1852phae.proj..21.1

KG
11365
211

K. 1

No 1.

Zones.

1852.

From April 7th to May 4th

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

1852phae.proj..211E

KG 11365.211

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

1852phae.proj.211E

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

1852phae.proj..211E

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

1952phae.proj..211B

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

1852phae.proj..211E

KG 11365.211

HARVARD UNIVERSITY LIBRARY APR 28 1956

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

1852phae.proj..211E

List of stars contained in Zone 1 - 2 & 3 between the positions

R $10^h\ 14^m$ to R $11^h\ 54^m$ & Dec $-0^\circ.01'$ & $+0^\circ.11'$

– Taken from Mr. Runkle's General Catalogue –

(N.B. All the Weisse stars have been submitted to a new reduction by Mr. R

See Reduction of Zones Vol I.

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

1852phae.proj..211E

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

1852phae..proj..211E

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

1852phae.proj..211E

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

1852phae.proj.211E

307.0 15.50
76.7 387.5

9.. 22.. 14.5 +0.. 01.. 05.8
1.. 16.7 6
9.. 23.. 31.2

307.4 15.68
76.8 392.0
+1.. 16.8 -6'.. 32".0
*594- 9.. 25.. 39.13 +0.. 17.. 13.8
*9.. 8 9.. 26.. 55.93 +0.. 10.. 41.8

θ Hydrae
9.. 34.. 39.4 D +2.. 58.00 by t
H 0.. 29.08
9.. 05.. 31.4
194 1.. 30
9.. 07.. 01.4
9..

BAC 3540 - 7^m mag.

R 1850.0 = 10^h.. 14^m.. 23^s.89 Dec +0°.. 0'.. 05"

194 9.. 48.. 15.0
H -0 25.. 4

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

1852phae.proj...211E

April 7th 1852. Zone Observations Zone No 1 Dec 0° to 0°.10' N

(a) is B.A.C 3540

Scale A.

7 – 4

Mean Eq. 1852.0

B.A.C. 3540		d	Reduced in Smeaton for Prof.	Sid. time	Bar	alt. Ther.	Eq. Ther.
(a)	7h + 0'.. 05"	– 34.0	– 0.. 00 .. 29.0	10h 12m	29.930 – 63		36
	10 + 3.. 57	– 33.9	+ 0.. 03 .. 23.1	12.. 12	29.933 – 62		35
	11 – 3.. 45	– 34.0	0.. 3 .. 11.0		003 +.003		1
	11 – 9.. 59	– 33.8	9 .. 25.2		dm_B +0.01	dr_θ +0.11	
	10 – 3.. 24	– 34.0	2 .. 50.0		11		
	15 – 8.. 38	– 33.8	8 .. 04.2		0.12		
	11 3 54	– 34.0	03 .. 20.2		dr = + 0".06 in one hour		
	9–10 5.. 16	– 33.9	4.. 42.1				
B.A.C. 3597	6 7.. 44	– 33.9	7.. 10.1				
	11 5.. 42	34.0	5.. 08.0				
	Break						
	12 4.. 27	34.0	3.. 53.0				
	11 8 53	33.8	8.. 19.2				
	10 1.. 23	34.1	0 .. 48.9				
	9 9.. 58	33.9	9.. 24.1				
	9 9.. 19	33.9	8.. 45.1				
	10 2.. 21	34.1	1.. 46.9				
	Break						
	13 6.. 42	34.0	6 .. 08.0				
	8, 9 2.. 37	34.1	2 .. 02.9				
	9–10 1.. 48	34.2	1.. 13.8				
	12 6.. 27 (1) Bad – not 34.1		5.. 52.9				
	8–9 6.. 37	34.0	6.. 03.0				
	long Break						
	9 8.. 44	34.0	8.. 10.0				
	8–9 0.. 12 ?	34.3	– 0.. 0.. 22.3				
	9 8.. 31	34.0	+ 0.. 7.. 57.0				
	9–10 4.. 43	34.1	4.. 08.9				
	10 1.. 48	34.3	1.. 13.9				
	11 6.. 16	34.0	7.. 42.0				
	12 9.. 10 (2) ✗ not good 34.2 and worn		8.. 36.0				
	Break	~~34.2~~					
	10 6.. 30	34.2	5.. 55.8				
	9 9.. 47	34.0	+ 0.. 9.. 13.0				
	8–9 – 0.. 33	34.4	– 0.. 01.. 07.4				
	11 7.. 45	– 34.2	+ 00.. 07.. 10.8				

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

1852phae.proj.x11e

Mean Eq. 1852.0

Mean of Wires

K

B.A.C. 3540.

10h 14m 23.6	27.4	27.5	+1.88	10h 14m 29.38	+	×
15 15.8	19.8	19.8	1.87	15 21.67		×
15 57.7	16 1.7	1.7	1.86	16 03 56		×
17 32.1	36.1	36.1	1.85	17 37.95		×
18 55.1	59.1	59.1	1.85	18 00.95		×
19 13.1	17.1	17.1	1.83	19 08.93		
20 22.4	26.2	26.3	1.83	20 28.13		×
22 7.8	11.8	11.8	1.82	22 13.62		×
B.A.C. 3597 = 22 37.8	41.6	41.7	1.82	22 43.52	×	×
23 2.0	6.0	6.0	1.82	23 07.82		
23 56.1	0.1	0.1	1.82	24 01.92		
24 49.0	53.0	53.0	1.82	24 54.82		×
25 47.6	51.6	51.6	1.81	25 53.41		
26 53.7	57.6	57.65	1.81	26 59 46		×
27 18.4	22.7	22.55	1.81	27 24.36		
27 42.4	46.4	46.4	1.81	27 48.21		×
28 53.1	57.0	57.05	1.80	28 58.85		
29 45.2	49.1	49.15	1.80	29 50.95		×
30 47.9	51.9	51.90	1.80	30 53.70		×
32 39.3	(1) 39.7	39.5	1.80	32 41.30		
33 16.7	20.6	20.65	1.80	33 22.45		×
37 14.2	18.0	18.10	1.79	37 19.89		×
37 34.2	38.1	38.15	1.79	37 39.94		×
37 59.9	3.9 0.0	3.90	1.78	38 05 68		×
40 41.0	45.1	45.05	1.78	40 46.83		×
41 50.4	54.3	54.35	1.78	41 56.13		×
42 3.2	7.2	07.2	1.78	42 08.98		
43 33.0	(2) 37	37.0	1.78	43 38.78		
45 56.6	0.4					
46 46.1	50.1	0.5	1.77	46 02.27		×
46 46.1	50.1	50.1	1.77	46 51.87		×
47 26.5	30.5	30.5	1.77	47 32.27		
48 28.3	32.2	32.2	+1.76	10 48 33.96		
48 28.2	32.2					
49 39.6	43.6					

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

1852phae.proj...211E

Zone 1

	Dec. 00°-10°	d	Mean Eq. 1852.0
8-9	5..41	− 34.3	+ 00..05..06,7
10	8. 33	34.2	7..58.8
11	1..27	34.4	00..47.6
11-12	1..03	34.4	0..23.6
12	2..22	34.4	1..47.6
7	3..23	34.3	2..48.7
9-10	6..19	34.3	5..44.7
8.9	6..39	34.3	6..04.7
9	5..16	34.3	4..43.7
	long break		
9	7..38 d-4"	34.3	7..03.7
10	5..10	34.3	4..35.7
10	9..35	34.2	9..00.8
10	5..50	34.3	5..15.7
11	9..01	34.2	8..26.8
10	− 0..28	34.4	− 00..01..02.4
9	3..36	34.3	3..01.7
10	7..10	34.3	6..35.7
11	9..51	34.2	9..16.8
	Break		
	0..10 nonR	~~34.4~~	
10	8..46	34.2	8..11.8
10	1 42	34.4	0..07.6
8	7 10	34.3	6..35.7
8	1 16	34.4	0..43.6
10	3 59	34.3	3..24.7
10	6 27	34.3	5..52.7
10	5 59	34.3	5..24.7
9-10	4 19	34.3	3..44.7
8-9	0 11	34.5	− 0.. 0..23.5
9	7 08	34.3	6..33.7
9	3 27	34.4	2..52.6
10	8 40	34.2	8..05.8
8	3. 27	34.4	2..52.6
10	8 37	34.3	8..02.7
8-9	8 11	− 34.3	+ 00..07..36.7

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

1852phae.proj.2111

June 1

		Mean of wires	K_s	h m s	
10 49 39.6	43.5	~~49.55~~		M. Eq 1852.0	
~~10 50 44.5~~	~~48.6~~	43.55	+ 1.75	10 49 45.30	x
50 44.5	48.6				
~~51 07.4~~	~~11.2~~	48.55	1.75	50 50.30	x
51 7.3	11.2				
~~50.6~~	~~50.6~~	11.25	1.75	51 13.00	+
51 46.6	50.6				
~~54 51.7~~	~~55.7~~	50.60	1.75	51 52.35	x
54 51.5	55.9				
~~55 54.6~~	~~38.7~~	55.90	1.74	54 57.64	x
55 34.7	38.7				
~~56 08.7~~	~~13.0~~	38.70	1.74	55 40.44	x
56 9.0	13.0				
~~56 39.6~~	~~43.6~~	13.00	1.74	56 14.74	x
56 39.6	43.5	43.55	1.74	56 45.29	x
56 53.9	57.9	57.90	1.74	56 59.64	x
58 28.5	32.3	32.40	1.73	56 34.13	x
58 57.4	1.6	59 01.50	1.73	10 59 03.23	+
11 0 13.0	17.0	17.00	1.73	11 00 18.73	x
1 8.2	12.2	12.20	1.73	01 13.93	+
1 17.7	21.7	21.80	1.73	01 23.43	+
1 48.7	~~49.6~~	49.65	1.73	1 51.38	
2 19.1	19.1	19.10	1.73	2 20.83	x
2 22.7	26.6	26.65	1.73	2 28.38	x
2 43.7	47.7	47.70	1.72	2 49.42	x
3 48.2	52.2	52.20	1.72	3 53.92	
4 19.2	23.2	23.20	1.72	4 24.92	x
4 27.2	31.2	31.20	1.72	4 32.92	
4 44.4	48.4	48.40	1.72	4 50.12	+
6 5.5	9.4	9.45	1.72	6 11.17	x
6 44.0	48.0	48.00	1.72	6 49.72	x
~~8~~ 3.8	7.5	07.65	1.71	8 09.36	x
8 51.8	55.5	55.50	1.71	8 57.21	x
9 0.4	4.4	4.40	1.71	9 06.11	x
10 51.0	55.1	55.05	1.71	10 56.76	+
13 4.6	8.6	08.60	1.70	13 10.30	+
13 12.1	16.1	16.10	1.70	13 17.80	+
13 27.4	31.5	31.45	1.70	13 33.15	x
14 34.8	38.7	38.75	1.70	14 40.45	+
15 22.8	26.7	11 15 26.75	1.69	11 15 28.44	x

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

1852phae.proj...211E

June 1

		d	d	Mean Eq. 1852.0
9	9.43		−34.2	+ 00..09..08.8
11	5.11		34.3	4..36.7
	Break double			
9	3..23		34.5	2..48.5
8	3 16		34.5	2..43.5
9	8 47		34.3	8..12.7
9-10	2 03		34.5	1..28.5
9-10	7 37		34.3	7..02.7
9	6..32 R? 1st Late		34.4	5..57.6
9-10	−0..39		34.7	− 00..01..03.7
10	8..39		34.4	8..04.6
8-9	9..30 no Sig		34.4	8..55.6
10	2..18		34.6	1..43.4
8	8..12		34.4	7..37.6
Bode 3446 5	0..05 (3) 2nd Wire 8.2 early		34.7	− 00..00..29.7
	Break			
9	8..49		34.4	8..14.6
8-9	0..45		34.7	0..00..10.3
10	4..26		34.6	3..53.4
9	6..22		34.5	5..47.5
7-8	9..19		34.4	8..44.6
10	9..27		34.4	..06..52.6

Cloudy
Break

old 9?	6..30	
11	6..12	2nd Wire
8	8..28	
9-10	6..04	
9	9..11	
9	6..49	
10	0..27	
10	6..36	

Break

Sun now

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

1852phae.proj.211E

Zeus 1 M. Eq. 1852.0

		Mean of wires	k	h m s	
11.. 15.. 48.6	52.6	52.60	+1.68	11.. 15.. 54.29	x
16.. 38.7	42.8	42.75	1.68	16..44.44	x
17.. 31.0	35.0	35.00	1.68	17..36.68	x
18.. 7.9	11.9	11.90	1.68	18..13.58	x
19.. 43.1	47.1	47.10	1.68	19..48.78	+
20.. 28.7	~~32.6~~	32.65	1.68	20..34.33	x
22..03.1	7.1	7.10	1.68	22..08.78	x
23.. 49.1	53.1	53.10	1.68	23..54.78	x
26.. 20.1	24.2	24.15	1.67	26..25.82	
27.. 0.4	4.9	4.65 (5.15)	1.67	27..06.38 (82)	wires differ 0.5 x
27.. 24.8	28.8	28.80	1.67	27..30.47	x
27.. 29.4	33.3	33.35	1.67	27..35.02	
28.. 27.8	31.7	31.75	1.67	28..33.42	x
29.. 16.9	(3) 20.6+0.2	20.~~7~~ (80)	1.66	29..22.~~36~~ (46)	x
30..03.2	7.2	07.20	1.66	30..08.86	x
31.. 43.8	47.7	47.75	1.66	31..49.41	+
32.. 16.2	20.1	20.15	1.66	32..21.81	x
32.. 48.6	52.6	52.60	1.66	32..54.26	x
33.. 15.7	19.5	19.60	1.65	33..21.25	x
35.. ~~46.0~~	~~50.6~~ 49.4	49.95	1.65	11..35.51 (60)	x

At 11h 35m 28s the Spring broke at the same time that clouds gathered & prevented observations

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

1852phae.proj...211E

Zone 1

3 retrograde signals

9 –	1.00
	Break
10	0.13
9	4.26
9	4.34
7.8	3.41
9-10	5.39
11	7.30
9	8.6
8 ±	10.20 ±

7.716
957
8.673
1.529
7.144
204
6.835

648
637
204

7.716
648
8.364
1.529
6.835

N.A.

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

1852phae.proj.211E

Reduction of star B.A.C 3540 to its apparent place on April 7th 9h 10m M.T. Cambridge 1852

In Ar

a	b	c	d
−8.7761	+8.4714	+0.4872	−4.1606

N.A. −1.2498 −0.8090 −8.9302 +0.1639
+0.0254 −9.2804 −9.4174 −4.3245
1.061 −0.191 −0.261 −.0000021
cor +5.609

In N.P.D.

a′	b′	c′	d′
−9.6375	+5.3367	+1.2544	+9.6480

N.A. −1.2498 −0.8090 −8.9302 +0.1639
+0.8873 −6.1457 −0.1846 +9.4119
+7.716 −0.000 −1.529 +0.[illegible]
cor in N.P.D. +6.635

α = 10h 14m 24s
δ = +0° 0′ 5″

Reduction of star B.A.C. 3946 to its apparent place on April 7th 10h 25m M.T. Cambridge 1852

In Ar

a	b	c	d
−8.8200	+7.9500	+0.4872	−4.6517

N.A. −1.2497 −0.8100 −8.9300 +0.1639
+0.0697 −8.7600 −9.4172 −4.8156
+1.174 −0.0575 −0.261 −0.000

cor. in Ar +5.846

In N.P.D.

a′	b′	c′	d′
−9.6375	+5.8278	+1.2983	+9.1261

N.A. −1.2497 −0.8100 −8.9300 +0.1639
+0.8872 −6.6379 −0.2283 +9.2900
+7.713 −0.000 −1.692 +0.195

cor. in N.P.D. +6.″216

α = 11h 29m 16s
δ = +0° 0′ 13″

Reduction of star B.A.C. 3597 to its apparent place on April 7th 7h 16m M.T. Cambridge 1852

In Ar

a	b	c	d
−8.7835	+8.4390	+0.4874	−6.1393

N.A. −1.2500 −0.8073 −8.9312 +0.1638
+0.0335 −9.2463 −9.4186 −6.3031
+1.080 −0.1763 −0.262 −0.000

cor. in Ar +5.642

In N.P.D.

a′	b′	c′	d′
−9.6366	+7.3154	+1.2618	+9.6151

−1.2500 −0.8073 −8.9312 +0.1638
+0.8866 −8.1227 −0.1930 +9.7789
7.702 −0.013 −1.560 +0.601
cor. in N.P.D. +6.″730

α = 10h 22m 38s
δ = +0° 7′ 48″

Reduction of star B.A.C. 3774 to its apparent place April 7th 7h 16m M.T. Cambridge 1852

In Ar

a	b	c	d
−8.8065	+8.2671	+0.4873	−5.8017

N.A. −1.2500 −0.8073 −8.9312 +0.1638
+0.0565 −9.0744 −9.4185 −5.9655
+1.139 −0.118 −0.262 −0.000

cor. in Ar +5.759

In N.P.D.

a′	b′	c′	d′
−9.6372	+6.9778	+1.2848	+9.4432

−1.2500 −0.8073 −8.9312 +0.1638
+0.8872 −7.7851 −0.2160 +9.6070
+7.712 −0.006 −1.644 +0.404
cor. in N.P.D. +6.″472

α = 10h 55m 34s.23
δ = +0° 03′ 24″

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

1852phae.proj...211E

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

1852phae.proj.211E

Reduction of Zone 1 — April 7th 1852 — $\delta = 0^\circ .. 0'$, $\delta' = 0^\circ .. 10' N.$

1852

		f	g	G	h	H	i
t_0	$10^h .. 00^m$	$-3''.95$	$+2''.25$	$139^\circ .. 40'$	$+18''.91$	$250^\circ .. 10'$	$-7''.72$
t_1	10 .. 50						
t_2	11 .. 40						

$t_0 =$ $t_1 =$ $t_2 =$

α_0	150 .. 00	α_0	α_1	α_2		α_0	α_1 α_2
α_1	162 .. 30	G				H	
α_2	175 .. 00	$(\alpha + G)$					
G	139 .. 40	$\min(\alpha+G)$					
H	250 .. 10						
$G+\alpha_0$	289 .. 40						
$G+\alpha_1$	302 .. 10						
$G+\alpha_2$	314 .. 40						
$H+\alpha_0$	40 .. 10						
$H+\alpha_1$	52 .. 40						
$H+\alpha_2$	65 .. 10						

$H = 250^\circ .. 10'$ $\quad -7''.72\, i =$

$\alpha =$ $\quad \cos\delta$ 0.00000

$H+\alpha$ 40 .. 10 $\quad i \cos\delta$ ——— $= -7''.72$

in 9.80957 $\quad \cos(H+\alpha)$ 9.88319

rec δ 0.00000 $\quad \sin\delta$ $-\cos$

$+18''.91$ h 1.27669 $\quad h$ ———

1.08626 $= +12''.20$ $\quad = 0''.00$

G

$G+\alpha$ 289 .. 40

$(G+\alpha)$ in 9.97390 $\quad \cos(G+\alpha)$ 9.52705

$\sin\delta$ $-\cos$

$+2''.25$ g ——— 0.00 $\quad g$ 0.35218

$=$ $\quad 9.87923 = +0''.76$

f $= -3''.95$ $\quad$ cor in Dec. $-0''.96$

cor in Dec. of par. R $+8''.25$

$-\frac{1}{3}$ 275

cor in Dec. of Time $+0''.550$

for $t = 10^h .. 00^m$

To be subtracted from A.R.

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

1852phae.proj..211E

H+α, ν 9.90043 — γ+α, cor 9.72622
16.91 h 1.27669 — g 0.35218
+15.04 = 1.17712 — +1.22 = 0.07840
−3.95 — −7.72
+11.09 2, — −6.50
3 20 For t = 10h 50m
+0.739 = cor in R
1

The correction to Mean Equinox in R alters inversely with 10' change in Dec — Also in Dec. = +0.03

cor (H+α,) 9.78280
10' in δ' 7.46373
h 1.27669
+0.03 = 8.52322
+1.22
1.25
−7.72
−6.47

H+α2 9.95786 — 9.84694
1.27669 — 0.35218
+17.16 = 1.23455 — +1.58 = 0.19912
−3.95 — −7.72
+13.21 — −6.14
4 40
+0.881 cor in R for t = 11h 40m

142
.0284

Rate of EC losing 1.0 daily = 0.042 hourly

x0 − 0.550
x1 − 0.739
x2 − 0.881 — cor for rate 50m & 1h 40m
x1 − x0 = −0.189 + 0.034 — −0.155
x2 − x0 = −0.331 + 0.069 — −0.262

10h 14m 27s
11. 29. 20.80
rate + .063
− .853
14. 29. 20.01
22.33

	B.A.C. 3540	3597	3779	3946
	10. 14. 23.89	10h. 22m. 37.51	10. 55. 34.23	11. 29. 16.19
	+6.14	+6.14	+6.14	6.14
1852	10. 14. 30.03 Cat. R	10. 22. 41.65 43.50	10 55 40.37	11. 29 22.33
	10. 14. 27.54 Obsd R	10. 22. 41.70	10 55 38.70	11. 29. 20.80
	+2.53	+1.95	+1.67	+1.53
cor Apeh R	+0.05	+0.07	+.17	+23
c =	+2.58	+2.02	+1.84	+1.76

See Two or Three pages on

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

1852phae.proj..211E

Weiss H X - 244 307.1 H.X 405- 307.3 -4m.44

10.13.06.24 7678 10.21.30.82 76.82

1.16.78 1.16.82

6.18 6.15

10.14 29.16 10.22 53.79

10.22.53.79

8.24.63 = Dif. R of B.A.C. 3540 and 3597 By Bessels Zone Obs.

8.13.62 " By B.A.C.

30 Sextantis

Lalande 1852 10.11.49.54 Santini 735 10.22.06.53 Edinburgh 10.21.57.29 10.54.54.08

2.33.60 30.72 30.72 30.71

6.14 6.14 15.36 15.36

10.14.29.28 10.22.43.39 10.22.43.37 10.55.40.15

Weiss 10.14.29.28 10.21.36.02 Ed. Obs 1857 Lalande

Lalande 29.16 Brotherley Cor 1.01.42 11.28.36.13 10.53.00.72

10 14.29.22 6.14 46.07 2.42.82

B.A.C. 10.14.30.03 10 22 43.58 11.29.22.20 1853.0 10.55.43.54

Mean 10.14.29.62 = adopted place 29.58 by our obs Apr 13d 1853.0 +0°.02'.44".3

10.14.27.50 Obsd

c = +2.12 +0.04 B.A.C. 3540

+2.02 " 3597

+1.84 3779

+1.76 3946

7.74

+1.93 = constant part of cor in R

cor for Ref in Dec dδ 10' is 0".29

δ = 0° δ = 0°.10'

Cor from Ap to Mean Dec 10h.00m = +6.96 = +6.93

10.50 +6.50 +6.47

11.40 +6.14 +6.11

Constant cor for Dec

δ = 0°, δ = 0°.10'			B.A.C. 3540	3597	3779	3946
α	k	k	89.59.55.0	89.52.11.7	89.56.35.8	89.59.46.5
10h.00m	+1.93	+1.93	+ 35.9	+36.5	38.5	39.8
10			-0.00.30.9	89 52.48.2	89.57.14.3	-0.00.26.3
20			dδ +6.8	0.7.11.8	0.2.45.7	+6.2
30			-0.00.37.7	+7.0	+6.5	-0.00 32.5
40				cor 0.7.04.8 cor	0.2.39.2	0.00
10.50	+1.78	+1.78	old +0.00.05.0 0.0	0.7.44.0 0.2	0.3.23.0 +0.1	0.00.5.0
11.00.			dδ -47.7	-34.4	-43.9	-37.5
11.10			39.4			
20			43.9			
30			37.5			
40	+1.67	+1.67	dδ -40.6 = constant cor in Dec.			

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

1852phae.proj..211E

$10^h..00^m$	0°	$0^\circ..10'$	$11^h..40^m$	
Zero cor in Dec	−40.90	−40.90	−40.90	−40.90
cor to Mean Eq	+6.96	+6.93	+6.12	+6.11
	−33.94	+0.29	.00	+0.29
		7.22	−34.78	6.40
		−33.66		−34.80

$10^h..50^m$		
	−40.90	−40.90
	+6.50	+6.47
	+0.00	+0.29
	−34.40	6.76
		−34.14

Reduction of Zone 1

The stars included in this Zone BAC 3540, 3597 – 3779 and 3946 are used. Given for the Zero corrections in R ~~+3.150~~ and Dec.]

Places corrected by Santini's Prontuario, 2 Ed. Pp.

BAC	3540	3597	3779	3946
α	$10^h..14^m..29^s.58$	$10^h..22^m..43^s.50$	$10^h..55^m..40^s.37$	$11^h..29^m..22^s.33$
t	$10^h..14^m..27^s.50$	$10^h..22^m..41^s.70$	$10^h..55^m..38^s.70$	$11^h..29^m..20^s.80$
$d\alpha$ +0.607	2.08	634 1.80	713 1.67	1.53
dt +0.005	10	16 62	039 71	79
$d\alpha - dt$ = 0.598	p +2.68	618 p = 2.42	714 p = 2.38	p + 2.32

p = 2.69	p	+2.450	+2.450	+2.450
42	$d\alpha$	−0.550	−0.789	−0.841
38	dt	0.000	+0.034	+0.069
32			2.484	2.514
p = + 2.45	k	+1.90	+1.745	+1.638

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

1852phae.proj..211E

Reduction of Zone Observations in R.

Let t be the time read off from the cylinder sheet
α the mean right ascension of the star at the beginning of the year
R apparent " at the time of observation.-
$k = p - d\alpha \mp dt$, dt being the correction for clock rate positive if it gains
$\alpha = t + k$, $R = \alpha + d\alpha$ p = correction for the zero of the zone in R.
Take t_0 at the nearest 10^m, 20^m &c to the first Observation
t_2 " last "
and such that t_1 half way between them will also fall on an even 10^m

1st Find the gain or loss of the Clock from t_0 to t_1 and from t_0 to t_2 which call dt_1 and dt_2 $-$ if the clock gains.

2nd Calculate $d\alpha$ for t_0, t_1 and t_2 from the formula by the form afterwards given

$$d\alpha = f + g \sin(G+\alpha) \tan\delta + h \sin(H+\alpha) \sec\delta$$

To find p take the places of all the known stars in the Zone from the Catalogues referred to the mean Equinox of the beginning of the year and interpolate $d\alpha$ for each and find $p = (\alpha + d\alpha) - (t \mp dt) = (\alpha - t) + (d\alpha + dt)$
From the mean of the whole assume the value of c which is most probable and with it find $k = c - d\alpha \mp dt$ for t_0, t_1 and t_2 interpolating afterwards do as frequent arguments as are necessary

k then is to be applied to every star of which the transit has been observed.

When the declination is more than 20° South & the hour angle greater than 1^h it will be necessary to correct it for refraction. The Table will then contain two columns of values of k one for the upper & one for the lower limit of the zone. Also when the star is more than 30° N or S of the Equator the change of $d\alpha$ for the upper & lower limit of the zone (10′ broad) will exceed $0^s.01$ & must be taken account of.

Reduction in Declination

Let s = reading of the Scale for declination
Let δ = the mean declination of the star
D = the apparent "
$d = q - d\delta \mp dr$, dr being the correction for change (increase) of refraction (By change of Bar. & Ther.)
$\delta = s + d$, $D = \delta + d\delta$ q = correction of the zero of the zone in Dec.

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

1852phae.proj..111

Reduction of Zones (continued)

calculate $d\delta$ for t_0, t_1 and t_2, in the forms afterwards given, by the formula

$$d\delta = i\cos\delta + g\cos(G+\alpha) + h\cos(H+\alpha)\sin\delta$$

To find g take the places of the known stars from the Catalogue reduced to the mean equinox at the beginning of the year. and interpolate $d\delta$ for each and find $g = (\delta + d\delta) - (s \mp dr) = (\delta - s) + (d\delta + dr)$

Take the mean of all the values of g & thence compute a table of two arguments t on the side & δ and $\delta+10'$ at the top- containing values of $d = g - d\delta \mp dr$

Note — In North declination the zero of the scale will be at the South limit of the zone dr will be positive and $= 0$ at the zero

In South declination the zero will be at the North limit δ and s will be negative and dr will be negative.

For further notes on reductions on back of next leaf.

Form for computing $d\alpha$ and $d\delta$

No of Zone Date t δ

H		$= i$	
α		$\cos\delta$	
$H+\alpha$			$=$
$\sin(H+\alpha)$		$\cos(H+\alpha)$	
$\sec\delta$		$\sin\delta$	
$= h$		h	
	$=$		$=$
G			
$G+\alpha$			
$\sin(G+\alpha)$		$\cos(G+\alpha)$	
$\tan\delta$			
$= g$		g	
	$=$		$=$
$f =$			
		$d\delta =$	

$d\alpha$ in sec. of arc. $=$

$-\frac{1}{3}$

$d\alpha$ in sec. of time. $=$

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

1852phae.proj.x211E

Example

From calculations on preceding pages for Zone 1 – April 7th 1852

					dr
t_0	$10^h..00^m$	$dt_0 = 0^s.000$	$d\alpha_0 = +0^s.550$	$d\delta_0 = -6''.96$	+0.00
t_1	10..50	$dt_1 = +0.034$	$d\alpha_1 = +0.739$	$d\delta_1 = -6.50$	0.05
t_2	11..40	$dt_2 = +0.069$	$d\alpha_2 = +0.881$	$d\delta_2 = -6.14$	+0.04

$dr = 0''.00$ to $+0''.29$ for breadth of Zone = 10′

From B.A.C	3540	$p = +2^s.68$	$q =$	$-29''.1$	$-42''.7$
"	3597	$= +2.47$		-28.4	39.4
	3779	$= +2.38$		-30.9	43.9
	3946	$= +2.32$		-25.4	-37.5
adopted value of p		$= +2.45$	$q =$	-27.6	-40.4

		$\delta = 0°..00'$	$\delta = 0°..10'$	$\delta = 0°..00'$	$\delta = +0°..10'$
$k_0 = +1^s.90$	d_0	$-20''.5$	$-20''.3$	$d_0 \; -33.9''$	-33.7
$k_1 = +1.75$	d_1	-21.0	-20.7	$d_1 \; -34.4$	-34.1
$k_2 = +1.64$	d_2	-21.4	-21.1	$d_2 \; -34.8$	-34.5

The following table is to be used in reducing the Zone

t	k	$\delta = 0°..00'$	$\delta = +0°..10'$	$\delta = 0°..00'$	$\delta = +0°..10'$		
$10^h..00^m$	$k = +1^s.90$	$d =$ $-33''.9$	$-33''.7$	$d = -33''.9$	$-35''.1$	$\Delta\delta = 1''.2$	
10	1.86	34.0	33.8	34.0	35.2	1	0.1
20	1.83	34.1	33.8	34.1	35.3	2	0.2
30	1.80	34.2	33.9	34.2	35.4	3	0.4
40	1.78	34.3	34.0	34.3	35.5	4	0.5
10..50	1.75	34.4	34.1	34.4	35.6	5	0.6
11..00	1.73	34.4	34.2	34.5	35.7	6	0.7
10	1.70	34.5	34.2	34.6	35.8	7	0.8
20	1.68	34.6	34.3	34.7	35.9	8	1.0
30	1.66	34.7	34.4	34.8	36.0	9	1.1
11..40	+1.64	-34.8	-34.5	-34.9	-36.1		

The Red ink figures for d are the values corrected for change the Barometer & Thermometer and contain the reduction to the value of the Scale
A 10 divisions = 9′..58″.50 & the change of refraction for 10′ in δ.
In the original Reduction of Zone 1 the figures in black ink were used – the corrected places are in red

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

1852phae.proj..211E

Three other corrections are to be noticed namely dr' the increase of refraction for the rise of the Barometer after the passage of the 1st Star dr'' the increase ref. for the fall of the Thermometer after the 1st star. and ds the correction of the scale reading for error of division. ds may be taken to increase uniformly with the distance from zero.

The rise of the Barometer and fall of the Thermometer will both (when the zone is S of the zenith) carry the stars too far North

Zero of Zone. the scale being supposed to increase with the declination both ways when N & S, which causes the signs of dr to change at the Equator

	$-\delta$	dr	dr' rise of 0.10 in Bar	dr'' fall of 1° in Ther.
Scale incr South	-20°	$-0.''78$	$+0.''38$	$+0.''23$
"	-10	-0.45	$+0.25$	$+0.16$
Scale incr. North.	0	$+0.30$	$+0.18$	$+0.11$
"	$+10$	$+0.23$	$+0.12$	$+0.07$
"	$+20$	$+0.20$	$+0.08$	$+0.05$

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

1852phae.proj..211E

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

1852phae.proj..211E

Zone 2nd

April 16 9h 25m sid. time Barom. 29.748 att. Therm. 64° – Ext Th. 39.5

12h 35m +29.800 " .62 – 38.5

+0.052

1h 40m +0.039 = dh dr dr – 1.0

Daily rate losing 0s.50 0.05 0".11

0.05

dr – 0.16

Scale A

Zone 2 – Zone 1

1st wire	2nd wire	Mean	k	Mean Eq. 1852.0	
10h 14m 25s.6	14m 29s.6	10h 14m 29s.60	–0s.12	+ 10h 14m 29s.48	+0s.10
15 17.7	15 21.7	15 21.70	.12	15 21.58	– .04
15 59.7	16 03.7	16 03.70	.12	16 03.58	+ .02
16 10.7	16 14.7	16 14.70	.12	16 14.58	
17 34.43	17 38.3	17 38.30	.13	× 17 38.2217	+ .22
17 57.1	18 01.1	18 01.10	.13	× 18 00.97	+ .02
19 54.8	19 58.8	19 58.80	.13	19 58.67	
21 24.5	21 28.4	21 28.45	.14	× 21 28.31	+ .18
					Ink failed
22 09.8	22 13.7	22 13.75	.14	× 22 13.61	– .01
22 19.8	22 23.7	22 23.75	.15	22 23.60	
22 39.7	22 43.6	22 43.65	.15	× 22 43.50	– .02
23 04.0	23 08.0	23 08.00	.15	23 07.85	+ .03
24 51.0	24 55.0	24 55.00	.16	× 24 54.84	+ .02
25 52.5	25 56.4	25 56.45	.16	25 56.29	
26 55.6	26 59.5	26 59.55	.16	× 26 59.39	– .07
27 20.6	27 24.5	27 24.55	.16	27 24.39	+ .03
27 44.2	27 48.3	27 48.25	.17	× 27 48.08	– .13
29 47.2	29 51.1	29 51.15	.18	× 29 50.97	+ .02
29 58.1	30 02.1	30 02.10	.18	30 01.92	
30 33.2	30 37.1	30 37.15	.18	30 36.97	
30 54.0	30 54.0	30 54.00	.18	× 30 53.82	+ .12
33 18.6	33 22.5	33 22.55	.19	× 33 22.36	– .09
34 55.2	34 59.2	34 59.20	.20	34 59.00	
37 16.2	37 20.1	37 20.15	.20	× 37 19.95	+ .06
37 36.1	37 40.0	37 40.05	.21	× 37 39.84	– .10
38 02.0	38 05.8	38 05.90	0.21	× 10 38 05.69	+ .01

sum = –0.51 +0.88 = +0.37

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

1852phae.proj.211E

Zone 2nd = 21 repeated

Zone 2 - Zone 1

			d	Mean Eq. 1852.0		$z_2 - z_1$ uncorrected in Right for Prop.
X	7.8	−00°.00′.29″	−3.6	δ −00°.00′.32″.6	−3″.6	−3.6
	10	+ 3.27	3.5	+ 00 .03 .23.5	+0.4	+0.2
	11	3.15	3.5	3.11.5	+0.5	+0.2
	12	2.20	3.5	2.16.5		
	12	9.28	3.4	9.24.6	−0.6	−1.1
	10	2.53	3.5	2.49.5	−0.5	−0.7
	Break					
	11	3.31	3.6	3.27.4		
	11.12	3.24	3.6	3.20.4	+0.2	+0.2
	11	7.45	3.5	7.41.5		
	9.10	4.46	3.6	4.42.4	+0.3	+0.1
	10	7.20	3.5	7.16.5		
	5	7.15	3.5	7.11.5	+1.4	+1.2 B.A.C. 3597-
	11	5ʰ 8.11	3.6	5ʰ 8.07.4	−0.6	−0.8 10 mags × 4/10.6 Space
	Break					
	11	8.23	3.5	8.19.5	+0.3	+0.1
	12	5.37	3.6	5.33.4		
	90	9.28	3.5	9.24.5	+0.4	0.0
m	9.10	8.50	3.5	8.46.5	+1.4	+1.1
	11	1.50	3.7	1.46.3	−0.6	−0.6 3 more stars in field 10 mag. each
	9.10	2.06	3.7	2.02.3	−0.6	−0.7
X	8	+ 10.09	3.5	10.05.5		
	11.12	3.20	3.7	3.16.3		
	11	1.18	3.8	1.14.2	+0.4	+0.2
	Break double					
	9	6.07	3.6	6.03.4	+0.4	
X	10	× 10.28	3.5	10.24.5		
	10	+ 8.13	3.6	+ 00.08.09.4	−0.6	−1.2
	9	− 0.17	3.8	− 0.00.20.8	+1.5	+1.4
	9	+ 8.01	3.6	+ 00.07.57.4	+0.4	−0.1 +4.7 − 8.8 = −4.1

Sum = −7.1 + 7.6 = +0.5

Four short hours

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

1852phae.proj...211E

Zone 2

			K	Mean Eq. 1852.0	Z2 − Z1
10h 39m 24.5	39m 28.2	10h 39m 28.35	−5 0.22	10h 39m 28.13	− 4
40m 18.8	40m 22.7	40m 22.75	.22	40m 22.53	
40 43.1	40m 47.0	40m 47.05	.22	× 40m 46.83	− 0.00
41m 52.3	56.3	41m 56.30	.22	× 41m 56.08	− .05
42m 5.3	9.3	42m 9.30	.22	42m 09.08	+ .10
43m 38.0	Lost	43m 42.00	.23	× 43m 41.77	
44m 0.6	4.6	44m 04.60	.23	44m 04.37	
45m 58.4	46m 02.8	46m 02.45	.23	46m 02.22	
46m 48.2	52.3	46m 52.25	.24	× 46m 52.01	+ .14
48m 47.7	52.1	48m 51.90	.24	48m 51.66	
49m 41.7	45.7	49m 45.70	.25	× 49m 45.45	+ .15
50m 46.4	50.3	50m 50.35	.25	× 50m 50.10	− .20
51m 09.2	13.3	51m 13.25	.25	× 51m 13.00	.00
51m 48.7	52.7	51m 52.70	.25	× 51m 52.45	− .18
52m 26.4	30.4	52m 30.40	.25	52m 30.15	
54m 53.9	57.9	54m 57.90	.26	× 54m 57.64	.06
~~55m 30.~~					
55 ~~56~~m 30.0	33.9	~~56~~m 33.95	.27	× 55m 33.68	
* 55m 36.7	40.8	55m 40.60	.27	× 55m 40.33	− .11
56m 11.0	15.0	56m 15.00	.27	× 56m 14.73	− .01
56m 41.6	45.5	56m 45.55	.27	× 56m 45.28	− .01
56m 55.9	59.9	56m 59.90	.27	× 56m 59.63	− .01
58m 30.6	34.4	58m 34.50	.28	× 58m 34.22	+ .09
58m 59.6	59m 03.7	59m 03.65	.28	× 59m 03.37	+ .14
10h 59m 21.2	25.0	59m 25.10	.29	× 10h 59m 24.81	
11h 00m 15.1	19.0	00m 19.05	.29	× 11h 00m 18.76	+ .03
1m 10.3	14.3	1m 14.30	.29	× 1m 14.01	+ .08
1m 19.7	23.8	1m 23.75	.29	× 1m 23.46	+ .03
2m 17.0	21.1	2m 21.05	.29	× 2m 20.76	− .07
2m 24.6	28.5	2m 28.55	.29	× 2m 24.26	− .12
2m 45.8	49.8	2m 49.80	−5 0.29	× 11h 02m 49.51	+ .09

sum = −0.68 + .85 = + 0.17

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

1852phae.proj.x211E

Zone 2

		d	Mean Eq. 1852.0	$z_2 - z_1$	
		s	$\delta + 0^\circ.06'.2''.3$		
12	00.06.27	− 3.7			
11	2..42	3.8	2..38.2		corrected for scales
10	4..12	3.8	4..08.2	− 0.7	− 1.0
10	1..17	3.9	1..13.1	− 0.6	− 0.7
11	7..45	3.7	7..41.3	− 0.7	− 0.8
	Break				
12	9..11	3.6	9..07.4	2 other stars one very faint not in list	
9	8..00	3.7	7..56.3		
12	6..00	3.7	5..56.3		
10	9..18	3.6	9..14.4	+ 1.4	+ 1.0
	Break				
13	3..56	3.9	3..52.1		N Bad
9	5..10	3.8	5..06.2	− 0.5	− 0.4
9.10	6..03	3.7	7..59.3	+ 0.5	+ 0.3
11	0..51	4.0	0..47.0	− 0.6	− 0.7
11.12	0..34	4.0	0..30.0	+ 1.4	+ 1.3
9	9..58	4.0	9..54.0		
12	1..52	3.7	1..48.3	+ 0.7	+ 0.4
	Break double				
12	3..09	4.0	3..05.0		
6	2..54	4.0	2..50.0	+ 1.3	+ 1.2 no signal
12	5..50	3.8	5..46.2	+ 1.5	+ 1.1
9.10	6..10	3.8	6..06.2	+ 1.5	+ 1.0
10	4..49	3.9	4..45.1	+ 1.4	+ 1.1
	Break				
9	7..08	3.9	7..04.1	+ 0.4	0.0
9.10	4..40	4.0	4..36.0	+ 0.3	+ 0.2
13	1..43	4.1	1..38.9		no signal
11	9..05	3.8	9..01.2	+ 0.4	+ 0.2 ~~+ 0.2~~
11	5..20	3.9	5..16.1	+ 0.4	+ 0.2
11	8..31	3.8	8..27.2	+ 0.4	0.0
9.10	3..07	4.0	3..03.0	+ 1.3	+ 1.3
11	6..40	3.9	6..36.1	+ 0.4	+ 0.1
11	9..20	− 3.8	0..09..16.2	− 0.6	− 1.0 ~~1.0~~
	Break double				

sum = $-3''.7 + 13''.3 = +9''.6$

+9.4 −5.1 = +4.3

/21

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

1852phae.proj..211E

Zone 2

			K		Mean Eq. 1852.0	$z_2 - z_1$
11.. 3.. 56.0	4.. 00.0	11.. 4.. 00.00	−0.29		11.. 03.. 59.71	
4.. 21.2	4.. 25.3	4.. 25.25	.30	x	4.. 24.95	+0.03
4.. 29.4	33.3	4.. 33.35	.30		4.. 33.05	+.13
4.. 46.7	50.3	4.. 50.50	.30	x	4.. 50.20	+.08
6.. 7.6	11.5	6.. 11.55	.30	x	6.. 11.25	+.08
6.. 33.4	37.6	6.. 37.50	.31		6.. 37.19	
6.. 45.9	50.0	6.. 49.95	.31	x	6.. 49.64	−.08
7.. 30.3	34.6	7.. 34.45	.31		7.. 34.18	
8.. 05.8	9.5	8.. 09.65	.31	x	8.. 09.34	−.02
8.. 8.0	11.7	8.. 11.85	.31		8.. 11.54	
8.. 53.5	57.6	8.. 57.55	.31	x	8.. 57.24	+.03
9.. 02.2	06.23	9.. 06.25	.32	x	9.. 05.93	−.78
10.. 53.2	57.0	10.. 57.10	.32	x	10.. 56.78	+.02
11.. 15.2	19.2	11.. 19.20	.32		11.. 18.88	
13.. 06.4	10.6	13.. 10.50	.32	x	13.. 10.18	−.12
13.. 29.6	33.7	13.. 33.65	.33	x	13.. 33.32	+.17
13.. 34.7	38.7	13.. 38.70	.33		13.. 38.37	
14.. 36.7	40.18	40.75				
~~14.. 36.7~~	~~36.7~~	~~14.. 36.70~~	.33	x	14.. 40.42	−.03
15.. 24.8	28.8	15.. 28.80	.33	x	15.. 28.47	+.03
15.. 50.7	54.7	15.. 54.70	.33	x	15.. 54.37	+.08
16.. 01.4	5.1	16.. 5.25	.34		16.. 04.91	
16.. 40.8	44.8	16.. 44.80	.34	x	16.. 44.46	+.02
17.. 33.2	37.1	17.. 37.15	.34	x	17.. 36.81	+.12
18.. 10.0	14.0	18.. 14.00	.34	x	18.. 13.66	+.07
~~19.. 40.1 wrong~~	44.1	19.. 44.10	.35		19.. 43.75	
19.. 45.1	49.0	19.. 49.05	.35	x	19.. 48.70	−.08
20.. 30.2	34.7	20.. 34.45	.35	x	20.. 34.10	−.23
22.. 09.3	09.1	22.. 09.20	.35	x	22.. 08.85	+.07
22.. 05.3	09.1	22.. 09.20	.36		22.. 08.84	
lost						
~~23.. 33.7~~	33.7	23 33.70	.36		23.. 33.34	
lost	39.7	23.. 39.70	.36		23.. 39.34	
23.. 51.0	55.0	23.. 55.00	.37	x	23.. 54.63	−.15
24.. 52.4	56.4	24.. 56.40	.38		11.. 24.. 56.02	

sum = −0.94 + 0.98 = −0.01

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

1852phae.proj..211E

Zone 2

			d	Mean Eq. 1852.0	$z_2 - z_1$		
			"				
+	11	+00..09..45	−3.9	+00..09..41.1			due uncertain
−	8	1..12	4.1	1..07.9	+0.3	+0.4	
−	8	6..39	4.0	6..35.0	−0.7	−0.8	no sig
−	8	0..47	4.0	0..43.0	−0.6	−0.6	
−	11	3..28	4.1	3..23.9	−0.8	−0.7	
	12	4..32	4.0	4..28.0			
−	11	5..58	4.0	5..54.0	+1.3	+1.1	
	12	6..59	4.0	6..55.0			
−	11	5..29	4.0	5..25.0	+0.3	+0.1	
−	11	4..23	4.0	4..19.0			no sig
+	10	+ 3..50	4.0	+0..03..46.0	+1.3	+1.3	
×	9	− 00 17	4.1	−0..00..21.1	+2.4	+2.5	
	Long Break						
	10	6..38	4.0	+0..06..34.0	+0.3	+0.1	
×	11	10..22	3.9	10..18.1			
	10	2..56	4.1	2..51.9	−0.7	−0.8	
	7.8	2..56	4.1	2..51.9	−0.7	−0.8	no signal
	10	8..28	3.9	8..24.1			
	12	8 07	3.9	8..03.1	+0.4	0.0	2nd mark is abo. per
	Dauble Break						
	9	7..42	3.9	7..38.1	+1.4	+1.0	
	10	9..12	3.9	9..08.1	−0.7		
	13	1..09	4.1	1..04.9			
	10	4..40	4.0	4..36.0	−0.7	−1.0	
−	11	2..52	4.1	2..47.9	−0.6	−0.8	
	8	2..48	4.1	2..43.9	+0.4	+0.2	
×	9.10	10..10	3.9	10..06.1			
	9.	8..20	3.9	8..16.1	+3.4	+2.7	
−	11	1..33	4.2	1..28.8	+0.3	+0.5	in R differ 0.5
	9.10	7..08 > sum R	4.1	7..03.9	+1.2	+1.9	
×	10	10..00	4.0	+0..09..56.0			
	Dauble Break						
×	9. 10	− 00..35 > last-wire	4.2	−0..00..30.8			
×	9-10	− 00 32	4.2	−0..00 27.8			
	11	6..09	4.1	5..58.9	+1.3	+1.2	
	11	5..50	−4.1	0..05..45.9		+10.9 − 5.5 = +5.4	
	Long Break						

sum = +14.4 − 5.5 = +8.9

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

1852phae.proj..211E

Zone 2

			k	Mean Eq. 1852.0	$z_2 - z_1$
* 11.. 27.. 03.2	07.1	11.. 27.. 07.15	−0.37	× 11.. 27.. 06.78	+0.04
27.. 16.1	19.84	27.. 19.47	.37	27.. 19.60	
27.. 26.8	31.00	27.. 30.90	.37	× 27.. 30.53	+.06
	~~35.1~~	~~35~~			Two stars passed at this int.
27.. 54.3	58.4	27.. 58.35	.37	27.. 57.98	
28.. 29.7	33.7	28.. 33.70	.38	× 28.. 33.32	−.10
BAC 4946 29.. 18.6	22.7	29.. 22.65	.39	× 29.. 22.26	−.20
~~29.. 48.4~~	~~29.. 48.8~~				
~~29.. 44.4~~	29.7 45.1	29.. ~~22.65~~ 45.25	.39	29.. 44.86	
~~29.. 44.4~~ 30.. 05.1	09.1 ~~45.1~~	30.. 09.10	.39	× 30.. 08.71	−.15
~~30.. 5.1~~	~~5.1~~	~~5.10~~			
31.. 45.7	49.7	31.. 49.70	.39	× 31.. 49.31	−.10
~~32.. 18.1~~	~~22.0~~	~~32.. 22.05~~			
~~32.. 18.1~~ 32.. 18.1	~~54.7~~ 22.0	~~32.. 54.70~~ 32.. 22.05	.39	× 32.. 21.66	−.15
~~32.. 50.7~~ 32.. 50.7	~~21.5~~ 54.7	~~32.. 54.70~~ 32.. 54.70	.39	× 32.. 54.31	−.05
33.. 17.6	21.5	33.. 21.55	.40	× 33.. 21.15	−.10
34.. 32.0	35.9	34.. 35.95	.40	34.. 35.55	
35 29.0	33.2	35.. 33.10	.41	35.. 32.69	
35. 47.8	51.8	35. 51.80	.41	× 35.. 51 ~~31~~ 39	−.21 as mean as pos. err.
36.. 15.1	19.0	36.. 19.05	.41	36.. 18.64	
36.. 37.1	41.0	36.. 41.05	.41	36.. 40.64	
37.. 22.6	26.7	37.. 26.65	.41	37.. 26.24	
37.. 35.5	39.3	37.. 39.40	.41	37.. 38.99	
37.. 56.0	38.. ~~38~~.0	38.. 00.00	.41	37.. 59.59	
38.. 08.2	12.4	38.. 12.30	.41	38.. 11.89	
38.. 24.9	28.9	38.. 28.90	.42	38.. 28.48	
39.. 35.4	39.3	39 39.35	.42	39.. 38.93	
39.. 57.6	40.. 01.4	40.. 01.50	.42	40.. 01.08	
40.. 14.7	18.7	40.. 18.70	.42	40.. 18.28	
43.. 9.4	13.4	43.. 13.40	.43	43.. 12.97	
43. 24.3	28.4	43.. 28.35	.43	43.. 27.92	
43.. 34.2	lost	43.. 38.20	.43	43.. 37.77	
43.. 53.1	57.2	43.. 57.15	.43	43.. 56.72	
45.. 25.0	29.1	43.. 29.05	.43	43.. 28.62	
47.. 22.1	26.0	47.. 26.05	.43	47.. 25.62	+ 0.06 − 1.10 = −1.04 sum = + 0.32 − 1.16 = − .84

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

1852phae.proj..211E

		d	Mean Eq. 1852.0		
11	+00,,8,,11	−4.1	+ 0,,08,,06.9	+ 2.3	+2.0
11	1,,32	4.3	1,,27.7		no sig.
10	8,,59	4.1	8,,54.9	− 0.7	−1.0
11					9
12	8,,15	4.1	8,,10.9		
8.9	7,,43	4.1	+ 0,,07,,38.9	+1.3	+1.2
Double Break					
4	− 00,,25	4.3	− 0,,00,,29.3	+0.4	+0.6
11	9,,38	4.1	+ 0,,09,,33.9		
10	8,,20	4.1	8,,15.9	+1.3	+1.2
Break					
9.10	0,,15	4.3	00,,10.7	−0.4	+0.5
long dots					
11	3,,58	4.3	3,,53.7	+0.3	+0.2
9.10	5,,47 (51?)	4.2	5,,46.8	+0.7	−0.8
6.7	8,,48	4.1	8,,43.9	−0.7	−0.9
Double Break					
11	0,,41	4.3	0,,36.7		
12	6,,39	4.2	6,,34.8		
9.10	6,,53	4.1	8,,48.9	+3.7	−3.9
9.10	5,,25	4.2	5,,20.8		+5.7 −6.6 = −0.9
Three breaks					
11	9,,37	4.1	9,,32.9		−4.1 18
9	0,,14	4.3	0,,09.7		+4.3 21
10	9,,32	4.1	9,,27.9		+5.4 20
12	2,,50	4.2	2,,45.8		−0.7 10
11.12	1,,05	4.3	1,,00.7		2-21 Zero 64/74.7 (+0.07)
9	4,,13	4.2	4,,08.8		
9	5,,58	4.2	5,,53.8		
12	2,,29	4.4	2,,24.6		
10	4,,19	4.3	4,,14.7		
10	10,,08	4.2	10,,03.8		
12	8,,57	4.2	8,,52.6		
12	6,,22	4.3	6,,17.7		2nd min bst
12	9,,03	4.2	8,,58.8		
Break					
10	3,,42	4.3	3,,37.7		
9	4,,24	4.4	4,,19.6		

Sum = +10.0 − 1.8 = +8.2

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

1852phae.proj..211E

Lone 2

			K	Mean Eq. 1852.0
~~47 22.1~~	~~26.0~~			
47 37.2	41.0	47 41.10	−0.44	47 40.66
48 28.2	32.0	48 32.10	.44	48 31.66
48 59.5	49 03.2	49 03.35	.44	49 02.91
49 51.9	56.0	49 56.95	.45	49 56.50
50 44.9	49.0	50 49.95	.45	50 49.50
51 00.4	04.4	51 04.40	.45	51 03.95
51 49.4	53.1	51 53.25	.45	51 52.80
11 51 51.5	55.4	51 55.45	.45	51 55.00
52 46.4	50.2	52 50.30	.45	52 49.85
53 17.4	21.9	11 53 21.75	0.45	11 53 21.30

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

1852phae.proj..211E

D	Mean Time	d	Mean Eq. 1852.0	
13	5h 32m	− 4.5	+ 0m 05s 27.6	a 9th mag star in this circle
9	1.31	4.5	+ 0.01 26.5	
11	0.03	4.5	− 0.00 01.5	
11.12	3.28	4.4	+ 0.03 23.6	
9	5.47	4.4	5.42.6	
11	1.40	4.5	1. 35.5	
12	6.03	4.4	5. 58.6	
9	5.43	4.4	5. 38.6	
Doubl Breath				
7.8	7.56	4.4	7. 51.6	Doubl comp 13 m.d.6"
10	5.34	4.4	+ 0.05 29.6	

Barom. 29,800 - 62 Ext Ther 38.5 at 12.35

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

1852phae.proj..211E

Reduction of Zone 2 April 16, 1852 $\delta = 00^\circ..0'$ $\delta + 00..1'$

		f	g	G_0	k	H_0	i
t_0	$10^h..00^m..00^s$	$-3.''07$	$+2.''01$	$131^\circ..34'..36''$	$+19.''09$	$240^\circ..49'..36''$	$-7.''24$
t_1	$10..50..00$			$131..32..16$		$240..47..28$	
t_2	$11..40..00$			$131..29..56$		$240..45'21$	

$a_0 = t_0 = 150^\circ..0'$

$a_1 = t_1 = 162..30$

$a_2 = t_2 = 175..00$

$H_0 + a_0 = 30^\circ..49'..36''$

$H_1 + a_1 = 43..17..28$

$H_2 + a_2 = 55..45'21$

$G_0 + a_0 = 281..34..36$

$G_1 + a_1 = 294..02..16$

$G_2 + a_2$ $306..29..56$

Nang. δ ~~-0.00000~~

$G_0 + a_0$ sin. $9.''99107$

g log. 0.30320

~~$0.''29427$~~ $-$ ~~1.868~~

0.000

h log. 1.28081

$H_0 + a_0$ sin. 9.70965

sec. δ 0.00000

0.99046 $+9.783$

~~$+9.783$~~

$f = -3.07$

corr. in sec. of arc $+6.''715$

to " " time $+$ ~~$0.''446$~~

$+0.448$

Nang. δ

$G_1 + a_1$ sin.

g log.

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

1852phae.proj.211E

April 16th Zone 2

240.4 H 240.50 | -7.24=2' | 240.50

a 150.00 | cos δ ——— | 175.00

H+a 30.50 | 2 cos δ ——— = -7.24 | 55.50 | -7.24

ni 9.70973 | cos 9.93382 | 9.91772 | 9.74943

ni δ 0.00000 | ni δ - S

+19.09 = h 1.28081 | h ——— | 1.28081 | ———

0.99054 = +9.78 | = 0.00 | 1.19853 = +15.80 | 0.00

ζ 131.34 | 131.34

ζ+a 281.34 | 306.34

ni | cos 9.30213 | 9.77507

ni δ -S

+2.01 ζ ——— | ζ 0.30320 | 0.30320

-S = 0.00 | 9.60533 = +0.40 | 0.00 | 0.07827 = +1.20

S = -3.07 | - 6.84 | -3.07 | - 6.04

+6.71 | 12.73

2.24 | 4.24

+0.447 | +0.849

H 240 50 | δ +0..10'

a 162.30

H+a 43.20 | -7.24

ni 9.83648 | 9.86176 | cos H+a 9.93[illegible]

0".00' ni δ 0.00000 | ni δ 7.463

h 1.28081 | h 1.281 -7.24

1.11729 = +13.10 | 0.00 | 8.678 = +0.05

ζ 131.34 | +0.82

ζ+a 294.04 | -6.37

9.61045

ni ζ+a 9.966

0.30320 | 7.463

0.00 | 9.91365 + 0.82 | 8.303

-3.07 | δ 0..00' - 6.42 | 7".726 = -0.01

+10.03 | 0..10 - 6.37

3.34

δ 0..00' +0.669

0..10 +0.669

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

1852phae.proj...211E

α	$d\alpha$	dt	$d\alpha+dt$	p	$k = p - d\alpha - dt$
10..00	+ 0.447	− 0.000	+ 0.447	+ 0.400	= − 0.047
10..50	+ 0.669	− 0.016	+ 0.653	+ 0.400	= + 0.253
11..40	+ 0.849	− 0.034	+ 0.815	+ 0.400	= + 0.415

	$d\delta$	dr	$d\delta+dr$	q	d for δ 0°..0′	d for δ 0°..10′
10..00	− 6.84	+ 0″.00	− 6.84	− 10″.30	− 3.46	−0.05+0.30 = − 3.21
10..50	− 6.42	+ 0.08	− 6.34	− 10.30	− 3.96	−0.05+0.30 = − 3.71
11..40	− 6.04	+ 0.16	− 5.88	− 10.30	− 4.42	−0.05+0.30 = − 4.17

change q ref. for 10′ in α 0″.30
" " δ 0.05

Zone 2 April 16th

α	k	d, δ=0°..0′	d δ 0°..10′	
10h.00m	− 0s.05	− 3″.5	− 3.2	− 5.1
10	− .09	3.6	3.3	5.2
20	− 14	3.7	3.4	5.3
30	18	3.8	3.5	5.4
40	22	3.9	3.6	5.5
10..50	−0.25	−4.0	−3.7	5.6
11..00	29	4.1	3.8	5.7
10	32	4.1	3.9	5.8
20	35	4.2	4.0	5.9
30	39	4.3	4.1	6.0
40	−0.42	−4.4	−4.2	6.1
50	45	4.5	4.3	6.2
12..00	48	4.6	4.4	6.3
12..10	− 0.50	− 4.7	− 4.4	− 6.3

The corresponding corrections in Zone 2 are in red ink.

The figures for d in red ink contain the values for the

Value of micr. Scale A = 9′..58″.10
A = 9′..58″.5 9..58.8

(9..58.1 was used by mistake (in the final reduction in red ink (instead of 9′..58″.5

α	δ
h 3	° 3..

δ-s	$d\delta+d\alpha$	q
− 3.5	+ 6.7	= − 10.2
− 3.5	− 6.4	= − 9.9
− 4.3	− 6.2	= − 10.5
− 4.5	− 6.0	10.5
		10.3

α-t	$d\alpha+dt$
− 0.22	
− 0.03	
− 0.14	
− 0.40	
− 0.15	
− .32	
13	
18	
157	

	α	p	
10h.20m	− 0.20	+ 0.53	= + 0.33
			0.47
			p = + .40

− 0.12	
2.42	
0.22	
9 0.48	
8 −0.28	
0 −0.19	
8 [illegible]	
0 29	
5 44	
30	
10	

10h.28m − 0.30 + 0.77 = + 0.47

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

1852phae.proj..211E

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

1852phae.proj..211E

April 17d P.M. 1852 Zone 3 — Scale 13.

Bar 30.050 − 67 — Ext T 39.7 — Sid T 9h 45m
30.047 − 64 " 37.6 12.30
003

dt = 0.00 dt = −2°.1
2h 45m dt = +0".23
Daily rate losing 0s,50 1h 50m d2 0.15

1st wine h m s	2d wine m s	Mean	K s	Z3 − Z1 Mean. Eq. 1852.0	Z3 − Z2
10 14 25.6	14 29.6	10h 14m 29.60	−0.11	10 14 29.49	−.09
15 17.7	15 21.8	15 21.75	.12	15 21.63	+.05
15 59.9	16 03.8	16 03.85	.12	16 03.78	+.75
16 10.7	16 14.5	16 14.60	.12	16 14.48	−.10
17 34.2		17 38.20	.13	17 38.07	−.15
17 57.2	18 01.1	18 01.15	.13	18 01.02	+.05
19 15.0	19 19.0	19 19.00	.14	−0.07 19 18.86	
19 54.8	19 58.7	19 58.75	.14	19 58.61	−.06
20 24.8	20 28.7	20 28.75	.14	20 28.61	+.80
21 24.83	21 28.2	21 28.25	.14	21 28.11	−.20
21 44.1	21 48.1	21 48.10	.14	21 47.96	
22 09.7	22 13.6	22 13.65	.15	22 13.50	−.11
22 19.7	22 23.7	22 23.70	.15	22 23.55	−.05
22 39.7	22 43.7	22 43.70	.15	22 43.55	+.05
23 01.2	23 05.0	23 05.10	.15	23 04.95	
23 28.2	23 32.2	23 32.20	.15	23 32.05	
23 58.0	24 02.1	24 02.05	.15	−.02 24 01.90	
24 51.0	24 55.0	24 55.00	.16	24 54.84	.00
25 14.9	25 19.2	25 19.05	.16	25 18.89	
25 49.7	25 53.5	25 53.60	.16	+.03 25 53.44	
25 52.2	25 56.3	25 56.25	.16	25 56.09	−.20
26 55.6	26 59.6	26 59.60	.16	26 59.44	+.05
27 09.2	27 13.4	27 13.30	.17	27 13.13	
27 24.9	27 29.0	27 28.95	.17	27 28.78	
27 39.4	27 43.9	27 43.40	.17	10 27 43.23	
	27 48.3	27 48.30	.17	27 48.13	+.05

sum = +0.45 − 0.95 = −.50

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

1852phae.proj.211E

		d	$Z_3 - Z_1$ Mean Eq. 1852.0	$Z_3 - Z_2$	$Z_3 - Z_2$ 2nd Reduction	
× 7.8	— 00°.00.28	— 2.0	— 00°.00.30.0	+2.6	+2.5	
10 +	3.23	1.9	+ 03.21.1	− 2.4	−2.5	
12	3.12	1.9	3.10.1	− 1.4	−1.5	
12	2.17	2.0	02.15.0	− 1.5	−1.4	
12	9.28	1.9	9.26.1	+ 1.5	+1.7	2nd wire lost (a)
10	2.50	2.0	2.48.0	− 1.5	−1.5	
13	8.10	2.0	− 3.8 8.08.0			
double Break						
11.12	3.29	2.0	03.27.0	−0.4	−0.4	
13	1.29	2.1	1.26.9			
12	3.21	2.0	3.19.0	− 1.4	−1.4	
12	7.41	2.0	7.39.0			
9	4.42	2.0	4.40.0	− 2.4	−2.3	
10	7.20	2.0	7.18.0	+ 2.5	+1.6	
5	7.04 = dn 17.14	2.0	7.12.0	+ 0.5	+0.6	
Break						
10	9.31	2.0	9.29.0			
12	1.09	2.1	1.06.9			
12.13	3.53	2.0	− 2.0 3.51.0			
12	8.23	2.0	8.21.0	+ 1.5	+1.5	
+ 10	10.36	2.1	10.33.9			
11	0.50	2.1	− 1.0 0.47.9			
11	5.32	2.0	5.30.0	− 3.4	−3.4	
Break						
11	9.27	2.1	9.24.9	+ 0.4	+0.5	
11	5.34	2.0	5.32.0	+ 8.4 − 14.4 = −6.0		14
10	1.20	2.2	1.17.8			
9.10	3.58	2.1	3.55.9			last wire late
9	1.48	2.2	+ 0.01.45.8	− 0.5		over 2nd wire
double Break						

Sum = − 14.9 + 9.0 = − 5.9

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

1852phae.proj...111E

Zone 3

1st wire h m s	2nd wire	Mean	K	Mean Eq. 1852.0 h m s	$Z_3 - Z_2$
10 28 37.8	28 41.1	10 28 14.20	−0.18	10 28 14.02	
29 08.5	29 12.5	29 12.50	.18	29 12.32	
29 47.0	29 51.1	29 51.05	.18	29 50.87	−.10
29 58.1	30 02.0	30 02.05	.18	30 01.87	−.05
30 49.8	30 53.8	30 53.80	.18	30 53.62	−.20
33 18.6	33 22.6	33 22.60	.19	33 22.41	+.05
36 16.8	36 20.4	36 20.60	.20	36 20.40	
37 16.0	37 20.1	37 20.05	.20	37 19.85	−.10
37 23.1	37 27.2	37 27.15	.20	37 26.95	
37 36.1	37 40.0	37 40.05	.20	37 39.85	+.01
38 02.0	38 06.0	38 06.00	.20	38 05.80	+.11
38 59.1	39 03.0	39 03.05	.21	39 02.84	
39 24.2	39 28.1	39 28.15	.22	39 27.93	−.20
40 18.6	40 22.7	40 22.65	.22	40 22.43	−.10
~~40 40.0~~	~~40 44.0~~				
40 40.0	40 44.0	40 44.00	.22	40 43.78	
40 43.0	40 47.0	40 47.00	.22	40 46.78	−.05
41 52.2	41 56.2	41 56.20	.22	41 55.98	−.10
42 01.5	42 06.0	42 06.75	.22	42 05.53	
43 37.9	43 41.7	43 41.80	.23	43 41.57	−.20
44 00.6	44 04.6	44 04.60	.23	44 04.37	.00
44 28.6	44 32.4	44 32.50	.24	44 32.26	
46 58.83	46 02.2	46 02.285	.24	46 02.045	−.20(.21)
46 48.2	46 52.2	46 52.20	.24	46 51.96	−.05
	47 12.3	47 12.30	.24	47 12.06	
48 47.8	48 51.7	48 51.75	.25	48 51.50	−.16
49 35.4	49 39.4	49 39.40	.25	49 39.15	
49 41.6	49 45.6	49 45.60	.26	49 45.34	−.11
50 46.5	50 50.3	50 50.40	.26	50 50.14	+.04
51 09.2	51 13.1	51 13.15	.26	51 12.89	−.11
51 48.7	51 52.4 +0.1	51 52.60	.26	51 52.34	−.06
10 52 26.5	52 30.4	52 30.45	−0.26	10 52 30.19	+.04

sum −1.85 + 0.25 = −1.60

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

1852phae.proj..211E

Zone 3

May			d	Mean Eq. 1852.0	$Z_3 - Z_2$	
12	+00	02.50	−2.2	+00 02 47.8		
12		2.59	2.2	2 56.8		
10		2.02	2.2	1 59.8	−2.5	−2.4
9		10.07	2.1	10 04.9	−0.6	−0.6
10		1.13	2.2	1 10.8	−3.2	
long Break		No. stars abou 14 mag. vis				
9		6.04	2.1	6 01.9	−1.5	−1.6
12		10.09	2.1	10 06.9		
10		8.13	2.1	8 10.9	+0.5	+1.7
12	+	8.20	2.1	+0 08 17.9		
9	−	00.22	2.2	−0 00 15.8 (24.2)	+1.0	−3.4
10	+	8.01	2.2	+ 7 58.8	+1.4	+1.4
11		10.27	2.2	10 24.8		
12		6.25	2.2	6 22.8	−0.5	−0.5
11		2.37	2.3	2 34.7	−3.5	−3.3
~~9~~		~~4.10~~		2.00.8		
11		2.03	2.2	2.00.8		
9		4.10	2.2	4 07.8	−0.4	−0.3
					several stars	
double Break						
11		1.12	2.3	1 09.7	−3.4	−3.4
11,12		4.22	2.2	4 19.8		
12		9.11	2.2	9 08.8	+1.4	+1.5
9		7.59	2.2	7 56.8	+0.3	+0.3
12		0.56	2.3	0 55.7		
12		5.58	2.2	5 55.8	−0.5	−0.6 +0.5
10		9.17	2.2	9 14.8	+0.4	+0.6
12		4.01	2.3	3 58.7	1st wire lost	
three Breaks						
12		3.50	2.3	3 47.7	−4.4	−4.5
13		9.43	2.3	9 40.7		
9		5.08	2.3	5 05.7	−0.5	−0.9
11		8.02	2.3	7 59.7	+0.4	+0.2
9,10		0.49	2.4	0 46.6	−0.4	−0.4
11		0.30	2.4	0 27.6	−2.4	−2.4
9		9.58	2.3	+0 09 55.7	last wire 1 early	
					+1.7	+1.4

long Break No stars greater than 13–15 mag present

sum = −24.0 + 7.1 = −16.9

+7.4 − 23.9 = −16.5

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

1852phae.proj..211E

Zone 3

		Mean	k	$z_3 - z_1$	Mean Eq. 1852.0	$z_1 - z_2$
10.. 54.. 54.0	54.. 57.9	10.. 54.. 57.95	− 5 0.28		10.. 54.. 57.67	+ 0.03
55. 29.9	33.8	55 33.85	.28		55.. 33.57	− .11
55.. 36.7	40.6	55.. 40.65	.28		55.. 40.37	+ .04
56.. 11.0	15.0	56.. 15.00	.28		56.. 14.72	− .01
56.. 41.6	45.7	56.. 45.65	.28		56.. 45.37	+ .04
56.. 56.0	00.0	57. 00.00	.28		56.. 59.72	+ .04
57.. 33.8	37.9	57.. 37.85	.28		57.. 37.57	
58.. 30.5	34.5	58.. 34.50	.29		58.. 34.21	− .01
58.. 59.6	59.. 03.5	59. 03.55	.29		59.. 03.26	− .11
10.. 59.. 21.0	25.2	10.. 59.. 25.10	.29		10.. 59.. 24.81	.00
11.. 00.. 15.0	19.0	11.. 00.. 19.00	.30		11.. 00.. 18.70	− .06
1 01.. 10.4	14.4	1.. 14.40	.30		1.. 14.10	+ .04
01.. 19.9	23.8	1.. 23.85	.30		1.. 23.55	+ .04
02.. 17.2	21.1	2.. 21.15	.31		2.. 20.84	+ .08
2.. 24.8	28.7	2.. 28.75	.31		2.. 28.44	+ .18
2.. 45.8	49.7	2.. 49.75	.31		2.. 49.44	− .07
3.. 11.2	15.2	3.. 15.20	32		3.. 14.88	
3.. 19.4	23.4	3.. 23.40	.32		3.. 23.08	
3						
3.. 56.0	bit	4.. 00.00	.32		3.. 59.68	− .03
4.. 21.2	25.4	4.. 25.30	32		4.. 24.98	− .01
4.. 46.6	50.4					
6.. 7.5	11.5	4.. 50.50	.32		4.. 50.18	− .02
~~6.. 45.4~~	~~49.4~~	6.. 11.50	.32		6.. 11.18	− .07
8.. 45.9	49.9	~~6.. 49.90~~	.32			
8.. 05.7	9.7	6.. 49.90	.32		6.. 49.58	− .06
8.. 30.4	34.2	8.. 09.70	.32		8.. 09.38	+ 04
8.. 53.5	57.5	8.. 34.30	.32		8.. 33.98	
9.. 02.4	6.3	8.. 57.50	.33		8.. 57.17	− .07
10.. 53.2	57.0	9.. 06.35	.33		9.. 06.02	+ .14
11.. 21.5	25.4	10.. 57.10	.33		10.. 56.77	− .01
		11.. 25.45	.33		11.. 25.12	
13.. 06.5	10.7	13.. 10.60	.33		13.. 10.27	− .04
13 14.1	18.1	13.. 18.10	.33	− 0.03	13.. 17.77	
13.. 29.6	33.5	13.. 33.55	.33		13.. 33.21	− .11
13.. 34.7	38.7	13.. 38.70	.33		13.. 38.36	− .01
14.. 36.7	40.7	14.. 40.70	.34		14.. 40.36	− .06
15.. 24.8	28.7	15.. 28.75	− 5 0.35		11.. 15.. 28.40	− .07

sum = −0.98 + 0.87 = −0.11

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

1852phae.proj..211E

Zone 3

		d	Mean Eq. 1852.0	$z_3 - z_1$	$z_3 - z_2$
		"		"	
12	+ 00..01..49	— 2.4	+ 0..01..46.6	− 1.7	−1.5
10	3..07	2.4	03..04.6	− 0.4	−0.4
6	2..50	2.4	2..47.6	− 2.4	−2.4
10.11	5..47	2.3	5..44.7	− 1.5	−1.5
9.10	6..07	2.3	6..04.7	− 1.5	−1.4
9.10	4..43	2.3	4..40.7	−4.4	−4.3
13	7..22	2.3	7..19.7		
9.10	7..06	2.4	7..03.6	−0.5	−0.5
9	4..37	2.4	4..34.6	− 1.4	−1.4
11	1..41	2.5	1..38.5	− 0.4	−0.4
12	9..03	2.3	9..00.7	− 0.5	−0.5
12	5 16	2.3	5..13.7	− 2.4	−2.4
12	8.30	2.3	8..27.7	+0.5	+0.5
9.10	8..04	2.4	3..01.6	− 1.4	−1.3
11	6..37	2.3	6..34.7	− 1.4	−1.5
12	9..20	2.3	9..17.7	+ 1.5	+1.5
13	2..19	2.5	+ 0..02..16.5		
10	00..27	2.5	− 0..00..29.5		
	double Breath				
13	9..42	2.4	+ 0..09..39.6	− 0.5	2nd wire lost −1.3
8	1..09	2.5	1..06.5	− 1.4	−1.4
9.10	R seems to be wanting. 6..36	2.3	6..33.7	− 1.3	−1.6
8.9	0..42	2.5	0..39.5	− 3.5	−3.5
	No stars greater than 16 mag.				
12	3..25	2.5	3..22.5	− 1.4	−1.5
10	5..56	2.4	5..53.6	− 0.4	−0.5
11	5..27	2.4	5..24.6	− 0.4	−0.4
13	3..40	2.5	3..37.5		
10	3..47	2.5	+ 0..03..44.5	− 1.5	−1.5
9.10	— 0..21	2.6	— 0..00..23.6	−2.5	−2.5
10.11	6..35	2.6	+ 0..06..32.4	— 1.6	−1.7
12	0..29	2.6	0..00..26.4		
10	2..52	2.6	2..49.4	−2.5	−2.4
11	8..09	2.4	+0.4 8..06.6		
9	2..53	2.6	2..50.4	−1.5	−1.5
11	8..28	2.4	8..25.6	+1.5	+1.5
11	8..05	2.4	8..02.6	−0.5	−0.4
9	7..39	2.4	+ 0..07..36.6	−1.5	−1.5

sum = −41.4 + 3.5 = −37.9

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

1852phae.proj..211E

Zone 3

		Mean	k	$Z_3 - Z_1$ Mean 1852.0	$Z_3 - Z_2$
11h 15m 50s.7	15m 54.6	11h 15m 54.65	−0.35	11h 15m 54.30	−.07
16.. 00.0	05.2	16.. 05.10	0.35	16.. 04.75	−.16
16.. 11.2	15.0	16.. 15.10	0.35	16.. 14.75	
16.. 40.7	44.8	16.. 44.75	0.35	16.. 44.40	−.06
17.. 33.0	37.1	17.. 37.05	0.35	17.. 36.70	−.11
18.. 9.9	13.9	18.. 13.90	0.35	18.. 13.55	−.11
19.. 4					
19.. 40.1	44.0	19.. 44.05	0.35	19.. 43.70	−.05
19.. 45.0	49.0	19.. 49.00	0.36	19.. 48.64	−.06
20.. 30.7	34.7	20.. 34.70	0.36	20.. 34.34	+.24
20.. 58.0	21.. 01.9	21.. 01.95	0.36	21.. 01.59	
22.. 05.0	lost ~~09.2~~	22.. 09.0	0.36	22.. 08.64	−.20
lost	09.2	22.. 09.2	0.36	22.. 08.84	.00
23.. 35.6	39.7	23.. 39.65	.37	23.. 39.28	−.06
23.. 51.0	55.0	23.. 55.00	.37	23.. 54.63	.00
24.. 02.1	06.1	24.. 06.10	.38	24.. 05.72	
24.. 52.4	56.4	24.. 56.40	.38	24.. 56.02	00
25.. 55.4	59.4	25.. 59.40	.38	25.. 59.02	
26 47.1	51.0	26.. 51.05	.38	26.. 50.67	
27.. 3.1	7.1	27.. 07.10	.38	27.. 06.72	−.06
27. lost	27.. 20.1	27.. 20.10	.38	27.. 19.72	+.12
27.. 26.9	30.9	27.. 30.90	.38	27.. 30.52	−.01
lost	27.. 35.3	27.. 35.30	.38	−0.10 27.. 34.92	
27. 54.4	58.0	27.. 58.50	.38	27.. 58.12	+.14
28.. 29.7	33.8	28.. 33.75	.39	28.. 33.36	+.04
28.. 38.4	42.6	28.. 42.50	.39	28.. 42.11	
29.. 18.8	22.8	29.. 22.80	.39	29.. 22.41	+.15
29.. 32.0	36.1	29.. 36.05	.39	29.. 35.66	
29.. 41.4	45.4	29.. 45.40	.39	29.. 45.00	+.14
30.. 5.3	9.1	30.. 9.20	.40	30.. 08.80	+.09
31.. 45.7	49.7	31.. 49.70	.40	31.. 49.30	−.01
32. 9.0	13.0	32.. 13.00	.40	32.. 12.60	
32 18.1	22.0	32.. 22.05	.40	32.. 21.65	−.01
32.. 50.6	54.6	32.. 54.60	.40	32.. 54.20	−.11
33.. 17.7	21.6	33.. 21.65	.41	11h 33.. 21.24	+.09

sum = −1.08 + 1.01 = −0.07

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

1852phae.proj.211E

Zone 3

		d	Mean Eq. 1852.0	$z_3 - z_2$	New Reduction
— 10	+ 00,,09,,81	— 2".4	δ + 00°.09'.08".6	+ 0.5	+0.5
— 11	1,,04	2.6	1,,01.4	— 3.5	— 3.4
— 12	9,,29	2.4	9,,26.6		
— 12	4,,38	2.5	4,,35.5	— 0.5	— 0.5
— 11	2,,49	2.5	2,,46.5	— 1.4	— 1.5
— 9	2,,46	2.5	2,,43.5	— 0.4	— 0.7
	Vacancy no stars visible				
x 9.10	10,,10	2.5	10,,07.5	+ 1.4	+1.5
— 10	8,,17	2.5	8,,14.5	— 1.6	— 1.2
— 11	1,,30	2.7	1,,27.3	— 1.5	— 1.5
— 12.13	4,,59	2.6	4,,56.4		
— 10	7,,05	2.6	7,,02.4	1st wire taken	— 1.5 — two stars in same th.
— 10	9,,58	2.5	9,,55.5	— .05 2d wire	— 0.5
	Break				no stars gr. than 16 mag
x 11	— −00,,35	2.7	− 00,,37.7	— .11	— 1.5
— 10	6,,00	2.6	5,,57.4	— 1.5	— 1.2
— 11	— −0,,02	2.7	−0,,04.7		
— 11.12	5,,46	2.6	5,,45.4		
— 13	5,,58	2.6	5,,55.4	— 0.5	— 1.5 AR sheet has two sets of marker stars
— 13	8,,21	2.5	8,,18.5		med 25,,51.2 55.4 57.0
— 12	8,,08	2.5	8,,05.5	— 1.4	— 1.5 med 59.4
— 10	1,,28	2.7	1,,25.3	— 2.4	-2.7 1st wire lost +1.8
— 10	8,,59	2.5	8,,56.5	+ 1.6	
— 10	2,,46	2.7	2,,43.3		1st wire lost
— 13	8,,11	2.6	8,,08.4	— 8.5	— 2.5
	Many dots				
— 9	7,,40	2.6	+ 0,,07,,37.4	— 1.5	— 1.7
x 11	— 00 27	2.8	−0,,00,,29,,8		
x 8	— 00,,28	2.8	−0,,00,,29.8	+ 0.5	— 0.6
— 11	+ 1,,01	2.8	+ 0,,00,,58.2		
11	10,,30	2.5	,,10,,27.5		
+ — 10	8,,18	2.5	8,,15.5	−0.4 no sig.	— 0.5 2d mark too 1st wire
	No stars gr. than 16 mag				
— 9.10	0,,11	2.8	00,,08.2	— 2.5	— 2.6
x 11	10,,02	2.5	9,,59.5		
— 11	3,,57	2.7	3,,54.3	+ 0.6	+0.1
— 9.10	5,,49	2.6	5,,46.4	+ 0.4	+ 0.5
— 6.7	8,,49	2.5	8,,46.5	+ 2.6	+ 2.5

sum = −22.8 + 7.6 = −15.2

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

1852phae.proj...211E

Zone 3d

		Mean	t	Mean 1852.0	$Z_3 - Z_2$
11.. 34.. 32.0	34.. 36.0	11.. 34..36.00	−s.47	11,,34..35.59	+.04
35.. 29.0	33.0	35,, 33.00	.42	35,,32.58	−.11
35.. 47.9	52.0	35.. 51.95	.42	35,,51.53	+.19
36.. 15.1	19.0	36,, 19.05	.42	36,,18.63	−.01
37.. 22.7	26.5				
37. 35.4	39.3	37,,26.60	.42	37,,26.18	−.06
37.. 56.0	38.. 00.0	37,, 39.35	.42	37,,38.93	−.06
38.. 8.4	12.4	38.. 00.00	.42	37,,59.58	−.01
38.. 25.0	28.9	38,, 12.40	.42	38,,11.98	−.09
38.. 52.8	56.7	38.. 28.95	.42	38,,28.53	+.05
39.. 35.4	39.4	38. 56.75	.43	38,,56.32	
39.. 57.6	40.. 1.6	39.. 39.40	.43	39,,38.97	+.04
40.. 14.7	18.7	40,, 01.60	.43	40,,01.17	+.09
		11.. 40,,18.70	.43	40,,18.27	−.01
43.. 09.4	13.5	43.. 13.45	.43	43,,13.02	+.05
24.4	28.4	43,, 28.40	.43	43,,27.97	+.05
34.1	38.1	43.. 38.10	.43	43,,37.67	−.10
43.. 53.1	43.. 57.2	43.. 57.15	.43	43,,56.72	.00
45. 25.0	29.0	45.. 29.00	.43	45,,28.56	−.06
47.. 22.1	26.1	47.. 26.10	.44	47,,25.66	+.04
47.. 57.0	48.. 01.0	48. 01.00	.44	48,,00.56	
48.. 28.1 +0.s2	32.2	48.. 32.25	.44	48,,31.81	+.15
48 59.4	49.. 03.2	49.. 3.30	.45	49,,02.85	−.06
49.. 52.1	49.. 56.0	49.. 56.00	.45	49,,55.55	+.05
50.. 45.0	49.0	50.. 49.00	.45	50,,48.55	+.05
51.. 00.4	4.4	51.. 04.40	.45	51,,03.95	
51.. 49.4	53.4	51.. 53.40	.45	51,,52.95	+.15
51.. 51.7	55.5	51.. 55.60	.45	51,,55.15	
52.. 46.4	50.4	52.. 50.40	.45	52,,49.95	+.10
53.. 17.9	21.8	53.. 21.85	.46	53,,21.39	
53.. 54.4	58.4	53.. 58.40	46	53,,57.94	
11 .. 54.. 11.2	15.1	54. 15.15	−0.46	11,,54,,14.69	

sum = +10.5 − 5.1 = +5.4

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

1852phae.proj..211E

Zone 3

	Breast double		d	Mean Eq. 1852.0	$z_3 - z_2$	New Re
–	10	+ 00 00.39	– 2.8	+ 00 00 36.2	– 0.5	-0.4
+	12	6..38	2.6	6..35.4	+ 0.6	+0.5
–	9.10	8..53	2.5	6..50.5	+ 1.6	+1.5
–	10	5..22	2.6	5..19.4	– 1.4	-1.5
	12 Rust Std.	9..41	2.5	9..38.5		
–	9	0..09	2.8	0..06.2	– 3.5	-3.4
–	10	9..34	2.5	9..31.5	+ 3.6	+3.7
–	21	2..47	2.8	2..44.2	– 1.6	-1.5
–	11	1..03	2.8	1..00.2	– 0.5	-0.5
+	9	4..10	2.7	4..07.3	– 1.5	-1.4
+	13	4..08	2.7	4..05.3		
–	10	5..58	2.8	5..55.4		+1.5
–	11.12	2..22	2.7	2..19.3	– 5.3	-5.3 ??
–	9.10	4..16	2.7	4..13.3	– 1.4	-1.3
	Very Breast			no stars above 13 mag.		
–	10	10..10	2.6	10..07.4	+ 3.6	+3.7
–	10	8..56	2.6	8..53.4	+ 0.6	+0.4
–	11	6..23	2.7	6..20.3	+ 2.6	+2.6
–	11	9..03	2.6	9..00.4	+ 1.6	+1.4
–	10	3..31	2.8	3..28.2	9.5	-9.5 ??
–	9.10	4..23	2.8	4..20.2	+ 0.6	+0.5
–	12	8..22	2.7	8..19.3		
–	9	1..28	2.9	+0..01..25.1 (1st vis two comb by .2	5 -1.5	-1.4
–	11.12	0..02	2.9	– 0..00..00.9	+ 0.6	+0.6
–	11,12	3..26	2.7	+ 0..03..23.3	– 0.3	-0.2
–	10	5..46	2.7	5..43.3	+ 0.7	+0.7
–	10.11	1..37	2.9	1..34.1	– 1.4	-1.5
–	12	6..02	2.7	5..59.3	+ 0.7	+0.5
–	10	5..40	2.8	5..37.2		-1.5
	8,9	7..56	2.8	7..53.2	1.6 comp 13 mag dist 6"	+1.4
	10	5..32	2.8	5..29.2		-0.3
	11	8..41	2.7	8..38.3		
	10,11	6..18	2.8	+ 0..06..15.3		

Sum = +15.6 – 18.6 = –3.0

-6.0 14
-16.8 20
-37.2 30
-16.2 24
-3.0 21
109 | 74.2 | 0.73
763
290

mean $(z_3 - z_2)$ = –0.7

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

1852phae.proj...111E

April 17th 1852 Zone 3 –

α	dα	dt	dα+dt	p	k = p − dα − dt
10.00	+0.s436	−0.000	+0.436	+0.s385	= −0.s051
10.50	+0.663	−.017	+0.646	0.385	= −0.261
11.40	+0.845	−.034	+0.811	+.385	= −0.426

	dδ	dr	dδ+dr	q	d = q − dδ − dr (δ = 0°.00′)	d (δ = +0°.10′)
10.00	−6.″83	+0.″00	−6.83	−8.77	= −1.″94 − 0.05 + 0.30 =	−1.″69
10.50	−6.41	+0.07	−6.34	−8.77	= −2.43	= −2.28
11.40	−6.03	+0.15	−5.88	−8.77	= −2.89	= −2.64

change of ref for 10′ in δ = 0.″30
" " dδ 0.05

α−t	α−t	δ−s	δ−s	
−0.22	−0.34	$10^h.20^m$	−2.″3	
.08	.34	dδ+dr	−6.63	
.34	29	q	−8.93	
.25	.24			
.20	.36			
.03	40			
18	33			
18	43			
−0.14	−0.30			
$10^h.20^m$ −0.18	303			
dα+dt +0.520	−0.34	$11^h.27^m$		
p = +0.34	+.720 dα+dt			
	p = +0.430			
	34			
	p = 0.385			

Zone 3 April 17th 1852

α	k	d − 0°.0′	d + 0°.10′		
$10^h.00^m$	−0.s05	+1.″9	+7.″7	−3.6	
.10	.09	2.0	7.8	3.7	
20	.14	2.1	8.0	3.9	
30	.18	2.2	8.1	4.0	
40	.22	2.3	8.2	4.1	
10.50	−0.26	−2.4	−8.3	−4.2	
11.00	.30	2.9	8.3	4.3	
10	33	2.6	8.4	4.B	q = −8.77
20	36	2.7	8.5	4.4	
30	.40	2.8	8.5	4.4	
40	−0.43	−2.9	−8.6	4.5	
11.50	45	−2.9	−8.7	4.6	
12.00	−0.48	−3.0	−8.8	−4.7	

6	−2.4
8	−3.4
8	−3.4
2	−2.6
0	−2.7
8	−3.4
2	−0.7
3	−3.6
5	−1.5
9	23.7
	−2.6 $11^h.25^m$
	−6.02
	−8.62
	−8.93

In red ink are the values for value of Scale B
10 div = 9′.58″.10

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

1852phae.proj..211E

$z_2 - z_1 = a$ $\quad z_2 = \frac{1}{2}(z_1 + z_2) + \frac{1}{2}a$ $\quad z_3 - \frac{1}{2}(z_1 + z_2) = b - \frac{1}{2}a$

$z_3 - z_2 = b$

$\frac{1}{3}(z_1 + z_2 + z_3) - z_1 = a + \frac{1}{3}(b - a)$

$\Sigma\left[\frac{1}{3}(z_1 + z_2 + z_3) - z_1\right] = \frac{2}{3}\Sigma a + \Sigma b$, $\Sigma\left[\frac{1}{3}(z_1 + z_2 + z_3) - z_2\right] = \frac{1}{3}\Sigma(b - \frac{1}{3}\Sigma a$, $\Sigma\left[\frac{1}{3}(z_1 + z_2 + z_3) - z_3\right] = -\Sigma a - \frac{2}{3}\Sigma b$

Comparison of Results by Zones 1, 2 and 3

Zones 1 and 2 were observed with the scale A

Zone 3 " scale B

The determinations of the relative right ascensions & declinations by this process may then be tested by a comparison of the stars common to the three. As the results are absolutely independent of each other after being reduced to a common zero. The scales A & B were engraved on different days on different slips of mica.

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

1852phae.proj..211E

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

1852phae.proj.:211E

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

1852phae.proj...211E

1st wire of 1st star passed at 11h 36m 06s Dill. Time Zone 4 April 27th 1852.

1st star is a in Zone 3 reads 0.25 Jupe 9.25

		Mean	k	Mean Eq. 1852.0
10h 17m 33.3	37.6	17.37.45	+0.46	10.17.37.91
17.. 51.6	55.6	17.. 55.60	.46	17..56.06
18.. 26.7	30.6	18..30.60	.46	18..31.06
19.. 1.6	5.5	19.. 5.55	.45	19..06.00
20.. 19.9	23.8	20..23.90	.45	20..24.35
21.. 18.9	22.8	21..22.85	.45	21..23.30
21.. 28.5	32.4	21..32.45	.45	21..32.90
22.. 09.2	13.2	22..13.20	.44	22..13.64
22.. 38.1	42.1	22..42.10	.44	22..42.54
23.. 0.5	4.4	23.. 4.45	.44	23..04.89
23.. 42.4		23.46.40	.43	23 46.83
24.. 13.5	17.6	24..17.55	.43	24..17.98
24.. 49.2	53.3	24..53.25	.43	24..53.68
25. 14.5	18.6	25..18.55	.43	25..18.98
26.. 06.1		Ink failed		
36.. 19.9	23.9	36..23.90	.36	36..24.26
32.0	36.0	36..36.00	.36	36..36.36
59.0	37..03.0	37.03.00	.36	10..37.03.36

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

1852phae.proj.2116

Zone 4

10' to 20'

Previous to reduction add 9' to all the scale readings & copy the new columns

mag.	′ ″	° ′ ″	d	Mean Eq. 1852,0	
					The declinations are too small by 9' as the Zone lapsed over Zones 1, 2 & 3 by 1' & is North of it
12	0..00..26 +9′	0.. 9′.26	− 3.7	+0.. 09′..22.3	
9-10	4..07	13. 07	4.2	„13..02.9	
11-12	3..40	12. 40	4.2	12„35.9	
10	2..27	11 27	4.0	11..23.0	~~Dec was recorded 11..27~~
	B				No star larger than 15 may passing)
9.10	2..38	11„38	4.0	11„34.0	
11	1..57	10..57	3.9	10„53.1	
12-13	10..29	19„29	5.5	19„23.5	
11	1..33	10..33	3.9	10„29.1	
	B				
10	6„42	15..42	4.7	15..37.3	
10-11	0..31	9„31	3.9	9„27.1	
13	2..40	11..40	4.0	11„36.0	2nd wire bad
12	7..48	16„48	4.8	16„43.2	
10	9„56	18„56	5.5	18„50.5	
10	1„37	10„37	3.9	10„33.1	
	B				
11	9..03	18„03	5.3	17„57.7	
12	0..36	9„36	3.9	9„32.1	
11	x^m − 0..11	8..49	4.0	8„45.0	
11	2..23	11„23	4.1	11„18.9	1st wire 0.1 early
12	8„13	17„13	5.4	17„07.6	
10-11	5..20	14„20	4.7	14..15.3	long dash = cattle
9	9..33	18„33	5.5	18„27.6	
9	8„35	17„35	5.3	17„29.7	Clouds & stars
9	x^m 1..05	10„05	4.0	10„01.0	2nd wire bad
9	7..33	16„33	4.9	16„28.1	
	B cloudy				No stars passing
10	9„18	18„18	5.2	18„12.8	
9-10	10..23	19„23	5.6	19„17.5	
13	10..02	19„02	5.5	18„56.5	
13	1„30	10„30	4.0	10„26.0	
	long break				
12	6„17	15„17	4.8	15„12.2	
12	9„48	18„48	5.5	18„42.5	
9	3„16	12„16	4.3	+ 0..12„11.7	

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

1852phae.proj...111E

Zone 4

		Mean	k	Mean Eq. 1852.0	
10 37 38.2	42.2	37 42.20	+0.36	10 37 42.56	
38 58.3	39 02.5	39 02.40	.35	39 02.75	
39 05.5	" 9.6	39 09.55	.34	39 09.89	W 17 X 594
41 14.9	19.0	41 18.95	.34	41 19.29	
41 48.2	52.2	41 52.20	.34	41 52.54	Where is W 772-?
41 57.9	lost 58.9	42 01.90 41 57.80	.34	42 02.24 41 58.24	
10 43 8.2	12.0	43 12.10	.33	43 12.43	
			~~.33~~		
10 43 50.9	54.9	54.90	.33	43 55.23	
10 44 18.6	22.7	22.65	.32	44 22.97	
~~45 01.3~~	~~5.~~				
45 01.3	5.2	45 05.25	.32	45 05.57	
45 26.4	30.4	45 30.40	.32	45 30.72	
45 55.8	lost	45 59.80	.32	46 00 12	
46 33.0	36.9	46 36.95	.31	46 37.26	
46 47.6	51.5	46 51.55	.31	46 51.86	
47 9.8	13.7	47 13.75	.31	47 14.06	
47 38.5	42.7	47 42.60	.31	47 42.91	
48 56.4	49 00.3	48 00.35	.30	48 00.65	
49 24.7	lost	49 28.7	.30	49 29 00	
49 30.1	34.0	49 34.05	.29	49 34.34	
50 15.2	18.9	50 18.05	.29	50 18.34	
51 32.7		36.70	.29	51 36.99	
52 15.4	19.5	52 19.45	.28	52 19.73	
52 26.0	29.9	52 29.95	.28	52 30.23	
52 59.3	3 03.3	53 03.30	.28	53 03.58	
53 23.7	27.4	53 27.55	.28	53 27.83	
54 30.3	34.3	54 34.30	.27	54 34.57	
54 51.8	55.8	54 55.80	.27	54 56.07	
55 16.8	20.9	55 20.85	.26	55 21.11	
55 38.0	42.1	55 42.05	.26	55 42.31	
56 28.1	32.0	56 32.05	.26	56 32.31	
57 6.0	10.1	57 10.05	.25	57 10.30	
24.4	57 28.3	57 28.35	.25	57 28.60	
58 02.7	58 06.7	58 06.70	.25	58 06.95	

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

1852phae.proj.:211E

Zone 4

			d		
May					
13	5..51	14..51	−4.8	+00..14'46.2	No stas greater than 15 mm
11	1..26	10..26	4.8	10..22.9	
+ 9	8..56	17..56	5.4	17..50.6	1st wire uncertain three or four other small stars ac.
10	2..16	11..16	4.2	11..11.8	
B					
11	9..50	16..50	5.4	18..44.6	
13	1..44 ?	10..44	4.1	10..39.9	δ may be 2..44
11	9..19	18..19	5.4	18..13.6	
Interrupt					
8	9..04	18..04	5.4	17..58.6	10 mag free
10	3..40	12..40	4.3	12..35.7	
double Break					
10.11	3..35	12..35	4.3	12..30.7	
12	3..36	12..36	4.3	12..31.7	
12	1..37	10..37	4.1	10..32.9	2nd wire lost
B					
9	6..12	15..12	4.9	15..07.1	
10-11	0..16	9..16	4.1	9..11.9	
9	2..52	11..52	4.3	11..47.7	
12	1..57	10..57	4.3	10..52.7	
12	5..00	14..00	4.7	13..55.3	
10	3..37	12..37	4.5	12..32.5	2nd wire lost
9-10	4..31	13..31	4.6	13..26.5	
12-13	6..06	15..06	5.0	15..01.0	
13	9..40	18..40	5.5	18..34.5	but one wire recorded
12	2..02	11..02	4.3	10..57.7	
10	0..57	9..57	4.2	9..52.8	
B.					
12	5..53	14..53	5.0	14..48.0	
9	8..36	17..36	5.4	17..30.6	
13	5..51	14..51	5.0	14..46.0	
10	10..41	19..41	5.7	19..35.3	
12	10..08	19..08	5.7	19..02.3	Another some may s.p.
12	0..47	9..47	4.2	9..42.8	2nd wire bad
9	7..50	16..50	5.1	16..44.9	dubble comp 12m s.f. d 12'
10..11	9..30	18..30	5.5	18..24.5	
12	9..52	18..52	5.6	18..46.4	
9.10	3..12	12..12	4.5	12..07.6	Daraya ? is this not a planet? being without small companions
3 B					

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

1852phae.proj...211E

Zone 4

		Mean	k	Mean Eq. 1852.0
10 58 50.2	54.2	58 54.20	+0.25	10 58 54.45
59 10.5	last	59 14.50	.25	59 14.75
59 38.2	42.1	59 42.15	.24	59 42.39
11 0 6.4	10.5	11 00 10.45	.24	00 10.69
14.1	18.2	18.15	.24	0 18.39
43.9	47.9	47.90	.24	0 48.14
56.7	0.7	00.80	.24	1 00.94
11 01 19.0	11 01 23.1	23.05	.24	1 23.29
11 01 58.1	02 02.2	1 02.15	.23	1 02.38
~~28.4~~ 02.19.4	2 ~~32.4~~	2 23.40	.23	2 23.63
~~45.0~~ 23.4	2 ~~47.4~~ 2 27.4	2 27.40	.23	2 27.63
~~55.1~~ 45.0	2 ~~57.4~~ 49.1	2 49.05	.23	2 49.28
~~57.0~~ 55.1	3 ~~00.9~~ 3 59.4	3 59.25	.22	3 59.47
17.0	4 20.9	4 20.95	.22	4 21.27
4 40.1	4 44.1	4 44.10	.22	4 44.31
6 13.7	6 17.7	6 17.70	.21	6 17.91
6 24.3	28.3	6 28.30	.21	6 28.51
7 6.0	7 9.8	7 09.90	.21	7 10.11
7 22.0	7 26.0	7 26.00	.21	7 26.21
7 29.6	7 33.6	7 33.60	.20	7 33.80
8 5.1	8 9.2	8 09.15	.20	8 09.35
8 31.0	8 35.0	8 35.00	.20	8 35.20
8 38.2	8 42.5	8 42.35	.20	8 42.55
9 4.3	9 8.3	9 08.30	.19	9 08.49
9 27.0	9 31.0	9 31.00	.19	9 31.19
9 37.2	9 41.1	9 41.15	.19	9 41.34
10 15.2	10 19.2	10 19.20	.19	10 19.39
10 33.7	10 37.7	10 37.80	.19	10 37.89
11 14.5	11 18.5	11 18.50	.19	11 18.69
11 22.7	11 26.6	11 26.65	.19	11 26.84
11 52.0	11 56.0	11 56.00	.19	11 56.19
12 12.0	12 15.9	12 15.95	.18	12 16.13
12 29.2	12 33.1	12 33.15	.18	12 33.33

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

1852phae.proj.211E

Zone 4

			d	Mean Eq. 1852.0	
10	6..43	15..43	− 5.1	+ 0..15..37.9	
13	9..43	18..43	5.7	18.37.3	2nd wire lost
10	4..50	13..50	4.8	13..45.2	
9	3..00	12..00	4.6	11..55.4	fol. by * 12 mag
11	0..03	9..03	4.2	8..58.8	
10	9..32	18..32	5.6	18..26.4	
6.7	5..17	14.. 17	4.9	14..12.1	
12	− 0..30	8.. 30	4.1	8..25.5	several lost
B					
11.12	3..31	12..31	4.6	12..26.4	
11	3..08	12..08	4.6	12..03.4	2nd wire lost
9	3..32	12..32	4.6	12..27.4	
ruffle					
12	0..20	9..20	4.2	9..15.8	
12	0..42	9..42	4.2	9..37.8	
13	1..11	10..11	4.3	10..06.7	
B					
12	7..06	16..06	5.2	16..00.8	lary space without stars
11	4..19	13..19	4.8	13..14.2	
10	9..04	18..04	5.5	17..58.5	
12	2..10	11..10	4.5	11..05.5	
12	6..04	15..04	5.1	14..58.9	
12	8..00	17..00	5.4	16..54.6	several others lost
11	8..19	17..19	5.4	17..13.6	
9	6..38	15..38	5.1	15..32.9	
11	8..27	17..27	5.5	17..21.5	
B					
12	2..21	11..21	4.6	11..16.4	
12	4..37	13..37	4.9	13..32.1	
12	2..38	11..38	4.6	11..33.4	
9-10	2..08	11..08	4.6	11..03.4	
13	10..18	19.18	5.9	19..12.1	
11	1..20	10..20	4.4	10..15.6	
10	10..30	19..30	5.9	19..24.1	
double Great					
9	8..10	17..10	5.5	17..04.5	
11	5..56	14..56	5.2	14..50.8	
12	6..40	17..40	5.6	+ 0..17..34.4	

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

1852phae.proj...111E

Zone 41

		Mean	K	Mean Eq. 1852.0
				h m s
11 12 37.8	42.0	12 41.90	+0.18	11 12 42.08
13 25.5	29.6	13 29.50	.18	13 29.68
29.0	33.0	13 33.60	.18	13 33.18
lost	13 37.9	13 37.90	.17	13 38 07
14 22.7	14 26.6	14 26.65	.17	14 26.82
15 49.8	53.8	15 53.80	.16	15 53.96
16 11.9	16 15.9	16 15.90	.16	16 16.06
16 32.0	35.8	16 35.80	.16	16 36.06
16 52.6	56.5	16 56.55	.16	16 56.71
17 9.5	13.4	17 13.45	.16	17 13.61
17 32.2	36.1	17 36.15	.16	17 36.31
17 48.7	52.6	17 52.65	~~.15~~	17 52.80
lost	17 55.7	17 55.70	.15	17 55.85
18 39.8	43.6	18 43.80	.15	18 43.85
18 51.5	55.6	18 55.55	.15	18 55.70
19 18.4	22.6	19 22.50	.15	19 22.65
39.6	43.6	19 43.50	.14	19 43.64
~~46.~~				
11 20 39.3	43.1	20 43.20	.14	20 43.34
21 58.2		22 02.20	.14	22 02.34
22 4.8	8.6	22 08.70	.14	22 08.84
10.4	14.4	22 14.40	.13	22 14.53
2 — 23.1				See Zone 5
				$2_6 - 2_4$
23 32.4	36.5	23 36.45	.13	23 36.58 +.07
23 58.3	2.1	24 02.20	.13	24 02.33 +.04
24 37.1	41.1	24 41.10	.12	24 41.22 −.13
25	25 43.0	24 43.00	.12	24 43.12
25 31.1	35.0	25 35.05	.11	25 35.16 −.02
25 59.0	26 3.0	26 03.00	11	26 03.11
~~51.5~~	~~56.0~~			
26 51.5	56.0	26 55.75	.11	26 55.86 −.07
27 26.2	30.2	27 30.25	.11	27 30.36 −.08
27 37.8	41.9	27 41.85	.10	27 41.95 −.22
27 52.6	56.8	27 56.75	.10	27 56.85 −.24
29 25.9	29.8	29 29.85	.10	29 29.95 −.18
29 38.0	41.0	29 42.00	.09	11 29 42.09 −.12

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

1952phae.proj..211E

Zone 4

			d	Mean Eq. 1852.0	
	"	' "	"		
12	2..56	11..56	−4.7	+00..11..54.3	
11	9..02	18..02	5.6	17..56.4	2nd wire lost
8	2..04	11..04	4.5	10..59.5	
9 ?	− 0..33	8..27	4.3	8..22.7	last 1's wire
9	2..03	11..03	4.5	10..58.5	
10	0..10	9..10	4.4	9..05.6	
11	8..31	17..31	5.5	17..25.5	
	13				
11	5..36	14..36	5.2	14..30.8	
9	3..34	12..34	4.8	12..29.2	
12	4..20	13..20	4.9	13..15.1	
9.10	1..47	10..47	4.5	10..42.5	
11	3..34	12..34	4.7	12..29.3	no signal
11	4..26	13..26	4.9	13..21.1	1st wire lost
11	4..20	13..20	4.9	13..15.1	
9	9..41	18..41	5.6	18..35.4	
No 10 Dec?	1..11	10..11	4.4	10..06.6	
	N & S				
	Long Breath				
11	4..36	13..36	5.0	13..31.0	
11	5..43	14..43	5.2	14..37.8	2nd wire lost
11	9..59	18..59	5.9	18..53.1	no sig
10	5..22	14..22	5.2	14..16.8	no sig 1st wire
9	8..40	17..40	5.7	17..34.3	
	Breath double				
12	7..08	16..08	5.4	16..02.6	
9	2..32	11..32	4.7	11..27.3	
12	6..15	15..15	5.3	15..09.7	
12	0..30	9..30	4.5	9..25.5	1st wire lost
9.10	8..34	17..34	5.6	17..28.4	
10	2..58	11..58	4.8	11..53.2	
	Breath				
12	1..42	10..42	4.5	10..37.5	
9.10	− 0..02	8..58	4.4	8..53.6	
9	7..01	16..01	5.4	15..55.16	
11	5..53	14..53	5.3	14..47.7	
9-10	7..03	16..03	5.4	15..57.6	
8	5..28	14..28	5.2	+00..14..22.8	

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

1852phae.proj..211E

Zone 4

		Mean	k	Mean Eq. 1852.0
11h 29m 51.5	55.5	29m 55.50	+0.09	11h 29m 55.59
30 4.6	8.5	30 08.55	.09	30 08.64
30 35.4	39.4	30 39.40	.09	30 39.49
31 45.1	~~48.9~~ Lost ?	31 49.10	.09	31 49.19
50.0	54.0	31 54.00	.09	31 54.09
32 ~~28.3~~ 8.3	~~32.8~~ 12.3	32 12.30	.08	32 12.38
28.5 32	~~32.7~~ 32.6	32 32.55	.08	32 32.63
33 17.0	21.0	33 21.00	.08	33 21.08
51.3	55.3	55.30	.08	33 55.38
34 ~~38.5~~	22.5	34 22.50	.07	34 22.57
51.2	55.4	55.30	.07	34 55.37
35 47.2	51.0	35 51.10	.07	35 51.17
36 36.5	40.4	36 40.45	.06	36 40.51
48.1	52.9	36 52.00	.06	36 52.06
37 00.2	4.0	37 04.00	.06	37 04.06
37 23.0	27.0	37 27.00	.06	37 27.06
34.8	38.8	7 38.80	.06	7 38.86
38 21.0	25.1	38 25.05	.06	38 25.11
39 21.1	25.1	39 25.10	.05	39 25.15
55.6	59.6	39 59.60	.05	39 59.65
40 43.0	47.0	40 47.00	.05	40 47.05
42 01.4	5.6	42 05.45	.04	42 05.49
48.6	52.5	42 52.55	.04	42 52.59
55.1	59.1	42 59.10	.04	42 59.14
43 9.0	13.0	43 13.00	.04	43 13.04
23.8	27.9	43 27.85	.03	43 27.88
44.4	48.5	43 48.45	.03	43 48.48
52.6	56.8	43 56.70	.03	43 56.73
44 ~~18.8~~	22.9	44 22.85	.03	44 22.88
44 56.2	45 0.2	44 00.20	.02	44 00.22
45 13.2	17.2	45 17.20	.02	45 17.22
46 21.0	25.0	46 25.00	.02	46 25.02
11h 46 53.1	57.1	46 57.10	.02	11h 46 57.12

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

1852phae.proj.211E

Zone 4

Aug.		′	″	d	Mean Eqx. 1852.0	
8		7..25	16..25	−5.7	+0..16..19.6	
10		−0..40	8..20	4.4	8..15.6	8 uncertain
12.13		5..00	14..00	5.1	13..54.9	
12		10..38	19..38	6.0	19..32.0	2nd wire lost 3
9		2..42	11..42	4.7	11..37.3	~~2nd wire lost~~
11		1..03	10..03	4.5	9..58.5	
11		3..19	12..19	4.6	12..14.2	
long Break						
7		−0..10	8..50	4.4	8..45.6	
12		4..31	13..31	5.0	13..26.0	
12		7..46	16..46	5.5	16..40.5	
12		0..27	9..27	4.7	9..22.6	
10		−0..07	8..53	4.4	8..49.6	
	B					
12		0..41	9..41	4.5	9..36.5	
12		3..50	12..50	4.9	12..45.1	
9		5..57	14..57	5.3	14..51.7	
7		9..30	18..30	5.8	18..24.2	C buster
10.11		0..33	9..33	4.5	9..28.5	
13		7..01	16..01	5.5	15..55.5	
11		5..05	14..05	5.2	13..49.8	
10		8..61	17..11	5.7	17..05.3	
	B					
10		9..57	18..57	6.0	18..51.0	no signal
12		10..27	19..27	6.1	19..20.9	1st wire back
9..10		9..29	18..29	5.9	18..23.1	
12		5..17	14..17	5.2	14..11.8	no sig
11		1..09	10..09	4.6	10..04.4	
11		−0..02	8..58	4.5	8..53.5	
12		2..41	11..41	4.8	11..36.2	
11		0..02	9..02	4.5	8..57.5	
10		4..04	13..04	5.0	12..58.0	
	3 Observs					
9.10		6..21	15..21	5.4	15..15.6	
11		5..58	14..58	5.4	14..52.6	
~~13~~	B.					
9		8..40	17..40	5.8	17..34.2	
12		4..51	13..51	5.2	+0..13..45.8	

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

1852phae.proj...111E

Zone 4

		Mean	K	Mean Eq. 1852.0
11h 47m 22.4	26.4	47m 26.40	+0.02	11h 47m 26.42 W 814 ? x
56.4	48m 0.3	00.35	.02	48m 00.37
48m 52.5	56.5	48m 56.50	.01	48m 56.51
49m 55.6	19.6	49m 19.60	.01	49m 19.61
37.4	41.4	41.40	.01	49m 41.41
49m 52.4	56.4	49m 56.40	.01	49m 56.41
50m 57.7	1.7	50m 01.70	.00	50m 01.70
51m 25.1	29.2	51m 29.15	+0.00	51m 29.15
52m 18.6	22.3	52m 22.45	−0.01	52m 22.44
53m 53.8	57.8	57.80	− 01	53m 57.79
55m 4.0	8.0	55m 08.00	− .02	55m 07.98
56m 3.0	7.0	56m 07.00	.02	56m 06.98
56m 19.5	23.6	56m 23.45	.02	56m 23.43
56m 33.0	37.0	56m 37.00	.02	56m 36.98
56 38.6	42.5	56m 42.55	.02	56m 42.53
lost	58m 35.3	35.30	.03	58m 35.27
58m 42.0	58m 46.2	58m 46.10	.03	58m 46.07
		59m 25.00	.03	59m 24.97
59m 21.0	25.0	59m 36.90	.03	11h 59m 36.87
32.8	37.0			Santini 826
	12m 00m 22.1	00m 26.1	.04	00m 22.06

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

1852phae.proj.211E

Zone 4

		′ ″	d	Mean Equinox 1852.0	
8	7..07″	16..07	−5″.5	+ 0..16..01.5	
10	− 0..38	8..22	4.5	8..17.5	8 uncertain
10,11	7..59	16..59	5.8	16..53.2	
	Breath				
11	10..12	19..12	6.1	19..05.9	
9-10	5..04	14..04	5.3	13..58.7	
12	1..22	10..22	4.7	10..17.3	
	Break				
12	3..33	12..33	5.0	12..28.0	
12	7..10	16..10	5.5	16..04.5	
12	10..37	19..37	6.2	19..30.8	
9.10	− 0..18	8..42	4.5	8..37.5	
	Breath				dub
12	2..31	11..31	4.9	11..26.1	
11	0..58	9..58	4.7	9..53.3	
9.10	5..38	14..38	5.4	14..22.6	
12	1..01	10..01	4.7	9..56.3	
11	2..56	11..56	5.0	11..51.0	no adj.
	12? 9m 7.687	10..27	4.7	10..22.3	
12	0 27	9..27	4.7	9..22.3	1st w lost
12	3..52	12..52	5.1	12..46.9	
7	2..40	11..41	5.0	11..36.0	
10	0..5				
9-10	0..50	9..50	4.8	+ 0..09..45.2	1st lost

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

1852phae.proj...211E

April 27th 1852 Zone 4

11h 30 Sid Time 29.732-69 – Ext Ther 42.0
13h 27m Sid Time Bar 29.750-70 – Ext Ther 40.5
+ 0.018 – 1.5
dr_b + 0".04 dr_θ + 0.16
0.16
dr + 0.20

Note The 1st Star observed in this Zone is R 10h 17m 38.07s
Dec +0° 9' 26.1"

Stars common to Zone 4 & Z 1, 2 or 3

		Mean of Passage		
Zone 4	* α	10h 17m 37.45	0h 00m 26.0	Figures in red are corrections including new value of Scale B.
Hzd	1	37.95	9" 25.2 –1.5	
	2	38.22	24.6 –1.6	δ-s = –1m 00.7
	3	38.07	26.1 –1.9	dδ+dr – 6.4
	α	10h 17m 38.08	δ 0h 09m 25.3 –1.7 23.6	q = 1m 07.1
Z 4	obsd t	10h 17m 37.45	9 0h 10m 26.0 –0.1 25.9	
	α-t	+ 0.63	+ 0m 08.7	* = –1m 02.3
				– 6.4
				q = –1m 05.7
	β	10h 46m 51.96	+0m 9' 14.8	
		52.01	14.4	
		51.87	13.0	
		10h 46m 58.95	0m 9' 14.0	– 1m 02.0
	obsd	46 51.55	0 10 16.0	6.0
		+ 0.40	– 1m 20	1m 08.0
				9.1
	* γ	10h 52m 30.15	9' 54.0	
		.15	55.7	
		10h 52m 30.17	9' 54.8	–1m 02.2
	obsd	52 29.95	10 57.0	6.0
		+ 0.22	– 1m 22	1m 8.2
				9.9
	* δ	11h 00m 18.70	9' 00.7	
		18.76	01.2	1m 02.1
		00 18.73	9' 00.9	7.9
	obsd	18.15	10 03.0	q = 1m 08.0
		+ .58	– + 2.1	9.6

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

1852phae.proj.211E

							ds dr
g	11.01.23.05	8.30	W 694	10.39.09.94	+0° 17' 53.3		
	11.01.23.55	8.27.7		39 09.55	0.18.56.0	-1.7+0.2	
	23.46	8.27.2	a-b	+.39	-1.2.7		
	23.43	8.26.8	da+dt	+54	ds+dr -6.4		
	1.01 23.48	8.27.2	p	+0.93	g = -1.7.6		
	23.05	g 30.0					
	+0.43	-+2.8	W 241	16.14.26.80	0.10.58.4		
	+0.44	1.1.6		16.14.26.65	0.12.03.0	-0.4+0.1	
11.27	+0.37	1.5		+.15	1.4.6		
30	+.30	4.5		70	5.5		
32	+.30	3.5	p =	+0.85	1.10.1		
	+24	3.5					
37	+13	1.5	W	11.33.20.66	0.08.44.1		
	+03	1.6	+	11.33.21.00	09.50.0	0.0+00	
43	12	4.6		-.39	1.05.9		
44	02	1.6		+79	5.6		
48	+.12	2.7	p	+.40	1.11.5		
	14	3.7					
				11.47.26.25	0.15.58.8		
				11.47.26.40	17.07.0	-1.3+0.2	
a-t	+0.63	0.40	0.22	0.58	-.15	1.08.2	
da/dr	+~~61~~	58	57	64	+87	5.5	
p	~~1.04~~	0.98	0.79	1.22	+.72	1.12.6	
				W bo11	11.59.36.49	0.11.34.6	
11.24	0.40	11.36 -0.27	11.48 10	S. 825	11.59.36.97	0.11.36.4	
	75	81	87	chm a	11.59.36.73	δ 11.35.3	
p	+1.15	1.08	0.97		+11.59.36.90	D 12.40.0	-0.5+0.1
					-.17	-1.4.7	
	By Zones 1, 2 & 3	p = +1.03			+.92	5.4	
	By Bessel's Form	0.73			+.75	g = -1.9.7	Weight = 3
		0.88				9.7	
				g =	1.07.1 -1.7	7.6	
11.24	-1.03.0	1.02.8			8.0 -	10.1	
	-5.7	5.5			8.2 -	11.5	
g =	-1.08.7	g -1.08.3			8.0 -	12.6	
					8.7 -	12	
					8.3 -	g -1.10.2	
			By Zones 1, 2 & 3	g =	-1.08.0 -1.7	By Catalogue Stars.	
					-1.9.7		

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

1852phae.proj...111E

Reduction of Zones — $\delta = 0^\circ.10'$

H 229°.43'
a 150.00
H+a 19.43
sin 9.52811
cos 0.00000
+19.38 = h 1.28735
0.81546 = + 6.53

G 117.15
G+a 267.15
sin n 9.99950
sin d 7.46373
+1.79 = g 0.25285
7.71608 = − 0.01
g = −1.90
+4.62
154
da + 0.308

−6.42 = i
sin δ
i sin δ = −6.42
cos 9.97376
sin δ 7.46373
h 1.28735
8.72484 = +0.06

9.68104
g 0.25285
8.93389 = −0.09
dδ − 6.45

H 229.40
a 165.00
H+a 34.40
sin 9.75496
cos
h 1.28735
1.04231 = +11.02
G 117.12
282.12
9.99008
7.46373
0.25285
7.70666 = − 0.01
−1.90
+9.11
304
da + 0.607
+ 0.606 for δ = +0°.20

−6.42
9.91512
7.46373
1.28735
8.66620 = +0.05

9.32495
0.25285
9.57780 + 0.38
dδ −6.00 for δ = +0°.10'
−5.95 +0.20

0°.10'

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

1952phae.proj.:211E

229.38
180.00
49.38 ≈ 9.88145
0.00000
h 1.28735
1.16883 + 14.75

− 6.42
9.81195
7.46373
1.28735
8.56303 + 0.04

117.08
297.08 ≈ 9.94936
7.46373
0.25285
7.66594 − 0.01
− 1.90
12.84
4 28
+ 0.856

9.65902
0.25285
9.91187 + 0.82
− 5.56

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

1852phae.proj...211E

Zone 4

α	dα	dt	dα+dt	p	k
10..00	+ 0.308	0.000	+ 0.308	+ 0.880	+ 0.572
11..00	0.607	+ 0.033	0.640	.880	+ 0.240
12..00	+ 0.856	+ 0.065	+ 0.921	+ 0.880	− 0.041

	dδ	dr'	dδ+dr'	q	d = q − dδ − dr'	d for δ = 0°.10
10..00	− 6".45	+ 0.00	− 6".45	− 0..10".0 − 0..10".20	− 3".55	− 3.75
11..00	6.00	+ .10	5.90	10.0	− 4.10	4.35
12..00	− 5.56	+ .20	5.36	− 10.0 − 10.20	− 4.64	− 4.84

The correction q is increased by 0".2 for d for the reason that the argument for d is the declination ~~is the~~ or the scale reading diminished by 1'. 0".2 is the reduction for 1' to the true value of the scale.

Change of ~~dα~~ k for +10' in δ = + 0.001

" d " = − 0".05 + 0".30 − 1".40 = − 1".65

For Zone 4 −

α	k	d for δ + 0°.10'	d for δ = + 0°.20'		1".65
10..00	+ 0.57	− 3".7	− 5".4		
10	51	3.8	5.5	1	0.2
20	45	3.9	5.6	2	0.3
30	40	4.0	5.7	3	0.5
40	34	4.1	5.8	4	0.7
10..50	29	4.2	5.9	5	0.8
11..00	+ 0.24	− 4.3	− 6.0	6	1.0
10	19	4.4	6.0	7	1.2
20	14	4.5	6.1	8	1.3
30	.09	4.5	6.2	9	1.5
40	+ 0.05	4.6	6.3		
11..50	.00	4.7	6.4		
12..00	− 0.04	− 4.8	− 6.5		

Including corrections for value of Scale 13 = 9'.58".1

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

1952phae.proj..211B

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

1852phae.proj...211E

Zone 5 April 28th 1852

	mg.			d	Mean Eq. 1852.0	Telescope W. of Pier.
1	.13	0 28	0.09 28	−5.4	+00 09 22.6	25–24 +0.3 omitted
2	.10	4 08	13.08	5.9	13.02.1	−.8
3	.12	3 41	12.41	5.8	12.35.2	−.7
4	.10.11	2 38	11.28 11.38	5.6	11.22.4	−.6
5	.10	2 41	11.41	5.7	11.35.3	+1.3
6	.11	1 58	10.58	5.6	10.52.4	−.7
7 X	doubtful	4 10 30	19.30	6.9	19.23.1	+.4
8	.11	1 34	10.34	5.5	10.28.5	−.6
	Poreak					
9	.10.11	0 48	9.43	5.5	9.37.5	+.2
10	.11	0 32	9.32	5.5	9.26.5	−.6
X	03					
12 Sw	.14	2 40	11.40	5.7	11.34.3	−1.7
nSW	.14	4 49	16.45	6.4	16.42.6	+.6
13	.12	9 57	18.57	6.7	18.50.3	−.2
14	.11	1 36	10.38	5.6	10.32.4	−.7
15	.12	9 04	16.04	6.8	17.57.2	−.5
16	.12	0 26	9.26	5.5	9.20.5	
17	X 11	−0 9	8.57	5.4	8.45.6	+.6
18	.12	2 22	11.25	5.7	11.19.3	+.4
	X 8					
19	.13	8 15	17.15	6.6	17.08.4	+.6
20	.12	2 22	14.22	6.2	14.15.8	+.5
21	.10	9 34	18.34	6.8	18.27.2	−.3
22	.9	8 35 (2)	17.35	6.0	17.29.0	−.7
23	.10	1 08	10.08	5.6	10.02.4	+1.4
24	.9.10	4 33	16.33	6.5	16.26.5	−1.6
25	.12	3 58	12.58	6.0	12.52.0	
	BB					
26	.10	9 20	18.20	6.8	18.13.2	+.4
27	X 10	10.25	19.25	7.0	19.18.0	+.5
28	X 13	10.03	19.03	7.0	18.56.0	−.5
29	.13	1 32.5	10.31	5.7	10.25.3	−.7
	long streak					
30	.13	6 10	15.19	6.3	15.12.7	+.5
31	.13	4 56	18.50	6.9	18.43.1	+.6
32	.11	3 17	12.17	6.0	00.12.13.0	+1.3

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

1952phae.proj.:211E

Zone 5

$z_5 - z_4$ 10' to 20'

lost		Mean	k	Mean Eq. 1852.0
10.. 17. 52	56.0	17.. 56.00	+0.08	10.. 17.. 56.08 + 0.02
18.. 27.0	30.7	18.. 30.85	.08	18.. 30.93 − .13
19.. 2.0	5.9	19.. 05.95	.08	19.. 06.03 + .03
20.. 20.2	23.9	20.. 24.05	.07	20.. 24.12 − .23
21.. 19.2	23.1	21.. 23.15	.07	21.. 23.22 − .08
lost				
22.. 9.5	13.4	22.. 13.45	~~.05~~ .06	22.. 13.51 − 13
22.. 38.4	42.5	22.. 42.45 x	~~.05~~ .06	22.. 42.51 − 03
23.. 01.0	5.0	23.. 05.00	~~.05~~ .06	23.. 05.06 + .17
23.. 42.9	46.8	23.. 46.85	.06	23.. 46.90 + 07
24.. 13.9	18.0	24.. 17.95	.05	24.. 18.00 + .02
24.. 49.6	53.7	24.. 53.65	.06	24.. 53.71 + .03
25.. 15.0	19.0	25.. 19.00	.06	25.. 19.06 + .08
26.. 6.4	10.5	26.. 10.45	.04	26.. 10.49
26.. 55.2	59.2	26.. 59.20	.03	26.. 59.23
27.. 20.2	24.3	27.. 24.25	.03	27.. 24.28
27.. 54.0	58.0	27.. 58.00	.02	27.. 58.02
28.. 24.0	27.9	28.. 27.95	.02	28.. 27.97
29.. 15.6	19.7	29.. 19.65	.02	29.. 19.67
29.. 32.8	37.0	29.. 36.90	.02	29.. 36.92
29.. 41.4	45.4	29.. 45.40	.02	29.. 45.42
29.. 58.0	30. 1.9	30.. 01.95	.01	30.. 01.96
30.. 6.3	10.3	30.. 10.30	.01	30.. 10.31
30.. 15.6	19.5	30.. 19.55	+ .01	30.. 19.56
32.. 58.0	33.. 01.8	33.. 01.85	− .00	33.. 01.85
33.. 25.9	29.7	33.. 29.80	.01	33.. 29.79
34.. 10.6	14.8	34.. 14.70	.01	34.. 14.69
34.. 54.6	58.6	34.. 58.60	.01	34.. 58.59
36.. 20.1	24.2	36.. 24.15	.02	36.. 24.13 − 13
36.. 32.3	36.3	36.. 36.30	.02	36.. 36.28 − 08
36.. 59.3	37.. 03.1	37.. 03.20	.02	10.. 36.. 03.18 − .18
~~37.. 39.0~~	42.			

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

1852phae.proj...111E

Zone 5

			Mean	k	Mean Eq. 1852.0	$z_5 - z_4$	
				s	h m s		
34	10.. 37. 38.9	42.6	37.. 42.75	−0.02	10.. 37.. 42.73	+.17	
35	38.. 58.8	39.. 2.9	9.02.65	.03	39.. 02.82	+.07	
36	39.. 6.0	10.0	9.. 10.00 x	.04	39.. 09.96	+.07	
38	41.. 15.2	19.2	41.. 19.20	.04	41.. 19.16	−.13	
39	41.. 48.3	52.4	41.. 52.35	.04	41.. 52.31	−.23	
38	41.. 58.0	42.. 02.2	42.. 02.10	.05	42.02.05	∓ 19	
39	43.. 8.4	12.4	43.. 12.40	.06	43.. 12.34	−.09	
40	43.. 51.3	55.2	43.. 55.25	.06	43.. 55.19	−.04	
41	44.. 18.9	22.9	44.. 22.90	.06	44.. 22.84	−.13	
42	45.. 01.7	5.6	45.. 05.65	.07	45.. 05.58	+.01	
43	45.. 26.9	31.0	45.. 30.95	.07	45.. 30.88	+.16	
44	45.. 56.0	lost	46.. 00.00	.07	45.. 59.93	−.19	
45	46.. 33.2	37.0	46.. 37.10	.07	46.. 37.03	−.23	
46	47.9	52.0	46.. 51.95	.07	46.. 51.88	+.02	
47	47.. 10.0	14.0	47.. 14.00	.07	47.. 13.93	−.13	
48	47.. 39.0	43.1	47.. 43.05	.08	47.. 42.97	+.06	Dec wanting
49	48 56.6	49.. 0.6	49.. 00.60	.08	48.. 00.52	−.13	
50	49.. 25.3	lost	49.. 29.30	.08	49.. 29.22	+.22	
51	49.. 30.4	34.3	49.. 34.35	.08	49.. 34.27	−.07	
52	50 49.. 15.4	19.0	49.. 19.20	.09	50 49.. 19.11		R badly fixed
				(			
53	51.. 33.0	lost	51.. 37.00	.09	51.. 36.91	−.08	
54	52.. 15.9	19.7	52.. 19.80	.10	52.. 19.70	−.03	
55	26.1	30.2	2.. 30.15	.10	52.. 30.05	−.13	
56	52.. 59.6	53.. 3.7	3.. 03.65	.10	53.. 03.55	−.03	
57	53 23.9	28.0	3.. 27.95	.10	3.. 27.85	+.02	
56	54.. 30.6	34.4	54.. 34.50	.11	54.. 34.39	−.18	
57	54.. 52.0	56.0	54.. 56.00	.11	54.. 55.89	−.18	
60	56.. 28.4	32.3	56.. 32.35	.12	56.. 32.23	−.08	
61	57.. 06.2	10.7	57.. 10.45	.12	57.. 10.33	+.03	
62	57.. 24.6	28.6	57.. 28.60	.13	57.. 28.47	−.13	
63	58.. 3.0	7.0	58.. 07.00	.13	58.. 06.87	−.08	

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

1952phae.proj..211E

Zone 5

Mag	Decl		d	Mean Eq. 1852.0	$z_5 - z_4$	
.13	5' 53"	14h 59m	−6.4	+ 00h 14m 46.66	+ .2	1st wire lost
.11	1 27	10 27	5.7	10 21.3	− .6	
.9	8 55	17 58	6.8	17 51.2	+ .6	
BB						
.14	2 18	11 18	5.8	11 12.2	+ .4	
.12	9 52	18 52	7.1	18 44.9	+ .3	
.13	7 49	10 49	7.3	10 41.7	+1 .8	
.11.12	9 22	18 22	6.9	17 58.1	− .5	
.8	9 05	18 05	6.9	17 58.1		
.13	3 42	12 42	6.1	12 35.9	+ .2	variable! mighty small?
.11	3 36	12 36	6.1	12 29.9	− .8	
B						
.13	3 37	12 37	6.1	12 30.9	+ .2	
.14	1 39	10 39	5.8	10 33.2	+1.5	last wire lost
−10	6 16	15 16	6.4	15 09.6	+2.5	
.11	0 18	9 18	5.7	9 12.3	+ 4	
.9.10	2 54	11 54	6.0	11 48.0	+ .3	Bad seeing. tremulous
BBB						
.13	5 2	14 02	6.3	13 55.7	+ .4	
.11	3 35	12 37	6.0	12 31.0	−1.5	2nd wire lost
.10	4 32	13 32	6.1	13 25.9	− .6	
−13	0 06.5	15 06	bad 6.4 ~~6.9~~	14 59.6	− 1.4	very bad?
B						
.13	9 40.5	18 40	6.9	18 33.1	− 1.4	2nd wire lost
.11	2 06	11 06	5.9	11 00.1	+2.4	
−10	1 00	10 00	5.8	9 54.2	+ 1.4	
.12	5 46	14 56	6.5	14 49.5	+ 1.5	
.10	8 37	17 37	6.8	17 30.2	− .4	
B1						
B						
.13	5 55	14 55	6.45	14 48.6	+ 2.6	
.10	10 43	15 43	7.4	15 36.6	+ 0.3	last wire 0.1 early
—						
.9.10	7 42	16 52	6.8	16 45.2	+ .3	double comp. d 10"
.11	9 33	18 33	7.0	18 26.0	+ 1.5	
.12	9 53	18 59	7.0	18 46.0	−.04	
.9.10	3 15	12 15	−6.4	12 08.6	+ 1.1	reddish

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

1852phae.proj...111E

June 5

		Mean	k	Mean Eq. 1852.0	$Z_5 - Z_4$
64	10h 58m 50.6 54.5	58m 54.55	−0.13	10h 58m 54.42	− 03
65	10h 59m 38.5 42.5	59m 42.50	0.14	10h 59m 42.36	− 03
66	11h 0m 6.8 10.8	0m 10.80	0.14	11h 00m 10.66	− 03
67	0m 14.6 18.7	0m 18.65	0.14	0m 18.51	− 12
68	0m 44.X.2 47.9	0m 48.025	0.14	0m 47.86 91	− 23
69	0m 57.1 1m 01.1	0m 01.10	0.14	0h 00m 96	+ 02
70	1m 58.5 2m 2.4	2m 02.45	0.15	2m 02.30	− 08
71	2m 23.9 27.8	2m 27.85	.15	2m 27.70	+ 07
72	2m 45.6 49.5	2m 49.55	.15	2m 49.40	+ 12
73	3m 55.6 59.7	3m 59.65	.16	3m 59.49	+ 02
74	4m 40.5 44.4	4m 44.45	.16	4m 44.29	+ 02
75	6m 14.0 17.9	6m 17.95	.17	6m 17.78	− 13
76	6m 24.6 28.7	6m 28.65	.17	6m 28.48	− 03
77	7m 22.4 26.4	7m 26.40	.17	7m 26.23	+ 02
78	7m 29.9 33.9	7m 33.90	.18	7m 33.72	− 08
79	8m 4.0 5.4 9.3	8m 05	.18	8m 05 .17	− 18
80	8m 31.3 35.2	8m 35.25	.18	8m 35.07	− 13
81	8m 38.7 42.6	8m 42.65	.18	8m 42.47	− 05
82	Lost 9m 31.4	9m 31.40	.19	9m 31.21	+ 02
83	10m 15.4 19.5	10m 19.45	.19	10m 19.26	− 13
84	10m 34.0 37.9	10m 37.95	.19	10m 37.76	− 13
85	11m 14.9 19.0	11m 18.95	.19	11m 18.76	+ 7
86	11m 23.1 26.9	11m 27.00	.19	11m 26.81	− 3
87	11m 52.4 56.4	11m 56.40	.20	11m 56.20	+ 1
88	12m 12.2 16.2	12m 16.20	.20	12m 16.00	− 13
89	12m 29.3 33.3	12m 33.30	.20		
90	12m 29.2 33.2	12m 33.30	.20	12m 33.10	− 23
91	13m 23.1 27.0	13m 33.20	.21	13m 32.99	− 19
0		14m 27.05 x	.21	14m 26.84	+ 02
92	50.2 54.2				
93	15m 50.2 54.2	15m 54.20	.22	15m 53.98	+ 08
94	16m 12.0 15.9	16m 15.95 16.00 15.95	.22	16m 15.73	− 28
95	16m 52.9 56.9	16m 56.90	.22	16m 56.68	− 03
96	17m 32.6 36.4	17m 36.50	.22	17m 36.28	− 03
97	17m 48.9 53.0	17m 52.95	.22	17m 52.73	− 07

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

1852phae.proj.211E

Zone 5

			d	Mean Eq. 1852.0	$z_5 - z_4$
. 10,11	– 6′46″	15″.46	–″.7	+00″.15″.39.3	+ 1.4
-10	4 53	13″.53	6.5	13″.46.5	+ 1.3
. 9	3 02	12″.02	6.2	11″.55.8	+ 0.4
. 12	0 06	9″.06	5.8	9″.00.2	+ 1.4
. 10	4 35	16″.35	7.1	18″.27.9	+ 1.5
. 9	5 20	14″.20	6.5	14″.13.5	+ 1.4
	B				
. 13	3″.33	12″.33	6.2	12″.26.8	+ 0.4
. 10	3″.36	12″.36	6.2	12″.29.8	+ 2.4
. 12	0″.21	9″.21	5.9	9″.15.1	– 0.7
. 13	0″.46	9″.46	5.9	9″.40.1	+ 2.3
	d B				
. 13	7″.10	16″.10	6.8	16″.03.2	+ 2.4
. 12	4″.21	13″.21	6.3	13″.14.7	+ 0.5
. 10	9″.07	18″.07	7.1	17″.59.9	+ 1.4
. 12,13	6″.07	15″.07	7.6	14″.59.4	+ 0.5
. 11	8″.05	17″.05	6.9	16″.58.1	+ 3.5
. 12	8″.22	17″.22	6.9	17″.15.1	+ 1.5
. 9	6″.40	15″.40	6.7	15″.33.3	+ 0.4
	8″.09	17″.09	6.9	17″.02.1	?
	Brut				
. 12	4.39	13″.39	6.5	13″.32.5	+ 0.4
. 10	2″.10	11″.10	6.1	11″.03.19	+ .5
. 12	10″.20	19″.20	7.4	19″.12.6	+ .5
. 12	1″.23	10″.23	6.1	10″.16.9	+ 1.3
9.10	10″.32	19″.32	7.4	19″.24.6	+ .5
. 9	8″.12	17″.12	7.1	17″.04.9	+ .4
. 12	5″.59	14″.59	6.7	14″.52.3	+ 1.5
	~~5.59~~				
. 12	8″.40	17″.40	7.1	17″.32.9	– 1.5
9	2″.10	11″.10	6.2	11″.03.8	+ 4.3
9	2″.06	11″.06	6.2	10″.59.8	+ 1.3
	Rattle GB				
10	0″.13	9″.13	5.9	9″.07.1	+ 1.5
12	8″.35	17″.35	7.0	17″.26.0	+ 0.5
10	3″.36	12″.36	6.3	12″.29.7	+ 0.5
10	1″.49	10″.49	6.1	10″.42.9	+ 0.4
11	3″.36	12″.36	6.3	+00″.12″.29.7	+ 0.4

2nd com observed

Zone 6 = ∞

9 mag ✗ – bst

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

1852phae.proj...111

Zone 5 April 28th 1852 –

			Mean	k	Mean Eq. 1852.0	
98	18h 40.2	44.1	18h 44.15	−0.23	11h 18m 43.92	+.07
99	19h 18.9	22.9	19h 22.90	.23	19h 22m 67	+ 02
100	19h 39.9	43.9	19h 43.90	.24	19h 43.676	+ 02
101	20h 39.4	43.4	20h 43.40	.24	20h 43.16	− 18
102	21h 58.6	22h 2.6	22h 02.60	.24	22h 02.36	+ 07
103	22h 19.4	23.4	22h 23.40	.24	22h 23.16	− 07
104	23h 31.1	23h 35.0	23h 35.05	.245	23h 34.80	
105	23h 58m 4.5	24h 2.2	24h 02.30	.25	24h 02.05	−.23 −.28

Sid Time 11h 30m Bar 29.830 − 66 Ext Ther. 40.0

14. 30 29.844 − 65 " 39.2

last Barometer interpolated from Meteor. Record –

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

1852phae.proj..211E

			Mean	d	Mean Eq. 1852.0	$z_5 - z_4$
×	11,12	4,,22	0,,13,,22	− 6.4	+00,,13,,15.6	+ 0.5
	10	8,,12	17,,12	7.0	17,,05.0	
	10	1,,11	10,,11	6.0	10,,05.0	− 1.6
		B				
	11	4,,38	13,,38	6.4	13,,31.6	+ 0.6
	11	5,,46	14,,46	6.7	14,,39.3	+ 1.5
	10	8,,42	17,,42	7.0	17,,35.0	+ 0.7
		B				
	11	6,,18	15,,17	6.7.	15,,10.3	
	10	2,,34	11,,34	6.2	11,,27.8	touched the finder + 0.5

We discontinued the Zone apprehending a derangement of the place of the telescope from its being accidentally jarred.

32,,05.5
59.0
53 5

34,,26.5
1 27 5

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

1852phae.proj..211E

Reduction of Zone 5

Observed April 28, 1852

f	g	G	h	H	i	
−1.″78	+1.″77	115°.39	+19.″43	228°.42	−6.″34	δ = +0°.10′.00″

h m											
10.00	a =	150°.00′	a	150°.00	á = 160°.00	í	160°.00	ä	170°.00′	ä″	170°.00′
10.40	á	160°.00	H	228°.42	H 228°.42	G	115°.39	H	228°.42	G	115°.39
11.20	ä″	170°.00	H+a =	378°.42	H+á 388°.42	G+á	275°.39	H+ä	398°.42	G+ä	285°.39

sin. H+a g. 50598
sec. δ 0.00000
log. h 1.28847
0.79445 +6.″23

sin H+á g. ~~71111~~ .68144
sec. δ 0.00000
log. h 1.28847
0.96991 + ~~10.″78~~ +9.33

sin H+ä g. 79605
sec. δ 0.00000
log. h 1.28847
1.08452 +12.″15

cos. H+ä g. 89233
~~sin~~ δ 7.46373
log. h 1.28847
8.64453 +0.04

G 115°.39 sin G+a g. 99875
a 150 tang. δ 7.46373
G+a 265°.39 log. g 0.24797
7.71045 −0.00

sin G+á g. 99288
tang δ 7.46373
log. g 0.24797
7.70458 −0.00

sin. G+ä g. 98359
tang. δ 7.46373
log. g 0.24797
7.69529 −0.00

cos. G+a g. 43098
log. g 0.24797
9.67855 +0.477

f −1.78
da = 4.45
148
da = +0.297

f −1.78
da = +~~7.00~~
252
dá + ~~0.600~~
0.503

f −1.78
da +10.37
346
dä″ +.691

i cos δ = −6.34
dδ″ −6.78
−5.82

log. i 0.″80209
cos. δ 0.00000
0.″80209 −6.34

cos. H+a g. 97645
sin. δ 7.46373
h 1.28847
8.72865 +0.05

cos. H+á g. 92010
sin. δ 7.46373
log h 1.28847
8.67230 +0.05

~~8.99322~~

cos. G+a ~~8.87995~~
log. g 0.24797
9.12792 +0.13
dδ = − ~~6.42~~
6.42
−6.42

cos. G+á ~~9.26672~~
log. g 0.24792
~~9.51469~~ +0.33
~~9.24119~~ +0.17
i cos δ = −6.34
dδ = − ~~6.62~~
− ~~5.96~~
−6.12

k = p − da − dt

E.C. gains daily 5.34

h m			dt	da + dt	p	k	
10.00	da + 0.297	dδ − 6.12	dt + 0.000	da + dt + 0.297	+ 0.450	+ .147	+ 0.153
10.40	da + 0.503	dδ − ~~5.96~~ 6.12	dt + 0.010	+ .606	+ 0.493	+ .943	− 0.043
11.20	da + 0.682	dδ − 5.82	dt + .025		+ 0.666	+ 1.116	− 0.216

			da − dt	p	k
10.00	dδ − 6.42	dt + 0.00	+ 0.297	+ 0.450	+ .163
10.44	dδ − 6.12	dt + 0.65	+ 0.513	+ .450	− .063
11.20	dδ − 5.82	dt + 0.14	+ 0.716	+ .450	− .266

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

1852phae.proj.2118

No. 35		No. 91		No. 35	No. 91
	h m s			s	s
a	10 39 09.94	a	11 14 26.80	da + 0.503	da + 0.673
t	10 39 10.00	t	14 27.05	dt − 0.010	dt − 0.023
a−t	− 0.06	a−t	− .25	+ 0.493	+ 0.650
da+dt	+ 0.4951	da+dt	+ .6569		
	p = + 0.43.45		p = + .40.44		

z^4 z^5 : z^4 z^5

10 22 — 11 18 — .24

+.06 + .11

+.21 − .14

+.05 − .19

+.30 − .14

−.15 − .30

+.19 − .25

+.09 − .26

+.11 − .06

+.03 − .26

+ 03 − 1.89

107 + 11

15 10)178

10)92 − .178

+ .092 da+dt .663 70

da+dt .396 41 p + .485

p + .486 + 52

+ .50

.49 + 510 = p by Davies

.48 + .445 = p by Catalogue

.47 955

.46 p = 477

20

p = + .45 c p = + 0.477

No. 35

s ~~+00 17 53.00~~

D ~~00 17 55.00~~

No. 35 No

s ~~+00 17 58~~ s +00 17 53.0 s

ds − 1.7 s 17 58.0

~~00 17 56.3~~ s − s − 5.0

5' ~~00 17 56.7~~ ds+dr − 6.07

+ 1.10

q − 9.97

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

1852phae.proj...111E

Zone 6 April 29th 1852 –

No.			Mean	k	Mean Eq. 1852.0	$z_7 - z_6$	
1	11h 13m 29.4	33.3	13m 33.35	–.25	11h 13m 33.10	+0s.01	
2	~~38.4~~ lost?	38.4	13m 38.40	.25	13m 38.15	+ .06	
3	14m 23.0	27.0	14m 27.00	.26	14m 26m 74	–.04	
4	15m 50.3	54.3	15m 54.30	.26	15m 54.04	+ .11	
5	16m 12.0	16.0	16m 16.00	.27	16m 15m 73	+ .17	
6							
7							
8	1st Star in Zone 5 R.A. 11h 13m 33.20					2.10	
9							
10							
11							
12							
13							
14	Lost – 11h 20m 43.5		20m 43.50	–.29	20m 43.21	+.07	
			Mean				
15	11h 21m 58.6	22m 02.4	22m 02.50	–8.29	22m 02.21	+.17	$z_6 - z_4$
16	22m 19.4	23.4	22m 23.40	.30	22m 23.10	+.17	
17	23m 33.0	36.9	23m 36.95	.30	23m 36.65	+.02	– .23
18	23m 58.6	24m 2.6	24m 02.60	.31	24m 02.29	–.02	–.04
19							
19	24m 37.4	Lost.	24m 41.40	.31	24m 41.09	+.07	–.13
20	25m 31.4	35.5	25m 35.45	.31	25m 35.14	+.02	–.02
21	25m 59.2	26m 3.1	26m 03.15	.31	26m 02.84	~~+.27~~	
22	26 52.1	56.1	26m 56.10	.31	26m 55.79	+ .27	–.07
23	27m 26.6	30.6	27m 30.60	.32	27m 30.28	+.03	–.08
24	27 38.1	42.0	27m 42.05	32	27m 41.73	+.03.28	–.22
25	27m 52.9	56.9	27m 56.95	.32	27m 56.63	+.02	–.22
2	2						
26	29m 26.2	30.0	29m 30.10	.33	29m 29m 77	+.18	–.18
27	29m 38.3	42.3	29m 42.30	.33	29m 41.97	+.13	–.12
28	29m 52.0	55.8	29m 55.90	.33	29m 55.57	+.07	–.02
29	30 5.0	9.0	30m 09.00	.33	30m 08.67	–.03	+.03
30	31m 50.6	54.5	31m 54.55	.33	31m 54.22	+.02	+.13
31	32m 8.8	12.8	32m 12.80	.34	32m 12.46	+.08	+.08
32	32m 29.0	33.0	32m 33.00	.34	32m 32.66	+.07	+.03

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

1852phae.proj.211E

Zone 6 10' to 20'

1st Star in Zone 5 α 11h 13m 33 δ 2° 10'

Mean Eq. 1852.0 $z_7 - z_6$ $z_6 - z_4$

9-	2.07	11.07	− 7.8	+0.10m 59.2	0.0		
10	−0.30	8.30	7.4	8.22.6	+ .6		1st wire lost?
9	2.06	11.06x	−7.8	10.58.3	− .5		
10	0.16	9.16	7.5	9.08.5	−1.5		
11	8.33	17.33	8.8	17.24.2	+0.7		
B			8.7				
12	5.39	14.39	8.3	14.30.7	+ .6		
9.10	3.36	12.36	8.0	12.28.0	+ .6		
10	1.51	10.51	7.9	10.43.1	+ .8		
11	3.36	12.36	8.0	12.28.0	+1.6		
B							
13	4.22	13.22	8.4	13.13.6	+ 0.9		
9	8.11	17.11	8.7	17.02.8 3			
10	1.12	10.12	7.6	10.04.4	+ 0.6		
9.10	−0.40	8.20	7.5	8.12.5			no sig 8 dubia
11	4.39	13.39	8.7	13.30.9 9	+0.5		
B double							
11	5.47	14.47	8.3	14.38.7	−0.4		
10	8.53 43.2	17.53 43.2	8.8	17h 34.2	+1.1		10" added = 1 div.
12	7.10	16.10	8.7	16.01.3	−0.1	−1.3	
9	2.35	11.35	7.8	11.27.2	−0.4	−0.1	
B							
12	6.18	15.18	8.5	15.09.5	+0.9	−0.2	first wire lost
9.10	8.38	17.38	8.8	17.29.2	+0.8	+0.8	
10	3.01	12.01	8.0	11.53.0	+0.4	−0.2	
13	1.46	10.46	7.7	10.38.3	+0.7	+0.8	
9.10	0.01	9.01	7.6	8.53.4	+0.4	−0.2	
9	7.04	16.04	8.7	15.55.3	−0.2	−0.3	
11	5.57	14.57	8.4	14.48.6	−0.4	+0.9	
B							
10	7.06	16.06	8.7	15.57.3	−0.2	−0.3	
7	5.31	14.31	8.4	14.22.6	−0.4	−0.2	
8	7.27 +11.2	16.27	8.9	16.18.1	+1.1	−1.5	
9	−0.35	6.22	7.8	8.14.2	0.0	−1.4	Moon too bright to
9	2.46	11.46	8.1	11.37.9	−1.3	+0.6	allow stars smaller than 13
11	1.06	10.06	7.9	9.58.1	+0.7	−0.4	
11	3.21	12.21	8.1	+0.12.12.9	−0.4	−1.3	

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

1852phae.proj..111E

Zone 6

			Mean	k	Mean Eq, 1852.0 $z_7 - z_6$		$z_6 - z_4$
33	11.. 33.. 17.83	21.2	33..21.225	−0.34	11.. 33..20.91	+0.22	−.17
34		33.. 20.0	33..20.00	.34	33..19.66		
	~~34.. 18.7~~ add 0.2	~~22.~~		.75	.40		
35	34.. 18.9	22.6	34..22.55	.35	34..22.25	+27	−.17
36	35.. 47.5	51.6	35..51.55	.36	35..51.19	+08	+.02
37	36.. 36.8	40.8	36..40.80	.36	36..40.44	+13	−.07
38	36.. 48.2	52.2	36..52.20	.36	36..51.84	+18	−.22
39	37.. 00.4	4.3	37..04.35	.36	37..03.99	+02	−.07
40	37.. 23.2	27.1	37..27.15	.36	37..26.79	+22	−.27
41	37.. 35.1	39.1	37..39.10	.38	37..38.73	+28	−.13
42	38.. 21.7		38..25.70	.37	38..25.33	−13	+.22
43	39..21.4	39..25.4	39..25.40	.37	39..25.03		−.12
44	39..56.0	39..59.9	39..59.95	.38	39..59.57	+13	−.08
45	40..43.5	40..47.3	40..47.40	.38	40..47.02	+08	−.03
46	42..48.9	42..52.7	42..52.80	.39	42..52.41	−07	−.18
47	42..55.4	42..59.4	42..59.40	.39	42..59.01		−.13
48	43 09.1	43..13.1	43..13.10	.39	43..12.71	+28	−.33
49	43..44.8	43..48.7	43..48.75	.39	43..48.36	+07	−12
50	44..19.0	44..23.1	44..23.05	.40	44..22.65	−07	−29
51	44..56.5	45..00.6	45..00.55	.40	45..00.15	+03	−07
52	45..13.6	45..17.8	45..17.90	40	45..17.30	−03	+8
53	46..21.9	46..25.4	46..25.40	.40	46..25.00	+02	−2
54	46..53.4	46..57.5	46..57.45	.40	46..57.05	+12	−7
55	47..22.8	47..26.6	47..26.70	.40	47..26.30	+07	−12
56	47..57.5	~~47..57.5~~	48..01.50	.40	48..01.10		~~27~~
57	48..53.0	48..56.9	48..56.95	.41	48..56.54	−08	+3
58	49..15.9	49..19.9	49..19.90	.41	49..19.49	+27	−12
59	49..38.0	49..42.0	49..42.00	.42	49..41.58	−08	+17
60	49..53.0	49..56.8	49..56.90	.42	49..56.48	−.03	+7
61	50..58.1	51..02.0	51..02.05	.42	51..01.63	+12	−7
62	51..25.8	51..29.7	51..29.75	.42	51..29.33	−13	+18
63	52..18.8	52..22.7	52..22.85	.42	52..22.33	+16	−11
64	53..54.2	53..58.3	53..58.25	.43	11.. 53..57.82	+12	+3

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

1852phae.proj.2111E

Zone 6

		′ ″	d	Mean Eq. 1852.0	$z_7 - z_6$	$z_6 - z_4$
7	−0.08	8.52 x	−7.8	+00 08 44.782	+0.9	−1.4
13	4.34	13.34	8.83	13 25.7	−1.3	−0.3 2 wire lost
	B double					
12	7.48	16.48	9.0	16 39.0	+0.1	−1.5 2nd wire 0.2 early
9.10	−0.04	8.56	7.8	8 48.2	+0.9	−0.4
12	0.45	9.45	7.9	9 37.1	+0.8	+0.6
12	3.52	12.52	8.3	12 46.7	−0.2	+1.6
9	5.58	14.58	8.7	14 49.3	+1.0	−2.4
7	9.32	18.32	9.2	18 22.8	+3.8	−1.4
11	0.36	9.36	7.8	9 28.2	+1.8	−0.3 +1.6
14	7.06	16.06	8.9	15 57.1		K reject 2nd wire lost +1.6
	B	~~5.08~~				
12	5.08	14.08	8.6	13 59.4	−0.2	−0.4
10.11	8.15	17.15	8.1	17 06.9	−1.1	+1.3
10	10.00	19.00	9.5	18 50.5	−1.1	−0.5
9	9.33	18.33	9.3	18 23.7	+0.9	+0.6
12	5.20	14.20	8.7	14 11.3		−0.5
12	1.10	10.10	8.0	10 02.0	+1.8	
	B					
12	2.45	11.45	8.2	11 36.8	+1.7	+0.6 1 sig.
10	4.07	13.07	8.5	12 58.5	+0.8	+0.5
9.10	6.24	15.24	8.8	15 13.2	+0.9	−0.4
12	6.01	15.01	8.9	14 52.1	0.1	−0.5
	B double					
9	8.44	17.44	9.1	17 34.9	+0.8	+0.7
11	4.55	13.55	8.7	13 46.3	−0.2	+0.5
7.8	7.10	16.10	9.0	16 01.0	0.0	−0.5
11	0.34	9.34	7.9	9 26.1	+1.7	2nd wire lost
10.11	8.02	17.02	9.2	16 52.8	0.0	−0.4
13	10.17	19.17	9.5	19 07.5	+0.9	+1.6
10	5.07	14.07	8.8	13 58.2	+0.9	−0.5
12	1.26	10.26	8.1	10 17.9	−0.2	+0.6
11	3.36	12.36	8.4	12 27.6	−0.3	−0.4
~~13~~	B					
	7.13	16.13	9.1	16 03.9	0.0	−0.6
12	10.40	19.40	9.6	19 30.4	−1.1	−0.4
10	−0.14	~~8.46~~	8.9	~~8 38.1~~	−0.2	+0.6
	B double					

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

1852phae.proj..X11E

Zone 6

			Mean	k	Mean Eqn 1852.0	$z_7 - z_6$	$z_6 - z_4$
65	11h 55m 04.3	55m 08.2	55m 08.25s	−0.44	11h 55m 07.81	+0.02	−17
66	56m 03.4	56m 07.4	6m 07.44s	.44	56m 07.00	−.07	+2
67	56.20.0	56m 23.9	56m 23.95s	44	56m 23.51	+.07	+8
68	56m 33.1	56m 37.2	56m 37.15s	.44	56m 36.71	+22	−27
69	58m 31.7	58m 35.6	58m 35.65s	45s	58m 35.20	+02	−7
70	58m 42.4	58m 46.7	58m 46.55s	.45s	58m 46.10	+22	+3
71	59m 07.5s	59m 11.2	59m 11.35s	.46	59m 10.89	+12	−8
72	59 21.2	59 25.4	59m 25.30	.46	59m 24.84	+12	
73	59m 33.4	59m 37.3	59m 37.35s	.46	11h 59m 36.89	+02	+3
74	12m 00 18.6	00m 22.5s	00m 22.55s	.46	12h 00m 22.09	−03	+3
75	38.8	00m 42.8	00m 42.80	46	42.34	+02	
76	12m 02m 16.2	2m 20.4	2m 20.30	.46	2m 19.84	+08	
77	2m 48.5	2m 52.6	2m 52.55s	.47	2m 52.08	+02	
78	3m 18.0	3m 21.8	3m 21.90	.47	3m 21.43		
79	3m 29.0	3m 33.0	3m 33.00	.47	3m 32.53		
80	6m 00.4	6m 04.6	6m 04.50	.48	6m 04.02	+12	
81	6m 14.9	6m 18.6	6m 18.75s	.48	6m 18.27	−13	
82	6m 36.9	6m 40.8	6m 40.85s	.48	6m 40.37	−03	
83	7m 21.8.7	7m 26.0 25.6	7m 25.65	.48	7m 25.42.17	−08	
X 84	7m 25.6	7m 29.1	7m 29.35s	.48	7m 28.87	+17	
85	7m 50.5s	7m 54.6	7m 54.55s	.49	7m 54.06	+07	
86	8m 17.0	8m 21.0	8m 21.00	.49	8m 20.51	−8	
87	9m 01.4	9m 05.5s	9m 05.45s	.49	9m 04.96	+.01	
88	9m 33.7	9m 37.9	9m 37.80	.50	9m 37.30	−8	
	~~11h 35.0~~	~~8~~					
89	11h 35.0	11h 39.0	11h 39.00	.50	11h 38.50	+12	
90	11h 44.3	11h 48.3	11h 48.30	.50	11h 47.80		
91	12h 16.7	12m 20.7	12m 20.70	.50	12m 20.20	−10	
				~~.50~~			
92	13m 38.0	13m 42.0	13m 42.00	.51	13m 41.49	−08	
93	14m 14.2	14m 18.3	14m 18.25	.51	14m 17.74		
94	14m 19.2	14m 23.1	14m 23.15s	.51	14m 22.64	+22	
95	15m 05.1	15m 09.1	15m 09.10	.52	12h 15m 08.58	+28	
96	12 ~~15m 55.5~~	~~16m 03.4~~					

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

1852phae.proj.:211E

Zone 6

			d		$z_7 - z_6$	$z_6 - z_4$
12	2,,34	11,,34	− 8.3	+00°11′25″.7	−0″.3	−0.4
12	0,,56	9,,59	8.1	9,,50.9	+0.8	−2.1
9	5,,32	14,,32	8.8	14,,23.2	−0.2	+0.6
12	1,,03	10,,03	8.1	9,,54.9	−0.2	−1.4
	B					
11	1,,31	10,,31	8.2	10,,22.8	−1.1	
11	− 0,,27	8,,33	7.9	8,,25.1	+0.8	
12	9,,56	18,,56	9.6	18,,46.4	−1.4	
12	3,,57	12,,57	8.6	12,,48.4	−1.2	+1.5
7	2,,44	11,,44 x	8.3	11,,35.7	−0.3	−0.3
10	0,,54	9,,54	8.2	9,,45.8	−0.1	+0.6
10	3,,39	12,,37	8.5	12,,28.65	−0.2	
	B					
11	3,,18	12,,18	8.5	12,,09.5	−0.2	
10.11	3,,47	12,,47	8.5	12,,38.5	?	
12	− 0,,09	8,,51	8.1	8,,42.9		
12	5,,12	14,,12	8.9	14,,03.1		
12	9,,09	18,,09	9.5	17,,59.5	0.0	
7.8	2,,07	11,,07	8.4	10,,58.6	+0.9	1st half night
12	8,,19	17,,19	9.3	17,,09.7	0.0	
9	0,,11	9,,41	8.2	9,,32.8	+1.9	
10	6,,22	15,,22	9.0	15,,13.0	+1.1	no sig.
11	7,,29	16,,29	9.2	16,,19.8	+1.1	
12	0,,40	9,,40	8.2	9,,31.8	+1.8	
11	6,,40	15,,40	9.0	15,,31.0	±0.0	
11	9,,39	18,,39	9.6	18,,29.4	+1.0	
	B double					
9	4,,35	13,,35 *	8.8	13,,26.2	−0.1	
12	− 0,,15	8,,45	8.1	8,,36.9		
3	0,,25	9,,25 *	8.2	9,,16.8	+2.9	
	B ruttle					
9.10	1,,23	10,,23	8.3	10,,14.7	−0.1	
11	10,,17	19,,17	9.8	19,,07.2		
10	4,,38	13,,38	8.8	13,,29.2	−0.1	no sig.
11	7,,24	16,,24	− 9.3	+00,,16,,14.7	+0.1	

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

1852phae.proj..211E

Zone 6

$Z_7 - Z_6$

			Mean	k	Mean Eq. 1852.0	
97	12h 15m 59.5	16m 03.4	16m 03.45	−0.52	12h 16m 02.93	+17
98	16 43.9	16 47.9	16 47.90	.52	16 47.38	+02
99	17 17.9	17 21.4	17 21.65	.52	17 21.13	+17
100	17 54.9	17 58.8	17 58.85	.52	17 58.33	+7
101	18 44.3	18 48.3	18 48.30	.53	18 47.787	+3
102	19 24.0	19 28.0	19 28.00	.53	19 27.47	+2
103	20 28.8	20 32.8	20 32.80	.53	20 32.27	−13
104	21 01.0	21 05.0	21 05.00	.53	21 04.47	+2
105	22 4.4	22 08.4	22 08.40	.53	22 07.87	+1
106	23 17.6	23 21.7	23 21.65	.53	23 21.12	+11
107	24 55.4		24 55.40	.54	24 54.86	
108	25 40.4	25 44.4	25 44.40	.54	25 43.86	+1
109	26 00.6	26 04.5	26 04.55	54	26 04.01	−09
110	27 02.4	27 06.6	27 06.50	.54	27 05.96	−4
111	27 39.5	27 43.3	27 43.40	.55	27 42.85	−3
112	28 42.X.2	46.1	28 46.185	.55	28 45.35.60	+21
113	28 58.9	29 02.8 X 7	29 02.80	.55	29 28 02.30.25	−19
114	29 16.5	29 20.8	29 20.65	.56	29 20.09	−X 13
115	29 47.7	29 51.6	29 51.65	.56	29 51.09	−04
116	30 28.0	31 [illegible]	30 32.00	.56	30 31.44	
117	31 07.7	31 11.5	31 11.60	.56	31 11.04	+11
118	31 33.8	31 37.5	31 37.80	.56	31 37.24	−14
119	31 54.6	31 58.6	31 58.60	.56	31 58.04	+01
120	32 22.0	32 26.0	32 26.00	.56	32 25.44	−04
121	33.4	32 37.4	32 37.40	.57	32 36.83	−04
122	33 05.4	33 09.5	33 09.45	.57	33 08.88	+16
123	33 25.2	33 29.2	33 29.20	.57	33 28.63	+6
124	33 59.6	34 03.7	34 03.65	.57	34 03.08	−4
125	34 34.0	34 38.1	34 38.05	.57	34 37.48	+16
126	34 49.3	34 53.3	34 53.30	58	34 52.72	+01
127	35 16.0	35 19.7	35 19.85	.58	35 19.27	−.04
128	35 27.9	35 32.0	35 31.95	.58	35 31.37	+01
129	36 21.0	36 25.0	36 25.00	.58	36 24.42	+.06

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

1852phae.proj.2118

Zone 6

			d	Mean Eq. 1862.0	Z−Z	
12	10.32	19.32	−9.8	+00.19.22.2	+1.0	
10	7.07	16.07	9.3	15.57.7	+0.1	
12	5.07	14.07	8.6	13.58.6	+0.5	see Zone 7
11	0.53	9.53	8.3	9.44.7	+0.9	
12	1.32	10.32	8.4	10.23.6	+1.0	
10.11	3.05	12.05	8.6	11.56.4	+0.8	two 12* mag. in field
B						
12	10.27	19.27	9.9	19.17.1	+1.1	
12	5.38	14.38	9.1	14.28.9	+1.0	
9	0.49	9.49	8.4	9.40.6	+1.0	
12.13	1.05	10.05	8.4	9.56.6	+1.0	
12	0.12	9.12	8.3	9.03.7	~~+1.1~~	2nd wire lost
10.11	11.31	10.31	8.5	10.22.5	+0.1	4, 12-13 mag., near it
11	−0.33	~~9.33~~ 8.27	8.4	9.24.6 8.15.6	?	
11	2.06	11.06	8.6	10.57.4	0.0	
9.10	6.29	15.29	9.2	15.19.8	+1.2	
Rattle						
11.12	8.55	17.55	9.8	17.46.82	−0.6	
9	3.27	12.27	8.8	12.18.32	+1.0	
9	10.25	19.25	9.9	19.15.1	+1.1	several * 11-12 mg near
10	1.58	10.58	8.7	10.49.#3	+2.1	
13	1.13	10.13	8.5	10.04.5		2nd wire lost
13	9.27	18.27	9.8	18.17.2	−0.9	
12	3.50	12.50	8.8	12.41.2	−1.0	
12	1.01	10.01	8.5	9.52.5	+2.0	
B						
9	8.10	17.10 x	9.6	17.00.4	+1.1	
10	5.11	14.11	9.2	14.01.8	0.0	
13	2.49	11.49	8.8	11.40.2	+0.9	
9	2.46	11.46 x	8.7	11.37.3	−2.1	Rubrec
12	8.21	17.21	9.6	17.11.4	+2.8	* 12 mg. i.s.f.
11	9.47	18.47	9.9	18.37.1	−0.8	
11	5.33	14.33	9.2	14.23.8	0.0	another i.n.f.
12	7.47	16.47	9.5	16.37.5	1.2	
9	7.33	16.33	9.5	16.23.5	0.2	
10	4.32	13.32	9.0	+00.13.23.0	2.9	
B double						

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

1852phae.proj..211E

Zone 6

Z7 - Z6

			Mean	k.	Mean Eq. 1852.0	
130	12h 37m 41.7	37m 45.8	37m 45.75s	−0.58	12h 37m 45.17s	−09
131	39m 02.0	39m 05.9	39m 05.95s	.60	39m 05.35s	−13
132	40m 40.9	40m 44.8	40m 44.85s	.60	40m 44.25s	− 8
133	41m 49.0	41m 53.2	41m 53.10s	.60	41m 52.50s	− 8
134	42m 10.0	42m 14.1	42m 14.05s	.60	42m 13.45s	
135	43m 33.1	43m 37.1	43m 37.10s	.61	43m 36.49s	−13
136	44m 16.8	44m 20.7	44m 20.75s	.62	44m 20.13s	− 8
137	44	44m 23.1	44m 23.10s	.62	44m 22.48s	
138	45m 12.6	45m 16.6	45m 16.60s	.62	45m 15.98s	+ 7
139	46m 34.6	46m 38.6	46m 38.60s	.62	46m 37.98s	
140	47m 05.2	47m 09.1	47m 09.18 −20	.62	47m 08.558	+ 22
141	47m 53.6	47m 57.6	47m 57.60s	.62	47m 56.98s	+ 11
142	48 00.4	48m 04.3	48m 04.35s	.62	4803.73s	+ 1
143	49m 40.4	49m 44.4	49m 44.40s	.63	49m 43.77s	− 4
144	50m 00.4	50m 04.2	50m 04.30s	.63	50m 03.67s	− 4
145	52m 48.5s	52m 52.6s				
146	52m 54.0s	52m 58.0s	52m 52.55s	.63	52m 51.92s	+ 1
147	53m 18.1s	53m 22.1s	52m 58.00s	.63	52m 57.37s	− 10
148	53m 44.0s	53m 47.9s	53m 22.10s	.64	53m 21.46s	+ 11
149	54m 18.0s	54m 22.4s	53m 47.95s	.65	53m 47.30s	+ 2
150	55m 5.7s	55m 9.6s	54m 22.20s	.65	54m 21.55s	+ 2
151	55m 13.6s	55m 17.6s	55m 09.75s	.65s	55m 09.10s	+ 2
			55m 17.60s	.65s	56m 16.95s	− 3
152	55m 38.0s	55m 42.0s	55m 42.00s	.65s	55m 41.35s	+ 11
153	55m 56.2s	56m 00.3s	56m 00.25s	.65s	55m 59.60s	+ 11
154	56m 36.6s	56m 40.3s	56m 40.45s	65s	56m 39.80s	
155	48.5s	56m 52.4s	56m 52.45s	65s	56m 51.80s	+ 6
156	57m 17.0s	57m 21.0s	57m 21.00s	.65s	57m 20.35s	+ 21
157	57m 28.1s	57m 32.2s	57m 32.15s	.65s	57m 31.50s	
158	58m 32.9s	58m 36.8s	58m 36.85s	.66	12h 58m 36.19s	− 8
159	58m 52.5s	58m 56.4s	58m 56.45s	.66	58m 55.79s	− 9
160	59m 06.1s	59m 10.0s	59m 10.05s	.66	59m 09.39s	
161	59 17.0s	59m 21.1s	59m 21.05s	.66	12h 59m 20.39s	

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

1852phae.proj.211E

Zone 6

			d	Mean, Eq. 1852.0	
10.11	7.59	16.59	− 9.6	+ 00 16 39.4	+ 0.1
8	− 0.04	8.56 x	8.5	8.47.5	+ 1.0
	Brent				
9	10.20	19.20	10.1	19.09.9	
11.12	4.24	13.24	9.1	13.14.9	+ 2.0
13	4.48	13.48	9.1	13.38.9	13 mag. stars difficult
10	10.27	19.27	10.1	19.16.9	+ 1.1 to observe on account
9	1.26	10.26	8.7	10.17.3	− 0.9 of Moon
11	9.40	18.40	9.9	18.30.1	no very 1st wire last
10	6.54	15.54	9.4	15.44.6	0.0
	Butts				
10	− 0.17	8.43	8.5	8.34.5	
12	4.17	13.17	9.1	13.07.9	+ 1.0
10.11	00.52	9.52	8.6	9.43.4	
11	3.05	12.05	8.9	11.56.1	
13	13				
12	7.29	16.29	9.7	16.19.3	+ 1.3
10	6.01	15.01	9.5	14.51.5	+ 1.3
		17.12			
11	8.12	17.22	9.8	17.02.2	+ 0.2
9.10	7.23	16.23	9.7	16.13.3	+ 1.3
12	5.02	14.42	9.4	14.32.6	+ 0.1 Cluster
11	1.20	10.20	8.7	10.11.3	+ 1.1
10	− 0.30	8.30	8.6	8.21.4	+ 0.4 1st wire 0.3 early
12	5.59	14.59	9.5	14.49.5	+ 1.3
11.12	1.07	10.07	8.7	9.58.3	+ 3.1
	B3				
11	3.13	12.13	9.0	12.04.0	+ 1.0
9	4.07	13.07	9.2	12.57.8	+ 0.1 comp. of 12m 7" s.f.
12.13	9.09	18.09	10.0	17.09.0	
12	4.39	13.39	9.2	13.29.8	
12	8.35	17.35	9.8	17.25.2	+ 0.2
13	4.27	13.27	9.2	13.17.8	
9	0.25	9.25 x	− 8.5	09.16.5	+ 1.2
10	8.55	17.55	9.9	17.46.1	+ 0.3
12	5.51	14.51	9.5	14.41.5	
13	6.56	15.56	9.6	+ 00 15.46.4	

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

1852phae.proj..211E

Zone 6.

		Mean	k	Mean Eq. 1852.0
		h m s		h m s
13 12 00 39.00	00 43.0	00 43.00	−0.66	13 00 42.34
1 04.50	1 08.4	1 08.45	.66	1 07.79
1 25.00	1 28.8	1 28.90	.66	1 28.24
2 26.40	2 30.2	2 30.30	.66	2 29.64
3 11.60	3 15.5	3 15.55	.67	3 14.88
3 59.4	4 03.3	4 03.35	.67	4 02.68
13 05 00.0	5 03.9	5 03.95	−0.67	13 05 03.28

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

1852phae.proj..211E

Zone 6.

			d	Mean, Eq. 1852.0	
10	9..47	18..47	−10.1	+00.. 18..3 6.9	12 mag + mean
12.13	8..51	17..51	9.9	17..41.1	
11	1..54	10..54	9.0	10..45.0	several 12 mag lost
9	1..30	10..30	8.9	10..21.1	
12	1..47	10..47	9.0	10..38.0	
13	6..47	15..47	9.7	+00..15..37.13	
Rutter					
11.12	7..33	16..33	9.8	16..23 2	

End of Zone 6

April 29^{d} Sid. time 11^{h}..05^{m} Bar 29.830 − 65 Ext Ten 49.6

.. 14..00 .860 63 .. 42.8

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

1852phae.proj..211E

Zone 7

No.			Mean	k	Mean Eq. 1852.0
1	11 13 29.0	33.0	13 33.00	+0.11	11 13 33.11
2	13 34.1	38.1	13 38.10	.11	13 38.21
3	14 22.5	26.8	14 26.60	.10	14 26.70
4	15 50.1	54.0	15 54.05	.10	15 54.15
5	16 11.8	15.8	16 15.80	.10	16 15.90
6	16 32.0	36.0	16 36.00	.10	16 36.10
7	16 52.8	56.5	16 56.65	.10	16 56.75
8	17 32.3	36.3	17 36.30	.09	17 36.39
9	17 48.7	52.7	17 52.70	.09	17 52.79
10	18 40.0	43.9	18 43.95	.09	18 44.04
11	19 18.6	22.8	19 22.70	.09	19 22.79
12	lost	19 27.4	19 27.40	.09	19 27.49
13	19 39.4	43.5	19 43.45	.08	19 43.53
14	20 39.2	43.2	20 43.20	.08	20 43.28
15	21 58.3	02.3	22 02.30	.08	22 02.38
16	22 10.7	14.7	22 14.70	.07	22 14.77
17	22 19.2	23.2	22 23.20	.07	22 23.27
18	~~23 32.7~~	~~36.5~~		~~.07~~	
19	23 32.7	24 2.2	23 36.60	.07	23 36.67
20	23 58.2	41.1	24 2.20	.07	24 02.27
21	24 37.1		24 41.10	.06	24 41.16
22	25 31.2	36.0	25 35.10	.06	25 35.16
23	25 58.8+0.2	26 3.0	26 03.00	.06	26 03.06
24	26 52.0	lost	26 56.00	.06	26 56.06
25	27 26.3	30.2	27 30.25	.06	27 30.31
26	38.0 37.9	42.0	27 42.00	.06	27 42.06
27	lost ~~56.6~~	27 56.6	27 56.60	.05	27 56.65
28	29 ~~lost 26.0~~	29 29.9	29 29.90	.05	29 29.95
29	38.1	~~42.0~~	29 42.05	.05	29 42.10
30	29 51.6	55.6	29 55.60	.04	11 29 55.64

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

1852phae.proj..211E

Albany 4th Pl

Zone 7 - Commences with Zone 6

11..50 30.346-65 45.0
18h..35m Bar 30.316-64 Ext Ther 44.8
.030 -0.2 dr = -0.02 2 hours

Mag		′ ″	d			Mean Eq. 1852.0		
. 9.	2..06	11..06	−8.0	−7.6	-7.2	+00° 10′ 59″.5	00..10..59.2	
x 10 − 0..30		8..30	7.6	7.1	6.8	8..22.9	8..23.2	noisy
. 9	2..05	11..05 x	8.0	7.6	7.2	10..57.5	10..57.8	1st win per cus .2
. 11	0..14	9..14	7.9	7.2	7.0	9..06.8	9..07.0	
. 12	8..33	17..33	8.9	8.4	8.1	17..24.6	17..24.9	Zone is some [illegible]
B								[illegible] The bright moon
. 13	5..39	14..39	8.4	7.9	7.7	14..31.1	14..31.3	light make it difficult to
. 10	3..36	12..36	8.1	7.6	7.4	12..28.4	12..28.6	estimate magnitudes.
. 10	1..51	10..51	8.0	7.5	7.1	10..43.5	10..43.9	
. 11	3..37	12..37	8.1	7.6	7.4	12..29.4	12..29.6	
B								
. 14	4..22	13..22	8.3	7.8	7.5	13..14.2	13..14.5	
. 10	8..12	17..12	8.9	8.4	8.0	17..03.6	17..04.0	
. 11	4..09	13..09	8.3	7.8	7.5	13..01.2	13..01.5	1st win lost
. 10	1..12	10..12	7.8	7.3	7.0	10..04.7	10..05.0	
B								
. 13	4..39	13..39	8.3	7.8	7.6	13..31.2	13..31.4	
. 12	5..46	14..46	8.4	7.9	7.7	14..38.1	14..38.3	
. 11	5..27	14..27	8.4	7.9	7.7	14..19.1	14..19.3	
. 10	8..43	17..43	8.9	8.4	7.7	17..34.6	17..35.3	8 certain
B								
. 12	7..09	16..09	8.7	8.2	7.8	16..00.8	16..01.2	
. 9-10	2..34	11..34	8.0	7.5	7.2	11..26.5	11..26.8	
. 13	6..18	15..18	8.6	8.1	7.6	15..09.9	15..10.4	
. 10	8..38	17..38	8.8	8.3	8.0	17..29.7	17..30.0	
. 10	3..00	12..00	8.0	7.5	7.4	11..52.5	11..52.6	1st win s 0.2 early
. 13	1..46	10..46	7.9	7.4	7.0	10..38.6	10..39.0	2nd win lost
. 10	0..00	9..00	7.5	7.0	7.0	8..53.0	8..53.0	
. 9	7..03	16..03	8.6	8.1	7.9	15..54.9	15..55.1	
. 11.12	5..56	14..56	8.5	8.0	7.8	14..48.0	14..48.2	1st win lost
dub								
. 10	7..05	16..05	8.6	8.1	7.9	15..56.9	15..57.1	
. 7	5..30	14..30	8.5	8.0	7.8	14..22.0	14..22.2	1st win lost
. 8	7..27 87	16..27 37	8.6	8.1	7.8	00..16..18.8	16..19.2	

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

1852phae.proj..211E

			Mean	K	Mean Eq. 1852.0
31	11.. 30 .. 04.7	08.5	30.. 06.60	+0.04	11..30..08.64
32	31 50.2	54.2	31.. 54.20	.04	31.. 54.24
33	32.. 8.6	12.4	32.. 12.50	.04	32.. 12.54
34	32.. 28.7	32.7	32.. 32.70	.03	32.. 32.73
35	33.. 17.2	21.0	33.. 21.10	.03	33.. 21.13
36	33.. 51.7	55.2	33.. 55.45	.03	33.. 55.48
37	34.. 18.7	22.6	34.. 22.65	.02	34.. 22.67
38	35.. 47.2	51.3	35.. 51.25	.02	35.. 51.27
39	36.. 36.5	40.6	36.. 40.55	.02	36.. 40.57
40	36, 48.0	52.0	36.. 52.00	.02	36.. 52.02
41	37.. 00.0	4.0	37.. 04.00	.01	37.. 04.01
42	37.. 23.0	27.0	37.. 27.00	.01	37.. 27.01
43	37.. 35 0	39.0	37.. 39.00	+ .01	37.. 39.01
44	39.. 21.2	25.2	39.. 25.20	.00	39.. 25.20
45	39.. 55.7	59.7	39.. 59.70	.00	39.. 59.70
46	40.. 43.0	47.2	40.. 47.10	.00	40.. 47.10
47	42.. 48.3	52.4	42.. 52.35	−0.01	42.. 52.34
48	43.. 9.0	13.0	43.. 13.00	.01	43.. 12.99
49	43.. 44.4	48.5	43.. 48.45	.02	43.. 48.43
50	44.. 19.0	23.0	44.. 23.00	.02	44.. 22.58
51	44.. 56.2	45.. 00.4	45.. 00.20	.02	45.. 00.18
52	45.. 13.2	17.4	45.. 17.30	.03	45.. 17.27
53	46.. 21.0	25.1	46.. 25.05	.03	46.. 25.02
54	46.. 53.2	57.2	46.. 57.20	.03	46.. 57.17
55	47.. 22.4	26.4	47.. 26.40	.03	47.. 26.37
56	47.. 55.0	58.9	47.. 58.95	.03	47.. 58.92
57	48.. 52.6	56.4	48.. 56.50	.04	48.. 56.46
58	49.. 15.7	19.9	49.. 19.80	.04	49.. 19.76
59	49.. 37.6	41.5	49.. 41.55	.05	49.. 41.50
60	lost	49.. 56.5	49.. 56.50	.05	49.. 56.45
61	50.. 57.7	51.. 1.9	51.. 01.80	.05	51.. 01.75
62	51 25.3	29.2	51.. 29.25	−0.05	11.. 51.. 29.20

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

1852phae.proj.211E

Zone 7

Mean Eq. 1852.0

			d	d				
× 10	−0.39	8.21	−7.5	−7.0	−6.8	+00° 08′ 14″.0	+0° 08′ 14.2	Certain
-9.10	2.44	11.44	7.9	7.5	7.4	11.36.5	11.36.6	
. 11	1.06	10.06	7.70	7.2	7.1	9.58.8	9.58.9	
. 11.12	3.20	12.20	8.0	7.5	7.5	12.12.5	12.12.5	
× 7	−0.08	8.52 ×	7.5	7.0	6.9	8.45.0	8.45.1	1st min 0.5 late
. 13	4.32	13.32	8.2	7.7	7.6	13.24.3	13.24.4	
. 13	7.47	16.47	8.6	8.1	7.9	16.38.9	16.39.1	
B								
× 10	0.04	8.56	7.5	7.0	6.9	8.49.0	8.49.1	
. 12	0.45	9.45	7.6	7.1	7.9	9.37.9	9.37.9	
. 13	3.54	12.54	8.0	7.5	7.5	12.46.5	12.46.5	
. 9	5.58	14.58	8.5	8.0	7.7	14.50.0	14.50.3	
-7.6	9.35	18.35	9.0	8.5	8.3	18.26.5	18.26.7	
. 12	0.36	9.36	7.6	7.1	7.0	9.28.9	9.29.0	
B					7.			
. 12	5.07	14.07	8.3	7.8	7.8	13.59.2	13.59.2	
. 9.10	8.14	17.14	8.9	8.3	8.2	17.05.7	17.05.8	
. 10	9.58	16.58	9.1	8.6	8.6	18.49.4	18.49.4	
B double								
- 9	9.33	18.33	9.1	8.6	8.4	18.24.4	18.24.6	
. 11	1.11	10.11	7.7	7.2	7.2	10.03.8	10.03.8	
. 12	2.46	11.46	7.9	7.4	7.5	11.38.6	11.38.5	
. 10	4.07	13.07	8.2	7.7	7.7	12.59.3	12.59.3	
. 9	6.24	15.24	8.5	8.0	7.9	15.16.0	15.16.1	
. 11	6.00	15.00	8.5	8.0	7.8	14.52.0	14.52.2	
. 9	8.44	17.44	8.8	8.3	8.3	17.35.7	17.35.7	
. 11	4.54	13.54	8.8	7.8	7.9	13.46.2	13.46.1	
B double								
. 7	7.09	16.09 ×	8.6	8.1	8.0	16.00.9	16.01.0	
. 12	0.35	9.35	7.7	7.2	7.2	9.27.8	9.27.8	
. 10	8.01	17.01	8.8	8.3	8.2	17.52.7	16 52.8	
× 10	10.17	19.17	9.1	8.6	8.6	19.08.4	19.08.4	Mag. certain
. 9.10	5.07	14.07	8.3	7.8	7.9	13.59.2	13.59.1	
. 12	1.25	10.25	7.6	7.1	7.3	10.17.9	10.17.7 1st min last	
. 11	3.35	12.35	7.9	7.4	7.7	12.27.6	12.27.3	
B								
. 12	7.12	16.12	8.5	8.0	8.1	16.04.0	+00° 16.03.9	
B double								

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

1852phae.proj..211E

11..	52.. 15.6	22.5
	53.. 54.0	58.0
	55.. 3.9	7.9
	56.. 3.0	7.0
	56 . 19.7	23.5
	56 .. 33.0	37.0

See Book No 2

$5^h\ 59^m.99^s$
$6^h\ 00^m\ 18^s$

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

1852phae.proj.2118

Zone 7-

12 10.38
x10 — 0.15 — — — — — — — — certain
.12 2.33 — — — — — — — — last-win double
.12 0.59
.10 5.31
.13 1.03

dots

11.12 1.29
x 11 — 0.27
.12 9.54
.12 3.55
.7 2.43

10 0.53
10.11 3.34

Ruttle

12 2.59
11 3.17
11 3.06 — — — — — — — — — — certain

B Mensa

11 9.08
7 2.07
12 8.18
9 0.42 — — — — — — — — — — 2 win last
9-10 6.22 — — — — — — — — — — no sig
11 7.29

B

12 0.40
12 6.39
11 9.39
9 4.34
11 1.40 noisy

B

3 0.37 - 10"?

B double

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

1852phae.proj..211E

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

1852phae.proj.211E

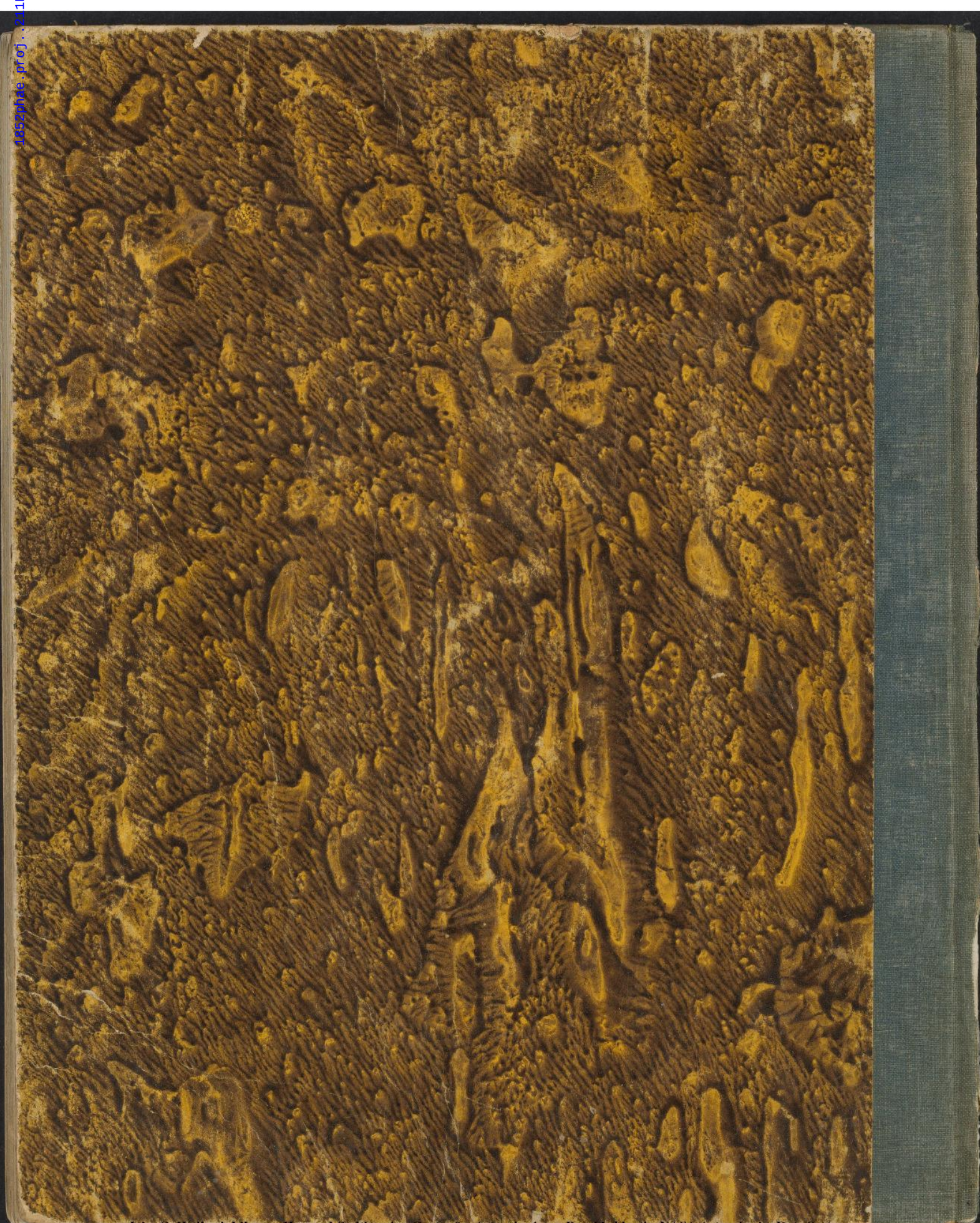
John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1852phae.proj..211E

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

1852phae.proj.211E

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



1952phie.proj...21.1B

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