1878phae.proj.1603R

KG
11366
v.604

Zone Observations & Reductions

C 42

Also Explanation of the Zone Reductions. pages 58-63. 1878

Comm. Feb. 3 1878 to ~~June 9 1878~~ Dec. 16 1878 (inclusive)

Charles W. Sever, University Bookstore, Cambridge.

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.160R

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16[illegible]R

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.160.R

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1661R

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1603R

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1603R

Adopted values of i for this book

1878		log	for circle readings	for declinations
Jan 1 to Feb 6	$i = +5^\circ\ 4'\ 40''$	$\log 15 \tan i$	$= 0.12478$	$= 0.12478_n$
Feb 7 to June 5	$= -4\ 51\ 30$		$= 0.10550_n$	$= 0.10550$
June 6 to Jan 20, 1879	$= -4\ 51\ 53$		$= 0.10607_n$	$= 0.10607$
Jan 20, 1879 to Jan 26 1879	$= -4\ 51\ 58$		0.10619_n	$= 0.10619$

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1603R

1878 Feb. 3 Feb. 4 Obs. H.A.R. Rec. J.F.M.

	624	625														
	h m s		h m s		h m s		h m s		h m s		h m s		h m s			
α	2 56 51	55 39.0	3 2 39	1 25.9	3 11 38	10 49.8	3 12 43	11 34.5	3 14 16	13 7.2	3 15 38	14 24.3				
δ	° ′ 52 34	29.3 8.5	° ′ 54 2	53 57.9 9.5	° ′ 51 06	2.9 8.3	° ′ 50 38	34.2 8.8	° ′ 57 50	46.9 9.2	° ′ 54 13	9.3 8.4				
Feb. 3		+10.46		+11.96		+8.61		+8.43		+10.11		+12.58				
	56 10.8	11.40	1 56.6	12.90	11 20.7	9.55	12 5.5	9.37	13 39.2	11.05	15 0.3	13.52				
	14.1		58.8		24.0		8.8		42.6		3.7					
	17.5		3.8		27.4		12.0		46.0		7.1					
	20.8		7.2		30.7		15.2		49.4		10.8					
	24.2		10.8		34.0		18.4		52.8		14.2					
	374		182		368		99		297		361					
	56 17.48		2 3.64		11 27.36		12 11.98		13 45.24		15 7.22					
	+ 63.10	+ 62.25	+ 63.10	+ 62.21	+ 63.10	+ 62.30	+ 63.10	+ 62.31	+ 63.10	+ 62.27	+ 63.10	+ 62.24				
	− 85		− 89		− 80		− 79		− 83		− 89					
	57 19.63		3 5.85		12 29.66		13 14.29		14 48.21		16 9.43					
	− 0.99		− 1.07		− 1.18		− 1.89		− 1.22		− 1.25					
	57 18.74	−12.88 −43.08	3 4.78	−13.18 −42.00	12 28.48	−12.92 −40.20	13 13.10	−12.87 −40.05	14 46.99	−13.05 −39.75	16 8.18	−13.42 −39.51				
	9.1 9.3		9.4		8.4		8.5		8.3		8.3					
	55 42.2		1 34.0		10 58.7		11 48.9		13 49.9		14 40.0					
	45.8		38.0		3.5		53.2		52.0		43.2					
	48.7		40.8		6.8		56.3		54.6		46.2					
Corr to Micros	167	+0.94	1124		100		94		65		94					
	55 45.57	52 34 48.83	1 37.63	54 3 28.58	11 8.33	51 8 13.52	11 52.13	50 39 54.70	13 52.17	51 51 32.85	14 42.13	54 15 37.32				
	+31.91	− 27	+26.01	− 18	+24.03	− 15	+18.85	− 10	−6.23	− 1	+ 21.09	− 15				
	1.50393	− 52	1.41514	− 77	1.38071	− 83	1.27531	− 54	0.79449	− 31	1.38184	− 40				
	9.78377	+ 11.03	9.76857	+12.66	9.79783	+ 9.41	9.80	+ 8.90	9.79077	+1022	9.76642	+12.88				
	1.41233	+ 22	1.30844	+ 25	1.30311	+ 18	1.20206	+ 17	0.71006	+ 21	1.27304	+ 25				
	50	−21.80 20		−22.30 15		−21.40 45		−21.20 35		−2160 10		−22.20				
n = −.65	2 50.8	34 38.43	4 16.5	3 19.18	11 31.9	8 1.67	2 55.8	39 42.87	1 37.0	51 22.30	2 10.0	15 28.64				
	59.1		24.9		40.1		2.2		46.8		17.1					
Rrs. = −.18	99		414		720		1180		838		71					
	52 54.65		21 20.70		19 36.00		47 59.00		36 41.90		12 13.58					
+5′ 21.27	29 53.40		58 27.65		3 12.39		34 49.35		46 6.45		10 34.80					
	52 35 14.67		54 3 48.92		51 8 33.62		50 40 10.62		51 51 27.72		54 15 56.07					
	− 25.84		− 20.34		− 20.10		− 15.92		+ 5.13		− 18.75					
							13 023									
	57 5.86	33 55.4	2 51.60	2 37.2	12 15.56	7 21.5	12 59.23	39 2.8	14 33.94	50 42.6	15 54.76	14 49.1				
Feb. 4						+8.58		+8.31		+9.80		+12.33				
					11 19.8	8.89	12 4.4	8.70	13 38.0	10.19	14 58.0	12.72				
					23.0		7.6		41.6		2.5					
					26.4		10.9		44.8		6.0					
					29.7		14.3		48.2		9.7					
					32.8		17.7		51.6		13.1					
					317		49		242		303					
					11 26.34		12 10.98		13 44.84		15 6.06					
					+ 64.32	+63.40	+ 64.32	+63.42	+ 64.32	+63.37	+ 64.32	+63.30				
					− 98		− 88		− 98		− 1.02					
					12 29.74		13 14.40		14 48.21		16 9.36					
					− 1.16	−12.92	− 1.17	−12.87	− 1.20	−13.05	− 1.22	−13.42				
					12 28.58	−40.20	13 13.23	−40.05	14 47.01	−39.75	16 8.14	−39.51				
					8.8		8.8		9.0		8.5					
					11 0.4		11 48.2		13 10.9		14 30.9					
					3.7		51.1		13.4		34.6					
					6.0		53.2		16.4		37.8					
Corr to Micros.					101	+0.39	25		107	2	133					
					11 27.61	51 8 13.60	11 50.83	50 39 53.89	13 13.57	51 51 30.07	14 34.43	54 15 37.39				
					+ 22.94	− 14	+20.15	− 11	+31.27	− 26	+31.63	− 26				
					1.36116	− 83	1.30428	− 54	1.49513	− 22	1.50010	− 38				
					9.79782	+ 9.29	9.80	+ 8.79	9.79063	+1007	9.76642	+12.72				
					1.28356	+ 18	1.23103	+ 17	1.41054	+ 21	1.39130	+ 25				
					15	−21.40 45		−21.30 35		−2160 10		−22.20				
					4 32.1	8 1.09	2 54.7	39 41.29	1 6.3	51 20.66	2 2.9	15 27.91				
					41.1		2.3		16.9		11.9					
n = −.74					732		1170		232		148					
					19 36.60		47 58.50		36 11.60		12 7.40					
Rrs = −.18					3 11.75		34 49.85		46 36.75		10 40.95					
					51 8 32.81		50 40 10.91		51 51 57.81		54 16 2.01					
					−19.21		−17.02		−25.14		−24.62					
+5′ 21.06					12 15.66	7 20.9	13 0.36	39 1.2	14 33.96	50 40.9	15 54.72	14 48.4				

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16018R

6.24 6.25

1878 Feb. 3, Feb. 4,

	h m s		h m s		h m s		h m s		h m s		h m s		h m s	
α	3 16 21	15 12.3	3 17 21	16 12.1	3 18 17	17 24	3 20 47	19 32.5	3 23 5	21 50.2	3 34 6	32 49.7		
δ	51° 53′	49.9 9.0	50° 23′	19.7 7.5	54° 44′	40.0 8.6	52° 27′	23.6 6.7	53° 49′	45.1 8.4	58° 7′	4.0 9.0		

Feb. 3

		+9.96		+8.10		+13.45		+10.76		+12.12		+10.88		
	15 44.4	10.90	16 48.4	9.04	17 39.2	14.09	20 7.5	11.00	22 25.5	13.06	33 26.1	11.82		
	47.7		46.5		42.8		10.9		28.9		29.5			
	50.9		49.7		46.5		14.2		32.3		32.7			
	54.1		53.1		50.0		17.6		36.0		36.2			
	57.7		56.5		53.7		21.0		39.5		39.8			
	48		492		322		712		122		143			
	15 50.96		16 49.84		17 46.44		20 14.24		22 32.44		33 32.86			
	+ 63.10	+62.27	+ 63.10	+62.31	+ 63.10	+62.19	+ 63.10	+62.25	+ 63.11	+62.22	+ 63.11	+62.24		
	− 83		− 79		− 91		− 85		− 89		− 87			
	16 53.23		17 52.15		18 48.63		21 16.49		23 34.66		34 35.10			
	− 1.25		− 1.25		− 1.29		− 1.31		− 1.35		− 1.49			
	16 51.98	−13.09 −39.33	17 50.90	−12.90 −39.15	18 47.34		21 15.18	−13.23 −38.46	23 33.31	−13.47 −38.01	34 33.61	−13.52 −35.73		
	8.6 8.6		6.9		6.8 9.0		7.0		6.0		8.8			
	15 39.7		16 17.0		17 26.4		19 34.3		22 4.0		33 0.8			
	42.0		19.2		30.5		37.3		8.5		3.2			
	45.2		22.9		33.4		40.0		11.0		6.6			
	69		591		03		216		235		106			
	15 42.30	51 55 8.25	16 19.70	50 25 9.63	17 30.10	54 44 56.20	19 37.20	52 28 33.70	22 7.83	53 50 24.52	33 3.53	53 8 21.67		
	+ 8.66	− 2	+ 30.14	− 24	+ 16.34	− 7	+ 37.04	− 36	+ 24.61	− 16	+ 29.33	− 23		
	0.93752	− 52	1.47914	− 47	1.21325	− 54	1.56867	− 45 74	1.39111	− 43	1.46731	− 79		
	9.79047 16	+10.29	9.80458 12	+8.64	9.76140 29	+13.49	9.78461	+10.95	9.77028	+12.46	9.77795	+11.68		
	0.86245 m	+ 21	1.40804 m	+ 17	1.09932 m	+ 27	1.47806 m	+ 21	1.28667 m	+ 25	1.37004 m	+ 22		
	30	−2160	0	−21.10	40	−22.30	55	−21.70	35	−22.00	45	−21.40		
	2 50.41	54 57.55	2 30.6	24 46.57 36.63 57.57	2 57.8	44 47.99	1 1.8	28 23.08	2 22.3	50 15.58	4 21.1	8 11.79		
	58.1		38.2		3.9		9.9		29.2		27.9			
	85		88		17		11.7		115		90			
	32 54.25		2 34.40		43 0.85		59 5.85		37 25.75		19 24.50			
	49 54.10		20 13.95		39 47.50		23 42.50		45 22.60		3 23.85			
	51 55 15.37		50 25 35.22		54 45 8.77		52 29 3.77		53 50 43.87		53 8 45.12			
	− 7.12		− 25.57		− 12.57		− 30.07		− 12.35		− 23.45			

Feb. 4

	16 38.89	54 18.2	17 38.00	24 18.4			21 1.95	27 44.5	23 19.84	49 37.6	34 20.09	7 36.1		
		+9.79		+7.99		+12.74		+9.91		+11.96				
	15 42.3	10.18	16 42.2	8.38	17 38.2	16.13	20 6.3	10.30	22 24.3	12.35				
	46.4		45.4		41.6		9.7		27.9					
	49.8		48.6		45.4		13.1		31.4					
	53.2		51.9		48.9		16.4		34.8					
	56.4		55.2		52.4		19.9		38.4					
	441		433		265		654		68					
	15 49.82		16 48.66		17 45.30		20 13.08		22 31.36					
	+ 64.32	+63.37	+ 64.32	+63.42	+ 64.32	+63.28	+ 64.32	+63.36	+ 64.32	+63.32				
	− 95		− 88 90		− 104		− 986		− 99 100					
	16 53.19		17 52.08		18 48.58		21 16.44	−13.23	23 3.41					
	− 1.22		− 1.22		− 1.26		− 1.28	−38.46	− 1.28	−13.47				
	16 51.97	−13.09 −39.33	17 50.86	−12.90 −39.15	18 47.32		21 15.16		23 33.40	−38.01				
	8.3 8		7.0		6.8 9.0		6.9		6.0					
	15 34.9		16 16.2		17 7.0		19 33.8		22 7.2					
	36.9		18.7		11.4		36.9		10.9					
	40.0		21.3		13.9		39.7		13.9					
	218		562		23		204		20					
	15 37.27	51 55 8.37	16 18.73	50 25 9.65	17 10.77	54 44 55.10	19 36.80	52 28 32.06	22 10.67	53 50 23.59				
	+12.55	− 5	+ 29.93	− 24	+ 34.53	− 31	+ 36.28	− 34	+ 20.66	− 10				
	1.09864	− 50	1.47611	− 47	1.53820	− 50	1.55967	− 74	1.31576	− 45				
	9.79015	+10.13	9.80412	+8.53	9.76129	+13.28	9.78461	+10.74 8	9.77078	+12.24 16				
	1.01357 m	+ 21	1.40501 m	+ 17	1.42427 m	+ 27	1.46906 m	+ 21	1.21132 m	+ 25				
	30	−21.50	0	−21.10	40	−22.30	55	−21.70	35	−22.00				
	2 46.2	54 57.05	2 30.0	24 56.93	2 43.7	44 45.93	1 2.9	28 20.66	2 24.9	30 13.94				
	55.2		38.7		51.8		12.9		34.2					
	1014		87		955		158		591					
	32 50.70		2 34.35		42 47.75		59 7.90		37 29.55					
	49 57.65		20 14.00		40 0.40		23 40.45		45 18.80					
	51 55 18.69		50 25 35.06		54 45 21.66		52 29 1.58		53 50 39.86					
	− 10.32		− 25.41		− 26.56		− 29.45		− 16.27					
	16 38.88	54 17.7	17 37.96	24 17.8			21 1.93	27 42.2	23 19.93	49 35.9				

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1603R

624 625

1878 Feb. 3, Feb. 4, Obs. W. A. R. Rec. J. F. M.

36 5.7

37 57.9
23.7

	h m s		h m s		h m s		h m s		h m s		h m s	
α	3 36 20	35 41	3 37 14	36 3.6	3 38 7	36 56.8	3 39 23	38 12.8	3 40 36	39 25.2	3 41 22	40 5.6
δ	° ′		° ′		° ′		° ′		° ′		° ′	
	53 30	27.1	50 45	41.7	50 46	43.3	50 27	28.7	50 22	18.7	54 18	15.3
		8.0		9.2		9.5		7.1		9.0		8.0

Feb. 3

+4.88 +8.79 +8.80 +9.14 +7.98 +7.92 +7.84 +12.70

35 41.3 1282 36 37.9 36 40.0 9.78 9.74 37 31.5 10.08 38 31.8 38 46.7 6.92 8.86 39 56.9 8.78 40 44.0 13.64
44.8 41.2 43.4 84 63 34.8 35.1 48.9 3.1 47.7
48.2 44.5 46.8 38.0 38.1 53.1 6.2 51.2
51.7 47.9 49.9 41.1 41.4 56.3 9.5 54.5
55.2 51.1 53.2 44.4 44.9 59.6 12.8 58.4

412 226 333 398 413 156 315 58
35 48.24 4452 46.66 37.96 38.26 83.12 40 6.30 40 51.16
+63.11 +62.23 +63.11 +63.11 +62.31 +62.31 +63.11 +62.31 +63.11 +63.11 +62.32 +62.32 +63.11 +62.32 +63.11 +62.21
− 88 − 80 − 80 − 80 − 79 79 − 79 − 90
36 50.47 36 46.83 36 48.97 38 40.27 38 40.58 39 55.44 41 8.62 41 53.37
−1.52 −1.50 −1.50 −1.51 −1.52 −1.52 −1.54 −1.60
36 48.95 −1361 −3525 37 45.33 4747 −1321 −3504 38 38.76 −1322 −3486 39 39.06 52.92 −13.19 −34.59 41 7.08 −1320 −34.32 41 51.77 −13.81 −34.14

8.0 9.0 9.1 9.7 8.2 7.0 9.0 8.0

35 18.5 36 31.2 36 21.5 37 50.0 38 19.4 38 28.1 39 39.4 40 33.3
21.5 33.3 24.0 52.8 21.8 30.7 42.7 36.6
23.7 36.1 28.0 55.9 25.5 35.7 45.7 39.8
37 106 135 87 67 45 78 197
35 21.23 +0.94 53 31 18.42 1st star 33.53 24.50 50 45 23.60 45.00 37 52.90 50 47 56.56 22.23 31.50 1st star 50 28 8.82 39 42.60 50 23 13.08 40 36.57 54 20 2.33
+27.01 − 19 10.99 +22.16 − 29 − 14.94 − 6 46.03 +21.62 − 7 +23.70 − 15 +14.54 − 6
1.43152 − 27 1.02100 1.34557 + 17 1.17435 + 7 1.20093 1.33486 + 8.74 1.37475 − 83 1.16406 − 52
9.77405 +12.11 9.80105 9.80105 + 9.05 9.80074 + 9.10 9.80382 9.80382 + 17 9.80443 + 8.65 9.76572 +13.02
1.33035 + 23 0.96683 1.27 40 2110 1.09987 + 17 1.13353 1.26346 − 2080 1.30396 + 17 1.05456 + 26
55 −21.50 40 40 2 2nd star 46 14.17 −2100 55 55 27 56.94 28 4.080 − 2080 5 −2190

1 25.9 31 9.44 2119 1329 − 13 21.9 47 4564 4443.8 43.8 41 32.8 23 1.06 2 52.8 19 5407
33.7 18.8 + 9.05 29.4 50.6 50.6 40.0 59.1
596 107 735 C.R. 1st 2.53 + 17 113 994 994 + 17 728 119
56 29.60 C.R. 2d 4215.35 41 36.75 46 2412 40 25.65 59 4720 59 47.20 − 2080 4 36.40 7 55.95
.26 18.55 4033.00 41 1150 45 42 22.70 25 1.15 25 1.15 27 52.44 18 11.95 14 52.40
53 31 39.82 50 45 54.27 46 32.87 50 47 43.97 50 28 22.42 50 23 33.22 54 20 13.67
−21.40 − 9.27 + 12.59 − 13.60 − 20.14 − 11.34
− 18.68 − 18.34
36 35.34 30 34.2 37 32.12 44 49.1 38 25.54 47 10.8 39 25.87 40 53.88 2226.7 41 37.96 19 19.9
+4.65 34.26 +8.71 +8.40 +8.97 40.73 +7.83 +7.85 +7.82 +12.55

Feb. 4

35 40.2 1204 36 36.9 36 39.0 9.10 8.79 37 30.0 9.36 38 30.8 38 45.7 8.22 8.17 39 58.7 8.11 40 43.0 12.94
43.6 40.4 42.3 33.4 34.0 48.8 2.0 46.5
47.0 43.8 45.5 36.8 37.2 52.1 5.2 49.9
50.6 47.0 48.8 40.0 40.6 55.3 8.3 53.6
54.2 50.0 52.0 43.3 43.7 58.4 11.7 57.2
356 181 276 335 362 103 259 02
35 47.12 4362 45.52 36.70 37.24 82.06 40 5.18 40 50.04
+64.33 +63.33 +64.33 +64.33 +63.43 +63.43 +64.33 +64.33 +63.43 +63.43 +64.33 +63.30
− 88 − 88 − 88 − 88 − 88 − 88 − 88 − 1.083
36 50.45 −13.61 −3525 37 47.05 48.45 −1321 −3504 38 40.13 −13.22 −3486 38 40.69 55.47 −13.19 −34.59 41 8.61 −13.20 −34.32 41 53.34
−1.49 −1.47 −1.47 −1.49 −1.50 −1.50 −1.52 −1.58
36 48.96 37 45.58 47.48 −1321 −3504 38 38.64 39.17 53.99 −13.19 −34.59 41 7.09 41 51.76 −1381 −3414

8.0 9.0 8.9 9.6 8.3 6.8 8.8 7.2

35 13.4 36 49.1 36 6.1 37 51.8 38 17.8 38 26.6 39 38.5 40 33.0
16.7 52.5 9.5 55.8 20.1 30.0 43.9 36.5
19.8 55.2 12.5 58.0 24.0 32.4 46.7 40.2
199 68 281 156 19 890 101 197
35 16.63 +0.39 53 31 18.11 1st star 52.27 9.37 53 46 23.10 14.10 37 55.20 50 47 57.54 20.63 29.67 1st star 50 28 8.47 36.65 39 43.37 50 23 13.13 40 36.57 54 20 3.14
+30.49 − 24 − 8.65 +36.15 − 36 − 18.50 − 9 +16.61 +22.39 − 8 +21.81 − 13 +13.47 − 5
1.48416 − 27 0.98702 1.55811 + 8.92 1.26717 − 7 1.22037 1.34005 + 8.60 1.33866 − 83 1.12934 − 6.82
9.77405 +11.93 9.80105 9.80105 + 17 9.80074 + 8.86 9.80382 9.80382 + 17 9.80443 + 8.57 9.76572 +12.86
1.38299 + 23 0.86285 1.48394 2nd star 2.10 1.19269 + 17 1.14897 1.26805 − 2090 1.26787 + 17 1.01987 + 26
55 −21.50 40 40 45 46.34 −21.10 55 55 28 4.000 − 5579 − 2080 5 −2190

1 22.1 31 8.35 1 38.1 1 48.8 22.5 47 4580 4426 4 42.6 41 33.3 23 0.44 2 51.7 19 5418
32.2 7.1 58.6 + 8.92 32.4 51.1 51.1 + 8.60 42.2 57.9
643 52 1074 + 17 549 937 937 + 17 755 116
56 27.15 C.R. 2d 42.260 4153.6 C.R. 1st 2.10 40 27.45 59 4685 5346.85 + 8.60 4 37.75 7 55.80
26 21.20 4645.75 40 6465 45 2090 23 +60 23 1.50 27 51.27 18 10.60 14 52.55
53 31 42.26 50 46 6.81 46 15.71 2403 50 47 41.96 50 28 22.56 39 25.98 50 23 31.66 54 20 13.61
− 24.15 +7.29 −30.47 + 15.58 − 14.09 40.80 − 18.53 − 10.47
36 35.35 30 33.1 −3047 +7.29 4576.1 38 45.42 47 10.9 − 18.56 21.2 40 53.89 2226.1 41 37.95 19 20.0

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1008R

6214 625

1878 Feb. 3, Feb. 4,

	h m s		h m s		h m s		h m s		h m s		h m s		h m s	
α	3 38 44	57 27 34	4 2 43	1 26.3	4 4 4	2 46.3	4 5 3	3 45.1	4 7 11	5 53.1	4 7 48	6 30.9
δ	° ′ 58 1	52 58.1 7.1	° ′ 57 5	2.3 7.5	° ′ 52 48	45.9 9.0	° ′ 54 40	36.8 8.0	° ′ 53 2	52 59.4 8.0	° ′ 52 49	46.5 8.2

Feb. 3

	+1140		+12.36		+10.77		+12.68		+10.89		+11.84	
58	6.1	12.34	2 6.8	13.30	3 26.0	11.71	4 26.3	13.62	6 31.8	11.83	7 10.0	+11.98
	9.3		10.3		29.4		30.0		35.3		13.2	
	13.0		13.9		32.7		33.6		38.6		16.4	
	16.3		17.3		36.3		37.3		42.0		20.0	
	19.7		21.3		39.6		40.7		45.7		23.1	
	644		696		1640		1679		484		827	
58	12.88		2 13.92		3 32.80		4 38.58		6 38.68		7 16.54	27
	+63.12	+62.26	+63.12	+62.23	+63.12	+62.26	+63.12	+62.21	+63.12	+62.25	+63.12	+62.27
	−86		−89		−86		−91		−87		−85	
59	15.14		3 16.15		4 35.06		5 35.79		7 40.93		8 18.81	
	−1.81	−13.82	−1.88	−14.05	−1.84	−13.84	−1.93	−14.18	−1.92	−13.92	−1.92	−13.89
59	13.33	−30.30	3 14.27	−29.40	4 33.19	−29.10	5 33.86	−28.86	7 39.01	−28.38	8 16.89	−28.23
	7.4		8.0		9.2		8.3		8.7		8.6	
	57 37.4		1 36.7		2 58.3		4 0.3		6 10.0		7 7.8	
	41.3		38.6		1.0		2.6		13.3		11.2	
	43.3		42.5		4.2		7.2		15.7		13.9	
	20		1188		35		101		90		29	
57	40.67	53 2 2.15	1 39.60	54 5 37.25	2 1.17	52 49 42.10	4 3.37	54 38 48.27	6 13.00	53 3 34.15	7 10.97	52 50 9.04
	+32.21	−27	+3432	−31	+31.63	−26	+30.21	−24	+25.68	−18	+557	−1
	1,507.99	−13	1,535.55	−34	1,500.10	−54	1,480.15	−72	1,409.60	−76	0,744.86	−52
	9.777.13	+11.58	9.768.17	+12.76	9.781.13	+11.35	9.762.36	+13.38	9.778.79	+11.61	9.781.13	+11.35
	1.411.90 m	+22	1.428.50 m	+25	1.406.01 m	+22	1.367.29 m	+26	1.313.17 m	+22	0.651.77 m	+22
	25	−2110	20	−21.30	35	−20.90	45	−21.40	90	−20.90	35	−2080
	0 37.4	1 53.39	1 52.1	5 39.25	2 58.7	49 32.91	3 52.9	38 40.49	4 11.1	3 25.08	2 52.3	50 0.22
	45.9		59.0		5.4		1.2		18.7		59.9	
	83.3		111		41		1161		98		122	
	25 41.65		21 55.53		28 2.05		48 58.05		24 14.90		37 56.10	
	57 6.70		0 52.80		44 46.30		33 50.30		58 33.45		41 52.25	
	53 2 27.97		54 6 14.07		52 50 7.57		54 39 11.57		53 3 54.72		52 50 13.52	
	−26.82		−26.82		−25.97		−23.30		−20.57		−4.48	
	58 59.51	1 23.1	3 0.22	59.8	4 19.35	49 3.8	5 19.68	38 11.6	7 25.09	256.7	8 3.00	49 32.0
		+11.20		+12.19		+10.62		+12.44		+10.82		+10.84

Feb. 4

58	4.5	11.59	2 5.8	12.58	3 24.7	11.01	4 25.1	12.83	6 30.7	11.21	7 8.5	11.23
	8.2		9.3		28.2		28.8		34.2		12.0	
	11.8		12.8		31.6		32.3		37.7		15.6	
	15.2		16.4		34.9		36.4		41.0		19.0	
	18.5		20.0		38.4		39.5		44.3		22.6	
	585		643		78		121		379		767	
58	11.70		2 12.86		3 31.56		4 32.42		6 37.58		7 15.54	
	+64.33	+63.35	+64.33	+63.31	+64.33	+63.35	+64.33	+63.29	+64.33	+63.35	+64.33	+63.35
	−98		−102		−98		−1034		−978		−988	
59	15.05		3 16.17		4 34.91		5 35.71		7 40.93		8 18.89	
	−1.78	−13.82	−1.86	−14.05	−1.84	−13.84	−1.90	−14.18	−1.89	−13.92	−1.89	−13.89
59	13.27	−30.30	3 14.31	−29.40	4 33.07	−29.10	5 33.81	−28.86	7 39.04	−28.38	8 17.00	−28.23
	7.1		7.8		9.2		8.5		8.8		8.4	
	57 34.0		1 35.2		2 58.3		3 56.2		6 20.0		7 0.7	
	36.7		38.2		1.8		0.0		22.3		4.0	
	38.5		42.2		4.8		2.6		26.7		7.0	
	192		256		49		1788		90		117	
57	36.40	53 2 2.92	1 38.53	54 5 46.88	3 1.63	52 49 42.11	3 59.60	54 38 17.51	6 23.07	53 3 34.33	7 3.90	52 50 7.39
	+35.30	−33	+34.33	−31	+29.63	−24	+32.82	−28	+14.58	−6	+11.64	−4
	1,547.77	−11	1,535.67	−34	1,447.61	−54	1,516.14	−72	1,163.76	−79	1,065.95	−52
	9.779.13	+11.45	9.768.17	+12.59	9.781.13	+11.18	9.762.18	+13.18	9.778.79	+11.45	9.781.13	+11.18
	1.451.68 m	+22	1.428.62 m	+25	1.382.02 m	+22	1.403.10 m	+26	1.067.33 m	+22	0.971.86 m	+22
	25	−2110	20	−21.30	35	−20.90	45	−21.40	20	−20.90	35	−2080
	0 32.3	1 53.41	1 51.1	5 38.06	2 58.5	49 32.22	3 3 22.3	38 6.94	4 18.9	3 24.64	2 47.6	49 57.82
	44.1		0.3		7.9		30.9		27.9		57.7	
	76.4		111.4		64		532		468		1053	
	25 38.20		21 53.70		38 3.20		48 26.60		24 23.40		37 52.65	
	57 10.15		0 52.65		44 45.18		34 21.75		58 24.98		44 55.74	
	53 2 31.21		54 6 13.71		52 50 6.21		54 39 42.81		53 3 46.01		52 50 16.76	
	−28.29		−26.83		−24.10		−25.30		−11.68		−9.37	
	58 59.45	1 23.1	3 0.26	6 8.8	4 19.23	49 3.1	45 19.63	38 40.1	7 25.12	256.3	8 3.11	49 29.6

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1603R

6.24 6.25

1878 Feb. 3, Feb. 4, Obs. H. A. R. Rec. J. F. M.

	h m s		h m s		h m s		h m s		h m s		h m s		h m s	
α	4 18 37	17 18.3	4 27 38	26 18.9	4 29 49	28 29.8	4 30 15	28 55.9	4 36 1	34 42.4	4 37 66	36 57.4		36 24.4 / 32.7
S	° ′ 54 45	41.7 / 7.5	° ′ 53 13	10.1 / 8.5	° ′ 53 13	10.5 / 5.4	° ′ 53 14	10.6 / 8.8	° ′ 54 34	32.4 / 8.3	° ′ 54 35	33.5 / 8.8		
Feb. 3		+12.83		+10.88		+11.10		+11.24		+12.87		+13.17		
	18 1.0	13.71	26 59.1	11.82	29 11.4	12.04	29 37.9	12.18	35 26.2	13.81	37 8.5	14.11		
	4.5		2.6		14.9		41.5		29.8		12.4			
	8.1		6.0		18.2		44.8		33.2		15.9			
	11.5		9.7		21.6		48.2		36.9		19.5			
	15.2		12.9		25.0		51.7		40.5		23.1			
	403		302		411		241		166		794			
	18 8.06		27 6.04		29 18.22		29 44.87		35 33.32		37 18.88			
	+63.13	+62.21	+63.13	+62.26	+63.13	+62.26	+63.13	+62.26	+63.13	+62.21	+63.13	+62.21		
	−92		−87		−87		−87		−92		−92			
	19 10.27		28 8.30		30 20.48		30 47.08		36 35.53		38 18.09			
	−2.10		−2.17		−2.20		−2.21		−2.32		−2.35			
	19 8.17	−14.35 / −25.68	28 6.13	−14.15 / −23.52	30 18.28	−14.17 / −23.01	30 44.87	−14.18 / −22.89	36 39.21	−14.48 / −21.48	38 15.74	−14.50 / −21.80		
	7.0		8.6		6.0		8.7		8.7		8.8			
	17 38.5		26 30.0		28 43.3		29 41.7		34 58.4		36 58.7			
	41.7		34.4		45.3		43.8		2.6		1.3			
	44.9		38.2		48.0		42.4		6.0		4.7			
	51		126		166		12.9		80		47			
	17 41.70	+0.94 54 43 37.28	34.20	53 12 46.86	28 45.53	53 13 57.64	29 44.30	53 13 37.80 / 44.07	35 26.7	54 34 55.05	37 1.57	54 35 40.37		
	+26.36	− 18	+31.84	− 26	+32.69	− 28	+ 0.52	− 0	+30.65	− 24	+14.31	− 5		
	1.42095	− 76	1.50294	− 89	1.51441	− 67	9.41600	− 81	1.48643	− 50	1.15564	− 41		
	9.76146	+13.51	9.77728	+11.81	9.77711	+11.83	9.77711	+11.83	9.76307	+13.35	9.76289	+13.37		
	1.30719n	+ 26	1.40503n	+ 22	1.41630n	+ 22	9.61788n	+ 22	1.37428n	+ 26	1.04331n	+ 26		
	40	−20.90 10		−20.10 10		−20.00 10		−20.00 50		−20.20 50		−20.10		
	4 8.9	43 30.15	4 53.9	12 38.58	9 42.0	13 49.68	4 28.1	13 27.98	2 47.9	34 48.66	2 15.0	35 34.38		
	15.2		0.8		49.8		34.7		53.9		21.4			
	24.1		114.7		118		62.8		101.8		36.4			
	44 12.05		14 57.35		13 45.90		14 31.40		52 50.90		52 18.20			
	38 36.30		7 51.00		9 2.45		8 16.98		29 57.45		30 30.15			
	54 43 57.57		53 13 12.27		53 14 23.72		53 13 38.22		54 35 18.72		54 35 51.42			
	− 20.29		− 25.41		− 26.08		− 4.15 / 0.42		− 23.67		− 11.05			
Feb. 4	18 53.82	43 4.5 +12.73	27 51.98	12 15.1 +10.82	30 4.11	13 26.7 +10.85	30 30.69	13 7.1 +11.03	36 18.73	34 27.2 +12.66	38 1.24	35 13.2 +12.98		
	17 59.9	13.12	26 57.8	11.21	29 10.4	11.24	29 36.8	11.42	35 24.9	13.05	37 7.6	13.37		
	3.5		1.3		13.5		40.2		28.6		11.3			
	7.0		4.8		17.0		43.7		32.0		14.9			
	10.4		8.2		20.6		47.1		35.8		18.4			
	14.0		11.6		24.0		50.6		39.5		21.9			
	348		238		855		2184		1608		741			
	18 6.96		27 4.76		29 17.10		29 42.68		35 32.16		37 14.82			
	+ 64.34	+63.30	+64.34	+63.35	+ 64.34	+63.35	+ 64.34	+63.35	+ 64.33	+63.29	+ 64.34	+63.30		
	− 1.04		− 99		− 99		− 99		− 1.04		− 1.04			
	19 10.26		28 8.11		30 20.45		30 47.03		36 35.45		38 18.12			
	−2.08	−14.35 / −25.68	− 2.15	−14.15 / −23.52	−2.18	−14.17 / −23.01	− 2.18	−14.18 / −22.89	− 2.30	−14.48 / −21.48	− 2.32	−14.50 / −21.80		
	19 8.18		28 5.96		30 18.27		29 44.85		36 33.15		38 15.80			
	8.1		7.0		5.5		8.8		8.7		8.6			
	17 47.5		26 38.3		28 36.9		29 47.6		34 57.1		36 55.6			
	51.3		42.8		40.0		53.2		59.9		58.9			
	53.5		45.5		43.0		55.5		2.7		2.2			
	23		76		1199		63		1797		267			
	17 50.77	+0.39 54 43 38.10	26 42.53	53 12 48.52	28 39.97	53 13 57.39	29 52.10	53 13 37.18	34 59.90	54 34 54.29	36 58.90	54 35 41.02		
	+ 16.19	− 7	+ 22.23	− 13	+ 37.13	− 36	− 8.42	− 2	+ 32.26	− 27	+ 15.92	− 7		
	1.20925	− 77	1.34694	− 90	1.56972	− 67	0.92531n	− 83	1.50866	− 50	1.20194	− 41		
	9.76146	+13.31	9.77728	+11.59	9.77711	+11.66	9.77711	+11.66	9.76307	+13.18	9.76289	+13.20		
	1.09549n	+ 26	1.24900n	+ 22	1.47161n	+ 22	0.82720	+ 22	1.39651n	+ 26	1.08961n	+ 26		
	40	−21.00 10		−20.20 10		−20.10 10		−20.10 50		−20.20 50		−20.10		
	4 15.2	43 30.22	4 58.8	12 39.53	3 37.6	13 48.53	4 35.0	13 28.50	2 45.5	34 47.64	2 12.1	35 34.29		
	22.5		7.5		47.2		42.9		53.9		20.1			
	37.7		6.3		84.8		77.9		99.4		32.2			
	44 18.85		15 03.15		13 42.40		14 38.95		52 49.70		52 16.10			
	38 29.80		7 45.20		9 5.95		8 9.40		29 58.65		30 32.35			
	54 43 50.56		53 13 6.24		53 14 27.91		53 13 30.46		54 35 19.71		54 35 53.31			
	− 12.46		− 17.74		− 29.62		+ 6.72		− 24.92		− 12.29			
	18 53.83	43 4.5	27 51.81	12 16.0	30 4.10	13 25.5	30 30.64	13 5.6	36 18.67	34 26.2	38 1.30	35 13.3		

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

624 625

1878 Feb. 3, Feb. 4.

7

no Comp. for 1st #

	h m s		h m s		h m s		h m s		h m s		h m s	
α	4 40 14 (44)	39 24.9	4 41 52	40 34.7	4 56 31	55 17.6	4 57 1	55 47.4	5 6 32	5 10.6	5 12 24	11 3.3
δ	° ′ 54 12	10.2 / 8.0	° ′ 52 53	50.6 / 9.3	° ′ 51 34	32.5 / 9.0	° ′ 51 58	56.3 / 8.5	° ′ 53 11	8.6 / 9.0	° ′ 52 53	52.1 / 8.9
Feb. 3		~~+12.82~~		~~+10.61~~		~~+9.08~~		~~+9.81~~		~~+4.38~~		~~+11.04~~ +10.73
	40 9.0	13.76	41 17.2	11.55	56 1.2	10.02	56 29.7	10.75	5 54.3	12.32	11 35.7 11 48.2	11.98 11.67
	12.5		20.6		4.2		32.7		57.9		39.0 51.6	
	16.0		23.9		7.5		36.2		1.2		42.8 54.9	
	19.5		27.3		11.2		39.7		4.8		46.1 58.4	
	23.1		30.8		14.3		42.7		8.3		49.5 1.7	
	801		1198		384		1810		65		131 248	
	40 16.02		41 23.96		56 7.68		56 36.20		6 1.30		42.82 54.96	
	+ 63.13	+62.23	+ 63.14	+62.28	+ 63.14	+62.32	+ 63.14	+62.31	+ 63.14	+62.27	+ 63.95 + 63.15	+62.29 +62.29
	− 90		− 86		− 82		− 83		− 87		− 86 − 86	−14.41
	41 18.26		42 26.24		57 10.00		57 38.51		7 3.57		12 44.91 12 57.25	−12.33
	− 2.37		− 2.34		− 2.46		− 2.48		− 2.63		− 2.68 − 2.68	
	41 15.88	−14.45 −20.34	42 23.90	−14.22 −20.04	57 7.54	−14.08 −16.38	57 36.03	−14.15 −16.26	7 0.94	−14.43 −13.86	12 ~~54.61~~ 42.23 54.57	−14.41 −12.33
	8.7		9.1		9.3		8.5		9.0		9.0 8.2	
	39 47.7		40 46.5		55 28.2		56 38.7		5 26.6		11 55.4 11 22.4	
	50.4		49.3		32.2		41.8		31.2		26.3	
	54.1		52.0		35.4		45.5		33.9		28.1	
	22		278		58		60		17		168	2d #
	39 50.73	54 11 ~~25.48~~ 45.10	40 49.27	52 53 31.63	55 31.93	51 33 36.45	56 42.00	51 58 ~~27.91~~ 37.43	30.57	53 10 38.98	55.40 25.60	52 54 57.25 27.46
	+25.29	− 16	+34.69	− 31	+35.75	− 35	− 5.80	− 1	+30.73	− 24	+12.78 +29.36	− 23
	1.40295	− 20	1.54020	− 76	1.55328	− 74	0.76343n	− 83	1.48756	− 38	1.10653 1.46776	− 39
	9.76712	+12.93	9.78047	+11.46	9.77351	+9.98	9.78950	+10.44	9.77761	+11.78	9.78047 9.78047	+11.46
	1.19486n	+ 25	1.44545n	+ 22	1.47157n	+ 19	0.67771	+ 21	1.38995n	+ 22	0.91178 1.37301n	+ 22
	15	−19.80	30	−19.50	50	−18.30	25	−18.40	15	−18.20	30 30	−17.30
	1 1.5	11 39.06	4 6.9	53 23.68	4 0.1	33 28.17	4 33.2	58 29.78	2 3.1	10 33.10	3 14.9 3 14.9	52 54 46.01
	8.1		13.3		7.0		40.7		9.1		22.2 22.9	17.38
	96		202		71		739		122		371 08	− 72
	16 4.80		34 10.10		54 3.55		29 36.95		17 6.10		33 18.55 34 0.40	+11.46
	6 43.55		48 38.25		28 44.80		53 11.40		15 42.25		49 27.80 48 47.95	+ 22 −17.80
	54 12 4.82		52 53 59.52		51 34 6.07		51 58 32.67		53 11 3.52		52 54 51.07 54 9.22	54 11.85 43
	− ~~39.39~~ −19.72		− 27.89		− 29.62		+ 4.76	56 26.9 54.9	− 24.54		+ 8.16 − 23.61 / − 23.61 + 8.16	
	41 1.43	11 18.7	42 9.68	53 3.6	56 43.46 (53)	33 11.8	57 21.88	58 13.5	6 46.51	10 19.2	12 27.62 53 59.1 40.16 54 9.1	14.10
Feb. 4.		~~+12.72~~		~~+10.57~~		~~+9.08~~		~~+10.24~~		~~+4.29~~		~~+10.78~~ +10.88
	40 7.8	13.11	41 15.9	~~13.96~~ 10.	55 59.9	9.47	57 8.5	10.63	5 53.1	11.68	11 34.5 11 46.8	11.17 11.24
	11.1		19.3		3.1		12.1		56.7		38.0 50.3	
	14.7		22.7		6.3		15.3		0.1		41.6 53.5	
	18.2		26.0		9.8		18.7		3.5		44.8 57.2	
	21.9		29.6		13.2		22.3		7.1		48.4 0.8	
	737		1135		323		769		05		73 2686	
	40 14.74		41 22.70		56 6.46		57 15.38		6 0.10		41.46 53.72	
	+ 64.34	+63.32	+ 64.34	+63.36	+ 64.34	+63.42	+ 64.35	+63.40	+ 64.35	+63.37	+ 64.35 + 64.35	+63.37 +63.37
	− 1.02		− 98		− 93		− 95		− 98		− 98 − 98	−14.41
	41 18.06		42 26.06		57 9.88		58 18.78		7 3.47		12 44.83 12 57.09	−12.33
	− 2.35		− 2.32		− 2.44		− 2.46		− 2.61		− 2.67 − 2.66	
	41 15.71	−14.45 −20.34	42 23.74	−14.22 −20.04	57 7.44	−14.08 −16.38	58 16.32	−14.16 −16.05	7 0.86	−14.43 −13.86	12 42.16 54.43	−14.41 −12.33
	8.8		9.3		8.9		8.6		9.0		9.0 7.8	
	39 53.7		40 53.8		55 34.0		56 50.4		5 29.8		11 18.4 11 39.0	
	56.4		57.2		37.3		54.6		34.1		19.9 40.5	
	0.8		0.4		40.4		56.9		36.4		22.6 42.9	
	1709		1714		217		119		1003		09 191	1st #
	39 56.97	54 11 46.26	40 57.13	52 53 31.80	55 37.23	51 33 38.34	56 53.97	51 57 11.92	5 33.43	53 10 38.31	20.30 40.63	52 54 22.05
	+17.44	− 8	+25.57	− 18	+29.23	− 22	+21.41	− 12	+26.67	− 17	21.16 +13.06	− 12
	1.24166	− 20	1.40773	− 77	1.46583	− 74	1.33062	− 11	1.42602	− 38	1.32552 1.11694	− 63
	9.76712	+12.58	9.78047	+11.33	9.79351	+9.77	9.78983	+10.26	9.77761	+11.64	9.78047 9.78047	+11.31
	1.14159n	+ 75	1.31298n	+ 30	1.38412n	+ 85	1.24528n	+ 21	1.32841n	+ 22	1.23077 1.02219n	+ 22
	15	−19.70	30	−19.50	50	−18.40	30	−18.50	15	−18.30	30	−17.90
	1 4.8	11 39.47	4 12.5	53 23.26	4 4.9	33 29.41	0 34.9	57 4.05	2 5.2	10 31.69	3 26.1	2d # 54 15.32
	13.8		21.6		8.8		44.9		14.4		34.6	54 2.54
	186		341		137		798		196		3 07	− 5 / − 63
	16 9.30		34 17.05		54 6.85		30 39.90		17 9.80		30 30.35	+ 11.31
	6 39.05		48 31.30		28 41.50		52 8.45		5 38.55		49 18.00	+ 22 −17.90
	54 12 0.11		52 53 52.36		51 34 2.56		51 57 29.51		53 10 59.61		52 54 39.06	54 21.88
	−13.85		− 20.56		− 24.22		− 17.59		− 21.30		− 17.01 − 10.52	
	41 1.26	11 19.1	42 9.52	53 3.2	56 53.36	33 13.0	58 2.16	56 48.0	6 46.43	10 17.8	12 27.75 40.02	54 3.0 9.6

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1608R

1878phae.proj.160BR

624 625

1878 Feb. 3 Feb. 4 Obs. K. K. Ko. Roe. P. F. Mc.

	h m s		h m s		h m s		h m s		h m s		h m s	
α	5 13 0	11 39.0	5 18 20	17 5.5	5 28 32	27 16.7	5 37 0	35 44.0	5 45 8	43 46.3	5 45 52	44 29.8
δ	° ′ 52 38	565 9.0	° ′ 50 29	28.1 9.3	° ′ 49 53 Obs. 50°	385 8.5	° ′ 54 36	35.4 9.5	° ′ 54 50	489 9.0	° ′ 54 24	23.4 9.0
Feb. 3		+12.67		+8.17		+8.79		+10.58		+12.98		+12.75
	12 27.1	13.61	17 48.3	9.11	27 51.5	9.73	36 21.8	13.52	44 36.5	13.92	45 17.1	13.69
	30.6		51.8		54.7		25.2		40.0		20.8	
	33.9		54.9		58.2		29.0		43.6		24.1	
	37.3		58.0		1.3		32.2		47.2		27.9	
	40.8		1.5		4.4		36.0		52.8		31.4	
	1697		2745		401		443		181		1213	
	12 38.92		17 54.90		27 58.02		36 28.86		44 43.62		45 24.26	
	+ 63.15	+62.26	+ 63.15	+62.36	+ 63.15	+62.35	+ 63.16	+62.25	+ 63.16	+62.25	+ 63.16	+62.25
	− 89		− 79		− 80		− 91		− 91		− 91	
	13 36.20		18 57.26		29 0.37		37 31.11		45 45.87		46 26.51	
	−2.74	−14.62	−2.64	−14.00	−2.76	−14.11	−3.04	−14.83	−3.14	−14.89	−3.12	−14.81
	13 33.46	−12.18	18 54.62	−10.80	28 57.61	−8.16	37 28.07	−5.88	45 42.73	−3.81	46 23.39	−3.63
	8.7		9.0		9.0		9.6		9.1		8.8	
	12 23.8		17 24.4		27 43.6		36 45.9		44 13.0		45 2.4	
	26.5		27.7		45.7		48.3		16.7		8.3	
	30.0		31.2		49.8		52.6		20.0		11.8	
	284	+0.94	233		191		268		497		225	
	12 26.50	53 57 0.42	17 27.77	50 29 25.97	27 46.81	50 54 37.63	36 46.93	54 33 23.39	44 16.57	54 48 56.60	45 7.57	54 24 31.82
	+ 7.14	− 2	+27.13	− 20	+11.65	− 4	−20.07	− 10	+27.05	− 19	+16.76	− 7
	0.85370	− 20	1.43345	− 59	1.06633	− 61	1.30255	− 90	1.48217	− 70	1.22424	− 61
	9.76974	+12.64	9.80351	+8.79	9.79965	+9.26	9.76342	+13.32	9.76057	+13.61	9.76501	+13.17
	0.74822	+ 25	1.36174	+ 17	0.99076	+ 18	1.19075	+ 26	1.31752	+ 26	1.11406	+ 26
	30	−15.00	55	−16.80	30	−16.20	50	−16.50	35	−16.00	0	−15.80
	1 0.5	58 56.03	3 17.5	29 18.28	3 19.0	54 31.06	4 59.4	33 20.41	3 49.4	48 54.52	3 21.4	24 29.71
	6.7		23.8		25.6		4.1		55.1		28.2	
	7.2		41.3		44.6		35		1045		9.6	
	31 ~~36.0~~	240	58 20.65		33 22.30		55 1.75		38 52.25		3 24.80	
	51 44.75		24 27.70		49 26.05		27 46.60		43 56.10		19 23.55	
	53 57 6.02		50 29 48.97		50 54 47.32		54 33 7.87		54 49 17.37		54 24 44.82	
	− 5.60		−23.00		− 9.79		+15.52		− 20.77		− 13.00	
Feb. 4	13 18.84	56 48.8 +12.49	18 40.62	29 7.5 +7.99	28 43.50	54 22.9 +8.67	37 13.24	33 14.5 +12.48	45 27.84	48 50.7 +13.01	46 8.58	24 26.1 +12.51
	12 —	12.88	17 47.3	8.38	27 50.4	9.06	36 20.8	12.87	44 35.5	13.40	45 16.0	12.90
	—		50.3		53.8		24.0		38.9		19.4	
	33.0 33.00		53.7		57.0		28.1		42.4		23.2	
	36.5 33.00		56.8		0.3		31.1		46.2		26.7	
	40.0 33.00		0.3		3.5		34.5		49.8		30.2	
	12 33.00		2684		350		383		128		1155	
	+ 64.35	+63.33	17 53.68		27 57.00		36 27.70		44 42.56		45 23.10	
	− 1.02		+ 64.35	+63.45	+ 64.35	+63.43	+ 64.36	+63.32	+ 64.36	+63.31	+ 64.36	+63.32
	13 36.33		− 88		− 92		− 1.04		− 1.05		− 1.04	
	− 2.72		18 57.13		29 0.43		37 31.02		45 45.87		46 26.42	
	13 33.61	−14.62	−2.63	−14.00	−2.75	−14.11	−3.02	−14.83	−3.12	−14.89	−3.10	−14.81
		−12.18	18 54.50	−10.80	28 57.68	−8.16	37 28.00	−5.88	45 42.75	−3.81	46 23.32	−3.63
	8.7		8.8		9.2		9.6		9.3		8.9	
	12 40.5		17 19.0		27 35.8		35 58.1		44 32.7		45 38.5	
	43.6		21.6		38.9		1.4		36.4		43.4	
	47.0		25.2		41.4		4.8		38.0		46.4	
	111	+0.39	58		261		43		171		93	
	12 43.70	53 57 2.05 56 45.27	17 21.93	50 29 25.99	27 38.70	50 54 39.03	36 1.43	54 33 24.15	44 35.70	54 48 58.24	45 43.10	54 24 31.78
	− 10.70	− 3	+31.75	− 28	+18.30	− 9	+26.27	− 18	+ 6.86	− 1	−20.00	− 10
	1.02938	− 22	1.50174	− 59	1.26245	− 59	1.41946	− 79	0.83632	− 74	1.30103	− 70
	9.76974	+12.49	9.80351	+8.69	9.79965	+9.17	9.76342	+13.19	9.76057	+13.50	9.76501	+13.05
	0.92390	+ 25	1.43003	+ 17	1.18688	+ 18	1.30766	+ 26	0.72167	+ 26	1.19082	+ 26
	30	−18.10	55	−16.90	30	−16.30	50	−16.70	35	−16.11	0	−16.00
	1 11.7	56 56.83	3 12.9	29 17.47	3 11.1	54 31.79	4 21.4	33 20.32	4 2.6	48 55.53	3 49.4	24 28.68
	19.8		20.1		18.9		28.5		9.2		56.9	
	11.5		330		100		99		118		1063	
	31 15.75		58 16.50		33 15.00		54 24.95		39 5.90		3 53.15	
	51 32.60		24 31.85		49 33.36		28 23.40		43 47.45		18 55.20	
	53 56 53.66		50 29 52.91		50 54 54.41		54 33 44.46		54 49 3.51		54 24 16.26	
	+ 8.39		− 26.92		− 15.38		−20.31		− 5.27		+15.52	
	13 18.99	5644.6	18 40.50	29 6.7	28 43.57	54 23.6	37 13.17	33 14.4	45 27.86	48 51.7	46 8.51	24 25.05

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16038R

1878 Feb. 5, Feb. 6, Obs. U. A. Pa. Rec'd. L. Me.

	h m s		h m s		h m s		h m s		h m s		h m s	
α	2 56 51	55 39.0	3 14 20	13 11.8	3 16 12	15 3.2	3 29 4	21 54.5	3 33 47	32 37.4	3 37 39	36 42.8
δ	° ′	29 3	° ′	14 0	° ′	30 2	° ′	10 0	° ′	3 3	° ′	37 4
	52 34	8.5	57 17	7.8	57 34	9.3	50 13	9.0	57 6	9.4	55 42	8.6

Feb. 5

		+11.48		+9.77		+9.45		+7.89		+8.33		+11.51
	57 8.1	10.84	14 40.9	47	16 33.7	81	23 25.1	8.25	34 9.1	69	38 18.1	87
	11.6		44.4		37.2		28.2		12.4		21.3	
	15.0		47.5		40.5		31.4		15.9		25.0	
	18.3		50.9		43.5		34.8		19.0		28.7	
	21.7		54.3		46.9		37.8		22.4		32.2	
	747		380		18		73		788		12.53	
	576 14.92		183 47.60		185 40.36		282 31.46		342 15.76		38 25.06	
	+ 65.35	+64.43	+ 65.35	+64.47	+ 65.35	+64.46	+ 65.35	+64.50	+ 65.35	+64.47	+ 65.36	+64.40
	− 92		− 888		− 889		− 846		− 888		− 986	
	587 19.37		184 52.07		186 44.82		283 35.96		384 20.23		388 29.46	
	− 0.94		− 1.17		− 1.19		− 1.27		− 1.41		− 1.49	
	57 18.43		14 50.90	−12.98	16 43.63	−13.04	23 34.69	−12.95	34 18.82	−13.22	38 27.97	−13.67
				−39.72		−39.36		−38.01		−35.76		−34.89
	9.0		7.8		9.4		9.0		9.4		8.9	
	57 13.2	Corr'n Eq.	14 22.8		16 19.6		23 4.7		33 35.9		37 54.6	
	15.9	− 0.21	26.3		22.3		8.0		38.4		56.8	
			28.3		25.7		10.5		41.9		59.4	
	91	+0.36	174		76		232		262		208	
	57 13.03	52 34 44.47	14 3 25.80	51 20 12.03	16 5 22.53	51 35 25.52	282 7.73	50 15 5.66	33 2 38.73	51 8 6.21 14.58	37 6 56.93	53 44 0.20
	+ 039	0	+ 21.80	− 13	+ 17.83	− 9	+ 23.73	− 15	+ 37.03	− 37	+ 28.13	− 21
	1.59106	− 61	1.33846	− 47	1.25115	− 45	1.37530	− 49	1.56855	− 81	1.44917	− 68
	9.78362	+10.88	9.79573	+9.52	9.79319	+9.80	9.80580	+8.38	9.97748	+9.33	9.77199	+12.18
	0.49946	+ 21	1.25897	+ 19	1.16912	+ 19	1.30588	+ 16	1.54409	+ 18	1.34594	+ 23
	50	− 21.70	5	− 21.40	50	− 21.40	10	− 21.07	15 1.49095	− 21.10	40	− 21.80
n = −.781	3 15.9	34 33.40	2 33.6	19 59.89	2 23.8	35 13.72	2 38.2	14 52.70	34 27.1	7 5380	3 42.1	43 49.87
	27.9		45.1		34.7		49.1		37.6		52.2	50.06
Rro = −.18	43.8		78.7		58.5		87.3		64.7		94.3	
	53 21.90		7 39.35		52 29.25		12 43.65		19 32.35	−21	43 47.15	
20.97	29 26.45		15 9.00		30 19.10		10 4.70		3 16.00		39 1.20	
+5′ 21.18	52 34 47.63		51 20 30.18		51 35 40.24		60 15 25.88		51 8 37.18		53 44 22.38	
	− 3.16		−18.15		− 14.76		−20.22		−22.60		− 22.18	
									36.97			
Feb. 6			14 37.92	19 20.2	16 30.59	34 34.4	23 21.74	14 14.7	34 5.60	7 18.0	38 14.30	43 15.2
				+9.15	Not seen.							+11.44
			14 7.4	9.69							38 18.2	11.98
			17.6								21.7	
			47.8 78								25.3	
			60.8 75								28.4	
			74.1								32.0	
			392								125.6	
			14 47.65								38 25.12	
			+ 5.50	+4.68							+ 5.48	+4.59
			− 82								− 89	
			14 52.33								38 29.71	
			− 1.14								− 1.46	
			14 51.19	−12.98							38 28.25	−13.67
				−39.72								−34.89
			8.5								4.7	
			14 38.7								37 52.3	
			42.0								56.7	
			45.2								59.0	
			59	+0.54							180	
			14 41.97	51 20 10.73							37 56.03	53 43 59.86
			+ 5.68	− 1							+ 29.12	− 22
			0.76 5.37	− 52							1.46419	− 68
			9.79573	+9.49							9.77199	+12.11
			0.68915	+ 19							1.36096	+ 23
			5	−21.40				45			40	− 21.80
n = −.66			2 46.1	19 59.02				4 27.1			3 38.9	43 50.04
			0.1	18				37.6			52.9	
Rro = −.18			16.2								9.8	
			7 53.10								43 45.90	
			14 55.25								39 2.95	
			51 20 15.62								53 44 22.82	
+5′ 20.37			− 4.89								− 22.96	
			14 38.21	93 19 19.5							38 14.58	43 15.1

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1603R

D 626 627

1878 Feb. 5, Feb. 6, Obs. W. A. R. Rec. J. F. M.

	h m s		h m s		h m s		h m s		h m s		h m s		h m s	
α	3 38 38	37 27.9	3 39 48	38 32.2	3 54 0	52 43.4	3 57 56	56 39.0	4 0 22	3 59 5.8	4 0 48	3 59 30.3
	57 232 598											
δ	° ′	1.8 9.2	° ′	122 6.5	° ′	523 7.6	° ′	52 39.5 −8.7	° ′	469 8.9	° ′	458 8.3
	67 5		52 16		52 56		53 3		52 50		52 48	

Feb. 5

	+9.20		+10.55		+11.23		+10.66		+10.94		+10.65	
	39 0.1	56	40 6.7	91	57 18.7	39	58 59.8	11.02	0 42.2	11.30	1 7.3	11.01
	3.4		9.7		22.2		3.4		45.6		10.5	
	6.3		13.3		25.5		6.7		48.9		14.0	
	9.8		16.6		28.7		10.0		52.0		17.6	
	13.3		19.7		32.4		13.5		55.5		20.9	
	329		660		1275		334		442		703	
	658		1320		2550		668		4884		14,06	
	+65.36 +64.48		+65.36 +64.45		+65.36 +64.42		+65.36 +64.42		+65.36 +64.42		+65.36 +64.43	
	− 988		− 981		− 984		− 984		− 984		− 93	
	11.06		17.65		29.92		11.10		53.26		18.49	
	− 1.47	−13.27	− 1.50	−13.46	− 1.69	−13.75	− 1.76	−13.82	− 1.77	−13.81	− 1.78	−13.81
	39 9.59	−34.80	40 16.15	−34.50	54 28.23	−31.38	59 9.34	−30.20	0 51.49	−29.94	1 16.71	−29.85
	8.8		7.2		7.4		6.7		8.7		7.4	
	38 56.0		40 4.4		53 51.3		58 34.8		0 20.8		0 38.4	
	59.2	−0.21	6.8		54.7		38.0		24.1		42.9	
	1.8		8.8		58.4		40.8		27.8		46.0	
	170		200		144		236		133		1283	
	387 5907 51	+0.36 6 30.29	399 6.67 52	16 52.20	538 54.80 52	56 29.93	587 37.87 53	3 35.86	859 24.43 52	60 53.73	59 0 42.7 52	49 53.63
	+ 7.58	− 2	+6.53	− 1	+30.70	− 25	+28.81	− 22	+24.41	− 15	+31.29	− 26
	0.879 64	− 27	0.814491	− 22	1.487 14	− 22	1.459 54	− 76	1.387 57	− 34	1.495 41	− 50
	9.797 78	+ 9.31	9.786 58	+10.57	9.779 97	+11.28	9.778 72	+11.42	9.780 97	+11.21	9.781 13	+11.19
	0.802 23	+ 18	0.726 27	+ 21	1.391 89	+ 22	1.363 11	+ 22	1.293 32	+ 22	1.401 32	+ 22
	20	−21.00 10		−21.40 30		−21.30 20		−21.20 35		−21.10 35		−21.00
	1 26.9	6 18.64	1 5.9	16 41.50	1 9.0	56 19.81	4 5.1	3 24.97	1 50.2	50 43.72	2 44.9	49 43.43
	38.9		18.1		20.9		17.1		2.1		56.5	
	658		240		299		222		1123		1014	
	21 32.90		11 12.00		31 14.95		24 11.10		36 56.15		37 50.70	
	21 15.45		11 36.35		51 33.40		58 37.25		45 52.20		44 57.65	
	51 6 36.63		52 16 57.53		52 56 54.58		53 3 68.43		52 51 13.38		52 50 18.83	
	− 6.34		− 5.33		− 24.65		− 23.07		− 19.65		− 25.20	
	38 56.32	5 43.8	40 2.69	16 7.0	54 14.48	55 48.4	58 55.52	2 54.7	0 37.68	50 13.8	1 2.90	49 13.6
		+9.11		+10.43		+11.83				+10.81		+10.79

Feb. 6

	39 0.1	9.65	40 6.3	1097	54 18.6	57			0 42.0	11.35	1 7.4	11.31
	3.3		9.9		22.0				45.3		10.7	
	6.4		13.2		25.2				48.7		14.1	
	9.4		16.4		28.9				52.0		17.5	
	13.2		20.0		32.5				55.9		21.1	
	324		658		1272				2439		708	
	39 6.48		40 13.16		54 25.44				0 48.78		1 14.16	
	+ 5.98 +4.67		+ 5.47 +4.63		+ 5.48 +4.58				+ 5.46 +4.58		+ 5.46 +4.58	
	− 81		− 84		− 88				− 88		− 88	
	39 11.15		40 17.79	−13.46	54 30.02	−13.75			0 53.36		1 18.74	
	− 1.45	−13.27	− 1.48	−34.50	− 1.67	−31.38			− 1.75	−13.81	− 1.75	−13.81
	39 9.70	−34.80	40 16.31		54 28.35				0 51.61	−29.94	1 16.99	−29.85
	9.5		7.3		7.5							
	38 52.3		39 50.3		53 54.0				0 16.6		1 2.2	
	54.6		54.6		57.6				18.8		4.9	
	57.4		55.9		59.8				22.8		7.7	
	143	+0.54	108		214				592		148	
	38 54.77 51	6 29.02	39 53.60 52	16 51.67	53 57.13 52	56 29.24			0 19.78 52	50 52.44	1 4.93 52	49 52.99
	+11.71	− 4	+19.56	− 11	+28.31	− 21			+29.05	− 22	+9.23	− 3
	1.068 56	− 27	1.291 37	− 18	1.451 94	− 23			1.463 15	− 34	0.965 20	− 56
	9.797 78	+ 9.24	9.786 58	+10.52	9.779 97	+11.25			9.780 97	+11.15	9.781 13	+11.14
	0.991 12	+ 18	1.202 73	+ 20	1.356 69	+ 22			1.369 80	+ 22	0.871 11	+ 22
	20	−21.10 10		−21.40 30		−21.30			35	−21.10 35		−21.10
	1 22.8	6 17.57	0 53.6	16 41.24	1 9.8	56 19.51			1 45.9	50 42.69	3 0.7	49 43.20
	37.0		8.6		24.2				59.9		15.9	
	598		1222		335				1058		166	
	21 29.90		11 1.10		31 16.75				36 52.90		38 8.30	
	1 18.45		11 47.25		51 31.60				45 55.45		44 40.05	
	51 6 38.82		52 17 7.62		52 56 51.97				52 51 16.82		52 50 0.42	
	− 9.80		−15.95		− 22.73				−23.38		− 7.43	
	38 56.43	5 42.8	40 2.85	16 6.7	54 14.60	55 48.1			0 37.80	50 12.8	1 2.18	49 13.4

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1603R

626 627

1878 Feb. 5, Feb. 6

	h m s		h m s		h m s		h m s		h m s		h m s	
α	4 4 20	3 8.1	4 11 12	9 39.7	4 11 45	10 26.6	4 28 19	27 0.2	4 28 30	27 11.2	4 30 2	28 44.7
δ	° ′ 54 20	270 50 38 8.5 49		49 55 0 8.5	53 38	55 0 9.0	52 27	248 9.0	52 30	273 8.5	52 14	11.3 8.0
Feb. 5		+9.39 75		76.5° +8.38 74				+10.37 43		+10.58 89		+9.94 10.30
	4 42.8		12 9.9				28 38.3		28 49.2		30 23.5	
	46.5		13.3				41.6		52.2		27.0	
	49.8		16.7				45.2		55.7		30.3	
	52.9		19.8				49.5		59.0		33.7	
	56.4		23.0				52.2		2.7		37.0	
	484		827				2268		2788		1515	
	34 49.68		112 16.54				287 45.36		287 55.76		29 30.30	
	+ 65.36	+64.47	+ 65.36	+64.48			+ 65.37	+64.45	+ 65.37	+64.45	+ 65.37	+64.46
	− 88		− 88				− 92		− 92		− 90	
	48 54.15		132 21.02				298 49.81		39 0.21		310 34.76	
	− 1.79		− 1.88				− 2.11		− 2.18		− 2.16	
	4 52.36	−13.63 −2901	12 17.14				28 47.70	−1402 −2340	28 58.09	−1403 −2331	30 32.63	−14.00 −22.95
	8.3		8.2				8.8		7.2		7.7	
	4 15.9		11 48.7				28 10.0		28 32.7		29 54.9	
	20.3		52.5				13.2		35.6		58.5	
	23.9	− 0.21	54.8				15.6		38.9		1.6	
	01		60				88		172		175 0	
	3 20.03	51 30 58.64	11 52.00	50 58 27.64			298 12.93	52 25 31.86 39 20.56	287 25.73	52 30 31.93	298 38.33	52 14 38.19
	+29.65	− 24	+24.54	− 16			−27.56	− 20	+20.03	− 11	+31.97	− 27
	1.47202	− 32	1.38987	− 79	1.51095		1.47041 243	− 76	1.30168	− 43	1.50474	− 56
	9.79339	+9.76	9.79903	+9.15	9.78461		9.78461	+1082	9.78428	+10.86	9.78691	+1056
	1.39079 m	+ 19	1.31368 m	+ 18	1.42034		1.34983	+ 21	1.21074 m	+ 21	1.41643 m	+ 21
	55	−20.60	55	−18.20			55	−20.10	55	−20.00	10	−19.90
	1 40.5	30 47.58	4 15.8	58 17.97			41 5.7	29 10.64 26 21.58	2 15.6	30 22.61	3 10.41	14 28.48
	52.1		26.8				17.0		27.1			
	926		426				227		427		105	
	56 46.30		29 21.30				59 11.35		57 21.35		13 5.25	−10
	2.6 2.05		53 27.05				23 37.00		25 27.00		9 43.10	
	51 31 23.23		50 58 48.23				52 28 58.18		52 30 48.18		52 15 4.28	
	−24.57		−20.57				+ 2238 −26.32		−16.23		−26.07	
Feb. 6	4 38.73	30 18.6				+11.42	28 33.68	2758.6	28 44.06	29 59.3 +1039	30 18.63	14 5.5 +9.94
					12 5.3	11.96	28 38.4	10.46	28 49.4	93	30 23.4	10.42
					8.9		41.7		52.4		26.9	
					12.4		45.0		55.8		30.0	
					15.8		48.5		59.2		33.4	
					19.5		51.6		2.5		36.7	
					619		2252		2793		1504	
					12 12.38		28 45.04		28 55.86		30 30.08	
					+ 5.43	+4.54	+ 5.43	+4.57	+ 5.43	+4.57	+ 5.43	+4.59
					− 91		− 86		− 86		− 84	
					12 16.92		28 49.61		29 0.43		30 34.67	
					− 1.92		− 2.09		− 2.09		− 2.10	
					12 15.00	−14.13 −2730	28 47.52	−1402 −2340	28 58.34	−1403 −2331	30 32.57	−14.00 −22.95
					8.0		8.8		7.8		7.8	
					11 31.5		28 8.8		28 24.6		29 55.6	
					34.7		12.8		27.3		58.7	
					38.5		15.8		30.0		1.5	
					147		374		819		1758	
					11 34.90	53 58 4.50	28 12.47	52 28 30.38	28 27.30	52 30 30.11	29 58.60	52 14 36.73
					+3.48	− 37	+32.57	− 28	+28.56	− 21	+31.48	− 26
					1.57380	− 83	1.51282	− 76	1.45576	− 41	1.49803	− 56
					9.76909	+1238	9.78461	+1074	9.78428	+1080	9.78691	+1050
					1.46797 m	+ 24	1.42221 m	+ 21	1.36482 m	+ 21	1.40972 m	+ 20
					25	−21.10	55	−20.105	55	−20.10	10	−20.00
					4 27.9	57 55.36	41 4.7	28 20.73	2 8.1	30 20.94	2 58.8	14 27.15
					41.8		19.1		22.8		13.8	
					69.7		238		30.9		126	
					29 34.85		59 11.90		57 15.45		13 6.30	
					53 13.50		23 36.45		25 32.90		9 42.05	
					53 58 33.87		52 28 56.82		52 30 53.27		52 15 2.42	
					− 29.37		−26.44		−23.16		−25.69	
					12 0.84	57 28.1	28 33.50	27 57.3	28 44.31	29 57.6	30 18.57	14 4.2

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16BR

626 627

1878 Feb. 5. Feb. 6. Obs. W. A. R. Rec. J. F. M.

34 513 48.0

	h m s		h m s		h m s		h m s		h m s		h m s	
L.	4 30 42	29 242	4 36 3	34 44.3	4 37 41	36 209	4 56 84	55 203	5 6 52	5 3.10	5 6 57	5 35.9
S	° ′	19.3 9.0	° ′	501 8.7	° ′	5 1.4 5 7.0	° ′	23.7 5.2	° ′	246 9.0	° ′	25.2 Var

Feb. 5

+1080 +17.44 +12.81 +9.33

31 2.4 11.16 | 36 26.4 36 35.3 | 1340 13.17 | 58.6 69
5.8 | 28.8 38.5
9.0 | 33.6 42.2
12.5 | 37.2 45.8
15.7 | 41.0 49.5

454 | 1680 2114 | 274
380 9.08 | 35 3360 4228 | 576 5.48
+ 65.37 +64.45 | + 65.37 +65.37 | +64.36 +64.36 | + 65.37 +64.48
− 92 | − 1081 − 1081 | − 14.54 | − 889
38 13.53 | 36 37.96 36 46.64 | − 21.48 | 587 9.96
− 2.14 | − 2.29 − 2.29 | − 2.41
31 11.39 −1403 −2277 | 36 35.67 36 44.35 | −14.54 −21.48 | 57 7.58 −1405 −1638

8.4 | 8.9 8.7 2nd's 1845 | Not seen | 6.2

30 54.7 | 35 58.9 36 17.9
58.0 | 1.5 22.2
2.8 −0.21 | 4.8 25.4
29 1755 +.36 | 52 55
30 58.50 52 22 32.16 | 35 1.73 35 21.85 | 56 31.1
33.8
36.0
109
58.5 23.63 51 26 8.97

+1058 | − 34 31.84 +20.46 | +40.55 | +11.77 | +3185 | − 27
1.02036 | − 9 1.53238 1.31066 | 1.60799 | 1.07078 | 1.50311 | − 29
9.78560 | +10.71 9.76021 9.75785 | 9.76021 | 9.75985 | 9.79463 | + 9.70
0.93074m | + 21 | 1.49298m | 0.97541m | 1.42252m | + 19
5 | −19.90 | 35 30 | 1st # | 2nd # | 0 | − 17.90 18.30 | 0

0 23.1 22 23.21 | 121.0 4 42.5 | 54 51 12.57 | 54 53 13.01 | 1 28.3 25 59.75 | 7.9 | 7.9
34.6 | 30.7 37.5 | − 41 | − 4 | 39.9 | 18.6 | 18.6
57.7 | 51.7 95.0 | − 25 | − 86 | 682 | 265 | 265
5 28.85 | 36 25.85 34.750 | +13.43 | +13.44 | 1 34.10 | 1 13.25 | 1 13.25
17 19.50 | 46 22.50 48 0.85 | + 27 | 27 | 21 14.25
52 22 40.68 | 54 51 43.68 53 22.03 | − 20.40 | − 20.40 | 51 26 35.43
− 8.52 | − 31.11 − 9.0 | 51 5.36 | 53 5.57 | − 26.46

30 57.36 220.4 | 36 21.13 | 50 43.9 52 44.1 | 56 53.50 25 43.6
+10.73 | 29.81 | +18.14 +12.63 | +11.60 | +9.29 | +11.33 | +11.71
Feb. 6

31 2.1 11.24 | 36 26.0 36 34.8 | 13.68 13.17 | 38 7.0 | 12.14 | 56 58.7 9.83 | 7 13.4 | 7 18.3
5.5 | 28.8 38.4 | | 10.4 | | 2.0 | 17.2 +11.18 | 21.9 +11.54 +12.25
8.8 | 33.5 41.9 | | 18.9 | | 5.4 | 20.4 | 25.2
12.2 | 37.2 45.5 | | 17.3 | | 8.7 | 24.0 | 28.7
15.6 | 40.5 49.3 | | 20.9 | | 12.0 | 27.5 | 32.2

442 | 1671 99 | | 695 | | 268 | 25 | 1263
31 8.84 | 33.42 41.98 | | 38 13.90 | | 57 5.36 | 7 20.50 | 7 25.26
+ 5.43 +4.57 | + 5.43 + 5.43 | +4.49 +4.49 | + 5.43 +4.54 | | + 5.41 +4.58 | + 5.41 +4.52 | + 5.40 +4.57
− 86 | − 94 − 94 | | − 89 | | − 83 | − 89 | − 89
31 13.41 | 36 37.91 36 46.47 | −14.54 −21.48 | 38 18.44 | | 57 9.94 | 7 25.02 | 7 29.77
− 2.11 −1403 −2277 | − 2.26 − 2.26 | | − 2.23 | | − 2.39 −1405 −1638 | − 2.58 −1448 −1374 | − 2.68 −1448 −1377
31 11.30 | 36 35.65 36 44.21 | −14.54 −21.48 | 38 16.21 | | 57 7.55 | 7 22.44 | 7 27.19

8.3 | 9.2 | 5.0 | 8.7 | 8.0

30 49.9 | 36 0.2 36 11.5 | +39.05 +18.35 | 37 54.7 | 56 32.5 | 6 33.3 | 6 56.7
53.3 | 2.6 15.3 | 1.59162 1.26364 | 56.3 | 35.7 | 36.4 | 59.7
56.2 | 6.0 18.7 | 9.76003 9.76003 | | 38.2 | 38.2 | 2.0
94 +.54 | 88 15.2 | 1.14845m | 110 | 164 | 179 6 | 284
30 53.13 52 22 32.84 | 2.93 15.07 | 1.47643m | 37 55.50 53 30 27.23 | 56 35.47 51 26 8.54 | 6 35.97 53 25 31.31 | 6 35.47 53 26 54.20
+ 15.71 | − 7 +30.49 +26.91 | | + 18.40 | − 8 | + 29.89 | − 24 | + 44.53 | − 51 | + 25.79 | − 18
1.19618 | − 7 4.84116 4.42991 | | 1.26482 | − 43 | 1.47553 | − 29 | 1.64865 | − 90.18 | 1.41145 | − 17
9.78560 | + 10.66 9.76003 9.75895 | | 9.77439 | + 11.88 | 9.79463 | + 9.63 | 9.77507 | + 11.79 | 9.77490 | + 11.83
1.10656m | + 21 1.36897 1.31364m | 1st # 2nd # | 1.16379m | + 23 | 1.39494m | + 19 | 1.54850m | + 23 | 1.31113m | + 23
5 | −20.00 35 25.30 | 54 51 55 | | −19.90 | | − 18.60 | | −18.50 | | − 18.50

0 15.8 22 24.11 | 120.5 4 35.7 | 12.12 12.25 | 2 20.9 | 30 19.471 | 28.4 | 25 59.77 | 6 59 55.9 | 25 24.68 | 47.2 | 26 47.95
30.4 | 32.8 49.1 | − 24 − 19 | 32.9 | | 42.3 | | 8.2 | 26 23.96 | 0.9
46.2 | 53.3 8.48 | − 25 − 85 | 53.8 | | 70.7 | | 41 | | 10.81
5 23.10 | 36 26.65 36 42.40 | +13.37 +13.41 | 57 26.90 | | 1 35.35 | | 2.05 | | 54.05
17 25.25 | 46 21.70 53 3.78 | + 26 + 26 | 25 27.45 | | 21 13.00 | | 24 46.30 | | 21 54.30
52 22 45.62 | 54 51 42.07 53 26.32 | − 2050 −2050 | 53 30 41.82 | | 57 26 33.37 | 53 26 6.67 | 53 25 14.67
− 12.78 | + 2339 − 2059 | 53 4.92 | − 14.59 | | − 24.83 | − 35.36 | − 20.47
30 57.27 22 1.34 | − 29.95 − 14.07 | 36 21.11 29.67 | 50 43.8 52 43.4 | | 56 53.50 | 25 43.4 | 7 7.96 | 26 10.2 | 7 12.31 | 26 34.2

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1618R

626 627

13

1878 Feb. 5 · Feb. 6

	h m s	h m s	h m s	h m s	h m s	h m s
α	5 18 13	16 57.7	5 45 14	43 52.6	5 49 29	48 6.6	6 0 41	5 59 19.1
δ	° ′		° ′		° ′		° ′	
	54 30	49.1	34 10	96	34 22	223	53 89	384
		8.5		9.0		8.5		8.0

Feb. 5

+12.98 +12.56 +11.39

	34.2	13.34	38.6	92			1 0.8	75
	38.0		42.7				4.3	
	41.5		46.0				7.7	
	45.2		49.4				10.9	
	48.8		53.2				14.6	
	77		299				383	
	187 41.54		484 45.98				01 7.66	
	+ 65.38	+64.37	+ 65.38	+64.40			+ 65.38	+64.42
	− 98		− 98				− 98	
	188 45.91		485 50.38				81 12.08	
	− 2.76		− 3.06				− 3.18	
	18 43.15	−14.82	45 47.32	−14.76			1 8.90	−14.66
		−10.83		−3.81				+0.24
	8.0		8.9		8.5		8.0	

Obl.

	15.5		11.5				36.5	
	20.0	−0.21	15.5				41.1	
	22.3		18.8				43.2	
	578		158				08	
	17 19.27	54 49 27.19	44 15.27	54 11 32.99			59 40.27	53 38 20.89
	+22.27	− 12	+30.71	− 24			+27.39	− 20
	1.34 7742	− 61	1.48 7728	− 22			1.43 7359	− 81
	9.76 0139	+13.45	9.76 7112	+12.78			9.77 2855	+12.17
	1.23 2894	+ 26	1.37 9184	+ 24			1.33 5224	+ 23
	35	−18.10	15	−16.10	0		45	−14.80
	3 21.0	49 22.22	1 7.4	11 29.60	4 45.7		4 22.1	38 17.63
	29.5		17.8		53.8		31.9	
	105		252		1015		540	
	38 25.25		16 12.60		4 50.75		49 27.00	
	44 23.10		6 35.75				33 21.33	
	54 49 44.28		54 11 56.93				53 38 42.53	
	− 17.09		− 23.94				− 21.64	
	− 75		− 96					9
	18 28.33	49 11.4	45 32.56	11 25.8			0 54.24	38 17.4
				+12.26		+4.94		+11.20

Feb. 6

			45 38.8	.80	49 50.5	12.48	1 0.7	74
			42.3		54.3		4.1	
			45.8		57.7		7.8	
			49.4		1.2		11.2	
			52.9		4.8		14.9	
			2292		2885		387	
			45 45.84		49 57.70		1 7.74	
			+ 5.37	+4.46	+ 5.37	+4.44	+ 5.36	+4.47
			− 91		− 93		− 89	
			45 50.30	−14.76	50 2.14		1 12.21	
			− 3.05	−3.81	− 3.10	−14.81	− 3.17	−14.66
			45 47.25		49 59.04	−2.70	1 9.04	+0.24
			8.6		7.8		7.2	

			45 0.2		49 21.0		0 31.8	
			4.3		23.9		34.7	
			7.0		27.4		37.7	
			11 5		123		142	
			45 3.83	54 11 33.07	49 24.10	54 22 43.49	0 34.73	53 38 19.79
			+ 42.01	− 46	+33.60	− 29	+33.01	− 29
			1.62 3335	− 18	1.52 6344	− 90	1.51 8655	− 79
			9.76 7112	+12.68	9.76 8519	+12.88	9.77 2855	+12.05
			1.51 5256	+ 24	1.41 6314	+ 25	1.41 6284	+ 23
			15	−16.20	6	−16.00	45	−15.00
			0 53.9	11 29.67	41 52.7	22 39.97	4 17.1	38 16.53
			9.9		5.6		28.6	
			58		1183		457	
			16 2.90		4 59.15		49 22.85	
			6 45.45		17 49.20		33 25.50	
			54 12 5.82		54 23 9.57		53 38 45.87	
			−32.75		−26.08		−26.08	
			45 32.49	11 25.9	49 44.23	22 37.3	0 54.38	38 16.8

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1608R

1878 Feb. 7, Feb. 11 Obs. W. A. P. Rec. J. F. M.

	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
α	3 14 6	12 57.7	3 16 26	15 11.6	3 17 58	16 49.4	3 23 7	21 58.0
	3 14 6	12 57.7	3 16 26	15 11.6	3 17 58	16 49.4	3 23 7	21 58.0
	° ′		° ′		° ′		° ′	
δ	31 41	37.6	52 51	47.8	31 43	39.2	38 3	47 59.4
		8.7		7.0		8.8	1	50 9.0
							60 50	

Feb. 7 E.C. +9.78 +10.42 +9.84 +7.27 +8.97 +10.97

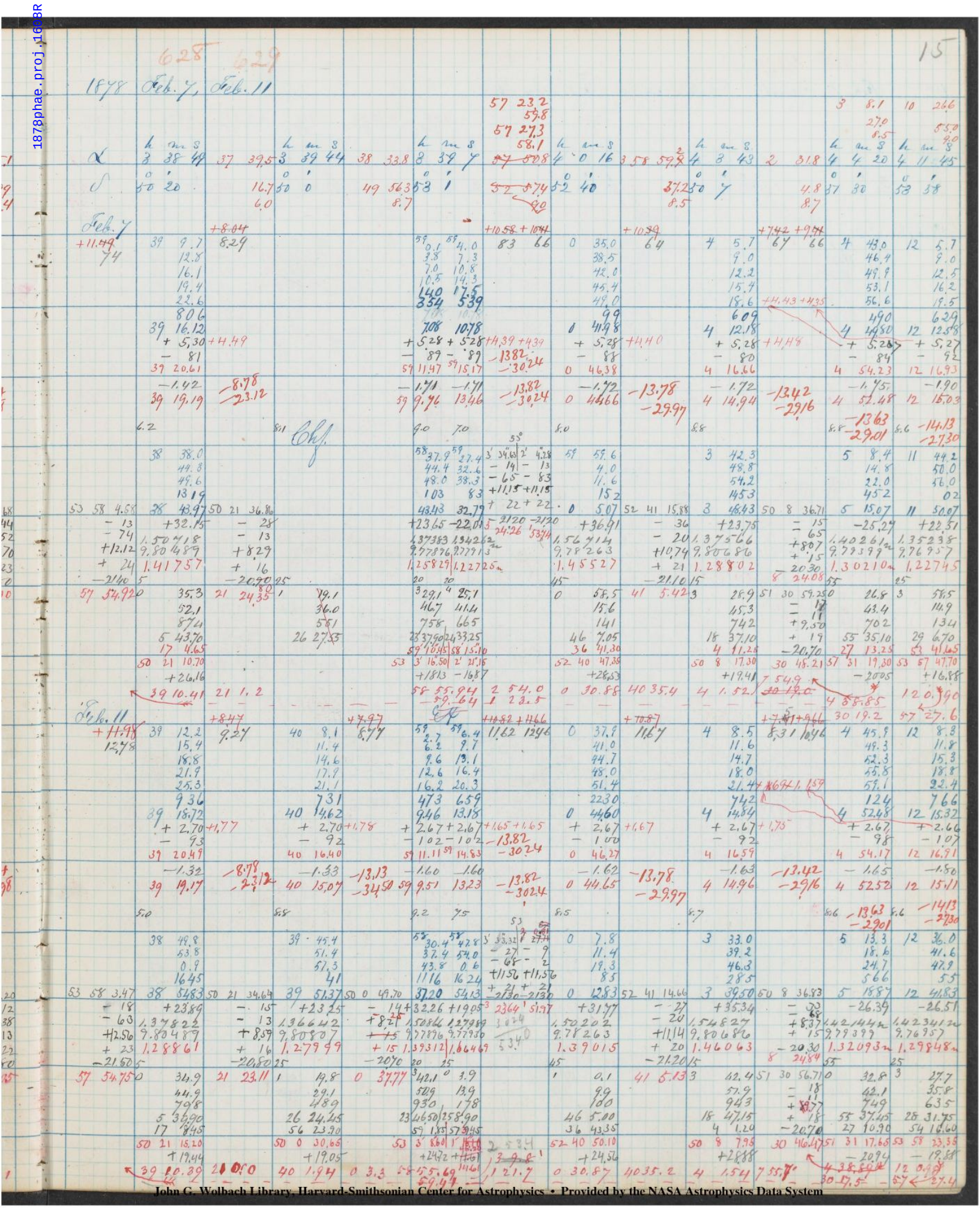
	14 28.2	41	16 48.0	67	18 20.0	.54	23 52.1	7.52	33 53.1	9.22	38 0.7	11.22
	31.2		46.4		23.4		55.1		56.5		4.0	
	34.5		50.0		26.8		58.5		59.7		7.7	
	36.3		53.3		29.9		1.4		3.0		11.0	
	39.7		56.8		33.3		4.5		6.3		14.5	
	1694		495		334		416		486		379	
	14 33.98		16 49.90		18 26.68		23 58.32		33 59.72		38 7.58	
	+ 5.32	+4.45	+ 5.32	+4.23	+ 5.31	+4.47	+ 5.31	+4.57	+ 5.30	+4.47	+ 5.30	+4.40
	− 84		− 89		− 84		− 80		− 83		− 90	
	14 38.46		16 54.33		18 31.15		24 2.83		34 4.19		38 11.98	
	− 1.11		−1.15		−1.16		−1.23		−1.36		−1.43	
	14 37.35	−13.03 −35.81	16 53.18	−13.22 −35.33	18 29.99	−13.09 −39.00	24 1.60		34 2.83	−13.24 −35.82	38 [illegible]	−13.64 −34.98
	9.0		7.7		8.5		9.0		8.5		9.2	
	14 29.8		17 11.5		17 57.0		23 45.7		33 19.8		37 19.6	
	32.6		17.0		2.3		50.6		21.4		25.8	
	38.7		22.4		8.6		57.0		24.0		33.7	
	1011		514		79		33		27.0		492	
	14 33.70	51 42 [illegible]	17 17.13	52 53 35.03	18 2.63	51 44 48.39	23 51.10	50 7 6.90	31.2	51 16 39.85	37 [illegible]	53 34 31.68
	+ 0.78	− 0	27.23	− 19	+ 24.05	− 15	+ 7.22	− 2	33 24.68	− 33	26.40	− 44
	0.44716	− 72	1.43505	− 54	1.38112	− 43	0.85854	− 88	+ 35.04	− 13	+ 41.18	− 52
	9.79208	+9.69	9.78047	+10.93	9.77192	+9.73	9.80701	+8.02	1.54456	+9.25	1.61469	+11.70
	0.34474	+ 19	1.34093	+ 22	1.27854	+ 19	0.77105	+ 15	9.79636	+ 18	9.77370	+ 23
	40	−21.40	30	−21.70	40	−21.40	15	−20.90	10	−21.20	50	−21.80
π = −.67	3 [illegible]	42 [illegible]	2 49.8	53 24.00	2 16.1	44 36.58	4 45.9	6 53.52	0 33.1	16 27.87	2 45.7	34 21.10
	179	3.27	7.0		33.9		0.9		51.9		2.1	
ρ_{RS} = −.18	16 [illegible]		1168		560		1068		850		1078	
	44 [illegible]		32 58.40		42 25.00		19 53.40		10 42.50		52 53.90	
+4″ 6.05	38 [illegible]	40.00	49 49.95		40 23.35		2 54.95		12 5.85		29 54.45	
	51 42 [illegible]	46.05	52 53 56.00		51 44 29.40		50 7 1.80		51 16 11.90		53 34 0.50	
	+ 0.21		− 20.97		+ 18.99		+ 5.90		+ 27.95		+ 31.18	
	14 23.32	41 [illegible]	16 39.96	52 44.7	18 16.90	43 57.6	Not Seen		33 49.59	1552.0	37 56.91	33 46.1
Feb. 11										+9.52		+11.85
									33 55.6	10.32	38 8.9	12.65
									59.0		6.6	
									2.3		10.2	
									5.6		13.7	
									8.9		16.9	
									114		513	
									34 2.28		38 10.26	
									+ 2.70	+1.75	+ 2.70	+1.66
									− 95		− 104	
									34 4.03		38 11.92	
									−1.26		−1.33	
									34 2.77	−13.24 −35.82	38 10.59	−13.64 −34.98
									9.0		9.5	
									33 35.0		38 26.0	
									39.8		31.2	
									45.9		36.8	
									07	+ .80	40	
									33 40.23	51 16 38.79	38 31.33	53 34 32.20
									+22.05	− 13	− 21.07	− 12
									1.34341	− 11	1.32366	− .38
									9.79636	+ 9.59	9.77370	+12.13
									1.24527	+ 17	1.20286	+ 22
									10	−21.10	50	−21.80
π = −.77									0 29.0	16 28.01	2 1.4	34 23.05
ρ_{RS} = −.18									88.8		12.5	
									678		139	
									10 33.90		52 6.95	
									12 1445		30 4140	
+4″ 6.75									67 16 21.20		53 34 48.15	
									+17.59		−15.95	
									23 49.53	1552.2	37 56.95	3348.1

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16BR

628 629

1878 Feb. 7, Feb. 11



John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

6

630 631 632

1878 Feb. 13, Feb. 14, Feb. 16, Obs. W. A. R. Rec. J. T. M.

					+7.74 8.18	+11.34 78	+10.35 54	+10.50 94	+10.28 47	+10.34 75	+9.76 95	+9.85 10.29
α	h m s 3 38 12	37 16	h m s 3 39 26	38 16.5	h m s 3 48 42	47 25.2	h m s 3 55 48	54 31.5	h m s 3 57 56	56 39.5	h m s 4 0 16	3 58 59.9
δ	° ' 50 2	54.3 8.4	° ' 50 18	14.9 8.7	° ' 53 42	39.3 8.8	° ' 52 43	40.1 8.1	° ' 52 52	49.0 9.1	° ' 52 10	6.7 9.0

Feb. 13 | Feb. 14 | Feb. 14 | Feb. 14 | Feb. 14 | Feb. 14

38 52.9 +1.18 7.92 (+7.73) | 39 52.0 +0.70 | 49 … +0.56 | 56 10.9 +1.09 | 56 11.4 +0.58 | 58 18.4 +1.07 | 58 18.8 +0.56 | 0 39.5 +1.09 | 0 39.8 +1.61

56.3 | 55.4 | 6.1 | 14.3 | 15.2 | 22.0 | 22.0 | 42.7 | 43.4

58.6 | 58.5 | 10.5 | 17.6 | 17.8 | 25.4 | 25.6 | 46.1 | 46.5

2.7 | 1.9 | 14.0 | 21.0 | 21.5 | 28.8 | 29.1 | 49.8 | 50.0

5.8 | 5.1 | 17.4 | 24.6 | 24.8 | 32.0 | 32.7 | 53.2 | 53.4

2973 | 2929 | 525 | 884 | 907 | 1266 | 1282 | 2313 | 2331

38 59.46 | 39 58.58 | 49 10.50 | 17.68 | 56 18.14 | 58 25.32 | 58 25.64 | 0 46.26 | 0 46.62

+ 2.06 1.18 | + 1.72 69 +0.70 | + 1.71 68 | + 2.05 | + 1.70 68 72 | + 2.05 | + 1.70 67 72 | + 2.04 | + 1.70 69 72

− 88 | − 1.04 | − 117 | − 96 | − 114 | − 98 | − 116 | − 95 | − 111

39 0.64 | 39 59.26 | 49 11.04 | 56 18.77 | 56 18.70 | 58 26.39 | 58 26.18 29 | 0 47.35 | 0 47.21

− 1.26 | − 1.25 | − 1.39 | − 1.50 | − 1.48 | − 1.54 | − 1.51 | − 1.56 | − 1.53

38 59.38 | 39 57.98 58.03 | 49 9.72 9.67 | 56 17.27 | 56 17.28 | 58 24.85 | 58 24.68 | 0 45.79 | 0 45.66 70

8.7 −13.17 −34.56 | 8.5 −13.81 −32.55 | 8.0 −13.74 −30.99 | 8.2 −13.74 −30.99 | 8.9 −13.78 −30.51 | 8.9 −13.78 −30.51 | 8.8 −13.69 −29.97 | 9.0 −13.69 −29.97

For Feb. 13

n = −.74

Rw = −.18

+4' 7.19

39 13.2 | 20.7 | 26.2 | 01 | 39 20.03 | 50 4 57.62 | +0.19 | −20.57 | − 11 | − 40 | + 8.10 | + 14 | −20.70

1.31323 | 9.80731 | 1.32604 | 20?

39 11.3 | 13.8 | 17.4 | 19.5 | 22.1 | 50 19 45.91 | +.44 | 39 16.82 | +41.76 | − 46 | − 49 | + 8.54 | + 15 | −20.70

1.62076 | 9.80519 | 1.53145

48 24.5 | 27.7 | 30.4 | 32.6 | 36.7 | 48 30.38 | +40.12 | 1.60336 | 9.77216 | 1.48102

55 38.4 | 45.2 | 50.7 | 1343 | 55 44.87 | +32.41 | 1.51733 | 9.78213 | 1.40496

55 37.2 | 39.0 | 41.3 | 44.2 | 48.8 | 55 42.10 | +36.04 | 1.55678 | 9.78213 | 1.44441

57 48.0 | 53.5 | 58.3 | 98 | 57 53.27 | +32.05 | 1.50583 | 9.78063 | 1.39196

57 38.3 | 40.2 | 46.0 | 48.5 | 50.8 | 57 44.76 | +40.88 | 1.61151 | 9.78063 | 1.49764

0 1.9 | 7.6 | 11.7 | 212 | 0 7.07 | +39.19 | 1.59318 | 9.78772 | 1.48640

59 56.7 | 1.5 | 9.6 | 78 | 0 2.60 | +44.02 | 1.64365 | 9.78772 | 1.53687

For Feb. 14

n = −.87

Rw = −.18

+4' 7.26

2 10.2 | 19.3 | 295 | 22? 14.75 | 0 33.60 | 50 4 40.79 | +16.83 | 4 4484

2 38.6 | 48.8 | 874 | 7 43.70 | 15 4.65 | 50 19 4.91 | +34.00 | 19 33.39 | 39 44.86 18 58.8

3 57.4 | 6.7 | 41 | 44 2.05 | 38 46.30 | 53 42 53.56 | +30.27 | 48 55.86 | + 44 | 53 43 23.83

2 45.1 | 55.3 | 1004 | 42 50.20 | 39 58.15 | 52 44 6.34 | +25.41 | 56 3.53 | 43 49.9

2 49.7 | 59.7 | 10.94 | 42 54.70 | 39 53.65 | 52 44 0.91 | +27.82 | 56 3.58 | 57 54.79 | + 30.75 | 52 44 28.73

4 5.5 | 15.3 | 208 | 34 10.40 | 48 37.95 | 52 52 45.14 | +24.66 | 58 11.07 | 52 28.5

4 14.1 | 24.8 | 389 | 34 19.45 | 48 28.90 | 52 52 36.16 | +31.05 | 58 11.00 | 52 26.5 | + .19 | 52 53 9.80

1 52.3 | 2.3 | 1146 | 16 57.90 | 5 51.05 | 52 9 58.24 | +30.65 | 0 32.10 | 9 47.0

1 58.1 | 8.1 | 62 | 14 3.10 | 5 45.25 | 52 9 52.51 | +34.42 | 0 32.01 | 9 46.2 | +19 | 52 10 28.89

Feb. 16 +11.78 58 | +10.21 61 | +10.49 59 | +9.92 10.32

Add +0.12 to (ΔT+m) Feb 16. It has been added to sum of the constants and to final R.A.

49 4.1 +0.13 | 7.5 | 11.0 | 14.7 | 18.0 | 553 | 49 11.06 | +0.12 + 1.12 09 | − 97 | 49 11.21 | − 1.34 | 49 9.84 5 | 8.6 −13.81 −32.55

− 48 72 | + 12.26 | + 21 | − 21.60 | 43 14.01 | 52 44 30.78 | 42 41.5

56 12.0 +0.19 | 15.2 | 18.6 | 22.1 | 25.5 | 934 | 56 18.68 | + 1.10 | − 94 | 56 18.85 | − 1.42 | 56 17.44 5 | 8.3 −13.74 −30.99

− 29 50 | + 10.94 | + 20 | − 21.20 | 44 20.09 | 52 44 28.73 | − 34 | − 52 | + 11.16 | + 20 | − 21.20 | 44 18.47

58 19.7 +0.15 | 22.9 | 26.4 | 30.0 | 33.4 | 1324 | 58 26.48 | + 1.10 | − 96 | 58 26.63 | − 1.45 | 58 25.19 | 9.0 −13.78 −30.51

− 27 | − 76 | + 11.11 | + 20 | − 21.30 | 52 58.97 | 52 53 7.68 | − 26 44 | − 77 | + 11.32 | + 20 | − 21.30 | 52 57.06 13

0 40.4 +0.19 | 43.9 | 47.0 | 50.5 | 53.9 | 2357 | 0 47.14 | + 1.10 | − 92 | 0 47.33 | − 1.48 | 0 45.84 5 | 9.0 −13.69 −29.97

− 29 | − 36 | + 10.33 | + 19 | − 21.00 | 10 17.43 | 52 10 26.73 | − 37 51 | − 37 | + 10.54 | + 19 | − 21.00 | 10 16.22

48 23.9 | 29.7 | 38.4 | 20 | 48 30.67 | + 40.39 | 1.60624 | 9.77216 | 1.48393

53 43 22.90 | + .40 | − 43 | − 72 68 | + 12.08 | + 21 | − 21.60 | 43 12.88

55 29.2 | 31.4 | 36.4 | 38.4 | 44.0 | 55 36.08 | 42.60 | 1.62941 | 9.78213 | 1.51704

52 44 29.27 | + .40 | − 48 | − 51 | + 11.00 | + 20 | − 21.20 | 44 18.68

57 39.1 | 45.2 | 50.3 | 846 | 57 44.87 | + 41.61 | 1.61920 | 9.78063 | 1.60533

52 53 8.29 | + .40 | − 45 | − 73 | + 11.17 | + 20 | − 21.30 | 52 57.58

0 4.9 | 12.0 | 17.0 | 339 | 0 11.30 | + 35.84 | 1.55437 | 9.78772 | 1.44759

52 10 27.31 | + .40 | − 34 | − 38 2 | + 10.39 | + 19 | − 21.00 | 10 16.68

n = −.72

Rw = −.17

+4' 6.53

2 39.6 48.8 | 2 38.6 48.8

3 57.0 | 7.9 | 49 | 44 2.45 | 38 45.90 | 53 42 52.43 | + 30.47

2 52.6 | 4.4 | 1170 | 42 58.50 | 39 49.85 | 52 43 56.38 | + 32.89

4 12.4 | 24.8 | 372 | 34 18.60 | 48 29.75 | 52 52 36.28 | + 32.01

1 49.8 | 1.4 | 1112 | 16 55.60 | 5 52.75 | 52 9 59.28 | + 28.03

48 56.04 | 42 40.3 | 55 28.86 | 43 47.7 | 58 11.40 | 52 27.1 | 0 32.16 | 9 46.7

Red. ... w ... 4...

1878phae.proj.1608R

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1603R

630 631 632

1878 Feb. 13, Feb. 14, Feb. 16

Feb. 13

Feb. 14

Feb. 16

Cycle Readings for Feb 13 4 36 10 and Feb 14 Same

For Sq these 2 Slopes are

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16:BR

1878 Feb. 14, Feb. 16, Obs. H. A. R. Rec. J. F. M.

α	h m s 4 57 13	h m s 5 6 55	5 34.1	h m s 5 28 39	27 23.6	h m s 5 45 28	44 5.7	h m s 6 11 47	10 14.7	h m s 6 13 33	12 10.7
δ	° ′ 53 23	° ′ 53 2	03 8.8	° ′ 50 17	16.0 8.5	° ′ 54 29	28.4 8.8	° ′ 57 43	42.7 8.5	° ′ 53 18	17.8 8.2

Feb. 14

					+7.70						+12.60				+4.78				
				28	6.0	84				12	4.6	13.04		13	58.6	12.22			
					9.4						8.2				2.0				
					12.6						11.6				5.5				
					15.8						15.3				8.7				
					19.0						18.9				12.5				
					62.8						5.86				2.73				
				29	12.56					12	11.72			14	5.46				
					+ 1.61	+0.57					+ 1.58	86 +0.34			+ 1.58	86 +0.40			
					− 1.04						− 1.22				− 1.16				
				29	13.13					12	12.06			14	5.86				
					− 2.54						− 3.18				− 3.15				
				29	10.59	−14.00 −8.13				12	8.88	−14.87 +3.12		14	2.73	−14.58 +3.60			
				8.1						8.3				8.3					
				28	26.5					11	33.1			13	26.7				
					31.3						38.5				33.3				
					39.0						47.4				39.5				
					68						1190				95				
				28	22.27	50 17 38.54				11	29.67	54 42 37.37		13	33.17	53 17 6.61			
					+40.29	− 44					+32.05	− 27			+32.29	− 27			
					1.60520	− 86					1.50583	− 85			1.50907	− 4			
					9.80550	+8.56					9.76182	+13.48			9.77660	+11.89			
					1.51620	+ 14					1.37315	+ 23			1.39117	+ 20			
				5		−17.10				40		−15.40		10		−14.90			
				4	46.5	17 29.28				4	37.8	42 35.01		0	9.1	17 3.93			
					53.3						45.9				18.1				
					998						837				272				
				9	40.90					44	41.85			10	1360				
				12	58.45					38	6.50			12	34.75				
				50	17 5.71					54	42 13.76			53	16 42.01				
					+32.83						+23.61				+24.61				
				28	56.59	17 21.2				11	53.99	42 38.1		13	48.13	17 7.5			

Feb. 16

			+10.45			+7.87			+12.86										
		7	19.9	85	29	6.7	77	45	53.9	76									
			23.3			10.0			57.1										
			26.4			13.3			0.9										
			30.0			16.4			4.3										
			33.6			19.6			7.8										
			133.2			66.0		6	40										
		7	26.64		29	13.20		45	0.80										
			+ 1.08	+0.09		+ 1.04	+0.14		+ 1.02	+0.02									
			− 96			− 86			− 1.01										
		7	26.74		29	13.38		46	0.78										
			− 2.34			− 2.49			− 2.56										
		7	24.38	−14.40 −13.74	29	10.89	−14.00 −8.13	45	57.95	−14.82 −3.75									
		8.8			8.5			9.0											
			6 43.4			28 30.5			45 20.4										
			48.9			33.4			27.9										
			55.3			37.4			35.2										
			476	+ .40		40.8			835										
		6	49.20	53 2 57.99		43.9	50 17 37.77	45	27.83	54 29 8.56									
			+37.44	− 37	28	35.06	− 35		+32.97	− 28									
			1.57334	− 75		+36.20	− 82		1.51812	− 57									
			9.77913	+ 11.39		1.55871	+8.56		9.76431	+12.83									
			1.45797	+ .26		9.80 5150	+ 14		1.38793	+ 95									
		20		−19.20	5	1.46971	−17.30	55		+ 23									
			4 30.1 20.1	2 49.64	4	? 41.3	17 28.24	3	? 5.6	29 4.02									
			31.1			51.9			15.9										
			512			932			215										
			24 25.60		9	46.60		58	10.75										
			58 22.75		13	1.70		24	37.60										
		53	2 29.28		50	17 8.28		54	28 44.13										
			+ 28.71			+29.49			+24.43										
		7	9.99	2 35.9	28	56.89	17 20.1	45	43.11	29 0.3									

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1603R

631

1878. Feb. 14.

	h m s		h m s	modern place	h m s		h m s		h m s			
α	6 18 9	16 46.7	6 20 1	18 45.7	6 39 9	37 50.5	6 41 2	39 41.3				
δ	° ′ 54 89	39.1 9.2	° ′ 50 59	59.5 9.3	° ′ 52 ?	7.7 9.0	° ′ 54 21	21.9 8.5				
Feb. 14		+12.74		+8.97		+10.25		+12.76				
	18 38.8	13.18	20 9.6	9.41	39 37.7	.69	41 30.0	13.20				
	42.4		12.9		41.1		33.6					
	46.0		16.3		44.6		37.3					
	49.7		19.8		47.9		40.8					
	53.5		22.9		61.5		44.4					
	2304		815		2228		1861					
	18 46.08		20 16.30		39 44.56		41 37.22					
	+ 1.56	5 +0.33	+ 1.53	5 +0.47	+ 1.53	3 +0.42	+ 1.53	2 +0.30				
	− 122		− 108		− 111		− 122					
	18 46.42		20 16.77		39 44.98		41 37.53					
	−3.24		−3.08		−3.31		−3.46					
	18 43.86 .14	−14.85 +4.83	20 13.71 .69	−14.15 +5.34	39 41.70 .67	−14.29 +10.29	43 34.10 41 .06	−14.71 +10.80				
	9.3		9.4		9.0		8.5					
	17 57.0		19 39.6		39 1.4		40 58.9					
	2.0		45.1		7.6		6.0					
	9.3		49.0		13.5		12.6					
	83		1337		225		175					
	18 2.77	54 39 56.41	19 44.57	51 0 32.67	39 7.50	52 6 28.39	41 58.3	54 20 30.00				
	+43.31	− 49	+31.79	− .26	+34.06	− 36	+31.39	− 26				
	1.63659	− 45	1.50147	− 32	1.56891	− 16	1.49679	− 32				
	9.76236	+13.45	9.79887	+9.39	9.78837	+10.58	9.76572	+13.11				
	1.50446	+ 23	1.40584	+ 16	1.46278	+ 19	1.36801	+ 23				
	45	−14.80	25	−13.90	20	−12.60	5	−12.90				
	2 26.8	39 54.79	1 44.2	0 28.18	0 52.0	6 26.48	1 44.1	20 30.30				
	35.5		526		0.5		51.8					
	623		968		1125		959					
	47 31.15		26 48.40		20 56.25		6 47.95 +1"					
	35 17.20		55 59.95		1 52.10		16 0.40					
	54 39 24.46		51 0 7.21		52 5 59.36		54 20 7.66					
	+31.95		+25.46		+ 29.03		+ 23.34					
								46				
	18 28.29	39 59.6	19 59.54	0 33.5	39 27.38	6 36.8	41 19.35	20 49.5				

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1603R

633 634

1878 Feb. 18, Feb. 19, Obs. H. A. R. Recd. J. F. M.

	h m s		h m s		h m s		h m s		h m s		h m s		h m s	
α	4 11 12	9 59.7	4 11 17	10 53	4 28.2	26 42.0	4 36 28	35 8.9	4 56 41	55 21.2	5 6 55	5 34.1		
δ	° ′		° ′		° ′		° ′		° ′		° ′			
	49 38	550	49 37	539	54 41	37.8	53 0	54 57.9	52 3	1.7	58 2	03		
		8.5		7.8		9.0		9.0		9.3		8.8		
Feb. 18		+7.53		+7.63				+13.33		+10.74		+10.98		
	11 —	.95	11 43.3	8.05			36 56.1	13.75	57 6.7	.53	7 20.6	90		
	—		46.5				59.7		9.8		23.8			
	45.2 45.20		48.7				3.8		13.3		27.8			
	48.7 45.49		52.7				7.3		16.6		30.7			
	51.6 45.19		56.0				10.8		19.8		34.4			
	88		482				177		661		1368			
	11 46.29		11 49.64				3.64		57 13.22		7 27.36			
	+ 0.37	−0.62	+ 0.37	−0.62			+ 0.35	−0.84	+ 0.33	−.73	+ 0.32	−0.78		
	− 99		− 99				− 1.19		− 1.06		− 110			
	11 44.67		11 49.02				37 2.70		57 12.49		7 26.68			
	−1.54		−1.54				−1.95		−2.13		−2.28			
	11 43.13	−13.47 −27.42	11 47.48	−13.46 −27.42			37 0.75	−14.57 −21.36	57 10.36	−14.17 −16.35	7 24.30	−14.40 −13.74		
	8.5		7.6				8.8		9.6		8.6			
	11 18.0		11 ~~26.0~~ stat				36 13.5		56 47.5		6 31.9			
	23.6		47.5				19.0		52.3		40.0			
	31.9						22.5		58.9		44.6			
	735		865				550		87		1165			
	11 24.50 49	+4.27 53.77 44.37	11 43.25 49	57 42.31 47.31			36 18.33	55 0 49.43	56 52.90	52 3 58.55	6 38.83	53 2 56.73		
	39.5 20.79	− 11	+ 6.39	− 1			+ 4.79	− 53	+ 20.32	− 11	48.53	− 61		
	1.31785	− 73	0.80550	− 73			+ 45.27	− 27	1.30792	− 54	1.68601	− 78		
	9.80837	+ 8.23	9.80852	+ 823	9.76218		1.65523	+ 13.90	9.78886	+ 1.057	9.77913	+ 11.68		
	1.23172	+ 14	0.71952	+ 14			9.75859	+ 23	1.20228	+ 17	1.57064	+ 19		
	25	−2010	25	−2010	45		1.51932	−21.00	20	−1940	20	−1920		
n = −.83	4 246 13.4	~~57 [illegible]~~	4 13.4	57 ~~2026~~	2 16.9		1 34.8	0 42.18	3 8.1	3 42.68	4 30.9	2 48.43		
	3 33.2 22.9	~~58 31.22~~	22.9	~~26.70~~	24.2		42.9		17.1		40.5			
R_{HS} = −.17	578363		363	30.26	411		777		252		714			
	28 ~~28.18~~ 28.90		29 18.15		47 20.55		26 38.85		23 12.60		24 35.70			
+4′ 6.87	54 ~~53 38.20~~ 19.45		53 30.20		35 27.80		56 9.50		59 35.78		58 12.65			
	49 ~~57 37.07~~ 26.32		49 57 37.07		54 39 34.47		55 0 16.37		52 3 42.62		53 2 19.82			
	+ 17.05		+ ~~5.24~~				+33.06		+15.93		+37.21			
	11 29.66	58 3.8	11 34.02	57 2.8			36 46.18	0 20.8	56 56.19	3 33.3	7 9.90	2 34.7		
Feb. 19		+7.49		+7.54		+13.12		+13.48		+9.59		+10.64		
	11 39.1	+7.98	11 43.2	8.03	28 29.7	61	36 55.9	97	57 6.4	10.08	7 20.5	11.13		
	42.1		46.3		33.5		59.5		10.0		24.0			
	45.4		49.7		36.7		3.2		13.1		27.4			
	48.7		53.1		40.5		7.0		16.9		30.9			
	51.9		56.2		44.2		10.4		20.3		34.2			
	2272		485		1846		160		667		1370			
	11 45.44		11 49.70		28 36.92		3.20		57 13.34		7 27.40			
~~.006~~	+ 0.~~21~~ 12.34	−0.72	4 0.~~34~~ 12.21	−0.72	+ 0.~~19~~ 12	+10 −0.88	+ 0.~~18~~	+18 −0.90	+ 0.~~15~~	−0.82	+ 0.~~13~~	~~.08~~ −0.95
	− 84		− 84		− 98		− 100	+10	− 90	+.08	− 93	.13 08
	11 44.81		11 49.07		28 36.13		37 2.38		57 12.59		7 26.60			
	−1.51		−1.51		−1.80		−1.92		−2.10		−2.26			
	11 ~~43.21~~ 30	43.21 −13.47 −27.42	11 ~~47.47~~ 56	47.47 −13.46 −27.42	28 ~~34.25~~ 33	34.24 −14.43 −23.13	37 ~~0.36~~ 46	0.38 −14.57 −21.36	57 ~~10.48~~ 44	10.42 −14.17 −16.35	7 ~~24.29~~ 34	24.29 −14.40 −13.74		
	8.9		7.2	24.6	9.5		9.2		9.1		8.5			
	11 7.3		11 29.0		28 4.4		36 18.7		56 18.5		6 36.8			
	12.2		34.3		9.8		26.1		26.7		44.4			
	~~21.6~~			8.49	17.6		30.7		34.0		51.9			
	1954 11			28.83	318		755		802		1381			
	11 9.17 37.00 49	+4.49 58 ~~37.00~~ 37.74	11 ~~28.83~~ 31.15 49	57 40.88 ~~38.13~~	28 1060	54 39 5408	36 25.17	55 0 49.58	56 26.73	52 3 59.97	6 44.37	53 2 56.91		
	~~35.69 31.47~~	− 27	~~+2.48~~ 18.05	− 9	+26.32	− .18	+ 38.03	− 37	+ 46.61	− 57	+ 43.63	− 48		
	1.6 ~~52.85~~	− 63	1.~~23.84~~ 5	− 76	1.42029	− .39	1.58013	− 27	1.66848	− 60	1.63377	− 76		
	9.80837	+8.25	9.80852	+ 8.25	9.76218	+13.48	9.75859	+13.96	9.78886	+10.58	9.77913	+11.55 70		
	1.41 ~~5.48~~ 6642	+ 14	~~1.17050~~ 1.24443	+ 14	1.28797	+ 21	1.44422	+ 22	1.56284	+ 19	1.51840	+ 18		
	25	−2010	25	−2010	45	−2120	25	−21.00	20	−1946	20	−1930		
n = −.70	3 39.9	58 ~~24.89~~	4 28.7	57 ~~26.06~~	2 16.9	39 46.49	1 30.1	0 42.55	3 28.1	3 ~~50.65~~	4 27.7	2 48.74		
	48.6	28.62	36.1	28.81	24.2		37.8		36.5	16.37	35.9			
R_{HS} = −.17	885		648		411		79		646	343	636			
	28 44.25		29 32.40		47 20.55	+50	26 33.65		23 32.30		24 31.80			
+4′ 7.37	54 4.10		~~53~~ 15.95		35 27.60		56 14.40		59 16.05		58 16.55			
	49 58 11.47		49 ~~57~~ 23.32		54 39 34.67		55 0 21.77		52 3 23.42		53 2 23.92			
	~~+26.07~~ 29.27		~~+14.81~~ 1756		+ 19.41		+27.81		+36.55		+32.99			
	11 29.74	58 1.2	11 34.01	57 1.4	28 19.81	39 23.1	36 45.81	0 21.2	56 56.25	3 ~~42.3~~ 343	7 9.89	2 35.0		

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16618R

1878, Feb. 18, Feb. 19

	h m s		h m s		h m s		h m s		h m s		h m s	
α	5 12 23	11 11.6	5 45 28	44 5.7	5 49 4	47 45.2	6 11 47	10 14.7	6 13 18	12 3.0	6 18 9	16 46.9
δ	° ′		° ′		° ′		° ′		° ′		° ′	
	53 42	402 9.4	54 29	284 8.8	52 40	39.9 9.0	54 43	42.7 8.5	50 59	58.9 8.5	57 37	69.1 9.2

Feb. 18

	+11.53		+12.81		+10.82		+12.61		+8.25		+12.82	
	12 58.5	95	45 54.5	13.23	49 31.2	11.24	12 5.9	13.23	13 51.2	8.67	18 40.4	13.24
	2.8		57.9		34.7		9.4		54.6		44.1	
	6.8		1.8		38.0		12.8		57.4		47.8	
	10.0		5.0		41.5		16.5		0.1		51.0	
	13.8		8.8		44.6		20.3		4.2		54.4	
	329		80		400		649		2883		377	
	13 6.58		46 1.60		49 38.00		12 12.98		13 57.66		18 47.54	
	+0.32	-0.80	+0.27	-0.87	+0.28	-0.90	+0.26	-0.90	+0.26	-0.77	+0.26	-0.90
	-1.12		-1.16		-1.08		-1.16		-1.03		-1.16	
	13 5.78		46 0.73		49 37.20		12 12.08		13 56.89		18 46.64	
	-2.38		-2.81		-2.76		-3.11		-2.94		-3.18	
	13 3.40	-14.56 -12.30	45 57.92	-14.82 -3.75	49 34.44	-14.47 -2.79	12 8.97	-14.87 +3.12	13 53.95	-14.16 +3.57	18 43.46	-14.85 +4.83
	9.3		9.2		8.8		8.0		8.8		9.0	
	12 27.3		45 27.6		48 52.4		11 36.5		13 6.0		17 55.4	
	32.5		31.3		59.6		42.0		10.7		1.7	
	38.9		38.0		6.7		46.8		15.4		6.7	
	87		64		1787		53		21		38	
	12 32.90	53 42 24.24	45 32.30	54 29 7.77	48 59.57	52 40 47.43	11 41.77	54 42 37.61	13 10.70	50 58 21.93	18 1.27	54 39 57.20
	+33.68	- 27	+29.30	- 23	+38.43	- 39	+31.21	- 25	+46.96	- 57	+46.24	- 56
	1.52437	- 83	1.46687	- 53	1.58467	- 27	1.49426	- 80	1.64173	- 71	1.66530	- 42
	9.77233	+12.45	9.76413	+13.35	9.78280	+11.30	9.76182	+13.64	9.79918	+9.40	9.76236	+13.58
	1.40520	+ 20	1.33650	+ 22	1.47297	+ 18	1.36161	+ 22	1.57641	+ 15	1.53316	+ 22
	40	-19.20	55	-17.60	45	-16.90	40	-15.90	25	-14.80	45	-15.40
	4 52.9	42 16.99	3 5.4	29 3.40	1 33.6	40 48.77	4 37.3	42 34.94	4 7.2	58 15.80	2 28.9	39 55.04
	59.9		12.9		41.4		43.9		14.8		35.4	
	128		183		750		812		220		643	
	44 56.40		58 9.45		46 37.50		44 40.60		29 11.00		47 32.15	
	37 51.95		24 39.20		36 14.85		38 7.75		83 37.38		35 16.20	
	53 41 58.82		54 28 46.07		52 40 17.72		54 42 14.69		50 57 44.22		54 39 23.07	
	+25.42		+21.70		+29.71		+22.99		+37.71		+34.13	
	12 48.84	42 4.7	45 43.10	28 59.6	49 19.97	40 39.0	11 54.10	42 38.8	13 39.79	58 19.4	18 29.77	39 59.87
		+12.06		+12.86		+10.91		+12.87		+8.34		+12.99
Feb. 19	12 58.6	12.55	45 54.3	95	49 31.4	11.40	12 5.8	96	13 50.7	83	18 40.0	13.48
	2.9		58.1		34.5		9.4		54.1		43.8	
	6.4		2.0		38.0		13.0		57.3		47.6	
	10.0		5.2		41.9		16.4		0.7		51.2	
	13.5		8.6		44.6		20.0		3.8		54.6	
	3.24		8.2		379		646		2867		2372	
	13 6.48		46 1.64		37.98		12 12.92		13 57.34		18 47.47	
	+0.12 -0.08	.07 -0.88	+0.10 -0.06	.05 -0.93	+0.40 -0.07	-0.86	+0.04 -0.03	-0.95	+0.04 -0.03	-0.83	+0.03 -0.02	-0.96
	-0.95		-0.98		-0.91		-0.98		-0.86		-0.98	
	13 5.65		46 0.76		49 37.17		12 11.98		13 56.52		18 46.49	
	-2.35		-2.78		-2.74		-3.10		-2.92		-3.17	
	13 3.26 -0.01	3.25	45 57.98 -0.02	57.93	49 37.43 -0.02	34.38	12 8.87 -0.00	8.87	13 53.59 -0.00	53.59	18 43.32 -0.01	
		-14.56 -12.30		-14.82 -3.75		-14.47 -2.79		-14.87 +3.12		-14.16 +3.57		-14.85 +4.83
	9.2		8.7		9.1		8.2		8.7		9.1	
	12 14.0		45 8.8		50 12.8		11 19.7		13 7.3		18 2.3	
	21.0		14.0		19.4		26.8		10.8		9.2	
	27.8		18.0		24.9		33.8		13.7		17.5	
	29		21.5		571		803		16.7		290	
	12 20.97	53 42 24.67	24.1	54 29 7.13	50 19.03	52 40 47.88	11 26.77	54 42 39.02	13 17.47	50 58 21.85	18 9.67	54 39 57.68
	+45.81	- 54	8.69	- 51	-41.05	- 45	+46.15	- 55	13.52	- 50	+37.74	- 38
	1.65811	- 2	+44.36	- 56	1.61331	- 10	1.64414	- 82	+43.82	- 70	1.57715	- 41
	9.77233	+12.43	1.64699	+13.32	9.78280	+11.28	9.76182	+13.63	1.64167	+9.39	9.76236	+13.57
	1.53594	+ 19	9.76413	+ 21	1.50161	+ 18	1.53149	+ 21	9.79918	+ 15	1.44501	+ 21
	45	-19.30	55	-17.70	45	-17.00	40	-16.00	25	-14.90	45	-15.50
	0 1.6	42 17.92	3 17.8	29 2.38	0 31.4	40 42.28	4 47.5	42 35.98	4 5.6	58 15.78	2 22.9	39 55.56
	9.2		25.1		40.8		53.9		12.5		29.1	
	108		429		722		1014		181		120	
	45 5.40		58 21.45		45 36.10		44 50.70		29 9.05		47 24.00	
	37 42.96		24 26.90		37 12.25		37 57.65		53 39.30		35 22.35	
	53 41 50.32		54 28 34.27		52 41 19.62		54 42 5.02		50 57 46.67		54 39 29.72	
	+34.35		+32.86		-01.74		+34.00		+35.18		+27.86	
	12 48.69	42 5.6	45 43.18	28 58.6	49 19.91	40 39.5	11 54.08	42 39.1	13 39.43	58 19.4	18 28.46	40 0.4

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16IBR

1878 Feb. 18, Feb. 19 Obs. W.A.R. Rec. J.F.M.

	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
α	6 20 1	18 45.7	6 41 2	39 41.3	7 0 43	7 12 8	10 46.3	7 19 49	18 35.2
δ	° ′ 50 59	59.5 9.3	° ′ 54 21	21.9 8.5	° ′ 53 24	° ′ 52 31	32.8 9.2	° ′ 50 6	58.9 9.0

Feb. 18

+8.66 +10.73 +12.98 +12.12 +10.81 +8.94

20	31.9	9.08	37	10.5	11.13	41	31.7	13.40	0	43.1	12.54	12	31.5	11.23	20	18.8	9.36
	35.2			23.8			35.0			46.5			34.6			22.0	
	38.6			27.2			38.7			50.2			38.2			25.4	
	42.0			30.1			42.0			53.6			41.7			28.3	
	45.0			33.4			45.6			57.3			45.1			32.0	
	431			349			430			07			411			270	
20	38.652		41	26.98		41	38.60		0	50.14		12	38.22		20	26.40	
	+ 0.26	-0.77		+ 0.24	-0.82		+ 0.24	-0.92		+ 0.22	-0.90		+ 0.21	-0.87		+ 0.21	-0.82
	- 103			- 106			- 116			- 112			- 108			- 103	
20	37.85 75		37	26.16		41	36.68		0	49.24		12	37.35		20	24.58	
	-3.00			-3.22			-3.39			-3.51			-3.54			-3.50	
20	34.85 75	-14.14 +5.34	37	22.94		41	34.29	-14.71 +10.80	0	45.73	-14.43 +15.69	12	33.81	-14.19 +18.66	20	21.08	-13.86 +20.61
	9.2			9.5			8.3			8.8			9.3			9.0	

19	58.7		37	1.3		41	3.0		0	10.6		11	58.4		19	44.0		
	3.4			6.2			12.2			15.8			5.6			50.0		
	7.2			9.7			17.4			24.4			9.2			54.0		
	09.3	+.42		17.2			26			5.08			13.2			7480		
20	3.10	50 58 58.34 26	37	5.73	52 7 1.01	41	10.87	54 20 31.03	0	16.93	53 27 6.69	12	440	52 30 51.42	19	49.33	50 55 49.71	
	+35.52	42 - 34		4 21.25	- 12		+27.73	- 20		+33.21	- 28		+33.82	- 31		+36.07	- 35	
	1.55	- 58		1.32736	- 3		1.44295	- 29		1.52127	- 3		1.52914	- 26		1.55715	- 27	
	9.79918	+9.43		9.78821	+10.78		9.76572	+13.25		9.77490	+12.20		9.78445	+11.20		9.79965	+9.41	
	1.45515	+ 15		1.22107	+ 17		1.31417	+ 22		1.40167	+ 19		1.41912	+ 18		1.46230	+ 15	
	393																	
25		-14.30	20		-13.30	5		-13.50	0		-11.70	55		-10.40	30		-9.30	
3	22.1	58 53.18	0	6.8	6 58.86	1	41.3	20 30.93	0	9.9	27 7.53	1	26.2	30 52.25	1	30.6	55 49.77	
	28.7	04		14.9	?		48.3			176			33.9			38.4	2	
	168			217			96			275			601			90		
28	25.40		20	10.85		6	44.80		0	13.75		56	30.05		31	34.50		
54	22.95		2	37.50		16	3.55		22	34.60		26	18.30		51	13.85		
50	58 29.82		52	6 44.37		54	20 10.42		53	26 41.47		52	30 26.17		50	55 20.72		
	+28.52			+16.64			+20.61			+25.22			+26.25			+28.99		
	44																	
	20 20.60	5858.4				41	19.58	20 41.7	0	31.30	27 23.2	12	19.62	31 10.9	20	7.22	56 10.4	
		+8.56			+16.75			+12.70			+4.86			+10.74			+8.95	

Feb. 19

20	31.8	9.05	37	20.2	11.24	41	31.5	13.19	0	43.3	12.35	12	31.2	11.23	20	18.8	9.44	
	35.4			23.8			35.3			46.6			34.7			21.8		
	38.5			27.0			38.5			50.4			38.1			25.4		
	41.7			30.3			42.2			53.5			41.6			28.4		
	45.0			33.6			45.9			57.0			44.9			31.6		
	1925			349			434			08			405			260		
20	38.50		37	26.98		41	38.68		0	50.16		12	38.10		20	25.20		
	+ 0.03	2 -0.84		+ 0.00	+01 -0.89		+ 0.01	+01 -0.97		- 0.04	14 01 -0.96		- 0.05	15 02 -0.93		- 0.00	12 02 -0.88	
	- 86			- 90			- 98			- 95			- 91			- 86		
20	37.67		37	26.08		41	37.69		0	49.17		12	37.14		20	24.28		
	-2.98			-3.20			-3.37			-3.50			-3.53			-3.48		
20	34.69 8	-14.14 +5.34	37	22.89 4	22.89	41	34.32 2	34.34 -14.71 +10.80	0	45.67	45.70 -14.43 +15.69	12	33.64 4	33.64 -14.19 +18.66	20	20.84 4	-13.86 +20.61	
	9.3			9.5			8.0			8.7			9.1			9.3		

18	52.7		37	0.7		40	54.4		0	0.5		11	55.9		19	44.6		
	57.9			9.6			0.6			5.8			2.3			50.2		
	57.0			15.3			6.4			6.3			8.9			56.6		
	59.8	+.49		25.6			14			15.6			71			14		
	24	50 58 58.35	37	8.53	52 6 57.91	41	0.47	54 20 32.08	0	28 2.03	53 27 6.25	12	2.37	52 30 49.50	19	50.47	50 55 46.99	
19	28.8	- 41		+18.45	- 9		+38.21	- 39		+43.11	- 48		+35.73	- 34		+34.73	- 32	
	57.36																	
	+41.14	- 60		1.26620	- 3		1.58218	- 32		1.63458	- 7		1.55303	- 26		1.54870	- 27	
	1.61426	+ 9.42		9.78821	+10.70		9.76572	+13.20		9.77490	+12.22		9.78445	+11.16		9.79965	+9.39	
	9.79918	+ 15		1.15971	+ 17		1.45340	+ 21		1.51498	+ 19		1.44298	+ 18		1.44585	+ 16	
25	1.51894	-14.40	20		-13.45			-13.60	0		-11.80	55		-10.50	30		-9.40	
3	26.9	58 53.00	0	8.1	6 53.751		49.0	26 31.67	0	18.5	27 6.80	1	29.7	30 50.23	1	33.6	55 47.03	
	33.6			16.4	2.		55.1			25.9			38.2			39.7	2.	
	605			245			1041			444			679			133		
28	30.40		20	12.25		6	52.05		0	22.20		56	33.95		31	36.65		
54	17.95		2	36.10		15	56.30		22	26.15		26	14.40		51	11.70		
50	58 25.32		52	6 43.47		54	20 3.67		53	26 33.52		52	30 21.77		50	55 19.07		
	+33.03			+14.44			+28.41			+32.73			+27.23			+27.92		
	20 20.54	5858.3				41	19.63	20 42.5	0	31.27	27 22.5	12	19.45	31 8.9	20	6.98	56 7.6	

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1608R

1878 Feb. 18, Feb. 19

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16BR

1878 Feb. 24, Feb. 26 Obs. U. A. R. Rec. J. E. M.

	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
α	4 56 30	5 55 10.2	5 6 47	5 26.0	5 12 43	11 21.6	6 11 17	9 55.2
δ	53 32	29.9	54 51	49.5	53 33	30.9	52 35	34.6
		9.0		9.4		9.2		8.4
Feb. 24		+11.72		+12.58		+11.50		+10.10
	57 0.1		7 23.0		13 12.7		11 44.8	
	3.4		26.6		16.2		48.3	
	6.8		30.2		19.7		51.8	
	10.4		34.0		23.2		55.2	
	13.8		37.5		26.7		58.5	
	345		13		485		86	
	57 6.90		7 30.26		13 19.70		11 54.72	
	− 1.64	-2.69	− 1.65	-2.76	− 1.66	-2.71	− 1.73	-2.74
	− 1.05		− 1.11		− 105		− 101	
	57 4.21		7 27.50		13 16.99		11 48.98	
	− 2.00	-14.44	− 217	-14.76	− 2.21	-14.53	− 2.87	-14.45
	57 2.21	-16.38	7 25.33	-13.77	13 14.78	-12.24	11 46.11	+3.03
	8.8		9.1		8.9		8.5	
	56 46.3		6 44.0		12 49.9		11 15.8	
	53.4		51.4		57.0		22.0	
	58.5		56.4		2.0		28.3	
	92		18		1689		61	
	56 53.07	53 31 36.35	6 50.60	54 50 34.78	12 56.30	53 31 5.20	11 22.83	52 34 17.77
		+ 00						
	+13.83	− 5	+39.66	− 40	+23.40	− 14	+29.69	− 23
	1.14082	− 8	1.59835	− 31	1.36922	− 19	1.44261	− 51
	9.77422	+11.67	9.76039	+13.88	9.77422	+11.65	9.78379	+1067
	1.02054	+ 18	1.46424	+ 21	1.24894	+ 18	1.36190	+ 17
	55	−2000	35	−2000	55	−19.80	50	−1600
	0 21.9	31 28.07	1 43.0	50 27.36	1 0.6	30 56.90	2 53.6	34 11.87
	36.8		56.1		14.9		7.3	
	1 587		991		155		09	
	55 29.35		36 49.55		56 7.75		53 0.45	
	27 19.00		45 58.80		26 48.60		29 47.90	
	53 31 25.80		54 50 5.66		53 30 47.46		52 33 54.76	
	+10.49		+29.12		+17.74		+ 23.01	
	56 47.77	31 11.7	7 10.57	50 13.6	13 0.25	30 44.7	11 31.66	34 14.9
		+11.23		+12.52		+11.08		+9.84
Feb. 26								
	57 0.7	50	7 23.9	79	13 18.7	35	11 45.7	10.11
	4.2		27.5		17.2		49.2	
	7.9		31.1		20.6		52.7	
	11.4		34.6		24.1		55.9	
	14.7		38.2		27.5		59.4	
	389		53		31		129	
	57 7.78		7 31.06		13 20.62		11 52.58	
	− 2.58	-3.57	− 2.58	-3.62	− 2.59	-3.58	− 2.61	-3.56
	− 99		− 104		− 99		− 95	
	57 4.21		7 27.44		13 17.04		11 49.02	
	−1.95	-14.44	− 2.11	-14.76	− 216	-14.53	− 2.82	-14.45
	57 2.26	-16.38	7 25.33	-13.77	13 14.88	-12.24	11 46.20	+3.03
	8.7		9.0		9.1		8.2	
	56 17.7		6 38.8		12 27.5		11 3.2	
	23.7		46.3		33.8		9.0	
	30.3		52.4		40.8		15.8	
	717		1386		1022		280	
	56 28.90	53 31 37.24	6 46.20	54 50 34.37	12 34.07	53 31 5.12	11 9.33	52 34 21.38
		+ 27						
	+43.88	− 52	+44.86	− 51	+46.55	− 56	+43.25	− 50
	1.64224	− 15	1.65186	− 32	1.66792	− 24	1.63509	− 53
	9.77422	+11.72	9.76039	+13.14	9.77422	+11.70	9.78379	+10.70
	1.52199	+ 18	1.51775	+ 21	1.54764	+ 18	1.53528	+ 17
	55	−2000	35	−2010	55	−19.80	50	−1610
	0 45.3	31 28.74	1 48.3	50 27.06	1 19.7	30 56.67	3 4.8	34 15.39
	56.9		69.0		30.8		11.2	
	1022		1073		505		160	
	55 51.10		36 53.65		56 25.25		53 8.00	
	26 57.25		45 54.70		26 23.10		29 40.35	
	53 31 3.98		54 50 1.43		53 30 29.83		52 33 47.08	
	+33.26		+32.94		+35.29		+34.30	
	56 47.82	31 12.4	7 10.57	50 13.3	13 0.35	30 44.4	11 31.75	34 18.4

	h m s	h m s	h m s	h m s	h m s
α	12 30	6 13 18	12 30	6 18 29	17 7.4
					16 55.5
δ	58.9	54 39	58.9	54 50	50.5
	8.5		8.5		8.0
	+7.97		+7.97		+12.64
		13 52.8		19 1.7	
		55.9		5.3	
		58.8		8.9	
		2.4		12.4	
		5.8		16.0	
		463		443	
		13 59.26		19 8.86	
		− 1.73	-2.70	− 1.74	-2.86
		− 97		− 112	
		13 56.56		19 6.00	
		− 2.81	-14.46	− 3.06	-14.89
		13 53.75	+3.57	19 2.94	+4.89
		9.0		8.4	
		13 12.4		18 25.3	
		18.2		31.8	
		24.7		39.0	
		553		61	
	50 58 23.49	13 18.43	50 58 23.49	18 32.03	54 50 19.26
	− 45	+40.83	− 45	+36.83	− 34
	− 70	1.61098	− 70	1.56620	− 35
	+ 8.97	9.79918	+ 8.97	9.76039	+1312
	+ 15	1.51566	+ 15	1.43209	+ 21
	−1540	25	−1540	35	−16.20
	58 16.06	3 57.9	58 19.63	1 57.2	50 15.70
		11.1	+7.89	8.8	
		90		60	
		29 4.50		37 3.00	
		53 43.85		45 45.38	
		50 57 50.71		54 49 52.21	
		+32.18		+27.05	
	58 19.63	13 39.59	58 19.63	18 48.05	50 20.6
			+7.89		+12.47
	8.26	13 53.3	8.26	19 2.5	68
		56.8		6.2	
		0.1		9.7	
		3.8		13.3	
		6.7		16.9	
		02		486	
		14 004		19 9.72	
		− 2.61	-3.52	− 2.62	-3.66
		− 91		− 104	
		13 56.52		19 6.06	
	-14.46	− 2.76	-14.46	− 3.01	-14.89
	+3.57	13 53.76	+3.57	19 3.05	+4.89
		8.8		7.7	
		13 13.3		18 14.7	
		19.7		22.0	
		25.9		29.3	
		589		60	
	50 58 23.23	13 M.63	50 58 23.23	18 22.80	54 50 19.47
	− 44	+4041	− 44	+47.72	− 58
	− 70	1.60646	− 70	1.67870	− 37
	+8.99	9.79918	+8.99	9.76039	+13.16
	+ 14	1.51117	+ 14	1.54459	+ 21
	−1560	25	−1560	35	−16.20
	58 15.89	3 58.8	58 15.89	2 5.5	50 15.95
		9.8		15.8	
		86		21 3	
		29 4.30		37 10.65	
		53 44.05		45 37.70	
		50 57 50.78		54 49 44.43	
		+32.45		+35.04	
	58 19.5	13 39.60	58 19.5	18 48.16	50 20.8

n = −.78, R_{no} = −.17, +4′ 6″.86

n = −.73, R_{no} = −.17, +4′ 6″.73

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16GBR

1878 Feb. 24, Feb. 26 Obs. H. A. S. Rec. J. E. K.

	h m s		h m s		h m s		h m s		h m s	
α	7 19 49	18 35.2	7 22 44	21 24.4	7 29 12	27 42.0	7 31 24	30 10.9	7 36 44	35 31.7
	° ′		° ′		° ′		° ′		° ′	
δ	60 57	58.9	57 53	54.8	54 11	128	51 46	47.6	54 15	17.3
		9.0		9.0		7.0		8.3		9.2

Feb. 24

				+12.88		+11.61		+9.19		+8.39
		23 17.8		27 31.2		31 56.4		37 16.2		
		21.4		34.8		59.9		19.4		
		24.7		38.3		3.0		22.9		
		28.6		41.9		6.5		26.2		
		32.0		45.4		9.9		29.6		
		12 47		19 16		31 57		11 43		
		23 24.94		29 38.32		32 3.14		37 22.86		
		− 1.81	−2.93	− 1.82	−2.90	− 1.82	−2.90	− 1.83	−2.80	
		− 1.12		− 1.08		− 98		− 97		
		23 22.01		29 35.42		32 0.34		37 20.06		
		− 3.69	−14.54	− 3.70		− 3.55		− 3.55		
		23 18.32	+21.33	29 31.72	−14.35 +22.86	31 56.79	−13.90 +23.43	37 16.51	−13.77 +24.72	
	9.2			68.7		5.6		9.0		
		22 58.6		28 42.2		31 30.0		36 30.4		
		4.0		47.8		34.0		32.4		
		11.0		55.0		39.6		36.7		
		13.6		1450		136		39.7		
		23 4.53	54 50 2.55	28 48.33	54 10 28.52	31 34.53	51 44 1.65	42.9	51 14 38.23	
		+20.41	− 11	+49.99	− 65	+28.61	− 22	36 36.42	− 57	
		1.30984	− 36	1.69888	− 36	1.45652	− 56	+46.44	− 49	
		9.76039	+1314	9.76747	+1243	9.79192	+9.82	1.66680	+9.30	
		1.17573	+ 21	1.57185	+ 19	1.35394	+ 15	9.79668	+ 15	
		35	−1080	15	−1000	40	−9.30	10 1.56907	−8.70	
		2 17.	50 4.63	1 57.6	10 30.62	3 9.9	44 [illegible]	2 47.6	14 37.92	
		13.6		10.4	13	22.4	1.54	0.5		
		153		80		323		1081		
		37 7.65		17 4.00		43 16.15		12 64.05		
		45 40.70		5 44.35		39 32.20		9 54.30		
		54 49 47.66		54 9 51.21		51 43 39.06		51 14 1.16		
		+14.99		+37.31		+22.59		+37.07		
		23 3.78	50 26.60	29 17.37	1053.0	31 42.89	4425.0	37 2.74	15 2.6	
Feb. 26	+8.46		+12.78		+11.71		+9.02		+8.50	
	20 21.3	73	23 18.4	13.05	29 32.0	11.98	31 57.2	9.29	37 17.2	77
	24.6		22.2		35.6		0.5		20.4	
	27.8		25.9		39.0		4.0		23.7	
	31.0		29.3		42.5		7.2		27.0	
	34.5		32.8		46.2		10.5		30.3	
	392		1286		1952		194		1186	
	20 27.84		23 25.72		29 39.04		32 3.88		37 23.72	
	− 2.64	− 3.55	− 2.64	−3.68	− 2.65	−3.66	− 2.65	−3.57	− 2.65	−3.56
	− 91		− 104		− 101		− 92		− 91	
	20 24.29		23 22.04		29 35.38		32 0.31		37 20.16	
	− 3.38	−13.86	− 3.66	−14.54	− 3.66	−14.35	− 3.52	−13.90	− 3.52	−13.77
	20 20.91	+20.61	23 18.38	+21.33	29 31.72	+22.86	32 56.79	+23.43	37 16.64	+24.72
	9.2		9.0		6.8		5.6		6.8	
	19 42.6		22 50.2		28 38.0		31 18.4		36 35.0	
	50.7		57.9		41.6		24.9		38.2	
	56.6		55.2		44.8		31.7		41.9	
	499		133		47.6		760		45.5	
	19 49.7	50 55 48.52	22 54.43	54 50 4.26	51.4	54 10 28.00	31 25.33	51 44 1.47	48.3	51 14 36.86
	+37.87	− 39	+31.29	− 25	28 44.68	− 77	+38.55	− 39	36 28.80	− 47
	1.57830	− 27	1.49541	− 37	+54.36	− 19	1.58602	− 58	+41.94	− 49
	9.79965	+8.78	9.76039	+1319	1.73528	+12.48	9.79182	+9.84	1.62263	+9.32
	1.48345	+ 14	1.36130	+ 21	9.76747	+ 19	1.48344	+ 15	9.79668	+ 14
	30	−1041.35		−11.10	1.60825	−1040	40	−9.60	1.52481	−9.00
	1 31.7	55 46.85	2 8.5	50 6.21	12 2.3	10 27.58	3 18.9	44 1.16	2 46.4	14 36.63
	42.1		19.1		13.0		29.2		57.0	
	738		276		153		481		1034	
	31 36.90	+10	37 13.80		18 7.65		43 24.05		12 67.70	
	51 11.45		45 34.55		50 40.70		39 24.30		9 56.65	
	50 55 18.18		54 49 41.28		54 [illegible] 47.43		51 43 31.03		51 14 3.38	
	+30.44		+22.98		+40.57		+30.44		[illegible] 33.48	
	20 7.05	56 7.4	23 3.84	50 27.54	29 17.27	1052 4	31 42.89	4424.6	37 2.87	15 1.4

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16r8R

1878 Feb. 27 Feb. 28 Obs. W. A. R. Rec. J. F. M.

	h m s		h m s		h m s		h m s		h m s		h m s	
α	4 36 13	54 53.2	5 7 11	5 52.5	5 12 36	11 35.1	6 13 18	12 3.0	7 12 23	11 6.4	7 19 47	18 35.2
δ	° ′	″	° ′	″	° ′	″	° ′	″	° ′	″	° ′	″
	32 30	284	53 42	40.3	53 53	50.6	50 59	58.9	32 14	15.7	50 57	58.9
		8.5		9.0		9.0		8.5		9.3		9.0

Feb. 27

	10.17											
	+10.09		+10.87	+4.78	+10.93		+7.99		+9.89		+8.37	
	56 40.2	7 42.6	7 47.9	94 1205	13 27.5	1.20	13 53.7	8.26	12 53.9	.96	20 2.6	.64
	43.6	46.3	57.3		31.3		57.1		57.4		24.9	
	47.0	49.8	57.7		84.8		0.3		0.8		28.1	
	3.04	53.2	58.3		38.0		3.6		4.3		31.3	
	5.40	56.7	2.2		41.5		6.9		7.5		84.6	
	23.52	48.6	24.4		23.1		16		39		40.7	
	56 47.04	49.72	54.88		13 34.62		14 0.32		13 0.78		20 28.14	
	− 2.92 −3.91	− 2.98	− 2.93	−3.96 −3.96	− 2.93	−3.98	− 2.96	−3.90	− 2.99	−3.96	− 2.99	−3.94
	− 99	− 103	− 103		− 105		− 94		− 97		− 94	
	56 43.13	7 45.76	7 50.92		13 30.64		13 56.42		12 56.82		20 24.21	
	−1.59	−2.07	−2.07		−2.20	2.14	−2.74		−3.37		−3.36	
	56 41.24	7 43.69	48.85		13 28.50		13 53.68		12 53.45		20 20.85	
	8.7	9.0	9.4	53°	8.8		8.8		9.0		9.3	
				42 55.44 41 49.61								
	56 4.1	7 0.9	7 29.2	47.18 − 45 − 9	12 51.6		13 17.4		12 19.4		19 45.2	
	8.8	8.6	34.9	− 50 − 5	54.5		24.2		21.8		3.6.8	
	14.5	13.1	43.7	+11.75 +11.75	57.3		31.0		26.0		57.3	
	27.4	25.4	46.8	+ 17 + 17	0.6		726		28.3		3.5	
	56 9.13	52 30 23.10	8.20	35.77 −2000 −2000	44	53 52 30.53	13 24.20	50 58 25.14	32.4	52 14 58.17	19 51.17	50 55 49.41
	+3.91	− 38 +41.52	+19.11	42 38.12 41 44.86	12 28.6	− 36	+36.12	− 35	12 25.88	− 33	+36.97	− 37
	1.57845	−.36 17 1.61826	1.23726		57.72	− 83	1.55-7475	− 68	+35.20	− 41	1.56 7855	− 27
	9.78428	+10.48 9.77233	9.77233		+36.90	+11.94	9.79918	+ 888	1.54654	+10.26	9.79965	+8.87
	1.46853	+ 16 1.49409	1.15909		1.56703	+ 18	1.46243	+ 14	9.78691	+ 15	1.47300	+ 14
	55	−2010 40 45			9.77061	−2020	25	−1600	101.43895	−11.90	30	−10.90
					30 1.44314							
n = −.76	1 55.1	31 13.36 434.1° 84.7			4 46.6	52 21.53	3 52.9	58 17.40	2 18.2	14 52.23	1 29.1	55 47.145
	9.5	30 13.17 459 45.9			59.8		6.8		32.4		43.5	
Rss = −.17	46	800 416			1064		1194		506		726	
	56 2.30	44 4000 4520.80			34 53.20		28 59.85		12 25.30		31 36.30	
+4' 7.64	285 46.05	38 835 37 27.35			47 55.15		53 48.50		10 23.05		57 12.05	
	52 30 53.69	53 42 16.99 41 38.19			53 52 2.79		50 57 56.14		52 14 30.69		50 55 19.69	
	29 +29.41	+3.45 + 14.42			+27.74		+29.00		+27.48		+29.72	
		31.19										
	7 29.16	42 24.5	13 13.91	52 9.3	13 39.52	58 21.0	12 39.32	15 15.0	20 6.99	56 7.8		
	56 27.00	29 56.7	8.9 9.4		8.7							

Feb. 28

			+10.58		+11.06		+7.68		+9.72		+8.32	
		7 48.0	7 48.2	72	13 28.0	20	13 54.4	82	12 54.3	86	20 22.0	46
		47.1	51.7		81.4		57.5		57.8		23.2	
		50.2	55.3		35.0		0.8		1.2		28.6	
		53.8	58.6		38.4		4.0		4.4		31.8	
		57.1	2.3		41.9		7.3		7.8		85.1	
		12 27.61			1747		40		55		142.7	
	7 50.24	55.22			13 34.92		14 0.80		13 1.10		20 28.54	
	− 3.34	− 3.34	−4.41 −4.31		− 3.34	−4.43	− 3.389	−4.37	− 3.44	−4.45	− 3.45	−4.43
	− 1.07	− 1.07			− 109		− 98		− 101		− 98	
	7 45.83	7 50.81			13 30.51		13 56.43		12 56.65		20 24.11	
	−2.04	−2.04			−1.99		−2.72		−3.35		−3.34	
	7 43.79	48.77			13 28.39		13 53.71		12 53.30		20 20.77	
	8.9	9.4	+.14 53°		8.7		9.0		9.2		9.2	
			42 46.19 41 28.54									
		6 58.4	7 28.7	− 54	12 58.9		13 5.9		12 22.0		19 43.9	
		5.0	34.4	− 50	1.6		12.5		24.5		49.7	
		11.3	34.8	+11.75	5.8		19.3		28.0		56.4	
		14.7	39.9	+ 17	8.3		877		31.6		00	
	7	490	33.30	−1976	12.0	53 52 31.04	13 12.57	50 58 24.30	35.2	52 14 59.16	19 3.00	50 55 50.30
		+45.34	+2.92	42 37.21								
		1.65648	1.34084		13 26.62	− 22	+48.23	− 62	12 41.32	− 28	+38.54	− 40
		9.77233	9.77233		3.82	− 82	1.68332	− 71	28.26	− 41	1.58591	− 27
		1.53431	1.21867		+29.62	+11.92	9.79918	+ 887	+32.84	+10.26	9.79965	+ 8.85
					1.47159	+ 18	1.58800	+ 14	1.51640	+ 15	1.49106	+ 14
		40	36		9.77061	−1990	25	−1570	9.78691	−11.70	30	−10.70
		4	13.7		30 1.34770				10 1.40881			
			54.9		4 40.1	52 22.34	4 3.5	58 16.42	2 15.2	14 57.31	1 29.1	55 48.86
			950		54.9		17.9		30.3		44.8	
n = −.79			886		950		214		455		73.9	
		44	44.30		34 47.50		29 10.70		12 22.75		31 36.95	
		38	4.05		48 0.85		53 37.65		10 25.60		51 11.40	
Rss = −.17		53 42	11.97		53 52 8.77		50 57 45.57		52 14 33.52		50 55 19.32	
			+34.22		+22.27		+38.13		+25.63		+30.98	
+4' 7.92			+16.54									
		7 29.26	42 23.6		13 13.80	52 10.1	13 39.55	58 20.0	12 39.17	15 16.1	20 6.91	56 8.7

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1008R

1878 Feb. 27. Feb. 28

Feb. 27

Feb. 28

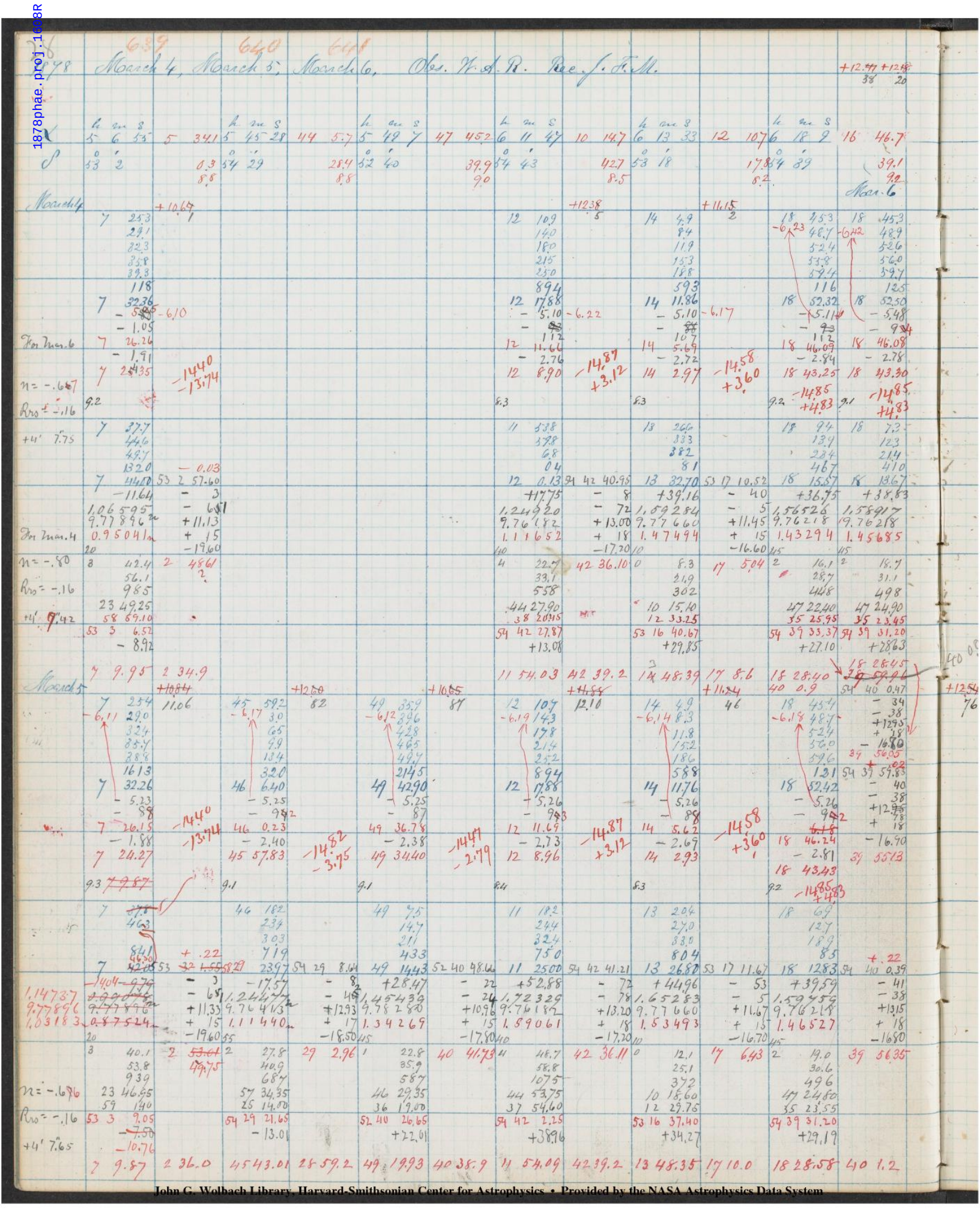
These 4 observations are continued above

These 4 observations are continued above.

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1608R

1878 March 4, March 5, March 6, Obs. H. A. R. Rec. J. F. M.



John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1979phae.proj.1008R

1878 Mar. 4 Mar. 5 Mar. 6

	h m s	h m s	h m s	h m s	h m s	h m s	h m s
α	6 20 1	18 45.7	6 39 9	37 50.5	6 41 2	39 41.3	7 0 43
δ	° ′ 50 48	° ′ 595 52 9	7.7 9.0	° ′ 54 21	21.9 8.5	° ′ 53 24	25.3 9.0
		9.3					

Mar. 4 — Mar. 6 — Mar. 6 — Mar. 6

+8.18 — +12.33

	20 27.0		41 36.6		12 36.5		21 20.4
	40.2		40.1		39.9		23.7
	43.8		44.0		43.3		27.1
	46.8		47.7		46.8		30.3
	50.3		50.7		50.3		34.0
	2181		191		168		1385
	20 43.62		4382		12 43.36		21 27.10
	− 5.48	−6.31	− 5.13	−6.25	− 5.52	−6.39	−6.31 − 5.52
	− 8.83		− 1.12		− 8.87		− 8.86
	20 37.31		41 37.57		12 [9.13] 36.77		21 20.72
	− 2.64		− 3.08		− 3.25		− 3.29 30
	20 34.67		41 34.49	−14.71 +10.80	12 33.72	−14.19 +18.66	21 17.42
	9.3		9.3		9.1		−14.07 +20.82

	19 58.0		41 9.0		12 5.2		20 34.4
	5.0		14.3		10.5		41.9
	10.2		20.7		17.8		48.0
	13.2	+ 002	44.0	− 03	35	+ 02	43
	20 4.40	50 58 59.49	41 14.67	54 20 34.94	12 11.17	52 30 54.13	20 41.43
	+39.22	− 41	+ 29.15	− 22	+ 32.19	− 27	+45.67
	1.59351	− 56	1.46464	− 27	1.50752	− 22	1.65963
	9.79918	+ 8.98	9.76572	+1264	9.78445	+10.68	9.78700
	1.49819	+ [13]	1.33586	+ 18	1.39767	+ 15	1.55213
	25	+ 12	5	−15.10	55	− 12.40	10
	3 21.5	− 15.60	1 36.2	20 32.14	1 20.0	30 52.09	2 21.5
	34.7	58 52.04	48.8		33.9	02	34.2
	56.2		850		539	52 15 3.91	557
	28 28.10		6 42.50		56 26.95	− .55	12 27.85
	54 20.25		16 5.85		26 21.40	− 40	10 20.50
	50 58 28.00		54 20 13.27		52 30 27.15	+10.39	52 14 28.25
	+31.49		+21.67		+24.78	+ .14	+3.56
					12 19.53	− 11.60	21 3.35
			41 19.78	20 42.9	31 10.8	15 1.91	15 22.7
				+12.16	+10.71		+10.28 +10.29
							30 41

40.00 − 12.54

Mar. 5 — +8.30 — +10.32 — +11.18

76

	20 37.1	52	39 44.5	54	41 36.5	38	1 16.7
	40.3		47.7		40.0		20.0
	43.6		51.1		43.7		23.5
	46.4		54.6		47.1		26.9
	50.0		57.8		50.7		30.6
	2177		57		180		1177
	20 43.54		39 51.14		41 43.60		1 23.54
	− 5.27	−6.09	− 5.28	−6.14	− 5.28	−6.20	− 5.29 −6.18
	− 8.82		− 8.4		− 9.82		− 9.0
	20 37.45		39 45.02		41 37.40		1 17.36
	− 2.67		− 2.92	−14.29 +10.29	− 3.05		− 3.20
	20 34.78		39 42.10		41 34.35	−14.71 +10.80	1 14.16
	9.4		9.0		8.6	28	

	19 57.1		39 23.8		40 51.3		0 58.3
	3.6		32.0		58.6		1.3
	10.4		38.3		5.8		6.9
	11.4		41		1757		15
	20 38.0	50 58 59.16	39 31.37	52 6 32.66	40 58.57	54 20 35.03	1 0.50
	+39.74	− 42	+19.47	− 10	+45.03	− 53	+23.04
	1.59923	− 56	1.29661	− 10	1.65350	− 30	1.36248
	9.79918	+ 9.15	9.78837	+10.38	9.76572	+12.82	9.77558
	1.50391	+ 13	1.19048	+ 14	1.52472	+ 17	1.24356
	25	− 15.60	20	−14.70	5	−15.20	0

	3 22.7	58 52.08	0 31.8	6 28.50	1 48.6	20 32.21	4 18.8
	34.8		45.9		0.3		28.8
	57.5		777		1089		476
	28 28.75		20 36.85		6 54.45		4 23.80
	54 19.60		2 9.50		15 53.90		18 24.55
	50 58 27.25		52 6 17.15		54 20 1.58		53 22 32.20
	+31.71		+15.51		+33.48		+17.52

	12 36.4	63	21 29.8	27	1 16.7	32	12 39.4
	39.8		22.6	33.1	20.0		43.5
	43.5		27.0	36.4	23.5		47.1
	46.8		30.3	40.0	26.9		50.7
	50.0		33.7	43.6	30.6		54.4
	2165		348	1829			1177
	12 43.30		26.96	36.58			1 23.54
	− 5.29	−6.15	− 5.29	−5.29 −6.14			− 5.29 −6.18
	− 8.86		− 8.85	− 8.85			− 9.0
	12 37.15		21 20.82	21 30.44			1 17.36
	− 3.26		− 3.32	− 3.32			− 3.20
	12 33.89	−14.19 +18.66	21 17.50	27.12			1 14.16
	9.1		9.0	7.3			8.1

	12 1.7		20 49.9	21 8.5			0 58.3
	4.3		54.6	14.4			1.3
	8.0		2.0	19.5			6.9
	10.8		1685	424			15
	12.8	+ 22	5617	14.15			1 0.50
	12 38.6	− 33+	30.79	+22.45			+23.04
	772	− 24	1.48841	1.35722			− 14
	+35.58	+10.83	9.78700	9.78700			− 70
	1.55121	+ 15	1.38091	1.24372			+11.78
	9.78445	−1240	10				+ 16
	1.44116						−13.50

	1 23.0	30 52.65	2 10.1				22 47.54
	35.4		22.9				
	584		336				
	56 29.20		12 16.50				
	26 19.15		10 31.85				
	52 30 26.80		52 14 39.50				
	+27.62		+24.00				
			+17.53				

	12 19.70	31 11.3	21 3.43	15 23.1			
			13.65	45.9			

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1608R

	640	641							51	42	26	90
1878.	Mar. 5	Mar. 6	Obs. H.A.R. Rec. J.F.M.						+11.29	+11.20	+13.04	+11.68
									11 51.2 5.0 9.2	12 40.8 27.0 8.8	13 59.0 58.5 8.4	17 59.3 27.0 8.7
α	h m s 7 21 11	19 54.2	h m s 7 48 27	47 15.0	h m s 7 49 14	48 2.1	h m s 8 10 23	9 4.8	h m s 8 13 9	h m s 8 13 59	h m s 8 15 16	h m s 8 19 16
δ	° ′ 52 13	14.6 9.3	° ′ 51 32	34.2 9.5	51 22	25.0 9.0	° ′ 52 57	53 0.5 9.4	° ′ 53 2	° ′ 53 24	° ′ 54 55	° ′ 53 24

Mar. 5

	+10.14		+9.59		+8.82		+10.65				
21 44.1 −6.14 47.4 50.9 54.3 57.8 45 21 50.90 − 5.29 − 8.85 21 44.76 − 3.33 21 41.43 9.3	36 −14.06 +20.94	49 4.3 −6.14 7.3 10.5 13.8 17.0 52.9 49 10.58 − 5.31 − 8.43 49 4.44 − 3.51 49 0.93 9.5	8.1	49 50.6 −6.14 53.9 57.0 0.5 3.7 285.7 49 57.14 − 5.31 − 8.43 49 51.00 − 3.51 49 47.49 8.8	9.04 −13.67 +27.66	10 56.6 −6.20 0.6 3.8 7.1 10.6 18.7 11 3.74 68 − 5.32 − 8.8 10 57.54 48 − 3.76 10 53.78 2 9.4	34 87 38 3.7 3.8 −13.69 +32.46	13 39.0 −6.20 42.7 45.9 49.5 52.8 229.9 13 45.98 − 5.32 − 8.8 13 39.78 − 3.78 13 36.00 9.3 −13.66 +33.06	14 26.2 −6.21 29.6 32.8 36.6 40.4 165.6 14 33.12 − 5.32 − 9.0 89 14 26.91 − 3.72 82 14 23.09 8.5 −13.71 +33.24	15 48.7 −6.26 52.3 56.2 59.6 3.2 280.0 15 56.00 − 5.32 − 9.4 15 49.74 − 3.87 94 15 45.80 8.0 −13.96 +33.54	19 47.7 −6.21 51.0 54.5 58.0 1.4 272.6 19 54.52 − 5.32 − 9.0 89 19 48.31 − 3.85 19 44.46 8.4 −13.64 +34.41
22 3.4 11.0 18.0 24 22 10.80 −19.90 1.29885 9.78707 1.19142 10 2 31.9 44.9 76.8 12 38.40 10 9.95 52 14 17.60 −15.54	+.22 .03 52 14 2.06 − 11 − 42 +10.53 + 14 −11.60 14 0.82	48 50.0 54.3 0.3 164.6 48 54.87 +15.71 1.19618 9.79415 1.09683 55 1 21.1 34.0 55.1 56 27.55 26 20.80 51 30 28.45 +12.47	51 30 40.92 − 7 − 24 + 9.77 + 13 − 9.00 30 41.73	50 15.5 21.5 28.0 50 50 21.67 −24.53 1.38970 9.79542 1.29062 0 4 35.9 48.0 83.9 4 41.95 18 6.40 51 22 14.05 −19.53	51 21 54.52 − 16 − 75 + 9.60 + 13 − 8.90 21 56.66 4	10 16.7 21.5 26.9 51 10 21.70 + 42.04 41.98 1.62366 04 9.78030 1.50416 884 30 2 5.1 17.2 22.3 32 11.15 50 37.20 52 54 44.85 +32.32 27	2 52 55 17.17 − 46 − 35 +11.31 + 15 − 7.30 55 22.44 20.69	13 24.2 30.9 38.0 31 13 31.03 +14.95 1.17464 9.77946 1.05960 25 19.0 32.8 51.8 26 25.90 56 22.45 53 0 30.10 +11.47	14 9.4 15.4 20.0 44.8 14 14.93 +18.19 1.25983 9.77575 1.14108 0 4 26.1 36.9 63.0 4 31.50 18 16.85 53 22 24.50 +13.84	15 16.1 20.8 27.8 47 15 21.57 +34.43 1.53694 9.75949 1.40193 30 2 16.4 27.8 24.2 32 22.10 50 26.25 54 54 33.90 +25.23	19 21.9 25.2 33.9 81.0 19 27.00 + 27.52 1.43965 9.77592 1.32107 5 0 27.1 39.0 66.1 5 33.05 17 15.30 53 21 22.95 +20.94
21 27.37	14 21.8			49 33.82	22 22.3	10 40.63	55 53.2	13 22.34 53 0 41.57 − 6 − 22 +11.42 + 15 − 7.10 0 45.98 1 19.0	14 9.38 53 22 38.34 − 8 − 72 +11.84 + 16 − 7.10 22 42.66 23 15.9	15 37.84 54 54 59.13 − 30 − 38 +13.54 + 18 − 7.30 55 65.09 55 38.6	19 30.82 53 21 43.89 − 20 − 10 +11.82 + 16 − 6.50 21 49.29 22 23.7

Mar. 6

	+9.79 81		+9.14 6		+9.40 8
21 44.2 47.9 51.4 54.7 58.0 62 21 51.24 − 5.52 − 8.86 21 44.86 − 3.31 21 41.55 9.4	−6.38 −14.06 +20.94	49 4.4 7.6 10.9 14.1 17.5 54.5 49 10.90 − 5.55 − 8.34 49 4.51 − 3.49 49 1.02 9.6	−6.39	49 50.7 54.0 57.4 0.8 4.0 286.9 49 57.38 − 5.55 − 8.34 49 50.99 − 3.49 49 47.50 8.5	−6.39 −13.67 +27.66
22 17.7 24.7 31.1 73.5 22 24.50 −33.26 1.52192 9.78707 1.41449 10 2 21.2 34.7 55.9 12 27.95 10 20.40 52 14 28.15 − 25.97	+ .02 52 14 21.8 − 29 − 40 +10.34 + 14 −11.60 14 0.39	48 31.8 38.1 43.8 113.7 48 37.90 +33.00 1.51851 9.79415 1.41816 55 1 33.1 46.8 79.9 56 39.95 26 8.40 51 30 16.15 +26.19	51 30 42.34 − 29 − 26 +9.57 + 12 −9.10 30 42.40	49 37.4 42.6 48.8 88 49 42.93 +14.45 1.15987 9.77542 1.06079 5 0 7.9 21.5 29.4 5 14.70 17 33.65 51 21 41.40 +11.50	51 21 52.90 − 5 − 3 +9.42 + 12 −9.00 21 53.38
21 27.49	14 21.3			49 33.83	22 21.0

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1608R

1878 Mar. 16, Mar. 19. Obs. W. A. R. Rec. J. F. M.

α	h m s 6 39 9	37 50.5	h m s 7 0 43	6 59 22.5	h m s 7 12 23	11 6.4	h m s 7 50 11	~~48 58.8~~ 48 10.0 53.7	h m s 8 10 23	9 4.8	h m s 8 13 11	11 52.8
δ	° ′ 52 7	7.7 9.0	° ′ 53 24	25.3 9.0	° ′ 52 14	15.7 9.3	° ′ 49 31	~~53.8~~ 8.0	° ′ 52 57	53 0.5 9.4	° ′ 53 47	50.1 9.3
Mar. 16	39 48.5 52.2 55.5 58.8 22 277.2	+10.21 9.91	0 18.8 22.5 25.9 29.4 33.0 129.6	+11.39 29	13 0.9 4.3 7.4 11.0 14.3 37.9	+9.81 71	50 1.5 4.8 8.0 11.1 14.7 40.1	+7.42 32			13 46.8 50.3 53.8 57.3 0.8 269.0	+11.57 47
	39 55.44 −10.00 −1.09	−11.09	0 25.92 −10.03 −1.15	−11.18	13 7.58 −10.04 −1.09	−11.13	50 8.02 −10.08 −1.01	−11.09			13 53.80 −10.11 −1.16	−11.27
	39 44.35 −2.63 39 41.72	−14.29 +10.29	0 14.74 −2.91 ~~14.95~~ 0 11.83		12 56.45 −2.98 12 53.47	−14.13 +18.75	49 56.93 −3.20 49 53.73	−13.43 +27.72			13 42.63 −3.62 13 38.91	−13.79 +33.06
	8.9		9.0		9.0		8.0				9.0	
	39 19.2 24.4 81.1 74.7 39 249.0	−.10 52 6 33.89	0 46.9 53.5 57.2 76 0 525.3	53 25 5.15	12 24.2 31.1 37.9 32 12 31.07	52 15 0.22	49 38.5 40.7 43.9 46.5 49.6	49 49 38.08			13 9.4 13.3 20.5 43.2 13 14.40	53 45 47.82
	+30.54 1.48487 9.78837 1.37874	−24 −12 +10.25 +12 −15.50	−26.61 1.42504 9.77524 1.30578	−19 −22 +11.64 +13 −14.60	+36.51 1.56241 9.78691 1.45482	−35 −38 +10.40 +12 −13.40	49 23.92 +24.20 1.38382 9.80972 1.29904	−15 −39 +7.87 +9 −10.80			+39.40 1.59550 9.77181 1.47281	−41 −24 +12.08 +14 −9.00
n = −.85 Rn = −.15 +4′ 8″.72	20 0 37.3 56.9 94.2 20 47.10 2 1.25	~~52 6 33.89~~ 6 28.30	0 1 23.2 40.2 63.4 1 31.70 21 16.65	25 1.84	10 2 16.9 33.8 50.7 12 25.35 10 23.00	14 56.53	35 2 29.9 47.9 79.8 37 38.90 45 9.45	49 35.40	30 2		40 1 30.0 47.9 77.9 41 38.95 41 9.40	45 50.29
	52 6 9.97 +23.92		53 25 25.37 −20.22		52 14 31.72 +28.50		49 49 18.17 +19.91				53 45 18.12 +29.70	
	39 27.43	6 38.6			12 39.34	15 15.3	49 40.30	50 3.1			13 25.12	46 23.4
Mar. 19	39 50.5 54.0 57.2 0.7 4.1 286.5	+9.49 57	1 23.2 26.5 30.0 33.4 87.1 0.2	+10.89 97	13 2.5 6.0 9.2 12.6 16.0 46.3	+9.876 84	50 3.4 6.6 9.7 13.0 16.2 48.9	+7.22 30	11 3.2 6.6 10.2 13.6 17.0 50.6	+10.47 55	13 48.6 52.3 55.7 59.3 2.7 278.6	+11.18 26
	39 57.30 −12.08 −99	−13.07	1 30.04 −12.10 −1.04	−13.14	13 9.26 −12.11 −99	−13.10	50 9.78 −12.14 −92	−13.06	11 10.12 −12.17 −1.02	−13.19	13 55.72 −12.17 −1.04	−13.21
	39 44.23 −2.55 39 41.68	−14.29 +10.29	1 16.90 −2.84 1 14.06		12 56.16 −2.90 12 53.26	−14.13 +18.75	49 56.72 −3.13 49 53.59	−13.43 +27.72	10 56.93 −3.48 10 53.45	−13.69 +32.46	13 42.51 −3.56 13 38.95	−13.79 +33.06
	8.2		8.3		8.4		8.2		9.1		9.0	
	39 6.0 13.2 19.7 89 39 129.7	+.08 52 6 33.64	1 36.6 42.9 48.8 83 1 427.7	53 22 51.34	12 41.3 47.9 54.2 143.4 12 478.0	52 15 0.07	49 40.2 46.0 52.2 138.4 49 461.3	49 49 37.23	10 25.7 32.5 39.5 77 10 325.7	52 55 19.24	13 5.8 12.8 19.0 76 13 125.3	53 45 49.18
	+44.33 1.64670 9.78837 1.54057	−52 −14 +10.03 +12 −15.60	−12.73 1.10483 9.77558 0.98591	−5 −64 +11.36 +13 −14.70	+21.46 1.33163 9.78691 1.22404	−12 −35 +10.17 +12 −13.60	+23.65 1.37383 9.80972 1.28905	−14 −43 +7.65 +9 −10.20	+37.65 1.57461 9.78030 1.46041	−37 −34 +11.00 +13 −9.30	+43.19 1.63538 9.77181 1.51269	−48 −28 +11.78 +14 −9.30
n = −.77 Rn = −.14 +4′ 9″.72	20 0 51.1 7.2 118.3 20 59.15 1 49.20	6 27.61	0 3 50.1 4.07 114.1 3 57.05 18 51.30	22 47.61	10 2 7.1 22.4 29.5 12 14.75 10 33.60	14 56.41	35 2 32.7 47.9 80.6 37 40.30 45 8.05	49 34.33	30 2 0.4 15.0 15.4 32 7.70 50 40.65	55 20.49	40 1 34.0 48.9 82.9 41 41.45 41 6.90	45 51.14
	52 5 58.92 +34.72		53 23 1.02 −9.68		52 14 ~~23.88~~ 43.32 +16.75		49 49 ~~18.33~~ 17.77 +19.46		52 54 50.37 +28.87		53 45 16.63 +32.56	
	39 27.39	6 37.9			12 39.13	15 15.2	49 40.16	50 2.0	10 39.76	55 53.0	13 25.16	46 24.2

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1618R

1878. Mar. 16, Mar. 19, Obs. W.A.R. Rec. J.E.M.

	h m s		h m s		h m s	
α	8 13 37	12 408	8 15 16	13 590	8 19 16	17 593
δ	° ′	27.0 8.8	° ′	585 8.4	° ′	27.0 8.7

Mar. 16

		+11.02		+13.09		+11.36
14	31.3	10.92	15	53.6 1299	19	52.6 11.26
	34.7			57.2		55.9
	38.3			0.9		57.3
	41.5			4.3		2.7
	45.2			7.9		6.3
	410			39		468
14	38.20		16	0.18	19	59.36
	− 10.11	−11.26		−10.11 −11.33		− 10.11 −11.26
	− 1.15			− 1.22		− 1.15
14	26.94		15	49.45	19	48.10
	− 3.60	−13.71 +33.24		− 3.72 −13.96 +33.54		− 3.65 −1364 +3441
	14 23.34		15	45.73	19	44.45
	8.5			7.8		8.8

14	59.2		15	35.0	19	17.3
	5.2			43.0		23.9
	12.6			49.8		29.6
	17.0	−.10		7.8		7.08
15	5.67	53 22 40.08	15	42.60	19	23.60 53 21 47.44
	∓ 27.47	− 20		+ 18.18		− 8 + 35.76 − 33
	1.43886	− 58		1.25959		− 33 1.55340 − 9
	9.77558m	+11.67		9.75944		+ 13.34 9.77592 +11.65
	1.31994m	+ 13		1.12458		+ 16 1.43482 + 13
0		− 8.5030		2.9		− 9.00 5 − 830
	48.4			48.4		
3	30.9	22 4220	2	43.4	5	343 0 27.7 21 5040
	37.8			13.8		46.0
	45.4			18.6		737
	1122			219		
	×3 56.10			32 10.95		5 36.85
	188 52.25			50 37.40		17 11.60
	53 43 0.97			54 54 46.12		53 21 20.22
	2 −2089			+ 13.32		+ 27.22

	14 9.63	23 15.4	15	31.77 55 37.0	19	30.81 22 24.8
Mar. 19		+10.86		+12.58		+10.84
14	33.0	94	15	55.1 59	19	54.3 95
	36.5			58.9		57.8
	40.0			2.4		1.2
	43.3			6.2		4.7
	46.9			9.8		8.1
	1997			124		61
14	89.98		16	2.48	20	1.22
	−12.17	− 13.27		−12.17 −13.27		− 12.17 −13.21
	− 1.04			− 1.10		− 1.04
14	26.78		15	49.21	19	48.01
	− 3.54	−13.71 +33.24		− 3.65 −13.96 +33.54		− 3.58 −1364 +3441
	14 23.19		15	45.56	19	44.43
	8.0			8.2		8.2

14	23.7		15	19.0	19	10.2
	30.0			24.8		17.0
	35.6			32.3		23.4
	89.3			76.1		50.6
14	29.77	53 22 40.35	15	25.37	19	16.87 53 21 47.37
	+10.14	− 3		+37.11		− 35 + 44.35 − 52
	1.00732	− 62		1.56949		− 3148 1.64689 − 10
	9.77558	+11.38		9.76003		+ 13.01 9.77592 + 11.36
	0.88840	+ 13		1.43502		+ 16 1.52831 + 13
	×0	− 9.2030				− 9.505 − 8.70
	16.8			16.9		
4	34.0	22 4209	×2	12.99	55	5.09 0 34.1 21 49.62
	37.4			2 4664		51.8
	40.7			33 2336		889
	509			5048 25.05		5 44.45
	×4 25.45					17 3.90
	188 22.90					
	53 42 32.62			54 54 34.77		53 21 13.62
	2 + 7.73			+ 27.23		+ 33.75

	14 9.48	23 15.3	15	31.60 55 38.6	19	30.79 22 24.0

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj,1008R

6274 6275

1878 Mar. 20, Mar. 26 Obs. U. S. R. Rec. J. F. M.

	h m s		h m s		h m s	
α	7 48 27	47 15.0	7 49 14	48 21	8 13 9	11 51.2
δ	° ′		° ′		° ′	
	51 32	342	51 22	250	53 2	5.0
		9.5		9.0		9.2

Mar. 20 +9.06 +9.51 +10.86

	49 11.4	8.66	49 58.0	11	13 46.6	46
	14.7		1.3		5.0	
	18.0		4.5		53.5	
	21.1		7.7		56.9	
	24.5		11.2		0.4	
	8.9.7		2.27		1.74	
	49 17.98		50 4.54		13 53.48	
	−12.78	−13.98	−12.75	−13.92	−12.78	−14.02
	−1.17		−1.17		−1.24	
	49 4.02		49 50.62		13 39.46	
	−3.18		−3.17		−3.48	
	49 0.84		49 47.43		13 35.98	−13.66 +33.06
	49 0.84					
	9.5		8.5		9.3	

	48 31.6		49 50.9		14 25.7	
	37.3		53.8		33.9	
	44.3		57.5		39.1	
	11.34	−40	1.8		8.7	
	48 37.80	51 30 45.98	49 22.30	51 21 54.84	14 32.90	53 0 45.25
	+40.14	−43	+8.79	−2	−39.42	−41
	1.60358	−24	0.94399	−3	1.59372	−10
	9.79415	+9.62	9.79342	+9.45	9.77930	+11.24
	1.50323	+11	0.84491	+11	1.48052	+13
	55	−1080	5	−10.70	25	−9.20
n = −.93	1 38.0	30 43.81	0 4.2	21 53.25	0 36.2	0 46.51
	51.9		18.2		50.9	
R.A. = −.14	899		224		8.71	
	56 44.95		5 11.20		25 43.55	
+4′ 10.69	2.6 3.40		17 37.15		57 4.80	
	51 30 14.09		51 21 47.84		53 1 15.49	
	+31.86		+7.00		−30.24	
					13 22.32	1 19.6

Mar. 26 +8.79 +9.36 +10.96

	49 14.1	8.8	50 0.8	25	13 49.7	8.5
	17.5		4.2		53.1	
	21.0		7.5		56.5	
	24.1		10.8		57.7	
	27.5		14.0		3.1	
	10.42		3.73		3.21	
	49 20.84		50 7.46		56.42	
	−18.93	−17.06	−18.93	−7.06	−16.95	−17.15
	−1.13		−1.13		−1.20	
	49 2.78		49 49.40		13 38.27	
	−3.03		−3.03		−3.34	
	49 [illegible]		49 [illegible]		13 34.93	−13.66 +33.06
	9.5		8.7		9.0	

	48 34.6		49 43.8		13 30.2	
	42.6		50.5		35.6	
	48.5		53.9		42.1	
	57	−11	02		10.79	
	48 41.90	51 30 46.82	49 50.07	51 21 56.10	13 35.97	53 0 44.14
	+38.94	−41	+17.39	−8	+20.45	−11
	1.59040	−24	1.24630	−4	1.31069	−21
	9.79415	+9.53	9.79342	+9.37	9.77930	+11.15
	1.49005	+11	1.14122	+11	1.19549	+13
	55	−11.40	5	−11.30	25	−9.90
	1 36.0	30 44.30	0 9.7	21 54.05	0 23.9	0 45.09
	49.9		23.5		36.9	
	85.0		33.2		60.8	
	56 42.95		5 16.60		26 30.40	
n = −.90	26 5.40		17 31.75		56 17.95	
	51 30 15.91		51 21 42.26		53 0 28.46	
R.A. = −14	+30.91		+13.84		+15.68	
+4′ 10.51					13 22.27	1 18.2

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16r8R

1878 Mon. 30 Mon. 31 Obs. K. A. R. Rec. J. S. M.

34 57.6

	h m s		h m s		h m s		h m s		h m s		h m s		h m s	
α	9 59 28	58 21.6	10 26 6	25 5.6	10 36 16	35 14.4	10 44 22	43 25.0	10 48 24	48 21.9	10 52 51	51 50.1		
	° ′		° ′		° ′		° ′		° ′		° ′			
δ	54 37	423	57 4	8.5	54 23	28.5	57 48	536	52 39	43.9	53 38	54 0.7		
		9.0		9.2		9.5		8.9		8.9		8.9		

Mon. 30 +12.58 +8.79 +12.09 +12.34 +9.39 +11.26 +11.35

	0 9.6	47	26 49.2	68	36 40.2 36 57.0	11.98 23	45 11.0	48	50 4.3	18	53 29.2	24		
	13.1		52.7		43.9 0.5		14.4		7.7		32.7			
	16.8		56.1		47.5 4.3		17.6		11.2		36.2			
	20.3		59.2		51.0 7.7		21.0		14.8		39.8			
	23.9		25		34.5 11.1		24.3		18.2		43.4			
	8.37		27.97		23.71 2.06		8.83		5.62		18.13			
	0 16.74		26 55.93		47.42 37 4.12		45 17.66		50 11.24		53 36.26			
	− 17.65	−18.90	− 17.64	−18.77	− 17.69 − 17.69	−18.94 −18.94	− 17.69	−18.82	− 17.70	−18.90	− 17.70	−18.93		
	− 1.275		− 1.10		− 1.275 − 1.275		− 1.153		− 1.20		− 1.283			
	59 57.84		26 37.17		36 28.48 36 45.18	−11.21 +56.22	44 58.84		49 52.34		53 17.33			
	− 4.07		− 3.91	−11.18	− 4.18 − 4.18		− 4.01		− 4.16		− 4.19			
	59 53.77		26 33.26	+55.20	36 24.30 41.00	−11.21 +56.22	44 54.83	−10.85 +56.94	49 48.18	−10.86 +57.36	53 13.14	−10.80 +57.60		
	9.9		9.0		9.5 9.3	54° 21′ 58.2	9.0		8.8		8.9			
						21′ 28.02 20 20.50								
	59 44.6		26 44.5		35 59.0 36 24.5	− 48 − 19	44 41.0		49 19.9		52 55.7			
	50.4		50.3		45 31.0 − 13 − 17		45.8		26.3		2.7			
	54.7		56.6		53 38.0 +12.56 +12.56		54.2		33.6		8.7			
	24	− 11	14		1.28 35 + 14 + 14		41.0		7.98		71			
	59 50.80	54 35 45.67	26 50.47	51 0 54.9	4.27 31.17 + 2.40 + 2.40		44 47.07	51 46 39.84	49 26.60	53 36 51.92	53 2.37	53 53 6.18		
	+ 25.94	− 18	+ 54.7	− 1	43.15 − 2.28 4.240 −5.13		+ 30.66	− 24	+ 44.61	− 52	+ 33.89	− 30		
	1.41397	− 20	0.73799	− 26	1.63498 1.48247	21 20.46	1.48657	− 9	1.64972	− 9	1.53007	− 56		
	9.76307	+ 12.81	9.79887	+ 8.96	9.76554 9.76554	+33.95	9.79160	+ 9.80	9.77336	+11.76	9.77061	+12.07		
	1.28254	+ 15	0.64236	+ 10	1.50602 1.30321	1.40188	1.38367	+ 12	1.52858	+ 14	1.40618	+ 14		
	50	− 1.30	25	+ 2.20	5 5		40	+ 3.80	50	+ 3.90	30	+ 4.20		
n = .898	1 24.4	35 56.84	1 49.8	0 16.37	55.5′ 11.0		0 34.7	46 53.12	0 32.4	37 7.40	4 10.9	53 21.62		
	39.9		5.3		9.9 25.1		51.3		48.6		25.0			
Rms. = .13	643		1151		54 361		860		810		359			
	51 32.15		26 57.55		6 2.70 6 18.05		40 43.00		50 40.50		34 17.95			
+4′ 10.30	31 16.20		55 50.80		1.48 65 16 30.30		42 5.35		32 7.85		48 30.40			
	54 35 26.50		51 0 1.10		54 20′ 55.98 20 40.60		51 46 15.65		53 36 18.15		53 52 40.70			
	+ 19.17		+ 4.39		+ 32.07 −20.10		+ 24.17		+ 33.77		+ 25.48			
					+ 25.23									
			26 22.08	1 11.6	36 13.09 16.7	22 38.6	44 43.98	47 50.1	49 37.32	38 4.4	53 2.34	54 19.2		
					29.79									

Mon. 31 +12.34 +8.64 +12.31 +12.09 +11.28 +11.08

	0 10.1	09	26 49.4	53	36 44.3 36 58.0	20 11.98			50 4.5	17	53 29.7	10.97		
	13.8		52.8		44.5 0.6				8.2		33.3			
	17.2		56.2		48.3 4.8				11.5		36.6			
	20.8		59.5		51.3 8.0				15.1		40.4			
	24.2		2.9		55.2 11.7				18.8		43.7			
	8.61		28.08		40.6 23.1				5.81		18.37			
	0 17.22		26 56.16		48.12 37 4.62				50 11.62		53 36.74			
	− 18.08	−19.40	− 18.10	−19.27	− 18.11 − 18.11	−19.43 −19.43			− 18.12	−18.39	− 18.12	−19.42		
	− 1.332		− 1.187		− 1.332 − 1.332				− 1.287		− 1.30			
	59 55.82		26 36.89		36 28.69 36 45.19	−11.21 +56.22			49 52.23		53 19.32			
	− 4.06		− 3.90	−11.18	− 4.16 − 4.16				− 4.14	−10.86	− 4.17			
	59 53.76		26 32.99	+55.20	36 24.53 41.03	−11.21 +56.22			49 48.09	+57.36	53 13.15	−10.80 +57.60		
	9.3		9.3		9.5 9.4	54° 21′ 56.3			8.5		8.4			
						21′ 28.26 20 21.04								
	59 25.9		26 24.0		36 12.6 36 38.3	− 24 − 44			49 24.1		52 44.0			
	31.5		34.5		17.0 45.9	− 12 − 14			26.4		52.2			
	39.7		40.8		24.8 53.9	+12.53 +12.53			34.6		59.5			
	71	− 11	99.3		54.4 13.71	+ 14 + 14			8.21		5.7			
	59 32.37	54 35 45.96	26 33.10	51 0 6.32	18.13 45.70	+ 2.20 + 2.20			49 27.37	53 36 52.30	52 51.90	53 53 6.43		
	+44.85	− 53	+23.06	− 14	+29.99 −41.08	21 42.66 20 35.22			+44.25	− 51	+44.82	− 52		
	1.65176	− 22	1.36286	− 29	1.47698 1.61383	19.81			1.64591	− 9	1.65164	− 57		
	9.76307	+12.80	9.79887	+8.96	9.76554 9.76554	+18.92			9.77336	+11.74	9.77061	+12.03		
	1.52033	+ 15	1.26723	+ 10	1.34802 1.48467	1.4796			1.52477	+ 14	1.52778	+ 14		
	50	−1.50	25	+2.00	5 5				50	+3.70	30	+4.00		
	1 38.9	35 56.55	3.1	0 16.85	46.2′ 0.1				0 32.2	37 7.17	4 19.2	53 21.40		
	53.0		18.8		59.4 14.3				47.7		32.9			
	919		21.9		1.56 144				46.0		52.1			
	51 45.95		27 10.95		5 52.80 6 7.20				50 30.95		34 26.05			
n = .954	31 2.40		55 37.40		16 55.55 16 41.15				32 8.40		48 22.30			
	54 35 12.82		50 59 47.82		54 21′ 69.97 20 51.57				53 36 18.82		53 52 32.72			
Rms. = .13	+33.14		+18.50		+22.29 − 30.53				+33.48		+33.71			
					+14.06									
+4′ 10.42			26 21.81	1 12.0	36 13.32	22 38.9			49 37.23	38 4.5	53 2.35	54 19.0		
					29.82	16.0								

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj,1008R

1878 Mar. 30 Mar. 31

	h m s		h m s		h m s		h m s		
α	10 59 19	58 19.0	10 57 32	59 52.2	11 4 2	3 2.2	11 12 23	11 28.3	
δ	° ′		° ′		° ′		° ′		
	54 23	27.7	54 29	35.0	53 28	33.9	50 37	42.7	
		8.0		9.2		9.0		9.5	

Mar. 30 +11.82 +12.04 +11.25 +8.11 +7.97

	57	56.5	71		0	37.0	11.99		4	38.0	14		12	29.7	12	58.9	00	86						
		0.0				40.9				41.5				32.9		2.0								
		8.6				44.4				43.0				36.2		5.2								
		7.0				47.9				48.6				39.4		8.5								
		10.7				51.6				52.2				42.8		11.7								
		17.8				22.18				22.53				18.10		26.0								
	0	3.56			0	44.36			4	45.06			12	36.20	13	5.20								
		−17.71	−18.96			−17.71	−18.96			−17.71	−18.91			−17.72		−17.72	−16.80	−15.80						
		−1.27				−1.27				−1.20				−1.10	08	−1.10	08							
	59	44.60			0	25.40			4	26.15			12	17.40	12	46.40								
		−4.23				−4.24				−4.17				−3.98		−3.97	−10.23							
	59	40.37	−10.67		0	21.16			4	21.98	−10.52		12	13.42	12	42.41	+5889							
			+5888								+5838						−10.23							
	8.0				9.5				8.9				8.0		9.5		+5889							
	59	10.4			1	4.0			3	58.7			12	15.0	13	23.3								
		15.0				9.7				6.3				20.5		30.0								
		17.8				16.3				11.8				26.4		35.0								
		20.0				80.0				16.8				19.		88.3								
		23.8	54 20 3.71		1	10.00	54 26 47.34		4	5.60			12	20.63	13	29.43	50 38 13.14		50 37 10.11					
	59	17.40	− 55	−25.64		− 17		+39.46	53	27 0.61		+15.57		−24.23		− 7		− 15						
		+46.16	− 32		1.40892		− 64	1.59616			− 41	1.19229		1.38435		− 52		− 58						
	1.66427		+12.55		9.76448		+12.68	9.77490			− 6	9.80228		9.80228		+ 8.60		+ 8.60						
	9.76572		+ 14		1.27890		+ 14	1.47656			+1.159	1.90007		1.29213		+ 10		+ 10						
	1.53549		+4.80	55			+4.80	0			+ 13	45	45			+5.80		+5.80						
	2	22.0	20 20.22	4	41.8	27 4.04	0	20.1			+5.40	35	12	4	219		38 26.94		37 23.77					
		36.5			59.8			35.9		27 17.15		5.0		30.0										
		58.5			1046			560				1162		579										
	4	29.25		59	52.30		0	28.00				4858	10	62	8.95									
	15	19.10		22	56.05		22	20.35				33	50	25	33	39.40								
	54	19 29.40		54	27 6.35		53	26 30.65			50	38	0	59	57	29.70								
		+34.31			−19.01			+29.96						+12.59		−19.57								
	59	29.70	21 18.3				4	11.46	28	15.5	12	3.19		39 25.8		38 22.6								
Mar. 31			+11.83			+12.68			+11.34			32.18		+7.63		+7.99								
	59	86.9	82		0	57.6	57		4	38.8	23		12	30.1	12	59.2	52	88						
		0.6				0.8				42.4				33.4		2.9								
		4.0				4.4				46.0				36.6		5.9								
		7.6				7.9				49.3				39.9		8.9								
		11.3				11.7				52.9				43.3		12.5								
		20.4				22.4				29.4			12	18.33	13	29.4								
	0	4.08			1	4.48			4	5.88				36.66		5.88								
		−18.13	−19.45			−18.13	−19.45			−18.13	−19.59			−18.14		−18.14	−16.28	−19.28						
		−1.32				−1.32				−1.28	40			−1.18	41	−1.18	41							
	59	24.53			0	45.03			4	26.48			12	18.38		46.60	−10.22							
		4.63															+5889							
		−4.22	−10.67			−4.22	−10.66			−4.16	−10.52			−3.97		−3.98								
	59	40.41	+5888		0	40.81	+5817		4	22.32	+5838		12	13.41		42.62	+10.22							
																	+5889							
	8.0				9.5				8.4				8.0		9.5									
	59	18.0			0	40.5			4	5.3			11	48.0	12	5.29								
		24.0				46.4				11.8				57.0		58.1								
		30.7				53.0				18.7				3.48		44								
		7.27				14.19				58				5.76		17.84								
	59	24.23	54 20 4.89		0	47.30	54 27 2.36		4	11.93	53	27 0.30		0.7		58.47	50 38 13.93		50 37 11.56					
		+39.85	− 41			+17.18	− 7			+33.95	− 30			27.21		−52.59	− 48		− 2					
	1.60043		− 31		1.23502		− 3		1.53084		− 6			5.42		+7.41	− 56		− 64					
	9.76572		+12.51		9.76448		+12.64		9.77490		+11.56		1.82572		0.86982		+8.57		+8.55					
	1.47165		+ 14		1.10500		+ 14		1.41124		+ 13		9.90228		9.80228		+ 10		+ 10					
	5		+4.50	0			+4.60	0			+5.17	1.53350	23	45	0.77760		+5.60		+5.60					
	2	16.9	20 21.21	0	1.3	27 19.53	0	16.6	27	16.70		4.12.1	4	25.9		38 27.05		37 25.04						
		30.1			17.0			31.9				25.9		0.9										
		47.0			18.3			48.5				38.0		16.44										
	7	23.50		0	9.15		0	24.25				49.19	00	49.53	20									
	15	24.85		22	39.20		22	24.10				33	29.35	52	55.15									
	54	19 35.27		54	26 49.62		53	26 34.54			50	37	39.77	37	6.51									
		+29.62			+12.74			+25.78						+34.16		+5.99								
	59	29.74	21 19.3	0	30.15	28 17.7	4	11.80	28	15.1	12	3.19		32.40		39 25.9								
																39 23.9								

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1018R

1878 Apr. 18 | May 2 | Obs. H. A. R. | Rec. J. E. M.

	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
α	10 36 16	35 144	10 44 22	43 250	10 46 17	45 193	10 58 53	37 568
	11 4 27	3 270	11 25 50	24 555				
	° ′		° ′		° ′		° ′	
δ	54 23	28.5	57 48	536	49 33	50 0.2	50 47	525
	53 14	280	50 12	18.0				
		9.5		8.9		9.1		9.3
		9.0		8.1				

Apr. 18

		+11.55		+9.08			+8.07	
	36 32.5	1224	45 23.8	47			59 46.4	46
	36.3		27.0				49.7	
	39.8		30.4				52.9	
	34		33.6				56.0	
	7.0		37.0				59.2	
	490		18				142	
	36 59.80		45 30.36				59 52.84	
	−30.33	−31.77	−30.34	−31.64			−30.35	−31.60
	−1.44		−1.30				−1.25	
	36 28.03		44 58.72				59 21.24	
	−3.85		−3.72				−3.72	
	36 24.18	−11.21 +5622	44 55.00	−10.85 +5694			59 17.52	−10.50 +5805
	9.5		9.0				9.2	

	36 3.4		44 32.6				59 6.3	
	8.3		35.9				9.3	
	16.6		40.0				12.0	
	28.3		44.0				15.4	
	54	21 32.60	51 46 43.85				50 45 15.94	
	26 9.43	−66	47.2	−68			19.0	−44
	+50.37	−13	19.47	−11			59 6.20	−26
	1.70214	+12.51	44 39.93	+9.76			12.40	+8.67
	9.76554	+13	+50.42	+11			+40.44	+10
	1.57321	−1.30	1.70260	+0.10			1.60681	+1.60
			9.79160				9.80120	
		21 43.54	1.59970	46 53.42			1.51351	46 26.00
	5		40				40	
n = −1.03	0 55.2		0 4 45.7				2 7.6	
	12.0		3.7				23.3	
Rm = −.12	12.72		10.94				30.9	
	65 33.60		40 54.70				42 18.45	−15.45
	17 14.78	16 44.75	41 53.65				40 32.90	
+4′ 10.42	59.21 25.17	54 20 55.17	51 46 4.07				50 44 43.32	
	+37.44	+37.43	+39.78	47 50.4			+32.62	46 24.0
May 2	36 12.97		44 44.15			+6.73	59 7.02	+7.76
	36 30.97	+11.55 +11.72		+8.89				

	36 37.8	14.6	45 28.6	9.37	47 16.7	7.21	59 51.6	8.24
	1.5	17.7	32.0		19.9		54.9	
	5.1	21.7	35.5		23.0		58.0	
	8.3	25.2	38.7		26.3		1.3	
	12.0	28.7	42.0		29.5		4.4	
	247	79	1768		1154		402	
37	49.2 21.58		45 25.36		47 23.08		59 58.04	
	−35.65	−37.19 −37.19	−35.65	−37.05	−35.65	−36.96	−35.65	−36.98
	−1.54	−1121	−1.40		−1.32		−1.33	
	36 27.75	+5622	44 58.31		46 46.12		59 22.06	
	−3.53	−1121	−3.43	−10.85	−3.35	−10.72	−3.46	−10.50
	36 24.22	+5622	44 54.88	+5694	46 42.77	+5709	59 17.60	+5805
	9.5	9.4	9.2		9.0		9.2	

	36 14.4	39.5	44 44.0		46 40.3		59 10.7	
	19.7	44.9	51.0		46.6		17.0	
	26.0	50.2	57.4		52.9		23.4	
	603	1376	24		1398		611	
36	2010	45.87	44 50.80	51 46 44.57	46 46.60	49 53 11.23	59 17.03	50 45 16.64
	+44.84	+35.71	+44.56	−53	+36.48	−36	+41.01	−45
	1.65767	1.55279	1.64895	−9	1.56205	−47	1.61289	−24
	9.76584	9.76554	9.79160	+9.40	9.80912	+7.47	9.80120	+8.35
	1.52301	1.42383	1.54605	+11	1.47667	+6	1.51959	+10
				−2.10		−1.40		−0.80
	5	5	40		30		40	
	0 51.8	5.8	0 39.4	46 51.84	4 8.9	53 17.04	2 5.8	45 24.08
	11.5	24.8	59.4		26.3		24.8	
	1.71	301 1233	9.88		352		306	
n = −1.10	55 55 61 50 56	1.65	40 49.40		34 17.60		42 15.30	
	16 48.80 16 33.30	16 46.70	41 58.98		48 30.76		40 33.09	
Rm = −.11	54 21 0.31 20 43.81	20 57.21	51 46 9.41		47 52 41.26		50 44 43.56	
	+33.54	+26.54 +33.54	+35.16		+29.97		+33.08	
+4′ 10.51								
	36 13.01	22 35.8	44 44.03	47 48.8	46 32.05	54 14.1	59 7.10	46 22.1
	36 29.65	15.5						

	4 51.0		25 56.4					
	54.3		3.0					
	57.9		8.9					
	1.0	53 10 51.63	8.3	50 10 0.48				
	146	−21	26 2.77	−49				
	4 28.8	−18	+42.79	−31				
	57.2	+11.24	1.63134	+8.08				
	+28.54	+12	9.80671	+8				
	1.45545	+1.40	1.54355	+4.00				
	9.77778							
	1.33873	11 4.39		10 12.23				
15			15					
1	20.8		2 24.8					
	37.1		41.7					
	57.9		6.65					
	16 28.95		17 3.25	2				
	6 17.40		5 15.10					
	53 10 29.82		50 9 25.52					
	+21.81	12 2.8	+34.96	11 12.7				
	4 40.18	+10.71	26 0.25	+7.24				

	5 24.5	89	26 44.3	72				
	28.0		47.5					
	31.5		50.6					
	34.8		53.5					
	38.3		57.1					
	71		33					
5	31.42		26 8.66					
	−35.66	−37.13	−35.66	−36.97				
	−1.48		−1.32					
4	54.29		26 13.69					
	−3.61	−10.50	−3.54	−9.93				
4	50.68	+5841	26 10.15	+5949				
	9.0		8.2					

	4 47.9		26 9.4					
	54.9		11.8					
	0.4		14.1					
	1635		17.1					
4	54.50	53 10 53.28	203	50 10 2.22				
	+36.92	−36	727	−35				
1	56726	−18	26 14.34	−26				
	9.77778	+10.83	+36.12	+7.76				
	1.45054	+12	1.55775	+9				
		−0.90	9.80671	+1.40				
15			15 1.46996					
1	24.0	11 3.27	2 17.1	10 11.34				
	43.6		35.2					
	67.6		52.3					
16	33.80		17 26.15					
6	14.55		5 22.20					
53	10 25.06		50 9 32.71					
	+28.22		+29.51					
4	40.18	12 1.7	26 0.22	11 10.8				

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16jBR

1878 Apr. 18 May 2

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16038R

1878 Apr. 18 May 2

	h m s		h m s		h m s		h m s		h m s	
α	11 45 23	44 27.4	11 47 59	47 2.8	11 51 6	50 11.9	11 58 0	57 7.0	11 58 28	57 35.2
	° ′		° ′		° ′		° ′		° ′	
δ	53 2	7.9	54 57	55 2.8	58 46	51.3	51 47	52.3	51 0	56
		9.0		8.7		9.0		9.5		8.2

Apr. 18

+12.85 +12.70 +9.76 +8.34

	46 8.2	13.84	48 44.8	13.09			58 47.5	6.5	59 16.0	7.3
	11.8	2	48.5				50.6		19.4	
	15.8		52.0				54.0		22.8	
	19.2		55.7				57.4		26.0	
	22.9		59.4				0.9		29.4	
	7.79		1.04				2.764		11.36	
	46 15.58		48 52.08				58 54.08		59 22.72	
	− 30.40	−31.87	− 30.44	−31.87			− 30.41	−31.72	− 30.41	−31.69
	− 1.47		− 1.47				− 1.31		− 1.28	
	45 43.71		48 20.21				58 22.36		58 51.03	
	− 4.12	9.58	− 4.11	9.51			− 3.91	9.26	− 3.87	9.24
	45 39.59	0.03	48 16.10	0.09			58 18.45	0.15	58 47.16	0.15
		+1		+1				+1		+1
	9.3		7.8				9.5		7.2	
	45 39.4		48 13.2				58 19.0		59 43.7	
	45.8		20.3				24.8		49.3	
	52.2		26.5				30.1		54.7	
	13.74	+ 39	00				7.39		14.77	
	45 45.80	54 59 59.45	48 20.02	54 54 43.39			58 24.63	51 44 24.87	59 49.23	50 58 13.86
	+29.78	− 23	+32.08	− 26			+29.45	− 23	−26.51	57 31.28
	1.47392	− 28	1.50623	− 31			1.46909	− 36	1.42341 m	− 19
	9.75859	+1322	9.75967	+13.13			9.79192	+ 9.74	9.79918	− 49
	1.33801	+ 14	1.37140	+ 14			1.36651	+ 11	1.32809 m	+ 8.92
	25	+ 4.70	30	+ 5.00			40	+ 6.50	25	+ 10
										+ 6.70
	2 13.1	55 0 17.39	2 30.9	55 1.48			2 49.1	44 41.02	3 58.5	57 46.71
	20.1		46.9				5.2		13.9	
	42.2		7.8				11.43		12.4	
	27 21.10		32 38.90				42 57.15		29 6.20	
	85 27.25		50 9.45				39 51.20		83 42.15	
	54 59 37.67		54 54 19.87				51 44 1.62		50 57 52.57	
	+21.78		+23.52				+23.25		− +21.29	
	45 30.01	1 17.4	48 6.59	56 1.6			58 9.19	45 41.2	58 37.92	58 46.9
May 2		+12.72		+12.01		+7.79		+9.19		+8.71
	46 13.3	9.0	48 49.9	49	51 58.1	8.27	58 53.3	9.67	59 21.2	59
	16.9		53.6		1.3		57.8		24.3	
	20.5		57.0		4.5		59.4		27.8	
	24.0		0.6		7.7		2.4		31.0	
	27.7		4.2		10.9		5.9		34.4	
	24		28.53		22.5		2.768		387	
	46 20.48		48 57.06		52 4.50		58 5.936		59 27.74	
	− 35.67	−37.24	−35.67	−37.24	−35.67	−37.02	−35.68	−37.08	−35.68	−37.04
	− 1.597		− 1.597		− 1.345		− 1.386		− 1.386	
	45 43.24	9.58	48 19.82	9.51	51 27.50	9.40	58 22.35	9.26	58 50.70	9.24
	− 3.88	0.03	− 3.88	0.09	− 3.65	0.12	− 3.72	0.15	− 3.68	0.15
	45 39.36	+1	48 15.94	+1	51 23.83	+1	58 18.586	+1	58 47.02	+1
	9.3		8.4		9.5		9.8		7.0	
	45 45.6		48 7.6		51 24.7		58 52.0		59 42.0	
	52.6		13.8		31.8		57.0		47.0	
	59.8		19.9		36.9		1.5		51.5	
	80	+ .48	413		34		1705		435	
	45 52.67	55 0 1.50	48 13.77	54 54 46.60	51 31.13	50 44 10.99	58 56.83	51 44 28.56	59 47.83	50 57 33.53
	+27.81	− 20	+43.24	− 48	+33.37	− 30	+ 2.53	− 0	−20.09	− 11
	1.44420	− 28	1.63639	− 30	1.52336	− 35	0.40312	− 28	1.30298 m	− 45
	9.75859	+12.73	9.75967	+12.64	9.80136	+8.34	9.79192	+ 9.36	9.79918	+ 8.57
	1.30829	+ 15	1.50156	+ 15	1.43022	+ 10	0.30054	+ 11	1.20766 m	+ 10
	25	+ 1.80	30	+ 2.00	40	+ 3.20	40	+3.50	25	+ 3.70
	2 8.2	0 16.20	2 34.9	55 1.09	3 5.6	44 22.46	2 22.1	44 41.73	3 59.6	57 45.82
	27.2		53.1		24.0		42.5		18.8	
	35.4		8.80		29.6		6.46		18.4	
	27 17.70		32 44.00		43 14.80		42 32.30		29 9.20	
	55 30.65		50 4.35		39 33.56		40 16.05		83 39.15	
	54 59 41.16		54 54 14.86		50 43 44.06		51 44 26.56		50 57 49.66	
	+20.34		+31.74		+26.93		+ 2.08		− 16.13	
					1443				3778	
	45 29.78	1 16.2	48 6.43	56 1.2	51 33.20	45 22.6	58 9.30	45 41.9	58 56.26	58 46.0

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16.BR

1878 May 4 May 6 Obs. K.S.P. Rec. J.F.M. June 649 37

May 2

α

h m s h m s h m s h m s h m s h m s h m s

10 46 14 45 19.3 11 32 19 31 23.3 11 44 45 43 49.0 11 47 31 46 27.5 11 57 6 50 11.9 12 2 25 1 33.8

δ

° ′ ° ′ ° ′ ° ′ ° ′ ° ′ ° ′

49 53 50 0.2 49 52 57.4 33 1 6.3 57 5 11.0 50 46 51.3 49 52 54.6

9.1 9.2 8.5 9.2 9.0 7.3

May 4

+6.98 +6.71 +11.07 +7.06

f

47 17.0 7.68 33 13.2 7.41 48 27.3 7.7 3 17.1 7.54

20.2 16.3 34.3 34.0 21.2

23.6 19.4 30.5 24.4

26.7 22.7 34.1 41.1 27.6

29.8 26.0 31.0

1173 976 1686 1221

47 23.46 33 10.52 48 34.13 3 24.42

−36.02 −37.56 −36.05 −37.59 −36.07 −37.85 −35.68 −36.99

− 1.54 − 1.54 − 1.78 − 1.38

46 45.90 32 41.93 47 56.28 2 47.43

− 3.31 −10.72 − 3.51 −9.78 − 3.78 −9.51 − 3.64 −9.16

46 42.59 +57.09 32 38.42 +57.73 47 52.50 +1 0.09 2 43.79 +1 0.15

9.1 9.3 9.5 7.3

10 46 55.4 32 31.2 48 0.0 2 38.2

2.3 36.6 4.2 45.3

8.5 41.6 11.8 58.7

7.2 + .70 10.94 16.0 99 13.42 + .48

47 24.0 49 53 12.42 32 36.47 49 49 58.93 48 5.33 54 2 40.68 2 44.73 49 51 40.89

+21.06 − 12 +43.05 − 50 +28.80 − 21 +39.69 − 42

1.32346 − 45 1.63397 − 29 1.45 − .52 1.59868 − 9

9.80912 + 7.46 9.80972 + 7.41 9.76887 +11.67 9.80942 + 7.48

1.23808 + 9 1.54919 + 9 1.32754 + .13 1.51360 + 9

30 30 35 20 1.33372 + 1.80 35 + 4.30

n = −1.29 3 55.7 53 18.40 2 26.7 50 8.04 4 30.9 2 54.25 0 41.1 51 52.73

14.7 46.9 50.9 0.1

Rms = .11 104 736 8.18 1012

34 5.20 37 36.80 24 40.90 35 50.60

+4' 11.97 49 48 43.18 49 45 11.55 53 58 7.45 46 57.75

49 52 55.12 49 49 23.52 54 2 19.42 49 51 8.26

+17.30 +35.41 +21.36 +32.63

57

46 31.87 54 15.5 32 28.64 51 7.8 47 48.99 3 54.6 2 34.63 52 52.9

May 6 +6.93 +4.91 +10.91 +7.52 +6.93

47 18.4 7.59 Ch. f. 45 37.0 12.57 48 28.4 11.57 52 0.0 8.18 3 20.1 7.59

21.8 40.6 31.9 3.3 23.4

25.0 44.1 35.4 6.4 26.5

28.0 47.7 39.0 08 29.7

31.4 51.4 42.5 13.2 32.7

1246 208 272 327 1326

47 24.92 45 44.16 48 35.44 52 6.54 3 26.52

−37.42 −39.02 − 37.47 53 −39.39 − 37.49 54 −39.33 − 37.49 54 −39.11 − 37.56 −39.11

− 1.55 − 1.86 − 1.79 − 1.57 − 1.55

46 45.95 45 4.81 47 56.16 51 27.48 2 47.47

− 3.26 −16.72 − 3.79 −9.59 − 3.74 −9.51 − 3.58 −9.40 − 3.58 −9.16

57.53 45 1.02 0.98 47 52.42 .37 51 23.90 .85 2 43.89 3 +1 0.15

46 42.80 .74 42.64 +57.09 +1 0.03 +1 0.09 +1 0.12

9.3 9.7 8.3 9.5 9.4 7.3

46 57.3 44 53.2 47 47.2 51 13.4 2 35.0

57.4 56.2 52.8 20.2 37.8

3.6 0.0 0.4 26.0 40.5

1725 9.2 1604 596 43.6

46 57.50 49 53 11.10 54 58 11.18 47 53.47 54 2 38.95 51 14.87 50 44 12.48 46.8 49 51 40.61

+27.42 − 20 + 41.97 − 46 + 46.67 − 58 2 40.74 − 56

1.43807 − 46 45 0.88 − 50 − 47 1.66904 − 37 + 45.78 − 10

9.80912 + 7.50 + 4.08 1.62294 − 54 1.66904 +8.37 1.66068 + 7.50

1.35269 + 9 1.64424 +12.78 9.76887 +11.78 9.80136 +10 9.80942 + 9

− 1.90 9.75895 + 15 1.49731 + 13 1.57590 +2.50 1.57560 + 3.50

1.50869 + 1.00 20 +1.40

30 35 25 40 35

4 2 4 2 3 44 2316 0

53 16.79 58 24.75 42.7 51.92 15.1 47.3

0.0 V1.6 11.4 0.9 33.9 5.4

20.6 30.7 29.4 1036 4590 1127

n = −1.30 2.15 42.3 408 24 51.80 43 24.50 35 5735

34 10.75 37 21.15 2 29 20.40 57 56.55 39 23.85 46 52.00

Rms = .11 48 37.60 53 27.95 54 2 7.52 50 43 34.82 49 51 2.97

49 52 48.57 54 57 38.92 +31.43 +37.66 +37.64

+4' 10.97 +22.53 +32.26 3 52.0 45 23.3 2 34.67 52 5.8

46 31.92 54 13.9 44 51.39 59 24.8 47 42.86 51 14.05

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16038R

For 1st star of May 2, see preceeding page.

1878 May 2 May 6

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16:BR

1878 May 2 May 6

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16MBR

649 651

1878 Mar 21 Mar 6

	h m s		h m s		h m s		h m s		h m s		h m s	
	13 17 32	16 49.5	13 19 17	18 31.9	13 20 54	20 11.3	13 22 58	22 15.9	13 32 57	32 15.5	13 35 24	34 47.7
	° ′		° ′		° ′		° ′		° ′		° ′	
	49 36	50 1.8	50 40	45.0	51 33	38.7	51 14	19.7	51 37	42.0	53 30	55.7
		9.4		9.0		9.4		7.5		8.0		7.1
Mar 2		+6.58		+7.67		+8.92		+8.28		+8.26		+11.20
13	18 24.3	7.28	20 8.1	8.35	21 43.1	9.40	23 45.9	.76	23 45.4	.74	36 15.7	.68
	27.4		7.1		46.2		49.2		48.8		19.1	
	30.9		10.5		49.6		52.3		52.1		22.6	
	34.0		13.9		53.0		55.7		55.7		26.2	
	37.2		17.0		56.1		58.9		58.8		29.6	
	38		524		480		120		108		1132	
	18 30.76		20 10.48		21 49.60		23 52.40		33 52.16		36 22.64	
	− 35.71	−37.02	− 35.71	−37.04	− 35.71	−37.10	− 35.71	−37.08	− 35.71	−37.10	− 35.71	−37.22
	− 1.34		− 1.34		− 1.40		− 1.38		− 1.40		− 1.58	
	17 53.74	−7.63	19 33.44		21 12.50		23 15.32		32 58.06		35 45.42	
	− 3.71	+56.73	− 3.75	−7.55.6 +56.58	− 3.78	−7.47 +56.43	− 3.76	−7.44 +56.25	− 3.78	−7.22 +55.26	− 3.87	−6.99 +55.02
	17 50.03		19 29.69		21 8.72		23 11.56		33 11.28		35 41.55	
	9.4 ~~1742.40~~		8.8		9.3		6.4		8.0		7.5	
	17 43.7		17 23.6		21 15.3		23 11.3		32 33.6		36 12.1	
	47.8		26.7		19.7		18.2		36.2		14.9	
	51.2		29.3		24.1		24.4		39.6		18.0	
	1495	+.48	329		621		539		2.8		21.0	
	17 49.83	49 54 17.92	17 33.0	50 37 13.14	21 20.70	51 31 9.29	23 17.97	51 32 45.27	60	51 34 30.48	24.2	53 48 13.67
	+40.93	− 45	19 29.90	− 44	+28.90	− 22	+34.43	− 32	29.82	− 73	40.2	− 1
	1.61204	− 35	+40.58	− 3	1.46090	− 13	1.53694	− 52	32 59.64	− 35	36 18.04	− 42
	9.80897	+7.51	1.60831	+ 824	9.79399	+ 916	9.79542	+ 9.02	+ 52.52	+ 9.23	+ 4.60	+1150
	1.52651	+ 9	9.80244	+ 10	1.35949	+ 11	1.43786	+ 10	1.72032	+ 11	0.66276	+ 13
		+9.90	1.51625	+9.90		+9.80		+10.00	9.79351	+10.70	9.77130	+10.50
		54 35.10		37 31.39		31 28.49		~~23~~ 13 4.03	1.61933	34 49.92	0.53956	48 38.85
	30		50		55		10		50		35	
	3 5.3		0 9.2		1 2.9		4 31.7		3 0.3		3 39.5	
	23.8		27.9		22.0		50.3		19.7		57.8	
	29.1		34.1		24.9		82.0		2.00		9.73	
	33 14.55		50 18.55		56 12.45		14 41.00		53 10.00		38 48.65	
	49 33.80		32 29.80		26 35.90		8 7.35		29 38.36		43 59.70	
	49 53 44.31		50 36 40.31		51 30 46.41		51 12 17.86		57 33 48.86		53 48 10.21	
	+33.61	5531.8	+32.83	3825.0	+2288	32 24.9	+ 27.41		+ 41.62		+ 3.46	
Mar 6	1742.40	+6.81	1922.14	+7.86	21 1.25	+8.72	23 ~~19.00~~ 4.12	14 0.3	33 4.06	35 45.2	~~35 48.52~~ 35 34.54	49 30.9
	18 26.2	7.47	20 6.2	8.52	21 45.0	9.38						
	29.3		9.4		48.7							
	32.5		12.5		51.8							
	35.7		15.8		55.0							
	39.0		19.1		58.4							
	162.9		630		89							
	18 02.58		20 12.60		21 51.78							
	− 37.89	64 −39.19	− 37.59	64 −39.21	− 37.59	65 −39.29						
	− 1.55		− 1.57		− 1.64							
	17 53.44	−7.63	19 33.44		21 12.55							
	− 3.70	+56.73	− 3.71		− 3.76							
	17 49.74		~~19 40.29~~		21 8.79	3 −7.47						
	9.2		19 30.73 9.0 ~~24.7~~	29.68 −7.55 +56.58	9.4	+56.43						
	17 42.8		19 22.4		21 34							
	50.8		29.8		9.2							
	53.2		35.8		14.4							
	1489	+.66	880		270							
	17 49.63	49 54 19.34	19 29.33	50 37 13.73	21 9.00	51 31 11.41						
	+42.95	− 50	+43.27	− 51	+42.78	− 48						
	1.63296	− 35	1.63619	− 3	1.63124	− 14						
	9.80897	+7.57	9.80244	+ 8.30	9.79399	+9.23						
	1.54743	+ 9	1.54413	+ 10	1.53073	+ 11						
		+8.90	50	+8.70 53		+8.10						
	30		0		1							
	3 6.4	54 35.71	11.9	37 31.38	12.8	31 28.89						
	24.1		29.3		30.9							
	30.5		41.2		43.7							
	33 15.25		50 20.60		56 21.85							
	49 33.10		32 27.75		26 26.50							
	49 53 44.07		50 36 38.72		51 30 37.47							
	+3527		+3501		+3394							
	1742.06	5532.4	1922.13	3827.7	21 1.26	3225.3						

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16BR

1878 May 2 May 6

	h m s		h m s		h m s		h m s	
α	13 44 12	43 343	13 57 16	50 37.8	13 53 40	53 1.0	13 55 23	54 45.6
δ	° ′		° ′		° ′		° ′	
	53 17	22.6	53 35	40.1	54 6	11.5	53 33	38.1
		9.0		9.5		9.1		8.8
May 2		+10.78		+10.89		+11.32		+11.70
	45 9.0	11.26	52 34.1	11.37	54 27.8	80	56 10.4	58
	5.3		6.7		81.4		13.9	
	8.4		10.3		34.8		17.4	
	12.0		13.5		38.3		20.8	
	13.5		17.2		42.0		24.3	
	435		511		17 43		868	
	45 8.70		52 10.22		54 34.86		56 17.36	
	−35.72	−37.19	−35.72	−37.21	−35.72	−37.24	−35.72	−37.21
	− 1.48		− 1.50		− 1.58		− 1.50	
	44 31.51		51 33.01		53 57.62		55 40.15	
	− 3.85	−6.85	− 3.84	−6.68	− 3.88	−6.58	− 3.84	−6.59
	44 27.66	+54.03	51 29.17	+53.19	53 53.74	+52.92	55 36.31	+52.68
	9.1		9.5		8.7		8.5	
	44 47.2		51 49.3		53 52.0		55 50.6	
	53.8		56.5		57.3		56.3	
	0.6		1.8		3.9		3.5	
	16.6		16.6		17.2		17.4	
	44 53.87	53 15 14.32	51 55.87	53 32 56.33	53 57.73	54 5 0.47	55 56.80	53 30 53.45
	+14.88	− 6	+14.35	− 5	+37.13	− 36	+20.56	− 11
	1.17114	− 21	1.15685	− 46	1.56972	− 26	1.31302	− 15
	9.77694	+10.93	9.77387	+11.28	9.76837	+11.81	9.77422	+11.23
	1.05358	+ 12	1.03622	+ 13	1.44259	+ 13	1.19274	+ 13
		+11.20		+11.70		+11.80		+12.00
		15 36.78		33 19.40		5 24.07		31 17.03
	10		50		20		55	
	1 46.4		4 4.1		2 16.8		1 11.5	
	5.3		22.7		35.1		30.5	
	10.7		28.8		52.2		42.0	
	11 55.85		54 13.40		22 26.10		56 21.00	
	10 52.50		28 34.95		0 22.25		26 27.35	
	53 15 3.01		53 32 45.46		54 4 32.76		53 30 37.86	
	+11.31		+ 10.87		+ 27.71		+15.59	
	44 20.81	16 30.8	51 22.49	34 12.6	53 47.16	6 16.0	55 29.72	32 9.7

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16MBR

1878 May 7 May 8 Obs. H. A. R. Rec. J. Tuttle

652 653

	h m s		h m s		h m s		h m s		h m s		h m s		h m s	
X	11 32 10	31 23.3	11 44 45	43 49.0	11 47 31	46 37.5	11 57 6	50 11.9	11 58 37	58 45.3	12 23 8	22 19.2		
S	° ′ 49 52	57.4 9.2	° ′ 53 1	63 8.5	° ′ 54 3	11.0 9.2	° ′ 50 46	51.3 9.0	° ′ 49 52	57.7 7.0	° ′ 49 45	50.7 8.6		
May 7		+7.00		+12.39		+10.68		+7.65		+6.97				
	11 33 15.4	7.5	45 37.8	13.09	48 29.5	11.63	52 0.7	8.40	0 32.2	7.72				
Add +0.19 to (ΔT+m) May 7 20h has been added.		18.7 21.7 25.0 28.2		41.4 45.0 48.6 52.3		32.8 36.3 40.0 43.3		4.0 7.5 10.8 14.0		85.6 88.7 41.9 45.2				
to sum of the Constants and +0.19 to finac R.A.	33	90 21.80 - 38.44 - 1.50	- 39.92	251 45 45.02 - 38.46 - 1.80	- 40.24	181.9 48 36.38 - 38.47 - 1.74	- 40.18	370 52 7.40 - 38.17 - 1.54	- 39.99	193.6 0 38.72 - 38.47 - 1.50	- 39.96			
	32 41.86	- 3.45	45 4.76	- 3.77	47 56.18	- 3.78	51 27.40	- 3.56	59 58.75	- 3.55				
	32 38.41	- 9.78 +59.93	45 [illegible] 101	- 9.59 +1 0.03	47 [illegible] 82.488	- 9.51 +1 0.09	51 23.85	- 9.40 +1 0.12	59 55.39 21	- 9.22 +1 0.15				
	9.2		8.8		9.2		9.5		7.2					
	32 48.7 53.4 57.3		45 14.3 20.5 28.2		47 45.9 37.0 58.2		51 18.0 23.3 32.4		59 57.3 2.4 8.6					
	119	+ .75	30		51		737		83					
	32 53.97	49 49 58.97	45 21.00	54 58 11.71	47 51.70	54 2 40.34	51 24.57	50 44 13.99	0 27.7	49 50 3.19				
	+27.83	- 21	+24.02	- 15	+44.68	- 52	+42.63	- 50	+35.95	- 35				
	1.44451	- 26	1.38057	- 45	1.65011	- 54	1.63175	- 36	1.55540	- 26				
	9.80957	+7.38	9.75895	+12.79	9.76887	+11.81	9.80136	+8.41	9.80957	+7.89				
	1.35958	+ 9	1.24502	+ 15	1.52448	+ 13	1.53861	+ 10	1.47077	+ 9				
	35	+1.20	25	+1.30 20		+1.30 20		+2.60 35		+3.10				
n = -1.26	2 14.8	49 50 7.92	3 57.0	58 25.60	4 44.5	2 53.17	3 11.4	44 24.69	2 17.4	50 14.01				
	32.8		14.5		1.5		29.5		35.1					
Rms. = -11	476		915		1060		409		525					
	37 23.80		28 5.75		24 53.00		43 20.45		37 26.25					
+4′ 11″.53	45 24.55		53 42.60		57 55.35		39 27.90		45 22.10					
	49 36.08 49 +22.89		54 57 54.13 +17.58		54 2 16.88 +33.46		50 43 39.43 +34.56		49 49 33.63 +29.56					
	3228.65	51 7.6	44 51.42	59 25.6 +12.54	47 42.97	3 53.3 +11.09	51 14.45	45 24.8 +7.89	59 46.99	51 14.2 +6.51		+7.01 62		
May 8														
			45 38.8 42.7 46.2 49.6 53.4	13.15	48 30.2 34.2 37.6 41.0 44.4	70	52 1.4 4.7 8.2 11.4 14.6	8.50	0 33.0 36.3 39.6 42.7 46.2	7.42	24 5.0 8.1 11.4 14.7 17.8			
			23 07 45 46.14 - 39.42 - 1.87	- 41.29	37 48 - 39.42 - 1.81	- 41.23	40 8.16 - 39.43 - 1.59	- 41.02	47 8 0 39.56 - 39.44 - 1.56	- 41.00	57 0 24 11.40 - 39.48 - 1.56	- 41.04		
			45 4.85		47 56.25		51 27.14		59 58.56		23 30.36			
			- 3.75 45 1.10	- 9.59 +1 0.03	- 3.70 47 52.55	- 9.51 +1 0.09	- 3.54 51 23.60	- 9.40 +1 0.12	- 3.53 59 55.03	- 9.22 +1 0.15	- 3.61 37.09 23 26.75	- 8.73 15985		
			9.0		9.4		9.3		7.0		8.5			
			45 28.5 37.1 44.2 109.8		47 52.7 53.1 57.7 04.7		57 26.7 33.6 40.8 101.1		59 48.0 54.2 2.1 164.3		23 24.0 33.7 39.2 89			
			45 36.60	54 58 12.27	47 29.06 88.12	54 2 40.06	51 33.70	50 44 14.05	59 54.77	49 50 29.7	23 32.97	49 42 2.98		
			+ 9.54	- 3	+ 39.36	- 41	+ 34.46	- 32	+ 44.79	- 53	+ 38.43	- 40		
			0.979955	- 39	1.59506	- 48	1.58732	- 32	1.65118	- 26	1.58467	- 5		
			9.775895	+12.81	9.76887	+11.85	9.80136	+8.43	9.80957	+7.51	9.81076	+7.37		
			084400	+ 15	1.46943	+ 13	1.44418	+ 10	1.56625	+ 9	1.50093	+ 9		
			25	+ 0.60	20	+ 1.20 40		+ 2.30 35		+ 3.00 45		+ 4.60		
n = -1.31			3 45.7 3.1 10.88 28 54.40 53 53.95	58 26.02	4 40.2 58.0 982 24 49.10 57 59.25	2 52.76	3 41.1 22.8 269 43 13.45 39 34.90	44 24.65	2 23.9 43.2 671 37 33.55 45 14.80	50 13.29	0 18.9 37.9 56.8 45 28.40 37 19.95	42 15.20		
Rms. = -10			54 58 5.29 + 6.98		54 2 10.59 + 29.47		50 43 46.24 + 27.81		49 49 26.14 + 36.83		49 41 31.29 + 31.69			
+4′ 11″.34			44 51.51	59 26.0	47 43.04	3 52.85	51 14.20	45 24.8	59 45.81	51 13.4	23 18.02	43 15.0		

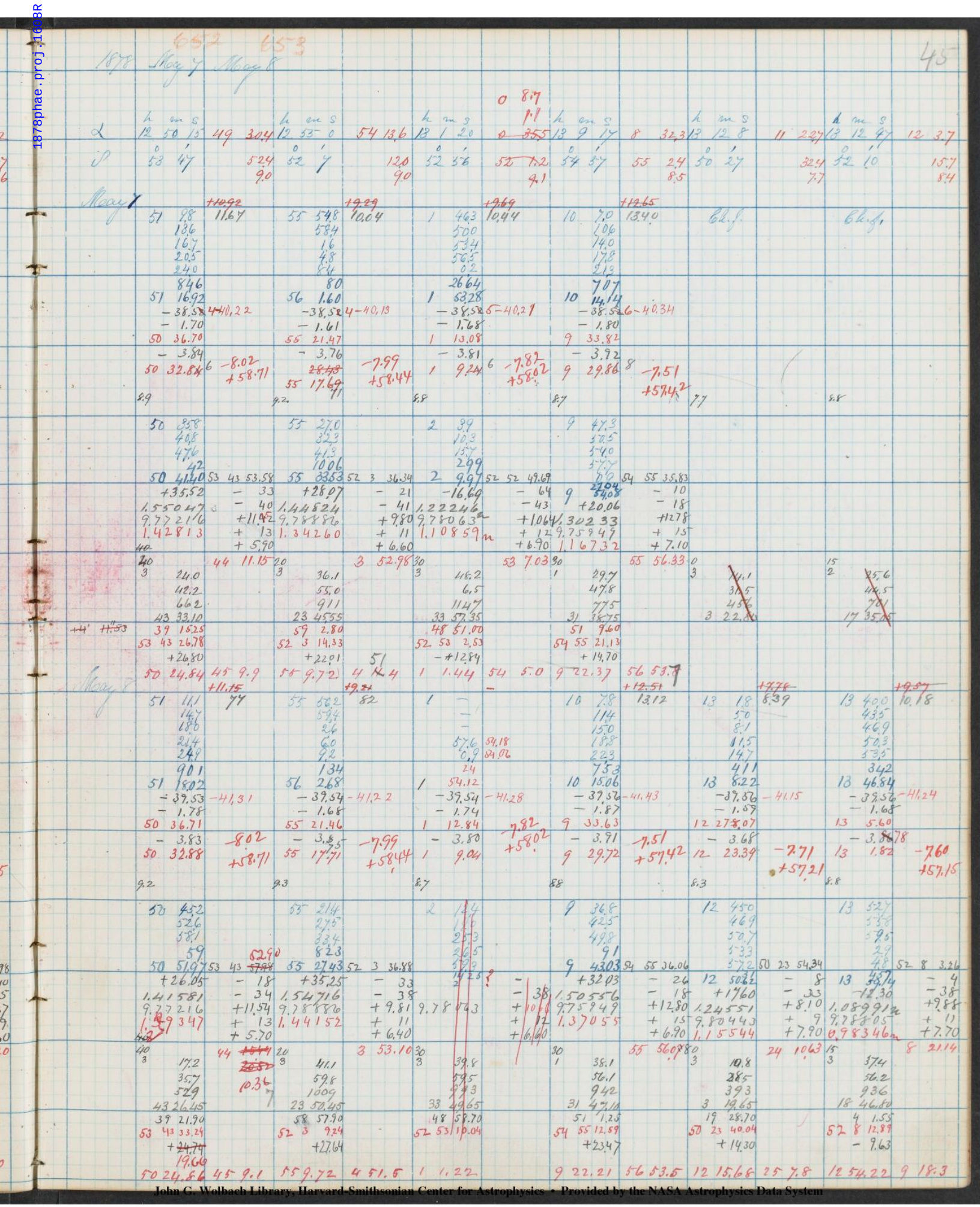
John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16iBR

652 653

1878 May 7 May 8

45



John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1608R

1878 May 7 652 May 8 653

	h m s		h m s		h m s		h m s		h m s		h m s		h m s	
α	13 22 58	22 159	13 32 57	32 155	13 35 27	34 477	13 44 12	43 343	13 51 16	50 378	13 53 40	53 1.0
δ	° ′ 57 14	19.7 7.5	° ′ 57 37	42.0 8.0	° ′ 53 50	55.7 7.1	° ′ 53 17	22.6 9.0	° ′ 53 35	40.1 9.5	° ′ 54 6	11.5 9.1
May 7		+8.15		+8.73		+10.76		+10.82		+11.02		+11.40
	23 48.7	9.0	33 48.5	9.48	36 18.4	11.53	45 4.9	11.57	52 63	11	54 30.9	12.15
	52.2		52.0		22.2		8.3		9.9		34.3	
	53.3		53.1		25.8		11.6		13.4		38.0	
	58.6		58.5		29.3		15.2		16.6		41.4	
	2.0		1.9		32.6		18.6		20.3		45.0	
	2768		2760		1286		587		665		1896	
	23 55.36	8 −40.12	33 55.20	9 −40.16	36 25.72	9 −40.31	45 11.74	60 −40.26	52 13.30	61 −40.29	54 37.92	62 −40.34
	− 38.54		− 38.55		− 38.55		− 38.56		− 38.57		− 38.57	
	− 1.56		− 1.57		− 1.74		− 1.68		− 1.70		− 1.74	
	23 15.26		33 15.06		36 45.43		44 31.50		51 33.03		53 57.61	
	− 3.73		− 3.74		− 3.85		− 3.82		− 3.82		− 3.85	
	23 11.79	−7.44	33 11.28	−7.22	35 41.54	6 −6.99	44 24.64	6 −6.85	51 29.17	9 −6.68	53 53.71	3 −6.58
	91	+56.25	30	+55.26		+55.02		+54.03		+53.19		+52.92
	8.0		7.4		6.8		9.0		9.7		9.1	
	23 12.7		33 12.8		35 34.7		45 32.8		52 .02		53 52.2	
	16.3		18.0		38.2		38.5		5.4		39.4	
	19.0		23.0		42.5		43.9		11.2		6.7	
	21.8		51.8		46.3		11.72		16.8		17.95	
	24.8	+.75	18.93		49.1		32.8		7.02		38.83	
	51 12 47.04		51 34 32.53		53 48 14.93		45 39.07	53 15 16.59	52 56.0	53 32 58.26	53 59.83	54 5 1.57
	23 9.46	− 36	+36.27	− 36	35 10.8	− 49	−27.33	− 19	+ 7.70	− 2	+38.09	− 38
	18.92	− 52	1.55955	− 32	42.16	− 47	1.43664	− 15	0.88649	− 45	1.58081	− 26
	+36.44	+8.93	9.79351	+9.30	+43.56	+11.61	9.77677	+11.04	9.77387	+11.36	9.76835	+1191
	1.56158	+ 10	1.45856	+ 11	1.63909	+ 13	1.31891	+ 12	0.76586	+ 13	1.45466	+ 13
	9.79699	+8.80		+9.40	9.77136	+9.20		+9.90		+10.30		+1040
	1.46407				1.51589							
	10	13 4.74	50	34 51.41	35	48 35.66	10	15 38.06	50	33 20.33	20	5 24.12
	4 32.8		2 47.1		4 8.8		1 13.1		3 58.0		2 18.2	
	51.1		5.1		26.7		31.8		16.9		35.4	
	83.9		11.22		35.5		44.9		14.9		53.6	
	14 41.85		52 56.10		39 17.75		11 22.45		54 7.45		22 26.80	
	8 6.40		29 52.26		43 30.60		11 25.90		28 40.90		0 21.55	
	51 12 17.93		51 34 3.78		53 47 42.13		53 15 37.43		53 32 52.43		54 4 33.08	
	+29.11		+28.75		+32.80		−20.84		+ 5.83		+28.49	
May 8	23 4.07	14 1.0	33 4.08	35 46.7	35 34.57	49 30.7	44 20.81	16 32.1	51 22.51	34 13.5	53 47.15	6 17.0

10
4 33.3
52.2
85.5
14 42.75
8 5.60

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1608R

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1618R

1878 June 3 June 5 Obs. U.S.N.R. Rec. J. F. M.

α h m s h m s h m s h m s h m s h m s h m s

12 54 53 13 0 22 12 59 36.2 13 1 12 0 28.4 13 12 21 11 36.9 13 43 14 42 34.0 13 57 26 50 48.0

δ ° ′ ° ′ ° ′ ° ′ ° ′ ° ′ ° ′

57 55 54 57 12.8 57 81 36.9 49 36 50 0.9 54 82 37.6 53 33 8.3

June 3 +12.[illegible] +11.64 +11.88 +7.25 +11.84 +10.79

56 5.2 .52 1 400 .77 2 33.8 .96 13 41.7 .33 44 38.6 .92 52 35.0 .87

8.8 43.5 87.3 44.8 42.0 38.2

12.2 46.9 41.4 48.0 45.6 41.8

16.0 50.3 44.6 51.3 49.3 45.3

19.6 53.8 48.0 54.3 52.9 48.9

1.18 3.45 5.1 4.03 2.84 9.23

56 12.36 1 46.90 2 41.02 13 48.06 44 45.68 52 41.84

− 67.49 −69.36 − 67.[illegible] −69.31 − 67.50 −69.33 − 67.51 −69.07 − 67.56 −69.39 − 67.57 −69.34

− 1.887 − 1.[illegible] − 1.823 − 1.586 − 1.873 − 1.787

55 3.00 0 37.59 1 31.69 12 38.99 43 36.29 51 32.50

− 3.40 − 3.37 − 3.41 − 3.29 − 3.49 − 3.49

54 59.60 −7.86 +58.44 0 34.20 −7.77 +58.08 1 28.28 −7.73 +58.02 12 35.[illegible]70 −7.73 +57.18 43 32.78 −6.76 +54.15 51 29.01 −6.68 +53.16

8.5 8.7 9.4 9.0 9.0 9.1

56 17.3 1 22.3 3 4.3 13 57.4 45 12.9 53 5.7

24.6 29.3 11.2 4.5 20.3 14.1

29.6 30.0 17.7 10.8 25.6 19.5

7.15 8.75 3.2 1.47 5.88 9.3

56 23.83 54 53 32.15 1 29.[illegible] 54 5 31.95 3 11.07 54 29 12.11 14 49.0 49 53 54.38 45 19.60 54 29 26.15 53 18.10 53 33 5.78

− 11.47 − 3 +17.70 − 8 − 30.05 − 23 − 16.84 − 8 − 33.92 − 30 − 31.76 − 26

1.059 56 − 30 1.24797 − 15 1.47784 − 22 1.22634 − 26 1.53046 − 20 1.49499

9.75967 +12.62 9.76835 +11.78 9.76395 +12.19 9.80897 + 7.50 9.76395 +12.20 9.72387 +11.23

0.92473 + 15 1.12182 + 14 1.34729 + 14 1.14081 + 9 1.39991 + 14 1.37436 + 14

+ 0.80 + 1.20 + 1.20 + 2.70 + 2.70 + 3.80

n = −1.381 3 10.9 58 45.47 1 31.8 5 44.92 2 16.9 29 25.27 2 43.2 54 4.41 2 0.1 29 41.37 3 21.6 33 20.45

Rho = −.09 28.8 57.6 35.2 1.2 18.2 40.3

39.7 83.4 52.1 104.4 183 61.9

+4′ 12.06 33 19.65 21 41.70 57 26.05 32 52.20 57 9.15 53 30.95

49 28.50 1 6.65 2.6 22.30 49 56.15 25 39.20 29 17.40

54 53 40.56 54 5 18.71 54 29 34.36 49 54 8.21 54 29 51.26 53 33 29.46

− 8.11 + 13.24 − 22.25 − 13.83 − 25.11 − 23.68

54 51.74 54 43.9 0 26.43 6 43.0 1 20.55 30 23.3 12 27.97 55 1.6 43 26.02 30 35.5 51 22.33 34 13.6

June 5 +11.89 +11.72 +7.74

Add +020 to (AT + m) June 5. Illus has been added to June 4 Illus corrected and to final + 020 R.A.

56 7.7 12.06 1 42.3 29 13 44.4 31

11.3 45.8 47.6

15.0 49.4 50.9

18.5 52.8 53.9

22.0 56.5 57.1

7.45 4.68 3.9

56 14.90 1 49.36 13 50.78

− 70.06.14 −72.12 − 70.07.15 −72.06 − 70.17 −71.82

− 1.99 − 1.923 − 1.687

65 2.00 0 30.36 12 39.00

− 3.36 − 3.35 − 3.25

54 59.40 −7.86 +58.44 0 23.98 −7.77 +58.08 12 35.[illegible]89 −7.73 +57.18

8.6 9.0 9.0

55 22.3 0 57.0 13 26.4

25.0 57.8 31.5

28.5 3.5 38.0

31.9 6.7 5.9

34.7 54 54 32.87 10.4 54 5 33.40 13 31.97 49 53 55.04

55 28.48 55 1 3.48 − 55 +18.81 − 10

+ 4.642 − 27 +45.88 − 18 1.27436 − 31

1.66671 +12.56 1.66162 +11.71 9.80897 +7.46

9.75967 + 15 9.76835 + 14 1.18886 + 9

1.53188 + 0.60 1.53547 + 1.00 +2.10

54 45.53 20 5 45.69 30 54 4.75

53 1 53.1 3 12.6

n = −1.39 54.1 10.3 29.8

9.8 34 42.4

34 39 22 1.70 33 21.20

33 1.95 0 46.65 49 27.16

Rho = −.09 46.40 54 4 59.09 49 53 39.59

54 58.84 +34.31 +15.45

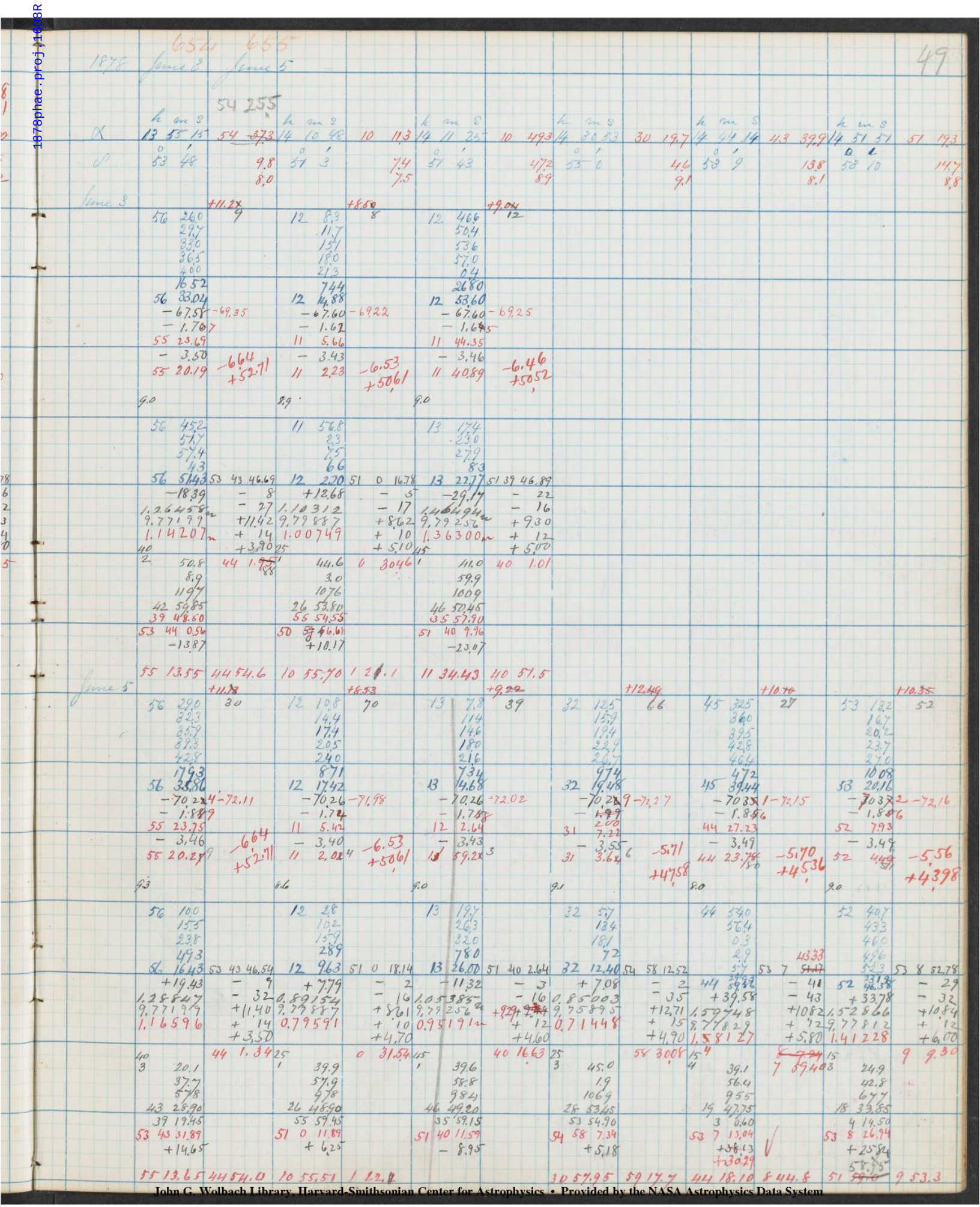
+4′ 12.44 34.03

54 51.56 54 44.0 0 26.18 6 43.8 12 27.98 55 1.9

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16008R

1878 June 3 June 5



John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16018R

5

8.78 June 6 June 9 Obs. H. A. C. Rec. J. F. M.

	h m s		h m s		h m s		h m s		h m s		h m s		h m s	
	13 12 15	11 31 4	13 43 14	42 340	13 57 26	50 480	13 35 23	54 45.6	14 11 35	10 58.3	14 21 23	20 48.2
	° ′		° ′		° ′		° ′		° ′		° ′	
S	52 2	7.4	54 82	37.6	53 33	8.3	53 83	38.1	53 23	27.6	54 18	22.2
		9.0		9.0		9.2		8.8		9.0		8.5

June 6

	13 40.7	10.02	44 42.2	12.61	52 39.0	7.3	56 46.2	6.1	12 56.4	11.55		
	44.0		45.7		42.3		49.8		54.8			
	47.4		49.3		46.1		53.3		33			
	50.5		52.9		49.6		56.7		6.6			
	54.0		56.5		52.9		0.3		10.1			
	366		466		299		163		162			
	13 47.32		44 49.32		52 45.98		56 53.26		13 3.24			
	− 71.57	−73.32	− 71.62	−73.54	− 71.63	−73.48	− 71.63	−73.48	−71.66	−73.51		
	− 1.775		− 1.932		− 1.885		− 1.885		− 1.865			
	12 34.00		43 35.78		51 32.50		55 39.78		11 49.73			
	− 3.29		− 3.46	−6.74	− 3.44	−6.68	− 3.44	−6.59	− 3.46	−6.28		
	41.28	−7.62	43 32.32	+54.15	51 29.06	+53.16	55 36.34	+52.68	11 46.27	+50.49		
	12 30.71	+57.18										
	9.2		9.1		9.6		8.1		9.3			

	13 14.5		44 23		52 27.1		56 12.2		12 29.2			
	20.8		3.4		34.1		14.8		35.6			
	27.8		8.7		40.0		17.3		42.0			
	31		11.3		10.12		20.5		10.6.8			
	13 21.03	+.61	155	54 40 9.27	52 33.73	53 33 7.57	23.7	53 31 3.21	12 35.60	53 20 56.50		
	+26.29	51 59 48.30	432	− 43	+12.25	− 4	56 8.85	− 33	+ 2.764	− 20		
	1.419779	− 18	44 8.64	− 18	1.088140	− 32	+ 40.96	− 11	1.441541	− 11		
	9.787150	− 20	+ 40.68	+12.47	9.773187	+11.34	1.550936	+11.30	9.775792	+11.13		
	1.331536	+9.67	1.609388	+ 15	0.968081	+ 14	9.774222	+ 14	1.032353	+ 12		
		+ 12	9.762218	+2.60		+3.20	1.431254	+3.36		+4.10		
		+ 1.80	1.477634									
	7											
n = −1.378	25	5.20 0.12	45	40 24.49	50	33 22.50	55	31 18.18	5	21 12.15		
	2 20.9		2 10.1		51.1		1 12.2		13.8			
Rss = −.08	39.6		27.2		8.1		29.9		31.1			
	60.5		37.3		11.92		42.1		44.9			
	27 30.25		47 18.65		53 50.60		56 2.105		6 22.45			
+4′ 9.53	55 18.10		35 29.70		−28 48.75		26 27.30		16 25.90			
	51 59 27.63		54 39 39.23		53 32 58.28		53 30 36.83		53 20 35.43			
	+20.67		+30.04		+ 9.29		+26.38		+21.07			
June 9	12 23.09	0 57.3	43 25.58	41 18.6	51 22.38	34 15.7	55 29.75	32 10.9	11 39.99	22 2.6		
			+12.22			+10.94		+10.74		+10.78		+11.61

			44 46.9	44	52 43.5	11.16	56 50.7	9.8	13 0.8	11.00	22 4.98	8.3
			50.3		47.2		54.3		4.9		53.3	
			54.0		50.6		57.9		7.9		57.8	
			57.4		54.3		1.5		11.3		0.5	
			1.2		57.7		4.6		14.7		3.9	
			26.98		53		28.90		341		28.43	
			44 58.96		52 50.66		56 57.80		13 7.82		22 58.36	
			−76.34	−78.19	−76.35	−78.13	−76.35	−78.13	−76.37	−78.15	−76.38	−78.21
			− 1.865		− 1.880		− 1.880		− 1.880		− 1.843	
			43 35.77	6.74	51 32.53	6.68	55 39.67	6.59	11 58.22	6.28	21 38.65	
			− 3.40	+54.15	− 3.38	+53.16	− 3.38	+52.68	− 3.41	+50.49	− 8.45	−5.99
			43 32.37		51 29.15		55 36.29		11 46.26		21 30.20	+49.05
			9.3		9.6		8.5		9.0		8.2	

	44		44 23.2		53 7.1		56 8.2		12 28.4		22 12.6	
			30.0		4.0		11.1		32.6		15.7	
			35.7		22.6		14.5		36.3		19.0	
			88.9	+.22	43.7		18.0		38.7		22.3	
			44 29.63	54 40 10.09	53 14.57	53 33 6.10	21.2	53 31 5.07	44.6	53 20 56.04	25.5	54 15 45.85
			+24.33	− 16	−23.91	− 15	56 14.60	− 48	12 35.52	− 27	26.1	− 38
			1.386141	− 17	1.378558	− 29	+43.20	− 11	+32.30	− 11	19.02	− 14
			9.762218	+12.40	9.773576	+11.24	1.635548	+ 14	1.509209	+11.04	+37.84	+11.99
			1.254397	+ 15	1.258355	+ 14	9.774222	+ 12	9.775792	+ 12	1.577795	+ 14
				+2.10		+2.60	1.515771	+2.81	1.391191	+3.50	9.766660	+3.70
											1.450622	

			45	40 24.68	50	33 19.86	55	31 18.86	5	21 18.54	10	16 1.38
			5.72		3 24.8		1 16.9		1 17.7		1 31.3	
n = −1.382			15.0		43.2		35.0		35.9		49.9	
			12.2		68.0		51.9		53.6		8.12	
Rss = −.08			47 6.10		53 34.00		56 25.95		6 26.80		11 40.60	
			35 42.25		29 14.35		26 22.40		16 21.55		11 7.75	
+4′ 9.88			54 39 52.13		53 38 24.23		53 30 32.28		53 20 31.43		54 15 17.63	
			+17.96		−18.13		+32.79		+24.61		+28.22	
			43 25.63	41 18.8	51 22.47	34 13.0	55 29.70	32 11.5	11 39.98	22 1.0	21 29.21	16 50.14

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16098R

1878 June 6 June 7

	h m s		h m s		h m s		h m s		h m s	
α	14 30 53	30 19.7	14 44 14	43 39.9	14 57 51	51 19.3	14 55 40	55 80	15 16 19	15 48.7
δ	° ′ 53 0	46 9.1	° ′ 53 9	13.8 8.1	° ′ 53 10	14.7 8.8	° ′ 49 56	50 06 7.5	° ′ 52 27	30.5 5.5

June 6

+12.00 +10.20 +10.24 +9.58

	32 13.5	13.01	45 34.0	.81	53 14.5	85			17 40.4	10.19
	17.3		37.4		18.0				43.6	
	21.0		40.9		21.4				47.1	
	24.3		44.3		25.0				50.5	
	28.0		47.8		28.4				53.8	
	41		44		73				23.54	
	32 20.82		45 40.88		53 21.46				17 47.08	
	−71.69	−73.65	−71.71	−73.53	−71.72	−73.54			−71.74	−73.54
	−1.1976		−1.842		−1.842				−1.78	
	31 7.17		44 27.35		52 7.92				16 33.54	
	−3.54		−3.48		−3.48				−3.46	
	31 3.63	−5.71 +47.58	44 23.87	−5.70 +45.36	52 4.44	−5.56 +43.98			16 30.08	−5.27 +39.39
	9.3		7.8		8.6		7.5		5.6	
	31 40.0		44 37.6		52 29.6				16 58.8	
	48.3		58.0		32.9				29	
	57.3		35		35.9				6.3	
	18.26	13.53	17.31		39.0				9.6	
	31 4.20	54 58 58.47	44 57.70	53 7 44.62	42.5	53 8 53.71			11.8	52 23 39.83
	+33.29	− 29	+43.18	− 48	52 39.98	− 34			17 28.8	− 45
1.52231	1.12352	− 33	1.63528	− 38	1.65782	− 30			1.61490	− 30
9.75895	9.75895	+12.87	9.77829	+10.94	9.77812	+10.96			9.78560	+10.21
1.38733	0.98854	+ 15	1.51964	+ 12	1.54201	+ 12			1.50657	+ 12
		+4.60		+5.50		+5.80				+6.80
	25	58 38.14	15	8 09.3	15	9 10.36	30		0	23 56.82
	4 0.9		4 37.9		3 30.2		2 29.0		3 41.2	
	16.6		54.8		47.8		46.5		59.1	
	17.5		9.27		7.80		7.55		10.03	
	29 8.75		19 46.35		18 39.00		32 37.75		3 50.15	
	53 39.60		3 2.00		4 9.35		50 10.60		18 58.20	
	54 57 49.13		53 7 11.53		53 8 18.88		54 20.43		52 23 7.73	
	+ 9.74		+33.09		+34.83				+32.10	
	30 57.92	24.40	44 18.17	8 46.3	57 58.88	9 54.3			16 24.81	24 36.2
		59 18.7 +12.34		+10.12		+10.30		+7.74		+9.40

June 7

	32 18.3	56	45 38.5	34	53 19.0	52	57 8.4	36	17 44.9	62
	21.8		42.0		22.5		11.6		48.2	
	25.2		45.3		26.2		14.7		51.6	
	28.9		48.8		29.6		18.0		55.3	
	32.4		52.4		33.1		21.3		58.5	
	12.69		22.70		13.04		7.40		8.5	
	32 25.38		45 48.40		53 26.08		57 4.80		17 51.70	
	− 76.39	−78.28	− 76.41	−78.17	− 76.42	−78.18	− 76.42	−77.99	− 76.45	−78.17
	− 1.770		− 1.786		− 1.786		− 1.88		− 1.742	
	31 7.89		44 27.23	−5.70	52 7.90		55 56.81		16 33.53	
	3.48		− 3.44	+45.36	− 3.44	−5.56	− 3.37	−5.91	− 3.43	−5.27
	31 3.62	−5.71 +47.58	44 23.79		52 4.46	+43.98	55 53.44	+48.32	16 30.10	+39.39
	9.0		7.8		9.0		7.2		5.8	
	31 48.1		44 56.6		52 39.9		56 34.4		17 0.3	
	56.6		59.2		44.0		40.3		4.3	
	4.0		2.8		47.5		47.0		6.7	
	16.87		6.0		51.0		17		9.4	
	31 56.23	54 58 13.74	88	53 7 46.91	53.0	53 8 53.84 42.80	56 40.57	49 54 55.43	136	52 23 40.72
	+29.15	− 22	45 31.34 2.68	− 47	52 42.08	− 40	+34.23	− 32	17 43.3 6.86	− 53
1.46464	1.46464	− 33	1.63083 +42.22	− 38	1.59180	− 29	1.53441	− 20	1.65167 +44.84	− 31
9.75895	9.75895	+12.74	9.77829	+10.82	9.77812	+10.87	9.80897	+7.57	9.78560	+10.12
1.32966	1.32966	+ 45	1.51499	+ 12	1.47579	+ 12	1.44945	+ 9	1.54334	+ 12
		+4.00		+4.80		+5.10		+5.70		+6.00
	25	58 30.30	15	8 1.05	15	9 9.46	30	55 8.49	0	23 56.34
	3 56.9		4 36.0		3 25.1		2 21.8		3 43.7	
	14.8		53.9		43.5		40.1		1.2	
	11.7		8.99		6.86		6.19		10.49	
	29 5.85		19 44.96 +10		18 34.30		32 30.65		3 52.45	
	53 42.50		3 3.40		4 14.05		50 17.40		18 55.90	
	54 57 52.38		53 7 13.28		53 8 23.93		49 54 27.28		52 23 5.78	
	+21.36		+32.73		+34.87		+28.15		+34.94	
					29.91					
	30 57.91	59 17.9	44 18.09	8 46.4	51 58.90	9 53.4	53 47.53	55 5.18	16 24.83	24 35.7

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16618R

1878 June 19, June 20. Obs. W.A.R. Rec. J.F.M.

	h m s	Mag.		h m s	Mag.		h m s	Mag.	h m s	Mag.		h m s	Mag.	
α	14 11 31	7.5	10 53.8	14 21 23	8.5	20 48.2	~~14 56 5~~	~~9.5~~	15 24 35	9.0	24 53.1	15 25 23	9.1	24 53.5
δ	50° 43′		51.0	54° 18′		22.2	~~54° 57′~~		52° 9′		13.1	51° 20′		23.6

June 19

			+7.76				+11.82				+9.85			+8.61
	13 11.40	6.0		23 3.3	12.04				26 15.5	7.0		27 3.1	8.6	
	14.6			6.8					19.0			6.5		
	18.0			10.3					22.3			9.7		
	21.2			14.0					25.5			13.0		
	24.5			17.6					29.0			16.2		
	13 17.94			23 16.40					26 22.26			27 9.70		
	− 90.01	−91.72		− 90.03	−91.98				− 90.13	−91.94		− 90.14	−91.89	
	− 1.71			− 1.95					− 1.87			− 1.75		
	11 46.22			21 38.42					24 50.32			25 37.81		
	− 3.16			− 3.25					− 3.31			− 3.29		
	11 43.06		−6.55 +50.52	21 35.17		−5.99 +49.05			24 47.01		−5.20 +37.74	25 34.52		−5.30 +37.56
	7.8			8.4					9.2			9.2		
	12 38.3			23 18.5					26 7.3			27 2.0		
	43.9			24.4					13.0			31.9		
	49.9			30.6					18.2			37.9		
	121		+ 25	135					85			58		
	12 44.03	50 43 49.29		23 24.50	54 15 45.97				26 12.83	52 7 37.32		27 31.93	51 18 37.85	
	+ 33.91	− 31		− 14.10	− 5				+ 9.43	− 3		− 22.23	− 13	
	1.530 33	− 26		1.149 22	− 7				0.974 51	− 31		1.346 94	− 21	
	9.801 57	+ 8.22		9.766 42	+ 11.89				9.788 21	+ 9.67		9.795 73	+ 8.84	
	1.437 91	+ 11		1.021 71	+ 15				0.868 79	+ 12		1.248 74	+ 11	
	40	+ 2.30		10	+ 1.80				15	+ ~~3.20~~ 3.00			+ ~~2.40~~ 2.20	
n = ~~+1.89~~ −1.40	3 41.2	43 ~~50.60~~ 45		52.7	15 59.84				4 19.1	7 50.82		2 53.7	18 50.61	
	~~58~~ 8.9			10.2					36.9			11.6		
Rss = −.07	101			2.9					56.0			47		
	43 ~~45~~ 05			11 1.45					19 28.80			8 2.35		
+4′ 9″.58	39 3.30			11 46.90					3 20.35			14 46.00		
	50 43 12.88			54 15 56.48					52 7 29.93			51 18 55.58		
	+ 27.41			− 10.51					+ 7.39			− 17.73		
	11 36.51	4436.1		21 29.18	16 49.0				24 41.81	8 28.6		25 29.22	19 28.2	

June 20

			+7.62				+11.93				+9.36			+8.48
	13 13.1	87		23 4.8	58				26 17.0	61		27 4.7	73	
	18.5			8.4					20.3			7.8		
	19.5			12.0					23.7			11.2		
	22.8			15.4					27.0			14.4		
	26.0			19.2					30.3			17.9		
	479			198					183			160		
	13 19.58			23 11.96					26 23.66			27 11.20		
	− 91.62	−93.27		− 91.63	−93.51				− 91.72	−93.46		− 91.72	−93.41	
	− 1.65			− 1.88					− 1.74			− 1.69		
	11 ~~8.31~~ 46.31			21 38.45					24 50.20			25 37.79		
	− 3.14		−6.55 +50.52	− 3.23		−5.99 +49.05			− 3.~~19~~ 26		−5.20 +37.74	− 3.~~15~~ 28		−5.30 +37.56
	11 43.17			21 35.22					24 46.91			25 34.51		
	7.9			8.6					9.3			9.3		
	12 36.6			22 27.8					26 5.8			27 32.2		
	42.0			33.5					14.8			39.4		
	46.9			39.5					21.2			43.5		
	1255		+ 25	1008					418			1151		
	12 41.88	50 43 35.67		22 33.60	54 15 47.26				26 13.93	52 7 35.69		27 38.37	51 18 37.49	
	+ 37.75	− 38		+ 38.36	− 39				+ 9.73	− 3		− 27.17	− 19	
	1.576 92	− 27		1.583 88	− 11				0.988 11	− 31		1.431 06	− 21	
	9.801 57	+ 8.16		9.766 42	+ 11.68				9.788 21	+ 9.58		9.795 73	+ 8.77	
	1.484 50	+ 11		1.456 37	+ 15				0.882 39	+ 12		1.335 89	+ 11	
	40	+ 2.00		10	+ 1.60				15	+ ~~2.10~~ 3.60			+ ~~2.20~~ 3.70	
n = −1.35	3 ~~114.7~~ 114.7	43 45.54		30.5	16 0.44				4 ~~21.2~~ 50.4	7 48.90		2 50.4	18 49.92	
	~~1002~~ (0.9)			48.1					86.6			7.2		
Rss = −.07	1056			786					598			476		
	43 5280			11 39.30					19 29.90			7 58.80		
+4′ 9″.61	38 55.55			11 9.05					3 18.45			~~14~~ 49.55		
	50 43 5.16			54 15 18.66					52 7 28.06			51 ~~18~~ 18 59.16		
	+ 30.51			+ 28.60					+ 7.63			− 21.64		
	11 36.62	4436.1		21 29.~~83~~ 26	16 49.5				24 41.71	8 26.6		25 29.21	19 27.5	

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1078R

1878 June 26, July 1 Obs. W.A.R. Rec. J.F.M.

53

	h m s	Mag.		h m s	Mag.		h m s	Mag.		h m s	Mag.		h m s	Mag.		h m s	Mag.		
α	14 55 49	7.5	55 166	15 24 19	9.0	23 49.7	15 56 5	9.5	55 27.4	16 5 21	8.6	4 53.9	16 17 33	9.5	17 5.6	16 18 54	9.1	18 28.3	
δ	54° 23′		27.1	49° 56′		59.7	54° 57′		55 0.0	51° 12′		14.6	54° 22′		24.9	49° 49′		51.9	
									9.5										

June 26

		+11.37	+11.82			+6.96			+12.56			+8.79			+12.13			+7.12	
	33 55		42 7	23 47.8		7.01	55 16.9		61	4 48.8		24	16 54.2		7	18 22.2		7	
	11.6 13.0			51.0			20.5			52.3			58.0			25.5			
	15.1 16.7			54.0			24.0			55.5			1.0			28.7			
	18.9 20.3			57.2			27.8			58.9			4.9			31.8			
	22.2 23.7			0.4			31.0			2.1			8.4			35.0			
	25.9 55 27.2																		
	55 18.14 20.18			23 54.08			55 24.04			4 55.52			17 1.30			18 28.64			
	+ 4220 + 4220	+40.20	+40.20	+ 4215	+40.45		+ 42.11	+40.07		+ 42.09	+40.30		+ 4207	+40.07		+ 4207	+40.37		
	− 200 − 200	−5.33	+4.32	− 1.70			− 2.04			− 1.79			− 2.00			− 1.70			
	55 58.94 56 0.38			24 34.53			56 4.11			5 35.82			17 41.37			19 9.01			
	− 3.17 − 3.17			− 3.16			− 3.26			− 3.23			− 3.27			− 3.22			
	55 55.77 55 57.21	−5.33	+4.32	24 31.37		−5.50	56 0.85		−4.32	5 32.59		−4.84	17 38.10		−4.17	19 5.79		−4.92	
						+37.77			+30.99			+28.83			+26.01			+25.65	
	7.2 6.8			9.1			9.6			8.2			9.6			8.9			

	54 54 47.7			23 3.8			54 51.5			4 0.5			16 45.7			17 57.3			
	21.0 54.0			10.5			57.8			3.8			51.9			5.9			
	27.6 58.8			16.5			4.5			7.4			58.2			12.0			
	35.5 10 3.5		+.05	0.8			23.8			10.7			58			17.2			5
	54 28.03 54 53.5	21	18 90 20 29.67	23 10.27	49	55 44.63	54 57.93	54	55 48.87	14.5	51	10 27.06	16 51.93	54	21 19.39	18 5.73	49	48 11.86	
	+50.71 +26.68	− 66	− 19	+43.81		− 52	+26.11		− 17	3.69		− 61	+ 9.37		− 3	+22.91		− 14	
	1.70509 1.42619		− 11	1.64157		− 11	1.41681		− 9	4 7.38		− 13	0.97174		− 5	1.36003		− 25	
	9.76534 9.76534		+11.96	9.80882		+7.48	9.75931		+12.65	1.68251		+8.81	9.76554		+12.04	9.80987		+7.41	
	1.57670 1.29786	16	+ 16	1.65646		+ 10	1.28219		+ 17	9.79731		+ 12	0.84335		+ 16	1.27597		+ 10	
	5		+1.40 +1.40	30		+2.60	30		+ 2.40	15	1.58589	+ 3.00	5		+ 2.80	35		+ 3.30	
n = −1.43	117.9 389	21	21.72 20 42.94	1		41.0	55 54.24	1	19.41	56 3.88	2	1.9	10 38.30	0		35.9	21 34.36	3	57.8	48 21.15	2
	35.0 56.7					57.0			36.4			16.3				54.5			13.9		
Rms. = .06	529 956					980			558			182				904			117		
	6 2645 6 47.60			31		4900	21		27.90		17	9.10	58			45.20		39	585		
+4′ 9.27	16 2190 0.55			50		59.35	51		20.45			5 39.25	58		17 3.15			43	42.50		
	54 20 3.17 9.82			49 55 8.62			54 55 29.72			51 9 48.52			54 21 12.42			49 47 51.77			
	+ 34.73 + 19.45			+ 36.01			+ 19.15			+ 38.54			+ 6.97			+ 18.88			
	55 50.44 22 5.0			24 25.87	55	16.5	55 56.53	56	34.9	5 27.75	11	7.1	17 33.93	22	0.4	19 0.87	48	46.8	
	55 51.88 21 26.3																		

July 1

		+11.09	+11.42			+7.06			+12.29			+8.74			+11.58			+7.02	
	55 55		55 88	23 57.8		52	55 27.4		75	4		57	17 4.0		12.04	18 32.4		48	
	21.7 23.0			1.0			30.4			59.0			7.8			35.6			
	25.3 27.0			4.4			34.0			2.3			11.5			39.0			
	29.0 30.2			7.5			37.9			5.6			15.0			42.1			
	32.4 33.8			10.7			41.3			8.9			18.2			45.2			
	35.8 37.2			21.4			210			12.2			65			443			
	442 55 −12			24 4.28			55 34.20			280			17 11.30			18 38.86			
	55 28.84 30.24			+ 32.14	+ 30.32		+ 32.08	+24.89		5 560			+ 3204	+29.90		+ 3204	+30.23		
	+ 32.19 + 32.19	+30.05	+30.05	− 1.82			− 2.19			+ 3207	+ 30.17		− 2.14			− 1.81			
	− 2.14 − 2.14			24 34.60			56 4.09			− 1.90			17 41.20			19 9.09			
	55 58.89 56 0.29	−5.33	+4.32	− 3.08		−5.50	− 3.17		−4.32	5 35.77			− 3.19			− 3.16			
	− 3.06 − 3.06			24 31.52		+37.77	56 0.92		+30.99	− 3.16			17 38.01		−4.17	19 5.93		−4.92	
	55 55.83 57.23									5 32.61		−4.84			+26.01			+25.65	
		−5.33	+4.32									+28.83							
	7.4 6.8			9.1			9.7			8.4			9.5			8.9			

	54 54			23 29.3			55 10.0			4 20.4			17 36.3			18 23.0			
	33.1 51.0			35.4			17.3			25.4			42.5			29.3			
	40.0 57.2			41.0			24.2			31.1			49.3			34.8			
	46.3 3.2			10.57			31.5			76.9			128.1			871			
	11.94 17.14 54		+.46																
	54 39.80 57.13	21	9.04 20 30.97	23 35.23	49	55 44.53	55 13.83	54	55 51.19	4 25.63	51	10 26.30	17 42.70	54	21 21.90	18 29.03	49	48 13.00	
	+49.04 +33.11	− 63	− 28	+29.05		− 23	17.17		− 7	+39.97		− 43	−31.40		− 26	+ 9.83		− 3	
	1.69055 1.51496	− 9	− 11	1.46315		− 10	+17.03		− 8	1.60173		− 13	1.49693		− 1	0.99255		− 24	
	9.76334 9.76634	+11.64	+11.64	9.80882		+ 7.28	1.23121		+12.26	9.79731		+ 8.55	9.76537		+11.69	9.80987		+7.18	
	1.56216 1.39157	+ 17	+ 17	1.37804		+ 11	1.09659		+ 18	1.50511		+ 12	1.36837		+ 16	0.90849		+ 11	
	5 5	+0.50	+0.50	30		+ 1.60	30		+ 1.20	15		+ 1.80	5		+ 1.60	35		+ 2.10	
n = −1.52	117.3 449	21	21.09 20 43.35			29.3	55 53.65	1	11.5	56 5.14	1	35.9	10 36.67	0		4.8	21 35.54	3	45.9	48 22.58	
	37.2 53.2					49.4			31.1			15.5				24.7			4.3		
Rms. = .06	545 1073					787			426			114				29.5			1102		
	6 2725 6 53.65			31		39.35	31		21.30		17	5.70	5			14.75		38	55.10		
+4′ 11.65	16 2090 16 53.70			51		9.00	51		27.05			5 42.65	17			33.60		43	53.25		
	54 20 32.55 6.35			49 55 20.65			54 55 38.70			51 9 54.30			54 21 45.25			49 48 4.19			
	+36.49 +24.64			+23.88			+12.49			+32.00			−23.35			+ 8.10			
	22 44																		
	55 50.50 21 15.8			24 26.02	55	15.9	55 56.60	56	36.1	5 27.77	11	5.5	17 33.84	22	1.55	19 1.01	48	45.2	
	51.90 20 21.01																		

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1648R

1878 July 10, July 13 Obs. WAR. Rec. J.F.M.

	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.
α	16 18 57	8.9 18 314	16 50 5	8.9 49 402	16 54 26	9.4 53 510	17 6 3	9.0 6 389	17 7 3	9.3 6 411	17 7 49	8.4 7 254
δ	49° 53′	564	51° 20′	223	49° 51′	531	55° 5′	61	49° 56′	573	51° 28′	295

July 10

+7.07 +7.00 +11.91

	18 54.0				54 11.9			6 51.9				
	57.0				15.0			55.9				
	0.3				18.2			59.3				
	3.8				21.4			2.9				
	6.8				24.7			6.5				
	19 0.38				54 18.24			6 59.30				
	+ 13.65	+11.77			+ 1356	+ 11.68		+ 1353	+11.27			
	− 1.88				− 1.88			− 226				
	19 12.15				54 29.92			7 10.57				
	− 3.03	−4.91 +2.565			− 3.09			− 3.11				
	19 9.12				54 26.83	−466 +1701		7 7.46	−362 +13.80			
	8.9				9.3			9.3				
	18 17.7				53 37.4			6 4.3				
	20.5				43.4			12.2				
	24.5				48.7			18.3				
	27.5	+ 80			95			48				
	30.4	49 52 1424			53 43.17	49 50 51.58		6 11.60	55 3 40.46			
	206	− 35			+ 35.07	− 33		+ 47.70	− 58			
	18 24.12	− 2			1.544494	− 10		1.678552	− 24			
	+36.26				9.809787	+ 7.31		9.775805	+12.53			
	1.559443	+ 7.32			0.46088	+ 12		1.54264	+ 20			
	9.80927	+ 12				0.00			− 0.50			
	35 1.474377	000			35			20				
n = −1.57	0 6.0	52 22.11	19.5		1 27.5	50 59.38		3 44.9	3 52.67			
	27.2		13.2		49.2			6.0				
R₂₀ = −.06	33.2				76.7			1109				
	35 16.60				36 38.35			23 55.45				
+4′ 12″.68	47 31.75				46 100.0			58 52.90				
	49 51 44.43				49 50 22.68			55 3 5.58				
	+29.81				+26.90			+34.88				
	19 4.21	52 47.8			54 22.17	51 16.4		7 3.84	4 6.5			

July 13

+7.03 +6.64 +7.03 +7.27 +6.88

	19 0.2	86	50 6.5	217	54 18.3	36			7 8.0	60	7 49.5	9.21
	3.7		10.1		21.5				11.0		53.2	
	7.0		13.4		24.5				14.4		56.9	
	10.2		16.7		28.0				17.5		0.0	
	13.1		20.0		31.2				21.0		3.3	
	343		167		235				219		329	
	19 6.86		50 13.34		54 24.70				7 14.38		7 56.58	
	+ 7.16	+5.35	+ 7.06	+5.16	+ 7.05	+5.24			+ 7.01	+5.20	+ 7.01	+5.09
	− 1.81		− 1.90		− 1.81				− 1.81		− 1.92	
	19 12.21	−4.91 +2.565	50 18.50		54 29.94				7 19.58	−4.58 +13.74	8 1.67	
	− 3.00		− 3.04		− 3.05	−466 +1701			− 3.07		− 3.07	
	19 9.21		50 15.46	−443 +1806	54 26.89				7 16.51		7 58.60	−4.31 +13.56
	9.0		9.0		9.3				9.2		7.8	
	18 33.5		49 46.2		53 38.8				6 42.3		7 40.2	
	39.7		51.4		47.0				47.8		48.4	
	46.1		59.8		53.4				52.7		53.7	
	1193	+.33	15784		1392				1428		1423	
	18 39.77	49 52 1412	49 52 53.51	20 1483	53 46.40	49 52 53.14			6 47.60	49 55 23.29	7 47.43	51 27 50.01
	+27.09	− 20	+.47	− 12	+38.30	− 40			+26.78	− 19	+ 9.15	− 2
	1.443281	− 31	1.319552	− 6	1.583320	− 10			1.427281	− 12	0.961142	− 26
	9.809227	+ 7.41	9.795573	+ 8.88	9.809887	+ 7.41			9.809882	+ 7.46	9.791147	+ 9.02
	1.348815	+ 12	1.221332	+ 14	1.459914	+ 12			1.342701	+ 12	0.861961	+ 14
	30	− 0.70	505	− 0.90	35	− 0.80			20	− 0.90	55	− 1.00
n = −1.49 1.52	4 56.0	52 22.78	13.2	20 23.10	1 27.8	50 59.80			1 48.1	55 29.99	4 6.8	27 56.22
	16.4		37		49.1				9.4		27.8	
R₂₀ = −.06	124		6 1.85		769				1175		346	
	345 620		7 1.85		36 3845				31 58.75		59 1730	
+4′ 11″.68	47 42.15		15 46.50		46 990				50 4960		23 3105	
	49 4 53.83		51 19 58.18		49 50 21.58				49 55 1.28		51 27 42.73	
	51 +22.29		+16.65		+31.56				+22.01		+ 7.28	
	19 4.30	52 48.4	50 11.03	20 41.2	54 22.23	51 16.7			7 11.93	55 43.7	7 54.29	28 11.8

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16008R

1878. July 16, July 22, July 23 Obs. W.A.R. Rec. J.F.Mc.

n = -1.54

Rn = -.06

	July 16	Mag.	July 22	Mag.	July 23	Mag.
α	h m s 16 18 57	8.9	h m s 16 48 10	7.7	h m s 16 50 5	8.9
δ	49° 53′		51° 0′		51° 20′	

+4′ 12.23

July 16

19 6.5 9.7 13.0 16.3 19.5

19 13.00 + 0.82 − 1.76 = 19 12.06 − 2.92 = 19 9.14 −4.91 +2.565

9.0

18 31.4 38.7 45.2 2.53 18 38.43 +34.57 1.53870 9.80927 1.45404

49 52 15.84 − 32 − 1 +7.42 + 13 −1.30

n = −1.48

Rn = −.06

+4′ 12″.04

35 0 2.1 23.9 26.0 35 13.80 47 35.35

49 51 49.34 +28.45

52 22.08

19 4.23 52 47.7

July 22 +6.86

19 20.0 23.0 26.2 29.4 32.5 7.24

19 26.22 − 12.53 − 1.80 = 19 11.89 − 2.79 = 19 9.10 −4.91 +2.565

8.8

18 30.0 32.4 33.8 37.8 49 52 18.03 + 38

14 274 − 25 18 55.48 +30.74 1.48770 9.80927 1.40304

− 31 +7.42 + 7.29 + 13

30 25

34 54.6 18.1 157 35 7.85 47 40.50

49 51 52.73 +25.30

52 22.87

19 4.19 52 48.5

July 23 +6.93

19 21.9 25.0 28.4 31.5 34.7 41.5 19 28.30 − 14.73 − 1.80 = 19 11.77 − 2.77 = 19 9.00 −4.91 +2.565

7.28 −16.53

8.9

18 38.6 41.3 44.3 47.7 51.0 18 44.58 +43.72 1.24068 9.80927 1.55602

49 52 17.80 + 35 − 54 − 2 +7.03 + 13 −2.60

35

n = −1.51

Rn = −.05

+4′ 12″.07

0 8.1 29.1 37.2 35 18.60 47 29.75

49 51 41.82 +35.98

52 22.58

19 4.09 52 48.2

+8.05

48 33.0 38.2 39.5 42.6 46.0 473 48 39.46 − 14.78 − 1.87 = 48 22.81 − 2.84 = 48 19.97 −4.50 +1.851

40 −16.65

75

47 58.8 1.4 3.4 6.5 10.4 50 58.305 48 4.10 +35.36 1.54851 9.79918 1.45376

+ 35 − 34 − 20 +8.44 + 15

25

3 46.0 9.6 11.76 28 58.80 53 49.58 50 58 1.62 +24.43

−3.10 58 35.35

48 15.47 58 53.9

+8.44

50 28.1 31.7 35.1 38.2 41.6 247 50 34.94 − 14.78 − 1.89 = 50 18.27 − 2.84 = 50 15.43 −4.43 +1.806

76 −16.67

8.8

49 47.9 54.2 0.2 16.23 49 57.43 +40.84 1.61109 2.79573 1.51289

+ 35 − 45 − 11 +8.82 + 15

51 20 16.35

5

2 5.9 24.4 33.3 7 16.65 15 31.70 51 19 43.77 +32.58

−3.10 20 22.01

50 11.00 20 40.1

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16108R

1878 July 16, July 22, July 23. Obs. W.A.R. Rec. J.Y.Mc.

	h m s	mag		h m s	mag		h m s	mag
α	17 7 3	9.3		17 8 15	8.5		~~17 34 3~~	9.2
δ	49° 56′			49° 51′			~~55~~ 55° 2′	

July 16 — July 22 — July 22 — July 22

8	24.7		7	35.2	53.9	8	12.5							
	27.8			38.7	57.1		16.0							
	31.0			42.0	0.7		19.3							
	34.2			45.5	4.0		22.8							
	37.3			48.7	7.2		26.2							
8	31.00		7	42.02	8	0.58	8	19.36						
+	0.76	−1.00	+	0.76	+0.76		+	0.76						
−	1.76		−	1.75	−1.76		−	1.75						
8	30.00		7	41.03	59.59	8	18.37							
	− 3.03	−4.58 +13.44		− 3.03	−3.03			− 3.03						
8	26.97		7	38.00	56.56	8	15.34							
	9.0			9.0										

8	0.4		7	4.0										
	4.4			6.2										
	8.6			9.2										
	12.0	50 + 32		12.5										
	13.8	49 ~~52~~ ~~40.65~~ 17.85		15.2										
	39.2	− 14		48.1										
8	78.4	−12.29	7	9.62 42										
	123.16	+ 7.421		+ 3260	+ 5116	+ 69.94								
	9.80924	+ 135		1.51322	1.70893	1.84473								
	1.280078	− 1.60		9.80957	9.80957	9.80957								
30			30	42886	1.62457	1.76837								
35														
1	50.9		4	~~38.6~~	~~52 36.49~~		4	386	~~509~~					
	12.5			~~59.0~~	50 23.67			590	~~12.5~~					
	34			~~9.76~~				976	~~34~~					
87	1.70	+10 1.34 4880						~~3437~~	~~+70~~ 4880					
45	46.65	47 59.55						~~4745~~	~~4665~~ 59.55					
49	49 58.64	49 62 11.59	50	37.1				~~49 49~~ 58.09						
	+ 19.06	+19.06							~~+26.54~~ + 42.13 + ~~57.59~~					
		6 41.173												
	8 22.39													
		+6.90							+6.98					
July 23														
	7 29.6	7.25		8 40.0	7.33									
	32.8			43.2										
	35.9			46.4										
	39.2			49.6										
	42.5			52.8										
	300			320										
7	36.00		8	46.40										
−	14.81	−16.61	−	14.81	−16.60									
−	1.82		−	1.79										
7	19.39		8	29.80										
−	2.90	−4.58 +13.44	−	2.91										
7	16.49		8	~~29.89~~ 27.89	−4.58 +13.44									
	9.3			8.6										

These 3 stars to be re-worked with the new Circle Reading —

49														
				+38			+38			+38				
~~50~~	~~50~~	2.55	50	~~30~~ 30.82		50	~~32~~ 32.6							
	−	28		− 70			− 1.31							
	−	12		− 12			− 12							
	+	78.41		+ 8.41			+ 8.41							
	+	15		+ 15			+ 15							
	−	1.60		− 1.60			− 1.60							
50	31.47	1	50	46.34	28	50	1.19	3						

6	45.5		8	4.4										
	52.6			10.0										
	58.5			16.4										
	1566	+35		308	+ 35									
6	52.20	49 55 26.12	8	10.27	49 50 19.17									
	+43.80	− 51		+36.13	− 35									
	1.64147	− 11		1.55787	− 11									
	9.80882	+7.39		9.80957	+7.31									
	1.55636	+ 13		1.47351	+ 13									
30		− 3.20	35		− 3.20									
1	59.9	55 ~~30.17~~	2	0.8	50 23.30									
	20.7	29.97		21.2										
	206			220										
32	10.50		37	11.60										
50	38.05		45	37.35										
49	54 50.12		49	49 49.42										
	+36.00			+29.75										
7	11.91	55 43.7	8	19.31	50 36.7									

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1608R

1878 July 16, July 22, July 23.

(See over for last obs. of this date

				h m s	mag
α	17 43 59 75		17 47 42 94	17 50 23	8.8
δ	53° 3′		54° 28′		
July 16	July 22	July 22		July 22	

No such observations

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16608R

Reduction of the Zone Observations.

In the books C_1 to C_{42} containing the zone observations the form of the reductions was originally arranged according to the scheme of Argelander adopted to the special problem in hand.
The general expressions for the reductions are:—

$$R.A. = T + K + \frac{(\delta - \Delta)}{100} K' + \frac{(\delta - \Delta)}{100} K''$$

$$\delta = [\varphi - \text{Circle reading}] + d + \frac{(\delta - \Delta)}{100} d'$$

The terms involved in these equations have the following signification:

Δ = Any assumed declination.
$(\Delta T + m)$ = The clock error + m for any given mid transit
i = $n \tan \Delta + C \sec \Delta$.
i' = Δi for a change of 100′ in Δ.
y = the given year of observation minus 1875
A.C.E = The day constants for reduction to apparent place
t = $(A - y) \frac{m}{15}$. m being taken for $\frac{(A-y)}{2}$

s	$= \frac{\tan \Delta}{15}$	s'	$= \frac{w}{15}$
r	$= \frac{\sec \Delta}{15}$	r'	$= s' \sin \Delta$
u	$= \cos \Delta \tan \alpha$	u'	$= -w \tan \alpha \sin \Delta$.
v	$= \sin \Delta$	v'	$= w \cos \Delta$.
q	$= u + \tan z$.	dq	$= w l \sec^2 z$
w	$= \frac{100'}{K}$	w''	$= w' \sin 2\Delta$
w'	$= w \sec^2 \Delta$.	s''	$= r'' = \frac{w' w''}{15}$
		l'	$= (B + T + y)$

$(\varphi - \text{Circle reading}) = \delta'$

$\left[\begin{matrix} R_m \\ R_{sy} \\ R_{sd} \\ R_{ns} \\ R_{pl} \\ R_{av} \end{matrix}\right.$ = the quantities defined in Vol IX = R'

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16638R

Then

$$R = T + (\Delta T + m) + i - r - g s \sin(G+\alpha) - h \tau \sin(H+\alpha)$$
$$\kappa = i' - g s' \sin(G+\alpha) - h \tau' \sin(H+\alpha)$$
$$\kappa'' = w'' i' - g s'' \sin(G+\alpha) - h \tau'' \sin(H+\alpha)$$
$$d = R' + l' a - b_{,} u - g \cos(G+\alpha) - h v \cos(H+\alpha)$$
$$d' = l' d a - b_{,} u' - h v' \cos(H+\alpha)$$

It is to be noted that the value of g is not the value for the reduction to apparent place for a single year.

A and B being given for any date we have,

$$g' \sin G = B$$
$$g' \cos G = n(A-y)$$

Since B is a constant for any date, it will not be necessary to actually solve the equations except as a check on G, which is also a constant, we shall then have,

$$g' = \frac{B}{\sin G}$$

The complete reduction to 1875 will then be as follows:—

$$\alpha' - \alpha = \pm (A-y) m \pm g' \tan\delta \sin(G+\alpha) \pm h \sec\delta \sin(H+\alpha)$$

$$\delta' - \delta = \pm g' \cos(G+\alpha) \pm h \sin\delta \cos(H+\alpha) \pm c \cos\delta$$

in which m, n, α and δ are to be taken out for the time $\frac{(A-y)}{2}$

Example.

Reduction from Nov 10 1870 to 1875.0

δ =	58° 30′	G =	178° 43′	log A =	9.6977	m (1872.5)	3.0722
2δ =	101 00	α =	337° 30′	A =	.4986	n	20.″0545
$\phi - \delta$ =	−8 7	H =	38° 55′	A − 5 =	−.5014	log(A−5) =	.6533
log tan δ =	0.0839	$G+\alpha$ =	156 13	log(A−5)	.6533$_n$	log m =	.4874
log sec δ =	0.1965	$H+\alpha$ =	16 25	log u	1.3022	log r =	1.1408$_n$
log cos δ =	9.8035	log h	1.2950			r =	−13.″830
log sin δ =	9.8874	log b.	1.0931	log g cos G.	1.9555$_n$		
log tan $\frac{1}{2}(\phi-\delta)$ =	9.1542$_n$			log g′ sin G.	.3077		
log sec $\frac{1}{2}(\phi-\delta)$ =	0.0043			log tan G.	8.3521$_n$		
log tan ω =	9.6373			G.	178 43		
log k =	1.7614			log g	1.9557		

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1603R

560

Example (continued)

Reduction from Nov 10 1878 to 1875.0

n =	+.303	log S =	8.9078	log S' =	7.6806
C =	.00	" T =	9.0204	" T' =	7.5680
T' at 22h 10m =	−2m 6.573	" u =	9.4408	" u' =	7.9884
l =	+0.303	" V =	9.8874	" v' =	8.2672
$-z$ =	+13.530	" Q =	0.9156	" dQ =	8.4680
$T'+l-z$ =	−152.440	" w =	8.4637	" w'' =	8.8487
$\Delta T'$ =	−.020	" w' =	8.8567	" S'' = T''	6.1441
i =	+.019	" $h\Pi$ =	.3154	" $\log\mu'$ =	8.8915$_n$
		" hv =	1.1824	" hv' =	9.5622
				" $h\Pi'$ =	8.8630

Bar =	30.15
Hyk =	70.0
log k =	.0080
log T' =	.0015
log f =	.0131
$-C_{\mu}$ =	−.342
l'_Q =	+8.31

α	$\Pi+N$	$N+\varkappa$	log sin($\Pi+\varkappa$)	log cos($\Pi+\varkappa$)	log sin($N+\varkappa$)	log cos($N+\varkappa$)
22h 30m	156° 13′	16° 25′	9.6056	9.9615	9.4512	9.9819
22 50	161 13	21 25	9.5078	9.9762	9.5625	9.9689
23 10	166 13	26 25	9.3770	9.9873	9.6483	9.9521
23 30	171 13	31 25	9.1838	9.9949	9.7170	9.9311
23 50	176 13	36 25	8.8194	9.9990	9.7735	9.9056
0 10	181 13	41 25	8.3270$_n$	9.9999	9.8205	9.8750
0 30	186 13	46 25	9.0346$_n$	9.9974	9.8600	9.8384

α	$-g\sin(\Pi+\varkappa)$	$-h\Pi\sin(N+\varkappa)$	$T'_{\mu}-z$	K
22h 30m	−2.945	−0.5811	−1m 32.442	−1m 55.975
22 50	−2.352	−.756	.452	55.558
23 10	−1.740	−.920	.462	55.122
23 30	−1.115	−1.078	.472	54.655
23 50	−0.482	−1.228	.482	54.192
0 10	+0.155	−1.367	.492	53.704
0 30	+0.791	−1.497	.502	52.208

α	$-g\cos(\Pi+\varkappa)$	$-hv\cos(N+\varkappa)$	$-C_{\mu}$	$-l_Q$	dl
22h 30m	+1′ 22.65	−14.60	−.342	+8.31	+1′ 12.94
23 00	26.68	−13.91			1′ 17.66
23 30	29.25	−12.99			1′ 21.15
0 00	30.28	−11.84			1′ 23.33
0 30	29.77	−10.49			1′ 24.17

α	$-g\sin(\Pi+\varkappa)$	$-h\Pi\sin(N+\varkappa)$	i'	K'
22m 30s	−.175	−.021	+.019	−.177
23 00	−.121	−.030	+.019	−.132
23 30	−.066	−.038	+.019	−.086
0 00	−.010	−.046	+.019	−.037
0 30	+.047	−.053	+.019	+.013

C'_{dQ}	$-C_{\mu'}$	$-hv'\cos(N+\varkappa)$	dl'
+1.804″	−.078″	+.350	+2.076″
		.333	+2.059
		.310	+2.036
		.284	+2.010
		.252	+1.978

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.167BR

It will be seen from the following that κ'' is practically insensible for the data involved in the Zone Reductions:

$$\begin{aligned} w''i' &= +.001 \\ -fs''\sin(G+\lambda) &= -.005 \\ -kr''\sin(H+\lambda) &= -.001 \\ \kappa'' &= -.005 \end{aligned}$$

For $(\delta - \Delta) = 60'$

$$\left(\frac{\delta-\Delta}{100}\right)^2 \kappa'' = -.002$$

It is evident from the following considerations that this form of reduction is not well adapted to the reduction of the Zone from 50° to 55°:—

(a) The values of κ, κ', d and d' can not be safely used much beyond the limit of 2° 00'. Especially during the later observations the range of declination in the same zone is after 5°

(b) This form is not economical where no more than 50 or 60 stars are observed on a single night. It is especially adapted to the case where a large number of stars with a range of no more than 1° in δ are observed on the same night.

(c) In order to be able to take out the reduction with the correct arguments in R.A. and δ, it is necessary to first apply to "i" the values of ΔI_m and K_y. These quantities therefore must be applied before the table can be used and there is then nothing to be saved by including them in the tables or constants.

The following are the steps of the operation in reducing a set of zone observations as recorded in books C_1 to C_{12}.

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16038R

(a) The mean of the verns and the mean of the circle readings being found, the first step is to obtain $\delta' =$ [42° 22' 48".35 − mean of circle readings]. To this quantity is applied the value of R_δ taken from Table I. We shall then have the value of δ necessary to complete the remaining reductions.

(b) Computation of $R_m = 15 \sin 1'' \cos\delta (T_m - T)$
The value of δ' defined above should strictly include R_m but for the purpose required it is sufficiently accurate since R_m never exceeds 30".

(c) The value of R_m having been applied to δ' the value of δ' thus corrected is written on the left-side of the page

(d) The remaining operations are indicated in the following scheme,

For R.A.	For δ
T	δ'
ΔT_m	R_{md}
$n \sin\delta$	$R_{n\delta}$
K	R_δ
$\alpha' - \alpha$	R_{pe}
	$\delta' - \delta$
R.A.	δ

(e) (1) T and δ' are given
(2) (ΔT_m) and R_{pe} are taken from sheets marked B
(3) $n \sin\delta$ is taken from a table of products marked C and K is a constant. The value of n is written on the first page of each zone.
(4) R_{md} is taken from sheet D with the argument $(T_m - T)$
(5) The constant δ term is given on sheets marked A. This constant is given on the first page of each zone.
(6) R_{pe} is taken from sheets marked E.
(7) $\alpha' - \alpha$ and $\delta' - \delta$ are taken from the tables on sheets E with the argument $[T + \Delta T_m + n \sin\delta + K]$

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.160BR

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1603R

66

1878 July 16, July 22, July 23

	h m s	Mag.
☿	17 56 44	8.8
☉	50° 39′	

	h m s	Mag
	17 58 20	8.9
	54. 17′	

July 16

July 22

July 22

July 22

July 23

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16038R

1878. July 24. July 31 Obs. W.A.R. Rec. J.F.M.

	h m s	Mag	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag	h m s	Mag.
α	16 48 10	7.7 47 453	16 50 5	8.9 49 402	17 7 37	9.0 7 130	17 7 46	9.3 7 221	17 34 3	9.2 33 395	17 47 42	9.4 47 146
δ	57 ″ 0 ′	1.9	57 ° 20 ′	223	54 ° 12 ′	137 ~~90~~	54 ° 13 ′	139	55 ° 2 ′	34	54 28 ′	28.8

July 24

		+7.72				+8.45				+11.27				+11.31				+12.15				+11.26		
	48 35.0	8.47		50 30.5	9.20		7 57.3	12.62		8 6.4	12.09		34 21.6	13.20		48 2.8			12.01					
	38.3			33.8			10.9			10.0			25.4			6.3								
	41.6			37.0			14.4			13.4			29.0			9.8								
	44.9			40.3			7.4			17.0			32.4			13.4								
	48.1			43.6			413			20.5			36.0			16.8								
	79			352			213			173			444			491								
	48 41.58			50 37.04			8 4.26			8 13.46			34 28.88			48 9.82								
	— 16.87	-18.75		— 16.87	-18.77		— 1691	-19.02		— 16.91	-19.02		— 16.96	-19.13		— 1698	-19.11							
	— 1.88			— 1.90			— 2.11			— 2.11			— 2.17			— 2.13								
	48 22.83			50 18.27			7 45.24			7 54.44			34 9.75			47 50.71								
	— 2.82			— 2.82			— 2.85			— 2.85			— 2.91			— 2.95								
	48 ~~20.01~~ 19.88	-4.50 +18.51		50 15.45	-4.43 +18.06		7 42.39	-3.80 +13.62		7 51.59	-3.80 +13.59		34 6.84	-3.52 +6.78		47 47.76	-3.60 +3.21							
	7.8			9.1			9.1			9.3			9.3			9.3								
	47 47.3			49 54.0			8 ~~40.0~~ 48.0			8 ~~45.0~~ 40.0			34 6.5			47 14.3								
	54.3			0.0									13.5			20.0								
	0.2			6.8									20.0			27.0								
	118			08									100			13								
	47 53.93	+ .75	50 58 29.78	50 0.27		51 20 16.60	8 40.00		54 11 ~~52.50~~ 52.35	8 45.02	12 1.95	54 11 ~~58.97~~	34 13.33		55 2 34.85	47 20.43		54 28 12.57						
	+47.65	— 60		+36.77		— 36	-40.74 ~~35.71~~		— 33	-26.57 ~~31.54~~ 23.50	— 26		+ 15.55		— 6	+49.39		— 64						
	1.67806	— 21	1.56549			— 11	1.~~41.76~~ 16.05		— 23	1.~~49.56~~ 40.39	— 23		1.19173		— 23	1.69364		— 22						
	9.79918	+ 8.38	9.79573			+ 8.76	9.~~84.82~~ 76.82		+ 11.63	9.76412	+ 11.63		9.75823		+ 1.52	9.76431		+ 11.92						
	1.58331	+ 15	1.46729			+ 16	1.~~45.47~~ 83.21		+ 20	1.~~37.05~~ 29.09	+ 20		1.05603		+ 22	1.56402		+ 20						
	25	— 3.205				— 3.30	10		— 3.80	10	— 3.80		20		— 4.20	55		— 4.30						
$n = -1.53$	3	58.9	58 35.05	2	2.6	20 22.50	41	29.6	12 ~~07.8~~ 11 59.57	4	29.6	12 ~~6.51~~ 10.24	4	27.1	2 43.85	41	15.2	28 20.28						
	2	19.4			24.1			48.1			48.1			47.2			34.2								
$Rrs = -.05$		18.3			26.7			77.7			77.7			74.3			19.4								
	29 9.15			7 13.35			14 38.85			14 38.85			24 37.15			59 24.70								
$+4' 12''.27$	5~~4~~3 39.20			15 35.00			8 9.50			8 9.50			58 11.20			23 23.65								
	50 ~~37~~ 57 51.47			51 19 47.27			54 12 21.77			54 12 21.77			55 2 23.~~47~~ 58			54 27 35.92								
	+38.31			+29.33			- ~~29.21~~ 36.82			- ~~2355~~ 19.82			+ 11.38			+ 86.65								
	48 15.51	58 53.6		50 11.02	20 40.6		7 38.59	12 13.2		7 47.79	12 23.8		34 3.32	2 50.6		47 44.16	28 23.5							
	July 31	+8.21			+8.04			+11.81			+11.78			+12.62										
	48 49.7	31		50 45.2	56		8 11.7	90		8 21.0	87		34 36.5	9										
	53.0			48.4			15.1			24.4			39.6											
	56.4			51.4			18.8			28.0			43.2											
	59.6			54.9			22.3			31.6			47.1											
	2.8			58.3			26.2			35.0			50.6											
	315			82			441			400			170											
	48 56.30			50 51.64			8 18.82			8 28.00			34 43.40											
	— 31.61	-33.57		— 31.60	-33.58		— 31.65	-33.65		— 31.65	-33.83		— 31.71	-33.97										
	— 1.96			— 1.97			— 2.20			— 2.20			— 2.26											
	48 22.73			50 18.06			7 44.97			7 54.15			34 9.43											
	— 2.66	-4.50 +18.51		— 2.66	-4.43 +18.06		— 42.68	-3.80 +13.62		— 2.68	-3.80 +13.59		— 2.76	-3.52 +6.78										
	48 20.07			50 15.40			7 ~~32.29~~ 42.29			7 51.47			34 6.67											
	7.2			9.1			8.9			9.1			9.4											
	48 14.2			49 59.0			7 ~~44.2~~ 52.00			7 ~~52.0~~ 44.20			35 7.0											
	16.7			8.5									13.5											
	20.0			12.2									18.8											
	22.2	+ .09		17.7			52.00		11 ~~53.14~~	44.20	12 5.82		39.3											
	24.7	50 58 31.72		50 5.90		51 20 18.59	7 44.20		54 ~~12~~ 11 ~~1.40~~ 59.74	7 ~~52.00~~ 44.99	54 11 ~~58.99~~ 59.77		35 13.10		55 2 38.18									
	48 19.56	— 36		+45.74		— 55	+26.83 ~~34.62~~ 34.46		— 31	+43.80 +36.00	— 34		- 29.70		— 23									
	+36.74	— 20		1.66030		— 11	1.~~53.33~~ 53.46		— 2	1.~~56.38~~ 56.38	— 2		1.47216		— 20									
	9.79918	+ 8.62		9.79573		+ 8.98	9.~~60.25~~ 60.25		+ 11.93	9.76412	+ 11.93		9.75823		+ 12.80									
	1.47139	+ 15		1.56210		+ 15	1.~~26.71~~ 26.71		+ 21	1.~~42.49~~ 42.49	+ 21		1.33706		+ 23									
	25	— 4.505				— 4.69	15	1.30165	— 5.30	15	1.51662	— 5.30	20		— 5.80	5									
$n = -1.58$	3	46.6	58 35.52	2	6.5	20 22.55	50	15.1	11 ~~8.00~~ 59.74	0	15.1	12 ~~6.56~~ 12.39	3	48.9	2 45.57										
		9.0			29.1			38.5			38.5			10.1											
$Rrs = -.05$		11.56			35.6			53.6			53.6			11.90											
	28 ~~58.53~~			7 17.80			15 26.80			15 26.80			23 59.50											
$+4' 11''.56$	53 ~~57.80~~ 58.55			15 30.55			7 21.55			7 21.53			58 48.85											
	50 58 2.11			51 19 42.11			54 11 33.11			54 11 33.11			55 3 ~~0.41~~ 0.41											
	+29.61			+36.48			+ 28.29 + 20.83			+ ~~41.58~~ 32.71			- 21.73											
	48 15.57	58 54.0		50 10.99	20 40.6		7 38.49	12 13.4		7 47.67	12 26.0		34 3.15	2 52.4										

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1698R

647 668

1878 July 24, July 31 Obs. W.A.K Rec. J.Z.Mc

	h m s	Mag	h m s	Mag.	h m s	Mag.
α	17 50 23	8.8 49 598	17 56 44	8.8 56 215	17 58 20	8.9 57 572
δ	53° 18′	17.8	50° 39′	39.4	54° 17′	17.2

July 24

		+1017			+794			+1426
	50 43 5	10.92		57 10.0	8.67	58	40.4	1201
	47.0			13.4			43.7	
	50.3			16.6			47.2	
	53.8			19.9			50.8	
	57.4			23.0			54.4	
	20			329			365	
	50 50.40			57 16.58		58 47.30		
	− 16.99	−19.03		− 17.00	−16.85	− 17.02	−19.11	
	− 2.04			− 1.85		− 2.11		
	50 31.37			56 57.73		58 28.19		
	− 2.97	3.84		− 3.01	−4.33	− 2.98		
	50 28.40	+2.52		56 54.72	+ 0.84	58 25.21		
	9.0			9.0		8.9		
	49 59.2			56 44.4		57 49.2		
	8.1			47.4		56.4		
	11.9			50.8		2.7		
	17.2			54.0		18.3		
	50 5.73	53 17 53.22	.75	54.3	50 39 13.50	57 56.10	54 16 54.14	
	+4467	− 52		39	− 18	+ 51.20	− 67	
	1.65002	− 23		56 50.78	− 16	1.70927	− 4	
	9.77660	+10.74		+ 25.80	+ 8.11	9.76642	+11.77	
	1.53269	+ 18		4.41182	+ 15	1.58176	+ 20	
	5	− 4.30		9.80213	− 4.20	10	− 4.50	
	4 31.8	17 59.84		1.31982	39 17.940	34.0	17 1.65	
	51.2			2 57.9		55.3		
	83.0			18.1		89.3		
	9 41.50			160		10 44.65		
	13 6.85			48 8.00		12 3.70		
	53 17 19.2			34 40.35		54 16 15.97		
	+34.10			50 38 52.62		+38.17		
				+20.88				

July 31 50 24.56 18 2.4 56 50.39 39 18.8

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1008R

1878 Aug 14, Aug 20. Obs W.A.R. Rec. W.A.R.

669 670

	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.
α	17 7 49	7 254	17 42 15	6.341 51.6	17 46 13	9.345 50.3	17 47 48	8.8 47 25.0	17 50 23	8.8 49 59.8	17 56 44	8.8 56 21.5
δ	51° 28′	29.5	51° 58′	52 0.3	49° 57′	57.0	54° 46′	46.8	53° 18′	17.8	50° 39′	39.4

Aug. 14

			+8.50			+9.46			+7.05			+12.21			+10.31			+7.72	
	9	0.3	9.33		43	25.0	10.29		46	32.9	88		48	21.2	13.04		51	30.0	11.14		57	57.0	8.55	
		3.5				28.4				35.8				24.8				33.5				0.2		
		6.8				32.0				39.0				28.2				37.0				3.4		
		10.0				35.2				42.2				31.8				40.3				6.6		
		13.5				38.7				45.4				35.4				44.0				10.0		
		341				993				453				414				348				172		
	9	682			43	31.86			46	39.06			48	28.28			51	36.96			57	3.44		
	−1	4.04	−65.98		−1	4.12	−66.09		−1	4.12	−65.95		−1	4.13	−66.31		−1	4.14	−66.20		−1	4.15	−66.01	
	−	1.94			−	1.97			−	1.83			−	2.19			−	2.06			−	1.86		
	8	0.84			42	25.77			45	33.11			47	21.96			50	30.76			56	57.41		
	−	2.35			−	2.49			−	2.56			−	2.44			−	2.50			−	2.59		
	8	58.49	−4.31		42	23.28	−4.10		45	30.85			47	19.52			50	28.26	−3.84		56	54.82	−4.33	
			+13.56				+4.65												+2.52				+6.84	
	8.5				8.8				9.3				9.0				8.9				8.8			
	9	39.0			43	14.0			47	4.8			48	33.4			50	52.0			57	13.9		
		44.3				19.4				10.6				40.8				56.2				21.2		
		49.7				24.3				17.0				47.5				5.5				26.2		
		130				277				24				17				237				13		39
	9	44.33	51 27 36.07		43	19.23	51 59 44.48		47	10.80	49 49 44.96		48	40.57	54 39 52.28		50	57.90	53 14 58.56		57	20.43	50 40 19.35	
		−37.51	− 87			+12.63	− 4			−31.74	− 27			−12.29	− 4			+39.06	− 40			+43.01	− 50	
		1.57415	− 18			1.10140	− 12			1.50161	− 10			1.08955	− 10			1.59173	− 23			1.63357	− 11	
		9.79447	+ 8.90			9.78934	+9.44			9.80957	+7.29			9.76200	+12.12			9.77660	+10.75			9.80197	+ 8.18	
		55 47469	+ 15			0.99681	+ 18			1.41725	+ 13			0.95762	+ 23			1.47440	+ 19			1.54161	+ 15	
		35	− 7.27	25			− 8.60	35			−8.30	45			− 9.00	5			−9.00				−9.00	45
n = −1.54	3	23.1	27 58.13		2	14.7	59 46.17		1	48.2	49 44.34		1	46.3	39 56.32		1	19.8	18 0.70		3	5.1	40 18.90	
		44.3				35.4				6.8				6.2				41.9				25.0	39	
Rms = .05		674				501				170				116.5				617				301		
		58 33.70			27	2505			36	5850			46	5825			9	3085			48	1505		
+4′ 11.″25		24 1465			55	23.30			45	49.85			36	50.10			13	17.50			38	33.0		
		51 28 25.90			51 39	34.55			49 50	1.10			54 40	1.35			53 17	28.75			50 39	44.56		
		−29.83				+9.93				−26.14				−9.07				+29.81				+34.80		
	7	54.18	28 11.7		42	19.18	59 50.8										50	24.42	18 3.2		56	50.51	39 19.4	

Aug 20

										+7.06						+12.44				+10.49			+7.48	
					47	—	45		49	9.2	53		51	45.0	88		58	11.8	87					
						—				13.0				48.4				15.0						
						48.0	48.00			16.3				52.0				18.3						
						51.3	48.09			20.0				55.4				21.6						
						54.6	48.19			23.7				58.9				24.8						
						28				32.2				97				41.5						
					47	48.09			49	16.44			51	51.94			58	18.30						
					−1	19.38	−81.07		−1	19.38	−81.40		−1	19.39	−81.29		−1	19.41	−81.11					
					−	1.69			−	2.02			−	1.90			−	1.70						
					46	27.02			47	55.04			50	30.65			56	57.19						
					−	2.40	−4.45		−	2.26			−	2.32	−3.84		−	2.43	−4.33					
					46	24.62	+3.60		47	52.78			50	28.33	+2.52		56	54.76	+0.84					
					8.8				8.2								8.6							
					48	2.4			49	27.5			51	27.0			57	28.7						
						9.3				38.0				34.0				34.8						
						15.3				39.7				39.2				40.0						
						27.0	+ 39.60			100.2				100.2				103.5						
					48	900	49 56 4.86		49	33.40	54 45 31.19		51	33.40	53 17 58.28		57	34.50	50 39 18.83					
						−20.91	− 12			−16.96	− 7			+18.54	− 8			+4.380	− 51					
						1.32035	− 25			1.22943	− 6			1.26811	− 21			1.64147	− 16					
						9.80852	+ 7.30			9.76111	+12.05			9.77643	+10.60			9.80213	+7.74					
						1.23494	+ 13			1.09661	+ 22			1.15061	+ 18			1.54967	+ 15					
					25		− 960	40?			−10.00	5			−10.02	45			−10.10					
n = −1.42					41?	54.1	56 34.65	1		41.1	45 33.72	41		43.3	17 59.16	3		49.9	39 16.60					
						15.2	34.65			25.8				24.7				25.6						
Rms = .05						493				299				290				305						
					30																			
+4′ 10.″28					29	5465	465		41	14.95			9	1450			48	15.25						
					52	4870	4370		41	3340			15	33.85			34	3210						
					49 56	5571	5398		54	45 43.68			53 17	44.13			50 38	43.38						
						−17.18				−12.49				+14.15				+ 35.45						
																	56	50.43						
					46	20.17	56 38.2						50	24.49	18 1.7		55	55.43	39 17.4					

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16008R

669 670

1878 Aug. 14, Aug. 20. Obs. W.A.R. Rec. W.A.R.

	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.
α	18 2 50	8.72 27.2	18 7 53	9.2 7 30.8	18 9 18	8.48 55.4	18 11 2	9.3 10 38.2 28.9	18 18 7	8.9 17 44.3	18 19 12	6.8 18 49.8
δ	52° 50′	49.7 8.9	51° 38′	37.8	52° 2′	1.6	52° 30′	27.5	53° 26′	25.7	51° 29′	28.3
		+10.37		+9.08		+9.57		+9.88		+10.75		+5.88
	3 57.5	11.20	9 5.3	91	10 30.7	10.40	12 9.6	10.71	19 16.0	11.58	20 23.0	9.71
	1.0		8.4		33.8		13.1		19.5		26.2	
	4.5		11.5		37.0		16.4		22.8		29.5	
	8.0		14.9		40.4		19.8		26.2		32.9	
	11.5		18.2		43.8		23.5		29.7		36.4	
	225		83		357		324		142		480	
	4 4.50		9 11.66		10 37.14		12 16.48		19 22.84		20 29.60	
	−1 4.17	−66.20	−1 4.18	−66.17	−1 4.18	−66.15	−1 4.19	−66.19	−1 4.20	−66.28	−1 4.21	−66.15
	− 2.03		− 1.94		− 1.97		− 2.00		− 2.08		− 1.94	
	2 58.30		8 5.54		9 30.99		11 10.29		18 16.56		19 23.45	
	− 2.57	−3.93	− 2.62	−4.15	− 2.62	−4.08	− 2.61	−4.00	− 2.62		− 2.67	
	2 55.73	−0.75	8 2.92	−2.10	9 28.37	−2.46	11 7.68	−2.88	18 13.94		19 20.78	−4.19 −5.04
	5.6		9.4		8.2		9.0		8.9		6.5	
	4 9.1		9 12.2		10 19.6		11 54.3		18 55.9		20 11.2	
	12.3		23.8		23.6		0.9		0.9		17.7	
	16.0				29.3		5.0		8.2		23.3	
	18.5	+.83	360		125		02		5.0		222	
	21.2	52 50 4.83	9 18.00	51 38 3.73	10 24.17	52 1 4.84	12 0.07	52 28 36.75	19 1.67	53 27 21.77	20 17.40	51 28 50.73
	271	− 3	− 6.34	− 1	+ 12.97	− 5	+ 16.41	− 8	+ 21.17	− 12	+ 12.20	− 4
	4 15.42	− 9	0.80209	− .19	1.11294	− 2	1.21511	− 16	1.32572	− 24	1.08636	− 16
	1.03822	+1030	9.79288	+9.10	9.78902	+9.46	9.78461	+9.94	9.77490	+10.92	9.79431	+8.93
	9.78113	+ 19	0.70104	+ 18	1.00803	+ 18	1.13579	+ 18	1.20669	+ 19	0.98674	+ 15
	35.9 2542	−9.40 45		−9.40 25		−9.60 55		−9.70 55		−9.90 55		−9.90
	35.3	50 6.63	3 40.7	38 4.24	0 11.0	1 48.6	3 4.9	28 57.76	4 42.9	27 23.45	3 6.0	28 50.54
	57.4		1.0		32.9		26.2		3.0		27.2	
	927		1017		439		311		1059		352	
	36 4635		48 5085		25 21.95		58 1555 +97		59 5295		58 17.60 +97	
	46 2.00		33 5750		57 2640		24 3280		22 5540		24 30.75	
	52 50 13.25		51 38 8.75		52 1 37.65		52 28 47.08		53 27 5.68		51 28 47.03	
	− 8.42		−5.02		+ 10.19		+ 13.67		+ 16.09		+ 9.70	
	2 51.80	50 5.9	7 58.77	38 2.1	9 24.29	1 46.2	11 3.68	28 54.9			19 16.59	28 45.5
Aug. 20		+10.02		+8.55		+9.06		+9.82		+10.66		
	4 12.7	41	9 19.8	94	10 —	45	12 24.5	10.21	20 9.2	11.05		
	16.0		23.2		—		28.0		12.5			
	19.3		26.5		52.0	52.00	31.5		16.0			
	23.0		30.0		55.5	52.16	34.9		19.5			
	26.3		33.0		58.8	52.11	38.3		23.0			
	473		325		27		72		302			
	4 19.46		9 26.50		10 52.09		12 31.44		20 1604			
	−1 19.42	−8.28	−1 19.44	−8.23	−1 19.44	−8.26	−1 19.45	−8.30	−1 19.47	−8.38		
	− 1.86		− 1.79		− 1.82		− 1.85		− 1.92			
	2 58.18		8 5.27		9 30.83		11 10.14		18 54.65			
	− 2.40	−3.93	− 2.46	−4.15	− 2.46	−4.08	− 2.45	−4.00	− 2.46			
	2 55.78	−0.75	8 2.81	−2.10	9 28.37	−2.46	11 7.69	−2.88	18 52.19			
	9.2											
	3 45.0		10 0.2		11 14.0		12 36.9		20 19.8			
	51.5		7.0		20.0		42.5		25.7			
	58.0		13.0		26.2		49.1		30.6			
	1545	+.39	202		402		1285		761			
	3 51.50	52 50 5.99	10 6.73	51 38 6.75	11 20.07	52 1 4.935	12 42.83	52 28 59.02	20 25.37	53 26 52.24		
	+ 2796	− 21	− 40.23	− 43	− 27.58	− 21	− 11.39	− 3	− 9.33	− 3		
	1.444654	− 11	1.604554	− 17	1.444685	− 24	1.056522	− 14	0.969888	− 25		
	9.781113	+10.16	9.794288	+8.98	9.789029	+9.34	9.784612	+9.82	9.774904	+10.76		
	1.333744	+ 18	1.503504	+ 17	1.341944	+ 17	0.944204	+ 17	0.850854	+ 18		
	35	−10.50 45		−10.60 20		−10.70 55		−10.80 55		−11.20		
	2 3.2	50 5.90	3 9.1	38 5.09	4 36.8	1 48.10	2 40.2	28 58.434	4 48.7	26 52.09		
	25.2		30.9		57.8		1.3		9.9			
	284		400		946		1015		1186			
	37 1420		48 2078		24 4730		57 5075		59 5930			
	45 34.15		34 28.35		58 1.05		24 57.60		22 49.05			
	52 49 44.43		51 38 38.63		52 2 11.33		52 29 7.88		53 26 59.33			
	+ 2156		− 31.88		− 21.98		− 8.86		− 7.09			
	2 51.85	50 5.2	7 58.66	38 3.0	9 24.29	1 45.6	11 3.69	28 55.6				

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1098R

669 677

1878 Aug. 14, Aug. 20.

			Comp.	Mag.	
α	18	39	8.8	38	37.6
δ	50°	0′		49	59.8

Aug. 14

	40	14.5	+7.27		
		17.7	8.10		
		21.0			
		24.0			
		27.4			
		46			
	40	20.92			
	−1	4.25	−66.08		
	—	1.83			
	39	14.84			
	—	2.80			
	39	12.04	−4.50		
			−10.23		
	39	42.0			
		49.1			
		54.4			
		255	+ 83		
	39	48.50	50	1	1.93
		+32.42		−	29
	1.510	81		−	7
	9.80	792		+7.50	
	1.42	480		+	13
	25			−10.40	
	1	13.3		a	59.83
		33.4			
		47.0			
	26	2350	+.97		
	56	2485			
	50	0 35.13			
		+26.60			
	39	7.54	0	49.2	
			+7.35		
	40	29.5		74	
		32.8			
		36.0			
		39.2			
		42.4			
		299			
	40	35.98			
	−1	1954.2	−8.21		
	—	7.69			
	39	14.75			
	—	2.66	−4.50		
	39	12.11	−10.23		

Aug. 20

	40	54.2			
		59.2			
		6.0			
		1794	+ 39		
	40	59.80	50	1	4.09
		−2382		−	15
	1.37	6944		−	3
	9.80	792		+7.35	40
	1.29	093		+	13
	25	25		−11.80	
	0	23.4		1	0.03
		46.6			
		70.0			
	25				
	35	3500			
	54	1335			
	50	1 2363			
	−	1954			
	39	7.61	0	49.8	

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16R8R

1878 Aug. 22, Aug 26. Obs. W.A.K. Rec W.A.K.

	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.
α	17 42 15	8.3 41 516	17 46 13	9.3 45 503	17 47 48	8.8 47 250	18 2 44	8.5 2 241	18 8 11	8.0 7 487	18 10.6	9.4 9 433
δ	51° 58′	52 0.3	49° 57′	57.0	54° 46′	46.8	52° 0′	0.2	54° 31′	31.2	54° 30′	30.4

Aug. 22

	+9.76		+7.31		+12.58		+9.61		+12.47		+12.34	
	44 21.9	10.61	47 —	8.16	49 14.1	13.43	4 13.4	10.46	9 38.0	13.32	11 32.7	13.19
	25.3		—		17.9		16.4		41.9		36.0	
	28.6		53.1	53.10	21.2		19.9		45.0		39.8	
	32.0		56.2	52.99	24.9		23.2		48.8		43.0	
	35.2		59.5	53.09	28.5		26.6		52.0		47.0	
	480		66	318	66		495		257		485	
	44 28.60		47 53.086		49 21.32		4 19.90		9 45.14		11 39.70	
+.035	−1 24.28 47 24	−86.19	−1 24.28 477 26	−86.07	−1 24.25 45 27	−86.43	−1 24.31 47 32	−86.27	−1 24.33 48 35	−86.48	−1 24.34 49 36	−86.49
	− 1.95		− 1.81		− 2.16		− 1.95		− 2.13		− 2.15	
	43 2.42		46 27.01		47 54.91		2 53.64		8 18.68		10 13.23	
	− 2.26		− 2.34	−4.45	− 2.20		− 2.37	−4.08	− 2.32	−3.59	− 2.33	
	42 7.39 54.97	43 0.15	46 24.47 65 54	+3.60	47 52.54 89		2 51.77 26	−0.75	8 16.24 34	−2.16	10 10.78 88	
	45 16.40		9.2		8.0		—		7.4		9.5	
	44 23.2		48 10.8		49 32.4		3 50.2		9 31.0		11 53.8	
	28.0		16.8		39.9		56.3		36.0		56.7	
	34.0		24.4		47.0		3.0		43.3		3.7	
	252	+85	220		293		195		203		242	
	44 28.40	52 0 15.22	48 17.33	49 56 37.77	49 39.77	54 45 29.52	3 56.60	51 59 54.30	9 36.77	54 31 42.46	11 58.07	54 30 39.05
	+ 0.20	− 0	−24.27	− 16	−18.45	− 8	+23.40	− 14	+ 8.37	− 2	−18.37	− 8
	9.30403	− 9	1.38507	− 25	1.26600	− 6	1.36922	− 11	0.92273	− 2	1.26111	− 11
	9.78934	+ 9.68	9.80852	+ 7.59	9.76111	+ 12.50	9.78934	+ 9.69	9.76360	+ 12.30	9.76378	+ 12.26
	9.19644	+ 17	1.29966	+ 13	1.13318	+ 22	1.26463	+ 17	0.79240	+ 21	1.13396	+ 21
	25	− 9.90	25	− 9.90	40	−10.30	25	−10.80	55	−11.20	55	−11.30
η = −1.57	1 31.8	0 15.93	4 50.2	56 36.03	1 4.8	45 32.65	2 11.7	59 53.96	0 11.6	31 44.58	0 54.9	30 40.94
	2 55.0		11.3		25.9		33.4		32.8		16.7	
R_{xy} = −.05	868		15		3.07		451		444		186	
	26 43.40		30 0.75		41 15.35		27 22.55		55 22.20		56 5.80	
+4′ 10″.11	56 4.95		52 47.60		41 33.00		55 25.80		27 26.15		26 42.55	
	52 0 18.06		49 56 57.71		54 46 43.11		51 59 35.91		54 31 36.26		54 30 52.60	
	+ 0.16		−19.94		−13.59		+ 18.39		+ 6.20		−13.61	
			46 20.20	56 39.6			2 47.18	59 53.2	8 12.75	31 42.4		

Aug. 26

			+7.60		+12.36		+9.81					
			47 56.7	8.28	49 24.0	13.14	4 23.0	79				
			0.0		27.6		26.5					
			3.2		31.2		29.8					
			6.2		34.7		33.0					
			9.3		38.3		36.3					
			154		58		486					
			48 3.08		49 31.16		4 29.72					
+.017			− 1 34.32	−95.96	− 1 34.38 21.99	−96.28	− 1 34.35	−96.13				
			− 1.68		− 2.02		− 1.80					
			46 27.08		47 54.82		2 53.57					
			− 2.23	−4.45	− 2.06		− 2.25	−4.08				
			46 24.85 9	+3.60	47 52.80 2		2 51.33 4	−0.75				
			47 38.5		49 5.0		3 36.8					
			44.6		10.2		43.1					
			52.0		16.0		48.0					
			1351	+.78	312		1279					
			47 45.03	49 56 35.78	49 15.60 16:40	54 45 33.35	3 42.63	51 59 36.73				
			+18.05	− 9	+ 20.76	− 11	+47.09	− 58				
			1.25618	− 3	1.31723	− 9	1.66293	− 13				
			9.80867	+ 7.49	9.76129	+12.34	9.78950	+ 9.55				
			1.17122	+ 13	1.18459	+ 22	1.56856	+ 17				
			30	−10.40	40	−10.80	25	−11.40				
−1.41												
η = −1.38			0 27.7	56 33.66	1 30.4	45 35.69	2 28.9	59 55.12				
R_{xy} = −.05			47.1		52.2		50.11					
			768		826		793					
+4′ 11″.00			30 38.40		41 41.30		27 39.65					
			52 9.95		41 7.05		55 8.70					
			49 56 20.95		54 45 18.05		51 59 19.70					
			+14.83		+15.30		+ 37.03					
			46 20.44	56 37.3			2 47.26	59 54.4				

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1668R

1878. Aug. 22, Aug 26. Obs. W.A.R. Rec. W.A.R.

	h m s	Mag.	h m s	Mag.	h m s	Mag.
α	18 18 32 / 46 50	8.8 / 3 15 27.2	18 19 24.4	19 02	19 36 11	9.0 35 46.8
δ	53 21 / 49 54	54.2	55° 4'	3.7	53° 18'	16.0 / 9.0

+7.03 +12.58 +10.99

20	0.7	88	20	48.4	1373		37	42.5	11.84			
	4.0			52.0				46.0				
	7.9			55.4				49.6				
	11.2			59.1				53.0				
	14.7			2.8				56.5				
	38.5			27.7				47.6				
20	7.70		20	55.54			37	49.52				
−1	24.38 57 / 38	−86.19	−1	24.38 57 / 39	−86.56		−1	24.65 / 8 70	−86.74			
−	1.81		−	2.17			−	2.04				
18	41.51		19	28.99			36	22.75				
−	2.52		−	2.36			−	2.52 / 84		−4.30		
	4.88 / 8.86 / 99		19	26.58 / 62	−3.50 / −507		36	42.46 / 11.99	1994	−24.51		
				7.5				9.0				
19	16.2		21	11.2			37	18.2				
	19.1			17.4				24.0				
	24.7			23.4				31.0				
	30			22.0				13.2				
19	21.00	49 54 41.97	21	17.33	55 4 6.98		37	24.40	53 19 40.37			
	+46.70	− 58		−21.79	− 12			+ 25.12	− 16			
	1.66932	− 8		1.33826	− 13			1.40002	− 13			
9.80882	9.47000	+ 7.56		9.75787	+ 11.91			9.77626	+ 11.10			
1.58421	1.54548	+ 13		1.20220	+ 22			1.28235	+ 18			
	30	−1180	20		−1170		5		−1356			
1	27.3	54 38 55	2	24.9	4 9.01		2	26.2	19 38 81			
	45.9			46.2				48.3				
	76.2			7.11				7.45				
31	38.10		22	35.53			7	37.25				
51	10.25		0	12.80			15	11.10				
53	20.36		55	4 22.91			53	19 21.21				
19	+ 35.11			∗15.93				+19.16				
	− 38.39											
				19 23.12	4 3.9		36	15.64	19 14.3			

Aug. 26

5
2 11.2
32.2
43.4
7 21.40
53 11 32.70

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16M8R

1878 Aug 27, Aug. 29 Obs. W.A.R. Rec. W.A.R.

	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.
α	17 42 15	8.3 41 51.6	18 8 11	8.0 7 48.7	18 10 6	9.4 9 43.3	18 16 50	8.3 15 27.2
δ	51° 58′	52 03	54° 31′	31.2	54° 30′	30.4	49° 54′	54.2 8.3

Aug 27

+9.46

43 57.3 10.09
0.7
4.0
7.4
10.9
20.3
44 40.6
− 1 36.95 −98.73
1.78
42 25.33
− 2.151
42 23.22

8.7 8.2

44 16.0
21.4
27.2
46 +64
44 21.53 59 46.90
−1747 − 8
1.24229 − 10
9.79887 +8.48
1.14723 + 15
25 −10.40 55
50

η = −1.39	1	48.2	59	46.49	0	28.2	5	1	35.8	30	1	24.3
Rss = −.05		9.1				49.7			56.8			44.3
+4′ 11″.24		18.73				7.9			926			686
		26 58.65			55	38.95		6	46.30		31	34.30
		55 19.40										
	54	52 0	0.94									
			−14.04									

Aug 29

+12.04 +11.71 +7.24

				9	55.7	76		11	50.0	12.46		17	41.2	96
					59.0				53.4				44.6	
					2.6				57.2				47.7	
					6.3				0.8				50.9	
					9.8				4.5				54.2	
					134				359				386	
				10	2.68			11	57.18			17	47.72	
				−1	42.20	404.30		−1	42.21	−104.31		−1	42.22	−104.00
				−	2.10			−	2.10			−	1.78	
				8	18.38	−3.59		10	12.87			16	3.72	
				−	2.10	−2.16		−	2.11			−	2.31	−4.46
				8	16.28			10	10.76			16	1.41	−4.17

8.2 9.4 8.3

				9	25.0			11	15.2			18	14.7	
					30.3				19.4				20.3	
					37.0				28.4				25.0	
					923	+.72			630				600	
				9	3077	54 31 43.56		11	2100	54 20 39.49		18	2000	49 54 58.02
					+3191	− 27			+36.18	− 34			−32.28	− 29
				1.50393		− 3		1.55847		− 9		1.50893		− 8
				9.46378		+12.13		9.46572		+11.96		9.80882		+ 7.46
				1.34378		+ 21		1.43026		+ 21		1.42382		+ 15
				55		−12.205				−12.30	30			−12.30

η = −1.50	55 0.	28.12		0	28.2	31 44.12		1	35.8	20 39.65		1	24.3	54 53.68
Rss = −.05		49.7			49.7				56.8				44.3	
+4′ 10″.51		7.9			7.9				926				686	
				55	38.95			6	46.30			31	34.30	
				27	.940			16	2.05			51	14.05	
				54 31	19.91			54 20	12.56			49 55	24.56	
					+23.65				+26.93				−26.51	

δ 12.69 31 42.0 15 56.95 54 49.5

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae_proj_16008R

1878 Sept 2. Sept 9. Obs. W & R. Rec. J. F. Inc. 73

	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.
α	19 36 15	8.7 35 51.6	19 41 11	8.5 40 46.5	19 44 55	8.8 44 29.6	19 48 3	7.3 47 37.2	19 48 17	9.4 47 52.0	19 50 17	7.8 49 50.0
δ	55° 9′	6.3	53° 42′	39.8	51° 19′	16.5	50° 27′	24.6	50° 26′	22.9	50° 49′	46.5

Sept 2

	+11.95		+10.98 +10.55		+8.44		+7.16		+7.64		+7.88	
	38 10.1	13.29	43 43	12.32 11.89	46 56.0	9.48	50 4.0	8.52	50 —	8.98	52 16.7	9.22
	13.7		7.7 8.7		59.3		7.5		—		20.0	
	17.3		10.9 11.9		2.8		10.7		—		23.1	
	21.0		14.5 15.8		5.9		14.0		26.8 23.57		26.4	
	24.6		18.0 19.3		9.4		17.4		30.0 23.53		29.8	
	367		227 287		134		36		10		160	
	38 17.34	43	43 14.54 43 15.74		47 2.68		50 10.72		50 23.55		52 23.20	
	−1 51.28	−113.35	−1 51.30 −1 51.30	−113.27 −113.27	−1 37.31	−113.12	−1 51.31	−113.05	−1 51.31	−113.05	−1 51.52	−113.10
	− 2.07		− 1.97 − 1.97	−4.28	− 1.81		− 1.74		− 1.74		− 1.78	
	36 23.99	41	41 21.27 41 22.47	−25.71	45 9.56		48 17.67		48 30.56		50 30.10	
	− 2.53		− 2.58 − 2.58		− 2.72	−4.72	− 2.77	−4.89	− 2.77	−4.90	− 2.77	−4.85
	36 21.44	−3.96 41	18.64 19.84	−4.28	45 6.84	−2661	48 15.90	−2736	48 27.73	−2739	50 27.33	−27.87
		−24.54		−25.71								
	8.6		8.2 8.9		8.3		7.7		9.3		8.0	
	37 22.5		42 42	− 5 − 46	46 8.0		49 22.2		49 44.8		51 40.8	
	27.2		55.5 26.0	− 26 − 28	15.3		27.3		51.9		45.9	
	35.6		1.0 33.4	+13.10 +13.10	21.5		33.0		57.0		52.5	
	25.3	+1.34	9.2 41.0	+ 19 + 19	14.8		22.5		37		19.2	
	37 28.43	55 9 28.11	57 10.4	−17.20 −17.20	46 14.93	51 20 20.12	49 27.50	50 27 45.26	49 51.23	50 26 26.86	51 46.10	50 50 12.80
	+48.91	− 62.43	1.90 42 33.47	42 43.00 33.66	+47.75	− .60	+43.22	− 51	+32.32	− 28	+36.80	− 37
	1.689406	− 19 + 8.64	+ 42.27	19.27	1.679897	− 14	1.635685	− 29	1.509447	− 6	1.565855	− 13
	9.975696	+12.55	1.101175 1.626.03		9.795733	+8.73	9.803977	+7.85	9.804112	+7.85	9.800043	+8.24
	1.855243	+ 21	2.772333 9.772338		9.979181	+ 13	1.545472	+ 13	1.411966	+ 13	1.447235	+ 14
	15	−17.30	0.870.0 48.0443		51.558077	−17.30	55	−17.40	0	−17.40	35	−17.50
n = −1.45	2 53.6	9 24.10	4 14.8 4 36.0		2 5.9	20 12.30	4 38.9	27 36.38	0 47.3	26 18.44	2 4.6	50 4.52
	17.7		37.1 52.1		28.2		59.2		9.7		27.3	
Rms = .06	13.3		51.9 6.81		34.1		98.1		11.70		31.9	
	18 6.65		44 25.95 44 44.05		7 17.05		59 49.00		0 58.50		37 15.45	
+4′ 10″.73	4 41.70		38 24.60 38 43.80		15 31.30		22 59.30		21 49.85		46 32.40	
	55.8 57.43	53	42 33.13 15.03	41 53.6	51 19 42.03		50 27 10.03		50 26 0.58		50 49 43.13	
	+35.68		+ 16.77 +23.96	42 34.5	+ 0.80		+ 35.13		+ 26.28		+ 29.67	
			+ 1.55		38.09							
	36 17.48	8 59.6	41 14.36	45 2.12	19 45.7	48 10.01	27 9.0	48 22.83	25 51.0	50 22.48	49 36.6	
		+12.95	15.56	+11.35 +11.08	+8.62		+7.51		+7.76		+7.79	
Sept 9												
	38 28.5	13.65	43 43	12.05 11.78	47 14.3	9.32	50 22.5	8.21	50 35.2	8.46	52 35.0	8.48
	32.0		25.5 26.5		17.5		25.7		38.7		38.3	
	35.5		29.0 30.2		24.1		—		42.0		41.7	
	39.0		32.5 33.6		24.3		32.3		45.0		44.8	
	42.7		36.3 37.5		27.5		35.5		48.3		48.0	
	277		135 43 185		47		360		92		78	
	38 35.54	43	32.62 33.70		47 20.94		50 29.00		50 41.84		52 41.56	
	− 2 9.88	−13.81 − 2	9.89 29.89	−13.73 −13.73	2 9.91	−13.60	− 2 9.91	−13.54	− 2 9.91	−13.54	− 2 9.92	−13.58
	− 1.93	−	1.84 1.84	−4.28	− 1.69		− 1.63		− 1.63		− 1.66	
	36 23.73	41	20.89 41 21.97	−25.71	45 9.34		48 17.46		48 30.30		50 29.98	
	− 2.35	−3.96 −	2.37 − 2.37		− 2.56	−4.72	− 2.60	−4.89	− 2.61	−4.90	− 2.61	−4.85
	36 21.38	−24.54 41	18.44 19.52	−4.28	45 15.28	−2661	48 13.86	−2736	48 27.69	−2739	50 27.37	−27.87
				−25.71	6.78							
	8.3		8.3 9.2		8.4		7.1		9.2		7.0	
	38 9.9		43 42	− 8 − 30	46 35.5		49 41.0		49 58.3		51 44.0	
	14.7		12.1 52.6	− 26 − 28	42.7		47.6		3.2		50.0	
	21.1		20.0 59.3	+11.48 +11.48	48.0		53.3		9.7		55.7	
	46.3	+.70	27.4 7.2	+ 18 + 18	126.2		141.9		11.2		149.7	
	38 15.43	55 9 28.46	59.5 19.1	−18.80 −18.80	46 42.07	51 20 20.54	49 47.30	50 27 46.24	50 3.73	50 26 28.98	51 49.90	50 50 15.19
	+20.11	− 10 +	19.83 12.79 + 34.00	42 42.85 38.27	+38.87	− 40	+ 41.70	− 46	+ 38.11	− 39	+ 57.66	− 71
	1.303411	− 16	1.10687 1.53148	1.80 59.57	1.589961	− 13	1.620147	− 29	1.581041	− 7	1.713157	− 14
	9.975696	+13.02	9.97216 9.77238		9.995733	+9.02	9.803977	+8.14	9.804112	+8.10	9.800043	+8.57
	1.166444	+ 19	0.98510 1.40588		1.491441	+ 13	1.530187	+ 12	1.491123	+ 12	1.619657	+ 13
	15	−18.90	40 40		5	−18.80	55	−18.90	0	−18.90	35	−19.00
n = −1.38	2 31.4	9 23.21	4 6.9 4 33.6		1 58.9	20 11.06	4 36.1	27 35.55	0 49.8	26 18.54	2 11.2	50 4.68
	55.2		17.8 51.8		19.2		56.4		11.4		35.9	
Rms = .06	89.6		34.7 68.4		18.1		92.5		61.2		50.1	
	17 44.80		44 18.13		7 9.05		59 46.25		0 30.60		37 25.05	
+4′ 10″.24	5 3.55		38 31.00 4.25		15 39.30		23 2.10		21 47.73		45 23.30	
	55 9 13.79		33 42 41.24 14.49		51 19 49.54		50 27 12.34		50 25 57.99		50 49 33.54	
	+14.67		+9.66 +25.70	41 52.3	+ 31.00		+33.90		+30.99		+41.65	
				42 33.8								
	36 17.42	8 58.7	41 14.16	45 2.06	19 44.4	48 9.97	27 8.2	48 22.79	25 51.2	50 22.52	49 36.8	
			15.24	42 7.6								

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1608R

1878. Sept 2. Sept. 9 Obs. W.A.R. Rec. J.F.M.

675 676

	h m s	Mag.	h m s	Mag.	h m s	Mag.
α	19 54 50	9.0	19 58 14	9.3	20 1 26	8.9
δ	51° 5′		53° 3′		52° 6′	

Sept 2 Chf

			+7.85				+9.47	
56	51.7	9.19			3	11.0	17.69	10.81
	55.0					11.2	17.54	
	58.3							
	1.7							
	5.0							
	4.17							
56	58.34				3	17.61		
1	51.33	-113.13			-1	51.34	-113.20	
	1.80					1.86		
55	6.21				1	24.41		
	2.80	-4.86				2.82	-4.77	
55	2.41	-28.92				2093	-30.42	
					1	21.59		
8.8					8.6			

56	0.5				2	46.5		
	6.2					51.7		
	13.5					58.7		
	20.2	+1.34				6.9		
56	6.73	51 6 19.85			2	52.30	52 6 52.82	
	+57.61	- 71				+25.31	- 17	
1.71273		- 8			1.40329		- 3	
9.79793		+ 8.50			9.78821		+9.51	
1.61673		+ .14			1.29757		+ 16	
20		-17.60	20		20		- 17.90	
1	9.1	6 11.45	3	28.8	0	14.4	6 45.73	
	32.1		4	50.1		37.8		
	412			9		522		
21	20.60				20	26.10		
1	27.75				2	2225		
51	5 48.48				52	6 32.98		
	+41.37					+19.84		
	54 57.55	5 42.5						

Sept. 9

		+8.29	h m s	+10.48			+9.48	+9.64
57	10.0	99	20 0 29.4	11.18	3	3	10.18	10.34
	13.3		33.0		37.2	43.5		
	16.4		36.4		40.5	46.6		
	19.8		40.0		44.0	50.3		
	23.0		43.4		47.2	53.5		
	325		322		50.2	56.7		
57	16.50		0 36.44		3 44.02	3 50.12		
- 2	9.93	-131.60	- 2 9.94	-131.74	- 2	9.95 - 2 9.98	-131.68	-131.68
-	1.67		- 1.80		-	1.73 - 1.73		
55	4.90	-4.86	58 24.70		1	32.34 1 38.44	-4.77	
-	2.64	-28.92	- 2.60	-4.58	-	2.66 - 2.66	-30.42	
55	2.26		58 22.10	-29.67	1	29.68 35.78		
8.8			9.2		9.4	8.0		

							52	
							8 0.07	7 4.57
56	25.4		59 59.4		3	3	- 23	- 7
	31.0		4.5		7.8	59.5	- 28	- 28
	36.8		11.4		15.7	6.0		
	93 2	+.70	153		20.6	12.2	+9.84	+9.84
56	31.07	51 6 21.01	59 3.72	53 3 43.19	44.1	17.7	+ 15	+ 15
	+45.43	- 55	+31.34	- 26	14.70	4 5.90	-19.50	-19.50
1.65734		- 7	1.49610	- 22	29.32	-15.76	7.5075	6.5541
9.79793		+ 8.78	9.77896	+10.80	1.46716	1.19511		
1.54734		+ .13	1.38113	+ 16	9.78805	9.78821		
20		-19.20		-19.40	1.36128	1.09239		
1	3.1	6 10.60	3 28.8	3 34.97	15	15		
	24.9		50.1		4 10.9	4 31.1		
	2.80		789		32.1	52.2		
21	2.44.00		23 39.55		430	833		
1	33.37		59 8.90		19 21.50	19 41.65		
51	5 50.59		53 3 19.14		3 26.85	3 6.78		
	+36.42		+24.06		52 7 37.09	16.94		
					+22.98	-12.37		
54	57.40	5 41.9	58 17.52	3 5.3	+5			
					1 31.01	6 25.0		

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16008R

1878 Sept. 12, Sept. 14 Obs. W.A.R. Rec. J.F.M.

677 678

	h m s	mag.	h m s	mag.	h m s	mag.	h m s	mag.	h m s	mag.	h m s	mag.
α	19 36 9	8.9 35 440	19 50 23	9.4 49 561	19 55 5	9.2 54 397	19 58 14	9.3 57 470	20 1 38	9.0 1 107	20 9 40	8.9 9 12.7
δ	50° 34′	31.6	50° 33′	30.6	51° 45′	42.8	53° 3′	52 598	52° 51′	47.9	50° 36′	33.1

Sept. 12

	+7.44		+7.64		+9.12		+9.80		+9.90		+7.75	
	38 37.0	8.66	52 49.0	8.86	57 31.4	10.34	20 0 37.0	11.02	4 2.7	11.12	12 8.2	8.97
	40.0		52.0		34.6		40.5		6.0		11.4	
	43.4		55.4		37.8		43.9		9.3		14.7	
	46.7		58.8		41.2		47.3		12.8		18.0	
	49.8		2.0		44.5		51.0		16.2		21.3	
	169		272		395		197		470		236	
	38 43.38		52 55.44		57 37.90		20 0 43.94		4 9.40		12 14.72	
	−2 17.23	−138.89	−2 17.27	−13.4.93	−2 17.28	+139.02	−2 17.28	−139.10	−2 17.29	−139.10	−2 17.31	−138.97
	− 1.66		− 1.66		− 1.74		− 1.82		− 1.81		− 1.66	
	36 24.49		50 36.51	v	55 18.88		58 24.84		1 50.30		9 55.75	
	− 2.43		− 2.54		− 2.54		− 2.52		− ~~25~~ 2.56		− 2.70	
	~~30.24~~	−4.76	50 33.97	−4.90	55 16.34	−4.75	58 22.32	−4.58	1 47.74	−4.65	9 53.05	−5.09
	36 22.06	−24.51		−27.87		−28.98		−29.67		−30.45		−32.25
	8.7		9.4		9.0		9.2		9.0		8.8	
	37 51.0		52 15.0		57 0.8		59 47.7		3 16.6		11 28.0	
	58.9		20.2		7.3		53.9		19.3		33.6	
	3.3		26.5		12.0		2.1		23.0		41.0	
	21.2	+ 1.22	17		20.1		13.7		26.0		126	
	37 57.07	50 34 58.02	52 20.57	50 34 19.10	57 6.70	51 46 37.67	59 54.57	53 3 44.71	28.8	52 51 51.64	11 34.15	50 36 52.75
	+46.31	− 58	+34.87	− 32	+ 31.20	− 26	+49.37	− 64	137	− 57	+40.52 20	− 44
	1.66567	− 18	1.54245	− 72	1.49415	− 5	1.69346	− 27	3 22.74	− 5	1.60764	− 4
	9.80290	+ 8.08	9.80290	+ 8.06	9.79160	+ 9.29	9.77896	+10.56	+46.66	+10.37	9.80259	+ 8.11
	1.57464	+ 12	1.45142	+ 12	1.39182	+ 14	1.57849	+ 15	1.66694	+ 15	1.51633	+ 12
	7 50	−18.90	50	−19.60	46	− 19.80	20	−20.10	9.78097 35 55 598	−20.20 50		−20.50
h = −1.38	2 25.9	34 47.78	2 55.6	34 8.36	0 33.4	46 28.21	3 40.0	3 35.63 2.	0 30.1	51 42.56	0 27.0	36 41.22
	49.3		18.9		56.7		2.5		54.7		49.3	
Rs = −.07	752		145		901		1025		848		763	
	52 37.60		53 7.25		40 45.05		23 51.25		35 42.40		50 38.15	
+4′ 9.72	30 10.75		29 41.10		42 3.30		58 57.10		47 5.95		32 10.20	
	50 34 20.47		50 33 50.82		51 46 13.02		53 3 6.82		52 51 15.67		50 36 19.52	
	+37.53		+28.28		+24.65		+37.89		+35.97		+32.83	
	36 17.30	34 23.3	50 29.07	33 40.5	55 11.59	45 59.2	58 17.74	3 6.0	1 43.09	51 12.1	9 47.96	36 9.0

Sept. 14

	+7.85		+7.82		+9.05 +9.33		+10.33 +10.14		+9.69		+7.90	
	38 42.2	9.61	52 54.4	9.58	57 57	11.09	20 0 0	12.09 11.90	4 7.8	11.45	12 13.5	9.66
	45.4		58.0		38.8 36.6		41.3 42.8		11.2		17.0	
	48.7		1.0		37.4 40.0		45.0 ~~46.6~~		14.6		20.0	
	52.0		4.1		40.8 43.2		48.3 49.5		18.3		23.4	
	55.0		7.3		44.0 46.5		51.8 53.0		21.5		26.5	
	433		48	7	47.0 49.8		55.3 56.3		234		04	
	38 48.66		53 0.96	58	30 7 161		417 482	54.	4 14.68		12 20.08	
	−2 22.65	−144.33	−2 22.68	−144.36	−2 2269 −2 2269	−144.46 −144.46	48.34 0 49.64	−144.55 −144.55	−2 22.71	−144.54	−2 22.73	−144.41
	− 1.68		− 1.68		1.77 1.77		2270 2270		− 1.83		− 1.68	
	36 24.33		50 36.60		50 16.14 58 18.76	v −4.75	1.85 1.85		1 50.14		9 55.67	
	− 2.38	−4.76	− 2.49		− 2.49 − 2.49	−28.98	23.79 58 25.09		− 2.50	4.65	− 2.65	
	36 21.95	−24.51	50 34.11	−4.90	55 13.65 55 16.27		− 2.47 − 2.47		1 47.64	−30.45	1 ~~48~~	−5.09
				−27.87			58 21.32 22.42				9 53.02	−32.25
	9.0		9.2		9.1 58 46 39 51		9.4 9.0	53 3 28.44 2′ 1.00	9.1		8.9	
	38 12.4		52 24.7		57 57		20 0 59		3 11.2		11 37.5	
	14.7		31.5		13.4 0.0	− 41 − 13	13.2 54.3	− 22 − 63	15.7		43.0	
	18.4		37.5		17.4 2.3	− 6 − 6	16.5 56.2	− 27 − 4	24.0		48.5	
	21.5		937		19.7 6.0	+9.38 +9.38	19.5 1.3	+10.67 +10.66	509		1290	
	23.0	+ 1.76	31.23		22.4 8.5	+ 14 + 14	23.0 3.8	+ 15 + 15	3 16.97		11 43.00	
	50 34 57.29		52	50 34 17.65	26.8 10.9	−20.20 −20.20	26.5 6.8	+20.40 −20.40		52 51 51.28		50 36 51.14
	38 18.50	− 25	+29.73	− 24.57	1994 5.51	46 30 23 45 91.80	1974 0.48	2033 52.50 2.	+ 57.71	− 87	+ 37.08	− 37
	+3.466	− 17		− 21	57 44 22.32	+37.68 0	+2.60 +49.12		1.76125	− 6	1.56914	− 4
	1.48657	+8.15	1.47319	+8.15	1.59483 −1.34569		1.69637 1.69161		9.78097	+10.47	9.80259	+8.17
	9.80274	+ 12	9.80290	+ 12	9.79160 9.77160		9.77896 4.77930		1.64879	+ 15	1.47780	+ 12
	1.39538	−19.24	1.38216	−20.00	1.49250 1.24036		1.34140 1.57694		35	− 20.60		−20.90
	50		50		120		20 25			50		
h = −1.39	2 14.8	34 47.66	2 53.6	34 7.23	0 38.2		3 40.6 23.0		0 39.9	51 42.13	0 25.8	36 39.90
	37.2		16.2		1.6		2.9 47.4		3.4		48.9	
Rs = −.07	520		98		998		1035 704		1033		747	
	52 26.00		53 4.90		40 49.90		23 51.75 25 3.520		35 51.65		50 37.35	
+4′ 10.09	30 22.35		29 43.45		41 58.45		58 56.60 57 11.5		46 56.70		32 11.00	
	50 34 32.44		50 33 53.54		51 46 8.54		53 3 6.69 1 23.24		52 51 6.79		50 36 2.09	
	+24.85		+24.11		~~+31.08~~ ~~−17.13~~ 30.80		+21.95 +37.76		+44.49		+30.05	
	36 17.19	34 23.2	50 29.21	33 39.4	55 14.52	46 1.2 45 12.8			1 42.99	51 11.7	9 47.93	36 7.6

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1008R

1878 Sept 12. Sept. 14 Obs. W.A.R. Rec. J.F.M.

677 678

11 44.0

	h m s	Mag.	h m s	Mag.	
α	20 12 17	8.9	11 52.2	20 15 48.0	15 20.8
δ	54° 51′	418.4	55° 58′		5.3

Sept 12

+12.40 +12.37 +12.20

14 32.8	14 38.9	13.32	13.59	18. 9.5	13.42
36.3	42.2			13.0	
40.0	45.9			16.5	
43.5	49.3			20.2	
47.0	53.2			23.8	
496	297			330	
14 39.92	14 45.94			18 16.60	
−2 17.32	−2 17.32	−139.26	−139.26	−2 17.32	−139.28
− 1.94	1.94			− 1.96	
12 20.66	12 26.68	−44 32.85		15 57.32	
− 2.59	− 2.59	−44 32.85		− 2.61	−445 −33.60
12 18.07	12 24.09			15 54.71	
		+ 1.22			
8.4	8.3	54°		7.7	
		53 10.01	53 10.01		
		53 47.3	50 41.48		
15 8.0	14 16.1	− 23	− 14	17 24.5	
9.9	22.9	− 29	− 6	27.1	
16.5	30.0	+1244	+12.89	32.7	
294	690	+ 18	+ 18	35.0	
15 9.80	14 23.00	−20.76	−20.70	37.8	55 9 46.84
− 29.88	+ 22.94	57.55	50 34.37	177	− 52
1.47536	1.36059			17 31.54	− 1.89
9.75985	9.76021			1.45379	+ 12.73
1.34130	1.22687			9.75696	+ 18
30	35			1.51682	− 20.90
				15	

The 1st circle reading belongs to the 2nd ☉

3 58.90	43.4			2 33.1	9 35.36
21.1	5.9			53.1	
200	1093			882	
3 10.00	35 54.65			17 44.10	
48 38.35	46 53.70			5 4.25	
54 52 48.07	51 3.42			55 9 13.97	
				+ 32.87	
+ 16.86	− 21.94	52 24.7			
12 13.63	50 1.5			15 50.26	9 5.8
19.65		+12.38 +12.04			+12.41

Sept 14

14 38.3	14 48.8	14.14	13.85	18 14.8	14.17
41.9	47.8			18.4	
45.6	51.2			22.0	
49.0	55.0			25.6	
52.6	58.7			29.2	
277	14 45			100	
14 45.45	51.50	30 V		18 22.00	
−2 22.47	22.74	−144.73	−144.78	−2 22.75	−144.74
− 1.97	1.97	−44 32.85		− 1.99	
12 20.83	12 26.75			15 57.26	
− 2.53	− 2.53	−44 32.85		− 2.56	−445 −33.60
12 18.30	24.26			15 54.71	
		54° +1.76			
8.5	8.5			7.3	
		52 45.74	50 59.52		
14 18.7	13 38.8	53 52.750	39.99	17 34.0	
26.1	6.4	− 9	− 53	37.0	
34.6	12.3	− 31	− 11	39.5	
794	177	+1260	+1255	43.0	
14 26.47	5.90	+ 18	+ 18	47.3	55 9 47.06
+ 19.07	+ 45.60	−21.20	−21.20		
		52 58.21	50 32.64	17 40.16	− 45
1.28035	1.65896			+41.84	− 19
9.75985	9.76036			1.62175	
1.14627	1.52542			9.75696	+ 12.87
30	35			1.48462	+ 18
				15	− 21.30

The 1st circle reading belongs to the 2nd ☉

4 16.2	20.8			2 31.1	9 39.93
372	44.1			52.7	
534	649			838	
34 2670	3632.45			17 41.90	
48 2165	46 1890			15 6.45	
54 52 31.74	50 25.95			55 9 16.54	
				+ 30.52	
+ 33.53	+ 14.00				
12 13.86	5 225.4			15 50.26	9 6.3
12 19.82	49 59.8				

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16N8R

1878 Sept. 15, Sept 16 Obs. W.A.R. Rec. J.F.M.

	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.
α	19 48 49	7.0 48 23	19 49 21	9.0 48 55	20 9 48	9.0 9 20	20 12 40	9.4 12 13	20 13 27	9.3 13 10	20 19 24	9.0 18 57
δ	57° 57′	54	52° 53′	50	50° 50′	47	51° 23′	20	51° 37′	34	52° 55′	52

Sept 15

		+8.91		+10.62		+8.44		+8.71		+9.08		+10.13
	51 21.8	9.82	51 52.9	11.53	12 23.4	9.02	15 3.8	9.82	16 16.2	9.9	21 57.5	11.04
	25.2		56.3		27.0		7.5		19.6		1.0	
	28.6		59.8		30.3		11.0		22.9		4.5	
	32.0		3.3		33.4		14.0		26.3		7.9	
	35.2		6.7		36.9		17.5		29.3		11.3	
	428		490		10		38		143		222	
	51 28.56		51 59.80		12 30.20		15 10.76		16 22.86		22 4.44	
	−2 25.54	−147.29	−2 25.54	−147.36	−2 25.60	−147.28	−2 25.60	−147.33	−2 25.61	−147.34	−2 25.62	−147.44
	− 1.75		− 1.82		− 1.69		− 1.73		− 1.73		− 1.82	
	49 1.27		49 32.44		10 2.91		12 43.45		13 55.54		19 37.00	
	− 2.40	−466	− 2.37	−451	− 2.62	−506	− 2.62		− 2.63	−4.95	− 2.64	−4.86
	48 58.87	−27.51	49 [illegible]	−27.63	[illegible]	−32.28	12 40.81		13 52.89	−33.15	19 [illegible]	−34.41
	7.5		9.0		9.2		9.4		9.2		9.1	
	50 33.8		52 8.7		11 42.0		14 37.2		16 43.4		21 6.8	
	38.0		15.5		47.0		44.0		48.3		12.5	
	46.0		21.7		53.3		49.7		53.0		17.8	
	278	+0.91	159		223		109		58.4		71	
	50 39.27	51 58 5.46	52 15.30	52 54 2.49	11 47.43	50 50 48.22	14 43.63	51 24 21.09	31	51 38 5.66	21 12.37	52 56 31.05
	+49.29	− 65	− 15.50	− 6	+42.77	− 49	+ 27.13	− 19	16 50.78	− 21	+ 52.07	− 71
	1.69276	− 32	1.19033	− 19	1.63114	− 12	1.43345	− 21	−27.92	− 25	1.71659	−4.98
	9.78983	+9.74	9.78047 m	+10.72	9.80043	+8.60	9.79570	+9.18	1.44592 m	+9.41	9.78013	+4.73
	1.58866	+ 14	1.07687 m	+ 15	1.53764	+ 12	1.33462	+ 13	9.79288	+ 13	1.60279	+ 15
	25	−20.20	30	−20.20	35	−21.10	0	−21.30	1.34487 m	−21.30	30	−21.60
									45			
h = −1.37	4 20.4	57 55.08	2 32.8	53 58.2	1 34.7	50 36.14	2 46.7	24 9.61	8 19.8	37 54.55	0 56.6	56 20.49
	44.3		56.4		53.9		10.4		42.7		19.5	
Rss = −.07	647		892		906		1191		625		161	
	29 32.35		32 44.60		36 45.30		2 59.53		48 31.25		31 8.05	
+4′ 10.68	53 16.07		50 3.75		46 3.05		19 48.80		34 17.10		51 40.30	
	51 57 26.68		52 54 14.43		50 50 13.73		51 23 59.48		51 38 27.78		52 55 50.98	
	+ 38.78		− 11.94		+ 34.49		+ 21.61		− 22.12		+ 40.07	
	48 54.21	57 27.6	49 25.56	53 26.2	9 55.24	50 3.9			13 47.90	37 21.2	19 29.50	55 46.1

Sept. 16

		+9.30		+10.59		+8.31		+8.74		+9.17		+10.74
Add +.038 to (II + m) Sept. 16 2h has been added to sum of the constants and to final +0.38 R.A.	51 24.4	10.24	51 55.3	11.53	12 26.0	9.25	15 18.2	9.71	16 18.5	10.11	21 59.7	11.65
	27.4		58.8		29.0		21.6		21.8		3.5	
	30.7		2.0		32.5		24.9		25.4		6.7	
	34.0		5.6		35.8		28.1		28.7		10.0	
	37.5		9.0		38.9		31.5		32.0		13.5	
	140		107		122		243		264		334	
	51 30.80		52 2.14		12 32.44		15 24.86		16 25.28		22 6.68	
	−2 27.99	2806 −14972	−2 27.99	2806 −14979	−2 28.02	11 −149.71	−2 28.02	12 −149.77	−2 28.12	−149.76	−2 28.13	−149.86
	− 1.70		− 1.77		− 1.64		− 1.68		− 1.68		− 1.77	
	49 1.11		49 32.38		10 2.78		12 55.16		13 55.58		19 36.88	
	− 30.68	−466	− 2.34	−451	− 2.59	−506	− 2.60		− 2.60	−4.98	− 2.61	−4.86
	49 2.37	−27.51	28.19	−27.63	10 0.19	−32.28	12 52.49		13 52.88	−33.15	19 34.17	−34.41
	58.64		49 29.87						92		21	
	71		30.01									
	74		9.2		9.2		9.3		9.2		9.3	
	50 49.8		52 20.3		11 49.8		14 40.2		15 56.1		21 32.9	
	55.2		27.8		50.4		47.0		1.0		37.9	
	59.5		33.9		3.0		52.7		7.0		43.2	
	16.45	+.94	822		169.2		139.9		41		1140	
	50 54.83	51 58 6.31	52 27.40	52 54 2.97	11 56.40	50 50 49.18	14 46.63	51 24 29.47	16 1.37	51 38 6.47	21 38.50	52 56 30.89
	+35.97	− 34	− 25.26	− 17	+36.04	− 35	+38.23	− 39	+23.91	− 15	+28.68	− 22
	1.55594	− 31	1.40243	− 18	1.55678	− 11	1.58240	− 21	1.37858	− 29	1.45758	− 6
	9.78967	+9.81	9.78047 m	+10.80	9.80643	+8.65	9.79510	+9.24	9.79288	+9.48	9.78013	+10.85
	1.45168	+ 14	1.28897 m	+ 14	1.46328	+ 12	1.48357	+ 13	1.27753	+ 13	1.34378	+ 14
	25	−20.30	30	−20.40	35	−21.30	0	−21.50	45	−21.50	30	−21.80
h = −1.33	4 9.4	57 56.25	2 25.0	53 54.10	1 27.0	50 37.13	2 46.8	24 17.68	4 0.2	37 55.08	0 36.2	56 20.74
	31.3		46.9		49.5		99		21.5		0.9	
Rss = −.07	407		719		765		1187		217		991	
	29 20.35		32 35.95		36 38.25		2 59.35		49 10.85		30 49.55	
+4′ 10.02	53 28.00		50 12.40		46 10.10		19 49.00		33 37.50		51 57.80	
	51 57 38.02		52 54 22.42		50 50 20.12		51 23 59.02		51 37 47.52		56 6.82	
	+ 28.29		− 19.45		+ 29.06		+ 30.45		+ 18.95		+ 22.07	
	48 54.05	57 28.7	49 25.50	53 26.5	9 55.08	50 4.8	12 47.48	23 44.8	13 47.94	37 21.9	19 29.35	55 46.3

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1008R

1878 Sept. 15. Sept. 16. Obs. W.A.R. Rec. J.F.M.

	h m s	Mag.	h m s	Mag.	h m s	Mag.
α	20 20 22	9.0	20 22 4	8.0	20 30 7	7.3
δ	50° 24′	23.9	55° 0′	54 57.2	52° 23′	19.9

Sept. 15

	22 59.0	8.89		24 35.0	13.59		32 23.2	10.76
	2.3			38.5			26.6	
	5.3			42.0			30.0	
	8.6			45.8			33.3	
	11.8			49.5			36.8	
	270			108			499	
	23 540			24 42.16			32 29.98	
	−2 25.63	147.29		−2 25.63	147.59		−2 25.65	147.43
	− 1.66			− 1.96			− 1.78	
	20 38.11			22 14.57			30 2.55	
	− 2.71	5.24		− 2.59	4.55		− 2.74	5.09
	20 35.40	3.462		22 11.98	3.495		30 59.81	3.666
	9.0			7.8			7.6	
	22 44.7			23 53.0			31 56.0	
	48.4			56.0			1.2	
	53.0			59.7			7.4	
	261	+ 0.91		3.4			46	
	22 48.70	50 28 24.00		6.0	55 1 51.02		32 1.53	52 23 24.15
	+ 16.70	− 8		481	− 46		+ 2845	− 21
	1.22272	− 27		23 59.62	− 4		1.45408	− 28
	9.80382	+ 822		162 550	+ 1300		9.78560	+ 1020
	1.13261	+ 11		9.75 841	+ 18		1.34575	+ 14
	55	− 21.60		958 325	− 2180		0	− 22.00
	8 38.1	28 11.29		0 27.8	1 42.81		3 45.8	23 12.91
	59.1			50.5			8.3	
	972			783			1141	
	58 48.60			25 39.15			3 57.05	
	23 59.75			57 9.20			18 51.30	22 36.32
	50 28 10.43			55 1 19.88			52 23 1.98	29 20.3
	+ 13.57	19 39.4		+ 31.14			+ 22.17	29 18.4
	20 30.16	36.7		22 7.43	1 7.9		29 54.72	29 40.1
		+ 8.29			+ 12.78			19.9
		26.1						+ 9.60 + 9.86

Sept. 16

	22 47.2	9.23		24 37.2	13.66		32 32	10.54 10.80
	50.5			40.9			25.4 45.0	
	53.5			44.4			28.8 48.4	
	57.0			48.0			32.2 51.8	
	0.3			51.5			35.7 55.0	
	185			220			39.0 58.6	
	22 53.70			24 44.40			111 88	
	− 2 28.84	13.14970		− 2 28.84	14.80.01		32 32 32 32	
	− 1.61			− 1.90			− 2 28.84 2 28.84	14.88.2 14.88.2
	20 24.06	5.24		22 14.46	4.55		1.73 1.73	5.09
	− 2.69	3.462		− 2.57	4.95		30 2.45 30 21.99	3.666
	20 21.37			22 11.89	3.495		− 2.72 − 2.72	5.09
	8.7			7.3			29 59.62 30 19.27	3.666
							7.7 7.0	
	22 39.1			23 54.5			31 32	− 64 − 38
	47.5			0.4			1445 7.6	− 29 − 19
	52.0			7.1			470 13.5	+ 1029 + 1029
	1386	+ .94		20	✓ 51.71		46.5 18.8	+ 14 + 14
	22 46.20	50 30 29.16		24 0.67	✗ 45.11		210 399	− 22.20 − 22.20
	+ 7.50	− 2		+ 43.73	− 49		31 47.00 32 13.30	23 18.00 24 34.48
	0.87506	− 11		1.64078	− 4		+ 45.22 + 38.46	
	9.80351	+ 8.31		975761	+ 1307		1.65533 1.58501	
	0.78464	+ 11		1.50436	+ 18		9.78560 9.78543	
	55	− 21.80		205	− 22.00		1.54706 1.47651	
	1 23.9	30 16.59		0 27.2	1 43.37		0 0	
	46.7			50.0			3587 34.6	
	706			772			18.2 56.3	
	56 35.30			28 38.60			1139 909	
	26 13.05			678 9.75			685 245.45	
	50 30 23.14			55 1 19.77			18 440 20 2.90	
	+ 6.09			+ 25.31			52 23 54.42 24 12.92	
				21.94			+ 3524 + 29.96	
	20 16.09	29 42.0		22 7.27	1 8.4		29 54.59	22384
							30 14.11	23 54.8

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16N8R

1878. Sept. 17, Sept 18. Obs W.A.C. Rec J.Z.M. 79

	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.
α	19 48 44	7.8 48 183	20 9 58	9.6 9 314	20 12 36	9.0 12 96	20 13 36	9.0 13 94	20 15 48	8.6 15 208	20 19 25	8.5 18 585
δ	51° 40′	37.5	53° 8′	50	50° 48′	45.0	49° 59′	56.0	55° 8′	5.3	51 9′	4.0

Sept 17

	+9.10		+10.49		+7.96		+7.62		+12.67		+8.48	
	51 22.9	10.05	12 35.8	11.44	15 17.5	8.91	16 18.0	8.57	18 22.4	13.62	22 6.2	9.63
	25.0		37.5		20.4		21.5		25.9		9.5	
	29.4		43.0		24.0		24.8		29.6		12.7	
	33.0		46.5		27.3		27.8		33.3		16.0	
	36.1		49.8		30.6		30.9		36.8		19.4	
	474		146		198		230		480		138	
	51 29.48		12 42.52		15 23.96		16 24.60		18 29.60		22 12.76	
	−2 30.46	−152.07	−2 30.51	−152.21	−2 30.52	−152.07	−2 30.52	−152.04	−2 30.53	−152.36	−2 30.51	−152.13
	− 1.61		− 1.70		− 1.55		− 1.52		− 1.83		− 1.59	
	48 57.41		10 10.71		12 51.89		13 52.56		15 57.24		19 40.63	
	− 2.36		− 2.49		− 2.59		− 2.62		− 2.47		− 2.64	
	48 55.05	−4.70 −27.51	10 8.22	−4.70 −32.34	12 49.30	−5.10 −32.91	13 ~~54.44~~ 49.94	−5.23 −33.15	15 54.77	−4.45 −33.60	19 37.99	−5.13 −34.41
	8.2		9.3		9.3		9.5		8.0		8.0	
	50 51.2		12 2.6		14 37.6		16 20.2		17 47.0		21 41.6	
	56.9		9.8		44.0		36.4		52.0		47.3	
	3.5		17.5		50.0		43.7		56.4		52.7	
	216		299		116		193		07		216	
	50 57.20	51 40 58.97	12 9.97	53 9 20.35	14 43.87	50 49 32.16	16 36.43	50 0 40.32	8.6	55 9 48.07	21 47.20	51 10 40.68
	+32.28	− 28	+32.95	− 28	+40.09	− 43	−~~18.17~~ 18.81	− 4	297	− 29	+25.56	− 18
	1.50893	− 10	1.51756	− 22	1.60304	− 21	~~1.55277~~	− 8	17 5594	− 18	1.40756	− 11
	9.79240	+9.34	9.77795	+10.85	9.80058	+8.48	1.07298	+7.64	+33.66	+12.96	9.79731	+885
	1.40740	+ 14	1.40188	+ 14	1.50969	+ 12	9.80792	+ 10	1.52711	+ 18	1.31094	+ 12
	45	−20.50 15		−21.60 35		−21.60 25	0.98697 n	−21.60 15	9.75696	−22.00 15		−22.00
									1.39014			
n = −1.28	14.5	40 48 52 2	53.6	9 10.09 2	48.4	49 19.47 0	58.7	0 27.29 2	25.0	9 39.69 1	28.2	10 28.31
	37.4		15.1		10.7		20.0		46.7		50.1	
Rms = .07	51.9		87		1191		1487		717		783	
	46 25.95		18 4.35		37 59.55		26 9.35		17 35.85		16 39.15	
+4′ 11.02	36 22.40		4 44.00		44 48.80		56 39.00		15 12.50		6 9.20	
	51 40 33.42		53 8 55.02		50 48 59.82		50 0 50.02		55 9 23.52		51 10 20.22	
	+25.55		+25.23		+32.31		− 9.70		+24.55		+20.46	
	48 50.35	40 21.0	10 3.52	8 37.8	12 44.20	48 46.6	13 44.71	59 54.1	15 50.32	9 6.1	19 32.86	9 53.9
		+9.22		+10.06		+8.05		+7.32		+12.06		+8.17

Sept 18

Add +0.33 to (M+m) 21 has been added to sum of the corrections and to final R.A.

	51 25.1	10.58	12 38.4	11.42	15 19.8	9.41	16 20.3	8.68	18 24.8	13.42	22 8.6	9.53
	28.3		42.0		23.0		23.7		28.3		12.0	
	31.7		45.4		26.2		26.6		31.8		15.0	
	35.2		48.5		29.4		30.0		35.4		18.4	
	38.6		52.3		32.8		33.4		39.3		21.8	
	89		266		312		340	+.01	986		258	
	51 31.78		12 45.32		15 26.24		16 26.80		18 31.86		22 15.16	
+0.33	−2 32.85	9 −154.52	−2 32.88	92 −154.62	−2 32.88	93 −154.48	−2 32.88	93 −154.47	−2 32.92	93 −154.77	−2 32.89	94 −2 34.51
	− 1.63		− 1.72		− 1.56		− 1.54		− 1.84		− 1.60	
	48 57.30		10 10.72		12 51.80		13 51.38		15 57.19		19 50.67	
	− 2.33		− 2.46		− 2.56		− 2.60		− 2.44		− 2.61	
	48 54.97	6 −4.70 −27.51	10 8.225	−4.70 −32.34	12 49.19 92	−5.10 −32.91	13 49.73	7 −5.23 −33.15	15 54.71	4 −4.45 −33.60	38.01	4 −5.13 −34.48
	8.4		8.9		8.8		9.1		7.5		8.3	
	51 38.1		11 55.2		14 51.1		15 56.9		17 36.3		21 26.7	
	41.5		1.9		57.7		3.2		43.4		29.6	
	45.2		8.3		6.0		8.8		47.4		32.0	
	1248		54		1748		89		1271		38.5	
	51 41.60	51 41 1.81	12 1.50	53 9 20.50	14 58.27	50 49 31.74	16 2.97	50 0 39.94	17 42.37	55 9 48.63	21 31.70	51 10 43.12
	− 9.82	− 2	+43.52	− 49	+27.97	− 21	+23.83	− 15	+ ~~1.85~~	− 63	+ 43.46	− 50
	0.99211 n	− 6	1.63869	− 22	1.44669	− 20	1.37712	− 12	1.65805	− 19	1.63805	− 13
	9.79240	+9.16	9.77795	+10.63	9.80058	+834	9.80807	+7.49	9.78694	+1271	9.79731	+868
	0.89058 n	+ 14	1.52271	+ 14	1.35334	+ 12	1.29126	+ 10	1.55207	+ 17	1.54147	+ 12
−.129	45	−20.70 15		−21.80 35		−21.80 25		−21.80 15		−22.20 15		−22.20
n = ~~−1.30~~	0 38.2	40 51.69 3	1.7	9 10.12 2	39.4	49 19.35 1	28.0	0 26.82 2	36.1	9 39.85 1	40.2	10 30.45
	1.7		23.0		1.3		50.3		57.0		2.2	
Rms = .07	909		2.47		1007		783		931		1024	
	45 49.95		18 12.35		37 50.35		26 39.15		17 46.55		16 51.20	
+4′ 11.18	36 58.40		4 36.00		44 58.80		56 9.20		5 1.80		5 57.15	
	51 41 9.58		53 8 47.18		50 49 9.18		50 0 20.38		55 9 12.98		51 10 8.33	
	− 7.77		+33.32		+22.56		+19.56		+35.65		+34.79	
	48 50.26	40 24.2	10 3.85	8 37.8	12 44.12	48 46.4	13 44.54	59 53.7	15 50.29	9 6.2	19 32.91	9 56.0

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1648R

1878 Sept 17. Sept 18 Oz. W. AR Rec J Fm.

	h m s	Mag.		h m s	Mag.		
α	20 30 21	8.8	19 538	20 22 39	9.5	22	13.0
δ	50° 33′		30.0	52° 14′			11.3

Sept 17

+8.84 +9.60

23	1.2	99		25	17.0	10.55	
	4.5				22.0		
	8.0				25.3		
	11.0				28.7		
	14.2				32.0		
	389				270		
23	7.78			25	25.40		
−2	30.54	−2m 32.09		−2	30.54	−2m 32,18	
−	1.55			−	1.64		
20	35.69			22	53.22		
−	2.66	−523 −34.59		−	2.63	−501 −35.07	
	41.45			22	50.59		
20	33.03						
90				95			

22	43.5			24	42.3		
	50.4				47.4		
	55.3				52.9		
	29.2	+ 95			22.6		
22	49.73	50 34 24.16		24	47.52	52 16 1.21	
	+ 18.05	− 9			+ 37.87	− 38	
1.25648		− 20		1.57830		− 10	
9.80290		+ 8.22		9.78674		+ 9.95	
1.16545		+ 11		1.47111		+ 13	
50		− 2200		10		− 22.20	
2	39.0	34 11.15		1	16.2	15 49.56	
	0.7				39.3		
	9.97				555		
52	49.85			11	27.75		
29	38.50			11	20.60		
50	34 9.52			52	15 31.62		
	+ 14.64				+ 29.59		
20	27.80	33 36.6		22	45.58	15 14.5	

Sept 18

+7.89 +9.40

23	3.3	925		25	21.0	10.76	
	6.8				24.2		
	10.0				27.8		
	13.3				31.3		
	16.5				34.5		
	499				388		
23	9.98			25	27.76		
−2	32.89	94 −2 34.47		−2	32.94	−2 34.5	
−	1.56			−	1.65		
20	35.53			22	53.21		
−	2.64	−523 −34.59		−	2.61	−501 −35.07	
20	32.89			22	50.60		
8.7				9.5			

23	25.4			24	43.0		
	31.9				50.5		
	37.7				55.6		
	95.0	+ 1.36			1491		
23	31.67	50 34 23.75		24	49.70	52 16 0.22	
	− 21.69	− 13			+ 38.06	− 38	
1.33626	m	− 16		1.58044		− 11	
9.80274		+ 8.07		9.75672		+ 9.76	
1.24507	m	+ 11		1.47328		+ 13	
50		− 2220.0				− 22.40	
2	7.5	34 10.80			17.8	15 48.58	
	28.9				403		
	36.4				581		
52	18.20			11	29.05		
30	30.15			11	19.30		
50	34 41.33			52	15 30.48		
	− 17.58				+ 29.74		
20	27.64	33 36.2		22	45.89	15 13.5	

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1970phae.proj.16008R

1878 Sept. 19, Sept 22 Obs. W.A.R. Rec. J.F.M.

81

	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.
α	19 48 40	9.6 48 15.2	20 9 59	8.59 324	20 12 19	9.0 11 52.7	20 19 26	9.1 18 58.7	20 20 59	9.0 20 31.2	20 22 4	8.0 21 36.8
δ	53° 24′	245 9.0	55° 0′	54 57.6	52° 6′	3.5 7.3	49° 53′	50.1	53° 37′	34.0 ~~7.0~~	55° 0′	54 57.2

Sept 19

+10.83 +12.46 +7.01 +10.83 +11.04 +12.91

	51 21.0	12.08	12 39.0	13.71			22 13.0	8.26	23 24	12.08 12.29	24 44.0	14.16
	24.5		42.9				16.0		39.6 0.4		48.0	
	28.0		46.4				19.2		43.2 3.8		51.5	
	31.5		50.0				22.4		46.8 7.4		55.0	
	35.0		53.6				25.8		50.4 11.0		59.0	
	400		319				462		540 144		75	
	51 28.00		12 46.38				340 368					
	−2 35.26	−2 37.11	−2 35.30	−2 37.26			22 19.24		23 46.80 24 7.34		24 51.50	
	− 1.85		− 1.96				−2 35.32	2 36.95	−2 35.32	−2 37.17 2 37.17	−2 35.32	−2 37.28
	48 50.89		10 9.42				− 1.63		− 1.85	−.477	− 1.96	
	− 2.23		− 2.36				19 42.29		21 9.63 21 30.19	−34.74	22 14.22	
	48 48.66	−4.40 −27.48	10 6.76	−4.38 −32.34			− 2.63	−5.31	− 2.53		− 2.48	
							19 39.66	−34.41	21 7.18	27.66 −34.74	22 11.74	−4.55 −34.95
	9.0		8.5		8.9		9.1		8.4 9.1	53° 38′ 52.12 37′ 54.15	8.3	

	50 45.0		11 58.8				21 34.2		23 23	− 41 − 27	24 36.7	
	47.3		6.4				40.0		1.4 29.0	− 25 − 18	42.4	
	51.0		12.7				45.4		6.9 35.8	+11.34 +11.34	50.3	
	54.0	+ 1.25	17.9	✓			29.6	✓	14.0 41.4	+ 15 + 15	±9.4	
	57.0	53 26 37.51	12 5.97	55 1 41.20			21 39.87	49 54 41.55	23 23 43 35.40	−22.60 −22.60	~~45.7~~	55 1 51.54
	43	− 37	+40.41	− 42			+39.37	− 42	39.37 + 31.96	4160 4384	24 43.13	− 2
	50 50.86	− 6	1.60649	− 5			1.59517	− 19	1.59517	1.50461	+ 8.37	− 1
	+37.14										0.92273	
	1.56964	+11.12	9.75841	+12.76			9.80897	+752	9.77262	9.77265	9.75823	+12.77
	9.77607	+ 14	1.47097	+ 17			1.51021	+ 10	1.47426	1.38353	0.78703	+ 17
	01.45098	−20.80 25		−22.10 15			30	−22.30	45 45		25	−22.70
n = −1.37	0 38.2	26 28.79	0 35.9	1 32.81	12 40.1		2 39.1	54 27.51	3 25.1 2 17.6		0 2.3	1 43.00
	0.6		56.2		1.9		59.9		47.6 39.8		24.2	
Rrs = −.07	988		941				990		727 574		265	
	0 49.40		25 47.05				32 49.50		48 36.35 47 25.76		25 13.25	
+4′ 10.32	21 58.95		57 1.30				49 58.85		34 1200 65 19.65		57 35.10	
	53 26 9.27		55 1 11.62				49 54 9.17		53 38 22.32 39 29.97		55 1 45.42	
	+28.24		+29.58				+32.38		+29.80 +24.18		+6.12	
	48 44.26	26 1.3	10 2.38	1 0.5			19 34.35	53 53.1	21 2.34	38 6.9	22 7.19	1 8.0
									22.88	39 9.1		

Sept. 22

+10.72 +12.50 ~~+5.01~~ +9.42 +7.52

	51 28.4	11.57	12 46.6	13.35	15 15		21 81.8	8.37	23 23			
	31.9		50.0		10.4 18.4	986 10.27	85.0		47.8 55.5			
	35.4		53.8		14.0 16.8		88.0		50.7 58.8			
	38.7		57.5		17.3 20.1		41.3		54.7 2.4			
	42.2		1.0		20.5 23.5		44.4		58.1 5.7			
	266		189		24.0 27.0		405		1.4 8.5			
	51 35.32		12 53.78		362 15 08				222 109			
	−2 42.41	−2 44.41	−2 42.45	−2 44.57	15 17.24 20.16		21 38.10		23 54.44 ~~24~~ 2.18			
	− 2.00		− 2.12		2 4.96 2 4.96	−2 44.35 −2 44.35	−2 42.47	−2 44.23	2 42.48 2 42.48			
	48 50.91		10 9.21		− 1.89 − 1.89		− 1.76		− 2.00 − 2.00			
	~~− 21.37~~ ~~2.13~~	−4.40	− 2.27	−4.38	12 32.89 12 35.81	−4.90	18 53.87		21 9.96 21 17.70			
	48 48.78	−27.48	10 6.94	−32.34/12	− 2.41 − 2.41	−82.85	− 2.55		− 2.44 − 2.44			
					30 48 ~~42.00~~ 33.40		18 51.32		21 ~~57~~.52 15.26			
	9.0		8.5		6.9 9.0	52° 7′ 50.50 7′ 35.32	8.9					

	50 37.5		11 55.4		14 14		21 10.9		23 23			
	43.3		3.0		17.4 37.2		15.6		7.6 37.5			
	48.3		10.0		22.8 43.0	− 72 − 36	21.7		15.7 46.0			
	1291	+ 0.85	84		29.9 49.1	− 34 − 34	482		21.2 51.0			
	50 43.03	53 26 36.94	12 2.80	55 1 48.38	3 14	+10.00 +10.00		✓	445 1345			
	+52.29	− 72	+50.98	− 67	401 1293	+ 12 + 12	21 16.07	49 54 31.24	33 14.83 44.83			
	1.71842	− 7	1.70740	− 6	14 23.37 43.10	−22.60 −22.60	+22.03	− 13	+3.961 +1.735			
	9.77507	+11.38	9.75841	+13.07	1.73135 1.52891		1.34901	− 19	1.59780 1.23930			
	1.59956	+ 13	1.57188	+ .16	9.78821 9.78821		9.80894	+ 7.75				
	0	−21.4025		−22.70	1.62563 1.46319		1.25805	+ 9				
					15		30	− 22.~~57~~ 90				
n = −1.48	0 50.3	26 27.11	0 42.0	1 34.03	4 40.1		2 35.7	54 16.71				
	13.9		[4.4] 52.4		1.9		56.6					
Rrs = −.07	42		9.64		10.20		923					
	1 2.10		25 ~~58.20~~		19 57.00		32 46.15					
+4′ 10.92	21 46.25		58 58.15		2 57.85		50 2.20					
	53 25 57.17		55 1 ~~6~~4.07		52 7 6.27		49 54 13.12					
	+39.74		+37.31		+42.23 +29.05		+ 18.12					
	48 44.38	25 59.6	10 2.56	1 1.7	12 25.58 7 4.9							

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1608R

1878. Sept 23, Sept. 25 Obs. W.A.R. Rec. J.Tme

	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.
α	20 12 19	7.3	20 13 17	9.2	20 19 17	7.3	20 22 4	8.0	20 39 23	9.0	20 40 5	8.9
δ	52° 06′	3.5	54° 4′	1.0	54° 9′	28.0	55° 0′	54 57.2	50° 35′	31.6	52° 13′	9.8

Sept 23

	15	12.3	10.51		16	16	12.92	12.61	21	39.5	79	24	24	13.68	13.52	41	47.2	9.07	43	0.2	7.4
		15.9			5.0	26.9				42.8			53.7				50.5			3.8	
		19.2			8.4	30.0				46.2	23.70	23.7	57.3				53.9			7.0	
		22.5			11.9	33.8				49.6	23.42	27.8	6.8				57.2			10.4	
		26.0			15.7	37.4				53.0	23.52	30.7	45				0.4			13.5	
		459			19.2	40.4				311			8.2							349	
					102	185					164		45				192				
	15	19.18		16	12.04	16 33.70			21	46.22	24 23.55	25	0.90			41	53.84		43	6.98	
	−2	44.78	−2 46.44	−2	44.78	−2 44.78	−2 46.57	−2 44.57	−2	44.80	−2 44.81	−2	44.81	−2	46.67	−2	44.85	−2 46.42	−2	44.86	−2 46.52
	−	1.66		−	1.79	− 1.79	−4.59		−	1.79	− 1.86	−	1.86			−	1.57		−	1.66	
	12	32.74		13	25.47	13 47.13		−33.06	18	59.63	21 36.88	22	14.23			39	7.42		40	20.46	
	−	2.38	−4.90	−	2.31	− 2.32		−46.0	−	2.37	− 2.36	−	2.37			−	2.68	−5.46	−	2.65	−5.25
	12	30.36	−4.85	13	23.16	44.81		−33.06	18	57.26	−46.6	21	34.52		11.86	89	4.74	−38.46	40	17.81	−38.70
			−32.8								−34.26										
	7.0				8.1	9.3	54° 5′ 80.16	7′ 13.89	7.8			6.8	6.0	55° 2′ 59.17	1′ 54.11	8.4			8.8			
		14	55.3		10	16	− 2	− 9	21	27.6		24	25	− 11	− 19	41	33.2			42	40.2	
			2.0		13.2	47.0	− 7	− 32		33.8		39.3	21.0	− 26	− 33		38.9				46.3	
			9.0		20.0	53.0	+12.25	+12.26		39.0		44.3	28.2	+13.27	+13.26		45.2				54.0	
			63		25.8	57.4	+ 14	+ 14		104		50.5	34.6	+ 16	+ 16		273				205	
		15	2.10	+62	29.0	7.4	−23.00	−23.00	21	33.47	54 5 1.39	24	41.70	27.93	−23.40	−23.41	41	39.10	50 35 24.64		42	46.83	52 14 39.19
			+ 17.08	− 8	16	19.47				+ 12.75	− 5		−21.15	−27				+14.74	− 6		+20.15	− 11
			1.23249	− 30		−7.63	−18.77	4008 7 3.00		1.10551	− 15		1.32531	1.43155				1.16850	− 12		1.30428	− 18
			9.78805	+1015		9.76164	9.76800			9.76835	+12.23		9.75805	9.75823				9.80274	+ 8.52		9.78707	+10.29
			1.12661	+ 12		0.75023	1.14753			0.97993	+ 14		1.18443	1.29615				1.07731	+ 11		1.19742	+ 12
				−22.80	15	20	15		20		−2330	20	20				50		−24.00	10			−24.20
n = −1.30	4	10.9	7 3828		052.2	4 20.5			1	56.5	4 50.88	3	33.3	4 34.6		1	35.0	35 9.71	2	24.0	14 25.73	
		31.9			13.4	41.8				17.0			54.6	54.8			56.8			46.3		
Rms = −.07		428			1856	623				135			879	894			918			703		
	19	21.40			24	28.0	19 31.15		22	6.75		23	43.95	44.76		51	45.90		12	35.15		
+4′ 10.24	3	26.95			1	33.6	3 17.20		0	4.60		5	49.05	3.45		31	2.45		10	13.20		
	52	37.19	54	55.79	7	27.44			54	4 51.84		55	3 14.64	2 13.89		50	35 12.69		52	14 23.44		
		+13.38		− 6.63	−	14.05				+ 9.55			+15.47	−19.78			+ 11.95			+15.75		
				13	18.57	5 7.0																
	12	25.46	7 5.4	13	40.21	6 29.9			18	52.60	4 16.6					38	59.28	34 31.2	40	12.56	13 47.0

Sept. 25

	15	15.8	10.85	16	16	13.60	12.99	21	43.2	12.50	24	24	13.96	14.69	41	51.0	9.42	43	3.8	11.24
		19.3		8.5	30.0				46.8		19.8	57.4				54.0			7.2	
		22.9		12.1	34.0				50.0		23.5	1.0				57.4			10.6	
		26.3		15.4	40.8				53.5		27.0	4.5				0.8			14.0	
		29.5		19.0					57.0		30.8	8.1				4.0			17.4	
		138		22.8					05		34.3	11.8								
				278	280						354	228				372			30	
	15	22.76	16	15.56	16 37.00	+1.40		21	50.10	24	27.08	25 4.56			41	57.44		43	10.60	
	−2	48.43	−2 50.29	−2	48.43	−2 48.43	−2 50.43	−2	48.44	−2 50.44	−2	48.44	−2 48.44	−2 50.51	−2 50.51	−2	48.48	−2 50.23	−2	48.48	−2 50.34
	−	1.86		−	2.00	− 2.00	−4.59		−	2.00	−	−	2.07	− 2.07		−	1.75		−	1.86	
	12	32.47		13	25.13	13 46.57	−33.06	18	59.66		21	36.57	22 14.05			39	7.21	−54.6	40	20.26	
	−	2.32	−4.90	−	2.25	− 2.26		−	2.31	−46.6	−	2.30	− 2.31			−	2.63	−38.46	−	2.60	−5.25
	12	30.15	−4.85	13	22.88	44.31	−46.0		57.35	−34.26	21	34.27	11.74			39	4.58		40	17.66	−38.70
			−32.85			71	−33.06														
	7.5			8.6	9.3	54° 5′ 55.04	7′ 13.84	8.3			6.8	7.8	55° 3′ 0.19	1′ 51.41	8.4			8.8			
		14	40.4	16	25.2	17 8.7	− 3	− 40	21	35.8		23	24	− 43	− 3	41	15.5			42	34.2	
			46.5			17.1	− 8	− 34		44.3		41.2	48.0	− 36	− 2		22.0				40.4	
			52.5			22.0	+12.26	+12.28		48.8		48.0	54.4				28.0				47.0	
			1394	+1.31		478	+ 14	+ 14		1289		54.2	50.3	+13.28	+13.27		665				1216	
		14	46.47	527 5091	16	2520	17 1593	−23.30	−23.30	21	42.97	54 5 0.35	23	1434	1617	+ 16	+ 16		41	2183	50 35 24.48	42	40.53	52 14 39.52
			+36.29	− 35		−9.64	−38.93	5 45.34	7 3.53		+ 7.13		− 2	+ 41.21	+ 53.90	2 1046	5031	4230		+ 35.61	− 34		+ 30.07	− 24
			1.55979	− 38		0.96405	1.59028				0.85306		− 17	1.61500	1.02776					1.55154	− 16		1.47813	− 22
			9.78821	+1015		9.76869	9.76782				9.97683		+12.24	9.75804	9.75823					9.80274	+ 8.50		9.78707	+10.27
			1.45407	+ 12		0.85832	1.46417				0.72751		+ 14	1.47711	0.89206					1.46038	+ 11		1.37127	+ 12
				−2310	15	20	15					20	−2360	20	25				50		−24.40	10			−24.60
n = ~~−1.46~~ −1.45	4	26.1	7 3826		0	4.64	4 5.4		1	53.5	4 50.25	4	18.80	4.48		1	52.9	35 9.50	2	31.9	14 57.22	26.16
		46.5				7.8	27.4			15.2			39.9	26.7			14.6			57.8		
Rms = −.08		74.6				11.42	328			87			58.7	31.5			75			8.64		
	19	37.30			20	5.10	19 16.40		22	4.35			24.29	35 25.75		52	3.75		12	43.35		
+4′ 11.01	3	11.05			1	51.25	3 31.95		0	44.00		58	19.07	57 32.60		30	44.60		10	5.00		
	52	22.06	54 6	2.26	42.96			54	55.01		55	30.01	1 43.65		50	34 55.61		52	14 16.01		
		+28.45		− 7.22	−29.12				+ 5.34			+30.14	+ 7.80				+28.87			+ 23.51		
						12.3																
	12	25.25	7 5.4	13	18.29	5 ~~40.7~~ 11.65	6 30.5	18	52.69	4 16.0						38	59.12	34 31.0	40	12.41	13 47.5	

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16018R

1878 Sept. 23, Sept 25 Obs. W & R Rec. J. F. Me. 83

α p m G Mag 41 9.2 550
δ 20 42 26 8.5 41 58.9
° ′ 54 59 45.4

Sept 23 +13.25
44 28.5 87
32.2
35.7
39.1
43.0
28 5
44 36.70
−2 44.86 −2 46.72
− 1.86
41 48.98
− 2.57 −4.86
41 46.41 −3900

87

44 19.0
25.3
32.7
1 7 0
44 25.67 55 0 21.33
+ 10.03 − 3
1.00130 − 12
9.75859 +13.24
0.86596 + 16
25 −24.80
1 34.1 0 10.90
55.1
89 2
26 44.60
56 3.75
55 0 13.99
+ 7.34
41 41.55 59 31.9

Sept 25 +13.22
44 31.9 1453
35.4
39.0
43.0
46.5
458
44 39.16
−2 48.38 −2 50.55
− 2.07
41 48.61 −4.86
− 2.52 −3900
41 46.09

85

44 27.5
34.1
41.2
102 8
44 34.27 55 0 21.04 26.04
+ 4.89 − 1
0.68931 − 14
9.75859 +1321
0.55397 + 16
25 −24.80
1 31.1 81.1 0 10.77
52.7 [82.7]
838 438
26 41.90 26 36.90
56 6.45 56 1.45
55 0 17.46 55 0 22.46
+ 3.58

41 41.23 59 31.8

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1008R

1878 Sept. 28, Sept. 30 Obs. W AR Rec J Z M.

5308

	h m s	Mag.	h m s	Mag.	h m s	Mag	h m s	Mag	h m s	Mag	h m s	Mag
α	20 12 37	9.0 12 10.1	20 13 4	7.8 12 37.2	20 19 51	9.4 19 24.2	20 38 14	8.8 37 46.7	20 38 56	7.9 38 28.7	20 53 50	8.8 53 23.8
δ	52° 40′	51.4	51° 59′	56.6	51° 42′	39.1	53° 34′	30.3	52° 10′	6.6 7.9	55° 12′	9.0

Sept 28

	+10.38		+10.03		+9.63 +9.55		+11.34		+10.26		+13.86 +13.85	
	15 39.8	70	16 7.7	41	22 22		41 19.2	72	42 2.0	64	56 56	
	43.0		11.0		8.3 33.6	10.01 .93	23.0		5.6		33.9 54.9	.74 .83
	46.1		14.4		11.7 59.0		26.1		8.8		38.0 58.3	
	50.0		18.0		14.4 2.3		29.8		12.4		41.4 2.1	
	53.5		21.2		18.2 5.7		33.2		15.7		44.6 5.9	
	338		223		21.3 9.0		313		445		47.4 9.2	
	15 46.60		16 14.46		239 116		41 26.26		42 8.90		153 104	
	-2 55.34	-2 57.17	-2 55.34	-2 57.14	22 14.78 23 2.32		-2 55.39	-2 57.29	-2 55.39	-2 57.19	56 41.06 57.28	
	- 1.83		- 1.80		-2 55.35 -2 55.35	-2 57.13 57.13	- 1.90		- 1.80		-2 55.42 -2 55.42	-2 57.48 -2 57.46
	12 49.43	-4.78 -32.91	13 17.32		- 1.78 - 1.78		38 28.97		39 11.71		- 2.02 - 2.02	-502
	- 2.20		- 2.25	-4.93	19 17.65 20 5.19	-504 -34.50	- 2.45	-503 -38.34	- 2.50	-524 -38.49	53 43.62 54 4.64	-41.40
	12 47.23		13 15.07	-33.03	- 2.32 - 2.32		38 26.52		39 9.21	53	- 2.56 - 2.56	-502
	8.9		7.4		19 15.33 20 2.87	-505 -34.50	8.8		7.8		41.06 54 2.08	-41.40
					8.8 9.2	51° 44′ 38.46 43 46.34					9.3 9.0	55° 15 37.16 14 48.77
	14 48.9		16 19.0		21 22	- 3 - 3	40 42.2		41 50.7		56 57	- 17 - 6
	57.2		28.3		59.4 46.0	- 19 - 27	50.0		57.2		8.6 10.2	- 14 - 16
	5.4		33.7		4.7 52.3	+9.74 +9.74	56.1		1.4		15.0 17.3	+13.52 +13.52
	21.5		21.0		12.1 57.0	+ 11 + 11	283		193		21.2 23.0	+ 15 + 15
	14 57.17	+ 38	16 27.00		162 53		40 49.43		41 56.43		148 209	-26.94 -25.70
	52 55 41.37		52 1 27.40	- 5	22 5.40 51.77	-2407 -24.70	53 36 52.06		52 1 47.41		56 14.93 57 16.83	-2508 -3670
	+49.43	- 64	- 12.54		+ 9.38 + 10.55		+ 36.83	- 36	+ 12.47	- 5	+26.13 - 46.75	
	1.69399	- 15	1.09830	+7000 3	2.97220 1.02325		1.56620	- 13	1.09587	- 3	1.41714 1.65.42	
	9.75769	+10.99	9.78902	+8.76	4.79176 9.79192		9.77353	+11.70	9.78739	+1023	9.75887 9.55.57	
	1.55775	+ 12	0.99339	+ 11	1.08.7603 0.92124		1.44580	+ 13	0.98933	+ 11	1.23908 1.08073	
	30	- 23.70	25	-2370	40 40		50	-25.10	5	-25.10	10 10	
n = -1.41	1 44.2	55 28.37	0 11.9	1 14.11	2 16.3 17.5		1 24.9	35 38.68	0 11.6	11 32.95	1 31.8 50.5	
	4.6		32.9		389 31.8		46.1		32.4		51.2 9.8	
Rms = .08	1088		448		572 433		710		440		830 03	
	31 54.40		25 22.40		42 2860 43 21.65		51 35.50		15 22.00		1141.50 120.15	
+4′ 11.30	50 53.95		57 25.95		40 1975 39 2670		31 1285		7 26.35		10 6.85 10 48.50	
	55 5.25		52 1 37.25		51 44 31.05 43 36.00		53 35 24.15		52 11 37.65		55 15 18.15 14 59.50	
	+36.12		- 9.85		+ 7.41 + 8.34		+27.91		+ 9.76		+19.01 -10.23	
	12 42.45	54 55.5	13 10.14	0 41.1	19 10.29	43 50.0	38 21.49	35 0.3	39 3.97	10 54.5	53 36.04	14 43.6
		+10.24		+9.81	57.82	42 57.8					53 57.06	13 55.3
Sept 30												+12.89 +12.90
	15 43.7	11.07	16 1.9	10.64	C		Chf		Chf		56 56	13.72 13.73
	46.9		15.3								384 58.6	
	50.4		18.6								42.0 2.4	
	53.7		22.0								45.1 5.9	
	57.2		25.3								48.9 9.7	
	19		431								53.4 13.0	
	15 50.38		16 18.62								268 296	
	-2 59.52	-3 1.28	-2 59.52	-3 1.25							56 45.36 57 5.92	
	- 1.76		- 1.73								-2 59.59 -2 59.69	-3 1.52 -3 1.52
	12 49.10	-4.78 -32.91	13 17.37	-4.93 -33.03							- 1.93 - 1.93	
	- 2.14		- 2.19								53 43.84 54 4.40	-502 -41.40
	12 46.96		13 16.18								- 2.50 - 2.50	
											53 41.84 1.90	-502 -41.40
	8.8		7.9		7.8 9.7		8.8		8.2		9.0 8.6	55° 15 38.03 14 48.44
	15 0.0		16 31.0								56 56	- 34 - 27
	6.7		36.9								2.4 26.8	- 14 - 20
	15.5		43.4								7.7 33.8	+13.23 +13.23
	22.2	+.83	111.3								17.0 40.0	3 14 3 14
	15 7.40	52 55 41.00	16 37.10	52 1 26.88							47.1 1.01	+ 14 + 14
	+42.98	- 48	- 18.48	- 9							56 9.03 33.5	-26.30 -26.30
	1.63327	- 15	1.26670	- 2							+36.33 +32.55	2545 3587
	9.75769	+10.75	9.78902	+ 9.81							1.56227 1.51255	
	1.49703	+ 12	1.16179	+ 11							9.75887 9.75605	
	30	-24.00	25	-2400	40 35		50		10		1.42221 1.37467	
											10 10	
n = -1.35	1 39.1	55 28.07	0 7.1	1 13.22	1 34.1 46.9		0 34.1		4 34.9		1 37.1 23.8	
	0.1		29.1		53.3 7.2		57.6		58.5		56.1 41.1	
Rms = .08	992		362		894 1441		937		956		952 689	
	31 49.60		25 18.10		41 44.70 39 57.05		50 46.85		14 47.80		1 47.60 1 34.45	
+4′ 10.84	50 58.75		54 30.25								11 0.75 10 13.90	
	57 55 9.59		52 1 41.09								55 15 11 59 14 24.14	
	+31.41		-14.51								+26.44 +23.90	
	12 42.18	54 55.2	13 10.25	0 40.2							53 36.32	14 44.0
											53 56.88	13 54.5

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16098R

1878. Oct 1, Oct 2 Obs WAR Rec. J. L'Me

	h m s	Mag.	h m s	Mag	h m s	Mag	h m s	Mag	h m s	Mag	h m s	Mag
α	20 13 2	9.0 12 35.8	20 20 12	9.0 19 44.8	20 44 12	9.0 43 44.5	20 47 40	9.4 47 11.6	21 12 22	6.7 11 51.4	21 15 11	7.2 11 40.7
δ	50° 31′	27.8	50° 44′	41.0	53° 17′	13.4	51° 56′	52.9	52° 0′	51 55.8	51° 46′	42.7

Oct 1

	+7.91		+8.76		+10.58		+9.84 +9.44		+9.39		+8.75	
	15 20.0	8.57	23 24.9	82	47 23.8	11.24	50 50	90 10.07	15 35.2	10.05	18 25.0	
	28.4		28.0		27.3		30.2 52.4		38.4		28.4	
	26.9		31.4		30.7		33.4 56.1		41.9		31.8	
	30.0		34.7		34.1		37.0 59.3		45.2		35.1	
	33.83		38.0		37.1		40.0 2.7		48.5		38.5	
	333		70		36		43.5 6.2		92		88	
	15 26.86		23 31.40		47 30.72		341 467		15 41.84		18 31.76	
	−3 1.42	−3 3.14	−3 1.42	−3 3.14	−3 1.44	−3 3.33	50 36.82 50 59.34		15 41.84		18 31.76	
	− 1.72		− 1.72		− 1.87		−3 1.44 −3 1.44	−3 3.26 −3.8.26	−3 1.45	−3 3.27	−3 1.45	−3 3.24
	12 23.52		20 28.26		44 27.39		− 1.82 − 1.82	−5.40 −40.20	− 1.82		− 1.79	
							47 33.56 47 56.08		12 38.57	−5.79 −44.79	15 28.52	
	− 2.21		− 2.30 28		− 2.44	−5.16	− 2.52 − 2.52	−5.41	− 2.79		− 2.82	−5.86
	12 21.31		20 25.98	−4.90 −34.59	44 24.95	−39.54	47 31.04 47 53.56	−40.20	12 35.78		15 25.70	−45.30
	9.2		9.0		8.9		9.3 9.2		8.9		7.4	
							57 13.13 51°					
							56 59.57 58 13.73					
	15 58.0		22 38.9		46 52.5		50 57 − 17 − 4		14 39.0		17 40.3	
	3.3		1.1		59.0		4.8 5.3 − 32 − 28		4.0		46.5	
	10.3		4.0		4.8		12.0 12.0 + 9.62 + 9.62		10.8		52.4	
	16		6.6		26.3		17.5 17.4 + 11 + 11		138		192	
	16 38.7	50 36 34.95	10.4	50 45 37.52	46 58.77	53 18 42.53	43 47 51 11.43 51 11.57	−26.00 −26.00	15 46.0	52 1 47.81	17 46.40	51 48 50.96
		+ 66						56 57.27 57 57.60				
	−37.21	− 37	21.0	− 20	+31.95	− 27	+ 25.39 − 12.23		+ 37.24	− 37	+45.36	− 55
	1.57066	− 7	23 4.20 +2.20	− 14	1.50447	− 29	1.40466 1.08743		1.57101	− 5	1.65667	− 30
	9.80259	+8.25	1.43457	+8.40	9.77643	+110 2	9.78853 9.74467		9.78918	+9.70	9.79128	+9.49
	1.47932	+ 10	9.60126	+ 10	1.38697	+ 12	1.20856 0.98347		1.46626	+ 11	1.55402	+ 11
	50	−24.00	48.34184	−24.50		−26.00	25 25		25	−2.20	35	−27.20
n = −1.42	0 43.6	36 19.52	32.3	45 29.37 21.84	3 29.9	18 27.77	41 55.3 24.1		0 29.1		3 33.1	48 33.17
	49		54.7		57.9		48 47.3		51.9	1 30.76	54.7	
Rms. = .08	10.85		8.70		8.18		31 7.14		8.10		8.58	
	50 54.25		41 43.50		8 40.90	30 56.5	30 [illegible] 28 35.70		25 40.50		38 43.90	
+4′ 10.70	31 57.10		41 4.85		14 7.45		52 48.05 42.65		57 7.85		44 4.45	
	50 36 4.80		50 45 15.55		53 18 16.15		57 57.50 53 23.36		52 1 18.53		51 48 15.75	
	+30.15		+21.97		+24.38		+ 1.57 − 9.62		+29.26	11 51.9 55.8	+35.81	
					0.49	+19.97	47 25.64	56 17.1	12 29.99	12 25.6		
			20 21.08	44 47.2	44 17.44	17 48.2	47 48.15	57 17.6	11 17.0	54.7	15 19.54	47 47.9
								+8.96 +9.07	0 46.0	+9.63 +9.49		+8.52
Oct 2		+7.65		+7.68		+10.26						
	16 17.0	8.7.5	23 26.0	8.78	47 25.3	11.36	50 50	10.04 10.17	15 16	10.73 10.57	18 26.5	9.62
	20.0		29.4		28.7		25.5 31.5		36.7 11.0		29.9	
	23.3		32.8		32.1		28.7 35.0		39.9 14.3		33.0	
	26.6		36.0		35.6		30.0 38.3		43.1 17.7		36.3	
	30.0		39.3		39.0		35.6 41.3		46.5 21.1		39.8	
	169		135		107		38.9 44.8		50.0 24.5		155	
	16 23.38		23 32.70		47 32.14		107 409		162 386		18 33.10	
	−3 2.76	−3 4.36	−3 2.77	−3 4.37	−3 2.80	−3 4.56	50 33.14 50 38.18		15 43.24 16 17.78		18 33.10	
	− 1.60		− 1.60		− 1.76		−3 2.81 −3 2.81	−3 4.50 −3 4.58	−3 2.84 −3 2.84	−3 4.53 −3 4.58	−3 2.85	−3 4.51
	13 19.02		20 28.33		44 27.58		− 1.69 − 1.69	−5.40 −	− 1.67 − 1.68	−5.79	− 1.66	
							47 27.64 47 33.68	−40.20 12	38.71 13 13.19	−44.79	15 28.59	
	− 2.18		− 2.25	−4.90	− 2.41	−5.16	− 2.49 − 2.49	−5.41	− 2.76 − 2.76	−5.79	− 2.80	−5.86
	13 16.84	−5.15	20 26.08	−34.59	44 25.17	−39.54	47 25.15 31.19	−40.20	35.95 10.43	−44.79	15 25.79	−45.30
	9.4		9.0		8.8		51°		8.3 8.8		7.2	
							7.0 9.4 56 36.29 57 11.89		52			
									2′ 8.32 6′ 44.50			
	15 38.8		22 41.9		46 46.5		50 50		15 16		17 38.3	
	45.2		45.2		50.6		54.5 14.8	− 22 − 9	34.2 26.3	− 0 − 6	44.0	
	51.8		48.0		53.4		1.2 20.8	− 40 − 40	41.1 33.0	− 2 − 8	50.0	
	1358		50.5		56.5		8.1 26.1	+ 9.45 + 9.45	45.6 39.8	+9.54 +9.52	1323	
	15 45.27	+ 1.10	53.0	50 45 37.96	59.5	53 18 42.26	1.8 50 6.17	+ 11 + 11	1209 491	+ 11 + 11		
		50 31 36.42					51 0.60 20.57	−26.20 −26.20	15 40.30 16 33.81	−27.40 −27.40	17 44.10	51 48 50.37
	+38.11	− 39	22 47.72	− 54	46 53.30	− 40	−2846 + 17.61	56 2013 56 58.1	+ 2.94 − 15.31	5145 2769	+49.00	− 64
	1.58104	− 7	+44.98	− 15	+38.54	− 30	1.25423 1.24576		0.46335 1.18458		1.69020	− 30
	9.80336	+8.01	1.65302	+8.27	1.55928	+1084	9.78193 9.78193		0.78902 9.78918		9.79128	+9.35
	1.49047	+ 10	9.80120	+ 10	9.77643	+ 12	1.23423 1.13876		0.36344 10.0023		1.58758	+ 11
	55	−24.1040	1.56029	−24.6055	1.47178	−2610	25 25		25 25		35	−27.60
n = −1.33	0 43.4	31 20.97	46.9	45 22.18	3 35.9	18 27.52	4 50.1 50.1		0 2.50 50.9		3 37.1	48 32.49
	4.5	21.07	8.7		57.7		12.2 12.2		25.9 14.9		58.4	
Rms. = .08	10.79		11.56		9.36		23 23		28.4 58		9.55	
	55 53.95		41 57.80		8 46.80		30 1.15 1.15		25 14.20 26 3.00		38 47.75	
+4′ 11.08	26 54.40		40 50.55		14 1.55		52 47.20		57 34.15 56 4.95		44 0.60	
	50 31 54.8		50 45 1.63		53 18 12.63		57 56 58.28		52 1 45.23 0 56.53		57 48 11.68	
	+30.94		+36.33		+29.63		−21.99 +13.61		+9.31 −12.93		+38.64	
										D 4.61		
	13 11.69	30 48.0	20 21.18	44 47.6	44 20.01	17 48.0	47 19.74 25.78	56 39.9 56 15.4	12 30.16 11 25.61	6.9 59 42.8	15 [illegible] 15 19.54	15 19.93 47 47.2

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj:1698R

1878 Oct 1, Oct 2 Obs. W.A.R. Rec J.F.M.

1202

no Dm place

	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.
α	21 35 20	6.8	22 0 24	9.0	22 13 5	9.0	22 15 22	7.5	22 17 36	9.2
δ	51° 36′	22.0	54° 3′	53 58.4	51° 52′	48.4	51° 13′	7.9	51° 13′	7.9

Oct 1

	+11.85	+9.48	+8.42	+8.86 +8.78
	3 36.2 81	15 54.0 10.14	18 36.2 9.08	20 20 9.52 9.44
	39.7	57.4	39.6	12.9 26.7
	43.3	0.8	43.0	16.2 30.0
	46.7	4.0	46.2	19.4 33.3
	50.4	7.5	49.5	22.3 36.4
	163	37	145	26.0 39.5
	3 43.26	16 0.74	18 42.90	468 20 159
	−3 1.48 −3 8.44	−3 1.49 −3 3.31	−3 1.49 −3 3.25	20 19.36 33.18
	− 1.96	− 1.82	− 1.76	−3 1.49 −3 1.49 −3 3.25 −3 3.25
	0 39.82	12 57.43	15 39.65	− 1.76 − 1.76 −7.05
	− 3.29 −6.46	− 3.45 −6.91	− 3.48 −7.02	17 16.11 17 29.93 −54.27
	0 36.53 −52.17	12 53.98 −53.76	15 36.17 −54.03	− 3.50 −3.50
				17 12.61 26.43 −7.06 −54.27
	8.9	9.0	6.7	9.4 9.3 51°
				15′ 30.24 15′ 23.31
	2 47.0	15 46.0	17 56.2	20 20 − 3 − 14
	51.5	52.0	59.9	1.6 50.4 − 13 − 10
	54.5	58.5	3.0	9.4 55.3 +8.92 +8.92
	57.6 + 66	65	6.6	15.2 1.6 262 20 173 + 10 + 10
	1.2 54 5 0.74	15 52.17 51 50 1201	9.0 51 15 1268 20	8.73 55.77 −8970 −2900
	218 − 63	+ 857 − 2	147 − 43 +	10.63 − 22.59 15 −28.70 −2900
	2 54.36 − 20	0.9398 − 15	18 7.94 − 18 9	11.06 485
	+48.90 +11.85	9.79095 +9.54	+39.96 +893	1.68931 1.35392
	1.68931 + 13	0.83000 + 11	1.60163 + 10	9.77652 9.79652 9.79636
	9.77652 −28.6035	−28.70	9.79652 −28.70	0.72912 1.25635 20
	2056390		10.50422	10 10
	2 24.0 4 43.95	1 42.9 49 58.45	2 7.2 14 53.06	1 25.9 6.8
	45.9	4.7	29.4	48.7 26.6
	699	1076	366	746 354
	22 34.95	36 53.80	12 18.30	11 37.30 11 17.70
	0 13.40	45 54.55	10 30.05	11 11.95 11 30.65
	54 4 24.10	51 50 5.25	51 14 40.75	51 15 21.75 15 41.35
	+36.64	+ 6.76	+31.93	+ 8.49 −18.04
				17 6.56 14 16.8
	0 30.07 8 51.8	12 47.07 48 59.7	15 29.15 13 59.0	17 19.37 14 49.8

Oct 2

+9.05	+11.60 +11.61	+9.29	+8.10	+8.41 +8.54
38 28.3 10.15	3 3 1270 1271	15 55.5 10.39	18 37.7 9.20	20 20 9.51 9.67
31.7	16 4 37.5	58.8	41.0	14.2 27.9
35.0	19 8 41.0	2.0	44.2	17.5 31.2
38.2	23 3 44.7	5.2	47.5	20.5 34.1
41.3	28 8 48.0	8.6	51.0	24.0 37.8
245	30 3 51.6	101	214	27.2 41.0
38 34.90	166 228	16 2.02	18 44.28	34 20 226
−3 2.88 −3 4.54	3 2332 3 4456	−3 2.94 −3 4.63	20	20.68 20 3452
− 1.66	−3 2.92 −3 2.92 −3 4.74 −3 4.74	− 1.69	− 3 2.94 −3 4.58	−3 2.94 −3 2.94 −3 4.58 −3 4.58
35 30.36	− 1.82 − 1.82	12 57.39 −6.91	− 1.64	− 1.64 − 1.64 −7.05
− 3.02	0 18.58 0 39.82 −6.46	− 3.43 −53.76	15 39.70 −7.02	17 16.10 17 29.94 −54.27
35 27.34	− 3.26 − 3.27 −52.17	12 53.96	− 3.46 −54.03	− 3.48 − 3.48 −7.06
	0 15.32 36.55		15 36.24	17 12.62 26.46 −54.27
9.2	9.2 5.6 54°	9.3	7.4	9.2 9.0 51°
	5′ 10.96 4′ 57.48			15′ 31.16 15′ 23.23
38 32.0	3 3 − 2 − 1	15 41.6	17 51.8	19 20
38.5	7.5 44.7 − 15 − 15	49.2	54.3	40.3 3.2 − 32 − 16
44.2	13 5 50.8 +11.64 +11.64	55.8	56.8	45.1 10.6 − 15 − 15
1147 +1.10	21 0 56.2 + 13 + 13	1466	59.3	52.9 15.8 +8.78 +8.78
38 38.23 51 34 58.73	1400 5057 −2880 −2880	15 48.87 51 50 11.50	3.5 51 15 12.93 19	1383 296 + 10 + 10
− 3.33 − 0 + 9.32 6.01 5466 4339	− 16 0.06942 0.77857	+ 13.15 − 5	17 57.10 − 59 + 34.58 + 24.68 45 1167 15 390	46.10 20 987 −29.00 −2900
0.52244	+ 9.11 9.76835 9.76835	1.11893 − 16	+ 47.18 1.63876 1.53882 1.39182	
9.79335	+ 10 0.84489 0.65329 20	9.79095 +9.39	+ 8.78 9.79652 9.79652	5427
0.42186	−28.20	1.01595 + 11	+ 10 1.57635 1.44141 1.29441	
50	20 20	35 −2900	10 −2900	10 10
1 51.9 34 40.72	44.7 44.7	1 46.9 49 52.89	2 13.1 14 53.13	1 44.9 1 44.9
14.7	6.2 6.2	9.7	35.3	6.9 6.9
66	1109 1109	1166	484	1118 1118
52 3.30	21 55.45 21 55.45	36 58.30	12 24.20	11 55.90 11 55.90
30 45.05	0 52.90	45 50.05	10 24.15	10 52.45
51 34 56.13	54 5 3.98	51 50 1.13	51 14 35.23	51 15 3.53
+ 2.64	+ 6.98 −4.50	+10.37	+ 37.70	+ 27.63 +19.70
				19.40 96
	0 30.09 3 51.2	12 47.05 48 59.13	15 29.22 13 59.1	17 5.57 14 17.4

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

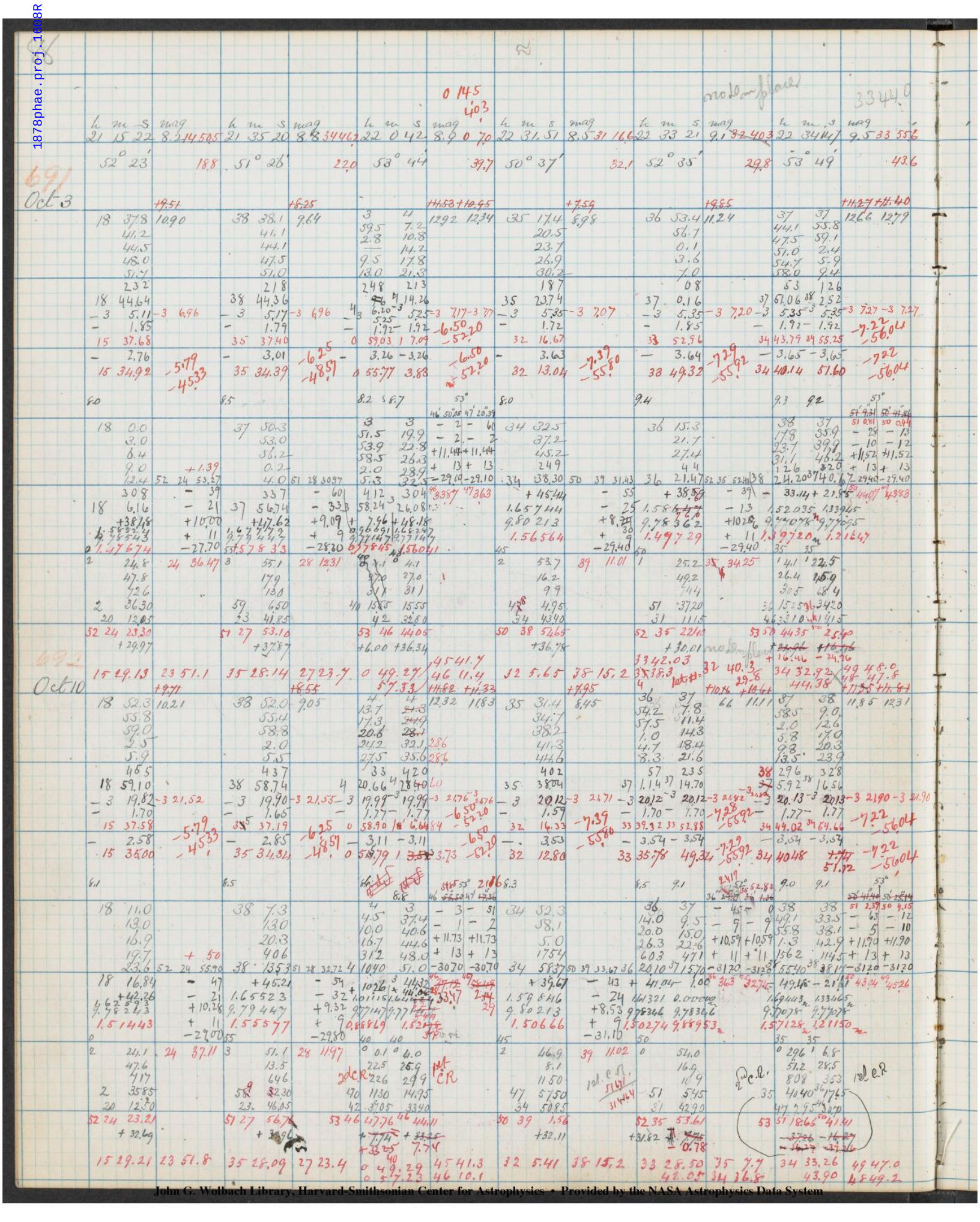
1878 Oct 3, ~~Oct 8~~; Oct 10 Obs. WAR Rec J F M.

691 692

	h m s	mag			h m s	mag	h m s	mag	h m s	mag	h m s	mag
α	20 12 42	7.5 12 15.0			20 20 13	9.3 19 45.7	20 47 40	9.4 47 11.6	21 4 9	9.53 38.2	21 12 41	8.2 12 9.9
δ	51° 36'	33.1			50° 54'	50.6	51° 56'	52.9	52° 5'	0.5	52° 38'	34.0
Oct 3		+8.40	~~Oct 8~~		601-3	+8.27		+9.31 +8.60		+9.46		+10.38
	15 55.9	9.79			23 28.0	9.66	50 56.4 51 4.7	10.70 9.99	7 26.5	10.85	15 56.9	11.77
	59.0				31.3		59.6 7.9		30.0		0.2	
	2.3				34.4		3.1 10.9		33.5		3.7	
	5.8				37.6		6.6 14.8		36.5		7.1	
	9.2				41.0		9.7 17.9		40.2		10.5	
	122				223		154 51 62		167		184	
	16 2.44				23 34.46		51 3.08 1.24		7 33.34		16 3.68	
	−3 4.92	−3 6.71			−3 4.95	−3 6.71	−3 5.03 −3 5.03	−3 6.85 −3 6.85	−3 5.08	−3 6.90	−3 5.11	−3 6.96
	− 1.79				− 1.76		− 1.82 − 1.82	−5.41	− 1.82		− 1.85	
	12 55.73				20 27.75		47 56.23 48 4.39	−40.20	4 26.44		12 56.72	
	− 2.26				− 2.22		− 2.47 − 2.47		− 2.64	−5.64	− 2.72	
	12 53.47				20 25.53	−5.18 −34.59	47 53.76 1.92		4 23.80	−43.35	12 54.00	−5.71 −44.85
	8.0				9.3		9.3 ° 9.5	51° 59' 25".34 58' 37".38	9.7		8.3	
	15 13.0				23 8.5		50 31.2 50 12.0	− 15 − 76	6 56.5		15 1.0	
	19.1				13.8		39.5 16.5	− 23 − 33	3.0		7.0	
	24.3				20.8		47.4 23.0	+9.58 +9.58	9.2		13.2	
	264	+1.39			131		281 215	+ 11 11	87		212	
	15 18.80	51 37 37.04			23 14.37	50 55 10.37	50 39.37 50 17.17	−26.40 −26.40	7 290	52 6 18.84	15 7.07	51 40 5.98
	+43.64	− 50			+20.09	− 11	+23.71 +54.07	59 9.64 58 20.97	+30.44	− 25	+56.61	− 83
	1.63988	− 39			1.30298	− 17	1.37493 1.73296		1.48344	− 9	1.75289	− 21
	9.79304	+9.19			9.79965	+8.46	9.78950 9.78967		9.78510	+9.69	9.77963	+11.29
	1.53899	+ 10			1.20870	+ 9	1.27050 1.62870		1.37461	+ 11	1.63859	+ 13
	45	−24.40	45		30	−24.80	25 25		20	−27.20	2545	−27.60
u = −1.48 2	4 46.1	37 22.43	4 45.9		1 53.9	54 55.23	2 41.8 3 53.5		0 52.8	6 2.49	2 25.5	39 50.15
	8.2		7.5		16.9		4.0 16.0		16.1		494	
Rrs. = −08	1143		1134		108		1058 9.15		889		749	
	49 57.15		49 56.70		3x2 540		27 52.90 29 4.50		28' 3445		487 3745	
+4' 11".25	32 51.20		~~54 7.95~~		50 4295		54 554 5 53 4.75 43.60		31 43.90		355 10.90	
	51 37 2.45				50 54 54.20		51 59 6.70 57 54.85		52 5 55.15		52 39 22.15	
	+34.59				+16.17		+18.64 +42.53	no Comp place	+23.69		+43.51 83	
					20 20.35	54 20.6	47 48.35 ~~58 29.44~~	47 11.6 52.9	4 18.16	5 19.1	12 46.29	39 5.3
Oct 10						+8.41		+9.52 +9.49		+9.59		+10.40
					23 51.1	9.1	50 48.0 51 10.6	10.02 9.99	7 41.0	10.09	16 11.2	10.90
					54.5		51.1 14.1		44.0		14.5	
					57.7		54.8 17.3		47.5		18.0	
					1.0		58.1 20.6		51.0		21.5	
					4.5		1.5 24.2		54.2		24.8	
					388		235 368		377		400	
					23 57.76		50 54.70 51 17.36		7 47.54		16 18.00	
					−3 19.62	−3 21.24	−3 19.72 −3 19.72	−3 21.40 −3 21.40	−3 19.78	−3 21.46	−3 19.82	−3 21.52
					− 1.62		− 1.68 − 1.68	−5.41	− 1.68		− 1.70	
					20 36.52		47 33.30 47 55.96	40.20	4 26.08		12 56.48	
					− 2.01		− 2.26 − 2.27	−5.41	− 2.46	−5.64	− 2.54	−5.71
					20 34.51		47 31.04 53.69	−40.20	4 23.62	−43.35	12 53.94	−44.85
	8.8		9.2		9.2		9.1 9.0	51° 57' 13".31 58' 13".34	9.7		7.8	
					23 30.4		50 15.2 51 27.5	− 31 − 9	7 3.0		15 55.0	
					36.9		20.9 33.8	− 1 − 28	9.8		59.7	
					43.6		26.6 41.0	+9.73 +9.75	20.3		6.7	
					1109	+.501	627 1823	+ 11 + 11	331		1.4	
					23 36.97	50 54 34.20	50 20.90 51 37.43	−27.40 −27.50	7 11.63	52 6 21.19	16 0.47	52 40 8.85
					+20.79	− 12	+33.80 − 34.10 16.74	56 55.93 57 55.83	+36.51	− 35	+17.53	− 8
					1.31785	− 21	1.52892 1.22376		1.56241	− 9	1.24378	− 16
					9.79981	+8.65	9.78983 9.78967		9.78837	+9.92	9.78280	+10.57
					1.22373	+ 9	1.42482 1.01950		1.45685	+ 11	1.13265	+ 13
					30	−25.60	30 25		20	−28.40	45	−28.90
u = −1.35 1	45 4	45.9			2 30.3	54 17.51	0 1.0 3 21.6		0 55.1	6 2.88	1 54.7	39 50.83
Rrs = −.08		7.5			52.9		23.7 43.5		17.9		12.9	
					832		24.7 65.1		13.0		7.6	
+4' 10".71					32 41.60		30 12.35 28 32.55		2x' 6.50		47 3.80	
					50 6.75		52 36.00 54 15.80		1 41.85		35 44.55	
					50 54 17.46		51 56 46.71 58 26.51		52 5 52.56		52 39 55.26	
					+16.74		+26.60 −13.17		+28.63		+13.57	
							47 25.63 48.28	56 15.7 57 15.6	4 17.98	5 19.5	12 48.23	39 6.0

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1608R



John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1879phae.proj.16018R

no Dm flare

	h m s	mag		h m s	mag		h m s	mag	
	22 37 29	9.4	36 47.2	22 39 23	9.0	38 37.9	22 41 36	8.6	40 54.5
	53° 20'		15.0	53° 25'		30.3	53° 16'		11.3
					+10.98			+10.11	
				42 13.0	12.37		44 55.5	11.50	
				16.7			59.0		
				20.0			2.4		
				23.4			5.8		
				26.5			9.2		
				49.6			119		
				42 19.92			45 2.38		
				−3 5.57	−3 7.29		−3 3.38	−3 7.27	
				− 1.92			− 1.89		
				39 12.63			41 55.11		
				− 3.70			− 3.74		
				39 8.93	−7.34		41 51.37	−7.42	
					−56.49			−56.70	
				9.3			8.5		
				41 53.7			44 6.4		
				58.0			11.2		
				2.0			16.7		
				23.7			43		
				41 57.90	53 26 2.50		44 11.43	53 18 58.72	
				+ 22.02	− 13		+ 50.95	− 68	
				1.342 62	− 10		1.707 14	− 80	
				9.775 07	+11.10		9.776 43	+10.98	
				1.223 96	+ 11		1.589 64	+ 11	
				0	−29.40		5	−29.40	
				1 2.7	25 45.47		3 31.6	18 34.82	
				25.0			59	62	
				27.7			855		
				1 13.85			8 43.75		
				21 34.51			14 45.60		
				53 25 45.75			53 18 16.85		
				+ 16.75			+ 38.87		
				39 1.59	24 49.0		41 43.95	17 40.1	
		+11.01			+11.47			+10.94	
	41 16.0	61		42 27.8	97		45 10.0	11.44	
	19.3			31.1			13.3		
	22.6			34.2			16.6		
	26.3			37.8			20.2		
	29.7			41.4			23.6		
	13.49			2.23			33.7		
	41 22.78			42 34.46			45 16.74		
	−3 20.14	−3 21.91		−3 20.14	−3 21.91		−3 20.15	−3 21.89	
	− 1.77			− 1.77			− 1.74		
	38 0.87			39 12.55			41 54.85		
	− 3.58			− 3.60	−7.34		− 3.64	−7.42	
	37 57.29			39 8.95	−56.49		41 51.21	−56.70	
	9.4			9.4			8.0		
	40 34.0			42 19.0			44 40.0		
	41.5			26.4			47.2		
	47.3			32.0			53.3		
	122.8			774			1405		
	40 40.93	53 22 6.19		42 25.80	53 26 4.85		44 46.83	53 17 54.13	
	+41.85	− 46		+ 8.66	− 2		+ 29.91	− 24	
	1.621 70	− 3		1.493 752	− 8		1.475 82	− 27	
	9.775 75	+11.39		9.775 07	+11.46		9.776 43	+11.34	
	1.508 52	+ 11		0.818 66	+ 11		1.458 594	+ 11	
	5	−31.30		0	−31.20		5 1.358 32	−31.80	
	0 13.5	21 46.40		0 50.1	25 45.62		3 17.1	18 34.27	
	36.0			11.5			38.4		
	49.5			16			555		
	5 24.75			1 0.80			8 27.75		
	14 2.360			21 47.55			14 20.60		
	53 21 34.31			53 25 58.24			53 18 31.31		
	+31.68			+ 6.59			+ 30.62		
							22.82		
				39 1.61	24 49.1		41 43.79	17 37.6	

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16008R

1878 Oct 14, Oct. 15 Obs. WAR Rec. J & Mc.

J 455

J 464

	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.
α	20 12 49	7.6 12 22.8	20 12 55	8.9 12 28.8	21 4 28	9.5 3 57.7	21 12 27	8.9 11 56.6	21 12 57	9.2 12 25.6	21 15 35	8.4 15 2.1
δ	51° 42′	39.5	51° 45′	42.2	52° 47′	43.4	51° 56′	52.4	51° 58′	54.7	52° 47′	42.5

Oct 14

	+9.76		+9.53		+10.03 +10.26		+9.56		+9.87		+10.07 +10.42	
	16 26.1	61	16 34.5	98	7 8	88 91	16 7.6	10.01	16 36.8	10.32	18 19	52 87
	29.3		37.8		54.1 6.4		11.0		40.0		58.4 13.4	
	33.0		41.3		57.8 9.9		14.3		43.4		1.8 16.9	
	36.3		44.5		1.0 13.3		17.9		47.0		5.4 20.2	
	39.8		47.9		4.3 17.0		20.8		50.0		8.8 23.8	
					7.7 20.3						12.1 27.2	
	145		60		49 169		216		172		265 19 18	
	16 32.90		16 41.20	8	0.98 1.38		16 14.32		16 43.44		18 5.30 20.30	
	−3 28.82	−3 30.45	−3 28.82	−3 30.46	−3 28.99 28.99	−3 30.67 30.67	−3 29.01	−3 30.66	−3 29.01	−3 30.66	−3 29.02 29.02	−3 30.70 −3 30.70
	− 1.63		− 1.64		− 1.68 1.68		− 1.65		− 1.65		− 1.68 1.68	
	13 2.45		13 10.74		4 30.31 4 42.71		12 43.66		13 12.78		15 34.60 15 49.60	
	− 1.80		− 18.00		− 2.32 − 2.32		− 2.45		− 2.46		− 2.46 − 2.46	
	13 0.65	−4.96 −37.94	13 18.80 8.94	−4.96 −33.00	4 27.99 40.39		12 41.21		13 10.32	−5.80 −44.88	15 32.16 47.14	

7.2 8.9 9.4 9.3 8.7 9.0 9.0 8.5

	15 48.7		16 12.0		7 8	− 20 − 17	15 53.4		16 37.1		18 19	− 37 − 5
	56.4		18.3		26.2 32.0	− 21 − 21	0.5		42.5		20.5 27.8	− 36 − 33
	2.4		24.4		33.7 38.6	+10.73 +10.73	5.5		49.4		28.0 34.9	+10.69 +10.69
	1.75		24.7		40.1 45.5	+ 11 + 11	29.4		90		34.0 41.2	+ 11 + 11
	15 55.83	51 43 + 45 57 58.18	16 18.23	51 46 48.87 57 46.36	100 38.70	−29.00 −29.00	15 59.80	51 58 41.44	16 43.00	52 0 48.62	225 19 39.60	−29.60 −29.60
	+37.07	− 36	+22.97	− 14	+27.65 − 25.32	39.43 46 58.60	+14.52	− 6	+ 0.44	− 0	18 27.50 19 34.63	46 47 47 47.78
	1.56902	− 32	1.36116	− 4	1.40170 1.40316		1.16197	− 329.64345		− 11	+ 37.80 − 46.07	
	9.79047	+ 9.74	9.72683	+9.61	9.78113 9.78113		9.78950	+9.84	9.78918	+9.88	1.58149 1.15625	
	1.46556	+ 10	1.49406	+ 10	1.32890 1.29066		1.05754	+ 10	9.53870	+ 10	9.76142 9.78147	
	40	−25.50	40 25 883	−25.50	35 35		25	−29.40 25		−29.50	1.46503 1.06359	
n = ~~−1.32~~ 1.29	3 19.9	53 43 42.29	0 18.2	46 33.35	2 12.8 2 12.8		3 18.9	58 22.05	0 0.9	0 29.44	3 50.7 3 31.6	
	42.7		40.9		35.3 35.3		41.6		23.1		19.1 53.8	
Rms. = .09	6.26		59.1		48.1 48.1		60.5		24.0		38 8.41	
	43 31.30		40 29.55		37 24.65 24.05		28 30.25		26 12.00		39 1.90 38 42.70	
+4′ 11.92	3.9 17.05		42 18.80		45 24.30		54 18.10		56 36.35		43 44.45 44 3.45	
	51 53 28.97		51 46 30.72		52 49 36.22		51 58 30.02		52 0 48.27		52 47 58.37 44 17.37	
	4 +29.21		1 +15.63 18.15		+21.33 −19.53		+11.42	11 42.3 57.14	+ 0.35		+29.15 −11.06	
	4 22.44	4856.0	4 34.84	4815.2	12 35.41		−57 37.2	11 56.6 57.14			15 26.40	47 23.1
	1255.69	43 9.4	13 3.98	46 0.4				+9.09 +9.28	13 4.52	59 44.6	15 41.40	47 2.4
Oct 15										+9.64	15	+10.18 +10.25
							15 16	71 70	16 36.5	10.26	18 19	10.76 87
							52.8 7.5		40.2		58.6 13.4	
							58.0 11.0		43.5		1.8 17.0	
							59.5 14.3		47.0		5.3 20.3	
							2.9 17.1		50.3		8.6 23.7	
							6.2 21.0		17.05		12.2 27.1	
							474 215				265 15	
							15 59.48 16 14.30		16 43.46 58		19 5.30 19 20.30	
							−3 31.16 31.16	−3 30.86 −3 32.95 3081 3081	−3 31.16	−3 32.95 3081	−3 31.17 31.17	−3 32.99 −3 32.99 3081 3081
							− 1.69 − 1.69		− 1.69		− 1.72 − 1.72	
							+ 2.04 + 2.04	−5.79 −44.82	+ 2.04		+ 2.08 + 2.08	−5.74 −45.36
							12 28.67 12 43.49		13 12.69	−5.80 −44.88	15 34.49 18 49.49	
							− 2.42 − 2.42	−5.80 −44.82	− 2.44		− 2.43 − 2.43	−5.74 −45.36
							12 26.25 41.07		13 10.25		15 32.06 47.06	
							7.9 8.9	58 40.72 58 41.87	9.1		8.8 8.3	
							15 15	− 32 − 33	16 29.3		18 19	− 12 − 1
							19.1 32.7	− 34 − 34	36.0		37.9 18.8	− 34 − 34
							24.8 38.6	+9.65 +9.65	41.3		42.6 26.5	
							30.6 44.4		16.6		50.8 32.9	+10.49 +10.49
							145 257	+ 10 + 10			113 19 182	+ 11 + 11
							15 24.83 15 38.57	−29.60 −29.60	16 35.53 52 0 49.18		18 43.77 26.07	−29.80 −29.80
							+34.65 + 35.78	58 20.63 58 21.67	+ 7.97	− 21 +	21.53 − 57.33	58 9.35 47 48.54
							1.53970 1.55303		0.90146	− 11	1.33304 1.72640	
n = −1.32							9.73967 9.78947		9.78918	+9.67	9.78114 9.78147	
							1.43544 1.44877		0.79671	+ 10	1.22058 1.63354	
							25 85		25	−29.80	35 35	
Cor. = +1.26							335.7 335.7		1 6.1	0 29.64	3 37.3 3 37.3	
Rms. = .09							57.9 57.9		28.6		57.7 59.7	
+4′ 11.92							93.6		34.7		7.7 17.0	
							28 46.80		26 17.35		38 48.50	
							54 1.55		56 31.00		43 59.85	
							51 58 13.47		52 0 42.92		52 48 11.77	
							+2.25 +28.10		+ 6.26		+ 16.62 − 43.05	
											− 4.30	
							12 20.46 35.27	57 36.0 36.8	13 4.45	59 44.8	15 26.32 41.32	47 24.0 3.2

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16018R

1878 Oct. 14, Oct 15. 91

		Mag.		Mag.		Mag.		Mag.		Mag.		Mag.
	h m s		h m s		h m s		h m s		h m s		h m s	
α	22 31 51	8.5	22 32 27	9.0	22 35 6	6.6	22 37 56	8.5	22 41 40	8.2	22 44 29	8.1
δ	50° 31′		53° 16′		53° 10′		50° 48′		53° 4′		53° 22′	

Oct. 14

	+7.90		+10.72		+10.36		+8.26		+10.54		+10.92	
35 22.5	8.35	35 55.2	11.17	38 48.2	.81	41 40.2	.71	45 23.5	.99	48 11.1	.87	
25.8		58.5		51.9		43.6		27.0		14.7		
29.0		2.0		55.0		47.0		30.5		18.1		
32.0		5.8		58.5		50.2		34.0		21.5		
35.7		9.1		2.0		53.5		37.5		25.0		
480		106		256		345		25		404		
35 29.00		36 2.12		38 55.12		41 46.90		45 30.50		48 18.08		
−3 29.27	−3 30.83	−3 29.27	−3 30.94	−3 29.28	−3 31.00	−3 29.29	−3 30.85	−3 29.30	−3 31.02	−3 29.31	−3 31.05	
− 1.56		− 1.72		− 1.72		− 1.56		− 1.72		− 1.74		
31 58.17		32 31.13		35 24.12		38 16.05		41 59.48		44 47.03		
− 3.46		− 3.44		− 3.48		− 3.54		− 3.57		− 3.60		
31 54.71	−7.40 −5580	32 27.69	−7.21 −5583	35 20.64	−7.28 −5610	38 12.51	−7.50 −5637	41 55.91	−7.43 −56.70	44 43.43	−7.47 −56.94	
8.3		9.0		8.3		8.6		8.3		8.2		
34 58.0		36 27.5		38 5.0		41 5.0		44 36.4		47 40.9		
2.7		34.4		8.2		10.0		42.2		46.7		
9.2		42.4		11.3		16.2		49.0		54.0		
99		143		13.4		12		76		216		
35 3.30	50 29 6.45	36 34.77	53 17 41.61	172	53 12 59.64	41 10.40	50 60 51.65	44 42.53	53 7 11.47	47 47.20	53 24 1.17	
	− 18	− 32.65	− 28	51	− 51	+ 3650	− 36	+47.97	− 60	+ 30.88	− 25	
	− 29		− 35	38 11.02	− 41	1.56229	− 15	1.68094	− 3	1.48968	− 30	
1.40993	+ 8.70	1.51358	+ 11.24	+ 44.10	+ 11.17	9.80043	+ 8.68	9.77829	+ 11.06	9.77541	+ 11.36	
9.80366	+ 8	9.77643	+ 11	4.644444	+ 11	1.46879	+ 9	1.56523	+ 11	1.37116	+ 11	
1.38966	− 32.00	1.39638	− 32.10	10.152765	− 32.20	35	− 32.10	20	− 32.20	0	− 32.20	
55		5										
3 42.2	28 42.80	3 43.1	17 20.68	41 23.1	12 38.25	1 26.8	50 28.26	0 14.2	6 50.26	3 12.3	23 40.34	
25.2		4.4		45.6		49.3		36.9		32.9		
29.4		107.5		687		461		511		46.2		
58 14.70		8 53.75		14 34.35		36 38.05		20 25.585		3 22.60		
24 3.265		13 54.60		8 14.01		46 10.30		2 2.280		19 2.545		
50 28 45.57		53 18 6.52		53 12 25.92		50 50 22.22		53 6 34.72		53 23 37.67		
+ 20.88		−24.91		+ 33.72		+ 29.43		+ 36.75		+ 25.50		
31 47.31	27 47.0	32 20.48	16 24.8	35 13.36	11 42.2	38 5.01	49 31.9	41 48.46	5 53.6	44 35.96	22 43.4	
	+7.63		+10.63		+10.68		+7.90 +8.31		+10.44		+10.31	

Oct. 15

35 22.7	8.25	—	11.25	38 48.3	.70	41 41	8.52	93	45 23.7	11.06	48 11.0	93
25.8		—		51.6		40.5			27.0		14.5	
29.2		36 2.1	2.10	55.1		43.8			30.4		18.0	
32.4		5.5	2.06	58.5		46.8			34.0		21.5	
35.8		9.0	2.12	2.1		50.4			37.4		25.0	
459		28		256		290 349			25		400	
35 29.18		36 2.09		38 55.12	41	35.80 41 46.98			45 30.50		48 18.00	
−3 31.32	−3 30.92 30.94	−3 31.32	−3 31.08 30.98	−3 31.33	−3 31.09 31.00	−3 31.33	31.33 −3 30.75	−3 30.96	−3 31.34	−3 31.01	−3 31.35	−3 31.01
− 1.60		− 1.76		− 1.76		− 1.60	− 1.60		− 1.76		− 1.78	
+ 1.98		+ 2.10		+ 2.09		+ 1.98	+ 1.98	−7.50	+ 2.09		+ 2.12	
31 58.24	−7.40	32 31.11	−7.21	35 24.12	−7.28	38 4.85	38 16.03	−5637	41 59.49	−7.43	44 46.99	−7.47
− 3.44	−5580	− 3.42	−5583	− 3.46	−5610	− 3.52	− 3.52		− 3.55	−56.70	− 3.59	−5694
31 54.80		32 27.69		35 20.66		38 1.33	12.58		41 55.94		44 43.40	
8.1		9.1		6.0		9.1	8.2		8.1		8.3	
							50° 5.17.80	50.70				
34 49.9		36 19.3		38 2.9		40 41	− 47 − 15		44 40.7		47 24.0	
56.2		26.2		5.5		47.7 16.4	− 22 − 13		47.8		26.4	
1.7		33.8		8.7		53.0 23.0	+ 8.50 +8.50		54.4		29.5	
178		79.3		11.8		0.2 30.0	+ 9 + 9		1429		32.7	
34 55.93	50 29 7.98	36 26.43	53 17 42.35	15.1	53 12 59.7940	1609 694	53 41 23.13	−32.30 −32.30	44 47.63	53 7 12.42	36.2	53 24 1.65
+33.25	− 30	− 24.34	− 15	38 8.80	− 56	+ 42.17 + 23.85	49 4.39	50 27.33	+ 42.87	− 48	47 29.76	− 61
1.52179	− 30	1.38632	− 36	+ 46.32	− 41	1.62500 1.37745			1.63215	− 3	+48.24	− 33
9.80366	+8.15	9.77643	+11.03	4.666777	+1094	9.80043 9.80043			9.77829	+1084	1.68341	+11.14
1.43152	+ 8	1.26882	+ 11	1.54928	+ 11	1.53150 1.28359			1.51651	+ 11	1.56506	+ 11
55	−32.205		−32.40	10	−32.40	35 35			20	−32.50		−32.50
3 8.9	28 44.03	3 46.7	17 21.20	4 24.7	12 38.09	2 18.1 17.7			0 9.5	6 50.98	8 24.6	23 40.08
29.7		10.0		47.1		40.1 39.9			31.9		46.1	
38.6		1187		7118		582 576			414		10.7	
58 19.30		8 59.35		14 35.90		37 29.10 36 28.80			20 20.70		3 35.35	
24 2.305		13 4.950		8 12.45		45 17.25 46 19.55			2 2.765		19 1.510	
50 28 40.97		53 18 0.92		53 12 24.37		50 49 31.17 50 31.47			53 6 39.57		53 23 24.92	
+ 27.01		−18.57		+ 35.42		+34.00 +19.23			+ 32.85		+ 36.73	
31 47.40	27 48.2	32 20.48	16 25.4	35 13.38	11 42.0	38 5.01	49 31.0		41 48.51	5 54.3	44 35.93	22 43.1

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1008R

1878 Oct. 16, Oct. 29. Obs. W.A.R. Rec. J.F.M.

	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.
α	20 12 49	7.6 12 22.8	20 12 55	8.9 12 28.8	21 4 28	9.5 3 57.7	21 18 11	9.0 17 39.6	22 32 6	9.5 31 25.8	22 33 26	9.3 2 45.0
δ	51° 42′	39.5	51° 45′	42.2	52° 44′	43.4	49° 56′	52.5	52° 15′	9.6	52.12	6.7 8.1

Oct 16.

	+9.02 +9.19		+8.46 +8.36		+14.31 +10.86		+6.83 +7.02		+9.65		+9.80	
	15 15		16 16		7 8		21 22					
	32.2 50.4	86 10.03	30.4 38.2	9.30 9.70	58.2 11.2	11.15 90	58.5 11.7	7.67 .86	35 53.2	10.49	37 18.0	10.64
	35.7 53.8		33.7 41.7	90	1.7 14.3		1.8 14.6		56.5		16.4	
	42.5 57.3		37.0 45.0		5.0 17.3		5.0 18.0		0.0		19.8	
	45.8 0.6		40.3 48.5		8.3 20.9		8.3 21.0		3.5		23.0	
	49.0		43.8 51.9		11.8 24.4		11.4 24.2		6.8		26.4	
	36.2 36.1		35.2 16 25.3		2.50 8 38.1		2.60 39.5		00		48.6	
15	39.05 15 57.22		37.04 45.06	-3 34.72	5.00 8 17.62	22	5.00 22 17.90		36 0.80		37 19.72	
-3	33.12 33.12	-3 34.72 -3 34.72	33.12 33.12	-3 34.72	3.23 23.23	-3 34.86 -3	3.27 23.27	-3 34.78	-3 33.43	-3 35.06	-3 33.43	-3 35.06
-	1.60 - 1.60	-	1.60 - 1.60	-4.96	1.65 - 1.65	-3 34.86 -	1.51 - 1.51	-3 34.78	- 1.63		- 1.63	
12	4.33 12 22.50	13	2.32 13 10.34	-33.00 4	30.12 4 42.74	18	30.22 18 43.12	-6.12 -45.81	32 24.94		33 44.66	
	- 1.69 - 1.69		- 1.70 - 1.70	-4.96 -	2.26 - 2.26	-5.55 -43.38 -	2.54 - 2.54	-6.13 -45.81	- 3.41	-7.26 -55.80	- 3.43	-7.31 -55.92
12	2.64 20.81	13	0.62 8.04	-33.00 4	27.86 40.48	-5.55 -43.38 18	27.68 40.58	-6.13 -45.81	32 21.53		33 31.23	
	9.0 9.0		7.3 8.7		9.5 9.5		9.3 8.7		9.2		8.4	
		51° +8.4		51°		49°		49°				
		43′ 28.43 44 30.05		42′ 36.58 46 50.18		49′ 57.96 49′ 17.64		57′ 54.96 57 43.35				
	VS 15	- 8 - 3	17 17	- 61 - 72	7 8	- 8 - 33	21 21	- 41 - 22	35 15.3		37 3.3	
	15.3 59.6	- 33 - 21	19.7 36.0	- 33 - 21	42.3 47.6	- 20 - 20	20.4 43.0	- 42 - 42	21.8		6.3	
	21.5 6.1		25.4 44.4		48.2 52.7		25.6 49.7		28.0		9.0	
	28.0 13.4	+ 9.33 + 9.33	30.5 51.4	+ 9.30 + 9.39	54.2 59.1	+10.48 +10.48	32.4 56.0	+ 7.58 + 7.58	51		12.0	
	48 19.1	+ 10 + 10	156 118	+ 10 + 10	247 94	+ 11 + 11	184 287	+ 8 + 8				
15	21.60 16 6.37	-25.60	25.20 43.73	-25.60	48.23 8 53.13	-29.30	26.13 21 49.57	-29.80 -29.80	35 21.70	52 17 4.39	15.8	52 14 45.54
	1 17 21.5	- 9.15 12.74 14.58	-48.16 -58.87	2024	16.77 - 35.51	3981	38.87 + 28.38	3283 9141	+ 38.30	- 39	464	- 3
	1.24150 1.96142		1.48269 1.76989		1.22453 1.55035		1.58961 1.45225		1.55320	- 3	37 9.28	- 21
	9.79208 9.79106		9.79208 9.79128		9.78113 9.78113		9.80852 9.80852		9.78658	+9.97	+10.44	+9.94
n = -1.33	1.39954 8459 25		1.58084 1.66124		1.11173 1.48755		1.50420 1.36684		1.47585	+ 10	9.98299	+ 10
-1.27	40		40 35		35 35		25 25		10	-32.60	10 0.91168	-32.60
Rho = -.09	3 33.5 2 10.6		3 33.5 4 11.9		2 2.8 2 2.8		2 25.2 40 27.8		0 13.4	16 42.28	2 10.9	14 23.58
	56.3 33.9		56.3 33.9		26.2 26.2		47.8 57.1		36.4		33.4	
+4′ 11.18	898 445		898 458		290		8 730 789		501		443	
	43 44.90 43 22.25		43 44.90 39 22.90		37 14.50		36.50 37.545		10 25.05		12 22.15	
8	39 3.45 40 26.10		39 3.45 42 25.45		45 33.85		53 118.5 53 8.90		12 23.30		10 26.20	
	51 43 14.63 44 37.28		51 43 14.63 47 36.63		52 49 45.03		49 57 23.03 57 20.08		52 16 34.48		52 14 37.38	
	+18.80 - 7.23		-36.09 -46.48		A 12.93 -27.39		+31.63 +23.27		+29.91		+ 8.16	
			12 55.46		4 22.91	48 56.4	18 21.56	56 47.0	32 14.25	1546.5	33 33.92	13 27.7
			13 3.68 46 6.8		34.93 9.5 9.4	15.9	34.45 9.2 8.4	58 85.7 9.5			8.4	
Oct. 29						+10.37 +10.55		+7.43 +7.67		+10.06		+9.95
					8 8	25 43	22 22	31 55	36 21.3	9.94	37 41.0	83
					26.0 38.7		26.2 39.5		24.7		44.2	
					29.7 42.2		29.5 42.7		28.0		47.6	
					33.0 45.5		32.8 46.0		31.5		51.1	
					36.5 49.2		36.0 49.0		34.8		54.5	
					39.8 52.3		39.2 52.4		403		384	
					1 50 2 79		1 37 2 96		36 28.6		37 47.68	
					8 33.00 8 45.58	22	32.74 22 45.92		- 4 1.88	+4 3.43	- 4 1.88	-4 3.43
					- 4 1.70 1.70	-4 3.27 -4	1.73 1.73	-4 3.17	- 1.53		- 1.65	
					- 1.57 - 1.57	-4 3.27 -	1.44 - 1.44	-4 3.17	32 24.63		33 44.25	
					4 29.73 4 42.31	-5.55 -43.38 18	29.57 18 42.75	-6.12 -45.81	- 3.14	-7.26 -55.80	- 3.16	-7.31 -55.92
					- 1.86 - 1.87	- 2.19 - 2.19			32 21.49		33 41.09	
					4 28.57 40.44	-5.55 -43.38 18	27.38 40.56	-6.13 -45.81				
					27.87	-12						
						49′ 57.28 49 17.22		57′ 56.89 57 44.94				
					7 8	- 43 - 18	22 23	- 12 - 14	35 43.2		37 9.8	
					44.6 12.7	- 23 - 30	5.1 4.3	- 42 - 20	48.3		12.5	
					58.5 19.2	+10.91 +10.91	11.0 8.0	+7.88 +7.92	54.9		16.2	
					59.2 27.0	+ 12 + 12	18.4 13.5	+ 9 + 9	1474		19.0	
					1573 589	-30.50	345 258	-31.20 -31.20	35 49.43	52 17 7.40	22.6	52 14 48.20
					7 52.43 8 19.63	-80.59	11.50 23 8.60					
					+40.57 +25.59	3700	21.24 22.68	3300 21.29	+38.93	- 40	37 16.02	- 26
					1.60821 1.41444		1.32715 1.35566		1.59028	- 2	+31.66	- 24
					9.78130 9.78130		9.80837 9.80807		9.78658	+10.36	9.78705	+1033
					1.49558 1.30151		1.24159 1.26965		1.48293	+ 12	1.53365	+ 12
									10	-35.00	10	-35.00
	40 35				35 35		25 25					
n = -1.21	2 10.6 4 11.9				2 22.62 51.2		4 9.6 45.9		0 11.4	16 42.24	2 25.6	14 23.03
	33.9 33.9				43.9 12.8		29.9 5.4		32.1		45.9	
Rho = -.10					65 40		395 1113		438		715	
+4′ 10.85					37 33.25 58 2.80		29 14.75 26 55.65		10 21.90 +30		12 35.75	
					45 1.510 42 43.5		53 25.60 55 52.70		12 26.15		10 12.60	
					52 49 25.95 45 37.20		49 37 39.45 0 35.5		32 16 37.20		32 14 23.45	
					+31.30 +20.02		+17.44 +18.61		+30.40		+ 24.75	
					4 22.32	48 53.6	18 21.26	56 47.2	32 14.21	1546.5	33 33.78	13 27.1
					34.89	13.8	34.43	58 25.5				

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1698R

695 696

1878 Oct 16 Oct 29.

39 353
55 1

	K	m	s	mag	K	m	s	mag.
α	22	40	05	6.4 39 234	22	41	59	7.0 41 173
δ	°	′			°	′		
	54	2		53 574	52	42		373
				84				

Oct 16

+11.29 +11.26 +9.74

43 44 12.13 12.10 45 45.8 10.58
50.5 4.9 49.4
54.0 8.5 52.8
57.5 12.0 56.2
1.1 15.7 59.8
4.4 19.3

375 104 140
43 57.50 44 12.08 45 52.80
−3 33.44 33.44 −3 3519 −3 33.45 −3 3510
− 1.75 − 1.75 −3 3519 − 1.65
40 22.31 40 36.89 −7.33 42 17.70
− 3.50 − 3.57 −56.55 − 3.54
40 18.81 33.38 −7.34 42 14.16 −7.46
−5655 −56.73

8.2 8.8 54° 6.8
5′ 1.91 3′ 68

43 43 − 44 − 27 45 1.0
10.5 32.2 − 22 − 38 3.4
16.9 39.3 +11.83 +11.79 6.5
22.4 48.4 + 12 + 12 10.0
198 299 −3270 −32.70 13.1 52 44 44.24
43 16.60 43 39.97 + 40.90 + 32.11 4134 4609 340 − 56
1.61172 1.50664 45 680 − 26
9.76835 9.76852 + 46.00 + 10.45
1.48614 1.38123 166276 + 11
9.78273 −32.70
20 20 1.55096 40
2 166 4 6.1 2 39.2 24.1 44 22.12.
399 27.7 25 43.2
565 33.8 1017 69.3
22 2825 24 1690 42 3085 3965
0 2010 58 3145 39 57.20
54 4 31.28 2 4263 52 44 8.68
+30.63 +24.06 +35.56
40 11.48 3 44.8
26.04 1 49.5 42 6.70 43 25.4

Oct 29

+12.17 +11.81 +10.52

44 44 05 69 46 14.0 40
19.0 33.5 17.0
22.0 37.0 21.0
25.5 40.2 24.4
29.0 43.7 27.8
32.7 47.3
282 17 42
44 25.64 44 40.34 46 20.84
−4 1.90 1.90 −4 357 −4 3.57 −4 1.90 −4 3.47
− 1.67 − 1.67 −7.33 − 1.57
40 22.07 40 36.77 −56.55 42 17.37
− 3.23 − 3.23 −7.34 − 3.28 −7.46
3.23 33.54 −56.55 42 14.09 −56.73
40 18.84

7.4 8.8 54° 6.5
5′ 2.09 3′ 9.29

48 44 − 7 − 16 45 45.5
58.8 57.8 − 21 − 43 48.8
4.9 5.8 +12.31 +12.26 51.0
11.2 11.5 + 14 + 14 53.7
17.5 15.1 −3540 −3540 57.4 52 44 47.40
44 8.10 45 5.03 + 17.54 −24.69 3874 4558 45 51.28 − 23
1.24403 1.39252 + 29.56 − 23
9.76835 9.76857 9.47070 +10.86
1.19845 1.26746 1.35890 + 12
20 20 40 −35.30
2 0.6 3 21.4 2 24.1 44 22.50
199 41.4 45.2
205 3 62.8 69.3
22 1025 24 3140 42 34.65
0 3810 58 695 40 1370
54 4 48.95 3 27.60 52 44 24.54
+13.14 − 18.51 + 22.85

40 11.51 3 42.2 42 6.63 43 25.8
26.20 1 49.0

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1698R

1878 Nov. 2, Nov. 3. Obs. W.A.R. Rec. J.F.M.

	1	2	3	4	5	6	7	8
α	h m s	Mag	h m s	Mag	h m s	Mag	h m s	Mag
	12 16 12.1	7.8	12 52 9.22	9.3	31 27.5		22 41 20.40	8.9
δ	54 8 19.0	14.7	54 31 27.2		53 39 34.1		54 15 9.5	
Nov 2		+11.82		+12.27		+11.45		+11.87
	17 4.9	64	17 38.3	09	36 36.5	27	45 39.4	69
	8.6		41.8		40.0		42.9	
	11.9		45.4		43.3		46.7	
	15.5		49.0		47.2		50.0	
	19.2		52.5		51.0		54.1	
	101		270		180		331	
	17 12.02		17 45.40		36 43.60		45 46.62	
	−4 10.16	−4 18.72	−4 10.16	−4 11.73	−4 16.31	−4 11.82	−4 10.33	−4 11.88
	− 1.56		− 1.57		− 1.51		− 1.55	
	13 0.30		13 33.67		32 31.78		41 34.74	
	− 1.77	−5.47	− 1.76	−5.48	− 3.02	−7.18	− 3.15	−7.34
	12 58.53	−44.86	13 31.91	−44.97	32 28.76	−55.80	41 31.59	−56.67
	8.5		8.2		9.4		9.8	
	16 21.9		17 58.0		36 7.6		44 59.2	
	28.2		4.0		15.5		4.6	
	35.2		9.8		22.3		12.3	
	253	−.18	118		454		161	
	16 28.43	54 20 48.36	18 3.93	54 33 8.39	36 15.13	53 40 50.29	45 5.37	54 16 10.91
	+43.59	− 50	− 18.53	− 8	+ 28.47	− 21	+ 41.25	− 44
	1.63939	− 13	1.26788	− 38	1.45439	− 15	1.61542	− 18
	9.76572	+12.34	9.76342	+12.55	9.77268	+11.66	9.76642	+12.29
	1.51118	+ 15	1.13737	+ 16	1.33314	+ 15	1.48791	+ 15
	5	−31.60	50	−31.60	45	−35.80	10	−36.10
n = −1.14	1 33.8	20 28.40	3 28.0 32.55	32 48.88	1 21.9	40 25.76	1 10.5	15 46.58
	53.4		46.8 43.5		39.6		28.2	
Rms. = −.10	872		748		615		387	
	6 4360		53 37.40		46 30.75		11 19.35	
+4' 11.16	16 4.75		29 10.95		36 17.60		11 29.00	
	54 20 15.91		54 33 22.11		53 40 28.76		54 15 40.16	
	+32.45		− 13.72		+21.53		+30.75	
	12 53.06	19 43.6	13 26.43	32 2.9	32 21.58	39 30.0	41 24.25	14 49.8
Nov 3		+4.93		+12.52				
	17 7.0	1208	17 40.5	1267				
	10.7		44.0					
	14.2		47.5					
	17.8		51.0					
	21.1		54.9					
	208		379					
	17 14.16		17 47.58					
	−4 12.17	−4 13.85	−4 12.17	−4 13.86				
	− 1.68		− 1.69					
	13 0.31	−5.47	13 33.72	−5.48				
	− 1.74	−44.65	− 1.73	−44.97				
	12 58.57		13 31.99					
	8.5		8.0					
	16 15.4		18 6.8					
	18.0		12.9					
	21.0		19.2					
	24.6	+.15	389					
	28.7	54 20 47.94	18 12.97	54 33 6.87				
	16 21.54	− 72	−25.39	− 17				
	+52.62	− 21	1.40466	− 40				
	1.72115	+12.71	9.76342	+12.93				
	9.76572	+ 15	1.27415	+ 16				
	5 1.59294	−31.60	50	−31.70				
n = −1.21	1 43.3	20 28.42	3 25.5	32 47.84				
	59.5		43.5					
Rms. = −.11	1028		690					
	6 5140		53 34.50					
+4' 11.82	15 56.95		29 13.85					
	54 20 8.77		54 33 25.67					
	+39.17		− 18.80					
	12 53.10	19 43.6	13 26.51	32 2.9				

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16018R

1878 Nov. 2, Nov. 3.

	h m s	Mag	h m s	Mag	h m s	Mag
α	23 26 53	9.3 26 6,8	23 28 50	8.4 28 3.3	23 42 30	9.2 41 42.7
δ	° ′	15.6	° ′ 51 06	1.5	° ′ 55 8	2.1

Nov 2

		+10.12		+8.39		+12.52
	31 57.0	9.94	33 17.2	21	46 58.4	34
	54.0		20.4		2.0	
	57.7		23.7		5.4	
	1.0		27.2		8.7	
	4.4		30.6		12.3	
	381		191		268	
	31 57.62		33 23.82		47 5.36	
	−4 10.41	−4 11.87	−4 10.42	−4 11.81	−4 10.44	−4 12.04
	− 1.46		− 1.39		− 1.60	
	27 45.75		29 12.01		42 53.32	
	− 3.88		− 3.90		− 4.14	
	27 41.87		29 8.11	−8.55 −5961	42 49.18	−8.79 −1 0.00
	9.0		8.2		9.3	
	31 24.0		32 38.0		46 7.0	
	30.5		40.5		14.0	
	37.0		44.8		19.6	
	15		47.3		10 6	
	31 30.50	52 21 27.41	51.3	51 9 29.69	46 13.53	55 10 12.65
	+ 27.12	− 19	219	− 42	+ 51.83	− 69
	1.43329	−.09	32 44.38	− 30	1.71458	− 24
	9.78592	+10.28	+3944	+1026	9.75678	+1329
	1.32528	+ 13	1.59344	+ 11	1.57743	+ 16
	5	−3640	8.49947	−3630	5	−36.40
	44.1	21 0.95	2 524	9 1.60	2 16.2	9 48.59
	24		10.4		33.1	
	1065		628		493	
	5 5325		18 31.40		17 2465	
	16 5510		4 46.95		5 23.70	
	52 21 6.26		51 8 58.11		55 9 34.86	
	+ 21.15		+ 31.58		+ 37.79	
			28 59.56	8 2.0	42 40.39	8 48.6

Nov. 3

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16038R

1878 Nov. 4, Nov. 5 Obs. W.A.R. Rec. J.E.McL.

26 376

	h m s	mag	h m s	mag	h m s	mag	h m s	mag	h m s	mag	h m s	mag
α	21 13 3	8.6 12 32.3	22 32 8	9.3 31 27.5	22 41 20	9.5 40 38.2 8.9	23 23 6	8.4 22 21.6	23 25 48	9.3 25 1.9	23 26 53	9.3 26 6.8
δ	54° 33'	28.9 8.6	53° 39'	34.1	54° 15'	9.5	52° 42'	36.4	52° 53.	47.3	52° 21'	15.6

Nov 4

				+11.45				+12.68				+10.32				+10.14				+9.79
			36	40.5	1		45	43.7	4		27	38.4	28		30	19.8	0		31	55.3	5
				44.0				47.0				41.8				23.3				58.9	
				47.5				50.6				45.1				26.8				2.3	
				51.0				54.0				48.5				30.0				5.5	
				54.5				57.7				52.0				33.6				8.9	
				375				30				258				335				189
			36	47.50			45	50.60			27	45.16			30	26.70			32	2.18	
			−4	14.30	−H	15.85	−4	14.32	−H	15.91	−4	14.40	−H	15.90	−4	14.41	−H	15.94	−4	14.41	−H 15.91
			−	1.55			−	1.59			−	1.50			−	1.53			−	1.50	
			32	31.65			41	34.69			23	29.26			26	10.76			27	46.27	
			−	2.97	−7.18		−	3.10	−7.34		−	3.78	−8.38		−	3.83	−8.43		−	3.83	−8.48
			32	28.68	−55.80		41	31.59	−56.67		23	25.48	−59.40		26	6.93	−59.49		27	42.42	−59.55
			9.5				9.8				8.5				9.1				8.9		
			35	53.5			46	5.0			26	55.2			29	21.3			31	3.0	
				57.1				15.0				57.3				25.3				5.8	
				0.5				20.4				0.4				31.0				9.7	
				3.8	−.04			40.4	5.91			2.9				17.6				13.3	
				7.3	53 40 48.96		46	13.47	54 16 48.01			7.2	52 44 17.46		29	25.87	52 55 17.84			16.7	52 24 41.39
				22	− 58			−2287	− 14			30	− 52			+60.83	− 98			48.5	− 73
			36	0.44	− 20			1,359.24	− 7		27	0.60	− 36			78.42	− 28		31	9.70	− 33
				+4706	+12.08			9.766 42	+12.74			+44.56	+11.059			78030	+11.26			+82.48	+10.72
			1.67	2765	+ 15			1,231.76	+ 15		1.64	8995	+ 15		1.67	049	+ 14		1.71	799	+ 13
			9.77	2685							9.78	2213							9.78	543	
			45.5	5140	−36.00		10		−36.40		40.53	715	−36.80		30		−36.80		0.61	149	−36.70
n = −1.14			1	40.3	40 24.37		0	29.6	16 16.25		3	10.9	43 50.94		2	23.1	54 51.14		2	53.5	24 14.44
				52.9				44.4	15 4.17			23.0				34.8				5.4	
Rms. = ±.11				93.2				7.40	42.13			33.9				57.9				11.89	
			46	46.60							43	16.95			32	28.95			2	59.45	
+4' 11".61			36	1.75			10	37.80			39	31.40			50	19.40			19	48.90	
					53 40 13.36		54	16 22.96			52	43 43.01			52	54 31.01			52	24 0.51	
		17 323 28.9			+35.60			−17.05				+34.45				+46.83				+40.88	
		12 50.9 27.2																			23
Nov 5		+12.50+12.46	32	21.50	39 28.6		41	24.25	14 45.5		23	17.10	42 51.5		25	58.50	53 51.6		27	33.94	25 14.9
					+11.55								+10.84								
	17 27.6	17 44.1		44	49		36	43.4			27	40.0	78								
	31.0	47.4						46.3				43.5									
	34.3	51.0						49.4				46.8									
	37.9	54.7						52.5				50.4									
	41.7	58.3						56.2				53.7									
	225	55						478				344									
17	34.50	17 51.10					36	49.56			27	46.88									
−4	15.99	15.99	−4	17.52			−4	16.08	−H 17.55		−4	16.14	−H 17.56								
−	1.53	− 1.53	−4	17.52			−	1.47			−	1.42									
13	16.98	13 33.58	−5.47	44.91			32	32.01	−7.18		23	29.32									
−	1.74	− 1.74	−5.47	44.91			−	2.93	−55.80		−	3.76	−8.38								
13	15.24	31.84					32	29.08			23	25.56	−59.40								
	9.0	6.2	84°	−.06			9.6				8.4										
			34' 50".57	33' 5".41																	
	16	17	− 40	− 22			36	1.5			27	43.9									
	48.4	49	− 29	− 46				7.8				49.7									
	55.8	21.7	+13.03	+10.01				14.8				54.5									
	1.7	28.8	+ 16	+ 16				241				148.1									
16	55.30	2180	−31.80	−31.80			36	803	53 40 48.77		27	49.37	52 44 16.14								
	+ 39.20	+ 29.30	34 31.21	32 49.04			+ 41.53		− 45		− 2.49		− 0								
	159329	1.46687					1.61836		− 19		0.39620		− 30								
	976324	9.76342					9.77268		+12.04		9.78213		+10.99								
	1.46260	1.33636					1.49711		+ 15		0.28440		+ 15								
	50	50					45		−36.20		40		−36.90								
n = −1.09	2	328 4 8.5					1	37.2	40 24.06		2	36.7	43 50.02								
		45.5 19.5						49.5				46.6									
Rms. = ±.11		783 280						8.67				85.3									
	52	39.15 54 4.00					46	4335			42	4265									
+4' 12".36	30	920 28 43.5					36	500			40	570									
	54	34 21.56 32 46.1					53	40 17.36			52	44 18.06									
		+29.01 +21.70						+ 31.41				−192									
		13 9.77	33	46.3	32 21.90		39	28.3			23	17.18	42 50.6								
		26.37	32	4.1																	

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1698R

1878 Nov. 4, Nov. 5

	h m s	mag	h m s	mag
α	23 28 50	6 4 28 3.3	23 42 30	9.2 41 42.7
δ	5° 6′	1.5	55° 8′	2.1

Nov 4

		+9.04		+12.92
	33 21.3	0	47 2.3	88
	24.7		6.0	
	28.0		9.7	
	31.0		13.4	
	34.5		17.0	
	39 5		48 4	
	33 27.90		47 9.68	
	−4 14.42	−4 15.85	−4 14.44	−4 16.08
	− 1.43		− 1.64	
	29 12.05		42 53.60	
	− 3.87		− 4.10	
	29 8.18	−8.55 / −596	42 49.50	−8.79 / −1.000
	4.0		9.3	
	33 2.7		46 9.4	
	6.1		13.3	
	9.9		16.3	
	12.5		19.7	
	15.0	51 9 28.35	22.8	55 10 12.69
	462	− 10	315	− 73
	33 9.24	− 31	46 16.30	− 26
	+ 18.66	+9.04	+ 5.38	+13.76
	1.27091	+ 11	1.72738	+ 16
	9.79744	−3660	9.74678	−3680
	51.17444		51.59623	
	2 40.6	9 0.75	2 21.1	9 48.77
	52.5		31.3	
	931		524	
	17 46.58		17 26.20	
	5 1.80		5 22.15	
	51 9 13.41		55 9 33.76	
	+1464		+38.93	
	28 59.63	8 1.1	42 40.71	8 48.8

Nov 5

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16BR

1878 Nov 6, Nov 10, Nov 12 Obs. W.A.P. Rec. J.F.M.

	Nov 6	Nov 10	Nov 6	Nov 6	Nov 10	Nov 6
	h m s Mag.	h m s Mag.	h m s Mag.	h m s Mag.	h m s Mag.	h m s Mag.
α	21 13 3 6.6	22 32 14 9.4	22 32 15 9.1		22 47 24 9.2	
δ	54° 33′	53° 15′	53° 14′		54° 56′	

Nov 12

(In these 4 observations there is a transposition of δ's. On the 1st date the 2nd δ precedes, apparently, though there is no note of that effect.)

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878 Nov 6, Nov. 10, Nov 12.

701 702 703

	h m s	Mag.		h m s	Mag.		h m s	Mag.		h m s	Mag.	
α	22 53 54	9.4	53 11.7 (52 40.0, 31.3) 53 11.7	23 21 42	9.2	20 56.7	23 27 01	9.0	26 7.4 (26 6.8, 15.6)	23 42 55	9.3	42 53
δ	50° 35′		30.7 / 30.2	54° 47′		41.8	52° 22′		37.6 / 16.5	54° 17′		11.3

Nov 10

Column 1 (Nov 10) +12.90, 56
52 0.5 / 4.2 / 7.8 / 11.3 / 15.0 / 38.8
52 7.76
−4 24.73 (−4 26.27)
− 1.64
47 41.49
− 3.04
46 38.45 −7.43 −57.18
9.0
51 39.5 / 46.9 / 53.2 / 19.6 — −34
51 46.53 54 58 42.84
+ 21.23 − 11
1.32695 − 43
9.75895 +13.26
1.19197 + 18
25 −37.40
3 27.7 58 18.00
40.9
68.6
28 34.30
54 14.05
54 58 27.28
+15.56
47 31.02 57 20.8

Column 2 (Nov 6) +8.38, 2
57 55.8 / 59.0 / 2.7 / 5.8 / 9.0 / 12.3
58 2.46
−4 17.82 (−4 19.21)
− 1.39
53 43.25
− 3.30
53 39.95 −7.82 −57.69
9.1
58 24.2 / 29.2 / 34.6 / 28.0 — −.06
58 29.33 50 39 24.57
− 26.87 − 20
1.42927n − 24
9.60197 +8.70
1.33731n + 12
45 −36.50
2 7.6 38 56.39
19.4
27.0
47 13.50
35 34.85
50 39 46.31
−21.74
53 32.13 37 58.7

Column 3 (Nov 10) +8.23, 7.89
58 34.5 / 37.9 / 41.4 / 44.3 / 47.7 / 5.8
58 41.16
−4 24.74 (−4 26.05)
− 1.31
54 15.11
− 3.20
54 11.91 −7.79 −57.69
—
58 41.8 / 48.5 / 54.8 / 25.1 — −.34
58 48.37 50 37 54.08
− 7.21 − 2
0.85794n − 48
~~9.71643~~ +8.60
~~0.48404~~ 0.56829n + 13
45 −37.01
3 57.1 37 ~~24.96~~ 28.36
59.4
16.5
48 ~~58.25~~
33 50.10
56 38 3.33
−~~7.25~~ 5.8
54 4.12 36 35.6 307

Nov 6

Column 4 +12.83, 77
25 39.5 / 43.0 / 46.4 / 50.1 / 53.4 / 32.4
25 46.48
−4 17.86 (−4 19.47)
− 1.61
21 27.01
− 3.71
21 23.30
9.4
26 3.7 / 14.1 / 20.5 / 38.3 — −.06
26 12.77 54 56 42.84
− 26.29 − 18
1.41979n − 54
9.75913 +13.38
1.28499n + 17
25 −37.30
4 53.5 56 18.81
1.9
115.4
29 57.70
52 50.65
54 57 ~~3.88~~ 2.11
−19.27
20 51.9 48.0

Column 5 +10.17 +10.44, 7 38
31 27.4 / 30.8 / 34.2 / 37.5 / 41.0 / 20.9 — 31 58.7 / 1.7 / 5.4 / 9.0 / 12.3 / 27.1
31 34.18 32 5.42
−4 17.87 17.87 (−4 19.37, −4 19.37)
− 1.50 − 1.50
27 14.81 27 46.05 −8.47 −59.55
− 3.80 − 3.81
27 ~~14.01~~ 11.01 42.24 −8.48 −59.55
8.6 9.0 52° −.06
23′ 56.18″ 24′ 42.04″
31 1.4 / 3.2 / 7.2 / 11.0 / 13.2 — 31 48.9 / 52.2 / 54.2 / 57.3 / 1.0 — −19 / −37 / +10.60 / +13 / −37.10 — −3 / −26 / +10.60 / +13 / −37.10
36.0 23.6 23 29.19 15.32
7.20 31 54.72
+26.98 +10.70
1.43104 1.02938
9.78543 9.78527
1.22254 0.92072
3 19.9 20.1
31.4 32.1
51.3 52.2
3 25.65 26.10
19 22.70 20 22.25
52 23 ~~35.03~~ 35.16 24 ~~35.~~ 33.71
+ 21.02 + 5.33
27 2.54 33.76
22 29.6 / 23 15.8 / 26 14.4 / 16.5 / 26 37.6

Column 6 +12.71, 05
47 29.5 / 33.0 / 36.3 / 40.0 / 43.7 / 32.5
47 36.50
−4 17.90 (−4 19.50)
− 1.60
43 17.00
− 4.07
43 12.93 −8.81 −1.000
9.2
46 50.9 / 57.4 / 5.5 / 23.8 — −.06
46 57.93 54 19 22.78
+ 38.57 − 39
1.58625 − 34
9.76590 +12.68
1.45822 + 16
5 ~~−36.80~~ −37.20
3 0.6 0.6 18 57.63
10.9 10.9
11.5
8 5.75
14 42.60
54 18 ~~53.~~ 54.06
+ 28.72
43 4.12 17 57.6

Nov 12

Column 4 +12.65, 19
26 21.6 / 25.1 / 28.6 / 32.2 / 35.8 / 43.3
26 28.66
−4 27.75 (−4 29.40)
− 1.65
21 59.26
− 3.59
21 55.67 −8.27 −59.34
9.5
25 55.4 / 2.7 / 9.5 / 7.6 — −.46
26 2.53 54 56 4.05
+ 26.13 − 17
1.41714 − 14
9.75931 +12.79
1.28252 + 17
30 −38.30
1 2.8 55 37.94
26.9
29.7
31 14.85
51 33.50
54 55 44.88
+19.17
21 47.40 54 38.6

Column 5 +9.86 +9.99, 40 53
31 45.6 / 49.0 / 52.2 / 55.8 / 59.0 / 11.6 — 32 8.7 / 12.2 / 15.4 / 18.9 / 22.1 / 27.3
31 52.32 32 15.46
−4 27.76 −4 27.76 (−4 29.29, −4 29.29)
− 1.53 − 1.53
27 23.03 27 46.17 −8.48 −59.55
− 3.69 − 3.70
27 19.34 42.47 −8.48 −59.55
~~9.0~~ — 52
24′ 21.90″ 24′ 47.92″
31 30.1 / 36.3 / 42.7 / 109.1 — 32 6.1 / 12.8 / 19.4 / 38.3 — −7 / −34 / +10.14 / +13 / −38.10 — 0 / −28 / +10.14 / +13 / −38.10
31 36.37 12.77 23 53.20 24 14.35
+ 15.95 + 2.69
1.20276 0.42975
9.78543 9.78527
1.09426 0.32169
0 2 41.6 0 2 9.7
58.9 28.1
10.05 37.8
2 50.25 2 18.90
19 58.10 20 29.45
52 24 9.48 24 40.83
+12.42 + 2.09
27 10.86 ~~23~~ 22 53.6
33 ~~4~~.99 23 14.8

Column 6 +11.39, 10.93
47 39.3 / 42.8 / 46.3 / 49.8 / 53.4 / 31.6
47 46.32
−4 27.79 (−4 29.43)
− 1.64
43 16.89
− 3.96
43 ~~24.13~~ 12.93 −8.81 −1.000
9.0
46 52.7 / 59.5 / 7.4 / 17.9.6
46 59.87 54 19 25.07
+ 46.45 − 56
1.66699 − 38
9.76590 +12.17
1.53696 + 16
5 −38.30
3 0.6 18 57.70
17.9
18.5
8 9.25
14 39.10
54 18 50.48
+34.59
43 4.12 17 57.7

Left margin notes
Nov. 6 also on this page.
n = −1.0~~1~~8
Rrs. = −12
+4′ ~~12.23″~~ 13.23

n = −1.1~~8~~ 8
Rrs. = −12
+4′ ~~11.18″~~ 11.38

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System
1878phae.proj.1608R

1878phae.proj.1693R

1878 Nov 6. Nov. 12 Obs. WAR Rec. J. Z. Pe

	h m s	mag.	h m s	mag.	h m s	mag.	h m s	mag.	h m s	mag.	h m s	mag.
α	23 43 58	6.8	23 53 01	6.6	23 54 33	9.0	0 1 35	9.1	0 3 25	8.4	0 6 7	8.0
δ	50° 54′		53° 59′		51° 54′		50° 16′		50° 5′		50° 46′	

Nov 6

	48 33.6		57 37.3		58 52.0		6 6.0		8 2.7		10 45.9	7.96
	37.0		40.7		55.3		9.3		6.0		49.1	
	40.3		44.2		58.4		12.2		9.1		52.3	
	43.6		47.8		2.0		15.8		12.3		55.5	
	46.8		51.3		5.3		19.0		15.6		59.0	
	13		213		430		123		457		118	
	48 40.26		57 44.26		58 58.60		6 12.46		8 9.14		10 52.36	
	−4 17.90	+4 19.33	−4 17.92	+4 19.51	−4 17.92	+4 19.39	−4 17.93	+4 19.30	−4 17.94	+4 19.31	−4 17.94	+4 19.33
	− 1.43		− 1.59		− 1.47		− 1.37		− 1.37		− 1.39	
	44 20.93		53 24.75		54 39.21		1 53.16		3 49.83		6 38.03	
	− 41.06	−8.87	− 4.23	−9.05	− 4.22		− 4.30	−9.25	− 4.33	−9.31	− 4.38	
	44 16.87	−1 0.03	53 20.52	−1 0.15	54 34.99		1 48.86	−1 0.15	3 45.50	−1 0.15	6 28.65	−9.35 −1 0.15
	5.9		8.2		9.3		9.1		8.4		7.4	
	48 2.3		56 52.0		58 23.4		5 30.2		7 43.0		10 0.3	
	7.9		59.3		31.7		38.0		46.0		2.5	
	11.2		5.0		38.2		43.5		48.1		6.0	
	244	− .06	263		33		217		50.8		8.4	
	48 8.13	50 57 6.70	56 58.77	54 0 59.40	58 31.10	51 56 12.41	5 37.23	50 17 22.26	52.5	50 8 9.54	11.5	50 48 48.38
	+ 32.13	− 27	+45.49	− 54	+ 27.50	− 20	+ 35.23	− 34	404	− 12	287	− 58
	1.506 91	− 3	1.65792	− 18	1.43933	− 13	1.54691	− 1	7 48.08	− 48	10 5.74	− 42
	9.799 34	+9.06	9.76922	+12.36	9.78999	+10.12	9.80550	+8.33	+ 21.06	+8.17	+ 46.62	+8.90
	1.412 32	+ 12	1.53321	+ 16	1.43359	+ 13	1.45848	+ 10	1.32346	+ 10	1.66857	+ 12
	30	−36.90	25	−37.07	30	−36.81	10	−36.58	9.80666	−36.50	9.80074	−36.50
	0 13.4	56 38.62	1 28.7	0 34.14	1 3.3	55 45.47	0 0.4	16 53.77	151.23639	7 40.68	35 1.57538	48 19.84
	24.5		40.4		14.8		12.2		4 2.6		3 43.2	
	37.9		69.1		18.1		12.6		12.4		54.9	
	30 18.95		26 34.55		31 9.05		10 6.30		15.0		98.1	
	52 29.40		56 13.80		57 39.30		12 42.05		19 4.50		38 49.05	
	50 56 40.86		54 0 25.26	59 34.0	57 55 50.76		50 16 53.51		3 40.85		43 59.30	
	+ 25.84		+ 34.14	51 41.5	+ 21.65		+ 28.74		50 7 52.31		50 48 10.76	
	44 8.00	55 38.6	53 11.47	52 11.0			1 39.61	15 53.6	+ 17.23		+ 37.62	
				546					3. 36.19	6 40.5	6 19.30	47 19.7

Nov 12

	48 43.7		57 57		59 20.0							
	47.0		17.5 47.2		23.5							
	50.2		21.2 50.7		27.0							
	53.4		24.5 54.1		30.2							
	56.7		28.0 57.5		33.6							
	10		31.8 1.0		343							
	48 50.20	57	230 205		59 26.86							
	−4 27.79	−4 29.25	24.60 57 54.10		−4 27.81	−4 29.32						
	− 1.46		−4 27.80 27.88	−4 29.43	− 1.51							
	44 20.95	59	− 1.63 − 1.63	−4 29.43	54 57.54							
	− 3.96	−8.87	55.17 53 24.67	−9.04	− 4.13	−9.09						
	441 27.83	−1 0.03	− 4.13 − 4.13	−1 0.15	54 53.41	−1 0.15						
	16.99		52 57.05 20.54	−9.05								
				0.15								
				−1								
	6.3		8.1 9.5	57°	9.3							
				2′ 23.76 1′ 0.48								
	48 18.2		56 57	− 26 − 2	58 45.6							
	21.0		46.5 39.0	− 60 − 13	53.0							
	23.9		50.0 45.3	+11.86+11.86	59.3							
	27.4	− 46	53.1 51.6	+ 17 + 17	15.79							
	30.1	50 57 8.36	56.0 136.1	−38.10 −38.10	58 [illegible]	51 56 28.12						
			59.5		52.43							
	48 24.12	− 18.56	53.02 57 45.37	56.37 0 33.80	+ 31.58	− 31						
	+ 26.08	− 2	+ 31.58 + 8.78		1.53 44 [illegible]	− 12						
	1.41 631	+8.66	1.49941 0.94101		9.78999	+9.67						
	9.799 34	+ 13	9.76887 9.76504		1.43047	+ 15						
	1.32 172	−37.90	1.57435 0.51612		30	−37.90						
	30		20 25									
	0 3.1	56 38.59	21 519 0 57.0		0 49.4	58 59.15						
	21.6		7.4 14.6		7.7							
	247		1193 116		1171							
	30 123.5		24 5965 26 580		30 5855							
	52 36.80		57 48.70 54 4.55		57 4880							
	50 56 47.38		54 2 0.08 0 53.98		51 56 1.18							
	+ 20.98		+123.68 + 6.55		+ 26.94							
	44 8.12	55 38.6	52 42.01 0 56.2		54 42.32	54 59.6						
			53 11.40 59 33.6									

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1003R

1878 Nov 6

h m s mag

α 0 7 28 7.56 35.7

δ ° ′ ″ 28.0

Nov 6 +12.63

12 5.0 57
8.5
12.4
16.0
19.2
111

12 1.22.22
−4 17.94 −H 19.55
— 1.61
7 52.67
— 4.47
7 48.20 −9.40
−10.12
7.3

11 22.7
25.9
29.4
32.4
35.6 54 36 40.97
46.0 − 48
11 29.20 − 9
+43.02 +13.03
16 33 6.7 + 17
9.76 22.29
50 1 50 26.3 −36.70
0 45.2 36 16.84
56.1
1013
50 50.65
31 57.70
54 36 9.16
+31.81

7 38.80 35 16.7

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.160BR

1878 Nov. 13. Nov. 23 Obs. W.A.R. Rec. W.A.R.

	h m s	mag	h m s	mag	h m s	mag	h m s	mag	h m s	mag	h m s	mag
α	23 21 37.95		23 28 58	9.0	23 42 08	8.9	23 45 24	8.8	23 53 14	9.0	0 16 4	8.9
δ	54° 53′		52° 4′		52° 39′		55° 13′		57° 10′		53° 35′	

Nov 13

	26 4.6	39	33 45.9	14	46 54.6	36	49 27.7	44	58 58		20 20	
	8.2		49.4		58.1		31.2		1.3 5.6		29.0 53.2	
	11.7		52.5		1.5		34.9		5.0 9.2		32.7 56.8	
	15.4		56.0		4.9		38.4		8.6 12.8		36.2 0.2	
	18.9		59.4		8.3		42.0		12.2 16.1		39.7 3.7	
	88		132		74		242		15.7 19.7		43.0 7.2	
	26 1.76		33 52.64		47 1.48		49 34.84		428 58 134		306 21 11	
	−4 29.42	−4 31.02	−4 29.43	−4 30.86	−4 29.45	−4 30.91	−4 29.45	−4 31.05	8.56 12.68		36.12 0.22	
	− 1.60		1.43		− 1.46		− 1.60		−4 29.47 29.47		29.50 29.50	
	21 40.74		29 21.78		42 30.57		45 3.79		− 1.55 − 1.55		1.51 − 1.51	
	− 3.56	−8.26	− 3.70	−8.53	− 3.92	−8.81	− 3.97		53 37.54 53 41.66		5.11 16 29.21	
	21 37.18	−5934	29 18.08	−5961	42 26.65	−5997	44 59.82		− 4.11 − 4.12		− 4.48 − 4.48	
	8.9		8.5		8.7		9.1		53 33.43		0.63	
	26 18.2		32 54.3		45 55.1		49 30.0		8.2 9.3		8.3 8.4	
	22.5		(0.3)		58.3		56.5		57 57		21 21	
	26.7		5.5		2.3		3.0		4.2 50.5		23.5 18.2	
	30.7	−39	13.0		5.8		19.5		4638			
	34.0 54 53 7.44		131 52 7 1.17		8.7 52 41 10.74		49 56.50		56.15 57 4.20 57 50.50		23.50 21 18.20	
	321	− 6	33 3.28	− 65	108	− 93	− 21.66	− 12				
	26 2642	− 44	+ 49.36	− 7	216	− 19	1.335662	− 58	9.76312	1.34596		
	1.16 14.66	+13.08	1.66338	+10.10	1.77320	+10.71	9.75733	+13.33	9.76712	9.76712		
	9.75 98.5	+ 20	9.78 837	+ 15	1.78 280	+ 16	1.14906	+ 20	1.681.81	1.2115		
	10	− 38.40	1.58782	−38.20	1.66 207	−3830	15	−38.50	15	15		
	1.032.05		20		45							

n = −1.13
Rms. = −12
+4′ 10″.61

	3 33.8	52 41.43	0 33.8	6 39.41	1 26.7	40 41.80	4 40.4	6 30.09	0 4.0	4.0	4 20.8	
	47.7		29.2	47.11	41.6		53.6		17.7	17.7	33.7	
	8.15		1.30		6.83		9.40		21.7		545	
	33 40.75		20 3650	2150	46 34.15		19 47.00		15 10.85		49 27.25	
	49 1.60		2 11.85		36 19.20		3 1.35		7 3.50		33 2.10	
	54 53 18.21		52 6 22.46		52 40 24.81	39 41.8	55 7 11.96		54 11 48.11		53 37 31.71	
	−10.77		+38.71		+45.93	40 47.6	− 15.81		+48.06 +46.54		−35.87 −13.40	
	21 28.92	51 42.1	29 9.55	5 47.5	42 17.84	29.8			53 24.87	11 8.8	15 51.03	35 28.4
						+10.18		+12.33		10 38.2	16 15.13	35 51.2
Nov 23												+11.44 +11.87

					46 34.7	07	50 25.0	12			20 21	
					38.2		28.4				40.4 4.0	
					41.4		31.9				43.8 7.8	
					45.0		35.7				47.3 11.5	
					48.3		39.5				50.7 14.5	
					76		105				54.3 18.2	
					46 41.52		50 32.10				365 21 60	
					−4 40.84	−4 42.24	−4 40.85	−4 42.39			20 47.30 11.20	
					− 1.40		− 1.54				−4 40.90 40.90	
					41 59.28		45 49.71				− 1.46 1.46	
					− 3.71	−8.80	− 3.77	−8.83			16 4.94 16 28.84	
					41 55.57	−5997	45 45.94	−1003			− 4.32 − 4.32	
					8.5		8.8				16 0.62 24.52	
											2nd's fr. transpose.	
					46 38.7		49 30.3				20 20	
					44.4		36.0				15.7 (30.0)	
					51.6		42.8				22.5	
					58.7		109.1				29.3	
					46 4154	52 3544	49 36.37	55 15 16.03	1st #	2nd #	675 20	
					4490	51 0	+55.73	− 79 +17.3		+ 48.7 +	2250 3002	
					− 3.35	− 52	1.74602	− 31 1.23805		1.68753	24.80 +40.20	
					1.52 34.93	+10.51	9.77558	+13.10 9.77319		9.77319	1.37445 1.60423	
					9.78 19.2	+ 19	1.60803	+ 23 1.11731		9.77319	9.77319	
					1.41 1153	−39.60	10	−89.90		1.56679	1.27361 1.48347	
					45						50	
					8 50.7	54.1	2 16.3	14 48.25			0 9.5	
					3.8	37 21.09	29.7			1st Q.R.	22.1	2nd Q.R.
					11.45		46.0				31.6	
					48 [illegible]		12 23.50			50 16.50	60 1550	60 16.10
					33 54.10		10 25.35				32 32.54	
					52 45 1.23		55 14 35.48				53 36 42.65	
					17 −25.77		+40.55				+18.78 +30.44	
											+ 13.16 + 36.88	
					41 46.77	21.12	45 37.11	13 48.28			15 51.02	35 27.6
											16 14.92	51.1

n = 1.08
Rms. = −13
+4′ 10″.13

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj:I00BR

Nov 13, Nov 23

	h m s	Mag	h m s	Mag	h m s	Mag	h m s	Mag	h m s	Mag	h m s	Mag	h m s	Mag
α	0 22 21	9.0	0 23 59	6.8	0 29 53	7.8	0 44 53	9.6	0 56 30	6.6	1 2 56	7.6	1 5 76	
δ	55° 2′		55° 0′		57 32		50° 5′		51 49		51 27′			

Nov 13

	26 38.7	12.83	28 16.2	12.80	34 41.4	47	49 27.3	12	1 1 22.0	45				
	41.8		20.0		45.0		30.5		25.3					
	45.3		23.4		48.5		33.8		28.7					
	49.0		27.2		52.0		37.0		32.0					
	52.6		30.9		55.6		40.2		35.4					
	269		177		425		188		434					
	26 45.38		28 23.54		34 48.50		49 33.76		1 28.68					
	−4 29.51	−H 38.11	−4 29.52	−H 31.12	−4 29.53	−H 31.10	−4 29.55	−H 30.88	−4 29.57	−H 30.98				
	− 1.60		− 1.60		− 1.57		− 1.33		− 1.41					
	22 14.27		23 52.42		30 17.40		45 2.88		56 57.70					
	− 4.62		− 4.64		− 4.74		− 4.83		− 5.06					
	22 9.65	−9.77 −59.8	23 47.78	−9.81 −59.82	30 12.66	−9.95 −59.64	44 58.05	−10.15 −59.01	56 52.64	−10.47 −58.32				
	5.9		9.0		8.0		8.4		6.1		7.1			
	26 36.2		28 38.4		83 55.6		48 41.1		1 45.7					
	2.5		45.2		0.0		46.5		51.2					
	9.6		51.4		2.4		52.3		57.2					
	83		150		5.8		1399		15.41					
	27 2.77	55 0 46.23	28 45.00	54 56 24.68	8.5	54 33 10.60	48 46.63	50 7 8.94	1 51.37	51 51 20.72				
	− 17.39	− 8	− 21.46	− 12	34 2.46	− 55	+ 47.13	− 59	− 22.6	− 14				
	1.24030	− 12	1.33163	− 4	1.66314	− 53	1.67330	− 6	1.35583	− 4				
	9.75841	+13.22	9.75913	+13.15	9.76342	+13.74	9.80701	+8.04	9.79063	+9.87				
	1.10478	+ 20	1.19683	+ 20	1.53263	+ 20	1.58638	+ 12	1.25253	+ 15				
	25	−37.70	30	−37.70	50	−37.40	20	−36.50	35	−36.00	55			
	0 53.1	0 21.36	0 11.8	55 59.78	41 16.1	32 44.67	0 21.4	6 39.56	0 12.8	50 54.17	0 34.3			
	6.9		25.3		28.8		35.8		27.9		49.7			
	00		37.1		44.9		57.2		40.7		54.0			
	26 00.0		30 18.55		54 22.45		20 28.60		35 20.35		55 42.50			
	56 48.35		52 29.80		28 25.90		2 19.75		47 28.88		27 6.35			
	55 0 58.96		54 56 40.41		54 32 36.51		50 6 30.36		51 57 38.61		57 31 16.96			
	−12.73		−15.73		+31.09		+38.58		−17.89					
	21 59.88	59 21.5	23 37.97	23 4.3 54.3	30 2.71	31 45.0	44 47.90	5 40.6	56 42.17	49 55.8				
		+12.53		+12.22		+11.44		+7.26		+9.00				+8.07
	26 49.4	42	28 59.1	11	34 52.6	33	49 38.5	15	1 33.3	8.89	7 59.0	36		
	53.0		2.6		56.2		41.8		36.7		2.3			
	56.3		6.2		59.6		45.0		40.0		5.5			
	59.8		9.8		3.2		48.1		43.3		9.0			
	38		13.4		6.8		51.5		46.8		12.2			
	323		311		484		249		01		28 0			
	26 56.46		29 6.22		34 59.68		49 44.98		1 40.02		8 5.20			
	−4 40.91	−H 42.45	−4 40.91	−H 42.45	−4 40.92	−H 42.43	−4 40.94	−H 42.23	−4 40.96	−H 42.32	−4 40.97	−H 42.33		
	− 1.57		− 1.57		− 1.57		− 1.29		− 1.36		− 1.36			
	22 14.01		24 23.77		30 17.25		45 2.75		56 57.70		3 23.27			
	− 4.45		− 4.49		− 4.59		− 4.72		− 4.96		− 5.05			
	22 9.56	−9.77 −59.88	24 19.28	−9.82 −59.82	30 12.66	−9.95 −59.64	44 58.03	−10.15 −59.01	56 52.74	−10.47 −58.32	3 18.22	−10.58 −57.90		
			6.3		8.0		8.2		5.8		6.8			
	26 9.2		28 26.3		34 2.0		48 50.2		0 45.4		7 14.0			
	16.7		29.7		5.2		53.2		47.3		20.5			
	24.7		32.8		8.7		55.0		50.2		27.0			
	50.6		35.5		11.9		58.2		52.9		61.5			
	26 16.87	55 0 49.07	39.6	55 2 20.80	15.8	54 33 13.21	0.8	50 7 11.10	54.3	51 51 23.59	7 20.50	51 27 15.29		
	+39.59	− 40	28 55.48	− 29	34 8.70	− 67	48 55.48	− 66	0 50.42	− 65	+45.10	− 34		
	1.59756	− 21	1.52427	− 65	1.70723	− 57	1.69461	− 6	1.69545	− 16	1.65418	− 43		
	9.75855	+12.91	9.75823	+12.93	9.76342	+12.45	9.80701	+7.84	9.79079	+9.63	9.79431	+9.27		
	1.46225	+ 23	1.38857	+ 23	1.57672	+ 23	1.66769	+ 14	1.59234	+ 18	1.55456	+ 17		
	25	−39.50	20	−39.50	50	−39.10	20	−38.20	35	−37.90	55	−37.60		
	1 32.0	54 21.99	41 57.2	1 53.11	4 17.8	32 45.44	0 21.7	6 40.05	7.1	50 54.58	3 12.8	28 46.05		
	44.8		7.7		28.2		34.1		20.9		25.3			
	76.8		4.9		460		558		280		38.1			
	26 38.40		29 2.45		54 23.00		20 27.90		36 14.60		58 19.05			
	56 9.85		57 45.90		28 25.35		2 20.45		46 34.35		24 29.30			
	55 0 20.08		55 1 56.03		54 32 35.48		50 6 30.58		51 50 44.48		57 28 39.43			
	+28.99		+24.47		+37.73		+40.52		+39.11		+35.86			
	21 59.79	59 22.1	24 9.46	0 53.3	30 2.71	31 45.8	44 47.88	5 41.0	56 42.27	49 56.3	3 17.64	27 48.2		

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1603R

1878 Nov 13, Nov 23 Obs W AR Rec. W AR

	h m s	mag		h m s	mag	
α	1 7 51	9.0	6 425	1 10 18	8.9	9 195
δ	51° 06′		0.5	51° 43′		37.4

Nov 13

		+8.31			+9.29	
12	33.2	7.92		15	10.8	8.90
	38.6				14.2	
	40.0				17.4	
	43.1				20.8	
	46.4				24.3	
	49.3				37.5	
12	39.86			15	17.50	
−4	29.58	−4 30.97		−4	29.59	−4 31.00
−	1.39			−	1.41	
8	8.89			10	46.50	
−	5.19			−	5.26	
8	3.70	−10.67		10	41.24	−10.75
		−57.54				−57.33
9.1				8.7		
11	53.4			14	36.3	
	59.5				41.7	
	5.4				47.8	
	17.83	−.39			12.58	
11	59.43	51 8 23.35		14	41.93	51 45 7.78
	+40.43	− 44			+35.57	− 34
	1.60670	− 49			1.54108	− 28
	9.79762	+9.11			9.79176	+9.77
	1.51039	+ 13			1.43891	+ 14
15		−35.40		40		−35.20
4	1.3	7 55.87		2	11.5	44 41.48
	14.7				25.8	
	16.0				37.3	
19	8.00			42	18.65	
3	46.35			40	29.70	
51	7 50.96			51	44 40.31	
	+32.39				+27.47	
	7 53.03	6 58.3		10	30.49	43 44.2

Nov 23

		+8.14			+8.96	
12	44.5	03		15	22.2	905
	47.9				25.7	
	51.2				28.7	
	54.5				32.3	
	57.7				35.6	
	58				445	
12	51.16			15	28.90	
−4	40.97	−4 42.31		−4	40.98	−4 42.34
−	1.34			−	1.36	
8	8.85			10	46.56	
−	5.11	−10.67		−	5.18	−10.75
8	3.74	−57.54		10	41.38	−57.33
9.0				9.1		
12	6.4			14	49.7	
	12.4				56.5	
	19.0				3.9	
	37.8	−.11			17.1	
12	12.60	51 8 26.32		14	56.70	51 45 10.98
	+38.56	− 40			+32.20	− 27
	1.58614	− 53			1.50786	− 29
	9.79762	+8.91			9.79176	+9.54
	1.48983	+ 16			1.40569	+ 18
15		−37.30		40		−37.20
3	57.2	7 57.05		2	6.2	44 42.83
	8.9				19.4	
	6.1				25.9	
19	3.05			42	12.95	
3	45.30			40	35.40	
51	7 55.43			51	44 45.53	
	+30.89				+25.45	
	7 53.07	6 59.5		10	30.63	43 45.5

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1603R

1878. Nov. 24. Nov 26 Obs. W.A.R. Rec. J.F.M.

	h m s	Mag.	h m s	Mag.	h m s	Mag	h m s	Mag.	h m s	Mag.	h m s	Mag
α	23 6 29	8.4 5 44.3	23 11 25	9.5 10 40.0	23 21 5	9.5 20 18.8	23 25 7	8.4 24 21.4	23 25 55	8.9 25 8.4	23 28 58	9.0 28 11.6
δ	53° 50′	45.0 8.4	54° 47′	41.5	55° 12′	6.5	53° 36′	30.1	53° 58′	52.5	52° 4′	51 59.2

Nov 24

		+10.23				+11.63				+12.78				+10.84				+12.01				+9.56
	11 26.0	11.03		16 18.4	12.43		26 1.6	12.58		30 5.8	11		30 52.7	11.81			33 58.5	9.36				
	29.6			22.0			5.2			9.3	74		56.1				2.0					
	33.1			25.5			9.0			12.7			59.5				5.4					
	36.7			29.3			12.4			16.1			3.1				8.6					
	40.1			33.0			16.0			19.9			6.8				12.0					
	155			282			442			138			482				265					
	11 33.10			16 25.64			26 8.84			30 12.76			30 57.64				34 5.30					
	−4 42.33	−4 43.88		−4 42.34	−4 43.92		−4 42.31	−4 43.94		−4 42.35	−4 43.86		−4 42.35	−4 43.98			−4 42.35	−4 43.78				
	− 1.55			− 1.58			− 1.60			− 1.51			− 1.55				− 1.43					
	6 49.22			59 58.42			21 24.90			25 28.90			26 15.74				29 21.52					
	− 3.04			11 41.72			− 3.29	−8.25		− 3.38	−8.40		− 3.389				− 3.47	−8.53				
	6 46.18	−7.95		11 38.61	−8.02		21 21.61	−59.31		25 25.52	−59.46		26 18.35	−8.40			29 18.05	−59.61				
	8.3	−58.53		9.4	−58.83		9.4			8.2			8.7	−59.49			8.8					
	10 49.7			15 51.5			25 34.8			29 29.0			30 48.5				33 9.3					
	56.1			57.0			40.7			31.8			51.5				11.7					
	1.8			6.2			48.5			34.7			55.6				15.2					
	16.6	− 20		17.7			1240			38.7			58.7	53 57 58.70			18.7					
	10 55.87	53 53 15.27		15 58.23	54 49 36.77		25 41.33	55 12 33.55		41.0	53 38 6.81		2.0	57 8 28.28			22.1	52 7 16.33				
	+ 37.23	− 36		+ 27.41	− 20		+ 27.51	− 30		29 + 35.04	− 37		30 55.26	− 1			33 15.40	− 46				
	1.57056	− 59		1.43791	− 38		1.43949	− 66		1.57657	− 60		0.64147	− 29			1.69 +47.90	− 6				
	9.77043	+11.97		9.76057	+12.98		9.75642	+13.41		9.77302	+11.71		9.76922	+12.10			9.78821	+10.10				
	1.44739	+ 21		1.30455	+ 23		1.30198	+ 23		1.45566	+ 20		0.51676	+ 21			1.59238	+ 18				
	30	−39.20		35	−39.50		10	−39.80		45	− 4000		25	−39.90			20	− 39.80				
											39.60											
n = −1.12	4 4.9	52 47.10		2 35.5	49 9.70		4 39.2	12 6.33		4 13.9	37 37.95		1 56.9	59 30.81			0 14.9	6 46.79				
	18.4			49.1			57.6			27.4			10.1				28.5					
Rrs = −14	23.3			846			908			413			70				434					
	34 1165			37 42.30			14 45.40			49 2065			27 3.50				20 21.70					
+4′ 10.36	48 36.70			45 6.03			8 2.95			53 2770			55 448.5				2 266.5					
	53 52 47.26			54 49 16.61			55 12 13.51			53 37 38.26	36.38.5		53 59 55.41				52 6 37.21					
	+28.01			+20.16			+20.04			+28.55	23 44.2		+ 3287				+39.12					
											27.7		37.9									
	6 38.23	51 48.6		11 30.59	48 10.9		21 13.36	11 7.02		25 17.12			26 3.95	58 31.3			29 9.52	546.6				
Nov. 26								+12.87			+11.88			+12.24				+10.02				
							26 4.0	/0		29 31.5			30 55.0	/0			34 1.0	9.95				
							7.5			35.0			58.5				4.2					
							11.0			38.3			2.0				7.4					
							14.6			41.7			5.5				11.1					
							18.4			45.4			9.0				14.4					
							55			419			100				381					
							26 1.10	6		29 38.38	6		31 2.00				34 7.62	19				
							+015 − 4 44.68	.73 −4 46.3X		− 4 44.69	.73 −4 46.2X		− 4 44.69	.73 −4 46.3X			− 4 44.69	.74 −4 46.2X				
							− 1.64			− 1.55			− 1.67				− 1.47					
							21 24.78			24 52.14			26 15.72				29 21.46					
							− 3.23			− 3.33	−8.38		− 3.34				− 3.42					
							21 21.58	−8.25		24 48.81	−59.46		26 12.34	−8.40			29 17.99	−8.53				
								−59.31						−59.49				−59.61				
							9.3			9.2			8.5				8.8					
							25 21.7			29 11.8			30 41.6				33 18.0					
							29.9			18.5			46.4				24.1					
							37.1			23.9			53.0				30.1					
							887	− 07		54.2	✓		1410				422					
							25 29.87	55 12 32.44		29 18.07	53 35 36.97		30 47.00	53 57 57.51			33 24.07	52 7 15.22				
							+41.53	− 44		+ 20.31	− 10		+ 15.00	− 6			+ 43.55	− 50				
							1.61836	− 70		1.30771	− 22		1.14609	− 31			1.63899	− 4				
							9.75642	+13.77		9.77353	+11.79		9.76922	+12.42			9.78821	+10.37				
							1.48085	+ 24		1.18731	+ 21		1.05238	+ 22			1.53327	+ 19				
							10	− 40.00		50	−39.80		25	−39.90			20	−39.60				
n = −1.1							4 51.7	12 5.24		31.1	35 9.05		2 6.8	57 29.81			0 11.9	6 45.57				
5							3.1			44.9	8.98		19.9				25.1					
Rrs. = −14							1148			760			26.7				370					
							14 57.40			51 38.00			27 13.35				20 18.50					
+4′ 11.23							7 50.95			31 10.35			55 35.00				2 29.85					
							35 12 2.38			53 35 21.58			53 59 46.23				52 6 41.08					
							+30.26			+ 15.36			+ 11.28				+ 34.14					
							21 13.26	11 5.9		24 40.41	34 9.5		26 3.95	58 30.3			29 9.48	5 46.0				

Add +0.15 to (11h+m) for Nov. 26. It has been added to sum of the constants and to final R.A.

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1608R

1878 Nov. 24. Nov. 26 0

	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.
α	23 31 43	8.1	23 42 36	8.4	23 43 39	9.5	23 53 13	9.0	23 54 28	8.8	0 0 57	8.9
δ	51° 37′		53° 9′	3.3	50° 6′	0.7	54° 34′	2.8	51° 22′	16.2	51° 57′	5.3

Nov 24

	+9.31		+10.62		+7.64		+12.40 +12.62		+6.18		+9.01	
	36 30.9	11	47 35.5	42	48 39.1	46	58 58		59 27.1	8.98	5 54.8	8.81
	34.3		39.0		43.0		14.3 228		31.1		58.1	
	37.6		42.4		46.0		18.0 26.2		34.4		1.4	
	40.8		45.9		49.4		21.5 29.6		37.5		4.9	
	44.2		49.4		52.5		25.2 33.0		40.9		8.2	
	378		122		306		28.5 36.7		216		74	
	36 36.56		47 42.44		48 46.12	58	75 483		59 34.32		6 1.48	
	−4 42.35 −H 43.76		−4 42.36 −H 43.85		−4 42.36 −H 43.69		58 21.50 58 29.66		−4 42.37		−4 42.38 −H 43.81	
	− 1.41		− 1.49		− 1.33		−4 42.37 42.37 −H 43.94 43.94		− 1.41		− 1.43	
	31 53.80	−8.59	42 58.59		44 2.43		− 1.57 − 1.57 −9.06		54 50.54		1 17.67	
	− 3.52	−57.70	− 3.70	−8.81	− 3.73	−8.88	53 37.56 53 45.72 −1 0.15		− 3.91	−9.10	− 4.02	−9.24
	31 50.28		42 54.89	−1 0.00	43 58.70	−1 0.00	− 3.90 − 3.90 −9.06		54 46.63	−1 0.15	1 13.65	−1 0.15
	8.6		8.4		9.4		53 38.66 41.82 −1 0.15 ✓		8.7		8.6	
							8.4 9.1 34° 37′ 50.75 36′ 59.97					
	36 18.3		46 46.1		48 24.5		58 57 − 3 − 34		59 19.5		5 3.9	
	24.4		49.6		27.2		5.7 46.3 − 59 − 6		25.3		7.1	
	30.5		53.0		37.0		11.7 54.4 +12.80 +12.80		31.5		9.8	
	732	−20	56.7		92.7		17.3 0.1 + 22 + 22		763		13.2	
	36 24.40 51 34 38.80		0.2 53 11 19.54		48 30.90 50 8 53.86 58		34.7 1608 −40000 −40000		59 25.43 51 24 35.70		16.0 51 59 19.09	
	+ 13.16	− 5	46 53.12	− 64	+ 15.22	− 6	57 11.57 57 53.66		+ 8.89	− 2	5 10.00	− 10
	1.11926	− 35	1.69 49.32	− 18	1.18241	− 46	9.77 38.7 38.7 2295 2339		0.94890	− 35	1.71 22.48	− 46
	9.79351	+ 9.54	9.77761	+11.25	9.80671	+ 8.04	9.76253 9.76271		9.79558	+9.38	9.78950	+9.99
	1.01884	+ 17	1.57670	+ 19	1.09519	+ 14	0.86555 1.42581		0.85055	+ 17	1.60721	+ 18
	50	−39.40 15		−39.80 15		−39.30	45 50		0	−39.50 25		−39.60
	2 23.8	34 8.51	1 10.6	10 6.16	3 11.1	8 22.02	49.1 49.1		2 23.2	24 5.18	3 13.8	58 48.30
	37.3		23.6		23.9		21.9 21.9		37.4		26.8	
	611		342		350		30 512		606		406	
	52 30.55		16 17.10		18 17.50		49 1550 2174 50 2560 49.30		2 30.30		28 20.30	
	30 17.80	33 8.8	6 31.25		4 30.85		33 32.85 32 22.75		20 18.05		54 28.05	
	51 34 28.36		53 10 41.81		50 8 41.41		54 37 43.41 36 33.31		57 21 28.61		57 58 38.61	
	+10.44	29 58.6 29.0	+37.73		+12.45	+7.34	7.66 + 26.66 36.1		+ 7.09		+10.48	
	31 41.69	30 45.5 26.4	42 46.08	9 50.2	43 49.82	7 22.0	53 24.60 36 22.8		54 37.53	23 5.0	1 4.41	57 48.2
	+9.30 +9.66		+10.98		+7.90		53 32.76 34 49.0 +12.53 +13.10			+9.116		+9.40
Nov 26	35 36	23 59	47 37.9		48 42.3	53	58 58		59 30.1	39	5 57.2	33
	47.4 32.8		41.3		45.4		46 03		33.4		0.5	
	51.0 36.7		45.0		48.3		18.7 24.4		36.8		3.9	
	53.8 39.9		48.3		51.7		20.1 28.3		40.0		7.3	
	57.2 43.3		51.7		55.0		23.7 32.0		43.3		10.6	
	0.7 47.1		51.7				27.4 35.6					
	201 36 498		242		427		30.8 39.1		336		195	
	35 54.02 39.96		47 44.84		48 48.54		187 58 94		59 36.72		6 3.90	
	−4 44.78 44.70 −H 46.28		−4 44.74 −H 46.27		−4 44.74 −H 46.12		58 23.74 31.88		−4 44.78 −H 46.34		−4 44.78 −H 46.20	
	− 1.45 − 1.45	−8.57	− 1.53		− 1.37		−4 44.75 44.75 −H 46.34		− 1.45		− 1.47	
	31 7.87 31 53.81	−57.70	42 58.60		44 2.46		− 1.61 − 1.61 −9.06		54 50.54		1 17.69	
	− 3.48	−8.59	− 3.66	−8.81	− 3.69	−8.88	53 37.40 53 45.54 −1 0.15		− 3.87	−9.10	− 3.98	−9.24
	31 4.31	−57.70	42 54.78	−1 0.00	43 58.78	−1 0.00	− 3.85 − 3.86 −9.06		54 46.65	−1 0.15	1 13.70	−1 0.15
							53 33.58 41.66 −1 0.15 ✓					
	8.2 8.8	51° −.07 37′ 9.78 34′ 38.85	8.8		9.5		8.2 9.1 54° 38′ 23.41 35′ 59.27		8.4		8.9	
	36 36	− 6 − 5	46 52.9		48 31.5		57 58	− 7	59 27.2		5 10.6	
	3.0 48.5	− 66 − 29	57.6		36.5		43.2 8.0	− 56 − 17	34.8		16.3	
	9.3 53.4	+9.84 +9.82	3.1		43.2		50.1 18.0	+13.15 +13.11	41.5		24.4	
	1.48 0.5	+ 18 + 18	1736		111.2		57.3 22.0	+ 23 + 23	1035		513	
	36 9.03	−39.60 −37.60	46 57.87 53 11 19.26		48 34.07 50 8 56.16		1506 480	−4020 −4020	59 34.50 51 24		17.10 51 57 18.13	
	− 1.01 − 14.17	39.41 34 8.84	+ 46.97	− 58	+ 11.47	− 41	58 20.20 58 16.00	37 55.67 35 32.10	+ 2.22	− 0	+ 46.80	− 57
	1.17638 1.14137		1.67182	− 18	1.05956	− 45	+ 33.54 + 15.88		0.34635	− 34	1.67025	− 46
	9.79304 9.79335		9.77761	+11.54	9.80671	+ 8.25	1.52556 1.20085		9.79494	+9.64	9.78950	+10.24
	0.97549 1.04079		1.55550	+ 20	0.97234	+ 14	9.76253 9.76269		0.24736	+ 16	1.56582	+ 19
	45 50		15	−40.00 15		−39.50	1.39416 1.06581 45 50		0	−39.80 25		−39.80
	4 33.92 33.9		1 10.1	10 50.17	8 8.1	8 23.49	3 56.0 5.6		2 19.6	24 20.50 5.05	3 11.9	58 47.66
	46.8 16.3		22.4		19.5		5.9 18.5		32.3		24.6	
	807 19.5		325		276		1.9 241		579		365	
	37.98 4.19 4.35 5.20 9.75		16 16.25		18 13.80		548 4.79 5.45 51 12.05		2 2.59 4.80		28 18.25	
	33 8.08 30 38.60		6 32.10		4 34.55		33 47.40 31 36.30		20 22.40		54 30.19	
	57 37 19.23 49.83		53 10 43.33		50 8 45.78		54 37 56.65 47.59		57 24 33.63		57 58 41.33	
	− 4.55 −10.98		+ 35.93		+ 9.38		+ 24.78 + 11.74		+ 17.68		+ 36.80	
	− 1.52								+ 1.83			
	30 55.81	35 39.7	42 46.11	9 50.2	43 49.87	7 23.5	53 24.48 36 36.5		57 37.56	23 4.9	1 4.48	57 47.5
	31 41.72	33 9.1					32.62 34 57.0					

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj:16008R

1878 Nov. 24 Nov. 26. Ns. W.A.R. Rec'd 1 Dec.

1560 121

	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.
x	0 2 4	8.3 1 119	0 3 11	8.8 2 196	0 6 7	8.0 5 169	0 7 28	7.5 6 357	0 16 10	8.9 15 165
δ	53° 6′	0.3	51° 19′	140	50° 46′	410	54° 34′	28.0	51° 28′	22.3

Nov. 24

+10.66 +9.34 +8.82 +8.39 +8.45 +12.27 +9.35

7 3.2 46 | 7 8 8 | 10 11 | 12 29.2 77 | 21
6.8 48.3 11.3 | 12.0 10.0 | 32.8 | 21 12.0 15
10.0 55.0 18.1 | 15.2 13.4 | 30.3 | 15.3
13.6 58.2 21.4 | 18.4 16.7 | 39.8 | 18.6
17.0 1.7 24.7 | 21.7 19.9 | 43.4 | 22.0
06 2.50 40.6 | 24.1 23.2 | 315 | 25.2
7 10.12 | 7 55.00 8 18.10 | 10 18.48 11 16.64 | 12 36.30 | 21 18.62
−4 42.38 −4 43.87 | −4 42.38 42.38 −4 43.78 | −4 42.38 −4 43.75 | −4 42.38 −4 43.95 | −4 42.39 −4 43.80
— 1.49 | — 1.40 — 1.40 −9.29 | — 1.37 — 1.37 | — 1.57 | — 1.41
2 26.25 | 3 11.22 3 34.32 −1 0.15 5 | 34.73 46 32.89 | 7 52.35 | 16 34.82
— 4.05 −9.26 | — 4.05 — 4.06 −9.29 | — 4.09 — 4.10 | — 4.16 | — 4.28 −9.58
2 22.20 −1 0.15 3 | 7.17 30.26 −1 0.15 5 | 30.64 6 28.79 | 7 48.19 −9.40 −1 0.12 | 16 30.54 −1 0.00

6.0 | 8.8 8.6 51° 20′ 23.19 33′ 20.73 | 8.4 8.3 50 48′ 34.77 34 48′ 52.35 | 7.5 | 9.0

6 35.0 | 7 8 − 0 − 0 10 11 − 7 − 1 | 11 48.2 | 20 58.1
37.1 | 48.7 10.2 − 22 − 66 20.0 31.6 − 45 − 45 | 55.0 | 11.4
40.9 | 53.4 15.6 +9.29 +9.31 34.7 11.4 +8.76 +8.75 | 1.0 | 10.4
44.2 | 57.2 22.2 + 17 + 17 40.6 16.2 + 16 + 16 | 1642 | 129 1434
47.0 53 8 34.24 7 53.77 8 16.00 −39.50 −39.50 | 43.0 34.77 11 11.07 −39.40 −39.40 | 11 54.73 54 36 44.85 | 21 4.90 51 30 19.34
6 49.6 − 22.4 1.23+ 2.10 19 52.73 21 49.85 | 16.9 + 5.57 48 35.1 49 21.20 | + 41.57 − 45 + 14.32 | − 5
+2.96 − 53 0.08991 0.32222 | 1.21192 0.74586 | 1.61878 − 10 1.15594 | − 25
1.11 2.76 | 9.47812 +11.22 9.79573 9.79512 | 9.80058 9.80058 | 9.76289 +12.80 9.79415 | +9.28
9.47812 | 1.34898 + 19 9.99871 0.22371 | 1.14857 0.65251 | 1.48774 + 22 1.05616 | + 17
1.34898 | 15 −39.80 | 15 0 35 35 | 50 −39.90 55 | −39.30

8 40.2 8 49.0 | 12 9.7 33.2 | 3 40.9 4.9 | 0 38.2 36 17.22 | 49.6 29 44.14
53.8 | 43.7 46.5 | 17.2 17.2 | 51.4 | 2.3 44.19
9.0 | 48.4 79.7 | 22.1 | 8.96 | 18.19
18 47.00 | 6 36.70 4 29.85 | 28 18.05 | 50 44.80 | 56 50.95 55.95
4 1.35 | 14 11.45 18 8.50 | 44 37.30 | 32 3.55 | 25 37.48 52.40
53 8 11.91 | 57 22.21 22 19.06 | 50 48 47.86 | 54 36 14.11 | 51 30 7.96 2.96
+22.33 | + 0.98 + 1.67 | − 13.14 + 4.19 | + 30.74 | + 11.38

2 12.94 7 4.8 +11.15 | 2 57.88 18 52.6 | | 7 38.79 35 17.1 +13.00 | 16 20.96 28 44.2 +9.04
3 20.97 20 49.7 | +9.48 +9.00 18.50 1 55 73 +7.18 811 | 12.93 | 54

Nov. 26

7 5.5 | 7 8 8 | 11 12.3 | 12 31.5 | 21 14.6
9.0 −4 46.18 | 50.5 8.4 13.5 | 15.7 | 35.0 | 18.0
12.3 | 54.0 9.9 17.1 | 18.8 | 38.7 | 21.2
16.0 | 57.5 13.4 20.3 | 22.0 | 42.3 | 24.5
19.4 | 0.8 16.8 23.7 | 25.4 | 45.8 | 27.7
122 | 4.0 19.8 27.0 | 442 | 433 | 60
7 12.44 | 368 163 16 | 11 18.34 | 12 38.66 | 21 21.20
24 44.74 6 −4 46.28 | 7 57.36 8 43.30 20.32 | 44.74 6 −4 46.14 | 44.74 6 −4 46.14 | 44.75 6 −4 46.36 | 44.78 7 −4 46.20
— 1.53 | 44.74 6 44.74 44.74 6 −4 46.14 | — 1.40 | — 1.61 | — 1.48
2 26.17 | 4.44 1.44 1.44 | 6 32.70 | 7 52.30 | 16 34.99
— 4.01 | 3 11.18 3 58.56 3 34.14 | — 4.07 | — 4.12 | — 4.24 −9.58
2 22.14 5 −9.26 −1 0.15 3 | 4.01 4.03 4.02 | 6 28.63 | 7 48.18 −9.40 −1 0.12 | 16 30.78 30.76 −1 0.00
30.11 −9.29 −1 0.15 −9.29

8.1 | 8.8 6.2 | 7.8 8.2 | 7.9 | 9.2

6 48.8 | 7 8 8 | 10 32.8 | 12 0.6 | 21 6.1
57.7 | 50.0 18.9 48.5 | 39.3 | 2.9 | 13.0
4.0 | 55.8 24.8 55.1 | 45.4 | 6.3 | 18.5
170.5 | 0.2 30.0 2.3 | 117.5 | 9.3 | 376
6 56.83 53 8 34.54 7 55.33 8 25.23 8 55.30 | 10 39.17 | 12.9 54 36 44.04 | 21 12.53 51 30 14.07
+15.61 − 7 + 2.03 − 11.97 − 34.48 | + 39.67 | − 43 12 6.40 − 27 + 8.67 | − 2
1.19340 | 1.59846 | − 52 +32.26 − 10 | − 59
9.47812 −0.80750 1.00809 1.54382 | 9.80071 | +8.98 1.50866 | 0.98802
1.07759 +11.52 9.79573 9.79558 9.79526 | +9.56 +9.56 +9.56 | 9.76289 +13.14 9.79415 | +9.73
15 + 20 0.20930 0.99974 1.44515 | + 16 + 16 + 16 | 1.37762 + 23 0.83824 | + 17
−40.00 5 5 0 35 | −39.70 −39.70 −39.70 | −39.60 50 − 40.10 45 | −39.60

3 30.6 4 56.2 | 1 32.1 48.7 4 55 | 3 32.8 | 0 32.6 36 16.87 | 1 45.9 29 44.01
43.2 | 45.9 24.9 176 | 46.2 | 46.2 | 58.9
7.40 | 58.0 1.06 23.1 | 79.0 | 78.8 | 10.48
18 37.80 | 6 39.00 5 33.30 4 11.55 | 38 39.60 | 50 39.40 | 56 52.40
4 11.35 | 16 9.35 13.05 18.3680 | 44 8.85 | 32 8.95 | 25 55.95
53 8 22.58 | 57 20.58 21 24.25 22 48.03 | 50 48 20.08 | 54 36 20.18 | 51 30 7.18
+11.96 | +16.40 −3.54 −27.87 | +32.01 | +23.86 | +6.89

2 12.89 7 5.5 | 2 57.88 18 51.8 | | 7 38.78 35 16.8 | 16 21.18 28 44.0
3 20.82 20 49.02

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj:16938R

1878 Nov. 24, Nov. 26

	h m s	Mag	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	
α	0 56 12	9.2 55 14.2	0 57 12	9.0 56 12.0	1 5 49	9.54 49.1	1 16 24	7.0 15 26.5	1 21 24	8.5 20 22.3	1 22 15	-8.8 21 12.5
δ	51° 31′	25.3	53° 59′	54.5	54° 55′	48.7	50° 30′	24.8	53° 33′	28.3	52° 26′	20.7

Nov 24

+8.62 +11.75 +12.97 +7.84 +11.05 +10.26 +10.22

1 1 17.2	1 2 14.6	10 54.1	21 29.8	26 30.0	26 27							
20.6	18.5	57.6	33.0	33.4	57.0 20.3							
23.9	22.1	1.2	36.2	36.9	0.3 23.9							
27.4	25.7	4.8	39.5	40.4	3.5 27.4							
30.5	29.0	8.3	43.0	44.0	7.1 30.4							
196	99	60	315	347	182 27 360							
1 23.92	2 21.98	11 1.20	21 36.30	26 36.94	3.64 27.20							
-4 42.42 -H 43.83	-4 42.42 -H 43.97	-4 42.42 -H 44.02	-4 42.43 -H 43.79	-4 42.43 -H 43.94	-4 42.43 42.43 -H 43.89							
- 1.41	- 1.55	- 1.60	- 1.36	- 1.51	- 1.46 - 1.46 -4 43.89							
56 40.09	57 38.01	6 17.18	16 52.51	21 53.00	22 19.25 22 42.81 -11.05							
- 4.94 -10.45	- 5.03 -19.58	- 5.22 -10.84	- 5.21 -10.82	- 5.42 -11.12	- 5.37 - 5.38							
56 35.15 -58.35	57 32.98 -58.29	6 11.96 -57.69	16 47.30 -56.85	21 47.58 -56.40	22 14.38 37.93 -11.06 -56.31							
9.1	9.0	8.8	8.0	9.0	8.2 8.7							

0 35.0	2 3.5	10 17.7	20 53.2	25 39.1	27 27							
42.0	9.3	23.7	59.0	45.6	18.4 39.5 - 12 - 9							
48.2	14.2	29.4	4.8	54.3	24.4 45.5 - 36 - 45							
125 2 -.20	270	408	1770	1390	30.9 50.2 +10.56 +10.56							
0 41.51 51 33 7.29	2 40.54 2 41.14	10 23.60 54 56 44.59	20 59.00 50 32 39.83	25 46.33 53 35 54.02	27 24.5 45.7 - 36.80 - 36.50							
+42.62 30	- 48 + 12.98	- 5 + 37.60	- 36 + 37.30	- 38 + 50.61	- 66 - 20.93 - 17.89							
1.62961	- 62 1.11327	- 63 1.57519	- 10 1.57171	- 67 1.70424	- 24 1.32077 1.25212							
9.79367	+9.55 9.76870	+12.22 9.75934	+13.20 9.80320	+8.51 9.77353	+11.75 9.78461 9.78461							
1.52935	+ 17 0.98804	+ 21 1.44057	+ 23 1.48098	+ 15 1.58384	+ 20 1.21185 1.24783							
50	-38.020	-38.30 30	-38.00 50	-36.90 50	-36.90 55 55							
4 19.0	4 21.1	0 35.2	4 42.8	36.6	2 26.9 3 3.6							
31.9	33.9	48.6	55.9	49.9	40.7 16.6							
56.9	5.50	8.38	98.7	86.5	6.76 26.2							
54 25.45	24 27.50	20 41.90	54 49.35	57 48.25	57 33.50 10.10							
28 22.90	58 20.85	52 6.45	27 57.00	31 5.10	25 14.55 38.25							
51 32 33.46	54 2 31.41	54 56 17.01	50 32 9.56	53 35 15.66	52 29 25.11 38.81							
+33.83	+ 9.73	+27.58	+30.27	+38.36	-16.27 -13.88 27 45.8							
56 24.70 31 39.4	57 22.40 1 16.1	6 1.12 55 21.7	16 36.48 31 13.5	21 36.46 34 31.6	22 3.32 11.8							
					22 26.87 +10.51 +10.34							

Nov 26

+8.81 +12.83 +7.96 +11.58

1 1 19.7		10 56.5	21 32.0	26 32.4	26 27							
23.0		59.9	35.2	36.0	59.3 —							
26.2		3.7	38.5	39.4	2.6 29.5 29.50							
29.5		7.5	41.7	43.0	6.0 32.7 29.32							
33.0		10.8	45.1	46.6	9.5 36.3 29.52							
314		184	425	474	305 134							
1 26.28		11 3.68	21 38.50	26 39.48	27 6.10 27 29.45							
-4 44.80 -H 46.24		-4 44.82 -H 46.42	-4 44.83 -H 46.19	-4 44.84 -H 46.34	-4 44.84 -H 46.30							
- 1.45		- 1.64	- 1.39	- 1.55	- 1.50 -4 46.30							
56 40.02		6 17.22	16 52.28	21 53.09	22 19.76 22 43.11 -11.05							
- 4.91 -10.45		- 5.19 -10.84	- 5.19 -10.82	- 5.40 -11.12	- 5.35 - 5.36							
56 35.12 -58.35		6 12.03 -57.69	16 47.28 -56.85	21 47.72 -56.40	22 14.45 37.78 -11.06							
9.0		9.0	8.5	8.7	8.4 8.8							

0 37.9		10 0.5	21 0.5	25 50.2	27 27							
46.3		6.0	7.4	57.6	15.1 — - 38 - 43							
52.5		13.8	14.3	3.4	21.1 48.5							
136 7 -.07		203	222	1712	26.7 53.5 +10.83 +10.83							
0 45.57 51 33 8.65		10 6.79 54 56 45.22	21 7.40 50 32 38.47	25 57.0 53 35 52.82	27 1.3 + 19 + 19							
+40.71		+ 56.91 - 83	+ 31.10 - 26	+ 42.41 - 47	27 37.10 -37.10							
1.60970		1.75519 - 13	1.49276 - 67	1.62747 - 22	1.20945							
9.79367		9.75931 +13.55	9.80320 + 8.74	9.77353 +12.06	9.78461							
1.50944		1.62057 + 24	1.40203 + 15	1.50704 + 21	1.24036							
50		-38.20 50	-37.20 50	-37.20 50	55 55							
4 17.7		0 50.6 56 19.68	4 41.2 32 9.16	1 33.1 35 27.13	2 33.7 3 0.1							
28.8		1.6	57.5	44.7	46.4 11.4							
46.5		112.2	92.7	77.8	80.1 11.5							
54 23.25		30 56.10	54 46.35	51 38.90	57 40.05 5.75							
28 2.50		51 52.25	28 20.0	31 9.45	25 8.30 4.60							
51 32 36.33		54 56 3.48	52 32 13.23	53 35 20.68	52 29 19.53 53.83							
+32.32		+41.74	+ 25.24	+ 32.14	-19.34 -15.20							
					-1.56 -19.94							
56 24.68 31 40.7		6 1.23 55 22.0	16 36.30 31 12.3	21 36.62 34 30.7	22 3.40 27 45.1							
					26.74 10.8							

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae..proj.1608R

1878 Nov 24. 786 Nov 26. 787

23 56 1
41.0

	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.
α	1 25 12	9.1 24 100	1 28 57	8.8 27.5 8.5	1 30 37	9.6 29 36.7	1 31 56	8.2 30 53.3
δ	54° 49′	43.4	50° 36′	31.0	57° 52′	46.9	54° 25′	20.2

Nov 24

+12.31 +13.05 +7.67 +8.96 +11.67

30 30		34 6.2		35 44.8		37 3.2		
4.5 20.0		9.3		48.1		8.7		
8.5 23.2		12.5		51.4		10.3		
12.0 26.8		15.7		54.8		14.0		
15.5 30.3		19.0		58.0		17.4		
98 346		127		71		16		
30 19.6 30 26.2		34 12.54		35 51.42		37 10.32		
−4 42.44 42.44	−H 44.02 44.02	−4 42.44	−H 43.80	−4 42.44	−H 43.87	−4 42.44	−H 44.01	
− 1.58 − 1.58	−11.29 −56.04	− 1.36		− 1.43		− 1.57		
25 27.54 26 42.90		29 28.74		31 7.55		32 58.31		
− 5.54 − 6.54	−11.29 −56.04	− 5.40	−11.07 −55.77	− 6.48	−11.19 −55.50	− 5.64	−11.41 −55.38	
25 22.40 37.36		29 23.34		31 2.07		32 20.67		
8.9 9.0	54° 48′ 59.24 50 54.57	8.8		9.0		8.3		
29 30	− 49 − 13	33 21.5		34 54.5		36 17.6		
21.3 43.2	− 49 − 11	24.9		0.2		20.8		
28.5 49.3	+13.07 +13.11	27.3		5.9		24.3		
35.5 55.8	+ 22 + 22	30.4		0.6		27.8		
8.53 1483		33.7	50 38 40.83	35 0.20	51 54 17.46	31.4	54 27 33.71	
29 2.843 30 49.43	−36.80 −36.80							
+ 43.53 − 22.51	3455 50 3064	33 27.56	− 54	+ 51.22	− 69	36 24.38	− 55	
1.63879 1.35238		1.65 30 98	− 55	1.70944	− 46	1.66219	− 70	
9.76075 9.76021		9.80228	+8.81	9.79031	+9.93	9.76448	+12.70	
1.50561 1.21866		1.56137	+ 15	1.60582	+ 18	1.53274	+ 22	
35 35		45	−36.10	30	−36.10	55	−36.30	
8 25.1° 41.7		3 48.7	38 12.20	3 15.1	53 50.12	41 53.4	27 8.88	
38.3 53.9		0.3		28.5		5.2		
6.34 9.56		10.98		43.6		11.86		
38 51.70 35 47.80		48 54.57		33 21.80		59 59.30		
44 16.46 47 0.55		33 53.85		49 26.55		22 49.05		
54 48 27.21 57 11.11		50 38 4.41		51 53 37.11		54 26 59.61		
+32.03 −16.54		+36.42		+40.35		+31.10		
25 11.11	47 38.5							
25 26.07	49 34.6	29 12.27	37 16.4	30 50.88	52 54.6	32 9.26	26 13.5	
	+12.59 +13.09		+7.53		+9.71		+12.07	

Nov 26

30 30		34 8.3		35 47.1		37 5.5		
7.2 22.3		11.8		50.5		9.0		
10.8 25.6		14.8		53.9		12.7		
14.3 29.0		18.0		57.2		16.3		
18.2 32.6		21.1		0.5		20.0		
220 458		240		192		135		
30 1440 30 29.16		34 14.80		35 53.84		37 12.70		
−4 44.85 44.85	−H 46.43 46.42	−4 44.85	−H 46.20	−4 44.85	−H 46.27	−4 44.85	−H 46.42	
− 1.62 − 1.62		− 1.39		− 1.47		− 1.61		
25 27.93 25 42.69	−11.29 −56.04	29 28.56		31 7.52		32 26.23		
− 5.52 − 5.62		− 5.38	−11.07 −55.77	− 5.46	−11.19 −55.50	− 5.62	−11.41 −55.38	
25 23.42 7.68		29 23.24		31 2.06		32 20.65		
22.445 37.20	−11.29 −56.04							
8.7 8.7	54° 49′ 0.0 50 53.94	8.8		9.0		7.9		
29 29	− 39 − 37	33 25.2		34 55.4		36 23.0		
19.2 45.5	− 50 − 22	31.3		0.2		30.0		
26.1 50.7	+13.44 +13.44	37.3		5.8		37.2		
33.7 56.6	+ 24 + 24	43.8		1.4		0.2		
29 2.633 30 3.03	−37.10 −37.10	33 31.27	50 38 40.38	35 0.47	51 54 18.12	36 30.07	54 27 33.52	
+ 48.07 + 36.23	3552 2986	+ 43.53	− 51	+ 53.37	− 75	+ 42.63	− 47	
1.65187 1.58240		1.63876	− 55	1.72730	− 48	1.62972	− 70	
9.76075 9.76039		9.80228	+8.84	9.79031	+10.20	9.76448	+13.02	
1.54869 1.44886		1.54714	+ 15	1.62368	+ 19	1.50027	+ 22	
35 35		45	−36.40	30	−36.50	55	−36.60	
9 29.8 28.3		3 49.1	38 11.85	3 18.1	53 50.71	4 32.9	27 8.92	
399 39.2		59.8		28.9		2.5		
697 695		68.9		47.0		11.54		
38 34.85 36 33.75		48 54.45		33 23.50		59 57.70		
44 13.50 46 14.60		33 53.90		49 24.85		22 50.65		
54 46 24.73 25.83		50 38 5.13		51 53 36.08		52 27 1.88		
+35.37 +28.11		+35.25		+42.04		+31.64		
25 11.16	47 39.5	29 12.15	37 16.1	30 50.92	52 55.2	32 9.25	26 13.5	
25.93	38.8							

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1698R

1878 Nov. 30, Dec 1. Obs. W.A.R. Rec. J.F.M.

	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.
α	23 6 29.84	5 44.3	23 25 46.87	24 59.4	23 42 4.92	41 15.0	23 45 24.88	44 37.3	23 53 14.90	52 24.7	23 54 24.90	53 37.9
δ	53° 50′	45.0	53° 29′	22.8	52° 49′	43.4	55° 13′	7.4	54° 10′	4.4	51° 33′	27.5

Nov. 30

	11 32.3	02	30 50.5	10.88	29 47 9.9	10.53	50 50 32.6		50 12.71	58 20.6	11.91	59 34.3
	35.9		49.9		13.4		0.5			24.0		37.8
	39.5		53.4		17.0		4.2			27.5		41.0
	42.9		57.1		20.3		7.5			31.2		44.4
	46.4		0.5		23.8		11.2			34.7		47.9
	470		347 30 378		344		384 50 00			380		64
	11 39.40		30 56.94	57.56	47 16.88		50 7.68	48.00		58 27.60		59 41.08
	− 4 48.90	−4 50.49	− 4 48.91	48.91	− 4 48.92	−4 50.43	− 4 48.92	48.92	−4 50.59	− 4 48.93	−4 50.52	− 4 48.98
	− 1.59		− 1.55	1.55	− 1.51		− 1.67	1.67		− 1.59		− 1.45
	6 48.91	26 6.48	26 7.10		42 26.45		45 17.10	45 49.42		53 37.08		54 50.70
	− 2.89		− 3.25	−3.25	− 3.55		− 3.60	−3.61		− 3.76		− 3.79
	6 46.02	26 3.23		3.85	42 22.90		45 13.49			53 33.82		54 46.91
	8.2		8.9	8.7	9.1		8.9	8.2		8.9		9.1
	10 58.4		30 31 17.3	− 6 − 19	46 42.5		49 50			57 42.3		59 11.6
	3.7		35.0	24.0 − 68 − 12	46.5		41.8	58.4		45.2		17.8
	9.4		42.0	31.2 +11.88 +11.86	51.5		49.0	1.2		49.8		23.0
	11.5	− 48	12.50	7.25 + 22 + 22	140.5		54.9	3.7		54.5		52.4
	11 3.83	53 53 15.64	30 41.67	31 24.17 −40.10 −40.10	46 48.3	52 51 38.04	49 48.37	54 14.22		58.2	54 12 4.00	59 17.47
	+35.57	− 33 + 15.27	− 26.61	32 10.39 30 23.16	+ 30.05		− 24 + 19.11	− 24.22		57 + 58.00	− 39	+ 23.61
	1.55108	− 62 1.18364	1.42504		1.47784		− 12 1.28426	1.38417		1.57519	− 6	1.37310
	9.77043	+12.22 9.77405	9.77422		9.78097		+11.16 9.75587	9.75551		9.76712	+12.61	9.79319
	1.42758	+ 23 1.06396	1.30533		1.36488		+ 21 1.40320	1.29457		1.44837	+ 23	1.27236
	30	−39.60	50 55		35		−40.30	10 10		15	−40.60	30
	4 4.0	52 47.06	4 21.9	43.1	0 40.1	51 5.27	2 56.0	25.2		11 16.6	11 35.31	14.2
	17.2		37.9	51.4	55.0		276	18.8		30.4		28.1
	211		628	945	951		432	240		470		423
	34 10.55		54 31.40	55 47.25	35 47.55		12 2160	10 1200		15 2350		51 21.15
	48 37.80		28 16.95	27 1.10	47 0.80		10 267.5	12 3635		4 2485		31 27.20
	53 52 48.87		53 31 26.02	31 12.17 31 10.9	52 57 11.87		55 14 37.82	16 47.42		54 11 35.92	51	35 38.27
	+26.77		+11.59	−20.20 29 23.7	+23.14		+13.91	−13.61		+28.08		+18.72
	6 38.07	51 48.5	25 54.81	24 48.5 20.6	42 14.09	50 5.3	+ 37.43	−41.11	13 47.0	53 24.26	10 35.2	54 37.81
		+11.26	55.43	+10.70		+10.98	45 4.65	36.96	14 38.3		+12.78	
									+13.99 +13.36			34 25.8 +9.72
	11 33.4	10.91	30 40.8	35	47 11.1	58	50 30		64 21	58 21.5	43	39 35.4
	37.0		44.2		14.3		1.8	34.0		24.7		38.4
	40.3		47.4		17.8		5.3	37.4		28.4		41.8
	44.0		51.0		21.3		9.1	41.2		32.0		45.3
	47.8		54.6		24.4		12.5	45.0		35.6		49.1
	25		380		389		16.2	48.4		422		100
	1+ 40.50		30 47.60		47 17.78		449 50	60		58 28.44		59 42.00
	− 4 49.96	−4 51.48	− 4 49.97	−4 51.45	− 4 49.98	−4 51.42	50 8.98	41.20	−4 51.58	− 4 49.99	−4 51.51	− 4 49.99
	− 1.52		− 1.48		− 1.44		− 4 49.98	49.98		− 1.52		− 1.39
	6 49.02		25 56.15		42 26.36		45 17.43	46 49.65		53 36.93		54 50.62
	− 2.86	−7.95	− 3.22	−8.41	− 3.53	−8.81	− 3.57	−3.57	−8.84	− 3.74	−9.06	− 3.77
	6 46.16	−58.53	25 52.93	−59.49	42 22.83	−59.97	45 13.83	46.05	−1 0.03	53 33.19	−1 0.15	54 46.85
	8.3		8.5		9.2		9.0	8.3		8.8		9.3
	10 42.2		29 44.0		46 27.0		49 51			57 51.2		59 9.2
	48.4		49.1		33.4		41.9	21.5	− 11 − 54	58.8		15.0
	53.3		56.0		43.8		48.0	26.5	− 19 − 19	5.4		20.3
	14.39	− 35	149.1		104.2		53.1	33.3	+14.03 +14.03	175.4		44.5
	10 47.97	53 53 16.60	29 49.70	53 28 36.42	46 34.73	52 51 36.74	49 47.67	27.10	−40.80 −40.80	57 58.47	54 12 1.55	59 14.83
	+52.53	− 72	+57.90	− 87	+43.05	− 48 + 21.31		−15.70	36.76	+29.97	− 23	+ 27.17
	1.72041	− 70	1.76268	− 66	1.63397	− 14 1.32858		1.66181	47.13	1.47669	− 5	1.43409
	9.77043	+12.45	9.77473	+12.01	9.78097	+11.34 9.75569		9.75569		9.76712	+12.83	9.79319
	1.59691	+ 23	1.64348	+ 22	1.52101	+ 21 1.19034		1.52754		1.34988	+ 23	1.33335
	30	−39.60	55	−40.80	35	−40.40	10	10		15	−40.70	30
	4 17.3	52 47.91	41 2.2	28 6.57	0 50.3	51 6.89	1 63.6	3		0 14.5	11 33.28	19.6
	28.2		12.6		2.3		16.1	16.1		26.8		32.1
	455		14.8		1126		224			413		51.7
	34 2275		59 7.40		35 5630		11 1140			15 2065		51 25.85
	48 25.60		23 40.95		46 5205		11 3695			4 2770		31 22.50
	53 52 37.07		53 27 52.42		52 51 3.52		55 15 48.42			54 11 39.17		51 35 33.99
	+39.53		+44.02		+ 33.14		+15.80	+33.70		+ 22.38		+ 21.55
	6 38.21	51 49.4	25 44.52	27 7.1	42 14.02	50 6.9	45 4.99		14 36.7	53 24.13	10 33.1	54 37.75
							37.21		13 47.1			34 24.4

Dec 1

	11 33.4	10.91	30 40.8	35	47 11.1	58	50 30		64 21	58 21.5	43	39 35.4
	37.0		44.2		14.3		1.8	34.0		24.7		38.4
	40.3		47.4		17.8		5.3	37.4		28.4		41.8
	440		51.0		21.3		9.1	41.2		32.0		45.3
	47.8		54.6		24.4		12.5	45.0		35.6		49.1
	25		380		389		16.2	48.4		422		100
	1+ 40.50		30 47.60		47 17.78		449 50	60		58 28.44		59 42.00
	− 4 49.96	−4 51.48	− 4 49.97	−4 51.45	− 4 49.98	−4 51.42	50 8.98	41.20	−4 51.58	− 4 49.99	−4 51.51	− 4 49.99
	− 1.52		− 1.48		− 1.44		− 4 49.98	49.98		− 1.52		− 1.39
	6 49.02		25 56.15		42 26.36		45 17.43	46 49.65		53 36.93		54 50.62
	− 2.86	−7.95	− 3.22	−8.41	− 3.53	−8.81	− 3.57	−3.57	−8.84	− 3.74	−9.06	− 3.77
	6 46.16	−58.53	25 52.93	−59.49	42 22.83	−59.97	45 13.83	46.05	−1 0.03	53 33.19	−1 0.15	54 46.85
	8.3		8.5		9.2		9.0	8.3		8.8		9.3
	10 42.2		29 44.0		46 27.0		49 51			57 51.2		59 9.2
	48.4		49.1		33.4		41.9	21.5	− 11 − 54	58.8		15.0
	53.3		56.0		43.8		48.0	26.5	− 19 − 19	5.4		20.3
	14.39	− 35	149.1		104.2		53.1	33.3	+14.03 +14.03	175.4		44.5
	10 47.97	53 53 16.60	29 49.70	53 28 36.42	46 34.73	52 51 36.74	49 47.67	27.10	−40.80 −40.80	57 58.47	54 12 1.55	59 14.83
	+52.53	− 72	+57.90	− 87	+43.05	− 48 + 21.31		−15.70	36.76	+29.97	− 23	+ 27.17
	1.72041	− 70	1.76268	− 66	1.63397	− 14 1.32858		1.66181	47.13	1.47669	− 5	1.43409
	9.77043	+12.45	9.77473	+12.01	9.78097	+11.34 9.75569		9.75569		9.76712	+12.83	9.79319
	1.59691	+ 23	1.64348	+ 22	1.52101	+ 21 1.19034		1.52754		1.34988	+ 23	1.33335
	30	−39.60	55	−40.80	35	−40.40	10	10		15	−40.70	30
	4 17.3	52 47.91	41 2.2	28 6.57	0 50.3	51 6.89	1 63.6	3		0 14.5	11 33.28	19.6
	28.2		12.6		2.3		16.1	16.1		26.8		32.1
	455		14.8		1126		224			413		51.7
	34 2275		59 7.40		35 5630		11 1140			15 2065		51 25.85
	48 25.60		23 40.95		46 5205		11 3695			4 2770		31 22.50
	53 52 37.07		53 27 52.42		52 51 3.52		55 15 48.42			54 11 39.17		51 35 33.99
	+39.53		+44.02		+ 33.14		+15.80	+33.70		+ 22.38		+ 21.55
	6 38.21	51 49.4	25 44.52	27 7.1	42 14.02	50 6.9	45 4.99		14 36.7	53 24.13	10 33.1	54 37.75
							37.21		13 47.1			34 24.4

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1698R

1878 Nov 30. Dec 1.

	h m s	mag	h m s	mag.	h m s	mag.	h m s	mag.	h m s	mag.	h m s	mag.
α	0 0 22	9.0	0 1 54	8.8	0 3 25	8.4	0 4 55	7.9	0 16 23	8.3	0 52 42	8.8
δ	57° 11′	52	50° 41′	50	52° 5′	00	51° 15′		53° 37′	31	52° 17′	11.7

Nov 30

	10.98	11.61	1.9	7.63	33.4	42	07	10.98	9.66	12.2	11.83	11.07
			5.2		36.5					16.0		10.87
			8.4		39.7					19.3		9.70
			11.8		43.0					22.8		
			15.0		46.0					26.5		
	3.67	3.94	4.23		4.86				2.66	1.25		
	37.34	37.88	8.46		39.72				55.32	12.50		
	4.893	48.93	48.93		48.93				4.899	48.94		
	1.57	1.57	1.39		1.37				1.55	1.55		
	46.82	47.36	18.14		49.42				4.83	28.87		
	3.90	3.90	3.92		3.94				4.18	4.18	4.19	
	43.92	43.46	14.22		45.48				0.65	17.83	24.68	
	4.2	4.4	23.4		23.9				23.27	14.7	3.57.9	
	15.1	56.7	35.3		35.9				469	27.1	10.8	
	174	10.16	584		598				96	418	87	
	14 8.70	14 50.80	43 29.35		19 29.90				47 39.80	49 20.70	49 4.30	
	8 34.5	7 51.55	39 19.00		3 18.45				35 8.55	33 19.45	33 4.05	
	54 12 50.72	12 8.62	50 43 30.07		50 7 29.52				53 39 19.62		52 16.12	16 28.4
	+41.46	+12.61	+30.59		+44.34							
	0 38.69	12 2.4										
	0 34.23	10 52.1	2 4.96	4228.1	3 36.17	6 40.2						
Dec 1												
			7 3.0	7.84	8 34.3	6.95						
	3.15	32.1	6.2		37.4							
	3.48	35.2	9.6		40.6							
	3.83	38.6	12.5		44.0							
	4.19	42.1	16.1		47.4							
	4.54	45.6			37							
	4.19	4.36	4.74									
	38.38	38.72	9.48		40.74							
	4.999	49.99	49.99		49.99							
	1.52	1.52	1.33		1.31							
	46.87	47.21	18.16		49.44							
	3.88	3.88	3.90		3.93				4.16	4.16	4.16	
	43.99	43.33	14.26		45.51				0.68	17.56	24.86	
	4.1	4.5	25.1		51.5							
	41.2	8.4	30.4		57.0							
	47.2	13.6	35.3		4.3							
	53.4	22.4	9.08		17.8							
	14.18	4.44										
	4.72.7	5.148.0	6.30.27		7.57.60							
	+51.11	+23.92	+39.21		+43.14							
	1.40851	1.37876	1.59340		1.63488							
	9.76695	9.76742	9.80151		9.80686							
	1.58153	1.25195	1.50098		1.54781							
	4.3.4	4.32.6	25.8		16.6							
	13.7	3.1	37.5		26.1							
	16.1	11.57	6.33		4.27							
	14 8.05	14 5.785	43 31.65		19 21.35							
	8 40.20	7 50.50	39 16.70		3 27.01							
	54 12 51.77	12 1.97	50 43 28.14		50 7 38.53							
	+38.15	+17.86	+31.69		+35.30							
	0 33.76	12 0.5	2 5.00	4227.4	3 36.20	6 40.6						
	0 34.10	10 50.8										

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16008R

1878 Nov. 30 Dec 1 Obs W AR Rec J & Mc

	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.
	0 56 12	9.2	55 14.2	0 57 16	8.9	56 16.1	1 2 43	8.6	1 43.0	1 16 43	7.6	15 45.7	1 21 56	8.8	20 53.8	1 25 20	7.0	24 18.0
	51° 31'		25.3	53° 54'		49.2	53° 3'		52 57.6	50° 8'		2.8	54° 21'		15.7	54° 14'		12.0

Nov 30

	+8.84			+12.41			+10.82			+7.74								
	1 1 23.7	33		2 26.6	11.93		7 53.4	34		21 57.9	6.96		Chf			30 33.1		
	27.4			30.3			56.9			1.0						36.6		
	30.5			33.6			0.0			4.2						40.1		
	34.0			37.3			3.5			7.5						438		
	37.5			40.7			7.2			10.7						47.2		
	31			186			1.0			21 63						08		
	1 30.62			2 33.70			8 0.20			22 4.32 26						30 40.16		
	-4 48.96	-4 50.41		-4 48.96	-4 50.53		-4 48.97	-4 50.50		-4 48.98	-4 50.35					-4 48.98	-4 50.57	
	- 1.45			- 1.57			- 1.53			- 1.37						- 1.59		
	56 40.21			57 43.15			3 9.70			17 13.91						25 49.59		
	- 4.80	-10.45		- 4.94	-10.58		- 5.01	-10.66		- 5.14	-10.80					- 5.45		
	56 35.35	-58.35		57 38.21	-58.29		3 4.69	-57.90		17 8.77	-56.82					25 44.14	-11.25	
	9.3			9.0			8.5			8.0			6.8			7.0		
	0 41.0			2 4.1			7 10.1			21 9.3			26 24.3			Chf		
	47.0			10.4			13.4			13.5			31.0					
	54.2			17.1			15.6			20.5			36.7					
	142	- 48		316			18.2			43.3			92.0					
	0 47.4	51 33 8.33		2 10.53	53 56 43.28		20.5	53 5 24.60		21 14.43	50 10 27.92		26 30.67					
	+ 43.22	- 50		+ 23.17	- 14		15.56	- 52		+ 49.83	- 67							
	1.63568	- 66		1.36493	- 9		+44.64 1.64972	- 33		1.69749	- 33							
	9.79367	+ 9.78		9.76991	+12.41		9.77862	+11.46		9.80656	+ 8.29							
	1.53542	+ 19		1.24091	+ 23		1.53441	+ 21		1.61012	+ 15							
	50	- 38.90	30		-39.30	20		-38.90	15		-37.80	0				5		
	4 19.1	32 37.76	0	27.3	56 15.91	2	2.7	4 56.04	2	6.3	9 57.08	21	26.9			3 6.9		
	31.7			39.8			15.4			18.2			38.1			17.9		
	50.8			67.4			18.1			24.5			6.50			24.8		
	54 25.40		30	33.55		22	9.05		17	12.25		4	32.50			8 12.40		
	28 22.95		52	14.80		0	39.30		5	36.10			~~43.57~~			54 12 23.47		
	51 32 34.02		53	56 25.87		53	4 50.37		50	9 47.17								
	+ 34.31			+ 17.41			+ 31.23			+ 40.75								
	56 24.90	31 39.4	57	27.63	55 17.6	2	54.03	3 58.1	16	57.97 ~~58.0~~	9 0.3					25 32.89		

Dec 1

	+8.72			+12.48			+10.84			+7.87			+11.56			+12.03		
	1 1 25.0	8.37		2 28.2	12.13		7 54.2	29		21 58.8	.52		27 8.7	21		30 33.7	11.68	
	28.2			31.1			57.7			2.0			12.3			37.2		
	31.5			34.6			1.2			5.3			15.8			41.0		
	34.8			38.2			4.5			8.4			19.2			44.4		
	38.3			41.7			8.2			11.9			23.0			48.1		
	78			238			58			264			290			44		
	1 31.66			2 34.76			8 1.16			22 5.28			27 15.80			30 40.88		
	-4 50.03	-4 51.42		-4 50.03	-4 51.55		-4 50.33	-4 51.49		-4 50.34	-4 51.35		-4 50.04	-4 51.58		-4 50.04	-4 51.57	
	- 1.39			- 1.52			- 1.46			- 1.31			- 1.54			- 1.53		
	56 40.14			57 43.21			3 9.67			17 13.93			22 24.22			25 49.31		
	- 4.84	-10.45		- 4.93	-10.58		- 5.00	-10.66		- 5.12	-10.80		- 5.39	-11.18		- 5.44	-11.25	
	56 35.30	-58.35		57 38.28	-58.29		3 4.67	-57.90		17 8.81	-56.82		22 18.83	-56.34		25 43.87	-56.01	
	9.4			9.2			8.0			8.6			8.6			6.6		
	0 36.2			1 58.4			6 59.7			21 21.1			26 7.7			29 43.3		
	41.4			4.7			4.2			29.5			15.3			46.9		
	47.7			13.0			12.4			34.5			20.6			50.6		
	125.3	- 35		161			16.3			85.7			43.6			53.2		
	0 41.77	51 33 8.07	6	2 5.37	53 56 42.71	87	5.43	53 5 26.71	21	28.57	50 10 28.24 36.01	26	14.53	54 22 59.79		55.5	54 19 25.78	
	+49.79	- 66		+29.39	- 22		+ 55.73	- 81		+ 36.71	- 36		+ 61.27	- 97		29 49.90	- 67	
	1.69714	- 72		1.46820	- 10		1.74609	- 37		1.56478	- 32		1.78725	- 77		+ 50.78 1.70748	- 52	
	9.79383	+ 9.91		9.76991	+12.57		9.77862	+11.61		9.80656	+ 8.40		9.76537	+13.06		9.76590	+12.99	
	1.59704	+ 19		1.34418	+ 23		1.63078	+ 21		1.47741	+ 15		1.65869	+ 24		1.57937	+ 23	
	50	-39.10	30		-39.40	20		-39.00	15		-37.90	0		-38.20	5		-38.00	
	4 25.8	32 37.34	0	33.3	56 15.44	2	11.1	4 57.00	1	56.6	9 57.86	21	40.9	22 32.80	3	7.1	18 59.46	
	36.8		3	45.1			22.6			6.6			50.5			16.9		
	62.6			78.4			33.7			32			91.4			24.0		
	54 31.30		30	39.20		22	16.85		17	1.60		4	45.70			8 12.02		
	28 17.05		52	91.5		0	31.50		5	46.75		18	2.65			14 36.35		
	51 32 28.53	2	53	56 20.62		53	4 42.97		50	9 58.22		54	22 14.12			54 18 47.82		
	+ 39.54			+ 22.09			+ 42.74			+ 37.79			+ 45.67			+ 37.96		
	56 24.85	31 39.0	57	27.70	55 17.2	2	54.01	3 59.1	16	58.01	9 1.0	22	7.65	21 36.5	25	32.62	18 3.4	

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1608R

1878 Dec 7, Dec 8. Obs. WAR Rec. JFM. 1/3

0 332 5?0

	h m s	mag	h m s	mag	h m s	mag	h m s	mag	h m s	mag	h m s	mag
α	22 53 57	8.2	23 11 25	9.6	23 21 37	9.5	23 25 28	9.0	0 1 10	9.0	0 2 4	8.8
δ	50 19′		54 47′		54 53′		55 2′		54 56′		53 06′	

Dec 7

	58 21.3	8.31	23 1 57.0	85	26 32.1	44	30 30		14.03	13.82	5 26.7	69		
	24.6		0.3		35.5		18.2	20.0			30.2			
	27.9		3.8		39.2		21.7	23.9			33.4			
	31.0		7.2		42.8		25.5	27.7			36.7			
	34.3		10.8		46.2		29.1	31.2			40.0			
	391		191		458		271	30 376			170			
	58 27.82		2 38.2		26 39.16		30 25.42	27.52			5 33.40			
	−4 57.37	−4 58.74	−4 57.38	−4 58.91	−4 57.42	−4 59.06	4 57.43	57.43	−4 58.07	−4 58.07	−4 57.49	−4 58.9		
	− 1.37		− 1.53		− 1.64		−	1.64	−8.35		− 1.43			
	53 29.08		57 4.91		21 40.10	25	26.35 25	28.45	−5946		0 34.48			
	− 2.81		− 2.65	−7.77	− 2.96		−	3.03	−8.35		− 3.75			
	53 26.48	−783	57 2.36	−57.90	21 37.14	−826 25	23.32	25.42	−5946		0 30.73	−9.22		
	8.3	−3763	7.5		9.3	−5934	8.8	6.8	55°		9.0	−1 0.15		
									4′ 54.70	5′ 6.00				
	58 43.8		1 48.0		28 3.3		30 30		− 8	− 29	5 47.0			
	50.1		50.5		9.2		0.2	55.0	− 39	− 39	53.2			
	56.3		53.3		15.4		8.0	0.6	+1388	+1388	57.8			
	1502	+ 35	56.0		24.9		14.3	7.1	+ 27	+ 27	1580			
	58 57.07	50 23 2.27	59.8	53 9 37.45	28 7 30.30	54 53 7.08	30 7.50	31 0.90	−4070	−4070	5 52.67	51 5 34.21		
	− 22.25	− 13	1 53.52	− 3	−30.14	− 23	+ 4292	+ 3338	2803	3912	−19.27	− 10		
	1.34733	− 71	1.01250	− 42	1.47914	− 60	37.78	25.34	1.54558	1.52349	1.28488	− 20		
	9.80458	+864	9.77795	+11.72	9.75985	+1365	9.75769	9.75769	5.11776		9.79793	+9.45		
	1.25798	+ 16	0.89686	+ 23	1.34506	+ 27	1.11710	1.38725	1.36967		1.18888	+ 19		
	0	−39.00 15		−37.70 30		−4050	30	20	1.10667		20	−4070		
		3850		00										
n = −1.154	10.7	72 32.08 2	259	9 10.30	26.3	52.4002	13.8	13.8	1.30146		1 5.1	5 3.30		
	20.2		34.8		35.1		22.8	22.8	5.78761		15.4			
Rms. = −17	309	21 5.03	607		614			366	6.05515		20.5			
	4 1548	+1 5.10	17 30.35		33 30.70		22	18.30	1.10669		21 10.25			
+4′ 11.″56	18 32.90		5 18.00		49 17.65		0	30.05	1.1622		1 38.10			
	50 22 44.16		53 9 29.52	56 54.59	54 53 29.21		55 4 41.61				51 5 49.66			
	+18.11		+ 7.89	−8 12.4	− 22.13		+17.00	+21.50			− 15.45			
	53 18.65	20 58.4	h m s	Mag			− 17.14	2 49.3						
		5	23 11 25	10 40.3	21 28.88	51 40.7	25 14.97	3 28.6	0 21.51	4 3.2				
Dec 8			54° 47	9.5 41.5			25 17.07	3 29.7		+9.34				+10.90
			16 31.4	+17.73				29.9	5 27.7	76	6 41.0	11.30		
			37.8	13.13					31.0		44.4			
			41.4						34.3		47.8			
			44.8						37.6		51.3			
			48.7						41.0		54.7			
			71						21.6		392			
			16 41.42						6 34.32		6 47.84			
		+.014	−4 58.57	49 −4 58.82					−4 58.56	−4 59.80	−4 58.55	6 −4 59.48		
			− 1.34						− 1.25		− 1.34			
			11 41.57						0 34.52		1 47.95			
			− 2.74						− 3.73		− 3.74			
			11 38.83	6 −8.02					0 30.78	9 −9.22	1 44.21	2 −9.24		
				−5883						−1 0.15		−1 0.15		
			9.2						8.9		8.5			
			15 45.9						5 15.5		6 11.0			
			51.6						19.4		− 17.6			
			2.0						25.4		22.9			
			1595	+ 40					603		515			
			15 53.17	54 49 36.65					5 20.10	51 5 33.66	6 17.17	53 7 39.01		
			+48.25	− 61					+14.22	− 5	+ 30.67	− 25		
			1.68350	− 54					1.15290	− 29	1.46671	− 85		
			9.76057	+13.65					9.79809	+ 9.51	9.77829	+11.78		
			1.55014	+ 23					1.05706	+ 19	1.37107	+ 22		
			35	−40.10					30	−40.70	15	−41.00		
n = −1.01	15 2 25.9		2 55.1	49 9.68					1 32.7	5 2.72	4 40.4	7 9.31		
	34.6		1.7						41.9		47.7			
Rms. = −18	60.7		1168						746		881			
	17 30.5		37 5840						21 37.30		19 4405			
+4′ 11.″21			44 49.95						1 11.05		3 4.36			
			54 49 1.16						51 5 22.26		53 7 15.51			
			+35.49						+11.40		+23.50			
			11 30.64	48 10.8					0					
									5 21.57	4 2.6	1 34.98	6 9.2		

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16008R

1878 Dec 7, Dec 8. Obs W.A.R. Rec. J.F.M.C.

	h m s	mag.	h m s	mag	h m s	mag.	h m s	mag.	h m s	mag
α	0 4 55	7.3	0 16 16	8.0	1 15 18	8.5	1 16 29	9.1	1 27 11	8.9
δ	51° 15'	57.1	51° 09'		52° 46'		53° 39'		52° 41'	

Dec 7

	9 3.8	64	21 36.0	40	20 37.6	11.66	21 21 48.6	88 98	27 27	55 .94
	7.0		39.3		41.3		30.1 52.4		17.1 30.3	
	10.3		42.6		44.5		33.6 55.8		20.7 33.7	
	13.7		45.8		48.0		37.2 59.2		24.2 37.3	
	17.0		49.2		51.3		40.5 2.8		27.5 40.3	
	18		129		227		354 288		205 357	
	9. 10.36		21 42.58		20 44.54		21 37.08 55.76		27 24.10 37.14	
	−4 57.50	−4 58.93	−4 57.52	−4 58.95	−4 57.52 62	4 39.12	−4 57.63 57.63	−4 37.18 −4 58.15	−4 57.64 57.64	−4 39.14 −4 58.14
	− 1.43		− 1.43		− 1.50		− 1.55 − 1.55	−11.00	1.50 − 1.50	−1106
	4 11.43		16 43.63		15 45.42		16 37.90 16 56.58	−5685	22 24.96 22 38.00	−5631
	− 3.81	49.32	− 4.03	−9.58	− 5.12	−10.93 −	5.16 − 5.17	−1101	− 5.23 − 5.23	
	4 10.62	0.15	16 39.60	−1.00	15 40.30	−10.94	16 32.74 51.41	−5685	22 19.73 32.77	−1107
	7.0 58.30	+3 1.2	16 30.02	4 29.8	15 29.37	49 9.7	8.6 9.2		8.7 8.9	−5631

	8 14.8		20 59.6		20 28.5		22 21 46.8	− 55 − 3	26 27	− 62 − 22
	55.9		4.9		35.4		17.4 − 2 − 44		27.1 1.3	− 65 − 66
	1.3		6.6		40.3		23.3 + 12.33 + 12.38		32.1 8.4	+ 11.25 + 11.25
	16.70	+ 35	9.0		104 2		28.5 + 24 + 24		38.8 245	+ 22 + 22
	8 55.67	51 14 32.30	12.3	51 6 1.08	20 34.73	52 50 33.58	22 23.07	21 46.80 −39.30 −39.30	42.1 27.17	−38.90 −38.90
	+ 14.69	− 6	21 6.48	− 35	+ 9.81	− 3	−45.99 + 8.96		35.50	
	1.16 702	− 46	+ 36.10 1.55	− 24	0.99167	− 27	1.66266	0.95231	1.45664	1.46195
	9.79 668	+ 9.62	9.79793	+ 9.45	9.78113	+ 11.39	9.77233	9.77199	9.78230	9.78230
	1.06977	+ 19	1.46151	+ 19	0.87887	+ 22	1.54106	0.83037	1.57501	1.35032
	10	−4.0620	20	−4.0635		−3.9220	45 40		40 40	

	2 34.3	14 1.34	230	5 29.85	28.9	50 6.04	0 2.6 2 33.7		3 45.4 3 52.2	
	41.4		32.6		38.9		11.2 41.2		53.1 59.6	
	78.7		556		678		45 138 749		985 1118	
	12 39.35		21 27.80		36 33.90		45690 42 37.45		43 49.25 43 55.70	
	10 9.00		1 20.55		46 14.45		37 4145 40 10.90		38 5910 38 52.95	
	51 14 20.56		51 5 32.11		52 50 26.01		5341 53.01 44 22.46		52 43 1066 43 401	
	: +11.41		+28.91		+ 7.57		− 34.76 + 6.77 0		+37.59 +22.40	
	3 58.30	13 1.2	16 30.02	4 29.8	15 29.37	49 9.7	16 21.74	44 36.5	22 8.67	42 23.6
							90.40	42 23.5	21.70	42 2.1

Dec 8

	9 4.5	9.05			20 38.6	11.02	21 21 49.8	40 1201	27 27	11.31 11.26
	8.0				42.0		31.1 53.3		18.1 31.6	
	11.4				45.5		34.5 56.6		21.8 34.7	
	14.6				49.0		37.9 0.4		24.9 37.8	
	18.0				52.2		41.3 3.9		28.3 41.3	
	6.5				27.3		398 340		25 1.01 403	
	9 11.30				20 45.46		21 37.96 56.80		27 25.02 38.06	
	−4 58.56	−4 59.80			−4 58.61	58 −4 58.84	58 −4 58.64 58.64	58 −4 59.92	58 −4 58.64 58.64	58 −4 58.84 −4 58.92
	− 1.25				− 1.31		− 1.36 − 1.36	−11.00	− 1.31 − 1.31	−1106
	4 11.50				15 45.54	16	37.99 16 56.83	−5685	22 25.10 22 38.14	−5631
	− 3.79	9.32			− 5.10	10.93 −	5.15 − 5.15	−1101	− 5.22 − 5.22	
	4 7.78	0.15			15 40.47	8 −10.94	16 32.87 51.72	−5685	22 19.98 32.96	−1107
	57.4				8.8		8.3 9.3		8.3 9.2	−5631

	8 15.0				19 47.4		21 22 − 6 − 23		27 27 − 3 − 8	
	19.9				55.4		16.7 20.4 − 61 − 83		6.2 49.2 − 59 − 59	
	21.0				0.5		22.1 26.7		13.6 54.1	
	24.8	+ 40			16.3		30.1 32.3 +12.43 +12.43		20.8 0.7	+ 11.31 + 11.31
	27.6	51 14 31.11			19 54.43	52 50 35.77	695 494 + 24 + 24		406 1640	+ 22 + 22
	8 21.78	− 66			+ 51.03	− 68	21 23.17 22 2.64 −39.40 −39.40		13.53 27 546	−3900 −3900
	1.69 [illegible]	− 56			1.70783	− 38	+11.79 − 29.67 1.46997 1.47232		1149 − 16.61	1980
	9.79668	+ 9.68			9.78113	+11.46	9.77199 9.77233		1.06032 1.22037	
	1.57753	+ 19			1.59503	+ 22	9.78113 9.78213		9.78213 9.78213	
	10	−4.0170			35	−39.80	1.04863 1.35072		0.54852 1.10957	
							40 40		20 40	

	3 1.6	13 59.46			58.9	50 7.49	3 20.1 21 30.6		3 16.8 3 16.8	
	10.9				7.4		27.5 37.8		25.1 25.1	
	12.5				6.3		46 84		41.9	
	13 6.25				37 3.15		4 323.20 44 34.20		43 20.95	
	9 42.10				45 45.20		39 24.55 38 14.15		39 27.40	
	51 13 53.31				52 49 56.41		5343 35.76 42 25.36		52 43 38.61	
	+37.80				+39.36		+11.17 − 22.42		+8.88 − 12.87	
	3 58.39	12 59.3			15 29.55	49 10.6	16 21.89	42 23.6	22 8.85	42 23.5
							40.71	40 28.7	21.89	1.7

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1608R

1878 Dec. 7 Dec 8.

	h m s	mag.	h m s	mag.	h m s	mag	h m s	mag	h m s	mag	h m s	mag.
d	1 25 20	7.0	24 18.0	1 29 21	9.4	28 17.2	1 30 59	8.7	29 58.2	1 39 48	8.0	38 43.6	2 19 20	9.0	18 16.2	2 21 44	8.5	20 38.4
δ	8° 54′ 17″		12.0	52° 24′		18.9	52° 4′		51 58.1 E	53° 15′		9.9	51° 6′		2.0	54° 36′		31.2

Dec 7

		+11.97			+10.92			+10.01			+11.99			+8.76			+12.68 +12.78	
	30 41.5	12.32		34 41.2	11.27		36 22.8	36		45 8.7	12.34		23 46.9	9.11		25 30.6	1303 1278	
	45.0			44.3			26.0			12.2			50.0			34.0		
	48.5			47.9			29.4			15.8			53.4			37.5		
	52.3			51.3			33.0			19.2			56.5			41.1		
	-55.7			54.6			36.3			22.3			59.9			44.9		
	430			393			475			282			167			381		
	30 48.60			34 47.86			36 29.50			45 15.64			23 53.34			25 37.62		
	-4 57.64	-H 59.23		-4 57.65	-4 59.15		-4 57.65	-4 59.12		-4 57.67	-4 59.20		-4 57.74	-4 59.17		-4 57.74	-4 59.35	
	- 1.59			- 1.50			- 1.47			- 1.58			- 1.43			- 1.61		
	25 49.37			29 48.71			31 30.38			40 16.44			18 54.17			20 38.27		
	- 5.36			- 5.34			- 5.36			- 5.56			- 6.05			- 6.32		
	25 44.01	-11.25		29 43.37	-11.20		31 24.02	-11.21		40 10.88	-11.49		18 48.12	-12.04		20 31.95		
		-56.01			-55.62			-55.44			-54.54			-49.32				
	6.6			9.4			8.7			8.6			9.2			8.8		
	29 46.8			34 21.4			35 42.3			44 47.4			23 19.3			24 47.1		
	50.2			28.3			46.4			54.0			26.2			52.5		
	52.8			34.0			53.6			59.5			32.8			59.4		
	55.8			83.7			142.3			160.9			78.3			159.0	54° 39	
	59.2	54 19 26.39		34 27.90	52 26 26.50		35 47.43	52 5 39.96		44 53.63	53 17 10.96		23 26.10	51 7 49.48		24 53.01	39 27.83 37.318	
	29 [illegible]	- 80		+ 19.96	- 11		+ 42.07	- 47		+ 22.01	- 13		+ 27.24	- 19		+ 44.62	- .49	-.49
	+ 55.69	- 64		1.30016	- 14		1.62397	- 32		1.34262	- 2		1.43521	- 76		1.64953	- 53	-.78
	1.74539	+13.06		9.78510	+10.95		9.78853	+10.58		9.77660	+11.91		9.79762	+ 9.52		9.76258	+13.45	+13.45
	9.76596	+ 23		1.19133	+ 22		1.51857	+ 22		1.22529	+ 23		1.33890	+ 19		1.51813	+ .25	+ .25
	1.61736	-38.90	5		-38.40	20		-38.25	10		-37.80	15		-34.40	45		-34.70	-34.70
	3 11.4	18 59.81	0	45.5	25 59.37	1	49.0	5 11.07	0	2.1	16 45.30	4	19.2	7 24.19	3	29.436.99	6.26 37.312	
	18.5			52.4			56.9			9.4			35.3			7.0 42.6		
	99			99			1059			11.5			645			99 794		
	8 14.95			0 48.95			21 52.95			10 5.75			19 32.25			48.495 49.39.70		
	14 33.40			21 59.40			0 55.40			12 42.60			3 16.10			34.340 33 8.65		
	54 18 44.96			52 26 10.96			52 5 6.96			53 16 54.16			51 7 27.66			54 38 42.96 37 2.021		
	+41.43			+15.54			+33.00			+16.80			+21.82			- 34.70 -34.70		
																+ 32.97 +32.97		
	25 32.76	18 3.8		29 32.17	25 3.8		31 13.81	4 16.6		39 59.39	15 51.0		18 36.08	6 34.9				
		+12.33			+10.72			+10.08			+12.06			+8.95				

Dec 8

	30 42.4	73		34 41.5	11.12		36 23.5	48		45 9.5	46		23 47.5	9.35		2		
	45.8			45.0			26.9			12.9			51.0					
	49.3			48.6			30.2			16.2			53.9					
	53.0			52.0			33.7			19.8			57.3					
	56.5			55.4			37.3			23.4			60.8					
	470			425			16			318			205					
	30 49.40			34 48.50			36 30.32			45 16.36			23 54.10					
	-4 58.62	59-H 59.92		-4 58.62	60-H 59.90		-4 58.62	60-H 59.87		-4 58.63	1-H 59.94		-4 58.66	74-H 59.98				
	- 1.39			- 1.31			- 1.29			- 1.34			- 1.25					
	25 49.39			29 48.57			31 30.41			40 16.39			18 54.19					
	- 5.34			- 5.33			- 5.35			- 5.55			- 6.04					
	25 44.18	-11.25	7	29 43.26	-11.20	7	31 25.08	-11.21	7	40 10.86	-11.49	8	18 48.07	-12.04	8			
		-56.01			-55.62			-55.44			-54.54			-49.32				
	6.4			9.5			8.8			8.5			9.5			8.5	8.3	
	29 59.2			34 6.9			35 43.2			44 48.4			24 11.2					
	4.0			13.3			49.2			54.7			16.8					
	11.8			17.8			55.9			0.8			22.8					
	30 15.0			38.0			148.3			163.9			50.8					
	59.2	54 19 25.32		34 12.67	52 26 27.15		35 49.43	52 5 39.64		44 54.63	53 17 10.80		24 16.93	51 7 50.67				
	+ 44.40	- 51		+ 35.83	- 34		+ 40.89	- 45		+ 21.73	- 13		- 22.83	- 14				
	1.64438	- 56		1.55425	- 18		1.61162	- 34		1.53706	- 2		1.35851	- 68				
	9.76590	+13.15		9.78510	+11.02		9.78853	+10.65		9.77660	+11.98		9.79762	+ 9.67				
	1.51935	+ 25		1.44542	+ 22		1.50622	+ 22		1.21973	+ 23		1.26220	+ 19				
	5	-39.00	0		-38.60	20		-38.40	10		-38.00	15		-34.60	45			
	3 3.4	18 59.05	0	56.7	25 59.67	1	47.9	5 11.72	0	1.4	16 44.96	3	47.1	7 25.42	4	38.1		
	11.2			3.9			56.1			9.9			54.1			43.9		
	14.6			06			1040			113			1012			820		
	8 730			1 030			21 52.00			10 565			18 5060			49 41.60		
	14 41.05			21 48.05			0 56.35			12 42.70			3 57.15			53 57.21		
	54 18 52.26			52 25 59.26			52 5 7.56			53 16 53.91			51 8 8.96					
	+33.06			+27.89			+32.08			+16.59			-18.29					
	25 32.83	18 3.0		29 32.07	25 4.0		31 13.89	4 16.3		39 59.38	15 50.4		18 36.04	6 36.1				

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16008R

1878 Dec 7. Dec 8 Obs. W.A.R. Rec J.E.M.

	h. m. s	Mag.		h. m. s	Mag.	
α	2 23 52	9.0	22 43.6	2 22 34	9.0	21 23.7
δ	53° 24′		19.4	54° 15′		45.5

20 38.4
31.2

not seen

Dec 7

+11.06

29	16.7	81	27	13.1	
	20.4			17.0	
	23.8			20.3	
	27.2			23.9	
	30.6			27.2	
	187			20	
29	23.74		27	20.40	
−4	57.75	−4 59.30	−4	57.74	−4 59.33
−	1.55		−	1.59	
24	24.44		22	21.07	
−	6.29	−1240	−	6.32	−1246
24	18.15	−4866	22	14.75	−4887
9.2			8.2		

28	27.7		26	18.4	
	33.3			24.0	
	39.13			31.4	
	10 03	+.35		738	
28	33.43 53	26 30.52	26	2460	
	+50.31	− 67		+55.80	
1.70165		− 19	1.74663		
9.77507		+12.09			
1.58279		+ 23			
0		−35.00			
1	4.0	26 7.33			
	10.3				
	143				
1	765				
21	4070				
53 25	52.26				
	+3826				
24	5.78	25 18.7	22	2.29	

Dec 8

+11.75

29	17.1	1215	27	13.7	
	21.0			17.7	
	24.4			21.0	
	27.9			24.7	
	31.5			28.0	
	225			51	
29	24.50		27	21.02	
−4	58.66	×5 0.00	−4	5866	−5 0.05
−	1.36		−	1.40	
24	24.48		22	20.96	
−	6.28	2 −1240	−	6.32	
24	18.20	−4866	22	14.645	−1246
9.1			9.1		

28	37.3		26	16.2	
	43.4			23.3	
	48.2			31.6	
	1289	+.40		411	
28	4297 53	26 32.70	26	23.70	
	+4153	− 45		+57.32	
1.61886		− 18	1.75831		
9.77507		+12.15			
1.49950		+ 23			
0		−35.20			
0	55.0	26 9.65			
	1.9				
	1169				
0	58.45				
21	4990				
53 26	1.11				
	+31.59				
24	5.82	25 21.0	22 2.19		

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1608R

1878 Dec 12. Dec 14. Dec 16. Obs. W.A.R. Rec. J.E.M. Dec 14

n = −1.11
Rrs = −.19

712 713 714

	Dec 12	Dec 14	Dec 16	Obs. W.A.R.	Rec. J.E.M.	Dec 14
α	22 53 57	22 56 24	23 11 25	23 21 21	23 25 28	
δ	50° 19′	50° 53′	54° 47′	54° 47′	56° 2′	

Dec 12 +7.52 — Dec 14 +7.86 — Dec 12 +9.12 — Dec 12 +12.84 — Dec 14

n = −1.034
Rrs = −18
+4′ 9″.76

Dec 16 +13.11 — +13.30 — +13.72

n = −0.978
Rrs = −19
+4′ 10″.44

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16008R

1878 Dec 12, Dec 14, Dec 16.

For Dec 12 & 14 of this # see p. 120.

	h m s	Mag.	h m s	Mag.	h m s	Mag.	h m s	Mag.
α	23 31 51	9.0	31 28	8.0	0 21 8.6	23 59 30.7	0 1 35	9.1
δ	55° 2'		54 56.5		53° 16'	10.4	50° 16'	11.1

	h m s	Mag.	h m s	Mag.	h m s	Mag.
α	0 44.1		0 4 55	7.8 4	3.4	
δ			0 55 15		9.3	

Dec 12

+12.96

37	8.0	83	
	11.5		
	15.0		
	18.7		
	22.3		
	25.5		
37	1.5.10		
−5	3.01	−5	4.48
−	1.47		
32	10.62		
−	3.03		
32	7.59	−8.52	−59.70

8.9

36	26.1		
	32.5		
	40.8		
	99.4	−	.13
36	33.13	55 4	38.88
	+ 41.97	−	49
1.62	29.4	1.21	511
9.75	769	+13.61	9.77 6413
1.48	670	+	29 1.09761
20		−	41.085

2	33.9	5	10.11
	45.9		42.071
	79.8		
22	39.90		
0	8.45		
55 4	18.21		
	+ 30.67		

31	59.07	3	21.0

Dec 12

+11.13 00

5	42.0		
	45.4		
	49.0		
	52.5		
	56.0		
	44.9		
5	48.98		
−5	3.05	−5	4.43
−	1.38		
0	44.55		
−	3.62	−9.23	
0	40.93	−1	0.15

8.5

5	26.8		
	32.1		
	38.8		
	97.7	−	.13
5	32.57	53 18	20.63
	+ 16.41	−	7
		5	12.42
1.21	511	−	68
9.77	6413	+11.64	
1.09	761	+	24
		−41.30	5

3	49.6	17	50.33 45
	0.4		
	100.0		
8	58.00		
13	58.35		
53 18	8.11		
	+ 12.52		

0	31.70	16	45.2

Dec 14

+10.82

5	44.3		
	47.7		
	51.0		
	54.5		
	58.0		
	55.1		
5.	51.10		
−5	4.96	−5	6.45
−	1.49		
0	44.65		
−	3.57	−9.23	
0	41.08	−1	0.151

8.7

5	6.7		
	10.2		
	12.3		
	15.4		+.00
5	17.5	53 18	15.20
	− 39		
5	12.42		
−	76		
1.37	6941		
9.80	534		
+11.73			
1.28	835		
+	24		
−41.30			

3	7.7	17	44.72
	18.1		
	25.8		
9	12.90		
12	35.45		
53 17	45.69		
	+ 29.51		

16	45.2	0	31.85

Dec 16

+11.05 14

5	46.14		
	49.7		
	53.5		
	57.0		
	0.3		
	16.9		
5	53.38		
−5	7.47	−5	8.78
−	1.31		
0	44.60		
−	3.583	−9.23	
0	41.07	−1	0.15

(8.3)

5	19.3		
	24.4		
	31.4		
	75.1		
5	25.03	53 18	14.82
	+28.35	−	21
		−	78
1.44	5255	+11.80	
9.77	6443	+	24
1.33	505	−41.40	5
5			

4	1.0	17	44.56
	10.2		
	11.2		
9	56.0		
13	42.75		
53 17	53.19		
	+ 21.63		
0	31.84	16	44.4

1.1
10.2

For Dec 12 & 14 of this # see p. 120.

Dec 12

+7.76 +7.52

6	56.0		
	59.5		
	2.5		
	5.5		
	8.7		
	12.2		
6	56.88		
	2.44		
6	58.87		
−5	3.05	−5	4.28
−	1.23		
1	58.16		
−	3.66	−	3.67
	54.49		

9.0 8.6

	14.8		
	20.3		
	27.0		
	6.21		
7	20.70		
	− 23.82	+	31.47
	137694		149471
	9.80534		9.80534
	1.40612		
5	21.5		
3	18.1		
	29.7		
	47.8		
8	5.40	9	8.65
14	13.45	13	39.70
50 18	24.69	17	44.94
3	44.42		46.46
	+ 25.47		−19.42

Dec 14

+7.96 +7.38

6	58.1		
	1.2		
	4.5		
	7.7		
	11.3		
	43.9		
6	58.87		
	4.96		4.96
1	52.49		58.27
−	3.62	−	3.62
	48.87		54.65

9.0 8.7 8.0

	41.0		
	47.2		
	53.8		
	60.5		
6	25.88		
	+ 11.78	+	38.73
	1.07115		1.55805
	9.80534		9.80550
	0.88256		1.49946
5	20.5		
3	25.0		35.0
	35.4		46.2
	60.4		81.2
8	30.20	9	40.60
14	18.15	13	7.75
50 18	28.39	17	17.99
			2206
50 18	6.33	17	32.31

Dec 14

+13.49

10	17.7		
	21.4		
	25.0		
	28.7		
	32.8		
	25.6		
10	25.12		
−5	4.97	−5	6.57
−	1.60		
5	18.55		
−	3.64	−9.34	
5	14.91	−1	0.15

8.0

9	26.0		
	29.9		
	32.4		
	37.0		
40 6	55 17	25.70	
9	33.18	−	69
9	51.94	−	4
1.71	8.58		
		+	13.93
1.57	708	+	29
		−41.80	

0	4.9	16	57.39
	16.4		
	21.3		
10	10.65		
12	37.70		
35 16	47.94		
	+ 37.76		

5	5.57	15	57.2
		+	17.97
			13.06

10	20.8		
	23.6		
	27.5		
	31.3		
	35.0		
	37.7		
10	27.54		
−5	7.48	−5	8.89
−	1.41		
5	18.65		
−	3.60	−9.34	
5	15.05	−1	0.15

(7.0)

9	41.0		
	46.0		
	54.3		
	141.3		
9	47.10	55 17	26.09
	+40.44	−	42
		−	95
1.60	681	+14.05	
9.75	557	+	29
1.46	839	−41.80	
5			

4	57.8	16	57.35
	6.4		
	42.0		
10	21.0		
12	46.25		
53 16	56.29		
	+ 29.40		

5	5.71	15	57.2

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.1698R

1878 Dec. 12. Dec 14. Dec 16.

713 714

119

1884

	h m s	mag.	h m s	mag.	h m s	mag.	h m s	mag.	h m s	mag.	h m s	mag.
α	0 6 16	8.0 5 23.6	0 56 58	9.1 55 56.1	1 16 17	8.2 15 15.6	1 29 8	8.9 28 9.1	1 31 13	8.7 30 10.9	2 19 54	9.0 18 53.0
δ	° ′		° ′		° ′		° ′		° ′		° ′	
	55 9	3.1	51 7	2.0	52 12	5.9	50 40	3.5.0	54 10	5.0	50 42	3.7.7

Dec 14

		+13.47		+9.16				+7.77		+8.27		
	11 38.2		1 2 19.8				34 38.0		36 40.5			
	41.8		23.1				41.4		43.6			
	45.3		26.8				44.7		47.0			
	49.0		29.8				48.0		50.0			
	52.7		33.0				51.3		53.5			
	270		325				234		346			
	11 45.40		2 26.50				34 44.68		36 46.92			
	−5 4.97	−5 6.56	−5 5.05	−5 6.43			−5 5.09	−5 6.43	−5 5.10	−5 6.48		
	− 1.59		− 1.38				− 1.34		− 1.38			
	6 38.84		57 20.07				29 38.25		31 40.44			
	− 3.67	−9.38	− ~~3.67~~				− 5.17		− 5.22			
	6 35.17	−1 0.15	4.72	−10.44			29 33.08	−11.08	31 35.22	−11.15		
			57 15.35	−5832				−55.77		−5544		
	8.0		9.2				8.8		8.9			
	10 58.6		2 4.0				33 57.5		35 57.5			
	2.2		11.5				6.1		4.1			
	5.0		17.0				12.6	42 58.67	9.7			
	8.8	+ .00	325	+ .00			62 57	+ .00	11 3	+ .00		
	11.3 55 11 17.66		2 10.83 51 10 10.93				34 538 2.07 50	43 4.39	36 3.77 51 12 33.41			
	11 5.18	− 41	+ 156	− 7			+ 42.61	− 49	+ 43.15	− 47		
	1.60 40.22	− 23	1.19 507	− 38			1.62 9 3.30 51	− 86	1.63 498	− 95		
	9.75660	+13.82	9.77 7311	+ 9.59			9.80166	+8.93	9.79699	+ 9.68 51		
	1.46711	+ 29	1.09845	+ 20			1.53724	+ 19	1.53804	+ 20		
	15	−41.80	15	−41.80			40	−39.00	10	−39.00	48	
				4040							2	599
n = −1.11	1 4.7	10 49.33	55.5	9 39.69			4 26.9	42 30.76	41 55.4	12 2.68		7.5
	15.8		4.9				36.4	27.52	41.0			
Rrs. = −19	20.5		0.84				633		1194			
	16 10.25		17 0.20				44 31.65		14 59.70			
+4′ 10.″24	6 38.10		5 48.5				38 16.70		7 48.65			
	55 10 48.34		51 9 58.39				50 42 26.94		51 11 58.89			
	+29.32		+12.54				+34.45		+34.52			
							31.81					
	6 25.79	9 49.2	57 4.91	8 41.4			29 22.00	41 31.6	31 24.07	11 7.2		

Dec 16

		+13.58		+9.29		+10.80		+7.63		+9.14		+8.38
	11 40.5	67	1 2 22.3	88	21 46.1	9	34 40.5	72	36 42.6	25	25 0.2	47
	44.5		25.4		49.4		43.8		46.1		3.4	
	47.8		28.9		53.0		47.0		49.0		6.4	
	51.5		32.3		56.4		50.3		52.3		9.5	
	55.0		35.4		59.6		53.5		55.7		13.1	
	393		443		145		351		457		326	
	11 47.86		2 28.86		21 52.90		34 47.02		36 49.14		25 6.52	
	−5 7.48	−5 8.88	−5 7.54	−5 8.76	−5 7.56	−5 8.81	−5 7.58	−5 8.77	−5 7.58	−5 8.80	−5 7.65	−5 8.84
	− 1.40		− 1.22		− 1.25		− 1.19		− 1.22		− 1.19	
	6 38.98		57 20.10		16 44.09		29 38.25		31 40.34		19 57.68	
	− 3.62	−9.38	− ~~3.62~~		− 4.96		− 5.14		− 5.19		− 5.96	
	6 35.36	−1 0.15	4.68	−10.44	16 39.13	−10.91	29 33.11	−11.08	31 35.15	−11.15	19 51.72	−12.02
	5		57 15.42	−5832		−5685		−55.77		−5544		−49.26
	(8.0)		(9.3)		(8.7)		(8.8)		(8.8)		9.3	
	11 0.4		2 9.7		21 3.6		33 49.8		35 53.8		24 30.3	
	6.4		17.0		9.3		53.5		59.4		37.1	
	14.3		21.7		16.6		56.2		7.8		46.0	
	211		484		295		59.0		1.0		1140	44
	11 7.03 55 11 16.60		2 16.13 51 10 11.03		21 9.83 52 13 41.03		7.5 50 42 57.89		36 033 51 12 33.04		24 3800 50 39 18.18	
	+40.83	− 42	+ 12.73	− 5	+43.07	− 49	33 56.00	− 70	+48.81	− 64	+ 28.52	− 22
	1,61098	− 23	1,10483	− 38	1.63417	− 74	+51.02	− 87	1.68851	− 21	1,45515	− 57
	9.75660	+13.94	9.79731	+9.52	9.78723	+11.81	1.70554	+9.03	9.79699	+9.62	9.80213	+8.98
	1.47365	+ 29	1.00821	+ 20	1.52747	+ 22	9.80166	+ 19	1.59157	+ 20	1.36335	+ 19
	15	−41.80	15	−40.80	10	−40.10	40	−39.20	15	−39.20	480	−3560
				60								
	1 7.3	10 48.47	1 53.3	9 39.81	3 46.8	13 11.82	4 38.0	42 26.41	0 0.5	12 3.09	2 599	35 5105
	16.6		2.6		56.1		46.3		9.1		7.5	43
	23.9		11.59		10.29		843		96		3 7.4	
	16 11.95		16 57.95		13 51.45		44 42.15		15 4.80		44 3.70	
	6 36.90		5 50.40		8 56.90		38 6.20		7 43.55		339 44.65	
	55 10 46.84		51 10 0.84		52 13 7.34		50 42 16.64		51 11 53.99		50 35 55.09	
	+29.76		+10.19		+33.69		+41.25		+39.05		43 +23.09	
	6 25.98	9 48.3	57 4.98	8 41.5	16 28.22	12 15.0	29 22.03	41 30.6	31 24.00	11 7.6	19 39.70	43 1.8

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.160BR

1878 Dec 16.

	h m s	mag	h m s	mag	h m s	mag	h m s	mag
α	2 21 47	8.5 20	38 42	33 4	9.4 31	59.1	22 56 45	7.4 56 1.5
δ	54° 36′	31.2 8.5	50° 33′	28.5 9.4	53° 4′	1.7		

Dec 16 +12.20 +8.24

27 22.7	9	38 41.7	33
26.1		45.0	
29.8		48.4	
33.4		51.4	
36.8		55.3	
488		418	
27 29.76		38 48.36	
−5 7.65	−5 9.02	−5 7.66	−5 8.85
− 1.37		− 1.19	
22 20.74		33 39.51	
− 6.25		− 6.16	−12.24
22 14.49	−12.50 −48.96	33 33.35	−47.19
8.6		9.4	7.8

26 33.8		38 4.4	
39.3		10.4	
47.7		15.2	
128	+.09	30.0	
26 40.254	38 3.68	38 10.50	35 1.59
+49.49	− 64	+38.36	− 40
1.694452	− 86	1.583858	− 48
9.762.71	+13.43	9.802.74	+8.93
1.563.30	+ 27	1.492.69	+ 19
45	− 36.00	50	− 34.40
4 28.2	37 39.97	2 24.9	34 35.52
35.2		31.7	
634		56.6	
49 31.70		52 28.30	
33 16.65		30 20.05	
54 37 27.09		50 34 30.49	
+36.59		+31.10	
22 1.99	36 51.0	33 21.11	33 48.3

				46.8	
				57.8	

0 0 38.2 57.5

h m s mag

δ 1 35 9.0 0 44.1

50 16 11.1

Dec 12 +7.54 +7.51

6 50.2	6 56.0				
53.5	59.5				
57.0	2.5				
0.5	5.5				
3.2	8.7				
344	122				
6 56.88	7 2.44				
−5 3.05	−5 3.05	−5 4.28	−5 4.28		
− 1.23	− 1.23				
1 52.60	1 58.16				
− 366	− 367				
1 48.94	1 54.49				
9.0 −9.25 −1 0.15	8.6 −9.25 −1 0.15				
		50	−.13	50	−.13
7 14.8	6 25.0	14 30.03		18 59.68	
20.3	31.3	− 15		− .27	
27.0	37.3	− 74		− .65	
62.1	93.6	+ 8.39		+ 8.39	
7 20.70	6 31.20	+ .17		+ .17	
− 2382	+ 3124	− 40.70		− 40.70	
1.376914	1.419471	16 56.87		18 26.49	
9.805.50	9.805.34				
1.288.51	1.406.12				
5	5				
4 3.2	3 18.1				
14.1	29.7				
17.3	47.8				
9 8.65	8 23.90				
13 39.70	14 24.45				
50 17 49.46	18 34.21				
−19.43	+ 25.47				
1 39.69	1 45.24	15 56.7		17 26.3	

Dec 14 +7.74 +7.50

6 52.2	6 58.1				
55.5	1.2				
59.0	4.5				
2.0	7.7				
5.2	11.3				
439	228				
6 58.78	7 4.56				
−5 4.96	−5 4.96	−5 6.29	−5 6.29		
− 1.33	− 1.33				
1 52.49	1 58.27				
− 362	− 362				
1 48.87	1 54.65				
9.0 −9.28 −1 0.15	8.7 −9.28 −1 0.15				
6 41.0	6 19.7				
47.2	25.9				
52.8	31.9				
14.10	77.5		+.02		+.02
6 47.00	6 25.83	50		50	
+ 11.78	+ 38.73	17	27.60	18	59.97
1.071115	1.588105	−	4	−	.40
9.805.50	9.805.34	−	.85	−	.63
0.982.72	1.499.46	+	8.46	+	8.46
5	5	+	.17	+	.17
4 35.0	3 25.0	−	40.70	−	40.70
46.2	33.4	16	54.64	18	26.77
81.2	60.4				
9 40.60	8 30.20				
13 7.75	14 18.15				
50 17 17.99	18 28.39				
+ 9.61	+ 31.58				
1 39.59	1 45.37	15 54.3		17 26.6	

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1978phas..projA..68R

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.160BR

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1972phrc..proj.xA69BR

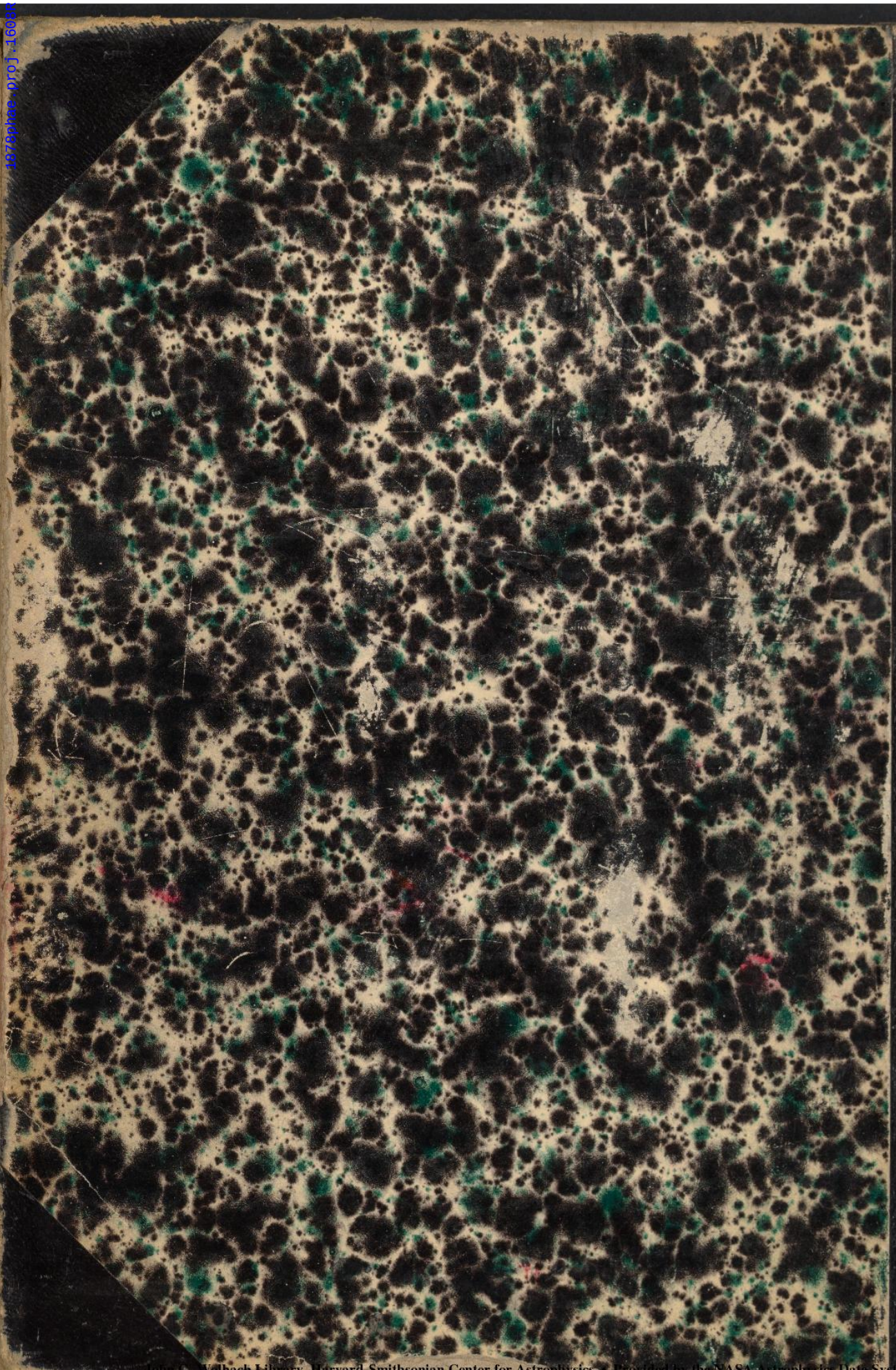
John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.16[illegible]R

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1878phae.proj.10038

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System



1979phas.proj.160R

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System