

KG

11366

v. 950

LXXIII



3669

3783



Harvard Lunar Plates

Measures and Reductions

Mary Fowler

Volume L ~~XXIII~~

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1913 Sep 20.

3669

Stars - Measures

1914 May 9.

	d	N
1	19587	16235
11.3	1324042	1259090
13.6	40	9490
	89	39
	<u>13.6397</u>	<u>6354</u>

d	N
19210	15420
1161002	1307010
11	02
05	20
<u>112402</u>	<u>2412</u>

2	19322	19740
19.9	1204041	1703025
24.7	38	31
	30	48
	<u>24.7288</u>	<u>7287</u>

15881	14535
1559087	2928
89	14240
<u>199708</u>	<u>9709</u>

3	17818	19130
23.7	1411116	1283939
9.5	14	4239
	19	40
	<u>9.3704</u>	<u>3704</u>

17890	20182
14876	13196
8180	97000
94	89
<u>23.6988</u>	<u>6989</u>

Grade 1

1913 Aug 20

3669

Stars Measures

1914 May 9

	d	N
1	19587	16235
113	1324042	1259090
136	40	9490
	89	39
	<u>136397</u>	<u>6354</u>

2	19322	19740
199	1204041	1703025
247	38	31
	30	48
	<u>297288</u>	<u>7287</u>

3	17818	19130
237	1411116	1283929
195	14	4231
	19	40
	<u>93704</u>	<u>3704</u>

Grade 1

	d	N
	19210	15420
	1161002	1307010
	11	02
	05	20
	<u>112402</u>	<u>2412</u>

	15881	1453528
	1559087	29
	89	14240
	<u>199708</u>	<u>9709</u>

	17890	20182
	1487680	1319600
	81	97
	94	89
	<u>236988</u>	<u>6987</u>

Reincarnate

2 19345
 12165 77 29
 86 69
 59
14,7180

max 19277
 11259 55
 55
 89
19,8031

6 18365
 16267 68
 63
 81
19,2102

3669 Moon Measures

d	q	v	d	v
1 scratch				
18417200	15940		17261	16510
1641362920	951223		1257879	11190
19	32		72	9493
01	35		64	10
<u>16.3577</u>	<u>3585</u>		<u>18.5314</u>	<u>15318</u>

<u>2</u>	17074	15959
199	992523	1314045
167	21	50
	82	60
<u>16.7157</u>	<u>17186</u>	

3
19.2
17.0

4
19.4
18.0
max
in
x

5
19.2
19.0

6
19.0
19.3

19.0	14930	17935
19.3	1282041	999811
	3038	09
	37	49
<u>19.2099</u>	<u>2060</u>	

16861
892020
21
55
19.2064

16780
1153225
21
70
19.4751

16718
836760
60
30
19.1634

17670
1562020
0129
77
2053

17706
1295655
59
19
4755

18774
1714737
41
80
1633

3669 Brown Measures

d 9

v

d 2

v

1 scratch

18417200

15940

17261

16510

16913629²⁰

951223

1257579

11190⁹³

19

32

72

94

01

35

69

10

16.3577358518.5314153182 17079

15959

199 992523

1319045

167 21

50

8.2

60

16.7157171863

19.2

170

16861

17670

8920²⁰15620²⁰

21

0129

55

77

19.206420534

199

180

199

180

199

180

199

180

199

180

199

180

199

180

199

180

199

180

199

180

199

180

199

180

16780

17706

11532²⁵12956⁵⁵

21

59

70

19

19.47514755

16718

18774

836760

17147³⁷

60

41

30

80

19.163416336

190 14930

17935

193 1282041

999811

3038

09

37

49

19.40992060

7
18
198
17
191
1

3699 Moon Measures

	d	N	d	N
1	14976	17900		
180	726570	15600		
197	69	9801		
	65	00		
	<u>197700</u>	<u>7700</u>		

8	14989	18875
176	695958	1689900
197	61	00
max	99	83
8	<u>188038</u>	<u>8023</u>

9	14015	18840
17.0	1215953	1571923
19.6	54	20
	12	51
	<u>19.6857</u>	<u>6878</u>

3699 Moon Measures

	d	n	d	n
2	19976	17900		
180	726570	15600		
197	69	9801		
	65	00		
	<u>197700</u>	<u>7700</u>		

8	19989	18875
176	695988	1689900
197	61	00
	99	83
8	<u>198038</u>	<u>8023</u>

9	19015	18840
170	1215953	1571723
196	54	20
	12	51
	<u>196857</u>	<u>6878</u>

3669 Times etc.

Expt. times 1913 Aug 20	1 ^h	09 ^m	1 ^L	21 ^m
... Moon	1	14	51.0 ^v	14 51.4 ^v
Clock fast		2	06.2 ^v	
H. lid T.	1	12	45.0 ^v	0 ^h 0 ^m 16 ^s 16 ^v
M. long	4	44	31.0 ^v	
G. lid T.	5	57	16.0 ^v	
Sid T. h. nom	9	52	51.68 ^v	
Interval	2.0	04	24.37 ^v	
Red.		3	17.31 ^v	
G. M. T.	20	01	07.06 ^v	

Dominant Area	R. A.	Decl.
Moon 20 ^h	0 ^h 57 ^m 07.42 ^v	+8° 15' 09" 8 ^v
Motion in 1.7747 ^v		13.752 ^v
+1.1177 ^v	+ 1.98 ^v	+ 15.4 ^v
Tabular place	0 57 09.40 ^v	+8 15 25.2 ^v

Moon's age 19 days^v
 parallax 54' 14.0^v
 semidiam. 14 48.3^v

$$924 = 13.0^v
 888 = 11.8^v$$

R
 Augmentation +11.8^v
 Irradiation (1) (3) -0.3^v
 R 899.8^v
 R 1.9288^v - 969^v
 (1+a) R 1.8319^v
 R² 3.3558^v

$$a = -502.3$$

$$- 24.
 478.3$$

$$1.9288 - 923
 1.8365,
 3.3727$$

3669 Times etc
 Exp. telan 1913 Aug 20 1^h 09^m 1^h 21^m
 Moon 1 14 51.01 14 51.4
 Clock fast 2 06.2

H. lid T. 1 12 45.0 0^h 16^m
 H. long 4 44 31.05
 G. lid T. 5 57 16.05
 Sid. T. H. nom 9 52 51.68
 Interval 20 04 24.37
 Red 3 17.31
 G. M. T. 20 01 07.06

From Mount Wilson R. A. Decl.
 Moon 20^h 0^h 57^m 07^s 42 + 8° 15' 09^s 8
 Position 1.7747 13752
 + 1.1177 + 1.98 + 154
 Tabular place 0 57 09.40 + 8 15 252

Moon age 19 days

parallax 54' 14" 05
 semidiam 14 48.3

934 = 13.0
 888 = 11.8

R 888.3
 Augmentation + 1.18
 Irradiation (1) - 0.3
 R 894.8
 R 19288 - 969
 (179) R 18319
 R² 33558

a = -502.3

3669

Plate Constants

R.A.

Decl.

α	γ							
11.2407	13.6350	0 53	27	+7	0 8	28		
199708	24.7288	0 58	10	+8	39	58		
23.6988	9.3704	1 00	18	+6	34	54		
3 54.91	47.73	1 18	55	21	81	140		
1830	15.91	0 57	18	+7	27	47		
-18	-22	-	9	+	47	40		
.30	6.09	0 57	09	+8	15	27		
31	46.58							
9 ²	2860							

$$\text{Center } \left\{ \begin{array}{l} A = 0^h 57^m 09^s \\ D = +8^\circ 15' 27'' \end{array} \right.$$

$$\begin{array}{rcll} \alpha - 3 & + 5002 & -128.44 & +2.32 & -7152 \\ + 3257 + 5620 = +8877 & - 1751 = +7126 + 26 = +7152 & = & 0 \\ + 295 + 9985 = +10280 & - 3175 = +7105 + 46 = +7151 & = & -1 \\ - 3548 + 11849 = +8301 & - 1203 = +7098 + 54 = +7152 & = & 0 \\ \hline 17.6507 + 8825 & - 2297 & + 41 = 17.5924 & \\ 17.6453 + 8823 & - 2307 & + 41 = 17.5858 & \checkmark \end{array}$$

$$\begin{array}{rcll} 4 - \gamma & + 5002 & +126.82 & +3.14 & -10729 \\ + 2443 + 6818 = +9261 & + 1425 = +10686 + 42 = +10728 & = & -1 \\ - 4244 + 12364 = +8120 & + 2532 = +10652 + 77 = +10729 & = & -0 \\ + 3012 + 4685 = +7697 & + 3005 = +10702 + 29 = +10731 & = & +2 \\ \hline 17.9689 + 8984 & + 2238 & + 56 = 18.0238 & \\ 17.9674 + 8984 & + 2237 & + 56 = 18.0222 & \checkmark \end{array}$$

$$\begin{array}{l} \text{Atlas } a = -0.8 \quad \alpha = -2.6 \quad \alpha - \alpha = +1.8 \quad b + a = 0.0 \\ \text{Obs } a = -2.3 \quad \alpha = -3.1 \quad a - \alpha = +0.8 \quad b + a = -1.6 \\ a = -502.3 \quad \alpha = -503.1 \end{array}$$

$$0 - a \quad -501.5'' \quad -500.5'' \quad -1.6''$$

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Plate Constants

R A

Decl.

112407	136350	0 53	27	+7	08	28
199708	247288	0 58	10	+8	39	58
236988	93709	1 00	18	+6	34	54
35491	4773	1 18	55	+21	81	140
1830	1591	0 57	18	+7	27	47
			9	+47	40	
	609	0 57	09	+8	15	27
	468					
9	2860					

Center } $A = 0^{\circ} 57' 09''$
 $D = +8^{\circ} 15' 27''$

$$\begin{aligned}
 & x-3 \quad +1002 \quad -128.44 \quad +2.32 \quad -7152 \\
 & +3257 + 5620 = +8877 - 1751 = +7126 + 26 = +7152 = 0 \\
 & +295 + 9985 = +10280 - 3175 = +7105 + 46 = +7151 = -1 \\
 & -3548 + 11849 = +8301 - 1203 = +7098 + 54 = +7152 = 0 \\
 & 176507 + 8825 = 177382 \\
 & 176453 + 8823 = 177326 \\
 & -2297 + 41 = -2256 \\
 & -2307 + 41 = -2266 \\
 & +41 = 175858
 \end{aligned}$$

$$\begin{aligned}
 & y-2 \quad +15002 \quad +126.82 \quad +3.14 \quad -10729 \\
 & +2443 + 6818 = +9261 + 1425 = +10686 + 42 = +10728 = -1 \\
 & -4244 + 12364 = +8120 + 2532 = +10652 + 77 = +10729 = -0 \\
 & +3012 + 4685 = +7697 + 3005 = +10702 + 29 = +10731 = +2 \\
 & 179689 + 8984 = 180673 \\
 & 179674 + 8984 = 180658 \\
 & +2237 + 56 = 2293 \\
 & +56 = 180222
 \end{aligned}$$

Titles $a = -0.8$ $c = -2.6$ $e = e = +1.8$ $g+a = 0.0$
 Obs $a = -2.3$ $c = -3.1$ $a-e = +0.8$ $h+a = -1.6$
 $a = -502.3$ $c = -1503.1$

	ξ	η	$\Delta \xi$	$-\eta \xi$		$+1\eta$		$+ \eta$
1	-7.08	-8.62	-22	+28	\sim	+6	-8	\sim -2 +2
2	+1.94	+3.15	+1	-8	\sim	-7	+3	\sim -4 0
3	+6.05	-12.94	+30	+24	\sim	+6	-13	\sim -7 -3
M	-0.41	-3.98	0	+2		-4		\sim <u>+2</u>

	$\Delta \eta$	$-\eta \eta$		$+1.5\xi$		$+ \eta$
	-26	+34	\sim	+8	-11	\sim -3 +1
	+1	-13	\sim	-12	+3	\sim -9 -5
	-62	+52	\sim	-11	+9	\sim -2 +2
	0	+16		-1		<u>+19</u>

3669 Standard Coordinates - Comparison Stars

Cape No	123	mag 8.2	Cape No	135	mag 6.7	Cape No	141	mag 7.8
C	0 ^h 52 ^m 46 ^s .55		0 ^h 57 ^m 29 ^s .46			0 ^h 59 ^m 37 ^s .80		
L		60		47			86	
B		51		49			92	
mean	0 52 46.55		0 57 29.47			0 59 37.86		
Prece		+ 40.44		+ 40.60			+ 40.57	
α	0 53 26.99		0 58 10.07			1 00 18.43		
A	0 57 09		0 57 09			0 57 09		
$\alpha - A$	- 3 42.01		+ 1 01.07			+ 3 09.43		
$\sin(\alpha - A)$	- 222.00		+ 61.07			+ 189.42		
log	2.34635		1.78583			2.27743		
log S	9.99662		9.99501			9.99713		
\bar{S}	0.85021		0.28808			0.78180		
\bar{S}_0	- 7.0828		+ 1.9412			+ 6.0506		
\bar{S}_1	- 22		+ 1			+ 30		
\bar{S}	10.9150		19.9413			24.0536		
\bar{S}	11.2407		19.9708			23.6988		
$\bar{S} - \bar{S}_0$	+ 32.57		+ 29.5			- 3.548		
C	+ 7° 04' 14".2		+ 8° 35' 44".7			+ 6° 30' 43".8		
L		19.7		45.9			44.3	
B		14.3		45.2			43.5	
mean	+ 7 04 14.4		+ 8 35 45.3			+ 6 30 43.9		
Prece		+ 4 13.6		+ 4 12.4			+ 4 10.5	
δ	+ 7 08 28.0		+ 8 39 57.7			+ 6 34 54.4		
D	+ 8 15 27		+ 8 15 27			+ 8 15 27		
$\delta - D$	- 1 06 59.0		+ 24 30.7			- 1 4.0 32.6		
$\tan(\delta - D)$	- 4019.5		+ 1470.7			- 6034.3		
log	3.60418		3.16752			3.78063		
η_0	0.93533		0.49867			1.11178		
$\tan \delta$	9.0979		9.1830			9.0621		
\bar{S}^2	17004		05762			15636		
η_1	78517		68126			76791		
η_0	- 8.6164		+ 3.1526			- 12.9355		
η_1	+ 71		+ 6			+ 47		
η	13.3907		25.1532			9.0692		
η_1	13.6350		24.7288			9.3704		
$\eta - \eta_1$	+ 2443		- 4244			+ 3072		

Standard Coordinates - Comparison Station											
Cape No. 123 mg 8.2				Cape No. 135 mg 6.7				Cape No. 141 mg 7.8			
C	0°	52'	46.55"	C	0°	57'	29.46"	C	0°	59'	37.80"
L			60				47				86
B			51				49				92
mean	0	52	46.55	0	57	29.47		0	59	37.86	
Pre		+	40.49			40.60			+	40.57	
A	0	53	26.99	0	58	10.07		1	00	15.48	
A	0	57	09	0	57	09		0	57	09	
A-A	-3	4	20.1	+1	0	1.07		+3	0	9.43	
ln(A-A)		-22	200			+61.07			+18	9.42	
log		2.346	35~			1.785	83		2.277	43	
log		9.976	62			9.995	01		9.997	13	
B		0.850	21~			0.288	08		0.781	80	
B		-7.08	28			+1.94	12		+6.05	06	
B		-	22			+	1		+	30	
B		10.91	50			1.994	13		2.405	36	
B		11.24	07			1.997	08		2.369	88	
B-B		+3.25	7			+	2.95		-3.54	8	
C	+7°	04'	14.2	+8°	35'	44.7		+6°	30'	43.8	
L			19.7			45.9				44.3	
B			14.3			45.2				43.5	
mean	+7	04	14.4	+8	35	45.3		+6	30	43.9	
Pre		+.4	13.6		+.4	12.4			+.4	10.5	
S	+7	08	28.0	+8	39	57.7		+6	34	54.4	
D	+8	15	27	+8	15	27		+8	15	27	
S-D	-1	06	59.0	+	24	30.7		-1	40	32.6	
tan(S-D)		-4.01	9.5			+1.47	0.7			-6.03	4.3
log		3.604	1.8~			3.167	5.2		3.780	6.3~	
log		0.935	3.3~			0.498	6.7		1.111	7.8~	
tan		9.097	9			9.183	0		9.062	1	
B		1.70	0.4			0.57	6.2		1.56	3.6	
B		7.85	1.7			6.81	2.6		7.67	9.1	
B		-8.61	6.4			+3.15	2.6		-1.29	3.55	
B		+	7.1			+	6		+	4.7	
B		1.33	9.07			2.51	5.32		9.06	9.2	
B		1.36	3.50			2.47	2.88		9.37	0.4	
B-B		+2.44	3			-4.24	4		+3.07	2	

1
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Moon's Center

	x	$x - x_0$	$(x - x_0)^2$	$(x - x_0)^2 + (y - y_0)^2$	$O - C$
1	18.5316	+0.8916	0.7950	3.3745	+187
2	19.0000	+1.3600	(1.8496)	3.4044	+486
3	19.2058	+1.5658	2.4518	3.3813	+255
4	19.4753	+1.8353	(3.3683)	3.3696	+138
5	19.1634	+1.5234	2.3207	3.3942	+384
6	19.0000	+1.3600	1.8496	3.3974	+426
7	18.0000	+0.3600	0.1296	3.3919	+361
8	17.6400	0.0000	0.0000	3.3826	+268
9	17.0000	-0.6400	0.4096	3.3783	+225

Comp $R^2 = (3.3558)$
3.3729

	y	$y - y_0$	Δy	$(y - y_0)^2$	
1	16.3581	-1.6059	-2	2.5795	151
2	16.7172	-1.2468	-1	(1.5548)	132
3	17.0000	-0.9640	-1	0.9295	122
4	18.0000	+0.0360	0	(0.0013)	90
5	19.0000	+1.0360	+1	1.0735	56
6	19.2080	+1.2440	+1	1.5478	48
7	19.7700	+1.8060	+2	3.2623	11
8	19.8030	+1.8390	+2	3.3826	0
9	19.6868	+1.7228	+2	2.9687	340
					Range 171

Approx Center

$$x = 19.0 \quad y = 16.7172$$

$$19.2080$$

$$35.9252$$

$$y_0 = 17.9626$$

$$y_{\text{max}} = 19.8030$$

$$R = 1.8404$$

$$x_{\text{max}} = 19.4753$$

$$x_0 = 17.6349$$

$$\text{Center } \left\{ \begin{array}{l} 17.6400 \\ 17.9640 \end{array} \right.$$

3669

Moons Center

	x	$x - x_0$	$(x - x_0)^2$	$(x - x_0)(y - y_0)$	$y - y_0$
1	18.5316708916	0.7950	3.3745	+1.87	
2	19.0000 + 1.3600	1.8496	3.4044	+4.86	
3	19.2058 + 1.5658	2.4518	3.3813	+2.55	
4	19.4753 + 1.8353	3.3643	3.3696	+1.38	
5	19.1634 + 1.5234	2.3207	3.3942	+3.84	
6	19.0000 + 1.3600	1.8496	3.3974	+4.26	
7	18.0000 + 0.3600	0.1296	3.3919	+3.61	
8	17.6400 0.0000	0.0000	3.3826	+2.68	
9	17.0000 - 0.6400	0.4096	3.3783	+2.25	

Comp $R^2 = (3.3558)$
3.3737

	y	$y - y_0$	Δy	$(y - y_0)^2$	
1	16.3581 - 1.6059	-2	2.5795	1.51	
2	16.7172 - 1.2468	-1	1.5548	1.32	
3	17.0000 - 0.9640	-1	0.9295	1.22	
4	18.0000 + 0.0360	0	0.0013	90	
5	19.0000 + 1.0360	+1	1.0735	56	
6	19.2080 + 1.2440	+1	1.5478	48	
7	19.7700 + 1.8060	+2	3.2623	11	
8	19.8030 + 1.8390	+2	3.3826	0	
9	19.6868 + 1.7228	+2	2.9687	340	

Range 171

Approx Center

 $x = 19.0$ $y = 16.7172$ 19.2080

359252

 $y_0 = 17.9626$ $y_{mean} = 19.8030$ $R = 1.8404$ $x_{mean} = 19.4753$ $y = 17.6349$

Center $\left\{ \begin{array}{l} 17.6400 \\ 17.9640 \end{array} \right.$

Formation of Normals (169.9) (169.6)

	ab	am	bm		
1	- 1.43	+ 166.4	- 301.0	+ 150.9	- 272.1
2	(- 1.70)	(+ 661.0)	- 608.0	+ 229.8	- 211.2
3	- 1.51	+ 400.0	- 244.8	+ 265.3	- 162.2
4	(+ 0.07)	(+ 259.0)	+ 5.5	+ 311.0	+ 6.8
5	+ 1.58	+ 584.0	+ 399.5	+ 256.9	+ 175.8
6	+ 1.70	+ 580.0	+ 532.5	+ 229.8	+ 209.6
7	+ 0.65	+ 130.0	+ 653.0	+ 60.8	+ 305.9
8	+ 0.00	+ 0.0	+ 493.0	+ 0.0	+ 311.0
9	- 1.10	- 143.9	+ 387.0	- 108.2	+ 290.7
	- 1.74	+ 2631.5	+ 1316.7	+ 1396.8	+ 654.3
		+ 1396.8	- 654.3		
		+ 1234.7	+ 662.4		

$\frac{1}{4}$ wt $t(2) + 14$ gives

	ab	[am]	(bm)
2	- 0.11	+ 269	- 24.6
4	+ 0.00	- 3.6	- 0.1
	- 0.22		

	+ 1234.7	+ 662.4
(2)	- 431.2	+ 396.8
	+ 803.5	+ 1059.2
(4)	+ 57.0	+ 1.3
	+ 860.5	+ 1060.5

3669

Moon's Center-Conditional Equations

8

	O	L	O-L
1	+ 0.89 - 1.61 = + 1.87	+ 190 - 157 = + 33	+ 154
2	+ 1.36 - 1.25 = + 486	+ 290 - 122 = + 168	+ 318
3	+ 1.57 - 0.96 = + 255	+ 339 - 93 = + 241	+ 14
4	+ 1.84 + 0.04 = + 138	+ 392 + .4 = + 396	- 258
5	+ 1.52 + 1.04 = + 384	+ 324 + 101 = + 425	- 41
6	+ 1.36 + 1.24 = + 426	+ 290 + 121 = + 411	+ 15
7	+ 0.36 + 1.81 = + 361	+ 77 + 176 = + 253	+ 108
8	+ 0.00 + 1.84 = + 268	+ 0 + 179 = + 179	+ 89
9	- 0.64 + 1.72 = + 225	+ 136 + 167 = + 31	+ 194

+ 1892 - 299
Average = 132

Normal Equations

$$+ 13.17 - 1.74 = + 2632$$

$$+ 1.74 + 17.30 = + 1317$$

$$+ 1.74 - 0.23 = + 348$$

$$+ 17.07 = + 1665$$

$$h = + 97.5$$

$$+ 13.17 = + 2632 + 170 + 2802$$

$$a = + 213.2$$

Arc measured: 171° Average (O-L) = + 66

$$\frac{pc}{m} = 0.26$$

$$+ \frac{66}{130} = + 2.20$$

$$\Delta a = + 2.5$$

3669 Moon's Mean Position (1913.0)

$$X_0 = 176400$$

$$Y_0 = 179640$$

$$n = +53$$

$$n = +39$$

$$176453$$

$$179674$$

Jovian Planet Constants $X = 175858$ $Y = 180222$

$$z = -04142$$

$$z = -3.9778$$

$$\log s = 9.61721$$

$$\log n = 0.57969$$

$$ws = 997602$$

$$733115$$

$$850724$$

$$326849$$

$$1.11395$$

$$D = -30556$$

$$x - A = -13.00$$

$$D = +81527$$

$$A = 05709$$

$$S_0 = 7744314$$

$$q = 0565600$$

$$R_{\text{red}} = +204$$

$$R_{\text{red}} = +29.1$$

$$S = +74451.8$$

$$q = 0505891$$

$$\text{Lunar par} = -3030.1$$

$$\text{Lunar par} = +11.13$$

$$S = +81529.9$$

$$x = 05710.04$$

$$\text{Tables} = +81525.2$$

$$\text{Tables} = 05709.40$$

$$O - C = +47$$

$$O - C = +0.64$$

3669

Proper Center Conditional Equation

8

	0	6	6-6
1	+0.89 - 1.61 = +1.87	+1.90 - 1.57 = +3.3	+1.54
2	+1.36 - 1.25 = +4.86	+2.90 - 1.22 = +1.68	+3.18
3	+1.57 - 0.96 = +2.55	+3.34 - 0.3 = +2.41	+1.4
4	+1.84 - 0.04 = +1.38	+3.92 - 4 = -3.96	-2.58
5	+1.52 + 1.04 = +3.84	+3.24 - 1.01 = 4.25	-4.1
6	+1.36 + 1.24 = +4.26	+2.9 - 1.21 = +4.11	+1.5
7	+0.36 + 1.81 = +3.61	+7.7 - 1.76 = +2.53	+1.08
8	+0.00 + 1.84 = +2.68	+0 + 1.79 = +1.79	+0.89
9	-0.69 + 1.72 = +2.25	+1.36 - 1.67 = +3.1	+1.4

-1.892 - 2.44

Average 1.32

Nominal Equations

$$+1.317 - 1.74 = +2.632$$

$$-1.74 + 1.730 = +1.317$$

$$-1.74 - 0.23 = +3.48$$

$$+1.707 + 1.665$$

$$+97.5$$

$$+1.317 + 2.632 + 1.70 + 2.802$$

$$+213.2$$

One measured 1.76° Average 0.0 + 6.6

$$\frac{120}{30} = 0.30$$

$$+ \frac{0.0}{30} + 2.20$$

$$\Delta 2 + 2.5$$

3669 Orion's mean Position (1913.0)

$$\begin{array}{r} X_0 = 17.6400 \\ \text{ia} = + 53 \\ \hline 17.6453 \end{array}$$

$$\begin{array}{r} Y_0 = 17.9640 \\ \text{ib} = + 34 \\ \hline 17.9674 \end{array}$$

From Plate Constants $X = 17.5858$ $Y = 18.0222$

$$z = -0.4142$$

$$\eta = -3.9778$$

$$\begin{array}{r} \log z = 9.61721 \\ \text{...} \\ 8.50724 \end{array}$$

$$\begin{array}{r} \log \eta = 0.59964 \\ 7.33115 \end{array}$$

$$1.11395$$

$$3.26849$$

$$X - A = - 13.00$$

$$\delta - D = - 30.556$$

$$A = 0.5709$$

$$D = +8.1527$$

$$\alpha_0 = 0.565600$$

$$\delta_0 = +7.44314$$

$$R_{\alpha} = + 2.91$$

$$R_{\delta} = + 20.4$$

$$\alpha' = 0.5658.91$$

$$\delta' = +7.4451.8$$

$$\text{Lunar par} = + 11.13$$

$$\text{Lunar par} = + 30.38.1$$

$$\alpha = 0.5710.04$$

$$S = +8.1529.9$$

$$\text{Tables} = 0.5709.40$$

$$\text{Tables} = +8.1525.2$$

$$O - C = + 0.64$$

$$O - C = + 4.7$$

$$\text{Plate cur.} + 0.01$$

$$\text{Curv.} + 0.9$$

$$+ 0.02$$

$$\text{2nd. ord. ref.} 0.0$$

$$\text{In Corr.} + 0.1$$

$$\alpha = 0.5710.06$$

$$\delta = +8.1530.0$$

$$O - C = + 0.66$$

$$O - C = + 7.8$$

3669 Moon's Mean Position (1913.0)

$$\begin{array}{r}
 X_0 = 17.6400 \quad Y_0 = 17.9640 \\
 \Delta\alpha = +1.07 \quad \Delta\delta = +4.9 \\
 \hline
 17.6507 \quad 17.9689
 \end{array}$$

From Plate Constants $X = 17.5924$ $Y = 18.0238$

$$\bar{z} = -0.4076$$

$$\eta = -3.9762$$

$$\begin{array}{l}
 \log \bar{z} = 9.61023 \\
 \text{mass} \quad 9.99602 \\
 8.50724
 \end{array}$$

$$\begin{array}{l}
 \log \tan \delta = 9.1338 \\
 \bar{z}^2 \quad 9.2205 \\
 7.0534 \\
 5.4077
 \end{array}$$

$$-(\alpha - A) = 1.10697$$

$$\begin{array}{l}
 \log \eta_0 = 0.59947 \\
 7.33115
 \end{array}$$

$$\alpha - A = 12.79$$

$$A = 0.5709$$

$$3.26832$$

$$\alpha_0 = 0.565621$$

$$\delta - D = 30.549$$

$$\text{Red} = +2.91$$

$$D = +8.1527$$

$$d' = 0.565912$$

$$s'_0 = +7.44321$$

$$\text{Red} = +20.4$$

$$s' = +7.44525$$

3669 Snows Mean Position (1913.0)

$$X = 176400$$

$$Y = 179640$$

$$a = +107$$

$$b = +49$$

$$176507$$

$$179689$$

Jwett's Constants $X = 17.5924$ $Y = 18.0238$

$$\xi = -0.4076$$

$$\eta = -3.9762$$

$$\log \xi = 9.61023$$

$$\log |\tan \delta| = 9.1338$$

$$\log \eta = 9.99602$$

$$\xi^2 = 9.2205$$

$$8.50724$$

$$7.0534$$

$$5.4077$$

$$(\alpha - A) = 110697$$

$$\log \eta_0 = 0.59947$$

$$\alpha - A = 1279$$

$$733115$$

$$A = 05709$$

$$326832$$

$$q_0 = 0565621$$

$$d - D = 30549$$

$$Red = +291$$

$$D = +81527$$

$$d' = 0565912$$

$$\delta_0 = +744321$$

$$Red = +204$$

$$\delta' = +744525$$

3669' Red. ad locum aph.

S $+7^{\circ} 44' 32''$

$$H+\alpha - 9^{\circ} 15.4 = 138^{\circ} 51'$$

$$H \quad 8 \quad 18.5$$

$$\alpha \quad 0 \quad 56.9$$

$$G \quad 21 \quad 41.5$$

$$G+\alpha \quad 22 \quad 38.4 = 339^{\circ} 36'$$

$$\log(G+\alpha) \quad 9.9719$$

$$S \quad 1.2190$$

$$\sin \dots \quad 9.5423m$$

$$\tan S \quad 9.1334$$

$$8.8239$$

$$8' \quad 1.1909$$

$$8 \quad 87186m$$

$$h \quad +2.10$$

$$8 \quad -0.05$$

$$h \quad +0.86$$

$$+291 \checkmark$$

$$\log \cos S \quad 9.9960$$

$$1 \quad 0.8377$$

$$(L) \quad 0.8337$$

$$\sin S \quad 9.1294$$

$$\cos(H+\alpha) \quad 9.8768m$$

$$h \quad 1.2851$$

$$\sin \dots \quad 9.8182$$

$$\sec S \quad 0.0040$$

$$\frac{1}{15} \quad 8.8239$$

$$h' \quad 0.2913m$$

$$h \quad 99312$$

$$8' \quad +15.52$$

$$8 \quad -1.96$$

$$1 \quad +642$$

$$+2038 \checkmark$$

3669' Red aa loam app

S 77° 44' 32"

H+α 9 154 = 138° 51'

H 8 185

α 0 569

G 21 41.5

G+α 22 38.4 = 339° 36'

log(G+α) 9 9719

S 1 2190

sin 9 5423m

tan 9 1334

8 8239

8 11909

8 87186-

+ 210

- 0.05

+ 0.86

+ 291

log cos S 9 9960

1 0 8377

(4) 0 8337

tan S 9 1294

cos(H+α) 9 8768m

L 1 2851

sin 9 8182

sec S 00040

+ 8 8239

L 02913m

L 99312

+ 5.52

- 1.96

+ 6.42

+ 20.38

Lunar Parallax

$$\begin{array}{r} 3669 \\ \alpha' = 0 \quad 56 \quad 59.12 \\ 6 - 1 \quad 12 \quad 45.0 \\ + \quad 15 \quad 45.88 \\ + \quad 3^\circ \quad 56' \quad 28'' \end{array}$$

$$+ \quad 1 \quad 23$$

$$+ \quad 3 \quad 55 \quad 05$$

$$9.95727$$

$$0.00000$$

$$0.00102$$

$$\hline 9.95829$$

$$\delta = 42 \quad 15 \quad 09.5$$

$$7 \quad 44 \quad 52.5$$

$$34 \quad 30 \quad 17$$

$$9.82640$$

$$8.19798$$

$$9.75318$$

$$0.17237$$

$$\hline 79.4993$$

$$\delta - \delta' = + 30 \quad 38.1$$

$$\delta = + 8 \quad 15 \quad 30.6$$

$$\text{Hant Allen } \delta = + 8 \quad 15 \quad 25.2$$

$$0 - c$$

$$+ 54$$

$$+ 0.85$$

See p 8 1/2.

$$\delta = + 7^\circ \quad 44' \quad 52.5''$$

$$\pi = 54' \quad 14.05''$$

$$9.86913$$

$$8.19798$$

$$8.83715$$

$$0.00399$$

$$\hline 69.0825$$

$$\alpha - \alpha' = + 2' \quad 46.99''$$

$$= + 11.13$$

$$\alpha = 0 \quad 57 \quad 10.25$$

$$\alpha = 0 \quad 57 \quad 09.40$$

3669 Lunar Parallax

$$\begin{array}{r} \alpha' = 0^{\circ} 56' 59.12 \\ 0 - 1 \quad 12 \quad 450 \\ + 15 \quad 4588 \\ + 3^{\circ} 56' 28'' \end{array}$$

$$+ 1 \quad 23$$

$$3 \quad 55 \quad 05$$

$$995727$$

$$000000$$

$$000102$$

$$995829$$

$$\delta = 42 \quad 15 \quad 09.5$$

$$7 \quad 44 \quad 52.5$$

$$34 \quad 30 \quad 17$$

$$982640$$

$$819798$$

$$975316$$

$$017237$$

$$794993$$

$$\delta - 5' + 30 \quad 38.1$$

$$\delta = +8 \quad 15 \quad 30.6$$

$$\text{Hant Allen } \delta = +8 \quad 15 \quad 25.2$$

$$0 - 2$$

$$+ 54$$

$$+ 0.85$$

$$\delta = +7 \quad 44 \quad 52.5$$

$$\pi = 54' \quad 14.05$$

$$986913$$

$$819798$$

$$883715$$

$$000399$$

$$690825$$

$$\alpha - \alpha' + 2 \quad 4699$$

$$+ 1113$$

$$\alpha = 0 \quad 57 \quad 10.25$$

$$\alpha = 0 \quad 57 \quad 09.40$$

Residuals giving (2) + (4) $\frac{1}{4}$ wt.

	O	C	O - C	Corr.
1	+18	+94 - 111 = -17	+35	+42 ✓
2	(+317)	(+38) - (22) = (+16)	(+63)	+64 ✓
3	+86	+166 - 66 = +100	-14	-16 ✓
4	-31	4 (48) + (1) = (+49)	(-57)	-64 ✓
5	+215	+161 + 71 = +232	-17	-22 ✓
6	+247	+149 + 85 = +234	+8	+4 ✓
7	+192	+38 + 124 = +162	+30	+37 ✓
8	+99	+0 + 127 = +127	-28	-17 ✓
9	+56	-68 + 128 = +60	-4	+16 ✓
				+136 = 120
				Average = 2.0

Arc measure: 176° Average (O - C) = +32 (2 + 4 full wt)

$$\frac{RC}{n} = +0.22$$

$$+\frac{32}{30} = +1.07 \quad \Delta n = +1.2$$

$$\text{Average (O - C)} = +2.2 \quad (2 + (4) \frac{1}{4} \text{ wt})$$

$$+\frac{2}{30} = +0.07 \quad \Delta n = 0.0$$

-11	+	3	+7 ✓
-16	+	2	+1 ✓
-19	+	2	-2 ✓
-22	-	0	-7 ✓
-18	-	2	-5 ✓
-17	-	2	-4 ✓
-4	-	4	+7 ✓
-0	-	4	+11 ✓
+8	-	3	+20 ✓

$$2RC = 1.83$$

$$-2RC = +0.73 + 15$$

$$-0.22 + 15.87 = +2.16$$

$$+ [] - 0 = +0.18$$

$$+15.87 = +2.37$$

$$\Delta b = +0.11 \quad \Delta d = +0.1$$

$$+8.28 = +6.65 + 0.03 = +6.68$$

$$\Delta a = +0.59 \quad \Delta q = +0.02$$

3669

With Comp $K^2 = 33739$

	O	C
1	+ 18	+ 78 - 78 = 0
2	+ 317	+ 119 - 64 = + 55
3	+ 86	+ 138 - 46 = + 92
4	- 31	+ 161 - 2 = + 163
5	+ 215	+ 133 + 50 = + 183
6	+ 247	+ 119 + 60 = + 179
7	+ 192	+ 32 + 88 = + 120
8	+ 99	+ 0 + 89 = + 89
9	+ 56	- 56 + 83 = + 27

O - C
+ 18
+ 262
- 6
- 194
+ 32
+ 68
+ 72
+ 10
+ 29

+ 491 - 200

Average = 77

Normal Equations

$$+ 13.17 - 1.74 = + 12.35$$

$$- 1.74 + 17.30 = + 6.67$$

$$+ 1.74 - 0.23 = + 1.63$$

$$+ 17.07 = + 82.5$$

$$b = + 48.4$$

$$+ 13.17 = + 12.35 - 84 = + 115.1$$

$$a = + 87.6$$

Using (2) + (4) $\frac{1}{4}$ wt.
normals

$$+ 8.28 - 0.22 = + 8.60 \quad + 6.65$$

$$- 0.22 + 15.84 = + 1.060 \quad + 2.16$$

$$+ 0.22 - 0.01 = + 0.23$$

$$+ 15.83 = + 1.083$$

$$b = + 68.8$$

$$+ 0.15 \Delta$$

$$+ 8.28 = + 8.60 + 15 = + 87.5$$

$$a = + 105.5$$

$$= + 0.81 \Delta$$

Arc 171

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

$$\frac{P}{n} = .25$$

$$+ 33$$

$$+ \frac{2}{.25} = + 8$$

$$\Delta R = + 0.1 \text{ Corrected}$$

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

$$\Delta R = + 0.3$$

3669

with Comp $K^2 = 3.3739$

0

0 - 0

1	+18	+78 - 78 =	0
2	+387	+119 - 14 =	+55
3	+86	+138 - 46 =	+92
4	-31	+161 + 2 =	+163
5	+205	+138 + 50 =	+183
6	+247	+119 + 60 =	+179
7	+192	+32 + 88 =	+120
8	+99	+6 + 89 =	+89
9	+56	+56 + 83 =	+127

+18
+262
-6
+194
+32
+68
+72
+10
+129

+491 - 200

Average = 77

Normal Equations

$$+13.17 - 1.74 = +1235$$

$$- 1.74 + 17.30 = +662$$

$$+ 1.74 - 0.23 = +163$$

$$+ 17.07 = +825$$

$$b = +48.4$$

$$+13.17 = +1235 - 84 = +1151$$

$$a = +87.6$$

Solving (2) + (4) $\frac{1}{4}$ wt.

$$+ 828 - 0.22 = +860$$

$$- 0.22 + 15.84 = +1060$$

$$+ 0.22 - 0.01 = +$$

$$+15.83 = +1083$$

$$b = +68.8$$

$$+ 8.28 = +860 + 15 = +875$$

$$a = +105.5$$

Arc 171

 $\frac{\Sigma V}{n}$ $\frac{f}{n} = .25$

+33

$$+33 = +1.3 \quad AR = +1.6$$

$$25$$

3783

Stars - Measures

13

	d	μ	d	μ
1	17025	15749	19700	14399
62	10649	1210004	1176770	1231016
96	5154	024	6570	0916
	25	29	00	89
	<u>9.6374</u>	<u>6.363</u>	<u>6.2068</u>	<u>2.085</u>
2	16506	19919	16291	14525
167	11162	1525050	1397074	711610
281	6060	59	76	1510
	01	05	79	17
	<u>28.5342</u>	<u>.5341</u>	<u>16.7687</u>	<u>7705</u>
3	11220	15970	18088	19240
30.5	15	15045	12520	14789
109	10303	4740	2919	8485
			90	31
	<u>20.9086</u>	<u>.9074</u>	<u>30.4434</u>	<u>4450</u>

Grade 3

3783

Stars - Spectra

13

d	n	d	n
1 17025	15749	19700	14399
62 10649	1210004	1176770	1231016
96 51	024	6870	09
25	29	00	89
96374	6361	6.2068	2085
2 16506	19919	16291	14825
167 11162	1525050	1397174	711610
25 60	59	76	1510
01	05	79	17
28.5342	5341	16.7687	7705
3 11220	15970	18088	19240
305 11	15045	12520	14789
29 10303	4740	2919	84
20.9086	9074	90	31
		304434	4450

Grade 3

3783

Moon Measures

$$\begin{array}{r}
 \text{d} \quad \text{N} \\
 \hline
 1 \quad 15309 \quad 15991 \\
 20.0 \quad 1073121 \quad 1056560 \\
 19.5 \quad 21 \quad 20 \\
 \quad 01 \quad 83 \\
 \hline
 19.4581 \quad 4578
 \end{array}$$

$$\begin{array}{r}
 \text{d} \quad \text{N} \\
 \hline
 1 \quad 15309 \\
 1073121 \\
 \quad 21 \\
 \quad 01
 \end{array}$$

$$\begin{array}{r}
 2 \quad 15312 \quad 15985 \\
 19.7 \quad 1093931 \quad 1032915 \\
 19.5 \quad 39 \quad 22 \\
 \text{min} \quad 06 \quad 75 \\
 \text{in} \quad 19.4373 \quad 4343 \\
 8
 \end{array}$$

$$\begin{array}{r}
 3 \quad 19311 \quad 16950 \\
 19.0 \quad 135525- \quad 1270099 \\
 19.6 \quad 70 \quad 8199 \\
 \quad 05 \quad 61 \\
 \hline
 19.5749 \quad 5739
 \end{array}$$

$$\begin{array}{r}
 4 \\
 18.5 \\
 20.0
 \end{array}$$

$$\begin{array}{r}
 19639 \quad 16040 \\
 1338082 \quad 123250- \\
 \quad 70 \quad 100 \\
 \quad 40 \quad 30 \\
 \hline
 1.83737 \quad 3719
 \end{array}$$

$$\begin{array}{r}
 5 \\
 17.9 \\
 20.0
 \end{array}$$

$$\begin{array}{r}
 14350 \quad 17480 \\
 1312919 \quad 868078 \\
 \quad 1019 \quad 77 \\
 \quad 60 \\
 \hline
 17.8769 \quad 8784
 \end{array}$$

$$\begin{array}{r}
 6 \\
 17.8 \\
 21.2 \\
 \text{min} \\
 \text{in} \\
 26
 \end{array}$$

$$\begin{array}{r}
 13315 \quad 15530 \\
 1186050 \quad 996969 \\
 \quad 60 \quad 71 \\
 \quad 20 \\
 \hline
 17.8542 \quad 8551
 \end{array}$$

~~15309~~
~~1013121~~
~~01~~
$$\begin{array}{r} 3 \\ 190 \\ 196 \end{array} \begin{array}{r} 19311 \\ 13552 \\ 70 \\ 05 \end{array} \begin{array}{r} 16950 \\ 1270099 \\ 8191 \\ 61 \end{array}$$

18.5
200

$$\begin{array}{r} 5 \\ \hline 179 \\ 240 \end{array}$$

6
178
212
mm
26

$$\begin{array}{r} 19639 \\ 1335082 \\ 70 \\ 40 \\ 153737 \end{array}$$
$$\begin{array}{r} 16040 \\ 12321 \\ \hline 3719 \end{array}$$

14350
13129,9
10,9
17.8769

17480
8680
7778
60
8784

13315
1186050
60
178542

$$\begin{array}{r} 18530 \\ 996969 \\ 71 \\ 20 \\ \hline 8551 \end{array}$$

3783

Moon Measurements

15

$$\begin{array}{r} 7 \\ 18.0 \\ 220 \end{array}$$

$$\begin{array}{r} 13279 \\ 64 \\ 13250 \end{array}$$

$$\begin{array}{r} 12793 \\ 12970 \\ 6477 \end{array}$$
180017.0023

$$\begin{array}{r} 8 \\ 19.0 \\ 22.9 \end{array}$$

$$\begin{array}{r} 1390921 \\ 16 \\ 13735 \end{array}$$
229820

$$\begin{array}{r} 12212 \\ 1201549 \\ 4649 \end{array}$$
9838

3783

Spoon Pickers

15

$$\begin{array}{r} 2 \\ 1802 \\ 220 \end{array}$$

$$\begin{array}{r} 1327919 \\ 64 \\ 13250 \end{array}$$

$$\begin{array}{r} 12993 \\ 1297077 \\ 64 \end{array}$$
180017.0023

$$\begin{array}{r} 8 \\ 190 \\ 229 \end{array}$$

$$\begin{array}{r} 1390971 \\ 16 \\ 137357 \end{array}$$
229820

$$\begin{array}{r} 12212 \\ 1105549 \\ 4649 \end{array}$$
.8838

3783 Times etc.

Expt. station	1913 Sept. 10	20 ^h 25 ^m	- 20 ^h 37 ^m
moon	20	30	36.9 - 20 30 37.4
clock/ast		2	25.1
H. Dist.	20	28	09.05 ^v 6 - α = +0 ^h 20 ^m
H. long	4	44	31.05 ^v
G. Dist.	25	12	40.10 ^v
Sig. T. in moon	11	15	39.32 ^v
Interval	13	57	00.78 ^v
Reduction		2	17.12 ^v
G. M. T.	13	54	436.6 ^v

From Mount Allen.	R. A.	Decl.
Moon 14 ^h	20 ^h 08 ^m 34.06 ^v	- 24° 36' 54.7 ^v
Position in 1 st = 2.15-32 ^v		80.17 ^v
" - 5.2723 ^v	-	11.35 ^v - 42.3 ^v
Tabular place	20 08	22.71 ^v - 24.37 37.0 ^v

Moon's age 10 days.

934 = 6.3 -	Parallax	54' 53.04 ^v
899 = 5.8	Semidiameter	14 58.8 ^v
934 = 6.1	R	898.8
899 = 5.7	Augmentation	+ 5.8 - 5.7
	Irradiation (3)	- 0.7
	R	903.9
	R	1.9376 - 975
c = - 503.2	1.9376	
	(1+a) R	18401
= - 479.2	R ²	33860
		19376
		- 928
		18448
	R ² =	34033

Turner etc.

3783	1913 Sept 10	20° 25'	- 20° 37'
moon		20 30 36.9	- 20 30 37.4
clock/alt		2 28.1	
H. Lat.		20 28 09.05	6 - x - + 0° 20'
H. long		4 44 31.05	
G. Lat.		25 12 40.10	
Sig T in moon		11 15 39.32	
Inclined		13 57 00.78	
Reduction		2 17.12	
G. L. T.		13 54 43.66	

Turner Point Area	R.A.	Rect.
moon 14"	20° 08' 34.06	- 24° 36' 54.7
moon in 1" 2.1532	8017	
" - 5.2723	11.35	423
Tabular place	20 08 22.67	- 24 37 37.0

moons age 10 days

parallel 54' 53.09
 perpendicular 14 588

$$934 = 63 -$$

$$819 = 58$$

Augmentation

Inclination (3)

R

R

~~1/2~~ R

(1+a) R

R²

$$c = -5032$$

$$= -9792$$

$$8988$$

$$+ 58$$

$$- 0.7$$

$$9039$$

$$1.9376 - 975$$

$$18401$$

$$33860$$

$$19376$$

$$- 928$$

$$18448$$

$$34033$$

3783

Plate Constants

x	y	R. A			Decl.		
6.2076	9.6368	19	59	54	-27	03	35
16.7696	28.5342	20	06	17	-24	29	04
30.4442	20.9080	20	14	33	-25	29	51
53.42	59.08	19	59	104	-76	61	90
17.81	19.69	20	06	55	-25	40	50
-18.	-22	+			+18		
19	231	20	07	00	-25	22	50
31	466						
6 ^s	1080						
	-18'						

Center of Plate $\left\{ \begin{array}{l} A = 20^h 07^m 00^s \\ \delta = -25^\circ 22' 50'' \end{array} \right.$

$$\begin{array}{rclcl}
 x - \bar{x} & +500x & -77.94 & +3.2x & -6607 \\
 +4234 + 3104 = 7338 & -751 = +6587 & +20 = +6607 & = & 0 \\
 +392 + 8385 = 8777 & -2223 = +6554 & +54 = +6608 & = & +1 \\
 -7083 + 15222 = 8139 & -1629 = +6510 & +97 = +6607 & = & 0 \\
 19.6949 + 9847 & -1657 & +63 & = & 19.8595 \\
 19.7002 + 9850 & -1658^{\checkmark} & +63^{\checkmark} & = & 19.8650^{\checkmark}
 \end{array}$$

$$\begin{array}{rclcl}
 y - \bar{y} & +500y & +81.22 & +18.54 & -12354 \\
 +6853 + 4818 = 11671 & +504 = +12175 & +178 = +12353 & = & -1 \\
 -3803 + 14267 = 10464 & +1362 = +11826 & +528 = +12354 & = & 0 \\
 -959 + 10454 = 9495 & +2472 = +11967 & +387 = +12354 & = & 0 \\
 21.2752 + 10638 & +1599 & +393 & = & 21.3028 \\
 21.2776 + 10639 & +1600^{\checkmark} & +394^{\checkmark} & = & 21.3055^{\checkmark}
 \end{array}$$

$$\begin{array}{lclcl}
 \text{Tables } a = +0.9 & c = -17.0 & a - c = +17.9 & b + a = -2.0 \\
 \text{Obs } a = -3.2 & c = -18.5 & a - c = +15.3 & b + a = -3.3 \\
 a = +503.2 & c = +518.5 & & &
 \end{array}$$

$$\begin{array}{rclcl}
 b - c & = 504.1^{\checkmark} & = 501.5^{\checkmark} & - & 2.6 \\
 & -4.1 & -1.5 & & -1.3
 \end{array}$$

3783

Plate Constants

2	7	R. A			Decl.		
6.2076	9.6368	19	59	54	-27	03	35
16.7696	28.5342	20	06	17	-24	29	04
30.4442	20.9080	20	14	33	-25	29	51
<u>53.42</u>	<u>59.08</u>	<u>59</u>	<u>79</u>	<u>104</u>	<u>-76</u>	<u>61</u>	<u>90</u>
17.81	19.69	20	06	55	-25	40	50
-18	22	+			+18		
19	231	20	07	00	-25	22	50
31	466						
<u>63</u>	<u>1080</u>	Center of Plate } A: 20 ^h 07 ^m 00 ^s D: -25 ^o 22' 50"					
	18'						

$$\begin{aligned}
 x-3 & +5002 & -7794 & +322 & -6607 \\
 +4234 & +3104:2338 & -751 & +6587 & +20 & +6607 & = & 0 \\
 +392 & +6385:6777 & -2223 & +6554 & +54 & +6608 & = & +1 \\
 -7083 & +15222:8139 & -1629 & +6510 & +97 & +6607 & = & 0 \\
 196999 & +9847 & -1657 & +63 & -1986595 & & & \\
 197002 & +9850 & -1658 & +63 & -198650 & & &
 \end{aligned}$$

$$\begin{aligned}
 y-7 & +5004 & +8122 & +1854 & -12354 \\
 +6853 & +4818:11671 & +504 & +12175 & +178 & +12353 & = & -1 \\
 -3803 & +19267:10464 & +1362 & +11826 & +528 & +12354 & = & 0 \\
 -959 & +10454:9495 & +2472 & +11967 & +347 & +12354 & = & 0 \\
 212752 & +10638 & +1599 & +393 & -213028 & & & \\
 212776 & +10639 & +1600 & +394 & -213055 & & &
 \end{aligned}$$

$$\begin{aligned}
 \text{Tables } a & = +0.9 & e & = -1.70 & a-b & = +1.79 & b+a & = -2.0 \\
 Q & = -3.2 & L & = -1.85 & a-L & = +1.53 & L+a & = -3.3 \\
 a & = +5032 & L & = +518.5 & & & &
 \end{aligned}$$

$$C-0 \quad +5041 \quad +501.5 \quad +1.8$$

Curvature of Plate

	ξ	η	$\Delta \xi$	-3.6ξ	-9.7η	-12
1	-12.21	-12.96	-97	+99 = -50	+61 = +11	+1
2	-12.69	+6.91	-2	+96 = +94	-32 = +12	-0
3	+13.15	-0.90	+55	-97 = +8	+4 = +12	0
M	+1.86	-0.69	0	-7	+3 = <u>-16</u>	
			$\Delta \eta$	-6.5η	-6ξ	$+5$
			-97	+84 = -13	+7 = -7	+1
			+34	-95 = -11	+7 = -6	-1
			-7	+6 = +2	-8 = -6	-1
M			0	+4	-1 = <u>+8</u>	

3783 Standard Coordinate-Comp. Stars

Cape W. 2773 mag 7.1				Cape W. 2785 mag 8.5				Cape W. 2806 mag 7.0			
C	19 ^h	59 ^m	05 ^s .98	20 ^h	05 ^m	29 ^s .88		20 ^h	13 ^m	46 ^s .20	
L			05.98			.97				.29	
E			06.06			.94					
Mean	19	59	06.01	20	05	29.93		20	13	46.22	
Proc		+	47.64		+	46.69			+	46.85	
S	19	59	53.65	20	06	16.62		20	14	33.07	
D	20	07	00	20	07	00		20	07	00	
S-D	-	7	06.35	-	0	43.38			+7	33.07	
tan(S-D)		-426.28			-43.38				+452.99		
log	262970	m		1.63729	m			2.65609			
log S	9.94965			9.95908				9.95550			
log S ₀	1.08659	m		0.10361	m			1.11883			
S ₀	-12.2064			-12.694				+13.1470			
S ₁	-	99		-	2			+	55		
S ₂	5.7842			16.7304				31.1525			
2C	6.2076			16.7696				30.4442			
2-S	+4234			+392				-7083			
C	-27°	05'	45".4	-24°	31'	20".3		-25°	32'	15".1	
L			45.4			20.3				15.3	
E			44.4			20.6					
Mean	-27	05	45.1	-24	31	20.4		-25	32	15.2	
Proc		+2	09.8		+2	16.1			+2	24.0	
S	-27	03	35.3	-24	29	04.3		-25	29	51.2	
D	-25	22	50	-25	22	50		-25	22	50	
S-D	-1	40	45.3		+53	45.7			-7	01.2	
tan(S-D)		-6047.0			+3226.0				-421.2		
log tan(S-D)	378154	m		3.50866				2.62449	m		
log	1.11269	m		0.83981				9.95564	m		
tan	9.7083	m		9.6584	m			9.6785	m		
tan ²	21.732			0.2072				2.2377			
tan ³	89349	m		6.9190	m			8.9696	m		
tan ⁴	-12.9624			+6.9153				-0.9029			
tan ⁵	-	861		-	8			-	932		
tan ⁶	8.9515			2.89145				21.0039			
tan ⁷	9.6368			2.85342				20.9080			
tan ⁸	+6.853			-3.803				-	959		

3783 Standard Coordinates - Compa Stars

Cape No. 2773 mag 7.1				Cape No. 2785 mag 8.5				Cape No. 2806 mag 9.1			
C	19° 59'	05.98		20° 05'	29.88			20° 13'	46.20		
L		05.98			97				29		
B		06.06			94						
mean	19	59	06.01	20	05	29.93		20	13	46.22	
Proc		+	47.64		+	46.69			+	46.65	
S	19	59	53.65	20	06	16.62		20	14	33.07	
D	20	07	00	20	07	00		20	07	00	
S-D	-	7	06.35	-	0	43.38			+7	33.07	
tan(A)		-426.28			-43.38				+452.99		
log	2.62970			1.63729				2.65609			
WDS	994965			995908				995550			
S ₀	108659			010361				111883			
S ₁	-12.2064			-12.694				+13.1470			
S ₂	-	99		-	2			+	55		
S ₃	57842			167304				311525			
S ₄	62076			167696				304442			
S ₅	+4234			+392				-7083			
C	-27° 05'	45.4		-24° 31'	20.3			-25° 32'	15.1		
L		45.4			20.3				15.3		
B		44.4			20.6						
mean	-27	05	45.1	-24	31	20.4		-25	32	15.2	
Proc		+2	09.8		+2	16.1			+2	29.0	
S	-27	03	35.3	-24	29	04.3		-25	29	51.2	
D	-25	22	50	-25	22	50		-25	22	50	
S-D	-1	40	45.3		+53	45.7			-7	01.2	
tan(A)		-6047.0			+3226.0				-421.2		
log tan(A)	3.78154			3.50866				2.62449			
log	1.11269			0.83981				9.95564			
tan S	9.7083			9.6584				9.6785			
S ₁	21732			02072				22377			
S ₂	89349			69190				89696			
S ₃	-12.9624			+69153				-09029			
S ₄	-	861		-	8			-	932		
S ₅	8.9515			289145				210039			
S ₆	96368			285342				209086			
S ₇	+6853			-3803				-	959		

1
2
3
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8

3783

Brooks Center

	x	$x - x_0$	Δx	$(x - x_0)^2$	$(x - x_0)^2 + (y - y_0)^2$
1	20.0000	+0.3030	-5	0.0913	3.4150
2	19.6470	0.0000	-5	0.0000	3.4051
3	19.0000	-0.6970	-4	0.4864	3.3985
4	18.3728	-1.3242	-3	1.7543	3.3932
5	17.8776	-1.8194	-0	3.3102	3.3878
6	17.8546	-1.8424	+0	3.3952	3.3952
7	18.0020	-1.6950	+2	2.8723	3.3953
8	19.0000	-0.6970	+4	0.4852	3.4018

	y	$y - y_0$	Δy	$(y - y_0)^2$		
1	19.4580	-1.8200	-31	3.3237	169	171°
2	19.4358	-1.8422	-31	3.4051	180 "	
3	19.5744	-1.7036	-29	2.9121	202 "	
4	20.0000	-1.2780	-22	1.6389	226 "	
5	21.0000	-0.2780	-5	0.0776	262 "	261
6	21.2780	0.0000	0	0.0000	270 "	
7	22.0020	+0.7220	+12	0.5230	293 "	
8	22.9829	+1.7049	+29	2.9166	337 "	
					Range	168

Approx. Center

$$x = 19.0 \quad y = 19.5744$$

$$\begin{array}{r} 22.9829 \\ \hline 42.5573 \end{array}$$

$$y_0 = 21.2786$$

$$y - \text{min} = 19.4358$$

$$R = 1.8428$$

$$x - \text{min} = 17.8546$$

$$x_0 = 19.6974$$

$$\text{Center} \left\{ \begin{array}{l} x_0 = 19.6970 + 60 = 19.7030 \\ y_0 = 21.2780 \end{array} \right.$$

see next page

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Approx Center

	x	$x - x_0$	Δx	$(x - x_0)^2$	$(x - x_0)(y - y_0)$
1	200000	+0.3030	-5	0.0913	3.4150
2	196970	00000	-5	0.0000	3.4051
3	190000	-0.6970	-4	0.4864	3.3985
4	183728	-1.3242	-3	1.7543	3.3932
5	178776	-1.8194	-0	3.3102	3.3878
6	178546	-1.8424	-0	3.3952	3.3952
7	180020	-1.6950	+2	2.8723	3.3953
8	190000	-0.6970	+4	0.4852	3.4018

	y	$y - y_0$	Δy	$(y - y_0)^2$	
1	19.4580	-1.8200	-31	3.3237	1.69
-2	19.4358	-1.8422	-31	3.4051	1.80
3	19.5744	-1.7036	-29	2.9121	2.02
4	20.0000	-1.2780	-22	1.6389	2.26
5	21.0000	-0.2780	-5	0.0776	2.62
6	21.2780	0.0000	0	0.0000	2.70
7	22.0000	+0.7220	+12	0.5230	2.93
8	22.9829	+1.7049	+12	2.9166	3.37
					Range 1.63

Approx Center

$$x = 19.0 \quad y = 19.5744$$

$$\frac{22.9829}{42.5573}$$

$$y = 21.2786$$

$$y_{\text{min}} = 19.4358$$

$$y_{\text{max}} = 1.8428$$

$$x_{\text{min}} = 17.8546$$

$$x_{\text{max}} = 19.6974$$

$$\text{Center } \left\{ \begin{array}{l} x_0 = 19.6970 + 60 = 19.7030 \\ y_0 = 21.2780 \end{array} \right.$$

3783

	x	$x - x_0$	Δx	$(x - x_0)^2$	$(x - x_0)^2 + (y - y_0)^2$	$0 - y$
1	20.0000	+0.2970	-5	0.0879	3.4116	+2.56
2	19.6970	0.0000	-5	0.0000	3.4051	+1.91
3	19.0000	-0.7030	-4	0.4948	3.4069	+2.09
4	18.3728	-1.3302	-3	1.7702	3.4091	+2.31
5	17.8776	-1.8254	0	3.3321	3.4097	+2.37
6	17.8546	-1.8484	0	3.4165	3.4165	+3.05
7	18.0020	-1.7010	+2	2.8927	3.4157	+2.97
8	19.0000	-0.7030	+4	0.4936	3.4102	+2.42

comp K^2 (3.3860)corrected $K^2 = 3.4033$ $(y - y_0)^2$

3.3237

3.4051

2.9121

1.6389

0.0776

0.0000

0.5230

2.9166

3783

	x	$x - X_0$	Δx	$(x - X_0)^2$	$(x - X_0)(y - Y_0)^2$	$y - Y_0$
1	200000	+02970	-5	0.0879	3.4116	+256
2	196970	00000	-5	0.0000	3.4051	+191
3	190000	-07030	-4	0.4948	3.4069	+209
4	183728	-13302	-3	1.7702	3.4091	+231
5	178776	-18254	0	3.3321	3.4097	+237
6	178546	-18484	0	3.4165	3.4165	+305
7	180020	-17010	+2	2.8927	3.4157	+297
8	190000	-07030	+4	0.4936	3.4102	+292

Comp K^2 (33860)

Corrected $R^2 = 34033$

$(y - Y_0)^2$

33237

34051

29121

1.6389

0.0776

0.0000

0.5230

29166

Formulation of Normals.

	ab	am	bu	{173.a}	{173.b}
1	-0.55	+ 76.8	-466.0	+ 51.9	- 314.9
2	-0.00	+ 0.0	-351.8	+ 0.0	- 318.3
3	+1.19	-146.3	-355.5	-121.1	- 294.1
4	+1.70	-307.0	-295.8	-230.1	- 221.4
5	+0.51	-432.4	- 66.4	-316.6	- 48.4
6	-0.00	-564.0	+ 0.0	-320.0	+ 0.0
7	-1.22	-505.2	+213.8	-294.1	+124.6
8	-1.19	-169.5	+412.0	-121.1	+294.1
	<u>+0.44</u>	<u>-2047.6</u>	<u>-909.7</u>	<u>-1351.1</u>	<u>-778.4</u>
		<u>+1351.1</u>	<u>+778.4</u>		
		<u>-696.5</u>	<u>-1313</u>		

3783

Ononis Centuri

Conditional Equations

	a	b	0	c	0-c
1	+0.30	-1.82	= +256	-49+103 = +54	+202
2	+0.00	-1.84	= +191	-0+104 = +104	+87
3	-0.70	-1.70	= +209	+114+96 = +210	-1
4	-1.33	-1.28	= +231	+216+73 = +289	-58
5	-1.83	-0.28	= +237	+267+16 = +283	-76
6	-1.84	+0.00	= +305	+300-0 = +300	+5
7	-1.70	+0.72	= +297	+276-41 = +235	+62
8	-0.70	+1.70	= +242	+114-96 = +18	+224
9					
1					

+580-135
Average = 89

Normal Equations

$$+12.49 + 0.44 = -2048$$

$$+0.44 + 14.80 = -910$$

$$-0.44 - 0.02 = +12$$

$$+14.78 = -838$$

$$b = -56.8$$

$$+12.49 - -2048 + 25 = -2023$$

$$a = -162.2$$

Arc measured 167° Average (0-c) = ~~+56~~ +15

$$\frac{pe}{n} = 0.23$$

$$\frac{+56}{23} = +2.42$$

$$\Delta a = +2.7$$

$$+\frac{15}{23} = +0.65$$

$$\Delta n = +0.7$$

2783

Orion's Center Conditional Equations

	a	b	0	c	0-c
1	+0.30	-1.82	+2.56	-49+103	+54
2	+0.00	-1.84	+1.91	-0+104	+104
3	-0.70	-1.70	-2.09	+114+96	+210
4	-1.33	-1.28	-2.31	+216+73	+289
5	-1.83	-0.28	-2.37	+247+16	+313
6	-1.85	+0.00	-1.30	+300-0	+300
7	-1.70	+0.72	-2.97	+276-41	+235
8	-0.70	+1.70	-2.42	+114-96	+18
9					
1					

+580 - 135
Average = 89

Normal Equations

$$+1249 + 0.44 = -2048$$

$$+0.44 + 19.80 = -910$$

$$-0.44 - 0.02 = +72$$

$$+1478 = -838$$

$$b = -56.8$$

$$+1249 = -2048 + 25 = -2023$$

$$a = -1622$$

Arc measured 1.67° Average (0-c) = ~~556~~ + 135

$$\frac{bc}{m} = 0.73$$

$$\frac{+56}{25} = +2.24 \quad \frac{+27}{25} = +1.08$$

$$+ \frac{135}{25} = +5.40 \quad \Delta = +0.7$$

3783 Moon's mean Position (1913.0)

$$X_0 = 19.7030$$

$$Y_0 = 21.2780$$

$$\frac{1}{2} \frac{d^2}{dt^2} = \frac{81}{19.6949}$$

$$\frac{1}{2} \frac{d^2}{dt^2} = \frac{28}{21.2752}$$

$$19.6949$$

$$21.2752$$

From Plate constants $X_0 = 19.8595$ $Y_0 = 21.3028$

$$\bar{x} = +1.8595$$

$$\eta = -0.6972$$

$$\log \bar{x} = 0.26940$$

$$\log \tan \delta = 9.6785m$$

$$\log \bar{y} = 9.95560$$

$$0.5388$$

$$8.50724$$

$$7.0534$$

$$7.2707m$$

$$(x-A) = 1.80656$$

$$(\delta-H)' = -17$$

$$x-A = +1.0400$$

$$\eta_0 = -0.6953$$

$$A = 20.0700$$

$$\log \eta_0 = 9.84217m$$

$$x_0 = 20.080406$$

$$7.33115$$

$$\text{Red.} = +3.80$$

$$2.51102m$$

$$x' = 20.080786$$

$$(\delta-D) = -5.24.4$$

$$U = -25.22.50$$

$$S_0 = -25.28.14.4$$

$$\text{Red.} = +1.2$$

$$S' = -25.28.13.2$$

3783 Oroom mean Position (19130)

$$\begin{array}{r}
 X_0 = 197030 \\
 \text{cor} = -81 \\
 \hline
 196949
 \end{array}
 \qquad
 \begin{array}{r}
 Y_0 = 212780 \\
 \text{cor} = -28 \\
 \hline
 212752
 \end{array}$$

From Platiconstant $X = 198595$ $Y = 213028$

$$z = +1.8595$$

$$\eta = -0.6972$$

$$\log z = 0.26940$$

$$\log \eta = 9.95560$$

$$8.50724$$

$$(x-1) = 1.80656$$

$$x-A = +1.0406$$

$$A = 20.0700$$

$$y_0 = 20.080406$$

$$\text{Red} = +3.80$$

$$y = 20.080786$$

$$\log \tan \delta = 9.6785$$

$$0.5388$$

$$7.0539$$

$$7.2707$$

$$\log \eta = -1.9$$

$$\eta = -0.6953$$

$$\log \eta = 9.89217$$

$$7.33115$$

$$2.51102$$

$$(S-D) = 5.244$$

$$D = -25.2250$$

$$S = -25.28144$$

$$\text{Red} = +1.2$$

$$S = -25.28132$$

3753

Red. ad locum aph.

$$\delta = -25^{\circ} 23'$$

$$H + \alpha = 3^{\circ} 00' = 45^{\circ}$$

$$H \quad 6 \quad 53$$

$$\alpha \quad 20 \quad 07$$

$$G \quad 21 \quad 49$$

$$G + \alpha = 17 \quad 56 = 269^{\circ}$$

$$l \cos s = 99559$$

$$l \quad 0.9609$$

$$(i) \quad 0.8568$$

$$l \cos(G + \alpha) \quad 82419^m$$

$$g \quad 12456^m$$

$$\sin \quad 99999^m$$

$$\tan s \quad 9.6762^m$$

$$8.8239$$

$$g' \quad 94875^m$$

$$g \quad 97456^m$$

$$f \quad +2.26$$

$$g \quad +0.56$$

$$h \quad +0.98$$

$$+3.80 \checkmark$$

$$\sin s \quad 9.6321^m$$

$$\cos(H + \alpha) \quad 9.8495$$

$$h \quad 1.2755^m$$

$$\sin \quad 9.8495$$

$$\sec s \quad 0.0441$$

$$8.8239$$

$$h' \quad 0.7571^m$$

$$h \quad 9.9930$$

$$g' \quad -0.31^m$$

$$h' \quad -572$$

$$i \quad +7.19$$

$$+1.16 \checkmark$$

3783 Red ad locum aph.

$$H + \alpha = 3 \quad 0 \quad 0 \quad 45^\circ, \quad \delta = -25^\circ 23'$$

$$H \quad 6 \quad 5 \quad 2$$

$$q \quad 20 \quad 0 \quad 7$$

$$G \quad 21 \quad 4 \quad 9$$

$$G + \alpha = 17 \quad 56 \quad -269^\circ$$

$$l \cos S = 99559$$

$$i \quad 09009$$

$$(L) \quad 08568$$

$$l \cos(G + \alpha) \quad 82419m$$

$$q \quad 12456$$

$$\sin \quad 99999m$$

$$\tan \quad 96762m$$

$$8239$$

$$8' \quad 99875m$$

$$8 \quad 97456m$$

$$l \quad +226$$

$$q \quad +056$$

$$L \quad +0.98$$

$$+380$$

$$\sin S \quad 96321m$$

$$\cos(H + \alpha) \quad 98495$$

$$h \quad 12715$$

$$\sin \quad 98495$$

$$\sec S \quad 0.0441$$

$$8.8239$$

$$h' \quad 07571m$$

$$h \quad 99930$$

$$q' \quad -031$$

$$h' \quad -572$$

$$i \quad +7.19$$

$$+1.16$$

3783

Lunar Parallax.

$$\alpha' = 20^{\circ} 08' 07.86''$$

$$\delta = 20^{\circ} 28' 09.05''$$

$$\delta - \alpha = +20^{\circ} 01.2''$$

$$+ 5^{\circ} 00' 18''$$

$$+ 1^{\circ} 57'$$

$$+ 4^{\circ} 58' 20''$$

$$9.95727^{\circ}$$

$$0.00000^{\circ}$$

$$0.00163^{\circ}$$

$$9.95890^{\circ}$$

$$8.421735^{\circ}$$

$$25^{\circ} 28' 13''$$

$$67^{\circ} 45' 48''$$

$$9.82640$$

$$8.20316$$

$$9.96644$$

$$0.17204$$

$$8.16804$$

$$\delta - \delta' = +50^{\circ} 37.3''$$

$$\delta = 24^{\circ} 37' 38.9''$$

$$\alpha = 20^{\circ} 08' 23.44''$$

$$\text{Hantellus } \delta = 24^{\circ} 37' 37.1''$$

$$\alpha = 20^{\circ} 08' 22.67''$$

$$0 - c$$

$$+ 1.2$$

$$+ 0.77$$

$$+ 2.5$$

$$+ 0.95$$

$$\delta' = 25^{\circ} 28' 13.2''$$

$$\Pi = 54^{\circ} 53.04'$$

$$9.86913$$

$$8.20316$$

$$8.94073$$

$$0.04142$$

$$7.05444$$

$$\alpha - \alpha' = + 3^{\circ} 53.81''$$

$$+ 1^{\circ} 5.58''$$

3783

Lunar Parallax

$$\alpha = 20^{\circ} 08' 07.86''$$

$$\delta = 20^{\circ} 28' 09.05''$$

$$\begin{aligned} \alpha - \alpha' &= +20^{\circ} 01.2'' \\ &+ 5^{\circ} 00' 18'' \end{aligned}$$

$$+ 1^{\circ} 57'$$

$$+ 7^{\circ} 58' 20''$$

$$\begin{array}{r} 995727 \\ 000000 \\ 000163 \\ \hline 995890 \end{array}$$

$$\delta = 42^{\circ} 17' 35''$$

$$25^{\circ} 25' 13''$$

$$67^{\circ} 45' 48''$$

$$\begin{array}{r} 982640 \\ 820316 \\ 996644 \\ 017204 \\ \hline 826804 \end{array}$$

$$\delta - \delta' = +59^{\circ} 37.3''$$

$$S = -24^{\circ} 37' 35.9''$$

$$\text{Hantell's } S = -24^{\circ} 37' 37.1''$$

$$O - C$$

$$+ 1.2''$$

$$+ 2.5''$$

$$\delta = 25^{\circ} 28' 13.2''$$

$$\pi = 54' 53.09''$$

$$986913$$

$$820316$$

$$894073$$

$$004142$$

$$\hline 705444$$

$$\alpha - \alpha' = + 3' 53.81''$$

$$+ 1^{\circ} 55.8''$$

$$\alpha = 20^{\circ} 08' 23.44''$$

$$\alpha = 20^{\circ} 08' 22.67''$$

$$+ 0.77''$$

$$+ 0.95''$$

-a	-b	-22 + ΔC
- 4	+ 11	- 15 ✓
- 0	+ 11	- 11 ✓
+ 10	+ 10	- 2 ✓
+ 19	+ 8	+ 5 ✓
+ 26	+ 2	+ 6 ✓
+ 26	- 0	+ 4 ✓
+ 24	- 4	- 2 ✓
+ 10	- 10	- 22 ✓

from page 20
0.355

$$+12.79 + 0.77 = -7.81 \Delta$$

$$+0.77 + 17.80 = -7.50 \Delta$$

$$+ [] + 0.02 = -0.37 \Delta$$

$$+17.78 = -7.16 \Delta$$

$$\Delta b = -0.28 \Delta$$

$$+12.79 = -7.81 \Delta + 0.12 \Delta$$

$$= -7.69 \Delta$$

$$\Delta a = -0.62 \Delta$$

3783 Corrected Solution,
with $R^2 = 3.4033$

	O		L	O-L	Corr.
1	+ 83	- 17	+ 13 = - 4	- 187	+ 72 "
2	+ 18	- 0	+ 13 = + 13	+ 5	- 6 "
3	+ 36	+ 39	+ 12 = + 51	- 15	- 17 "
4	+ 58	+ 74	+ 9 = + 83	- 25	- 20 "
5	+ 64	+ 101	+ 2 = + 103	- 39	- 33 "
6	+ 132	+ 102	- 0 = + 102	+ 30	+ 34 "
7	+ 124	+ 94	- 5 = + 89	+ 35	+ 33 "
8	+ 69	+ 39	- 12 = + 27	+ 42	+ 20 "
				+ 199	- 79

Normal Equations: Average = 36

$$+ 12.49 + 0.44 = - 696$$

$$+ 0.44 + 1480 = - 131$$

$$- 0.44 - 0.02 = + 25$$

$$+ 1478 = - 106$$

$$b = - 7.2$$

$$+ 12.49 = - 696 + 3 = - 693$$

$$a = - 55.5$$

from page 21

are measured 167°

$$\Delta R = + 0.7$$

In 7.5° R 1.87

$$\text{Corr} = + 0.3$$

$$- 2 RC = - 1.10$$

$$\Delta R = + 0.7$$

$$\Delta b = + 0.31$$

$$\Delta s = + 0.2$$

$$\Delta a = + 0.68$$

$$\Delta q = + 0.03$$

1
2
3
4
5
6
7
8

3783 Corrected Solution.
with $R^2 = 34033$

	O		L		O-L
1	+ 83	- 17 + 13	= - 4		- 87
2	+ 18	- 0 + 13	= + 13		+ 5
3	+ 36	+ 39 + 12	= + 51		- 15
4	+ 58	+ 74 + 9	= + 83		- 25
5	+ 64	+ 101 + 2	= + 103		- 39
6	+ 132	+ 102 - 0	= + 102		+ 30
7	+ 124	+ 94 - 5	= + 89		+ 35
8	+ 69	+ 39 - 12	= + 27		+ 42

+199 - 79

Normal Equations. Average = 36

$$+ 1249 + 044 = - 696$$

$$+ 044 + 1480 = - 131$$

$$- 044 - 0.02 = + 25$$

$$+ 1478 = - 106$$

$$b = - 72$$

$$+ 1249 - 696 + 3 = - 693$$

$$a = - 555$$

Irrad. Corr $\alpha = +0.^s03$ $\delta = +0.2$
 $\alpha = 20^h 08^m 23.^s65$ $\delta = -24^\circ 37' 33.''9$
 $O-C = +0.^s97$ $O-C = +3''.1$

3783 Moon's Mean Position (1913.0)

$$\begin{array}{r}
 X_0 = 19.7030 \quad Y_0 = 21.2780 \\
 -a = -28 \quad -b = -4 \\
 \hline
 19.7002 \quad 21.2776
 \end{array}$$

From Plate Constant $X = 19.8650$ $Y = 21.3055$

$$z = +1.8650$$

$$\eta = -0.6945$$

$$\begin{array}{r}
 \log z = 0.27068 \\
 9.95560 \\
 8.50724 \\
 \hline
 1.80784
 \end{array}$$

$$\begin{array}{r}
 \log \tan z = 9.6779 \text{ m} \\
 0.5414 \\
 7.0534 \\
 \hline
 7.2727 \text{ m}
 \end{array}$$

$$\alpha - A = + 01 \quad 04.24$$

$$\begin{array}{r}
 \eta_1 = - 19 \\
 \eta_0 = -0.6926
 \end{array}$$

$$A = 20 \quad 07 \quad 00$$

$$\begin{array}{r}
 \log \eta_0 = 9.84048 \text{ m} \\
 7.33115
 \end{array}$$

$$X_0 = 20 \quad 08 \quad 04.24$$

$$\text{Red} = + 3.80$$

$$(d-D) = 250933 \text{ m}$$

$$S-D = - 5 \quad 23.1$$

$$\alpha_1 = 20 \quad 08 \quad 08.04$$

$$D = 25 \quad 22 \quad 50$$

$$\text{Lunar Par.} = + 15.58$$

$$S_0 = -25 \quad 28 \quad 13.1$$

$$\alpha = 20 \quad 08 \quad 23.62$$

$$\text{Red} = + 1.2$$

$$\text{Tables} = 20 \quad 08 \quad 22.71$$

$$S' = -25 \quad 28 \quad 11.9$$

$$O-C = 0.91$$

$$\text{Lunar par} + 50 \quad 37.3$$

$$-0.05$$

$$S = -24 \quad 37 \quad 34.6$$

$$\text{Tables} = 24 \quad 37 \quad 37.0$$

$$O-C = + 2.4$$

$$\text{curr.} + 0.7$$

3783 Known Mean Position (1913.0)

X: 19.7030 Y: 21.2780

- 28	- 4
<hr/> 19.7002	<hr/> 21.2776

From Plate Constant X = 19.8650 Y = 21.3055

 $z = 1.18650$ $z_1 = -0.6945$ $\log S = 0.27068$

9.95560

8.50724

1.80784

 $\log \tan S = 9.6779$

0.5414

7.0534

7.2727

 $\alpha - A = 01.0924$ $\eta_1 = 19$ $\eta_2 = -0.6926$

A 20.07.00

 $\log \eta_1 = 9.84048$

7.33115

 $\alpha_c = 20.08.04.24$ $(d-1) = 2.50933$

Red = 3.50

 $S-D = 5.23.1$ $\alpha_1 = 20.08.08.04$ $D = -25.22.50$

Lunar Par = 15.58

 $S_1 = -25.28.13.1$ $\alpha = 20.08.23.62$

Red = 1.2

Tables 20.08.22.77

 $S = -25.28.11.9$

O-C 0.91

Lunar par + 50 37.3

-0.05

 $S = -29.37.34.6$

- Tables = 29.37.37.0

O-C = 2.4

Curv + 0.7

