

KG

11366

v. 1001

CXLIX

149



Plate	Date	Page
10692	Apr 10-1916	1
10693	"	24
10701	Apr 13-1916	21

1
12
28

2
28
9.6

3
30
13

1
21
13

2
21
18

2
20
14

10692

Star Measures

Ln. 3

1

1	19730	20098	19752	18512
12.3	16512	12960	15596	12659
28.7	08	68	6.00	55
	22	28	56	08
	<u>12.2918</u>	<u>12.2930</u>	<u>28.4156</u>	<u>28.4175</u>

2	20670	19796	20180	20969
28.6	19966	15728	19778	15880
9.6	68	26	50	78
	592	86	86	757
	<u>245633</u>	<u>24.5635</u>	<u>95437</u>	<u>9.5720</u>

3	19150	20590	19562	20002
30.0	19010	10732	10108	19970
13.9	12	30	12	38
	40	90	58	12
	<u>30.0139</u>	<u>30.0141</u>	<u>13.9778</u>	<u>13.9736</u>

Moon Measures

1	17	19892	19850
21.0		16236	13528
13.9		32	28
		90	76
		<u>13.3657</u>	<u>13.3680</u>

2
21.0
13.9

2	17791	20316
20.3	15308	12530
14	00	28
	99	08
	<u>20.2185</u>	<u>20.2219</u>

Poor Image

10692		Star Measures		Ln 3	
1	19930	20098	19752	18512	1
12.3	16512	12960	15596	12659	
28.9	08	68	600	" 55"	
	22	28	56	08	
	<u>12.2918</u>	<u>12.2930</u>	<u>28.9156</u>	<u>28.9195</u>	
2	20610	19796	20180	20969	
29.6	19966	15728	19798	15880	
9.6	68	26	50	78	
	592	86	86	959	
	<u>245633</u>	<u>24.5635</u>	<u>95439</u>	<u>9.5920</u>	
3	19150	20590	19562	20002	
30.0	19010	10732	10108	19990	
13.9	12	30	12	38	
	90	90	58	12	
	<u>30.0139</u>	<u>30.0191</u>	<u>13.9998</u>	<u>13.9936</u>	

Moon Measures

1	179	19892	19850
21.0		16236	13328
13.9		32	28
		90	96
		<u>13.3652</u>	<u>13.3680</u>

2
21.0
13.9

2	17791	20316
20.3	15308	12530
19	00	28
	99	08
	<u>20.2182</u>	<u>20.2219</u>

10692

Moon Measure

2

3

20.0

19.7

19992

15240

46

52

14.4203

19799

13968

52

26

14.9225

4

20626

20680

19.9

11792

19998

15

92

92

7

20

78

19.8829

19.8815

5

18669

19782

19748

20.0

17272

12796

16700

15.5

68

96

692 slant

69

1399

15.6986

15.6998

6

18669

20232

20.2

17272

11614

16

68

12

69

34

20.1399

20.1379

7

21.0

16.7

19930

12389

78

34

16.7552

19326

16860

62

30

16.7537

8

22

16.9

74

18597

9758

60

36

16.9078

19770

18899

53

72

16.9080

Star 7,

33.7

19868

19868

19892

19972

7.2

15381

19366

18206

17150

83

67

10

82

68

70

9898

68

33.7886

33.7896

7.1687

7.1628

10692

Moon Measure

2

3
20.0
19.9

19992
15290
96
52
199203

19799
13968
52 sl.
26
199225

9 20626 26680
19.9 11792 19998
15 92 92
X- 20 78
198829 198815

5 18669
20.0 17272
15.5 68
69
1399

19782
12796
96
156986

19788
16700
692 slant
156998

6 18669 20232
20.2 17272 11619
16 68 12
69 39
20.1399 20.1379

7
21.0
16.7

19930 19326 19378
12389 16860
78 62
9039 30
167552 167538

8
22
16.9
9+

19599 19770
9958 18899
60 53
36 72
169078 169080

Star 9.

33.9 19868
9.2 15381
83
68
339986

19868 19892
19366 18206
67 10
70 9898
339996 91687

19972
11150
92
68
91678

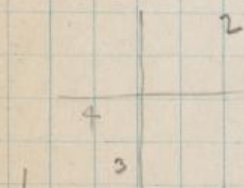
Curv. Corr.

z	η	Δz	-2.13	$+0.74$	$+15$
+12.03	-14.93	+10	-25 = -15	-10 = -25	
-10.14	+11.06	-55	+21 = -34	+8 = -26	
+2.71	-13.97	+13	-6 = +7	-11 = -9	
+8.95	-7.13	+18	-18 = 0	-3 = -3	

$$M = -0.25 \quad 0 \quad -2 \quad +13 = +0.04$$

$\Delta \eta$	-2.64	$+5.23$	-7
-123	+38 = -85	+69 = -21	
+58	-29 = +29	-52 = -23	
-14	+36 = +22	+19 = +36	
-18	+10 = -8	+99 = +36	

$$M = -2.92 + 8 \quad -1 \quad = -0 = -0.0$$



10692

Times Etc

3

Apr. 10-1916

Exp. to Stars	9	19		9	31
" " Moon	9	25	16.9	9	25 17.1
Clock fast		5	37.3		

H. Sid. Time	9	19	42.7	$\delta - \alpha = +1^h$	29.5
H. Long.	4	77	31.05		
G. Sid. T.	17	07	13.75		
Sid. T. M. Noon	1	13	31.72		
Interval	12	50	72.03		
Reduction		2	6.26		
G. M. T.	12	48	35.77		

From Naut Alman.		R. G.		Dec.
Moon 12h	7	48	35.28	+21 59 09.5
Motion in 1m			20.21	- 7.973
" " 78.5962	1	40.21		- 6 27.5
Tabular Place	7	50	15.99	+21 52 37.0

Moon's Age $\frac{7.8}{28.8}$ days

Parallax	57	25.07
Semid.	17	51.3
R.		891.3
Aug.		12.7
Ln. (3)		-0.3
R.		903.7
R.		1937.2
AR.		-925
(1+AR)		1844.7
PR		3402.9

934 13.9

$a = 501.5$
 $+ 27$
 477.5

pg 1117 mg. 6.3

7 59 58.98

58.53

58.47

7 59 58.99

56.00

7 55 59.99

7 99 16

+ 6 38.99

+ 398.93

2 600.35

997.286

1080.95

1203.50

+ 10.2

3907.52

3349.91

- 596.1

+ 20 05 25.9

25.3

25.1

20 05 25.3

- 2 39.8

20 02 50.5

21 55 0

+ 1 52 9.5

- 6731.9

- 322813

1157.28

956.22

2160.9

8776.5

- 17930.3

+ 605.98

3.6295

9.1679

+ 538.9

10692

Times etc

3

Apr. 10-1916

Epp. to Stars	9	19		9	31
" " Moon	9	25	16.9"	9	25 17.1"
Clock fast		5	39.3"		
H. Sid. Time	9	19	42.7"	8-x = +1 ^h	29.5"
H. Long.	7	49	31.05"		
g Sid T.	19	09	13.75"		
Sid T. M. Moon	1	13	31.72"		
Interval	12	50	22.03"		
Reduction		2	6.26"		
g M. T.	12	48	35.77"		

From Naut Alm.		R. 4		Dec.	
Moon 12 ^h	7	48	35.28"	+21	59 09.5"
Motion in 1 ^m			20621"		- 7.175"
" 78.5962		1	90.21"	-6	27.5"
Tabular Place	7	50	15.99"	+21	52 37.0"

Moon's Age ^{7.8} 24.8 days.

Parallax	5.7	25.07"
Semidi.	1.9	51.3"
R.		891.3"
Aug.		12.7"
Im. (3)		-0.3"
R.		90.27"
R.		1.9372"
aR.		-9.25"
(1+a)R		1.8997"
PR		3.9029"

939 13.9"

$$\begin{array}{r}
 a = 301.5 \\
 + 2.9 \\
 \hline
 477.5
 \end{array}$$

11/17

m. 6.3

7 57 58.98

58.53

58.47

7 57 58.79

56.00

7 55 57.79

7 79 16

+ 6 38.79

+ 398.73

2,60035

997286

108075

+ 120350

+ 102

380752

337791

- 5961

+20 05 25.7

25.3

25.1

20 05 25.3

- 2 39.8

20 02 50.5

21 55 0

+ 1 52 9.5

- 6731.9

3,82813

1,13928

95622

2,1609

8,7765

- 177303

+ 0.0598

3.6295

7.1679

+ 5384

10692			Standard Coordinates			7.		
Cape No 1091 - Mg 6.3			Cape No 1107 - Mg 5.3			Cape No 1117 - Mg 8.5		
C	7	92 37.91	7	99 49.81	7	53	01.57	
L		34.97	4	49.80			01.61	
E		37.89		49.78			01.57	
Mean	7	42 37.92	7	99 49.80	7	53	01.56	
Prec		+57.75 ^h		+56.06 ^h			56.53 ^h	
α	7	43.32.37	7	50 45.86	7	53	58.09	
A	7	49 16	7	49 16	7	49	16	
$\alpha-A$		-5 43.33		+1 29.86		+4	42.09	
Sen($\alpha-A$)		-373.59		+89.86			+282.07	
Log "	2.53	604 ^h	1.95	357 ^h	2.45	035 ^h		
" loss	9.96	289 ^h	9.97	269 ^h	9.96	903 ^h		
" γ_0	1.00	617 ^h	0.43	350	0.92	662		
γ_0	-10.19	30	2.71	33 ^h	8.47	54 ^h		
γ_1		-55 ^h		+13 ^h		+18 ^h		
γ	11.85	15	27.71	46	30.47	72		
χ	12.29	27 ^h	24.56	37 ^h	30.01	40 ^h		
$\chi-\gamma$	+4.40	9 ^h	-1.51	2 ^h	-9.33	2 ^h		
C	+23	23 18.9	+20	08 53.0	+21	25 25.1		
L		18.1		53.0		24.8		
E		18.3		52.5		25.2		
Mean	23	23 18.9	20	08 52.8	21	25 25.0		
Prec		-2 19.2 ^h		-2 29.0 ^h		-2 32.7 ^h		
δ	23	20 59.2	20	06 23.8	21	22 52.6		
D	21	55 0	21	55 0	21	55 0		
$\delta-D$	+1.25	59.2	-1	48 36.2	-32	07.4		
tans-D	+3.16	0.3	-6.51	8.7	-19.27	6		
Log "	3.71	267 ^h	3.81	414 ^h	3.28	499 ^h		
" γ_0	1.04	382 ^h	1.14	529 ^h	0.61	614 ^h		
Log tans	9.63	52 ^h	9.56	36 ^h	9.59	28 ^h		
" γ_0	2.01	17	0.86	70	1.85	32		
" γ_1	8.70	0.3	7.48	30	8.49	9.4		
γ_0	11.06	15 ^h	-13.97	29 ^h	-4.13	18 ^h		
γ_1	+0.05	02 ^h	+0.00	39 ^h	+0.03	16 ^h		
γ	29.11	17 ^h	4.03	04 ^h	13.89	98 ^h		
γ	28.71	50 ^h	4.57	27 ^h	13.94	92 ^h		
$\gamma-\gamma_1$	-6.96	67 ^h	+5.12	6 ^h	+7.77	7 ^h		

10692				Standard Coordinates				7.			
Cape No 1091 - m 96.3				Cape No 1107 - m 95.3				Cape No 1117 - m 85.5			
C	7	92	39.91	7	99	99.81	7	53	01.59		
L			39.97			99.80			01.61		
E			39.89			99.78			01.59		
Mean	7	92	39.92	7	99	99.80	7	53	01.56		
Prece			+57.95			+56.06			56.53		
x	7	93	32.37	7	50	95.86	7	53	58.09		
A	7	99	16	7	99	16	7	99	16		
x-A			-5.4363			+1.2986			+9.9209		
sin(x-A)			-393.59			+89.86			+282.07		
log..	2.53	464	"	1.95	367	"	2.95	035	"		
cosd	9.96	249	"	9.97	269	"	9.96	903	"		
..50	1.00	647	"	0.93	359	"	0.92	662	"		
To	-10.19	82	"	2.47	33	"	8.99	59	"		
5'			-55			+13			+18		
5'	11.85	15	"	29.71	96	"	30.99	72	"		
1	12.29	29	"	29.56	39	"	30.01	90	"		
x-5'			+9809			-1512			-9332		
C	+23	23	18.9	+20	08	53.0	+21	25	25.1		
L			18.1			53.0			24.8		
E			18.3			52.5			25.2		
Mean	23	23	18.9	20	08	52.8	21	25	25.0		
Prece			-2 19.2			-2 29.0			-2 32.9		
S	23	20	59.2	20	06	23.8	21	22	52.6		
D	21	55	0	21	55	0	21	55	0		
S-D	+1	25	59.2	-1	98	36.2		-32	07.9		
tand-D			+3 160.3			-6 518.9			-19 27.5		
log..	3.71	267	"	3.81	919	"	3.28	999	"		
..40	1.07	382	"	1.19	529	"	0.61	619	"		
log tand	9.63	52	"	9.56	36	"	9.59	28	"		
..50	2.01	17	"	0.88	70	"	1.85	32	"		
..40	8.70	03	"	7.98	80	"	8.99	99	"		
no	11.06	15	"	-13.97	29	"	-7.13	18	"		
h.	+0.05	02	"	+0.00	39	"	+0.03	16	"		
h	29.11	17	"	7.03	04	"	13.89	98	"		
h	28.91	50	"	7.57	27	"	13.94	92	"		
h-h			-69.67			+5.12			+7.77		

10692 x	Plate Center + Constants						5
12,2929	γ	α	δ				
29,5639	28.7150	7 43	32.7	23	20	5.9	
30,0190	7,5727	7 50	43.3	20	0.6	27	
	13,9772	7 53	58.1	21	2.2	5.3	
3) 66.8698	46,9019	3) 21 176	133.8	64	88	136	
22,2899	15,6339	7 49	27.6	21	36	95.3	
22	18		-9.0		+18	23.7	
-1,2899	+2,3661	7 49	15.6	21	55	090	
31 ⁵	466.5						
-9.0	+18 23.7	Plate Center		7 49	16.		
				21 55	00		
33,4491	4,1679						

$\pi - \gamma$	+500x	+70.4	+105x	-10857
+9409 + 6196	= +10635	+289	= +10839	+18 = +10857
-1512 + 12287	= 10775	+95	= 10820	+37 = 57
-9332 + 15007	= 10675	+139	= 10817	+95 = 59
-5961 + 16723	= 10769	+92	= 10806	+50 = 56
21,7290 + 10,868	+151	+33		21,7981

$\gamma - \eta$	+500y	-7.7x	+2.57	-7217
-6967 + 22207	= +7290	+95	= +7195	+71 = +7216
+5126 + 2271	= 7397	-189	= 7208	+11 = 7219
+998 + 6972	= 7916	-231	= 7185	+35 = 7220
+5389 + 2089	= 7468	-263	= 7205	+10 = 7215
15,0615 + 7531	-167	+38		15,0800

Tables a = +.7 c = +.7 a - c = 0 b + d = -0.9
 Obs = -501.5 = -502.5 = +1.0 = -2.3

O - C -502.2 -503.2 -1.4

10692 x	Plate center + constants							5
12.2929	y	x	d					
29.5639	28.7150	7 93	329	23	20	59		
30.0190	9.3727	7 50	73.3	20	06	27		
	13.7992	7 53	58.1	21	22	53		
3) 66.8698	96.9019	3) 21	176	133.4	69	98	136	
22.2899	15.6339	7 79	27.6	21	36	95.3		
22	18		-9.0		+18	23.7		
- .2899	+ 23661	7 79	13.6	21	55	09.4		
35	966.5							
- 9.0	+18 237	Plate	7 79	16.				
		center	21 55	00				

$$\begin{array}{rclcl}
 x - y & + 500x & + 10.4 & + 1.04 & - 10857 \\
 + 9907 + 6196 & = 110355 & + 249 & = 110839 & + 15 = + 10857 & 0 \\
 - 1512 + 12287 & = 10775 & + 95 & = 10820 & + 37 = & 57 & 0 \\
 - 9332 + 15007 & = 10675 & + 139 & = 10819 & + 95 = & 59 & + 2 \\
 - 5961 + 16725 & = 10764 & + 92 & = 10806 & + 30 = & 56 & - 1 \\
 21.7290 + 10.867 & & + 151 & + 23 & & 21.7981
 \end{array}$$

$$\begin{array}{rclcl}
 y - y & + 500y & - 7.71 & + 2.04 & - 7217 \\
 - 6967 + 17207 & = 7290 & - 95 & = 7195 & + 71 = + 7216 & - 1 \\
 + 5126 + 2271 & = 7397 & - 159 & = 7208 & + 11 = 7219 & + 2 \\
 + 999 + 6972 & = 7916 & - 231 & = 7185 & + 35 = 7220 & + 3 \\
 + 5389 + 2089 & = 7468 & - 263 & = 7205 & + 10 = 7215 & - 2 \\
 15.0615 + 75.31 & = 1 & - 167 & + 38 & & 15.0800
 \end{array}$$

$$\begin{array}{rclcl}
 \text{Tables } a & = +.7 & c & = +.7 & a - c & = 0 & b + d & = -0.9 \\
 \text{Obs} & = -501.5 & & = -502.5 & & = +1.0 & & = -2.3
 \end{array}$$

$a + .8$ $B + .7$ 

Moon's Center

x	$x - x_0$	Δx	$(x - x_0)^2$	$(x - x_0) + (y - y_0)$	
1 21.0000	-0.7280	-1	0.5308	33973	-56
2 20.2202	-1.5078	-1	2.2738	33974	-55
3 20.0000	-1.7280	0	2.9860	33938	-91
4 19.8822	-1.8458	0	3.4070	34070	+71
5 20.0000	-1.7280	+0	2.9860	33914	-115
6 20.1389	-1.5891	+1	2.5249	34085	+56
7 21.0000	0.7280	+1	0.5299	34009	-20
8 21.7280	0.0000	+1	0.0000	34151	+122

3.4029

y	$y - y_0$	Δy	$(y - y_0)^2$	L	
1 13.3668	-1.6932	-1	2.8672	203	✓
2 14.0000	-1.0600	0	1.1236	235	✓
3 14.9217	-0.6386	0	0.4078	250	✓
4 15.0600	0.0000	0	0.0000	270	✓
5 15.6967	+0.6367	+0	0.4054	290	✓
6 16.0000	+0.9400	+0	0.8836	301	✓
7 16.7593	+1.6993	+1	2.8740	337	✓
8 16.9079	+1.8479	+1	3.4151	360	✓

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Moon's Center

 $x = 20$ $y = 17.9217$

15.6967

30.1181

 y_0 15.0590 y_{max} 16.9079 R 1.8459 x_{min} 19.8822

21.7280

Moon's Center

 x_0 21.7280 y_0 15.0600

Moon's Center

x	$x - x_0$	Δx	$(x - x_0)^2$	$x - x_0 + (y - y_0)^2$	
1 21.0000	-0.7280	-1	0.5308	3.3973	-56
2 20.2202	-1.5078	-1	2.2738	3.3979	-55
3 20.0000	-1.7280	-0	2.9860	3.3938	-91
4 19.8822	-1.8458	0	3.4070	3.9070	+91
5 20.0000	-1.7280	+0	2.9860	3.3919	-115
6 20.1389	-1.5891	+1	2.5249	3.9085	+56
7 21.0000	-0.7280	+1	0.5299	3.9009	-20
8 21.7280	0.0000	+1	0.0000	3.9151	+122

3.9029

y	$y - y_0$	Δy	$(y - y_0)^2$	L
1 13.3668	-1.6932	-1	2.8672	203
2 14.0000	-1.0600	-0	1.1236	235
3 14.9219	-0.6381	-0	0.4078	250
4 15.0600	0.0000	0	0.0000	270
5 15.6967	+0.6367	+0	0.4059	290
6 16.0000	+0.9900	+0	0.8836	301
7 16.7593	+1.6993	+1	2.8740	337
8 16.9079	+1.8979	+1	3.5915	360

Moon's Center

 $x = 20$ $y = 14.9219$

15.6967

30.1181

 y_0 15.0590 y_{max} 16.9079 R 1.8489 x_{min} 19.8822

21.7280

Moon's Center

 x_0 21.7280 y_0 15.0600

Formation of Normals

$$\begin{array}{r}
 1 \quad + 1.23 \\
 2 \quad + 1.60 \\
 3 \quad + 1.11 \\
 4 \quad 0.0 \\
 5 \quad - 1.11 \\
 6 \quad - 1.49 \\
 7 \quad - 1.23 \\
 8 \quad - 0.0 \\
 \hline
 + 39.4 \\
 - 38.3 \\
 \hline
 + 1.1
 \end{array}$$

$$\begin{array}{r}
 + 41.0 \\
 + 83.0 \\
 + 157.5 \\
 - 75.8 \\
 + 199.0 \\
 - 89.0 \\
 + 17.5 \\
 - 0.0 \\
 \hline
 + 495.0 \\
 + 167.5 \\
 \hline
 + 330.2
 \end{array}$$

$$\begin{array}{r}
 + 94.6 \\
 + 58.0 \\
 + 58.0 \\
 0.0 \\
 - 73.5 \\
 + 52.5 \\
 - 33.8 \\
 + 226.0 \\
 \hline
 + 489.1 \\
 - 107.3 \\
 \hline
 + 381.8
 \end{array}$$

	-a	-b	(-a-b+ac)
1	-7	+5	+13 ✓
2	-15	+3	+3 ✓
3	-17	+2	0 ✓
4	-18	-0	-3 ✓
5	-17	-2	-4 ✓
6	-16	-3	-4 ✓
7	-7	-5	+3 ✓
8	-0	-5	+10 ✓

$$+1.1 + 11.97 = +1.73 \Delta$$

$$+[-] + .08 = -0.71 \Delta$$

$$+11.89 = +2.87 \Delta$$

$$15.33 = -9.87 \Delta \quad - .23 = -10.10$$

106.92

Conditional Equations.

7
new
O-C

1	-0.73	-1.69 = -56	-14	-51 = -65	+9	+22
2	-1.51	-1.06 = -35	-29	-32 = -61	+6	+9
3	-1.73	-0.67 = -91	-33	-19 = -52	-39	-39
4	-1.85	0.0 = +81	-36	0 = -36	+77	+77
5	-1.73	+0.67 = -115	-33	+19 = -14	-101	-105
6	-1.59	+0.99 = +36	-31	+28 = -3	+39	-53
7	-0.73	+1.69 = -20	-14	+51 = +37	-57	-59
8	-0.00	+1.85 = +122	0	+56 = +56	+66	+76

+ 217 = 197

Average 5.2

$$15.33 + 1.1 = +330.2 - 9.87 \Delta$$

$$+1.1 + 11.97 = +381.8 + 1.73 \Delta$$

$$+ [] + 1.08 = +23.6$$

$$+ 0.205 \Delta$$

$$+ 11.89 = +358.2$$

$$b = +30.2$$

$$15.33 = +330.2 - 33.2 = +297.0$$

$$a = +19.3$$

$$- 0.66 \Delta$$

$$\text{Arc Measure} = 15.70$$

$$\frac{P}{h} = 0.18$$

$$\frac{\Sigma V}{n} = 2.5$$

$$\text{Irr 3 } R \frac{1.87 + 2.5}{.18} = 13.0$$

$$\Delta R = +0.2$$

$$- 2PC = +0.75$$

$$(+15)$$

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

$$\Delta b = +0.15$$

$$(+3)$$

$$\Delta s = +0.1 = 81$$

$$\Delta P = +0.7$$

$$\Delta a = -0.79$$

$$(-10)$$

$$\Delta \alpha = -0.02$$

10692

Conditional Equations

7

							O-C
1	-0.73	-1.69	= -56	-19	-51	= -65	+9
2	-1.51	-1.06	= -55	-29	-32	= -61	+6
3	-1.73	-0.69	= -91	-33	-19	= -52	-39
4	-1.85	0.0	= +91	-36	0	= -36	+77
5	-1.73	+0.69	= -115	-33	+19	= -19	-101
6	-1.59	+0.99	= +36	-31	+28	= -3	+59
7	-0.73	+1.69	= -20	-19	+51	= +37	-57
8	-0.00	+1.85	= +122	-0	+56	= +56	+66

$$+ 217 = 197$$

Average 52

$$15.33 + 1.1 = +330.2$$

$$+1.1 + 11.97 = +381.8$$

$$1[] + .08 = +23.6$$

$$+11.89 = +354.2$$

$$b = +30.2$$

$$15.33 = +330.2 - 33.2 = +297.0$$

$$a = +19.3$$

$$\text{Arc Measure} = 15.7^\circ$$

$$\frac{P}{\Sigma V} = 0.18$$

$$\frac{\Sigma V}{n} = 2.5$$

$$\frac{+2.5}{.18} = 13.0$$

$$\Delta R = +0.2$$

10692

8

Moon's Mean Position

$$\begin{array}{r} \lambda_0 \quad 21.7280'' \\ + 10'' \\ \hline 21.7290'' \end{array}$$

$$\begin{array}{r} \gamma_0 \quad 15.0600'' \\ + 15'' \\ \hline 15.0615'' \end{array}$$

From Plate Constants

$$\lambda \quad 21.7481''$$

$$\gamma \quad 15.0800''$$

$$\xi \quad -0.2549''$$

$$\eta \quad -2.9200''$$

$$\begin{array}{r} \log \xi \quad 9.40123'' \\ \log \eta \quad 9.96857'' \\ 8.50727 \\ 0.92542 \end{array}$$

$$\begin{array}{r} \log \tan \delta \quad 8.8025'' \\ \xi^2 \quad 9.5962'' \\ \gamma \quad 7.0537 \\ 5.4521 \end{array} \quad \left. \begin{array}{l} \\ \\ \\ \end{array} \right\} \text{interchanged}$$

$$\alpha - A \quad - \quad 8.72 \quad \eta_1 \quad 0$$

$$A \quad 7 \quad 49 \quad 16.00'' \quad \log \eta_0 \quad 0.46538''$$

$$\alpha_0 \quad 7 \quad 49 \quad 07.58''$$

$$\begin{array}{r} 7.33115'' \\ 3.13923'' \end{array} \quad \left. \begin{array}{l} \\ \end{array} \right\} 1362.2$$

$$\text{Red} \quad + \quad 2.09''$$

$$S-D \quad - \quad 2.2 \quad 42.2''$$

$$\alpha' \quad 7 \quad 49 \quad 09.67''$$

$$D + 21 \quad 55 \quad 00.0''$$

$$\alpha_0 \quad 21 \quad 32 \quad 17.8''$$

$$\text{Red} \quad - \quad 0.1''$$

$$\delta' \quad 21 \quad 32 \quad 17.7''$$

10692

8

Moon's Mean Position

$$\begin{array}{r} \lambda_0 \quad 21.7280'' \\ + 10'' \\ \hline 21.7290'' \end{array}$$

$$\begin{array}{r} \gamma_0 \quad 15.0600'' \\ + 15'' \\ \hline 15.0615'' \end{array}$$

From Plate Constants

$$X \quad 21.7981''$$

$$Y \quad 15.0800''$$

$$Z = 0.2549''$$

$$H = 2.9200''$$

$$\log \xi \quad 9.90123''$$

$$\log \tan \delta \quad 8.8025''$$

$$\cos \delta \quad 9.96857''$$

$$\xi^2 \quad 9.5962''$$

$$8.50729$$

$$7.0539$$

$$0.923894''$$

$$5.9521$$

$$X-A \quad - \quad 8.92$$

$$H_1 0.1$$

$$A \quad 7 \quad 49 \quad 16.00''$$

$$\log H_0 \quad 0.76538''$$

$$7.33115''$$

$$\alpha_0 \quad 7 \quad 49 \quad 07.58''$$

$$3.13923'' \quad 1362.2$$

$$\text{Red.} \quad + \quad 2.09''$$

$$S-D \quad - \quad 22 \quad 92.2''$$

$$\alpha' \quad 7 \quad 49 \quad 09.67''$$

$$D + 21 \quad 55'' \quad 00.0''$$

$$S_0 \quad 21 \quad 32 \quad 17.8''$$

$$\text{Red} \quad - \quad 0.1''$$

$$S' \quad 21 \quad 32 \quad 17.7''$$

$$\begin{array}{r}
 7 \quad 90 \quad 12.88 \\
 10.69 \\
 \hline
 2.19
 \end{array}$$

$$\begin{array}{r}
 28^{\circ} \quad 13 \quad 50.97 \\
 78.17 \\
 \hline
 2.80
 \end{array}$$

$$\begin{array}{r}
 7 \quad 39 \quad 27.87 \\
 22.75 \\
 \hline
 2.12
 \end{array}$$

$$\begin{array}{r}
 24 \quad 35 \quad 62.73 \\
 61.18 \\
 \hline
 1.55
 \end{array}$$

$$\begin{array}{r}
 7 \quad 56 \quad 53.28 \\
 51.08 \\
 \hline
 2.20
 \end{array}$$

$$\begin{array}{r}
 25 \quad 37 \quad 26.18 \\
 25.16 \\
 \hline
 1.02
 \end{array}$$

$$\begin{array}{r}
 8 \quad 7 \quad 25.97 \\
 23.80 \\
 \hline
 + 2.17
 \end{array}$$

$$\begin{array}{r}
 17 \quad 33 \quad 65.02 \\
 67.85 \\
 \hline
 - 2.83
 \end{array}$$

30
 28
 26
 24
 22
 20
 18
 16
 14
 12
 10
 8
 6
 4
 2
 0

10692 Reduction to Apparent Place

9

$$H + \alpha 0 \quad 19.0 = 20 \quad 25.0 \quad \delta + 21 \quad 32.3 \quad "$$

$$H \quad 16 \quad 28.9$$

$$\alpha \quad 7 \quad 49.1 \quad "$$

$$G \quad 22 \quad 10.9 \quad "$$

$$G + \alpha \quad 6 \quad 00.5 \quad " \quad 900 \quad "$$

$$\log \cos \delta \quad 9.9686$$

$$" \quad \alpha \quad 0.8816 \quad "$$

$$(\alpha) - 0.8502 \quad "$$

$$\log \cos \beta + \alpha \quad 9 \quad "$$

$$g \quad 1.0876 \quad "$$

$$\sin " \quad 0.0000 \quad "$$

$$\tan \delta \quad 9.5962$$

$$8.8239$$

$$\log \sin \delta \quad 9.5678$$

$$" \quad \cos (H + \alpha) \quad 9.9985$$

$$\tan \quad 1.2787 \quad "$$

$$\sin " \quad 8.9884 \quad "$$

$$\sec \delta \quad 0.0314$$

$$8.8239$$

$$\log g' \quad -$$

$$g \quad 9.5077 \quad "$$

$$\log h' \quad 08720$$

$$h \quad 9.0521 \quad "$$

$$f + 1.660 \quad "$$

$$g + 0.322 \quad "$$

$$h + 0.142 \quad "$$

$$+ 2.094 \quad "$$

$$g' + 0.000 \quad "$$

$$h' + 6.951 \quad "$$

$$h' + 7.083 \quad "$$

$$- 0.132 \quad "$$

$$14 + 120 \quad 19.0 = 70 \quad 75.0 \quad \delta + 21 \quad 32.3$$

H 16 28.9

L	7	7	9	1	✓
---	---	---	---	---	---

C 22 10.9 -

G 12 6 00.5" 90°

England 7. 9 6 8 6

0.88164

$$(d) = 0,850 \pm 24\%$$

Long Cas G 14 7

cf 1.0876

Sum = 0.00002

Land 95962

8.8239

log Sand 7.5698

Ans (HXL) 9.9985

to 1,2787

Aug 11 - 9787 ✓

Sec 1 0.0319

8.8 239

$\log 9' = 9.5077$

long t' 08420
to 905295

$f + 1,660$

9 12 3 2 2 4

$\frac{1}{2} + 0.182$

+ 2094

$9 + 0.000$ ✓

$$L' + 6.957$$

$$2 + 7.083 =$$

4-0.132

10692

Lunar Parallax

10

α' 7 49 09.67^v
 δ 9 19 42.7^v
 $\delta - \alpha' + 1$ 30 33.1^v
 22° 38 16.6^v
 $\frac{1}{2}(\delta - \alpha')$ 8 20.97^v
 22 29 55.6^v

π 59' 25.09^v
 9.86913
 8.19945 ^v
 9.58535 ^v
 0.03246 ^v
 7.68639 ^v

9.95727
 0.00000
 0.03438 ^v
 9.99165 ^v

$\delta - \alpha'$ 16 41.88^v
 $= + 1$ 6.79^v

δ 44 26 57.6^v

$\delta + 21$ 32 17.7^v

$\delta - \alpha'$ 22 34 39.9^v

9.82680
 8.19945 ^v
 9.59029 ^v
 0.15472 ^v
 7.77086 ^v

$\delta - \alpha'$ 20 17.0^v

δ 21 52 39.7^v

$\text{Ephd} + 21$ 52 37.0^v

α 7 50 16.76^v

Ephd 7 50 15.99^v

$b-c$ - 2.3^v
 Carr. Corr - 0.0^v
 2nd Ref. 0.0^v

$b-c$ + 0.97^v
 $+ 0.04$

Ion Err + 0.1^v

- 0.02^v

$\delta + 21$ 52 39.8^v

α 7 50 16.97^v

$b-c$ + 2.2^v

+ 0.95^v

Root Image

10692

Lunar Parallax

10

$$\begin{array}{r}
 L' \quad 7 \quad 99 \quad 09.67'' \\
 \theta \quad 9 \quad 19 \quad 92.7'' \\
 \theta - L' + 1 \quad 30 \quad 33.1'' \\
 \quad 220 \quad 38 \quad 16.3'' \\
 \frac{1}{2} (1 - \theta') \quad 8 \quad 20.97'' \\
 \quad 22 \quad 29 \quad 55.6''
 \end{array}$$

$$\begin{array}{r}
 \pi \quad 59' \quad 25.09'' \\
 9.86913 \\
 8.19990'' \\
 9.58535'' \\
 \underline{0.03286''} \\
 7.68639''
 \end{array}$$

$$\begin{array}{r}
 9.93727 \\
 0.00000 \\
 \underline{0.03938''} \\
 9.99165''
 \end{array}$$

$$\begin{array}{r}
 L' \quad 16 \quad 91.88'' \\
 = \quad + 1 \quad 16.84''
 \end{array}$$

$$\theta \quad 99 \quad 26 \quad 57.6''$$

$$\theta + 21. \quad 32 \quad 17.7''$$

$$\theta - \theta' \quad 22 \quad 57 \quad 39.9''$$

$$\begin{array}{r}
 9.82690 \\
 8.19990'' \\
 9.59029'' \\
 \underline{0.15972''} \\
 7.77086''
 \end{array}$$

$$\theta - \theta' \quad 20 \quad 17.0''$$

$$\theta \quad 21 \quad 52 \quad 39.7''$$

$$\theta - \theta' \quad 21 \quad 52 \quad 37.0''$$

$$\theta \quad 7 \quad 50 \quad 16.96''$$

$$\theta - \theta' \quad 7 \quad 50 \quad 15.99''$$

$$\begin{array}{r}
 \theta - C \quad - 2.3'' \\
 \text{Curv. Corr} \quad + 0.0'' \\
 2nd \text{ Ref.} \quad 0.0''
 \end{array}$$

$$\begin{array}{r}
 \theta - C \quad + 0.80'' \\
 \quad + 0.07''
 \end{array}$$

Ref. Curvature

1
12
28

2
24
4

5
30
13

1
21
13

2
21
13

3
20
1

10693

Star Measures

71

1	20028	20998	20782	20073
12.3	16594	13934	19830	11022
28.1	98	32	30	26
	32	92	88	62
	<u>12.3933</u>	<u>12.3439</u>	<u>28.0953</u>	<u>28.0961</u>

2	20248	18992	20018	19792
24.7	13296	15940	17404	12412
4.3	92	40	394	12
	28	76	08	78
	<u>24.6940</u>	<u>24.6964</u>	<u>4.2616</u>	<u>4.2636</u>

3	20472	19586	20648	19658
30.1	19330	10714	13806	16462
13.7	38	10	02	54
	44	62	12	52
	<u>30.1135</u>	<u>30.1148</u>	<u>13.6810</u>	<u>13.6802</u>
	d	d	d	d

Moon Measures

1	20602	20524
21.3	27562	13578
13	64	70
	02	24
	<u>21.3046</u>	<u>21.3050</u>

2		19915	18628
21.0		12590	15948
13.3		94	60
		08	24
		<u>13.2682</u>	<u>13.2668</u>

3	19750	19506
20.6	15740	13520
14	48	26
	52	00
	<u>20.5993</u>	<u>20.5971</u>

Poor image

1
2
18

2
24
9

3
30
13

1
21
13

2
21
13

3
20
1

10693

Star Measures

21

1	20028	20998	20782	20073
2.3	16599	13934	19830	11022
8.1	98	32	30	26
	32	92	88	62
	<u>12.3933</u>	<u>12.3939</u>	<u>28.0953</u>	<u>28.0961</u>

2	20248	18992	20018	19792
24.7	13296	15990	17909	12912
9.3	92	90	399	12
	28	76	08	70
	<u>29.6970</u>	<u>29.6967</u>	<u>4.2616</u>	<u>4.2636</u>

3	20972	19586	20648	19638
30.1	19330	10719	13806	16962
13.7	38	10	02	59
	44	62	12	52
	<u>30.1135</u>	<u>30.1178</u>	<u>13.6810</u>	<u>13.6802</u>
	d	n	n	d

Moon Measures

1	20642	20524
21.3	27562	13578
13	69	70
	02	29
	<u>21.3096</u>	<u>21.3050</u>

2		19915	18628
21.0		12590	13958
13.3		99	60
		08	39
		<u>13.2682</u>	<u>13.2668</u>

3	19750	19506
20.6	15790	13520
19	98	26
	52	00
	<u>20.5993</u>	<u>20.5971</u>

19680
16728

10693

Moon Measures

m

22

	Δ	Δ	Δ	Δ
+	19713	19552		
20.5	14971	14272		
17.5	89	78		
-X	18	40		
	<u>20.5257</u>	<u>20.5270</u>		

5	19679	19586		
20.6	15629	13632		
15	27	22		
	79	76		
	<u>20.5949</u>	<u>20.5953</u>		

6	19326	20385	18992	19680
21.3	12252	17420	11370	16728
16	48	10	62	20
	28	82	38	77
	<u>21.2923</u>	<u>21.2974</u>	<u>21.2927</u>	<u>21.2957</u>

7		19516	19681
22.0		12586	16598
16.3		92	82
		12	80
		<u>16.3076</u>	<u>16.3092</u>

8	19510	19682
22.4	12972	16208
16.3	62	04
+4	08	72
	<u>16.3459</u>	<u>16.3473</u>

7

20

19

-

5

20

13

6

21

16

7

21

16

8

21

16

10693

Moon Measures

y

22

	μ	α	δ
<u>7</u>	19713	19552	
20.5	19971	19272	
19.5	89	78	
-1	18	90	
	<u>20.5259</u>	<u>20.5270</u>	

<u>5</u>	19679	19586	
20.6	15629	13632	
15	27	22	
	79	76	
	<u>20.5999</u>	<u>20.5953</u>	

<u>6</u>	19326	20385	18992	19680
21.3	12252	17920	11370	16728
16	98	10	62	20
	28	82	38	79
	<u>21.2923</u>	<u>21.2979</u>	<u>21.2927</u>	<u>21.2959</u>

<u>7</u>		19516	19681
22.0		12586	16598
16.3		92	82
		12	80
		<u>16.3076</u>	<u>16.3092</u>

<u>8</u>	19710	19510	19682
22.4	12972	12972	16208
16.3	66	62	09
+9	08	08	72
	<u>2939</u>	<u>16.3959</u>	<u>16.3973</u>

10693

Trine's etc.

13

Apr 10 '16

Up to Stars	9	33		9	75	
" " Moon	9	39	11.8	9	39	12.2
Clock fast		5	37.3			

H. Sid Time	9	33	37.7	$\delta - \alpha = +1^h$	73
H. Long	4	44	31.03		
g. Sid Δ	17	18	08.75		
Red T.M. Noon	1	13	31.72		
Interval	13	04	37.03		
Reduction		2	8.57		
g. M.T.	13	02	28.77		

From Naut Alman	7	R. A.		Dec.	7.5
Moon	7	50	38.99 + 21	51	05.5
Motion in m			2.0602		8.035
" " 2.7778			5.10		- 19.9
Tabular Place	7	50	44.09 + 21	50	45.6

Myron's Age	8.3 days	59	25.18
Farallan	19		51.3
Semidiameter		89	1.3
R			12.5
Aug			
$\delta \mu$ (3)			- 0.3
R			90.35
R			1.9368
αR			- 9.23
(1 + α) R			1.8775
R			3.7021

939 13,65

$$\begin{array}{r}
 a = -500.8 \\
 + 2.9 \\
 \hline
 -476.8
 \end{array}$$

10093

Times Cte.

13

Apr 10 '16

Eye to Stars	9	33		9	95	
" Moon	9	39	11.8	9	89	12.2
Clock fast		5	39.3			

H. Sid Time	9	33	37.7	$\theta - \chi = +1^{\circ}$	73
H. Long	9	44	31.05		
G. Sid 1	19	18	08.75		
Sid J M. Moon	1	13	31.72		
Interval	13	04	37.03		
Reduction		2	8.59		
G. M. T.	13	02	28.99		

From Mount Allen	7	50	38.99	+21	51	05.5
Moon			2.0602			-0.35
Motion in m			5.10			-19.9
" " 2.47.98						
Tubular Place	7	50	44.09	+21	50	45.6

Myron's Age 8.3 days	59	25.18
Parallax	14	51.3
Semidiameter	89	1.3
R		12.5
Ang		-0.3
R_1 (1)		90.35
R		1.9368
aR		-92.3
$(1+4)R$		1.3995
R_2		3.9021

9.39 13.6

$$\begin{array}{r}
 a = -500.8 \\
 + 29 \\
 \hline
 -471.8
 \end{array}$$

10693 Plate Constants

13

$$\begin{array}{rcl}
 \gamma & 12.3736 & 29.6953 & 30.1171 \\
 \gamma & 11.8515 & 29.7176 & 30.4772 \\
 \gamma - \gamma & +8921 & -193 & -3331
 \end{array}$$

$$\begin{array}{rcl}
 \gamma & 28.0957 & 7.2626 & 13.6806 \\
 \gamma & 29.1117 & 7.0301 & 13.8998 \\
 \gamma - \gamma & -10160 & +2325 & -2192
 \end{array}$$

$$\begin{array}{rcl}
 \gamma - \gamma & +5201 & +9994 & +51 & -12365 \\
 +8921 + 6172 = 11093 & +1261 = +12357 & +10 = +12367 & & -1 \\
 -193 + 12398 = 12155 & +191 = 76 & +20 = 66 & & +1 \\
 -3331 + 15057 = 11726 & +619 = 70 & +24 = 64 & & -1 \\
 22.3716 + 11186 & +651 & +18 & & 22.3206
 \end{array}$$

$$\begin{array}{rcl}
 \gamma - \gamma & +5204 & -90.71 & +2.94 & -3970 \\
 -10160 + 19098 = +3888 & -999 = +3389 & +81 = +3970 & & -0 \\
 +2325 + 2131 = 4456 & -998 = 3958 & +12 = 3970 & & 0 \\
 -2192 + 6890 = 4698 & -1217 = 3931 & +70 = 70 & & 0 \\
 19.5025 + 7257 & -909 & +92 & & 19.7999
 \end{array}$$

$$\begin{array}{rcl}
 \text{Tables} & a = +1.5 & e = +1.3 & a - e = +0.2 & b + d = -1 \\
 \text{Obs} & = -500.8 & = -502.9 & = +2.1 & = -7.5 \\
 \text{O-C} & -501.3 & -503.2 & & -3.5
 \end{array}$$

10693 Plate Constants

17

x	12.3436	29.6953	30.1171
y	11.8545	29.7196	30.9972
$x-y$	+9921	-193	-3331

x	28.0957	7.2626	13.6806
y	29.1117	9.0301	13.8998
$x-y$	-10160	+2325	-2192

$x-z$	1001	+99.99	+5A	-12363
+9921 + 1172 =	11092	+1261 =	+12359	+10 = +12369
-193 + 12398 =	12125	+191 =	76	120 = 66
-3331 + 15027 =	11726	+617 =	70	+29 = 69
22.3716 + 11186	+651	+18		22.3206

$y-z$	+5704	-90.91	+1.94	-3970
-10160 + 19098 =	+3858	-997 =	+3389	+51 = +3970
+2325 + 2131 =	4456	-998 =	3958	+12 = 3970
-2192 + 6390 =	4198	-1217 =	3931	+36 = 70
19.5025 + 7251	-909	+92		19.7999

γ plates $a = +1.5$ $e = +1.2$ $a-e = 1.2$ $b+d = -1$
 α plates $= -500.8$ $= -502.9$ $= +2.1$ $= -9.5$

A + 9
B + 2

10693

Moon's Center

15

	X	X - X ₀	ΔX	(X - X ₀) ²	(X - X ₀) + (Y - Y ₀) ²	O - C
1	21.3098	-1.0662	-1	1.1370	3.3930	-91
2	21.0000	-1.3710	-1	1.8799	3.4039	+18
3	20.5982	-1.7728	-0	3.1428	3.3948	-73
4	20.5262	-1.8448	0	3.4033	3.4033	+12
5	20.5951	-1.7739	+0	3.1538	3.4018	-3
6	21.2990	-1.0770	+1	1.1597	3.4037	+16
7	22.0000	-0.3710	+2	0.1375	3.4005	-16
8	22.3710	0.0000	+2	0.0000	3.4025	+9

R² 3.4021

	Y	Y - Y ₀	ΔY	(Y - Y ₀) ²	L
1	13.0000	-1.5020	-0	2.2560	215 ✓
2	13.2675	-1.2375	-0	1.5290	228 ✓
3	14.0000	-0.5020	-0	0.2520	257 ✓
4	14.5020	0.0000	-0	0.0000	270 ✓
5	15.0000	+0.4980	+0	0.2480	286 ✓
6	16.0000	+1.4980	+0	2.2470	324 ✓
7	16.3087	+1.8067	+0	3.2630	378 ✓
8	16.3766	+1.8746	+0	3.4025	360 ✓ 175

Moon's Center

X_{mean} 20.5262

R 1.8448

X₀ 22.3710Y_{max} 116.3766Y₀ 14.5020X₀ 22.3710Y₀ 14.5020

1

2

3

4

5

6

7

8

1

2

3

4

5

6

7

8

10693

Moon's Center

N

X	X - X ₀	ΔX	(X - X ₀) ²	(X - X ₀) + (Y - Y ₀)	O - C
1 21.3098	-1.0662	-1	1.1370	3.2930	-91
2 21.0000	-1.3710	-1	1.8799	3.9039	+18
3 20.5982	-1.7728	-0	3.1428	3.3948	-73
4 20.5262	-1.8448	0	3.4033	3.9033	+12
5 20.5951	-1.7759	+0	3.1538	3.8048	-3
6 21.2990	-1.0770	+1	1.1597	3.9037	+16
7 22.0000	-0.3710	+2	0.1375	3.9005	-16
8 22.3710	0.0000	+2	0.0000	3.9025	+9

R = 3.9021

Y	Y - Y ₀	ΔY	(Y - Y ₀) ²	L
1 13.0000	-1.5020	-0	2.2560	215
2 13.2675	-1.2345	-0	1.5240	228
3 19.0000	-0.5020	-0	0.2520	257
4 19.5020	0.0000	0	0.0000	270
5 15.0000	+0.9780	+0	0.2780	286
6 16.0000	+1.4780	+0	2.2740	324
7 16.3089	+1.8067	+0	3.2630	378
8 +16.3766	+1.8746	+0	3.9025	360

175

Moon's Center

X_{mean} 20.5262

R 1.8448

X₀ 22.3710Y_{mean} 116.3766Y₀ 19.5020X₀ 22.3710Y₀ 19.5020

Formation of Normals

1	+ 1.61	+ 97.5	+ 136.5
2	+ 1.69	- 24.5	- 22.0
3	+ 0.88	+ 129.0	+ 36.5
4	0.0	- 22.5	0.0
5	- 0.88	+ 5.3	- 1.5
6	- 1.62	- 17.3	+ 24.0
7	- 0.67	+ 6.0	- 29.0
8	0.0	- 0.0	+ 7.4
	+ 7.18	+ 237.8	+ 207.8
	- 3.17	- 64.3	- 52.5
	+ 1.01	+ 173.5	+ 151.9

	-a	-b	+15 ΔP_{res}
1	- 1	+ 7	+18
2	- 1	+ 7	+18
3	- 2	+ 2	+15
4	+ 2	0	+13
5	- 2	- 2	+11
6	- 1	- 7	+10
7	- 0	- 5	+10
8	- 0	- 5	+10

$$+1.01 + 13.19 = + 2.42$$

$$+ [] + .07 = - 0.67$$

$$+ 13.12 = + 3.09$$

$$14.01 = - 9.28 - .272 - 9.52$$

10693

Conditional Equations

O-C

16

new

1	-1.07	-1.50	= -91	-12	-16	= -28	-63	-95
2	-1.37	-1.23	= +18	-16	-13	= -29	+77	+65
3	-1.77	-0.50	= -73	-20	-5	= -25	-78	-33
4	-1.89	00	= +12	-21	0	= -21	+33	+76
5	-1.78	+0.50	= -3	-21	+5	= -16	+13	+24
6	-1.08	+1.50	= +16	-12	+16	= +4	+12	+22
7	0.37	+1.81	= -16	-7	+20	= +16	-32	-22
8	0.00	+1.89	= +9	-0	+20	= +20	-16	-6

+ 105 - 159

Average 33

$$17.01 + 1.01 = +173.5 - 9.28$$

$$1.01 + 13.19 = +151.9 + 2.72$$

$$+ [] + 0.07 = +12.5$$

$$+ .235 \Delta$$

$$+ 13.02 = +139.7$$

$$b = +10.7$$

$$+ 17.01 = +173.5 - 11 = +162.5$$

$$a = +11.6$$

$$- 0.68$$

In 3

R. 1.899

$$- 2RC = +.79$$

$$+ [15]$$

$$\Delta b \approx +0.17$$

$$[+3]$$

$$\Delta \delta \approx +0.1$$

$$\Delta a \approx -1.50$$

$$[-1]$$

$$\Delta \alpha \approx -0.02$$

Arc Measure 195°

$$\frac{P}{n} = .14$$

$$\frac{\Sigma V}{n} = -6.8$$

$$-68 = -78.5$$

$$.14$$

$$-8.1$$

$$= \Delta R \approx 1 = 0.6$$

$$\text{Corr} - 0.2$$

$$\Delta R \approx -0.7$$

10693 Conditional Equations 16

- 1.07	- 1.50	= - 91	- 12	- 16	= - 28	- 63
- 1.37	- 1.23	= + 18	- 16	- 13	= - 29	+ 97
- 1.77	- 0.50	= - 73	- 20	- 5	= - 25	- 98
- 1.89	0.0	= + 12	- 21	0	= - 21	+ 33
- 1.78	+ 0.50	= - 3	- 21	+ 5	= - 16	+ 13
- 1.08	+ 1.50	= + 16	- 12	+ 16	= + 4	+ 12
- 0.37	+ 1.81	= - 16	- 9	+ 20	= + 16	- 32
- 0.00	+ 1.89	= + 9	- 0	+ 20	= + 20	- 16

$$+ 105 - 159$$

average 33

$$19.01 + 1.01 = + 173.5$$

$$1.01 + 13.19 = + 151.9$$

$$+ [] + 0.07 = + 12.5$$

$$+ 13.02 = + 139.9$$

$$b = + 10.7$$

$$+ 19.01 = + 173.5 - 11 = + 162.5$$

$$a = + 11.6$$

Arc Measure 195°

$$\frac{P}{n} = .13$$

$$\frac{\Sigma v}{n} = -6.28$$

$$\frac{-6.28}{.13} = -3.6$$

$$-81 = \Delta R = 770.6$$

10693 *Maoris Mean Position*

17

 α_0 22 37 10 ✓ γ_0 17 50 20 ✓

+ 6 ✓

+ 5 ✓

22 37 16 ✓

17 50 25 ✓

from Plate Constants α 22 32 06 ✓ γ 17 79 44 ✓ δ + 1 32 06 ✓ η - 3 20 56 ✓ $\log \gamma$ 9.50596 ✓ $\log \tan \delta$ 9.5928 ✓ $\log \delta$ 9.96868 ✓ γ^2 9.01192 ✓

8.50724

7.0537

1.03007 ✓

5.6581 ✓

 $\alpha - A$ 10.72 ✓ $\eta + 0.0000$ ✓ A 7 49 16 ✓ $\log H_0$ 0.50596 ✓

7.33115 ✓

 δ_0 7 49 26 72 ✓

3.17476 1995.7 ✓

 Red + 2.09 ✓ $S - D$ - 27 55.7 ✓ α' 7 49 28.81 ✓ $D + 21$ 55 00 ✓ $S_0 + 21$ 30 08.6 ✓ Red - 0.2 ✓ $\alpha' + 21$ 30 08.7 ✓

10693 Micoris Mean Position

17

 α_0 22.3710"
 + 6"
 22.3716"

 γ_0 19.5020"
 + 5"
 19.5025"

from Plate Constants

 λ 22.3206" η 19.7979" ξ +.3206" η - 3.2056" $\log \xi$ 9.50596" $\log \eta$ 9.2928" $\log \xi$ 9.96868" ξ^2 9.01192"

8.50729

7.0537

7.03007"

5.6581"

 $\lambda - A$ 10.72" $\eta' + 0.0000$ A 7 99 16 - $\log \eta_0$ 0.50591"

7.33115

 λ_0 7 99 26.72"

3.17776 1995A

Red + 2.09"

 $S - D$ - 27 55.8" λ' 7 99 28.81" $D + 21$ 55 00 $S + 21$ 30 08.6"

Red - 0.2

 $S' + 21$ 30 08.9"

10693 Reduction to Apparent Phase 18

$$H+L \ 0 \ 19.7 = 9^{\circ} \ 51.0 \quad \delta \ 21 \ 22.3$$

$$H \ 16 \ 29.9$$

$$L \ 7 \ 79.5$$

$$O \ 22 \ 10.9$$

$$G+L \ 6 \ 00.7 = 90^{\circ} \ 06.0$$

$$\log \cos \delta \ 9.9691$$

$$L \ 0.8816 n$$

$$(L) \ 0.8507 n$$

$$\log \cos (g+L) \ 7.2718 n$$

$$g \ 1.0876$$

$$\sin \ 0.0000$$

$$\tan \delta \ 9.5925$$

$$8.8239$$

$$\log \sin \delta \ 9.5616$$

$$\cos (H+L) \ 9.9987$$

$$L \ 1.2787$$

$$\sin \ 8.9271$$

$$\sec \delta \ 0.0309$$

$$8.8239$$

$$\log g' \ 8.3295 n$$

$$g \ 9.5070$$

$$\log L' \ 0.8387$$

$$L \ 9.0606$$

$$f \ +1.660$$

$$g \ +0.319$$

$$L \ +0.115$$

$$+2.098$$

$$g' \ -0.021$$

$$L' \ +6.895$$

$$L \ -7.091$$

$$-0.217$$

10693 Reduction to Apparent Place 13

$$H + L \quad 0 \quad 19.9 = 9^\circ 51.0$$

$$H \quad 16 \quad 29.7$$

$$L \quad 7 \quad 99.5$$

$$C = 2 \quad 10.1$$

$$G + L \quad 6 \quad 00.9 = 90^\circ 06.0$$

$$S = 21 \quad 223$$

$$\log \cos 9.9691$$

$$L \quad 0.3516 n$$

$$(L) \quad 0.8507 n$$

$$\log \cos (g + l) \quad 7.2719 n$$

$$g \quad 1.0876$$

$$\sin \quad 0.0000$$

$$\tan \quad 9.5925$$

$$8.8239$$

$$\log \sin S \quad 9.5616$$

$$\cos (H + L) \quad 9.9987$$

$$L \quad 1.2787$$

$$\sin \quad 8.7271$$

$$\sec \quad 0.0309$$

$$8.8239$$

$$\log g' \quad 8.3295 n$$

$$g \quad 9.5070$$

$$\log L' \quad 0.8387$$

$$L \quad 9.0606$$

$$f \quad +1.660$$

$$g \quad +0.319$$

$$L \quad +0.115$$

$$+2.098$$

$$g' \quad -0.228$$

$$L' \quad +6.895$$

$$i \quad -7.091$$

$$-0.217$$

0693 Lumar Parallax

17

α' 7 49 28.81"
 δ 9 33 37.7"
 $\alpha - \alpha'$ 1 44 08.9"
 $= 26^{\circ} 02' 13.5''$
 $\frac{1}{2}(\alpha - \alpha') = 9 31.2''$
 $\frac{1}{2} 25 52 42.3''$

π 54' 25.18"
 9.86913
 8.19947"
 9.68282"
 0.03237"
 7.78339"

9.95727
 0.00000
 0.04389"
 0.00316"

$\alpha - \alpha'$ 19 02.90
 $= 1 16.16''$

γ 45 12 31.2"
 $\delta + 21 30 08.9''$
 $\gamma - \delta$ 23 42 26.8"

9.82640
 8.19947"
 9.60929"
 0.17899"
 7.77940

$\delta - \delta'$ 20 40.3

δ 21 50 44.7

Ephd + 211 50 45.6"

O-C -0.9"
 Curr. Corr -0.0
 2nd O. Ref. 0.0

In Corr +0.1

$\delta + 21 50 44.8$

O-C -0.8

α 7 50 44.97

Ephd 7 50 44.09"

O-C +0.88"
 +0.07

-0.02

α 7 50 44.95

+0.86

10693 Linnar Parallax

19

χ 7 99 28.81"
 δ 9 33 37.7"
 $\alpha - \alpha'$ 1 89 08.9"
 $= 26^\circ 02'$ 13.3"
 $\chi(1-\chi) = 9$ 31.2"
 χ 25 52 92.3"

π 57' 25.18"

9.86913
 8.19977"
 9.69292"
 0.03237"
 7.79339"

9.95727
 0.00000
 0.09589"
 0.00316"

$\chi - \chi'$ 19 02.90

$=$ 1 16.46"

χ 95 12 31.2"

$\delta + 21$ 30 08.7"

$\chi - \delta$ 23 82 26.8"

9.82690
 8.19977"
 9.60959"
 0.17899"
 7.77940

$\delta - \delta'$ 20 9.82

δ 21 50 98.7

χ 1 50.77917

$\text{Eph} \delta + 21$ 50 25.6"

$\text{Eph} \delta$ 7 50 79.09"

$0 - c$ - 0.9"

$0 - c$ + 0.88"

no. Corr - 0.9

+ 0.08

no. Ref. 0.0

22
223
29
101
2
132
21
193
20
15

10701

Star Measures

21

1	20368	19322	19788	19908
13.9	11027	18668	18360	11318
4.2	20	60	62	20
	52	18	86	08
	<u>13.9331</u>	<u>13.9372</u>	<u>7.1737</u>	<u>7.1711</u>
2	29682	19188	19878	19878
27.5	14077	14822	11800	17857
27.8	48	26	98	47
	82	82	60	828
	<u>27.5636</u>	<u>27.8638</u>	<u>27.8056</u>	<u>27.8037</u>
3	20072	19168	19372	19120
29.1	19500	9722	19117	9378
104	496	22	21	82
	50	168	77	22
	<u>29.0547</u>	<u>29.0547</u>	<u>10.0253</u>	<u>10.0257</u>
	d	r	d	r

Moon Measures

1		19828	19493
22		14860	14460
13.5		70	54
		30	98
		<u>13.4963</u>	<u>13.4961</u>

2	19260	20566
21.7	15958	13898
17	58	98
	68	60
	<u>21.3307</u>	<u>21.3336</u>
3	19598	18210
20.9	10616	17172
15	10	62
	600	08
	<u>20.8986</u>	<u>20.8958</u>

Fairly good image

27
283
29
101
2
132
21
193
20
18

10701

Star Measures

21

1	20368	19322	19788	19908
13.4	11029	18668	18360	11318
7.2	20	60	62	20
	52	18	86	08
	<u>13.9331</u>	<u>13.9392</u>	<u>8.1927</u>	<u>7.1911</u>
2	19682	19188	198980	19812
27.5	19049	19822	118010	17859
27.8	98	26	98	99
	82	82	608	828
	<u>27.5636</u>	<u>27.8638</u>	<u>278056</u>	<u>278039</u>
3	20092	19168	19572	19120
29.1	19500	9722	19117	9378
10.1	976	22	21	82
	50	168	79	22
	<u>29.0599</u>	<u>29.0599</u>	<u>10.0253</u>	<u>10.0257</u>
	d	n	d	n

Moon Measures

1		19828	19993
22		19860	19960
13.5		70	59
		30	98
		<u>139963</u>	<u>139961</u>

2	19260	20566
21.7	15958	13898
19	58	98
	68	60
	<u>21.3309</u>	<u>21.3336</u>

3	19598	18210
20.9	10616	17172
15	10	62
	600	08
	<u>208986</u>	<u>208958</u>

5
2
12
8
3
2
16
6
2
16
2
2
1
+
8
2
17

1070.1 m
 4 18172
 20.9 16970
 15.3 62
 X- 76

20.8797

Mean Measures

20628

11820

12

20

20.8806

5 19717
 21.1 9857
 16 52
 18

21.0935

20092

19654

77

88

21.0443

6
 22
 16.9

20090

19680

72

100

16.9586

19497

19897

98

96

16.9600

2
 22.7
 17.2
 17

20136

11392

88

28

17.1261

19142

17872

68

46

17.1273

8 20130
 23 14232
 17.1 38

1073

20160

11232

38

64

17.1073

19182

18038

47

52

17.1103

107012
 9 18172
 20.9 16970
 15.3 62
 1- 76

20.8799

Mean Measures

20628

11820

12

20

20.8806

5- 19919
 21.1 9859
 16 52
 18

21.0935

20092

19654

99

88

21.0993

6
 22
 16.9

20080

19680

72

100

16.9586

19999

18899

98

96

16.9600

2
 22.7
 17.2
 77

20136

11392

88

28

17.1261

19192

17872

68

96

17.1273

8 20100
 23 101232
 17.1 38
 64
 1073

20160

11232

38

64

17.1073

19192

18038

99

52

17.1103

10701 *Vincent E. Bol*

23

Apr. 13-76

Exp. to Stars	11	26		11	38
" Moon	11	31	57.3	11	31 5-7.5
Clock fast		5	36.7		

H Sid Time	11	26	180	8-9 = +1" 10"
H Star	7	77	31.05	
g. Sid Time	16	10	79.05	
Sid T.M.N.	1	25	21.38	
Internal	17	45	27.67	
Reduction		2	25.06	
G.M.T.	17	43	02.61	

From Nant Alm		R.A.		Loc.
Moon 17"	10	17	70.17 +8	22 10.6
Motion in 1 ^m			1.9218	13.549
" 73.0735		1	22.72	9 73.0
Tubular Place	10	16	02.86	8 12 27.6

Miron's age 11.3

Thrallor	5.5	55.75
Sunid.	15	16.0
R.		91.60
Aug.		12.0
Gr (3)		-0.3
R		927.7
R		198.86
AR		-997
(1+9)R		1,893.9
R		3,586.8

934 = 12.45

a-500.2	✓
+27	
-476.2	✓

10701 James Etal

23

Apr. 13 '76

Exp. to Stars	11	26		11	38
" " Moon	11	31	59.3"	11	31 59.5"
Clock fast		5	36.9"		

14 Sid Time	11	26	180"	8-9 = +1" 10"
H Time	4	99	31.05"	
G. Sid Time	16	10	99.05"	
Sid T. M. H.	1	25	21.38"	
Internal	19	95	27.67"	
Reduction		2	25.06"	
G. M. T.	19	93	02.61"	

From Naut Alman		RA		Dec.
Moon 19"	10	19	90.19 +8	22 10.6
Moon in 1 ^m			19218"	13.599
" 93.0935"		1	22.72	9 93.0
Tubular Place	10	16	02.86 8	12 27.6

Moon's age

Parallax	55	55.75"
Semid.	15	16.0"
R.		91.60"
Aug		12.0"
Tr (3)		-0.2"
R		927.7"
R		19886"
AR		-997"
(1+4)R		18939"
R		35868"

939 - 12.95"

a-500.2

+29
-976.2

η	η	η	η	η	η	η
-8.82	-17.29	-60	-4.95	-17	-9.1	+1.2
+5.77	+10.39	+19	+43	-8	+6	-11
+7.05	-8.08	+20	-27	-15	-7	-12
			-35	+3		
40.75			-2.2	-1		+9.2
						<u>+0.3</u>

$\Delta\eta$	$\Delta\eta$	$\Delta\eta$	$\Delta\eta$
-97	-3.55	-3.23	+18
+36	+30	+18	-19
-23	-37	-17	-18
	+28	+5	-18
	+9		
-2.62	-X	-1	+8
			+26
			<u>+0.7</u>
			+1.3

10701

Standard Coordinates

29

Cape No. 1399 - mag 8.7 Cape No. 1916 - mag 7.0 Cape No. 1918 - mag 6.3

C	10	09	29.82	10	16	57.82	10	17	76.51
L			29.90			57.86			76.57
E			29.84			57.81			76.52
mean	10	09	29.85	10	16	57.83	10	17	76.53
Prec			50.23			50.67			50.28 ²⁵
S	10	10	20.08	10	17	48.50	10	18	36.81 ⁷⁸
A	10	17	56	10	17	56	10	17	56
-A			- 9 35.92			+ 2 52.50			+ 3 70.81 ⁷⁸
(d-A)			- 275.90			+ 172.50			+ 220.80 ⁷⁷
mag			2.77075 ^h			2.23679 ^h			2.34700 ^h 2.34394
Good			9.99748 ^h			9.99715 ^h			9.99678 ^h
50			0.99547 ^h			0.73818 ^h			0.89802 ^h 0.89796
50			- 88200 ^h			+ 5.4727 ^h			7.0973 ^h 7.0463
T ₁			- 60 ^h			+ 19 ^h			+ 20 ^h
L			13.1740 ^h			27.4743 ^h			29.0893 ^h 29.0983
L			13.9336 ^h			27.5637 ^h			29.0587 ^h
-T			+ 75.96 ^h			+ 8.97 ^h			+ 0.51 ^h + 61
C	+ 6	17	76.1	+ 9	28	08.3	+ 7	03	00.9
L			76.3			07.7			01.2
E			75.3			7.2			1.1
mean	6	17	75.9	9	28	07.7	7	03	01.1
Prec			- 7 44.7 ^h			- 7 49.1 ^h			- 7 50.9 ^h
S	6	10	01.5 ^h	9	23	18.6 ^h	6	58	11.8 ^h 10.2
D	8	01	00	8	01	00	8	01	00
-D	- 1	50	58.5 ^h	+ 1	22	18.6 ^h	- 1	02	48.6 ^h 49.8
mag-D			- 66 60.8 ^h			+ 49 39.5 ^h			- 3 76 90 ^h - 3770.2
mag			3.82353 ^h			3.69368 ^h			3.57623 ^h 3.57637
No			1.15768 ^h			1.02483 ^h			0.90738 ^h 0.90752
optend			9.0336 ^h			9.2183 ^h			9.0873 ^h
50			1.8909 ^h			1.8768 ^h			1.6960 ^h
h ₁			7.9779 ^h			7.7481 ^h			7.8367 ^h
h ₀	- 14.2787 ^h			+ 10.5883 ^h			- 8.0790 ^h		8.0820
h ₁	+ 0.0095 ^h			+ 0.0056 ^h			+ 0.0069 ^h		
h ₂	3.7311 ^h			28.5939 ^h			9.9279 ^h		9.9279
h ₃	4.1719 ^h			27.8075 ^h			10.0255 ^h		
h-h	+ 7.108 ^h			- 7.897 ^h			+ 9.76 ^h		10.06

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Standard Coordinates

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Cape No 1399 - mag 8.7 Cape No 1916 - mag 7.0 Cape No 1918 - mag 6.3

C	10	09	29.82	10	16	57.82	10	17	76.51
L			29.90			57.86			96.57
E			29.84			57.81			96.52
Mean	10	09	29.85	10	16	57.83	10	17	96.53
Proc			50.23			50.67			50.2825
α	10	10	20.08	10	17	48.50	10	18	36.8178
A	10	19	56	10	19	56	10	19	56
$\alpha-A$			- 9 35.92			+ 2 52.50			+ 3 90.8178
Sum($\alpha-A$)			- 275.90			+ 172.50			+ 220.8077
log α			2.990754			2.23679			2.39900 - 2.39999
log δ			9.99798			9.99915			9.99678
$\log \rho$			0.995974			0.73818			0.89802 - 0.89996
$\log \mu$			- 8.8200			+ 5.9729			7.0973 - 6.0963
$\log \nu$			- 60			+ 19			+ 20
$\log \xi$			13.1790			27.9793			29.0993 - 28.0983
$\log \chi$			13.9336			27.5637			29.0599 - 28.0589
$\log \gamma$			+ 75.96			+ 899			+ 051 - 61
C	+ 6	19	96.1	+ 9	28	08.3	+ 7	03	00.9
L			96.3			07.7			01.2
E			95.3			7.2			1.1
Mean	6	19	95.9	9	28	07.7	7	03	01.1
Proc			- 9 94.9			- 9 99.1			- 9 50.9
δ	6	10	01.5	9	23	18.6	6	58	11.8 - 10.2
D	8	01	00	8	01	00	8	01	00
$\delta-D$	- 1	30	58.5	+ 1	22	18.6	- 1	02	98.6 - 99.8
land-D			- 66 60.8			+ 79 39.5			- 37 69.0 - 37 10.2
log α			3.823534			3.69888			3.576234 - 3.57639
$\log \mu$			1.159684			1.02983			0.907384 - 1.0702
log land			9.0336			9.2182			9.0872
$\log \nu$			1.8909			1.9769			1.6960
$\log \xi$			7.9779			7.7980			7.8369
$\log \chi$			- 14.2789			+ 10.5883			- 8.0790 - 8.0878
$\log \gamma$			+ 0.0095			+ 0.056			+ 0.0069
$\log \eta$			3.7311			28.5939			9.9279 - 9.9299
$\log \theta$			7.1719			27.8075			10.0255
$\log \phi$			+ 7.108			- 7.899			+ 9.76 - 10.06

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Plate Center and Constants

23-

X	Y	X	Y	S
13.9336	7.1819	10 10	20.08	6 10 0.15
27.5637	27.8075	10 17	78.50	9 23 18.6
29.0588	10.0255	10 18	36.81	6 58 11.9
3) 70.6517	7.19719	3) 30 75	105.39	21 91 31.5
23.5172	13.9906	10 15	35.13	7 30 30.5
22	18		- 47	+ 30 48.2
+1.517	+7.0097	10 14	78.13	8 01 18.7
31	766.5			
47	30' 48.2			

Plate Center) A 10 19 56.0
(D 8 01 00.0

$$\begin{array}{rclcl}
 X-Z & +500X & & -4.9Y & +.2X & -195.75 \\
 +75.96 + 69.67 = 145.63 - 21 = +124.63 & & & & & 0 \\
 + 89.7 + 137.82 = 227.52 - 136 = +91.52 & & & & & +1 \\
 + 61 + 193.27 = 254.27 - 99 = +155.27 & & & & & 0 \\
 22.7739 + 113.87 = 136.64 - 75 = 61.64 & & & & & 22.4511
 \end{array}$$

$$\begin{array}{rclcl}
 Y-Z & +500Y & +10X & +10Y & -6325 \\
 +4108 + 2071 = 6179 + 139 = 6318 + 6 = 6324 & & & & -1 \\
 -78.97 + 139.02 = 60.05 + 276 = 336.05 - 72 = 264.05 & & & & +1 \\
 +100.6 + 5013 = 5113.6 + 291 = 5404.6 - 15 = 5389.6 & & & & 0 \\
 15.2293 + 7615 = 9137.93 + 228 = 9365.93 & & & & 15.3834
 \end{array}$$

$$\begin{array}{rclcl}
 \text{Tables} & a = +1.2 & e = -1.2 & a-e = +1.9 & b+d = -1 \\
 \text{Obs} & = -500.2 & = -504.5 & = +1.3 & = -5.1
 \end{array}$$

$$O-C \quad -500.4 \quad -500.3 \quad -4.1$$

10701 Plate Center and Constants 20-

λ	γ	α	δ	
13.9336	9.1719	10 10 20.08	6 10	0 15
27.5637	27.8095	10 17 48.50	9 23	18.6
29.0579	10.0253	10 18 36.81	6 58	11.7
27.05517	9.19719	10 10 5.39	21 91	31.5
23.5172	13.9906	10 15 35.13	7 30	30.5
22	18	- 27	+ 30	98.2
+1.517	+9.0099	10 19 48.13	8 01	18.7
31	966.5			
47	30.956			

Plate Center } A 10 19 56.0
 (D 8 01 00.0

$$\begin{array}{rclcl}
 \lambda - \gamma & + 500X & - 7.94 & + 1.25X & - 190.95 \\
 + 75.96 + 6967 & = 19563 - 21 & + 19592 + 3 & = + 19595 & 0 \\
 + 899 + 137 \times 2 & = 19676 - 136 & = 19540 + 6 & = & 46 + 1 \\
 + 61 + 195.27 & = 19588 - 99 & = + 19539 + 6 & = & 95 0 \\
 22.7739 + 11387 & - 75 & + 5 & 22.9511
 \end{array}$$

$$\begin{array}{rclcl}
 \gamma - \eta & + 500Y & + 10X & + 11.5Y & - 6325 \\
 + 9108 + 12071 & = + 6179 + 139 & + 6318 + 6 & = + 6329 & - 1 \\
 - 7898 + 13902 & = 6008 + 276 & 6289 + 72 & = 632 & + 1 \\
 + 1006 + 5013 & = 6019 + 291 & 6310 + 15 & = + 6325 & 0 \\
 15.2293 + 7615 & + 228 & + 23 & 15.3839
 \end{array}$$

$$\begin{array}{lclcl}
 \text{Tables } a = 7.7 & b = -1.2 & a \cdot b = -11.9 & b + d = -1 \\
 \text{Obs } -500.2 & -504.5 & = +1.3 & = -5.1
 \end{array}$$

$\bar{a} \rightarrow +1$ $\bar{b} \rightarrow +1.3$

10701		Moon's Center								26
x		$x - x_0$	Δx	$(x - x_0)^2$	$(x - x_0) + (y - y_0)$	$y - y_0$	$(y - y_0)^2$	$(x - x_0)^2 + (y - y_0)^2$	$O - e$	
1	22,0000	-0.7750	-2	0.6009	3.6007	+1.39				
2	21,3320	-1.4430	-1	2.0825	3.5910	+8.2				
3	20,8972	-1.8778	0	3.5261	3.5781	-8.7				
4	20,8800	-1.8950	0	3.5910	3.5910	+4.2				
5	21,0939	-1.7311	+1	2.9967	3.5927	+5.6				
6	22,0000	-0.7750	+2	0.6003	3.5987	+11.6				
7	22,7750	0.0000	+2	0.0000	3.6058	+19.0				
8	23,0000	+0.2250	+2	0.0506	3.5888	+20				
										3.5868

y		$y - y_0$	Δy	$(y - y_0)^2$	L	
1	13,9962	-1.7318	-2	2.9998	209	
2	14,0000	-1.2280	-2	1.5085	230	
3	15,0000	-0.2280	0	0.0520	263	
4	15,2280	0.0000	0	0.0000	270	
5	16,0000	+0.7720	+1	0.5960	294	
6	16,9593	+1.7313	+2	2.9981	336	
7	17,1267	+1.8987	+2	3.6058	360	
8	17,1088	+1.8808	+2	3.5382	+7	1630

Moon's Center

$x = 22$

$y = 13.9962$

16.9593

30.8555

$y_0 = 15.2277$

$y_{max} = 17.1267$

$R = 1.8990$

1.8939

$x_{min} = 20.8800$

$x_0 = 22.7750$

Center $\left\{ \begin{array}{l} x_0 = 22.7750 \\ y_0 = 15.2280 \end{array} \right.$

10701 Moonis Center 26

	x	$x - x_0$	Δx	$(x - x_0)^2$	$(x - x_0) + (y - y_0)$	$O - e$
1	22,0000	-0,7750	-2	0,6008	3,6007	+ 139
2	21,3320	-1,4430	-1	2,0825	3,5910	+ 92
3	20,8972	-1,8778	0	3,5261	3,5781	- 87
4	20,8800	-1,8950	0	3,5910	3,5910	+ 92
5	21,0939	-1,7311	+1	2,9967	3,5929	+ 56
6	22,0000	-0,7750	+2	0,6003	3,5987	+ 116
7	22,7750	0,0000	+2	0,0000	3,6053	+ 190
8	23,0000	+0,2250	+2	0,0506	3,5888	+ 20
					3,5868	

	y	$y - y_0$	Δy	$(y - y_0)^2$	L
1	13,9962	-1,7318	-2	2,9998	209
2	19,0000	-1,2280	-2	1,5085	230
3	15,0000	-0,2280	0	0,0520	263
4	15,2280	0,0000	0	0,0000	270
5	16,0000	+0,7720	+1	0,5960	294
6	16,9593	+1,7313	+2	2,9981	336
7	+17,1267	+1,8987	+2	3,6058	360
8	17,1088	+1,8808	+2	3,5382	+7 1630

Moonis Center

 $x = 22$
 $y =$

13,9962
16,9593
30,8555

 y_0 15,2277 y_{max} 17,1267 R 1,8990 x_{min} 20,8800 x_0 22,7750

Center $\left\{ \begin{array}{l} x_0 \\ y_0 \end{array} \right.$ $\left\{ \begin{array}{l} 22,7750 \\ 15,2280 \end{array} \right.$

Formation of Normals

1 + 1.33	- 107.0	- 240.5
2 + 1.77	- 60.5	- 31.6
3 + 0.93	+ 163.5	+ 20.0
4 0.0	- 79.5	.00
5 - 1.33	- 97.0	+ 43.2
6 - 1.33	- 89.5	+ 200.5
7 - 0.0	- 0.0	+ 367.0
8 + 0.91	+ 7.5	+ 37.6
+ 3.98	+ 168.0	+ 662.3
- 2.66	- 433.5	- 292.1
+ 1.28	- 265.5	+ 370.2

	- a	- b	+ 1.5 Dpa
1 + 7	+ 3	+ 25	
2 + 12	+ 2	+ 29	
3 + 17	+ 0	+ 32	
4 + 17	0	+ 32	
5 + 15	- 1	+ 29	
6 + 7	- 3	+ 19	
7 + 0	- 4	+ 11	
8 - 2	- 4	+ 9	

$$+1.28 + 15.30 = +3.09$$

$$+ [] + 0.12 = +0.79$$

$$+15.18 = +2.30$$

$$13.95 = +8.26 - 0.19 = +8.07$$

10701 Conditional Equations

27

O - C O - C

1	- 0.77	- 1.73	= +139	+ 17	- 45	- - 28	+167	+192
2	- 1.89	- 1.23	= +92	+ 32	- 32	- 0	+ 82	+71
3	- 1.88	- 0.23	= - 87	+ 92	- 6	= +36	-123	-91
4	- 1.89	0.00	= +92	+ 92	0	= +92	0	+32
5	- 1.73	+ 0.77	= +56	+ 38	+ 20	= +58	+ 2	+27
6	- 0.77	+ 1.73	= +116	+ 17	+ 45	= +62	+58	+35
7	- 0.00	+ 1.90	= +190	- 0	+ 49	= +49	+181	+130
8	+ 0.22	+ 1.88	= +20	- 5	+ 49	= +49	-22	-13
							+409	-197

average 69

$$13.45 + 1.28 = -265.5 \quad +8.26$$

$$+ 1.28 + 15.30 = +370.2 \quad +3.09$$

+73.
+152.

$$+12 \quad] + 0.12 = -23.3$$

+ 0.15 Δ

$$+ 15.18 = +395.5$$

$$b = +26.1$$

$$13.45 = -265.5 - 33.9 = -298.9$$

$$a = -22.2$$

$$+0.60 \Delta$$

Arc. Measured 163°

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

$$\frac{\Sigma V}{h} = +32.1$$

$$I \quad 3 \quad R \quad 1.89$$

$$\frac{32.1}{21} = 1.53$$

$$\Delta R = +1.89$$

$$-2RC = +0.76$$

$$[+15]$$

$$Corr = -0.2$$

$$\Delta R = +2.1$$

$$\Delta b = +0.11$$

$$[+2]$$

$$\Delta \delta = +0.1$$

$$\Delta a = +0.96$$

$$\Delta \alpha = +0.02$$

$$[+9]$$

1
2
3
4
5
6
7
8

10701 Conditional Equations

O.C

1	- 0.77	- 1.73	= +139	+ 11	- 15	- 28	+167
2	- 1.99	- 1.23	= + 92	+ 32	- 32	0	+ 44
3	- 1.88	- 0.23	= - 87	+ 12	- 6	+ 26	-123
4	- 1.89	0.00	= + 92	+ 12	0	+ 92	0
5	- 1.73	+ 0.77	= + 56	+ 38	+ 20	= + 58	+ 2
6	- 0.77	+ 1.73	= +116	+ 17	+ 95	= + 62	+ 59
7	- 0.00	+ 1.90	= +190	+ 0	+ 17	= + 99	+171
8	+ 0.22	+ 1.88	= + 20	- 5	+ 17	= + 99	- 22

+ 409 -147

average 69

$$13.75 + 1.28 = -265.5$$

$$+ 1.28 + 15.30 = +370.2$$

$$16.3 + 1.1 = -25.3$$

$$+ 15.18 = +375.5$$

$$1 = +26.1$$

$$13.75 - 265.5 - 33.9 = -285.6$$

$$1 = -22.2$$

Arc. Measured 163°

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

$$\frac{\Sigma V}{h} = +32.1$$

$$\frac{32.1}{21} = 1.53$$

$$\Delta R = +1.89$$

10701 Moon's Mean Position

28

$$\begin{array}{r} \lambda_0 \quad 22.7750^{\circ} \\ \quad \quad -11^{\circ} \\ \hline 22.7739^{\circ} \end{array}$$

$$\begin{array}{r} \gamma_0 \quad 15.2280^{\circ} \\ \quad \quad +13^{\circ} \\ \hline 15.2293^{\circ} \end{array}$$

From Plate Constants.

$$\lambda \quad 22.7511^{\circ}$$

$$\gamma \quad 15.3834^{\circ}$$

$$\beta \quad +1.8511^{\circ}$$

$$\eta \quad -2.6166^{\circ}$$

$$\log z \quad 9.65927^{\circ}$$

$$\log \tan \delta \quad 9.1831^{\circ}$$

$$\log s \quad 9.99609^{\circ}$$

$$z^2 \quad 9.3083^{\circ}$$

$$8.50724$$

$$7.0537$$

$$1.15098^{\circ}$$

$$5.5459^{\circ}$$

$$d-A \quad +17.16^{\circ}$$

$$\eta \quad 0^{\circ}$$

$$A \quad 10 \quad 17 \quad 56.00^{\circ}$$

$$\log h_0 \quad 0.41778^{\circ}$$

$$7.33115^{\circ}$$

$$d_0 \quad 10 \quad 15 \quad 10.16^{\circ}$$

$$3.08659^{\circ} \quad 1220.69^{\circ}$$

$$Red \quad +2.56^{\circ}$$

$$S-D \quad -20 \quad 20.6^{\circ}$$

$$d' \quad 10 \quad 15 \quad 12.72^{\circ}$$

$$D \quad +8 \quad 01 \quad 00.0^{\circ}$$

$$S_0 \quad +7 \quad 40 \quad 39.8^{\circ}$$

$$Red \quad -12.7^{\circ}$$

$$S_1 \quad +7 \quad 40 \quad 26.7^{\circ}$$

10701 Moon's Mean Position

28

$$\begin{array}{r} \lambda_0 \quad 22.7750^{\circ} \\ \quad \quad -11^{\circ} \\ \hline 22.7739^{\circ} \end{array}$$

$$\begin{array}{r} \gamma_0 \quad 15.2280^{\circ} \\ \quad \quad +13^{\circ} \\ \hline 15.2293^{\circ} \end{array}$$

Moon's Constants

$$1 \quad 22.7511^{\circ}$$

$$7 \quad 15.3839^{\circ}$$

$$3 \quad +1.8511^{\circ}$$

$$4 \quad -2.6166^{\circ}$$

$$\text{Eq } 3 \quad 9.65727^{\circ}$$

$$\text{Eq } \text{tand } 9.1831^{\circ}$$

$$\text{Eq } 8 \quad 9.99609^{\circ}$$

$$7^{\circ} \quad 9.3085^{\circ}$$

$$\begin{array}{r} 8.50729 \\ \hline 1.15298^{\circ} \end{array}$$

$$\begin{array}{r} 7.0939 \\ \hline 5.5950^{\circ} \end{array}$$

A-A

$$+19.16^{\circ}$$

n. 0.

$$A \quad 10 \quad 15 \quad 56.00^{\circ}$$

$$\text{tghw } 0.91777^{\circ}$$

$$\lambda_0 \quad 10 \quad 15 \quad 10.16^{\circ}$$

$$7.33115^{\circ}$$

$$308659^{\circ} \quad 1220.69$$

Red

$$+2.56^{\circ}$$

S-D

$$-20 \quad 20.6^{\circ}$$

$$\lambda' \quad 10 \quad 15 \quad 12.82^{\circ}$$

$$D \quad +8 \quad 01 \quad 00.0^{\circ}$$

$$S^{\circ} \quad +8 \quad 40 \quad 39.9^{\circ}$$

$$\text{Red } +8 \quad 01 \quad -12.8^{\circ}$$

$$S1 \quad +7 \quad 40 \quad 26.9^{\circ}$$

$$\begin{array}{r}
 9.55 \quad 49.12 \\
 \underline{46.55} \\
 +2.57
 \end{array}$$

$$\begin{array}{r}
 +8 \quad 26 \quad 40.38 \\
 \underline{51.90} \\
 -11.52
 \end{array}$$

$$\begin{array}{r}
 10 \quad 03 \quad 56.69 \\
 \underline{54.02} \\
 +2.67
 \end{array}$$

$$\begin{array}{r}
 12 \quad 22 \quad 30.55 \\
 \underline{21.53} \\
 -10.98
 \end{array}$$

$$\begin{array}{r}
 10 \quad 37 \quad 10.39 \\
 \underline{7.78} \\
 +2.61
 \end{array}$$

$$\begin{array}{r}
 -1 \quad 17 \quad 73.97 \\
 \underline{57.93} \\
 -16.04
 \end{array}$$

$$\begin{array}{r}
 12 \\
 2.65 \\
 \underline{12.45} \\
 1
 \end{array}$$

+13

+11

+9

+7

+5

+3

+1

+0

-1

13

40 30 20 0 10h 30 9h

10701 Reduction to Apparent Place

29

Apr 13 - 114

$H + \alpha$ 2 32.3 $38^{\circ} 09.5'$ δ ~~8~~ $90.55'$
 H 16 17.1
 α 10 15.2
 Q 22 11.0
 $Q + \alpha$ 8 26.2 $126^{\circ} 33.0'$

log cos 9.9962 ✓

" 0.8722 ✓

(c) 0.8689 ✓

log cos (G + α) 9.7799 ✓

q 1.0921 ✓

sin (G + α) 9.9049 ✓tan δ 9.1296 ✓

8.8239

log sin δ 9.1257 ✓cos (H + α) 9.8961 ✓

" 1.2803 ✓

sin (H + α) 9.7900 ✓sec δ 0.0038 ✓

8.8239

log q' 0.8670 ✓

" q 8.9505 ✓

log h' 0.3624 ✓

h 9.8980 ✓

f 1.682 ✓

g + 0.089 ✓

h + 0.790 ✓

+ 2.562

q' -7.363 ✓

h' + 2.005 ✓

" -7.386

-12.749

10701 Reduction to Apparent Place

29

Apr 13 - 11^h

$$H + L \quad 2 \quad 3.23 \quad 38^{\circ} 09.5' \quad S \quad 8 \quad 90.55'$$

$$H \quad 16 \quad 18.1$$

$$L \quad 10 \quad 15.2$$

$$G \quad 22 \quad 11.0$$

$$G + L \quad 8 \quad 26.2 \quad 126^{\circ} 33.0' \quad (u) \quad 0.8689''$$

$$\log \cos(G+L) \quad 9.7719''$$

$$q \quad 1.0921''$$

$$\sin(G+L) \quad 9.9099''$$

$$\tan \delta \quad 7.1296''$$

$$8.8239$$

$$\log \sin \delta \quad 9.1257''$$

$$\cos(H+L) \quad 9.8961''$$

$$L \quad 1.2803''$$

$$\sin(H+L) \quad 9.7900''$$

$$\sin \delta \quad 0.0038''$$

$$8.8239$$

$$\log q' \quad 0.8670''$$

$$q \quad 89.505''$$

$$\log h' \quad 0.3021''$$

$$h \quad 98980''$$

$$f \quad 1.682''$$

$$g \quad +0.089''$$

$$h \quad +0.790''$$

$$+2.562$$

$$q' \quad -7.363''$$

$$h' \quad +2.005''$$

$$u' \quad -7.386''$$

$$-12.799$$

10701

Lunar Parallax

30

α' 10 15 12.72 ✓
 δ 11 26 18.0 ✓
 $\delta - \alpha'$ 1 11 05.28 ✓
 $= 17^\circ 46'$ 19.20 ✓
 $\delta (1-1)$ 6 22.80 ✓
 2 17 39 56.2 ✓

 π 55 55.75 ✓

9.86913
 8.21135 ✓
 9.98963 ✓
 000777 ✓
 7.56958 ✓

9.95727
 0.00000
 0.02098 ✓
 9.97825 ✓

$\delta - \alpha'$ 12 75.67 ✓
 $= + 0$ 51.09

 δ 23 33 57.6 ✓

 $\delta + \delta$ 70 267 ✓

 $\delta - \delta$ 35 53 30.9

9.82670 ✓
 8.21135 ✓
 9.76809 ✓
 0.16167 ✓
 7.96759 ✓

 $\delta - \delta$ + 31 57.0

 $\delta + \delta$ 12 20.7

 $\delta - \delta$ + 8 12 27.6 ✓

 δ 10 16 03.76 ✓

 $\delta - \delta$ 10 16 02.86 ✓

$\delta - \delta$ - 6.9
 Curr. Corr. + 0.4
 2d O. Ref. 0.4

$\delta - \delta$ + 0.90 ✓
 + 0.03

 $\delta - \delta$ + 0.1

+ 0.02

 $\delta + \delta$ 12 20.8

 δ 10 16 03.78

 $\delta - \delta$ - 6.8

+ 0.92

10701

Lunar Parallax

30

$$X' \quad 10 \quad 15 \quad 12.72 \checkmark$$

$$Y \quad 11 \quad 26 \quad 18.0 \checkmark$$

$$B-X' \quad 1 \quad 11 \quad 05.88 \checkmark$$

$$Y = 17 \quad 46 \quad 19.90 \checkmark$$

$$Y (1-X') \quad 6 \quad 22.80 \checkmark$$

$$Z \quad 17 \quad 39 \quad 56.9 \checkmark$$

$$T_1 \quad 55 \quad 55.75 \checkmark$$

$$9.86913$$

$$8.21135 \checkmark$$

$$9.78963 \checkmark$$

$$0.00497 \checkmark$$

$$7.56958 \checkmark$$

$$9.95727$$

$$0.00000$$

$$0.02098 \checkmark$$

$$9.97825 \checkmark$$

$$A-X' \quad 12 \quad 95.69 \checkmark$$

$$= \quad 0 \quad 51.09$$

$$X \quad 23 \quad 33 \quad 57.6 \checkmark$$

$$Y + Z \quad 70 \quad 26.7 \checkmark$$

$$X-Z \quad 35 \quad 53 \quad 38.9$$

$$9.82690$$

$$8.21105 \checkmark$$

$$9.76804 \checkmark$$

$$0.16127 \checkmark$$

$$7.96789 \checkmark$$

$$X-Z \quad 31 \quad 57.0$$

$$Y + Z \quad 12 \quad 20.8$$

$$Ephs + Z \quad 12 \quad 27.6 \checkmark$$

$$D-C \quad = 4.8$$

$$Cur Cur \quad + 0.3$$

$$240.14 \quad 0.4$$

$$X \quad 10 \quad 16 \quad 03.76 \checkmark$$

$$Ephs \quad 10 \quad 16 \quad 02.86 \checkmark$$

$$D-C \quad + 0.90 \checkmark$$

$$+ 0.03$$

