

KG
11366
v. 1047

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13331

1

1	16122	16964
19.7	9252	13836
20.8	52	36
	22	64
	<u>19.6870</u>	<u>19.6872</u>

16922	16383
882526	1447.071
27	72
22	83
<u>20.8096</u>	<u>20.8088</u>

2	18088	16570
20.4	14370	10282
5.9	70	8684
	88	70
	<u>20.3718</u>	<u>20.3714</u>

18340	16260
883634	15758
32	58
40	60
<u>59506</u>	<u>5.9498</u>

3	18478	18406
34.2	16258	10642
8.6	58	42
	78	06
	<u>34.2220</u>	<u>34.2236</u>

17852	16820
11762	1289496
62	98
52	20
<u>8.6090</u>	<u>8.6076</u>

Moon Measures

+
25.0
15.2

16246	19800
15046	1098893
46	08
46	00
<u>15.1200</u>	<u>15.1193</u>

2	16606	17758
25.9	811823	1623539
16.0	28	43
	06	58
	<u>25.8483</u>	<u>25.8481</u>

3
26.0
16.4

16618
10978
78
18
<u>163040</u>

13331

1	16122	16964
19.7	9252	13836
20.8	52	36
	22	64
	<u>19.6870</u>	<u>19.6872</u>

16922	16383
882526	1447071
27	72
22	83
<u>20.8096</u>	<u>20.8088</u>

2	18088	16570
20.4	14370	10282
5.9	70	8684
	88	70
	<u>20.3712</u>	<u>0.03719</u>

18340	16260
883634	15758
32	58
40	60
<u>59506</u>	<u>5.9498</u>

3	18478	18406
34.2	16258	10642
8.6	58	92
	78	06
	<u>34.2220</u>	<u>34.2236</u>

17832	16820
11762	1289496
62	98
52	20
<u>8.6090</u>	<u>8.6076</u>

Moon Measures

1
25.0
15.2

16246	19800
15046	1098893
46	08
46	00
<u>151200</u>	<u>15.1193</u>

2	16606	17858
25.9	811823	1623539
16.0	28	43
	06	58
	<u>25.8483</u>	<u>25.8481</u>

3
26.0
16.4

16018
10978
78
18
<u>16.040</u>

Moon Measures

2

13331
 5 16071 17456
 26 15788 773940
 168 9089 41
 X 71 56
26.0282 26.0284

4 16308 17450
 26.0 160852 7688
 17.0 79 88
 08 50
26.0226 26.0238

5 16834 16798
 25.7 10488 13158
 18.0 88 58
 34 98
25.6346 25.6360

6
 25.0
 18.5
 16330 16398
 10896 11836
 96 36
 30 98
18.5434 18.5438

7
 24.2
 18.8
 16588 16072
 8886 1378076
 86 7276
 88 72
18.7702 18.7704

8
 24.0
 18.8
 16850 16590
 915056 1428082
 62 84
 50 90
18.7694 18.7692

Moon Measures

2

13331
 4 16071 1745.6
 26 15788.89 773940
 17.0 90 41
 71 5.6
 Y 26.0282 26.0284

9 16308 1745.0
 26.0 16085.2 7688
 17.0 79 88
 08 5.0
26.0226 26.0238

5 16834 1679.4
 25.7 10488 1315.8
 18.0 88 58
 34 98
25.6346 25.6360

6
 25.0
 18.5
 16330 16398
 10896 11836
 96 36
 30 98
18.5434 18.5438

7
 24.2
 18.8
 16588 16072
 8886 13780.76
 86 72
 88 72
18.7702 18.7704

8
 24.0
 18.8
 1685.0 16590
 915.0 56 14280.82
 62 84
 5.0 90
18.7694 18.7692

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Times Etc

3

Date Sept. 6, 1917

Exp. & Stars	02	58 ^v		3	10 ^v
" " Moon	03	03	45.6 ^v	3	03 45.9 ^v
Clock Slow.			32.4 ^v		
H. Sid. Time	03	04	18.15 ^v		
H. Long.	04	44	31.05 ^v	$\Theta = -0^{\circ} 57''$	
G. Sid. Time	07	48	49.20 ^v		
" " " M.N	11	0	01.44 ^v		
Interval	20	48	47.76 ^v		
Red		03	24.58 ^v		
G. M. T	20	45	23.18	20.7564 ^v	

From Naut. Alm.	R. A.	Dec.
Moon	03 59	29.11 ^v + 23 36 03.7 ^v
Motion 1 ^m		2.378 ^v + 4.203 ^v
" 45 ^m 3863 ^v	01	47.93 ^v + 03 10.8 ^v
Latular Place	04 01	17.04 ^v + 23 39 14.5 ^v

Moon's Age 20^d^v

$$934'' = 14.55''$$

$$a = -5^{\circ} 03.7$$

$$+ 24.0$$

$$- 479.7$$

Parallax	57	12.7 ^v
Semi-dia	15	37.0 ^v
R		937.0 ^v
Aug.		14.6 ^v
Inc 4		-04
R		951.2 ^v
R		20390 ^v
a R		-978 ^v
(1+4) R		19412 ^v
R2		37683 ^v

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Times Etc

3

Date Sept. 6, 1918

Exp & Stars	02	58		3	10
" " Moon	03	03	45.6	3	03 45.9
Clock Slow.		-	32.4		
H. Sid Time	03	04	18.15		
H. Long	04	44	31.05		
G. Sid Time	07	48	49.20		
" " M.N	11	0	01.44		
Interval	20	48	47.76		
Red		03	24.58		
G. M. T	20	45	23.18		20.7564

 $\Theta = -0^{\circ} 57'$

From Naut. Alm.	R. A	Dec.
Moon	03 59	29.11 +23 36 03.7
Moon 1~		2.378 +4.203
" 45~3863	01	47.93 03 10.8
Latular Place	04 01	17.04 +23 39 14.5

Moon's Age 20^d

$$934'' = 14.55''$$

$$\begin{aligned}
 a &= 503.7 \\
 &+ 24.0 \\
 &= 479.7
 \end{aligned}$$

Parallax	57	12.7
Semi-diam	15	37.0
R		937.0
Aug		14.6
Inv 4		-04
R		951.2
R		2.0390
1.4 R		-978
11+WR		1.9412
RL		3.7683

S_0	η_0	ΔS_0	-6η	-7η	-11
-2.31	+2.95	-1	+14 = +13	-2 = +11	
-1.64	-12.66	-7	+10 = +3	+8 = +11	
+12.90	-9.95	+80	-77 = +3	+7 = +10	
+2.30	-1.24		-14	+1 = -24	-0.08

$\Delta \eta$	-3.2η	$+1.5 \eta$	$+12$
+1	-9 = -8	-9 = -11	
-50	+40 = -10	-2 = -12	
-63	+32 = -31	+19 = -12	
	+4	+3 = +19	+0.9

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Standard Coordinates.

4

Cape No. 584 mg. 56				Cape No. 585 mg. 4.5				Cape No. 611 mg. 6.1			
C	03	58	22.74	03	58	46.93	04	06	55.39		
y			22.74			46.94			55.41		
z			22.71			46.93			55.37		
m	03	58	22.73	03	58	46.93	04	06	55.39		
uc		01	0.90		01	0.20		01	00.40		
A	03	59	23.63	03	59	47.13	04	07	55.79		
A	04	0	42.27	04	0	42.27	04	0	42.27		
-A	-	01	18.64	-		55.14	+	07	13.52		
211			-78.64			-55.14			+433.45		
log			1.89564~			1.74147~			2.63694		
log			9.96114			9.96760			9.96655		
log S ₀			0.36402~			0.21631~			1.11073		

S ₀	-2.3123	-1.6455	+12.9041
S ₁	0	6	81
S	19.6877	20.3539	34.9122
X	19.6871	20.3716	34.2228
X-S	-0.0006	+0.0177	-0.6894

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
Pre		+02	51.7		02	50.5		02	40.8
S	+23	52	42.3	+21	51	21.9	+22	12	03.8
D	+23	29	45.8	+23	29	45.8	23	29	45.8
S-D	+	22	56.5	-1	38	23.9	-1	17	42.0
tan			+1376.5			-5905.5			-4662.8
log			3.13877			3.77125			3.66865
"m ₀			0.46992			1.10240			0.99980
tan S			9.6461			9.6034			9.6108
S ₀ ²			07280			04326			22215
η ₁			74275			7.0894			8.8857
η ₀	+2.9507			-12.6591					-9.9954
η ₁	+0.0027			+0.0012					+0.0769
η	20.9534			5.3421					8.0815
q	20.8092			3.9502					8.6083
q-η	-1.442			+0.6081					+0.5268

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Standard Coordinates.

4

Cape No. 584 mg. 56				Cape No. 585 mg 4.5				Cape No 611 mg 6.1			
C	03	58	22.74	03	58	46.93	04	06	55.39		
y			22.74			46.94			55.41		
z			22.71			46.93			55.37		
m	03	58	22.73	03	58	46.93	04	06	55.39		
Pre		01	090		01	020		01	0040		
A	03	59	23.63	03	59	47.13	04	07	55.79		
A	04	0	42.27	04	0	42.27	04	0	42.27		
A-A	-	01	18.64	-		55.14	+	07	13.52		
Sm			-78.64			-55.14			+433.45		
log			1.89564~			1.74147~			2.63694		
Cps			946114			946760			9.96655		
log S ₀			0.36402~			0.21631~			1.11073		
S ₀	-2.3	123		-1.6	455		+	12.9	041		
S ₁		0			6				81		
S	19.6	877		20.3	539			34.9	122		
X	19.6	871		20.3	716			34.2	228		
X-S	-	0006		+	0177			-	6894		
C	+23	49	50.8	+21	48	31.5	+22	09	22.7		
y			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		
Pre		+02	51.7		02	50.5		02	40.8		
S	+23	52	42.3	+21	51	21.9	+22	12	03.8		
D	+23	29	45.8	+23	29	45.8	23	29	45.8		
S-D	+	22	56.5	-1	28	23.9	-1	17	42.0		
tan			+1376.5			-5905.5			-46628		
log			3.13877			3.77125~			3.66865~		
" η_0			046992			1.10240~			0.99980~		
tan S			9.6461			9.6034			9.6108		
S ₀ ²			07280			04326			22215		
η_1			74275			7.0894			8.8857		
η_0	+29	507		+12.6	591		-9.9	954			
η_1	+00	027		+0	0012		+0.0	769			
η	20.9	534		57.3	421		8.0	815			
y	20.8	092		57.9	402		8.6	083			
y- η	-	1442		+	6081		+	5268			

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Plate Center + Constants.

57

$$\begin{array}{r}
 19.6871 \\
 22 \\
 \hline
 +2.3129 \\
 34 \\
 \hline
 +78.64
 \end{array}
 \quad
 \begin{array}{r}
 20.8092 \\
 18 \\
 \hline
 -2.8092 \\
 490 \\
 \hline
 \end{array}
 \quad
 \begin{array}{r}
 03 \quad 59 \\
 01 \quad 18.64
 \end{array}
 \quad
 \begin{array}{r}
 23.63 + 23 \\
 -22
 \end{array}
 \quad
 \begin{array}{r}
 52 \\
 56.5
 \end{array}
 \quad
 \begin{array}{r}
 42.3 \\
 56.5
 \end{array}$$

Plate Center

$$A = 4^h 0^m 42.27$$

$$D = +23 \quad 29 \quad 45.8$$

$$\begin{array}{l}
 Y-S + 500X \\
 -0.006 + 9844 = 9838 + 355.5Y + 739 = 10577 + 73 = 10650 \\
 +0177 + 10186 = 11363 + 211 = 10574 + 75 = 10649 \\
 -6894 + 17111 = 10217 + 306 = 10523 + 127 = 10650 \\
 24.0886 + 12044 + 598 + 89 = 24.2967
 \end{array}$$

$$\begin{array}{l}
 Y-\eta + 500\gamma \\
 -1442 + 10405 = 8963 - 38.2X - 752 = 8211 + 94 = 8305 \\
 +6081 + 2975 = 9056 - 778 = 8278 + 27 = 8305 \\
 +5268 + 4304 = 9572 - 1307 = 8265 + 39 = 8304 \\
 16.8298 + 8415 - 920 + 76 = 16.7564
 \end{array}$$

Table	$a = -0.9$	$l = -1.0$	$a-l = +0.1$	$h+d = 0.0$
am.	-503.7	-504.5	$+0.8$	$+2.7$
	-502.8	-503.5	$+0.7$	$+2.7$

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Plate Center + Constants.

5

19.6871	20.8092	03	59	23.63 + 23	52	92.3
22	18		01	18.64	-22	56.5

+2.3129	-2.8092
34	490

+78.64

Plate Center

A = 4^h 0^m 42.27

D = +23 29 45.8

Y-S + 500X	+ 355Y	+ 3.7X - 106
-0.006 + 9844 = 9838	+ 739 = 10577	+ 73 = 1065
+ 0.177 + 10186 = 11363	+ 211 = 10574	+ 75 = 1064
+ 6894 + 17111 = 10217	+ 306 = 10523	+ 127 = 1060
24.0886 + 12044	+ 598	+ 89 = 242967

1-Y + 500Y	- 38.2X	+ 4.5Y - 830
-1442 + 10405 = 8963	- 752 = 8211	+ 94 = 8305
+ 6081 + 2975 = 9056	- 778 = 8278	+ 27 = 8305
+ 5268 + 4304 = 9572	- 1307 = 8265	+ 39 = 8304
16.8298 + 8415	- 920	+ 76 = 16.7564

Tables	a = -0.9	l = -0.0	a-l = +0.1	l+d = 0.0
alt.	-503.7	-504.5	+0.8	+2.7

1
2
3
4
5
6
7
8

1
2
3
4
5
6
7
8

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Moon's Center

 $\Delta x = 0$

0 - e

6

1	25.0000	+0.9120	0.8317	3.7636	-47
2	25.8482	+1.7602	3.0983	3.7905	+222
3	26.0283	+1.9403	3.7648	3.7648	-35
4	26.0232	+1.9352	3.7450	3.7732	+49
5	25.6353	+1.5473	2.3941	3.7583	-100
6	25.0000	+0.9120	0.8317	3.7612	-71
7	24.0880	0.0000	0.0000	3.7574	-109
8	24.0000	-0.0880	0.0077	3.7612	-71
				3.7683	

 Δy

arc

1	15.1197	-1.7123	-0	2.9319
2	16.0000	-0.8320	-0	0.6922
3	16.8320	0.0000	-0	0.0000
4	17.0000	+0.1680	+0	0.0282
5	18.0000	+1.1680	+0	1.3642
6	18.5436	+1.7116	+0	2.9295
7	18.7703	+1.9383	+1	3.7574
8	18.7693	+1.9373	+1	3.7535

152° ✓

115° ✓

90° ✓

85° ✓

53° ✓

28° ✓

0° ✓

-37°

Range 155-0

$$x = 25 \quad y = 15.1197$$

$$18.5436$$

$$33.6633$$

$$y_0 = 16.8316$$

$$y_{\max} = 18.7703$$

$$R = 1.9387$$

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

$$y_{\max} = 26.0283$$

$$x_0 = 24.0896$$

Moon Center

$$x_0 = 24.0880$$

$$y_0 = 16.8320$$

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Moon Center

6

A.D.

O - E

1	25.0000	+0.9120	0.8317	3.7636	-47
2	25.8482	+1.7602	3.0983	3.7905	+222
3	26.0283	+1.9403	3.7648	3.7648	-35
4	26.0232	+1.9352	3.7450	3.7732	+49
5	25.6353	+1.5473	2.3941	3.7583	-100
6	25.0000	+0.9120	0.8317	3.7612	-71
7	24.0880	0.0000	0.0000	3.7574	-109
8	24.0000	-0.0880	0.0077	3.7612	-71
				3.7683	

A.D.

arc

1	15.1197	-1.7123	0	2.9319	15°20'
2	16.0000	-0.8320	0	0.6422	115°
3	16.8320	0.0000	0	0.0000	90°
4	17.0000	+0.1680	0	0.0282	85°
5	18.0000	+1.1680	0	1.3642	53°
6	18.5436	+1.7116	0	2.9295	28°
7	18.7703	+1.9383	-1	3.7574	0°
8	18.7693	+1.9373	-1	3.7535	-3°

Range 155°

$x = 25$ $y = 15.1197$
 18.5436
 33.6633
 $y_0 = 16.8316$
 $y_{max} = 18.7703$
 $R = 1.9387$
 $Com R = 1.9412$
 $x_{max} = 26.0283$
 $x_0 = 24.0896$

Moon Center

 $x_0 = 24.0880$ $y_0 = 16.8320$

1 - 1.55
 2 - 1.46
 3 0.00
 4 + 0.33
 5 + 1.81
 6 + 1.55
 7 0.00
 8 - 0.19
 + 3.69
 - 3.20
 + 0.49

- 42.7
 + 391.0
 - 68.0
 + 94.5
 - 155.0
 - 64.5
 0.0
 + 6.3
 + 491.8
 = 330.2
 + 161.6

+ 80.3
 - 184.0
 0.0
 + 8.3
 - 117.0
 - 121.3
 - 211.8
 - 137.8
 + 88.6
 - 771.9
 - 683.3

13331.

Conditional Equations.

7.

0-e

1	+0.91	-1.71	= -	47	+ 11	+ 76	= +	87	-	13.4
2	+1.76	-0.83	= +	22.2	+ 22	+ 37	= +	59	+	16.3
3	+1.94	0.00	= -	35	+ 24	0	= +	34	-	5.9
4	+1.93	+0.17	= +	49	+ 24	- 8	= +	16	+	3.3
5	+1.55	+1.17	= -	100	+ 19	- 52	= -	33	-	6.7
6	+0.91	+1.71	= -	71	+ 11	- 76	= -	65	-	6
7	0.00	+1.94	= -	109	0	- 86	= -	86	-	23
8	-0.09	+1.94	= -	71	- 1	- 86	= -	87	+	1.6

+ 21.2 28.9
av 62

$$+14.67 + 0.49 = +161.6$$

$$+ 0.49 + 15.46 = -683.3$$

$$- () - 0.01 = - 5.4$$

$$+15.45 = -688.7$$

$$h = -44.5^{\circ}$$

$$+14.67 = +161.6 + 21.8 = +183.4 \quad a = +12.5^{\circ}$$

arc 15-5-

$$p = .19^{\circ}$$

$$\frac{\Sigma V}{n} = -9.6^{\circ}$$

$$\frac{-9.6}{.19} = -50.5^{\circ}$$

$$\Delta R = -0.6^{\circ}$$

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Conditional Equations.

7.

0-e

1	+0.91	-1.71	= -	47	+11	+76	= +	87	-	134
2	+1.76	-0.83	= +	222	+22	+37	= +	59	+	163
3	+1.94	0.00	= -	35	+24	0	= +	24	-	59
4	+1.93	+0.17	= +	49	+24	-8	= +	16	+	33
5	+1.55	+1.17	= -	100	+19	-52	= -	33	-	61
6	+0.91	+1.71	= -	71	+11	-76	= -	65	-	6
7	0.00	+1.94	= -	109	0	-86	= -	86	-	23
8	-0.09	+1.94	= -	71	-1	-86	= -	87	+	16

+212 289
av 62

$$+14.67 + 0.49 = +161.6$$

$$+ 0.49 + 15.46 = -683.3$$

$$-1 - 0.01 = -55.4$$

$$+15.45 = -688.7$$

$$h = -44.5$$

$$+14.67 = +161.6 + 21.8 = +183.4 \quad a = +12.5$$

$$\text{arc } 15.5$$

$$\frac{p}{m} = .19$$

$$\frac{E}{m} = -9.6$$

$$\frac{-9.6}{.19} = -50.5$$

$$\Delta R = -26$$

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Moon's Mean Position

8

$$\begin{array}{r} X_0 \quad 24.0880^{\circ} \\ \quad \quad + 6 \\ \hline 24.0886 \end{array}$$

$$\begin{array}{r} Y_0 \quad 16.8320^{\circ} \\ \quad \quad - 22 \\ \hline 16.8298 \end{array}$$

From Plate Constants.

$$\begin{array}{r} 24.2967^{\circ} \\ 22 \\ \hline + 2.2967^{\circ} \end{array}$$

$$\begin{array}{r} 16.7564^{\circ} \\ 18 \\ \hline - 1.2436^{\circ} \end{array}$$

$$\begin{array}{l} \log \Sigma_0 \\ \cos \delta_0 \\ \sin \alpha - A \end{array} \quad \begin{array}{r} 0.36110^{\circ} \\ 996294^{\circ} \\ 850724 \\ 1.89092^{\circ} \end{array}$$

$$\begin{array}{l} \log \tan \delta \\ \Sigma_0^2 \\ \log \eta_1 \end{array} \quad \begin{array}{r} 9.6345^{\circ} \\ 0.7622^{\circ} \\ 7.0534^{\circ} \\ 7.4501^{\circ} \end{array}$$

$$\begin{array}{r} + 77.79^{\circ} \\ + 1 \quad 17.79 \\ A \quad 4 \quad 0 \quad 42.27^{\circ} \\ \alpha_0 \quad 4 \quad 2 \quad 0.06^{\circ} \\ \text{Red} \quad \quad \quad + 3.93^{\circ} \\ \alpha' \quad 4 \quad 2 \quad 3.99^{\circ} \end{array}$$

$$\begin{array}{r} \eta_1 \quad + 0.0028 \\ \eta_0 \quad - 1.2464 \\ \log \eta_0 \quad 0.09566^{\circ} \\ \log \tan \delta - D \quad 7.33115^{\circ} \\ \quad \quad \quad 2.76451^{\circ} \\ S - D \quad - 581.4 \\ \quad \quad \quad - 9 \quad 41.4^{\circ} \\ D \quad + 23 \quad 29 \quad 45.8^{\circ} \\ \delta_0 \quad + 23 \quad 20 \quad 4.4^{\circ} \\ \text{Red} \quad \quad \quad + 11.4 \\ \delta' \quad + 23 \quad 20 \quad 15.8^{\circ} \end{array}$$

13331

Moon's Mean Position

8

$$\begin{array}{r} X_0 \quad 24.0880 \\ \quad \quad + \quad 6 \\ \hline 24.0886 \end{array}$$

$$\begin{array}{r} Y_0 \quad 16.8320 \\ \quad \quad -22 \\ \hline 16.8298 \end{array}$$

From Plate Constants

$$\begin{array}{r} 24.2967 \\ 22 \\ \hline +2.2967 \end{array}$$

$$\begin{array}{r} 16.7564 \\ 18 \\ \hline -1.2436 \end{array}$$

$$\begin{array}{r} \log S_0 \quad 0.36110 \\ \text{Case } 0 \quad 996294 \\ \sin x \cdot A \quad 850724 \\ \sin x \cdot A \quad 189092 \end{array}$$

$$\begin{array}{r} \log \tan \delta \\ S_0^2 \quad 9.6345 \\ \quad \quad 0.7622 \\ \quad \quad 7.0534 \\ \log \eta \quad 7.4501 \end{array}$$

$$\begin{array}{r} +77.79 \\ + \quad 1 \quad 17.79 \end{array}$$

$$\begin{array}{r} \eta_1 \quad 0.0028 \\ \eta_0 \quad -1.2464 \end{array}$$

$$A \quad 4 \quad 0 \quad 42.27$$

$$\begin{array}{r} \log \eta_0 \quad 0.09566 \\ \quad \quad 7.33715 \end{array}$$

$$Q_0 \quad 4 \quad 2 \quad 0.06$$

$$\begin{array}{r} \log \tan \delta - E \quad 2.76451 \end{array}$$

$$\text{Red} \quad +393$$

$$S - E \quad -581.4$$

$$X' \quad 4 \quad 2 \quad 3.99$$

$$-9 \quad 41.4$$

$$E + 23 \quad 29 \quad 45.8$$

$$S_0 + 23 \quad 20 \quad 44$$

Red

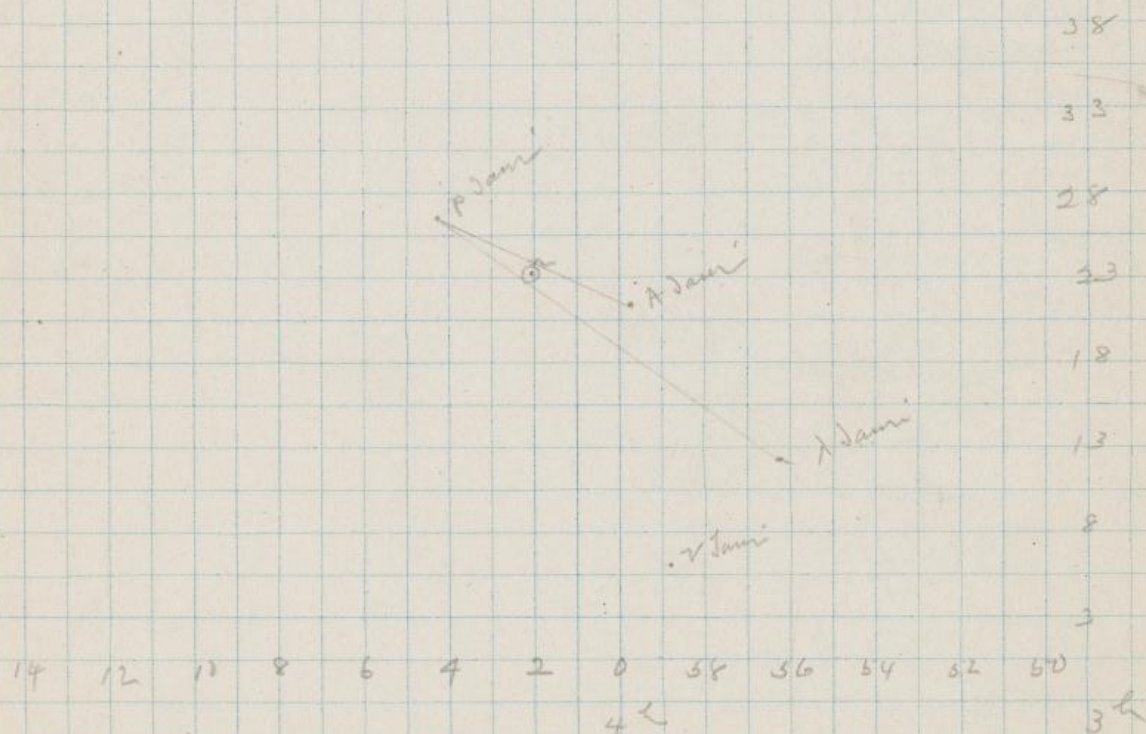
$$S' + 23 \quad 21 \quad 15.8$$

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

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

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

$$\begin{array}{r}
 26 \quad 16 \quad 57.26 \\
 \underline{55.08} \\
 10.18
 \end{array}$$



13331

Reduction & Apparent Place

9

$H + \alpha_0$	11	14.8	$168^\circ 42'$	δ_0	+23	20.1
H	7	12.8		$\cos \delta_0$		9.9629
α_0	4	02.0		$\log i'$		0.8920
C	23	41.4		$\log (i)$		0.8544
$G + \alpha_0$	3	43.4	$55^\circ 51'$	$\sin \delta_0$		9.5978
$\cos G + \alpha_0$		9.7492		$\cos H + \alpha_0$		9.9915 ^m
$\sin G + \alpha_0$		1.3153		h		1.2771
$\sin G + \alpha_0$		9.9178		$\sin H + \alpha_0$		9.2925
$\tan \delta_0$		9.6349		$\sec \delta_0$		0.0371
		8.8239				8.8239
$\log q'$		1.0645		$\log h'$		0.8664 ^m
q		9.6919		h		9.4302
J		+3.169		g'		11.600
J_0		+0.492		h'		-7.352
h		+0.269		i'		+7.152
Red		+3.930		$Red.$		+11.400

13331

Reduction to Apparent Place

9

$H + \lambda_0$	14	14.8	$268^{\circ} 42'$	S_0	$+23$	20.1
H	7	12.8				
λ_0	4	02.0		$\cos S_0$		99629
C	23	41.4		$\log i$		0.8920
$C + \lambda_0$	3	43.4	$55^{\circ} 51'$	$\log (1)$		0.8544

$\cos C + \lambda_0$	9	7492
q	1	3153
$\sin C + \lambda_0$	9	9178
$\tan S_0$	9	6349
	8	8239

$\log q'$	1	0645
q	9	6919

J	+3	169
q	+0	492
h	+0	269
Red	+3	930

$\sin S_0$	9	5978
$\cos H + \lambda_0$	9	9915
h	1	2771
$\sin H + \lambda_0$	9	2925
$\sec S_0$	0	0371
	8	8239

$\log h'$	0	8664
h	9	4302

q'	11	600
h'	-7	352
i	+7	152
Red	+11	400

13331

Lunar Parallax

10

$$\begin{array}{rcl}
 \alpha' & 04 & 02 \quad 03.99'' \\
 \theta & 03 & 04 \quad 18.15'' \\
 \theta - \alpha' & - & 57 \quad 45.84'' \\
 = & -14 & 26 \quad 27.60'' \\
 \frac{1}{2} \alpha - \alpha' & - & 05 \quad 45.69'' \\
 \theta - \frac{1}{2} \alpha - \frac{1}{2} \alpha' & -14 & 20 \quad 41.91'' \\
 \frac{1}{2} & &
 \end{array}$$

$$\begin{array}{rcl}
 \pi & 57 & 12.7'' \\
 & & 9.86913 \\
 \log \sin \pi & & 8.22119'' \\
 \sin \theta - \alpha' & & 9.39686'' \\
 \sec \delta & & 0.03811'' \\
 \sin \alpha - \alpha' & & 7.52529''
 \end{array}$$

$$9.95727$$

$$0.00000$$

$$0.01376''$$

$$9.97103''$$

$$\alpha \alpha' - 11' 31.38''$$

$$= -46.09$$

$$\begin{array}{rcl}
 \delta' & 43 & 05 \quad 25.4'' \\
 & 23 & 20 \quad 15.8''
 \end{array}$$

$$\gamma - \delta' \quad 19 \quad 45 \quad 9.6''$$

$$\begin{array}{rcl}
 \log \sin \pi & 9.82640 \\
 \sin \gamma - \delta' & 8.22119'' \\
 \cos \gamma & 9.52886 \\
 \sin \delta - \delta' & 0.16550'' \\
 & 7.74195''
 \end{array}$$

$$\delta - \delta' \quad + 18 \quad 586$$

$$\delta + 23 \quad 39 \quad 14.4''$$

$$\gamma - \delta + 23 \quad 39 \quad 14.5''$$

$$\delta - c \quad - 0.1''$$

$$\text{curr.} \quad + 0.8''$$

$$\text{Std. Clrd. Ref.} \quad 0.0$$

$$\delta + 23 \quad 39 \quad 15.2$$

$$\delta - c = + 0.7$$

$$\alpha \quad 04 \quad 01 \quad 17.90''$$

$$\gamma - \alpha \quad 04 \quad 01 \quad 17.04''$$

$$\delta - c \quad + 0.86''$$

$$\text{curr.} \quad - 0.07''$$

$$\alpha \quad 04 \quad 01 \quad 17.83$$

$$\delta - c = + 0.79$$

13331

Lunar Parallax

12

$$\begin{array}{rcl}
 \alpha' & 04 & 02 \quad 0399 \\
 \theta & 03 & 09 \quad 18.15 \\
 \theta - \alpha & -57 & 4584 \\
 = & -14 & 26 \quad 27.60 \\
 \frac{1}{2} \alpha \cdot \alpha' & -05 & 45.69 \\
 \theta - \alpha - \frac{1}{2} \alpha \cdot \alpha' & -14 & 20 \quad 41.91 \\
 2 & &
 \end{array}$$

$$\begin{array}{rcl}
 \pi & 57 & 12.7 \\
 & 986913 \\
 \lg \sin \pi & 822119 \\
 \sin \theta - \alpha' & 939686 \\
 \sin \delta & 003811 \\
 \sin \alpha' & 7.52529
 \end{array}$$

$$\begin{array}{rcl}
 995727 \\
 000000 \\
 001376 \\
 997103
 \end{array}$$

$$\begin{array}{rcl}
 \alpha \alpha' & -11' & 31.38 \\
 = & -46.09
 \end{array}$$

$$\begin{array}{rcl}
 \delta' & 43 & 05' \quad 25.9 \\
 \delta & 23 & 20 \quad 15.8
 \end{array}$$

$$\gamma - \delta' \quad 19 \quad 45 \quad 9.6$$

$$\begin{array}{rcl}
 & 982640 \\
 \lg \sin \pi & 822119 \\
 \sin \gamma - \delta' & 952886 \\
 \cos \delta & 016550 \\
 \sin \delta - \delta & 774195
 \end{array}$$

$$\delta - \delta' \quad 18 \quad 58.6$$

$$\delta + 23 \quad 39 \quad 14.4$$

$$\sin \delta + 23 \quad 39 \quad 14.5$$

$$\delta - \delta' \quad -0.1$$

$$\cos \delta \quad +0.8$$

$$\sin \delta \text{ (old Ref.)} \quad 00$$

$$\delta + 23 \quad 39 \quad 15.2$$

$$\delta - \delta' \quad +0.7$$

$$\alpha \quad 04 \quad 01 \quad 17.90$$

$$\sin \alpha \quad 04 \quad 01 \quad 17.04$$

$$\delta - \alpha \quad +0.86$$

$$\cos \alpha \quad -0.07$$

$$\alpha \quad 04 \quad 01 \quad 17.8$$

$$\delta - \alpha = \quad +0.7$$

1
19
20

2
20
5

3
34
8

1
1

2
1

2
1

13332

Star Measures

11

1	18448	16999	18864	16660
19.7	11450	13997	11396	14112.0
20.7	4648	97	96	08
	48	99	64	60
	<u>19.7000</u>	<u>19.6998</u>	<u>20.7468</u>	<u>20.7450</u>

2	18282	18404	18525	16790
20.4	15065	11610	19685.90	15620.16
5.9	6766	10	95	1.2
	82	04	15	84
	<u>20.3216</u>	<u>20.3206</u>	<u>5.8826</u>	<u>5.8827</u>

3	19487	18930	16942	16798
34.2	17656.57	10770.67	12120	11612
8.5	58	64	20	12
	87	30	42	98
	<u>34.1830</u>	<u>34.1837</u>	<u>8.4822</u>	<u>8.4814</u>

Moon

1	16916	16068
16.0	12406.01	10588.87
15.4	86	86
	16	68
	<u>15.4515</u>	<u>15.4519</u>

2	16602	17838
26.4	12362	12070.72
16.0	62	74
	02	38
	<u>26.4240</u>	<u>26.4234</u>

3	16787	17400
26.6	10406.07	13770
16.7	08	70
	87	00
	<u>26.6380</u>	<u>26.6370</u>

13332

Star Measures

11

L	18448	16999	18864	16660
9.7	11450	13997	11396	14112.0
0.7	4648	97	96	08
	48	99	64	60
	<u>19.7000</u>	<u>19.6998</u>	<u>20.7488</u>	<u>20.7450</u>

7	18282	18404	18525	16790
0.4	15065	11610	9685.90	15620.16
5.9	6766	10	95	12
	82	04	15	84
	<u>20.3216</u>	<u>20.3206</u>	<u>58826</u>	<u>58822</u>

2	19481	18930	18942	16798
4.2	17656.57	10770.67	12120	11612
85	58	64	20	12
	87	30	42	98
	<u>34.1830</u>	<u>34.1837</u>	<u>24822</u>	<u>84814</u>

Moon

L		16916	16068
16.0		12406.01	10588.87
5.4		86	86
		16	68
		<u>15.4515</u>	<u>15.4519</u>

3	16602	17838		
6.4	12362	12070.72		
16.0	62	74		
	02	38		
	<u>26.4240</u>	<u>26.4234</u>		

3	16787	17400		
26.6	10406.07	13770		
16.7	08	70		
	87	00		
	<u>26.6380</u>	<u>26.6370</u>		

10460
2270

13332

Moon Measures.

12

4 16790 16070

26.6 10440₃₈ 12416

17.0 36 16

90 70

26.6352 26.6346

5 16112 16542

26.2 13235₃₉ 9411

18.0 43 11

12 42

26.2873 26.2869

6 16600

26.0 13348

18.2 48

00

3252

16600

13364

64

00

18.3236

16484

9712

12

84

18.32287
25.0
18.8

16008

7920

20

08

18.8088

16054

14132

32

54

18.80788
24.8
18.8

16282

7952

4850

82

18.8332

16528

14854₅₈

62

28

18.8330

13332

Moon Measures.

12

4	16790	16010
26.6	10440 ³⁸	12416
17.0	36	16
	90	70
	<u>26.6352</u>	<u>26.6346</u>

	16112	16542
6.2	13235 ³⁹	9411
8.0	43	11
	12	42
	<u>26.2873</u>	<u>26.2869</u>

2	16600
6.0	13348
8.2	44
	00
	<u>3252</u>

16600	16484
13364	9712
64	12
00	84
<u>18.3236</u>	<u>18.3228</u>

7
5.0
8.8

16008	16054
7920	14132
20	32
08	54
<u>18.8088</u>	<u>18.8078</u>

4.8
8.8

16282	16528
7952	14854 ⁵⁴
4850	62
82	28
<u>18.8332</u>	<u>18.8330</u>

13332

Times etc

Date Sept. 6 1917

Exp. & Stars	3	11	✓
" " Moon	3	17	19.2 ✓
Clock Slow			32.5 ✓

3	23	✓
3	17	19.4 ✓

H. Sid. Time	3	17	51.8 ✓
H. Long	4	44	31.05
G. Sid. Time	8	02	22.85 ✓
" " " M.N	11	0	01.44
Interval	21	02	21.41 ✓
Red		03	26.81 ✓
G. M.T	20	58	54.60 ✓

4	-	44 ^m
---	---	-----------------

20.9818 ✓

From Naut. Alman.

R.A.

Dec.

Moon 20 ^h	3	59	29.11 ✓	+23	36	03.7 ✓
Mohair 1 ^m			+2.378 ✓			4.187 ✓
" 58.91 ✓		02	20.09 ✓		+04	06.6 ✓
Tatular Place	4	01	49.20 ✓	+23	40	10.3 ✓

934 " : 14.7 ✓

Moon's age 20^d

$$a = -503.8$$

$$+ \quad 24.$$

$$-479.8$$

Parallax	57.	12.2 ✓
Semi-dia	15	36.9 ✓
R		936.9 ✓
Aug		14.8 ✓
Sun 5		-03
R		951.4 ✓
R		2.0394 ✓
a R		-97.8 ✓
(1+a) R		1.9416 ✓
R ²		37698 ✓

13332

Times etc

13

Date Sept. 6 1917

Exp h Stars	3	11		3	23	
Mean	3	17	19.2	3	17	19.4
Clock Slow			32.5			
21 Sid Time	3	17	51.8			
71 Long	4	44	31.05			
21 Sid Time	8	02	22.85			
" " M.M	11	0	01.44			
Interval	21	02	21.41			
Red		03	26.81			
G.M.T	20	58	54.60			
				20	48	18

sun Haut Alm.			R.A.			Dec.
Mean 20 ^h	3	59	29.11	+23	36	03.7
Mean 1 ^m			+2.378			4.187
" 58.91		02	20.09		+04	06.6
Tabular Place	4	01	49.20	+23	40	10.3

934 - 14.7

Mean age 20^d

$$\begin{array}{r}
 a - 503.8 \\
 + \quad 24. \\
 \hline
 - 479.8
 \end{array}$$

Parallax	57	12.2
Semi diam	15	36.9
R		936.9
Ang		14.8
Sun 5"		-0.3
R		951.4
R		2.0394
a R		-97.8
(1+a) R		1.9416
R ²		2769.8

13332

Plate Center + Constants..

$$\begin{array}{r}
 X \quad 19.6999 \\
 -S \quad 19.6877 \\
 \hline
 X-S \quad +0122
 \end{array}$$

$$\begin{array}{r}
 20.3211 \\
 20.3539 \\
 \hline
 -0328
 \end{array}$$

$$\begin{array}{r}
 34.1834 \\
 34.9122 \\
 \hline
 -7288
 \end{array}$$

$$\begin{array}{r}
 y \quad 20.7459 \\
 \gamma \quad 20.9534 \\
 \hline
 y-\gamma \quad -2075
 \end{array}$$

$$\begin{array}{r}
 5.8826 \\
 5.3421 \\
 \hline
 +5405
 \end{array}$$

$$\begin{array}{r}
 8.4818 \\
 8.0815 \\
 \hline
 +4003
 \end{array}$$

$$\begin{array}{r}
 X-S + 500X \\
 +0122 + 9850 = 9972 \\
 -0328 + 10161 = 9833 \\
 -7288 + 17092 = 9804 \\
 246956 + 12348 = 248194
 \end{array}$$

$$-9.24$$

$$\begin{array}{r}
 -191 = 9781 \\
 -54 = 9779 \\
 -78 = 9726 \\
 -155 = 9671
 \end{array}$$

$$\begin{array}{r}
 +3.8X - 9855 \\
 +74 = 9855 \\
 +77 = 9856 \\
 +129 = 9855 \\
 +94 = 249388
 \end{array}$$

$$\begin{array}{r}
 y-\gamma + 500y \\
 -2075 + 10373 = 8298 \\
 +5405 + 2941 = 8346 \\
 +4003 + 4241 = 8244 \\
 16.8894 + 8445 = 25.3344
 \end{array}$$

$$+6.7X$$

$$\begin{array}{r}
 +132 = 8430 \\
 +136 = 8482 \\
 +229 = 8473 \\
 +165 = 8638
 \end{array}$$

$$+3.5\gamma - 8503$$

$$\begin{array}{r}
 +74 = 8504 \\
 +21 = 8503 \\
 +30 = 8503 \\
 +59 = 16.9060
 \end{array}$$

$$Tables \quad a = -0.9$$

$$Ats \quad -503.8$$

$$-502.9$$

$$c = -0.9$$

$$-503.5$$

$$-502.6$$

$$a-c = 0.0$$

$$-0.3$$

$$-0.3$$

$$A+d = 0.0$$

$$+2.5$$

$$+2.5$$

13332

Milne Center + Constants

$$\begin{array}{r}
 X \quad 19.6999 \\
 S \quad 19.6877 \\
 \hline
 X-S \quad + 0.0122
 \end{array}$$

$$\begin{array}{r}
 20.3211 \\
 20.3539 \\
 \hline
 - 0.0328
 \end{array}$$

$$\begin{array}{r}
 34.1834 \\
 34.9122 \\
 \hline
 - 0.7288
 \end{array}$$

$$\begin{array}{r}
 Y \quad 20.7459 \\
 \gamma \quad 20.9539 \\
 \hline
 Y-\gamma \quad - 0.2075
 \end{array}$$

$$\begin{array}{r}
 5.8826 \\
 5.3421 \\
 \hline
 + 0.5405
 \end{array}$$

$$\begin{array}{r}
 84818 \\
 80815 \\
 \hline
 + 4003
 \end{array}$$

$$\begin{array}{r}
 X-S + 5.00X \\
 + 0.0122 + 98.90 = 99.72 - 9.29 \\
 - 0.0328 + 10.161 = 98.33 - 1.91 = 97.81 + 3.81 = 98.55 \\
 - 0.7288 + 17.092 = 98.04 - 5.4 = 97.79 + 77 = 98.56 \\
 24.6956 + 1.2348 = 98.04 - 7.8 = 97.26 + 129 = 98.55 \\
 - 1.55 = 97.26 + 94 = 24.9384
 \end{array}$$

$$\begin{array}{r}
 Y-\gamma + 5.00Y \\
 20.75 + 10.373 = 82.98 + 6.71 \\
 - 5.405 + 2.941 = 83.46 + 1.32 = 84.30 + 3.57 = 85.13 \\
 4003 + 4.241 = 82.44 + 1.36 = 84.82 + 74 = 85.09 \\
 16.8894 + 84.45 = 82.44 + 2.29 = 84.73 + 21 = 85.03 \\
 + 165 = 84.73 + 30 = 85.03 + 59 = 16.9060
 \end{array}$$

$$\begin{array}{r}
 Tables \quad a. - 0.9 \quad b. - 0.9 \quad c. - 0.0 \quad d. 0.0 \\
 Abs \quad - 5.038 \quad - 5.035 \quad - 0.3 \quad + 2.5
 \end{array}$$

13332

Moon Center

15

			Δx				$0 - C$
1	26.0000	+1.3060	0	1.7056	3.7660	-	38
2	26.4237	+1.7297	0	2.9918	3.7786	+	88
3	X 26.6375	+1.9435	0	3.7772	3.7772	+	7.4
4	26.6349	+1.9409	0	3.7671	3.7799	+	101
5	26.2871	+1.5931	0	2.5379	3.7767	+	69
6	26.0000	+1.3060	0	1.7056	3.7686	-	12
7	25.0000	+0.3060	0	0.0936	3.7854	+	156
8	24.6940	+0.0000	0	0.0000	3.7876	+	178
					3.7698		

			Δy	
1	15.4517	-1.4353	-1	2.0604
2	16.0000	-0.8870	-0	0.7868
3	16.8870	-0.0000	-0	0.0000
4	17.0000	+0.1130	+0	0.0128
5	18.0000	+1.1130	+0	1.2388
6	18.3232	+1.4362	+1	2.0630
7	18.8083	+1.9213	+1	3.6918
8	y 18.8331	+1.9461	+1	3.7876

arc

138°

117°

90°

87°

55°

42°

9°

0°

Range 138°

$$x = 26 \quad y = 15.4517$$

$$18.3232$$

$$33.7749$$

$$y_0 = 16.8874$$

$$y_{\max} = 18.8331$$

$$R = 1.9457$$

$$\cos R = 1.9416$$

$$x_{\max} = 26.6375$$

$$x_0 = 24.6918$$

Moon Center

$$x_0 = 24.6940$$

$$y_0 = 16.8870$$

13332

Moon Center

15°

				Δx				$0 - C$
1	26 00 00	+1.3 06 0	0	1.7 05 6	3.7 6 60	-	38	
2	26 42 37	+1.7 29 7	0	2.9 9 18	3.7 7 86	+	88	
3	26 63 75	+1.9 43 5	0	3.7 7 72	3.7 7 72	+	74	
4	26 63 49	+1.9 40 9	0	3.7 6 71	3.7 7 94	+	101	
5	26 28 71	+1.5 93 1	0	2.5 3 79	3.7 7 69	+	69	
6	26 00 00	+1.3 06 0	0	1.7 05 6	3.7 6 86	-	12	
7	25 00 00	+0.3 06 0	0	0 0 9 36	3.7 8 54	+	156	
8	24 69 40	+0.0 00 0	0	0 0 0 00	3.7 8 76	+	178	
					3.7 6 98			

				Δy			arc
1	15.45 17	+1.4 35 3	-1	2.0 60 4			138
2	16.00 00	-0.8 87 0	-0	0.7 86 8			117
3	16.88 70	-0.0 00 0	-0	0.0 00 0			90°
4	17.00 00	+0.1 130	+0	0.0 12 8			87
5	18.00 00	+1.1 130	+0	1.2 38 8			55°
6	18.32 32	+1.4 36 2	+1	2.1 63 0			42
7	18.80 83	+1.9 21 3	+1	3.6 9 18			9
8	18.83 31	+1.9 46 1	+1	3.7 8 76			0°

Range 135°

$$x = 26 \quad y = 15.45 17$$

$$y_0 = 16.88 74$$

$$y_{\max} = 18.83 31$$

$$R = 1.9 45 7$$

$$\cos R = 1.9 4 16$$

$$x_{\max} = 26.63 75$$

$$x_0 = 24.69 18$$

Moon Center

$$x_0 = 24.69 40$$

$$y_0 = 16.88 70$$

Formation of Normals.

1	- 1.9 0	- 49.7	+ 55.2
2	- 1.54	+ 156.8	- 78.4
3	0 0 0	+ 143.2	0.0
4	+ 0.2 1	+ 196.0	+ 11.1
5	+ 1.7 6	+ 109.8	+ 76.5
6	+ 1.8 9	- 15.7	- 17.3
7	+ 0.5 9	+ 48.3	+ 299.8
8	+ 0.0 0	+ 0.0	+ 347.2
	+ 4.4 3	+ 654.1	+ 789.8
	- 3.4 4	- 65.4	- 95.7
	+ 1.0 1	+ 588.7	+ 694.1

13332

Conditional Equations

16

								0 - C
1	+1.31	-1.45	= -	38	+ 42	- 70	= -28	- 10
2	+1.73	-0.89	= +	88	+ 56	- 43	= +13	+ 75
3	+1.94	0.00	= +	74	+ 63	0	= +63	+ 11
4	+1.94	+0.11	= +	101	+ 63	+ 5	= +68	+ 33
5	+1.59	+1.11	= +	69	+ 52	+ 54	= +106	- 37
6	+1.31	+1.44	= -	12	+ 42	+ 70	= +112	- 124
7	+0.31	+1.92	= +	156	+ 10	+ 93	= +103	+ 53
8	+0.00	+1.95	= +	178	+ 0	+ 95	= +95	+ 83

+255 - 171

or 53

$$+16.58 + 1.01 = +588.7$$

$$+ 1.01 + 13.64 = + 694.1$$

$$- (1.1) - 0.06 = - 35.9$$

$$+13.58 = + 658.2 \quad f = + 48.5$$

$$+16.58 = +588.7 - 49.0 = +539.7 \quad a = + 32.5$$

are 138

$$P_n = .08^v$$

$$\frac{\Sigma K}{n} = +10.5^N$$

$$\frac{+10.5}{.08} = +131.$$

$$\Delta R = +1.6^v$$

13332

Conditional Equations

16

								0 - C
1	+1.31	-1.45	= -	3.8	+ 92	- 70	= - 28	- 10
2	+1.73	-0.89	= +	8.8	+ 56	- 43	= + 13	+ 75
3	+1.44	0.00	= +	7.4	+ 63	0	= + 63	+ 11
4	+1.44	+0.11	= +	1.01	+ 63	+ 55	= + 68	+ 33
5	+1.59	+1.11	= +	6.9	+ 52	+ 54	= + 106	- 37
6	+1.31	+1.44	= -	1.2	+ 92	+ 70	= + 112	- 124
7	+0.31	+1.92	= +	1.56	+ 10	+ 93	= + 103	+ 53
8	+0.00	+1.95	= +	1.78	+ 0	+ 95	= + 95	+ 83

$$+255 = 171$$

$$\text{or } 53$$

$$+16.58 + 1.01 = +588.7$$

$$+ 1.01 + 13.64 = + 694.1$$

$$- 1.1 - 0.06 = - 35.9$$

$$+13.58 = + 658.2 \quad A = + 48.5$$

$$+16.58 = +588.7 - 99.0 = +539.7 \quad A = + 32.5$$

are 138

$$\frac{P}{n} = .08$$

$$\frac{2K}{n} = +105$$

$$\frac{+10.5}{.08} = + 131.$$

$$\Delta R = + 1.6$$

13332

Moon's Mean Position

17.

$$\begin{array}{r}
 x_0 \quad 24.6940^{\circ} \\
 \quad \quad + 1.6^{\circ} \\
 \hline
 24.6956^{\circ}
 \end{array}$$

$$\begin{array}{r}
 y_0 \quad 16.8870^{\circ} \\
 \quad \quad + 24^{\circ} \\
 \hline
 16.8894^{\circ}
 \end{array}$$

Frame Plate Constants

$$\begin{array}{r}
 24.9388^{\circ} \\
 22. \\
 \hline
 + 2.9388^{\circ}
 \end{array}$$

$$\begin{array}{r}
 16.9060^{\circ} \\
 18. \\
 \hline
 - 1.0940^{\circ}
 \end{array}$$

$$\begin{array}{r}
 0.46817 \\
 99.6288^{\circ} \\
 8.50724^{\circ} \\
 1.99805^{\circ} \\
 \hline
 + 99.55^{\circ}
 \end{array}$$

$$\begin{array}{r}
 9.6352^{\circ} \\
 09363^{\circ} \\
 7.0534^{\circ} \\
 7.6249^{\circ}
 \end{array}$$

$$+ 0.1 \quad 39.55^{\circ}$$

$$\begin{array}{r}
 + 0.0042^{\circ} \\
 - 1.0982^{\circ}
 \end{array}$$

$$A \quad 4 \quad 0 \quad 42.27$$

$$0.04068^{\circ}$$

$$\alpha_0 \quad 4 \quad 02 \quad 21.82^{\circ}$$

$$7.33115^{\circ}$$

$$2.70953^{\circ}$$

$$Red \quad \quad \quad + 3.93^{\circ}$$

$$\begin{array}{r}
 - 8 \quad 32.3^{\circ} \\
 D \quad + 23 \quad 29 \quad 45.8^{\circ}
 \end{array}$$

$$\alpha' \quad 4 \quad 02 \quad 25.75^{\circ}$$

$$S_0 \quad + 23 \quad 21 \quad 13.5^{\circ}$$

$$Red \quad \quad \quad + 11.4^{\circ}$$

$$S' \quad + 23 \quad 21 \quad 24.9^{\circ}$$

13331

Moon's Mean Position

17

$$\begin{array}{r}
 Y_0 \quad 24.6940 \\
 \quad \quad + 1.6 \\
 \hline
 24.6956
 \end{array}$$

$$\begin{array}{r}
 y_0 \quad 16.8870 \\
 \quad \quad + 24 \\
 \hline
 16.8894
 \end{array}$$

Frame Plate Constants.

$$\begin{array}{r}
 24.9388 \\
 22. \\
 \hline
 + 2.9388
 \end{array}$$

$$\begin{array}{r}
 16.9060 \\
 18. \\
 \hline
 - 1.0940
 \end{array}$$

$$0.46817$$

$$9.96288$$

$$8.50724$$

$$1.99805$$

$$+ 99.55$$

$$+ 01 + 39.55$$

$$4 \quad 0 \quad 42.27$$

$$X_0 \quad 4 \quad 0 \quad 2 \quad 21.82$$

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

$$X' \quad 4 \quad 0 \quad 2 \quad 25.75$$

$$9.6352$$

$$0.9363$$

$$7.1534$$

$$7.6249$$

$$0.0042$$

$$- 1.0982$$

$$0.04068 \sim$$

$$7.33115$$

$$2.70953 \sim$$

$$- 8 \quad 32.3$$

$$+ 23 \quad 29 \quad 45.8$$

$$S_0 \quad + 23 \quad 21 \quad 13.5$$

$$\text{Red} \quad \quad \quad + 11.4$$

$$S' \quad + 23 \quad 21 \quad 24.9$$

13331

Moon's Mean Position

17

$$\begin{array}{r}
 Y_0 \quad 24.6940 \\
 \quad \quad + 1.6 \\
 \hline
 24.6956
 \end{array}$$

$$\begin{array}{r}
 y_0 \quad 16.8870 \\
 \quad \quad + 24 \\
 \hline
 16.8894
 \end{array}$$

Frame Plate Constants.

$$\begin{array}{r}
 24.9388 \\
 22. \\
 \hline
 + 2.9388
 \end{array}$$

$$\begin{array}{r}
 16.9060 \\
 18. \\
 \hline
 - 1.0940
 \end{array}$$

$$0.46817$$

$$996288$$

$$850724$$

$$199805$$

$$+ 9955$$

$$+ 01 + 39.55$$

$$4 \quad 0 \quad 42.27$$

$$X_0 \quad 4 \quad 0 \quad 2 \quad 21.82$$

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

$$X' \quad 4 \quad 0 \quad 2 \quad 25.75$$

$$9.6352$$

$$09363$$

$$7.1534$$

$$7.6249$$

$$0.0042$$

$$- 1.0982$$

$$0.04068 \sim$$

$$7.33115$$

$$2.70953 \sim$$

$$- 8 \quad 32.3$$

$$+ 23 \quad 29 \quad 45.8$$

$$S_0 \quad + 23 \quad 21 \quad 13.5$$

$$\text{Red} \quad \quad \quad + 11.4$$

$$S' \quad + 23 \quad 21 \quad 24.9$$

13332

Lunar Parallax

18

$$\begin{array}{rcl}
 \alpha' & 04 & 02 \quad 25.75^\circ \\
 \oplus & 3 & 17 \quad 51.80 \\
 \oplus \alpha' & - & 44 \quad 33.95 \\
 = & -11 & 08 \quad 29.25^\circ \\
 \frac{1}{2} \alpha - \alpha' & - & 4 \quad 27.85^\circ \\
 \oplus \frac{3}{2} \alpha' - \frac{1}{2} \alpha - \alpha' & -11 & 04 \quad 01.40^\circ
 \end{array}$$

$$\pi \quad 5.7 \quad 12.2^\circ$$

$$\begin{array}{r}
 9.86913 \\
 8.22113^\circ \\
 9.28608^\circ \\
 003816^\circ \\
 7.41450^\circ
 \end{array}$$

$$\alpha - \alpha' \quad -8 \quad 55.70^\circ$$

$$= \quad -35.71$$

$$\begin{array}{r}
 9.95727 \\
 0.00000 \\
 000815^\circ \\
 9.96542
 \end{array}$$

$$42 \quad 43 \quad 16.8^\circ$$

$$\delta' + 23 \quad 21 \quad 24.9^\circ$$

$$\begin{array}{r}
 \gamma - \delta' + 19 \quad 21 \quad 51.9^\circ \\
 9.82640 \\
 8.22113^\circ \\
 9.52058^\circ \\
 0.16849^\circ \\
 7.73660^\circ
 \end{array}$$

$$\delta - \delta' + 18 \quad 44.7^\circ$$

$$\delta + 23 \quad 40 \quad 09.6^\circ$$

$$\gamma - \delta \quad 23 \quad 40 \quad 10.3^\circ$$

$$O - C \quad - \quad 0.7^\circ$$

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

$$\text{2nd Chd. Ref.} \quad 0.0$$

$$\delta + 23 \quad 40 \quad 10.4$$

$$O - C \quad + 0.1$$

$$\alpha \quad 4 \quad 01 \quad 50.04^\circ$$

$$\gamma - \alpha \quad 4 \quad 01 \quad 49.20^\circ$$

$$O - C \quad + 0.84^\circ$$

$$\text{curr} \quad - 0.07^\circ$$

$$\alpha = 4 \quad 01 \quad 49.97$$

$$O - C = + 0.77$$

13332

Lunar Parallax

18

$$\begin{array}{rcl}
 X & 04 & 02 & 25.75 \\
 \oplus & 3 & 17 & 51.80 \\
 \oplus X & -44 & & 33.95 \\
 = & -11 & 08 & 29.25 \\
 \frac{1}{2} X - \frac{1}{2} X & -4 & & 27.85 \\
 \oplus X - \frac{1}{2} X & -11 & 04 & 01.40
 \end{array}$$

$$\pi \quad 5.7 \quad 12.2$$

$$\begin{array}{r}
 9.86913 \\
 8.22113 \\
 9.28608 \\
 003816 \\
 741450
 \end{array}$$

$$\alpha - \lambda \quad -8 \quad 55.70$$

$$= \quad -35.77$$

$$\begin{array}{r}
 9.95727 \\
 000000 \\
 000815 \\
 9.96542
 \end{array}$$

$$42 \quad 43 \quad 16.8$$

$$\delta' \quad +23 \quad 21 \quad 24.9$$

$$\begin{array}{rcl}
 y - \delta' & +19 & 21 & 51.9 \\
 & & 9.82640 \\
 & & 8.22113 \\
 & & 9.52058 \\
 & & 0.16849 \\
 & & 7.73660
 \end{array}$$

$$\delta - \delta' \quad +18 \quad 44.7$$

$$\delta \quad -23 \quad 40 \quad 09.6$$

$$y/\delta \quad 23 \quad 40 \quad 10.3$$

$$O-C \quad - \quad 0.7$$

$$\text{corr} \quad +0.8$$

$$2 \text{ nd Ord. Res.} \quad 0.0$$

$$\delta: \quad +23 \quad 40 \quad 00.4$$

$$O-C \quad +0.1$$

$$x \quad 4 \quad 01 \quad 50.04$$

$$y/x \quad 4 \quad 01 \quad 49.20$$

$$O-C \quad +0.84$$

$$\text{corr} \quad -0.07$$

$$\alpha = 4 \quad 01 \quad 59.97$$

$$O-C = \quad +0.77$$

13305-

Star Measures

L	18432	16270	16710	16760
19.1	17438	7268	15830	7628
20.1	34 ³⁶	68	38 ³⁴	28
	32	70	10	60
	<u>19.0996</u>	<u>19.0998</u>	<u>20.0876</u>	<u>20.0868</u>
3	19940	18268	16398	16017
33.7	1312628	1507076	15792	661513
4.0	30	82	92	11
	40	68	88	17
	<u>33.6812</u>	<u>33.6808</u>	<u>4.0606</u>	<u>4.0596</u>
2	19926	17909	19798	16068
23.9	1053028	1731011	10226	15642
30.9	26	12	26	42
	26	09	98	68
	<u>23.9398</u>	<u>23.9402</u>	<u>30.9572</u>	<u>30.9574</u>

Moon

L	18222	16543		
24.7	11984	12769		
15.0	84	69		
	22	43		
	<u>24.6238</u>	<u>24.6226</u>		
3			17709	16134
25.0			12822	1091016
15.8			42 ³²	22
			09	34
			<u>15.4872</u>	<u>15.4872</u>
2	16507	17714		
25.2	1444045	978482		
16.0	50	80		
	07	14		
	<u>25.2062</u>	<u>25.2068</u>		

13305-

Star Measure

1	18432	16270	16710	16760
19.1	17438	7268	15830	7628
20.1	39 ³⁶	68	38 ³⁴	28
	32	70	10	60
	<u>190996</u>	<u>190998</u>	<u>200876</u>	<u>200888</u>

3	19940	18268	16398	16017
337	1312628	1507076	15792	661513
4.1	30	82	92	11
	40	68	88	17
	<u>236812</u>	<u>336808</u>	<u>340606</u>	<u>40596</u>

2	19926	17909	19798	16068
239	1053028	1731011	10226	15642
30.9	26	12	26	42
	26	09	98	68
	<u>239398</u>	<u>239402</u>	<u>309572</u>	<u>309574</u>

Moon

1	18222	16543
24.7	1198457	12768
15.0	84	69
	22	43
	<u>246268</u>	<u>246226</u>

3		17709	16134
25.0		12822	1091016
15.5		42 ³²	22
		09	34
		<u>154872</u>	<u>154872</u>

3	16507	17714
25.2	1444045	978482
16.0	50	60
	07	14
	<u>252062</u>	<u>252068</u>

13305

Moon Measures.

4	16522	17682
25.2	13902	10300
16.5	02	00
	22	82
	<u>252620</u>	<u>252618</u>

5
25.0
17.3

16016	16150
11426	10754 ⁵²
26	50
16	50
<u>174590</u>	<u>174602</u>

6
24.0
18.3

18358	16748
14978	10118
78	18
58	48
<u>183380</u>	<u>183370</u>

7
23.3
18.5

18630	17408
13804	12222
04	22
30	08
<u>184826</u>	<u>184814</u>

8
23.0
18.4

18002	17130
1333938	1178480
37	76
02	30
<u>184664</u>	<u>184650</u>

Moon Measures

13305
 4 16522 17682
 25.2 13902 10300
 16.5 02 00
 22 82
25.2620 25.2618

5
 25.0
 17.3

16016 16150
 11426 10754⁵²
 26 50
 16 50
174590 17.4602

6
 24.0
 18.3

19358 16748
 14978 10158
 78 10
 58 48
183380 18.3370

7
 23.3
 18.5

18630 17408
 13804 12222
 04 22
 30 08
184826 18.4814

8
 23.0
 18.4

18002 17130
 1333938 1178980
 37 76
 02 30
189664 18.4650

13305

Time.

Date Sept. 4, 1917

Exp to Stars	02	08	-	02	20	-
" " Moon	02	14	15.7	02	14	16.0
Clock slow			+ 31.9			

H. Sid. Time	02	14	47.75	-		
" " Young	04	44	31.05	-		
S. Sid. Time	06	59	18.80	-		
" " " M.N	10	52	08.33	-		
Interval	20	07	10.47	-		
Red		03	17.76	-		
G. M. T	20	03	52.71	-	20	06 46 4

From Naut. Almanac	R.A.			Dec.		
Moon 20 ^h	02	05	35.46	+17	33	0.2
Motion 1 ^m			2.35			+10.687
Motion 3 ^m 8785			9.12			41.4
Tabular Place	02	05	44.58	+17	33	41.6

Moon's Age 18^d

934" = 14.2

$$\begin{array}{r}
 a = -505.3 \\
 + 240 \\
 \hline
 -481.3
 \end{array}$$

Parallax	59	8.3
Semi-diam	16	8.4
R		968.4
Aug		15.2
Int 4		-0.4
R		983.2
R		2.1076
aR		-1.014
(1+a)R		2.0062
R ²		4.0278

13305

Time

Date Sept 4, 1917

Exp to Stars	02	08		02	20
" " Moon	02	14	15.7	02	14 16.0
Clock slow			31.9		

H. Sid Time	02	14	47.75"		
" " Young	04	44	31.05"		$E = +0^h 9^m$
Sid Time	06	59	18.80		
" " " M.N	10	52	08.33		
Interval	20	07	10.47		
Red		03	17.76		
G. M. T	20	03	52.71		$20^h 06.464$

From Naut. Almanac	RA		Dec.	
Moon 20^h	02	55	35.46	+17 33 0.2
Motion 1 ^m			2.35-10	+10.687
Motion 3 ^m 8785			9.12	41.4
Tabular Place	02	05	44.58	+17 33 41.6

 $934'' = 14.2$

$$\begin{array}{r} 9 = 505.3 \\ + 290 \\ \hline = 481.3 \end{array}$$

Moon's Age	18 ^d
Parallax	59 8.3
Semi-diam	16 8.4
R	968.4
Aug	15.2
Sub 4	-0.4
R	983.2
R	2.1076
AR	-1.014
H+AR	2.0062
R ²	4.0248

S_0	η_0	ΔS	-5.65	$+1.5\eta$	-19
-2.89	$+2.19$	-1	$+16 = +15$	$+3 = +18$	
$+12.31$	-14.79	$+110$	$-69 = +41$	$-22 = +19$	
$+2.27$	$+13.58$	$+12$	$-13 = -1$	$+20 = +19$	
$M + 1.45$	-1.63		-8	$-2 = -29$	$= -0.10$

$\Delta \eta$	-6.2η	$+1.85$	$+18$
$+1$	$-14 = -13$	$-5 = -18$	
-132	$+92 = -40$	$+22 = -18$	
$+61$	$-84 = -23$	$+4 = -19$	
	$+10$	$+3 = +31$	$= +1.5$

13305	Standard Coordinates						24
Cafe No. 305	mg. 7.0	Cafe no. 324	mg. 8.1	Cafe No. 314	mg. 5.9		
C	02 02	16.44	02 10	28.15	02 05	04.89	
Y		16.52		28.22	"	04.96	
Z		16.43		28.18		04.84	
m	02 02	16.46	02 10	28.18	02 05	04.90	
Proc		55.85		55.51		56.41	
x	02 03	123.1	02 11	23.69	02 06	01.31	
A	02 04	46.57	02 04	46.57	02 04	46.57	
x-A	- 1	34.26	+ 6	37.12	+ 1	14.74	
sin		- 94.26		+ 397.07		+ 74.74	
log	1.97433	m	2.59887		1.87355		
cos	9.97910		9.98405		9.97538		
log S	0.46067	n	1.09016		0.35617		
S	- 2.8885		+ 12.3071		+ 2.2707		
S	- 1		+ 110		11		
S	19.1114		34.3181		24.2718		
Y	19.0997		33.6810		23.9400		
x-S	- .0117		- .6371		- .3318		
C	+ 17 33	11.0	+ 15 21	18.4	19 01	43.8	
Y		11.6		17.8		43.4	
Z		12.0		18.9		43.1	
m	+ 17 33	11.5	+ 15 21	18.4	19 01	43.4	
Proc		04	52.0	+ 04	45.2	+ 04 50.4	
S	+ 17 38	03.5	+ 15 26	03.6	19 06	33.8	
S	17 21	0.8	17 21	0.8	17 21	0.8	
S-D	+ 17	2.7	- 1 54	57.2	+ 1 45	33.0	
tan S-D		+ 1022.7		- 6899.7		+ 6335.0	
log	3.00975		3.83883		3.80175		
" m	0.34090		1.16998		1.13290		
tan S	9.5023		9.4410		9.5396		
S ²	0.9213		2.1803		0.7123		
log 71	7.4770		8.6747		7.3053		
71	+ 2.1923	-	- 14.7903		+ 13.5800		
n	+ 0.0030		+ 0.0473		+ 0.0020		
71	20.1953		3.2570		31.5820		
Y	20.0872		4.0601		30.9573		
Y ²	- 1081		+ .8031		- .6247		

13305	Standard Coordinates										24
Cape No.	305	Mg.	70	Cape No.	324	Mg.	81	Cape No.	314	Mg.	85
C	02	02	16 44	02	10	28.15	02	05	04.89		
L			16.52			28.22			04.96		
E			16 43			28.18			04.84		
m	02	02	16 46	02	10	28.18	02	05	04.90		
Puc			55.85			55.51			56.41		
A	02	03	1237	02	11	23.69	02	06	01.31		
A	02	04	46.57	02	04	46.57	02	04	46.57		
A-A	-	1	3426	+	6	37.12	+	1	19.74		
Sm			-94.26			+397.07			+74.74		
log			11.97433			2.59887			1.87355		
log S			9.97910			9.98405			9.97538		
log S ₀			0.46067			1.09016			0.35617		
S	-		2.8885	+		12.3071	+		2.2707		
S	-		1	+		110			11		
S	19.1	114				34.3181			24.2718		
X	19.0	997				33.6810			23.9400		
X-S	-		0117	-		6371	-		3318		
C	+17	33	11.0	+15	21	18.4	19	01	43.3		
L			11.6			17.8			43.4		
E			12.0			18.9			43.1		
m	+17	33	11.5	+15	21	18.4	19	01	43.4		
Puc		04	52.0	+	14	45.2	+	14	50.4		
S	+17	38	03.5	+15	26	03.6	19	06	33.8		
S	17	21	08	17	21	08	17	21	08		
S-S	+	17	2.7	-	1	54	57.2	+1	45	33.0	
tan S-S			+1022.7			-6899.7			+6335.0		
log			3.00975			3.83883			3.80175		
" m			0.34090			1.16998			1.13290		
tan S			9.5023			9.4410			9.5396		
S			0.9213			2.1803			0.7123		
log			7.4770			8.6747			7.3053		
m	+2.1923			-		14.7803	+		13.5800		
m	+0.0030			+		0.0473	+		0.0020		
m	201953					3.2570			31.5820		
m	200872			+		40601			30.9573		
log			1081	+		.8031	-		6247		

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Plate Center & Constants

25

19.09.97	20.0872	02.03	12.31	+17	38	03.5
22	18		1	34.26	-	17 02.7
+29003	-2.0872	02	04	46.57		
32.5	49.0					

Plate Center $x=02$ $y=04$ $z=46.57$ $D=17$ 21 0.8

$x-S$	$+500X$	$+69.44Y$	$+5.3X$	-10928
$-0117 + 9550 = 9433$	$+1394 = 10827$	$+101 = 10928$		
$-6371 + 16840 = 10469$	$+281 = 10750$	$+178 = 10928$		
$-3318 + 11970 = 8652$	$+2149 = 10801$	$+127 = 10928$		
$23.2558 + 11628$	$+1143$	$+123 = 23,4524$		

$y-\eta$	$+500Y$	$-68.9X$	$+5.9Y$	-7765
$-1081 + 10044 = 8963$	$-1316 = 7647$	$+118 = 7765$		
$+8031 + 2030 = 10061$	$-2320 = 7741$	$+24 = 7765$		
$-6247 + 15479 = 9232$	$-1649 = 7583$	$+182 = 7765$		
$16.4741 + 8237$	-1602	$+97 = 16,3708$		

Tables	$a = -0.6$	$e = -1.3$	$a-e = +0.7$	$b+d = 0.0$
oh.	-505.3	-505.9	$+0.6$	$= -0.5$
	-504.7	-504.6	-0.1	-0.5

33 05'

Plate Center & Constants

25'

19.0997	20.0872	02	03	12.31	+17	38	03.5'
22	18			1	34.26	-17	02.7
-29003	-2.0872	02	04	46.57			
<u>32.5'</u>	490						

Plate Center $\lambda=0.2$ 04 46.57 $\mu=0.17$ 21 0.8

-5	+500X	+69.4X	+5.3X	-10928
0117	+9550 = 9433	+1394 = 10827	+101 = 10928	
-6371	+16840 = 10469	+281 = 10750	+178 = 10928	
-3318	+11970 = 8652	+2149 = 10801	+127 = 10928	
23.2558	+11628	+1143	+123 = 23,4524	

-71	+500Y	-68.9X	+5.9Y	-7765
1081	+10044 = 8963	-1316 = 7647	+118 = 7765	
8031	+2030 = 10061	-2320 = 7741	+24 = 7765	
6247	+15479 = 9232	-1649 = 7583	+182 = 7765	
16.4741	+8237	-1602	+97 = 16,3708	

Tables	$a = -0.6$	$c = -1.3$	$a-c = +0.7$	$b+d = 0.0$
OH.	-505.3	-505.9	+0.6	-0.5'

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Mass Center

26.

Ax

O-C

1	24.6232	+1.3692	0	1.8747	4.0447	+199
2	25.0000	+1.7460	0	3.0485	4.0205	-43
3	25.2065	+1.9525	0	3.8122	4.0359	+111
4	25.2619	+2.0079	0	4.0317	4.0317	+69
5	25.0000	+1.7460	0	3.0485	4.0221	-27
6	24.0000	+0.7460	0	0.5565	4.0332	+84
7	23.2540	0.0000	0	0.0000	4.0365	+117
8	23.0000	-0.2540	0	0.0645	4.0356	+108
				R ²	4.0248	

arc

1	15.0000	-1.4730	-1	2.1700
2	15.4872	-0.9858	-1	0.9720
3	16.0000	-0.4730	-0	0.2237
4	16.4730	0.0000	0	0.0000
5	17.4596	+0.9866	+1	0.9736
6	18.3375	+1.8645	+1	3.4767
7	18.4820	+2.0090	+1	4.0365
8	18.4657	+1.9927	+1	3.9711

1.37°

119°

104°

90°

60°

22°

0°

-7°

Range 144°

x = 25 y = 15.4872

17.4596

32946.8

y₀ 16.4734y_{max} 18.4820

R 2.0086

Com R 2.0062

x_{max} 25.2619y₀ 23.2533

Mass Center

x₀ = 23.2540y₀ = 16.4730

13305

Mass Center

26

O-C

1	24.6282	+1.3692	0	1.8747	4.0447	+199
2	25.0000	+1.7460	0	3.0485	4.0205	-43
3	25.2065	+1.9525	0	3.8122	4.0359	+111
4	25.2619	+2.0079	0	4.0317	4.0317	+69
5	25.0000	+1.7460	0	3.0485	4.0221	-27
6	24.0000	+0.7460	0	0.5565	4.0332	+84
7	23.2540	0.0000	0	0.0000	4.0365	+117
8	23.0000	-0.2540	0	0.0645	4.0356	+108

R² 4.0248

arc

1	15.0000	-1.4730	-1	2.1700	737°
2	15.4872	-0.9858	-1	0.9720	119
3	16.0000	-0.4730	-0	0.2237	104
4	16.4730	0.0000	0	0.0000	90°
5	17.4596	+0.9866	+1	0.9736	160
6	18.3375	+1.4764	+1	3.4767	22
7	18.4820	+2.0090	+1	4.0365	0
8	18.4657	+1.9927	+1	3.9711	-7

Range 144

x = 25	y = 15.4872
	17.4596
	3.29468
y ₀	16.4734
y _{max}	18.4820
R	2.0086
Com R	2.0062
y _{max}	25.2619
y ₀	23.2533

x₀ = 23.2540

Mass Center

y₀ = 16.4730

Formation of Normals

1	- 2.0 1	+ 272.2	- 292.2
2	- 1.7 1	- 75.3	+ 42.0
3	- 0.9 2	+ 216.4	- 52.2
4	0.0 0	+ 138.9	0.0
5	+ 1.7 3	- 47.3	- 26.7
6	+ 1.3 9	+ 63.0	+ 156.2
7	+ 0.0 0	0.0	+ 235.0
8	- 0.4 9	- 27.0	+ 215.0
	+ 3.1 2	+ 690.5	+ 648.2
	- 5.1 3	- 149.6	- 371.1
	- 2.0 1	+ 540.9	+ 277.1

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Conditional Equations

27

0-c

1	+1.37	-1.47	= +199	+49	-32	= +17	+182
2	+1.75	-0.98	= -43	+62	-21	= +41	-84
3	+1.95	-0.47	= +111	+69	-10	= +59	+52
4	+2.01	0.00	= +69	+72	0	= +72	-3
5	+1.75	+0.99	= -27	+62	+22	= +84	-111
6	+0.75	+1.86	= +84	+27	+41	= +68	+16
7	0.00	+2.01	= +117	0	+44	= +44	+73
8	-0.25	+1.99	= +108	-9	+44	= +44	+64

+387-198
av. 73

$$+16.44 - 2.01 = +540.9$$

$$- 2.01 + 15.82 = +277.1$$

$$+ () - 0.25 = +66.1$$

$$+15.57 = +343.2$$

$$t = +22.0$$

$$+16.44 = +540.9 + 44.2 = +585.12 = +35.6$$

arc 144

$$\frac{P}{R} = 12^{\circ}$$

$$\frac{+23.6^{\circ}}{12} = +1.97^{\circ}$$

$$\Delta R = +2.4^{\circ}$$

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Conditional Equations

27

0 - C

1	+1.37	-1.47	= +1.99	+49	-32	= +17	+182
2	+1.75	-0.98	= -43	+62	-21	= +41	-84
3	+1.95	-0.47	= +1.11	+69	-10	= +59	+52
4	+2.01	0.00	= +69	+72	0	= +72	-3
5	+1.75	+0.99	= -27	+62	+22	= +84	-111
6	+0.75	+1.86	= +89	+27	+41	= +68	+16
7	0.00	+2.01	= +117	0	+44	= +44	+73
8	-0.25	+1.99	= +108	-9	+44	= +44	+64

+387-198

av. 73

$$-16.44 - 2.01 = +540.9$$

$$-2.01 + 15.82 = +277.1$$

$$+1.1 - 0.25 = +66.1$$

$$+15.51 = +343.2$$

$$+ = +22.0$$

$$+16.44 = +540.9 + 44.2 = +585.14 = +35.6$$

avg 144

$$\frac{P}{m} = 7.2$$

$$\frac{+23.6}{.12} = +197$$

$$\Delta R = +2.4$$

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Mori's Mean Position

28

$$\begin{array}{r} X_0 \quad 23.2540 \checkmark \\ \quad \quad + 18 \checkmark \\ \hline 23.2558 \end{array}$$

$$\begin{array}{r} Y_0 \quad 16.4730 \checkmark \\ \quad \quad + 11 \checkmark \\ \hline 16.4741 \end{array}$$

From Plate Constants.

$$\begin{array}{r} 23.4524 \checkmark \\ 22. \\ \hline + 1.4524 \checkmark \end{array}$$

$$\begin{array}{r} 16.3708 \checkmark \\ 18 \\ \hline - 16.292 \checkmark \end{array}$$

$$\begin{array}{r} 0.16209 \checkmark \\ 9.98028 \checkmark \\ 8.50724 \checkmark \\ 1.67457 \checkmark \end{array}$$

$$\begin{array}{r} 9.4889 \checkmark \\ 0.3242 \checkmark \\ 7.0534 \checkmark \\ 6.8665 \checkmark \end{array}$$

$$+ 47.27 \checkmark$$

$$\begin{array}{r} + 0.0007 \checkmark \\ - 1.6299 \checkmark \end{array}$$

$$A = 02 \quad 04 \quad 46.57$$

$$\alpha_0 \quad 02 \quad 05 \quad 33.84 \checkmark$$

$$\text{Red} \quad + 04.17 \checkmark$$

$$\alpha' \quad 02 \quad 05 \quad 38.01 \checkmark$$

$$\begin{array}{r} 0.21216 \checkmark \\ 7.33173 \checkmark \\ 2.88101 \checkmark \end{array}$$

$$- 760.3$$

$$- 12.40.3 \checkmark$$

$$\delta = + 17 \quad 21 \quad 0.8 \checkmark$$

$$\delta_0 \quad + 17 \quad 08 \quad 20.5 \checkmark$$

$$\text{Red} \quad + 21.4$$

$$\delta' \quad + 17 \quad 08 \quad 41.9 \checkmark$$

13305

Moser's Mean Position

28

$$\begin{array}{r} X_0 \quad 23.2540 \\ \quad + 18 \\ \hline 23.2558 \end{array}$$

$$\begin{array}{r} Y_0 \quad 16.4730 \\ \quad + 11 \\ \hline 16.4741 \end{array}$$

From Plate Constants.

$$\begin{array}{r} 23.4524 \\ 22 \\ \hline + 1.4524 \end{array}$$

$$\begin{array}{r} 16.3708 \\ 18 \\ \hline - 1.6292 \end{array}$$

$$\begin{array}{r} 0.16209 \\ 9.98028 \\ 85.0724 \\ 1.67457 \end{array}$$

$$\begin{array}{r} 9.4889 \\ 0.3242 \\ 71534 \\ 6.8665 \end{array}$$

$$+ 47.27$$

$$\begin{array}{r} - 0.0007 \\ - 1.6299 \end{array}$$

$$A = 0.2 \quad 0.4 \quad 46.57$$

$$X_0 \quad 0.2 \quad 0.5 \quad 33.89$$

$$\text{Red} \quad + 04.17$$

$$X' \quad 0.2 \quad 0.5 \quad 38.01$$

$$\begin{array}{r} 0.21216 \\ 7.33115 \\ 2.88101 \end{array}$$

$$- 760.3$$

$$- 12 \quad 40.3$$

$$S = + 17 \quad 21 \quad 08$$

$$S_0 \quad + 17 \quad 08 \quad 20.5$$

$$\text{Red} \quad + 21.4$$

$$S' \quad + 17 \quad 08 \quad 41.9$$

$$\begin{array}{r}
 1 \quad 50 \quad 07.342 \\
 \underline{03.057} \\
 + 4.285 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 2 \quad 02 \quad 33.737 \\
 \underline{29.429} \\
 + 4.308 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 2 \quad 08 \quad 39.959 \\
 \underline{35.910} \\
 + 4.049 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 20 \quad 24 \quad 31.47 \\
 \underline{10.04} \\
 + 21.43 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 23 \quad 04 \quad 33.95 \\
 \underline{13.99} \\
 + 19.96 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 8 \quad 27 \quad 51.91 \\
 \underline{28.09} \\
 + 23.82 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 \underline{19.96} \\
 3.86
 \end{array}$$

$$\begin{array}{r}
 4.308 \\
 \underline{4.049} \\
 .259
 \end{array}$$

42

37

32

27

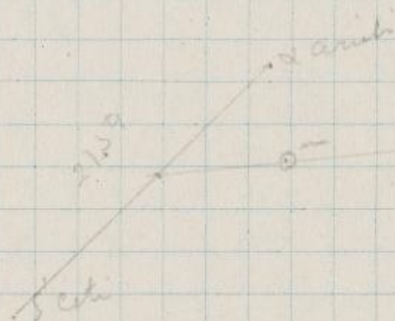
22

17

12

7

3 months



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Reduction to Apparent Place

29

$H + \alpha_0$	09	26.7	141°	40.5	$\delta_0 + 1.7$	08.3
H	7	21.1				
α_0	02	05.6			$\cos \delta_0$	9.9803
G	23	40.5			$\log i^0$	0.8874
$G + \alpha_0$	1	46.1	26°	31.5	"(i)	0.8677

$\cos G + \alpha_0$	9.9517
G	1.3139
$\sin G + \alpha_0$	9.6499
$\tan \delta_0$	9.4891
	8.8239

$\log g'$	1.2656
g	9.2768

g	+3.156
g	+0.189
h	+0.820
Red	+4.165

$\sin \delta_0$	9.4693
$\cos H + \alpha_0$	9.8946m
h	1.2778
$\sin H + \alpha_0$	9.7926
$\sec \delta_0$	0.0197
	8.8239

$\log h'$	0.64172
h	9.9140

$g' + 18.435$
$h' + 4.382$
$L' + 7.374$
Red + 21.727

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Reduction to Apparent Place

23

$H + \lambda_0$	09	26.7	$141^\circ 405''$	$\delta_0 + 1.7$	08.3
H	7	21.1			
λ_0	02	05.6		$\cos \delta_0$	99803
G	23	40.5		$\log i$	08874
$G + \lambda_0$	1	46.1	$26^\circ 31.5''$	"(1)	08617

$\cos G + \lambda_0$	99517
G	1.3139
$\sin G + \lambda_0$	9.6499
$\tan i_0$	94891
	88239

$\log g'$	1.2656
g'	9.2768

f	+3.156
g	+0.189
h	+0.820
Red	+4.165

$\sim \sin \delta_0$	94693
$\cos H + \lambda_0$	98946m
h	1.2788
$\sin H + \lambda_0$	9.7926
$\sec \delta_0$	0.0197
	88239

$\log h'$	0.64172
h'	99140

$g' + 1843.5$	
$h' - 4.382$	
$L + 7.374$	
$Red + 21.927$	

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Lunar Parallax.

$$\begin{array}{rcl}
 \alpha' & 02 & 05 \quad 38.01'' \\
 \delta & 02 & 14 \quad 47.75'' \\
 \delta - \alpha & + 09 & 09.74'' \\
 = & + 2^\circ & 17 \quad 26.10'' \\
 1/2 \alpha, \alpha & & + 55.02'' \\
 \delta - \alpha - \gamma \alpha \alpha & 2 & 16 \quad 31.08''
 \end{array}$$

$$\begin{array}{rcl}
 \Pi & 59 & 08.3'' \\
 & 9.86913 \\
 & 8.23558'' \\
 & 860169'' \\
 & 0.02073'' \\
 & 6.72713
 \end{array}$$

$$\begin{array}{rcl}
 9.95727 \\
 0.00000 \\
 0.00034'' \\
 9.95761''
 \end{array}$$

$$+110.1104''$$

$$\alpha - \alpha' = +7.34''$$

$$\begin{array}{rcl}
 Y & 42 & 12 \quad 30.0'' \\
 \delta' & + 17 & 08 \quad 41.9''
 \end{array}$$

$$Y - \delta' \quad 25 \quad 03 \quad 48.1''$$

$$\begin{array}{rcl}
 9.82640 \\
 8.23558'' \\
 9.62698'' \\
 0.17274'' \\
 7.86170''
 \end{array}$$

sin $\delta - \delta'$

$$\delta - \delta' \quad + 25'' \quad 0.1$$

$$\delta \quad + 17 \quad 33 \quad 42.0$$

$$\text{epk } \delta \quad + 17 \quad 33 \quad 41.6''$$

$$O - C \quad + 0.4''$$

$$\text{curr.} \quad + 1.3''$$

$$\text{2nd Chd Ry} \quad - \quad 0.0$$

$$\delta - \quad + 17 \quad 33 \quad 43.3$$

$$O - C = \quad + 1.7$$

$$\alpha \quad 02 \quad 05 \quad 45.35''$$

$$\text{epk } \alpha \quad 02 \quad 05 \quad 44.58''$$

$$O - C \quad + 0.77''$$

$$\text{curr.} \quad - 0.08''$$

$$\alpha = \quad 02 \quad 05 \quad 45.27$$

$$O - C. \quad + 0.69$$

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Lunar Parallax.

α' 02 05 38.01
 δ 02 19 47.75
 $\delta - \alpha$ + 09 09.74
 $\alpha - \delta$ - 20 17 26.10
 $\frac{1}{2} \lambda \cdot \alpha$ 55.02
 $\delta - \alpha - \frac{1}{2} \lambda \cdot \alpha$ 2 16 31.08

II 59 08.3
 9.86913
 8235.58
 860169
 70.02073
 6.72713

9.95727
 0.00000
 0.00034
 9.95761

+110."04

 $\alpha - \delta = +7^s 3.4$

γ 42 12 30.0
 δ' +17 08 41.9

 $\alpha - \delta'$ 25 03 48.1

9.82640
 8235.58
 9.62598
 0.17274
 7.86170

Sun δ' $\delta - \delta'$ +25 10.1 δ +17 33 42.0 $\alpha - \delta$ +17 33 41.6 $\delta - \alpha$ +0.9

curr +1.3

2nd Clad Ry 00

 $\delta - \alpha$ +17 33 43.3 $\delta - \alpha$ +1.7 α 02 05 45.35 $\alpha - \delta$ 02 05 44.58 $\delta - \alpha$ +0.77

curr -0.08

 α 02 05 45.2 $\delta - \alpha$ +0.6

to

