

KG

11366

v.1007

CLV

155



11009

11006

11039

1
13
2
13
15
3
3
15
2
2
1
3
2
1
+

11004 x	Stars	1	2	1
1	20106	20082	19062	20620
13.7	13390	16800	15788	13907
23.8	90	90	62	08
	02	58	62	24
	<u>13.6719</u>	<u>13.6722</u>	<u>23.3297</u>	<u>23.3283</u>

2	20380	20246	192307	19712
13.8	13542	17089	183821	10242
19.1	40	88	82	36
	78	42	18230	02
	<u>13.6838</u>	<u>13.6842</u>	<u>19.0898</u>	<u>14.0536</u>

3	20250	20536	19656	20084
34.3	17384	13912	17772	11940
14.2	88	08	72	44
	52	28	40	82
	<u>34.2864</u>	<u>34.2882</u>	<u>14.1881</u>	<u>14.1859</u>

	1st Measure	2nd Measure	
1	19868	20108	20088
26	14694	19927	15184
15.5	88	33	70
	60	90	62
	<u>15.5173</u>	<u>15.5169</u>	<u>15.5102</u>

2	18172	19318	2nd Star
26.4	14620	12888	d.v.
16	10	88	19500
	70	08	18992
	<u>26.3556</u>	<u>26.3576</u>	38

3	20218	20272	14.0560
26.6	14224	16288	
17	24	78	
+X	12	62	
	<u>26.5991</u>	<u>26.6015</u>	

Poor plate

11004

1st Star

1

1	20106	20082	19062	20620
3.7	13390	16800	15788	13909
3.9	90	90	62	88
	02	58	82	24
	<u>13.6719</u>	<u>13.6722</u>	<u>23.3297</u>	<u>23.3283</u>

2	20380	20296	19230	19712
13.8	13592	17089	18382	10292
19.1	90	88	82	36
	78	92	19230	02
	<u>13.6828</u>	<u>13.6892</u>	<u>19.0898</u>	<u>19.0536</u>

2	20250	20536	19656	20089
17.3	17389	13912	17772	11990
19.2	88	08	72	99
	52	28	90	82
	<u>39.2869</u>	<u>39.2882</u>	<u>19.1881</u>	<u>19.1859</u>

Mid Meridian

1	19868	20108	20088
26	14699	19927	15189
15.5	88	33	70
	60	90	62
	<u>15.5173</u>	<u>15.5169</u>	<u>15.5102</u>

2	18172	19318	20088
26.9	14620	12888	15189
16	10	88	70
	70	08	62
	<u>26.3556</u>	<u>26.3576</u>	<u>15.5102</u>

3	20218	20272	190560
26.6	19299	16288	
17	29	78	
18	12	62	
	<u>26.5991</u>	<u>26.6015</u>	

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Moon Measures

2.

2	19282	20224
26.3	16172	13586
18	78	72
	82	18
	<u>26.3107</u>	<u>26.3125</u>

5
26.0
18.7

20157	19990
16118	19028
20	29
50	86
<u>18.4037</u>	<u>18.4038</u>

6
24.7
19
+4

8	
18678	Est. 19746
18658	9796
8702	72
<u>19.0051</u>	<u>19.0049</u> Est

7
29.0
18.9

19813	20432
10559	19642
58	40
09	36
<u>18.9246</u>	<u>18.9202</u>

8	20426	19800
23.5	16368	13831
18.6	16380	30
	12	798
	<u>23.4047</u>	<u>23.4031</u>

19878	20096	109
13302	16552	70
296	62	77
42	96	00
<u>18.6516</u>	<u>18.6468</u>	↑

11009

Moon Measure

2.

9	19282	20224
26.3	16172	13586
18	78	92
	82	18
	<u>26.3107</u>	<u>26.3125</u>

5
26.0
18.9

20159	19990
16118	19024
20	29
92	86
<u>18.9039</u>	<u>18.9038</u>

6
29.7
19
+4

8	
18868	Est. 19796
18658	9796
8702	92
<u>19.0054</u>	<u>19.0097</u> Est

7
29.0
18.9

19813	20932
10559	19692
98	90
09	36
<u>98.9296</u>	<u>98.9202</u>

8	20926	19800
235	16368	13831
18.6	16380	30
	12	798
	<u>23.9097</u>	<u>23.9031</u>

19808	20096	109
13302	16552	70
296	62	77
12	96	00
<u>18.6516</u>	<u>18.6468</u>	7

A + 3.3
B + 4.2

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Times Etc.

Aug 13th

checked

Epp. to Stars	23	42	23	59
" " Moon	23	47	43.7 [✓]	23 47 43.9 [✓]
clock fast		8	19.8 [✓]	
H. Sid Time	23	39	27.0 [✓]	$\delta - \alpha = + 1^h 27^m$
H Long.	7	44	31.05 ⁻	
G. Sid T.	28	23	55.05 [✓]	
Sid T. M. Noon	9	26	21.31 ⁻	
Internal	18	57	33.74 ⁻	
Reduction		3	6.36 ⁻	
G.M.T.	18	54	27.38 ⁻	

From Nant Allen.		P.A.		hloc.	
Moon 18 ^h	22	10	11.35 ⁻	- 8	16 32.2
Motion m/m			226.29 [✓]	+ 17	19.5 ⁻ $1^m = 15.789$
" 54.7563	+ 2		3.23 ⁻	- 8	0.1 12.7 [✓]
Tabular Place	22	12	14.78		

Moon's Age 15 days

Parallax	60	30.7 [✓]
Semid.	16	30.8 [✓]
R		990.8 [✓]
Aug.		10.2 ⁻
Std. (T)		- 0.6
R		1000.7 [✓]
R		2.14 9.5 [✓]
alt		1027 ⁻
(1+a)R		20718 [✓]
R ²		4.1690 ⁻

9392 9.1[✓]

$$\begin{array}{r}
 a = -502.7^{\checkmark} \\
 + 29 \\
 \hline
 478.7^{\checkmark}
 \end{array}$$

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Times Etc.

3

Aug 13

Epp to Stars	23	92		23	59	
" " Moon	23	97	93.7	23	97	93.9
Clock fast		8	19.8			
H. Sid Time	23	39	27.0	$\delta - \epsilon = + 1^h 2.7^m$		
H Long.	9	99	31.05			
G Sid J	28	23	55.05			
Sid J. M. Noon	9	26	21.31			
Interval	18	57	33.79			
Reduction		3	6.36			
G.M.T.	18	54	27.38			

From Hunt Alm	H.A.		H.C.		
Moons 18"	22	10	11.55	- 8	16 32.2
Motion in 1 ^m			22629"	+ 19	19.5 - 15.789
" " 59.9563	+ 2		3.23	- 8	02 12.74
Intular Plane	22	12	17.78		

Moons Age 15 Days

Parallat	60	30.7"
Semid.	16	30.8"
R		990.8"
Aug		10.2
Ind (P)		- 0.6
R		1000.7"
R		2.1495"
alt		10.27"
(1+a)R.		20718"
R		7.1690"

139 = 9.1"

$$\begin{array}{r}
 a = -502.7'' \\
 + 2.9 \\
 \hline
 978.7''
 \end{array}$$

Curr. Corr

ζ	η	$\Delta \zeta$	$- \Delta \eta$	-7η	$- \delta$
-8.86	-3.98	-3.7	+3.5	+1	+3
-8.89	+5.77	-2.8	+3.6	+8	-7
+12.77	-3.78	+5.3	-5.1	+2	+2
$M = +2.55$		-10	+6	-8	-0.03

$\Delta \eta$	-2.64	$+2.13$	$+18$
-9	+10	+1	-18
+16	-15	+1	-18
-54	+70	-77	+26
M	-0.92	+2	+5
			+29 ⁵
			= + <u>1.2</u>

Plate Center & Constants

x	y	x	y	x	y
(R) 13.6718	23.3290	22 05	3.9	-7 57	01.7
(V) 13.6840	19.0578	22 05	3.9	-9 12	95.8
39.2873	19.1870	22 16	23.9	-9 11	13.2
2) 97.9713	28.2718	21	29.3	18 23	61.0
23.9856	17.1209	22 10	48.6	-9 12	0.5
22	18.	-1	1.7	+30	9.6
-1.99	3.8791	22 9	42.9	-8 81	50.9
312	766.5				
-61.69	301.9.6				

Plate Center { A 22 09 43
D -8 41 54.

$$\begin{array}{rclcl}
 x-y & +500x & -18.1y & +2.17x & -12079 \\
 +5759 + 6892 = +12296 - 259 = & 12092 + 37 = & 12079 & 0 \\
 +5628 + 6836 = 12464 - 922 = & 12092 + 37 = & 12079 & 0 \\
 -9902 + 17199 = 12292 - 256 = & 11986 + 90 = & 12079 & 0 \\
 24.5562 + 12278 - 307 = & +66 = & 24.5520 &
 \end{array}$$

$$\begin{array}{rclcl}
 y-y & +500y & +20x & +6y & -7839 \\
 +959 + 7027 = +7781 + 279 = & +7755 + 84 = & +7839 & 0 \\
 -9238 + 11667 = 7926 + 273 = & 7699 + 140 = & 7839 & 0 \\
 -19 + 7093 = 7079 + 686 = & 7765 + 83 = & 7890 & +1 \\
 16.9612 + 8781 + 891 = & +102 = & 17.0897 &
 \end{array}$$

$$\begin{array}{rclcl}
 \text{Table} & a = -1.6 & c = -4.9 & a-c = +4.3 & b+d = -4.0 \\
 \text{Obs.} & = -502.7 & = -506. & = +3.7 & = -1.9
 \end{array}$$

$$b-c -502.1 -501.1 +2.1$$

Cape 071 - m9 2.6

C	22	09	13.03
L			13.06
E	22	0	13.05
	22	09	13.05
			50.89
	22	05	03.89
	22	09	73
	-	9	39.11
	-	2	77.09
	2.9	95	79 n
	9.9	9	36
	0.9	9	73 9 n

- 8,8580

- 39

13,1386

13,6890

+ 5,459

C - 9 17 26.6

L 26.9

E 26.9

- 9 17 26.8

+ 9 94.0

- 9 12 85.8

- 8 40 57.0

- 0 30 59.8

- 1859.7

3.26 83.2 n

0.59 94.7 n

Cape 3 92100

18997

81581 n

- 39762

- 60199

190078

140598

+ 454

Plate center & Constants

1	7	8	5	9
13.6718	23.3290	22 03" 23.9	-7 57	01.7
13.6890	19.0598	22 03" 23.9	-9 12	95.8
39.2873	19.1870	22 16 23.9	-9 14	15.2
2) 97.9713	28.2918	21 29.3	18 23	61.0
23.9856	19.1209	22 10 27.6	-9 12	18.9
22	18.	-1 1.7	+30	9.6
-1.97	+3.8791	22 9 92.7	-8 81	50.8
312	766.5	Plate Center } A 22 09 93 D -8 91 51.		
-61.09	301.9.6			

$$\begin{array}{rclcl}
 \lambda - \gamma & +500x & -18.1y & +2.7x & -12079 \\
 +5754 + 6892 = +12296 - 257 = & 12092 + 37 = & 12079 & 0 \\
 +5625 + 6836 = 12969 - 922 = & 12092 + 37 = & 12079 & 0 \\
 -9962 + 17199 = 12292 - 256 = & 11986 + 93 = & 12079 & 0 \\
 29.5562 + 12278 - 307 & +66 & 29.5510
 \end{array}$$

$$\begin{array}{rclcl}
 \eta - \eta & +500x & +20x & +6y & -7839 \\
 +959 + 7027 = +7981 + 279 = & +7725 + 89 = & +7839 & 0 \\
 -9238 + 11669 = 7926 + 273 = & 7699 + 190 = & 7839 & 0 \\
 -19 + 7093 = 7079 + 686 = & 7765 + 85 = & 7890 & +1 \\
 16.9612 + 8981 + 991 & +102 & 17.0897
 \end{array}$$

$$\begin{array}{lclcl}
 \text{Tables} & a = -.6 & e = -4.9 & a - e = +4.3 & b + d = -4.0 \\
 \text{Obs.} & = -502.7 & = -506. & = +3.7 & = -1.9
 \end{array}$$

Cape 3071 - m98.6

C	22	09	13.03
L			13.06
E	22	0	13.05
	22	09	13.05
			50.87
	22	05	03.89
	22	09	73
	-	4	39.11
	-		279.09
	2745	74	n
	9.99	436	
	0.94	734	n

- 8.8580
 - 34
 13.1386
 13.6870
 + 5454

C	- 9	17	26.6
L			26.9
E			26.9
	- 9	17	26.8
		+ 4	74.0
	- 9	12	758
	- 8	41	51.0
	- 0	30	54.8
			1857.9
	3.26	832	n
	0.59	947	n

England 9.2100
 1.8977
 8.1581 n

- 3.9762
 - 0.0147
 170094
 140578
 + 4.67

11007

Standard Coordinates

Cape No.	3072	Mg 6.6	Cape No.	3103	Mg 7.7	Cape No.	3110	Mg 6.0	
E	22	07	13.25	22	15	37.73	22	18	17.93
E			13.26			37.75			17.97
E			13.30			37.76			17.77
Mean	22	07	13.27	22	15	37.75	22	18	17.96
Pres			50.67			50.68			50.39
X	22	05	03.88	22	16	25.43	22	19	07.35
A	22	09	93.	22	09	93	22	09	93
d-A	-	07	39.12	+	6	-92.73			
sin(d-A)	-	27	9.10	+	70	2.37			
log	2.99	57	6 n	2.60	96	3			
cos	9.99	58	1	9.99	79	0			
T ₀	0.99	88	1 n	1.10	62	7			
T ₀	-8.88	82		+	12.77	22			
T ₁	-28			+	53				
T ₂	13.10	90		37.77	75				
T ₃	13.67	18		37.28	73				
X-T ₃	+	56	28	+	99	02			
C	-8	01	36.7	-9	16	07.0	-7	92	40
E			35.8			3.1			1.2
E			36.1			3.3			0.6
Mean	-8	01	36.1	-9	16	3.5	-7	92	0.9
Pres	+	7	37.7	+	7	98.3	+	7	98.9
S	-7	57	01.7	-9	11	15.2	-7	37	11.0
D	-8	81	51.0	-8	81	51.0	-8	03	38.
d-D	+	77	79.3	-0	29	29.2	+	26	48.0
sin(d-D)	+	26	89.5	-	17	67.2			
log	3.42	96	7	3.27	65	5 n			
T ₀	0.76	08	2	0.57	77	0 n			
log T ₀	9.17	50		9.20	88				
T ₀ ²	1.89	76		2.21	25				
T ₁	8.09	60	n	8.47	77	n			
T ₀	+	5.76	53	-3.75	58				
T ₁	-0.01	25		-0.02	98				
T ₂	23.75	28		17.18	87				
T ₃	23.32	90		17.18	70				
T ₄	-4.23	38		-0.01	74				

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Standard Coordinates

Cape No.	3072	Mag	6.6	Cape No.	303	Mag	7.9	Cape No.	310	Mag	6.0
C	22	09	13.25	22	15	39.73		22	18	17.93	
E			13.26			39.75				17.97	
L			13.30			39.76				17.97	
Mean	22	09	13.27	22	15	39.75		22	18	17.96	
Pro			50.67			50.68				50.39	
X	22	05	0.388	22	16	23.93		22	19	07.85	
A	22	09	93.	22	09	93.		22	09	93.	
X-A			-07 39.112			+6 - 92.87				+2 - 22.85	

Sun (X-A)

log

cos

Z₀Z₁Z₂Z₃

X

X-3

13 67 18

+ 56 28

39 7775

+ 99 02

C	-8	01	36.7	-9	16	08.0	-7	92	10
E			35.8			3.1			1.2
L			36.1			3.3			0.6
Mean	-8	01	36.1	-9	16	3.5	-7	92	0.9
Pro			+9 38.9			+9 99.3			+9 98.9
X	-7	56	55.1	-9	11	15.2	-7	37	11.0
D	-8	98	59.0	-8	28	59.0	-8	03	59.
X-D			+ - 88 69.3			- 88 29.2			+ + 26 98.0
tan (X-D)			+ 26 89.5			- 17 69.2			
log			3 92967			3.29655			
Z ₀			0 76082			0 57770			

Z₁

log tan

Z₂Z₃

X

X

X

X

X

X

X

X

+ 57653

- 00125

23.7528

23.3290

- 4222

- 3.7818

- 0.0298

19.1888

19.1870

- 0049

11009

Moonis Center

6

x	$x - x_0$	Δx	$(x - x_0)^2$	$y - c$
1 26.0000	+1.4430	-5	2.0808	4.1720 + 30
2 26.3566	+1.7996	-3	3.2373	4.1580 - 110
3 +26.6003	+2.0433	0	4.1750	4.1750 + 60
4 26.3116	+1.7546	+3	3.0796	4.1641 - 49
5 26.0000	+1.4430	+5	2.0836	4.1722 + 32
6 24.5570	0.0000	+7	0.0000	4.1894 + 204
7 24.0000	-0.5570	+6	0.3095	4.1676 - 14
8 23.9039	-1.1531	+6	1.3282	4.1874 + 184

4.1690

y	$y - y_0$	Δy	$(y - y_0)^2$	L
1 15.5135	+1.4455	-6	2.0912	1.35
2 16.0000	-0.9590	-4	0.9205	1.18
3 16.9590	0.0000	0	0.0000	90
4 18.0000	+1.0410	+4	1.0846	59
5 18.7036	+1.7446	+6	2.0886	44 45
6 +19.0049	+2.0459	+9	4.1894	00
7 18.9229	+1.9634	+8	3.8581	344
8 18.6792	+1.6902	+7	3.8592	326 1690

Approx. Center

 $x = 26$ $y = 15.5135$

18.7036

33.9171

 $y_0 = 16.9585$ $y_{max} = 19.0049$ $R = 2.0464$ $R = 2.0918$ $x_{max} = 26.6003$

24.5570

Center { $x_0 = 24.5570$
 $y_0 = 16.9590$

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Munroe Center

6

	X	X - X ₀	ΔX	(X - X ₀) ²		O - C
1	26.0000	+1.4930	-5	2.0808	9.1720	+30
2	26.3566	+1.7996	-3	3.2375	9.1580	-110
3	26.6003	+2.0933	0	4.1750	9.1750	+60
4	26.3116	+1.7596	+3	3.0796	9.1691	-99
5	26.0000	+1.4930	+5	2.0836	9.1722	+32
6	29.5570	0.0000	+7	0.0000	9.1899	+209
7	29.0000	-0.5570	+6	0.3095	9.1676	-19
8	23.9039	-1.1531	+6	1.3282	9.1879	+189

9.1690

	Y	Y - Y ₀	ΔY	(Y - Y ₀) ²		
1	15.5135	+1.4955	-6	2.0912	135	
2	16.0000	-0.9590	-9	0.9205	118	
3	18.8590	0.0000	0	0.0000	90	
4	18.0000	+1.0410	+9	1.0895	59	
5	18.9036	+1.7976	+6	2.0386	99	
6	19.0099	+2.0459	+9	4.1899	60	
7	18.9229	+1.9639	+8	3.8581	399	
8	18.6992	+1.6902	+7	3.8592	326	1690

Approx. Center

X = 26

Y = 15.5135

18.9036

33.9171

Y₀ 16.9585Y_{max} 19.0099R₁ 2.0969R₂ 2.0918X_{max} 26.6003

29.5570

Center { X₀ 29.5570
Y₀ 16.9590

Formation of Normals.

1	- 2.10	+ 43.0	- 7.90
2	- 1.73	- 198.0	+ 106.0
3	0.0	+ 122.5	0.0
4	+ 1.82	- 83.5	- 51.0
5	+ 2.07	+ 76.0	+ 76.0
6	+ 0.0	0.0	+ 71.80
7	- 1.10	+ 8.0	- 27.5
8	+ 1.94	- 211.5	+ 311.0
	+ 6.93	+ 219.5	+ 881.0
	- 6.88	- 495.0	- 122.5
	+ 0.05	- 275.5	+ 758.3

		a	b	⁻¹⁶ c	new o-c
		+ 11	- 7	- 12	+ 110 ✓
a	+ 7	+ 13	- 6	- 9	- 195
b	+ 5	+ 14	0	- 2	+ 92
c	- 16	+ 12	+ 5	+ 1	- 76
		+ 10	+ 7	+ 1	- 9
		- 0	+ 10	- 6	+ 103
		- 4	+ 10	- 10	- 124
		- 8	+ 8	- 16	+ 70V

- 80

11009

Conditional Equations

7

1	+ 1.99	- 1.96	= +30	- 29	- 68	= -	92	+122
2	+ 1.80	- 0.96	= -110	- 31	- 75	= -	76	-186
3	+ 2.07	0.00	= +60	- 37	0	= -	37	+ 97
4	+ 1.75	+ 1.09	= -99	- 20	+ 48	= +	28	- 77
5	+ 1.49	+ 1.99	= +32	- 25	+ 67	= +	92	- 10
6	0.00	+ 2.05	= +209	0	+ 95	= +	95	+109
7	- 0.56	+ 1.96	= -19	+ 9	+ 91	= +	100	-117
8	- 1.13	+ 1.69	= +189	+ 20	+ 78	= +	98	+ 86
							+ 711.5	- 387
							Average	100

$$16.29 + 0.05 = -275.5 \quad + 6.76 \Delta$$

$$+ 0.05 + 18.09 = +758.5 \quad + 5.76 \Delta$$

$$+ [] + .00 = - 52.5 \quad + 0.32 \Delta$$

$$18.09 = + 811.0 \quad b = + 77.8$$

$$16.29 = -275.5 - 2.2 = -277.7 \quad a = - 17.0$$

$$+ 0.92 \Delta$$

Arc Measured 169°

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

$$\frac{\Sigma V}{n} = +3$$

$$\text{In } 7 \quad 19.2.07$$

$$- 2190 = -0.82$$

$$\frac{+3}{.25} = +12$$

$$\Delta P = +0.1$$

$$\text{err} = +0.2$$

$$\Delta b = +0.26$$

$$\Delta s = -0.1$$

$$\Delta P = -0.1$$

$$\Delta a = -0.35$$

$$\Delta q = -0.01$$

11009

Conditional Equations

7

1	+ 1.99	- 196	+ 30	- 29	- 68	- 19.2	+ 122
2	+ 1.80	- 0.96	- 110	- 31	- 75	- 78	- 186
3	+ 2.09	0.00	+ 160	- 39	0	- 38	+ 97
4	+ 1.75	+ 1.09	- 99	- 20	+ 48	+ 28	- 77
5	+ 1.99	+ 1.99	+ 32	- 25	+ 67	+ 32	- 10
6	0.00	+ 2.05	+ 209	0	+ 95	+ 95	+ 109
7	- 0.56	+ 1.96	- 19	+ 95	+ 91	- 400	- 117
8	- 1.15	+ 1.69	+ 189	+ 200	+ 78	+ 198	+ 86
						+ 711.5	- 380
						Average	10.0

$$16.29 + 0.08 = -275.5$$

$$+0.05 + 18.09 = +758.5$$

$$+L \quad] \quad + .00 = -52.5$$

$$18.09 = +811.0$$

$$b = +97.8$$

$$16.29 = -275.5 - 2.27 = -277.7 \quad a = -17.0$$

Arc Measured 169°

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

$$\frac{\sum V}{n} = +3$$

$$\frac{+3}{.25} = +12$$

$$\Delta R = +0.11$$

11007

Moon's Mean Position

8

$$\begin{array}{r} X_0 \quad 27,5570 \\ \quad -73 \quad -8 \\ \hline 27,5562 \end{array}$$

$$\begin{array}{r} Y_0 \quad 16,9590 \\ \quad +23 \quad 22 \\ \hline 16,9612 \end{array}$$

From Plate Constants

$$X \quad 27,5520$$

$$Y \quad 17,0894$$

$$Z \quad +2,5520$$

$$\eta \quad -0,9153$$

$$\log \zeta \quad 0,70688$$

$$\log \tan \delta \quad 9,1906 \quad -8 \quad 78$$

$$\cos \delta \quad 99,9787$$

$$\zeta \quad 0,8138$$

$$8,50727$$

$$7,0537$$

$$1,90480$$

$$7,0578$$

$$\alpha - A \quad +80,32$$

$$\eta_1 \quad -0,0011$$

$$A \quad 22 \quad 09 \quad 43$$

$$\log \mu \quad 9,96107$$

$$7,33113$$

$$\alpha_0 \quad 22 \quad 11 \quad 03,32$$

$$2,62989 \quad \eta \quad 726,5$$

$$\delta - D \quad -7 \quad 06,5$$

$$\text{Red.} \quad +4,29$$

$$D \quad -8 \quad 71 \quad 51$$

$$\alpha_1 \quad 22 \quad 11 \quad 07,61$$

$$\delta_0 \quad -8 \quad 78 \quad 57,5$$

$$\text{Red.} \quad +21,7$$

$$\delta_1 \quad -8 \quad 78 \quad 35,8$$

11009

Moon's Mean Position

8

X 29.5570

Y 16.9590

-13

+23

29.5557

16.9613

From Plate Constants

X 29.5820

Y 17.0897

Z +2.5229

h -0.9153

log 30.90688

log tan 9.1906

Cos 99.9888

-0.8138

8.50727

7.0537

1.908845

7.0578

X-A 58 +8032

h. -0011

A 22 09 93

log h 9.76109

7.33115

Y 22 11 03.32

2.62989 h 726.5

Red +7.29

S-D -7 06.4

X 22 11 07.69

D -8 71 51

S 8 98 58.5

optical +21.9

S' -8 98 35.8

$$\begin{array}{r} 22 \quad 01 \quad 32.38 \\ \underline{28.21} \\ 7.17 \end{array}$$

$$\begin{array}{r} -0 \quad 43 \quad 23.01 \\ \underline{42.04} \\ +19.03 \end{array}$$

$$\begin{array}{r} 22 \quad 01 \quad 58.54 \\ \underline{59.12} \\ 7.42 \end{array}$$

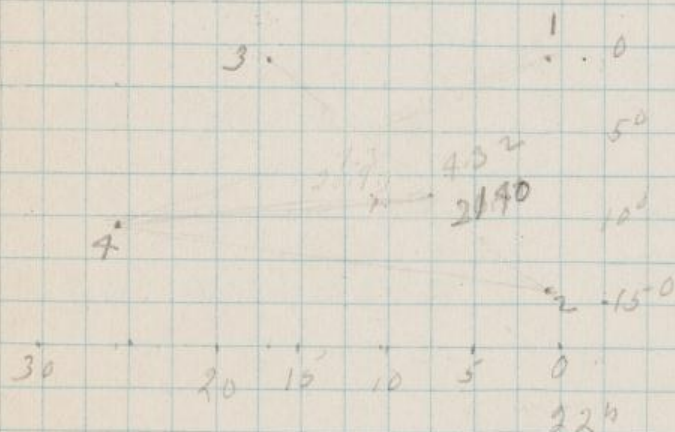
$$\begin{array}{r} -17 \quad 16 \quad 18.53 \\ \underline{39.78} \\ +24.25 \end{array}$$

$$\begin{array}{r} 22 \quad 17 \quad 23.25 \\ \underline{19.09} \\ 7.16 \end{array}$$

$$\begin{array}{r} -1 \quad 48 \quad 17.68 \\ \underline{39.31} \\ +21.62 \end{array}$$

$$\begin{array}{r} 22 \quad 26 \quad 16.50 \\ \underline{12.21} \\ +7.29 \end{array}$$

$$\begin{array}{r} -11 \quad 06 \quad 6.92 \\ \underline{29.24} \\ +22.82 \end{array}$$



11009

Reduction to Apparent Place

9

104
 $H + \alpha$ 6 56.1
 H 8 45.1^v
 α 22 11.0
 Q 23 6.3^v
 $\alpha + \alpha$ 21 17.3^v
 319^0 19.5^v

$\log \cos(Q + \alpha)$ 9.8799^v
 g 1.2890^v
 $\sin$ " 9.8181^v
 $\tan \delta$ 9.1906^v
 8.8239

$\log g'$ 1.1689^v
 g 9.1176^v

$f + 2.890$ ^v
 $g + 0.131$ ^v
 $h + 1.274$ ^v
 $+ 4.295$ ^v

$\delta - 8$ 48 = 58.8^v

$\log \cos \delta$ 9.9948^v
 $\cos(H + \alpha)$ 20.8025^v
 $\cos$ 20.7973

$\log \sin \delta$ 9.1858^v
 $\cos(H + \alpha)$ 9.3877^v
 h 1.2891^v
 $\sin(H + \alpha)$ 9.9869^v
 $\sec \delta$ 0.0052
 8.8239

$\log h'$ 9.8589^v
 h 0.1051^v

$g' + 17.753$ ^v
 $h' + 0.723$ ^v
 $u' + 6.270$
 21.746 ^v

11009

Reduction To Apparent Place 9

109 1.5
 H + x 6 56.1
 H 8 75.1
 x 22 11.0
 G 23 6.3
 G + x 21 17.3
 3190 19.5

log cos(G+x) 9.8799
 g 1.2890
 Sin " 9.8791 n
 tan d 9.1906 n
 8.8239

log g' 1.1689
 g 9.1176

f + 2.890
 g + 0.131
 h + 1.279
 + 7.295

d - 8 98 - 58.5

log cos d 9.9948
 L 0.8025
 L 0.7973

log Sin d 9.1859 n
 cos(H+x) 9.3897 n
 h 1.2891
 Sin(H+x) 9.9869
 Sec d 0.9052
 8.8239

log h' 9.8589
 " h 0.1051

g' + 19.753
 h' + 0.723
 L' + 6.270
 21.746

11069

Lunar Parallax

10

α^1 22 11 07.61 ✓
 δ 23 39 24.0 ✓
 $\delta - \alpha^1 + 1$ 28 16.39 ✓
 $=$ 22 7 5.85 ✓
 $+ 8$ 29.6
 $+ 21$ 55 36.3
9.95727
0.00000
003261 ✓
9.98988 ✓

π 60 30.7 ✓

9.86913 ✓
8.27455 ✓
9.57985 ✓
0.00728 ✓
7.69380 ✓

$\delta - \delta^1$ 16 59.12 ✓

$=$ 1 07.99

δ 44 19 57.6 ✓

$\delta - 8$ 48 35.8 ✓

$\delta - \delta^1$ 53 07 97.9 ✓

9.82670
8.27555 ✓
9.92376 ✓
0.15569
8.73079 ✓

$\delta - \delta^1$ + 46 27.2 ✓

δ -8 02 08.6 ✓

Eph δ -8 02 12.7 ✓

O-C + 7.1 ✓

Crown. Corr + 1.2
2nd Order Ref + .1

Im Corr - 0.1

δ -8 02 08.6

O-C + 7.1

δ 22 12 15.53 ✓

Eph δ 22 12 17.78 ✓

O-C + 0.77 ✓

-0.03

-0.01

δ 22 12 15.57

+ 0.76

Poor

11009

Sunar Parallax

10

χ^2 22 11 07.61⁻
 δ 23 39 29.0⁻
 $\delta - \chi^2 + 1 + 28$ 16.39⁻
 $=$ 22 7 5.85⁻
 $+ 8$ 29.6⁻
 $+ 21$ 55 36.3⁻
 9.95727
 0.00000
 0.03261 ⁻
 9.98988 ⁻

 π 60 307⁻

9.86913 ⁻
 8.29458 ⁻
 9.57185 ⁻
 0.00928 ⁻
 7.69380 ⁻

 $\chi - \chi^2$ 16 59.12⁻
 $=$ 1 07.99

 χ 99 19 57.6⁻
 $\delta - 8$ 98 36.8⁻
 $\chi - 253$ 07 99.9⁻

9.82690
 8.29558 ⁻
 9.90318 ⁻
 0.15569
 8.13079 ⁻

 $\delta - \chi^2$ 26 27.2⁻
 $\delta - 8$ 02 08.6⁻
 $\text{Eph } \delta - 8$ 02 12.7⁻
 δ 22 12 1535⁻
 $\text{Eph } \delta$ 22 12 19.78⁻
 $O - C$ + 9.1⁻
 $O - C$
 $+ 0.77$ ⁻

Crown Cover
 $2^{\text{nd}} \text{ Order Ref}$

$+ 1.2$
 $+ 1$

 $- 0.03$

Poor

1
1
22
20
83
32
21
25
152
2
13
2
16
+

Star Measures

11

	α	δ	α	δ
1	20 6 38	20 0 30	19 9 06	19 9 19
12.9	11 6 42	19 0 20	14 6 68	15 1 50
27.6	46	18	60	50
	32	22	896	68
	<u>12.8990</u>	<u>12.8988</u>	<u>27.5235</u>	<u>27.5239</u>
2	19 0 62	20 2 32	19 8 68	20 3 38
20.6	13 2 92	15 9 91	13 1 82	17 0 70
8.7	88	87	77	97
	32	32	50	42
	<u>20.5737</u>	<u>20.5757</u>	<u>8.6680</u>	<u>8.6662</u>
3	19 8 06	19 8 40	18 4 28	19 9 28
32.6	13 1 58	16 4 91	16 5 92	12 0 50
22.2	60	87	88	60
	806	30	26	28
	<u>32.6647</u>	<u>32.6653</u>	<u>22.2138</u>	<u>22.2127</u>

Moon Measures

1	19 0 20	20 4 38	20 5 68
24	17 7 48	19 1 40	11 7 74
15.7	58	52	66
		38	52
	<u>15.1267</u>	<u>15.1292</u>	<u>15.1217</u>
2	19 8 20	19 6 22	
24.6	13 8 31	15 5 91	
16	42	601	
	24	30	
	<u>24.5981</u>	<u>24.5971</u>	
3	19 8 78	19 6 02	
24.7	12 7 06	16 7 90	
16.6	92	84	
+X	78	598	
	<u>24.7179</u>	<u>24.7187</u>	

Double images

Star Measures

11

	d	^	z	d	^	z
1	20638		20030	19906		19919
12.8	11642		19020	14668		15150
27.6	46		18	60		50
	32		22	896		08
	<u>128990</u>		<u>128988</u>	<u>275235</u>		<u>275239</u>
2	19062		20232	19868		20358
20.6	13292		15991	13182		17070
8.7	88		87	79		92
	32		32	50		92
	<u>205757</u>		<u>205757</u>	<u>86680</u>		<u>86662</u>
3	19806		19890	18728		19928
32.6	13158		16991	16592		12050
22.2	60		87	88		60
	896		30	26		28
	<u>326647</u>		<u>326653</u>	<u>222138</u>		<u>222127</u>

Moon Measures

1	19020	20438	20569
4	17748	19190	11779
5.9	58	52	66
		48	52
	<u>151267</u>	<u>151292</u>	<u>151217</u>
2	19820	19622	
24.6	13831	15591	
16	42	601	
	24	30	
	<u>245981</u>	<u>245971</u>	
3	19888	19602	
24.7	12706	16790	
16.6	92	89	
4.1	78	598	
	<u>247179</u>	<u>247187</u>	

Double images

7
24
18

5
23
18

6
22
19
+

7
23
18

8
21
18
2

11006

Moon Measures.

12

4	18800	20540
24.2	16436	12909
18	28	10
	798	92
	<u>24.2362</u>	<u>24.2366</u>

5	19978	18580
23	17646	10928
18.2	56	20
	64	68
	<u>18.2324</u>	<u>18.2354</u>

6	20062	19500
22.6	12792	16760
18.8	98	64
ty	63	500
	<u>18.7268</u>	<u>7262</u>

7	20772	20470
22	19666	15538
18.6	50	98
	62	68
	<u>18.6108</u>	<u>18.6079</u>

8	20090	20348	19854	20478
21.8	16070	14286	17178	13130
18.5	92	98	138	26
20	48	50	80	40
	<u>18.3972</u>	<u>18.3942</u>	<u>18.2740</u>	<u>18.2686</u>

7
24
18

5
23
18

6
22
19
+

7
21
18

8
21
18
2

11006

Moon Measures.

12

<u>2</u>	18900	20590
29.2	16936	12909
18	28	10
	798	92
	<u>29.2362</u>	<u>29.2366</u>

<u>5</u>	19978	18580
23	17646	10928
18.2	56	20
	69	68
	<u>18.2324</u>	<u>18.2354</u>

<u>6</u>	20062	19500
22.6	12792	16780
18.8	98	69
+4	63	500
	<u>18.7268</u>	<u>7262</u>

<u>7</u>	20772	20490
22	19666	16538
18.6	50	98
	62	88
	<u>18.6108</u>	<u>18.6099</u>

<u>8</u>	20090	20398	19854	20498
21.8	16070	18286	17198	13130
18.3	92	98	138	26
26	98	50	80	90
	<u>18.3972</u>	<u>18.3992</u>	<u>18.2740</u>	<u>18.2686</u>

11006

Times Etc

13

Aug 13

Exp to Stars	1	16		1	28	
" Moon	1	23	08.3	1	23	08.6
Clock-fast		5	20.0			

H. Sid Time	1	14	48.45	$\delta - \alpha = + 2^h 59^m$
H. Long	7	44	31.05	
9 Sid T	5	59	19.50	
Sid Time M.M.	9	26	21.31	
Interval	20	32	58.19	
Reduction		3	21.99	
G.M.T.	20	29	36.20	

From Naut Alman.

R.A.

Dec.

Moon 20"	22	14	42.79	-7	44	55.9
Motions in 1 ^m			22546			+ 15.843 "
" 29.6033		1	6.74		+7	49.0
Tabular Place	22	15	49.53	-7	37	06.7 "

Moon's Age 15 days

Parallax	60	28.95
Semid.	16	30.2
R.		990.2
aug.		7.6
2 nd (4)		-0.6
R		997.2
R		2.1376
all		
1141P		
R2		

939 = 6.8 -

11006

Times Etc

13

Aug 13

Expt. Stars	1	16		1	28	
" Moon	1	23	08.3	1	23	08.6
Clock-fast		8	20.0			

H. Sid Time	1	14	48.45	$t - \gamma = + 2^h 59^m$
H. Long	4	44	31.05	
G. Sid T.	5	59	19.50	
Sid. Time M.M.	9	26	21.31	
Interval	20	32	58.19	
Reduction		3	21.99	
G.M.T.	20	29	36.20	

From Naut Alm.		R.A.		Dec.
Moon 20"	22	19	42.79, -7	99 55.9
Motion in 1 ^m			2.596	+ 15.893"
" " 29.6033		1	6.79	17 99.0
Tabular Place	22	15	49.53 - 7	37 06.9

Moon's Age 15 days

Parallax	60	28.95"
Semid.	16	30.2 "
R		990.2
Aug		7.6
2 nd (A)		-0.6
R		997.2
R		2.1376
all		
11/11/19		
R 2		

939 = 6.8 -

11006

Plate Center and Constants

17

χ	η	α	δ	
12.89 89	27.52 37			
20.57 57	8.66 71	22 12	26.7 -9	27 25
32.66 50	22.21 32			
			+98.0 +1+12	37.8
<u>32⁸</u>	<u>7665</u>	22 13	19.7 -8	19 50.2

Plate Center { A 22 13 15.1
 { D -8 19 50.2

Tables $a = -4.3$ $e = -8.1$ $a-e = +3.8$ $b+d = -11.0$
 Obs = = = =

11006

Plate center and Constants

17

λ	γ	τ	δ
12.89 89	27.52 37		
20.57 57	8.66 71	22 12	26.7 -9 27 25"
32.66 50	22.21 32		
32^s	7665	22 13	+98.0 +1+12 39.8 18.7 -8 19 50.2

Plate center } A 22 13 15.1
 } D -8 19 50.2

Tables $a = -9.3$ $e = -0.2$ $a \cdot e = +13.5$ $b+d = -17.0$
 Obs $=$ $=$ $=$ $=$

11006

Standard Coordinates.

15

Cape No 3081

Mag 7.8 Cape No 3073

Mag 6.0 Cape No 3110

C	22	7	27.70	22	11	35.83	22	18	17.95
L			27.46			35.83			17.97
E			27.73			35.89			17.97
Mean	22	7	27.73	22	11	35.83	22	18	17.96
Prec			50.31			+50.89			50.39
X	22	8	17.79	22	12	26.67	22	19	07.85
A	22	12	95	22	12	95	22	12	95
X-A	-	4	27.26			-18.33		+6	22.85
3m(d-A)			-267.29			-18.33			+382.80
log	2,72	690	n	1,26	316		2,58	297	
Surf	9,99	686		9,99	405		9,99	615	
γ_0	0,93	100	n	9,76	743	n	1,08	636	n
γ_0	-8,53	10	v	-0,58	19	v	+12,20	00	v
γ_1	-38			-2			+50		
γ_2	13,46	52		21,41	84		37,20	50	
X	12,89	89	v	20,57	57	v	32,66	50	v
X- γ	-56	63	v	+1,84	29	v	-1,57	00	v

C	-6	57	78.6	-9	32	18.5	-7	42	1.0
L			78.6			17.6			0.6
C			48.3			17.8			1.2
Mean	-6	57	78.5	-9	32	18.0	-7	42	0.9
Prec	+4		43.1	+4		52.7	+4		99.9
X	-6	53	05.7	-9	27	25.3	-7	37	11.0
D	-8	14	50	-8	14	50	-8	14	50
X-D	+1	21	49.6	-1	12	35.3	+0	37	39.0
3m(d-D)	+490	55		-735	59		+223	9.1	
log	3,69	069		3,63	908	n	3,35	398	
γ_0	1,02	189	v	0,97	023	n	0,68	508	v
log	9,08	18	n	9,22	16	n	9,12	89	n
γ_0	1,86	20		9,52	89		2,17	27	
γ_1	7,99	72	n	5,80	39	n	8,35	25	n
γ_0	+10,5	157	v	-9,33	75	v	+4,84	28	v
γ_1	-0,00	99	v	-0,00	01	v	-0,02	26	v
γ_2	2,85	058	v	8,66	29	v	2,28	202	v
γ_3	2,75	237	v	8,66	71	v	2,21	32	v
γ_4	-9,82	1	v	+47		v	-60	70	

11006

Standard Coordinates.

15

Cape No 3081	Mag 7.9	Cape No 3073	Mag 6.0	Cape No 3110	Mag 6.0
E 22 7 27.90	22 11 35.83	22 18 17.95			
L 27.46	35.83	17.97			
E 27.93	35.89	17.97			
Mean 22 7 27.73	22 11 35.83	22 18 17.96			
Pres 50.30	+50.89	50.39			
A 22 8 17.79	22 12 26.67	22 19 07.85			
H 22 12 95	22 12 95	22 12 95			
1-A - 4 27.26	- 18.33	+ 6 22.85			
2m(A-H) - 267.29	- 18.33	+ 38.250			
log u 2.42690	1.26316	2.58297			
Quot 9.99686	9.99405	9.79615			
Σ 8.93100	9.76995	1.08636			
Σ - 8.5310	- 0.5819	+ 12.2000			
Σ - 3.8	- 2	+ 50			
Σ 13.9652	21.9188	39.2050			
X 12.8989	20.5757	32.6650			
X-Σ - 5.683	+ 1.8929	- 1.5900			

C -6.57	98.6	-9.32	18.5	-7.92	1.0
L 48.6		17.6			0.6
C 48.3		17.8			1.2
Mean -6.57	98.5	-9.32	18.0	-7.92	0.9
Pres +4	93.1	+4	52.7	+4	99.9
A -6.53	05.7	-9.27	25.3	-7.37	1.10
D -8.19	50	-8.19	50	-8.19	50
2-D + 1.21	49.6	-1.12	35.3	+0.37	39.0
2m(D) + 490.55		-435.59		+ 225.91	
log u 3.69069		3.63908		3.35398	
u 1.02189		0.97023		0.68508	
logland 9.0818		7.2216		9.1269	
Σ 1.8620		9.5289		2.1727	
u 7.9972		5.8039		8.3522	
h ₀ + 10.5157		-9.3375		+9.8928	
h ₁ - 0.0099		-0.0001		-0.0226	
u 2.85058		8.6629		2.28202	
u 2.75237		8.6671		2.22132	
u-u - 9.821		+ 97		- 6070	

11039 Star Measures.			
	d	π	μ
1	20192	20888	20046
7.6	16204	14870	12196
13.8	04	68	40
	82	84	48
	<u>9.3984</u>	<u>9.3984</u>	<u>13.7904</u>

2	20288	19990	20702
21.9	10668	19590	18058
7.7	62	88	82
	80	80	00
	<u>21.9615</u>	<u>21.9601</u>	<u>27.8656</u>

3	20018	19748	20432
28.4	16662	13092	16056
29.1	60	96	50
	10	30	30
	<u>28.3354</u>	<u>28.3358</u>	<u>29.4348</u>

Moon Measures.

1	20519	19700	20180
23	17472	16680	13288 ragged
14.4	88	30	192
	04	680	78
	<u>28.3030</u>	<u>14.3062</u>	<u>14.3012</u>

2	19002	19842
23.6	13290	15592
15	88	38
	04	28
	<u>23.5712</u>	<u>23.5704</u>

3	18064	19772
23.7	10352	17498
15.9	52	94
+X	76	70
	<u>23.7704</u>	<u>23.7724</u>

Thin but good

Star Measures

	d	r	d	r
1	20192	20888	20046	19168
7.6	16204	19870	12196	17060
12.8	09	68	40	60
	82	89	98	66
	<u>9.3989</u>	<u>9.3989</u>	<u>13.7909</u>	<u>13.7899</u>

2	20288	19990	20708	19970
21.9	10668	19590	18058	16630
7.7	62	58	82	28
	80	80	00	70
	<u>21.9615</u>	<u>21.9601</u>	<u>27.6656</u>	<u>27.6658</u>

3	20018	19798	20932	19732
28.4	16662	13092	16056	19078
29.4	60	96	50	80
	10	30	30	06
	<u>28.3359</u>	<u>28.3358</u>	<u>29.4378</u>	<u>28.4362</u>

Moon Measures

1	20519	19700	20180
23	17972	16640	13280
19.4	88	30	192
	09	690	78
	<u>19.3030</u>	<u>19.3062</u>	<u>19.3012</u>

2	19002	19842
23.6	13290	15592
15	88	38
	09	28
	<u>23.5712</u>	<u>23.5709</u>

3	18069	19772
23.7	10352	17998
5.9	52	99
4	96	70
	<u>23.7709</u>	<u>23.7729</u>

4
17

23
17

17

17

17

Moon Measures

4 18180

13 13902

17 06

98

23.7232

19697

13960

56

97

23.7264

5

13

17.5

1

168

17.9

6

120

17.8

17

8

21

17.6

19718

15260

60

08

17.4457

19786

11122

20

89

17.8667

19762

11218

10

68

17.8544

18852

11790

90

50

17.7061

18736

13196

210

27

17.4477

19660

18302

00

92

17.8647

19668

18196

88

68

17.8527

19638

16688

82

22

17.7051

4
22
175
23
17.7
22
17.8
22
17
48
21
17

Thomson measures

✓ 18190	19699
23 13902	13960
17 06	56
98	99
<u>23.7232</u>	<u>23.7269</u>

✓
23
17.2

19718	18736
15260	13196
60	210
08	29
<u>17.9959</u>	<u>17.9979</u>

✓
22.9
17.9

19786	19660
11122	18302
20	00
89	92
<u>17.8669</u>	<u>17.8699</u>

✓
22
17.8
49

19762	19668
11218	18196
10	88
68	68
<u>17.8599</u>	<u>17.8529</u>

✓
21
17.6

18852	19638
11790	18688
90	82
50	22
<u>17.7061</u>	<u>17.7051</u>

11039

Jupiter Etc.

23

Aug 15^h

Exp. to Stars	1	70		1	52	
" " Moon	1	75	33.2 ^h	1	75	33.7 ^h
Clock fast		8	29.8 ^h			

H. Sid Time	1	37	08.5 ^h	$\theta - \alpha = + 1^h$	37 ^m
H. Long	4	44	31.05 ^h		
G. Sid T.	6	21	39.55 ^h		
Sid T. M. Noon	9	34	17.42		
Interval	20	47	25.13		
Reduction		3	29.36		
G. M. T.	20	44	00.77		

From Naut Alman.	R.A.			Dec.		
Moon - 20 ^h	23	58	56.71	+ 7	58	41.5
Motion in 1 ^h	-		2.199			15.395
" 44.0128	+ 1		33.08	+ 11		15.3
Tabular Place 24	00		29.79	+ 5	09	56.8

Moon's age 17 days

Parallax	58	56.07 ^h
Semid.	16	57.1 ^h
R.		965.1 ^h
Aug.		12.3
Err (R)		- 1.1
R		976.3
R		2.0928 ^h
AR		- 1000 ^h
(1+AR)		1.9928 ^h
R ²		39.712

$$939 = 11.5^h$$

$$- 501.6$$

$$+ 24$$

$$977.6$$

11039

Lunus Etc

23

Aug 15th

Exp. to Stars	1	90		1	52	
" " Moon	1	95	33.2"	1	95	33.9"
Clock fast		8	29.8"			

H. Sid Time	1	37	08.5"	$\theta - \alpha = + 1^h 37^m$
H. Long	7	99	31.05"	
G. Sid T.	6	21	39.55"	
Mid T. M. Noon	9	39	19.92	
Interval	20	77	25.13	
Reduction		3	29.36	
G. M. T.	20	77	00.77	

From Naut Alman.	RA.	Dec.
Moon - 20 ^h	23 58 56.71	+9 58 41.5
Motion in 1 ^h	2.199"	15.395"
" 44.0128	+1 33.08"	+11 15.3"
Tabular Place	24 00 29.79"	+5 09 56.8"

Moon's Age 17 days

Parallax	58	56.07
Semid.	16	5.1"
R.		965.1
Aug.		12.3
Ex 10		- 1.1
R		916.3
R		2.0928"
AR		- 1000"
(1+AR)		1.9928
R		397.12

939 = 11.5

- 501.6

+ 29

977.6

Plate Center + Constants

24

X	Y	Z	d
9.3989	13.7899	23 52 29.03	4 15 26.8
21.96 08	07.6657	23 59 22.00	3 26 22.3
28.33 56	29.7380	24 2 45.88	6 27 30.3
250.2964	37.1037	27 61 67.88	9 50 52.6
25.1782	18.5518	27 1 3.94	7 55 26.3
22	18	-1 37.6	- 7 16.6
+3.178	-55.18	23 59 16.3	+ 4 51 09.7
315	466.5		
- 2 7.6			

Plate Center A 23 59 26.0
 (+ 4 51 10.0)

X-3	+500x	-79.24	+16K	-11377
+7722	+7699	= +12921	-1092	= +11329 + 15 = 11344 0
+ 937	+10980	= 11917	-607	= 11310 + 35 = 11345 +1
- 538	+17168	= 13630	-2331	= 11299 + 85 = 11384 0
21.7791	+10890	-1257	+35	21.6113 -

Y-4	+500y	+82.31	+3.87	-11711
+3691	+6895	= +10586 + 773	= +11359 + 52	= 11411 0
+5771	+3833	= 9577 + 1807	= 11386 + 29	= 11410 -1
-5752	+19719	= 8967 + 2332	= 11299 + 112	= 11411 0 ✓
15.8738	+7937	+1792	+ 83	15.7139
			60	15.7116

Tables a = -1 e = -1.7 a-e = +1.6 b+d = -2
 Obs -501.6 -503.8 -+2.2 -3.1
 U-C -501.5 -502.1 -1.1

Plate Center & Constants

27

X	Y	Z	U	V	W	D
9.3989	13.7899	23	5.2	29.03	9	16
21.9608	07.6657	23	5.9	22.00	3	26
28.3356	29.9380	20	2	9.588	6	29
50.2964	37.1037	97	61	67.88	9	50
25.1782	18.5518	29	1	3.99	7	55
22	18		-1	37.6		9
+3.178	-2518	23	59	26.3	+9	51
31.5	966.2					
-2	7.6					

Plate Center A 23 59 26.0
 (D) + 9 51 10.0

X-3	15002	-7924	+16A	-11399
+7722	+9699	-112921	-1092	+11329 + 13 = 11399
+937	+10980	-11917	-607	+11310 + 33 = 11395 + 1
-538	+19168	-13630	-2331	+11299 + 95 = 11399
1.7791	+10890	-1257	+35	21.6113

4-4	+5004	+2.3	+3.89	-11911
+3691	+6895	= 10586	+773	113.59 + 5.2 = 11912
+5791	+3833	= 9579	+1807	11381 + 29 = 11910
+552	+1971.9	= 8967	+2332	11289 + 112 = 11911
15.8738	+7937	+1792	+83	15.7139
			60	15.7116

Tables a = -1 e = -1.7 a-e = +1.6 b+d = -2
 Ubs - - 501.6 - - 503.8 - +2.2 - - 3.1

Curv. Curv

$$\begin{array}{rclcl}
 \xi & \eta & \Delta \xi & -2 \xi & -2.7 \eta & +16 \\
 -13.37 & -9.59 & -59 & +27 & = -27 + 12 & = -15 \\
 -0.13 & -10.91 & -95 & +0 & = -95 + 29 & = -16 \\
 +6.39 & +12.01 & +29 & -10 & = +16 - 32 & = -16
 \end{array}$$

$$\begin{array}{rclcl}
 M & -0.39 & -2.29 & 0 & +1 & +6 & = +23 \\
 & & & & & & = +0.08
 \end{array}$$

$$\begin{array}{rclcl}
 \Delta \eta & -3.6 \eta & -9 \xi & -7 \\
 -23 & +17 & = -6 & +12 & = +6 \\
 -32 & +29 & = +7 & 0 & = +7 \\
 +56 & -90 & = +12 & -6 & = +7 \\
 6 & & & & \\
 0 & +8 & & 0 & = \textcircled{-1} = \frac{0}{+1}
 \end{array}$$

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Standard Coordinates

23

Cape No 3348 - Mag 6.9 Pipe No 3364 - Mag 7.9 Cape No 6 - Mag 7.8

e	23	51	39.91	23	58	32.85	0	01	56.69
L			39.98			32.85			56.70
E			39.91			32.87			56.70
Mean	23	51	39.93	23	58	32.85	0	01	56.70
Dec			49.10			49.15			49.18
d	23	52	29.03	23	59	22.00	00	02	45.88
A	23	59	26.0	23	59	26.0	23	59	26.06
d-A		-6	56.97		-	4.00	+	3	19.88
sin(A-A)		-	716.91		-	7.00	+	+	199.87
log n		2.62	007 n		0.60	206 n		2.30	075
cos d		9.99	880		9.99	922		9.99	728
Σo		1.12	608 n		9.10	852 n		0.80	327

Σo	-	13.36	87	-	0.12	87	+	63.86	5
Σ1	-		57	-		75			29
Σ		8.62	62		21.86	71		28.38	94
X		9.39	87		21.96	08		28.33	56
X-Σ		+	7722		+	937		-	538

e	+	410	05.9	+	321	01.6	+	619	09.9
L			6.7			1.9			10.1
E			6.2			1.7			8.7
Mean	410		6.2	+	321	1.6	6	19	9.6
Dec		5	20.6	+	5	20.7	+	5	20.7
d	415		26.8	3	26	22.3	6	27	30.3
D	451		10.0	4	51	10.0	4	51	10.0
d-D	-35		73.2	-1	24	77.7	+	133	20.3
sin(d-D)	-	21.9	3.2	-	5.0	88.7	+	5.6	01.7
log n		3.33	106 n		3.70	661 n		3.74	832
log		0.66	221 n		1.03	776 n		1.07	947

log tan δ		8.87	18		8.77	89		9.05	099
Σ ²		2.25	22		8.21	71		1.61	05
Σ ₁		8.17	74		4.02	94		7.71	43

log	-	4.59	77	-	10.9	087	+	12.0	080
Σ ₁	+	00	150	+	00	000	+	00	052
Σ		13.72	08		7.09	16		30.0	132
Σ		13.78	99		7.66	57		29.73	80
Σ ₁ -Σ	+	3.69	1	+	5.74	1	-	5.75	2

11039

Standard Coordinates

25

Capella No 3348 - mag 6.9			Capella No 3364 - mag 7.9			Capella No 6 - mag 7.8		
C	23	51 39.91	23	58 32.85	0	01	56.69	
L		39.98		32.85			56.70	
E		39.91		32.89			56.70	
Mean	23	51 39.93	23	58 32.85	0	01	56.70	
Prece		99.10		99.15			99.15	
d	23	52 29.03	23	59 22.00	0	02	45.88	
A	23	59 26.0	23	59 26.06	23	59	26.06	
A-A		- 6 56.97		- 7.00	+	3	19.88	
Sum(A-A)		- 7 11.91		- 7.00	+		99.87	
log		2.62009 n		0.60206 n			2.30075	
cosd		9.99880		9.99922			9.99728	
Σ		1.12608 n		9.10852 n			0.80327	
Σ	-	13.3689		- 0.1289			+ 63.865	
Σ	-	59		- 95			+ 29	
Σ		8'62.62		21'86.71			28'38.94	
X		9.3989		21.9608			28.3356	
X- Σ		+ 7.722		+ 9.37			- 5.38	
C	+7	10 05.9	+3	21 01.6	+6	19	09.9	
L		6.9		1.9			10.1	
E		6.2		1.9			8.7	
Mean	7	10 6.2	+3	21 1.6	6	19	9.6	
Prece		5 20.6		+ 5 20.7			+ 5 20.7	
d	7	15 26.8	3	26 22.3	6	27	30.3	
D	7	51 10.0	9	51 10.0	9	51	10.0	
D-D	-35	93.2	-1	29 97.7	+1	33	20.3	
Sum(D-D)		- 2193.2		- 5088.7			+ 5601.7	
log		3.33106 n		3.70661 n			3.79832	
HU		0.66221 n		1.03776 n			1.07947	
log(tan)		8.8718		8.7789			9.05099	
Σ		2.2522		8.2171			1.6105	
Σ		8.1779		4.0299			7.7143	
HU	-	9.5999		- 10.9089			+ 12.0080	
HU	+	0.0150		+ 0.0000			+ 0.0052	
H		18.7208		7.0916			30.0132	
H		13.7899		7.6657			29.7380	
H-H		+ 36.88		+ 5.741			- 5.752	

A + 2
B + 1.5

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Moonis Center

26

	x	$x - x_0$	Δx	$(x - x_0)^2$	$(x - x_0) + (y - y_0)$	$D - C$
1	23,0000	+1,2210	-3	14901	39616	-96
2	23,5708	+1,7918	-2	32099	39740	+28
3	+23,7719	+1,9929	0	39697	39697	-15
4	23,9248	+1,6458	+2	27093	39776	+64
5	23,0000	+1,2210	+3	14915	38646	-66
6	22,0000	+0,2210	+4	00492	39684	-38
7	21,7790	+0,0000	+4	00000	39669	-93
8	21,0000	-0,7790	+4	06062	39657	-55

 $R^2 = 3.9712$

	y	$y - y_0$	Δy	$(y - y_0)^2$	
1	17,3021	-1,5719	-2	24715	142
2	15,0000	-0,8740	-1	07691	116
3	15,8740	0,0000	0	00000	90
4	17,0000	+1,1260	+2	12683	56
5	17,9969	+1,6729	+2	24731	38
6	17,8539	+1,9794	+3	39192	86
7	+17,8659	+1,9914	+3	39669	360
8	17,7066	+1,8326	+3	33595	337, 165

Approx. Center

 $x = 23$ $y = 17,3021$

17,9969

31,7485

 y_0 15,8742

approx 17,8659

 R 1,9912

19,928

 x_{max} 23,7719 x_0 21,7792

Moonis Center

$\begin{cases} x_0 & 21,7790 \\ y_0 & 15,8740 \end{cases}$

11039

Moonis Center

26

	x	$x - x_0$	Δx	$(x - x_0)^2$	$(x - x_0)(y - y_0)$	$y - y_0$
1	23.0000	+1.2210	-3	1.4901	3.9616	-76
2	23.5708	+1.7918	-2	3.2099	3.9790	+28
3	+23.7719	+1.9929	0	3.9697	3.9697	-15
4	23.9298	+1.6758	+2	2.7093	3.9776	+69
5	23.0000	+1.2210	+3	1.4915	3.8646	-66
6	22.0000	+0.2210	+4	0.0492	3.9689	-38
7	21.7790	+0.0000	+4	0.0000	3.9669	-93
8	21.0000	-0.7790	+4	0.6062	3.9657	-55

 $R = 3.9712$

	y	$y - y_0$	Δy	$(y - y_0)^2$	
1	17.3021	-1.5719	-2	2.4715	192
2	15.0000	-0.8790	-1	0.7691	116
3	15.8790	0.0000	0	0.0000	90
4	17.0000	+1.1260	+2	1.2683	56
5	17.9969	+1.6729	+2	2.7731	38
6	17.8539	+1.9794	+3	3.9172	8
7	+17.8659	+1.9919	+3	3.9669	360
8	17.7066	+1.8226	+3	3.3595	337 165

App. wt. Center

 $x = 23$ $y = 17.3021$

17.9969

31.7485

 y_0 15.8792

mean 17.8659

 R 1.9912

mean 23.7719

 x_0 21.7792

Moonis Center

$\left\{ \begin{array}{l} x_0 \quad 21.7790 \\ y_0 \quad 15.8790 \end{array} \right.$

Formation of Normals.

1	- 191	- 1170	+ 1510
2	- 156	+ 500	- 245
3	00	- 290	00
4	+ 186	+ 727	+ 1055
5	+ 192	- 805	- 1090
6	+ 043	- 85	- 75
7	+ 00	- 00	- 855
8	- 173	+ 930	- 1010
	+ 721	+ 1657	+ 256.5
	- 790	- 1350	- 3223
	- .69	+ 307	- 66.0

		a	b	c	-5b	new o-c
a	+ 31	+ 38	- 31	- 79	- 157	
b	+ 20	+ 56	- 17	- 17	+ 7	
c	- 56	+ 62	+ 0	+ 7	- 12	
		+ 51	+ 23	+ 18	+ 83	
		+ 38	+ 31	+ 13	- 18	- 50
		+ 7	+ 70	- 9	- 70	
		+ 0	+ 70	- 16	- 52	
		- 27	+ 37	+ 73	- 43	- 7 - 90

0.051

$$- 0.69 + 18.22 = + 6.06 \Delta$$

$$+ [] - .03 = + 0.37 \Delta$$

$$+ 18.19 = + 6.73 \Delta$$

$$+ 13.52 = + 7.31 \Delta + 0.29 \Delta = + 7.55 \Delta$$

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Conditional Equations.

27

1 + 1.22 - 1.57 = -96	+3	+6 = +9	-105
2 + 1.79 - 0.87 = +28	+4	+3 = +7	+21
3 + 1.99 0.00 = -15	+4	0 = +4	-19
4 + 1.63 + 1.13 = +64	+3	-4 = -1	+65
5 + 1.22 + 1.57 = -66	+3	-6 = -3	-63
6 + 0.22 + 1.98 = -38	+0	-7 = -7	-31
7 + 0.00 + 1.99 = -43	+0	-7 = -7	-36
8 - 0.78 + 1.83 = -55	-2	-6 = -8	-47
		+86	-301

Average 48

$$+13.52 - 0.69 = +30.4 + 7.31 \Delta$$

$$-0.69 + 18.22 = -66.0 + 6.06 \Delta$$

$$+ [] - 109 = + 1.5$$

$$+ 18.18 = - 67.5$$

$$+ 6.35 \Delta$$

$$b = - 3.55$$

$$+13.52 = +30.4 - 2.7 = +28.0$$

$$a = + 2.07$$

$$+ 0.56 \Delta$$

Arc Measured 165

$$\frac{p}{h} = 22$$

$$\frac{\sum v}{h} = -26.9$$

$$\text{In } 6 \quad M \quad 1.99 \quad - \frac{26.9}{22} = -12.2$$

$$\Delta R = -1.5$$

$$\text{corr } +0.7$$

$$-2RC = -2.79$$

$$\Delta R = -2.2$$

$$\Delta b = -0.98$$

$$\Delta d = -0.5$$

$$\Delta a = -1.56$$

$$\Delta q = -0.00$$

1
2
3
4
5
6
7
8

11039

Conditional Equations

27

1 + 1.22 - 1.57 = -96	+ 3	+ 6 = +9	-105
2 + 1.79 - 0.87 = +28	+ 9	+ 3 = +7	+21
3 + 1.99 0.00 = -15	+ 9	0 = +9	-19
4 + 1.65 + 1.13 = +67	+ 3	- 9 = -1	+65
5 + 1.22 + 1.57 = -66	+ 3	- 6 = -3	-63
6 + 0.22 + 1.98 = -38	+ 0	- 7 = -7	-31
7 + 0.00 + 1.99 = -93	+ 0	- 7 = -7	-36
8 - 0.78 + 1.83 = -55	- 2	- 6 = -8	-97
		+ 26	-101

Average 98

$$+13.52 - 0.69 = +30.4$$

$$- 0.69 + 18.22 = -66.0$$

$$+L \quad] - .09 = +14.5$$

$$+18.18 = -69.5$$

$$b = -35.5$$

$$+13.52 = +30.4 - 2.9 = +28.0$$

$$a = +2.07$$

Arc Measured 16.5

$$\frac{P}{n} = 22$$

$$\frac{\sum V}{n} = -26.9$$

$$\frac{-26.9}{22} = -1.22$$

$$\Delta R = -1.5$$

11039 Moon's Mean Position

28

 λ_0 21.7790[✓]
 $+1$ [✓]
 21.7791[✓]
 γ_0 15.8770[✓]
 -2 [✓]
 15.8738[✓]

From Plate Constants

 λ 21.6115[✓] γ 15.7116 ζ -0.3885[✓] η -2.2889 $\log$ 39.58939[✓] $\log \tan \delta$ 8.9071 $\cos$ 89.99863[✓] ζ 29.1788[✓]

8.50724

70.534

1.08352[✓]

5.1393

 α $\alpha - A$ -12.12[✓] $\eta, 0.$ [✓] A 23 59 26.0[✓] $\log h_0$ 0.35954[✓]7.33115[✓] α_0 23 59 13.88[✓]3.02839[✓] 1067.6[✓]

1020

 Red +3.89[✓] $\delta - D$ -17 47.6 α' 23 59 17.77[✓] $D + 4$ 51 10.0[✓] δ_0 7 33 22.9[✓] Red +27.5[✓] δ' 7 33 48.9[✓]

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Moon Mean Position

28

$$\lambda_0 \quad 21.7790''$$

$$+1''$$

$$21.7791''$$

$$\lambda_0 \quad 15.8770''$$

$$-2''$$

$$15.8738''$$

From Plate Constants

$$\lambda \quad 21.6115''$$

$$\eta \quad 15.7134''$$

$$\gamma \quad -0.3885''$$

$$\eta \quad -2.2889''$$

$$\log \gamma \quad 39.58939''$$

$$\log \tan \delta \quad 8.9071''$$

$$\cos \quad 29.99863''$$

$$\gamma \quad 29.1788''$$

$$8.50729''$$

$$70.539''$$

$$1.08352''$$

$$5.1393''$$

q

$$q-A \quad -12.12''$$

$$q, 0''$$

$$A \quad 23 \quad 59 \quad 26.0''$$

$$\log h_0 \quad 0.35958''$$

$$7.33115''$$

$$q_0 \quad 23 \quad 59 \quad 13.88''$$

$$3.02839'' \quad 1067.5''$$

Red

$$+3.89''$$

$$\delta-D \quad -11 \quad 97.6''$$

$$q' \quad 23 \quad 59 \quad 17.77''$$

$$D+q \quad 51 \quad 10.0''$$

$$\delta_0 \quad 9 \quad 33 \quad 22.9''$$

$$\text{Red} \quad +29.5''$$

$$\delta' \quad 9 \quad 33 \quad 46.9''$$

$$\begin{array}{r}
 23 \quad 35 \\
 41.70 \\
 37.74 \\
 \hline
 3.96
 \end{array}$$

$$\begin{array}{r}
 +5 \quad 10 \quad 38.86 \\
 -15.28 \\
 \hline
 +23.58
 \end{array}$$

$$\begin{array}{r}
 23 \quad 57 \\
 43.09 \\
 39.14 \\
 \hline
 3.95
 \end{array}$$

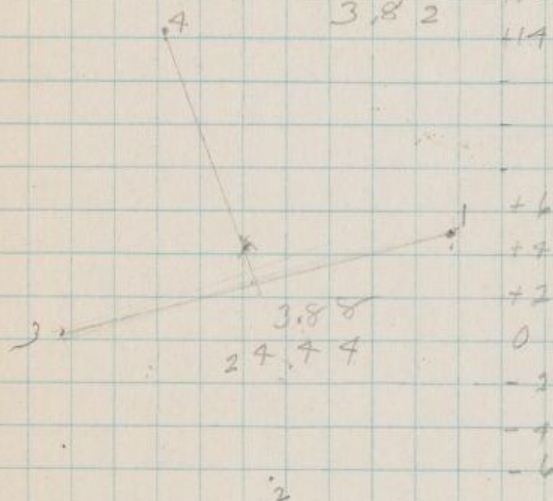
$$\begin{array}{r}
 -6 \quad 28 \quad 29.51 \\
 51.21 \\
 \hline
 +26.70
 \end{array}$$

$$\begin{array}{r}
 0 \quad 21 \\
 9.56 \\
 25.76 \\
 \hline
 3.80
 \end{array}$$

$$\begin{array}{r}
 +1 \quad 28 \quad 53.56 \\
 28.25 \\
 \hline
 25.31
 \end{array}$$

$$\begin{array}{r}
 0 \quad 8 \\
 58.33 \\
 57.51 \\
 \hline
 3.82
 \end{array}$$

$$\begin{array}{r}
 19 \quad 72 \quad 81.77 \\
 59.83 \\
 \hline
 21.94
 \end{array}$$



20 10 245 50 40 30 234

Reduction To Apparent Place.

29

Aug 15 - 24

$$H + \lambda \quad 8 \quad 361 \quad +129 \quad 65 \quad \delta \quad +9 \quad 33 \quad -22.7$$

$$H \quad 8 \quad 36.9$$

$$\alpha \quad 23 \quad 59.2$$

$$C \quad 23 \quad 5.7$$

$$C + \lambda \quad 23 \quad 04.9 \quad -13 \quad 46.5$$

$$\log \cos \delta \quad 9.9986$$

$$\lambda \quad +0.8193$$

$$\lambda \quad 0.8129$$

$$\log \cos C + \lambda \quad 9.9873$$

$$g \quad 1.2901$$

$$\sin \quad 9.3768$$

$$\tan \quad 8.9019$$

$$8.8239$$

$$\log \sin \delta \quad 8.8999$$

$$\cos(H + \lambda) \quad 9.7991$$

$$h \quad 1.2879$$

$$\sin \quad 9.8909$$

$$\sec \delta \quad 0.0019$$

$$8.8239$$

$$\log q' \quad 1.2774$$

$$g \quad 8.3922$$

$$\log h' \quad 9.8869$$

$$\log h \quad 0.0038$$

$$f \quad +2.907$$

$$g \quad -0.025$$

$$h \quad +1.068$$

$$+3.890$$

$$g' \quad +18.99$$

$$h' \quad -0.970$$

$$i' \quad +6.500$$

$$+29.970$$

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Lunar Pasallay

30.

 α' 23 59 17.77^v π 5-8 56.04^v δ 1 37 08.5^v $\delta - \alpha'$ 1 37 50.73^v

9.86913

 $=$ 24 27 20.83^v8.23407^v $=$ 9 3.81^v9.61708^v

24 18 37.84

0.00177^v7.72205^v

9.95727

0.00000

0.07038^v9.99765^v $\delta - \alpha'$ 18 07.62^v $=$ 1 12.51^v δ 77 50 91.5^v δ 4 33 96.9^v $\delta - \alpha$ 40 16 54.6^v

9.82670

8.23407^v9.81059^v0.15169^v

8.02175

 $\delta - \alpha'$ 36 13.6^v $\delta + 5$ 00 00.5^v γ 24 00 30.28^vEphed +5 09 56.8^vEphed 24 00 29.79^vO-C +3.7^vO-C +0.49^v

Cur. Corr 0.0

+0.08

2nd Order Ref 0.0

Fin Corr -0.5^v-0.03^v $\delta + 5$ 10 00.0 γ 24 00 30.23

O-C +3.2

+0.49

11039

Lunar. Pasallay

30.

 $\alpha' 23 59 17.77''$ $\pi 58 56.09''$ $\delta 1 37 08.5''$ $\alpha' 1 37 50.73''$

9.86913

 $= 29 27 40.85''$

8.23907

 $= 7 3.81''$

9.61708

 $24 18 37.11''$

0.00177

7.72205

1.95727

0.00000

0.07038

9.99765

 $\alpha' 18 07.67''$ $= 1 12.84''$ $\alpha' 50 91.5''$ $\delta 9 33 96.9''$ $\alpha' 40 16 59.6''$

9.82670

8.23907

9.81059

0.13469

8.02275

 $\alpha' 36 13.6''$ $+ 5 00 60.5''$ $\alpha' 29 00 30.28''$ $\alpha' +5 09 56.8''$ $\alpha' 29 00 29.79''$

U-C +3.7

U-C +0.47

Carr Carr 0.0

+ 0.08

L. Ref 0.0

