

KG
11366
v.1011

CLIX		
159		
Plate		
11219	Sept. 20 '16	1
11276	Oct. 9. '16	11
11285	Oct. 10 '16	21

15
622
273
31.4
13L
22
1523
153
23
16

11219

Star Measures

1

1 18121 17702
 158 1003835 1580098
 6.1 32 96
 21 02
158086 158096

18882 18148
 17413 11 9622
 9 20 21
 82 44
6.1471 6.1477

2 18252 16208
 22.6 1259294 11880 78
 27.1 96 76
 52 06
225658 225672

18738 18952
 17515 13 10183
 11 83
 38 52
27.1225 27.1231

3 17740 18642
 31.4 1410810 12274
 13.1 12 74
 40 44
31.3630 31.3630

18645 18688
 16640 38 10702
 36 04 03
 43 90
13.2007 13.2013

Moon.

1 18410
 22. 1549902
 153 05
 10
152908 15.2922

18410 17171
 1549902 10090
 05 9291
 10 69
152908 15.2922

3 16499 17061
 23.04 15912 7.656 53
 16. 12 50
 97 61
230587 230592

18891 18760
 9651 17990
 51 90
 93 60
159242 15.9230

11219

Star Measures

1

1 18121 17702
 158 1003835 1580098
 6.1 32 96
 21 02
158086 158096

18882 18148
 17413 11 9622
 9 20
 82 44
61471 61477

2 18252 16208
 2.6 1259294 1188078
 27.1 96 76
 52 06
225658 225672

18738 18957
 1751513 1018
 11 8
 38 52
271225 27123

3 17240 18642
 14 1410810 12274
 3.1 12 74
 40 44
313130 313630

18645 18688
 16640 38 1070
 36 04
 43 96
132007 132013

Moon.

12 1546402
 53 45
 10
2408

18410 17171
 1549902 10090
 05 92
 10 69
152908 152922

2 16499 17061
 23.4 15912 765653
 16 12 50
 97 61
230587 230592

18891 18760
 9651 17990
 51 90
 93 60
159242 159230

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Moon Measures

2

4 16721 17526
 23.4 12696 11548
 17 96 48
 21 28
234025 23.4021

5 16990 17676
 23.3 13883 10782
 17.6 85 82
 90 76
233106 23.3106

6 16812 17637
 23.1 15359 9090
 18. 59 40
 14 37
23.1453 23.1453

7
 230
 18.1

18082 17655
 15860 985255-
 60 58
 82 53
18.2222 18.2202

8 17540 18550
 22.5 1317879 1292221
 18.7 80 20
 40 8550
224361 224371

18081 18390
 11292 1518889
 92 90
 81 90
18.6789 18.6799

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Moon Measures

2

#	16721	17526
23.4	12696	11548
17	96	48
	21	28
	<u>234025</u>	<u>234121</u>

5	16990	17676
23.3	13883	10782
17.6	85	82
	90	76
	<u>233106</u>	<u>233106</u>

6	17637
23.1	9090
18	90
	37
	<u>231453</u>

7
23.0
18.1

17391	18096
10980	1449497
82	500
91	96
<u>176410</u>	<u>176401</u>

18082	17655
15860	985255
60	58
82	53
<u>182222</u>	<u>182202</u>

8	17540	18550
22.5	13178	1292221
18.7	80	20
	40	8550
	<u>224361</u>	<u>224871</u>

18081	18390
11292	1518889
92	90
81	90
<u>188789</u>	<u>186799</u>

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Lunas

3

Date Sept. 20 '16

Exp & Stars	04	50		05	02
" " mean	04	55	42.6 ^v	04	55 42.8
Clock Fast		09	49.6 ^v		

H. Sid. Time	04	45	53.1 ^v	$\Theta = -2^h 48^m$
H. Long	04	44	31.05	
S. Sid. Time	09	30	24.15	
" Sid. Time M.V.	11	56	10.36	
Interval	21	34	13.79 ^v	
Reduction		03	32.03 ^v	21.5116 ^v
S. M. T	21	30	41.76 ^v	

Trans	Naut Alm.	R A	Decl
Mean 21 ^h	07	32	27.59 +22 16 58.6
Mean 1 ^m			2.0664 ^v -7.218 ^v
" 30.696 ^v	+01	03.43 ^v	03 41.5 ^v
Tabular Place	07	33	31.02 ^v +22 13 17.1 ^v

Moon's Age 23d

Q 34'' = 12.0

a - 503.3
 +24
 - 479.3

Parallax	54	11.3 ^v
Semi-Diam	14	47.5 ^v
R		887.5 ^v
Aug		10.8 ^v
Semi 5		-0.8 ^v
R		897.5 ^v
R		1.9239 ^v
(1+2) R		-9.22 ^v
R		1.8317 ^v
R ²		3.3551 ^v

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Lunes

3

Date Sept 20 '16

Exp & Stars	04	50		05	02	
" " Stars	04	55	42.6	04	55	42.8
Clock Fast		09	49.6			

H Sid Lunes	04	45	53.1			
H Young	04	44	31.05			
S Sid Lunes	09	30	24.15			
" Sid Lunes M.N.	11	56	10.36			
Interval	21	34	13.79			
Reduction		03	32.03			
S M.T	21	30	41.76			

21^h 51.16

Trans	Naut Alm.	RA	Decl
Moon 21 ^h	07	32	27.59 +22 16 58.6
Mation 1 ^m			2.1664 -7218
" 30.196	+01	03.43	03 41.5
Tabular Place	07	33	31.02 +22- 13 17.1

Moon Age 23d

G 34" = 12.0

a - 503.3
+ 24
 - 479.3

Parallax	54	11.3
Semi-diam	14	47.5
R		887.5
Aug		10.8
Sr 5		-1.8
R		897.5
R		1.9239
Attal R		-922
R ²		1.8317
R ²		3.3551

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Plate Constants.

4

$$\begin{array}{rcl}
 X & 15.8091 & 22.5665 \\
 S & 16.2836 & 23.1278 \\
 X-S & -4.4745 & -1.5613
 \end{array}
 \quad
 \begin{array}{rcl}
 & & 31.3630 \\
 & & 32.5346 \\
 & & -1.1716
 \end{array}$$

$$\begin{array}{rcl}
 y & 6.1474 & 27.1228 \\
 -y & -6.1474 & -27.1228 \\
 y-y & +0.3051 & -0.8328
 \end{array}
 \quad
 \begin{array}{rcl}
 & & 13.2010 \\
 & & 13.4386 \\
 & & -0.2376
 \end{array}$$

$$\begin{array}{rcl}
 X-S + 500X & & -120.74 \\
 -4.4745 + 7904 & = & 3159 - 742 - 2417 + 53 - 2470 \\
 -5.613 + 11283 & = & 5670 - 3274 - 2396 + 75 - 2471 \\
 -1.1716 + 15682 & = & 3966 - 1593 - 2367 + 104 = 2471 \checkmark \\
 21.5705 + 1078.5 & & -2060 + 714 = 222030
 \end{array}$$

$$\begin{array}{rcl}
 y-3 + 500y & & +120.15X \\
 +3.051 + 3074 & = & 6125 + 1905 - 8038 + 23 = 8053 \\
 -8.328 + 13561 & = & 5233 + 2719 - 7952 + 100 = 8052 \\
 -2.376 + 6600 & = & 4224 + 3779 - 8003 + 44 = 8052 \\
 17.0692 + 8535 & & +2599 + 63 = 17.3837 \checkmark
 \end{array}$$

$$\begin{array}{rcl}
 \text{Tables } a = -2.1 & b = -2.0 & a-b = -0.1 & b+d = +1.8 \\
 -503.3 & = -503.7 & = +0.4 & = +0.2 \\
 a-c = -501.2 & -501.7 & & -1.6
 \end{array}$$

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Plate Constants.

4

$$\begin{array}{r} X \ 158091 \\ S \ 162836 \\ -S \ -4745 \end{array}$$

$$\begin{array}{r} 22.5665 \\ 23.1278 \\ - \ .5613 \end{array}$$

$$\begin{array}{r} 31.3630 \\ 32.5346 \\ -1.1716 \end{array}$$

$$\begin{array}{r} y \ 6.1474 \\ \eta \ 5.8423 \\ y-\eta \ +0.3051 \end{array}$$

$$\begin{array}{r} 27.1228 \\ 27.9556 \\ - \ .8328 \end{array}$$

$$\begin{array}{r} 13.2010 \\ 13.4386 \\ - \ .2376 \end{array}$$

$$\begin{array}{rcl} X-S + 500X & & -120.74 \quad + 33X - 2471 \\ -4745 + 7904 & = & 3159 + 742 - 2417 + 53 - 2470 \\ -5613 + 11283 & = & 5670 - 3274 - 2346 + 75 - 2471 \\ -1.1716 + 15.682 & = & 3966 - 1593 - 2367 + 104 - 2471 \\ 21.5705 + 10785 & & -2060 \quad + 71 - 22.2030 \end{array}$$

$$\begin{array}{rcl} y-\eta + 500y & & + 120.5X \quad + 3.78 \quad - 8052 \\ + 3051 + 3074 & = & 6125 + 1905 - 8038 + 23 = 8053 \\ -8328 + 13561 & = & 5233 + 2719 - 7952 + 100 = 8052 \\ -2376 + 6608 & = & 4224 + 3779 - 8003 + 44 = 8052 \\ 17.0692 + 8535 & & + 2599 \quad + 63 = 17.3837 \end{array}$$

$$\begin{array}{r} \text{Table } a = -2.1 \\ - \ 508.3 \end{array}$$

$$\begin{array}{r} b = -2.0 \\ = -5037 \end{array}$$

$$\begin{array}{r} g-b = -0.1 \\ = +0.4 \end{array}$$

$$\begin{array}{r} b+d = +1.8 \\ = +0.2 \end{array}$$

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Mean's Center

	X	X - X ₀	ΔX	(X - X ₀) ² + (Y - Y ₀) ²	0 - C	
1	22.0000	+0.4290	+3	0.1843	33541	- 10
2	23.0000	+1.4290	+2	2.0426	33612	+ 61
3	23.0590	+1.4880	+2	2.2147	3.3637	+ 86
4	23.4023	+1.8913	+0	3.3538	33538	- 13
5	23.3106	+1.7896	-1	3.1258	33510	- 41
6	23.1453	+1.5743	-2	2.4778	3.3388	- 163
7	23.0000	+1.4290	-2	2.0414	3.3614	+ 63
8	22.4366	+0.8656	-3	0.7487	3.3321	- 230

$$R^2 = 3.3551$$

	Y	Y - Y ₀			
1	15.2915	-1.7805	+1	3.1698	167 ^{0v}
2	15.9236	-1.1484	+1	1.3186	129 ^{0v}
3	16.0000	-1.0720	+1	1.1490	126 ^{0v}
4	17.0720	+0.0000	-0	0.0000	90 ^{0v}
5	17.6405	+0.5685	-0	0.3232	72 ^{0v}
6	18.0000	+0.9280	-1	0.8610	59 ^{0v}
7	18.2210	+1.1490	-1	1.3200	52 ^{0v}
8	18.6794	+1.6074	-1	2.5834	28 ^{0v}

Range 139

$$X = 23 \quad Y = 15.9236$$

$$18.2210$$

$$34.1446$$

$$Y_0 = 17.0723$$

$$\text{Corr } R = 1.8317$$

$$X_{\text{max}} = 23.4023$$

$$X_0 = 21.5706$$

$$\text{Mean's Center } \left\{ \begin{array}{l} X_0 = 21.5710 \\ Y_0 = 17.0720 \end{array} \right.$$

$$Y_0 = 17.0720$$

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Molau's Center

	X	X - X ₀	ΔX	(X - X ₀) ²	(Y - Y ₀) ²	O - C
1	22.0000	+0.4290	+3	0.1843	3.3541	- 10
2	23.0000	+1.4290	+2	2.0426	3.3612	+ 61
3	23.1590	+1.4880	+2	2.2147	3.3637	+ 86
4	23.4023	+1.8313	+0	3.3538	3.3538	- 13
5	23.3106	+1.7896	-1	3.1258	3.3510	- 41
6	23.1453	+1.5743	-2	2.4778	3.3388	- 163
7	23.0000	+1.4290	-2	2.0414	3.3614	+ 63
8	22.4366	+0.8656	-3	0.7487	3.3321	- 230

$$R^2 = 3.3551$$

	Y	Y - Y ₀		
1	15.2915	-1.7903	+1	8.1698
2	15.9236	-1.1484	+1	1.3186
3	16.0000	-0.0720	+1	1.1490
4	17.0720	+0.0000	-0	0.0000
5	17.6405	+0.5685	-0	0.3232
6	18.0000	+0.9280	-1	0.8610
7	18.2210	+1.1490	-1	1.3200
8	18.6894	+1.6074	-1	2.5834

Range 28°
139°

$$X = 23 \quad Y = 15.9236$$

$$18.2210$$

$$34.1446$$

$$Y_0 = 17.0723$$

$$X_{\text{cm}} R = 1.8317$$

$$X_{\text{max}} = 23.4023$$

$$X_0 = 24.5706$$

$$\text{Molau's Center} \left\{ \begin{array}{l} X_0 = 21.5710 \\ Y_0 = 17.0720 \end{array} \right.$$

Normals

1 - 0.76
 2 - 1.65
 3 - 1.68
 4 + 0.00
 5 + 0.99
 6 + 1.46
 7 + 1.64
 8 + 1.38
 + 5.47
 - 4.01
 + 146

- 43
 + 87.0
 + 128.0
 - 23.8
 - 71.4
 - 255.9
 + 90.0
 - 197.8
 + 305.0
 - 553.2
 - 248.2

+ 17.8
 - 70.5
 - 92.0
 - 000
 - 23.4
 - 151.8
 + 172.4
 - 370.0
 + 90.2
 - 707.7
 - 617.5

- a - b - 38
 + 11 + 5 - 22
 + 37 + 3 + 24
 + 39 + 3 + 44
 + 47 - 0 + 94
 + 46 - 2 + 64
 + 41 - 3 04
 + 37 - 3 - 44
 + 22 - 5 - 21

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Conditional Equations

6
O-C corr.

1	+ 0.43	- 1.78	= -	10	- 4	+	99	= + 95	- 105	-127
2	+ 1.43	- 1.15	= +	61	- 15	+	84	= + 69	-	9 - 7
3	+ 1.49	- 1.07	= +	86	- 15	+	60	= + 45	+	41 + 45
4	+ 1.83	+ 0.00	= -	13	- 19	-	00	= - 19	+	6 + 15
5	+ 1.74	+ 0.57	= -	41	- 18	-	32	= - 50	+	9 + 15
6	+ 1.57	+ 0.93	= -	163	- 16	-	52	= - 68	-	95 - 95
7	+ 1.43	+ 1.15	= +	63	- 15	-	64	= - 79	+	142 + 138
8	+ 0.86	+ 1.61	= -	230	- 8	-	90	= - 98	-	132 - 153
	+ 10.78	+ 0.26							198	-341
									av	67

$$16.09 + 1.46 = -248.2 + 10.78$$

$$+ 1.46 + 10.72 = -617.5 + 0.26$$

$$+ 1.46 + 0.13 = -22.3 + 0.98$$

$$+ 10.59 = -595.2 - 0.726 = -56 - 0.078$$

$$16.09 = -248.2 + 81.8 = -166.4$$

$$a = -10.3 + 0.67$$

$$P_m = .11$$

$$\frac{\Sigma V}{n} = -1.8$$

$$\frac{-1.8}{.11} = -16.3$$

$$\Delta R = -2.0$$

$$\text{Corr} = +0.5$$

$$\text{True } \Delta R = -2.5$$

$$-2R = -3.84 \quad -2R_{\text{corr}} = -1.92 \quad -3.8$$

$$\Delta t = +0.13 \quad \Delta S = +0.1$$

$$\Delta x = -1.28 \quad \Delta \alpha = -0.05$$

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Conditional Equations

6

D-C

1	+ 0.43	- 1.78	= -	1.0	- 4	+	99	= + 95	- 105
2	+ 1.43	- 1.15	= +	61	- 15	+	84	= + 69	- 9
3	+ 1.49	- 1.07	= +	86	- 15	+	60	= + 45	+ 41
4	+ 1.83	+ 0.00	= -	13	- 19	-	00	= - 19	+ 6
5	+ 1.74	+ 0.57	= -	41	- 18	-	32	= - 50	+ 9
6	+ 1.57	+ 0.93	= -	163	- 16	-	52	= - 68	- 95
7	+ 1.43	+ 1.15	= +	63	- 15	-	64	= - 79	+ 142
8	+ 0.86	+ 1.41	= -	230	- 8	-	90	= - 98	- 132

$$198 - 341$$

$$\text{or } 67$$

$$16.09 + 1.46 = -248.2$$

$$+ 1.46 + 10.72 = -617.5$$

$$+ 1.46 + 0.13 = -22.3$$

$$+ 16.59 = -595.2$$

$$A = -56$$

$$16.09 = -248.2 + 81.8 = -166.4$$

$$A = -10.3$$

$$P_n = 11$$

$$\frac{\sum v}{n} = -18$$

$$\frac{-18}{11} = -1.63$$

$$\Delta R = -2.0$$

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Marius Mean Position

7

$$\begin{array}{r} Y_0 \ 21.5710 \\ \quad \quad -5 \\ \hline 21.5705 \end{array}$$

$$\begin{array}{r} y_0 \ 17.0820 \\ \quad \quad -28 \\ \hline 17.0692 \end{array}$$

From Plate Constants

$$\begin{array}{r} 22.2030 \checkmark \\ 22. \\ \hline \} + .2030 \end{array}$$

$$\begin{array}{r} 17.3837 \checkmark \\ 18. \\ \hline -0.6163 \checkmark \end{array}$$

$$\begin{array}{r} \log S_1 \ 9.30750 \checkmark \\ \log \cos \delta_1 \ 9.96770 \\ \log \sin(\alpha-A) \ 8.50724 \\ \log \sin(\alpha-A) \ 0.83256 \end{array}$$

$$\begin{array}{r} \log \tan S \ 9.6028 \checkmark \\ \log S_1^2 \ 8.6150 \checkmark \\ \log n_1 \ 7.0534 \checkmark \\ \log n_1 \ 5.2712 \checkmark \end{array}$$

$$\alpha - A \quad + 6.80$$

$$n_1 + 0.0002 \checkmark$$

$$A \ 07 \ 35 \ 18.72$$

$$\begin{array}{r} n_1 - 0.6165 \checkmark \\ 9.78993 \checkmark \end{array}$$

$$y_0 \ 07 \ 35 \ 25.52$$

$$\begin{array}{r} \log n_1 \ 7.33115 \checkmark \\ \log \tan(S-D) \ 2.45878 \checkmark \end{array}$$

$$\text{Red} \quad + 3.12$$

$$(S-D) \ -287.59 \checkmark$$

$$\alpha' \ 07 \ 35 \ 28.64$$

$$\begin{array}{r} -04 \ 47.6 \checkmark \\ \# \ 21 \ 55 \ 25.9 \checkmark \end{array}$$

$$S_0 \ 21 \ 50 \ 38.3 \checkmark$$

$$\text{Red} \quad - 2.9$$

$$S' \ 21 \ 50 \ 35.4$$

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Means Means Position

7

$$\begin{array}{r} Y_0 \quad 21.5710 \\ \quad \quad \quad -5 \\ \hline 21.5705 \end{array}$$

$$\begin{array}{r} y_0 \quad 17.0720 \\ \quad \quad \quad -28 \\ \hline 17.0692 \end{array}$$

From Plate Constants

$$\begin{array}{r} 22.2030 \\ 22 \\ \hline + .2130 \end{array}$$

$$\begin{array}{r} 17.3837 \\ 18 \\ \hline -0.6163 \end{array}$$

$$\begin{array}{l} \log S_1 \quad 9.31750 \\ \log \cos \delta_0 \quad 9.96770 \\ \hline 8.50724 \\ \log \sin(x-N) \quad 0.83256 \end{array}$$

$$\begin{array}{l} \log \tan S \quad 9.6028 \\ \log S_0 \quad 8.6150 \\ \hline 7.1534 \\ \log n_1 \quad 5.2712 \end{array}$$

$$\lambda - A \quad + 6.800$$

$$\begin{array}{l} n_1 + 0.0002 \\ n_2 - 0.6165 \\ \hline 9.78993 \end{array}$$

$$A \quad 07 \quad 35 \quad 18.72$$

$$q_0 \quad 07 \quad 35 \quad 25.52$$

$$\text{Red} \quad - \quad + 3.12$$

$$\lambda' \quad 07 \quad 35 \quad 28.64$$

$$\begin{array}{l} \log n_1 \quad 7.33115 \\ \log \tan(\delta_0 - \delta_1) \quad 2.45872 \end{array}$$

$$\begin{array}{l} (S-L) \quad -287.59 \\ \quad \quad \quad -14 \quad 47.6 \end{array}$$

$$S \quad 21 \quad 55 \quad 25.9$$

$$S_0 \quad 21 \quad 50 \quad 38.9$$

$$\text{Red} \quad - \quad 2.9$$

$$S' \quad 21 \quad 50 \quad 35.4$$

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Lunar Parallax

9

α'	07	35	28.64
θ	04	45	53.1
$\theta - \alpha' - 0.2$	49		35.54
$=$	-42	23	53.1
$\frac{1}{2} \alpha - \alpha'$	-	14	35.95-
$\theta - \alpha' - \frac{1}{2}(\alpha - \alpha')$	-42	09	17.15-

 π 54 11.3

	9.86913
$\log \sin \pi$	8.19761
" $\sin \theta - \alpha'$	9.82883 n
" $\sec \delta \theta$	0.03351
$\sin (\alpha - \alpha')$	7.92908 n

$\alpha - \alpha' - 29$	11.91
$=$	-1 56.79

	9.95727
$\log \cos \frac{1}{2} \alpha - \alpha'$	0.000
$\sec \theta - \alpha' - 1$	0.12997
$\log \tan \gamma$	0.08724

 γ 50 43 00.0 δ' 21 50 35.4 $\gamma - \delta'$ 28 52 24.6

	9.82648
$\log \sin \pi$	8.19761
$\sin \gamma - \delta'$	9.68383
$\operatorname{cosec} \gamma$	0.11125-
$\sin \delta - \delta'$	7.81909

 $\delta - \delta'$ +22 39.9 δ 22 13 15.3 $\epsilon \mu \delta$ 22 13 17.1 $\delta - \epsilon$ - 1.8

curr + 0.6
 2nd ord ref. + 0.0

 2nd corr +0.1 δ 22 13 15.4 $\delta - \epsilon =$ - 1.7 α 07 33 31.85 $\epsilon \mu \alpha$ 07 33 31.82 $\delta - \epsilon$ +0.83 curr +0.02 2nd corr. -0.05 α 07 33 31.80 $\delta - \epsilon =$ +0.78

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Lunar Parallax

9

α' 07 35 28.67
 θ 04 45 53.1
 $\theta - \alpha' - 02$ 49 35.54
 $= -42$ 23 53.1
 $\frac{1}{2} \lambda - \alpha'$ - 1.4 35.95
 $\theta - \alpha' - \frac{1}{2} (\lambda - \alpha') - 42$ 09 17.15

 π 54 11.3

9.86913
 $\log \sin \pi$ 8.19761
 $\log \sin (\theta - \alpha')$ 9.82883
 $\log \sec \delta$ 0.03351
 $\sin \lambda - \alpha'$ 792908

9.95727
 $\log \cos \frac{1}{2} \lambda - \alpha'$ 0.000
 $\sec \theta - \alpha'$ 0.12997
 $\log \tan \gamma$ 0.08724

$\lambda - \alpha' - 29$ 11.91
 $= -1$ 56.79

γ 50 43 00.0
 δ' 21 50 35.4
 $\gamma - \delta'$ 28 52 24.6

9.82648
 $\log \sin \pi$ 8.19761
 $\sin \gamma - \delta'$ 9.68383
 $\cos \sec \gamma$ 0.11125
 $\sin \delta - \delta'$ 7.81909

 $\delta - \delta'$ +22 39.9

δ 22 13 15.3
 $\epsilon \text{ph} \delta$ 22 13 17.1

$O - C$ - 1.8
 Curre + 0.6
 $2^{\text{nd}} \text{ ord ref}$ + 0.0
 Sum Corr + 0.1

 δ 22 13 15.4

 $\lambda - \alpha' - 1.7$
 α 07 33 31.85

 $\epsilon \text{ph} \alpha$ 07 33 31.82

$O - C$ +0.83
 Curre +0.02
 Sum Corr -0.05

 α 07 33 31.80

 $O - C =$ +0.78

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Star Measures.

11

11276

Star Measures.

11

11276

Lunas Etc

13

Date Oct. 7 '16

Exp. Star	01	44		01	56	"
" " Moon	01	49	36.0	01	49	36.4
Clock fast		10	23.3			

H. Sid. Lun	01	39	12.9			
H. Long	04	44	31.05			
S Sid Lun	06	23	43.95			
" " " M.N	13	03	11.77			
Interval	17	20	32.18			
Reduction		02	50.47			
S. M. T.	17	17	41.71			
					17.29492	

Lunar Mount. Alum.

R.A.

Decl.

Moon 17h	22	19	35.90	-07	04	2.1
Motion 1m			2.1717			+15.148
" 17.69516			+38.43			+04 28.0
Tabular Place	22	20	14.33	-06	59	34.1

Moon's age.

Parallax

934" =

a =

+24

R
C
S
R
R
(1+g)/R
R
R Z

Trailed Images

11276

Lunas Etc

13

Date Oct. 7 '16

Epoch Stars	01	44		01	56	
" " Moon	01	49	36.0	01	49	36.4
Clock fast		10	23.3			

H Sid June	01	39	12.9
H Young	04	44	31.05
S Sid June	06	23	43.95
" " " M.N	13	03	11.77
Interpol	17	20	32.18
Reduction		02	50.47
S M.T.	17	17	41.71

17.29492

Lunar Nut. Alm.

R A

Decl

Moon 17h	22	19	35.90	-07	04	2.1
Motion 1m			2.1717			+15.148
" 17.69516			+38.43		+04	28.0
Tabular Place	22	21	14.33	-06	59	34.1

Moon age

934" =

a =

+24

Parallax

$$\frac{R}{\cos \delta}$$

$$(1 + a/R)$$

$$\frac{R}{R^2}$$

1
13
112
18
283
30
81
2
142
2
153
2
15

11285-

Star Measures.

21

1	18468	17340	17870	18713
131	1749194	8322	8930	1765458
119	97	22	22	60
	68	46	70	19
	<u>13.0974</u>	<u>13.0976</u>	<u>11.8944</u>	<u>11.8944</u>
2	17488	16391	17459	17772
184	14493	936873	13470	11760
284	8790	78	70	60
	92	97	65	72
	<u>18.2999</u>	<u>18.2979</u>	<u>28.3992</u>	<u>28.3988</u>
3	17245	17282	17886	17218
30.8	862825	15885787	16083787	899495
82	22	89	91	96
	43	88	86	22
	<u>30.8622</u>	<u>30.8604</u>	<u>8.1799</u>	<u>8.1773</u>

mean

1	1	18170	17195
22		1748075	787830
141		70	82
		66	97
		<u>14.0695</u>	<u>14.0683</u>
2	17345	16343	
213	1508076	859095	
15	72	600	
	41	39	
	<u>21.2268</u>	<u>21.2256</u>	
3	18410	17278	
211	1753836	815250	
157	34	48	
	04	74	
	<u>21.0873</u>	<u>21.0876</u>	

13
11
27
28
3
10
8
1
2
14
2
15
3
21
5

11285

Star Measure.

1	18468	17340
131	1749194	8322
119	97	22
	68	46
	<u>13.0974</u>	<u>13.0976</u>

17870	18713
893026	1765458
22	60
70	19
<u>11.8944</u>	<u>11.8944</u>

2	17488	16391
27.6	1444890	936873
25.4	87	78
	82	97
	<u>18.2999</u>	<u>18.2979</u>

17458	17778
1347061	11760
70	60
65	72
<u>28.3992</u>	<u>28.3980</u>

3	17245	17282
0.8	862825	1588587
82	22	89
	43	88
	<u>30.8622</u>	<u>30.8604</u>

17826	17218
1682387	899445
91	96
86	22
<u>8.1799</u>	<u>8.1773</u>

Mean

1		
22		
141		
3	17345	16343
21.3	1488076	859095
15	72	600
	41	39
	<u>21.2268</u>	<u>21.2256</u>

18170	17195
1748075	7878
70	82
66	97
<u>14.0695</u>	<u>14.0683</u>

3	18410	17278
21.1	1753836	815250
5.7	34	48
	04	74
	<u>21.0873</u>	<u>21.0870</u>

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Norm Meas

4	17725	17256
21.2	1664744	834039
16.8	41	38
	23	52
	<u>21.1081</u>	<u>21.1687</u>

5	17825	17160
21.6	12248 ⁵⁰	1272726
17.0	52	25
	21	56
	<u>21.5573</u>	<u>21.5569</u>

6	18551	18282
22.0	14730	12080 ⁸⁵
17.4	30	90
	47	78
	<u>17.3819</u>	<u>17.3807</u>

7	17430	18728
23.	1049089	15670
17.7	88	70
	28	30
	<u>17.6940</u>	<u>17.6946</u>

8	17096	18088
24	1257069	12625 ²⁸
17.3	68	31
	92	84
	<u>17.4526</u>	<u>17.4542</u>

11285

Moon Means

4 17725 17256
 21.2 1664744 834039
 16 41 38
 23 52
211081 211087

5 17825 17160
 21.6 1224850 1272726
 17.0 52 25
 21 56
215573 215569

6 18551 18282
 22.0 14730 1208085
 17.4 30 90
 47 78
17.3819 17.3807

7 17430 18728
 23. 1049089 15670
 17.7 88 70
 28 30
17.6940 17.6940

8 17096 18088
 24 1257069 1262528
 17.3 68 31
 92 84
17.4526 17.4542

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Linn's Etc.

23

Oct. 10, 1916

Exp't Stars 02 15

02 27 "

Exp't Moon 02 21

02 21 01.9

- 10 29.0 ✓

H. Sid. Time 02 10 32.8 ✓

H. Long 04 44 31.05 ✓

S. Sid. P 06 55 03.85 ✓

" " M. Nom 13 15 01.43 ✓

Interval 17 40 02.42 ✓

Reduction -02 53.66 ✓

S. m. T. 17 37 08.76 ✓

 $\theta = +01^{\circ} 16''$ 17.6191 ✓
5

From Naut. Almanac

RA

Decl

Moon 17^h0^h

52

57.66^h + 11

02

43.5^hMittim 1^h2.1415^h+ 13.78^h

37.746 ✓

+ 01

19.55^h

+ 08

31.9^h

Tabular Place

0

54

17.21^h + 11

11

15.4^h

Mittim age 14

934^h = 12.8

a = 500.3

+ 24.

- 476.3

Parallax

58

11.3^h

Semi-diam

15

52.8^h

P

952.8^h

ang

13.3^hS₁ 4- 0.6^h

R

965.5^h

R

2.0697^h

(1+g/R)

- 986^h

R

1.9711^h

R2

3.8852^h

11285

Times etc.

23

Oct. 10, 1916

Exp. Stars	02	15		02	27	"
Exp. Moon	02	21	01.7	02	21	01.9
		-10	29.0			

71 Sid. Time	02	10	32.8
71 Long	04	44	31.05
5 Sid. Time	06	55	03.85
" M. Moon	13	15	01.43
Interval	17 ^h	40	02.42
Reduction		-02	53.66
S. M. T.	17	37	08.76

$$\theta = +11^{\circ} 16''$$

17.6191

From Naut. Almanac

		RA	Decl
Moon 17 ^h	0 52	57.66 +11	02 43.5
Moon 1 ^h		2.1415	+13.78
37.746	+01	19.55	08 31.9
Tabular Place	0 54	17.21 +11	11 18.4

Moon age 14

$$934'' = 12.8$$

$$\begin{array}{r} a = 500.3 \\ + 24 \\ \hline - 4763 \end{array}$$

Parallax	5.8	11.3
Semi-diam	15	52.8

R
ang
2nd 4

R	965.5
R	20697
11+9/R	-986
R	19711
R2	3.8852

11285

Plate Center - Constants

24

13.1975	11.8944	0	47	44.74	+10	08	41.7
18.2989	28.3990	0	50	36.72	+12	23	31.9
31.8613	8.1781	0	57	33.33	+09	38	16.3
3) 162.2577	3) 48.4715	3) 2	35	54.79	3) 32	10	29.9
20.7526	16.1572	0	51	58.26	+10	43	30.0
22	18			+ 48.67		+ 14	19.7
+ 1.2474	+ 1.8428	0	52	46.93	+10	57	49.7
31	466.5						
+ 48.67							

Plate Center

$$\left\{ \begin{array}{l} A.0^h \quad 52 \quad 46.93 \\ P.10^m \quad 57' \quad 49.7 \end{array} \right.$$

$$\begin{array}{rcl} X-S & + 84 & + .3 X - 132.95 \\ +.6648 + 6548 = 13196 + 95 = 13291 + 4 = 13295 \\ +.3915 + 9149 = 13064 + 22.7 = 13291 + 5 = 13296 \\ -.2210 + 15431 = 13221 + 65 = 13286 + 9 = 13295 \\ 23.2604 + 11530 & + 126 & + Y = 22.8972 \end{array}$$

$$\begin{array}{rcl} Y-Z & - 7.6 X & + 3 Y - 78.42 \\ +.1958 + 5947 = 7905 - 99 = 9806 + 35 = 7841 \\ -.6303 + 14199 = 7896 - 139 = 7757 + 85 = 7842 \\ +.3963 + 4089 = 8052 - 234 = 7818 + 24 = 7842 \\ 15.7238 + 7862 & - 175 & + 47 = 15.7130 \end{array}$$

$$\text{Jahles } a = +0.2 \\ - 500.3$$

$$l = -1.4 \\ - 503.0$$

$$a-l = +1.6 \\ = +2.7$$

$$b+d = -0.9 \\ = -0.4$$

$$b-c = 500.5 - 507.7$$

$$+ 0.5$$

1285

Plate Center - Constants

24

13.1475	11.8944	0 47	4474	+10" 08	41.7
15.2989	28.3990	0 50	36.72	+12 23	31.9
31.8613	8.1781	0 57	33.33	+14 38	16.3
3 16.22577	3 48.4715	3 2 35	54.79	3 32 10	29.4
20.7526	16.1572	0 56	58.26	+10 43	30.0
22	18		+ 48.67	+ 14	19.7
+ 1.2474	+ 1.8428	0 52	46.93	+10 57	49.7
31	466.5				
+ 48.67					

Plate Center

0" 52 46.93

10" 57 49.7

X-S

+ 84

+ 3X - 13295

$$\begin{aligned}
 +.6648 + 6548 &= 13196 + 95 = 13291 + 4 = 13295 \\
 +.3915 + 9149 &= 13164 + 227 = 13291 + 5 = 13296 \\
 -.2210 + 15431 &= 13221 + 65 = 13286 + 9 = 13295 \\
 23.0604 + 11530 &+ 126 + 7 = 22.8972
 \end{aligned}$$

Y-T

- 7.6X

+ 38

- 7842

$$\begin{aligned}
 .1958 + 5947 &= 7905 - 99 = 7806 - 35 = 7841 \\
 .6313 + 14199 &= 7896 - 139 = 7757 + 85 = 7842 \\
 .3963 + 4089 &= 8052 - 234 = 7818 + 24 = 7842 \\
 5.7238 + 7862 &- 175 + 47 = 15.7130
 \end{aligned}$$

$$\begin{aligned}
 \text{Latter } a &= +0.2 \\
 &- 500.3
 \end{aligned}$$

$$\begin{aligned}
 l &= 1.4 \\
 &- 503.0
 \end{aligned}$$

$$\begin{aligned}
 a - l &= +1.6 \\
 &= +2.7
 \end{aligned}$$

$$\begin{aligned}
 b + d &= -0.9 \\
 &= -0.
 \end{aligned}$$

δ	η	$\Delta\delta$	-48	$+3\eta$	-4
-9.56	-6.32	-32	$+38 = +6$	$-2 = +4$	
-4.09	$+11.02$	-15	$+16 = +1$	$+3 = +4$	
$+9.08$	-10.23	$+44$	$-26 + 8$	$-3 = +5$	
$m + 0.90$	-2.29		-4	$-1 = -$	<u>9</u>

$\Delta\eta$	-3.5η	$+68$	$+6$
-21	$+22 = +1$	$-6 = -5$	
$+36$	$-39 = -3$	$-2 = -5$	
-47	$+36 = -11$	$+5 = -6$	
	$+8$	$+1 =$	$+15$

$$\text{Corr. } \alpha = -0.03$$

$$\delta = +0.7$$

11285

Standard Coordinates

25-

Cafe No 107 mg 8.4

Cafe No. 114 mg 8.5

Cafe No 133 mg 9

C ₁	0 ^h 46	54.75	0 ^h 49	46.45	0 56	43.33
q		54.75		46.46		43.32
E		54.78		46.49		43.19
Mean	0 ^h 46	54.76	0 49	46.47	0 56	43.28
Proc		+49.98		+50.19		+50.05
α	0 47	44.74	0 50	36.66	0 57	33.33
A	0 52	46.93	0 52	46.93	0 52	46.93
$\alpha - A$	-0.5	02.19	-0.2	10.27	+0.4	46.40
Sin "		-302.17		-130.27		+286.38
log "	2.48025	m	2.11484	m	2.45694	m
log cos δ	9.99316	m	9.98976	m	9.99382	m
log S ₀	0.98065	m	0.61184	m	0.95800	m
S ₀	-9.5642	m	-4.1911	m	+9.0782	m
S ₁	-0031	m	-0015	m	+0041	m
S	12.4327	m	17.9074	m	31.0823	m
Y	13.1975	m	18.2989	m	30.8613	m
X-S	+6648	m	+3915	m	-0.2210	m
C	10 03	28.7	12 18	19.4	09 33	05.8
q		28.0		19.7		05.4
E		28.1		19.8		05.4
Mean	10 03	28.3	12 18	19.6	09 33	05.5
Proc	+05	13.4	+05	12.3	+05	10.8
δ	10 08	41.7	12 23	31.9	09 38	16.3
δ	10 57	49.7	10 57	49.7	10 57	49.7
$\delta - \delta$	-49	08.0	+1 25	42.2	-1 19	33.4
tan "		-2948.2		+5143.2		-4774.2
log "	3.46956	m	3.71124	m	3.67890	m
log λ_0	0.80071	m	1.04239	m	1.01005	m
log $\lambda_0 \delta$	9.25269	m	9.34187	m	9.22997	m
log λ_0^2	1.96130	m	1.22368	m	1.91600	m
log η_1	8.2674	m	7.6189	m	8.1994	m
η_0	-6.3199	m	+11.0252	m	-10.2340	m
η_1	+0.0185	m	+0.0041	m	+0.0158	m
η	11.6986	m	29.0293	m	7.7818	m
Y	11.8944	m	28.3990	m	8.1781	m
Y - η	+1.958	m	-6.303	m	+3.963	m

11285-

Standard Coordinates

25-

Cafe No 107 mg 8.4

Cafe No 114 mg 8.5

Cafe No 133 mg 9

C 0 46 54.75

C 0 49 46.45 0 56 43.33

Q 54.75

46.46 43.32

E 54.78

46.49 43.19

Mean 0 46 54.76

0 49 46.47 0 56 43.28

Proc +49.98

+50.79 +50.05

λ 0 47 44.74

0 51 36.66 0 57 33.33

μ 0 52 46.93

0 52 46.93 0 52 46.93

α-μ -0.5 02.19

+0.2 10.27 +0.7 46.40

Sun -302.17

-130.27 +286.39

log 2.48025

2.11484 2.45694

log cos 7.99316

9.98976 9.99382

log S₀ 0.98065

0.61184 0.95800

S₀ -9.5642

-4.1911 +9.1782

S₁ -0031

-0015 +1041

S₂ 12.4327

17.9074 31.0823

X 13.1975

18.2689 31.8613

X-S +.6648

+.3815 +1.2210

C 10 03 28.7

12 18 19.4 09 33 05.8

Q 28.0

19.7 05.4

E 28.1

19.8 05.4

Mean 10 03 28.3

12 18 19.6 09 33 05.5

Proc +05 13.8

+15 12.3 +05 10.8

S 10 08 41.7

12 23 31.9 09 38 16.3

μ 10 57 49.7

10 57 49.7 10 57 49.7

S-E -49 08.0

+1 25 42.2 -1 19 33.4

Sun -2948.2

+5143.2 -4714.2

log 3.46956

3.71124 3.67890

log S₀ 0.80071

1.04239 1.01005

log S₁ 9.25269

9.34187 9.22997

log S₂ 1.96130

1.22368 1.91604

log n₁ 8.2674

7.6189 8.1994

log n₀ -6.3199

11.0252 -10.2240

n +0.0185

+0.0041 +0.0158

n 11.6980

29.0293 7.7818

q 11.8944

28.3490 8.1781

q-n -1.958

+.6303 +.3963

11285

Moon's Center

26

	X	$X - X_0$	ΔX	$(X - X_0)^2$	$(Y - Y_0)^2$	$O - C$
1	22.0000	-1.0580	-2	1.1198	3.8631	-221
2	21.2262	-1.8318	-1	3.3558	3.8815	-37
3	21.0875	-1.9705	0	3.8828	3.8828	-24
4	21.1084	-1.9496	0	3.8009	3.8765	-87
5	21.5571	-1.5009	1	2.2524	8.8783	-69
6	22.0000	-1.0580	2	1.1190	3.8639	-213
7	23.0000	-0.0580	2	0.0034	3.8812	-40
8	24.0000	+0.9420	2	0.8870	3.8750	-102
				R^2 3.8852		

	Y	$Y - Y_0$	ΔY		
1	14.0689	-1.6561	-2	2.7433	212 ⁰ ✓
2	15.0000	-0.7250	-1	0.5257	248
3	15.7250	0.0000	0	0.0000	270 ✓
4	16.0000	+0.2750	0	0.1756	278 ✓
5	17.0000	+1.2750	1	1.6259	310 ✓
6	17.3813	+1.6563	2	2.7449	328 ✓
7	17.6940	+1.9690	2	3.8778	360 ✓
8	17.4534	+1.7284	2	2.9880	29 ✓

Range 176

Approx Center

$X = 22$	Y	14.0689
		17.3813
		31.4502
	Y_0	15.7251
Y_{max}		17.6940
		1.9689
$Com R$		1.9711
X_{min}		21.0875

Moon's Center	X_0	23.0580
	Y_0	15.7250

1
2
3
4
5
6
7
8

1
2
3
4
5
6
7
8

11285

Mann's Center

21

	X	$X - X_0$	ΔX	$(X - X_0)^2$	$(X - Y_0)^2$	$O - C$
1	22.0000	-0.0580	-2	1.1198	38631	-221
2	21.2262	-1.8318	-1	33558	38815	-37
3	21.0875	-1.9705	-0	38828	38828	-24
4	21.1084	-1.9496	+0	38009	38765	-87
5	21.5571	-1.5009	+1	22524	88788	-69
6	22.0000	-1.0580	+2	1.1198	38639	-213
7	23.0000	-0.0580	+2	0.0034	38812	-40
8	24.0000	+0.9420	+2	0.8870	38750	-102
				$\Sigma 38852$		

	Y	$Y - Y_0$	ΔY		
1	14.0689	-1.6561	-2	2.7433	2120
2	15.0000	-0.7250	-0	0.5257	249
3	15.7250	-0.0000	-0	0.0000	270
4	16.0000	+0.2750	+0	0.1756	275
5	17.0000	+1.2750	+1	1.6259	310
6	17.3813	+1.6563	+2	2.7449	327
7	17.6940	+1.9690	+2	3.8778	360
8	17.74534	+1.7284	+2	2.9880	28

Range 176

Affix Center

$X = 22$	Y	14.0689
		17.3813
		31.4502
	Y_0	15.7251
Y_{max}		17.6940
		1.9689
Com R		1.9711

 X_{bailed} 21.0875

Mann's Center	$\{ X_0$	23.0580
	$\{ Y_0$	15.7250

normals.

1	+ 1.76
2	+ 1.31
3	+ 0.00
4	- 0.56
5	- 1.90
6	- 1.76
7	- 0.12
8	+ 1.63
	+ 4.70
	- 4.34
	+ 0.36

+ 234.2
+ 67.7
+ 47.3
+ 170.0
+ 103.5
+ 226.0
+ 24.1
- 96.0
+ 872.8
- 96.0
+ 776.8

+ 366.0
+ 26.6
+ 000
- 23.4
- 87.7
- 353.8
- 78.7
- 177.0
+ 392.6
- 720.6
- 328.0

-a	-b	-17	+DC
+ 9	- 8	- 16	✓
+ 16	- 4	- 5	✓
+ 17	- 0	0	✓
+ 17	+ 1	+ 1	✓
+ 13	+ 6	+ 2	✓
+ 9	+ 8	0	✓
+ 0	+ 9	- 8	✓
- 8	+ 8	- 17	✓

11285

Conditional Equations

27

								0-C	Corr
1	-1.66	-1.66	=	-221	-51	+39	-12	-209	-225
2	-1.83	-0.72	=	-37	-88	+17	-71	+34	+29
3	-1.97	-0.00	=	-24	-94	+0	-94	+80	+80
4	-1.95	+0.27	=	-87	-93	-6	-99	+12	+13
5	-1.50	+1.27	=	-69	-72	-30	-102	+33	+35
6	-1.06	+1.66	=	-213	-51	-39	-98	+123	+123
7	-0.06	+1.97	=	-40	-3	-47	-50	+10	+2
8	+0.94	+1.73	=	-102	+45	-41	+5	-107	-124

$$-8.49 + 4.52$$

$$+292 - 316$$

$$16.42 + 0.36 = +776.8 - 8.49$$

$$av \quad 76 \quad \checkmark$$

$$+0.36 + 14.58 = -328.0 + 4.52$$

$$+0.36 + 0.00 = +17.0 + 0.19$$

$$+14.58 = -345.0 + 4.71 \quad b = -23.7 + 0.32$$

$$16.42 = +776.8 + 8.5 = +785.3 \quad a = +47.8 - 0.52$$

arc 176

$$\frac{p}{n} = .29$$

$$\frac{\sum r}{n} = -3$$

$$\frac{-3}{29} = -10$$

$$\Delta R = -0.1$$

$$\text{Corr} = +0.2$$

$$\text{True } \Delta a = -0.3$$

$$-2R = -4.14 \quad -2R \text{ Corr} = -0.83 \quad -17$$

$$\Delta b = -0.27 \Delta \delta = -0.1$$

$$\Delta a = +0.43 \Delta \alpha = +0.01$$

11285

Conditional Equations

27

1	-1.16	-1.66	=	-221	-51	+39	-12	-209
2	-1.83	-0.72	=	-37	-88	+17	-71	+34
3	-1.97	-0.00	=	-24	-94	+0	-94	+80
4	-1.95	+1.27	=	-87	-93	-6	-99	+12
5	-1.50	+1.27	=	-69	-72	-30	-102	+33
6	-1.06	+1.66	=	-213	-51	-39	-90	+123
7	-0.06	+1.97	=	-40	-3	-47	-50	+10
8	+0.94	+1.73	=	-102	+45	-41	+5	-107

$$+292 = 316$$

av 76

$$16.42 + 1.36 = +776.8$$

$$+0.36 + 14.58 = -328.0$$

$$+0.36 + 0.00 = +17.0$$

$$+14.58 = -345.0$$

$$b = -23.7$$

$$16.42 = +776.8 + 8.5 = +785.3 \quad a = +47.8$$

arc 176

$$\frac{p}{n} = .29$$

$$\frac{\Sigma v}{n} = -3$$

$$\frac{-3}{29} = -10$$

$$AR = -0.1$$

11285

Moon's Mean Position

28

$$\begin{array}{r} X_0 \quad 23.0580 \\ \quad + 24 \\ \hline 23.0604 \end{array}$$

$$\begin{array}{r} Y_0 \quad 15.7250 \\ \quad - 12 \\ \hline 15.7238 \end{array}$$

From Plate Constants

$$\begin{array}{r} 22.8972 \quad \checkmark \\ 22 \\ \hline + 89.72 \end{array}$$

$$\begin{array}{r} 45.7130 \quad \checkmark \\ 18 \\ \hline - 2.2870 \end{array}$$

$$\begin{array}{r} \log S_0 \quad 9.95289 \quad \checkmark \\ \text{" cos } \delta \quad 9.99243 \quad \checkmark \\ \quad 8.50724 \quad \checkmark \\ \log \sin \alpha - A \quad 1.45322 \quad \checkmark \end{array}$$

$$\begin{array}{r} \log \sin \delta \quad 9.2750 \quad \checkmark \\ \log S_2 \quad 9.9057 \quad \checkmark \\ \quad 7.0534 \\ \log \eta \quad 6.2341 \end{array}$$

$$\alpha - A \quad + 28.39 \quad \checkmark$$

$$\begin{array}{r} \eta_1 \quad + 0.0002 \quad \checkmark \\ \eta_0 \quad - 2.2872 \end{array}$$

$$A \quad 0 \quad 52 \quad 46.93 \quad \checkmark$$

$$\log \eta \quad 0.35931 \quad \checkmark$$

$$\alpha_0 \quad 0 \quad 53 \quad 15.32 \quad \checkmark$$

$$\log \sin \delta - \delta \quad 3.02816 \quad \checkmark$$

$$\text{Red} \quad + 4.57 \quad \checkmark$$

$$(\delta - \delta_0) \quad - 1067. \quad \checkmark$$

$$\alpha' \quad 0 \quad 53 \quad 19.89 \quad \checkmark$$

$$\begin{array}{r} - 17 \quad 47.0 \quad \checkmark \\ \delta + 10 \quad 57 \quad 49.7 \quad \checkmark \end{array}$$

$$\delta_0 + 10 \quad 40 \quad 02.7 \quad \checkmark$$

$$\text{Red} \quad + 29.8 \quad \checkmark$$

$$\delta' + 10 \quad 40 \quad 32.5 \quad \checkmark$$

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Mean Mean Position

28

$$\begin{array}{r} X_0 \quad 23.0580 \\ \quad + 24 \\ \hline 23.1614 \end{array}$$

$$\begin{array}{r} Y_0 \quad 15.7250 \\ \quad - 12 \\ \hline 15.7238 \end{array}$$

From Plate Constants

$$\begin{array}{r} 22.8912 \\ 22 \\ \hline + 8972 \end{array}$$

$$\begin{array}{r} 45.7130 \\ 18 \\ \hline - 2.2870 \end{array}$$

$$\begin{array}{r} \log \delta_1 \quad 9.95289 \\ \log \delta_2 \quad 9.99243 \\ \quad 8507241 \\ \log \sin X-A \quad 1.45322 \end{array}$$

$$\begin{array}{r} \log \delta_1 \quad 9.2750 \\ \log \delta_2 \quad 9.9057 \\ \quad 7.0534 \\ \log \eta \quad 6.2341 \end{array}$$

$$X-A \quad - \quad + 28.39$$

$$\eta_1 \quad + 0.0002$$

$$\eta_2 \quad - 2.2872$$

$$A \quad 0 \quad 52 \quad 46.93$$

$$\log \eta \quad 0.359312$$

$$X_0 \quad 0 \quad 53 \quad 15.32$$

$$7.33115$$

$$\log \delta_1 - \delta_2 \quad 3.028162$$

$$\text{Red} \quad + 4.57$$

$$(\delta_1 - \delta_2) \quad - 10.67 \quad 47.0$$

$$- 17 \quad 47.0$$

$$E + 10 \quad 57 \quad 49.7$$

$$\delta_1 + 10 \quad 40 \quad 02.7$$

$$\text{Red} \quad + 29.8$$

$$\delta_1 + 10 \quad 40 \quad 32.5$$

$$\eta \quad 0 \quad 53 \quad 19.89$$

$$\begin{array}{r} 0 \quad 42 \quad 57.599 \\ 0 \quad 42 \quad 52.972 \\ \hline + 4.627 \end{array}$$

$$\begin{array}{r} 0 \quad 48 \quad 47.338 \\ 0 \quad 48 \quad 42.811 \\ \hline + 4.527 \end{array}$$

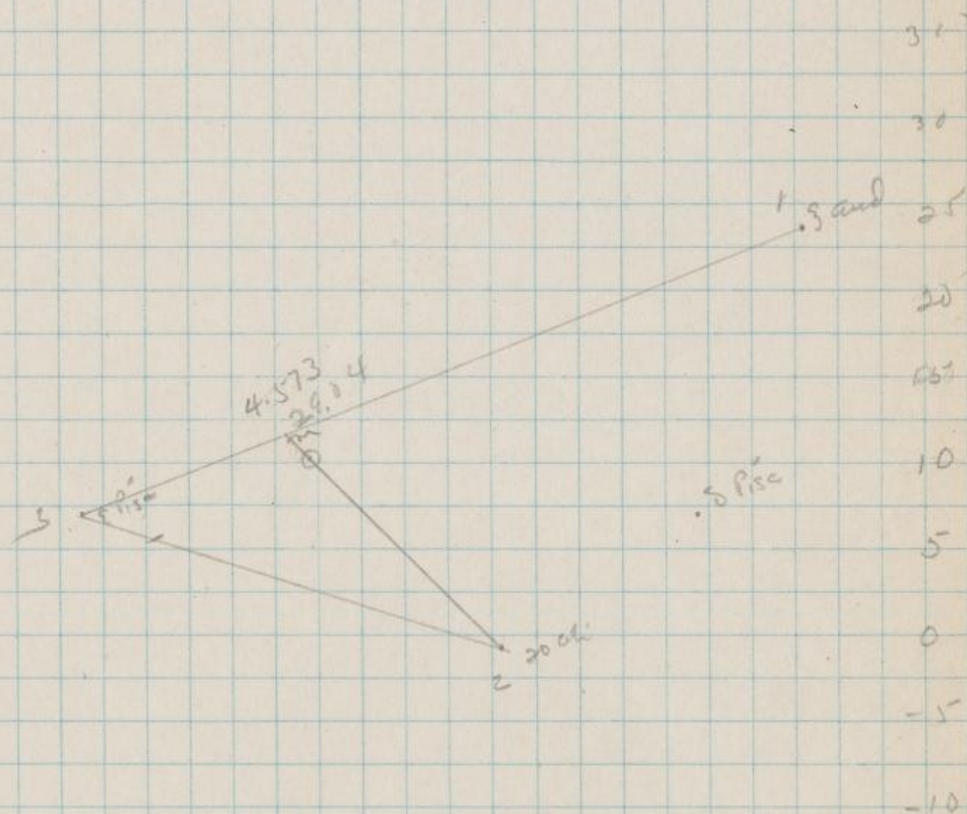
$$\begin{array}{r} 39.471 \\ 0 \quad 58 \quad 34.919 \\ \hline + 4.552 \end{array}$$

$$\begin{array}{r} 23 \quad 49 \quad 66.45 \\ 23 \quad 48 \quad 37.52 \\ \hline + 28.83 \end{array}$$

$$\begin{array}{r} -1 \quad 35 \quad 30.58 \\ -1 \quad 36 \quad 01.06 \\ \hline + 29.48 \end{array}$$

$$\begin{array}{r} 46.99 \\ 7 \quad 26 \quad 17.82 \\ \hline + 29.67 \end{array}$$

$$\begin{array}{r} 4.627 \\ 4.552 \\ \hline .075 \end{array}$$



9 7 9 3 1 59 57.55 53.57 49 47 45 43 41 39 -15
1.2 0.2
-20

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Reduction to Apparent Place

29

$H + x$	05	37.1	84	16.5	$\delta_0 + 10$	40.0
H	04	43.7				
x	0	53.4				
G	23	13.1				
$G + x$	0	06.5	1	37.5		

$$\log \cos \delta_0 \quad 9.9924$$

$$\log 1 + 0.8901$$

$$\log(1) \quad 0.8825$$

$$\log \cos G + x \quad 9.9998$$

$$\log g \quad 1.3385$$

$$\log \sin(G + x) \quad 8.4527$$

$$\log \tan \delta \quad 9.2750$$

$$8.8239$$

$$\log g' \quad 1.3383$$

$$7.8901$$

$$+ 3.281$$

$$+ 0.008$$

$$+ 1.278$$

$$+ 4567$$

$$\log \sin \delta_0 \quad 9.2674$$

$$\cos(H + x) \quad 8.9989$$

$$\log h \quad 1.2774$$

$$\log \sin(H + x) \quad 9.9978$$

$$\sec \delta_0 \quad 0.0076$$

$$8.8239$$

$$\log h' \quad 9.5437$$

$$h \quad 0.1067$$

$$g' + 2 \quad 1.790$$

$$h' + 0.349$$

$$G + 7.631$$

$$+ 29770$$

11285

Reduction to Apparent Place

29

$$H + \lambda \quad 05 \quad 37.1 \quad 84 \quad 16.5 \quad \delta_0 + 10 \quad 40.0$$

$$H \quad 04 \quad 43.7$$

$$\lambda \quad 0 \quad 53.4$$

$$G \quad 23 \quad 13.1$$

$$G + \lambda \quad 0 \quad 06.5 \quad 1 \quad 37.5$$

$$\log \cos \delta_0 \quad 9.9924$$

$$\log 1 + 0.8901$$

$$\log 11 \quad 0.8825$$

$$\log \cos \theta + \lambda \quad 9.9998$$

$$\log g \quad 1.3385$$

$$\log \sin(\theta + \lambda) \quad 8.4527$$

$$\log \tan \delta \quad 9.2750$$

$$8.8239$$

$$\log g' \quad 1.3383$$

$$7.8901$$

$$g \quad +3.281$$

$$g \quad +0.008$$

$$h \quad +1.278$$

$$+4.567$$

$$\log \sin \delta_0 \quad 9.2674$$

$$\cos(H + \lambda) \quad 8.9988$$

$$\log h \quad 1.2774$$

$$\log \sin(H + \lambda) \quad 8.9978$$

$$\sec \delta_0 \quad 0.0076$$

$$8.8239$$

$$\log h' \quad 9.5437$$

$$h \quad 0.1067$$

$$g' + 21.790$$

$$h' + 0.349$$

$$u + 7.631$$

$$+29.770$$

11285

Lunar Parallax

30

α'	0	53	19.89 ✓
θ	02	10	32.80 ✓
$\theta - \alpha' + 0.1$	1	17	12.91 ✓
$= + 19$		18	13.65 ✓
$\frac{1}{2}\alpha - \alpha'$		+ 7	15.18 ✓
$\theta - \alpha' - " + 19$		10	58.47 ✓

 π 58 11.3 ✓

9.86913

$\log \sin \pi$ 8.22854 ✓
 $\log \sin (\theta - \alpha')$ 9.51927 ✓
 $\log \sec \delta'$ 0.00833 ✓
 $\log \sin \alpha - \alpha'$ 7.62527

 $\alpha - \alpha' + 14'$ 3 0.36 ✓ $= + 58.02$

$\log \cos \frac{1}{2} \alpha$ 0.00
 $\log \cos \frac{1}{2} \alpha - "$ 0.02481 ✓
 $\log \tan x$ 9.98208 ✓

 y 43 49 04.8 ✓

δ 10 40 32.5 ✓
 $X - \delta'$ 33 08 32.3 ✓

9.82640

$\log \sin \pi$ 8.22854 ✓
 $\log \sin (\theta - \delta')$ 9.73776 ✓
 $\log \sec x$ 0.15966 ✓
 $\log \sin \delta - \delta'$ 7.95236 ✓

 $\delta - \delta'$ + 30 48.4 ✓ δ 11 11 20.9 ✓ $\theta - \delta$ 11 11 15.4 ✓ $\theta - \delta$ + 5.5 ✓

curr. + 0.7
 2nd ord. ref. + 0.0

 True Corr. - 0.1 $\delta = + 11$ 11 20.8 $\delta - \delta$ + 5.4

α 0 54 17.91 ✓
 $\theta - \alpha$ 0 54 17.21 ✓

$\theta - \alpha$ + 0.70
 curr. - 0.03

 True Corr. + 0.01 $\alpha = 0$ 54 17.92 $= \theta - \alpha$ + 0.71

11285

Lunar Parallax

30

α'	0	53	19.89'
θ	02	10	32.81'
$\theta - \alpha'$	01	17	12.91'
$= +19$	18	13.45'	
$\frac{1}{2} \alpha - \lambda$	+	7	15.18'
$\theta - \lambda$	$+19$	10	58.47'

	9.95727
$\log \sin \alpha$	0.01
$\log \sin \theta$	0.02481
$\log \tan \alpha$	9.98205

γ	43	48	048
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δ	10	40	32.5'
$\lambda - \delta'$	33	08	323'

	9.82640
$\log \sin \pi$	8.22854
$\sin \lambda - \delta'$	9.73776
$\cos \lambda$	0.15966
$\sin \delta - \delta'$	7.95236

$\delta - \delta'$	+30	48.4
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δ	11	12	209
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$\phi \delta$	11	11	15.4
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O-C	+5.5
-----	------

curr	+0.7
2nd ord. ref	+0.0

2nd Cor	-0.1
---------	------

δ	11	11	20.8
----------	----	----	------

O-C	+5.4
-----	------

π	58	11.3
-------	----	------

	9.86913
$\log \sin \pi$	8.22854
" $\sin (\theta - \alpha')$	9.51927
" $\sec \delta$	0.00833
$\sin \lambda - \alpha'$	7.62827

$\alpha - \alpha'$	+14	30.36
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	+58.02
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λ			
α	0	54	17.91
$\phi \lambda$	0	54	17.24

O-C	+0.70
-----	-------

curr	-0.03
------	-------

2nd Cor	+0.01
---------	-------

λ	0	54	17.92
-----------	---	----	-------

O-C	+0.71
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