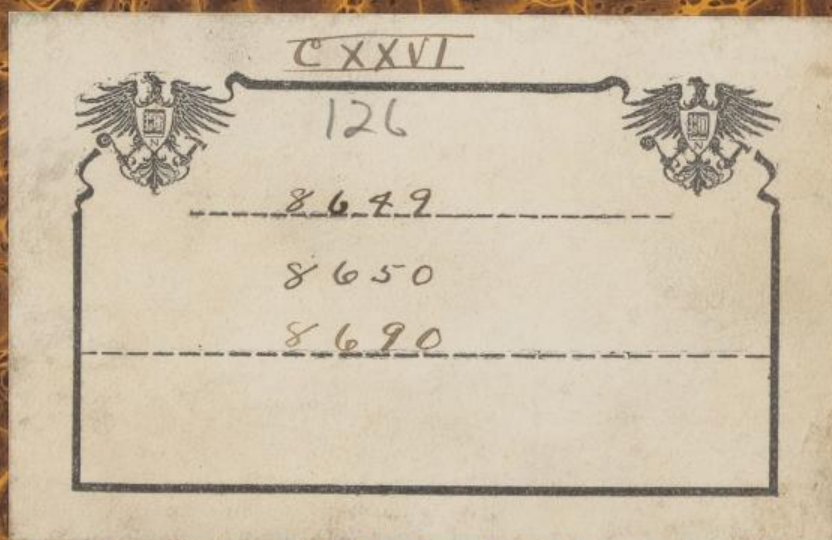


KG
H366
x.979



f

8679

Star Measures

1

1	18810	18070	18812	15930
15.8	10430	1842727	1168888	1258272
19.7	28	3027	88	6272
	30	70	12	27
	<u>158398</u>	<u>158358</u>	<u>19.7127</u>	<u>19.7194</u>

2	18962	17566	20176	17978
32.6	11726	14779	1389287	1427977
8.6	2827	7273	82	8077
	62	54	72	77
	<u>32.7234</u>	<u>32.7210</u>	<u>8.6286</u>	<u>8.6300</u>

3	17962	16338	17676	18200
32.9	881618	1595052	19868	1152019
25.4	20	54	6864	18
	56	48	84	00
	<u>32.9138</u>	<u>32.9112</u>	<u>25.3314</u>	<u>25.3318</u>

Moon Measures

1		17160	18376
23		15918	965653
14.2		91818	50
		60	72
		<u>14.1292</u>	<u>14.1280</u>

2		19250	18038
24		1905955	927267
15.0+		56	6267
		54	50
		<u>15.0196</u>	<u>15.1218</u>

3	14900	16588	
24.3	12918	9032	
16.7	18	4036	
+X	892	90	
	<u>24.2480</u>	<u>24.2496</u>	

8099

Star Measures

1

L	18810	18070	18812	15930
1.4	10930	16727	11688	12586
4.7	28	30	58	62
	30	70	12	17
	<u>158398</u>	<u>138328</u>	<u>197127</u>	<u>197199</u>

2	18962	17566	20176	17978
32.6	11726	14779	13892	14279
7.6	27	72	82	80
	62	59	72	79
	<u>327239</u>	<u>327210</u>	<u>86286</u>	<u>86300</u>

2	17962	16338	17676	18200
2.9	18816	13920	19360	11320
5.9	20	59	68	18
	56	78	84	00
	<u>329138</u>	<u>329112</u>	<u>253319</u>	<u>253318</u>

Moon Measures

3		17160	18376
14.2		13978	9686
		918	88
		60	72
		<u>191272</u>	<u>191280</u>

4		19250	18028
7		19054	9272
10.1		56	62
		59	50
		<u>150196</u>	<u>151218</u>

1	19900	16588
14.3	12918	9032
16	18	9036
18	892	90
	<u>292980</u>	<u>292996</u>

8649

Moon Measures.

2

9
24
16.9

16607
729083
76
14
16.9330

18280
1763729
57
58
16.9904

5
23.9
17

16602
698893
98
08
23.9614

16092
1571813
08
92
23.9620

6
23
17.8

18287
1005046
42
72
17.8226

16500
14779
8979
02
17.8278

7
22.2
17.9
+7

18300
8559
59
20
17.9764

15376
15198
98
98
17.9820

8
22
17.9

18290
871211
10
312
17.9598

15368
1500910
1610
72
17.9672

8647

Jimmie & Etc.

10-6

3

Exp. to stars May 31	19	19		19	26	
" " Moon	19	19	39.5 ⁻	19	29	39.7 ⁻
Clock fast		1	17.1 ⁻			

H. Sid. Time	19	18	25.5 ⁻	$\theta - \alpha =$	$- 41^m$
H Long.	9	99	31.05		
G. Sid. T.	24	02	56.55 ⁻		
Sid. J. M. N.	4	31	36.56 ⁻		
Interval	19	31	19.99 ⁻		
Reduction		3	11.89 ⁻		
G. M. T.	19	28	8.10 ⁻		

From Naut. Alm.	H. A.		Dec.	
Moon 19 ^h	19	58	25.95 ⁻	- 22 39 47.5 ⁻
Motion in 1 ^m			+ 2.4838	+ 9.898
" " 28, 135 ^o		+1	9.88	+ 4 38.5
Tabular Place	19	59	35.83 ⁻	- 22 35 09.0 ⁻

Moon's Age 18 days.

Parallax	59	31.85 ⁻
Semid	16	14.80 ⁻
R		977.80 ⁻
Aug.		7.1 ⁻
Sin 6		- 1.1 ⁻
R		980.8 ⁻
R		2.1027 ⁻
AR		- 100.5 ⁻
(1+2)R		2.0019 ⁻
R ²		4.0076 ⁻

939: 6.5⁻

$$\begin{array}{r}
 a = -501.8 \\
 + 29 \\
 \hline
 - 477.8
 \end{array}$$

8699

Services & Etc.

3

1 p. to Stars May 31	19	19		19	26
Moon	19	19	39.5	19	19 39.7
look for		1	19.1		

Sid Time	19	18	25.5	- 4.5	- 91.5
Long	9	99	31.05		
Sid 91	29	02	56.55		
Sid J.M.V	9	31	56.56		
Interval	19	31	19.99		
Reduction		3	11.89		
G.M.T	19	28	8.10		

from Naut. Alman.	K. A.	Dec.
Moon 19 ^h	19 58	25.95 - 22 39 97.5
Motion in 1 ^h		H. 6.11 83.5 + 7.875
28.1350	+1	+ 8.88 + 9 38.2
Tabular Place	19 59	25.83 - 22 35 97.0

Moon's Age 15 days.

Sid. time	54	31.85
Sid	16	19.80
R		977.80
Aug.		7.1
Pr		- 1.1
R		980.8
R		2.1029
alt		- 100.5
H.A.		200.19
R		400.76

7.59: 6.55

$a = -501.8$
 $+ 29$
 $- 477.8$

	ξ	η	$\Delta\xi$	-3.23	$+1.71$	-1.7
1	-7.17	+2.01	-10	+23.2	+13	+1.7
2	+10.56	-9.62	+3.2	-37.2	+18	-4.2
3	+10.76	+7.97	+7.6	-37.2	+12	+3.2
M	-0.97	-1.93	0	+1	-1	<u>-1.7</u>

	$\Delta\eta$	-8.54	-2.3	$+3$
+3	-9	2	-6	+1
-47	+83	2	-7	-2
+37	-56	2	-2	-2
0	+9		+0	<u>+1.8</u>

8689

Standard Coordinates.

9

Cape No 2769 - mag 6.1 Cape No 2785 - mag 8.5 Cape No 2786 - mag 8.2

C	19 55	27.34	20 05	29.88	20 05	31.36
L		27.35		29.97		31.38
C		27.91		29.98		31.42
Mean	19 55	27.37	20 05	29.93	20 05	31.39
Rec		+ 53.53		53.88		53.07
d	19 56	20.90	20 06	23.81	20 06	24.46
A	20 00	23	20 00	23	20 00	23
d-A	- 0 09	02.10	+ 06	00.81	+ 6	01.46
Sec d-A		- 242.09		+ 360.77		361.42
log "	2.38	397 n	2.55	723	2.55	801
" mod	9.96	412	9.95	910	9.96	654
" %	0.85	533 n	0.02	357	1.03	179

3	- 7.16	68	+ 10.55	78	+ 10.75	95
3 ₁		- 10		+ 52		+ 46
3 ₂	14.83	22	32.56	30	32.76	41
X	15.83	78	32.72	22	32.91	25
X-3	+ 1.00	56	+ 1.59	2	+ 1.48	4

C	- 23 00	43.2	- 24 31	20.3	- 22 17	49.9
L		42.9		20.3		49.9
C		43.3		20.6		50.0
Mean	- 23 00	43.1	- 24 31	20.4	- 22 17	49.9
Rec		+ 2 25.7		+ 2 37.0		+ 2 37.1
d	- 22 58	17.4	- 24 28	43.4	- 22 12	12.8
D	- 23 13	55	- 23 13	55	- 23 13	55
d-D	+ 15	37.6	- 1 14	48.4	+ 1 01	42.2
tan d-D		+ 937.6		- 7489.1		+ 3702.6
log "	2.97	202	3.65	216 n	3.56	850 n
" "	0.30	317	0.98	331 n	0.89	965 n

log tan d	9.62	72	9.65	82	9.61	08
" "	17.10	7	20.47	1	2.06	36
" "	8.39	13	8.75	87	8.72	78

no	+ 2.60	98	- 9.62	30	+ 7.93	68
n ₁	- 0.02	46	- 0.05	74	- 0.05	34
n	19.98	52	8.31	96	25.88	34
n	19.71	34	8.62	93	25.33	16
n-n	- 2.77	18	+ 3.09	7	- 5.55	18

8699

Standard Coordinates

9

	Cape W 2769 - Mag 6.1	Cape W 2785 - Mag 8.0	Cape W 2786 - Mag 2
C	19 55 27.34	20 00 29.88	20 00 31.36
L	27.35	29.97	31.38
E	27.91	29.99	31.92
Mean	19 55 27.37	20 00 29.93	20 00 31.39
Proc	+ 3.53	3.58	3.07
d	19 56 20.90	20 06 23.81	20 06 24.46
A	20 00 23	20 00 23	20 00 23
X-A	- 0 09 02.10	+ 06 00.81	+ 6 01.96
Sand A	- 292.09	+ 360.77	361.92
Eq "	2 38 49.7 h	2 55 72.3	2 55 80.1
" Prod	9 969.12	9 959.10	9 964.59
" 3	0 8553.3 h	0 0235.7	1 0317.9
10			
3	- 7.1668	+ 10.5578	+ 10.7572
5	- 10	+ 52	+ 96
7	19 83 22	22 56 30	32 76 +1
X	15 83 7.8	32 72 22	32 91 25
X-5	+ 1.0056	+ 1.592	+ 1.489
C	- 23 00 93.2	- 29 31 20.3	- 22 19 99.9
L	92.9	20.3	99.9
E	93.3	20.6	50.0
Mean	- 23 00 93.1	- 29 31 20.4	- 22 19 99.9
Proc	+ 2 25.7	+ 2 37.0	+ 2 37.1
d	- 22 58 17.9	- 29 28 93.9	- 22 12 12.8
D	- 23 13 55	- 23 13 55	- 23 13 55
X-D	+ 15 37.6	- 1 19 98.9	+ 1 01 92.2
Sand D	+ 937.6	- 9489.1	+ 3702.6
Eq "	2 97 20.2	3 65 21.6 h	3 06 85.0 h
" 4	0 3031.7	0 9833.1 h	0 8996.5 h
England	96 27.2	96 58.2	96 10.8
" 7	17 10.7	20 97.1	20 63.6
" 11	83 91.3	87 58.7	87 27.8
140	+ 20 09.8	- 96 23.0	+ 7 93.6 8
141	+ 0 029.6	+ 0 007.7	+ 0 053.4
142	29 985.2	83 79.6	28 883.7
143	19 713.7	86 29.3	25 331.6
144	+ 277.8	+ 309.7	+ 532.8

37

133

8649

Plate Center.

3-

χ	η	ϵ	δ
13.8378	19.7139	19 56	20.9 - 22 58 17.9
32.7222	8.6293	20 06	23.8 29 28 43.9
32.9125	25.3316	20 06	24.5 22 12 12.8
38.1.9725	53.6743	3)59 68	69.2 68 98 73.6
27.1575	17.8914	20 03	3.1 - 23 13 4.5
22	18.	- 2	39.9 + 50.6
- 5.1575	+ 0.1086	20 00	23.2 23 13 55.1
315	466.5		
- 159.59	+ 50.65		

Plate Center $\begin{cases} A = 20 & 00 & 23 \\ D = -23 & 13 & 55 \end{cases}$

$= -2^m 39.9$

$\chi - \gamma$	$+500\chi$	$+17\gamma$	$+168\chi$	-18017
+10056	+7919	= +17975	+19 = +17989	+28 = +18017 = 0
+1592	+16361	= +17953	+6 = +17959	+59 = +17 = 0
+1484	+16756	= +17990	+18 = +17958	+59 = +17 = 0
22.2427	+11121	+11	+90 = 21.5582	

$\eta - \chi$	$+500\eta$	-5.8χ	$+1578\chi$	-7358
-2718	+9857	= +7139	-92 = +7097	+3112 + 7358 = 0
+3097	+4315	= +7412	-190 = +7222	+136 = +58 = 0
-5518	+12666	= +7148	-191 = +6957	+900 = +57 = -1
15.9770	+7988	-129	+252 = 16.0523	

Tables
 Ubs

$a = -1.$	$e = -13.$	$a - e = +12.$	$b + d = +7$
$= -501.8$	$= -515.8$	$= +19$	$= +5.1$
$0 - C$	-500.8	-502.8	$+1.1$

8699

Plate Center

5

K

4

-E

J

15.8378	19.7139	19.56	20.9	-22.58	17.9
32.7222	86.293	20.06	23.8	29.28	93.9
32.9125	25.3316	20.06	29.5	22.12	12.8
18.19725	53.6743	31.59	68	69.2	68.98
27.1575	17.8919	20.03	3.1	-23.13	9.5
22	18	-2	39.9		+30.6
-5.1375	+0.1086	20.00	23.2	23.13	55.1
31 ⁵	466.5				
-159.9	+30.65				
Plate Center { A = 20 00 23					
{ D = 23 13 55					
= -2 ^m 39.9					

X-7	+502A	+77	+1.8A	-18017
+10056	+7919	= +17975	+19	= +17989
+1592	+16361	= +17953	+6	= +17959
+1789	+16356	= +17940	+18	= +17958
22.2927	+11121	+11	+90	= 21.5582
7-4	+502A	-5.8A	+15.84	-7358
-2718	+9557	= +7139	-92	= +7097
+3097	+4315	= +7412	-190	= +7222
-5518	+12666	= +7198	-191	= +6957
15.9770	+7988	-129	+252	= 16.0523

Jallies a = -1. e = -13. a-e = +12. b+d = +9.
 Wb2 = -501.8 = -513.8 = +19 = +5.1

$$a = -3.6$$

$$b = +13$$

8649

Moon's Center.

	x	$x-x_0$	Δx	$(x-x_0)^2$	$(x-x_0)(y-y_0)$	Δy
1	23.0000	+ 0.7550	+ 7	0.5710	4.0057	- 19
2	24.0000	+ 1.7550	+ 3	3.0810	3.9980	- 96
+3	24.2463	+ 2.0013	+ 0	4.0052	4.0052	- 27
4	24.0000	+ 1.7550	- 3	3.0789	4.0024	- 52
5	23.9617	+ 1.7167	- 4	2.9457	3.9949	- 127
6	23.0000	+ 0.7550	- 7	0.5689	3.9913	- 163
7	22.2450	0.0000	- 7	0.0000	4.0192	+ 116
8	22.0000	- 0.2450	- 7	0.0603	4.0108	+ 32

$$R^2 = 4.0076$$

	y	$y-y_0$	Δy	$(y-y_0)^2$	Δ
1	19.1261	- 1.8509	- 24	3.4347	158
2	15.0207	- 0.9663	- 13	0.9170	119
3	15.9770	- 0.0000	- 0	0.0000	90
4	16.9367	+ 0.9597	+ 13	0.9235	61
5	17.0000	+ 1.0230	+ 13	1.0492	59
6	17.8253	+ 1.8473	+ 27	3.4227	22
7 +	17.9792	+ 2.0022	+ 26	4.0192	0
8	17.9620	+ 1.9850	+ 26	3.9505	353 1650

Approximate Center.

$$\begin{aligned}
 X &= 24 \\
 y &= 15.0207 \\
 &\quad 16.9367 \\
 &\quad \hline
 &\quad 31.9574 \\
 y_0 &= 15.9787
 \end{aligned}$$

$$\begin{aligned}
 y_{\max} &= 17.9792 \\
 R &= 2.0006
 \end{aligned}$$

$$\begin{aligned}
 X_{\max} &= 24.2463 \\
 x_0 &= 22.2453
 \end{aligned}$$

$$\begin{aligned}
 \text{Moon's Center} \quad \left\{ \begin{aligned} X &= 22.2450 \\ y &= 15.9770 \end{aligned} \right.
 \end{aligned}$$

2699

Newton's center

	x	$x - \bar{x}_0$	Δx	$(x - \bar{x}_0)^2$	$(x - \bar{x}_0)(y - \bar{y}_0)$	y
1	23.0000	+ 0.7330	7	0.53710	9.0037	19
2	29.0000	+ 1.7330	3	3.0810	3.9980	96
3	29.2963	+ 2.0013	0	9.0032	4.0032	29
4	29.0000	+ 1.7330	3	3.0789	4.0029	52
5	23.9617	+ 1.7167	4	2.9457	3.9777	127
6	23.0000	+ 0.7330	7	0.5689	3.9913	163
7	22.2950	0.0000	7	0.0000	4.0192	116
8	22.0000	- 0.2730	7	0.603	4.0103	32

$$R = 9.0076$$

	y	$y - \bar{y}_0$	Δy	$(y - \bar{y}_0)^2$	
1	19.1261	- 1.8309	29	3.9347	128
2	17.0207	- 0.9363	13	0.9170	119
3	15.9770	- 0.0000	0	0.0000	90
4	16.9367	+ 0.9397	13	0.9232	61
5	17.0000	+ 1.0230	13	1.0492	59
6	17.8253	+ 1.8473	27	3.9227	22
7	17.9792	+ 2.0022	26	4.0192	0
8	17.9620	+ 1.9850	26	3.9205	353

Approximate center

$$\bar{x} = 29 \quad \bar{y} = 15.0207$$

$$16.9367$$

$$3.19374$$

$$\bar{y}_0 = 15.9787$$

$$y_{\max} = 17.9792$$

$$R = 2.0005$$

$$\bar{x}_{\max} = 29.2963$$

$$\bar{x}_0 = 22.2953$$

Newton's center $\left\{ \begin{array}{l} \bar{x} = 22.2950 \\ \bar{y} = 15.9770 \end{array} \right.$

Formation of normals.

1	- 1.39	- 17.0	+ 35.0
2	- 1.68	- 168.0	+ 92.0
3	- 0.00	- 78.0	+ 00.0
4	+ 1.68	- 91.0	- 50
5	+ 1.75	- 218.5	- 129.5
6	+ 1.39	- 122.5	- 301.5
7	+ 0.00	+ 00.0	+ 232.0
8	- 0.48	- 7.5	+ 63.5
	+ 4.82	+ 00	+ 422.5
	- 3.55	- 669.5	- 481.0
	+ 1.27		- 58.5

	a	b	c	New b-c
a	+ 31	+ 23	- 27	- 57 ^v
b	+ 13	+ 54	- 12	- 14 ^v
c	- 56	+ 62	- 0	+ 6 ^v
		+ 54	+ 12	+ 10 ^v
		+ 53	+ 13	+ 10 ^v
		+ 23	+ 29	- 9 ^v
		+ 0	+ 26	- 30 ^v
		- 7	+ 26	- 37 ^v
				- 16 ^v

.089

$$+1.27 + 17.71 = +15.00$$

$$+ [] + 0.11 = +0.75$$

$$+17.60 = +9.25$$

$$14.31 = +8.78 - 0.31 = +8.17$$

8649

Conditional Equations

						W-C
1	+ 0.75	- 1.85	= - 19	- 35	0	+ 16
2	+ 1.75	- 0.96	= - 96	- 82	0	- 17
3	+ 2.00	- 0.00	= - 29	- 93	0	+ 69
4	+ 1.75	+ 0.96	= - 52	- 82	0	+ 30
5	+ 1.72	+ 1.02	= - 127	- 80	0	- 77
6	+ 0.75	+ 1.85	= - 163	- 35	0	- 128
7	+ 0.00	+ 2.00	= + 116	- 0	0	+ 116
8	- 0.29	+ 1.98	= + 32	+ 11	0	+ 21
						+ 252 - 189

$$+ 14.31 + 1.27 = - 669.5 + 8.78 \Delta$$

$$+ 1.27 + 17.71 = - 58.5 + 5.00 \Delta$$

$$+ 1.27 + .41 = - 59.3$$

$$0 + 17.6 = + .8$$

$$+ 1.29 \Delta$$

$$b = 0$$

$$14.31 \neq - 669.5$$

$$a = - 46.7$$

$$+ 0.56 \Delta$$

Arc measured $165^{\circ} 0$

$$\frac{p}{n} = .21$$

$$\frac{zv}{n} = + 7.9$$

$$\text{In } 6 \quad R = 2.00$$

$$\frac{+ 7.9}{.21} = + 37.6$$

$$\Delta R = + 0.5$$

$$- 2RC = - 2.80$$

$$\text{corr} = + 0.7$$

$$\Delta b = .67$$

$$\Delta s = - 0.3$$

$$\Delta R = - 0.2$$

$$\Delta a = - 1.57$$

$$\Delta q = - 0.06$$

8679

Conditional Equations

7

1	+ 0.75	- 1.85	= -	19	-	35	0
2	+ 1.75	- 0.96	= -	96	-	82	0
3	+ 2.00	- 0.00	= -	29	-	93	0
4	+ 1.75	+ 0.96	= -	52	-	82	0
5	+ 1.72	+ 1.02	= -	127	-	80	0
6	+ 0.75	+ 1.85	= -	163	-	35	0
7	+ 0.00	+ 2.00	= +	116	-	0	0
8	- 0.29	+ 1.98	= +	32	+ 71	0	0
							+252 - 189

$$+19.31 + 1.27 = -669.5 + 8.95^{\Delta}$$

$$+ 1.27 + 17.71 = -58.5 + 5.00^{\Delta}$$

$$+ 1.27 + 1.91 = -59.3$$

$$0 + 17.6 = + 8$$

$$19.31 = -669.5$$

$$+ 1.27^{\Delta}$$

$$b = 0$$

$$a = -96.7$$

$$+ 0.56^{\Delta}$$

Arc measured 165.0

$$\frac{R}{h} = .212$$

$$\frac{ZV}{h} = +7.9$$

$$In 6 \quad R = 2.00 + \frac{7.9}{21} = 137.6$$

$$\Delta R = +0.4$$

$$-2110 = -2.80$$

$$Corr = +0.7$$

$$\Delta b = 0.67$$

$$\Delta Z = -0.3$$

$$\Delta R = -0.2$$

$$\Delta a = -5.58$$

$$\Delta Y = -2.06$$

8649

Moon's Mean Position

8

$$\begin{array}{r} \chi_0 = 22.2450'' \\ - 23'' \\ \hline 22.222'' \end{array}$$

$$\begin{array}{r} \gamma_0 = 15.9770'' \\ \hline 0'' \end{array}$$

From Plate Constants

$$\chi = 21.5582''$$

$$\gamma = 16.0523''$$

$$\xi = 0.9778''$$

$$\eta = 1.9777''$$

$$\begin{array}{r} \log \xi \quad 9.67523'' \\ \cos \delta \quad 9.96245'' \\ \hline 8.50727'' \\ 1.17552'' \end{array}$$

$$\begin{array}{r} \log \tan \delta \quad 9.6379'' \\ \xi^2 \quad 9.2905'' \\ \hline 7.0039'' \\ 5.9818'' \end{array}$$

$$\alpha - A = -14.98''$$

$$\eta_1 = -0.0001''$$

$$\eta_0 = -1.9776''$$

$$A \quad 20 \quad 00 \quad 23.0''$$

$$\begin{array}{r} \log h_0 \quad 0.28950'' \\ 7.32115'' \\ \hline 2.95835'' \end{array}$$

$$\alpha_0 \quad 20 \quad 00 \quad 08.02''$$

$$-908.6''$$

$$\text{Red} \quad +3.25''$$

$$S-D \quad -15 \quad 08.6''$$

$$\alpha' \quad 20 \quad 00 \quad 11.27''$$

$$D \quad -23 \quad 13 \quad 55''$$

$$S_0 \quad -23 \quad 29 \quad 03.6''$$

$$\text{Red} \quad +3.9''$$

$$\delta' \quad -23 \quad 28 \quad 59.7''$$

8699

Moon's Mean Position

$$\lambda_0 = 22.2930^{\circ}$$

$$- 23^{\circ}$$

$$22.2927^{\circ}$$

$$\eta_0 = 15.9770^{\circ}$$

$$0^{\circ}$$

From Plate Constants

$$\lambda = 21.5582^{\circ}$$

$$\eta = 16.0523^{\circ}$$

$$\lambda = 0.9718^{\circ}$$

$$\eta = 1.9777^{\circ}$$

$$\log \lambda = 9.87523^{\circ}$$

$$\log \lambda = 9.6377^{\circ}$$

$$\log \delta = 9.96295^{\circ}$$

$$\eta = 9.2905^{\circ}$$

$$85.0727^{\circ}$$

$$7.0539^{\circ}$$

$$1.17592^{\circ}$$

$$5.9848^{\circ}$$

$$\lambda - A = -1998$$

$$\eta = -00001^{\circ}$$

$$\eta_0 = -1.9778^{\circ}$$

$$A = 20.0023^{\circ}$$

$$\log \lambda_0 = 0.28950^{\circ}$$

$$\lambda_0 = 20.000802^{\circ}$$

$$7.22115^{\circ}$$

$$2.95835^{\circ}$$

$$Red = 13.28^{\circ}$$

$$-908.6^{\circ}$$

$$\lambda' = 20.001127^{\circ}$$

$$J-D = -15.08.6^{\circ}$$

$$D = 23.1355^{\circ}$$

$$\lambda_0 = 23.2903.6^{\circ}$$

$$Red = 3.9^{\circ}$$

$$\delta' = 23.28597^{\circ}$$

$$\begin{array}{r}
 19 \quad 41 \quad 27.50 \\
 \underline{27.29} \\
 + 3.21
 \end{array}$$

$$\begin{array}{r}
 -19 \quad 57 \quad 57.7 \\
 \underline{58.06} \\
 + 1.16
 \end{array}$$

$$\begin{array}{r}
 19 \quad 57 \quad 29.38 \\
 \underline{26.02} \\
 + 3.36
 \end{array}$$

$$\begin{array}{r}
 -27 \quad 56 \quad 47.7 \\
 \underline{49.37} \\
 + 4.67
 \end{array}$$

$$\begin{array}{r}
 20 \quad 16 \quad 17.20 \\
 \underline{14.25} \\
 + 3.0
 \end{array}$$

$$\begin{array}{r}
 -15 \quad 02 \quad 59.3 \\
 \underline{3 \quad 62.0} \\
 + \quad 2.7
 \end{array}$$

.2
 .30
 .1
 .20
 .15
 .194
 20 10 204 50 40

8649 Reduction to Apparent Place 9

$$\begin{aligned}
 &= 138^{\circ} 54'.0 \\
 H + \alpha & 9 \quad 15.6 \\
 H & 13 \quad 15.5 \\
 \alpha & 20 \quad 00.1 \\
 G & 22 \quad 6.0 \\
 G + \alpha & 18 \quad 06.1 \\
 &= 271^{\circ} 31.5
 \end{aligned}$$

$$\begin{aligned}
 \log \cos G + \alpha & 8.9251 + \\
 " \quad g & 1.4960 \\
 " \quad \sin " & 9.9998 n \\
 " \quad \tan \delta & 9.6379 n \\
 & 8.8239
 \end{aligned}$$

$$\begin{aligned}
 \log g' & 9.5711 \\
 " \quad g & 9.6076
 \end{aligned}$$

$$\delta - 23 \quad 29 \quad 03.6$$

$$\begin{aligned}
 \log \cos \delta & 9.9629 + \\
 " \quad \alpha & 0.4340 n \\
 " \quad \alpha' & 0.4164 n
 \end{aligned}$$

$$\begin{aligned}
 \log \sin \delta & 9.6009 n \\
 " \quad \cos (H + \alpha) & 9.8771 n \\
 " \quad h & 1.3069 \\
 " \quad \sin (H + \alpha) & 9.8178 n \\
 " \quad \sec \delta & 0.0376 \\
 & 8.8239
 \end{aligned}$$

$$\begin{aligned}
 \log h' & 0.7894 \\
 " \quad h & 9.9862
 \end{aligned}$$

$$\begin{array}{rcl}
 f + & 1.871 & g' + 0.372 \\
 g & + 0.405 & \rho h' + 6.087 \\
 h & + 0.969 & i - 2.609 \\
 \hline
 & + 3.245 & + 3.850
 \end{array}$$

8	6	9	9
---	---	---	---

9

$$z = 477^{\circ} 31.0$$

88239

Log Sum S 9.60094

Ans $H + d = 48771 \text{ m}$

8	8	2	3	9
---	---	---	---	---

i. 9 9.6076

41 1871

$$\frac{1}{2} + 0.900$$

A 3.295

9 1 + 0 3 7 2

+ 3.200

8679

Lunar Parallax

10

$$\begin{array}{rcl}
 \alpha' & 20 & 00 & 11.27^{\circ} \checkmark \\
 \theta & 19 & 18 & 25.5^{\circ} \checkmark \\
 \theta - \alpha' & - & 41 & 75.77^{\circ} \checkmark \\
 = & -10^{\circ} & 26' & 26.55^{\circ} \checkmark
 \end{array}$$

$$\begin{array}{rcl}
 \frac{1}{2} d - \alpha' & - & 9 & 19.31^{\circ} \checkmark \\
 & -10 & 22 & 7.29^{\circ} \checkmark
 \end{array}$$

$$\begin{array}{rcl}
 9.95727^{\circ} \checkmark \\
 0.00000^{\circ} \checkmark \\
 0.00715^{\circ} \checkmark \\
 \hline
 9.96442^{\circ} \checkmark
 \end{array}$$

$$\gamma \quad 42 \quad 39 \quad 20.6$$

$$\delta \quad -23 \quad -28 \quad 59.7^{\circ} \checkmark$$

$$\gamma - \delta \quad +66 \quad 08 \quad 20.3^{\circ} \checkmark$$

$$\begin{array}{rcl}
 9.82690^{\circ} \checkmark \\
 8.23849^{\circ} \checkmark \\
 9.96120^{\circ} \checkmark \\
 0.16903^{\circ} \checkmark \\
 \hline
 8.19507^{\circ} \checkmark
 \end{array}$$

$$\begin{array}{rcl}
 \delta - \delta' & & 28 \quad 59 \quad 8 \\
 & + & 53 \quad 52 \quad 3^{\circ} \checkmark
 \end{array}$$

$$\delta \quad -22 \quad 35 \quad 07.4^{\circ} \checkmark$$

$$\text{am Ephd} \quad -22 \quad 35 \quad 09.0^{\circ} \checkmark$$

$$\begin{array}{rcl}
 10 - C & + & 1.6 \\
 2nd Order Ref & + & 0.2 \\
 Curv of Plate & + & 0.7
 \end{array}$$

$$\text{Irr Corr} \quad - \quad 0.3$$

$$\begin{array}{rcl}
 \delta & -22 & 35 \quad 07.3^{\circ} \\
 10 - C & + & 1.5^{\circ}
 \end{array}$$

$$\delta' \quad -23 \quad 28 \quad 59.8$$

$$\pi \quad 59 \quad 31.86^{\circ} \checkmark$$

$$\begin{array}{rcl}
 9.86913^{\circ} \checkmark \\
 8.23849^{\circ} \checkmark \\
 9.25820^{\circ} \checkmark \\
 0.03966^{\circ} \checkmark \\
 \hline
 7.80093^{\circ} \checkmark
 \end{array}$$

$$\alpha - \alpha' \quad - \quad 8' \quad 38.63^{\circ} \checkmark$$

$$\begin{array}{rcl}
 = & - & 39^m \quad 58^s \checkmark \\
 & & 60.1125^{\circ}
 \end{array}$$

Images were trails.

$$\alpha \quad 19 \quad 59 \quad 36.69^{\circ} \checkmark$$

$$\alpha \quad 19 \quad 59 \quad 35.83^{\circ} \checkmark$$

$$10 - C \quad + \quad .86^{\circ} \checkmark$$

$$-0.05^{\circ}$$

$$-0.06^{\circ}$$

$$\alpha \quad 19 \quad 59 \quad 36.63$$

$$+ 0.80$$

8699

Lunar

Parallax

10

α' 20 00 11.27" δ' - 23 28 59.8
 β 19 18 25.5" π 59 31.82"
 $\gamma - \alpha'$ - 91 75.77" π 59 31.82"
 $\delta - \alpha'$ - 100 26' 26.55"

$\frac{1}{2} \alpha - \alpha'$ - 9 19.31" π 59 31.82"
 $\beta - \alpha'$ - 10 22 7.29"

9 56 913 "
 8 23 849 "
 9 25 820 "
 003966 "
 199993 "

9.95727 "
 0.000000 "
 000715 "
 9.96992 "

$\alpha - \alpha'$ - 2' 38.63 "
 $\beta - \alpha'$ - 39.58 "

γ 92 39 20.6

δ - 23 - 22 39.7"

$\gamma - \delta$ + 66 08 20.3"

9.82690 "
 5.23849 "
 9.96120 "
 0.16903 "
 8.79507 "

$\delta - \delta'$ 153 2.3"

δ - 22 35 01.9" α 19 59 36.69"

Ann Gphs - 22 35 09.0" α 19 59 35.83"

$\alpha - \alpha'$ + 1.6" $\alpha - \alpha'$ + 8.0"

Curv of Plate + 0.7
 Images were trails

-0.05"

8650

Star Measures

1	16008	17907	19388	16508
18.9	6229	17190	11932	1395855
18.7	2022	90	3433	5255
	6010	00	70	500
	<u>14.9788</u>	<u>14.9788</u>	<u>18.7442</u>	<u>18.7450</u>
2	16588	18178	17976	20002
31.9	7620	17158	1089093	1708285
7.7	2824	5255	96	88
	92	98	89	19
	<u>31.8968</u>	<u>31.8977</u>	<u>7.7088</u>	<u>7.7080</u>
3	16798	18502	17392	19380
32.0	1638990	8900	1326059	1399693
24.7	96	89899	98	9093
	96	00	902	388
	<u>32.0408</u>	<u>32.0398</u>	<u>24.9192</u>	<u>24.9108</u>

Moon Measures.

1			16536	19512
23			1126658	1777669
13.6			50	62
			38	08
			<u>13.5278</u>	<u>13.5260</u>
2	16170	17722		
23.6	10102	1381015		
19	82092	2015		
	70	32		
	<u>23.6078</u>	<u>23.6076</u>		
3			16170	19696
29			9290	16550
17.8			310300	5859
			86	92
			<u>14.6876</u>	<u>14.6860</u>

1650

Star Measures

L	16888	17407	19388	16508
1.9	6224	17190	11732	13938.5
9.7	20.2	70	34	32.5
	6210	00	70	500
	<u>187788</u>	<u>187788</u>	<u>187992</u>	<u>187950</u>

-	16588	18178	17976	20002
1.9	7620	17158	10890	17082.5
1.7	28.4	52.5	76	88
	92	98	89	19
	<u>318968</u>	<u>318979</u>	<u>17088</u>	<u>77080</u>

2	16798	18502	17392	19888
2.0	16389.0	8900	13260.59	13496.3
9.7	96	89899	98	9.0
	76	00	902	388
	<u>320908</u>	<u>320398</u>	<u>299192</u>	<u>299108</u>

Micom Measures

3		16536	19512
6.6		11266.8	19776.9
		50	62
		38	08
		<u>135278</u>	<u>135260</u>

-	16170	17722	
3.6	10102	13810.5	
9	52.72	20.15	
	70	32	
	<u>236078</u>	<u>236076</u>	

2		16170	19696
2.9		9290	16350
17.8		210360	58.9
		86	92
		<u>196876</u>	<u>196860</u>

1
2
1
+
5
2
13
4
2
1
7
2
17
2
2
1
+
2
2
1
1

Moon Measures

11

$$\begin{array}{r}
 2 \\
 24.1 \\
 15.2 \\
 +X \\
 \hline
 14010 \\
 13020 \\
 1216 \\
 10 \\
 29.0994 \quad 29.0956
 \end{array}$$

$$\begin{array}{r}
 5 \\
 29 \\
 15.9
 \end{array}$$

$$\begin{array}{r}
 15812 \\
 654237 \\
 3237 \\
 28 \\
 15.9288
 \end{array}
 \quad
 \begin{array}{r}
 17196 \\
 1679699 \\
 9299 \\
 88 \\
 15.9298
 \end{array}$$

$$\begin{array}{r}
 6 \\
 23.1 \\
 17 \\
 \hline
 18796 \\
 1699997 \\
 7000 \\
 92 \\
 23.1798
 \end{array}
 \quad
 \begin{array}{r}
 19096 \\
 10872 \\
 8275 \\
 108 \\
 23.1768
 \end{array}$$

$$\begin{array}{r}
 7 \\
 23 \\
 17.1
 \end{array}$$

$$\begin{array}{r}
 19467 \\
 1841814 \\
 1014 \\
 68 \\
 17.1050
 \end{array}
 \quad
 \begin{array}{r}
 18827 \\
 9928 \\
 28 \\
 57 \\
 17.1078
 \end{array}$$

$$\begin{array}{r}
 8 \\
 22.04 \\
 17.3 \\
 +7
 \end{array}$$

$$\begin{array}{r}
 19496 \\
 1627073 \\
 7673 \\
 506 \\
 17.3226
 \end{array}
 \quad
 \begin{array}{r}
 18792 \\
 1201607 \\
 1199807 \\
 86 \\
 17.3220
 \end{array}$$

$$\begin{array}{r}
 9 \\
 22.0 \\
 17
 \end{array}$$

$$\begin{array}{r}
 19510 \\
 1631809 \\
 29009 \\
 10 \\
 17.3206
 \end{array}
 \quad
 \begin{array}{r}
 18770 \\
 1193040 \\
 5040 \\
 70 \\
 17.3170
 \end{array}$$

Moon Measures

11

L	140	10	18930
24.1	130	20	7390
12.2		12	8000
+X		10	30
	29.0999		29.0936

5		15812	17196
29		454237	1699699
12.9		28	88
		10.7288	10.7298

6	18796	19096
23.1	16999	10872
17	700091	8272
	92	108
	23.1798	23.1768

7		17969	18829
23		1891819	9928
17.1		10	28
		68	59
		17.1050	17.1078

8		17496	18792
23.0		1627012	12016
17.3		76	11998
+Y		506	86
		17.3226	17.3220

9		19510	18770
22.0		1631809	1193090
17		290	50
		10	70
		17.3206	17.3170

8630

Times 2 Etc.

13

May 31 '10.

Exp. to stars	19	29	19	41
" " Moon	19	34	39.5	19 3.4 39.7
Clock fast		1	19.1	

H. Sid J.	19	33	25.5	
H. Long	4	44	31.05	$\gamma - \alpha = - 27^m$
G. Sid J.	29	17	56.65	
Sid J. M.H.	4	31	36.56	
Interval	19	46	19.99	
Reduction		3	19.35	
G. M. J.	19	43	05.64	

From Naut. Alman.	P.A.	Sec.
Moon 19 ^h	19 58	25.95 - 22 39 47.5
Motion in 1 ^m		+ 2.4827 + 9.8755
" " 43.0940	+ 1	46.99 + 7 7.3
Tabular Place 20	0	12.94 - 22 32 40.2

Moon's Age. 18 days.

934 = 6.6

Parallax	59' 31.3
Semid.	16' 14.6
R.	974.6
Aug.	7.2
R. 6	- 1.1
R.	9807
R.	2.1023
AR	- 1001
(+a) R	2.0022
R ²	4.0088

a = -500

27
- 476

8650

James & Eten

13

May 31 '15.

1p. to Stars	19	29	19	91
Moon	19	39	39.5	19 39 39.7
Orbit fact		1	19.1	
+ Sed J.	19	33	25.5	
+ long	9	49	31.05	10 x = - 27
Sed J.	29	17	56.55	
Sed J. M.H.	9	31	36.56	
Interval	19	46	19.99	
Reduction		3	19.35	
g. M. J.	19	43	05.69	

Transit Mount Alt

H.A.

Dec.

Moon 19 ^h	19	58	25.75	-22	39	17.5
Distortion in 1 ^m			+2.7527			+9.5755
43.0990	11	16.97		7		7.3
Tabular Place	20	0	12.99	-22	32	70.8

Moon's Age

18 days

Parallax

59' 31.3

Semi-d

16' 19.6

R.

974.6

Aug

7.2

1st R.

-1.1

R.

9807

R.

211023

R.

-1000

Oral R

20022

R.

90088

934 = 6.6

a = -500

27

-976

8650

Plate Constants

x	14.9788	3 1.8971	32.0903
y	14.8322	3 2.5630	32.7691
$x-y$	+ 1766	- 6659	- 7238

m	18.7996	7.7084	24.9125
n	19.9852	8.3196	25.8839
$m-n$	- 12406	- 6112	- 14709

$x-y$	+ 500 x	+ 30.4 y	- 95.2 z
+ 1466	+ 7489	= 8955 + 570	= + 9525
- 6659	+ 15999	= 9290 + 239	= + 9529
- 7238	+ 16020	= 8782 + 742	= + 9524
22,0988	+ 11047	+ 466	= 22,2992

$y-n$	+ 500 y	- 36.1 x	+ 15.7 z	+ 3294
- 12406	+ 9372	= - 3039 - 541	= - 3575 + 281	= - 3294 = 0
- 6112	+ 3854	= - 2258 - 1151	= - 3409 + 116	= - 93 = + 1
- 14709	+ 12206	= - 2503 - 1157	= - 3660 + 366	= - 99 = 0
15,3187	+ 7659	- 798	+ 230	= 16,3566

Tables	$a = -.6$	$e = -12.8$	$a-e = +12.2$	$b+d = +3$
Obs	= - 500.	= - 515.0	= + 15	= + 5.7

O-C	- 499.4	- 502.2	+ 2.7
-----	---------	---------	-------

8650

Plate Constants

x	19.9788	31.8971	32.0903
y	19.8322	32.5630	32.7691
z	+1766	-6659	-7238
m	18.7996	7.7089	29.9125
n	19.7852	8.3196	25.8839
$1-n$	-12906	-6112	-19709

$$\begin{aligned}
 x-z &+ 5200x & + 30.94 & - 90.24 \\
 1966 &+ 7989 = 8955 &+ 570 = 19525 & - 14 \\
 6659 &+ 10779 = 9290 &+ 239 = 19029 & = 0 \\
 7238 &+ 16020 = 8782 &+ 792 = 19029 & = 0 \\
 22.0988 &+ 11099 & + 966 & - 22.2972
 \end{aligned}$$

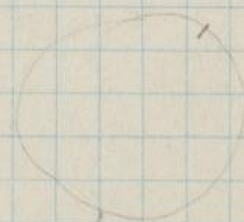
$$\begin{aligned}
 y-n &+ 5804 & - 36.11 & + 15.7 & + 3299 \\
 12906 &+ 9372 = -3039 & - 591 = -3575 & + 211 = -3299 & = 0 \\
 6112 &+ 3854 = -2258 & - 1151 = -3909 & + 116 = -93 & = +1 \\
 19709 &+ 13206 = -2503 & - 1157 = -3660 & + 366 = -99 & = 0 \\
 15.3187 &+ 7659 & - 798 & + 230 & - 16.3566
 \end{aligned}$$

$$\begin{aligned}
 \text{Tables} & a = -.6 & e = -12.8 & a-e = +12.2 & b+d = +3 \\
 \text{Obs} & = -700. & = -512.0 & = +12 & = +5.7
 \end{aligned}$$

$$A = -2.5$$

$$b = +13.$$

8



8650

Moon's Center

	x	$x-x_0$	Δx	$(x-x_0)^2$	$(x-x_0) + (y-y_0)$	15° 10°
1	23,0000	+ 0.9000	+ 4	0.8107	4.0269	+181
2	23,6077	+ 1.5077	+ 3	2.2741	4.0157	+36.9
3	24,0000	+ 1.9000	+ 1	3.6107	4.0098	+10
4	+24,0975	+ 1.9975	+ 0	3.9900	3.9900	-188
5	24,0000	+ 1.9000	- 1	3.6096	3.9892	-276
6	23,1783	+ 1.0783	- 4	1.1618	3.9987	-107
7	23,0000	+ 0.9000	- 4	0.8093	4.0159	+71
8	22,4000	0.0000	- 5	0.0000	4.0276	+188
9	22,0000	- 0.4000	- 5	0.0101	4.0233	+199

 $R = 4.0088$

	y	$y-y_0$	Δy	$(y-y_0)^2$	15° 10°
1	13,5269	- 1.7911	- 23	3.2162	+1.53
2	14,0000	- 1.3180	- 17	1.7746	131
3	14,6868	- 0.6312	- 8	0.3997	108
4	15,3180	0.0000	0	0.0000	90
5	15,9293	+ 0.6113	+ 8	0.3746	72
6	17,0000	+ 1.6820	+ 22	2.8366	30 32
7	17,1067	+ 1.7887	+ 23	3.2066	27 26
8	+17,3223	+ 2.0043	+ 26	4.0276	0
9	17,3188	+ 2.0008	+ 26	4.0136	- 3 156

Approximate center

$x = 24$

$y = 14.6868$

15.9293

30.6161

$y_0 = 15.3080$

$y_{\max} = 17.3223$

$R = 2.0143$

$x_{\max} = 24.0975$

$x_0 = 22.0872$

$$\text{Moon's Center} \begin{cases} x_0 = 22.0000 \\ y_0 = 15.3180 \end{cases}$$

1650

Moon's Center

15-

	x	y	$x-y_0$	$y-y_0$	x^2	y^2	$x-y_0$	$y-y_0$
1	23,0000	090000	08107	90267	+181			
2	23,6077	15077	13	22791	40157	+69		
3	290000	190000	1	36109	90098	+10		
4	+290975	19975	10	39900	39900	-188		
5	290000	190000	1	36096	39892	-296		
6	23,1783	10783	1	11698	39989	-109		
7	230000	090000	1	08093	40159	+71		
8	221000	000000	0	0000	90276	+188		
9	220000	010000	0	101	90237	+199		

90088

	x	y	$x-y_0$	$y-y_0$	x^2	y^2	$x-y_0$	$y-y_0$
1	13,2269	17911	-23	32162	+153°			
2	170000	13180	-17	17916	131			
3	17,6868	06312	8	03999	108			
4	15,3180	00000	0	00000	90			
5	15,9293	08883	8	03796	72			
6	170000	16820	-22	28366	30			
7	17,1067	17889	-33	32066	27			
8	17,3223	20093	-26	90276	0			
9	17,3188	120008	-26	90136	-3	156°		

Approximate center

$$x = 29$$

$$y = 17,6868$$

$$12,9293$$

$$30,6161$$

$$y_0 = 15,3080$$

$$y_{max} = 17,3223$$

$$16 = 20,193$$

$$x_{max} = 29,0975$$

$$10 = 22,0872$$

$$\text{Moon's Center} \begin{cases} x_0 = 22,1000 \\ y_0 = 15,3180 \end{cases}$$

Formation of Normals

1	- 1.67	+ 263.0	- 329.0
2	- 1.99	+ 105.0	- 99.0
3	- 1.20	+ 919.0	- 306.3
4	- 0.00	- 376.0	+ 000.0
5	+ 1.18	- 467.5	- 150.0
6	+ 1.87	- 112.5	- 175.0
7	+ 1.60	+ 67.0	+ 127.0
8	+ 0.00	+ 000.0	+ 376.0
9	- 0.20	- 15.0	+ 298.0
	+ 7.58	+ 357.0	+ 380.0
	- 5.00	- 971.0	- 746.3
	- .82	+ 620.0	+ 259.7

	a	b	c	new O-C
	+ 36	- 23	- 43	+ 175
a	+ 80	+ 60	- 17	+ 115
b	+ 13	+ 46	- 8	+ 94
c	- 56	+ 80	- 0	- 89
	+ 46	+ 8	+ 28	- 148
	+ 43	+ 22	+ 9	- 57
	+ 36	+ 23	+ 3	+ 105
	+ 6	+ 26	- 30	+ 134
	- 9	+ 26	- 34	+ 107

- 0.025

$$- 0.42 + 19.86 = + 19.37$$

$$+ [] - 0.1 = + 0.26$$

$$+ 19.85 = + 19.60$$

$$+ 16.53 = + 10.09 + 0.10 = + 10.19$$

865°

Conditional Equations.

16

10-c

1	+	0.90	-	1.79	=	+	18.1	(	-	34	-	23	=	-	37	+	21.8
2	+	1.51	-	1.32	=	+	369	(	-	56	-	13	=	-	59	+	128
3	+	1.90	-	0.63	=	+	110	(	-	71	-	11	=	+	72	+	82
4	+	2.00	-	0.00	=	-	188	(	-	75	-	0	=	+	75	-	113
5	+	1.90	+	0.61	=	+	296	(	-	71	+	1	=	-	70	-	176
6	+	1.08	+	1.68	=	-	109	(	+	81	+	3	=	+	38	-	66
7	+	0.90	+	1.79	=	+	71	(	+	34	+	3	=	+	31	+	102
8	+	0.00	+	2.00	=	+	188	(	+	0	+	49	=	+	49	+	184
9	-	0.10	+	2.00	=	+	179	(	+	4	+	49	=	+	8	+	191
																	$+ 855 - 355$

$$+16.53 - 0.82 = -6200.0 + 10.09$$

$$- 0.82 + 19.86 = +2572.7 + 7.39$$

$$+ 0.82 - 0.1 = -15.8$$

$$b = +1.96.7 + 0.23 \Delta$$

$$+19.85 = +38.9$$

$$a = +37.7$$

$$+16.53 = -620 + 0.8 = -619.2 + 250.3$$

$$+ 0.72$$

Arc Measured 156°

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

$$\frac{\Sigma V}{h} = +55.5$$

In 6 R 2.00

$$-2RC - 2.8$$

$$\frac{+55.5}{.19} = +292$$

$$\Delta R = +3.6$$

$$\text{Corr} = +0.7$$

$$\Delta b = -0.67 \quad \Delta \delta = -0.3$$

$$\Delta R = +2.9$$

$$\Delta a = -2.02 \quad \Delta \alpha = -0.07$$

565°

Conditional Equations.

16

6-0

1	+ 0.90	- 1.79	= + 18.1	- 39	- 39	= - 39	+ 21.8
2	+ 1.51	- 1.32	= + 69	- 56	+ 30	= + 39	+ 123
3	+ 1.90	- 0.63	= + 110	- 71	- 11	= + 72	+ 82
4	+ 2.00	- 0.00	= + 188	+ 75	- 0	= + 75	- 113
5	+ 1.90	+ 0.61	= + 296	+ 71	+ 1	= + 70	- 176
6	+ 1.08	+ 1.68	= + 109	+ 71	+ 36	= + 38	- 66
7	+ 0.90	+ 1.79	= + 71	- 39	+ 30	= - 31	+ 102
8	+ 0.00	+ 2.00	= + 188	+ 60	+ 99	= + 99	+ 184
9	+ 0.19	+ 2.00	= + 199	+ 9	+ 99	= + 80	+ 191
							+ 855 - 355

$$+ 16.53 - 82 = + 620.0$$

$$- 0.92 + 11.16 = + 39.7$$

$$+ 0.84 - 0.1 = + 15.8$$

$$b = + 1.961$$

$$+ 119.85 = + 38.9$$

$$a = + 37.9$$

$$+ 16.53 = + 620 + 0.8 = + 619.2$$

Are Measured 156°

$$\frac{p}{h} = .17$$

$$\frac{z.v}{h} = + 55.5$$

$$\frac{+ 55.5}{.17} = + 242$$

$$\Delta P = + 3.6$$

8650

Moon's Mean Position.

17

$$\begin{array}{r} \gamma_0 = 22.0000'' \\ + 19'' \\ \hline 22.0181'' \end{array}$$

$$\begin{array}{r} \gamma_0 = 15.3180'' \\ + 11'' \\ \hline 15.3181'' \end{array}$$

From Plate Constants

$$\chi = 22.2972''$$

$$\eta = 16.3566''$$

$$\eta = -1.6934''$$

$$\zeta = +0.2972''$$

$$\log \tan \delta = 9.6369''$$

$$\zeta = 8.9861''$$

$$7.0537''$$

$$\begin{array}{r} \log \eta = 9.47305'' \\ \log \delta = 9.96258'' \\ \hline 8.50724'' \\ 1.00323'' \end{array}$$

$$5.6367''$$

$$\eta_1 = -0.0000$$

$$\eta_0 = -1.6934''$$

$$\alpha - A = +10.07$$

$$\log \eta_0 = 0.21574''$$

$$A = 20 \ 00 \ 23. \quad \checkmark$$

$$7.33115''$$

$$2.88959'' = -766.6''$$

$$\alpha_0 = 20 \ 00 \ 33.07''$$

$$\delta - B = -12 \ 46.8''$$

$$\text{Red} = +3.26''$$

$$B = -23 \ 13 \ 55''$$

$$\alpha' = 20 \ 00 \ 36.33''$$

$$\delta_0 = -23 \ 26 \ 41.6''$$

$$\text{Red} = +3.9''$$

$$\delta' = -23 \ 26 \ 37.7''$$

3650

Moon's Mean Position

$$\lambda_0 = 221000''$$

$$+19''$$

$$220981''$$

$$\lambda_0 = 153180''$$

$$+19''$$

$$153181''$$

Moon's Plate Constants

$$\lambda = 222972''$$

$$\lambda = 163566''$$

$$\mu = -16939''$$

$$\gamma = +02972''$$

$$\log \lambda = 9.6369''$$

$$\gamma = 89861''$$

$$\log \gamma = 9.97366''$$

$$70539''$$

$$\log \delta = 9.96238''$$

$$5.6369''$$

$$850729''$$

$$\mu = 0.0000$$

$$1.00323''$$

$$\mu = -1.6939''$$

$$A-A \quad +1007$$

$$\log \mu = 0.21579''$$

$$A \quad 20 \quad 00 \quad 23''$$

$$7.33115''$$

$$2.88959'' - 766''$$

$$\lambda_0 \quad 20 \quad 00 \quad 33.07''$$

$$B-D \quad -12 \quad 96.6''$$

$$\log \delta \quad +3.26''$$

$$D \quad -23 \quad 13 \quad 50''$$

$$\delta' \quad 20 \quad 00 \quad 36.33''$$

$$S \quad -23 \quad 26 \quad 91.6''$$

$$\log \delta \quad +2.9''$$

$$\delta' \quad -23 \quad 26 \quad 31.9''$$

8650 Reduction to Apparent Place

138° 51.0
 $H + \alpha$ 33 154
 H 13 15.8
 α 20 00.6
 G 22 06.1
 $G + \alpha$ 42 06.7
 270° 40.7

$\log \cos(G + \alpha)$ 8.9665
 g 1.1466
 \sin " 9.9998 n
 $\tan \delta$ 9.6372 n
 8.8239

$\log g'$ 9.6131
 g 9.6075

$f + 1.587$
 $g + 0.905$
 $h + 0.969$
 $+ 3.258$

δ -23 26 41.8

$\log \cos \delta$ 9.9625
 i 0.4500 n
 i' 0.4125 n

$\log \sin \delta$ 9.5997 n
 $\cos(H + \alpha)$ 9.8768 n
 h 1.3069
 $\sin(H + \alpha)$ 9.8182
 $\sec \delta$ 0.0375
 8.8239

h' 0.4834
 h 9.9865

$g' + 0.910$
 $h' + 6.073$
 $i - 2.585$
 $+ 3.898$

-650 Reduction to Apparent Place

138° 31.0
 $H + \alpha$ 33 12.4
 H 12 19.8
 α 20 00.6
 G 22 06.1
 $G + \alpha$ 42 06.7
 271° 70.7

$\log \cos(G + \alpha)$ 8.9665
 g 1.1966
 \sin 9.9998
 $\tan \delta$ 9.6372
 8.8239

$\log g'$ 7.6131
 g 9.6075

$k + 1.887$
 $g + 0.905$
 $k + 0.969$
 $+ 3.258$

δ -23 26 41.8

$\log \cos \delta$ 9.9625
 α 0.4200
 $\alpha' 0.4155$

$\log \sin \delta$ 9.2997
 $\cos H + \alpha$ 9.8768
 k 1.0009
 $\sin H + \alpha$ 9.8152
 $\sec \delta$ 0.0375
 8.8239

k' 0.7837
 k 9.9865

$g' + 0.910$
 $k' + 0.073$
 $\alpha - 2.585$
 $+ 3.898$

84650

Lunar Parallax

19

$$\begin{array}{rcl} \alpha' & 20 & 00 & 36.33'' \\ \delta & 19 & 33 & 25.50'' \\ \theta - \alpha' & - & 27 & 10.89'' \\ = & -6^\circ & 47' & 42.45'' \end{array}$$

$$\begin{array}{rcl} \frac{1}{2} \theta - \alpha' & - & 2 & 49.23'' \\ & -6^\circ & 44 & 53.22'' \end{array}$$

$$\begin{array}{rcl} 9.95727'' \\ 0.00000'' \\ 0.00302'' \\ \hline \end{array}$$

$$\tan \delta 9.96029''$$

$$\delta \quad 42 \quad 23 \quad 02.4''$$

$$\delta' - 23 \quad 26 \quad 37.9''$$

$$\delta - \delta' + 6.5 \quad 49 \quad 40.1''$$

$$\begin{array}{rcl} 9.82670'' \\ 8.23838'' \\ 9.96015'' \\ 0.17128'' \\ \hline \end{array}$$

$$\sin \delta - \delta' 8.19621''$$

$$\begin{array}{rcl} & 26 & 37.9 \\ \delta - \delta' & + 54 & 00.8'' \end{array}$$

$$\delta \quad -22 \quad 32 \quad 36.9'' \quad \alpha \quad 20 \quad 00 \quad 13.77''$$

$$\text{Am. Eph. } \delta - 22 \quad 32 \quad 40.2'' \quad \text{A.E. } \alpha \quad 20 \quad 00 \quad 12.97''$$

$$\theta - \alpha \quad + 3.3'' \quad \theta - \alpha \quad + 0.83''$$

$$\text{Curv. of Plate} \quad + 0.7 \quad - 0.05''$$

$$2^{\text{nd}} \text{ Order Ref} \quad + 0.2$$

$$\text{Insr Corr} \quad - 0.3 \quad - 0.07$$

$$\delta \quad -22 \quad 32 \quad 37.0'' \quad \alpha \quad 20 \quad 00 \quad 13.70''$$

$$\theta - \alpha \quad + 3.2'' \quad + 0.76''$$

8450

Lunar Parallax

19

 $\delta' \quad 20 \quad 00 \quad 36.33''$
 $\tau \quad 19 \quad 33 \quad 25.50''$
 $\delta - \tau' \quad -27 \quad 10.83''$
 $\delta \quad -6'' \quad 17' \quad 923.95''$
 $\delta - \tau' \quad -2 \quad 99.23''$
 $\delta \quad -6'' \quad 99 \quad 53.22''$
 $9.95727''$
 $0.00000''$
 $0.00302''$
 $\tan \delta \quad 99.6029''$
 $\delta \quad 92 \quad 23 \quad 02.7''$
 $\delta' \quad -23 \quad 26 \quad 37.7''$
 $\delta - \delta' \quad +60 \quad 99 \quad 90.0''$
 $9.82690''$
 $8.23838''$
 $9.96013''$
 $0.17128''$
 $\sin \delta - \delta' \quad 8196.71''$
 $\delta \quad +54 \quad 008''$
 $\delta \quad -23 \quad 32 \quad 36.9''$
 $\delta \quad 20 \quad 00 \quad 13.77''$
 $\sin \delta \quad -22 \quad 32 \quad 90.21.6''$
 $\delta \quad 20 \quad 00 \quad 12.77''$
 $\delta - \delta' \quad +33''$
 $\delta - \delta' \quad +0.88''$
 $\text{Error of Plate} \quad +0.7$
 $-0.05''$

8690

Star Measures

29

1	12602	17092	19666	15582
13.7	9022	106605	7110	13148
6.7	3026	7065	1010	3240
	592	82	70	90
	<u>133572</u>	<u>133580</u>	<u>6.7558</u>	<u>6.7549</u>
2	17588	16482	19619	16426
18.4	1359693	10978	12082	1393833
30.9	9693	78	7076	28
	82	64	18	12
	<u>18,3992</u>	<u>18,4006</u>	<u>30.7540</u>	<u>30.7512</u>
3	18466	19850	18690	15838
33.9	969291	13628	10934	1703641
25.8	9091	2024	3434	4641
	60	42	32	36
	<u>33.8770</u>	<u>33.8776</u>	<u>25.8200</u>	<u>25.8209</u>
4	15542	18800	17806	15020
35.0	15248	913023	867271	1414039
9.9	4848	1623	7071	3839
	32	10	06	14
	<u>35.0299</u>	<u>35.0319</u>	<u>9.9136</u>	<u>9.9120</u>

Moon Measures.

1	17922	19356
22	14337	1298070
14.7	4238	60
	34	47
	<u>14.3584</u>	<u>14.3622</u>
2	17870	19450
21	7746063	992725
157	66	26
	92	56
	<u>15.0408</u>	<u>15.0470</u>

8690

Star Measures

29

	12602	17092	19666	13482
7	9022	10660	7110	13148
7	3026	7065	1010	3240
	392	82	70	90
	<u>133272</u>	<u>133580</u>	<u>67558</u>	<u>67549</u>

	17588	16482	19619	18926
1	10596	10978	12082	13938
9	9693	78	7076	28
	82	69	18	12
	<u>183992</u>	<u>184006</u>	<u>307570</u>	<u>307512</u>

	18466	19850	18690	15838
9	9692	13628	10939	17036
8	9011	3029	3439	46
	60	42	32	36
	<u>338770</u>	<u>338776</u>	<u>228200</u>	<u>228209</u>

	15542	18800	17806	15020
10	13248	9130	8672	17140
9	4878	16	1071	38
	32	10	06	19
	<u>320299</u>	<u>320319</u>	<u>99136</u>	<u>99120</u>

Moon Measures

	17922	19356
	14337	12980
	4238	60
	39	99
	<u>143589</u>	<u>143622</u>
	17870	19450
	77460	9929
	66	26
	72	56
	<u>150708</u>	<u>150770</u>

Moon Measures.

21

8690

3 16872
20.6 1099897
16.0 96

30
20.5852

4 16852
20.5 1128781
16.4 78
-X 96

20.5566

5 16862
20.7 999094
17 9894
52

20.6862

6
21
17.5

7 15152
21.5 1099997
18 500
48

21.4654

8
22
18.3

9
22.6
18.4
+7

10
23
18.3

16348
12200
19296

48
20.5848

16340
11918
2019
40

20.5580

16287
13160
5055
89

20.6870

15737

9958

58

28

17.5772

17010

12726

26

04

17.5727

16826
1143036
4236
18

21.7622

17290
1973026
22
300

18.2562

17292
1387852
56
98

18.3772

15060
761610
07
62

18.2548

18250
1159086
82
76

18.3772

Moon Measures

21

8690

3	1 8 8 7 2	1 6 3 9 8
5.6	1 0 9 9 8 7	1 2 2 0 0
6.0	9 6	9 2 9 6
	3 0	9 8
	<u>20.5822</u>	<u>20.5848</u>
7	1 6 8 5 2	1 6 3 9 0
0.5	1 2 8 9 8 1	1 1 9 1 8
6.9	7 8	2 0 1 9
7	9 6	4 0
	<u>20.5566</u>	<u>20.5580</u>
5	1 6 8 6 2	1 6 2 8 9
0.7	9 9 9 0	1 2 1 6 0
7	9 8 9 7	5 0 5 5
	5 2	8 9
	<u>20.6862</u>	<u>20.6870</u>

6		1 5 7 3 9	1 7 0 1 0
21		9 9 5 8	1 2 7 2 6
7.5		5 8	2 6
		2 8	0 9
		<u>17.5772</u>	<u>17.5727</u>

2	1 5 1 5 6	1 6 8 2 6
1.5	1 0 9 9 9 7	1 1 9 3 0 3 6
8	5 0 0	4 2
	9 8	1 8
	<u>21.4609</u>	<u>21.4622</u>

5		1 7 2 9 0	1 5 0 6 0
2		1 9 7 3 0 2 6	7 6 1 6 1 0
8.3		2 6	0 9
		3 0 0	6 6
		<u>18.2562</u>	<u>18.2548</u>
9		1 7 2 9 2	1 8 2 5 0
2.6		1 3 8 7 8 5 2	1 1 6 9 0 2 6
8.9		5 6	8 2
7		9 8	7 6
		<u>18.3492</u>	<u>18.3492</u>

10
13
8.3

Plate Constants.

x	y	α	δ
13.3576	6.7551	14 49 23.69	24 17 43.0
18.3999	30.7526	19 52 29.99	20 61 58.2
33.8773	25.8202	15 01 32.58	21 92 0.6
33.0309	9.9128	15 02 18.63	23 51 59.2
4) 100.6652	73.2707	4) 58 104.104.84	88 171.1610
25.1663	18.3102	14 56 26.21	-22 43 25.2
22	18	-1 38.19	-2 27.6
-3.1663	-3.102	14 54 48.07	-22 45 49.8
31 ^s	466 ^s		
-98.14	197.6		

Plate Center $\begin{cases} A = 14 54 48 \\ D = -22 45 50 \end{cases}$

$$\begin{aligned}
 & x - x_0 + 500x \\
 & + 8668 + 6679 = +15397 + 196 = +15493 + 3 = +15496 = -3 \\
 & + 5757 + 9200 = +14657 + 895 = +15549 + 4 = +15553 = +4 \\
 & -2152 + 16939 = +14787 + 751 = +15538 + 7 = +15545 = +3 \\
 & -2258 + 17515 = +15257 + 288 = +15545 + 7 = +15552 = +3 \\
 & 22.59664 \quad 11298 \quad + 475 \quad + 5 \quad 22.2295
 \end{aligned}$$

$$\begin{aligned}
 & y - y_0 + 500y \\
 & + 6196 + 3378 = +9574 - 321 = +9253 + 97 = +9350 = -2 \\
 & -6021 + 15376 = +9354 - 493 = +8911 + 443 = +9354 = +2 \\
 & -3117 + 12910 = +9793 - 816 = +8977 + 372 = +9349 = -3 \\
 & +5102 + 4956 = +10058 - 845 = +9213 + 143 = +9356 = +4 \\
 & 16.31047 + 8155 = -545 \quad + 14.97 \quad - 9352 \\
 & \quad \quad \quad + 235 = 16.1599
 \end{aligned}$$

$$\begin{aligned}
 \text{Tables } a &= 0 & e &= -12 & a-e &= +12 & b+d &= -4.5 \\
 \text{lbs} & & & & & & & = -5
 \end{aligned}$$

$$\begin{aligned}
 D-C & & -500.2 & -502.4 & & & & -0.5
 \end{aligned}$$

Plate Constants

x	y	x	y
13.3576	6.7551	19 49 23.69	29 17 43.0
15.3799	30.7326	19 52 27.99	20 61 58.2
33.8773	25.8202	19 03 32.58	21 92 0.6
33.0309	9 91 28	15 02 18.63	23 51 59.2
100.6652	73 29 07	9 08 104.89	88 171.1610
25.1663	18.3102	19 56 26.21	-22 93 25.2
22	18	-1 38.19	-2 29.6
-3.1663	-3.102	19 59 48.07	-22 95 49.8
31°	46°		
-98° 19	198° 6		

Plate Center $\begin{cases} A = 19 59 48 \\ D = -22 95 50 \end{cases}$

$$\begin{aligned}
 & x - \xi + 500x & + 29.14 & + 1.27 & - 15.999 \\
 & + 8668 + 6679 = +15397 + 196 = +15493 + 3 = +15496 = - \\
 & + 5759 + 9200 = +19659 + 895 = +15549 + 9 = + 53 = + \\
 & + 2152 + 16939 = +19787 + 751 = +15538 + 7 = + 95 = + \\
 & - 2258 + 17515 = +15257 + 288 = +15395 + 7 = + 52 = + \\
 & 22.5936 + 11298'' & + 475'' & + 5'' & 22.2295
 \end{aligned}$$

$$\begin{aligned}
 & y - \eta + 500y & - 29.14 & + 19.74 & - 93.5 \\
 & + 6196 + 3378 = +9574 - 321 = + 9253 + 97 = + 9350 = - 2 \\
 & - 6021 + 15376 = +9359 - 493 = + 8911 + 443 = +9354 = + 2 \\
 & - 3117 + 12910 = +9793 - 816 = + 8977 + 372 = +9349 = - 3 \\
 & + 5102 + 4926 = +10058 - 845 = + 9213 + 143 = +9356 = + 9 \\
 & 16.3104 + 8155'' & - 545'' & + 235'' & = 16.1599
 \end{aligned}$$

-500.2

-514.9

+ 17.9

- 5

10 = 4

23

8690 Times & Etc.

Jun. 23 '13

Exp. to Stars	15	38	15 50
" " Noon	15	44	28.3" 15 44 28.3"
Clock fast		01	45.5"
H Sid Time	15	42	42.9" $\theta - \alpha = +$ 47"
H Long	4	44	31.05"
G. Sid. "	20	27	13.95"
Sid. J. M. Noon	6	02	17.40"
Interval	14	24	56.55"
Reduction		2	21.70"
G. M. T.	14	22	34.85"

From Naut. Alman.

R. A.

Dec

Moon 19 ^h	14	54	40.08"	-22	01	59.2"
Motion in 1 ^m			+ 25.983			- 10.706
" " 22.5808			+ 57.54		-4	01.8
Tabular Place	14	55	37.62"	-22	05	56.0"

Moon's Age 11 days

Parallax	60'	31.2"
Semid.	16	30.9"
R		990.9"
Aug		7.2"
2nd 4		-0.6"
R		997.5"
R		2.1383"
aR		-1018"
(1+a)R		2.0365"
R ²		7.1473

$$934 = 6.4$$

$$a = -500.2$$

$$\frac{24}{-}$$

$$-476.2$$

5690 Lenses etc.

Jan 23/15

Exp. 20.25	15	38	15 30
" " Moon	15	99	28.3 15 99 28.5
Clock fast	-1	45.5	

H Sid Line	15	72	729	8-2-+	97
H Long	7	99	31.05		
G Sid "	20	27	1395		
Sid 1 M Moon	6	2	1790		
Interval	14	27	56.55		
Reduction			21.70		
G M. I.	19	22	3485		

From Nauf. obs	H. A.	Dec
Moon 19	19 59	90.08 -22 01 59.2
Mercury 1 st		10.716
" " 22.5808		107.59 -4 018
Jubular Place	19 25	37.62 -22 05 56.0

Moon's Age 11 days

Thalpa	60	31.2
Moon	16	30.9
"		990.9
Aug		7.2
"		-0.6
"		997
"		2.1383
at		-1018
11416		2.0365
"		91973

939 = 69

2.5000.2

29

- 476.2

3690 Standard Coordinates.

29

Cape No 2020 - mag 5.5

Cape No 2028 - mag 5.7

C Buss 19 48 31.54

Buss 19 51 37.49

I

E

Mean

Pico

+ 52.15

+ 52.45

 α

19 49 23.69

19 52 29.94

A

19 54 78

19 54 78

 $\alpha - A$

- 5 24.31

- 2 18.06

Sinh-A

- 327.29

- 138.06

log "

2.51094 n

2.14007 n

" Cus S

9.95973

9.97005

 γ_0

0.97791 n

0.61736 n

 γ_0

-9.5070

-9.1735

 γ_1

-52

-20

 γ_2

12.4908

17.8545

 γ_3

13.3576

18.3949

 $\gamma - \gamma_3$

+ 8668

+ 5454

C

- 24 13 59.8

- 20 57 52.0

L

E

Mean

Pico

- 3 43.2

- 4 06.2

 δ

- 24 17 43.0

- 20 61 58.2

D

- 22 40 50

- 22 40 50

 $\delta - D$

- 1 31 53.0

+ 1 43 51.8

tan $\delta - D$

- 5513.2

+ 6233.6

log "

3.79171 n

3.79477

 γ_0

1.07256 n

1.12589

tan δ

9.6576 n

9.5849 n

 γ_1

1.9558

1.2347

 γ_2

8.6638 n

7.8730 n

 γ_0

- 11.8184

+ 13.3622

 γ_1

- 0.0461

- 0.0045

 γ_2

6.1355

31.3547

 γ_3

6.7551

30.7526

 $\gamma - \gamma_3$

+ 6196

- 6021

No 40 Standard Coordinates

2.

Capella No 2020 - mag 3.4

Capella No 2028 - mag 3.7

C Dec 19 78 31.57

Dec 49 51 37.79

I

C

Name

Pars

+ 52 15

+ 52 45

19 79 23.69

19 52 29.99

19 57 78

19 57 78

A-A

- 5 29.31

- 2 18.06

Smith-H

- 329.29

- 138.06

Log

2.51099 n

2.14007 n

Log 2

9.95973

9.97005

Log 3

0.97791 n

0.61736 n

Log 4

-9.5090

-9.1935

Log 5

-5.2

-20

Log 6

1249.08

178595

Log 7

1335.76

183999

Log 8

+ 8668

+ 5959

Log 9

C

-29 13 59.8

-20 57 52.0

L

C

Name

Pars

- 3 73.2

- 4 06.2

A

-29 17 43.0

-20 61 58.2

D

-22 90 50

-22 90 50

A-D

- 1 31 53.0

+ 1 40 51.8

Smith-D

-5513.2

+6223.6

Log

3.79191 n

3.79979

Log 2

107256 n

112589

Log 3

96576 n

95899 n

Log 4

19558

12377

Log 5

86638 n

7.8730 n

Log 6

-11.8189

+133622

Log 7

-0.0961

-00075

Log 8

6.1355

313597

Log 9

6.7551

307526

Log 10

+ 6196

- 6021

	ζ	η	$\Delta \zeta$	-5.63	-3
1	+12.09	+8.20	+70	-68 ~	+2 -1
2	+13.25	-8.51	+77	-74 ~	+3 0
3	-9.50	-11.82	-52	+53 ~	+2 0
4	-7.17	+13.36	-20	+23 ~	+3 0
M	+0.23	-1.87	0	-1	= <u>-2</u>

$\Delta \eta$	-5.24	-12.7	$+0$
+42	-43 =	-1 - 2 =	-3 +2
-50	+44 ~	-6 - 3 ~	-9 -7
-66	+61 ~	-5 + 2 ~	-3 +2
+62	-69 ~	-7 + 1 ~	-6 -1
0	+9	-0	= <u>+18</u>

Standard Coordinates				Standard Coordinates			
Cape No 2052-Mg. 6.1				Cape No 2055-Mg. 7.3			
C	15	00	40.83	15	01	26.21	
L			40.80			26.26	
E			40.86				
Mean	15	00	40.83	15	01	26.23	
Prec			+51.75			+52.90	
X	15	01	32.58	15	02	18.63	
A	14	54	78	14	54	78	
X-A		+6	44.58		+7	30.63	
Sin(X-A)			+404.53			450.56	
Log "			2.60695			2.65375	
cos			9.96808			9.96118	
$\frac{1}{\cos}$			1.08227			1.12217	
$\frac{1}{\sin}$			+12.0855			+13.2485	
$\frac{1}{\tan}$			+70			+77	
X			34.0925			35.2562	
X-Y			33.8773			35.0307	
			-2152			-2258	
C	-21	38	34.4	-23	48	28.1	
L			34.8			28.5	
E			34.5				
Mean	-21	38	34.6	-23	48	28.3	
Prec		-3	31.6		-3	30.9	
S	-21	42	0.62	-23	51	59.2	
D	-22	45	50	-22	45	50	
S-D	+1	03	43.8	-1	06	09.2	
tan(S-D)			+3824.2			-3969.7	
log tan "			3.58254			3.59876	
" No			0.91369			0.92991	
Log tan S			9.59999			9.6459	
E			2.1675			2.2443	
$\frac{1}{E}$			881.78			894.36	
No			+8.1976			-8.5096	
N			-0.0657			-0.0878	
H			26.1319			94.026	
Y			25.8202			99.128	
Y-N			-3.117			+5.102	

8690				Standard Coordinates				Cape No 2052-Mg. 7.3				Cape No 2055-Mg. 7.3			
C	15	00	90.83					15	01	26.21					
L			90.80							26.26					
E			90.86												
Mean	15	00	90.83					15	01	26.23					
Pre			+51.75							152.90					
A	15	01	32.58					15	02	18.63					
A	19	59	98					19	59	98					
S-A		+6	49.58						+7	30.63					
sin(X-A)			+904.53							950.56					
log "			2.60695							2.65375					
cos			9.96808							9.96118					
$\frac{c}{10}$			1.08227							1.12217					
$\frac{c}{10}$			+12.0855							+13.2985					
$\frac{c}{10}$			+70							+77					
$\frac{c}{10}$			39.0925							35.2562					
$\frac{c}{10}$			33.8773							35.0307					
X- $\frac{c}{10}$			-2152							-2258					
C	-21	38	39.9					-23	48	28.1					
L			39.8							28.5					
E			39.5												
Mean	-21	38	39.6					-23	48	28.3					
Pre		-3	31.6						-3	30.9					
A	-21	42	06.2					-23	51	59.2					
D	-22	45	50					-22	45	50					
S-D	+1	03	93.8					-1	06	09.2					
tan(S-D)			+3829.2							-3969.7					
log tan "			3.58259							3.59876					
$\frac{c}{10}$			0.91369							0.92991					
log tan "			9.59999							9.67586					
$\frac{c}{10}$			2.1675							2.2943					
$\frac{c}{10}$			88178							89436					
$\frac{c}{10}$			+87946							-85096					
$\frac{c}{10}$			-0.0657							-0.0878					
$\frac{c}{10}$			26.1319							9.9026					
$\frac{c}{10}$			25.8202							9.9128					
$\frac{c}{10}$			-3117							+510.2					

A = +9
B = 1016

8690

Moon's center

	X	$X - X_0$	ΔX	$(X - X_0)^2$	$(X - X_0)(Y - Y_0)$	$O - e$
1	22.0000	-0.5920	-8	0.3514	4.1570	+182
2	21.0000	-1.5920	-5	2.5360	4.1398	+10
3	20.5850	-2.0070	-1	4.0284	4.1241	-197
4	-20.5573	-2.0347	+0	4.1400	4.1400	+12
5	20.6866	-1.9054	+2	3.6298	4.1083	-305
6	21.0000	-1.5920	+3	2.5329	4.1384	-09
7	21.4638	-1.1282	+7	1.2712	4.1367	-21
8	22.0000	-0.5920	+8	0.3495	4.1465	+77
9	22.5920	0.0000	+8	0.0000	4.1510	+122

$$R = 4.1388$$

	Y	$Y - Y_0$	ΔY	$(Y - Y_0)^2$	$(X - X_0)(Y - Y_0)$
1	14.3603	-1.9487	-21	3.8056	1.97
2	15.0439	-1.2651	-13	1.6038	2.31
3	16.0000	-0.3090	-3	0.0957	2.61
4	16.3090	+0.0000	+0	0.0000	2.70
5	17.0000	+0.6910	+7	0.4785	2.90
6	17.5748	+1.2658	+13	1.6035	3.09
7	18.0000	+1.6910	+18	2.8635	3.26
8	18.2553	+1.9465	+21	3.7970	3.43
9	+18.3442	+2.0352	+22	4.1510	3.60

Approximate Center

$$X = 21$$

$$Y = 15.0439$$

$$17.5748$$

$$32.6187$$

$$Y_0 = 16.3093$$

$$Y_{max} = 18.3442$$

$$R = 2.0349$$

$$X_{min} = 20.5573$$

$$Y_0 = 22.5922$$

$$\text{Moon's center } \begin{cases} X_0 = 22.5920 \\ Y_0 = 16.3090 \end{cases}$$

8690

Moon's center

	x	$x - x_0$	Δx	$(x - x_0)^2$	$(x - x_0)(y - y_0)$	$y - y_0$
1	22.0000	-0.5920	-8	0.3514	4.1570	+182
2	21.0000	-1.5920	-5	2.5360	4.1398	+10
3	20.5850	-2.0070	-1	4.0289	4.1241	-197
4	-20.5573	-2.0347	+0	9.1400	4.1400	+12
5	20.6866	-1.9054	+2	3.6298	4.1083	-305
6	21.0000	-1.5920	+5	2.5329	4.1384	-39
7	21.9638	-1.1288	+7	1.2742	4.1367	-21
8	22.0000	-0.5920	+8	0.3495	4.1465	+77
9	22.5920	0.0000	+8	0.0000	4.1510	+122

$$R = 9.13818 = 9.1388$$

	y	$y - y_0$	Δy	$(y - y_0)^2$	L
1	19.3603	-1.9487	-21	3.8056	197
2	15.0439	-1.2651	-13	1.6038	231
3	16.0000	-0.3090	-3	0.0957	261
4	16.3090	+0.0000	+0	0.0000	270
5	17.0000	+0.6840	+7	0.4785	290
6	17.5798	+1.2658	+13	1.6055	309
7	18.0000	+1.6910	+18	2.8655	326
8	18.2555	+1.9465	+21	3.7970	343
9	+18.3992	+2.0352	+22	4.1510	360

Approximate center

$$x = 21$$

$$y = 15.0439$$

$$17.5798$$

$$32.6187$$

$$y_0 = 16.3093$$

$$y_{max} = 18.3992$$

$$R = 2.0349$$

$$x_{min} = 20.5573$$

$$x_0 = 22.5922$$

$$\text{Moon's center } \begin{cases} x_0 = 22.5920 \\ y_0 = 16.3090 \end{cases}$$

Formation of Normals.

1	+ 1.15	- 107.5	+ 50	- 359.5	+ 166
2	+ 2.02	- 15.9	+ 135	- 12.9	+ 108
3	+ 0.62	+ 296.0	+ 171	+ 45.5	+ 26.5
4	- 0.00	- 29.5	+ 172	+ 0.00	- 0
5	- 1.32	+ 583.0	+ 162	- 210.0	- 58.5
6	- 2.02	+ 6.5	+ 135.5	- 5.0	- 108
7	- 1.91	+ 23.5	+ 96	- 35.5	- 193.5
8	- 1.15	- 45.5	+ 50	+ 150.0	- 166
9	- 0.00	- 0.00	+ 0	+ 247.5	- 172
	+ 3.79	+ 909.0	971.5	+ 443.0	
	- 6.80	- 193.4		- 617.7	
	- 2.61	+ 715.6		- 174.7	
		+ 971.5		+ 337.5	
		+ 1687.1		+ 162.8	

New
0-e

0.138

a -10
b +2
c -16

a	b	c	
+ 6	- 4	- 19	+ 15.9
+ 16	- 2	- 2	+ 63
+ 20	- 1	+ 3	- 70
+ 20	+ 0	+ 5.4	+ 92
+ 19	+ 1	+ 5.4	- 233
+ 16	+ 2	+ 3.4	+ 53
+ 11	+ 3	- 2	+ 26
+ 6	+ 4	- 6	+ 101
+ 0	+ 4	- 12	+ 118

$$-2.61 + 18.80 = +16.19$$

$$+ [] - 0.36 = -1.58$$

$$+ 18.07 = +2.52$$

$$+ 18.87 = -11.77 + 0.36 = -11.08$$

5690

Conditional Equations.

- 85'

27

b-c

1	- 0.59	- 1.95	= + 182	- 22 + 8	= - 14	+ 168
2	- 1.59	- 1.27	= + 10	- 60 + 5	= - 55	+ 65
3	- 2.01	- 0.31	= - 147	- 75 + 1	= - 74	- 73
4	- 2.03	+ 0.00	= + 12	- 76 - 0	= - 76	+ 88
5	- 1.91	+ 0.69	= - 305	- 71 - 3	= - 68	- 237
6	- 1.59	+ 1.27	= - 04	- 60 - 5	= - 55	+ 51
7	- 1.13	+ 1.69	= - 21	- 42 - 7	= - 49	+ 28
8	- 0.59	+ 1.95	= + 77	- 22 - 8	= - 30	+ 107
9	- 0.00	+ 2.03	= + 122	- 0 - 8	= - 8	+ 130

$$+ 18.84 - 2.61 = + 16.87.1 \quad - 11.79$$

$$- 2.61 + 18.40 = + 16.2.8 \quad + 9.10$$

$$+ 2.61 - .36 = + 237.5 \quad + 0.19 \Delta$$

$$+ 18.09 = + 397.3 \quad b = + 21.6$$

$$+ 18.84 = + 16.87.1 + 56.9 = 1773.5 \quad a = + 92.5$$

$$- 0.59 \Delta$$

Err 4 R 2.09 0

c b-c

- 2RC = - 0.82	+ .94	- 55	- 42	= - 13	+ 110
	- 75	- 147	- 27	= - 120	+ 45
$\Delta b = - 0''.11$	$\Delta \delta = - 0''.1$	- 232	- 186	- 7	= - 173
		- 73	- 188	+ 0	= - 188
$\Delta a = + 0''.98$	$\Delta \alpha = + 0''.02$	- 390	- 176	+ 15	= - 161
		- 89	- 147	+ 27	= - 120
		- 106	- 109	+ 36	= - 68
		- 8	- 55	+ 42	= - 13
		+ 37	- 0	+ 44	= + 44
					- 7
					+ 306
					- 313

Arc Measured 163°

$$\frac{p}{h} = .21$$

$$\frac{\Sigma v}{h} = - .8$$

$$\frac{- .8}{.21} = - 3.8$$

$$\Delta R = -.5$$

$$\text{Corr} = +.2$$

$$\Delta R = -.7$$

7690

Conditional Equations.

27

0-C

1	- 0.59	- 1.95	= + 182	- 22 + 8	= - 14	+ 168
2	- 1.59	- 1.27	= + 10	- 60 + 5	= - 55	+ 65
3	- 2.01	- 0.31	= - 147	- 75 + 1	= - 74	- 73
4	- 2.03	+ 0.00	= + 12	- 76 - 0	= - 76	+ 88
5	- 1.91	+ 0.69	= - 305	- 71 - 3	= - 68	- 237
6	- 1.59	+ 1.27	= - 09	- 60 - 5	= - 55	+ 51
7	- 1.13	+ 1.69	= - 21	- 92 - 7	= - 99	+ 28
8	- 0.59	+ 1.95	= + 77	- 22 - 8	= - 30	+ 107
9	- 0.00	+ 2.03	= + 122	- 0 - 8	= - 8	+ 130

$$+ 18.89 - 2.61 = + 16.87.1$$

$$- 2.61 + 18.90 = + 16.28$$

$$+ 2.61 - .36 = + 237.5$$

$$+ 18.09 = + 397.3$$

$$b = + 291.6$$

$$+ 18.89 = + 16.87.1 + 56.9 = 1793.4$$

$$ca = + 92.5$$

0

C 0-C

+ 97	- 55	- 92	= - 13	+ 110
- 75	- 147	- 27	= - 120	+ 95
- 232	- 186	- 7	= - 193	+ 38
- 73	- 188	+ 0	= - 188	+ 115
- 390	- 176	+ 27	= - 161	- 229
- 89	- 197	+ 27	= - 120	+ 31
- 106	- 109	+ 36	= - 68	- 38
- 8	- 55	+ 92	= - 13	+ 5
+ 37	- 0	+ 99	= + 99	- 7
			+ 306	- 313

Arc Measured 163°

$$\frac{P}{h} = .21$$

$$\frac{\Sigma V}{h} = -.8$$

$$\frac{-.8}{.21} = -3.8$$

$$\Delta P = -.5$$

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Moon's Mean Position.

28

$$\begin{array}{r} \chi_0 = 22.5920'' \\ + 86'' \\ \hline 22.5986'' \end{array}$$

$$\begin{array}{r} \eta_0 = 16.3090'' \\ + 17'' \\ \hline 16.3107'' \end{array}$$

From Plate Constants

$$\chi = 22.2295''$$

$$\eta = 16.1597''$$

$$\bar{\zeta} = +1.2295''$$

$$\eta = -1.8406''$$

$$\begin{array}{r} \log \bar{\zeta} \quad 9.35078'' \\ \log \delta \quad 9.96702'' \\ \quad 8.50727'' \\ \quad 0.87952'' \end{array}$$

$$\begin{array}{r} \log \tan \delta \quad 9.6278'' \\ \quad \eta \quad 8.7016'' \\ \quad \zeta \quad 7.0537'' \\ \quad \quad 5.3828'' \end{array}$$

$$\chi - A \quad + 7.58''$$

$$\eta_1 = .0000''$$

$$A \quad 14 \quad 54 \quad 48''$$

$$\eta_0 = -1.8406''$$

$$\chi_0 \quad 14 \quad 54 \quad 55.58''$$

$$\log \eta_0 \quad 0.26496''$$

$$\text{Red} \quad + 3.27''$$

$$\begin{array}{r} 7.33113'' \\ 2.93384'' \end{array}$$

$$\delta' \quad 14 \quad 54 \quad 58.85''$$

$$\delta - D \quad - 14 \quad 18.6''$$

$$D \quad - 22 \quad 45 \quad 50''$$

$$\delta_0 \quad - 23 \quad 00 \quad 08.6''$$

$$\text{red} \quad - 20.2''$$

$$\delta' \quad - 23 \quad 00 \quad 28.8''$$

8690

Moons Mean Position.

28

$$\begin{array}{r} 20 = 22.5920 \checkmark \\ + 96 - \\ \hline 22.5966 \checkmark \end{array}$$

$$\begin{array}{r} \eta_0 = 16.3090'' \\ + 17'' \\ \hline 16.3098'' \end{array}$$

From Plate Constants

$$X = 22.2285 \checkmark$$

$$y = 16.15 - 88 -$$

$$\bar{z} = +.2295$$

$$\eta = -1.870 \text{ eV}$$

Qty	9,35078
Cost	996702 ✓
	850729 -
	0.88952 -

Crystalline S	9	6	2	78	h
" 3 ²	8	7	2	16	h
	7	0	5	39	h
	5	9	7	28	h

$$y - A \quad + \quad 7.68$$

h, - 0000 -

A	19	59	98	✓
---	----	----	----	---

no - 1,8908

X_0 14 54 55.80 -

log h = 0.26994

Red + 3.27 ✓

733115 -
293384 n - 8586

5' 19 5' 9 5' 8 8 3

$\phi - D \quad - 14 \quad 18.6$

D - 22 95 50

20 - 23 00 086

red - 20.

$\delta' - 23 \quad 00 \quad 28$

$$\begin{array}{r}
 19 \quad 96 \quad 13.54 \\
 \underline{10.38} \\
 + 3.16
 \end{array}$$

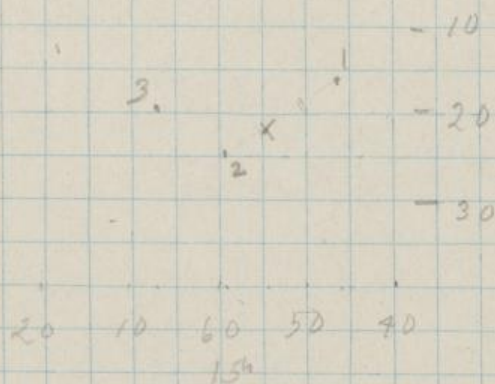
$$\begin{array}{r}
 -15 \quad 91 \quad 40.0 \\
 \underline{21.05} \\
 + 18.95
 \end{array}$$

$$\begin{array}{r}
 17 \quad 59 \quad 8.86 \\
 \underline{5.50} \\
 + 3.36
 \end{array}$$

$$\begin{array}{r}
 -24 \quad 56 \quad 75.2 \\
 \underline{54.67} \\
 - 20.56
 \end{array}$$

$$\begin{array}{r}
 15 \quad 07 \quad 25.67 \\
 \underline{22.36} \\
 + 3.31
 \end{array}$$

$$\begin{array}{r}
 -19 \quad 28 \quad 33.9 \\
 \underline{15.06} \\
 - 18.84
 \end{array}$$



8690

Reduction to Apparent Place

29

$$\begin{aligned}
 &= 42^{\circ} 49.5' \\
 H + \alpha & 2.6 \quad 89.3' \\
 H & 71 \quad 59.9' \\
 \alpha & 14 \quad 54.9' \\
 G & 22 \quad 19.7' \\
 G + \alpha & 37 \quad 14.6' \\
 &= 198^{\circ} 39.0'
 \end{aligned}$$

$$\begin{aligned}
 \log \cos G + \alpha & 9.9765'' \\
 g & 1.1828'' \\
 \sin & 9.5050'' \\
 \tan & 9.6279'' \\
 & 8.8239
 \end{aligned}$$

$$\begin{aligned}
 \log g & 1.1593'' \\
 g & 9.1398
 \end{aligned}$$

$$\begin{aligned}
 f & + 2.133' \\
 g & + 0.138' \\
 h & + 0.998' \\
 & + 3.269
 \end{aligned}$$

$$\delta - 23 \quad 00 \quad 86'$$

$$\begin{aligned}
 \log \cos \delta & 9.9690' \\
 & 9.3483' \\
 & 9.2783'
 \end{aligned}$$

$$\begin{aligned}
 \log \sin \delta & 9.5919'' \\
 \cos H + \alpha & 9.8689' \\
 h & 1.3111' \\
 \sin H + \alpha & 9.8282' \\
 \sec \delta & 0.0360' \\
 & 8.8239
 \end{aligned}$$

$$\begin{aligned}
 h' & 0.7719'' \\
 h & 9.9992
 \end{aligned}$$

$$\begin{aligned}
 g' & -14.938' \\
 h' & -5.915' \\
 & +0.190' \\
 & -20.158
 \end{aligned}$$

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Reduction to Apparent Place

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$$\begin{aligned}
 &= 42^{\circ} 49.5' \\
 H+x &26 \quad 59.3' \\
 H &11 \quad 29.9 \\
 L &14 \quad 34.9 \\
 G &22 \quad 19.7 \\
 G+x &37 \quad 19.6 \\
 &= 198^{\circ} 39.0'
 \end{aligned}$$

$$\begin{aligned}
 \log \cos G+x &9.9765 \bar{n} \\
 g &1.1828 \\
 \sin &9.5059 \bar{n} \\
 \tan &9.6279 \bar{n} \\
 &8.8239
 \end{aligned}$$

$$\begin{aligned}
 \log g &1.1598 \bar{n} \\
 g &9.1398
 \end{aligned}$$

$$\delta - 23 \quad 00 \quad 92$$

$$\begin{aligned}
 \log \cos &9.9690 \\
 &9.3389 + \\
 &9.3024
 \end{aligned}$$

$$\begin{aligned}
 \log \cos &9.5919 \bar{n} \\
 \cos H+x &9.8688 - \\
 L &1.3111 \\
 \sin H+x &9.8282 - \\
 \sec &0.0360 - \\
 &8.8239
 \end{aligned}$$

$$\begin{aligned}
 h' &0.7779 \bar{n} \\
 L &9.7992
 \end{aligned}$$

$$\begin{aligned}
 f &+2.133 \\
 g &+1.0138 \\
 h &+0.898 \\
 &+3.310
 \end{aligned}$$

$$\begin{aligned}
 g' &-14.938 - \\
 h' &-5.915 - \\
 &+0.190 - \\
 &20.158
 \end{aligned}$$

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Lunar Parallax

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$$\begin{array}{rcl}
 \alpha & 17 & 54 & 58.85^{\circ} \\
 \delta & 15 & 42 & 42.9^{\circ} \\
 \delta - \alpha & + & 77 & 77.05^{\circ} \\
 = & +11 & 55 & 00.75^{\circ} \\
 \frac{1}{2} \delta - \alpha & + & 7 & 59.78^{\circ} \\
 \frac{1}{2} & 11 & 50 & 58.76^{\circ}
 \end{array}$$

$$\begin{array}{r}
 9.95727^{\circ} \\
 0.00000^{\circ} \\
 0.00936^{\circ} \\
 \hline
 9.96663^{\circ}
 \end{array}$$

$$\gamma \quad 42 \quad 47 \quad 57.6^{\circ}$$

$$\delta \quad -23 \quad 00 \quad 28.8^{\circ}$$

$$\gamma - \delta \quad 65 \quad 48 \quad 26.4^{\circ}$$

$$\begin{array}{r}
 9.82640 \\
 8.27560 \\
 9.96008 \\
 0.16785^{\circ} \\
 \hline
 8.19993
 \end{array}$$

$$\delta - \alpha \quad +59 \quad 28.7^{\circ}$$

$$\delta \quad -22 \quad 06 \quad 00.1^{\circ}$$

$$\text{ann Eph} - 22 \quad 05 \quad 56.0^{\circ}$$

$$\text{O-C} \quad -7.1^{\circ}$$

$$\text{Curv. of Plate} \quad +0.7$$

$$2^{\text{nd}} \text{ Order Ref} \quad +0.7$$

$$\text{Irr Corr} \quad -0.1$$

$$\delta \quad -22 \quad 05 \quad 59.8^{\circ}$$

$$\text{O-C} \quad -3.8^{\circ}$$

$$\pi \quad 60' \quad 31.2''$$

$$\begin{array}{r}
 9.86913^{\circ} \\
 8.27560^{\circ} \\
 9.31491^{\circ} \\
 0.03314^{\circ} \\
 \hline
 7.86278^{\circ}
 \end{array}$$

$$\delta - \alpha = +09 \quad 58.68^{\circ}$$

$$= +0 \quad 39.91^{\circ}$$

$$\alpha \quad 17 \quad 55 \quad 38.76^{\circ}$$

$$\alpha \quad 17 \quad 55 \quad 37.62^{\circ}$$

$$\text{O-C} \quad +1.14^{\circ}$$

$$-1.01$$

$$+0.02$$

$$\alpha \quad 17 \quad 55 \quad 38.78^{\circ}$$

$$+1.16$$

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Lunar Parallax

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$$\begin{array}{r}
 \lambda' \quad 19 \quad 59 \quad 58.85'' \\
 \mu \quad 15 \quad 42 \quad 92.9'' \\
 \delta - \lambda' \quad + 97 \quad 99.05'' \\
 = \quad + 11 \quad 55 \quad 00.75'' \\
 \lambda - \lambda' \quad + 9 \quad 59.79'' \\
 \mu \quad 11 \quad 50 \quad 58.98''
 \end{array}$$

$$\begin{array}{r}
 9.95727'' \\
 0.00000'' \\
 0.00936'' \\
 \hline
 9.96663''
 \end{array}$$

$$\lambda \quad 92 \quad 97 \quad 58.6''$$

$$\delta \quad -23 \quad 00 \quad 29.8''$$

$$\lambda - \delta \quad 65 \quad 98 \quad 26.9''$$

$$\begin{array}{r}
 9.82670'' \\
 8.57461'' \\
 9.96008'' \\
 0.16785'' \\
 \hline
 8.19993''
 \end{array}$$

$$\delta - \delta' \quad + 59 \quad 28.7''$$

$$\delta \quad -22 \quad 06 \quad 00.7''$$

$$\text{ann Eph} - 22 \quad 05 \quad 56.0''$$

$$10-C$$

$$- 9.4''$$

$$10-C$$

$$+ 1.19''$$

$$\text{Curv. of Plate} \quad + 0.7$$

$$- 1.01$$

$$\pi \quad 60' \quad 31.2''$$

$$\begin{array}{r}
 9.86913'' \\
 8.24560'' \\
 9.31991'' \\
 0.03517'' \\
 \hline
 7.96278''
 \end{array}$$

$$\lambda - \lambda' = + 09 \quad 58.89''$$

$$= + 0 \quad 39.91''$$

$$\lambda \quad 19 \quad 55 \quad 38.76''$$

$$\lambda \quad 19 \quad 55 \quad 37.62''$$

