

KG

11366

v.961

LXXXIV



4423

4424

4455



Harvard Lunar Plates

Measures and Reductions

Mary Fowler

Volume LXXXIV

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99
100

1915 mar. 6

Stars - measures.

4423
d 4
1 17047
54 11216
24.6 1915
42
24.5827

out of
reach

17176
10418
1214
60
5.3244

2 16881
228 16490 90
121 82
12.0394

12765
769
12396
.0374

16016
14982 82
91
10
22.8970

19256
10255 59
59
50
.8993

3 18800
285 15119 30
244 20
88
24.2673

16524
10183
8279
20
.3659

19042
13530 23
30
20
28.4498

17250
12730
26 20
37
.4519

Density 3.

1 17471
15.5 12565
6560
73
15.4909

20145
15029
2529
22
15.4894

14830
14631 28
31
6.9800

18475
8887
13304
6.9824

1915 mar. 6.

Stars - measure

$$\begin{array}{r}
 4423 \\
 d \quad 4 \\
 \hline
 1 \quad 17047 \\
 54 \quad 11216 \\
 246 \quad 1915 \\
 \quad 42 \\
 \hline
 24.5827
 \end{array}$$

out of
reach

$$\begin{array}{r}
 17176 \\
 10418 \\
 1214 \\
 60 \\
 \hline
 5.3244
 \end{array}$$

$$\begin{array}{r}
 2 \quad 16881 \\
 228 \quad 16490 \\
 121 \quad 8290 \\
 \hline
 12.0394
 \end{array}$$

$$\begin{array}{r}
 12765 \\
 769 \\
 12396 \\
 \hline
 .0374
 \end{array}$$

$$\begin{array}{r}
 16016 \\
 1495282 \\
 91 \\
 10 \\
 \hline
 22.8970
 \end{array}$$

$$\begin{array}{r}
 19256 \\
 10255 \\
 5957 \\
 50 \\
 \hline
 .8993
 \end{array}$$

$$\begin{array}{r}
 3 \quad 18800 \\
 285 \quad 1511930 \\
 244 \quad 2088 \\
 \hline
 24.3673
 \end{array}$$

$$\begin{array}{r}
 16524 \\
 10183 \\
 8279 \\
 20 \\
 \hline
 3619
 \end{array}$$

$$\begin{array}{r}
 19042 \\
 1353023 \\
 3020 \\
 20 \\
 \hline
 28.4498
 \end{array}$$

$$\begin{array}{r}
 17250 \\
 12730 \\
 2620 \\
 37 \\
 \hline
 4.519
 \end{array}$$

Density 3.

$$\begin{array}{r}
 1 \quad 17471 \\
 15 \quad 1256560 \\
 \quad 6560 \\
 \quad 73 \\
 \hline
 15.4909
 \end{array}$$

$$\begin{array}{r}
 20145 \\
 1502929 \\
 2529 \\
 22 \\
 \hline
 15.9894
 \end{array}$$

$$\begin{array}{r}
 14830 \\
 1463128 \\
 31 \\
 \hline
 6.9800
 \end{array}$$

$$\begin{array}{r}
 1347557 \\
 7887 \\
 13304 \\
 \hline
 6.9821
 \end{array}$$

1915 March 62

4423 noon - Measures.

$$\begin{array}{r}
 d \quad \quad \quad n \\
 1 \quad 15479 \quad - \quad 13350 \\
 174 \quad \quad \quad 8095 \quad - \quad 13091 \\
 179 \quad 15250 \quad \quad \quad 8105 \\
 \hline
 17.9765 \quad \quad \quad 19742
 \end{array}$$

$$\begin{array}{l}
 x = 17.0000 \\
 y = 18.0000
 \end{array}$$

2 scratch

$$\begin{array}{r}
 169 \quad 19189 \quad \quad \quad 19785 \\
 181 \quad 18408 \quad 01 \quad 10550 \\
 \quad \quad \quad 94 \quad \quad \quad 1550 \\
 \quad \quad \quad 88 \quad \quad \quad 65 \\
 \hline
 180785 \quad \quad \quad 0785 \\
 3 \quad 16838 \quad \quad \quad 16 \\
 160 \quad 1189010 \quad \quad \quad 16765 \\
 185 \quad \quad \quad 15 \quad \quad \quad 11649 \\
 \quad \quad \quad 34 \quad \quad \quad 99 \\
 \hline
 184931 \quad \quad \quad 155 \\
 \quad \quad \quad 4889
 \end{array}$$

$$\begin{array}{r}
 17859 \quad \quad \quad 20142 \\
 14514 \quad 28 \quad \quad \quad 13474 \\
 \quad \quad \quad 30 \quad \quad \quad 6564 \\
 \quad \quad \quad 50 \quad \quad \quad 20 \\
 \hline
 166668 \quad \quad \quad 6667
 \end{array}$$

$$\begin{array}{r}
 4 \\
 15.6 \\
 19.0
 \end{array}$$

$$\begin{array}{r}
 18529 \\
 14806 \\
 \quad \quad \quad 9911 \\
 \quad \quad \quad 16 \\
 \hline
 15.6281
 \end{array}$$

$$\begin{array}{r}
 18318 \\
 12019 \\
 \quad \quad \quad 1917 \\
 \quad \quad \quad 00 \\
 \hline
 6289
 \end{array}$$

$$\begin{array}{r}
 5 \\
 15.5 \\
 19.6 \\
 \hline
 15.5 \\
 20.0
 \end{array}$$

$$\begin{array}{r}
 18460 \\
 1272940 \\
 \quad \quad \quad 3140 \\
 \quad \quad \quad 63 \\
 \hline
 15.4271
 \end{array}$$

$$\begin{array}{r}
 18348 \\
 1404950 \\
 \quad \quad \quad 5050 \\
 \quad \quad \quad 41 \\
 \hline
 4295
 \end{array}$$

$$\begin{array}{r}
 6 \\
 15.5 \\
 20.0
 \end{array}$$

$$\begin{array}{r}
 17470 \\
 1181500 \\
 \quad \quad \quad 00 \\
 \quad \quad \quad 58 \\
 \hline
 15.4342
 \end{array}$$

$$\begin{array}{r}
 18350 \\
 1400292 \\
 \quad \quad \quad 11 \\
 \quad \quad \quad 32 \\
 \hline
 4341
 \end{array}$$

1915 March 6.2

44 23 known - measures.

4

x

$\frac{1}{174} \quad 15479 \quad 13350$
 $\frac{179}{15250} \quad 8091 \quad 13091$
 $\quad \quad \quad 8105$

$x = 17.0000$
 $y = 18.0000$

$\frac{1}{8} \quad 17.9765$
 $\quad \quad \quad 9742$

Scratch

$\frac{1}{167} \quad 19189 \quad 19785$
 $\frac{181}{18408} \quad 01 \quad 10550$
 $\quad \quad \quad 94$
 $\quad \quad \quad 88$
 $\quad \quad \quad 65$

$\frac{1}{17859} \quad 17859$
 $\frac{14514}{30} \quad 28$
 $\quad \quad \quad 50$

$\frac{20142}{13474} \quad 6564$
 $\quad \quad \quad 20$

$\frac{1}{3} \quad 180785$
 $\frac{160}{183} \quad 16838$
 $\quad \quad \quad 15$
 $\quad \quad \quad 34$
 $\quad \quad \quad 18.4931$

$\frac{1}{16765} \quad 0785$
 $\frac{11649}{39} \quad 55$
 $\quad \quad \quad 4889$

$\frac{1}{16.6668}$

$\frac{1}{6667}$

$\frac{4}{156}$
 190

$\frac{1}{18529} \quad 18529$
 $\frac{14806}{9911} \quad 16$
 $\quad \quad \quad 15.6281$

$\frac{1}{18318} \quad 18318$
 $\frac{12019}{1917} \quad 00$
 $\quad \quad \quad 6.289$

$\frac{5}{115}$
 198
 $\frac{1}{1}$

$\frac{1}{18460} \quad 18460$
 $\frac{1272940}{31} \quad 63$
 $\quad \quad \quad 15.4271$

$\frac{1}{18348} \quad 18348$
 $\frac{1404950}{50} \quad 41$
 $\quad \quad \quad 4.295$

$\frac{6}{155}$
 200

$\frac{1}{17470} \quad 17470$
 $\frac{1181500}{00} \quad 58$
 $\quad \quad \quad 15.4342$

$\frac{1}{18350} \quad 18350$
 $\frac{1400292}{11} \quad 32$
 $\quad \quad \quad 4.341$

1915 March 6

3

4423

moon-measures -

$$\begin{array}{r}
 7 \\
 \hline
 15.8 \\
 21.0
 \end{array}$$

$$\begin{array}{r}
 19827 \\
 18349 \\
 3440 \\
 16 \\
 \hline
 15.8516
 \end{array}$$

$$\begin{array}{r}
 19395 \\
 1084650 \\
 4050 \\
 75 \\
 \hline
 8531
 \end{array}$$

$$\begin{array}{r}
 8 \\
 \hline
 18170 \\
 1401651021 \\
 21.2 \quad 23 \\
 58 \\
 \hline
 21.1650
 \end{array}$$

$$\begin{array}{r}
 19500 \\
 111338 \\
 198 \\
 00 \\
 \hline
 1623
 \end{array}$$

$$\begin{array}{r}
 9 \text{ scratch} \\
 16418002 \\
 21.5 \quad 1342210 \\
 08 \\
 00 \\
 \hline
 21.4588
 \end{array}$$

$$\begin{array}{r}
 16860 \\
 11480 \\
 7589 \\
 59 \\
 \hline
 4622
 \end{array}$$

$$\begin{array}{r}
 18114 \\
 1227234 \\
 41 \\
 04 \\
 \hline
 16.4131
 \end{array}$$

$$\begin{array}{r}
 17148 \\
 1298986 \\
 90 \\
 38 \\
 \hline
 4156
 \end{array}$$

1915 March 6

3

4423

moon-measures =

$$\begin{array}{r}
 7 \\
 150 \\
 210 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 19827 \\
 18349 \\
 3440 \\
 16 \\
 \hline
 158516
 \end{array}$$

$$\begin{array}{r}
 19395 \\
 1064650 \\
 4550 \\
 75 \\
 \hline
 8531
 \end{array}$$

$$\begin{array}{r}
 18170 \\
 1001651021 \\
 212 \\
 23 \\
 58 \\
 \hline
 211650
 \end{array}$$

$$\begin{array}{r}
 19500 \\
 111338 \\
 198 \\
 00 \\
 \hline
 1623
 \end{array}$$

9 scratch

$$\begin{array}{r}
 14418002 \\
 2151342210 \\
 0810 \\
 00 \\
 \hline
 214188
 \end{array}$$

$$\begin{array}{r}
 16860 \\
 11480 \\
 7559 \\
 59 \\
 \hline
 4622
 \end{array}$$

$$\begin{array}{r}
 18114 \\
 12272 \\
 4139 \\
 04 \\
 \hline
 164131
 \end{array}$$

$$\begin{array}{r}
 17148 \\
 1298986 \\
 9086 \\
 38 \\
 \hline
 4156
 \end{array}$$

4423

Times etc.

app. to stars	1913 Dec 8	2 ^h 51 ^m	-3 ^h 0 ^m 3 ^s
" " moon		2 56	528 ^v - 2 56 53.1 ^v
clock fast		0	168 ^v
H. Sid. T.		2 56	36.15 ^v 0 - 2 - + 1 ^h 31 ^m
H. long		4 44	31.05 ^v
G. Sid. T.		7 41	07.20 ^v
Sid. T. in. hour		17 06	32.77 ^v
Interval		14 34	34.43 ^v
Red.		2	23.28 ^v
G. M. T.		14 32	11.15 ^v

From near Alcu

Moon 14 ^h	1 ^h 24 ^m	R.A. 09 ^h 17 ^m	Decl. + 11° 51'	56.7 ^v
Motion in R	1.8426 ^v		13.184 ^v	
" " 32 ^m 18.6		+ 59.31 ^v	+ 7	04.3
Tabular place	1 25	08.48 ^v	+ 11	59 00.0 ^v

Moon's age 11 days.

Moon's parallax 54' 35".10

" semidiameter 14 54.0

934 = 12.6.

894 = 11.5

P 894.0

Augmentation + 11.5

Irradiation (3) - 0.3

P 905.2

R 1.9404

AR - 92.4

a = -500.0

124

(1+a)R 1848.0

476.0

R² 3.4151

4423

Times etc.

Exp. to stars	1913 Dec 8	2 ^h 51 ^m	-3 ^h 03 ^m
moon		2 56	528 - 2 56 53.1
clock fast		0	168

H. Sid T.	2	56	36.15	0 - 1. + 1 ^h 31 ^m
h. long	4	44	31.05	
G. Sid T.	7	41	07.20	
Sid. T. in. h. m.	17	06	32.77	
Interval	14	34	34.43	
R. Sid		2	33.11	
G. M. T.	14	32	01.32	

From hand clock		R A.	Decl.
Obs. 14 ^h	1 ^h 24 ^m	09 ^s 17	+ 11 [°] 51' 56.7
Moon 1.8426			13.184
32.022		+ 59.00	+ 7 02.2
T. Sid. place	1 25	08 17	+ 11 58 58.9

Moon age 11 days.

Moon parallel 54' 35".10

Semidiam 14' 54.0

734.126	R	094.0
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894.115	Augmentation	+ 11.5
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I. radial (3)	- 0.3
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R	905.2
---	-------

R	1940.4
---	--------

a R	- 92.4
-----	--------

(1+a) R	184.80
---------	--------

R ²	3415.1
----------------	--------

a = -522.0

1.27

476.0

4423

Plate Center

x	y	R.A.	Decl.
6.8812	15.4902	1 ^h 18 ^m 18 ^s	+10° 54' 46"
22.8982	12.0384	27 07	+10 26 28
28.4508	24.3666	30 14	+12 06 48
5833	5190	75 39	32 86 122
19.44	1730	1 25 13	+11 09 21
-18	-22	- 45	+36 30
144	490	1 24 28	+11 45 51
31	+665		
45	36' 30"		

Center { $A = 1^h 24^m 30^s$
 $\alpha = +11^h 45' 50''$

$$\begin{aligned}
 x - 3 &+ 500x &+ 27.54 &- 11209 \\
 + 7292 &+ 3491 = +10783 &+ 426 &+ 11209 = 0 \\
 - 571 &+ 11449 = +10878 &+ 331 &+ 11209 = 0 \\
 - 3686 &+ 14225 = +10539 &+ 670 &+ 11209 = 0 \\
 172770 &+ 8638 &+ 545 &= 170744
 \end{aligned}$$

$$\begin{aligned}
 y - 11 &+ 500y &- 25.9x &+ 0.04 &- 7873 \\
 + 294 &+ 7745 = +8039 &- 181 &+ 7858 &+ 15 = +7873 = 0 \\
 + 2435 &+ 6019 = +8454 &- 593 &+ 7861 &+ 12 = +7873 = 0 \\
 - 3596 &+ 12183 = +8587 &- 737 &+ 7850 &+ 24 = +7874 = +1 \\
 198255 &+ 9913 &- 447 &+ 20 &= 199868
 \end{aligned}$$

$$\begin{aligned}
 \text{Tables } a &+ 0.2 &e &- 0.9 &a - e &+ 1.1 &b + a &- 1.3 \\
 \text{Obs } a &- 500.0 &e &- 500.0 &&+ 1.0 &b + a &- 1.6
 \end{aligned}$$

$$\begin{aligned}
 a - e &= -500.2 &- 500.1 &- 0.1 &- 0.3
 \end{aligned}$$

4423

Plate Center

x	y	R A	Decl.
16.9812	15.4902	1 ^h 18 ^m 18 ^s	+10° 54' 46"
22.8982	12.0384	27 07	+10 26 28
28.4508	24.3666	30 14	+12 06 48
58.33	51.90	75 39	+32 86 122
19.44	17.30	1 25 13	+11 09 21
		- 45	+36 30
14.4	4.70	1 24 28	+11 45 51
31	+6.61		
75	36' 30"		

Center { A: 1^h 24^m 30^s
 D: +11° 45' 50"

$$\begin{aligned}
 x - 3 &+ 500x & +2754 & -11209 \\
 +7292 + 3491 & = +10783 + 426 & = +11209 & = 0 \\
 - 571 + 11449 & = +10878 + 331 & = +11209 & = 0 \\
 -3686 + 14225 & = +10539 + 670 & = +11209 & = 0 \\
 17.2770 + 8638 & + 545 & = 170744
 \end{aligned}$$

$$\begin{aligned}
 y - 7 &+ 1200y & -219x & +10y & -7873 \\
 +297 + 7745 & = +8039 - 181 & = +7858 + 15 & = +7873 & = 0 \\
 +2435 + 6019 & = +8454 - 593 & = +7861 + 12 & = +7873 & = 0 \\
 -3596 + 12183 & = +8587 - 737 & = +7850 + 24 & = +7874 & = 0 \\
 19.8255 + 9913 & - 447 & + 20 & = 19.9868
 \end{aligned}$$

$$\begin{aligned}
 \text{Obs } a &= +0.2 & a &= -0.9 & a &= +1.1 & b+a &= -1.3 \\
 \text{Obs } a &= -500.0 & & -500.0 & & +1.0 & b+a &= -1.6 \\
 a-c &= -0.2 & & -0.1 & & -0.1 & & -0.3
 \end{aligned}$$

$\bar{r}$	η	$\Delta \zeta$	-3.8ζ	$+24$	$+7$
1	-11.77	-6.57	-50	+93	-5 - 2 - 7 = 0
2	+9.95	-10.21	+16	-19	-3 - 3 = -6 +1
3	+10.82	+2.70	+39	-42	-8 + 1 - 7 = 0
M	-0.93	-2.01	+3	-1	= +9

$\Delta \eta$	-3.7η	-0.5ζ
-29	+29	= -5 +6 = +1
-32	+38	= +6 -2 = +4
+9	-8	= +1 -5 = -4
0	+7	0 = +7

4423 Standard Coordinates

Capehu. 189 mag 6.9

Capehu. 208 mag 7.6

Capehu. 217 mag 7.0

C	1 ^h	17 ^m	36.96	1 ^h	26 ^m	25.46	1 ^h	29 ^m	32.77
L			96			51			76
Q			96			54			74
Mean	1	17	36.96	1	26	25.50	1	29	32.76
Prec		+	41.05		+	41.15		+	41.32
S	1	18	18.01	1	27	06.65	1	30	14.08
A	1	24	30	1	24	30	1	24	30
A-A	-	6	11.99	+	2	36.65	+	5	44.08
sub(A)		-	371.94		+	156.65		+	344.04
log			2.57047m			2.19494			2.53661
cos			9.99207			9.99275			9.99022
3.			1.06978m			0.69493			1.03407
Σ	-	11.7430		+	4.9537		+	10.8160	
Σ ₁	-	50		+	16		+	34	
Σ		6.2520			22.9553			28.8194	
+		6.9812			22.8982			28.4508	
Σ-Σ		7.292		-	571		-	3686	

C	+10°	50'	40.8	+10°	22'	25.3	+12°	02'	47.7
L			40.4			25.3			47.6
Q			40.6			25.3			47.5
Mean	+10	50	40.6	+10	22	25.3	+12	02	47.6
Prec		+	4	050		+	4	024	00.9
S	+10	54	45.6	+10	26	27.7	+12	06	48.5
D	+11	45	50	+11	45	50	+11	45	50
S-D	-	51	04.4	-1	19	22.3	+	20	58.5
sub(D)		-	80646		-	4763.1		+	1258.5
log			3.48637m			3.67789m			3.09985
log			0.81752m			1.00904m			0.43100
tan S			9.2851			9.2655			9.3317
Σ			213.70			13899			2.0681
Σ			8.4781			7.7088			8.4532
Σ			-6.5693			-10.2102			+2.6978
Σ	+		301	+		51	+		284
Σ			15.4608			11.7949			24.7262
Σ			15.4902			12.0384			24.3666
Σ-Σ			+294			+2435			-3596

4423 Standard Coordinates

Cakuh. 189 m 6.9

Cakuh. 209 m 7.6

Cakuh. 217 m 7.0

C	1	17	36.96	1	26	25.46	1	29	32.77
L			96			51			76
E			96			54			74
Mean	1	17	36.96	1	26	25.50	1	29	32.76
Pave			41.05			41.15			41.32
S	1	18	18.01	1	27	06.65	1	30	14.08
A	1	24	30	1	24	20	1	24	30
A-H	-	6	11.99	-	2	36.65	-	5	44.08
subal			-37.144			+156.65			+344.04
Long			2.57047m			2.19494			2.53661
Wid			9.99207			9.99275			9.99022
3.			1.06978m			0.69493			1.03407
3.			-11.7430			+4.9537			+10.8160
E			50			16			34
S			6.2520			22.9553			28.8194
X			6.9812			22.8902			28.4508
2-3			77292			-571			-3686

C	+10°	50'	40.8	+10°	22'	25.2	+12°	02'	47.7
L			40.4			25.3			47.6
E			40.6			25.3			47.1
Mean	+10	50	40.6	+10	22	25.3	+12	02	47.6
Pave			40.50			40.24			40.9
S	+10	54	45.6	+10	26	27.7	+12	06	48.0
D	+11	45	50	+11	45	50	+11	45	50
S-H	-	51	04.4	-1	19	22.3	-	20	58.3
sub-D			-30.64.6			-47.63.1			+1258.3
Long			3.48637m			3.67789m			3.09985
Wid			0.81752m			1.00904m			0.43100
Long			4.2851			9.2655			9.3317
Wid			2.1390			1.3899			2.0681
Long			8.4781			7.7088			8.4532
Wid			-6.5693			-10.2102			+2.6978
Long			+301			51			+284
Wid			15.4608			11.7949			24.7262
Long			15.4902			12.0384			24.8666
Wid			+294			+2425			-2502

4
1
2
3
4
5
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-1
2
3
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5
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4423

mao's Center.

	y	$x - x_0$	Δx	$(x - x_0)^2$	$(x - x_0)^2 (y - y_0)^2$	$\sigma - c$
1	17.2800	0.0000	-2	0.0000	3.4292	+141
2	17.0000	-0.2800	-2	0.0785	3.4171	+20
3	16.6668	-0.6132	-2	0.3763	3.4339	+188
4	16.0000	-1.2800	-2	1.6389	3.4241	+90
5	15.6285	-1.6515	-1	2.7278	3.4117	-34
6	15.4283	-1.8517	0	3.4288	3.4288	+137
7	15.4342	-1.8458	+0	3.4070	3.4369	+218
8	15.8524	-1.4276	+2	2.0375	3.4136	-15
9	16.0000	-1.2800	+2	1.6379	3.4247	+96
10	16.4144	-0.8656	+2	0.7489	3.4176	+25
				$R^2 =$	3.4111	

	y	$y - y_0$	Δy	$(y - y_0)^2$	
-1	17.9754	-1.8516	-2	3.4292	180 ^v
2	18.0000	-1.8270	-2	3.3386	189 ^v
3	18.0786	-1.7484	-2	3.0576	199 ^v
4	18.4910	-1.3360	-1	1.7852	224 ^v
5	19.0000	-0.8270	0	0.6839	243 ^v
6	19.8270	0.0000	0	0.0000	270 ^v
7	20.0000	+0.1730	0	0.0299	275 ^v
8	21.0000	+1.1730	+1	1.3761	309 ^v
9	21.1636	+1.3366	+1	1.7868	316 ^v
10	21.4605	+1.6335	+1	2.6687	332 ^v
				Range	152

Approx. Center.

$$x = 160 \quad y = 18.4910$$

$$21.1636$$

$$39.6546$$

$$y_0 = 19.8273$$

$$y_{\text{min}} = 17.9754$$

$$R = 1.8519$$

$$x_{\text{min}} = 15.4283$$

$$x_0 = 17.2802$$

$$\text{Center} \begin{cases} x_0 = 17.2800 \\ y_0 = 19.8270 \end{cases}$$

4423

moments Center

	x	$x - X_0$	Δx	$(x - X_0)^2$	$(x - X_0)(y - Y_0)$	$y - Y_0$
1	17.2800	0.0000	-2	0.0000	3.4292	+1.41
2	17.0000	-0.2800	-2	0.0785	3.4171	+2.0
3	16.6668	-0.6132	-2	0.3763	3.4339	+1.88
4	16.0000	-1.2800	-2	1.6389	3.4241	+9.0
5	15.6285	-1.6515	-1	2.7278	3.4117	-3.4
6	15.4283	-1.8517	0	3.4288	3.4288	+1.37
7	15.4342	-1.8458	0	3.4070	3.4369	+2.18
8	15.8524	-1.4276	-2	2.0325	3.4134	-1.5
9	16.0000	-1.2800	-2	1.6379	3.4247	+9.6
10	16.4144	-0.8656	12	0.7489	3.4176	+2.5
				$R^2 =$	3.4111	

	y	$y - Y_0$	Δy	$(y - Y_0)^2$	
-1	17.9754	-1.8516	-2	3.4292	1.80
2	18.0000	-1.8270	-2	3.3386	1.89
3	18.0786	-1.7484	-2	3.0576	1.99
4	18.4910	-1.3360	-1	1.7852	2.24
5	19.0000	-0.8270	0	0.6839	2.43
6	19.8270	0.0000	0	0.0000	2.70
7	20.0000	+0.1730	0	0.0299	2.75
8	21.0000	+1.1730	+1	1.3761	3.09
9	21.1636	+1.3366	+1	1.7868	3.16
10	21.4605	+1.6335	+1	2.6687	3.32
				Range	1.52

Approx Center.

$$\begin{aligned}
 x &= 16.0 & y &= 18.4910 \\
 & & & \underline{21.1636} \\
 & & & 39.6546 \\
 y &= 19.8273 \\
 y &= 17.9754 \\
 R &= 1.8519 \\
 x &= 15.4283 \\
 x &= 17.2802
 \end{aligned}$$

$$\begin{aligned}
 \text{Center } \{ & X_0 = 17.2800 \\
 & Y_0 = 19.8270
 \end{aligned}$$

Formation of Normals

	ab	ac	bc
1	- 0.00	+ 0.0	- 260.8
2	+ 0.51	- 5.6	- 36.6
3	+ 1.07	- 11.4	- 328.5
4	+ 1.72	- 11.5	- 120.5
5	+ 1.37	+ 56.1	+ 28.2
6	- 0.00	- 253.5	+ 0.0
7	- 0.31	- 402.0	+ 37.1
8	- 1.67	+ 21.4	- 17.5
9	- 1.72	- 122.8	+ 128.8
10	- 1.42	- 21.8	+ 40.7
	- 0.45	- 958.2	- 529.1

- a	- b	+ 15	+ ΔC
- 0	- 5	+ 10	✓
- 3	- 5	+ 7	✓
- 6	- 5	+ 4	✓
- 13	- 4	- 2	✓
- 16	- 2	- 3	✓
- 18	+ 0	- 3	✓
- 18	+ 0	- 3	✓
- 14	+ 3	+ 4	✓
- 13	+ 4	+ 6	✓
- 9	+ 5	+ 11	✓

4423

Conditional Equations:

	a	b	0	c	0-c	Corr.
1	0.00	-1.85	= +141	- 0 + 57 = +57	+ 84	+94
2	-0.28	-1.83	= +20	+ 17 + 56 = +73	- 53	-46
3	-0.61	-1.75	= +158	+ 37 + 54 = +91	+ 97	+101
4	-1.28	-1.34	= +90	+ 77 + 41 = +118	- 28	-30
5	-1.65	-0.83	= -34	+100 + 25 = +125	-159	-162
6	-1.85	+0.00	= +137	+112 - 0 = +112	+ 25	+22
7	-1.85	+0.77	= +218	+112 - 5 = +107	+111	+108
8	-1.43	+1.17	= -15	+ 86 - 36 = +50	- 65	-61
9	-1.28	+1.34	= +96	+ 77 - 41 = +36	+ 60	+66
10	-0.87	+1.63	= +25	+ 53 - 50 = +3	+ 22	+33

+399 - 305

Normal Equations:

+431
740

Average = 70

$$+16.08 - 0.45 = -958 \quad -11.10$$

$$- 0.45 + 18.16 = -529 \quad -3.09$$

$$+ 0.45 - 0.01 = -27 \quad -0.26$$

$$+ 18.15 = -556 \quad -3.35 \quad b = -306 - 0.18$$

$$+16.08 = -958 - 14 = -972$$

$$a = -605 - 0.69$$

Arc measured = 152° Average (0-c) = +9.4

$$\frac{pc}{m} = 13$$

$$+ \frac{9.4}{13} = +0.72$$

$$\Delta R = +0.9$$

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

$$\Delta R = +1.1$$

$$-2RC = +0.74 + 15$$

$$\Delta \theta = -0.13$$

$$\Delta \delta = -0.1$$

$$\Delta \alpha = -0.51$$

$$\Delta \alpha = -0.02$$

4+23

Conditional Equations

	0		c	0-6
1	0.00 - 1.55 = +1.41	- 0 + 57 = +57	+84	
2	-0.28 - 1.83 = +2.0	+17 + 56 = +73	-53	
3	-0.61 - 1.75 = +1.88	+37 + 54 = +91	+97	
4	-1.28 - 1.34 = +9.0	+77 + 41 = +118	-28	
5	-1.65 - 0.83 = -3.4	+100 + 25 = +125	-159	
6	-1.85 + 0.00 = +1.37	+112 - 0 = +112	+25	
7	-1.85 + 0.47 = +2.18	+112 - 5 = +107	+111	
8	-1.43 + 1.17 = -1.5	+86 - 30 = +56	-65	
9	-1.28 + 1.34 = +9.6	+77 - 41 = +36	+60	
10	-0.87 + 1.63 = +2.5	+53 - 50 = +3	-22	

$$+99 - 305$$

$$A \text{ major } 70$$

Normal Equations

$$+16.08 - 0.45 = -958$$

$$-0.45 + 18.16 = -529$$

$$+0.45 - 0.01 = -27$$

$$+18.15 = -556$$

$$b = -306$$

$$+16.08 = -958 - 14 = -972$$

$$a = -605$$

13

$$\frac{9.4}{13} = +$$

72

$$\Delta R = +0.9$$

4423 Orion's Mean Position (1913.0)

$$\begin{array}{r} X_0 = 17.2800 \\ \frac{1}{2}a = -30 \\ \hline 17.2770 \end{array} \quad \begin{array}{r} Y_0 = 19.8270 \\ \frac{1}{2}b = -15 \\ \hline 19.8255 \end{array}$$

From Plate Constants $X = 17.0744$ $Y = 19.9868$

$$\begin{aligned} \bar{z} &= -0.9256 \\ \log \bar{z} &= 9.96642m \\ \cos \bar{z} &= 9.99119 \\ &8.50724 \end{aligned}$$

$$d-A \quad 1.46799m$$

$$\alpha-A \quad - \quad 29.38$$

$$A = 1 \quad 24 \quad 30$$

$$\alpha_0 = 1 \quad 24 \quad 00.62$$

$$\text{Red. add. app.} \quad + \quad 3.78$$

$$\alpha' = 1 \quad 24 \quad 04.40$$

$$\eta = -2.0132$$

$$\begin{aligned} \log \tan \delta &= 9.3117 \\ &9.9328 \\ &7.0534 \\ \hline &6.2979 \end{aligned}$$

$$\begin{aligned} \eta_1 &= + \quad 2 \\ \eta_0 &= -2.0134 \end{aligned}$$

$$\log \eta_1 = 0.30393m$$

$$7.33115$$

$$(\delta - D) = 2.97278m$$

$$\delta - D = - \quad 15 \quad 39.2$$

$$D = +11 \quad 45 \quad 50$$

$$\delta_0 = +11 \quad 30 \quad 10.8$$

$$\text{Red.} \quad + \quad 26.7$$

$$\delta' = +11 \quad 30 \quad 37.5$$

4423 Brown's Mean Position (1913.0)

9

$$\begin{array}{r}
 X_0 = 172800 \\
 - 20 \\
 \hline
 172770
 \end{array}
 \qquad
 \begin{array}{r}
 Y_0 = 198270 \\
 - 15 \\
 \hline
 198255
 \end{array}$$

From Plate Constants $X = 170744$ $Y = 199868$

$$\begin{array}{r}
 \xi = -0.9256 \\
 \log 3 = 9.96642 \\
 \cos = 999119 \\
 8.50724
 \end{array}$$

$$\mu - \mu = 1.46799$$

$$\lambda - \lambda = 29.38$$

$$A \quad 1 \quad 24 \quad 30$$

$$X_0 = 1 \quad 24 \quad 00.62$$

$$\text{Red. add. app.} \quad + \quad 3.78$$

$$X' \quad 1 \quad 24 \quad 04.40$$

$$\eta = -2.0132$$

$$\begin{array}{r}
 \log \tan 5 = 9.3117 \\
 4.9328 \\
 7.0534 \\
 \hline
 6.2979
 \end{array}$$

$$\begin{array}{r}
 \eta_1 = + \quad 2 \\
 \eta_0 = -2.0134
 \end{array}$$

$$\begin{array}{r}
 \log \eta_1 = 0.30393 \\
 7.33115
 \end{array}$$

$$(S-D) = 29.7278$$

$$S-D = -15.392$$

$$D = +11.4550$$

$$S_0 = +11.3010.8$$

$$\text{Red.} \quad - \quad 26.7$$

$$S' = +11.3037.5$$

$$\begin{array}{r} 1 \quad 13 \quad 22 \quad 33 \quad 33 \\ \underline{ 1862} \\ + 371 \\ \hline \end{array}$$

$$\begin{array}{r} + 3 \quad 09 \quad 47.9 \\ \underline{ 23.6} \\ + 24.3 \end{array}$$

$$\begin{array}{r} 1 \quad 26 \quad 53.31 \\ 49.51 \\ \hline + 3.80 \end{array}$$

$$\begin{array}{r} + 14 \quad 53 \quad 79.1 \\ \underline{ 51.6} \\ + 27.5 \end{array}$$

$$\begin{array}{r} 1 \\ 1 \quad 32 \quad 32.87 \\ \quad \quad 29.04 \\ \hline \quad \quad 43.83 \end{array}$$

$$\begin{array}{r} + 11 \quad 41 \quad 75.2 \\ \underline{ 48.5} \\ 26.7 \end{array}$$

4423 Red. ad. locum aph.

10

$$H + \alpha \quad 2^h \quad 13.8 = 33^\circ 27'$$

$$H \quad 0 \quad 49.8$$

$$\alpha \quad 1 \quad 24 \quad 00.62$$

$$g \quad 22 \quad 26.1$$

$$g + \alpha \quad 23 \quad 50.1 = 357^\circ 32'$$

$$l \cos(G + \alpha) \quad 9.9996$$

$$- \delta \quad 1.3311$$

$$- \sin \delta \quad 8.6338m$$

$$- \tan \delta \quad 9.3086$$

$$8.8239$$

$$8' \quad 1.3307$$

$$8 \quad 8.0974m$$

$$f \quad +3.02$$

$$g \quad -0.01$$

$$h \quad +0.77$$

$$+3.78$$

$$\delta = +11 \quad 30 \quad 10.8$$

$$l \cos \delta \quad 9.9912$$

$$l \quad 0.2800$$

$$(l) \quad 0.2712$$

$$l \sin \delta \quad 9.2998$$

$$- \cos(H + \alpha) \quad 9.9214$$

$$h \quad 1.3092$$

$$\sin \delta \quad 9.7413$$

$$\sec \delta \quad 0.0098$$

$$8.8239$$

$$h' \quad 0.5304$$

$$h \quad 9.8842$$

$$8' \quad +21.41$$

$$h' \quad +3.39$$

$$(i) \quad +1.87$$

$$+26.67$$

4423 Red and brown spots

10

$$H+X \quad 2^{\circ} \quad 13.8^{\circ} = 33^{\circ} 27'$$

$$H \quad 0 \quad 49.8$$

$$a \quad 1 \quad 24 \quad \overline{0062}$$

$$g \quad 22 \quad 26.1$$

$$g+X \quad 23 \quad 50.1 = 357^{\circ} 32'$$

$$\cos(G+X) \quad 9.9996$$

$$g \quad 1.3311$$

$$\sin \quad 8.6338^m$$

$$\cos S \quad 9.3086$$

$$8.8239$$

$$g' \quad 1.3307$$

$$8 \quad 8.0974^m$$

$$f \quad +3.02$$

$$g \quad -0.01$$

$$h \quad +0.77$$

$$\overline{+3.78}$$

$$S \quad +11 \quad 30 \quad 110.8$$

$$\cos S \quad 9.9912$$

$$i \quad \overline{0.2800}$$

$$(i) \quad 0.2712$$

$$\cos S \quad 9.29987$$

$$\cos(H+X) \quad 9.9214$$

$$h \quad 1.3092$$

$$\sin \quad 9.7413$$

$$\sec S \quad 0.0098$$

$$8.8239$$

$$h' \quad 0.5304$$

$$h \quad 9.8842$$

$$g' \quad +21.41$$

$$h' \quad +3.39$$

$$(i) \quad +1.87$$

$$\overline{+26.67}$$

4423

Lunar Parallax.

11

$$\begin{array}{r}
 \alpha = 1^h 24^m 04.40 \\
 \theta = 2 \quad 56 \quad 36.15 \\
 \theta - \alpha = +1 \quad 32 \quad 31.75 \\
 = +23^\circ 07' 56''
 \end{array}$$

$$- \quad \quad \quad 8 \quad 06$$

$$+ 22 \quad 59 \quad 50$$

$$9.95727$$

$$0.00000$$

$$0.03596$$

$$9.99323$$

$$\gamma = 44 \quad 33 \quad 12$$

$$11 \quad 30 \quad 28$$

$$33 \quad 02 \quad 34$$

$$9.82640$$

$$8.20078$$

$$9.73660$$

$$0.15392$$

$$7.91770$$

$$\delta - \delta' = +28 \quad 26.6$$

$$\delta = +11 \quad 59 \quad 04.1$$

$$\text{Amph } \delta = +11 \quad 59 \quad 00.0$$

$$O-C \quad \quad \quad + 4.1$$

$$\text{Curv. of Plate} \quad + 0.3$$

$$\text{Ind. orb. ref} \quad 0.0$$

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

$$\delta = +11 \quad 59 \quad 04.2$$

$$O-C \quad \quad \quad + 4.2$$

$$\delta = +11 \quad 30 \quad 37.5$$

$$\pi = 54' 35.1''$$

$$9.86913$$

$$8.20078$$

$$9.59423$$

$$0.00957$$

$$7.67371$$

$$\alpha - \alpha' = +16' 13.05''$$

$$= + 1^m 04.87$$

$$\alpha = 1 \quad 25 \quad 09.27$$

$$\alpha = 1 \quad 25 \quad 08.48$$

$$+ 0.79$$

$$\text{Curv} \quad + 0.03$$

$$\text{Irr} \quad - 0.02$$

$$\alpha = 1 \quad 25 \quad 09.25$$

$$O-C = + 0.77$$

4423

human Parallax

11

$$\begin{array}{r}
 \alpha = 1 \quad 24 \quad 04.40 \\
 \delta = 2 \quad 56 \quad 36.15 \\
 \alpha - \alpha' = +1 \quad 32 \quad 31.75 \\
 \delta - \delta' = +23^\circ \quad 07' \quad 56''
 \end{array}$$

$$- \quad \quad \quad 8 \quad 06$$

$$+ \quad 22 \quad 59 \quad 50$$

$$995727$$

$$000000$$

$$003596$$

$$999323$$

$$\delta = 44 \quad 33 \quad 12$$

$$11 \quad 30 \quad 38$$

$$33 \quad 02 \quad 34$$

$$982640$$

$$820078$$

$$973660$$

$$015392$$

$$7.91770$$

$$\delta - \delta' = +28 \quad 26.6$$

$$\delta = 11 \quad 59 \quad 04.1$$

$$\text{Amph } \delta = +11 \quad 58 \quad 58.9$$

$$O-C \quad \quad \quad +5.2$$

$$\text{Curv of Plate} \quad +0.3$$

$$\text{Ind. or. ref} \quad 0.0$$

$$\text{Err} \quad 0.1$$

$$\delta = +11 \quad 59 \quad 04.2$$

$$O-C \quad \quad \quad +4.2$$

$$\delta = +11 \quad 30 \quad 37.5$$

$$\pi = 54' \quad 35''$$

$$986913$$

$$820078$$

$$959423$$

$$000957$$

$$767371$$

$$\alpha - \alpha' = +16' \quad 13.05$$

$$= +1 \quad 04.87$$

$$\alpha = 1 \quad 25 \quad 09.27$$

$$\alpha = 1 \quad 25 \quad 08.17$$

$$+1.10$$

$$\text{Curv} \quad +0.03$$

$$\text{Err} \quad -0.02$$

$$\alpha = 1 \quad 25 \quad 09.25$$

$$O-C = \quad \quad \quad +0.17$$

1
6
15
2
23
11
25/3
25

4424

Stars - Measures

1915 Mar. 8,

12

	d	n
✓	18892	19209
63	1808584	1099198
152	82	9098
	02	01
	<u>15.4810</u>	<u>1791</u>

	d	n
	19784	19629
	1248174	16900
	80	0395
	80	14
	<u>6.2697</u>	<u>2724</u>

	d	n
2	19320	17740
223	1027586	1676769
119	82	6069
	24	43
	<u>11.9043</u>	<u>9025</u>

	d	n
	19269	18053
	1150600	1580297
	99	9997
	60	55
	<u>22.2240</u>	<u>2254</u>

	d	n
3	17752	17411
276	1484040	1035850
243	3040	5450
	53	60
	<u>24.2914</u>	<u>2897</u>

	d	n
	18750	17209
	1515561	1077169
	50	6969
	40	01
	<u>27.6409</u>	<u>6434</u>

Density 3.

4424

Star-Measures

1915 Mar 8

12

	d	n
✓	16892	19209
63	18085	10991
152	8284	9098
	02	01
	<u>150810</u>	<u>1791</u>

	d	n
✓	19320	17740
223	10275	16767
119	8286	6069
	24	43
	<u>119043</u>	<u>9025</u>

	d	n
✓	17752	17411
276	14840	10358
243	3540	5450
	53	60
	<u>242914</u>	<u>2697</u>

	d	n
	19784	19629
	12481	16905
	8074	0395
	80	14
	<u>62697</u>	<u>2724</u>

	d	n
	19269	18053
	11506	15802
	9900	9997
	60	53
	<u>222240</u>	<u>2254</u>

	d	n
	18750	17209
	15151	10771
	50	6969
	40	01
	<u>276409</u>	<u>6434</u>

Density 3.

4

1

179

183

mi

5

8

2

11

18

18

3

16

18

4

15

19

5

15

20

mi

2

2

6

15

21

4424 *moon-measures* *1915 Mar. 8*

$$\begin{array}{r}
 1 \\
 16825 \\
 78 \\
 14629 \\
 183 \\
 4047 \\
 \text{min} \\
 42 \\
 18.2490
 \end{array}$$

$$\begin{array}{r}
 2 \\
 16821 \\
 70 \\
 14599 \\
 183 \\
 1004 \\
 30 \\
 18.2219
 \end{array}$$

$$\begin{array}{r}
 3 \\
 19795 \\
 16.0 \\
 13850.30 \\
 18.6 \\
 50 \\
 03 \\
 18.5957
 \end{array}$$

$$\begin{array}{r}
 4 \\
 2000
 \end{array}$$

$$\begin{array}{r}
 5 \\
 154 \\
 200 \\
 \text{min} \\
 16
 \end{array}$$

with a little less.

$$\begin{array}{r}
 6 \\
 156 \\
 21.0
 \end{array}$$

$$\begin{array}{r}
 19526 \\
 1171408 \\
 09 \\
 31 \\
 2180
 \end{array}$$

$$\begin{array}{r}
 19534 \\
 1176745 \\
 3440 \\
 32 \\
 2212
 \end{array}$$

$$\begin{array}{r}
 17531 \\
 1349069 \\
 80 \\
 40 \\
 5938
 \end{array}$$

$$\begin{array}{r}
 20009 \\
 16100 \\
 9879 \\
 89 \\
 15.6091
 \end{array}$$

$$\begin{array}{r}
 19000 \\
 11695 \\
 0411 \\
 92 \\
 15.2709
 \end{array}$$

$$\begin{array}{r}
 19530 \\
 1476561 \\
 58 \\
 41 \\
 15.5226
 \end{array}$$

$$\begin{array}{r}
 18211 \\
 12119 \\
 1119 \\
 96 \\
 6086
 \end{array}$$

$$\begin{array}{r}
 19196 \\
 1647381 \\
 7881 \\
 18 \\
 2725
 \end{array}$$

$$\begin{array}{r}
 19189 \\
 1394248 \\
 50 \\
 90 \\
 5242
 \end{array}$$

4424

d

more - measure

7

d

1915 Mar. 8

N

$$\begin{array}{r}
 1 \\
 16825 \\
 178 \quad 14629 \\
 183 \quad 4047 \\
 \quad 42 \\
 \hline
 18.2190
 \end{array}$$

$$\begin{array}{r}
 19526 \\
 1171408 \\
 \quad 0908 \\
 \quad 31 \\
 \hline
 2180
 \end{array}$$

$$\begin{array}{r}
 2 \\
 16821 \\
 170 \quad 14599 \\
 183 \quad 1004 \\
 \quad 30 \\
 \hline
 18.2219
 \end{array}$$

$$\begin{array}{r}
 19534 \\
 1176745 \\
 \quad 3440 \\
 \quad 32 \\
 \hline
 2212
 \end{array}$$

$$\begin{array}{r}
 3 \\
 19795 \\
 160 \quad 1285030 \\
 186 \quad 50 \\
 \quad 03 \\
 \hline
 18.5959
 \end{array}$$

$$\begin{array}{r}
 17531 \\
 134.7069 \\
 \quad 8069 \\
 \quad 40 \\
 \hline
 5938
 \end{array}$$

$$\begin{array}{r}
 4 \\
 156 \\
 190 \\
 \hline
 3000
 \end{array}$$

$$\begin{array}{r}
 20009 \\
 10100 \\
 \quad 9879 \\
 \quad 89 \\
 \hline
 15.6091
 \end{array}$$

$$\begin{array}{r}
 18211 \\
 12119 \\
 \quad 1119 \\
 \quad 96 \\
 \hline
 6086
 \end{array}$$

$$\begin{array}{r}
 5 \\
 154 \\
 200 \\
 \hline
 \text{min. is a little less.}
 \end{array}$$

$$\begin{array}{r}
 19000 \\
 11695 \\
 \quad 0411 \\
 \quad 92 \\
 \hline
 15.2709
 \end{array}$$

$$\begin{array}{r}
 19196 \\
 16473 \\
 \quad 7881 \\
 \quad 18 \\
 \hline
 2725
 \end{array}$$

$$\begin{array}{r}
 6 \\
 156 \\
 210 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 19530 \\
 14765 \\
 \quad 5861 \\
 \quad 41 \\
 \hline
 15.5226
 \end{array}$$

$$\begin{array}{r}
 19189 \\
 1394248 \\
 \quad 50 \\
 \quad 90 \\
 \hline
 5242
 \end{array}$$

4
7
16
2
8
10
2

4424

Moon - measures

1915 Mar. 8.

14

4

x

d

v

d

v

2 17885
 160 1247181
 215 86
 72
21.5398

20160
 1553030
 29
 65
5368

8/ scratch.

163 17882
 217 1052829
 21
 85
21.7358

20250
 1761913
 18
 50
.7367

17641
 10902
 0099
 31
3266

19970
 1670560
 90
 69
3272

4424

Moon - measures

1915 Mar 8.

14

	d	$\sim$	d	$\sim$
2	17885	20160		
160	1247181	1553030		
215	86	29		
	72	65		
	<u>21.5398</u>	<u>.5368</u>		

8 scratch.

163	17882
217	10528
	2129
	85
	<u>21.7358</u>

20250
1761913
18
50
<u>.7367</u>

17641
10902
0099
31
<u>.3266</u>

19970
1670560
90
69
<u>.3273</u>

4424

Times etc.

Exp. T. Stars 1913 Dec 8 $3^h 08^m - 3^h 20^m$
 Moon 3 13 39.5 - 3 13 39.9
 Clockfast 0 16.8

H. Sid. T. 3 13 22.9 $\Theta - \alpha = + 1^h 48$
 H. long 4 44 31.05
 G Sid. T. 7 57 53.95
 Sid. T. M. Moon 17 06 32.77
 Interval 14 51 21.18
 Reduction 2 26.03
 G. M. T. 14 48 55.15

From least. above.

R. A.

Decl.

Moon 15^h $1^h 25^m 59.78 + 12^0 05' 07.2$
 Motion in ~~1.081~~ 1.8452 13.161
 " 11.081 - 20.45 - 2 24.9
 Tabular Place 1 25 39.33 + 12 02 42.3

Moon's age 11 days

parallax $54' 35.32$

semidiameter 14 54.1

R 894.1

Augmentation 10.3

Irradiation (3) - 0.3

R 904.1

R 19380

aR - 921

(1+a) R 18459

R² 34073

$$934 = 11.5$$

$$894 = 10.3$$

$$a = -499.2$$

$$+ 24$$

$$4752$$

$$3.69$$

$$738$$

4424	Tanner Is.						
Exp. T. Star	1713 Dec 8	3 ^h 08 ^m		- 3 ^h 29 ^m			
known		3 13	39.5	- 3 13	39.9		
check feet		0	16.8				
H. Sid. T.		3 13	22.9		G-X = + 1 ^m 48		
H. long		4 44	31.05				
G. Sid. T.		7 57	53.95				
Sid. T. in. from		17 06	32.77				
Interval		14 51	21.18				
Reductive			26.03				
G. m. T.		14 48	55.15				

From least. above		R.A.		Decl.			
known 15"		1 ^h 25 ^m 59.78		+ 12° 05'	07.2		
known 15.001	1.5452						
71.081		- 20.45		- 2	24.1		
Talman Place		1 25 29.33		+ 12 02	72.3		

known age 11 days

parallax	54	35.32
semidiameter	14	54.1
R		89.41
Argumentation		10.2
Irregularities		- 0.3
R		90.41
R		19.380
alt		- 9.21
(12-2) R		18.459
R		3.4073

4.54 = 11.5
 2.53 = 10.3

a. - 499.2
 77
 775.2

Tables $a = 0.0$ $e = -1.1$ $a-e = +1.1$ $b+a = +1.7$
 Obs $a = -499.2$ $e = -501.1$ $a-e = +19$ $b+a = -1.0$
 $O-C$ $-799.2''$ $-5009.0''$ $+0.8$ $+0.7''$

Rate Constraints

x	6.2710	22.2247	27.6422	μ_{moon}	$x_0 = 17.1190$	16
z	6.2520	22.9553	28.8194	μ_a	-38	
$x-z$	+190	-7306	-11772		171152	
y	15.1800	11.9034	24.2906	y_0	20.0660	
η	15.4608	11.7949	24.7262	μ_b	-5	
$y-\eta$	-2808	+1085	-4356		200655	
$x-z$	+1505	+14214	-0.84		-5479	
$+190$	$+3136$	$+3326$	$+2157$	$= +5483 - 5$	$= +5478$	$= -9$
-7306	$+11112$	$+36106$	$+1691$	$= +5497 - 18$	$= +5479$	$= 0$
-11772	$+13821$	$+2049$	$+3452$	$= +5501 - 22$	$= +5479$	$= 0$
17.1152	$+8558$	$+2851$	-14			$= 17.7068$

$y-\eta$	+5004	-14115	+1.14	-3914			
-2808	+7590	+4782	-885	+3897	+17	+3914	= 0
+1085	+5952	+7037	-3136	+3901	+13	+3914	= 0
-4356	+12145	+7789	-3900	+3889	+26	+3915	= +1
20.0655	+10033	-2415	+22				= 20.4381

$$\beta = -0.2932$$

$$\log \beta = 9.46716$$

$$\cos \delta = 9.49110$$

$$8.50724$$

$$(x-A) = 0.96882$$

$$\eta = -1.5619$$

$$\log \tan \delta = 9.3085$$

$$\frac{z}{r} = 8.9343$$

$$7.0584$$

$$5.2962$$

$$\alpha-A = 9.31$$

$$\log \eta_0 = 0.19365$$

$$7.33115$$

$$2.86250$$

$$A = 1 \quad 24 \quad 30$$

$$\alpha_0 = 1 \quad 24 \quad 20.69$$

$$\delta-D = 12 \quad 08.6$$

$$\text{Red} = + \quad 3.78$$

$$D = 411 \quad 45 \quad 50$$

$$\alpha' = 1 \quad 24 \quad 24.47$$

$$\delta_0 = +11 \quad 33 \quad 41.4$$

$$\text{Red} = + \quad 26.7$$

$$\delta' = +11 \quad 34 \quad 08.1$$

Plate Wastards

X	6.2710	22.2247	27.6422	moon	16
3	6.2520	22.9553	28.8194	$X_0 = 17.1190$	
2-3	+ 190	-7306	-1177.2	-35	
				<u>17.1152</u>	
7	15.1800	11.9034	24.2906	$Y = 20.0660$	
7	15.4608	11.7949	24.7262	-5	
4-7	-2808	+1085	-4356	<u>20.0655</u>	
2-3	+1200	+14214	-0.8+	-5479	
+190	+3136	+2326	+2157	+5483-5	+5478
-7306	+11112	+3886	+1691	+5497-18	+5479
-11772	+13821	+2049	+3452	+5501-22	+5479
7.1152	+8858	+2851	-14		= 17.7068

4-7	+1204	-1411	+1.14	-3914
-2808	+7590	+4782	-885	+3897
+17	+13919			
7.1081	+5952	+7037	-3136	+3901
+13	+7914			
-4356	+12115	+7789	-3900	+3889
+26	+7915			
0.0655	+110033	-2415	+22	-204381

$$3 = -0.2932$$

$$\log 3 = 9.46716$$

$$\log 2 = 9.49110$$

$$8.50724$$

$$(x-u) = 0.96882$$

$$a-a = 9.31$$

$$A = 1 \quad 24 \quad 30$$

$$X_0 = 1 \quad 24 \quad 20.69$$

$$\text{Red} = + 3.78$$

$$x' = 1 \quad 24 \quad 24.47$$

$$m = -1.5619$$

$$\log \tan 5 = 9.3085$$

$$8.9343$$

$$7.0584$$

$$5.2962$$

$$\log 4 = 0.19365$$

$$7.33115$$

$$2.86250$$

$$S-D = 12.086$$

$$D = +11 \quad 45 \quad 50$$

$$S_0 = +11 \quad 33 \quad 41.4$$

$$\text{Red} = + 2.67$$

$$S' = +11 \quad 34 \quad 08.1$$

442+ Moons Calcul Conditional Equation

	0	C	0-C
1	+000 - 185 = +63	0 + 19 = +19	+44
2	-012 - 184 = +92	9 + 19 = +28	+64
3	-012 - 147 = +100	84 + 15 = +99	+1
4	-151 - 107 = +100	114 + 11 = +125	-19
5	-185 - 007 = +92	140 + 7 = +147	-51
6	-160 + 093 = +108	121 - 10 = +111	-3
7	-112 + 147 = +124	94 - 15 = +79	+55
8	-079 + 167 = +96	60 - 17 = +43	+53

Normal Equations

$$+1138 - 087 = -848$$

$$-087 + 1595 = -100$$

$$+087 - 007 = -65$$

$$+1588 = -165$$

$$b = -104$$

$$+1138 = -848 + 9 = -857$$

$$a = -75.4$$

$$+217 = 73$$

$$\text{Average} = 36$$

9

9

95°

ΔP = +

Formation of Normal

alt.		
1	-000 + 0.0	-116.2
2	+022 - 11.0	-109.7
3	+104 - 111.9	-147.1
4	+160 - 160.0	-103.0
5	+013 - 177.2	-6.7
6	-149 - 172.8	+100.2
7	-165 - 138.8	+182.5
8	-132 - 75.8	+160.2
	-207 - 847.5	-100.0

Moon's Center

17

	x	$x - x_0$	Δx	$(x - x_0)^2$	$(x - x_0)^2 + (y - y_0)^2$	$0 - c$
1	17.1190	0.0000	-3	0.0000	3.4136	+63
2	17.0000	-0.1190	-3	0.0143	3.4165	+92
3	16.0000	-1.1190	-2	1.2526	3.4173	+100
4	15.5088	-1.5102	-2	2.2813	3.4179	+106
5	15.2717	-1.8473	-0	3.4125	3.4169	+96
6	15.5234	-1.5956	+1	2.5456	3.4181	+108
7	16.0000	-1.1190	+2	1.2517	3.4197	+124
8	16.3269	-0.7921	+3	0.6270	3.4169	+96
					3.4073	

	y	$y - y_0$	Δy	$(y - y_0)^2$	
1	18.2185	-1.8475	-1	3.4136	180
2	18.2214	-1.8444	-1	3.4022	183 184
3	18.5948	-1.4712	-1	2.1647	217
4	19.0000	-1.0660	-1	1.1366	235
5	20.0000	-0.0660	-0	0.0044	267
6	21.0000	+0.9340	+1	0.8725	300
7	21.5383	+1.4723	+1	2.1680	323
8	21.7362	+1.6702	+1	2.7899	335
					Range 155

Approx. Center

$$\begin{aligned}
 x &= 16.0000 & y &= 18.5948 \\
 & & & \underline{21.5383} \\
 & & & 40.1331 \\
 y_0 &= 20.0666 \\
 y_{\text{min}} &= 18.2185 \\
 R &= 1.8481 \\
 x_{\text{min}} &= 15.2717 \\
 x_0 &= 17.1198
 \end{aligned}$$

$$\text{Center } \left\{ \begin{array}{l} x_0 = 17.1190 \\ y_0 = 20.0660 \end{array} \right.$$

4424

Moon's Calcul Conditional Equations

		0		C	0-C	Corr.	
1	+0.00	-1.85 = +6.3	-	0 + 19 = +19	+44	+54	1
2	-0.12	-1.84 = +9.2	+	9 + 19 = +28	+64	+73	2
3	-0.12	-1.47 = +10.0	+	84 + 15 = +99	+1	+0	3
4	-1.51	-1.07 = +10.6	+	114 + 11 = +125	-19	-24	4
5	-1.55	-0.07 = +9.6	+	140 + 7 = +147	-51	-56	5
6	-1.60	+0.93 = +10.8	+	121 - 10 = +111	-3	-3	6
7	-1.12	+1.47 = +12.4	+	84 - 15 = +69	+55	+62	7
8	-0.79	+1.67 = +12.6	+	60 - 17 = +43	+53	+65	8

Normal Equations

$$+11.38 - 0.87 = -84.8 - 8.11$$

$$-0.87 + 1.595 = -1.00 - 2.23$$

$$+0.87 - 0.07 = -6.5 - 0.62$$

$$+1.588 = -16.5 - 2.854 = -10.4 - 0.18 \Delta$$

$$+11.38 = -84.8 + 9 = -85.7$$

$$a = -75.4 - 0.73$$

Arc measured: 155 Average (0-C) = 18.0

$$\frac{pc}{n} = 19$$

$$\frac{+18.0}{19} = +9.5$$

$$\Delta R = +1.2$$

$$-2RC = +0.74 + 15$$

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

$$\Delta R = +1.4$$

$$\Delta \beta = -0.13 \quad \Delta \delta = -0.1$$

$$\Delta a = -0.54 \quad \Delta \alpha = -0.02$$

Formation of Normals

	at	an	bn
1	-0.00	+0.0	-116.2
2	+0.22	-11.0	-169.7
3	+1.64	-111.9	-147.1
4	+1.60	-160.0	-103.0
5	+0.13	-177.2	-6.7
6	-1.49	-172.8	+100.2
7	-1.65	-138.8	+182.5
8	-1.32	-75.8	+160.2
	-0.87	-847.5	-100.0

-a	-b	+ΔC
-0	-5	+10
-1	-5	+9
-12	-4	-1
-17	-3	-5
-20	-0	-5
-18	+3	+0
-12	+4	+7
-9	+5	+11

Means Center

17

	x	$x - x_0$	Δx	$(x - x_0)^2$	$(x - x_0)(y - y_0)$	$y - y_0$
1	17.1190	0.0000	-3	0.0000	3.4136	+6.3
2	17.0000	-0.1190	-3	0.0143	3.4165	+9.2
3	16.0000	-1.1190	-2	1.2526	3.4173	+10.0
4	15.5088	-1.5102	-2	2.2813	3.4179	+10.6
5	15.2717	-1.8473	-0	3.4125	3.4169	+9.6
6	15.5234	-1.5956	+1	2.5456	3.4181	+10.8
7	16.0000	-1.1190	+2	1.2517	3.4197	+12.4
8	16.3269	-0.7921	+3	0.6270	3.4169	+9.6

37073

	y	$y - y_0$	Δy	$(y - y_0)^2$	
1	18.2185	-1.6475	-1	3.4136	180
2	18.2216	-1.8444	-1	3.4022	183
3	18.5948	-1.4712	-1	2.1647	217
4	19.0000	-1.0660	-1	1.1366	235
5	20.0000	0.0660	0	0.0044	267
6	21.0000	0.9340	+1	0.8725	300
7	21.5383	1.4723	+1	2.1680	323
8	21.7362	1.6702	+1	2.7899	335

Range 15.5

Approx Center

$$\begin{aligned}
 x &= 16.0000 & y &= 18.1748 \\
 & & & \underline{21.5383} \\
 & & & 40.1331 \\
 y_0 &= 20.0666 \\
 y_{\text{min}} &= 18.2185 \\
 R &= 1.8481 \\
 x &= 15.2717 \\
 x_0 &= 17.1198
 \end{aligned}$$

$$\text{Center } \left\{ \begin{aligned} x_0 &= 17.1190 \\ y_0 &= 20.0660 \end{aligned} \right.$$

Lunar Parallax

$$\begin{array}{rcl} \alpha' & = & 1^h 24^m 24.47^s \\ \theta & = & 3 \quad 13 \quad 22.9 \\ \theta - \alpha' & = & +1 \quad 48 \quad 58.43 \\ & + & 27^\circ 14' 36'' \end{array}$$

$$\begin{array}{rcl} & + & 9 \quad 27 \\ & + & 27 \quad 05 \quad 09 \end{array}$$

$$\begin{array}{r} 9.95727 \\ 0.00000 \\ 0.05045 \\ \hline 0.00772 \end{array}$$

$$\begin{array}{rcl} f & = & 45 \quad 30 \quad 34 \\ & & 11 \quad 34 \quad 08 \\ & & 33 \quad 56 \quad 26 \end{array}$$

$$\begin{array}{r} 9.82640 \\ 8.20080 \\ 9.74690 \\ \hline 0.14669 \\ 7.92079 \end{array}$$

$$\delta' - \delta = + 28 \quad 38.8$$

$$\delta = + 12 \quad 02 \quad 46.9$$

$$\text{Am Eph } \delta = + 12 \quad 02 \quad 42.3$$

$$O - C \quad + \quad 4.6$$

$$\begin{array}{rcl} \text{Curv. of Plate} & + & 0.3 \\ \text{Cur} & - & 0.1 \\ \delta = & + & 12 \quad 02 \quad 46.8 \\ O - C & + & 4.5 \end{array}$$

$$\delta' = + 11^\circ 34' 06.1''$$

$$\Pi = 54' 35.22''$$

$$\begin{array}{r} 9.86913 \\ 8.20080 \\ 9.66065 \\ \hline 0.00969 \\ 7.74025 \end{array}$$

$$\begin{array}{rcl} \alpha - \alpha' & = & 18' 54.16 \\ & = & + 1^m 15.61 \end{array}$$

$$\alpha \quad 1 \quad 25 \quad 40.08$$

$$A = 1 \quad 25 \quad 39.33$$

$$+ 0.75$$

$$\begin{array}{rcl} \text{Curv} & + & 0.03 \\ \text{Cur} & - & 0.02 \end{array}$$

$$\alpha \quad 1 \quad 25 \quad 40.06$$

$$O - C \quad + \quad 0.73$$

Linear Parallax.

$$\begin{array}{r} \alpha' = 1 \quad 24 \quad 24.67 \\ \theta = 3 \quad 13 \quad 22.9 \\ \theta - \alpha = 1 \quad 48 \quad 58.43 \\ + \quad 27 \quad 14 \quad 36'' \end{array}$$

$$+ \quad \quad \quad 9 \quad 27$$

$$+ \quad 27 \quad 05 \quad 09$$

$$995727$$

$$000000$$

$$005045$$

$$000772$$

$$+ \quad 45 \quad 30 \quad 34$$

$$11 \quad 34 \quad 08$$

$$33 \quad 56 \quad 26$$

$$982640$$

$$820080$$

$$974690$$

$$014559$$

$$793079$$

$$\delta' - \theta' = + 28 \quad 38.8$$

$$S = + 12 \quad 02 \quad 46.9$$

$$\text{Am. Eph. } S = + 12 \quad 02 \quad + 23$$

$$O - C \quad \quad \quad + \quad 4.6$$

$$\text{Error of Plate } + 0.3$$

$$\delta' = + 11^{\circ} \quad 34' \quad 08''$$

$$\Pi = 54' \quad 35'' \quad 22$$

$$9.86913$$

$$820080$$

$$966065$$

$$000969$$

$$774025$$

$$\alpha - \alpha' = 18 \quad 54.16$$

$$= + 1^{\circ} \quad 15' \quad 21''$$

$$\alpha \quad 1 \quad 25 \quad 40.08$$

$$\alpha - 1 \quad 25 \quad 39.33$$

$$+ 0.75$$

$$+ 0.03$$

4455 Stars - Measures

1915 Mar 15

α	δ	μ	α	δ	μ
$\frac{1}{9.9}$	9046	1510000	10700	12411	1109
13.1	845751	0600	983129	11558	
	50	14570	30	9148	
	<u>13.0593</u>	<u>0592</u>	<u>9.9130</u>		
$\frac{2}{17.5}$	14536	19346	19630	19212	
26.5	1313941	15040	1430901	1451910	
	50	4947	11	12	
	50	49	40	10	
	<u>26.5701</u>	<u>5698</u>	<u>27.4672</u>	<u>4697</u>	
$\frac{3}{24.1}$	17800	18949	18036	18182	
17.6	10539	1620606	8877	1731109	
	3940	0206	8189	09	
	00	54	29	29	
	<u>177261</u>	<u>7260</u>	<u>24.0852</u>	<u>0872</u>	

Density 4

4415 Star - Measures

1915 Mar. 15

$$\begin{array}{r}
 \alpha \quad \nu \\
 1 \quad 9046 \quad 1510000 \\
 99 \quad 845751 \quad 0600 \\
 131 \quad 50 \quad 14510 \\
 \hline
 13.0593 \quad 0592
 \end{array}$$

$$\begin{array}{r}
 \alpha \quad \nu \\
 10700 \quad 1241109 \\
 985129 \quad 1109 \\
 30 \quad 11558 \\
 \hline
 9.9130 \quad 9178
 \end{array}$$

$$\begin{array}{r}
 2 \quad 18836 \quad 19346 \\
 175 \quad 1313941 \quad 15040 \\
 265 \quad 50 \quad 4947 \\
 \quad 50 \quad 49 \\
 \hline
 26.5701 \quad 5698
 \end{array}$$

$$\begin{array}{r}
 19630 \quad 19212 \\
 1430901 \quad 1451910 \\
 11 \quad 12 \\
 40 \quad 10 \\
 \hline
 7.4672 \quad 4697
 \end{array}$$

$$\begin{array}{r}
 3 \quad 17800 \quad 18949 \\
 241 \quad 14539 \quad 1620606 \\
 176 \quad 3940 \quad 0206 \\
 \quad 00 \quad 54 \\
 \hline
 177261 \quad 7260
 \end{array}$$

$$\begin{array}{r}
 15036 \quad 18132 \\
 8877 \quad 1731109 \\
 8189 \quad 09 \\
 29 \quad 79 \\
 \hline
 240852 \quad 0878
 \end{array}$$

Density 4

1
20
18

2
19
18

3
19
18

4
18
19

5
18
19

6
18
2

4455
dMoon-Measures
w1915 Mar. 15
d x

20

$$\begin{array}{r} 1 \\ 20.0 \\ 18.0 \end{array} \quad 18.0000$$

20.0000

2 scratch.

$$\begin{array}{r} 19.8 \\ 18.9 \end{array} \quad \begin{array}{r} 15460 \\ 14700 \\ 8900 \\ 70 \end{array} \quad \begin{array}{r} 18.0765 \end{array}$$

$$\begin{array}{r} 17611 \\ 8380 \\ 9091 \\ 29 \end{array} \quad \begin{array}{r} .0760 \end{array}$$

$$\begin{array}{r} 16366 \\ 14002 \\ 1510 \\ 69 \end{array} \quad \begin{array}{r} 19.7643 \end{array}$$

$$\begin{array}{r} 17902 \\ 10245 \\ 5186 \\ 88 \end{array} \quad \begin{array}{r} 7647 \end{array}$$

$$\begin{array}{r} 3 \\ 19.0 \\ 18.6 \end{array} \quad \begin{array}{r} 19558 \\ 18785 \\ 9082 \\ 60 \end{array} \quad \begin{array}{r} 18.6573 \end{array}$$

$$\begin{array}{r} 17580 \\ 14129 \\ 2018 \\ 90 \end{array} \quad \begin{array}{r} 6538 \end{array}$$

$$\begin{array}{r} 4 \\ 18.7 \\ 19.0 \end{array}$$

$$\begin{array}{r} 19737 \\ 17580 \\ 9081 \\ 45 \end{array} \quad \begin{array}{r} 18.7845 \end{array}$$

$$\begin{array}{r} 19013 \\ 11210 \\ 9001 \\ 29 \end{array} \quad \begin{array}{r} 7826 \end{array}$$

$$\begin{array}{r} 5 \\ 18.6 \\ 19.8 \end{array} \quad \begin{array}{r} \text{min} \\ \mu \end{array}$$

$$\begin{array}{r} 18685 \\ 14642 \\ 3133 \\ 90 \end{array} \quad \begin{array}{r} 18.5948 \end{array}$$

$$\begin{array}{r} 19290 \\ 13336 \\ 4027 \\ 80 \end{array} \quad \begin{array}{r} 5950 \end{array}$$

$$\begin{array}{r} 6 \\ 18.6 \\ 20.0 \end{array}$$

$$\begin{array}{r} 18642 \\ 14680 \\ 9680 \\ 58 \end{array} \quad \begin{array}{r} 18.6037 \end{array}$$

$$\begin{array}{r} 19321 \\ 13292 \\ 9900 \\ 29 \end{array} \quad \begin{array}{r} 6029 \end{array}$$

445-5
dShorn-Measures
N1915 March 15
d

N

$$\begin{array}{r} 1 \\ 200 \\ 18.0 \end{array} \quad 18.0000$$

20.0000

2 Scratch.

198 15460

189 14700

89

70

18.0765

17611

8380

9091

29

0760

16366

14002

1510

69

19.7643

17902

10245

5136

88

7647

3 19558

186 12785

9082

60

18.6573

17580

14129

2018

90

6538

4

87

19.0

5

86

98

18.0

N

6

18.6

20.0

19737

17580

9081

45

18.7845

19013

11210

9001

29

7826

18685

14642

3133

90

18.5948

19290

13336

4027

80

5950

18642

14680

7680

58

18.6037

19321

13292

9900

29

6029

4455

Moon Measures

1915 Mar 15

21

2

19.0 -

240+

8

200 16899
 246 1018590
 92
 12
28.6625

19190
 1582714
 21
 90
6631

9

205 16797
 247 950001
 max 02
 99
 in 24.7298
24.7298

19194
 16500
 9902
 09
7302

4455

Moon Measures

1915 Mar 15

21

2

19.0 -

2001

8

200 16899
 246 10185
 9290
 12
20.6625

19190
 1582714
 21
 90
6631

9 16797
 205 9500
 247 0201
 max 99
20.7298

19194
 16500
 9902
 09
7302

4455	Trices etc								
Exp. to stars	1913 Dec 11	1 ^h	19 ^m	- 1 ^h	31 ^m				
" " Moon		1	24	53.0	- 1	24	53.2		
clock fast			0	14.9					
H. Sid Time		1	24	38.2				$\theta - \alpha = -2^h 24^m$	
H. hour		4	44	31.05					
R. Sid T.		6	09	09.25					
Sid. T. in hour		17	18	22.44					
Interval		12	50	46.81					
Red.			2	06.27					
G. T. T.		12	48	40.54					

From Kantaleu.				R. A.		Decl.			
Moon 13 ^h		3 ^h	48 ^m	47 ^s 35		+ 24°	52'	19"	
motion in 1 ^m	2.2671					7.788			
" - 11.324				- 2567		- 1	28.2		
Tabular Place		3	48	21.68		+ 24	50	51.3	

Moon's age	14 days	(before full)			
parallax	55'	58"	65		
semidiameter	15	16.7			
R		9	16.7		
Augmentation		+ 12.6			
Inradiation (4)		- 0.6			
R		9287			
R		19908			
at R		- 949			
(1+a) R		18959			
R ²		3.5944			
934 = 13.0					
917 = 12.6					
a = -500.6					
+ 20					
476.6					

C. 0.00

1.5

1.5

1.5

1.5

1.5

1.5

1.5

1.5

1.5

4455 Times etc
 Eph. Stars 1913 Dec 11 1^h 19^m - 1^h 31^m
 " Moon 1 24 53.0 - 1 24 53.2
 clock fast 0 14.9

H. Sid. Time 1 24 38.2 $\theta - \alpha = -2^{\circ} 24'$
 H. long 4 44 31.05
 G. Sid. 6 09 09.25
 Sid. Time from 17 18 22.44
 Interval 12 50 46.81
 Red 2 06.27
 G. S. T. 12 48 40.54

Trans. Kant Allen R. A. Decl.
 Moon 13^h 3^h 48^m 47.35 + 24° 52' 19.5
 motion 1^h 2.2691 7788
 -11.324 - 25.67 - 1 28.2
 Tabular Place 3 48 21.68 + 24 50 51.3

Moon's age 14 days (before full)
 parallax 55' 58.65
 semidiam 15' 16.7
 R 9.167
 Augmentation 2.126
 Irradiation (+) - 0.6
 R 928.7
 R 19998?
 alt - 94.9
 (1 + a) R 18959
 R² 3.5944
 a = -5006
 24
 7766

4455

Plate Center

r3

x	y
9.9139	13.0592
17.4684	26.5700
24.0862	17.7260
3 51.47	57.36
17.16	19.12
-18	-22
84	288
31	4665
26	1342

= 22' 22"

R	A	Decl
3	43	47
48	20	25
52	14	24
143	51	72
3	48	07
+	26	+22
3	48	33
+	24	46
		55

Center } $A = 3^h 48^m 30^s$
 $D = +24^\circ 47' 00''$

$$\begin{aligned}
 26-3 &+ 5004 + 95.34 & + 0.6x & - 5590 \\
 + 2682 + 4917 + 1245 & = + 8884 + 6 & = + 8890 & = 0 \\
 - 2386 + 8734 + 2532 & = + 8880 + 10 & = + 8890 & = 0 \\
 - 4856 + 12043 + 1689 & = + 8876 + 14 & = + 8890 & = 0 \\
 20.4897 + 10245 + 1890 & & + 12 & = 20.8154
 \end{aligned}$$

$$\begin{aligned}
 y - \eta &+ 5004 & - 96.5x & + 2.2y & - 7824 \\
 + 2222 + 6530 & = + 8752 - 957 & = + 7795 + 29 & = + 7824 & = 0 \\
 - 3834 + 13285 & = + 9451 - 1686 & = + 7765 + 58 & = + 7823 & = -1 \\
 + 1246 + 8863 & + 10109 - 7324 & = + 7785 + 39 & = + 7824 & = 0 \\
 198309 + 9915 & - 1977 & + 44 & = 19.8467
 \end{aligned}$$

$$\begin{aligned}
 \text{Tables } a &= -0.5 & e &= -0.5 & a-e &= 0.0 & b+a &= +1.4 \\
 \text{Obs } a &= -50.6 & e &= -502.2 & a-e &= +1.6 & b+a &= +1.2 \\
 0-e &= -500.1 & & -501.7 & & +1.6 & & -0.2
 \end{aligned}$$

x	y	R A	Decl.
9.9139	13.0592	3 43 49	+23 35 30
17.4684	26.5700	48 20	21 25 31
24.0862	17.7260	52 14	24 12 38
3 51.47	57.36	143 81	72 99
17.16	19.12	3 48 07	24 33
		+	22 22
84	28.8	3 48 33	24 46 55
31	41.2		
26	134.2		
	22' 22"		
		Center	A: 3" 48" 30"
			L D +24° 47' 00"

$$\begin{aligned}
 x - \bar{x} &= +100 + 9534 + 0.61 - 8890 \\
 +2682 + 4917 + 1245 &= +8884 + 6 = +8890 &= 0 \\
 -2386 + 8734 + 2532 &= +8880 + 10 = +8890 &= 0 \\
 -4856 + 12043 + 1689 &= +8876 + 14 = +8890 &= 0 \\
 20.4897 + 10245 + 1890 &+ 12 = 20.8154
 \end{aligned}$$

$$\begin{aligned}
 y - \bar{y} &= +1004 - 96.5 + 2.24 - 7824 \\
 +2222 + 6530 + 8752 &- 957 = +7795 + 29 = +7824 = 0 \\
 -3834 + 13285 + 9451 &- 1616 = +7765 + 58 = +7823 = -1 \\
 +1246 + 8663 + 10109 &- 7324 = +7785 + 39 = +7824 = 0 \\
 198309 + 9918 &- 1977 + 44 = 198467
 \end{aligned}$$

$$\begin{aligned}
 \text{Tables } a &= -0.5 & a &= -0.5 & a &= -0.5 & b+a &= +1.4 \\
 \text{Obs } a &= -0.6 & & -50.22 & a &= +1.6 & b+a &= +1.2 \\
 0-c &= -0.1 & & 1.7 & & +1.6 & & -0.2
 \end{aligned}$$

	ξ	η	$\Delta \xi$	-3.25	-1.5η	0
1	-8.35	-9.20	-32	+27 = -5	+14 = +9	
2	-0.29	+4.95	-0	+1 = +1	-7 = -6	
3	+6.57	-4.42	+10	-21 = -11	+7 = -4	
M	+2.81	-2.15		-9	+3 = -6	
				-4.77		

$\Delta \eta$	0
-37	+43 = +6
+3	-24 = -21
-7	+21 = +14

M +10 +10

Corr $\begin{cases} \alpha = -0.02 \\ \delta = +0.5 \end{cases}$

	ξ	-2.55	-1.8η	+3
1	-32	+21 = -11	+7 = -4	
2	-0	+1 = +1	-4 = -3	
3	+10	-16 = -6	+3 = -3	
M		-7	+2 = -2	

η	-2η	-1.5ξ	+7
-37	+18 = -19	+12 = -7	
+3	-10 = -7	+0 = -7	
-7	+7 = +2	-10 = -8	
M	+4	-4	+7

Corr $\begin{cases} \alpha = -0.01 \\ \delta = +0.3 \end{cases}$

Standard Coordinates

Cape No. 550 mag 6.6				Cape No. 565 mag 7.2				Cape No. 575 mag 6.4			
C	3 ^h	43 ^m	00.35	3 ^h	47 ^m	33.05	3	51	27.54		
L						06				50	
B						03				49	
Mean	3	43	00.35	3	47	33.05	3	51	27.51		
Proc		+	46.22		+	46.86		+	46.56		
α	3	43	46.57	3	48	19.91	3	52	14.07		
δ	3	48	30	3	48	30	3	48	30		
$\alpha - A$	-	4	43.43	-	10.09		+	3	44.07		
$\sin(\delta - A)$	-		283.41	-	10.09		+		224.06		
$\log \mu$			2.45242 ^m			1.00389 ^m			2.35036		
$\log \delta$			9.96209			9.95576			9.96002		
$\log \sigma$			0.92175 ^m			9.46689 ^m			0.81762		
$\log \sigma$			-8.3512			-0.2930			+6.5708		
$\log \sigma$	-		31	-		0			10		
$\log \sigma$			9.6457			17.7070			24.5718		
$\log \sigma$			9.9139			17.4684			24.0862		
$\log \sigma$			+2682			-0.2386			-4856		
Δ	+23°	33'	04.6"	+25°	23'	08.4"	+24°	10'	19.6"		
L						09.2			20.3		
B						08.5			19.0		
Mean				+25	23	08.7	+24	10	19.6		
Proc		+	2	25.5		22.0		+	2	18.3	
δ	+23	35	30.1	+25	25	30.7	+24	12	37.9		
δ	+24	47	00	+24	47	00	+24	47	00		
$\delta - A$	-1	11	29.9	+	38	30.7		-34	22.1		
$\sin(\delta - A)$			-4290.5			+2310.8			-2062.2		
$\log \mu$			3.63251 ^m			3.36376			3.31433 ^m		
$\log \sigma$			0.96366 ^m			0.69491			0.64548 ^m		
$\log \sigma$			9.6402			9.6770			9.6529		
$\log \sigma$			1.8435			8.9338			1.6352		
$\log \sigma$			8.5371			5.6642			8.3415		
$\log \sigma$			-9.1972			+4.9534			-4.4206		
$\log \sigma$	+		342	+		0			+220		
$\log \sigma$			12.8370			26.9534			17.6014		
$\log \sigma$			13.0592			26.5700			17.7260		
$\log \sigma$			+2222			-3834			+1246		

Standard Coordinates

Cape Hu. 550 mag 6.6				Cape Hu. 565 mag 7.2				Cape Hu. 575 mag 6.4			
C	3"	43"	0035	3"	47"	33.05		3	51	27.54	
L						06				50	
E						03				49	
mag	3	43	0035	3	47	33.05		3	51	27.51	
Proc		+	4622		+	4686			+	4656	
A	3	43	46.57	3	48	19.91		3	52	14.07	
A	3	48	30	3	48	30		3	48	30	
n-A	-	4	4343	-		10.09		+	3	44.07	
m-A	-		283.41	-		10.09		+		224.06	
mag	2	45	242	1.00	389			2	35	036	
mag	9	96	209	9	95	576		9	96	002	
S ₀	0	92	175	9	46	689		0	81	762	
S ₀	-	8	3512	-	0	2930		+	6	5708	
S ₁	-		31	-		0		+		10	
S ₂		9	6457		1	77070			2	45718	
S ₃		9	9139		1	74684			2	40862	
1-3		+	2682		-	0.2586			-	4856	
C	+23	33'	0462	+25	23'	084		+24	10	19.6	
L						072				203	
E						085				190	
mag				+25	23	087		+24	10	19.6	
Proc		+	2	25.5		220			+	2	153
S	+23	35	30.1	+25	25	30.7		+24	12	379	
D	+24	47	00	+24	47	00		+24	47	00	
-A	-1	11	29.9	+	38	30.7		-	34	221	
m-A		-	4290.5		+	2310.8			-	2062.2	
mag	3	63	251	3	36	376		3	31	433	
mag	0	96	366	0	69	491		0	64	548	
mag	9	6	402	9	6	770		9	6	529	
S ₂	1	84	35	8	9	338		1	63	52	
S ₃	8	53	71	5	66	42		8	34	15	
mag	-	9	1972	+	4	9534		-	4	4206	
mag	+		342	+		0		+		220	
mag	1	28	370	2	69	534		1	76	014	
mag	1	30	592	2	65	700		1	7	7260	
mag	+	2	222	-	3	834		+	1	246	

4455 Inverse Center.

	x	$x - x_0$	Δx	$(x - x_0)^2$	$(x - x_0) + (y - y_0)^2$	$O - C$
1	20.0000	-0.4920	+3	0.2418	3.5976	+32
2	19.7645	-0.7275	+2	0.5290	3.6114	+170
3	19.0000	-1.4920	+2	2.2255	3.6096	+152
4	18.7836	-1.7084	+1	2.9183	3.6105	+161
5	18.5949	-1.8971	+0	3.5990	3.5990	+46
6	18.6033	-1.8887	-0	3.5672	3.5954	+10
7?	18.9990	-1.4930	-2	2.2296	3.5962	+18
8	20.0000	-0.4920	-3	0.2424	3.5939	-5
9	20.4920	0.0000	-3	0.0000	3.6020	+76

$$R^2 = 3.5944$$

	y	$y - y_0$	Δy	$(y - y_0)^2$	
1	18.0000	-1.8320	+1	3.3558	1950°
2	18.0762	-1.7558	+1	3.0824	2030°
3	18.6555	-1.1765	0	1.3841	2330° 232
4	19.0000	-0.8320	0	0.6922	2440°
5	19.8320	0.0000	0	0.0000	2700°
6	20.0000	+0.1680	0	0.0282	2750°
7?	21.0010	+1.1690	0	1.3666	3080°
8	21.6628	+1.8308	-1	3.3515	3450°
9	21.7300	+1.8980	-1	3.6020	3600°

Range 165°

Approx Center.

$$x = 20.0 \quad y = 18.0000$$

$$21.6628$$

$$39.6628$$

$$y_0 = 19.8314$$

$$y = \max = 21.7300$$

$$R = 1.8986$$

$$x = \min = 18.5949$$

$$x_0 = 20.4935$$

$$x = 19.0 \quad y = 18.6555$$

$$21.0010$$

$$39.6565$$

$$y_0 = 19.8282$$

$$\text{center } \left\{ \begin{array}{l} x_0 = 20.4920 \\ y_0 = 19.8320 \end{array} \right.$$

4455 Ovarious Center

	X	$x - x_0$	Δx	$(x - x_0)^2$	$(x - x_0)^2 + (y - y_0)^2$	O-C
1	20.0000	-0.4920	+3	0.2418	3.5976	+32
2	19.7645	-0.7275	+2	0.5290	3.6114	+170
3	19.0000	-1.4920	+2	2.2255	3.6096	+152
4	18.7836	-1.7084	+1	2.9183	3.6105	+161
5	18.5949	-1.8971	+0	3.5990	3.5990	+46
6	18.6033	-1.8887	-0	3.5672	3.5954	+10
7	18.9990	-1.4930	-2	2.2296	3.5962	+18
8	20.0000	-0.4920	-3	0.2424	3.5939	-5
9	20.4920	0.0000	-3	0.0000	3.6020	+76

$$R^2 = 3.5944$$

	Y	$y - y_0$	Δy	$(y - y_0)^2$	
1	18.0000	-1.8320	+1	3.3558	195
2	18.0762	-1.7558	+1	3.0824	203
3	18.6555	-1.1765	0	1.3841	233
4	19.0000	-0.8320	0	0.6922	244
5	19.8320	0.0000	0	0.0000	270
6	20.0000	+0.1680	0	0.0282	275
7	21.0010	+1.1690	0	1.3661	308
8	21.6628	+1.8308	-1	3.3515	345
9	21.7300	+1.8980	-1	3.6020	360

Range 165

Approx Center

$$\begin{aligned}
 x &= 20.0 & y &= 18.0000 \\
 & & & \underline{21.6628} \\
 & & & 39.6628 \\
 y &= 19.8314 \\
 y_{\text{max}} &= 21.7300 \\
 R &= 1.8986 \\
 x_{\text{min}} &= 18.5949 \\
 x &= 20.4935
 \end{aligned}$$

$$\begin{aligned}
 x &= 19.04 & y &= 18.6155 \\
 & & & \underline{21.0010} \\
 & & & 39.6165 \\
 y &= 19.8282
 \end{aligned}$$

$$\begin{aligned}
 \text{center} \} & x = 20.4920 \\
 & y = 19.8320
 \end{aligned}$$

Formation of Normals.

	ab	an	bn
1	+ 0.90	- 15.7	- 58.5
2	+ 1.28	- 124.0	- 299.0
3	+ 1.76	- 226.4	- 179.3
4	+ 1.42	- 275.3	- 133.6
5	- 0.00	- 87.5	+ 0.0
6	- 0.32	- 18.9	+ 1.7
7	- 1.74	- 26.8	+ 21.1
8	- 0.90	+ 2.9	- 9.2
9	+ 0.00	+ 0.0	+ 144.3
	+ 240	- 771.7	- 494.1

- a	- b	- 15 + ΔC
+ 5	- 16	- 26 ^v
+ 7	- 16	- 24 ^v
+ 15	- 11	- 11 ^v
+ 17	- 7	- 5 ^v
+ 19	+ 0	+ 4 ^v
+ 19	+ 15	+ 19 ^v
+ 15	+ 10	+ 10 ^v
+ 5	+ 16	+ 6 ^v
+ 0	+ 17	+ 2 ^v

4455 Proxima Centauri Conditional Equations - χ^2

	a	b	0	c	0-c	Corr.
1	-0.49	-1.83	= +32	+23 + 42 = +65	-33	-59
2	-0.73	-1.76	= +170	+34 + 40 = +74	+96	+72
3	-1.49	-1.18	= +152	+69 + 27 = +96	+56	+45
4	-1.71	-0.83	= +161	+79 + 19 = +98	+63	+58
5	-1.90	+0.00	= +46	+88 - 0 = +88	-42	-38
6	-1.89	+0.17	= +10	+87 - 4 = +83	-73	-54
7	-1.49	+1.17	= +16	+69 - 27 = +42	-24	-14
8	-0.49	+1.83	= -5	+23 - 42 = -19	+14	+20
9	+0.00	+1.90	= +76	-0 - 43 = -43	+119	+121

+ 348 = 172
Average = 58.

Normal Equations

$$\begin{aligned}
 +15.55 + 2.40 &= -772 & -10.19 \\
 +2.40 + 16.86 &= -494 & -0.53 \\
 -2.40 - 0.37 &= +119 & +1.57 \\
 +16.49 &= -375 & +1.04 \times = -227 + 0.06 \\
 +15.55 &= -772 + 55 = -717 & a = -46.1 - 0.65
 \end{aligned}$$

Arc measured = 165 Average 0-c = +19.6

$$\frac{pc}{\pi} = 2p$$

$$\frac{+19.6}{27} = +0.73 \text{ or } +1.2$$

$$-2\pi c = -0.76 - 15$$

Corr +0.2

$$\Delta b = -0.46 - 9 \quad \Delta \delta = -0.2$$

$$\Delta a = +0.50 + 10 \quad \Delta \alpha = +0.02$$

$$\Delta R = +1.0$$

4455 Moon's Center Conditional Equations 26

	a	b	0	C	0 - C
1	-0.49	-1.83	+32	+23 + 42 = +65	-33
2	-0.73	-1.76	+170	+34 + 40 = +74	+96
3	-1.49	-1.18	+152	+69 + 27 = +96	+56
4	-1.71	-0.83	+161	+79 + 19 = +98	+63
5	-1.90	+0.00	+46	+88 - 0 = +88	-42
6	-1.89	+0.17	+10	+57 - 4 = +53	-72
7	-1.49	+1.17	+18	+69 - 27 = +42	-24
8	-0.49	+1.83	-5	+23 - 42 = -19	+14
9	+0.00	+1.90	+76	-0 - 43 = -43	+119

+ 348 - 172
Average = 58

Normal Equations

$$+15.55 + 240 = -772$$

$$+ 240 + 1686 = -494$$

$$- 240 - 0.37 = +1.9$$

$$+ 16.49 = -375$$

$$+15.55 = -772 + 55 = -717$$

$$b = -22.7$$

$$a = -46.1$$

moon's Mean Position (1913.0)

$$X_0 = 20.4920 \checkmark$$

$$\frac{20.4920}{20.4897} \checkmark$$

$$Y_0 = 19.8320 \checkmark$$

$$\frac{19.8320}{19.8309} \checkmark$$

From plate constants $X = 20.8154 \checkmark$ $Y = 19.8467$

$$Z = +2.8154 \checkmark$$

$$\log Z = 0.44954 \checkmark$$

$$-\cos S = 9.95901 \checkmark$$

$$8.50724 \checkmark$$

$$(\alpha - A) 1.98329 \checkmark$$

$$\alpha - A + 1 36.22 \checkmark$$

$$A = 3 48 30 \checkmark$$

$$\alpha_0 = 3 50 06.22 \checkmark$$

$$\text{Red. ad l. app.} + 4.81 \checkmark$$

$$\alpha' = 3 50 11.03 \checkmark$$

$$\eta = -2.1533$$

$$\log \tan S = 9.6587$$

$$0.8991$$

$$\underline{7.0534}$$

$$76112$$

$$\eta_1 = + 41$$

$$\eta_0 = -2 1574$$

$$\log \eta_1 = 0.33393 \checkmark$$

$$7.33115$$

$$(\delta - D) = 3.00278 \checkmark$$

$$\delta - D = - 16 46.4$$

$$D = +24 47 00$$

$$S_0 + 24 30 13.6$$

$$\text{Red.} = + 22.4$$

$$\delta' = +24 30 36.0$$

Moon Mean Position (1913.0)

$$\lambda_0 = 20.4920$$

$$\begin{array}{r} 20.4920 \\ - 22 \\ \hline 20.4897 \end{array}$$

$$Y_0 = 19.8320$$

$$\begin{array}{r} 19.8320 \\ - 11 \\ \hline 19.8309 \end{array}$$

From plate constants $X = 20.8154$ $Y = 19.8467$

$$Z = +2.8154$$

$$\log Z = 0.44954$$

$$\cos Z = 9.95901$$

$$8.50724$$

$$(G-A) = 1.98329$$

$$G-A + 1.3623$$

$$A = 3.4830$$

$$A_0 = 3.5006.23$$

$$\text{Red. and bl. app.} + 4.81$$

$$X' = 3.5011.03$$

$$y = -2.1533$$

$$\log \tan S = 9.6587$$

$$0.8991$$

$$7.0534$$

$$7.6112$$

$$y_1 = +41$$

$$y_2 = -2.1574$$

$$\log y_2 = 0.33393$$

$$7.33115$$

$$(S-D) = 3.00278$$

$$S-D = -1.6464$$

$$D = +24.4700$$

$$S_0 + 24.3013.6$$

$$\text{Red.} = +22.4$$

$$S' = +24.3036.0$$

$$\begin{array}{r} 3 \quad 4 \quad 2 \quad 23.35 \\ \hline 18.60 \\ + 4.75 \\ \hline \end{array}$$

$$\begin{array}{r} + 23 \quad 50 \quad 35.6 \\ \hline 12.6 \\ + 23.0 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \quad 59 \quad 37.75 \\ \hline 32.97 \\ + 4.78 \\ \hline \end{array}$$

$$\begin{array}{r} + 21 \quad 50 \quad 63.3 \\ \hline 42.0 \\ + 21.3 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \quad 05 \quad 36.72 \\ \hline 31.78 \\ + 4.94 \\ \hline \end{array}$$

$$\begin{array}{r} + 26 \quad 15 \quad 38.0 \\ \hline 16.9 \\ + 21.1 \\ \hline \end{array}$$

40 45 50 55 0 5 30



$$\begin{array}{r} 4.94 \\ 4.75 \\ \hline 1.9 \\ 4.75 \\ \hline 6 \\ 4.81 \end{array} \quad \begin{array}{r} 23.0 \\ 21.1 \\ \hline 1.9 \\ 23.0 \\ \hline 6 \\ 22.4 \end{array}$$

445) Red. ad. column apt.

$$\begin{aligned}
 H + \alpha &= 4^h 28^m 9^s = 67^\circ 14' \\
 H &= 0 \quad 38.8 \\
 \alpha &= 3 \quad 50.1 \\
 \delta &= 22 \quad 28.5 \\
 \theta + \alpha &= 2 \quad 18.6 = 34^\circ 39'
 \end{aligned}$$

$$\begin{aligned}
 \ell \cos(\theta + \alpha) & 9.9152 \\
 \ell \sin \theta & 1.3338 \\
 \ell \cos \theta & 9.7548 \\
 \tan \theta & 9.6588 \\
 & 8.8239
 \end{aligned}$$

$$\begin{aligned}
 \theta' & 1.2490 \\
 \theta & 9.5713
 \end{aligned}$$

$$\begin{aligned}
 f & + 3.06 \\
 g & + 0.37 \\
 h & + 1.38 \\
 \hline
 & + 4.81 \checkmark
 \end{aligned}$$

$$\delta = +24 \quad 30.2$$

$$\begin{aligned}
 \ell \cos \delta & 9.9590 \\
 \ell \sin \delta & 0.1743 \\
 (\ell) & 0.1333
 \end{aligned}$$

$$\begin{aligned}
 \ell \sin \delta & 9.6178 \\
 \cos(\theta + \alpha) & 9.5877 \\
 \ell \sin \theta & 1.3100 \\
 \ell \cos \theta & 9.9648 \\
 \sec \theta & 0.0410 \\
 & 8.8239
 \end{aligned}$$

$$\begin{aligned}
 \theta' & 0.5155 \\
 \theta & 0.1397
 \end{aligned}$$

$$\begin{aligned}
 \theta' & = +17.74 \\
 \theta & = +8.28 \\
 (\ell) & = +1.36 \\
 \hline
 & +22.38 \checkmark
 \end{aligned}$$

4117) Red. and. common apts.

$$\begin{aligned}
 H + \alpha &= 4^{\text{h}} 28.9 : 67^{\circ} 14' \\
 H &= 0 \quad 38.8 \\
 \alpha &= 3 \quad 50.1 \\
 \delta &= 22 \quad 28.5 \\
 g + \alpha &= 2 \quad 18.6 : 34^{\circ} 39'
 \end{aligned}$$

$$\begin{aligned}
 \cos(\alpha + \alpha) & 9.9152 \\
 g & 1.3338 \\
 \sin & 9.7548 \\
 \tan \delta & 9.6588 \\
 & 8.8229
 \end{aligned}$$

$$\begin{aligned}
 s' & 1.2490 \\
 g & 9.5713
 \end{aligned}$$

$$\begin{aligned}
 f & + 3.06 \\
 g & + 0.37 \\
 h & + 1.38 \\
 \hline
 & + 4.81
 \end{aligned}$$

$$s = 124 \quad 30.2$$

$$\begin{aligned}
 \cos \delta & 9.9590 \\
 & 6 \quad 0.1743 \\
 (4) & 0.1333
 \end{aligned}$$

$$\begin{aligned}
 \sin \delta & 9.6178 \\
 \cos(H + \alpha) & 9.5877 \\
 h & 1.3100 \\
 \sin & 9.9648 \\
 \sec \delta & 0.0410 \\
 & 8.8239
 \end{aligned}$$

$$\begin{aligned}
 h' & 0.5155 \\
 h & 0.1397
 \end{aligned}$$

$$\begin{aligned}
 g' & + 1.774 \\
 h' & + 3.28 \\
 (4) & + 1.36 \\
 \hline
 & + 22.38
 \end{aligned}$$

4405

Lunar parallax.

28

$$\begin{array}{rcl}
 \alpha & = & 3^h 50^m 11.08^s \\
 \theta & = & 3 \quad 24 \quad 38.2 \\
 \theta - \alpha & = & -2 \quad 25 \quad 32.83 \\
 & = & -36 \quad 23 \quad 12
 \end{array}$$

$$- \quad 13 \quad 38$$

$$- \quad 36 \quad 09 \quad 34$$

$$\begin{array}{r}
 9.95727 \\
 0.00000 \\
 \hline
 0.09292 \\
 0.05019
 \end{array}$$

$$f = 48 \quad 18 \quad 42$$

$$24 \quad 30 \quad 56$$

$$23 \quad 47 \quad 36$$

$$\begin{array}{r}
 9.82640 \\
 8.21172 \\
 9.60578 \\
 \hline
 0.12687 \\
 7.77077
 \end{array}$$

$$\delta - \delta' = + 20 \quad 16.7$$

$$\delta = +24 \quad 50 \quad 52.7$$

$$\text{Ann Eph } \delta = +24 \quad 50 \quad 51.3$$

$$O - C \quad + 1.4$$

$$\begin{array}{rcl}
 \text{Curr.} & & + 0.3 \\
 2^{\text{nd}} \text{ obs. ref.} & & + 0.0 \\
 \text{Inv.} & & - 0.2
 \end{array}$$

$$\begin{array}{rcl}
 \delta & = & +24 \quad 50 \quad 52.5 \\
 O - C & = & + 1.2
 \end{array}$$

$$\delta = +24^{\circ} 30' 36.0''$$

$$\Pi = 55' 58.65''$$

$$\begin{array}{r}
 986913 \\
 821172 \\
 977322 \\
 \hline
 004219 \\
 789626
 \end{array}$$

$$\alpha - \alpha' = -27' 04.38''$$

$$= -1 \quad 48.29$$

$$\alpha = 3 \quad 48 \quad 22.74$$

$$\alpha = 3 \quad 48 \quad 21.68$$

$$+ 1.06$$

$$\begin{array}{rcl}
 \text{Curr.} & & - 0.1 \\
 \text{Inv.} & & + 0.02
 \end{array}$$

$$\alpha = 3 \quad 48 \quad 22.76$$

$$O - C \quad + 1.08$$

44.55

Lunar parallax.

28

$$x = 3^h 50^m 11^s.05$$

$$\theta = 1 \quad 27 \quad 38.2$$

$$\theta - x = -2 \quad 25 \quad 32.83$$

$$- \quad -36 \quad 23 \quad 12$$

$$- \quad \quad \quad 13 \quad 38$$

$$- \quad -36 \quad 09 \quad 34$$

$$9.95727$$

$$0.00000$$

$$0.09292$$

$$0.051059$$

$$x = 4^h 18^m 42^s$$

$$24 \quad 30 \quad 30$$

$$23 \quad 47 \quad 36$$

$$9.82640$$

$$8.21172$$

$$9.60578$$

$$0.12687$$

$$7.77077$$

$$S - S' = + 20 \quad 16.7$$

$$S = +24 \quad 50 \quad 52.7$$

$$\text{Ann. Eph. } S = +24 \quad 50 \quad 51.3$$

$$O - C = + 1.4$$

$$0.3$$

$$2^{\text{nd}} \text{ obs. ref.}$$

$$+ 0.0$$

$$2^{\text{nd}}$$

$$- 0.2$$

$$S = +24 \quad 50 \quad 52.5$$

$$O - C = + 1.2$$

$$S = +24^{\circ} 30' 36'' 0$$

$$\Pi = 55' 58'' 65$$

$$9.86913$$

$$8.21172$$

$$9.77372$$

$$0.0 + 2.17$$

$$7.81626$$

$$x - x' = -27' 04.38$$

$$- \quad 1 \quad 45.29$$

$$x = 3 \quad 48 \quad 22.74$$

$$x = 3 \quad 48 \quad 21.68$$

$$+ 1.06$$

$$\text{Corr.} = 0.1$$

$$2^{\text{nd}} = + 0.2$$

$$x = 3 \quad 48 \quad 22.76$$

$$O - C = + 1.08$$

