

KG
11366
v.1039

C LXXXVIII

188

Plate	Date	Page
13308	Sept. 4. 1917	1
13329	" 6. "	11
13330	" " "	21

16861-
10536
6347

13308

Star measures

1

L	19378	16030	18908	17825
17.0	19290 ⁹⁶	16118	16158 ⁵⁶	10570
19.3	02	18	54	7.0
	78	30	08	25
	<u>17.0082</u>	<u>17.0088</u>	<u>19.2752</u>	<u>19.2745</u>

2	19693	18570	18570	18312
19.9	11080	17198 ⁹⁷	14428	12450
13.4	80	95	28	50
	93	70	70	12
	<u>19.8613</u>	<u>19.8627</u>	<u>13.4142</u>	<u>13.4138</u>

3	18148	18072	18452	17949
33.4	14668	11552	15992	10405
14.2	68	52	92	05
	48	72	52	49
	<u>33.3480</u>	<u>33.3480</u>	<u>14.2460</u>	<u>14.2456</u>

4	17128	19208	17733	18323
34.4	13256 ⁵⁴	13082	11387	14653
22.6	52	82	87	53
	28	08	33	23
	<u>34.3874</u>	<u>34.3874</u>	<u>22.6346</u>	<u>22.6330</u>

Mars

L	17703	16280	16040	16850
23	14679	9320 ¹⁵	10834	12045 ⁴⁸
15.3	79	10	34	51
	03	80	40	50
	<u>25.3024</u>	<u>25.3035</u>	<u>15.5206</u>	<u>15.5198</u>

2	17358	16270		
25.7	11050 ⁵²	12560 ⁶⁵		
16.0	54	70		
	58	70		
	<u>25.6306</u>	<u>25.6295</u>		

13308

Star measures.

1

L	1.9378	116030	18908	17825
17.0	19290 ⁹⁶	16118	16158 ⁵⁶	10570
19.3	02	18	54	70
	78	30	08	25
	<u>170082</u>	<u>170088</u>	<u>192752</u>	<u>192745</u>

2	19693	18570	18570	18312
19.4	11080	17198 ⁹⁷	14428	12450
13.4	80	95	28	50
	93	70	70	12
	<u>198613</u>	<u>198627</u>	<u>134142</u>	<u>134138</u>

3	18148	18072	18452	17949
33.4	14668	11552	15992	10465
14.2	68	52	92	05
	48	72	52	49
	<u>333480</u>	<u>333480</u>	<u>242460</u>	<u>242456</u>

4	17128	19208	17733	18323
34.4	13256 ⁵⁴	13082	11387	14653
22.2	52	82	87	53
	28	08	33	23
	<u>343874</u>	<u>343874</u>	<u>226346</u>	<u>226330</u>

Mars

L	177203	16280	116040	16850
25	14679	9320 ¹⁵	10834	12045
15.3	79	10	34	51
	03	80	40	50
	<u>253024</u>	<u>253035</u>	<u>155206</u>	<u>155198</u>

2	17358	16270		
21.7	11050 ⁵²	12560 ⁶⁵		
16.0	54	70		
	58	70		
	<u>256306</u>	<u>256295</u>		

13308

Moon

2

3	17388	16260
258	9009	14644
16.8	04	44
	88	60
	<u>25,8384</u>	<u>25,8384</u>

4	17424	16830
25.4	12414	11840
18.	14	40
	24	30
	<u>25,5010</u>	<u>25,5010</u>

5
25
18.4

16712	16900
11531	12074
33	74
12	00
<u>18,5180</u>	<u>18,5174</u>

6
24
18.9

16062	16715
7212	15562
12	6463
62	15
<u>18,8850</u>	<u>18,8848</u>

7
23.9
18.9

16250	16088
731518	1503026
21	22
50	88
<u>18,8932</u>	<u>18,8938</u>

8	16210	16508
23	13300	9412
18.7	00	12
	10	08
	<u>23,2910</u>	<u>23,2904</u>

16790	16876
860402	15056
00	56
90	76
<u>18,8188</u>	<u>18,8180</u>

13308

Moon

2

3	17388	16200
258	90094	14644
16.8	04	44
	88	60
	<u>25.8384</u>	<u>25.8384</u>

4	17424	16830
5.4	12414	11840
8.	14	40
	24	30
	<u>25.5010</u>	<u>25.5010</u>

2
5
3.4

16712	16900
11531	12074
33	74
12	00
<u>185120</u>	<u>185174</u>

2
4
8.9

16062	16715
7212	15562
12	0463
62	15
<u>188850</u>	<u>188840</u>

2
3.9
8.9

16250	16088
731518	1503026
21	22
50	88
<u>188932</u>	<u>188738</u>

8	16240	16508
23	113300	9452
18.7	00	12
	10	08
	<u>282910</u>	<u>23,2904</u>

16740	16876
860402	15056
00	56
90	76
<u>188188</u>	<u>188180</u>

13308

Times Etc

3

Date Sept. 4, 1917

Exp. & Stars	03	07	✓		03	19	✓
" Moon	03	12		28.7	✓	03	12

Clock slow				31.9	✓		
------------	--	--	--	------	---	--	--

H. Sid. Time	03	13		0.8	✓		
H. Long	04	44		31.05	✓		
G. Sid. Time	07	57		31.85	✓	$\theta = +1^h 05^m$	✓
" " " M.N	10	52		8.33	✓		
Interval	21	05		23.52	✓		
Red		03		27.30	✓		
G. M. T	21	01		56.22	✓	21 ^h 03 23	✓

From Naut. Alman.

R.A.

Dec.

Moon 2 ^h	02	07		56.56	✓	+17	43	38.1	✓
Motion 1 ^m				2.35	23	✓		+10.569	✓
" 1 ^m 9.37				4.56	✓			20.5	✓
Tabular Place	02	08		01.12	✓	+17	43	58.6	✓

Moon's Age 18^d

9 34 = 13.8 ✓

$$\begin{array}{r}
 a = -504.4 \\
 + 240 \\
 - 480.4
 \end{array}$$

Parallax	59	06.0	✓
Semi-diam	10	07.8	✓
R		967.8	✓
Aug.		14.8	✓
Spl. 4		-0.4	
R		982.2	✓
R		2105.4	✓
a R		-1011	✓
(1+a)R		20043	✓
R2		4.0172	✓

13308

Times Etc

3

Date Sept 4, 1917

Exp. to Stars	03	07		03	19
" " Moon	03	12	28.7	03	12 29.1
Clock slow			31.9		

H Sid Time	03	13	0.8	
H. Yang	04	44	31.05	
G. Sid Time	07	57	31.85	$\Theta = +1^h 05^m$
" " " M.N	10	52	8.33	
Interval	21	05	23.52	
Red		03	27.30	
G. M. T	21	01	50.22	21 ^h 03 23

From Naut. Alman.		RA		Dec.
Moon 21 ^h	02	07	56.56	+17 43 38.1
Motion 1 ^m			235.23	10.569
" 1 ^m 937			4.56	20.5
Tabular Place	02	08	01.12	+17 43 58.6

Moon's Age 18^d

934" = 13.8

$a = -504.4$
 $+240$
 -480.4

Parallax	59	06.0
Semi-diam	10	078
R		9678
Aug.		14.8
Sr 4		-0.4
R		9822
R		2105.4
a R		-1011
(1+a)R		2.0043
R2		4.0172

13308

Plate Center + Constraints

4

$$\begin{array}{rclcl}
 X & 17.0085 & 19.8620 & 33.3480 & 34.3874 \\
 S & 16.8626 & 19.8248 & 33.9957 & 35.1381 \\
 X-S & +.1459 & +.0372 & -.6477 & -.7507
 \end{array}$$

$$\begin{array}{rclcl}
 Y & 19.2748 & 13.4140 & 14.2458 & 22.6338 \\
 \eta & 19.2462 & 13.0734 & 13.8648 & 22.6678 \\
 Y-\eta & +.0286 & +.3406 & +.3810 & -.0335
 \end{array}$$

$$\begin{array}{rclcl}
 X-S & +500X & & +60.2Y & +4.4X -11194 \\
 +.1459 & +8504 & = 9963 & +1160 & = 11123 + 77 = 11194 \\
 +.0372 & +9931 & = 10303 & +807 & = 11110 + 83 = 11193 \\
 -.6477 & +16074 & = 10197 & +857 & = 11054 + 140 = 11194 \\
 -.7507 & +17194 & = 9687 & +1362 & = 11049 + 145 = 11194 \\
 23.8338 & +11917 & = & +1017 & +105 = 24.0183
 \end{array}$$

$$\begin{array}{rclcl}
 Y-\eta & +500Y & & -61.1X & +2.2Y -8928 \\
 +.0286 & +9637 & = 9923 & -1039 & = 8884 + 42 = 8926 \\
 +.3406 & +6707 & = 10113 & -1213 & = 8900 + 29 = 8929 \\
 +.3810 & +7123 & = 10933 & -2037 & = 8896 + 31 = 8927 \\
 -.0335 & +11317 & = 10982 & -2101 & = 8881 + 50 = 8931 \\
 16.8880 & +8444 & & -1456 & +37 = 16.6977
 \end{array}$$

$$\begin{array}{rclcl}
 \text{Tables } a & -0.6 & e & -1.4 & a-e & +0.8 & d+d & -0.5 \\
 \text{Obs.} & -504.4 & & -502.2 & & -2.2 & & +0.9 \\
 & -503.8 & & -500.8 & & = -3.0 & & +1.4
 \end{array}$$

13308

Plate Center + Constants

4

X	17.0085	19.8620	33.3480	34.3874
Σ	16.8626	19.8248	33.9957	35.1381
X-Σ	+0.1459	+0.0372	-0.6477	-0.7507

y	19.2748	13.4140	14.2458	22.6338
Σ	19.2462	13.0734	13.8648	22.6673
y-Σ	+0.0286	+0.3406	+0.3810	-0.0335

$$\begin{array}{rcll}
 -S & +500x & & +60.2y \\
 1459 + 8504 & = & 9963 + 1160 & = 11123 + 81 = 11194 \\
 0372 + 9931 & = & 10303 + 807 & = 11110 + 83 = 11193 \\
 6477 + 16679 & = & 10197 + 857 & = 11054 + 140 = 11194 \\
 7507 + 17194 & = & 9687 + 1362 & = 11049 + 145 = 11194 \\
 238338 + 11917 & = & 10 & + 1017 + 105 = 24.0183
 \end{array}$$

$$\begin{array}{rcll}
 -\eta & +500y & & -61.1x \\
 0286 + 9637 & = & 9923 - 1039 & = 8884 + 42 = 8926 \\
 3406 + 6707 & = & 10113 - 1213 & = 8900 + 29 = 8929 \\
 3810 + 7123 & = & 10933 - 2037 & = 8896 + 31 = 8927 \\
 0335 + 11317 & = & 10982 - 2101 & = 8881 + 50 = 8931 \\
 168880 + 8444 & & -1456 & + 37 = 16.6977
 \end{array}$$

$$\begin{array}{l}
 a = -0.6 \\
 -504.4
 \end{array}$$

$$\begin{array}{l}
 b = -1.4 \\
 -5022
 \end{array}$$

$$\begin{array}{l}
 c = +0.8 \\
 -2.2
 \end{array}$$

$$\begin{array}{l}
 d + d = 0.5 \\
 + 0.9
 \end{array}$$

1
2
3
4
5
6
7
8

1
2
3
4
5
6
7
8

13308

Mean Center

5

	x	$x - x_0$	$(x - x_0)^2$	$+(y - y_0)^2$	$0 - c$	
1	25.3029	+1.4689	-1	2.1574	4.0313	+ 141
2	25.6300	+1.7960	-0	3.2256	4.0161	- 11
3	25.8384	+2.0044	0	4.0176	4.0176	+ 4
4	25.5010	+1.6670	+0	2.7789	4.0134	- 38
5	25.0000	+1.1660	+1	1.3596	4.0126	- 46
6	24.0000	+0.1660	+1	0.0276	4.0116	- 56
7	23.8340	0.0000	+1	0.0000	4.0184	+ 12
8	23.2907	-0.5433		0.2951	4.0181	+ 9
				R^2	4.0172	

	y	$y - y_0$	
1	15.5202	-1.2688	-1
2	16.0000	-0.8890	-1
3	16.8890	0.0000	0
4	18.0000	+1.1110	+1
5	18.5177	+1.6287	+1
6	18.8849	+1.9959	+1
7	18.8935	+2.0045	+1
8	18.8184	+1.9294	+1

anc.

133 ✓

116 ✓

90 ✓

56 ✓

36 ✓

5

0

374 ✓

Range 149 ✓

Corr. $R = 2.0043$ x_{max} 25.8384 x_0 23.8341 y_{max} 18.8935 y_0 16.8892

1
2
3
4
5
6
7
8

1
2
3
4
5
6
7
8

13308

Mean Center

5

	x	$x - x_0$	$(x - x_0)^2$	y	$y - y_0$	$(y - y_0)^2$	$O - C$
1	25.3029	+1.4689	-1	2.1574	4.0313	+	141
2	25.6300	+1.7960	-0	3.2256	4.0161	-	11
3	25.8384	+2.0044	-0	4.0176	4.0176	+	4
4	25.5010	+1.6670	+0	2.7789	4.0134	-	38
5	25.0000	+1.1660	+1	1.3596	4.0126	-	46
6	24.0000	+0.1660	+1	0.0276	4.0116	-	56
7	23.8340	0.0000	+1	0.0000	4.0184	+	12
8	23.2907	-0.5433	-1	0.2954	4.0184	+	9
				R^2	4.0172		

	x	$x - x_0$	$(x - x_0)^2$	y	$y - y_0$	$(y - y_0)^2$	arc
1	15.5202	-1.2688	-1	1.8739	1.33		
2	16.0000	-0.8890	-1	0.7905	1.16		
3	16.8890	0.0000	0	0.0000	9.0		
4	18.0000	+1.1110	+1	1.2345	5.6		
5	18.3177	+1.6287	+1	2.6530	3.6		
6	18.8849	+1.9959	+1	3.9840	5		
7	18.8935	+2.0045	+1	4.0184	0		
8	18.8184	+1.9294	+1	3.7230	3.44		
							Range 144

Corr. $R = 2.0043$ x_{max} 25.8384 x_0 23.8341 y_{max} 18.8935 y_0 16.8892

Formation of normals.

1	- 2.01	+ 208.04	- 193.0
2	- 1.60	- 19.8	+ 9.8
3	+ 0.00	+ 8.0	0.0
4	+ 1.86	- 63.5	- 42.2
5	+ 1.91	- 53.7	- 75.0
6	+ 0.33	- 9.5	- 111.4
7	+ 0.00	0.0	+ 24.0
8	- 1.04	- 4.8	+ 17.4
	+ 4.10	+ 712.0	+ 51.2
	- 4.65	- 151.3	- 421.6
	- 0.55	- 39.3	- 370.4

13308

Conditional Equations

6

0 - e

1	+1.47	-1.37 = +141 $\frac{1}{4}$	-5	+28 = +23	+118
2	+1.80	-0.89 = -11 $\frac{1}{4}$	-6	+18 = +12	-23
3	+2.00	0.00 = +4	-7	0 = -7	+11
4	+1.67	+1.11 = -38	-6	-23 = -29	-9
5	+1.17	+1.63 = -46	-4	-33 = -37	-9
6	+0.17	+1.99 = -56	-1	-41 = -42	-14
7	0.00	+2.00 = +12	0	-41 = -41	+53
8	-0.54	+1.93 = +9	+2	-39 = -37	+46

+228 -55

AV 35

$$+13.86 - 0.55 = -39.3 \checkmark$$

$$-0.55 + 18.28 = -370.4$$

$$+ () - 0.2 = -1.6$$

$$+18.26 = -372.0$$

$$t = -20.4 \checkmark$$

$$+13.86 = -39.3 - 11.2 = -50.5 \quad a = -3.6 \checkmark$$

ARC 149

$$\frac{P}{m} = .15 \checkmark$$

$$\underline{EK} = +21.6 \checkmark$$

$$\frac{+21.6}{.15} = +144 \checkmark$$

$$\Delta R = +1.8 \checkmark$$

13308

Conditional Equations

10

1	+1.47	-1.37	= +1.41	$\frac{1}{4}$	-5	+28	= +23	+118
2	+1.80	-0.89	= -1.1	$\frac{1}{4}$	-6	+18	= +12	-23
3	+2.00	0.00	= +4		-7	0	= -7	+11
4	+1.67	+1.11	= -3.8		-6	-23	= -29	-9
5	+1.17	+1.63	= -4.6		-4	-33	= -37	-9
6	+0.17	+1.99	= -5.6		-1	-41	= -42	-14
7	0.00	+2.00	= +1.2		0	-41	= -41	+53
8	-0.54	+1.43	= +9		+2	-39	= -37	+40

+228 -55

AV 35

$$+13.86 - 0.55 = -39.3$$

$$-0.55 + 18.28 = -370.4$$

$$+1 \quad 1 \quad -0.2 = -1.6$$

$$+18.26 = -372.0$$

$$t = -20.4$$

$$+13.86 = -39.3 - 11.2 = -50.5 \quad a = -3.6$$

ARC 149

$$\frac{P}{\pi} = .15$$

$$\frac{EK}{\pi} = +21.6$$

$$\frac{+21.6}{.15} = +144$$

$$\Delta R = +1.8$$

13308

Moon Mean Position

7

$$\begin{array}{r} X_0 \quad 23.8340'' \\ \quad - 2'' \\ \hline 23.8338'' \end{array}$$

$$\begin{array}{r} 40 \quad 16.8890'' \\ \quad - 10'' \\ \hline 16.8880'' \end{array}$$

Frame Plate Constants

$$\begin{array}{r} 24.0183'' \\ 22 \\ \hline + 2.0183'' \end{array}$$

$$\begin{array}{r} 16.6977'' \\ 18 \\ \hline - 1.3023'' \end{array}$$

$$\begin{array}{r} \log S_0 \quad 0.30499'' \\ \text{Cor } \delta_0 \quad 9.97988'' \\ \quad 8.50724'' \\ \log \sin X-A \quad 1.81787'' \end{array}$$

$$\begin{array}{r} \log \tan \delta \quad 9.4934'' \\ S_0^2 \quad 0.6100'' \\ \quad 7.1534'' \\ \eta_1 \quad 7.1568'' \end{array}$$

$$\begin{array}{r} X-A \quad + 65.74'' \\ \quad + 0.1 \quad 05.74'' \\ A \quad 0.2 \quad 0.5'' \quad 59.95'' \end{array}$$

$$\begin{array}{r} \eta_1 \quad + 0.0014'' \\ \eta_0 \quad - 1.3037'' \end{array}$$

$$X_0 \quad 0.2 \quad 0.7 \quad 0.569''$$

$$\begin{array}{r} \log \eta_0 \quad 0.11578'' \\ \quad 7.33115'' \end{array}$$

$$\text{Red} \quad + 0.416''$$

$$\log \tan \delta - 2 \quad 2.78403''$$

$$X' \quad 0.2 \quad 0.7 \quad 0.985''$$

$$\begin{array}{r} S-S \quad -608.2'' \\ \quad -10 \quad 08.2'' \\ D + 1.7 \quad 28 \quad 26.6'' \end{array}$$

$$S_0 + 1.7 \quad 18 \quad 18.4''$$

$$\text{Red} \quad + 21.3''$$

$$S + 1.7 \quad 18 \quad 39.7''$$

13308

Moon's Mean Position.

7

$$\begin{array}{r} X_0 \quad 23.8340 \\ \quad \quad - 2 \\ \hline 23.8338 \end{array}$$

$$\begin{array}{r} Y_0 \quad 16.8890 \\ \quad \quad - 10 \\ \hline 16.8880 \end{array}$$

From Plate Constants.

$$\begin{array}{r} 24.0183 \\ \quad \quad 22 \\ \hline + 2.0183 \end{array}$$

$$\begin{array}{r} 16.6977 \\ \quad \quad 18 \\ \hline - 1.3023 \end{array}$$

$$\begin{array}{l} \log S_0 \quad 0.30499 \\ \text{Cal } S_0 \quad 9.97888 \\ \quad \quad 8.50724 \\ \log S_0 \times A \quad 1.81787 \end{array}$$

$$\begin{array}{l} \log \tan \delta \quad 9.4934 \\ S_0^2 \quad 0.6100 \\ \quad \quad 7.1534 \\ \eta_1 \quad 7.1568 \end{array}$$

$$\begin{array}{l} \alpha - A \quad + 65.74 \\ \quad \quad + 01 \quad 05.74 \\ A \quad 02 \quad 05 \quad 59.95 \end{array}$$

$$\begin{array}{l} \eta_1 \quad + 0.0014 \\ \eta_0 \quad - 1.3037 \end{array}$$

$$\alpha_0 \quad 02 \quad 07 \quad 05.69$$

$$\begin{array}{l} \log \eta_0 \quad 0.11518 \\ \quad \quad 7.33115 \end{array}$$

$$\text{Red} \quad + 04.16$$

$$\log \tan \delta_2 \quad 2.78403$$

$$\alpha' \quad 02 \quad 07 \quad 09.85$$

$$\begin{array}{l} S - E \quad - 608.2 \\ \quad \quad - 10 \quad 08.2 \\ S + 17 \quad 28 \quad 26.6 \\ S_0 + 17 \quad 18 \quad 18.4 \\ \text{Red} \quad + 2 \quad + 21.3 \\ S + 17 \quad 18 \quad 39.7 \end{array}$$

13308.

Lunar Parallax.

8

α'	02	07	09.85 ^u	Π	59' 06" 0 ^u
θ	03	13	0.80 ^u		
$\theta - \alpha'$	+01	05	50.95		9.86913
$=$	+16	27	44.25 ^u	$\log \sin \Pi$	8.23529 ^u
$\frac{1}{2}(\alpha - \alpha')$		06	30.25	$\sin \theta - \alpha'$	9.45235 ^u
$\theta - \alpha' - \frac{1}{2}(\alpha - \alpha')$	+16	21	14.00 ^u	$\sec \delta'$	0.02114 ^u
				$\sin \alpha \delta'$	7.57794 ^u
			9.95727		
$\log \cos \frac{1}{2} \alpha \alpha'$			0.00000	$\alpha \delta'$	+13' 0.49
$\sec \theta \alpha' - \frac{1}{2} \alpha \alpha'$			0.01794 ^u	$=$	+52 ^s .03
$\log \tan \gamma$			9.97521 ^u		
γ	+43	21	55.4 ^u		
δ'	+17	18	39.7 ^u		
$\gamma - \delta'$	26	03	15.7 ^u		
			9.82640		
$\log \sin \Pi$			8.23529 ^u		
$\sin \gamma - \delta'$			9.64269 ^u		
$\csc \gamma$			0.16327 ^u		
$\sin \delta - \delta'$			7.86765		
$\delta - \delta'$	+25		20.8		
δ	+17	44	0.5 ^u	α	02 08 01.88 ^u
$\alpha \delta$	+17	43	58.6 ^u	$\alpha \delta$	02 08 01.12 ^u
$\theta - \alpha$		+19		$\theta - \alpha$	+0.76 ^u
2 nd Alt Ref		0.0		curr	-0.04 ^u
curr.		0.0			
				α	02 08 01.84
				$\theta - \alpha$	+0.72

13308.

Lunar Parallax.

8

α'	02	07	09.85"	Π	59' 06.0"
θ	03	13	0.80"		
$\theta - \alpha'$	+01	05	50.95"		9.86913
$\frac{1}{2}(\alpha - \alpha')$	+16	27	44.25"	$\log \sin \Pi$	8.23529
$\theta - \alpha' - \frac{1}{2}(\alpha - \alpha')$	+16	21	14.00"	$\sin \theta - \alpha'$	9.45235
				$\sec \delta'$	0.02114
				$\sin \alpha \delta'$	7.57784

	9.95727
$\log \cos \frac{1}{2} \alpha - \alpha'$	0.00000
$\sec (\theta - \alpha' - \frac{1}{2} \alpha - \alpha')$	0.01794
$\log \tan \gamma$	9.97521

$$\alpha \alpha' + 13' 30.49''$$

$$= +52.03''$$

$$\gamma + 43' 21'' 35.4''$$

$$\delta' + 17' 18'' 39.7''$$

$$\gamma - \delta' 26' 03'' 15.7''$$

	9.82640
$\log \sin \Pi$	8.23529
$\sin \gamma - \delta'$	9.64269
$\csc \gamma$	0.16327
$\sin \delta - \delta'$	7.86765

$$\delta - \delta' + 25' 20.8''$$

$$\delta + 17' 44'' 0.5''$$

$$\alpha \delta + 17' 43'' 58.6''$$

$$\alpha 02' 08'' 01.88''$$

$$\alpha \delta 02' 08'' 01.12''$$

$$O - C + 1.9''$$

$$O - C + 0.76''$$

$$2^{nd} \text{ And Ref } 0.0$$

$$\text{Curv } - 0.04''$$

$$\text{Curv } 0.0$$

$$\alpha 02' 08'' 01.84''$$

$$O - C + 0.72''$$

1
20
20
2
20
6
3
34
8
1
24
15
2
20
15
3
20
16

13329

Star Measures

11

1	15588	18318	16300	17720
20.2	13318	10562	702220	17002
20.9	18	76	18	02
	88	08	00	10
	<u>20.2270</u>	<u>20.2260</u>	<u>20.9280</u>	<u>20.9283</u>

2	17308	18730	16210	18972
20.9	8194	1783234	1555452	961210
6.0	94	36	50	08
	98	20	04	62
	<u>20.9105</u>	<u>20.9105</u>	<u>6.0658</u>	<u>6.0648</u>

3	16950	16964	16938	16286
34.7	9322	14588	9692	13510
8.7	22	88	92	10
	40	50	28	76
	<u>34.7621</u>	<u>34.7629</u>	<u>8.7239</u>	<u>8.7227</u>

Mean.

1	17358	16082
24.4	1292022	10510
15.0	24	10
	58	82
	<u>24.4436</u>	<u>24.4428</u>

3	16736	16550
25.0	1114042	12135
15.6	44	4138
	36	50
	<u>15.5594</u>	<u>15.5598</u>

3	17204	16300
25.2	14990	8504
16.0	90	04
	04	00
	<u>25.2214</u>	<u>25.2204</u>

1
20
20

2
20
6

3
34
8

1
24
15

2
25
15

3
20
16

1 3 3 2 9

Star Measures

11

1	15588	18318	16300	17720
20.2	13818	10562	702220	17002
20.9	18	76	18	02
	88	08	00	10
	<u>20.2270</u>	<u>2.02260</u>	<u>20.9280</u>	<u>20.9283</u>

2	17308	18730	16210	18952
20.9	8194	1783234	1555952	9602
6.0	7194	36	50	08
	98	20	04	62
	<u>20.9405</u>	<u>20.9105</u>	<u>6.0658</u>	<u>6.0648</u>

3	16950	16964	16938	16284
34.7	9322	14588	9692	1351
8.7	22	88	92	1
	40	50	28	7
	<u>34.7621</u>	<u>34.7629</u>	<u>8.7239</u>	<u>8.722</u>

Moon.

1	17358	16082
24.4	1292022	10510
15.0	24	10
	58	82
	<u>24.4436</u>	<u>24.4428</u>

3	16736	16550
25.0	1114042	12135
15.6	44	4138
	36	50
	<u>15.5594</u>	<u>15.5588</u>

3	17204	16300
25.2	14940	8504
16.0	90	04
	04	00
	<u>25.2214</u>	<u>25.2204</u>

2
1
5
25
17
6
15
17
2
25
18
8
23
18

Moon

4	17210	16900
25.3	13956	10160
16.5	56	60
	10	00
<u>25.3254</u>		<u>25.3260</u>

5	17548	17545
25.2	14658	10448
17.0	54	50
	48	45
<u>25.2892</u>		<u>25.2904</u>

6	16030	16212
25.0	9004	13240
17.6	94	42
	30	12
<u>17.7081</u>		<u>17.7029</u>

7	16354	16546
24.0	11654	11240
18.4	46	42
	54	46
<u>18.4704</u>		<u>18.4695</u>

8	16842	16110
23.5	11080	11863
18.5	76	61
	42	10
<u>18.5764</u>		<u>18.5752</u>

Moon

4	17210	16900
25.3	1395.6	10160
16.5	5.6	60
	10	00
	<u>25.3254</u>	<u>25.3260</u>

5	17548	17545
5.2	1465.8	10448.9
7.0	5.456	5049
	48	45
	<u>25.2892</u>	<u>25.2904</u>

6	16030	16212
5.0	9004.99	13240.41
7.6	94	42
	30	12
	<u>17.9031</u>	<u>17.7029</u>

7	16354	16546
3.0	11654.50	11240.44
8.4	46	42
	54	46
	<u>18.4704</u>	<u>18.4695</u>

8	16842	16110
23.5	12080.78	11863
18.5	76	61.67
	42	20
	<u>18.4764</u>	<u>18.4752</u>

13329

Junes etc.

13

Date Sept. 6 1917.

Exp. to Stars	2	30	"	2	42	"
" " Moon	1	36	30.0	2	36	30.2
Clock slow			32.4			

H. Sid. Time	2	37	02.50	"
H. Long	4	44	31.05	$G = 1^h 23^m$
G. Sid. Time	7	21	33.55	"
" " " M.N.	11	0	01.44	"
Interval	20	21	32.11	"
Red		03	20.12	"
G. M. T.	20	12	11.99	$20^h 30^m 33^s$

From Naut. Alman.

Moon 20 ^h	03	59	29.11	+23	36	03.7
motion 1 ^m			2.3781			+4.235
" 18 ^h 1998			43.28		01	17.1
Tabular Place	04	0	1239	+23	37	20.8

934" = 14.1

Moon's age 20d.

Parallax. 57' 13.3

Semi-diam 15' 37.3

R 937.3

Aug 14.2

Sub 5 -0.3

R 951.2

R 20390

a R -978

(1+a) R 1.9412

R² 3.7683

9 = 503.7

+ 24.0

- 47.9

13329

Times etc.

13

Date Sept. 6 1917.

Exp to Stars 2 30 "
 " " Moon 2 36 30.0 "
 Clock slow 32.4 "

2 42 "
 2 36 30.2 "

H. Sid Time 2 37 02.50 "
 H. Long 4 44 31.05 "
 G. Sid Time 7 21 33.55 "
 " " " M.N 11 0 01.44 "
 Interval 20 21 32.11 "
 Red 03 20.12 "
 G.M.T 20 18 11.99 "

G = " - 1^h 23^m20^h 30 33 "

From Nant Alman.

Moon 20^h 03 59 29.11 " + 23 36 03.7 "
 motion 1^m 2.3782 + 4.235 "
 " 18~1992 43.28 " 01 17.1 "
 Tabular Place 04 0 12.39 " + 23 37 20.8 "

934 " = 14.1

$$\begin{array}{r} 9 = 5-03.7 \\ + 240 \\ - 479.7 \end{array}$$

Moons age 209.

Parallax. 57' 13.3

Semi-diam 15" 37.3 "

R 937.3 "

Aug 14.2

In 5 - 0.3

R 951.2

R 2039.0

AR - 978

(1+A)R 1941.2

R² 37683

S_8	η_0	ΔS	-6.45	-6η	-9
-1.77	$+3.08$	-0	$+11 = +11$	$-2 = +9$	
-1.10	-12.53	-5	$+7 = +2$	$+7 = +9$	
$+13.45$	-9.87	$+88$	$-86 = +2$	$+6 = +8$	
$+1.53$	-1.44		-10	$+1 = -18 = -0.06$	

$\Delta\eta$	-2.9η	$+2.15$	$+12$
$+1 - 9 = -8$	$-4 = -12$		
$-46 + 37 = -9$	$-2 = -11$		
$-68 + 28 = -40$	$+28 = -12$		
$+14$	$+3 = +19$	$= +0.9$	

13329				Standard Coordinates							
Cape No. 584 mg 56				Cape No. 585 mg 45				Cape No. 611 mg 61			
C	3	58	22.74	3	58	46.93		4	06	55.39	
q			22.74			46.94				55.41	
z			22.71			46.93				55.37	
m	3	58	22.73	3	58	46.93		4	06	55.39	
Proc		01	0.90		01	0.20			01	00.40	
A	3	59	23.63	3	59	47.13		4	07	55.79	
H	4	0	23.93	4	0	23.93		4	0	23.93	
A-A		-1	0.30		-	36.80			+7	31.86	
Sin			-60.30			-36.80				+451.78	
log		1.78032	n		1.56585	n			2.65493		
cos		9.96114			9.96760				9.96655		
log S ₀		0.24870	n		0.04069	n			1.12872		
S ₀		-1.7730			-1.0982				+13.4500		
S ₁		0			4				9.0		
S		20.2270			20.9014				35.4590		
X		20.2265			20.9105				34.7625		
X-S		-0.0005			+0.0091				-6.965		
C	+23	49	50.8	21	48	31.5		22	09	22.7	
q			51.0			31.5				23.3	
z			50.1			31.2				23.1	
m	+23	49	50.6	21	48	31.4		22	09	23.0	
Proc		+02	51.7		+02	50.5			+02	40.8	
S	+23	52	42.3	21	51	21.9		22	12	03.8	
D	23	28	47.5	23	28	47.5		23	28	47.5	
S-D		+23	54.8		-1	37	25.6		-1	16	43.7
tan			+1434.8			-5847.2				-4604.5	
log H ₁		3.15679			3.76695	n			3.66318	n	
log H ₂		0.48794			1.09810	n			0.99433	n	
tan S		9.6461			9.6033				9.6108		
S ₁		0.4974			0.0814				22574		
log H ₁		7.1969			6.7381				8.9216		
H ₀		+3.0756			-12.5343				-9.8702		
H ₁		+16			+0005				+0835		
H		21.0772			5.4662				8.2133		
Y		20.9281			6.0653				8.7233		
Y-Y		-1491			+5991				-5100		

13329

Standard Coordinates:

4

cfe No 584 mag 5.0

cfe No 585 mag 4.5

cfe No 611 mag 6.1

C	3	58	22.74	3	58	46.93	4	06	55.39
q			22.74			46.94			55.41
z			22.71			46.93			55.37
m	3	58	22.73	3	58	46.93	4	06	55.39
Pre		01	0.90		01	0.20		01	00.40
x	3	59	23.63	3	59	47.13	4	07	55.79
A	4	0	23.93	4	0	23.93	4	0	23.93
x-A	-1		0.30	-		36.80	+7		31.86
Sm			-60.30			-36.80			+45.178
log		1.78	0.32		1.56	5.85		2.65	4.93
cos S		9.96	1.14		9.96	7.60		9.96	6.55
log S		0.24	8.70		0.04	0.69		1.12	8.72
S ₀	-1.77	3.0		-1.09	8.2		+13.45	0.0	
S ₁		0			4			9.0	
S	20.22	7.0		20.90	1.4		35.45	9.0	
X	20.22	6.5		20.91	0.5		34.76	2.5	
X-S	-1.00	0.5		+0.00	9.1		-1.69	6.5	
C	+23	49	50.8	21	48	31.5	22	09	22.
q			51.0			31.5			23.
z			50.1			31.2			23.
M	+23	49	50.6	21	48	31.4	22	09	23.
Pre	+02		51.7	+02		50.5	+02		40.
S	+23	52	42.3	21	51	21.9	22	12	03.
D	23	28	47.5	23	28	47.5	23	28	47.5
S-D	+23		54.8	-1	37	25.6	-1	16	43.7
tan			+14.34.8			-58.47.2			-46.04.5
log No	3	15	6.79	3	76	6.95	3	66	3.18
log No	0.48	7.94		1.09	8.10		0.99	4.33	
tan S	9.64	6.1		9.60	3.3		9.61	0.8	
S ₀	0.49	7.4		0.08	1.4		2.25	7.4	
log N ₁	7.19	6.9		6.73	8.1		8.92	1.6	
No	+3.07	5.6		-1.25	3.43		-9.87	0.2	
n ₁	-	1.6		+0.00	0.5		-0.83	5	
n	21.07	7.2		5.46	6.2		8.21	3.3	
y	20.92	8.1		6.06	5.3		8.72	3.3	
y-y	-1.49	1		+5.99	1		+5.10	0.0	

13329

Plate Center + Constants

67

$$\begin{array}{rcl}
 x & 20.2265 & 20.9281 \\
 & 22 & 18 \\
 + & 1.7735 & -2.9281 \\
 & 34 & 490 \\
 + & 60.30 &
 \end{array}
 \quad
 \begin{array}{rcl}
 3 & 59 & 23.63 \\
 & +01 & 0.30 \\
 & & -23 \\
 & & 548
 \end{array}$$

Plate Center

$$\begin{cases}
 A = 4^{\circ} 0' 23.73 \\
 B = +23^{\circ} 28' 47.5
 \end{cases}$$

$$\begin{array}{rcl}
 x-s & +500x & +29.7y \\
 -0005 & +10113 & = 10108 + 621 = 10729 + 75 = 10804 \\
 +0091 & +10455 & = 10546 + 180 = 10726 + 78 = 10804 \\
 -6965 & +17381 & = 10416 + 259 = 10675 + 129 = 10804 \\
 233842 & +11692 & + 494 + 86 = 235310
 \end{array}$$

$$\begin{array}{rcl}
 y-\eta & +500y & -32.X \\
 -1491 & +10464 & + 8973 - 647 = 8326 + 42 = 8368 \\
 +5991 & + 3033 & + 9024 - 669 = 8355 + 12 = 8367 \\
 +5100 & + 4362 & + 9462 - 1112 = 8350 + 17 = 8367 \\
 +66307 & + 8315 & - 747 + 33 = 165541
 \end{array}$$

Tables

$$a = -0.9$$

$$l = -1.1$$

$$a-l = +0.2$$

$$l+d = +0.4$$

$$-503.7$$

$$-502.0$$

$$-1.7$$

$$+2.3$$

$$-502.8$$

$$-500.9$$

$$-1.9$$

$$+1.9$$

13329

Plate Center + Constants

5.

$$\begin{array}{r}
 20.2265 \\
 \underline{22.} \\
 + 1.7735 \\
 \hline
 60.30
 \end{array}
 \quad
 \begin{array}{r}
 20.9281 \\
 \underline{18} \\
 - 2.9281 \\
 \hline
 490
 \end{array}
 \quad
 \begin{array}{r}
 3 \quad 59 \\
 + 01 \\
 0.30
 \end{array}
 \quad
 \begin{array}{r}
 23.63 \\
 - 23 \\
 0.30
 \end{array}
 \quad
 \begin{array}{r}
 23 \quad 52 \\
 - 23 \\
 0.30
 \end{array}
 \quad
 \begin{array}{r}
 42.3 \\
 - 48 \\
 5.48
 \end{array}$$

Plate Center

$$\left\{ \begin{array}{l} A = 4^{\circ} 0' 23.93 \\ B = +23^{\circ} 28' 47.5 \end{array} \right.$$

$$\begin{array}{l}
 S \quad +500X \quad +29.7X \quad +39X -10804 \\
 1005 + 10113 = 10108 + 621 = 10729 + 75 = 10804 \\
 1091 + 10455 = 10546 + 180 = 10726 + 78 = 10804 \\
 965 - 17381 = 10416 + 259 = 10675 + 129 = 10804 \\
 33842 + 11692 = 45534 + 494 = 46028 + 86 = 46114
 \end{array}$$

$$\begin{array}{l}
 -7 \quad +500Y \quad -32X \quad +2Y \quad -8367 \\
 491 + 10464 + 8973 - 647 = 8326 + 42 = 8368 \\
 991 + 3033 + 9024 - 669 = 8355 + 12 = 8367 \\
 100 + 4362 + 9462 - 1112 = 8350 + 17 = 8367 \\
 6.6307 + 8315 = 8978.6307 - 747 = 8231.6307 + 33 = 8264.6307
 \end{array}$$

Tables

$$a = -0.9$$

$$-508.7$$

$$b = -1.1$$

$$-502.0$$

$$a-b = +0.2$$

$$-1.7$$

$$t+d = +0.4$$

$$+2.3$$

1
2
3
4
5
6
7
8

13329

Moon Center

6

		Δx											
1	24.4432	+1.0602	+1	1.1242	3.7844	+1.61							
2	25.0000	+1.6170	+0	2.6147	3.7637	-44							
3	25.2209	+1.8379	+0	3.3778	3.7760	+77							
4	25.3257	+1.9427	0	3.7741	3.7741	+58							
5	25.2898	+1.9068	-0	3.6358	3.7720	+37							
6	25.0000	+1.6170	-0	2.6147	3.7639	-44							
7	24.0000	+0.6170	-1	0.3806	3.7625	-58							
8	23.3830	0.0000	-1	0.0000	3.7826	+143							

 $R^2 = 37683$

17.5279

 Δy

arc.

1	15.0000	-1.6310	-0	2.6602		147	✓
2	15.5591	-1.0719	-0	1.1490		124	
3	16.0000	-0.6310	-0	0.3982		109	
4	16.6310	0.0000	0	0.0000		90	✓
5	17.0000	+0.3690	+0	0.1362		79	
6	17.7030	+1.0720	+0	1.1492		56	
7	18.4700	+1.8390	+0	3.3819		18	
8	18.5758	+1.9448	+1	3.7826		0	✓

2.6573

Range 147

$$x = 25 \quad y = 15.5591$$

$$17.7030$$

$$33.2621$$

$$y_0 = 16.6310$$

$$y_{max} = 18.5758$$

$$R = 1.9448$$

$$\text{Corr } R = 1.9412$$

$$x_{max} = 25.3257$$

$$\text{Moon Center} \left\{ \begin{array}{l} x_0 = 23.3830 \\ y_0 = 16.6310 \end{array} \right.$$

1
2
3
4
5
6
7
8

13329

Moon Center

6

		Δx		Δy
1	24.4432	-1.0602 + 1	1.1242	3.7844 + 1.61
2	25.0000	+1.6170 + 0	2.6147	3.7637 - 4.6
3	25.2209	+1.8379 + 0	3.3778	3.7760 + 7.7
4	25.3257	+1.9427 0	3.7741	3.7741 + 5.8
5	25.2898	+1.9068 - 0	3.6358	3.7720 + 3.7
6	25.0000	+1.6170 - 0	2.6147	3.7639 - 4.4
7	24.0000	+0.6170 - 1	0.3806	3.7625 - 5.8
8	23.3830	0.0000 - 1	0.0000	3.7826 + 1.43
			R^2	3.7683

		Δx	Δy
1	15.0000	-0.6310 - 0	2.6602
2	15.5591	-1.0719 - 0	1.1490
3	16.0000	-0.6310 - 0	0.3982
4	16.6310	0.0000 0	0.0000
5	17.0000	+0.3690 + 0	0.1362
6	17.7030	+1.0720 + 0	1.1492
7	18.4700	+1.8390 + 0	3.3819
8	18.5758	+1.9448 + 1	3.7826

arc.

Range 1.47.

$$\begin{aligned}
 \lambda &= 25^\circ & y &= 15.5591 \\
 & & & 17.7030 \\
 & & & 33.2621 \\
 & & y_0 &= 16.6310 \\
 & & y_{\max} &= 18.5758 \\
 & & R &= 1.9448 \\
 & & \text{Corr } R &= 1.9412 \\
 & & x_{\max} &= 25.3257
 \end{aligned}$$

$$\text{Moon Center} \left\{ \begin{aligned} x_0 &= 23.3830 \\ y_0 &= 16.6310 \end{aligned} \right.$$

Formation of Normals

1	- 1.72	+ 170.5	- 262.0
2	- 1.73	- 74.5	+ 49.2
3	- 1.15	+ 141.5	- 48.5
4	+ 0.00	+ 112.5	0.0
5	+ 0.71	+ 70.8	+ 13.7
6	+ 1.73	- 71.3	- 47.0
7	+ 1.14	- 35.9	- 106.8
8	+ 0.00	0.0	+ 278.0
	+ 3.58	+ 495.3	+ 340.9
	- 4.60	- 181.7	- 464.3
	- 1.02	+ 313.6	- 123.4

13329

Conditional Equations

7

0 - c

1	+ 1.06	- 1.63	= + 1.61	+ 2.6	+ 9	= + 37	+ 124
2	+ 1.62	- 1.07	= - 4.6	+ 39	+ 6	= + 45	- 91
3	+ 1.84	- 0.63	= + 7.7	+ 45	+ 3	= + 48	+ 29
4	+ 1.94	0.00	= + 5.8	+ 47	0	= + 47	+ 1.1
5	+ 1.91	+ 0.37	= + 3.7	+ 46	- 2	= + 44	- 7
6	+ 1.62	+ 1.07	= - 4.4	+ 39	- 6	= + 33	- 77
7	+ 0.62	+ 1.84	= - 5.8	+ 15	- 10	= + 5	- 63
8	0.00	+ 1.94	= + 1.43	0	- 11	= - 11	+ 154

+ 318 - 238

avr. 69

$$12.66 - 1.02 = +3.13.6$$

$$-1.02 + 17.52 = -1.23.4$$

$$+ () - .08 = + 2.54$$

$$+ 1.7.44 = - 98.0$$

$$b = -5.5^{\circ}$$

$$+ 12.66 = +313.6 - 5.7 = +307.9$$

$$a = +24.3^{\circ}$$

avr 14.7

$$P_m = .14^{\circ}$$

$$\Sigma K_m = +1.0^{\circ}$$

$$\frac{+1.0}{14} = +.718^{\circ}$$

$$\Delta R = +0.9^{\circ}$$

1
2
3
4
5
6
7
8

13329

Conditional Equations

7

1	+1.06	-1.63	=	+1.61	+2.6	-9	=	+37	+124
2	+1.62	-0.07	=	-4.6	+39	+6	=	+45	-91
3	+1.84	-0.63	=	+7.7	+45	+3	=	+48	+29
4	+1.94	0.00	=	+5.8	+47	0	=	+47	+11
5	+1.91	+0.37	=	+3.7	+46	-2	=	+44	-7
6	+1.62	+1.07	=	-4.4	+39	-6	=	+33	-77
7	+0.62	+1.84	=	-5.8	+15	-10	=	+5	-63
8	0.00	+1.94	=	+14.3	0	-11	=	-11	+154
									+31.8 - 238
									av. 69

$$12.66 - 1.02 = +313.6$$

$$-1.02 + 17.52 = -123.4$$

$$+1.02 - 0.8 = +25.4$$

$$+17.44 = -98.0$$

$$h = -5.5$$

$$+1266 = +313.6 \cdot 57 = +3079$$

$$a = +24.3$$

$$\text{ave } 147$$

$$P_m = .14$$

$$\Sigma K = +10$$

$$\frac{+10}{.14} = +71.8$$

$$\Delta R = +0.9$$

13329

Means Mean Position

8

$$\begin{array}{r} X_0 \quad 23.3830^{\circ} \\ \quad + 12 \\ \hline 23.3842^{\circ} \end{array}$$

$$\begin{array}{r} Y_0 \quad 16.6310^{\circ} \\ \quad - 3 \\ \hline 16.6307^{\circ} \end{array}$$

From Plate Constants.

$$23.5310$$

$$16.5541$$

$$22.$$

$$18$$

$$S_0 \quad +1.5310$$

$$-1.4459$$

$$\log S_0 \quad 0.18498$$

$$\log S_0 \quad 9.96308^{\circ}$$

$$8.50724$$

$$\log S_0 - A \quad 1.71466$$

$$\log \tan \delta \quad 9.6338^{\circ}$$

$$S_0^2 \quad 0.3699^{\circ}$$

$$7.0534$$

$$\log \eta \quad 7.0571^{\circ}$$

$$\alpha - A \quad +51.84^{\circ}$$

$$\eta \quad +0.0011$$

$$\eta_0 \quad -1.4470^{\circ}$$

$$A \quad 4 \quad 00 \quad 23.93$$

$$\log \eta_0 \quad 0.16047^{\circ}$$

$$7.33115$$

$$\alpha_0 \quad 4 \quad 01 \quad 15.77^{\circ}$$

$$\log \tan \delta - K \quad 2.82932^{\circ}$$

$$Red \quad +3.93$$

$$\delta - B \quad -67.50$$

$$\alpha \quad 4 \quad 01 \quad 19.70^{\circ}$$

$$B \quad +23^{\circ} \quad 28' \quad 47.5^{\circ}$$

$$S_0 \quad +23 \quad 17 \quad 32.5^{\circ}$$

$$Red \quad +11.5^{\circ}$$

$$\delta \quad +23 \quad 17 \quad 44.0^{\circ}$$

13329

Mars Mean Position

8

$$\begin{array}{r} X_0 \quad 23.3830 \\ \quad + 12 \\ \hline 23.3842 \end{array}$$

$$\begin{array}{r} y_0 \quad 16.6310 \\ \quad - 3 \\ \hline 16.6307 \end{array}$$

From Plate Constants.

$$23.5310$$

$$16.5541$$

$$22.$$

$$18$$

$$S_0 \quad + 1.5310$$

$$- 1.4459$$

$$\log S_0 \quad 0.18498$$

$$\log S_0 \quad 9.96308$$

$$8.50724$$

$$\log \sin \alpha \cdot A \quad 1.71466$$

$$\log \tan S \quad 9.6338$$

$$S_0^2 \quad 0.3699$$

$$7.0534$$

$$\log \eta_1 \quad 7.0571$$

$$\alpha \cdot A \quad - 31.84$$

$$\eta_1 \quad + 0.0011$$

$$\eta_0 \quad - 1.4470$$

$$A \quad 4 \quad 00 \quad 23.93$$

$$\alpha_0 \quad 4 \quad 01 \quad 15.77$$

$$\text{Red} \quad + 3.93$$

$$\alpha' \quad 4 \quad 01 \quad 19.70$$

$$\log \eta_0 \quad 0.16047 \sim$$

$$7.33115$$

$$\log \tan S \cdot K \quad 2.82932 \sim$$

$$S \cdot B \quad - 675.0$$

$$B \quad + 23^\circ 28' 47.5''$$

$$S_0 \quad + 23 \quad 17 \quad 32.5''$$

$$\text{Red} \quad + 11.5''$$

$$S' \quad + 23 \quad 17 \quad 44.0''$$

$$\begin{array}{r}
 1 \quad 3 \quad 53 \quad 38.889 \\
 \underline{34.530} \\
 +4.359
 \end{array}$$

$$\begin{array}{r}
 35 \quad 33 \quad 19.67 \\
 \underline{11.66} \\
 +8.01
 \end{array}$$

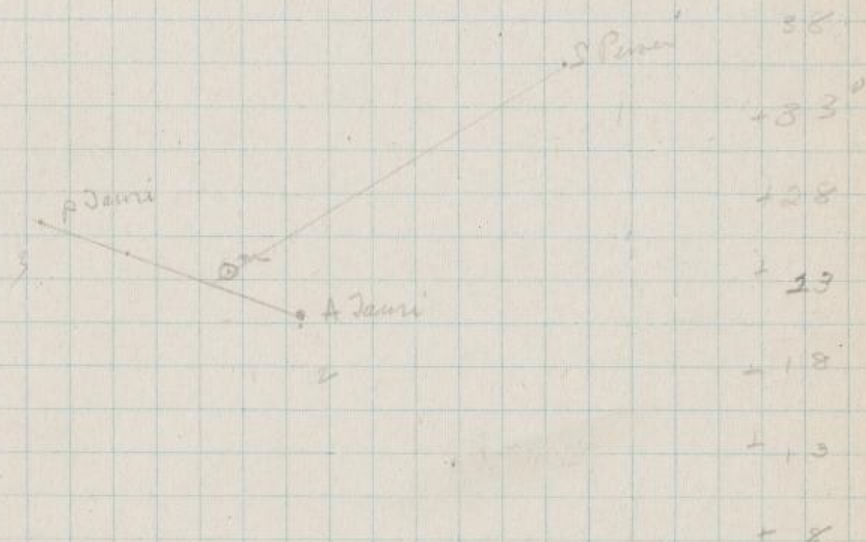
$$\begin{array}{r}
 3 \quad 59 \quad 51.079 \\
 \underline{47.139} \\
 +3.940
 \end{array}$$

$$\begin{array}{r}
 21 \quad 51 \quad 34.16 \\
 \underline{21.96} \\
 +12.20
 \end{array}$$

$$\begin{array}{r}
 4 \quad 5 \quad 50.402 \\
 \underline{46.378} \\
 +4.024
 \end{array}$$

$$\begin{array}{r}
 26 \quad 16 \quad 5.26 \\
 \underline{15 \quad 55.08} \\
 +10.18
 \end{array}$$

$$\begin{array}{r}
 12.20 \\
 \underline{10.18} \\
 2.02
 \end{array}$$



12 10 8 6 4 2 0 58 56 54 52 50 9.2

13329

Reduction to Apparent Place.

9

$H + \alpha_0$	11	14.3	168°	34.5	$\delta_0 + 23$	17.5
H	7	13.0				
α_0	4	01.3			$\cos \delta_0$	9.9631
G	23	41.4			$\log i$	0.8919
$G + \alpha_0$	3	42.7	55°	40.5	$\log (i)$	0.8550

$\cos G + \alpha_0$	9.7512
q	1.3152
$\sin G + \alpha_0$	9.9169
$\tan \delta_0$	9.6390
	8.8239

$\log q'$	1.0664
q	9.6900

q	+3.169
q	+0.490
h	+0.272
<u>Red.</u>	+3.931

$\sin \delta_0$	9.5970
$\cos H + \alpha_0$	9.9913
h	1.2771
$\sin H + \alpha_0$	9.2969
$\sec \delta_0$	0.0369
	8.8239

$\log h'$	0.8654
h	9.4348

q'	+11.650
h	-7.335
c'	+7.162
<u>Red.</u>	+11.477

13329

Reduction to Apparent Place.

9

$H + \alpha_0$	11	14.3	168°	$34.5''$	$\delta_0 + 23$	$175''$
H	7	13.0				
α_0	4	01.3			$\cos \delta_0$	9.9631
G	23	41.9			$\log i$	0.8919
$G + \alpha_0$	3	42.7	35°	$40.5''$	(11)	0.8550

$\cos G + \alpha_0$	9.7512
g	1.3152
$\sin G + \alpha_0$	9.9169
$\tan \delta_0$	9.6390
	8.8239

$\log g'$	1.0664
g	9.6900

g	+3.169
g	+0.490
h	+0.272
<u>Red.</u>	+3.931

$\sin \delta_0$	9.5970
$\cos H + \alpha_0$	9.9913
h	1.2771
$\sin H + \alpha_0$	9.2969
$\sec \delta_0$	0.0369
	8.8239

$\log h'$	0.8654
h	9.4348

g'	+12.650
h'	-7.335
g	+7.162
<u>Red.</u>	+11.477

13329

Linear Parallax.

10

α'	04	01	19.70	π	57	13.3
δ'	02	37	02.50			
$\phi \alpha'$	-01	24	17.20		9.86913	
"	-21°	4'	18.00	$\log \sin \pi$	8.22127	
$\frac{1}{2} \alpha - \alpha'$		-8	18.36	$\sin \phi - \alpha'$	9.55574	m
$\phi \alpha' - "$	-20	55	59.64	" $\sec \delta$	003.801	
				$\sin \alpha - \alpha'$	7.68415	m
			9.95727			
$\cos \frac{1}{2} \alpha \alpha'$			0.00000	$\alpha - \delta'$	-16	36.73
$\sec \delta \alpha - \frac{1}{2} \alpha \alpha'$			0.02965	"	-1	06.45
$\log \tan \gamma$			9.98692			
γ	44	08	14.4			
$\delta' + 23$	17		44.0			
$\gamma - \delta'$	20	50	30.4			
			9.82640			
$\log \sin \pi$			8.22127			
$\sin \gamma - \delta'$			9.55119			
$\cos \alpha$			0.15715			
$\sin \delta - \delta'$			7.75601			
$\delta - \delta'$		+19	36.1			
$\delta + 23$	37		20.1	α	04	00 13.25
$\phi \delta + 23$	37		20.8	$\phi \alpha$	04	00 12.39
$\alpha - \alpha'$			-0.7	$\alpha - \alpha'$		+0.86
$\cos \alpha$			+0.8	$\cos \alpha$		-0.05
$\sin \alpha \cos \delta \sin \pi$			0.0			
$\delta -$	+23	37	20.9	α_2	04	00 13.20
$\alpha - \alpha'$			+0.1	$\alpha - \alpha'$		+0.81

13329

Lunar Parallax.

10

α' 04 01 19.70
 δ' 02 37 02.50
 $\phi - \alpha'$ -01 24 17.20
 $=$ -21° 4' 18.00
 $\frac{1}{2} \alpha \cdot \alpha'$ -8 18.36
 $\alpha' - "$ -20 55 59.64

9.95727
 $\log \frac{1}{2} \alpha \alpha'$ 0.00000
 $\log \frac{1}{2} \alpha \alpha'$ 0.02965
 $\log \gamma$ 9.98692

γ 44 08 14.4

δ' +23 17 44.0

$\gamma - \delta'$ 20 50 30.4

9.82640
 $\log \sin \pi$ 8.22127
 $\sin \gamma - \delta'$ 9.55119
 $\cos \gamma$ 0.15715
 $\sin \delta \delta'$ 7.75607

$\delta - \delta'$ +19 36.4

δ +23 37 20.7

$\phi - \delta$ +23 37 20.8

$O - C$ -0.9

curr. +0.8

2nd Ued Ref 0.0

δ +23 37 20.9

$O - C$ +0.1

π 57 13.3

9.86913

$\log \sin \pi$ 8.22127

$\sin \phi - \alpha'$ 9.55574^m

$\sin \delta$ 00.3801

$\sin \alpha \alpha'$ 7.68421^m

$O - \alpha'$ -16 36.73

$=$ -1 06.45

α 04 00 13.25

$\phi - \alpha$ 04 00 12.39

$O - C$ +0.86

curr. -0.05

α 04 00 13.20

$O - C$ +0.81

13330

Star Measures

1	19850	18250	19250	16110
20.0	16848 ⁵⁰	11269 ⁶²	10618 ¹⁶	14730
20.0	52	60	14	30
	50	50	50	10
	<u>20.3000</u>	<u>20.3012</u>	<u>20.8634</u>	<u>20.8620</u>

3	17202	19065	18548	16662
21.0	17202	19065	18454 ⁵²	6744 ⁴⁸
6.0	02	65	58	52
	02	65	48	62
	<u>21.0000</u>	<u>21.0000</u>	<u>6.0092</u>	<u>6.0086</u>

3	18878	19320	18406	16740
34.8	10438 ³⁴	17762	11562 ⁵⁸	13570
8.7	30	62	54	70
	78	20	06	40
	<u>34.8444</u>	<u>34.8442</u>	<u>8.6848</u>	<u>8.6830</u>

Mean

1		18530	19880
25.0		18182	10226
15.0		82	26
		30	80
		<u>15.0348</u>	<u>15.0346</u>

3	17002	17382	
35.9	8256 ⁵⁴	16406	
16.0	52	06	
	02	82	
	<u>25.8748</u>	<u>25.8724</u>	

3	16294	17520	
26.0	16118	7688 ⁹⁰	
16.7	18	92	
	94	20	
	<u>26.0176</u>	<u>26.0170</u>	

13330

Star Measures

11

L	19850	18250	19250	16110
20.3	16848 ⁵⁰	11269 ⁶²	10618 ¹⁶	14730
20.8	52	60	14	30
	50	50	50	10
	<u>20.3000</u>	<u>20.3012</u>	<u>20.8634</u>	<u>20.8620</u>

3	17202	19065	18248	16662
11.0	17212	19065	18248 ⁵²	6744 ⁴⁸
6.0	02	65	58	52
	02	65	48	62
	<u>21.0000</u>	<u>21.0000</u>	<u>6.0092</u>	<u>6.0086</u>

3	18878	19320	18406	16740
4.8	10438 ³⁴	17762	11552 ⁵⁸	13570
8.7	30	62	54	70
	78	20	06	40
	<u>34.8444</u>	<u>34.8442</u>	<u>8.6848</u>	<u>8.6830</u>

Moon

L		18530	19880
5.0		18182	10226
5.0		82	26
		30	80
		<u>25.0348</u>	<u>25.0346</u>

5.9	17002	17382	17002
16.0	8256 ⁵⁴	16088	16088
	52	06	06
	02	82	82
	<u>25.8748</u>	<u>25.8724</u>	<u>25.8724</u>

5.0	16294	17520	17520
1.7	16118	7688 ⁹⁰	7688 ⁹⁰
	18	92	92
	94	20	20
	<u>26.0176</u>	<u>26.0170</u>	<u>26.0170</u>

4
56
17

5
25
18

6
25
18

1
24
8

8
14
18

13330

Moon

19

4	16652	16250
56	6678	16220
17	78	20
	52	50
	<u>259974</u>	<u>259970</u>

5	16934	16758
255	11468	12230
18	68	30
	34	58
	<u>255466</u>	<u>255472</u>

6
250
184

16228	18250
11770	12690
70	90
28	50
<u>184458</u>	<u>184440</u>

1
243
86

18412	18070
11628	14840
28	50
12	70
<u>186784</u>	<u>186780</u>

8
24
85

18620	18728
11866	15492
66	92
20	28
<u>186754</u>	<u>186764</u>

1917phae.p.01

1917phae.p.01

1917phae.p.01

1917phae.p.01

1917phae.p.01

1917phae.p.01

1917phae.p.01

1917phae.p.01

1917phae.p.01

1917phae.p.01

1917phae.p.01

1917phae.p.01

1917phae.p.01

1917phae.p.01

1917phae.p.01

1917phae.p.01

1917phae.p.01

1917phae.p.01

1917phae.p.01

1917phae.p.01

1917phae.p.01

1917phae.p.01

1917phae.p.01

1917phae.p.01

1917phae.p.01

1917phae.p.01

1917phae.p.01

1917phae.p.01

1917phae.p.01

1917phae.p.01

4

26

18

18

18

18

18

18

18

18

18

18

18

18

18

18

18

18

18

18

18

18

18

18

18

18

18

18

18

18

18

18

18

18

18

18

18

18

18

18

18

18

13330

Moon

12

4	16652	16230
26	6678	16220
17	78	20
	52	80
	<u>259974</u>	<u>259970</u>

5	16934	16758
255	11468	12230
18	68	30
	34	58
	<u>255466</u>	<u>255472</u>

250	16228	18250
184	11770	12690
	70	90
	28	50
	<u>184958</u>	<u>184940</u>

I	18412	18070
243	11628	14880
186	28	50
	12	70
	<u>186784</u>	<u>186780</u>

8	18620	18728
24	11866	15492
185	66	92
	20	28
	<u>186754</u>	<u>186764</u>

13330

Times etc.

13

Date Sept. 6, 1917

Exp Stars 2 44 ✓

2 56 ✓

" Moon 2 49 59.7 ✓

2 49 60.0 ✓

Clock slow + 32.4 ✓

H. Sid Time 2 50 32.25 ✓

H. Long 4 44 31.05 ✓

G. Sid Time 7 35 03.30 ✓

" " " " 11 0 01.44 ✓

 $\Theta = -1^h 10^m$

Interval 20 35 01.86 ✓

Red 13 22.33 ✓

G. M. T. 20 31 39.53 ✓

20 52 7.64 ✓

From Naut Alman.

R.A.

Dec.

Moon 20 03 59 29.11 ✓

+ 23 36 03.7 ✓

Moon 17 2.3781 ✓

+ 4.220 ✓

Moon 31.65883 ✓

01 15.29 ✓

02 13.6 ✓

Tabular Place 04 0 44.40 ✓

+ 23 38 17.3 ✓

Moon's Age 20d

 $934'' = 14.4$

Parallax 57' 13.3 ✓

Semi-diam 15' 37.1 ✓

R 937.1 ✓

Ang 14.5

Tan 5 - 0.3

R 951.3

R 2.0392

a R - 986

1 + a R 1.9406

R2 3.7659

a = -507.4

+ 24

-483.4

3330

Times etc.

13

Date Sept. 6, 1917

Exp Stars	2	44		2	56	
" Main	2	49	59.7	2	49	60.0
clock slow			+ 32.4			
+ Sid Time	2	50	32.25			
4 Young	4	44	31.05			
- Sid Time	7	35	03.30			
MM 11		0	01.44			
interval	20	35	01.86			
Red		13	22.33			
3 M.T	20	31	39.53			
						20.52764

0 - 16, 10m

our Naut Alman			R.A			Dec.	
room 20	03	59	29.11	+ 23	36	03.7	
when 1m			2.3781			4.220	
star 3165883		01	15.29		02	13.6	
Julian Place	04	0	44.40	23	38	17.3	

Means of 204

34" - 14.4

$$\begin{aligned}
 a &= -507.4 \\
 &+ 24 \\
 &- 483.4
 \end{aligned}$$

Parallax	57'	13.3
Semi-diam	15"	37.1
R		937.1
Ang		14.5
In 5"		-0.3
R		952.3
R		20392
a R		-988
(+A) R		19406
R2		3.7659

13330

Plate Constants

14

X	20.3006	21.0000	34.8443
S	20.2270	20.9014	35.4590
X-S	+ .0736	+ .0986	- .6147

y	20.8627	6.0089	8.6839
η	21.0772	5.4662	8.2133
y- η	- 2145	+ 5427	+ 4706

X-S	+ 500X	+ 40.8y	+ 7.4X	- 11887
+ 0736	+ 10150 = 10886	+ 851 = 11737	+ 150 = 11887	
+ 0986	+ 10500 = 11486	+ 245 = 11731	+ 155 = 11886	
+ 6147	+ 17422 = 11275	+ 354 = 11629	+ 258 = 11887	
24.0757	+ 12038	+ 683	+ 178 = 241769	

y- η	+ 500y	- 46X	+ 7.7y	- 7512
- 2145	+ 70431 = 8286	- 934 = 7352	+ 160 = 7512	
+ 6427	+ 3004 = 8431	- 966 = 7465	+ 46 = 7511	
+ 4706	+ 4342 = 9048	- 1603 = 7445	+ 67 = 7512	
16.7377	+ 8369	- 1109	+ 129 = 16.7256	

Table	a = -0.9	b = -1.1	a-b = +0.2	b+d = +0.2
	- 507.4	- 507.7	+ 0.3	+ 5.2
	- 506.5	- 506.6	+ 0.1	+ 5.0

0.2.2.2

3330

Plate Constants

14

X	203006	210000	348443
S	<u>202270</u>	<u>209014</u>	<u>354590</u>
X-S	+ 0736	+ 0986	- 6147

y	208627	6.0089	8.6839
7	<u>210772</u>	<u>5.4662</u>	<u>8.2133</u>
y-7	- 2145	+ 5427	+ 4706

X-:	+ 5008	+ 40.8y	+ 7.4x	- 11887
+ 0736	+ 10150	= 10886	+ 851	= 11737
+ 0986	+ 10500	= 11486	+ 245	= 11731
- 6147	+ 17422	= 11275	+ 354	= 11629
24.0737	+ 12038	+ 683	+ 178	= 24.1769

	+ 5008	- 46x	+ 7.7y	- 7512
- 2145	+ 10431	= 8286	- 934	= 7352
+ 5427	+ 3004	= 8431	- 966	= 7465
+ 4700	+ 4342	= 9048	- 1603	= 7445
16.7377	+ 8369	- 1108	+ 129	= 16.7206

6s	a = -0.9	b = -1.1	a-b = +0.2	b+d = +0.2
	- 5074	- 5077	+ 0.3	+ 5.2

13330

mean center:

15-

dx

1	25.0000	+ 0.9240	0	0.8538	3.7618	-	41
2	25.8736	+ 1.7976		3.2314	3.7790	+	131
3	26.0173	+ 1.9413		3.7687	3.7687	+	28
4	25.9972	+ 1.9212		3.6910	3.7586	-	73
5	25.5469	+ 1.4709		2.1635	3.7511	-	148
6	25.0000	+ 0.9240		0.8538	3.7605	-	54
7	24.0760	0.0000		0.0000	3.7570	-	89
8	24.0000	- 0.0760		0.0058	3.7539	-	120

R²
~~3.7741~~
3.7659

dy

anc.

1	15.0347	- 1.7053	- 0	2.9080
2	16.0000	- 0.7400	- 0	0.5976
3	16.7400	0.0000	0	0.0000
4	17.0000	+ 0.2600	+ 0	0.8676
5	18.0000	+ 1.2600	+ 0	1.5876
6	18.4449	+ 1.7049	+ 0	2.9067
7	18.6782	+ 1.9382	+ 1	3.7570
8	18.6759	+ 1.9359	+ 1	3.7481

152"

113"

90"

82"

50"

29"

0

-2"

Range 154°

x = 25 y = 15.0347

18.4449

33.4796

y₀ 16.7398y_{max} 18.6782

R 1.9384

Cum R 1.9427

x_{max} 26.0173x₀ 24.0789

Mean Center {

x₀ = 24.0760

y₀ = 16.7400

13330

Mean Center:

15

DT

1	25.0000	-0.9240	0	0.8538	3.7618	-1.41
2	25.8736	+1.7976		3.2314	3.1790	+1.31
3	26.0173	+1.9413		3.7687	3.7687	+2.8
4	25.9972	+1.9212		3.6910	3.1586	-1.73
5	25.5469	+1.4707		2.1635	3.7511	-2.48
6	25.0000	+0.9240		0.8538	3.7605	-1.54
7	24.0760	0.0000		0.0000	3.1570	-1.89
8	24.0000	-0.0760		0.0058	3.1539	-1.22

$$R^2 = \frac{3.7741}{3.7659}$$

DT

anc.

1	15.0347	-1.7053	-0	2.9080
2	16.0000	-0.7400	-0	0.5976
3	16.7400	0.0000	0	0.0000
4	17.0000	+0.2600	+0	0.0676
5	18.0000	+1.2600	+0	1.5876
6	18.4449	+1.7049	+0	2.9067
7	18.6782	+1.9382	+1	3.7570
8	18.6759	+1.9359	+1	3.7481

Range 15.4°

$$X = 25 \quad Y = 15.0347$$

$$18.4449$$

$$23.4796$$

$$Y_0 = 16.7398$$

$$Y_{max} = 18.6782$$

$$R = 1.9384$$

$$Corr. R = 1.9427$$

$$X_{max} = 26.0173$$

$$X_0 = 24.0789$$

$$\text{Mean Center} \begin{cases} X_0 = 24.0760 \\ Y_0 = 16.7400 \end{cases}$$

Formation of Normals

1	- 1.56	- 113.0	+ 209.0
2	- 1.33	+ 97.2	- 40.0
3	+ 0.00	- 105.0	0.0
4	+ 0.50	- 298.0	- 40.3
5	+ 1.85	- 339.0	- 290.0
6	+ 1.56	- 125.0	- 231.0
7	+ 0.00	+ 0.0	- 332.0
8	- 0.15	+ 16.1	- 390.0
	+ 3.91	+ 113.3	+ 209.0
	- 3.04	- 980.0	- 1323.3
	+ 0.87	- 866.7	- 1114.3
		corr + 729.0	corr + 381.3
		- 137.7	- 733.0

13330

Conditional Equations

16

O-C

+82

1	+0.92	-1.70	= -123	-51	+120	-41	69	-192
2	+1.80	-0.74	= +49	-99	+52	= -	47	+101
3	+1.94	0.00	= -	54	-107	0	= -107	+53
4	+1.92	+0.26	= -155	-106	-	18	-124	-31
5	+1.47	+1.26	= -230	-81	-	89	= -170	-60
6	+0.92	+1.70	= -136	-51	-	120	= -171	+35
7	0.00	+1.94	= -171	-0	-	137	= -137	-34
8	-0.08	+1.93	= -202	+4	-	136	= -132	-70

+189-387

av. 72

$$+14.57 + 0.87 = -866.7$$

$$+ 0.87 + 15.52 = -1114.3$$

$$- () - 0.52 = + 51.7$$

$$+15.00 = -1062.6$$

$$b = -70.8$$

$$+14.57 = -866.7 + 61.6 = -805.1$$

$$a = +55.3$$

new O-C

+14.57	+ 0.87	= -137.7	- 6	+80	= +74	-115
			- 12	+34	= +22	+109
+ 0.87	+15.52	= -733.0	- 13	0	= -13	+41
			- 13	- 12	= -25	-38
- ()	- 0.05	= + 8.2	- 10	- 39	= -69	-79
			- 6	- 80	= -86	+32
+15.47	= -724.8		0	- 91	= -91	+2
			+ 0	- 91	= -91	-29

$$b = -46.8$$

$$+184-271$$

av 57

$$+14.57 = -137.7 + 40.7 = -97.0$$

$$a = -6.65$$

$$\text{ave } 154 \quad \frac{P}{m} = 18$$

$$\frac{\Delta V}{m} = -11 \quad \frac{-11}{18} = -61.2 \quad \Delta Q = -0.8$$

13330

Conditional Equations

16

O-C

1	+0.92	-1.70	= -1.23	-51	+120	-4.69	-1.92
2	+1.80	-0.74	= +.49	-99	+52	= -47	+1.01
3	+1.94	0.00	= -54	-107	0	= -1.87	+53
4	+1.92	+0.26	= -1.55	-106	-18	= -1.24	-31
5	+1.47	+1.26	= -2.30	-81	-89	= -1.70	-40
6	+0.92	+1.70	= -1.36	-51	+120	= -1.71	+35
7	0.00	+1.94	= -1.71	-0	-137	= -1.37	-34
8	-0.08	+1.93	= -2.02	+4	-136	= -1.32	-70

+189.287

wt. 12

$$+14.57 + 0.87 = -866.7$$

$$+ 0.87 + 15.52 = -1114.3$$

$$- () - 0.52 = +51.7$$

$$+15.00 = -1062.6$$

$$t = -70.8$$

$$+14.57 = -866.7 + 61.6 = -805.1 \quad e = +55.3$$

New O-C

+14.57 + 0.87 = -137.7	-6	+80	= +84	-115
	-12	+39	= +22	+109
+ 0.87 + 15.52 = -733.0	-13	0	= -13	+41
	-13	-12	= -25	-48
- () - 0.05 = +82	-10	-59	= -69	-79
	-6	-80	= -86	+32
+15.47 = -724.8	0	-91	= -91	+2
	+0	-91	= -91	-29

$$t = -46.8$$

+184.271

wt 57

$$+14.57 = -137.7 + 40.7 = -97.0$$

$$a = -6.65$$

$$\text{Arc } 154 \quad p = 18$$

$$\frac{\Sigma v}{n} = -11 \quad \frac{-11}{18} = -0.612 \quad \Delta R = -0.8$$

13330

Mean Mean Position

17

$$\begin{array}{r} X_0 \quad 24.0760 \\ \quad \quad \quad - \quad 3 \\ \hline 24.0757 \end{array}$$

$$\begin{array}{r} Y_0 \quad 16.7400 \\ \quad \quad \quad - \quad 23 \\ \hline 16.7377 \end{array}$$

From Plate Constants.

$$\begin{array}{r} 24.1769 \\ \quad \quad \quad - \quad 12 \\ \hline S_0 + 2.1769 \end{array}$$

$$\begin{array}{r} 16.7256 \\ \quad \quad \quad - \quad 12 \\ \hline -1.2744 \end{array}$$

$$\begin{array}{r} \log S_0 \quad 0.33784 \\ \log \delta_0 \quad 9.96301 \\ \quad \quad \quad 8.50724 \\ \log \sin \alpha \cdot A \quad 1.86759 \end{array}$$

$$\begin{array}{r} \log \tan \delta \quad 9.6241 \\ S_0^2 \quad 0.6757 \\ \quad \quad \quad 7.0534 \\ \log H_1 \quad 7.3632 \end{array}$$

$$\begin{array}{r} \alpha - A \quad + \quad 73.72 \\ \quad \quad \quad + \quad 1 \quad 13.72 \end{array}$$

$$A \quad 4 \quad 0 \quad 23.93$$

$$\alpha_0 \quad 4 \quad 01 \quad 37.65$$

$$\text{Red} \quad + \quad 3.93$$

$$\alpha' \quad 4 \quad 01 \quad 41.58$$

$$\begin{array}{r} \eta \quad +0.0023 \\ \eta_0 \quad -1.2767 \end{array}$$

$$\begin{array}{r} \log \eta_0 \quad 0.10609 \\ \quad \quad \quad 7.33115 \end{array}$$

$$\log \tan \delta - D \quad 2.77494$$

$$\delta - D \quad -595.6$$

$$-9 \quad 55.6$$

$$D \quad +23 \quad 28 \quad 47.5$$

$$S_0 \quad +23 \quad 18 \quad 51.9$$

$$\text{Red} \quad +11.5$$

$$\delta' \quad +23 \quad 19 \quad 03.4$$

3330

Moons Mean Position

17

$$\begin{array}{r} \lambda_0 \quad 24.0760 \\ \quad \quad - 23 \\ \hline 24.0757 \end{array}$$

$$\begin{array}{r} \gamma_0 \quad 16.7400 \\ \quad \quad - 23 \\ \hline 16.7377 \end{array}$$

From Plate Constants.

$$\begin{array}{r} 24.1769 \\ \quad \quad - 22 \\ \hline S_0 + 2.1789 \end{array}$$

$$\begin{array}{r} 16.7252 \\ \quad \quad - 12 \\ \hline -1.2754 \end{array}$$

$$\begin{array}{l} \log S_0 \quad 0.33784 \\ \cos \delta_0 \quad 996301 \\ \quad \quad 8.50724 \\ \log \sin \alpha \quad 1.86759 \end{array}$$

$$\begin{array}{l} \log \tan \delta \quad 9.6341 \\ S_0^2 \quad 0.6788 \\ \quad \quad 7.0534 \\ \log \eta_1 \quad 7.3622 \end{array}$$

$$\begin{array}{r} X-A \quad + 73.82 \\ \quad \quad - 1 \quad 13.82 \end{array}$$

$$A \quad 4 \quad 0 \quad 23.93$$

$$\alpha_0 \quad 4 \quad 01 \quad 37.65$$

$$\text{Red} \quad + 3.93$$

$$\alpha' \quad 4 \quad 01 \quad 41.58$$

$$\begin{array}{r} \eta_1 \quad +0.0023 \\ \eta_0 \quad -1.2767 \end{array}$$

$$\begin{array}{r} \log \eta_0 \quad 0.10609 \\ \quad \quad 7.33115 \end{array}$$

$$\log \tan \delta - D \quad 2.17494$$

$$\delta - D \quad -595.6$$

$$-9 \quad 55.6$$

$$\odot \quad +23 \quad 28 \quad +7.5$$

$$S_0 \quad +23 \quad 18 \quad 51.8$$

$$\text{Red} \quad +11.5$$

$$\delta' \quad +23 \quad 19 \quad 03.4$$

13 3 3 0

Lunar Parallax.

18

$$\alpha' \quad 04 \quad 01 \quad 41.58$$

$$\theta \quad 02 \quad 50 \quad 32.25^{\circ}$$

$$\theta - \alpha' \quad -1 \quad 11 \quad 09.33$$

$$- \quad -17 \quad 47 \quad 19.95$$

$$\frac{1}{2} \alpha - \alpha' \quad -7 \quad 13.53$$

$$\theta - \frac{1}{2} \alpha - \alpha' \quad -17 \quad 40 \quad 16.42$$

$$9.95727$$

$$\cos \frac{1}{2} \alpha - \alpha' \quad 0.00000$$

$$\sec \delta - \alpha' - \frac{1}{2} \alpha \quad 0.02099$$

$$\log \tan \gamma \quad 9.97826^{\circ}$$

$$\gamma \quad 43 \quad 34 \quad 00^{\circ}$$

$$\delta' \quad +23 \quad 14 \quad 03.4^{\circ}$$

$$\gamma - \delta' \quad 20 \quad 14 \quad 56.6^{\circ}$$

$$9.82640$$

$$\log \sin \Pi \quad 8.22127^{\circ}$$

$$\sin (\gamma - \delta') \quad 9.53920^{\circ}$$

$$\cos \gamma \quad 0.16166^{\circ}$$

$$\sin \delta - \delta' \quad 7.74853^{\circ}$$

$$\delta - \delta' \quad +19 \quad 16.0^{\circ}$$

$$\delta \quad +23 \quad 38 \quad 19.4^{\circ}$$

$$\gamma - \delta \quad +23 \quad 38 \quad 17.3^{\circ}$$

$$D-C \quad +2.1^{\circ}$$

$$\text{curr.} \quad +0.8^{\circ}$$

$$\text{2nd Ord Ref} \quad 0.0$$

$$\delta \quad +23 \quad 38 \quad 20.2$$

$$D-C \quad +2.9$$

$$\Pi \quad 5.7^{\circ} \quad 13.3^{\circ}$$

$$9.86913$$

$$\log \sin \Pi \quad 8.22127^{\circ}$$

$$\sin \theta - \alpha' \quad 9.48503^{\circ}$$

$$\sec \gamma - \delta \quad 0.03806^{\circ}$$

$$\sin \alpha - \alpha' \quad 7.61349^{\circ}$$

$$\alpha - \alpha' \quad -14 \quad 7.106$$

$$= \quad = \quad -56.47$$

$$\alpha \quad 04 \quad 0 \quad 45.11^{\circ}$$

$$\gamma - \alpha \quad 04 \quad 0 \quad 44.40^{\circ}$$

$$O-C \quad +0.71^{\circ}$$

$$\text{curr.} \quad -0.05^{\circ}$$

$$\alpha \quad 04 \quad 0 \quad 45.06$$

$$O-C = \quad + \quad 0.66$$

13 3 3 0

Lunar Parallax.

18

α'	04	01	41.58
θ	02	50	32.25"
$\theta \cdot \alpha'$	-1	11	09.33
"	-17	47	14.45
$\frac{1}{2} \alpha \alpha'$		-7	03.53
$\theta \cdot \alpha'$	-17	40	15.42

Π	57	13.3
	986913	
$\log \sin \Pi$	822127	"
$\sin \theta \cdot \alpha'$	948503	"
$\sec \theta$	003806	"
$\sin \alpha \cdot \alpha'$	761379	"

	995727	
$\cos \frac{1}{2} \alpha \alpha'$	000000	
$\sec \alpha \cdot \frac{1}{2} \alpha \alpha'$	002099	
$\log \tan \gamma$	997826	"

$\alpha - \alpha'$	-14	7.04
=	=	-56.47

γ	43	34	00
----------	----	----	----

δ'	+23	14	02.4
-----------	-----	----	------

$\gamma - \delta'$	20	14	56.6
--------------------	----	----	------

	982640	
$\log \sin \Pi$	822127	"
$\sin (\gamma - \delta')$	953922	"
$\cos \gamma$	016166	"
$\sin \delta \cdot \delta'$	774855	"

$\delta \delta'$	+19	16.0
------------------	-----	------

δ	+23	38	14.4
----------	-----	----	------

$\gamma - \delta$	+23	38	17.3
-------------------	-----	----	------

$O-C$	+2.5	"
-------	------	---

curr.	+0.8	"
-------	------	---

2nd Aid Ref	00	"
-------------	----	---

δ	+23	38	20.2
----------	-----	----	------

$O-C$	+29	"
-------	-----	---

α	04	0	45.11
----------	----	---	-------

$\gamma - \alpha$	04	0	44.40
-------------------	----	---	-------

$O-C$	+0.71	"
-------	-------	---

curr.	-0.05	"
-------	-------	---

α	04	0	45.06
----------	----	---	-------

$O-C$	+0.66	"
-------	-------	---

