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1883. Nov. 19.4 U.C.

	10	44.0		5	33.6							
		50.0										
		55.8		7	54.6	10	49.9	6	1.2	16	51.1	
	11	1.3										
		22.8		9	23.2							
		28.0				11	22.0	5	31.1		53.1	
		45.4										
		52.2										
		58.8				11	52.1	5	1.0		53.1	
	12	1.6										
		23.5										
		28.8				12	23.3	4	30.9		54.2	
		46.8										
		52.6										
		59.0				12	52.8	4	0.8		53.6	
	13	~~1.0~~										
		23.4				13	23.4	3	30.7		54.1	
										16	58.20	

h	m	s	
16	53	20	
	−	67	
16	52	53	
17	22	20	
	−	29.69	

464
9.82
.72
9.60
4.50
3.14
4.86
-.77
4.09

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1883phae.proj.1566

1883 Nov. 19 D.C.

			13	11	41.5			4	13.2						
					46.0										
			11	43.7	—			5	22.0						
				12	3.0										
					13.2			6	12.5						
			12	11.8	19.2										
					37.3			6	57.0						
					42.3										
			12	42.6	48.1			7	50.4						
				13	2.2										
					8.0			8	35.1						
			13	8.7	16.8										
					34.0			9	35.8						
					39.6										
12	41.26		13	39.6	45.3			10	46.3						
				14	4.7										
					8.5			11	32.8						
			14	9.7	15.8										
					32.4			25	55.0						
					40.8										
			14	39.8	46.3			26	44.5						
				15	2.7										
					8.9			27	34.7						
			15	10.5	20.0										
					35.0			28	16.6						
					40.2										
			15	41.4	49.1			29	8.5						
				16	4.3										
					10.2			30	2.1						
			16	9.6	14.4										
15	10.20				34.4			30	57.0						
					39.0										
			16	40.2	47.5			31	(42.1)						
				17	3.1										
					7.5										
			17	9.3	11.4										
					34.5										
					38.8										
			17	39.7	45.9										
				18	3.2										
					11.7										
			18	10.6	16.8										
					33.5										
					41.5										
17	40.02		18	40.3	46.0										
				19	0.5										
					9.9										
			19	9.3	17.4										
					34.5										
					40.8										
			19	39.8	44.1										
				20	4.2										
					10.1										
			20	10.3	16.7										
					34.8										
					41.3										
			20	41.5	48.3										
				21	3.2										
					8.4										
			21	8.3	13.3										
20	9.84				32.8										
					41.3										
			21	40.5	47.3										
				22	6.2										
					12.3										
			22	11.6	16.4										
					35.3										
					41.0										
			22	41.0	46.7										
				23	8.3										
					10.0										
			23	10.2	12.4										
					37.4										
					43.3										
22	41.14		23	42.4	46.5										

17 40.496

Π_2 13 17 40.50
κ + 67
$\Pi_2 + \kappa$ 17 41.17
R.A 17 21.92
$\Pi + R.A$ + 19.25

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1883phae.proj.1566.

(Nov. 21.4)

1883. Nov. ~~21.5~~ 21.6

+ 43.85
+ 43.85
+ .70
− .05

56	16.7	
58	21.8	
59	43.2	
2	35.2	
3	56.7	
5	41.0	+
8	2.4	

h	m	s
1	16	44.26
		−.67
	16	43.59
	17	2.02
		−37.43

1				16	43.59	
				+	8.44	
				+	30.69	
				−	2.19	
				−1	29.14	
				−	52.20	
				15	57.39	

h	m	s				
1	16	11.0				
		12.6				
		14.0	x1	42.5		
3		8.7	15	3.1	16	45.6
		14.1				
		20.1	3	14.5		
4		32.7	13	32.8	16	47.3
		39.3				
		42.0	4	38.0		
6		2.7	12	2.5	16	40.5
		9.5				
		14.0	6	8.7		
7		40.0	10	32.2	16	40.9
		45.4				
		50.0	7	45.1		
			9	1.9	16	47.0
					16	44.26

+ 1167.56	+ 1102.46	+ 1021.06	+ 849.06	+ 767.56	+ 663.26	+ 521.86	
3.06788	3.04236	3.00905	2.92894	2.88511	2.82168	2.71755	
4.53726	4.51424	4.48093	4.40082	4.35699	4.29356	4.18943	
24 5.70	6.28	6.82	5.88	~~4.42588~~	~~3.38~~ 4.42	1.20	
− 3.41	− 3.28	− 3.26	− 2.47	− 22.75	− 19.66	− 15.47	
23 3.09	3.60	3.76	4.71	~~4.67~~ 13	~~3.70~~ 4.78	4.53	
+88 59 17.26	14.75	12.59	7.64	6.68	4.63	3.59 · 2.62	
				5.22			
46 17 32				46 17 32			
1.77930				1.77930			
+ 250				+ 250			
1.78180				1.78180			
+ 6051	+ 6051	+ 6051	+ 6051	+ 6051	+ 6051	+ 6051	
− 16.96	− 15.12	− 12.97	− 8.97	− 7.33	− 5.47	− 3.39	
− .82	− .82	− .82	− .82	− .82	− .82	− .80	
+ 43.73	+ 44.57	+ 46.72	+ 50.72	+ 52.36	54.22	+ 56.32	
59 59.99	59.32	59.31	58.36	~~59.04~~ 57.58	~~58.85~~ 59.81 ×	58.74	
				+ .73			
+ .73				58.31			
59 60.72	60.05	60.04	59.09	59 ~~59.77~~	~~59.58~~	59.67	
~~41~~ 36.7				41 36.7	58.54		
+18 24.0	23.3	23.3	22.4 × −18	~~23.0~~ 24.6 ·	~~22.9~~ 21.8 ×	23.0	

+88	57	57.81
−	18	21.80
+		.73
	−	30.80
	−18	51.87
+88	.41	5.94

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12

1883 Nov. 24 Gl. C

			9	27.4							
			23	56.9							
			26	52.4							
			28	10.1							
			29	23.0							
13	13	30.1									
		44.3	30	49.5	13	34.5	4	0.8	17	35.3	
		39.2									
	14	30.4									
		34.7									
		39.3			14	34.8	3	0.6		35.4	
	15	3.0									
		5.6									
		8.0			15	5.5	2	30.5		36.0	
		32.0									
		35.8									
		41.0			15	36.3	2	0.4		36.7	
	16	0.5									
		5.7									
		11.0			16	5.7	1	30.3		36.0	
		28.9									
		36.1									
		40.4			16	35.1	1	0.2		35.3	
		59.2									
	17	4.4									
		9.8			17	4.5	0	30.1		34.6	
		39.6									
		40.6									
		41.3			17	46.5 (-2.8)	—	—	~~7.8~~	38.5	
	18	0.4									
		4.7									
		10.5			18	5.2	0	30.1		35.3	
		30.3									
		34.4									
		40.2			18	35.0	1	0.2		35.2	
	20	30.8									
		38.0									
		42.3			20	37.0	3	0.6		36.4	
	21	0.3									
		4.9									
		12.3			21	5.8	3	30.7		35.1	
		30.2									
		35.2									
		41.6			21	35.8	4	0.8		34.9	
	22	0.5									
		6.1									
		12.4			22	6.3	4	30.9		35.4	
		31.3									
		36.0									
		41.7			22	36.3	5	1.0		35.3	
	23	2.2									
		5.9									
		10.3			23	6.1	5	31.1		35.0	
		31.2									
		36.7									
		43.1			23	37.0	6	1.2		35.8	
									17	35.66	

T_m 13 h 17 m 35.66 s
K + 67
$T_m + K$ 17 36.33
R.A. 17 19.00
$T - R.A.$ + 17.33

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1883phae.proj.1566.

1883 Nov 25.4 U.C.

1	10	9.6	52	45.2								
		16.2			10	16.5	6	~~1.2~~ 31.3	16	~~47.7~~ 47.8		
		23.7	55	~~24.4~~								
		45.4										
		48.7	56	59.8								
		52.4			10	48.8	5	~~31.7~~		~~19.9~~		
	11	9.8	58	36.7			6	1.2		58.0		
		12.0										
		16.3	0	16.1	11	12.7	~~5~~ 3	~~1.0~~ 31.1		~~13.7~~ 43.8		
		38.6										
		46.0	1	58.3								
		52.3			11	45.6	~~4~~ 5	~~30.9~~ 1.0		~~16.5~~ 46.6		
		—	3	16.0								
		—										
		—	4	49.2								
		—										
		—										
		—										
	13	14.0										
		21.3										
		27.1			13	20.8	3	~~0.6~~ 30.7		~~27.4~~ 51.5		
		—										
		—										
		—										
		—										
		—										
		—										
		—										
		—										
	15	12.0										
		16.2										
		21.3			15	16.5	1	~~0.2~~ 30.3		~~16.7~~ 46.8		
		~~42.3~~										
		49.2										
		—			15	45.7	~~0~~ 1	~~30.1~~ 0.2	16	~~15.8~~ 45.9		
									16	~~17.69~~ 47.49		

h	m	s
1	16	47.49
	–	67
16	36	82
17	18.	74
	–	4192

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1883phae.proj.1566.

1883. Nov. 25.9 L.C

	h	m	s
Tm	13	17	33.74
k			+ 67
Tm+k		17	34.41
R.A		17	18.51
Tm − R.A			+ 15.90

13 11 29.1 34.0 38.7 9.0 — 7 27.8 — 10 81.3 — 11 33.9 6 1.2 17 35.1

24 16.0

12 29.1 33.2 39.4 8.1 — 24 51.2 — 25 56.0 — 12 33.9 5 1.0 34.9

27 49.1

29 14.9

30 45.1

6 57.0 59.0

26.6 6 59.5

8 28.0 10 32.2

31.0

34.9 8 31.3

9 1.9

17 31.7 16 57.0

33.2 17 14 67 5.1 — 17 1.7 + 30.1 31.8

33.3

34.1

34.2

26 30.3

34.0

41.2 26 35.2

27 58.4 9 1.9

28 6.6

14.0 28 6.3

29 30.0 10 32.2

36.2

44.0 29 36.7 21 28.2 33.8 9.1

12 2.5

38.8 — 21 33.6 4 0.8 32.8

57.2

22 3.5 8.6 2.0 — 22 3.1 4 30.9 32.2

(See note) 23 41.0 1.0 — 23 32.0 6 1.2 30.8

17 33.65 .74

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1883phae.proj 1566.

1883 Nov. 26. Gl. C.

13	18	27.3		3	46.8						
		33.0									
		38.7		4	58.9	11	33.0	36	1.2	17 34.2	
	1	58.0									
	12	2.3		5	51.9						
		9.3				12	3.2	5	31.1	34.3	
		27.0		6	37.7						
		32.6									
		38.0		7	35.2	12	32.5	5	1.0	33.5	
		56.0									
	13	2.8		8	23.6						
		9.4				13	2.7	4	30.9	33.6	
		27.5		9	15.7						
		33.0									
		39.0		10	17.7	13	33.2	4	0.8	34.0	
		57.0									
	14	1.2		11	16.4						
		7.8				14	2.0	3	30.7	32.7	
		27.0		23	48.7						
		32.2									
		38.3		24	50.2	14	32.5	3	0.6	33.1	
		56.0									
	15	1.2		25	44.3						
		7.3				15	1.5	2	30.5	32.0	
		27.5		26	31.0						
		32.7					31.0				
		38.8		27	17.2	15	32.7	2	0.4	33.4	
		58.4									
	16	2.1		28	1.0						
		8.2				16	1.9	1	30.3	32.2	
		24.8		28	47.2						
		33.0									
		37.7		29	43.9	16	31.8	1	0.2	32.0	
		56.5									
	17	3.0		30	43.5						
		7.7				17	2.4		30.1	32.5	
		27.0		31	19.0						
		33.2									
		38.6				17	32.9	–	–	32.9	
		–									
		–									
		–									
		–									
		–									
		–									
		–									
		–									
		–									
		–									
		–									
		–									
		–									
	20	1.7									
		2.4									
		8.3				20	2.5	2	30.5	32.0	
		28.2									
		34.1									
		39.3				20	33.9	3	0.6	33.3	
		58.8									
	21	4.7									
		9.5				21	4.3	3	30.7	33.6	
		27.8									
		33.8					4				
		40.5				21	33.0	4	0.8	33.2	
		58.5									
	22	3.3									
		10.5				22	4.1	4	30.9	33.2	
		29.6									
		34.5									
		40.2				22	34.8	5	1.0	33.4	
		59.2									
	23	4.0									
		11.0				23	4.7	5	31.1	33.6	
		28.4									
		35.3									
		40.5				23	34.7	6	1.2	33.5	

17 33.17

h m s
13 17 33.17
+ 0.7
17 33.84
17 18.03
+ 15.81

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1883phae.proj.1566.

16

1883 Nov. 27 (Wash. C)

+ 43.86
+ 43.86
+ .62
− .04

1

18	31.9	
19	49.0	
21	2.8	+
22	10.6	
23	15.3	X

T_m — h 1, m 16, s 46.82
K — 6.9
$T_m + K$ — 16 46.15
R.A — 17 17.80
$T - R.A$ — − 31.65

1 16 46.15
+ 12.27
+ 2.16
− 1.45
−1 25.92
− 48.21
15 [−57.93]

14	45.6													
	46.8													
	49.0	−												
15	10.0		14	47.1	2	0.4	16	47.5						
	16.2													
	21.6	−												
	39.8													
	46.8													
	50.7	−	15	45.9	1	30.3		46.2						
16	9.5													
	14.3													
	28.0	−												
	41.2													
	47.5													
	53.6	−	15	45.8	1	0.2		46.0						
17	10.0													
	17.7													
	23.0	−												
	39.7													
	46.0													
	52.2	−	16	14.6		30.1		44.7						
18	13.2													
	20.2													
	24.4	−	16	47.4	−	−		47.4						
			17	16.9		30.1		47.0						
			17	46.0	1	0.2		46.2						
			18	19.3	1	30.3		49.6						

−10508	−18218	−25578	−323.78	−388.48
2.02152	2.26050	2.40821	2.51025	2.58937
0.49340	0.72238	0.88009	0.98213	1.06125
23 48.48	45.55	44.55	40.20	37.86 40.20 +
+ 3.11	+ 5.10	+ 5.55 + 1.59	+ 2.60	+ 1.57
23 51.59	50.95	51.45 53.14	42.80	39.43 41.71
+88 58 57.76	57.40	55.44	58.55	56.00
		55.21		56.64

46 17 50		46 17 50		
1.77940		1.77940		
+ 26.24		+ 26.24		
1.80564		1.80564		
+ 63.92	+ 63.92	+ 63.92	+ 63.92	+ 63.92
− .14	− .41	− .81	− 1.80	− 1.88
− .76	− .76	− .74	− .74	− .74
+ 6.02	+ 62.75	+ 62.37	+ 61.88	+ 61.30
59 59.78	60.15	59.58 +	64.93	60.20 59.94 X

+ .80	+ .80	+ .80		
59 60.58	60.95	59.38	61.23	60.06 58.74
41 38.2		41 38.2		
−18 22.3 X	22.6	19.3 X	22.9	22.8 20.4 X
		20.1 X		

+88 59 57.76
− 18 21.03
+ .80
− 32.40
− 18 52.63
+88 41 5.13

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- 43.86
- 43.86
+ .62
+ .08

1883 Nov 27, 9S. C

13 11	28.3, 32.1, 40.3, 58.8	6 7.5						13	17 36.67 / + 13.06 / - 27.19 / + - 0.00 3.51 / - 1 25.69 / - 1 39.89 3.33 / 15 56.85 / 53.34	13. 17 36.00 / + 67 / 17 36.67 / 17 17.57 / + 19.10
		7 52.9	11 33.6	6	1.2	17 34.8				
12	4.2, 10.0, 33.3, 41.2, 45.5	9 5.2 / 10 22.7	12 4.3	5	31.1	35.4				
		11 17.1	12 40.0	5	1.0	41.0	- 381.30 / 2.58127 / 1.02315 / 47 30.18 / - 10.55 / 47 19.63 / 35 28.72	- 487.00 / 2.68753 / 1.15941 / 33.18 / - 14.43 / 18.75 / 29.60	- 574.00 / 2.75891 / 1.23079 / 37.68 / - 17.01 / 20.67 / 27.68	- 650.70 / 2.81338 / 1.28526 / 40.80 / - 19.29 / 21.51 / 26.84	- 708.70 / 2.85046 / 1.32234 / 41.88 / - 21.01 / 20.87 / 29.98
	-, -, -	23 57.3									
13	81.0, 35.2, 40.6	25 43.0 / 27 10.0	13 35.6	4	0.8	36.4				
14	2.3, 5.4, 9.2, 29.4	28 26.7 / 29 24.7	14 5.6	3	30.7	36.3	48 54 58 / 1.81920 / + 30 18 / 1.84938				
	34.0, 38.2, 55.4		14 33.9	3	0.6	34.5	+ 70.69 / + 1.77 / - 50 / + 71.96 / 36 40.68	+ 70.69 / + 2.95 / - 52 / + 73.12 / 42.72	+ 70.69 / + 4.10 / - 52 / + 74.17 / 41.85	+ 70.69 / + 5.27 / - 54 / + 75.42 / 42.26	+ 70.69 / + 6.25 / - 54 / + 76.40 / 43.88
15	5.8, 11.5, 29.5, 34.6, 40.0		15 4.2	2	30.5	34.7					
16	0.9, 8.1, 14.3, 29.3, 34.9, 41.8		15 34.7	2	0.4	35.1	t / + 83 / 36 41.51 / 18 21.6 / 19.9 / - 8 / 20.7	43.55 / 22.0	42.68 / 21.1 / - 8 / 21.9	43.09 / 21.5	44.71 / 22.1
			16 7.8	1	30.3	38.1					
17	5.1, 9.0, 14.9, 34.1, 39.0, 45.7		16 35.3	1.	0.2	35.5					
			17 9.7		30.1	39.8					
			17 39.6	-	-	39.6					
18	58.0, 5.2, 9.5, 13.0, 39.0		18 6.4		30.1	36.53					
	37.5, 43.2, 58.5		18 36.6	1	0.2	36.84	+ 688.50 / 2.83790 / 1.30978 / 47 0.48 / + 20.41 / 47 20.89 / 35 27.46	+ 583.10 / 2.76574 / 1.23762 / 1.35 / + 17.28 / 18.63 / 30.72	+ 510.80 / 2.70825 / 1.18018 / 3.90 / + 15.14 / 19.04 / 29.31	+ 433.30 / 2.63679 / 1.10867 / 4.62 / + 12.84 / 17.46 / 30.91	+ 378.90 / 2.57852 / 1.05040 / 6.50 / + 11.23 / 17.73 / 30.62
19	3.1, 9.0, 29.3, 36.1, 42.6, 57.5		19 3.5	1	30.3	33.82					
			19 36.0	2	0.4	36.4 35.6 + 91					
20	4.2, 11.2, 29.8, 38.5, 42.4		20 4.3	2	30.5	34.8 3	48 54 38 / 1.81910 / + 30 18 / 1.84928				
21	1.3, 7.4, 13.5, 28.6, 35.7, 42.8		20 36.9	3	0.6	37.5 36.3	+ 70.68 / + 5.90 / - 40 / + 76.18 / 36 43.64	+ 70.68 / + 4.23 / - 40 / + 74.51 / 45.23	+ 70.68 / + 3.24 / - 40 / + 73.82 / 42.83	+ 70.68 / + 2.33 / - .42 / + 72.59 / 43.50	+ 70.68 / + 1.78 / - 42 / + 72.04 / 42.64
			21 7.4	3	30.7	38.1 36.7					
	59.1		21 35.7	4	0.8	36.5 34.9					
22	8.0, 13.3, 29.8, 35.9, 42.0		22 7.0	4	30.9	37.9 36.1	+ .83 / 36 44.47 / 18 21.6 / - 18 22.9	46.06 / 24.5	43.66 / 22.1	44.33 / 22.4	43.47 / 20.9
23	0.8, 7.0, 11.0, 28.8, 33.1, 42.5		22 35.7	5	1.0	36.7 4			+ 91 36 / 18 / + / + / - 17 / + 91 18 / + 88 41	41.85 / 21.03 / 83 / 32.50 / 47.70 / 54.15 / 5.85 / - 47 / 5.38	
			23 6.3	5	31.1	37.4 35.2					
			23 34.8	6	1.2	36.0 33.6					

17 36.65

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1883phae.proj.1566.

1883phae.proj.1566

18

+ 43.86
+ 43.86
+ .60
1883. Nov 28 4 U.C − .03

18	25.5	
19	25.6	X
20	19.0	X
21	21.8	
22	18.6	
23	38.0	

π_m — h m s
K — 1 16 : 42.71
π_m + K — − 6.7
π_m − R.A. — 16 42.04
— 17 17.54
— − 35.50

1 16 4204
+ 12.66
+ 26.32
− 1.32
− 1 25.46
− 47.80
15 54.24

1	14	39.6									
		42.5									
		44.2									
	15	8.8									
		14.0									
		19.5									
		34.3									
		42.6									
		48.7									
	16	7.0									
		12.3									
		18.5									
		37.9									
		44.2									
		49.2									
	17	5.6									
		11.4									
		16.7									
		37.2									
		42.7									
		49.0									
	18	8.0									
		11.1									
		18.8									

14	42.1	2	0.4	16	42.5						
15	14.1	1	30.3	16	44.4						
15	41.9	1	0.2		42.1						
16	12.6		30.1		42.7						
16	43.8	-			43.8						
17	11.2	-	30.1		41.3						
17	43.0	1	0.2		43.2 / 42.8						
18	12.6	1	30.3		42.9	+ 10279	− 162.89	− 216.29	− 279.09		
					3	2.01195	2.21189	2.33504	2.44574		
						0.48388	0.69377	0.80692	0.91762		
						23 47.08	46.90 X	44.95 X	41.98		
				16	42.7	+ 3.05	+ 4.94	+ 6.41	+ 8.27		
					42.7	23 50.13	51.84	51.36	50.25		
					+88	58 58.22	56.51	56.99	58.10		
						46 17 50					
						1.77940					
						+1972					
						1.79912					
						+ 62.97	+ 62.97	+ 62.97	+ 62.97		
						− .13	− .33	− .58	− .97		
						− .76	− .76	− .74	− .74		
						+ 62.08	+ 61.88	+ 61.65	+ 61.26		
						59 60.30	58.39	+ 58.64 +	58.36		
						+ 81					
						59 61.11	59.20	59.45	60.17		
						41 38.6					
						− 18 22.5	20.6 X	20.8 X	21.6		

		58.52	
+88	59	59.32	
−	18	20.84	
+		.81	
−		32.70	
−	18	52.73	
+88	41	6.59	
		5.79	

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1883phae.proj:1566.

1883. Nov. 28.96. C

− 43.86
− 43.86
+ .60
+ 43.08

13	11	38.7		7	21.5					
		39.6								
		40.4	−	8	24.8	11	39.6	6	1.2	17 40.8
		58.8								
	12	4.7		9	44.5					
		10.1				12	4.5	5	31.1	35.6
		29.5	−	10	14.4					
		33.5								
		42.0	−	11	12.4	12	35.1	5	1.0	36.1
		55.1								
	13	4.2		23	52.3					
		11.7	−			13	3.7	4	30.9	34.6
		29.3		25	1.7					
		35.5								
		39.4	−	25	42.0	13	34.7	4	0.8	35.5
		57.4								
	14	4.1		26	35.0					
		10.4	−			14	4.0	3	30.7	34.7
		28.4		27	30.0					
		35.6								
		41.6	−	27	44.5	14	35.2	3	0.6	35.8
	15	1.7								
		5.7		28	22.5					
		12.0	−			15	6.5	2	30.5	37.0
		27.4								
		32.0								
		36.7	−			15	32.0	2	0.4	32.4
		57.8								
	16	4.3								
		10.6	−			16	4.2	1	30.3	34.5
		28.7								
		34.0								
		39.8	−			16	34.2	1	0.2	34.4
		58.8								
	17	2.9								
		8.7	−			17	3.5		30.1	33.6
		−								
		−								
		−								
		−								
		−								
	18	−								
		−								
		−								
		−								
		−								
		−								
	19	37.7								
		38.3								
		38.8	−			19	38.3	2	0.4	38.7
		58.8								
	20	4.4								
		11.0	−			20	4.7	2	30.5	34.2
		29.0								
		33.5								
		39.8	−			20	34.1	3	0.6	33.5
	21	1.3								
		5.0								
		11.5	−			21	5.9	3	30.7	35.2
		30.2								
		36.5								
		42.7	−			21	36.5	4	0.8	38.7
	22	1.0								
		7.1								
		10.7	−			22	6.8	4	30.9	35.4
		29.8								
		36.5								
		42.0	−			22	35.6	5	1.0	34.6
		59.6								
	23	5.0								
		14.2	−			23	6.3	5	31.1	35.2
		28.0								
		35.0								
		42.2	−			23	35.1	6	1.2	34.9

17 35.78

+613.77	+550.47	+500.77	+450.87	
2.78501	2.74073	2.69964	2.65405	
1.25989	1.21261	1.17152	1.12593	
47	580	642	718	
+ 1819	+16.32	+14.84	+13.36	
47	2379	2274	2202	
+91 35	2626	2623	2409	2481
	2486	25.61	24.33	24.97
48 54 34				
1.81910				
+ 3809				
1.85719				
+71.98	+71.98	+71.98	+71.98	
+ 4.69	+ 3.77	+ 3.12	+ 2.53	
− .42	− .42	− .42	− .42	
+.7625	+.7533	+.7468	+.7409	
36	4261	4156	4177	4140
	40.61	40.74	41.01	40.58
+ .85				
36	4336	4246	4279	4262 4186 4273 4193
18 21.3				
−18	221	211	213	21.4
	202	20.5	20.6	20.1
	− 8			− 8
	21.0			20.9

+91	36	4058
−	18	2084
+		.85
+		3280
	−17	4479
+91	18	5339
+88	41	6.61
		−.77
		5.84

h m s
13 17 35.27
+ .67
17 35.94
17 17.10
− 4176
+18.84

13 17 35.94
+ 12.90
− 26.32
−351 ~~1.32 0.444~~
− 1 25.22 4215
− 5 ~~31.32 2.784~~
15 ~~58.62~~
~~56.86~~
53.79

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1883phae.proj:15660

1883. Nov. 30.3 M.C.

	1	10	30.0		P 19.7	
	10	30.8			Chf.	
	11	1.5	11			
	11	31.0				
	12	0.7	12			
1P	30.8	12	31.8			
	13	0.7	13			
	13	31.4				
	14	0.9	14			
	14	31.0				
14	1.22	15	2.1			
	15	33.1				
	16	3.7	16			
	16	33.1				
	17	2.8	17			
16	33.54	17	35.0			
	18	3.3	18			
	18	31.6				
	19	2.3	19			
	19	33.6				
19	2.96	20	4.0			
	20	33.4				
	21	6.1	21			
	21	36.3				
	22	3.9	22			
21	34.70	22	33.8			

	h	m	s
Tm	1	16	32.67
K			− 67
Tm + K		16	32.00
R.A.		17	16.60
T − R.A.			− 44.60

16 32.67 Ck.

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1883phae.proj.1566.

1883 Aug. 30 G.C.

13	11	27.2	7	53.4						
		32.3								
		39.4	9	20.2	11	33.0 32.4	6	1.2	17	34.8
		58.0								
	12	4.8	24	1.8						
		10.2			12	4.2	5	31.1		35.3
		28.3	27	19.4						
		35.7								
		43.0	29	9.0	12	35.3	5	1.0		36.3
		57.1								
	13	3.0	30	56.2						
		9.0			13	3.2	4	30.9		34.1
		29.0	34	4.2						
		35.8								
		41.0			13	35.3	4	0.8		36.1
		57.0								
	14	4.9								
		8.7			14	3.6	3	30.7		34.3
		28.0								
		34.3								
		39.7			14	34.0	3	0.6		34.6
	15	0.5								
		7.0								
		11.7			15	6.4	2	30.5		36.9
		28.8								
		35.2								
		41.2			15	35.1	2	0.4		35.5
		57.4								
	16	4.1								
		04.24			16	3.6	1	30.3		33.9
		30.4								
		42.9			16	36.6	1	0.2		36.8
	17	9.7								
		16.2								
		12.0			17	6.1	0	30.1		36.2
		34.0								
		—			17	34.0	—	—		34.0
		59.4								
	18	4.8								
		14.4			18	5.2		30.1		35.1
		27.6								
		28.6								
		33.0								
		35.0								
		41.0			18	33.0	1	0.2		32.8
		—								
		+								
		—								
	19	2.9								
		35.0								
		42.8			19	35.7	2	0.4		34.3
		57.8								
	20	4.5								
		11.0			20	4.4	2	30.5		33.9
		27.7								
		35.5								
		42.2			20	35.1	3	0.6		34.5
		57.5								
	21	—								
		11.2			21	4.3	3	30.7		33.6
		30.0								
		—								
		42.8			21	36.4	4	0.8		35.6
		57.0								
	22	8.5								
		10.8			22	3.8	4	30.9		32.9
		28.0								
		36.4								
		42.8			22	35.7	5	1.0		34.7
		59.5								
	23	7.0								
		13.4			23	6.3	5	31.1		36.2
		28.5								
		35.6								
		41.5			23	35.2	6	1.2		34.0

h m s
13 17 34.82
+ 67
17 35.49
17 16.63
+ 18.86

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1883phae.proj.1566.

1883 Dec. 13 W. C

	h.	m	s
T_m	1	16	30.33
k			− 67
$T_m + k$		16	29.66
R.A		17	15.79
T − R.A			− 46.13

1. 10	23.8 31.0 34.8 39.0	4	45.4					
	51.7	6	11.5	10	32.1	6	1.2	16 33.3
	57.0	7	15.0					
11	4.8	8	17.6	10	57.8	5	31.1	28.9
	27.1 33.0	9	26.2					
	35.5			11	31.9	5	1.0	32.9
	54.5	22	54.5					
12	3.2 9.1	24	5.4	12	2.3	4	30.9	33.2
	25.1 28.8	25	0.7					
	35.5 49.9	26	18.9	12	29.8	4	0.8	30.6
13	57.7 5.3	27	18.2	12	57.6	3	30.7	28.3
	23.2 29.0 34.8			13	~~28.7~~ 29.0	3	0.6	29.6
14	53.2 4.2 8.6			14	2.0	2	30.5	32.5
	20.0 25.2 30.5			14	25.2	2	0.4	25.6
15	55.7 58.8 7.0			15	0.~~7~~ 5	1	30.3	30.8
	26.0 30.0 35.1			15	30.4	1	0.2	30.6
16	55.5 2.3 6.2			16	1.3	×	30.1	31.4
	23.8 28.8 34.1			16	28.9	−	−	28.9
19	30.7 35.3 39.3			19	35.1	3	0.6	34.5
20	54.3 0.0 4.0			19	59.4	3	30.7	28.7
	22.6 30.3 37.3			20	30.1	4	0.8	29.3
21	52.4 1.4 9.2			21	1.0	4	30.9	30.1
	23.2 28.0 32.3			21	27.8	5	1.0	26.8
22	57.7 1.8 7.0			22	2.2	5	31.1	31.1
	22.7 30.7 38.7			22	30.7	6	1.2	29.5

16 30.33

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1883phae.proj.1566.

1883 Dec. 23 21. C

			1	18	22.5	0	18.3	
					28.3			
	10	28.3			34.0	3	30.4	~~34.3~~
					53.3			
					56.1	4	51.6	
				11	29			
	11	0.0			7.8	6	12.0	
					21.4			
					27.4	7	39.1	
	11	27.5			33.7			
					55.1	8	51.5	
				12	0.4			
	12	0.2			5.0	10	9.6	
					23.5			
					27.5			
					33.8			
11	29.2	12	30.2		36.0			
					53.9			
					58.0			
	~~12~~	~~57~~	~~58.0~~	13	8.0			
	13	0.0			26.3			
					30.7			
	13	31.3			37.0			
					54.5			
					59.3			
	14	0.2		14	6.7			
					24.0			
					29.8			
	14	30.3			37.1			
					52.8			
					58.3			
~~13~~	~~0.1~~	14	58.8	15	5.4			
14	0.12				26.3			
					31.0			
	15	31.9			38.3			
					53.4			
				16	0.3			
	16	0.5			7.7			
					26.3			
					33.3			
	16	32.4			38.5			
					55.2			
				17	0.6			
	17	0.9			6.8			
					26.4			
					32.0			
16	31.58	17	32.2		38.2			
					58.8			
				18	4.4			
					9.4			
	18	4.2			28.6			
					33.8			
	18	33.6			38.5			
					57.4			
				19	3.6			
	19	3.7			10.0			
					25.7			
					30.4			
	19	30.8			36.4			
					56.0			
				20	17			
19	2.84	20	1.9		8.1			
					26.8			
					33.5			
	20	33.4			40.1			
					55.9			
				21	1.6			
	21	2.2			9.0			
					27.8			
					32.5			
	21	33.0			37.7			
					56.4			
				22	3.4			
	22	3.3			10.0			
					26.5			
					33.3			
21	32.8	22	33.0		39.2			

h m s
1 16 31.35
– 6.7
16 30.68
17 15.14
– 44.46

POLARIS
G1-8

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1883phae.proj:1566:24

X 1883 Dec. 28 L.C.

		13	11	33.9		10	56.0				
				36.7							
	11	36.8		39.7		10	53.2				
				54.6							
			12	34		18	32.0				
	12	1.9		8.6							
				28.2		18	53.6				
				30.7		2					
	12	31.0		34.0		24	46.0				
				56.0							
			13	59.7		26	14.5				
	13	0.7	13	6.5							
				30.1		26	54.3				
				36.6							
12	33.36	13	36.5			27	52.6				
				39.6							
			14	6.4		44	(36.5)				
	14	6.5		13.5							
				33.6							
				37.8							
	14	37.6		41.3							
				58.6							
			15	4.2							
	15	4.6		11.0							
				25.5							
				30.8							
	15	31.5		38.3							
				55.8							
			16	4.3							
15	4.66	16	3.1								
				9.3							
				24.9							
				32.0							
	16	32.6		41.0							
				59.4							
			17	5.6							
	17	5.7		12.0							
				29.1							
				34.0							
	17	34.0		38.9							
				58.0							
			18	4.1							
	18	4.0		10.0							
				27.1							
				32.2							
17	33.90	18	33.2								
				39.4							
				56.1							
			19	2.5							
	19	2.6		9.2							
				25.4							
				32.2							
	19	31.7		37.6							
				55.3							
			20	1.5							
	20	2.8		8.5							
				28.7							
				35.8							
	20	34.8		39.8							
				59.5							
			21	5.0							
20	3.34	21	4.8								
				9.8							
				24.8							
				32.4							
	21	32.9		38.5							
				57.3							
			22	1.7							
	22	1.9		6.7							
				27.0							
				33.0							
	22	32.2		36.6							
				55.6							
			23	0.1							
	23	1.1		7.6							
				25.0							
				30.6							
22	21.84	23	31.1								
				37.7							

T_m h 13
K
$T_m + K$
R.A
T_- R.A

h m s
17 33 42
+ 67
17 34.09
17 ~~15.14~~ 14.78
+ ~~18.95~~
+ 19.31

17 33.42 ck

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1883. Dec. 3, 3 H.C.

+ 43.88
+ 43.88
+ .75
− .06

13 49.0

14 52.4 +

h	m	s
1	16	34.85
		− 67
	16	34.18
	17	14.43
		− 40.25

1	16	34.18
	+	15.28
	+	32.91
	−	2.63
	−1	22.53
	−	36.99
	15	57.19

13 33.30
35.8
37.8 −
55.8
14 34
9.8 −
30.3
36.0
42.0 −
58.0
15 0.7
10.2 −

13	35.5	3	0.6	16	36.1
14	3.0	2	30.5		33.5
14	36.1	2	0.4		36.5
15	3.0	1	30.3		33.3
				16	34.85

δ = +88° 41′ 43″ H.C
+91 18 17 L.C

cos δ	8.35736
sin δ	9.99989
tang	1.64253
log sin i	0.11378
sin δ	43.91
Ring	− .72 H.C
Ring	− .75 L.C

+	165.85	+ 10245	
2.21972		2.01051	
0.68086		0.48165	
23	57.98	54.65	57.98 +
−	4.91	− 3.03	
23	53.07	51.62	54.95
+88	58 55.28	58 56.70	53.40

46 18 40
1.77940
+ 33.79
1.81319

+	6504	+ 6504
−	.34	− 13
−	.80	− 78
+	6390	+ 6413
59	59.18	59 64.86 57.53 +

+	.86	+	.86
59	59.94	59	64.72 58.39
41	40.1	41	40.1
−18	19.8	−18	21.6
			18.3 +

88	59	57.53
	−18	17.82
	+	.86
	−	34.20
	−18	51.16
+88	41	6.37

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1883. Dec. 28 L. C.

− 43.88
− 43.88
+ .75
− .64
.01

11	28.7	9	39.3					
	33.4							
	39.5	9	(55.0)	11	33.9	6	1.2	17 35.1
	55.3							
12	59.6	23	55.4					
	6.8							
	12.0	24	57.9	12	3.4	5	31.1	34.5
	24.4							
	30.0	25	36.6					
	37.3			12	30.6	5	1.0	31.6
		26	24.4					
		27	16.4					
		29	22.5					
		30	17.7					
		30	57.0					
14	28.6							
	31.1	33	19.1	14	31.3	3	0.6	31.9
	34.1							
	58.6	34	22.2					
15	2.8							
	9.8			15	3.7	2	30.5	34.2
	26.0							
	32.3							
	38.8			15	32.3 (32.4)	2	0.4	32.8
	55.1							
16	1.0							
	8.4			16	1.5	1	30.3	31.8
	25.7							
	34.0							
	36.7			16	32.1	1	0.2	32.3
	40.2							
	52.2							
	58.3			16	57.5		30.1	27.6
17	2.0							
	28.6							
	34.3							
	38.0			17	33.6	−	−	33.6
	56.8							
18	2.5							
	7.2			18	2.2		30.1	32.1
	26.8							
	34.3							
	37.8			18	33.0	1	0.2	32.8
	57.8							
19	1.1							
	8.4			19	2.5 (2.4)	1	30.3	32.1
20	33.0							
	33.8							
	34.5			20	33.8	3	0.6	33.2
	57.2							
21	2.5							
	9.0			21	2.9	3	30.7	32.2
	27.0							
	37.6							
	38.6			21	32.4	4	−0.8	31.6
22	2.5							
	6.7							
	14.0			22	7.7	4	30.9	36.8
	27.1							
	30.6							
	36.0			22	31.2	5	1.0	30.2
	53.6							
	58.0							
23	3.3			22	58.3	5	31.1	27.2
	28.3							
	35.1							
	41.7			23	35.0	6	1.2	33.8

Left margin computations:

− 109.83
3.00468
1.47582
48 39.5
− 29.91
47 34.04
35 14.01

48 53 34
1.81890
+ 3472
1.85362
+ 71.39
+ 12.69
− 62
+ 83.46
36 37.47

+ 90
36 38.37
18 19.7
− 18 18.7

Right side computations:

	ℓ 13	m 17	2	
T_m	13	17	32.37	13 17
K			+ 67	+
$T_m + K$		17	33.04	−
R.A.		17	14.05	+
T − R.A.		+	18.99	−

− 584.03	− 710.13	− 765.23	− 804.63	− 946.73
2.76644	2.85134	2.88385	2.90560	2.97623
1.23758	1.32248	1.35499	1.37674	1.44737
47 40.90	47 50.25	47 52.48	47 52.48	48 1.25
− 17.28	− 21.01	− 22.65	− 23.81	− 28.01
47 23.62	29.24	29.83	28.67	33.24
+91 35 24.73	19.11	18.52	19.68	15.11

48 53 50				
1.81890				
+ 3472				
1.85362				
+ 71.39	+ 71.39	+ 71.39	+ 71.39	+ 71.39
+ 4.23	+ 6.26	+ 7.27	+ 8.04	+ 11.13
− 54	− 56	− 56	− 58	− 60
+ 75.08	+ 77.09	+ 78.10	+ 78.85	+ 81.92
36 39.81	38.87 / 36.20 +	38.85 / 36.62 +	38.53	37.03
+ 90				
36 40.71	39.77 / 37.10	39.75 / 37.52	39.43	37.93
18 19.7				
− 18 21.0	20.1 / 17.4 / − 8 / 18.2 +	20.0 / 17.8 / − 8 / 18.6 +	19.7	18.2

+ 473.07	− 383.03	− 445.53	− 484.23	− 532.03
2.67493	2.58323	2.64888	2.68505	2.72594
1.14607	1.05437	1.12002	1.15619	1.19708
47 8.20	31.75	35.18	37.20	39.48
+ 14.00	− 11.33	− 13.18	− 14.33	− 15.74
47 22.20	20.42	22.00	22.87	23.74
+91 35 26.15	27.93	26.35	25.48	24.61

48 54 30	48 54 6			
1.81910	1.81900			
+ 3472	+ 3472			
1.85382	1.85372			
+ 71.42	+ 71.40	+ 71.40	+ 71.40	+ 71.40
+ 2.78	+ 1.82	+ 2.46	+ 2.91	+ 3.51
− 42	− 50	− 52	− 52	− 52
+ 73.78	+ 72.72	+ 73.34	+ 73.79	+ 74.39
36 39.93	40.66	39.69	39.27	39.00
+ 90				
36 40.83	41.55	40.59	40.17	39.90
18 19.7				
− 18 21.1	21.8	20.9	20.5	20.2

+91 36 36.31 41
− 18 17.82
+ .90
+ 34.40
− 17 42.52
+91 18 53.79 89
+88 41 6.21 11
77
5.44
34

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1883. Dec. 6.3 W.C

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28

1883 Dec 6.8 S. O.

− 43.89
− 43.89
+ .65
+ .08 5

11	19.0	6	66						
	23.5								
	32.2	7	22.8	11	23.9	6	1.2	17	26.1
	53.3								
	57.5	8	34.0						
12	3.7			12	58.1	5	31.1		29.2
	19.4	9	29.0						
	25.6								
	32.0	10	27.0	12	25.7	5	1.0		26.7
	48.6								
	54.3	11	15.7						
13	0.8			12	54.6	4	30.9		25.5
	21.0	23	41.4						
	28.1								
	33.2	24	47.3	13	27.4	4	0.8		28.2
	50.0								
	55.7	25	47.0						
14	3.1			13	56.3	3	30.7		27.0
	19.5	26	37.2						
	23.5								
	29.2	27	23.5	14	24.0	3	0.6		24.6
	50.6								
	54.5	28	26.0						
	58.0			14	54.4	2	30.5		24.4
15	17.4								
	24.0								
	30.2			15	23.9	2	0.4		24.3
	49.6								
	56.9								
16	1.3			15	55.9	1	30.3		26.2
	19.0								
	24.7								
	31.3			16	25.0	1	0.2		25.2
	51.4								
	58.0								
17	3.8			16	57.7		30.1		27.8
	19.0								
	26.2								
	32.0			17	25.7	−	−		25.7
20	10.4								
	11.2								
	13.0			20	11.5	2	30.5		41.0
	30.6								
	31.4								
	33.0			20	31.3	3	0.6		30.7
	48.7								
	55.2								
21	1.2			20	55.0	3	30.7		24.3
	22.6								
	27.6								
	32.0			21	27.4	4	0.8		26.6
	51.2								
	56.6								
22	1.5			21	56.4	4	30.9		25.5
	20.7								
	27.4								
	33.2	+91 36	44.3	22	27.1	5	1.0		26.1
	49.0	− 17	47.28						
	56.0	+	.93						
23	3.1	+	35.10	22	55.7	5	31.1		24.6
	21.2	− 17	11.25						
	25.5	+91 18	53.18						
	31.3	+88 41	6.82	23	26.0	6	1.2		24.8
			−77						
			6.05						

T~m~ 13 17 26.20
K + 67
T~m~ + K 17 26.87
R.A 17 11.74
T − R.A + 15.13

13 17 26.87
+ 17.74
− 28.53
+ − .03 2.19
− 1 19.86
− 1 30.55 32.84
15 56.22
54.03

+ 679.60	+ 603.40	+ 532.20	+ 477.20	+ 419.20
2.83225	2.78061	2.72607	2.67870	2.62242
1.30339	1.25175	1.19721	1.14984	8.47114
47 36.65 37.62	37.62	40.78 18	40.18 42.30	+ 48.25
+ 26.11	+ 17.85	+ 15.75	+ 14.12	+ 12.40
47 56.76 57.73	56.47	56.53 55.93	54.30 56.42	55.65
+71 34 51.9 50.62	52.88	51.82	54.05	52.70
		52.42	51.92	

48 54 35
1.81960
+ 26.99
1.84609

+ 70.16	+ 70.16	+ 70.16	+ 70.16	+ 70.16
+ 5.73	+ 4.52	+ 3.52	+ 2.83	+ 2.18
− .52	− .52	− .54	− .54	− .54
+ 75.37	+ 74.16	+ 73.14	+ 72.45	+ 71.80
36 6.96 5.99	7.04	4.96 5.56	6.50 4.36	4.50
+ 93				
36 7.89 6.92	7.97	5.89 6.49	7.43 5.29	5.43
18 19.0				19.0
−17 48.9	49.0	46.9	48.7	46.4
47.9		47.5	46.3	− 8
			− 8	
			47.1	47.2

17 27.80 26.20

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1883 Dec. 7.3 W. C.

+ 43.89
− 43.89
+ .65

				10	7.5			5	31.2		
					.38						
		10	13.9		2.01			7	31.8		
					410						
					478			9	51.6		
		10	47.9		550						
				11	185			22	48.9		
					187						
		11	19.0		248			24	54.3		
					410						
					481			26	44.5		
		12	47.8		544						
				12	114			28	57.0		
					176						
					227			33	3.3		
	11	17.16	12	17.2	418						
					484						
		12	48.3		547						
				13	133						
					197						
		13	19.2		247						
					465						
					519						
		13	51.7		566						
				14	136						
					200						
		14	19.6		253						
					441						
					507						
	13	49.90	14	50.7	573						
				15	152						
					218						
		15	21.5		275						
					401						
					469						
		15	46.8		535						
				16	143						
					220						
		16	21.2		278						
					452						
					510						
		16	51.3		577						
				17	163						
					243						
	16	20.80	17	23.2	294						
					445						
					488						
		17	49.0		538						
				18	144						
					200						
		18	20.6		273						
					476						
					538						
		18	53.8	19	0.1						
					160						
					232						
		19	22.2		285						
					437						
					500						
	18	51.16	19	50.2	570						
				20	218						
					265						
		20	26.8		332						
					534						
		20	53.4		1						
				21	172						
					240						
		21	23.7		300						
					486						
					550						
		21	54.9	22	1.0						
					187						
					247						
	21	24.72	22	24.8	310						

l	m	s
1	16	22.75
		− 67
	16	22.08
	17	11.37
		− 49.29

1 16 22.08

16 22.75 C.K.

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30

1883 Dec. 9 R.C.

				10	24 8											
													T_m		13	17 24.74
													K			+ 67
13	11	14 5		23	55 7								$T_m + K$ R.A			17 25 41
		22 6														17 9.67
		28 6		24	50 2	11	21.9	6	1,2	17	23.1		T_- R.A			+ 15.74
		45 9														
		51 0		25	41 0											
		59 7				11	52.2	5	31,1		23.3					
	12	21 3		26	46 8											
		—														
		—		27	37 5											
		50 4														
		59 0		28	38.1											
	13	3 0				12	57.5	4	30.9		28.4					
		—		29	43 5											
		—														
		—		30	30 2											
		—														
		—		31	29 4											
		—														
	14	21 8														
		29 7														
		31 0				14	27.5	3	0.6		28.1					
		—														
		—														
		—														
	15	20 7														
		28 0														
		31 8				15	26.7	2	0.4		27,1					
		43 3														
		52 8														
		58 2				15	50.8	1	30,3		21,1					
		—														
		—														
		—														
		—														
		—														
		—														
	17	16 7														
		23 0														
		29 5				17	22.7	—	—		22.7					
		44 3														
		55 7				17	50.0		30,1		19.9					
	18	11 3														
		23 7														
		30 5				18	21.8	1	0.2		21,6					
		49 0														
		52 1														
		58 9				18	53.3	1	30,3		23.0					
	19	17 3														
		28 1														
		34 7				19	26.7	2	0.4		26,3					
		50 8														
		58 4														
	20	48				19	58.0	2	30.5		27.5					
		20 3														
		27 5														
		33 0				20	26.9	3	0,6		26,3					
		54 2														
		59 3														
	21	6 1				20	59.9	3	30.7		29,2					
		22 0														
		27 2														
		32 7				21	27,3	4	0.8		26.5					
		47 4														
		51 8														
	22	14				21	53.6	4	30.9		22,7					
		19 8														
		24 5														
		32 1				22	25.5	5	1.0		24.5					
		48 4														
		54 6														
	23	30				22	58.3	5	31,1		24.2					
		18 34														
		25 6														
		33 5				23	25 8	6	1,2		24,6					
															17	24,74

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+ 43.89
+ 43.89
+ .77
− .88

1883 Dec 10.3 U. C

h m s
1 16 16.93
− .67
16 16.26
17 9.36
− 53.10

1 10 8.1 22 37.0
12.4
18.2 + 23 44.0 10 12.9 6 1.2 16 14.1
37.6
42.2 24 30.2
50.4 10 43.4 5 31.1 14.5
11 8.2 + 25 14.3
14.0
20.9 26 8.2 11 14.4 5 1.0 15.4

1 16 16.26
+ 19.81
+ 33.80
− 3.51
−1 17.48
−0 27.38
15 48.88

38.7
42.8
51.6 11 44.4 4 30.9 15.3
12 9.0
11.8
20.8 12 13.9 4 0.8 14.7
38.1
44.2
50.0 12 44.1 3 30.7 14.8
13 6.7
14.0
21.2 13 14.0 3 0.6 14.6

−380.07	−447.07	−493.27	−537.37	−591.27
2.57986	2.65038	2.69308	2.78027	2.77179
1.05100	1.12152	1.16422	1.20141	1.24293
24 6.45	5.22 +	2.18	0.92 ×	23 57.80
+ 11.25	+ 13.23	+ 14.60	+ 15.90	+ 17.50
24 17.70	18.45	16.78	16.82	15.30
+88 58 30.65	29.90	31.57	31.53	33.05

18 41.2
46.2 ~~18 46.8~~
53.9 18 46.8 2 30.5 16.3
19 13.0
18.2
22.5 19 17.9 3 0.6 17.3
41.3
47.1
51.1 19 46.5 3 30.7 15.8
20 19.1
23.3
26.7 20 23.0 4 0.8 22.2

46 18.12
1.77950
+ 1376
1.79326

+ 62.12	+ 62.12	+ 62.12	+ 62.12	+ 62.12
− 1.79	− 2.48	− 3.02	− 3.59	− 4.34
− .82	− .82	− .80	− .80	− .80
+ 59.51	+ 58.82	+ 58.30	57.73	+ 56.98
59 30.16	28.72 +	29.87	29.26 +	30.03
+ 93				
59 31.09	29.65	30.80	30.19	30.96
41 41.7				
17 49.2	47.7 ×	49.1	48.5 ×	49.3

48.6
54.2 20 51.4 4 30.9 20.5
21 12.8
18.1
26.7 +88 59 28.99 21 19.2 5 1.0 18.2
44.9 − 17 47.84
51.0 + .93
58.2 − 35.80 21 51.4 5 31.1 20.3
22 16.2 − 18 22.71
20.5 +88 41 6.28
26.5 22 21.1 6 1.2 19.9
16 16.93

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1883 Dec. 10. S. C. – 43.89 – 43.89 + .77 – .01

13 11	14.1		6	2.4					
	22.3				11	18.2	6	1.2	17 19.4
	–		8	5.4					
	–		9	52.6					
	–	+	23	43.1					
	–	+	24	39.9					
12	40.5								
	47.6		25	44.5	12	47.2	4	30.9	18.1
	53.4								
13	13.0	✗	26	39.3					
	17.5				13	18.2	4	0.8	19.0
	24.0	✗	27	29.0					
	–		28	39.0					
	–		29	32.3					
14	41.5								
	48.1								
	53.5				14	47.7	2	30.5	18.2
15	13.7								
	19.5								
	23.7				15	~~18.7~~ 19.0	2	0.4	19.4
	42.5								
	49.0								
	56.0				15	49.2	1	30.3	19.5
16	11.2								
	18.7								
	24.0				16	18.0	1	0.2	18.2
	43.7								
	55.1				16	49.4		30.1	19.5
17	12.4								
	18.9								
	23.6				17	18.3	–	–	18.3
20	43.7								
	49.1								
	55.1				20	49.3	3	30.7	18.6
21	13.2								
	18.6								
	24.2				21	18.7	4	0.8	17.9
	42.4								
	47.1								
	54.7				21	48.1	4	30.9	17.2
22	11.5								
	15.7								
	24.5	+91	36	3.56	22	17.2	5	1.0	16.2
	42.7	–	17	47.84					
	52.2	+		.97					
	57.7	+		36.10	22	50.9	5	31.1	18.8 (9)
23	13.1	–	17	10.77					
	21.6	+91	18	52.79		~~20.~~			
	27.3	+88	41	7.21	23	20.7	6	1.2	19.5
			–	.77					
				6.44				17	~~19.19~~ 18.69

	h	m	s			
T_m	13	17	18.59	13	17	19.26
K		+	.67		+	20.00
T_m + K		17	19.26		–	33.80
R. A.		17	9.05		+	.44
T – R. A.			+ 10.21		–1	17.17
					–1	30.53
					15	48.73

– 560.71	– 610.41	– 680.41	– 733.71
2.74874n	2.78562	2.83277	2.86552
1.21988n	1.25676n	1.30391n	1.33666n
48 13.68	15.75	18.12	21.30
– 16.59	– 18.06	– 20.13	– 21.71
47 57.09	57.69	57.99	59.59
+91 34 51.26	50.66	50.36	48.76
48 53 58			
1.81900			
+ 3250			
1.85150			
+ 71.04	+ 71.04	+ 71.04	+ 71.04
+ 3.90	+ 4.63	+ 5.75	+ 6.68
– .61	– .61	– .63	– .63
+ 74.33	+ 75.06	+ 76.16	+ 77.09
36 5.59	5.72	6.52	5.85
+ 97			
36 6.56	6.69	7.49	6.82
18 18.0			
–18 48.6 ✗	48.7 ✗	49.5	48.8

+676.19	+553.19	+445.99	– 384.52	– 441.31	– 505.91	
2.83007	2.74287	2.64932	2.58492n	2.64474	2.70407	
1.30121	1.21401	1.12046	1.05606n	1.11588n	1.1175	21…
47 35.70	36.22	39.40	48 ~~5.60~~ 8.40 +	~~8.40~~ 10.78 +	~~10.78~~	13.68
+ 20.01	+ 16.37	+ 13.20	– 11.38	– 13.06	– 14.97	
47 55.71	52.59	52.60	~~53.22~~ 57.02	~~55.34~~ 57.72	~~55.81~~	58.7
+91 34 52.64	55.76	55.75	~~55.13~~ 51.33	~~53.01~~ 50.63	~~52.54~~	49.6
48 54 36			48 54 6			
1.81910			1.81900			
+ 3250						
1.85160			1.85150			
+ 71.06	+ 71.06	+ 71.06	+ 71.04	+ 71.04	+ 71.04	
+ 5.68	+ 3.80	+ 2.47	+ 1.84	+ 2.42	3.18	
– .50	– .50	– .50	– .59	– .59	– .59	
+ 76.24	+ 74.36	+ 73.03	+ 72.29	+ 72.87	+ 73.63	
36 8.88	10.12	8.78	~~7.42~~ 3.62 +	~~5.88~~ 3.50 +	~~6.14~~	3.…
+ 97						
36 9.85	11.09	9.75	~~8.39~~ 4.59	~~6.85~~ 4.47	7.19	4.2…
18 18.0						
–17 51.8	53.1	51.7	~~50.4~~ 46.6	~~48.8~~ 46.5	~~49.1~~ 46.2	
			– .8	– .8		
			47.4 +	47.3 +		

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1883phae.proj.1566.

1883 Dec 11.3 U.C.

+ 43.89
+ 43.89
+ .74
− 88.60

59	444								
0	593								
1	289								
2	344								
6	342	11	25.8	5	1.0	16	26.8		
7	42.3	11	53.1	4	30.9		24.0		
32	340								
33	38.5	12	25.2	4	0.8		26.0		
34	21.1								
		14	27.8	2	0.4		28.2		
		14	53.8	1	30.3		24.1		
		15	24.4	1	0.2		24.6		
		15	53.9		30.1		23.0		
		17	54.9	1	30.3		24.6		
		18	24.4	2	0.4		24.0		
		18	56.9	2	30.5		26.4		
		19	27.0	3	0.6		26.4		
		19	54.3	3	30.7		23.6		
		20	26.9	4	0.8		26.1		
		20	54.1	4	30.9		23.2		

11 19.5 26.7 31.1 47.0 53.0 59.3
12 18.7 26.6 30.3
14 22.0 28.0 33.3 48.8 53.3 59.3
15 19.5 24.7 28.9 27.5 54.6 59.7
17 50.6 55.0 59.1
18 17.8 25.0 30.5 50.4 58.0
19 2.3 20.3 27.0 33.8 47.7 54.0
20 1.1 22.0 25.8 33.0 48.7 54.2 59.4

1 91 172 265 1 17.6
2 454 15 3.1 482 564 2 49.9 − 13 32.8
7 13.5 23.1 29.4 7 22.0 9 1.9
16 20.7 22.7 23.9

1 16 24.66 − 67 16 23.99 17 8.75 − 44.76
1 16 23.99 + 20.22 + 32.48 − 3.58 − 1 16.87 − 27.68 15 56.31 55.43

+52236 −90934 −103384 −167644
2.71797 2.95873 3.01445 3.03199
1.18911 1.42987 1.98559 1.50313
24 16.65 23 39.65 36.58 34.82
− 15.46 + 26.91 + 30.59 + 31.85
24 1.19 6.56 7.10 8.67
58 47.16 41.79 38.11 39.92
46 17.55 46 18.32
1.77950 1.77960
+ 2791
1.80741 1.80751
+ 64.18 + 64.20 + 64.20 + 64.20
− 3.39 − 10.27 − 13.27 − 14.39
− .82 − .70 − .70 − .69
+ 59.97 + 53.23 + 50.23 + 49.12
59 47.13 35.02 28.34 29.04
+ 94
59 48.05 35.96 29.28 29.98
41 42.0
6.0 54.0 47.3 48.0

+1000.26 +925.36 +895.76 +830.26 +610.46
3.00016 2.96631 2.95219 2.91921 2.78566
1.47130 1.43745 1.42333 1.39035 1.25680
24 37.18 37.02 36.35 34.28 32.02
− 29.60 − 27.38 − 26.50 − 24.57 − 18.06
24 7.58 9.64 9.85 9.71 13.96
58 40.77 38.71 38.50 38.64 34.39
46 17.35
1.77940
+ 2791
1.80731
+ 64.17 + 64.17 + 64.17 + 64.17 + 64.17
− 12.42 − 10.63 − 9.96 − 8.56 − 4.63
− .87 − .87 − .87 − .87 − .86
+ 50.48 + 53.67 + 53.34 + 54.47 + 58.68
59 31.25 32.38 31.84 33.11 33.07
+ 94
59 32.19 33.32 32.78 34.05 34.01
41 42.0
17 50.2 51.3 50.8 52.0 52.0

1/10 24.66

+88 59 28.34
− 17 46.90
+ .94
− 36.10
− 18 22.06
+88 41 6.28

1926 2000 3380 44 1717 305 487
505.91 2.704 07 1.075 21 8+10.78 13.68 −14.97 51.81 58.91 52.54 49.62
+71.04 3.18 − .59 +73.63 + 6.17 3.27
7.17 4.24 4.91 4.62

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1883phae.proj.15663

34

1883 Dec 11.8 L.C. Doubtful

− 4389
− 43.89
+.74
− .08 2

11	11.8	+	26	9.3							
	17.5				11	17.8	6	1.2	17	19.0	
	24.0		28	12.2							
	43.1					46.8					
	49.7		29	50.9	11	44.7	6	31.1		20.8	
			32	1.5							
			33	53.2							
			35	36.2							
			41	48.7							
			43	23							
13	45.3										
	52.2				13	51.8	3	30.7		22.5	
	58.0										
14	12.8										
	19.8										
	25.0				14	19.0	3	0.6		19.6	
15											
	49.5										
	55.0				15	49.5	1	30.3		19.8	
16	13.3										
	22.0				16	22.0	1	0.2		22.2	
	44.0										
18	13.5										
	25.5				18	19.0	1	0.2		18.8	
	47.7										
	53.1										
	58.0				18	52.9	1	30.3		22.6	
19	17.3										
	23.9										
	29.8				19	23.7	2	0.4		23.3	
30											
	24.6				20	24.6	3	0.6		24.0	
	30.0								17	21.26	
	58.0										

	− 528.11	− 650.94	− 749.64	− 888.24
	2.72267	2.81354	2.87485	2.94460
	1.93818	1.28468	1.34599	1.41574
48	7.30	13.95	13.95 19.08	19.08 22.80	22.80
−	15.62	− 19.26	− 22.18	− 26.05
47	51.68	58.33	54.69 59.82	57.00 62	56.75
+91	34	56.67	50.02	55.66 48.53	51.46 47.73	51.60
	48 54 5		48 53 53	
	1.81900		1.81900	
	+ 2719			
	1.84619			
	+ 70.18	+ 70.18	+ 70.18	+ 70.18
	+ 3.46	+ 5.26	+ 6.98	+ 9.62
	− .59	− .61	− .63	− .65
	+73.05	+91.83	+76.53	+79.15
+91	36	3.07	3.07 + 3.36	3.36	3.26	10.57

	+ 98						
36	10.70	4.05	4.47	4.34	8.76	5.24	11.55
18	17.9						
	5.28		5.6		5.1		5.36
	46.1		46.4		46.8		
	− 8		− 8		− 8		
	46.9		47.2		47.1		

+91	36	3.07	
−	17	4.690	
+		.98	
+		3.620	
−	17	9.72	
+91	18	5.33.5	
+88	41	6.87 5	
		− .77	
		5.70	
		88	

h m s
13h 17 21.26
+ 67
17 21.93
17 8.44
+ 13.49

13 17 21.93
+ 20.49
− 32.48
+ 2.63 88
− 1 16.56
− 1 54.12 27.67
15 58.81
54.06

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1883phae.proj.1566.

+ 43.90
+ 43.90
+ 0.71
− .08

1883 Dec 12 324 C doubtful

1 10	(18 / 10.0)?	8	22.0						
	39.7	+ 6	16.3						
	47.0	8	3.1	10	46.4	5	31.1	17	17.5
	52.5	9	17.7						
11	44.2	27	58.0						
	48.9	29	38.7						
	52.7			11	48.6	4	30.9		19.5
12	11.0	31	19.5						
	17.5								
	24.3			12	17.6	4	0.8		18.4
	42.3								
	51.3								
	56.8			12	50.1	3	30.7		20.8
13	17.4								
	23.4								
	29.8			13	23.5	3	0.6		24.1
	44.3								
	51.7								
	56.7			13	50.9	2	30.5		21.4
14	13.3								
	19.3								
	24.2			14	18.9	2	0.4		19.3
	37.9								
	44.6								
	51.3			14	44.6	1	30.3		14.9
15	20.0								
	27.0								
	47.0			15	20.0	1	0.2		20.2
	51.0								
	55.1			15	51.0		30.1		21.1
16	10.0								
	14.2								
	21.0			16	15.1				15.1
17	44.8								
	51.0								
	59.0			17	51.6	1	30.3		21.3
18	15.8								
	23.1								
	29.7			18	22.9	2	0.4		22.5
	45.0								
	50.0								
	55.7			18	50.2	2	30.5		19.7
19	11.5								
	18.7								
	23.6			19	17.9	3	0.6		17.3
	43.4								
	53.5								
20	13			19	52.7	3	30.7		22.0
	18.2								
	25.3								
	30.0			20	24.5	4	0.8		23.7
	40.3								
	48.5								
	56.2			20	48.4	4	30.9		17.5
21	16.8								
	22.8								
	27.7			21	22.4	5	1.0		21.4
	49.2								
	54.0								
	59.5			21	54.2	5	31.1		23.1
	23.1								
	28.4			22	23.1	6	1.2		21.9

16 20.60

h m s
1 16 20.13
− .67
16 19.46
17 8.13
− 48.67

1 16 19.46
+ 20.78
+ 31.17
− 3.51
−1 16.25
− 27.81
15 51.65

+778.13	+603.83	+497.03	+422.43
2.89105	2.78091	2.69638	2.62575
1.36219	1.25205	1.16752	1.09689
24 39.68	36.40 +	37.62	9.58
− 23.02	− 17.87	− 14.71	− 12.50
24 16.66	18.53	22.91	7.08
58 31.69	29.52	25.44	

46 17.32
1.77940
+ 28.14
1.80754

+ 64.20	+ 64.20	+ 64.20	+ 64.20
− 7.52	− 4.53	− 3.07	− 2.22
− .78	− .78	− .76	− .74
+ 55.90	+ 58.89	+ 60.47	+ 61.2[illegible]
59 27.59	28.41 +	25.85	[illegible]

+ 94
59 28.53 | 29.35 | 26.79
41 42.2
−17 46.3 | 47.2 | 44.6

+88 59 28.41
− 17 47.94
+ .94
− 36.30
− 18 23.30
+88 41 5.11

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36

1883 Dec 12.8 S. O. very doubtful

- 43.90
- 43.91
+ .71 6
+ .0X

13	11	45.5	× 24	31.0					Tm	h 13 m 17 s 20.73
		51.0							K	+ 67
		56.9	26	13.0	11	51.1	5 / 6 34.1 / 1.2	17 22.2	Tm + K	17 21.40
	12	11.5							R. A	17 7.81
		17.4	26	37.0	12	17.3	5 / 5 1.8 / 31.1	18.3	T - R. A	+ 13.59
		23.0	× 27	45.6						
			28	41.0						13 17 21.40
	13	15.0								+ 21.25
		19.0	30	31.0						- 31.17
		25.0	31	27.5	13	19.7	4 / 4 0.8 / 30.9	20.5		2.63
										- 1 15.93
										- 1 28.48
	14	14.4								15 52.92
		20.2								
		27.0			14	20.5	3 / 3 0.6 / 30.7	21.1		
	16	46.4								
		52.2								
		59.9			16	52.8	30.1	22.9		
	17	15.5								
		18.5								
		28.2			17	20.7	-	20.7		

26	18.8			
	24.8			
	29.3	26	24.3	
27	48.3	9.	1.9	
	51.0			
	56.3	27	51.8	
29	30.4	10	32.2	
	35.6			
	36.5	29	34.2	
30	48.0	12	2.5	
	54.3			
31	1.2	30	54.5	
32	26.0	13	32.8	
	29.6			
	31.4	32	29.0	
		15	3.1	
		17	22.4	
			19.6	
			37.7	
			21.9	
			25.9	

20	13.7						- 430.27	- 532.27	- 556.27	- 624.87	- 680.27
	18.2						2.63374	2.72613	2.74529	2.79579	2.83268
	21.6	20	17.8	3	0.6	18.4 / 19.2	1.10488	1.19727	1.21643	1.26693	1.30382
	44.5						48 8.98 +	10.35	11.60	16.12 +	16.95
	57.3	20	50.9	3	30.7	21.6 / 20.2	- 12.73	- 15.75	- 16.46	- 18.49	- 20.13
							47 56.25	54.60	55.14	57.63	56.82
							34 52.10	53.75	53.21	50.72	51.53
21	15.6						48 54.50				
	19.7						1.81900				
	46.0	21	17.6	4	0.8	18.4 / 16.8	+ 2527				
	52.0						1.84427				
	56.8	21	51.6	4	30.9	22.5 / 20.7	+ 6987	+ 6987	+ 6987	+ 6987	+ 6987
22	13.1						+ 2.30	+ 3.52	+ 3.84	+ 4.85	+ 5.74
	21.5						- .63	- .63	- .63	- .63	- .63
	28.4	22	21.0	5	1.0	22.0 / 20.0	+ 7154	+ 7276	+ 7308	+ 7409	+ 7498
	45.5						36 3.64 +	6.51	6.29	4.81 +	6.51
	50.2										
	58.8	22	51.5	5	31.1	22.6 / 20.4	+ 98				
23	13.6						36 4.62	7.49	7.27	5.79	7.49
	22.0						48 17.7				
	27.3	23	28.0	6	1.2	24.2 / 21.8	- 17 46.97	49.8	49.6X	48.1 X	49.8
							- 8			- 8	
							47.7 +			48.9 +	

+ 91	36	4.22
	- 17	47.94
+		.98
+		36.40
	- 17	10.56
+ 91	18	53.66
+ 88	41	6.34
		- 77
		5.57

17 21.19 / 20.73

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1883phae.proj.1566.

1883phae.proj.1566.

1883 Dec 13 3W C.

+ 43.90
+ 43.90
+ .75
− .05

1

~~58 (421)~~
59 420
0 382
1 471
2 384
3 50.3
+ 7 28.1
8 40.0
9 30.0
33 32.5
34 40.8
35 36.7

1 16 17.21
+ 21.33
+ 32.92
− 2.20
− 1 15.61
− 23.56
15 53.65

h 1, h 16, s 17.88
− 67
16 17.21
17 7.49
− 50.28

+747.58	+529.78	+457.88	+407.88	−10.3462
2.87366	2.72410	2.66075	2.61053	3.01478
1.34480	1.19524	1.13189	1.08167	1.48592
24 36.10	32.05	31.12	30.60	23 34.85
− 22.12	− 15.68	− 13.55	− 12.07	+ 30.61
24 13.98	16.37	17.57	18.53	24 5.46
58 34.37	31.98	30.76	29.82	58 42.89
46 17.35				46 18.37
1.77940				1.77960
+ 1054				+ 1054
1.78994				1.79014
+ 61.65	+ 61.65	+ 61.65	+ 61.65	+ 61.68
− 6.94	− 3.48	− 2.60	− 2.07	− 13.29
− 88	− 86	− .86	− .86	− 68
+ 53.83	+ 57.32	+ 58.19	+ 58.72	+ 47.71
59 28.20	29.30 +	28.97	28.54	59 30.60
+ 95				
59 29.15	30.25	29.92	29.49	59 31.55
41 42.5				
46.7	47.7 ×	47.4	47.0	49.1

2 56
120
190 2 12.9
3 330 15 3.1
409
484 3 40.8
− 13 32.8
−
−
−
−
−
8 84
130
200 8 13.8
9 1.9

17 15.3
13.6
15.7

17 22.7
27.6
33.4
58.6
18 2.1
5.8
42.1
50.9
56.8
19 14.5
20.4
26.0
45.5
51.2
57.2
20 15.0
20.2
25.3
−
−
−
−
−
−
21 45.0
49.9
56.4

17	27.9	1	30.3	16	57.8
18	2.2	2	0.4	17	2.0
18	49.9	2	30.5	17 16	19.4
19	20.3	3	0.6		19.9
19	51.3	3	30.7		20.6
20	20.2	4	0.8	16	19.4
21	50.4	5	31.1	17	19.5

+995.88	+939.68	+870.78	+819.48
2.99821	2.97298	2.93991	2.91354
1.46935	1.44412	1.41105	1.38468
24 37.25	37.20	37.12	36.52
− 29.47	− 27.80	− 25.77	− 24.25
24 7.78	9.40	11.35	12.27
58 40.57	38.95	37.00	36.08
46 17.35			
1.77940			
+ 1054			
1.78994			
+ 61.65	+ 61.65	+ 61.65	+ 61.65
− 12.31	− 10.96	− 9.41	− 8.34
− 88	− 88	− .88	− 88
+ 48.46	+ 49.81	+ 51.36	+ 52.43
59 29.03	28.46	28.36	28.51
+ 95			
59 29.98	29.71	29.31	29.46
41 42.5			
17 47.5	47.2	46.8	47.0

+ 88	59	29.30
−	17	47.71
+		.95
−		36.60
−	18	23.36
+ 88	41	5.94

~~17 18.00~~
16 17.88

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1883phae.proj.1566

38

1883 Dec. 15, 3 HC

	1	11	45	4	51.8							
			16.0			11						
			20.8	6	7.0	11	13.8	5 1.0 / 6 1.2	16	14.8		
			39.6									
			43.8	7	21.8							
			49.7					4 30.9				
		12	14.1			11	44.4	5 34.1	16	15.3		
			14.3	8	59.0							
			22.0					4 0.8				
				22	37.8	12	18.1	5 4.0	16	18.9		
				23	51.0							
7	17											
	6.2											
	9.3	7	5.7									
8	27.2	10	32.2									
	34.8											
	41.7	8	34.6									
		9	1.9									
	(17	37.9										
		36.5)										
				21	43.6							
					47.6							
					53.0							
				22	10.6							
					14.6							
					35.0							
				21	48.1	5	31.1		16	17.0		
				22	18.1	6	1.2		16	16.9		
									16	16.58		

T_m — h 1 — m 16 — s 16.58

K — 1.67

$T_m + K$ — 16 15.91

R.A — 17 6.06

$T - R.A$ — 50.15

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1883phae.proj.1566.

1883 Dec. 15.8 L.C

13	11	16.2	24	26.1								
		20.5										
		25.8	28	43.0	11	20.8	6	1.2	17	22.0		
		44.6										
		47.0	30	21.0								
		50.6			11	47.4	5	31.1		18.5		
	12	19.0	32	46.5								
		24.3										
		30.0			12	24.4	5	1.0		25.4		
		48.0										
		58.0										
	13	59			12	57.3	4	30.9		28.2		
		-										
		-										
		-										
		-										
		-										
		-										
		-										
		-										
		-										
		-										
	15	46.0										
		50.4										
		54.6			15	50.3	1	30.3	17	20.6		
	16	19.9										
		22.8										
		27.6			16	23.4	1	0.2 30.1		23.6		
		54.0										
		59.0										
	17	48			16	59.3		30.1		29.4		
		20.0										
		26.4										
		34.8			17	27.1				27.1		
		51.0										
		59.3										
	18	55			17	58.6		30.1		28.5		
		18.9										
		27.5										
		36.0			18	27.5	1	0.2		27.3		
		50.0										
		56.0										
	19	5.3			18	57.1	1	30.3		26.8		
		17.1										
		23.7										
		31.0			19	23.9	2	0.4		23.5		
		47.4										
		55.2										
	20	1.0			19	54.5	2	30.5		24.0		
		20.3										
		25.6										
		30.4			20	25.4	3	0.6		24.8		
		49.7										
		56.5										
	21	20			20	56.1	3	30.7		25.4		
		12.1										
		17.8										
		23.5			21	17.8	4	0.8		17.0		
		49.0										
		56.4										
	22	22			21	55.9	4	30.9		25.0		
		19.3										
		27.7										
		35.5			22	27.5	5	1.0		26.5		
		49.0										
		56.5										
	23	5.3			22	56.9	5	31.1		25.8		
		21.6										
		31.0										
		39.0			23	30.5	6	1.2	17	29.3		
									17	24.93		

h m s
13 17 24.93
+ 67
17 25.60
17 56.5
+ 19.95

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1883phae.proj.1566

10

1883: Dec. 26 Wash. C

	19	47.0	9	41.0								
		52.8										
	10	1.8	5	45.2	9	54.2	6	1.2	15	55.4		
		24.5										
		31.4	7	20.8								
		38.0			10	31.3	5	31.1	16	2.4		
		–	8	58.0								
		–										
		–	9	36.4								
		–										
		–	22	28.3								
		–										
		–	25	41.7								
		–										
		–	28	39.9								
		–										
		–	30	24.9								
		–										
		–										
		–										
		–										
	13	32.3										
		39.0										
		46.0			13	39.1	2	30.5		9.6		
	14	3.3										
		9.5										
		15.1			14	9.3	2	0.4		9.7		
		31.6										
		39.3										
		45.3			14	38.7	1	30.3		9.0		
		59.4										
	15	5.9										
		–			15	5.9	1	0.2		6.1		
		–										
		–										
		–										
		–										
		–										
	16	33.4										
		40.8										
		47.0			16	40.4		30.1		10.3		
		–										
		–										
	17	11.9										
		33.1										
		38.4			17	38.6	1	30.3		8.3		
		44.4										
	18	12										
		6.0										
		13.0			18	6.7	2	0.4		6.3		
		–										
		37.3										
		38.2			18	38.2	2	30.5		7.7		
		59.5										
	19	5.3										
		10.8			19	5.2	3	0.6		4.6		
		24.5										
		31.8										
		39.8			19	32.0	3	30.7		1.3		
		55.7										
	20	2.2										
		10.3			20	2.7	4	0.8		1.9		
		30.0										
		36.0										
		42.0			20	36.0	4	30.9		5.1		
	21	0.0										
		6.9										
		12.3			21	6.4	5	1.0		5.4		
		34.0										
		39.8										
		46.9			21	40.2	5	31.1		9.1		
	22	1.4										
		5.5										
		11.8			22	6.2	6	1.2		5.0		

Π_m : h 1 m 16 s 6.36
K 67
$\Pi_m + K$ R.A 16 5.69
$\Pi -$ R.A 17 0.70
5.01

16 6.47 36

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1883 Dec 21.8 L.C

13	—		4	57.9							
	—										
	—		7	29.0							
	—										
	—		8	38.4							
	—										
12	31.8		23	38.2							
	36.5										
	42.4		27	21.0	12	36.9	4	30.9	17	7.8	
13	1.3										
	7.0		29	3.0							
	13.0				13	7.1	4	0.8		7.9	
	31.5		30	48.0							
	36.8										
	42.4		32	36.0	13	36.8	3	30.7		7.5	
	58.6										
14	4.2										
	—				14	4.2	3	0.6		4.8	
	. —										
	-										
	-										
	-										
	.										
	-										
15	31.0										
	38.5										
	43.2				15	37.6	1	30.3		7.9	
16	6.7										
	11.0										
	17.2				16	11.8	1	0.2		11.8	
	32.4										
	37.5										
	42.7				16	37.5		30.1		7.6	
17	1.0										
	6.5										
	12.0				17	6.5	—	—		6.5	
	30.0										
	39.2										
	43.4				17	37.5		30.1		~~7.6~~ 7.4	
18	2.0										
	9.0										
	15.5				18	8.8	1	0.2		~~9.0~~ 8.6	
	33.5										
	39.9										
	46.6				18	46.0	1	30.3		~~10.3~~ 9.7	
19	4.8										
	10.5										
	17.0				19	10.8	2	0.4		~~11.2~~ 10.4	
	34.7										
	41.0										
	48.0				19	41.2	2	30.5		~~11.7~~ 10.7	
20	6.0										
	18.0										
	19.4				20	12.8	3	0.6		~~13.4~~ 12.2	
	37.0										
	44.3										
	49.7				20	43.7	3	30.7		~~14.4~~ 13.0	
21	4.8										
	11.3										
	17.1				21	11.1	4	0.8		~~11.9~~ 10.3	
	36.0										
	41.0										
	46.5				21	40.8	4	30.9		~~11.7~~ 9.9	
22	2.0										
	7.1										
	12.5				22	7.2	5	4.0		~~6.2~~ 6.2	
	34.8										
	40.4										
	46.9				22	40.7	5	31.1		~~11.4~~ 9.6	
23	4.4										
	11.7										
	17.2				23	11.1	6	1.2		~~12.5~~ 9.9	
									17	~~9.10~~ 8.98	

L m s
13 17 8.98
+ 67
17 9.65
17 0.28
+ 9.37

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+43.91
+43.91
+ .82
− .15

1883. Dec. 22 23h.0

			1 10	30.3	+58	8.1			
				35.0					
				40.3	0	14.5	16 35.2	5 31.1 / 6 1.2 16	6.3
			11	2.4					
				8.4	3	12.4			
				15.7			11 8.8	5 1.0 / 5 31.1	9.8
				30.1	6	18.3			
				36.0					
				42.6	10	24.9		4 30.9	
				47.5			11 39.0	5 1.0	9.9
				58.8	22	25.8		4 0.8	
			12	3.0			12 3.9	4 30.9	4.7
				9.9	24	1.9			
0	53.8			33.5				3 30.7	
1	0.7			38.7			12 38.5	4 0.8	9.2
	7.7	1 0.7		43.3					
21	26.7	15 3.1	13	2.3					
	32.1			7.0				3 0.6	
	38.2	2 32.3		10.0			13 6.4	3 30.7	7.0
3	58.9	13 32.8		33.5					
4	2.3			38.5				2 30.5	
	5.7	4 2.3		44.7			13 38.9	3 0.6	9.4
	—	12 2.5	14	1.8					
	—			5.5				2 0.4	
	—			11.3			14 6.2	2 30.5	6.6
7	3.0			28.1					
	6.5			39.4				1 30.3	
	10.5	7 6.7		44.6			14 37.4	2 0.4	7.7
		9 1.4	15	5.3					
				9.8				1 0.2	
				12.4			15 9.2	1 30.3	9.4
		16 3.8							
		5.1							
		4.8							
		8.6							
		17.0							
25	18.4								
	18.9								
	24.5	25 18.9							
		9 × 9							
			21	40.1			21 46.4	5 31.1	15.5
				45.3					
				53.8					
			22	2.6					
				8.3					
				15.0			22 8.6	6 1.2	7.4

16 7.22
31

+88 59 26.83
− 17 43.52
+ 99
− 38.30
− 18 20.83
+88 41 6.00

	h	m	s
T ☆ / mK	1	16	7.31
			− 67
Tm + K		16	6.64
R.A		16	59.86
T − R.A			− 53.22

−378.49	−474.59	1 16	6.64
2.57805	2.67632	+	25.84
1.04919	1.14746	+	36.01
24 12.80	24 6.42	−	6.59
+ 11.21	+ 14.04	− 1	7.98
24 24.01	20.46	−	12.72
+88 58 24.34	27.89	15	53.92
46 17.59	46 18 6		
1.77950	1.77950		
+ 4675	+ 4675		
1.82625	1.82625		
+ 67.03	+ 67.03		
− 1.78	− 2.80		
− 80	− .78		
+ 64.47	+ 63.45		
59 28.81	31.34		
+ 99			
59 29.80	32.33		
41 44.2			
−17 45.6	48.1		

+1084.21	+952.81	+774.91	+589.01	+342.41
3.03511	2.97901	2.88925	2.77012	2.53455
1.50625	1.45015	1.36039	1.24126	1.00569
24 45.12 ×	42.05	42.10	40.02	
− 32.08	− 28.19	− 22.93	− 17.43	
24 13.04	13.86	19.17	22.59	
+88 58 35.31	34.49	29.18	25.76	
46 17 27				
1.77930				
+ 4675				
1.82605				
+ 67.00	+ 67.00	+ 67.00	+ 67.00	
− 14.59	− 11.27	− 7.46	− 4.31	
− .89	− .89	− .89	− .89	
+ 51.52	+ 54.84	+ 58.65	+ 61.80	
59 26.83 ×	29.33	27.83	27.56	
+ 99				
59 27.82	30.32	28.82	28.55	
41 44.2				
−17 13.6 ×	46.1	44.6	44.4	

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1883 Dec. 22.8 L.C

- 43.91
- 43.91
+ .82
- .15
0

	A1	s			
	11	34.9	11	29.4, 35.7, 39.7	
	12	5.9	12	3.8, 5.8, 8.0, 30.9, 34.5	
	12	34.7		38.7, 59.8	
	13	3.4	13	3.3, 7.1, 30.1	
12 34.98	13	36.0		37.0, 41.0	
	14	6.7 (4)	14	3.0, 6.8, 9.3	
	14	35.2		29.5, 34.0, 42.0	
	15	6.8	15	0.9, 5.5, 14.0	
	15	38.6		34.1, 38.5, 43.2	
15 7.26	16	9.0	16	3.8, 9.1, 14.2	
	16	37.3		31.0, 38.2, 42.6	
	17	6.4	17	59.2, 6.4, 13.7	
	17	33.5		28.0, 32.4, 40.0	
	18	7.3	18	0.6, 8.6, 12.7	
17 36.28	18	36.9		27.6, 38.0, 45.0	
	19	10.5	19	5.5, 10.8, 15.3	
	19	42.6		35.0, 42.8, 50.0	
	20	9.3	20	4.6, 9.3, 13.9	
	20	39.2		35.6, 39.8, 42.2	
20 10.64	21	8.6	21	3.6, 7.6, 14.5	
	21	32.5		27.2, 31.2, 39.0	
	22	6.6	22	59.3, 5.2, 15.3	
	22	35.7		28.4, 35.0, 43.8	
	23	2.6	23	58.2, 1.9, 7.7	

6	10.7
8	2.3
9	23.7
23	18.7
25	6.0
26	28.8
27	51.6
29	11.7
30	26.0
31	46.0
33	14

12	34.98	4	30.9	17	5.9
15	7.26	2	0.4		7.7
17	36.28	-	30.1		6.2
20	10.64	3	0.6		10.0
21	32.5	4	30.9		1.6
22	6.6	5	1.0		5.6
22	35.7	5	31.1		4.6
23	2.6	6	1.2		1.4

17 5.38

h m s
13 17 53.8
+ 6.7
17 60.5
16 59.46
+ 6.59

13 17 60.5
+ 26.12
- 36.01
+ 6.59 4.39
- 1 7.58
- 1 10.88 13.08
15 53.17
52.97

+654.68	+543.08	+461.68	-373.32
2.81603	2.73486	2.66434	2.57208
1.28717	1.20600	1.13548	1.04322
47 47.60	51.30	51.08	48 15.52
+ 19.37	+ 16.07	+ 13.66	- 11.05
48 6.97	7.37	4.74	4.47
+91 34 41.38	40.98	43.61	43.88
48 54.24			48 53.57
1.81910			1.81902
+ 70.91			+ 70.91
1.89001			1.88991
+77.63	+77.63	+77.63	+77.61
+ 5.32	+ 3.66	+ 2.65	+ 1.73
- .53	- .53	- .53	- .61
+82.42	+80.76	+79.75	+78.73
36 3.80	1.74	3.36	2.61
+ 1.03			
36 4.83	2.77	4.39	3.64
18 15.7			
-17 49.1	47.1	48.7	47.9

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1883 Dec 24.8 S C

	h	m	s
T_m	13	17	17.55
K		+	.67
T_m + K		17	18.22
R.A		16	57.92
T − R.A		+	20.30

15	37.0
16	52.3
23	38.0
25	51.4
29	47.7
33	5.7
34	42.1
36	5.3
37	46.5
39	11.7

25	(51.4)
26	7.3
	33.0
27	40.6
28	5.7
29	15.0
	22.0
	26.8

26	7.2
9	1.9
27	53.1
10	32.2
29	21.3
12	2.5

17	~~9.1~~
	5.3
	20.9
	18.8

15	43.7
	46.5
	50.9
16	11.3
	15.0
	21.2
17	14.5
	17.5
	21.0
	40.6
	45.8
	55.9
18	13.8
	17.9
	20.5
	39.8
	49.2
	54.0
19	10.7
	17.9
	22.2
	42.4
	48.7
	53.2
20	11.2
	16.4
	21.7
	42.2
	47.9
	55.1
21	42.3
	49.0
	53.5
22	19.2
	24.7
	31.5
	43.1
	49.0
	53.0
23	11.5
	20.0
	27.1

15	47.0	1	30.3	17	17.3
16	15.8	~~2~~ 1	~~0.4~~ 0.2		16.0
17	17.7	-			17.7
17	47.4		30.1		17.3
18	17.4	1	0.2		17.2
18	47.7	1	30.3		17.4
19	16.9	2	0.4		16.5
19	48.1	2	30.5		17.6
20	16.4	3	0.6		15.8
20	48.4	3	30.7		17.7
21	48.3	4	30.9		17.4
22	25.1	5	1.0		24.1
22	48.4	5	31.1		17.3
23	19.5	6	1.2		18.3
				17	17.~~64~~ 55

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1883 Dec. 28.3 21h. 1

				9	35.8	8	3.4	h	m s
					41.3			1	15 47.70
	9	41.7			48.1	22	7.9		− 67
				10	10.7				15 47.03
					15.1	26	8.5		16 55.19
	10	15.6			21.0				−1 8.16
					38.5	27	56.9		
					45.0				
	10	44.6			50.2	29	57.4		
				11	10.6				
					16.9	31	56.1		
	11	16.8			23.0				
					41.5				
					47.4				
10	45.28	11	47.7		54.1				
				12	10.0				
					16.1				
	12	15.8			21.8				
					39.0				
					44.3				
	12	44.6			50.5				
				13	12.2				
					13.0				
	13	16.2			23.5				
					39.0				
					47.8				
	13	47.6			56.0				
				14	11.0				
					17.7				
13	16.48	14	18.2		25.8				
					38.3				
					44.5				
	14	45.2			52.8				
				15	16.0				
					22.0				
					26.0				
	15	21.3			38.0				
					45.5				
					52.0				
	15	45.2		16	7.3				
					15.6				
	16	15.3			22.9				
					41.3				
					47.3				
15	46.90	16	47.5		58.8				
				17	11.4				
					16.4				
	17	16.8			22.5				
					41.1				
					47.4				
	17	47.3			53.4				
				18	10.2				
					17.2				
	18	17.2			24.3				
					42.1				
					49.6				
	18	49.7			57.8				
				19	13.3				
					20.8				
18	18.30	19	20.5		27.3				
					44.2				
					51.3				
	19	51.2			58.2				
				20	14.2				
					20.4				
	20	20.2			35.9				
					50.4				
					55.3				
	20	55.2			59.8				
				21	14.0				
					19.4				
	21	20.7			27.8				
					43.0				
					52.0				
20	57.74	21	50.4		58.1				

15 47.70 CK

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40

1883 Dec. 28 L.C.

			10	56.3			4	22.0							
			11	29											
	11	3.2		10.3			6	23.4							
				27.3											
				34.4			8	30.5							
	11	33.7		39.5											
				57.0			24	5.0							
			12	32											
	12	3.2		9.4			27	10.5							
				32.5											
				37.8			29	9.7							
	12	38.1		44.1											
				59.6											
			13	5.9											
12	4.86	13	6.1	12.8					12	4.86	5	1.0	17	5.86	
				29.4											
				36.8											
	13	36.1		42.0											
			14	1.8											
				7.5											
	14	7.7		14.2											
				33.1											
				39.3											
	14	39.5		46.0											
			15	2.6											
				8.5											
	15	8.5		14.3											
				32.5											
				40.0											
14	38.28	15	39.6	46.3					14	38.28	2	30.5	17	8.78	
			16	3.4											
				9.0											
	16	9.0		14.5											
				32.0											
				39.0											
	16	38.8		45.3											
			17	3.3											
				9.0											
	17	9.5		16.1											
				34.1											
				40.3											
	17	40.1		46.0											
			18	3.0											
				16.3											
17	9.46	18	9.9	16.5					17	9.46	—	—	17	9.46	
				33.2											
				39.7											
	18	40.0		47.0					18	40.0	1	30.3	17	9.78	
			19	4.5											
				10.4											
	19	10.4		16.2					19	10.4	2	0.4		10.0	
				33.4											
				41.3											
	19	41.2		48.9					19	41.2	2	30.5		10.7	
			20	9.5											
				14.5											
	20	15.1		21.3					20	15.1	3	0.6		14.5	
			21	2.5											
				9.4											
	21	9.4		16.3											
				33.4											
				39.2											
	21	39.3		45.3											
			22	3.1											
				10.5											
	22	10.1		16.8											
				34.9											
				40.3											
	22	40.6		46.7											
			23	5.2											
				11.4											
22	10.14	23	11.3	17.3					22	10.14	5	1.0		9.142	

	h	m	s
Π_m	13	17	9.77
K			+ 67
$\Pi_m + K$		17	10.44
R.A		16	54.74
$\Pi - R.A$			+ 15.70

17 ~~9.77~~ 9.47

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1883phae.proj.1566.

+ 43.92
+ 43.92
+ .78
− .01

1883 Dec. 29.3 W. C.

			10	19.1	+ 51	39.5							
				21.6									
				25.0	57	54.3	10	21.9	5	31.1	15	53.0	
				41.8									
				50.9	59	1.0							
				56.4			10	49.7	5	1.0		50.7	
			11	13.6	59	55.3							
				18.0									
				22.5	1	11.7	11	18.0	4	30.9		48.9	
				40.5									
				51.3	1	59.3							
				55.2			11	49.0	4	0.8		49.8	
			12	20.8	2	57.4							
0	36.8			24.1									
	43.2			28.2	4	(43.5)	12	24.2	3	30.7		54.9	
	46.2	0	42.1	45.8									
2	6.7	15	3.1	52.3	7	18.4							
	13.7			57.0			12	51.7	3	0.6		52.3	
	18.0	2	12.8	13	18.8	22	15.0						
3	37.8	13	32.8		24.3								
	44.1				28.9	23	28.7	13	24.0	2	30.5		54.5
	52.9	3	44.9		45.0								
	−	12	2.5		55.0	24	23.2						
	−			14	04			13	53.5	2	0.4		53.9
	−				16.3	25	20.3						
6	48.2				22.2								
	49.0				26.5			14	21.7	1	30.3		52.0
	53.4	6	48.5		45.2								
		9	1.9		52.0								
				15	0.5			14	52.6	1	0.2		52.8
		16	45.2										
			45.6										
			47.4										
			50.4										
			49.2										
			53.2										
24	45.0												
	50.2												
	58.0	24	51.1										
26	18.9	9	1.9										
	25.1												
	32.1	25	25.4										
		10	32.2										
				21	22.8								
					25.0								
					27.4	+88 59	30.57	21	25.1	5	31.1		54.0
					44.6	− 17	46.36						
					51.2	+	1.02						
				22	2.5	−	39.30	21	52.8	6	1.2		51.6
						− 18	24.64						
						+88 41	5.93						

15 51.08

Right-hand computations (upper):

h	m s		
1	15 51.08	1 15	50.41
	− .67	+	29.92
	15 50.41	+	34.26
	16 54.30	−	.44
	− 1 3.89	− 1	2.42
		+	1.32
		15	51.73

− 383.92	− 457.62	− 512.12	− 569.22
2.58424	2.66050	2.70937	2.75528
1.05538	1.13164	1.18051	1.22642
24 6.88	24 35.2	24 10.5	23 59.10
+ 11.36	+ 13.54	+ 15.15	+ 16.84
24 18.24	17.06	16.20	15.94
58 30.11	31.29	32.15	32.41
46 18 6			
1.77950			
+ 29.50			
1.80900			
+ 64.42	+ 64.42	+ 64.42	+ 64.42
− 1.83	− 2.60	− 3.26	− 4.02
− .78	− .78	− .76	− .76
+ 61.81	+ 60.94	+ 60.40	+ 59.64
59 31.92	32.23	32.55	32.05
+ 1.02			
59 32.94	33.25	33.57	33.07
41 45.2			
− 17 47.7	48.0	48.4	47.9

Right-hand computations (lower):

+ 1451.58	+ 1075.78	+ 1010.08	+ 955.78	+ 879.38
3.16184	3.03172	3.00435	2.98036	2.94418
1.63298	1.50286	1.47549	1.45150	1.41532
24 ~~36.72~~ 38.10	38.10	36.28	35.30	36.28
− 42.95	− 31.83	− 29.89	− 28.28	− 26.02
23 ~~53.77~~ 53.15	24 6.27	6.39	7.02	10.26
58 ~~54.38~~ 53.20	42.08	41.96	41.33	38.09
46 17 35				
1.77940				
+ 29.50				
1.80890				
+ 64.40	+ 64.40	+ 64.40	+ 64.40	+ 64.40
− 26.16	− 14.37	− 12.67	− 11.34	− 9.60
− .87	− .87	− .87	− .87	− .87
+ 37.37	+ 49.16	+ 50.86	+ 52.19	+ 53.93
59 ~~31.75~~ 30.57 +	31.24	32.82	33.52	32.02
+ 1.02				
59 ~~32.77~~ 31.59	32.26	33.84	34.54	33.05
41 45.2				
− 17 ~~47.6~~ 46.4 +	47.1	48.6	49.3	47.8

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1884 Jan. 2.8 L.C.

25	303
29	196
30	145
32	182
33	250
34	275
35	330
36	310
37	339
38	396

Π_m 13 h 15 m 58.68 s
K + 67
Π_{m+K} R.A 15 59.35
Π - R.A 16 49.79
−50.44

δ = +88° 41′ 46″ U.C
+91 18 14 L.C

cos δ 8.35708
sin δ 9.99989
tan δ 1.64281
log 45 tan i 0.11378n
tan δ
sin Z −.72 U.C
sin Z −.75 L.C

					18	246					
						30.1					
						36.5					
						52.8					
					19	0.1					
						7.5					
29	34.6					25.5					
	27.2					31.2					
	32.7	29	28.2			36.4					
30	55.0	13	32.8			53.0					
31	1.8					58.5					
	8.8	31	1.9	20		4.9					
		15	3.1			21.3					
						29.1					
						34.9					
		15	55.4								
			58.8								
				21		24.2					
						31.1					
						38.4					
						58.3					
						59.0					
				22		7.2					

					18	30.4	2	30.5		30.9	
									15	59.9	
					19	0.1	3	0.6		59.5	
					19	31.0	3	30.7	16	0.3	
					19	58.8	4	0.4	15	58.0	
					20	28.4	4	30.9		57.5	
					21	31.2	5	31.1		0.1	
					21	59.8	6	1.2		58.6	
									15	58.68	

N.A	1 h	16 m	14.291 s	+88° 41′ 24.87″
B.J		16	14.077	41 24.86
N.A − B.J.			+0.214	+0.01
Red to B.J			−.21	

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188⅔ Jan 23 W.C.

+43.93
+43.93
± .87
− .07

				1	9	34.7	58	56.8			
						41.5					
						48.3	0	14.1	9 41.5	6 1.2	15 42.7
					10	4.6					
						10.9	1	15.6			
						17.6			10 11.0	5 31.1	42.1
						36.9	2	22.8			
						43.0					
						49.3	3	13.5	10 43.1	5 1.0	44.5 (1)
					11	8.0					
						15.0	4	19.8			
						21.1			11 14.7	4 30.9	45.6
						38.0	+5	41.7			
0	30.0					44.5					
	35.0					50.0	6	34.0	11 44.2	4 0.8	45.0
	41.1	0	35.4	12		7.7					
2	3.4	15	3.1			13.5	+7	42.3			
	8.4					19.0			12 13.4	3 30.7	48.1 (4)
	12.8	2	8.2			36.7					
3	32.5	13	32.8			43.8					
	38.4					49.5			12 43.3	3 0.6	43.9
	45.0	3	38.6	13		7.1					
5	0.0	12	2.5			12.6					
	6.3					17.3			13 12.3	2 30.5	42.8
	13.6	5	bide			34.0					
6	36.3	10	32.2			40.9					
	42.0					46.5			13 40.5	2 0.4	40.9
	47.7	6	42.0	14		4.5					
		9	1.9			9.2					
						16.0			14 9.9	1 30.3	40.2
						34.0					
						40.4					
						46.0			14 40.1	1 0.2	40.3
				15		4.4					
		15	38.5			10.1					
			41.0			15.4			15 10.0	30.1	40.1
			41.1			34.8					
			38.8			40.3					
			43.9			45.8			15 40.3	—	40.3
				16		6.0					
						11.8					
						17.3			16 11.7	30.1	41.8 (6)
						35.3					
						41.5					
						48.2			16 41.7	1 0.2	41.9 (5)
				17		6.2					
						12.3					42.0 (3)
						19.2			17 12.6	1 30.3	
											15 41.74 / 94

1 15 41.27
+ 32.70
+ 38.22
− 3.07
− 35.20
+ 32.65
16 13.92

h 1 m 15 41.94
− 67
15 41.27
16 49.28
− 1 8.01

+682.14	+600.24	+542.94	+479.64
2.83387	2.77832	2.73873	2.68091
1.30473	1.24918	1.20959	1.15177
24 32.58	~~31.92~~ 32.58 30.68	30.68	30.98 +
− 20.17	− 17.75 +	− 16.20	− 14.18
24 12.41	~~14.17~~ 14.83	14.48	16.80
58 35.94	~~34.18~~ 33.52	33.87	31.55

46 17 46
1.77940
+ 2350
1.80290

+63.52	+63.52	+63.52	+63.52
− 5.77	− 4.47	− 3.72	− 2.85
− .86	− .86	− .86	− .86
+ 56.89	+ 58.19	+ 58.94	+ 59.81
59 32.83	~~32.37~~ 31.71 +	32.81	31.36 +
+ 1.03			
59 33.86	~~33.40~~ 32.74	33.84	32.39
41 45.8			
−17 48.1	~~47.6~~ 46.9 ×	48.0	46.6 ×

+1005.14	+927.84	+866.34	+799.14	+748.44
3.00223	2.96747	2.93769	2.90262	2.87416
1.47309	1.43833	1.40855	1.37348	1.34502
24 34.25	35.05	34.95	34.22	33.60
− 29.72	− 27.44	− 25.62	− 23.63	− 22.13
24 4.53	7.61	9.33	10.59	11.47
+88 58 43.82	40.74	39.02	37.76	36.88

46 17 46
1.77940
+ 2350
1.80290

+ 63.52	+ 63.52	+ 63.52	+ 63.52	+ 63.52
− 12.54	− 10.68	− 9.31	− 7.92	− 6.95
− .87	− .87	− .87	− .87	− .87
+ 50.11	+ 51.97	+ 53.34	+ 54.73	+ 55.70
59 33.93	32.71	32.36	32.49	31.18
+ 1.03				
59 34.96	33.74	33.39	33.52	32.21
41 45.8				
−17 48.2	47.9	47.6	47.7	46.4

+88 59 32.54 (2)
− 17 46.77
+ 1.03
− 20.90
− 18 6.64
+88 41 ~~24.90~~ 25.

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1883phae.proj.15661

1884 Jan. 3.8 L.C.

	h	m	s
T_m	13	17	52.46
$T_m K_{12}$			+ 67
$T_m + K$	17		53.13
$T_m - R.A$	16		48.80
$T - R.A$	+ 1		4.33

			13	11	39.0	24	28.1
					46.3		
		11	46.3		53.7	27	45.3
				12	16.0		
					21.7	29	49.3
		12	21.6		27.2		
					41.0	31	52.8
					49.5		
		12	48.8		56.0	33	57.6
				13	14.0		
					20.0	35	55.7
		13	20.3		27.0		
					46.9	37	55.5
					53.1		
12	50.62	13	53.1		59.3		
				14	18.8		
					24.9		
		14	24.4		30.0		
					48.8		
					55.6		
		14	55.9	15	30		
					20.0		
					25.7		
		15	25.6		31.0		
					46.2		
					51.4		
		15	52.0		58.3		
				16	20.0		
					25.9		
15	24.64	16	25.3		31.0		
					45.2		
					50.0		
		16	50.2		55.5		
				17	8.3		
					13.5		
		17	14.0		20.1		
					40.3		
					46.0		
		17	46.2		52.3		
				18	13.8		
					19.3		
		18	19.4		25.1		
					44.6		
					51.0		
17	48.12	18	50.8		56.7		
				19	16.3		
					23.8		
		19	23.4		30.0		
					45.7		
					52.0		
		19	52.9	20	0.9		
					22.8		
					28.0		
		20	28.0		33.3		
					52.0		
					57.2		
		20	57.2	21	2.5		
					19.0		
					26.7		
20	25.62	21	26.6		34.0		
					50.0		
					54.6		
		21	54.6		59.3		
				22	~~49.0~~		
					25.2		
		22	25.2		—		
					47.4		
					54.0		
		22	53.8	23	0.2		
					Q.K. ~~22.6~~		
					28.2		
		23	~~25.1~~ 14.3		—		
					43.9		
					50.4		
22	53.86	23	50.6		57.6		
			17	52.46	C.K.		

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1884 Jan 4-8 W.C.

			1	9	36.5		4	31.4	
					41.3				
		9	41.3		46.0		7	6.1	
				10	2.8				
					9.0		8	46.2	
		10	8.9		15.3				
					32.5		22	20.0	
					39.8				
		10	39.0		45.3		25	24.7	
				11	2.6				
					8.2		27	12.2	
		11	8.8		15.6				
					34.4		29	25.1	
					41.0				
10	39.74	11	40.6		46.3		31	12.0	
				12	3.4				
					10.9		33	33.0	
		12	10.9		18.4				
					36.7		35	10.0	
					42.5				
		12	42.2		47.5				
				13	6.0				
					12.2				
		13	12.0		17.8				
					37.3				
					42.3				
		13	42.6		48.3				
				14	4.6				
					11.8				
13	11.90	14	11.8		18.9				
					37.4				
					45.1				
		14	44.2		50.2				
				15	8.1				
					13.4				
		15	13.3		18.5				
					36.0				
					42.1				
		15	42.4		49.0				
				16	11.2				
					16.6				
		16	16.4		21.5				
					45.8				
					50.0				
15	45.34	16	50.4		55.3				
				17	11.5				
					18.6				
		17	17.8		23.3				
					42.4				
					48.3				
		17	48.3		54.3				
				18	12.7				
					18.5				
		18	18.7		25.0				
					42.5				
					48.0				
		18	48.1		53.7				
				19	10.0				
					15.3				
18	17.74	19	15.8		22.2				
					39.0				
					45.8				
		19	45.6		52.0				
				20	9.2				
					15.3				
		20	15.3		21.5				
					39.0				
					45.4				
		20	45.8		52.9				
				21	13.2				
					20.8				
		21	20.3		27.0				
					45.2				
					51.0				
2047.64		21	51.2		57.5				

15 44.48 ck.

h	m	s
1	15	44.48
		− 67
	15	43.81
	16	48.30
	−1	4.49

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1883phae.proj.15663

1884 Jan 5 3 W. C.

	1	18	34.8	1	38.6						
			32.1								
			37.4	3	49.5	9	31.4	6	1,2	15	32.6
		19	07								
			7.0	5	30.2						
			13.0			10	6.9	5	31.1	15	37.0
			29.0	7	55.5						
			35.3								
			39.0	21	42.2	10	34.4	5	1.0		35.4
				25	41.1						
		12	28.8								
4	25.8		35.0								
	30.1		41.0			12	34.9	3	0.6	15	35.5
	36.1	4	30.7								
		12	2.5								
		13	35.0								
	[16	33.2]	40.0			13	32.4	2	0.4		32.8
			56.7								
		14	3.7								
			7.4			14	2.6	1	30.3		32.9
		16	33.3								
			39.4								
			45.4			16	39.4	1	0.2		38.2
		17	3.0								
			11.4								
			17.0			17	10.5	1	30.3		40.2
			35.0								
			40.5								
			47.4			17	41.0	2	0.4		40.6
		18	6.3								
			13.2								
			20.1			18	13.9	2	30.5		43.7]
			38.3								
			43.5								
						18	41.9	3	0.6		41.3
										15	36.66 75

Π_{2m} — h m s
K — 1 15 36.75
$\Pi_m + K$ — 67
R.A — 15 36.08
$\Pi - R.A$ — 16 47.39
— 1 11.31

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1884. Jan 6. L. A.

13	10	41.9	23	6.1							
		48.0									
		54.7	30	37.7	10	48.2	6	1.2	16	49.4	
	11	17.0									
		22.6	32	30.0							
		29.3			11	23.0	5	31.1		54.1	
		46.4	34	34.8							
		52.3									
		58.0	36	53.3	11	52.4	5	1.0		53.4	
	12	18.0									
		23.4	41	53.0							
		29.0			12	23.5	4	30.9		54.4	
		—									
		—									
		—									
	13	13.0									
		16.1									
		22.6			13	17.2	3	30.7		47.9)	
		47.0									
		52.2									
		58.5			13	52.6	3	0.6		53.2	
		—									
		—									
		—									
	14	50.2									
		53.5									
	15	3.0			14	55.6	2	0.4		56.0	
		20.3									
		26.0									
		31.3			15	25.9	1	30.3		56.2	
		52.0									
		53.0									
	16	0.4			15	55.1	1	0.2		55.3	
		17.3									
		25.3									
		30.4			16	24.3		30.1		54.4	
		45.8									
		53.0									
		59.0			16	53.6	—			53.6	
	17	15.0									
		22.3									
		28.8			17	22.0		30.1		51.9	
		46.5									
		53.5									
	18	1.0			17	53.7	1	0.2		53.5	
		—									
		—									
		—									
		55.7									
	19	2.5									
		9.0			19	2.4	2	0.4	17	2.0)	
		25.9									
		31.3									
		37.2			19	31.5	2	30.5		1.0)	
		52.5									
		57.0									
	20	3.6			19	58.0	3	0.6		57.4	
		—									
		—									
		—									
		51.3									
		57.1									
	21	3.8			20	57.4	4	0.8		56.6	
		21.0									
		27.7									
		34.0			21	27.6	4	30.9		56.7	
		52.0									
		57.2									
	22	3.7			21	57.6	5	1.0		56.6	
		20.8									
		26.4									
		33.5			22	26.7	5	31.1		55.6	
		54.1									
		55.0									
		55.7			22	54.9	6	1.2		53.7	
									16	54.76	

h	m	s
13	16	54.56
	+	67
	16	55.23
	16	46.13
	+	9.10

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54

1884 Jan. 7.3 U.C.

	19	40.3	1	1.9									
		56.4											
	10	33.	2	38.1	9	56.3	5	31.1	15	27.4			
			4	42.0									
			6	16.0									
			6	47.5									
	11	24.3											
		30.3	22	4.7									
		35.7			11	30.1	4	0.8	15	30.9			
		51.8	24	(10.0)									
		57.9											
			25	0.3	11	57.9	3	30.7		28.6			
	12	24.2											
		28.9	27	18.0									
		34.2			12	29.1	3	0.6		29.6			
		52.0	29	9.0									
		58.0											
	13	4.3	31	33.7	12	58.1	2	30.5		28.6			
		21.7											
		29.5	33	25.2									
		35.0											
		51.5	37	58.7	13	28.7	2	0.4		29.1			
		57.8											
	14	3.7	39	51.2	13	57.6	1	30.3		27.9			
		22.2											
		27.7											
		33.5			14	27.8	1	30.2		28.0			
		51.4											
		57.4											
	15	4.0			14	57.6		30.1		27.7			
		20.6											
		27.0											
		33.0			15	26.9		30.		26.9			
		51.4											
		58.5											
	16	6.1			15	58.7		30.1		28.6			
		24.3											
		31.0											
		38.4			16	31.2	1	0.2		31.0			
		56.6											
	17	2.3											
		9.0			17	2.6	1	30.3		32.3			
		32.4											
		39.0											
		44.0			17	38.5	2	0.4		38.1			
	18	0.9											
24 30.4		6.8											
36.7		13.0			18	6.9	2	30.5		36.4			
43.1 24 36.7		30.1											
9 1.9		36.3											
15 37.8		41.4			18	35.9	3	0.6		35.3			
	19	1.4											
		6.5											
		13.0			19	7.0	3	30.7		36.3			
		30.5											
		36.5											
		43.1			19	36.7	4	0.8		35.9			
	20	1.2											
		7.8											
		13.7			20	7.6	4	30.9		36.7			
		31.3											
		37.8											
		44.6			20	37.7	5	1.0		36.7			
		59.3											
	21	5.4											
		12.3			21	5.7	5	31.1		34.6			
		26.6											
		35.4											
		42.0			21	34.7	6	1.2		33.5			
									15	31.9	6		

Tm — h 1 m 15 s 31.96
K — − 67
Tm + K — 15 31.19
R.A — 16 45.72
T − R.A — −1 14.53

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1883phae.proj 1566.

1884 Jan. 9 2 Ub. Cp

h	m	s
1	15	24.34
	−	6.7
	15	23.67
	16	44.11
	−1	20.44

21 44.9
25 15.7
27 (19.7)
29 2.0
30 53.7
33 21.6

12	47.2							
	54.0							
13	0.2			12	53.8	2	30.5	15 24.3
	17.0							
	22.5							
	29.3			13	22.9	2	0.4	23.3
	48.4							
	54.6							
14	1.3			13	54.8	1	30.3	25.1
	18.3							
	24.3							
	31.0			14	24.5	1	0.2	24.4
	47.8							
	56.1							
15	2.1			14	55.5		30.1 2	25.6
	21.4							
	28.0							
	33.3			15	27.7		−	27.4
	49.4							
	54.2							
16	1.2			15	54.9		30.1	24.8
	22.2							
	24.5							
	28.4			16	25.0	1	0.2	24.8
	48.3							
	54.1							
17	1.0			16	54.5	1	30.3	28.4 2
	19.2							
	25.0							
	32.0			17	25.4	2	0.4	25.0
	49.3							
	55.9							
18	1.1			17	55.4	2	30.5	24.9
	18.5							
	24.4							
	31.0			18	24.6	3	0.6	24.0
	48.5							
	55.1							
19	1.4			18	55.0	3	30.7	24.3
	19.9							
	25.0							
	31.2			19	25.4	4	0.8	24.6
	47.8							
	53.7							
20	0.0			19	53.6	4	30.9	22.9
	18.9							
	24.1							
	29.5			20	24.2	5	1.0	23.2
	46.4							
	52.4							
	59.5			20	52.8	5	31.1	21.7
21	18.4							
	24.1							
	30.5			21	24.3	6	1.2	23.1

15 24.2 3 4

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1884 Jan. 10 2 W.C

\+ 43.93
\+ 43.93
\+ .96
− .07

	h	m	s
T_m	1	15	26.72
K			− 67
T_m+K		15	26.05
R.A		16	43.26
T − R.A		−1	17.21

1 9 18.0 24.5 34.2 46.1 53.9
10 3.7 19.7 23.7 31.6 50.8 56.6
11 2.6 21.0 26.0 32.3 52.2 56.5
12 2.0 19.5 24.3 32.0 — 54.6
13 4.0 22.3 27.6 31.8 54.3 58.2
14 5.2 25.7 29.1 34.4 50.6 59.2
16 5.5 23.4 29.0 35.0

0 15.7 19.9 24.0
1 45.3 49.2 55.3
3 15.0 20.8 29.5
4 45.4 53.6 59.3
6 17.0 22.5 29.0

0	19.9	
15	3.1	
1	49.9	
13	32.8	
3	21.8	
12	2.5	
4	52.8	
10	32.2	
6	22.8	
9	1.9	
15	23.0 22.7 24.3 25.0 24.7	

54	52.0						
56	36.5	9	25.6	6	1.2	15	26.8
57	35.3	9	54.6	5	31.1		25.7
58	56.8						
0	43.6	10	25.0	5	1.0		26.0
1	40.3	10	56.7	4	30.9		27.6
2	54.0						
3	58.4	11	26.4	4	0.8		27.2
5	24.5	11	56.9	3	30.7		27.6
6	43.1						
		12	25.3	3	0.6		25.9
		12	57.3	2	30.5		29.8
		13	27.2	2	0.4		27.6
		13	59.2	1	30.3		29.5
		14	29.7	1	0.2		29.9
		14	58.4		30.1		28.5
		15	29.1		—		29.1
						15	26.72

1	15	26.05
	+	37.41
	+	42.17
	−	3.08
	−	29.18
	+	47.32
	16	13.37

+1234.72	+1130.22	+1071.42	+989.92	+883.12	+826.42	+752.72	+688.32	+602.22	+523.62
3.09157	3.05316	3.02996	2.99560	2.94602	2.91720	2.87663	2.83779	2.77976	2.71902
1.56243	1.52402	1.50082	1.46646	1.41688	1.38806	1.34749	1.30865	1.25062	1.18988
24 34.68	34.75	34.68	34.58	34.55	32.98	33.30	~~32.32~~ 34.55	~~30.90~~ 33.30	+ 30.08
− 36.51	− 33.42	− 31.68	− 29.27	− 26.11	− 24.44	− 22.26	− 20.35	+ − 17.81	− 15.48
23 58.17	1.33	3.00	5.31	8.44	8.54	11.04	~~11.97~~ 14.20	~~13.09~~ 15.49	14.60
+88 58 50.18	47.02	45.35	43.04	39.91	39.81	37.31	~~36.38~~ 34.15	~~35.26~~ 32.86	33.75
+46 17 45							46 17 45		
1.77940							1.77940		
+ 2304							+ 2304		
1.80244							1.80244		
+ 63.45	+ 63.45	+ 63.45	+ 63.45	+ 63.45	+ 63.45	+ 63.45	+ 63.45	+ 63.45	+ 63.45
− 18.92	− 15.85	− 14.24	− 12.16	− 9.68	− 8.47	− 7.03	− 5.88	− 4.50	− 3.40
− .83	− .83	− .83	− .83	− .83	− .81	− .81	− .81	− .81	− .81
+ 43.70	+ 46.77	+ 48.38	+ 50.46	+ 52.94	+ 54.17	+ 55.61	+ 56.76	+ 58.14	+ 59.24
59 33.88	33.79	33.73	33.50	32.85	33.98	32.92	~~33.14~~ 33.91 ×	~~33.40~~ 31.00 +	32.99
+ 1.00							31.91	32.00	
59 34.88	34.79	34.73	34.50	33.85	34.98	33.92	~~34.14~~	~~34.40~~	33.99
41 46.2									
−17 48.7	48.6	48.5	48.3	47.6	48.8	47.7	~~47.9~~ 45.7	~~48.2~~ 45.8	47.8

+88	59	32.95
	−17	45.67
	+	1.00
	−	21.30
	−18	5.97
+88	41	24.98

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1884 Jan. 14–28. C.

										h	m s
										1	15 24.24
											−.67
										15	23.57
										16	39.37
										−1	15.80
19	15.9		8	56.3							
	21.3										
	29.7		22	10.8	9	22.3	6	1.2	15 23.5		
	45.6										
	52.7		23	36.3							
10	1.3				9	53.2	5	31.1	24.3		
	19.3		29	28.1							
	26.6										
	29.7				10	25.2	5	1.0	26.2		
	49.4										
	54.9										
	59.9				10	54.7	4	36.9	25.6		
11	13.4										
	20.0										
	26.7				11	20.7	4	0.8	21.5		
	43.5										
	51.2										
12	8.9				11	51.9	3	30.7	22.6		
	14.5										
	22.0										
	29.6				12	23.0	3	0.6	23.6		
	50.2										
	54.5										
	57.0				12	53.9	2	30.5	24.4		
13	20.0										
	22.9										
	30.9				13	24.6	2	0.4	25.0		
	48.0										
	53.0										
	57.0				13	52.7	1	30.3	22.4		
14	17.5										
	24.5										
	31.2				13	24.4	1	6.2	24.6		
	47.4										
	54.6										
15	2.0				14	54.7		30.1	24.8		
	19.3										
	25.8										
	32.6				15	25.9		—	25.9		
19	54.0										
	57.0										
20	0.6				19	57.2	4	30.9	26.3		
	15.5										
	22.3										
	28.4				20	22.1	5	1.0	21.1		
	53.1										
	57.4										
21	2.5				20	54.0	5	31.1	26.9		
	15.0										
	22.0										
	30.0				21	23.3	6	1.2	22.1		
									15 24.7		

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58

add 1 minute.

1884 Jan 16 2 W. C.

+43.92
+43.92
+ .85
− .12

	8	11.3	2	42.8	
		17.9			
9 17.7		24.0	3	5.6	
		41.4			
		48.0	5	45.4	
9 47.9		54.4			
	9	12.7	7	5.6	
		17.4			
10 18.1		24.1	20	42.0	
		43.0			
		48.6	× 21	54.6	
10 49.0		55.5			
	10	12.9	· 22	49.2	
		19.3			
11 19.1		25.2	× 23	45.6	10 18.36
		42.0			
		47.7			
11 47.8		53.7			
	11	13.2			
		19.0			
12 19.2		25.3			
		43.0			
		49.7			
12 49.4		55.6			
	12	13.5			
		19.8			
13 19.7		25.8			
		44.0			
		49.8			
13 50.2		57.2			12 49.26
	13	14.2			
		20.5			
14 20.5		26.9			
		42.6			
		48.4			
14 48.5		54.6			
	14	13.6			
		20.8			
15 20.1		26.0			
		44.0			
		50.3			
15 50.4		57.0			
	15	16.9			
		22.8			
16 23.0		29.2			15 20.50
		49.1			
		54.5			
16 54.9	16	1.0			
		19.0			
17 24.3		23.8			
		30.0			
		48.7			
		56.6			
17 55.4	17	1.0			
		21.4			
		26.0			
18 27.3		34.5			
		54.6			
		59.6			
18 59.3	18	3.8			17 56.24
		24.9			
		31.9			
19 31.0		36.3			
		46.0			
		52.0			
19 51.5		56.6			
	19	15.2			
		24.0			
20 23.1		30.1	+88 59	28.96 27.98	
		51.7	− 17	42.37	
		54.8	+	.98	
20 55.2		59.0	−	21.50	
	20	20.4	− 18	2.89	
		26.0	+88 41	26.07	
21 25.7		30.7		25.09	20 24.30

23 18.5 / 23.0 / 33.5
24 25.0
9 1.9
15 23.1

15 21.93 ck

	h	m	s
T_m	1	15	21.93
k			−.67
T_m + k		15	21.26
R.A		16	37.25
T − R.A		−1	15.99

1 15 21.26
+ 41.03
+ 37.33
− 5.27
− 23.17
+ 49.92
16 10.48
11.18

+699.18	+516.53	+436.33	−388.07	−452.67	−507.27	−563.67
2.84455	2.71311	2.63982	2.57986	2.65578	2.70524	2.75103
1.31541	1.18397	1.11068	1.05072	1.12664	1.17610	1.22189
24 38.60	34.12	32.85	24 9.45	~~5.78~~ 9.45	5.28	~~2.38~~ 5.28
− 20.67	− 15.27	− 12.90	+ 11.24	+ 13.39	+ 15.00	+ 16.67
24 17.93	18.85	19.95	20.69	~~19.17~~ 22.84	20.28	~~19.05~~ 21.95
+88 58 30.42	29.50	28.40	27.66	~~29.18~~ 25.51	28.07	~~27.30~~ 26.40
+46 17 41			+46 18 21	46 18 21		
1.77940			1.77960	1.77960		
+ 3998			+ 3998	+ 3998		
1.81938			1.81958	1.81958		
+65.97	+65.97	+65.97	+66.00	+66.00	+66.00	+66.00
− 6.06	− 3.31	− 2.36	− 1.79	− 2.54	− 3.19	− 3.94
− .83	− .83	− .83	− .74	− .74	− .74	− .72
+ 59.08	+ 61.83	+ 62.78	+ 63.47	+ 62.72	+ 62.07	+ 61.34
59 29.50	31.33	31.18	33.13	~~31.90~~ 28.23 +	30.14	~~30.64~~ 27.74 +
+ .98						
59 30.48	32.31	32.16	32.11	~~32.88~~ 29.21	31.12	~~31.62~~ 28.72
41 46.4						
−17 44.1	45.9	45.8	45.7	~~45.5~~ 42.8 +	44.7	~~45.2~~ 42.3 +

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1884 Jan. 17.2 W.C

+43.92
+43.92
+ .91
− .20

19	15.5		2	36.8									
	21.6												
	25.0		4	38.9	20.7	6	1.2	15	21.9				
	41.3												
	45.5		5	1.5									
10	1.0				49.3	5	31.1		20.4				
	16.3		5	59.1									
	22.2												
	26.6	+	6	51.0	10	21.7	5	1.0		22.7			
	47.8												
	51.1		7	51.0									
	56.9				10	51.9	4	30.9		22.8			
11	12.2	+	8	39.5									
	19.5												
	27.8				11	19.8	4	0.8		20.6			
	45.5												
	49.4												
	54.3				11	49.7	3	30.7		20.4			
12	16.3												
	21.5												
	28.6				12	22.1	3	0.6		22.7			
	46.0												
	54.4												
	59.3				12	53.2	2	30.5		23.7			
13	16.8												
	22.0												
	29.7				13	22.6	2	0.4		23.2			
	46.2												
	52.5												
	59.3				13	52.7	1	30.3		23.0			
14	10.7												
	33.6												
	31.0				14	21.8	1	0.2		22.0			
	51.5												
	56.5												
15	1.2				17 56.4			30.1		26.5			
	11.3												
	21.0												
	30.3				15 20.9			—		20.9			
									15	22.37			

h	m	s
1	15	22.37
		− .67
	15	21.70
	16	36.21
	−1	14.51

1	15	21.70	
	+	41.64	
	+	39.97	
	−	8.78	
	−	22.13	
	+	50.70	
	16	12.40	

+76607	+67407	+62087	+56827	+51137	+45137	+40287
2.88427	2.82870	2.79300	2.75072	2.70874	2.65453	2.60517
1.35513	1.29956	1.26386	1.22158	1.17960	1.12539	1.07603
24 35.95	34.52	34.92	34.32	~~32.75~~ 34.7	32.32.15	~~30.32~~ 32.15
− 22.65	− 19.93	− 18.36	− 16.66	− 15.12	− 13.35	− 11.91
24 13.30	14.59	16.56	17.66	~~17.63~~ 19.20	18.80	~~18.41~~ 20.24
58 35.05	34.76	34.79	30.69	~~30.72~~ 29.15	29.55	~~29.34~~ 28.11
46 17 45						
1.77940				46 17 45		
+ 30 30				1.77940		
1.80970				+ 30 30		
				1.80970		
+ 64.52	+ 64.52	+ 64.52	+ 64.52	+ 64.52	+ 64.52	+ 64.52
− 7.28	− 5.64	− 4.78	− 3.94	− 3.24	− 2.53	− 2.01
− .78	− .78	− .78	− .78	− .76	− .76	− .76
+ 56.46	+ 58.10	+ 58.96	+ 59.80	+ 60.52	+ 61.23	+ 61.75
59 31.51	31.86	32.75	30.49	~~31.24~~ 29.67 +	30.78	~~31.69~~ 29.86 +
+ 97						
59 32.48	32.83	31.72	31.46	~~30.64~~ 32.2	31.75	~~30.83~~ 32.66
41 46.4						
−17 46.1	46.4	45.3	45.1	45.8 44.2 +	45.3	46.3 44.4 +

+88	57	29.76	
−	17	49.30	
+		.97	
−		21.50	
−	18	4.83	
+88	41	24.98	

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1884 Jun 18.2 W.C.

				19	13.1	5	58.7				
					19.0						
					24.6	6	24.0	9	18.9		
					43.7						
					48.4	6	35.6				
					55.2			9	48.8		
				10	14.3	8	22.9				
					20.7						
					26.3	21	58.1	10	20.4		
					44.7						
					49.8	24	2.0				
					55.1			10	49.9		
				11	12.5	24	43.4				
					19.4						
6	10.0				25.0	27	31.0	10	19.0	10	19.40
	15.9				42.5						
	22.0	6	16.0		49.2	30	15.7				
		+9	1.9		54.8			10	48.8		
				12	1.30	32	14.2				
					19.1						
					24.9			12	19.0		
					43.5						
					50.0						
					55.7			12	49.7		
				13	1.4.4						
		15	17.9		20.4						
			22.7		26.4			13	20.4		
					44.7						
					50.3						
					56.3			13	50.4	12	49.86
				14	15.1						
					20.0						
					25.4			14	20.2		
					43.5						
					49.6						
					56.2			14	49.8		
				15	14.5						
					20.7						
					26.8			15	20.7		
					43.9						
					50.4						
					56.8			15	50.4		
				16	15.2						
					21.7						
					27.5			16	21.5	15	20.52
					46.0						
					51.5						
					58.0			16	51.8		
				17	16.0						
2	24	184			3.2.1						
		24.8			27.1			17	21.7		
		30.6	24	24.6	46.1						
			9	1.9	53.0						
2					56.9			17	51.7		
				18	16.3						
					22.0						
1					27.7			18	22.0		
					48.3						
					54.4						
				19	0.0			18	54.2	17	52.28
					18.9						
					24.4						
					30.4			19	24.6		
					49.4			21			
					55.2						
				20	0.3			19	55.0		
					19.0						
					24.3						
					30.2			20	24.5		
					48.0						
					53.4						
					59.4			20	53.6		
				21	19.5						
					24.5						
					30.8			21	24.9	20	24.52

15 21.~~34~~32 (25) h m
20.30 (2) 15 21.21 mean

Π_m ... h 1 m 15 s 21.21
K − 67
Π_{m+K} 15 20.54
R.A 16 35.24
$\Pi - R.A$ −1 14.70

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1884 Jan. 21.21 G.

+43.92
+43.92
+ .84
− .05

h m s
1 15 14.45
− 67
15 13.78
16 32.62
−1 18.84

1 15 13.78
+ 44.31
+ 36.89
− 2.20
− 18.54
+ 0.46
16 14.24

18 57.7
9 4.4
10.0
36.9
43.7
51.2
10 4.7
9.4
17.3
36.4
42.9
50.9
11 5.3
9.6
20.6
38.5
44.9
47.8
12 3.3
11.3
18.9
37.3
41.2
48.6
13 5.5
11.0
20.0
35.4
41.0
52.0
14 9.8
16.6
22.0
39.2
43.6
51.0
15 6.8
13.6
19.4
37.0
43.3
50.0
19 16.5
18.9
24.9
37.0
46.0
53.0
20 12.7
16.0
28.3.5
45.0
49.0
53.6
21 12.3
17.2
20.9

0 46.0
2 36.2
4 12.2
4 47.2
5 42.2
6 32.2
7 31.3
8 21.7

9 43.9 5 31.1 15 0
10 10.6 5 1.0 11.6
10 43.4 4 30.9 14.3
11 11.8 4 0.8 12.6
11 43.4 3 30.7 14.1
12 12.5 3 0.6 13.1
12 42.4 2 30.5 12.9
13 12.2 2 0.4 12.6
13 42.8 1 30.3 13.1
14 16.1 1 0.2 16.3
14 44.6 0 30.1 14.7
15 13.3 — 13.3
15 43.4 30.1 13.3
19 20.1 4 0.8 19.3
19 45.0 4 30.9 14.1
20 17.1 5 1.0 16.1
20 49.2 5 31.1 18.1
21 16.8 6 1.2 15.6

15 5.2
15 14.45

+52225 +46315 +41278
2.71788 2.66572 2.61568
1.18874 1.13658 1.08654
24 3442 3438 3432 3402 3045 31.92
− 15.44 − 13.70 − 12.20
24 1858 1894 1832 1832 1826 19.72
58 2977 2941 3013 3011
28.03 28.63

+46 1743
1.77940
+ 3637
1.81577
+65.43 +65.43 +65.43
− 3.38 − 2.66 − 2.11
− .78 − .76 − .76
+61.27 +62.01 +62.56
59 3704 3668 3214 3266
30.04 31.19

+ 96
59 3760 3764 3710 3762
3185
41 46.2
−17 458 469 474
454 448 X 459

+90985 +75825 +67325 +62725 +57025
2.95897 2.87981 2.82817 2.79744 2.75758
1.42983 1.35067 1.29903 1.26830 1.22844
24 35.75 35.68 78 35.58 66 35.48 80 35.48 35.38
− 26.90 − 22.42 − 19.91 − 18.55 − 16.92
24 8.85 13.26 83 15.87 77 16.93 1225 18.56 17.46
58 39.50 35.47 82 32.46 58 3142 3089
31.10 29.9

+46 1743
1.77940
+ 3637
1.81577
+65.43 +65.43 +65.43 +65.43
−10.27 − 7.13 − 5.62 − 4.88 − 4.06
− .78 − .78 − .78 − .78 − .78
+54.38 +57.52 +59.03 +54.77 +60.59
59 33.88 32.61 54 31.49 61 31.19 30.88 31.46 30.38

+ 96
59 34.84 33.57 51 32.45 57 32.15 31.84 31.34 30.99
41 46.2
−17 48.6 474 47.3 462 46.4 460 45.6 462 45.1

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62

1884 Jan 22,2 W. C.

+43.92
+43.92
+ .84
− .08

1 9	45
	8.6
	15.8
	34.0
	37.6
	43.7
10	6.6
	10.5
	16.6
	36.1
	40.3
	48.1
11	6.2
	11.7
	17.7
	36.4
	42.6
	48.6
12	7.5
	14.2
	18.5
	38.5
	44.1
	48.8
13	6.2
	11.3
	17.2
	36.6
	41.5
	47.5
14	6.7
	13.2
	19.4
	37.8
	45.0
	49.4
15	7.2
	12.0
	18.6
	37.1
	42.3
	49.0
16	8.2
	13.8
	18.3
18	40.3
	44.5
	51.0
19	8.3
	14.3
	21.0
	38.5
	45.5
	51.7
20	7.7
	15.6
	21.7
	41.0
	46.6
	51.5
21	10.0
	16.2
	22.0

~~0~~	~~0.9~~
1	50.1
3	2.4
4	1.8
4	58.5
5	44.7
6	33.2
7	25.0
+ 8	18.4

+88 59 29.01
− 17 43.72
+ .95
− 21.30
− 18 4.07
+88 41 24.94

9	9.6	6	1.2	15 10.8
9	38.5 (3)	5	31.1	9.6
10	11.2	5	1.0	12.2
10	41.5	4	30.9	12.4
11	11.9	4	0.8	12.7
11	42.5	3	30.7	13.2
12	13.4	3	0.6	14.0
12	43.8	2	30.5	14.3
13	11.6	2	0.4	12.0
13	41.9	1	30.3	12.2
14	13.1	1	0.2	13.3
14	44.1		30.1	14.2
15	12.6		—	12.6
15	42.8		30.1	12.7
16	13.4	1	0.2	13.2
18	45.3	3	30.7	14.6
19	14.5	4	0.8	13.7
19	45.2	4	30.9	14.3
20	15.0	5	1.0	14.0
20	46.4	5	31.1	15.3
21	16.1	6	1.2	14.9

13.15

	h	m	s			
T_m	4	15	13.15	1	15	12.48
K			−.67	+		45.14
T_m+K		15	12.48	+		36.89 (3.51)
R.A		16	31.79	=		17.71
T − R.A		−1	19.31	+	1	0.81
					16	13.29

+568.45	+519.95	+468.15	+354.75
2.75469	2.71596	2.67038	2.54992
1.22555n	1.18682n	1.14124n	1.02078n
24 32.38	31.72	30.90	30.45 90
− 16.81	− 15.38	− 13.84	− 10.49
24 15.57	16.34	17.06	19.66 20.41
58 32.78	32.01	31.29	~~28.69~~ 27.92 +
46 17 43			46 17 43
1.77940			1.77940
+ 2267			+ 2267
1.80207			1.80207
+63.40	+63.40	+63.40	+63.40
− 4.01	− 3.35	− 2.72	− 1.56
− .76	− .76	− .76	− .76
+58.63	+59.29	+59.92	+61.09
59 31.41	31.30	31.21	~~29.78~~ 29.01 +
+ 95			
59 32.36	32.25	32.16	~~30.73~~ 29.96
41 46.2			
−17 46.2	46.0	46.0	~~44.5~~ 43.8

+912.65	+883.05	+730.75	+671.35	+614.65
2.96031	2.90474	2.86377	2.82696	2.78862
1.43117n	1.37560n	1.33463n	1.29782n	1.25948n
24 36.90	35.40	34.55	33.92	33.62
− 26.99	− 23.75	− 21.61	− 19.85	− 18.18
24 9.91	11.65	12.94	14.07	15.44
58 38.44	36.70	35.41	34.28	32.91
46 17 43				
1.77940				
+ 2267				
1.80207				
+63.40	+63.40	+63.40	+63.40	+63.40
− 10.33	− 8.00	− 6.63	− 5.59	− 4.69
− .78	− .78	− .78	− .78	− .78
+52.29	+54.62	+55.99	+57.03	+57.93
59 30.73	31.32	31.40	31.31	30.84
+ 95				
59 31.68	32.27	32.35	32.26	31.79
41 46.2				
−17 45.5	46.1	46.1	46.1	45.6

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+43.92
+43.92
+ .92
— .13

1884 Jan 26.2h. b.

		1	9	—								1	15	6.39
				5.0	56	12.2								- .67
		9	5.0	0.2	58	38.8							15	7.06 - 5.72
				27.5									16	28.21
				34.0	0	11.8							- 1	21.45
		9	33.6	39.2										22.49
				58.9	1	55.0								
			10	4.5										
		10	4.6	10.5	3	3.0								
				28.6			- 392 11	- 51661	- 80861			1	15	5.72
				35.2	5	11.7	2.59341	2.71316	2.90774				+	47.87
		10	34.9	41.0			1.06427	1.18402	1.37860				+	40.41
				57.0	6	44.4	24 7.85	24 7.85 1.15	5070				-	5.71
			11	3.5			+ 1159	+ 15.28	+ 23.91				-	14.13
		11	3.2	9.1	8	23.5	24 1944	24 23.13 1.43	1.461				+ 1	8.44
				28.6			58 28 91	58 25.22 3.92	33.72				16	19.16
	10	4.06	26											
		11	34.4	34.4	21	38.5	46 18 12							
				40.3			1.77950							
				57.6	24	43.0	+ 3712							
			12	3.8			1.81662							
		12	4.0	10.7	28	35.0	+ 65.56	+ 65.56	+ 65.56					
				27.5			- 1.91	- .339	- .811					
				34.0	33	37.8	- .69	- .69	- .64					
		12	34.0	40.4			+ 6296	+ 61.48	+ 5681					
				58.2			58 31.87	58 26.70 3.40	30.53					
			13	3.9										
		13	3.9	9.5										
				28.6										
				35.3			+ 94							
							58 32.81	58 27.64 3.434	31.47					
	12	34.28	13	35.1		41.3	41 46.1	41 46.1						
					14	0.6	- 17 467	41.5	45.4					
						7.0		47.2						
		14	6.7			12.5								
						30.5								
						37.4								
		14	37.2			43.8								
					15	1.1								
						7.2								
		15	7.8			15.0								
						34.2								
						38.2								
		15	38.6			48.3								
					16	0.6								
						6.8								
	15	7.42	16	6.8		13.0								
						30.2								
						36.3	+ 1134.19	+ 987.59	+ 894.59	+ 790.89	+ 695.39	+ 594.69	+ 501.99	+ 402.89
		16	36.7			43.5	3.05469	2.99458	2.95162	2.89812	2.84223	2.77429	2.70070	2.60519
					17	0.5	1.52555	1.46544	1.42248	1.36898	1.31309	1.24515	1.17156	1.07605
						6.3	24 39.95	39.00	38.70	37.50	36.55	35.80	33.68	31.80
		17	6.7			13.2	- 33.54	- 29.20	- 26.45	- 23.39	- 20.56	- 17.59	- 14.84	- 11.91
						32.0	24 6.41	9.80	12.25	14.11	15.99	18.21	18.84	19.89
						37.9	58 41.94	38.55	36.10	34.24	32.36	30.14	29.51	28.46
		17	37.8			43.6								
					18	2.0	H6 17 40							
						7.3	1.77940							
		17	7.8			14.0	+ 3712							
						34.4	1.81652							
						40.0	+ 6554	+ 6554	+ 6554	+ 6554	+ 6554	+ 6554	+ 6554	+ 6554
	17	37.78	18	39.9		45.3	- 15.96	- 12.10	- 9.98	- 7.76	- 6.00	- 4.39	- 3.13	- 2.01
					19	0.4	- .74	- .74	- .74	- .74	- .74	- .74	- .74	- .72
						7.3	+ 48.84	+ 52.70	+ 54.87	+ 57.04	+ 58.80	+ 60.41	+ 61.67	+ 62.81
		19	7.2			13.8	59 30.78	31.25	30.77	31.28	31.16	30.55	31.18	31.27
						33.7								
						39.5								
		19	39.8 4			45.0	+ .94							
					20	2.0	59 31.72	32.19	31.91	32.22	32.10	31.49	32.12	32.21
						7.4	41 46.1							
		20	7.6			13.3	- 17 456	46.1	45.3	46.1	46.0	45.4	46.1	46.1
						34.0								
						39.4								
		20	39.3			44.5								
					21	1.5								
						7.9								
	20	8.20	21	7.7		13.6								
			15	6.39 ck										

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1884 Jan 27, W. C.

21	39.5
23	32.7
24	54.7
26	17.1
27	30.3

	h	m	s
T_m	1	15	4.57
K			-.67
T_m + K		15	3.90
R.A		16	37.21
T - R.A		-1	23.31

1 14	4.3
	13.2
	28.4
	33.1
	40.3
15	1.5
	5.0
	8.0
	27.6
	32.6
	37.8
	58.7
16	8.4
	14.1
	28.3
	33.5
	36.6
	57.7
17	3.1
	10.1
	27.6
	32.7
	37.2
18	2.2
	10.0
	14.8
	30.0
	34.5
	38.5
	59.3
19	3.9
	8.6
	29.6
	36.0
	44.5
	59.6
20	4.6
	11.3
	31.1
	39.8
	59.8
21	4.4
	12.3

14	8.7	1	0.2	15	8.9
14	33.9		30.1		4.0
15	4.8		–		4.8
15	32.7		30.1		2.6
16	7.1	1	0.2		6.9
16	32.8	1	30.3		2.5
17	3.6	2	0.4		3.2
17	32.5	2	30.5		2.0
18	9.0	3	0.6		8.4
18	34.3	3	30.7		3.6
19	3.9	4	0.8		3.1
19	36.7	4	30.9		5.8
20	5.2	5	1.0		4.2
20	35.4	5	31.1		4.3
21	5.5	6	1.2		4.3

15 4.57

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1884 ~~Jan~~ Feb. 12 U. C.

	h	m	s
	1	14	59.18
			−.67
		14	58.51
		16	22.27
	− 1		23.76

19	22.6 27.5 33.0 58.5	55	51.3						
		55	59.8	9	27.7	5	31.1	14	58.8
10	56.4 1.4 19.2 25.5 32.0	58	19.5	9	56.1	5	1.0		57.1
		0	3.0						
		2	15.0	10	25.6	4	30.9		56.5
11	48.0 54.2 0.5 20.9 26.4	4	11.6	10	54.2	4	0.8		55.0
		6	27.0						
	32.7 50.0	7	59.6	11	26.~~6~~7	3	30.7		57.4
12	56.4 2.4 20.8	8	47.3	11	56.3	3	0.6		56.9
		21	27.3						
	29.0 32.8 52.3	23	31.4	12	27.5	2	30.5		58.0
13	57.0 2.5	25	32.3	12	57.3	2	0.4		57.7
		34	(17)						
	22.1 27.6 33.5 52.2 57.9			13	27.7	1	30.3		58.0
14	2.7 24.2 30.0			13	57.6	1	0.2		58.8
	35.4 54.7			14	29.9		30.1		0.0
15	0.1 5.6			15	0.1		—		0.1
18	26.4 32.4 38.3 56.9			18	32.4	3	30.7		1.7
19	4.6 10.4 25.2			19	4.0	4	0.8		3.2
	31.5 37.8 58.4			19	31.5	4	30.9		0.~~7~~6
20	3.4 9.8 26.0			20	3.9	5	1.0		2.9
	32.2 38.2			20	32.1	5	31.1		1.0
21	57.0 2.4 9.0			21	2.8	6	1.2		1.6

14 59.1~~7~~8

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1883phae.proj.1566.

1883phae.proj.1566.

1884 Feb. 22 U. C.

		+43.91							
		+43.91							
		+ .83							
		− .07							
		7 (57.1)							
		26 49.4							
9	47.6								
	50.7	28 23.7							
	56.7		9	51.3	5	~~31.7~~ 1.0	14	52.7	
10	15.0	32 1.4							
	21.5								
	27.7		10	21.4	5 4	30.9		52.3	
	44.1								
	50.5								
	56.9		10	50.5	4	0.8		51.3	
11	16.5								
	18.0								
	21.8		11	18.8	3	30.7		49.5	
	47.7								
	54.5								
12	18.1		11	54.4	3	0.6		55.0	
	21.0								
	26.0								
	32.3		12	26.4	2	30.5		56.9	
13	47.2								
	53.9								
14	0.2		13	53.8	1	0.2		54.0	
17	51.2								
	55.6								
18	2.5		17	56.4	3	0.6	14	55.8	
							14	53.44	

	h	m s
T_m	1	14 53.44
K		− .67
$T_m + K$		14 52.77
R.A.		16 21.43
T − R.A.		−1 28.66

h	m s
1	14 52.77
	+ 52.74
	+ 36.44
	− 3.07
	− 7.35
	+ 1 18.76
	16 11.53

+416.34	−715.96	−889.16	−1027.96
2.61945	2.85489	2.90804	3.01195
1.09031	1.32575	1.37890	1.48281
24 31.38	23 55.30	23 ~~55.3~~ 50.55	~~50.55~~ 38.70
− 12.31	+ 21.17	+ 23.93 ~~44.8~~	+ 30.40
24 19.07	16.47	24. ~~19.23~~ 14.48	20.95
58 29.28	31.88	58 ~~29.12~~ 33.87	27.40
46 17 49	46 18 25		
1.77940	1.77960		
+ 2135	2135		
1.80075	1.80095		
+ 63.20	+ 63.23	+ 63.23	+ 63.23
− 2.15	− 6.36	− 8.12	− 13.11
− .72	− .62	− .62	− .62
+ 60.33	+ 57.25	+ 54.49	+ 49.50
59 29.61	29.10	59 ~~23.61~~ 28.36	16.90
+ .90			
59 30.51	30.00	59 ~~24.51~~ 29.26	
41 45.5		41 45.5	
−17 45.0	44.5	~~39.0~~ 37.8 43.8	

1883phae.proj.1566.

1884 Feb 15.2 Vh C

h	m	s
1	14	38.75
	–	.67
	14	38.08
	16	10.50
	–1	32.42

m	s
1 . . 1 8	27.0
	33.4
	41.9
10	25.3
	32.2
	39.3
	59.9
11	6.5
	13.4
	31.6
	38.4
	43.6
12	1.8
	7.0
	13.5
	31.5
	37.0
	42.9
	58.0
13	6.4
	14.2
	35.9
	42.0
	47.0
14	1.2
	8.1
	15.8
	33.2
	39.3
	46.2
17	37.5
	41.0
	48.0
18	4.3
	9.2
	15.2
	36.3
	41.2
	45.3
19	4.6
	9.8
	17.4
	33.3
	38.9
	46.0
20	6.4
	11.6
	16.3
	36.3
	40.6
	47.3

14 37.2 / 41.3 / 37.5 / 40.1 / 41.2

23	33.5		
	38.3		
	45.5	23	39.1
25	8.6	9	1.9
	13.0		
	19.0	25	13.5
26	35.1	10	32.2
	40.1		
	47.7	26	40.0
28	~~8.5~~ 8.3	12	2.5
	12.5		
	18.0	28	12.9
29	(43.3)	13	32.8
	44.4		
	45.2	29	44.8 (3)
		15	3.1

2	(44.3)
6	18.0
6	49.3
21	39.8
23	26.4
24	23.6
26	5.6
26	48.6
27	5.7
27	23.2
28	13
29	9.2

8	38.1 (4)	6	1.2	14 35.3
10	32.3	4	0.8	33.1
11	6.6	3	30.7	37.3
11	37.9	3	0.6	38.5
12	7.4	2	30.5	37.9
12	37.1	2	0.4	37.5
13	6.2	1	30.3	36.5
13	41.6	1	0.2	41.8
14	8.4		30.1	38.5
14	39.5 (6)		—	39.6
17	42.2	3	0.6	41.6
18	9.6	3	30.7	38.9
18	40.9	4	0.8	40.1
19	10.6	4	30.9	39.7
19	39.4	5	1.0	38.4
20	11.4	5	31.1 (3)	40.3
20	41.4	6	1.2	40.2

14 38.75

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1883phae.proj.1566.

1884 Feb. 21. ~~[illegible]~~ C

+43.90
+43.90
+ .78
+ .00

	h	m	s
T_m	1	14	28.46
K			−.67
T_m+K		14	27.79
R.A.		16	6.50
T − R.A.		−1	38.71

1	14	27.79
	+1	4.55
	+	34.24
	+	.00
	+	7.58
	+ +	4 6.37
	16	14.16

δ = +88 41 40

cos δ	8.35763
sin δ	9.99989
tan δ	1.64225
log 15 sec i	0.11378n
sin z	−.72

m	s
18	–
	–
	–
	45.8
	52.3
	58.2
9	16.5
	23.8
	30.4
	–
	–
	–
10	19.8
	24.0
	31.5
	50.8
	58.1
11	3.5
	20.7
	2
	33.6
	50.0
	55.5
12	2.5
	22.2
	–
	32.3
	47.4
	55.5
13	2.3
	–
	–
	–
	55.3
14	0.5
	6.8
	25.1
	31.6
	38.2
	53.9
15	0.9
	13.7
	23.0
	28.2
	35.7
	52.2
	59.5
16	6.0
	23.7
	28.3
	34.3
	51.6
	56.6
17	3.8
	26.3
	33.0
	39.3
	56.8
18	2.0
	8.1
	27.0
	32.0
	37.4
	52.7
19	0.0
	6.7
	20.7
	27.0
	34.5
	55.0
20	3.5
	6.6
	23.2
	29.0
	37.4

4	53.0
6	7.0
7	1.4
8	1.4
21	42.9
23	42.0
25	43.6
27	16.7
29	39.0
31	15.2
33	10.7
34	9.6
36	26.0
37	6.4
37	54.6
38	41.9

8	52.1	5	31.1	14	23.2
9	23.6	5	1.0		24.6
10	25.1	4	0.8		25.9
10	57.5	3	30.7		28.2
11	27.1	3	0.6		27.7
11	56.0	2	30.5		26.5
12	27.2	2	0.4		27.6
12	55.1	1	30.3		25.4
14	0.9		30.1		31.0
14	31.6		~~30.1~~		31.6
15	2.8	×	30.1		32.7
15	29.0	1	30.2		28.8
15	59.2	2	30.3		28.4
16	28.8	2	30.4		28.4
16	57.3	2	30.5		26.8
17	32.9	3	30.6		32.3
18	2.3	3	30.7		31.6
18	32.1	4	30.8		31.3
18	59.8	5	30.9		28.9
19	27.4	5	1.0		26.4
20	0.7	5	31.1		29.6
20	29.9	6	1.2		28.7

14 28.46

+57.546	+58.146	−67.514
2.76002	2.70024	2.82939
1.23143	1.17165	1.29080
24 38.75	37.85	24 7.00
− 17.04	− 14.85	+ 19.53
24 21.71	23.00	24 26.53
58 26.64	25.35	58 21.82
46 17 41		46 18 13
1.77940		1.77950
+ 2165		+ 2165
1.80105		1.80115
+63.25	+63.25	+63.26
− 4.11	− 3.12	− 5.66
− .64	− .64	− .57
+ 58.50	+ 59.49	+ 57.03
59 25.14	24.84	18.85
+ .73		
59 25.87	25.57	19.58
41 42.4		41 42.4
−17 43.5	43.2	−17 37.2

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1884 Feb. 22. Ph. C.

18.	20.4	2	34.5								
	23.3										
	27.0	3	48.6	8	23.6	6	1.2	14	24.8		
	49.6										
	55.3	4	34.5								
9	0.6			8	55.2	5	31.1		26.3		
	17.4	5	29.6								
	24.0										
	28.5	6	25.49	23.3		5	1.0		24.3		
	49.5										
	53.2	7	14.3								
	57.3			9	53.3	4	30.9		24.2		
10	19.9	20	43.7								
	35.6										
	50.1	21	45.5	10	25.2	4	0.8		26.0		
	58.0										
	64.4	22	41.0								
	58.4			10	54.3	3	30.7		25.0		
11	14.5	23	33.8								
	20.1										
	32.0	24	27.0	11	22.2	3	0.6		22.8		
	–										
	–	25	26.5								
	–										
	–	26	38.9								
	–										
	–	27	46.5								
	–										
	–	28	39.9								
	–										
	–	29	22.0								
	–										
	–										
	–										
13	51.5										
	59.6										
14	3.6			13	58.2		30.1		28.3		
	19.8										
	28.3										
	37.6			14	28.6		–		28.6		
	51.2										
	54.2										
15	1.4			14	58.6		30.1		26.5		
	19.2										
	24.0										
	28.5			15	23.9	1	0.2		23.7		
	49.8										
	55.6										
16	4.2			15	56.5	1	30.3		26.2		
	22.1										
	27.4										
	35.3			16	28.3	2	0.4		27.9		
	53.4										
	57.2										
17	3.6			16	58.1	2	30.5		27.6		
	19.4										
	24.0										
	33.8			17	25.7	3	0.6		25.1		
18	0.9										
	5.2										
	8.6			18	4.9	3	30.7		34.2		
	19.6										
	24.0										
	32.5			18	26.4	4	0.8		27.6		
	58.3										
19	1.5										
	5.5			19	1.8	4	30.9		30.9		
	24.5										
	27.8										
	32.6			19	28.3	5	1.0		27.3		
	51.4										
20	0.3										
	5.8			19	57.1	5	31.1		28.0		
	23.1										
	31.0										
	33.9			20	29.0	6	1.2		28.1		

2	m	R
1	14	26.36
		–.67
	14	25.69
	16	5.78
	–1	49.09

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1883phae.proj.15662

M.C.

1884 Feb. 24.1 add 1 minute

21	26.9	
24	13.0	
28	47.5	
34	27.6	
36	22	
37	23.0	

	h	m	s
T_m	1	(14)	25.17
K			−.67
$T_m + K$		(14)	24.50
R.A.		16	1.25
$T - R.A.$		−1	39.75

			1	10	16.0			
					23.6			
					27.6	10	22.1	3
					46.4			
					52.2			
					59.7	10	52.8	2
				11	17.3			
					23.2			
					30.4	11	23.6	2
					48.6			
					55.2			
				12	2.5			
					19.8			
					24.0			
					30.8	11	55.4	1
						12	24.9	1
			13		24.1			
					24.0			
					25.2			
					27.0			
					26.2			
22	19.8							
	26.8							
	31.5	22	26.0					
23	49.4	9	~~25.7~~ 1.9					
	54.7			15	27.0			
24	46.2	3	56.2		29.0			
25	20.6	10	32.2		30.7	15	28.9	2
	27.7				55.4			
	34.7	25	27.7		56.6			
26	53.0	12	2.5		58.2	15	56.7	2
27	03							
	6.0	26	59.8					
28	21.7	13	32.8					
	29.0							
	37.3	28	29.3					
		15	3.1					

		25.17
	13	
	(14)	

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1883phae.proj.1566.

M.C.

1884 Feb. 25.1

h	m	s
1	14	19.92
		−.67
	14	19.25
	16	3.46
	−1	44.21

20	47.6	
23	38.7	
25	20.2	
27	30.2	
30	13.3	
31	44.5	
33	8.9	
34	19.8	
35	8.1	
35	47.5	
36	38.7	
37	19.3	
38	0.3	
38	46.7	

17	45.0						
	49.0						
	56.0	17	50.0	3	30.7	14	19.3
18	14.6						
	19.5						
	25.7	18	19.9	4	0.8		19.1
	45.2						
	51.4						
	58.0	18	51.5	4	30.9		20.6
19	14.4						
	20.3						
	26.5	19	20.4	5	1.0		19.4
	44.6						
	51.4						
	58.0	19	51.3	5	31.1		20.2
20	16.1						
	22.0						
	28.2	20	22.1	6	1.2		20.9

14 19.92

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1883phae.proj.1566.

M.C.

1884 Feb. 27.1 doubtful

+43.89
+43.89
+ .80
+ .101

T_m h m s
K
$T_m + K$
$T_m + K$ R.A
Σ R.A

1 14 19.13
−.67
14 18.46
16 1.98
−1 43.52

1 14 18.46
+1 8.05
+ 35.11
+ .44
+ 12.10
+1 55.70
16 14.16

+832.73 +655.63
2.92050 2.81466
1.39191 1.28807
24 39.40 38.92
− 24.65 − 19.41
24 14.75 19.51
58 33.60
14 19.13
46 17 41
1.77940
+ 1018
1789.58
+ 61.60
− 8.62
− .64
+ 52.34
39 56.96
+ 66
59 26.30
41 41.1
−17 45.5

+528.93
2.72340
1.19482
3480
− 15.66
1894
2941
+61.60
− 3.48
− .64
+ 57.48
2689
2755
46.5

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1883phae.proj.1566

U.C.

1884 Mar 1 ★ 11 h

+43.88
+43.88
+ .91
+ .64

h m s
1 14 12.50
−.67
14 11.83
16 0.20
−1 48.37

1 14 11.83
+1 9.11
+ 39.93
+ 1.74
+ 13.88
+2 4.66
16 16.49

1 58 16.5
1 47.6
8 35.7
43.5
48.9
× 5 18.0
6 52.5
+7 35.4

8 42.7 5 31.1 14 13.8

12 33.6
39.5
46.5
13 58
1.00
16.8
36.4
41.2
47.0
14 42
11.6
18.4

12 39.9 1 30.3 10.2
13 10.9 1 0.2 11.1
13 41.5 30.1 11.6
14 11.4 − 11.4

19 40.2
46.2
52.2
20 [illegible]
15.4
22.2

+88 59 17.22
−17 37.28
+ .65
− 15.40
−17 52.03
+88 41 25.19

19 46.2 5 31.1 15.1
20 15.5 6 1.2 14.3
1H 12.50

+956.00 +744.90 +534.50 +440.20 +397.10
2.98046 2.87210 2.72795 2.64345 2.59891
1.45187 1.34351 1.19936 1.11486 1.07032
−28.30 24 48.15 24 48.15 42.12 +43.65
−22.05 −15.83 −13.03 −11.76
24 26.10 24 32.32 3.89
58 22.25 58 16.03 16.46

46 17.32
1.77130
+ 29.52
1.80882
+64.39 +64.39 +64.39 +64.39
− 6.89 − 3.55 − 2.40 − 1.96
− .67 − .66 − .66 − .66
+56.82 +60.18 +61.33 +61.77
59 19.07 16.21 + +18.23

+ 65 + 65
59 19.72 59 16.86 18.88
41 40.3 41 40.3
−17 39.4 −17 36.6 × 38.6 ×

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1883phae.proj.1566.

1884 Mar. 31 U.t.

+ 43.88
+ 43.88
+ .88
− .01

T_m h m s
1 14 12.47
K − 67
$T_m + K$ 14 11.80
R.A. 15 59.29
$T - R.A$ −1 47.49

				9	18.2														
				6	41.3														
				21	58.0														
				X 33	59.7														
				25	58.7													1	14 1180
9	37.1																		+1 1019
	42.6			32	59.0	9	43.1	H	30.7	14	13.8								± 38.61
	49.5																		± .44
10	4.5			34	53.9														+ 1479
	9.4																		± 2 315
	15.1			37	45.3	10	9.7	H	0.6		10.3								16 14.95
				38	38.0														
				39	31.7														
				40	25.5														
				40	57.8														
13	0.6																		
	7.4																		
	14.3					13	7.4	1	0.2		7.6								
14	34.5																		
	42.4																		
	48.3					14	41.7		30.1		11.6								
15	5.2																		
	12.0																		
	18.6					15	11.9	1	0.2		11.7								
	36.6																		
	43.7																		
	49.3					15	43.2	1	30.3		12.9								
16	8.9																		
	16.5																		
	22.0					16	15.8	2	0.4		15.4	+654.27	+488.17	−465.53	−587.23	−706.23			
												2.81576	2.68857	2.66795	2.76881	2.84895			
												1.28717	1.15998	1.13936	1.24022	1.32036			
												24 42.58	39.78		24 13.28	8.88			
												− 19.37	− 14.45	+ 13.78	+ 17.39	+ 24.91			
												24 23.21	25.33		24 30.67	33.79			
												58 25.14	23.02		58 17.68	18.56			
												46 17 37			46 18 7				
												1.77940			1.77950				
												+ 19.76			+ 19.76				
												1.79916			1.79926				
18	37.4											+ 62.87	+ 62.97		+ 62.99	+ 62.99			
	43.4											− 5.32	− 2.96		− 4.28	− 6.20			
	49.3					18	43.5	H	30.9		12.6	− .66	− .66		− .59	− .57			
19	4.2											+ 56.99	+ 59.35		+ 58.12	+ 56.22			
	11.2											59 22.13	22.37		1580	14.78			
	18.3					19	12.2	5	1.0		11.2								
	36.7											+ 62			+ 62	15.40			
	44.0											59 22.75	22.99		59 16.42				
	50.8	+88	59	1580		19	43.8	5	31.1		12.7	41 37.8			41 39.8				
		−	17	36.61								−17 48.0	43.2		−17 36.6	35.6			
		+		.62															
		−		14.90							14 12.47								
			− 17	50.89															
		+88	41	24.91															

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1883phae.proj : 1566.

1884 March

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1883phae.proj.15667

1884 Mar. 5, U. C.

		8	29.9		20	53.0								
			35.6											
~~6~~	~~36.0~~		42.6		22	57.9	8	36.0	5	31.1	14	7.1		
		9	1.4											
			8.1		36	39.6								
9	7.6		13.3				9	7.6	5	1.0		8.6		
			26.5		27	36.5								
			33.7											
~~19~~	~~33.3~~		39.8		28	32.8	9	33.3	4	30.9		4.2		
			59.4											
		10	5.4		29	19.5								
			12.0				10	5.6	4	0.8		6.4		
			28.2		30	29.8								
			33.8											
			41.3		31	32.0	10	34.4	3	30.7		5.1		
		11	3.0											
			10.0											
			15.0				11	9.3	3	0.6		9.9		
			28.5											
			34.5											
			41.1				11	34.7	2	30.5		5.2		
		12	2.9											
			7.21											
			15.6				12	8.6	2	0.4		9.0		
			27.8											
			34.7											
			42.2				12	34.9	1	30.3		5.2		
		13	2.8											
			8.2											
			12.5				13	7.8	1	0.2		8.0		
			34.2											
			39.6											
			44.8				13	39.5		30.1		9.6		
		14	3.6											
			8.3											
			12.7				14	8.2	—			8.2		
			31.6											
			37.7											
			44.0				14	37.8		30.1		7.7		
		15	3.0											
			9.1											
			15.0				15	9.0	1	0.2		8.8		
			31.8											
			36.0											
			42.3				15	36.7	1	30.3		6.4		
		16	4.2											
			8.0											
			13.3				16	8.5	2	0.4		8.1		
			34.2											
			42.0											
			47.5				16	41.2	2	30.5		10.7		
		17	3.3											
			10.0											
			14.5				17	9.3	3	0.6		8.7		
			32.7											
			36.2											
			43.0				17	37.3	3	30.7		6.6		
		18	3.5											
			9.9				18	9.9	4	0.8		9.1		
			34.4											
			39.7											
			46.6				18	40.2	4	30.9		9.3		
		19	2.0											
			8.6											
			14.1				19	8.2	5	1.0		7.2		
			33.7											
			39.0											
			42.9				19	38.5	5	31.1		7.4		
		20	5.0											
			12.0											
			17.6				20	11.5	6	1.2		10.3		
											14	7.78		

$\frac{\text{IV}}{m\,K}$ 1 — 14 7.78
$\frac{\text{IV}}{m+K}$ — 67
$\frac{\text{I}}{R.A}$ 14 7.11
I − R.A 15 5840
−1 5129

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1883phae.proj.1566.

1884 Mar. 10, [illegible]

+43.86
+43.86
+ .86
+ .00

~~20~~	~~51.2~~
21	43.7
22	16.4
24	4.5
25	1.0
26	0.1
27	16.1
27	34.0
28	27.2
+29	22.6

h	m	s
1	14	51.6
		−6.7
	14	44.9
	15	55.64
	−1	51.15

1	14	44.9
	+1	15.04
	+	37.7
	+	.00
	+	18.44
	+2	11.2
	16	15.7

11	26.0 30.0 37.0	11	34.0	2	30.5	14 1.5
12	57.4 4.8 8.8 16.2	12	6.8	2	0.4	7.2
	28.8 34.5 38.6	12	34.0	1	30.3	4.3
13	5.0 11.3 18.0	13	11.4	1	0.2	11.6
	29.0 33.5 40.0 59.7	13	34.2		30.1	4.3
14	3.3 11.0	14	4.7		—	4.7
	27.2 34.3 41.6 58.6	14	34.4	0	30.1	4.3
15	4.0 12.2	15	4.9	1	0.2	4.7
	29.8 34.9 40.8	15	35.2	1	30.3	4.9
16	1.0 5.0 10.8	16	5.6	2	0.4	5.2
	30.0 36.2 40.0	16	35.4	2	30.5	4.9
17	58.7 4.2 10.1	17	4.3	3	0.6	3.7
	34.4 37.3 43.2	17	37.3	3	30.7	6.6
18	2.6 7.9 13.0	18	7.8	4	0.8	7.0
	31.6 36.2 41.9	18	36.6	4	30.9	5.7
19	1.0 5.4 11.0	19	5.8	5	1.0	4.8
	30.5 35.1 39.4 59.5	19	35.0	5	31.1	3.9
20	4.3 10.7	20	4.8	6	1.2	3.6

1H 5.16

88 59 15.05
−17 37.98
+ .57
− 13.10
−17 50.51
+88 41 24.54

−406.04	−458.54	−808.84	−862.04	−917.44
2.60857	2.66138	2.90786	2.93553	2.96258
1.07998	1.13279	1.37927	1.40694	1.43399
24 16.08	12.98	24 1.15	23 58.92	57.92
+ 12.02	+ 13.58	+ 23.95	+ 25.52	+ 27.16
24 28.10	26.56	24 25.10	24 24.44	25.08
58 20.25	21.79	58 23.25	58 23.91	23.27

46 18 14
1.77950
+ 1830
1.79780

+ 62.78	+ 62.78	+ 62.79	+ 62.79	+ 62.79
− 2.05	− 2.61	− 8.13	− 9.23	− 10.46
− .60	− .59	− .55	− .55	− .55
+ 60.13	+ 59.58	+ 54.11	+ 53.01	+ 51.78
59 20.38	21.37	59 17.36	59 16.92	15.05
+ .57			+ .57	+ .57
59 20.95	21.94	59 17.93	59 17.49	15.62
41 38.0		41 38.0	41 38.0	
−17 42.9	43.9	−17 39.9	−17 39.5	37.6

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78

M.C.

1884 Mar 16.1

+4384
+4384
+ .59
+ .00

7	58.3							
8	4.5	52	17.0					
	10.7	54	9.7	8 4.5	6	1.2	14	5.7
	30.2							
	34.0	55	58.0					
	39.8			8 34.7	5	31.1		5.8
	59.3	57	44					
9	4.0							
	9.8	58	15.0	9 4.4	5	1.0		5.4
	29.2							
	35.2	59	9.2					
	43.4			9 35.9	4	30.9		6.8
10	1.0	2	28.3					
	5.0							
	10.6	+ 5	17.7	10 5.5	4	0.8		6.3
	30.4							
	35.6	6	28.3					
	41.5			10 35.8	3	30.7		6.5
	59.8							
11	16.5							
	10.7			11 5.7	3	0.6		6.3
	31.3							
	35.7							
	41.1			11 36.0	2	30.5		6.5
12	0.0							
	6.3							
	14.2			12 6.8	2	0.4		7.2
	30.0							
	37.2							
	43.6			12 36.9	1	30.3		7.2
13	0.3							
	6.1							
	11.9			13 6.1	1	0.2		6.3
	22.7							
	38.7							
	43.0			13 38.1	0	30.1		8.2
14	2.0							
	7.3							
	14.0			14 7.8		—		7.8

14 6.284

58	54.5			
59	0.3			
59	7.4	59	0.7	
0	27.0	18	3.1	
	31.1			
	36.4	0	31.5	12
1	57.0	13	32.8	
2	2.0			
	8.0	2	2.3	
3	26.5	12	2.5	
	33.1			
	40.1	3	33.2	13
5	2.9	10	32.2	
	5.5		2	
	10.3	5	6.8	
		9	1.9	

14
3.8
4.3
4.8
5.4
8.1

T_m		1	14 6.24
K			− 67
$T_m + K$			14 5.57
R.A			15 33.25
T − R.A			−1 47.68

1	14 5.57
	+1 18.93
	+ 25.87
	+ .00
	+ 20.83
	+2 5.63
	16 11.20

δ = +88 41 34

Cos δ	8.35819	
Sin δ	9.99989	
tan δ	1.64170	
log sin ...	0.11378	for Mar 16
	0.11312	from Mar 18 to July 16
Sin Z	−.72	

+130924	+119654
3.11702	3.07793
1.58899	1.54990
24 48.72	48.30
− 38.81	− 35.47
24 9.91	12.83
58 38.44	35.52
46 17.31	
1.77940	
+ 970	
1.78910	
+ 61.53	+ 61.53
− 21.32	− 17.81
− .72	− .72
+ 39.49	+ 43.00
59 17.93	18.52
+ 53	
59 18.46	19.05
41 36.1	
−17 42.4	43.0

+697.94	+528.54	+457.94
2.84382	2.72308	2.66081
1.31579	1.19505	1.13278
24 47.50	45.58 ×	43.25
− 20.69	− 15.67	− 13.58
24 26.81	29.91	29.67
58 21.54	18.44	18.68
46 17.31		
1.77940		
+ 970		
1.78910		
+61.53	+ 61.53	+61.53
− 6.06	− 3.48	− 2.61
− .70	− .70	− .70
+ 54.77	+57.35	+ 58.22
59 16.31	15.79 ×	16.90
+ 53		
59 16.84	16.32	17.43
41 36.1		
−17 40.7	40.2 ×	41.3

88	59	15.79
	− 17	40.25
	+	.53
	−	11.20
	− 17	50.72
+88	41	25.07

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1883phae.proj.1566.

M.C

1884 Mar 18.1

+43.84
+43.84
+ .60
+ .03

7 56.2 8 2.9 5.8	0 49.0 2 30.0	8	1.6	6	1.2	14	2.8		
28.6 33.3 37.8	3 23.5	8	33.1	5	31.1		4.2		
59.5 9 4.4 8.6	4 12.0 5 26	9	4.2	5	1.0		5.2		
28.6 33.2 38.7	5 52.0	9	33.5	4	30.9		4.4		
56.4 10 4.4 12.1	6 42.5 7 32.9	10	4.3	4	0.8		5.1		
29.7 36.6 42.3		10	36.2	3	30.7		6.9		
57.0 11 4.0 11.0		11	4.0	3	0.6		4.6		
28.4 37.1 43.2		11	36.2	2	30.5		6.7		
12 8.4 7.5 13.2		12	8.0	2	0.4		8.4		
30.0 34.7 39.5		12	34.7	1	30.3		5.0		
58.3 13 4.0 11.6		13	4.6	1	0.2		4.8		
31.0 36.6 42.0		13	36.5		30.1		6.6		
57.2 14 1.5 7.3		14	2.0		—		2.0		
30.7 36.3 42.0		14	36.3		30.1		6.4		
15 0.7 7.2 14.9		15	7.6	1	0.2		7.8		
30.6 35.0 41.2		15	35.6	1	30.3		5.9	+796.75 2.90132 1.37263	+695.75 2.84245 1.31376
58.2 16 4.0 13.1		16	5.1	2	0.4		5.5	24 45.52 − 23.58 24 21.94 58 26.41	44.70 − 20.59 24.11 24.24
31.6 38.4 43.0		16	37.7	2	30.5		8.2		
17 2.0 8.5 14.2		17	8.2	3	0.6		8.8	46 17.32 1.77940 + 1925 1.79865	
						14	5.75	+ 62.90 − 7.90 − .70 + 54.30 59 20.71	+ 62.90 − 6.02 − .70 + 56.18 20.42
								+ 51 59 21.22 41 35.5 −17 45.7	20.93 45.4

h	m	s
1	14	5.75
		− 67
	14	5.08
	15	52.78
	−1	47.70

1	14	5.08
	+1	26.06
	+	26.30
	+	1.31
	+	21.30
	+2	8.97
	16	14.05

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1883phae.proj:1566

50

Subtract minute

1884 Mar. 22.0 M.C.

			8	48.9		55	21.0		
				54.4					
	8	54.2		59.4	-	57	22.9		
			9	20.3					
				26.0		58	52.0		
	9	26.0		31.6	-				
				50.4		0	27.0		
				56.6					
	9	55.9	10	0.7	-	2	15.0		
				18.0					
				24.0		4	3.5		
	10	23.8		29.4	-				
				48.3		5	34.1		
				54.0					
9	54.76	10	53.9		59.4	-	7	6.8	
			11	18.6					
				24.7		21	30.0		
	11	24.9		31.3	-				
				51.0		23	35.6		
				57.8					
	11	57.2	12	2.7	-	25	23.0		
				20.2					
				26.1		26	47.0		
	12	25.8		31.2	-				
				49.5		28	12.4		
				55.4					
	12	55.5	13	1.6	-	29	54.8		
				(20.8					
				27.0					
12	25.96	13	26.4		31.5				
				~~34.6~~	-				
				51.5					
	13	58.0		59.1					
			14	3.5	-				
				22.7					
				27.5					
	14	27.8		33.1	-				
				53.5					
				59.1					
	14	59.3	15	5.3	-				
				22.4					
				30.5					
	15	29.4		35.4	-				
				50.5					
				56.4					
14	58.12	15	56.1	16	1.4	-			
				23.0					
				28.0					
	16	28.5		34.4	-				
				55.1					
			17	0.1					
	17	0.2		5.3	-				
				26.2					
				31.1					
	17	30.9		35.4	-				
				53.6					
				58.9					
	17	59.0	18	4.5	-				
				23.8					
				29.5					
17	29.74	18	30.1		37.0	-			
				55.6					
			19	1.0					
	19	1.3		7.3	-				
				25.4					
				30.3					
	19	30.7		36.3	-				
				54.1					
				59.2					
	19	58.9	20	3.5	-				
				24.0					
				29.9					
	20	29.6		34.9	-				
				53.5					
				59.0					
19	57.98	20	59.4	21	5.8	-			

Π_{Rm} \ 1 | h 1 | m 13. | s 57.71
K −.67
$\Pi_m + K$ 13 57.04
R.A 15 51.59
$\Pi - R.A$ −1 54.55

13
57.71 ck

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1883phae.proj.1566.

1884. Mar. 25, 26. b

+43.82
+43.82
+ .50
− .06

h m s
1 14 6.98
−.67
14 6.31
15 5.06
−1 44.30

				20	28.5												
				21	20.3												
				22	6.3												
9	4.0			25	15.5												
	6.4																
	9.2			26	40.0	9	6.5	5	1.0	14	7.5			1	14	6.31	
	23.9														+1	24.04	
	32.8	+	26	48.3											+	21.91	
	38.9				9	38.9	4	30.9		2.8					−	2.63	
	58.8	+	27	4.98											+	2.347	
10	5.4														+2	6.79	
	13.7			28	21.2	10	6.0	4	0.8		6.8				16	13.10	
	27.3																
	32.6																
	37.3					10	32.4	3	30.7		3.1						
11	1.8																
	9.7																
	17.1					11	9.5	3	0.6		10.1						
	28.6																
	36.5																
	41.6					11	35.6	2	30.5		6.1						
	58.0																
12	5.4																
	13.7					12	5.7	2	0.4		6.1						
	31.8																
	38.8																
	44.9					12	38.5	1	30.3		8.8						
13	1.3																
	8.9																
	13.2					13	7.8	1	0.2		8.0						
	30.8																
	37.7																
	44.0					13	37.5		30.1		7.6						
14	2.1																
	7.9																
	12.6					14	7.5	—			7.5						
	33.0																
	39.0																
	44.0					14	38.7		30.1		8.6						
15	0.8																
	4.5																
	15.6					15	8.0	1	0.2		7.8						
	32.4																
	37.7																
	44.2					15	38.1	1	30.3		7.8	−38.57	−43.32	−76.32	−82.82	−85.22	
												2.58 15	2.63 681	2.88 157	2.91 530	2.93 157	
												1.05 288	1.10 812	1.35 28 8	1.38 661	1.40 288	
												24 13.80	17.22	24 5.12	+24 1.85	23 59.80	
												+ 11.29	+ 12.83	+ 22.54	+ 24.36	+ 25.29	
												24 25.09	30.05	24 27.66	24 26.21	25.09	
												58 28.26	18.30	58 20.69	58 22.14	23.26	
17	4.6																
	8.4											46 18 4				46 18 20	
	12.7					17	8.6	3	0.6		8.0	1.77950				1.77960	
	30.3											+ 142				+ 142	
	37.6											1.78092				1.78102	
												+ 60.38	+ 60.38	+ 60.40	+ 60.40	+ 60.40	
	44.2					17	37.4	3	30.7		6.7	− 1.81	− 2.34	− 7.21	− 8.42	− 9.08	
18	2.6											− .87	− .69	− .66	− .64	− .64	
	9.5											+ 57.90	+ 57.35	+ 52.53	+ 51.34	+ 50.68	
	17.2					18	9.8	4	0.8		9.0	59 2.16	1.65	59 13.22	13.48	13.94	
	21.3																
	32.5																
	33.6					18	32.5	4	30.9		1.6	+ .50		+ .50			
19	3.2											59 2.66	1.65	59 13.72	13.98	14.44	
	10.5											41 33.5		41 33.5	41 33.5		
	16.0	+88 59		13.35		19	9.9	5	1.0		8.9	−17 48.2	42.7	−17 40.2	40.5	40.9	
	33.3	− 17		40.40													
	39.0	+		.50													
	45.2	−		8.60		19	39.2	5	31.1		8.1						
20	0.3	−17		48.50													
	6.3	+88 41		24.85													
	14.1					20	6.9	6	1.2		5.7						
										14	6.9	8					

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1883phae.proj.15662

62

1884 Mar. 28.0 M.C

29	32.5
30	45.5
31	33.2
32	28

π h m
1 14 3.90
K −.67
Mar+K 14 3.23
R.A 15 50.12
π R.A −1 46.89

29 22
7.0
11.9 29 7.0
15 3.1
14 3.90

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1883phae.proj 1566.

1884 Mar. 31, 21h G.

				7	47.3	3	(7.3)								
					52.5										
				8	0.0	3	37.6	7	53.3	6	1.2	13	54.5		
					17.5										
					22.5	5	4.2								
					28.5			8	22.8	5	31.1		53.9		
					47.6	6	37.6								
					51.5										
					57.0	7	22.5	8	52.0	5	1.0		53.0		
				9	18.2										
					23.3	20	14.2								
					29.2			9	23.6	4	30.9		54.5		
					48.3	21	43.2								
					53.1										
				10	0.9	22	26.3	10	54.1	4	0.8		54.9		
					18.3										
					23.3	23	14.7								
					30.9			10	24.2	3	30.7		54.9		
					47.2	23	53.6								
3	14.1				54.8										
	18.5			11	1.6			10	54.5	3	0.6		55.1		
	24.5	3	19.0		17.1										
4	42.3	10	82.2		22.4										
	47.6				27.3			11	22.3	2	30.5		52.8		
	55.5	4	48.5		47.4										
		9	1.9		52.0										
					56.6			11	52.0	2	0.4		52.4		
				12	20.4										
					25.2										
					30.5			12	25.4	1	30.3		55.7		
					46.2										
					52.5										
				13	0.3			12	53.0	1	0.2		53.2		
					18.0										
		14	51.2		23.1										
			50.4		30.6			13	23.9		30.1		54.0		
					49.0										
					53.4										
				14	0.2			13	54.2		—		54.2		
					19.5										
					25.2										1
					34.0			14	26.2		30.1		56.3		
					51.2										
					55.7										
				15	0.9			14	55.9	1	0.2		~~56.1~~ 55.7		
					20.7										
					27.2										
					33.6			15	27.2	1	30.3		~~57.5~~ 56.9		
					54.9										
					57.0										
				16	3.3			15	57.4	2	0.4		57.4 0		
					20.3										
					25.6										
					33.5			16	26.5	2	30.5		~~57.0~~ 56.0		
												13	54.47		
													71		

h	m	s
1	13	54.71
		.67
	13	54.04
	15	50.15
	−1	56.11

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1883phae.proj.1566:

84

M.C.

1884 April 1.1

+43.80
+43.80
+ .71
− .14

	17	51.0		55	31.3														
		56.8																	
	8	2.6		56	44.1	7	56.8	6	1.2	13	58.0								
		24.0																	
		29.0		57	42.4														
		33.7				8	28.9	5	31.1		0.0								
		50.0		58	35.0														
		56.5																	
	9	2.1		59	23.4	8	56.2	5	1.0		57.2								
		20.0																	
		25.2		2	22.1														
		31.3				9	25.5	4	30.9		56.4								
		52.6		4	18.4														
		58.5																	
	10	3.2		5	43.2	9	58.1	4	0.8		56.9								
		24.0																	
		29.0		6	23.3														
		37.4				10	30.1	3	30.7		0.8								
				7	12.7														
				20	18.3														
				21	7.8														
	11	25.0																	
		30.8		+ 21	48.2														
		35.4				11	30.4	2	30.5		0.9								
		53.8		22	34.0														
		58.6																	
	12	6.2		23	36.2	11	59.5	2	0.4		59.9								
		20.1																	
		27.7		28															
		35.9				12	27.9	1	30.3		58.2								
		54.0																	
	13	0.1																	
		4.9				12	59.7	1	0.2		59.9								
		22.0																	
		28.1																	
		33.6				13	27.9		30.1		58.0								
		54.0																	
		57.6																	
	14	3.7				13	58.4	—			58.4								
		22.6																	
		29.6																	
		37.4				14	29.9		30.1		~~0.0~~ 59.8								
		52.0																	
		57.8																	
	15	5.7				14	58.5	1	0.2		58.7								
		22.5																	
		29.0																	
		33.6				15	28.4	1	30.3		58.7								
		53.0																	
		58.0																	
	16	5.5				15	58.8	2	0.4		~~59.2~~ 59.4								
		23.2																	
		30.0																	
		35.3				16	29.5	2	30.5		~~0.0~~ 59.0								
		52.0																	
		57.9																	
	17	8.3				16	59.4	3	0.6		~~0.0~~ 58.8								
		23.0																	
		33.8																	
		38.2				17	31.7	3	30.7		~~2.4~~ 1.0								
		54.9																	
		58.5																	
	18	5.5				17	59.6	4	0.8		~~0.4~~ 58.8								
		27.3																	
		30.7																	
		36.2				18	31.4	4	30.9		~~2.3~~ 0.5								
		55.0																	
	19	1.4																	
		8.0	− 88	59	9.10	19	1.5	5	1.0		~~2.5~~ 0.5								
		23.5	− 17		38.23														
		29.3	+		.49														
		37.6	−		6.30	19	30.1	5	31.1		~~1.2~~ 59.0								
		54.4	− 17		44.04														
		59.0	+88 41		25.06														
	20	6.8				20	0.1	6	1.2		~~1.3~~ 59.9								
										13	59.72								
											59.87								

T_m K

$T_m + K$

R.A

$T - R.A$

h	m	s
1	13	59.07
		−.69
	13	58.40
	15	50.17
	−1	57.77

1	13	58.40		
+	1	26.43		
+		31.10		
−		6.13		
+		23.91		
+	2	15.31		
	16	13.71		

+1107.77	+1034.97	−469.13	−514.93	+577.13
3.84445	3.01493	2.67130	2.71175	2.76127
1.51576	1.48624	1.14261	1.18306	1.23258

24 53.58	54.22	24 23.38	24 20.35	24 18.18
− 32.79	− 30.64	+ 13.89	+ 15.24	+ 17.08
24 20.79	23.58	24 37.19	24 36.09	24 35.26
58 27.56	24.77	58 11.16	58 12.26	58 13.09
46 17.24				46 15.0
1.77930				1.77950
+ 855				+ 855
1.78785				1.78805
+ 61.35	+ 61.35	+ 61.38	+ 61.38	+ 61.36
− 15.27	− 13.32	− 2.74	− 3.29	− 4.14
− .78	− .78	− .70	− .69	− .69
+ 47.30	+ 47.25	+ 57.94	+ 57.40	+ 56.55
59 12.56	12.02	59 9.10	9.66	59 9.64

+ 49		+ 49	+ 49	+ 49
59 10.35	12.51	59 9.59	10.15	59 10.13
41 31.2		41 31.2	41 31.2	
−17 42.2	41.3	−17 38.4	−17 39.0	−17 38.9

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U.C

1884 April 12

1

29 159
32 572
34 110
35 422

8	48.3								
	53.4								
	59.2								
					8	53.6	5	1.0	13 54.6
9	13.3								
	19.1								
	26.4								
	43.2				9	19.8	4	30.9	50.7
	51.0								
	57.3				9	50.5	4	0.8	51.3
10	1.54								
	24.2								
	28.9				10	22.8	3	30.7	53.5
	46.8								
	52.6								
	59.5				10	53.0	3	0.6	53.6
11	17.1								
	23.3								
	27.5				11	22.6	2	30.5	53.1
	43.2								
	48.9								
	55.6				11	49.2	2	0.4	49.6
12	1.59								
	21.5								
	29.4				12	22.3	1	30.3	52.6
	47.0								
	54.4								
	59.7				12	53.7	1.	0.2	53.9
13	1.80								
	23.5								
	29.7				13	23.7		30.1	53.8
	48.0								
	54.5								
14	1.5				13	54.7			54.7
	18.0								
	24.7								
	30.7				14	24.5		30.1	54.4
	45.1								
	50.6								
	57.0				14	50.9	1	0.2	50.7
15	1.63								
	31.5								
	26.5				15	21.4	1	30.3	51.1
	46.4								
	54.0								
	59.9				15	53.5	2	0.4	53.1
16	1.43								
	33.0								
	21.0				16	23.8	2	30.5	53.3
	52.1								
	58.1								
17	3.9				16	58.0	3	0.6	57.4
	—								
	—								
	27.2								
	4.4								
	53.5								
	59.4				17	53.4	4	0.8	52.6
18	1.90								
	23.3								
	22.5				18	25.6	4	30.9	54.7
									13 53.09

-428.73
2.63718
1.10349
24 2285
+ 1269
24 3554
58 1281

+61.38
— 229
— 10
+58.38
19

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1883phae.proj.1566.

86

U.C.

1884 April 13-14

1	7	54.2	55	32.7		
		56.3				
	8	5.7	58	23	7	58.8
		25.8				
		31.7	59	30.3		
		37.6			8	31.8
		55.8	0	25.6		
		10				
	9	6.6	1	31.2	9	1.1
		29.3				
		32.3	2	9.7		
		39.2			9	33.6
		55.6	3	34.7		
	10	1.2				
		9.2	20	27.6	10	2.0
		21.5				
		33.3	23	0.0		
		40.6			10	33.8
		58.5	24	1.0		
	11	3.0				
		7.4	24	47.6	11	3.0
		28.4				
		34.6	25	40.0		
		28.6			11	33.9
		55.5	26	39.2		
	12	0.7				
		7.2	27	31.5	12	1.1
		34.3				
		35.0	2			
		35.6			12	35.0
		52.7				
	13	0.0				
		7.3			13	0.0
		-				
		-				
		-				
		-				
		-				
	14	2.60				
		36.5				
		44.3			14	35.6
	15	9.1				
		10.4				
		11.4			15	10.3
		23.9				
		30.6				
		39.9			15	31.5
	16	2.0				
		5.0				
		11.3			16	6.1
		29.7				
		35.0				
		43.2			16	36.0
		54.3				
	17	4.6				
		8.1			17	3.3
		39.5				
		41.3				
		41.0			17	39.9
		54.1				
		59.3				
	18	6.2			17	59.9
		26.5				
		33.0				
		39.2			18	32.6
		54.3				
	19	6.4				
		10.6			19	5.5
		26.4				
		33.8				
		38.7			19	33.0
		58.9				
	20	4.6				
		9.7			20	4.4

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1883phae.proj.1566.

1884 April 12-13 (X)

1	7	8	56.0	21	29.6	
			05	21	(45.3)	8 1.1
			69.			
			21.0			
			27.3	23	17.3	8 27.2
			33.2.			
			53.4	24	38.8	
			59.2			8 59.8
		9	6.4	36	55.3	
			27.5			
			34.5	38	18.4	9 34.33
			41.0.			
				39	30.5	

22	59.7	
23	4.1	
	10.3	
24	27.8	
	33.0	
	38.3	
25	54.0	
	2.6	
	8.8	

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1883phae.proj.1566.

58

1884 April 16 (17) UC (7)

1	7	250	
		540	
		579	7 52.3
	8	14.0	
		195	
		253	8 19.6
		448	
		491	8 49.1
		540	
	9	142	
		304	9 20.1
		256	

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1883phae.proj.1566.

1884 April 21-20 U.C. (X)

1	7	57.8	1	36.5	7	58.3
		58.3				
		58.8	2	35.7		
	8	14.1			8	15.9
		16.0	3	19.3		
		17.5				
		45.0	4	10.7	8	49.3
		48.7				
		54.1	4	53.1		
	9	11.0			9	17.8
		17.3	5	36.4		
		35.0				
		42.4	6	26.3	9	48.5
		48.6				
		54.5	7	11.0		
	10	14.0				
		20.2	20	6.4	10	19.8
		23.2				
		41.3	21	39.7		
		46.0			10	46.5
		52.3	22	18.2		
	11	11.7				
		16.2	23	9.2	11	16.3
		21.1				
		41.4	23	50.4		
		46.7			11	47.6
		54.7	2			
	12	13.4				
		18.3			12	19.6
		27.0				
		41.1				
		47.4			12	47.2
		53.2				
	13	16.7				
		20.4			13	20.7
		25.1				
		44.0				
		51.2			13	50.9
		57.5				
	14	12.8				
		18.2			14	18.3
		24.0				
		44.7				
		46.5			14	48.6
		53.0				
	15	12.2				
		18.6			15	19.0
		36.8				
		43.8				
		50.0			15	49.5
		55.5				
	16	14.0				
		17.2			16	18.6
		24.5				
		43.8				
		47.5			16	~~50.9~~ 49.2
		56.4				
	17	15.3				
		18.3			17	19.9
		25.4				
		41.3				
		49.2			17	48.9
		55.8				
	18	11.0				
		17.6			18	17.2
		23.0				
		43.2				
		47.5			18	48.0
		53.3				
	19	13.5			19	19.4
		18.5				
		26.1				
		43.0				
		48.4			19	48.8
		55.0				

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1883phae.proj.1566.

20

1884 April 22

						⊕
1	7	47.7	0	47.5		
		50.2			7	50.6
		53.8	1	40.2		
	8	13.9				
		19.5	2	31.3	8	19.2
		34.3				
		43.2	3	29.2		
		50.7			8	50.2
		56.4	4	16.5		
	9	14.3				
		17.7	6	11.8	9	19.4
		26.1				
		42.5	6	5.86		
		49.3			9	48.6
		54.0	20	1.35		
	10	14.8				
		20.6	25	3.80	10	20.4
		23.4				
		42.1	26	2.23		
		48.6			10	48.3
		54.2	27	3.28		
	11	13.7				
		19.3	28	4.00	11	19.7
		26.1				
		44.4				
		49.6			11	49.1
		53.3				
	12	13.9				
		20.6			12	20.7
		37.5				
		45.2				
		51.6			12	51.1
		56.5				
	13	10.0				
		16.1			13	16.6
		33.6				
		41.2				
		45.7			13	47.8
		56.5				
	14	13.5				
		18.5			14	19.8
		27.3				
		43.6				
		51.6			14	51.3
		58.1				
	15	16.8				
		21.2			15	21.2
		36.7				
		42.3				
		48.2			15	49.0
		56.6				
	16	13.3				
		19.8			16	20.0
		37.0				
		42.3				
		48.4			16	48.7
		55.3				
	17	14.1				
		19.0			17	19.6
		35.4				
		44.6				
		51.8			17	51.1
		54.4				
	18	1.70				
		22.3			18	22.0
		36.8				
		45.6				
		51.7			18	52.1
		56.0				
	19	14.5				
		20.0			19	20.0
		35.6				
		47.3				
		52.6			19	53.6
		59.9				

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+ 43.73
+ 43.73
+ .59
+ .03

1884 April 23 U.C.

	T_m	h 1	m 13	52.68
	K			− 67
	T_m + K		13	52.01
	R.A.		15	52.91
	T − R.A.		− 2	2.90

1	13	52.01		
+ 1		35.07		
+		25.80		
+		1.31		
+		21.17		
+ 2		23.35		
16		15.36		

min	sec							
1	—	5 20.8						
	—							
	—	6 31.4						
8	12.4							
	18.0	7 20.0						
	27.7		8	19.4	5	31.1	13	50.5
	44.4	20 25.5						
	51.8							
	56.2	22 26.0	8	50.6	5	1.0		51.6
9	15.1							
	21.4	23 16.0						
	27.4		9	21.3	4	30.9		52.2
	47.5	+ 24 6.0						
	52.7							
	58.4	24 56.5	9	52.8	4	0.8		53.6
10	12.6							
	21.1							
	28.4		10	20.7	3	30.7		51.4
	46.8							
	51.9							
	57.6		10	52.1	3	0.6		52.7
11	18.5							
	22.8							
	27.9		11	23.1	2	30.5		53.6
	46.0							
	51.4							
	57.9		11	51.8	2	0.4		52.2
12	19.0							
	23.0							
	37.7		12	23.2	1	30.3		53.5
	44.2							
	51.4							
	59.4		12	51.7	1	0.2		51.9
13	15.5							
	23.6							
	28.5		13	22.6		30.1		52.7
	47.0							
	52.2							
	59.2		13	52.8	—			52.8
14	20.0							
	25.1							
	30.2		14	25.1		30.1		55.0
	45.5							
	50.7							
	56.1		14	50.8	1	0.2		50.6
15	13.8							
	22.7							
	31.0		15	22.5	1	30.3		52.2
	48.1							
	53.3							
16	1.3		15	54.2	2	0.4		53.8
	20.1							
	25.2							
	31.5		16	25.6	2	30.5		55.1
	47.4							
	51.8							
	59.4		16	53.0	3	0.6		52.4
17	16.7							
	22.0							
	30.0		17	22.9	3	30.7		52.2
	47.0							
	53.4							
18	1.3		17	53.9	4	0.8		53.1
	18.6							
	27.5							
	32.2		18	26.1	4	30.9		55.2
	48.6							
	55.1							
	59.0	+88 59 23.1	18	53.2	5	1.0		52.2
19	18.7	− 17 38.32						
	24.5	+ .47						
	31.5	+ 0.60	19	24.9	5	31.1		53.8
	44.2	− 17 37.25						
	50.6	+88 41 25.06						
	58.5		19	51.1	6	1.2		49.9
							13	52.68

δ = +88 41 24

cos δ 8.35910
sin δ 9.99989
tan δ 1.64078
log ist...i 0.11 312
...i z −72

+ 51.88	+ 44.28	− 56.32	− 61.32	− 66.382
2.70917	2.64471	2.75076	2.78768	2.82206
1.18028	1.11582	1.22207	1.25899	1.29337
24 51.95	53.20	24 24.60	24 22.65	24 20.22
− 15.15	− 13.06	+ 16.68	+ 18.15	+ 19.65
24 36.80	40.14	24 41.28	24 40.80	24 39.87
58 11.55	8.21	58 7.07	58 7.55	58 8.48
46 17 26				46 17 58
1.77930				1.77950
+ 31				+ 31
1.77961				1.77981
+ 60.20	+ 60.20	+ 60.23	+ 60.23	+ 60.23
− 3.27	− 2.43	− 3.95	− 4.68	− 5.48
− .86	− .86	− .79	− .79	− .77
+ 56.07	+ 56.91	+ 56.49	+ 54.76	+ 53.98
59 7.62	5.12	3.56	59 2.34	59 2.46
+ 47		+ 47		+ 47
59 8.09	5.59	59 4.03	59 2.78	59 2.93
41 24.3		41 24.3	41 24.3	41 24.3
−17 43.8	41.3	39.7	−17 38.5	−17 38.6

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92

1884 April 29 (X)

1	7	50.3	3	16.4			
		52.0			7	52.6	
		55.5	3	7.8			
	8	18.3					
		24.0	4	0.7	8	24.5	
		31.2					
		40.3	5	6.6			
		54.7			8	55.0	
	9	1.0	6	2.8			
		15.6					
		20.7	6	53.5	9	20.5	
		35.3					
		44.4	23	11.5			
		50.0			9	50.7	
		57.8	24	11.0			
	10	22.0					
		25.8	24	56.3	10	26.8	
		32.7					
			25	42.0			
			26	29.0			

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Eq. mine.

1884 April 30 U.C. (May 1) (X)

1	6	56.9		4	14.8		
		58.9				7	2.1
		4.7		5	23.7		
		7.8					
	7	21.0		6	30.0		
		29.0				7	29.1
		37.3		20	47.0		
		58.8					
	8	5.0		21	49.7	8	4.6
		9.9					
		31.0		22	37.8		
		31.8				8	31.7
		32.4		23	36.4		
		54.1					
	9	0.0		24	10.7	9	0.7
		8.0					
		24.0					
		29.4				9	30.2
		37.1					
		54.5					
	10	0.2				10	0.8
		7.8					
		22.4					
		27.8				10	28.7
		36.0					
		49.0					
		54.0				10	56.1
	11	3.3					
		24.7					
		31.0				11	27.8
		54.0					
	12	0.2				12	1.8
		5.3					
		29.7					
		36.2				12	35.1
		40.4					
		56.7					
	13	3.0				13	2.7
		8.3					
		25.0					
		29.8				13	30.9
		38.0					
		57.4					
	14	2.4				14	2.7
		8.5					
		24.8				14	31.2
		32.4					
		36.3					
		57.2					
	15	0.8				15	1.5
		6.6					
		25.6					
		30.0				15	29.7
		33.6					
		54.5					
	16	2.3				16	2.3
		10.1					
		24.8				16	32.3
		33.4					
		39.7					
		56.7					
	17	3.6				17	2.9
		8.3					
		20.0					
		27.5				17	26.7
		32.6					

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1884 May 2 U.C. (4)

1	7	566	0	36.2			
		573			7	58.2	
	8	07	2	9.7			
		206					
		254	3	34.7	8	25.8	
		813					
		450	4	42.4			
		550			8	53.8	
	9	15	6	50.7			
		184					
		246	7	26.0	9	24.6	
		308					
		463	21	55.2			
		502			9	51.6	
		583	27	5.7			
	10	180					
		244	28	38.3	10	24.3	
		306					
		495	30	22			
		570			10	57.7	
	11	65	31	56.0			
		216					
		374			11	27.1	
		323					
		514					
	12	07			11	57.4	
		60					
		222					
		285			12	28.7	
		354					
		500					
		582			12	57.5	
	13	43					
		224					
		276			13	27.7	
		332					
		519					
		577			13	58.6	
	14	62					
		232					
		295			14	29.4	
		365					
		532					
	15	08			15	0.7	
		80					
		285					
		292			15	29.2	
		350					
		514					
		564			15	56.9	
	16	30					
		235					
		289			16	28.9	
		343					
		532					
		594			16	59.1	
	17	46					
		215					
		274			17	27.4	
		334					
		529					
		593			17	58.9	
	18	44					
		240					
		292			18	29.5	
		853					

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1884 May 24 L.C

13 8 24.4
28.5
32.7 –
46.5
51.0
9 4.6 –
21.8
29.3
35.3 –
52.7
56.4
10 1.5 –
40.8
43.2
46.8 –
11 12.0
16.2
19.4 –
54.0
58.3
12 1.7

–43.67
–43.67
+ .33
– .15

+54 33.4
+55 47.5

6 56.6
7 45.0

8	28.5	6	1.2	14	29.7
8	53.0	5	31.1		24.1
9	28.6	5	1.0		29.6
9	57.0	4	30.9		27.9
10	43.6	4	0.8		
11	16.1	3	30.7		
11	58.2	3	30.7		28.9
				14	28.04

13 14 28.04
+ 67
14 28.71
16 10.23
–1 41.52

13 14 28.71
+1 49.38
– 14.41
+ 6.55
+ 3.85
+1 45.37
16 14.08

δ = +88 41 15 U.C
+91 18 45 L.C

Cos δ	8.35993
Sin δ	9.99989
Tan δ	1.63995
Log 15 sin i	0.11312n
Sin z	–.72 U.C.
	–.75 L.C.

	+119464	+112054	+45144	+40304
	3.07724	304943	265460	2.60435
	1.55028	1.52248	1.12765	1.07840
47	~~3.958~~ 8.384	~~2.857~~ 1.278	8.38	11.42
	+ 3550	+ 3330	+13.42	+11.98
47	~~37.45~~ 13.88	~~36.15~~ 14.42	1.80	23.40
+91 35	~~8.90~~ 4.47	~~12.20~~ 3.93	26.55	25.25

48 55 14
1.81930
–2047
1.79883

+ 6293	+ 6293	+62.93	+62.93
+ 1.782	+ 15.68	+ 2.54	+ 2.03
– .40	– .38	– .40	– .40
+ 8035	+7823	+65.07	+64.56
36	~~29.25~~ 30.43	31.62	29.81
	~~24.82~~ 22.16 ×		
+	.50		
36	~~29.75~~ 25.32	~~30.93~~ 30.93	32.12	30.31
18	43.4	22.66		
–17	~~46.4~~ 41.9	~~47.5~~ 37.8	48.7	46.9
	– .8	– .8		
	42.7	40.1		

91 36 23.49
– 17 40.88
+ .50
– 8.30
– 17 48.68
+91 18 ~~24.81~~
+88 41 25.19
– .77
2442

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96

1884 May 26 L.C.

9	28.0	4	21.8		
	34.0			9	33.8
	39.3	5	28.2		
10	6.4				
	7.9	6	27	10	7.9
	9.5				
	25.0	6	35.9		
	27.8			10	28.8
	33.7	7	7.0		
		7	35.6	~~11~~	~~0.3~~
		8	15.6		
		10	34.0		
		16	5.0		
13	53.4				
14	1.3			14	0.3
	6.3				
	22.0				
	24.0			14	25.5
	30.5				
	51.0				
	59.0			14	58.1
15	4.2				
	21.0				
	28.6			15	27.3
	32.4				
	54.5				
	59.8			16	59.4
16	4.5				

Aug 21

4	55.7
	40
	10.4
6	24.3
	30.2
	36.2

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1883phae.proj.1566.

1884 May 31 S. C.

8	31.5	3	20.7	8	38.2
	38.6	4	27.6		
	44.4				
9	3.7				
	7.4	4	58.0	9	7.8
	12.4				
	29.6	6	29.7	9	35.7
	35.3				
	42.1	7	2.8		
10	3.0				
	10.8	7	40.3	10	9.4
	14.5	15	18.0		
13	1.8				
	4.6			13	6.5
	13.0				
	29.4				
	34.2			13	34.5
	40.0				
14	3.6				
	11.6			14	10.4
	16.0				
	32.9				
	36.5			14	37.7 [4]
	42.7				
15	0.5				
	4.8			15	7.6
	17.5				

4	0.2
	8.6
	13.8
5	37.6
	53.2

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98

1884 June 2 L.C. (7)

8	31.6	0	56.0	8	
	38.0			8	37.3
	42.2-	1	59.4		
9	2.7				
1	10.4	2	58.6	9	9.4
	14.0-				
8	34.0	3	59.7		
	39.5			9	39.5
	44.9-	4	32.4		
10	0.1				
	6.2	6	46.6	10	6.0
	11.6-				
	33.0				
	36.9			10	36.4
	39.8-				
11	1.5				
	10.6			11	10.2
	14.4-				
	31.5				
	37.3			11	37.9
	44.9-				
12	7.0				
	10.2			12	10.4
	14.0-				
	34.4				
	37.6			12	37.8
	41.8-				
13	4.7				
	5.8			13	8.4
	11.6-				
	30.7				
	36.4			13	36.2
	41.6-				
	57.9				
14	3.4			14	4.1
	11.5-				
	38.4				
	35.4			14	36.1
	44.4-				

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−43.65
−43.65
+ .39
= .12

1884 June 3.4 S.L.

8	31.1	+	1	28.0						
	35.6									
	41.6		2	17.0	8	36.1	6	1.2	14 37.3	
	59.0									
9	5.4		2	44.4						
	11.0				9	5.1	5	31.1	36.2	
	30.3		3	10.3						
	36.4									
	42.6		3	43.3	9	36.4	5	1.0	37.4	
10	1.3									
	5.6		4	6.3						
	8.2				10	5.0	4	30.9	35.9	
	20.7	+	4	28.0						
	33.9									
	40.0				10	34.5	4	0.8	35.3	
	59.4									
11	5.4									
	12.2				11	5.7	3	30.7	36.4	
	38.3									
	35.5									
	40.8				11	34.9	3	0.6	35.5	
	59.4									
12	4.2									
	9.4				12	4.4	2	30.5	34.9	
	27.4									
	36.6									
	44.6				12	36.2	2	0.4	36.6	
	58.3									
13	5.7									
	10.7				13	4.9	1	30.3	35.2	
	28.4									
	34.6									
	41.0				13	34.7	1	0.2	34.9	
	57.2									
14	2.4									
	8.4				14	2.7		30.1	32.8	
	30.4									
	36.3									
	43.2				14	36.7		—	36.7	
									14 35.78	

13 14 35.78
+ .67
14 36.45
16 17.89
−1 41.44

13 14 36.45
+1 53.47
— 17.02
+ 6.24
— 3.81
+1 37.88
16 14.33

+787.78	+738.78	+607.78
2.89641	2.86852	2.78375
1.36946	1.34157	1.25680
47 11.85	× 1205	13.60 ×
+ 2341	+ 21.96	+ 18.06
47 35.26	33.01	31.66
35 13.09	15.34	16.69

48 55.6		
1.81920		
− 1543		
1.80377		
+6366	+6366	+6366
+ 7.75	+ 6.82	+ 461
− 40	− 40	− 40
+ 7101	7008	+6787
36 24.10 ×	25.42	24.36 ×

7 61		
36 24.61	25.93	25.07
18 44.8		
−17 39.8	41.1	40.3
− 8	− 8	− 8
40.6 ×	41.9	41.1 ×

+91	36	24.33
	−17	40.78
	+	.51
	−	9.70
	−17	49.97
+91	18	34.36
+88	41	25.64
		.77
		24.87

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1883phae.proj.1566..100

1884 June 4 L. C.

3-9

1

3

4

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1883phae.proj.1566.

1884 June 5 3 h 6

Add + minute

− 43.65
− 43.65
± .33
− 1.36

7	− 38.8	59	88					
		1	53.4	7	38.8	6	1.2	13 40.0
8	26							
	46	3	24.4					
	132			8	7.8	5	31.1	38.9
	30.2	3	32.3					
	36.6							
	43.2	4	8.1	8	36.7	5	1.0	37.7
9	04							
	7.5	4	52.0					
	12.5			9	6.8	4	30.9	37.7
	31.3	5	33.4					
	34.3							
	41.5	+ 6	7.5	9	36.8	4	0.8	37.6
10	1.0							
	4.3			10	7.2	3	30.7	37.9
	13.2							
	34.7							
	37.6			10	37.3	3	0.6	37.9
	42.6							
11	16							
	7.0			11	6.9	2	30.5	37.4
	12.2							
	33.1							
	37.2			11	37.3	2	0.4	37.7
	41.6							
12	0.5							
	7.4			12	7.1	1	30.3	37.4
	13.4							

18.3862
13

13 13.3862

+ .67
13.3929
16 19.70
−2 39.41

13 13 3929
+ 1 5430
− 1440
+ 59.36
− 5.62
+ 2 33.69
16 12.93

5-9 18.7
23.6
28.4
36.4
38.7
43.0
2.1
8.4
13.8
32.3
38.6
42.7

59 23.6
13 32.8
1 39.3
12 2.5
3 8.1
10 32.2
4 37.9
9 1.9

(12 56.4)
13 41.8
40.3
39.8

+ 809.82
2.90 839
1.38144
47 13.35
+ 24.08
47 37.43
35 10.92

48 55 5
1.81920
− 15 15
1.80405
+ 63.69
+ 8.19
− .40
+ 71.48
36 22.40

.51
36 22.91
18 45.4
37.8

+ 49522 + 451.12
2.69480 2.65429
1.16785 1.12734
47 13.55 4.88 17.95 15.25 +
+ 14.72 + 13.41
47 31.27 2.52 31.36 28.46
+91 35 17.08 1883 16.99 17.89

48 55 1
1.81920
− 15 15
1.80405
+ 63.69 + 63.69
+ 3.06 + 2.54
− .41 − .41
+ 66.34 + 65.82
36 23.42 22.81
25.97 25.91 ×

+ .51
36 22.93 23.48 23.52 26.22
18 45.1
−17 38.8 38.2
40.6 41.1
− .8 − .8
41.4 41.9 ×

+91 36 25.71
−17 41.82
+ .51
− 16.22
−17 57.31
+91 18 34.97 34.40
+88 41 25.09 25.60
− .77
24.32
24.83

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102

1884 June 9 S. G.

		28 29.0	
		29 7.2	
		29 53.3	
		30 34.5	
9	53.5		
10	02		10 0.8
	6.8		
	26.9		
	30.3		10 30.9
	37.0		
	86.4		
11	2.3		11 2.0
	7.4		
	24.2		
	32.2		11 31.7
	38.8		
	76.3		
12	3.2		12 3.0
	9.4		
	28.9		
	33.7		12 34.2
	40.0		
	57.9		
13	2.2		13 2.8
	8.3		
	24.8		
	29.0		13 29.6
	35.0		
	63.3		
	59.4		13 59.6
14	6.0		
	24.9		
	30.5		14 30.9
	37.2		
	56.2		
15	1.3		15 2.8
	10.9		
	33.0		15 38.1
	37.7		
	43.7		
16	3.8		
	9.5		16 8.8
	13.2		

a+1

28 9.7
10.5
11.8
29 25.0
32.0
37.0

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1884 June 14 L.C. (X)

21 33
24 09
26 49.0
28 47.0
29 37.4

13 28.0
37.0
44.4
14 12.
90
16.9
36.2
42.7
48.8
15 6.0
11.3
17.7
34.0
39.7
46.9
16 2.1
8.2
15.0
33.7
39.5
47.4
17 4.3
11.5
18.4
31.8
38.1
44.7
18 1.4
9.4
16.8
33.3
39.7
46.2
19 4.8
11.0
19.9
34.5
40.5
47.5
20 0.5
6.3
12.9
31.0
37.5
44.0

13 36.5
14 9.0
14 42.6
15 11.7
15 40.2
16 8.6
16 40.2
17 11.4
17 38.2
18 9.2
18 39.7
19 11.8
19 40.8
20 6.6
20 37.8

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1883phae.proj.1566

104

1884 June 16 L. H.

23 (280)
24 204
24 495
25 410
26 113
26 525
27 282
28 246

a41

23 355
408
482
25 41
100
177
26 362
422
472
28 52
125
191
29 374
432
486

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1884 June 17 S. C.

									13	14	35.27
											+.67
										11	35.94
										16	30.27
										−1	54.33
		20	525								
		21	440								
		22	65								
		22	451								
		23	98								
		23	535								
		24	183								
16	00										
	68										
	132										
	242										
	350										
	408										
	590										
17	68										
	108										
	312										
	360										
	423										
18	10										
	74										
	131										
	304										
	372										
	425										
19	01										
	52										
	117										
	314										
	374										
	410										
20	15										
	90										
	147										
	306										
	374										
	431										
				16	6.7	1	30.3		14	36.4	
				16	35.0	2	0.4			34.6	
				17	5.5	2	30.5			30.0	
				17	36.5	3	0.6			35.7	
				18	7.3	3	30.7			36.6	
				18	36.7	4	0.8			35.9	
				19	5.7	4	30.9			34.8	
				19	36.6	5	1.0			35.6	
				20	8.4	5	31.1			37.3	
				20	37.0	6	1.2			35.8	
										14 35.27	

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1884 June 183 L. C.

23	0.0						
25	59.6						
27	1.8						
28	5.2						
29	6.7						
30	3.1						
31	3.7						

13 14 34.11
+ .67
14 34.78
16 31.27
−1 56.49

14	58.8						
15	5.0						
	11.1						
	30.1						
	36.2						
	41.3	15	5.0	−	30.1	14	34.9
	59.0						
16	5.4						
	11.1	15	35.9	−1	0.2		35.7
	30.0						
	35.9						
	43.0	16	5.2	−1	30.3		34.9
17	0.3						
	5.9						
	11.3						
	31.8	16	36.3	−2	0.4		35.9
	36.7						
	41.4						
	59.6	17	5.8	−2	30.5		35.3
18	3.7						
	9.6						
	28.0	17	36.6	−3	0.6		36.0
	34.6						
	40.7						
	57.8	18	3.3	3	30.7		32.6
19	4.4						
	10.6						
	30.9						
	35.3	18	34.4	4	0.8		33.6
	41.0						
	58.2						
20	3.3						
	10.2	19	4.3	4	30.9		33.4
	30.2						
	34.9						
	40.5	19	35.7	5	1.0		34.7
21	0.0						
	5.4						
	11.4	20	3.9	5	31.1		32.8
	30.3						
	34.9						
	40.7	20	35.2	6	1.2		34.0
	57.2						
22	3.4						
	9.9	21	5.6	6	31.2		34.4
	26.8						
	32.8						
	34.7	21	35.2	7	1.3		33.9
		22	3.5	7	31.4		32.1
		22	33.1	8	1.5		31.6

14 34.11

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1882 June 23.3 L.C.

	330								
8	392								
	454								
9	20	+	2	2.0					
	100								
	153		2	30.2	9	9.1	5	31.1	40.2
	335								
	393		2	57.3					
	462				9	39.7	5	1.0	40.7
10	24		2	38.2					
	82								
	143		4	8.0	10	8.3	4	30.9	39.2
	314								
	386		4	39.5					
	453				10	38.5	4	0.8	39.3
11	30								
	90								
	144				11	8.8	3	30.7	39.5
	314								
	362								
	433				11	37.0	3	0.6	37.6
									14 39.56

- 43.64
- 43.64
+ .22
− .10

13 14 39.56
+ 67
14 40.23
16 3638
−1 5615

13 14 4023
+ 2 1.58
− 9.60
+ 4.36
− 2230
+1 3404
16 14.27

+81.16 +757.56
2.90911 2.87942
1.38316 1.35247
47 7.05 ~~8.15~~ 705 *
+ 24.11 + 22.51
47 31.16 ~~3066~~ 29.58
35 17.19 ~~1769~~ 18.77

48 55 11 48 55 11
1.81930 1.81930
− 1105 − 1105
1.80825 1.80825
+ 6431 + 6431
+ 8.42 + 7.17
− .36 − .36
+72.17 + 71.12
36 29.36 36 ~~28.81~~ 29.89 *

+ 57 + 57
36 29.93 36 ~~29.38~~ 30.46
18 46.4 18 46.4
−17 43.5 430
−17 44.1
−8
44.9 +

+91 36 29.89
− 17 44.88
+ 57
− 11.30
−17 55.61
+91 18 34.28
+88 41 25.72
− 77
24.95

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108

1884 June 26 L.C. ⊕

+6

21 36.3
23 46.0
24 38.2
25 52.7
26 50.2
27 44.0
28 41.2

16 34.6
40.3
46.3-
17 44
11.0
17.3-
34.4
41.1
47.3-
18 46
10.9
17.0-
34.3
40.6
18 40.6
46.8-
19 3.7
11.2
19 10.2
15.7-
35.5
40.2
46.1-
19 40.6
20 6.3
12.2
17.3-
34.7
41.2
47.1-
20 11.9
20 41.20

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