

KG

11366

v. 970

CXVII

117

7678

7692

7693

1-
2-
2-
2-
3-
2-
1-
2-
1-
2-
1-

7678

Stars - measures

1916 Feb. 2

1.

	α	δ	α	δ	α	δ	α	δ
1	19881	18556	17683	19260				
17.4	16688	11719	8520	18375				
8.9	8782	1308	1003	6806				
	58	49	20	50				
	<u>17.3193</u>	<u>3162</u>	<u>8.9113</u>	<u>7111</u>				
2	20260	16989	19800	17670				
23.5	15743	11489	12078	15370				
20.7	4746	8284	8089	7776				
	56	79	92	60				
	<u>23.4513</u>	<u>4501</u>	<u>20.7712</u>	<u>7706</u>				
3	13210	10520	19118	17760				
27.9	1005	10215	16170	10710				
9.4	12920	441	70	009				
			98	60				
	<u>27.9712</u>	<u>9692</u>	<u>9.2942</u>	<u>2946</u>				

Moon - measures

1			18050	19496
22.5			10664	16869
15.7			68	6780
min			28	90
in			<u>15.7373</u>	<u>7378</u>
2			18061	19469
22.0			9264	18266
15.8			72	70
			54	50
			<u>15.8789</u>	<u>8807</u>
3				
21.7	17339	15438		
16.0	9746	17069		
	32	71		
	30	30		
	<u>21.7594</u>	<u>7634</u>		

7678

Stars - measures

1916 Feb. 2

1

a		N		a		N	
1	19881	18556		17683		19260	
17.5	16683	11719	08	8520	03	18375	66
85	8782	13		1003		68	66
	58	49		20		50	
	<u>17.3193</u>	<u>3162</u>		<u>8.9113</u>		<u>9111</u>	
2	20260	16989		19800		17670	
235	15743	11489	84	12078	89	15370	76
207	4746	8284		80	7	77	76
	56	79		92		60	
	<u>23.4513</u>	<u>4501</u>		<u>20.7712</u>		<u>7706</u>	
3	13210	10520		19118		17760	
279	1005	10215	11	16170	70	10710	09
94	12920	4911		70		00	9
		98		98		60	
	<u>27.9712</u>	<u>9692</u>		<u>9.2942</u>		<u>2946</u>	

Stars - measures.

1	225		18050		19496	
	157		10664	51	16869	80
	min		68		67	80
	28		28		90	
			<u>15.7373</u>		<u>7378</u>	
2	220		18061		19469	
	158		9264	63	18266	85
			72		70	
			54		10	
			<u>15.8787</u>		<u>8807</u>	
3	217	17339	19438			
	16.0	9746	17069			
		32	71			
		30	30			
	<u>21.7594</u>	<u>7634</u>				

7678 Moon-Measures 1916 Feb. 2

2

4	1110500	19551
20.9	10	19135
17.0	10641	3735
		36
	<u>20.9536</u>	<u>19587</u>

5	16317	15561
20.9	7712	14153
17.5	1840	6762
min	20	34
in	<u>20.8603</u>	<u>8604</u>
+		
6	20331	16533
20.9	11256	15606
18.0	40	0089
	21	26
	<u>20.9076</u>	<u>9066</u>

7	18349	16803
21.5	13271	11880
19.0	7277	8080
	47	05
	<u>21.5075</u>	<u>5076</u>

8
22.0
19.4

19318	18571
16239	10641
4750	5037
05	72
<u>193069</u>	<u>3071</u>

9
22.5
19.4
max
avg

19240	18580
14749	13041
6360	4642
30	76
<u>19.4478</u>	<u>4465</u>

Density 1

7678 Moon - Measures 1916 Feb 2 2

$$\begin{array}{r}
 4 \quad 1110500 \quad 19551 \\
 20.5 \quad 10 \quad 19135 \\
 17.0 \quad 10641 \quad 3735 \\
 \quad \quad \quad 36 \\
 \hline
 20.9536 \quad 19587
 \end{array}$$

$$\begin{array}{r}
 5 \quad 16317 \quad 15561 \\
 20.9 \quad 7712 \quad 14153 \\
 17.5 \quad 1800 \quad 6762 \\
 \quad \quad 20 \quad 34 \\
 \hline
 20.8603 \quad 8604 \\
 6 \quad 20331 \quad 16533 \\
 20.9 \quad 1125641 \quad 1560689 \\
 18.0 \quad 40 \quad 00 \\
 \quad \quad 21 \quad 26 \\
 \hline
 20.9076 \quad 9066
 \end{array}$$

$$\begin{array}{r}
 7 \quad 18349 \quad 16803 \\
 21.5 \quad 1327177 \quad 1188080 \\
 19.0 \quad 72 \quad 80 \\
 \quad \quad 47 \quad 05 \\
 \hline
 21.5075 \quad 5076
 \end{array}$$

$$\begin{array}{r}
 8 \\
 220 \\
 194
 \end{array}$$

$$\begin{array}{r}
 9 \\
 225 \\
 194 \\
 \hline
 38
 \end{array}$$

$$\begin{array}{r}
 19318 \quad 18571 \\
 16239 \quad 1064137 \\
 4750 \quad 5037 \\
 05 \quad 72 \\
 \hline
 193069 \quad 3071
 \end{array}$$

$$\begin{array}{r}
 19240 \quad 18580 \\
 1474960 \quad 1304142 \\
 63 \quad 46 \\
 30 \quad 76 \\
 \hline
 19.4478 \quad 4465
 \end{array}$$

Intensity 1

7678 Times etc.

Expt. Jan 1915 Jan 26,	4 ^h	01 ^m	-4 ^h 13 ^m
... known	4	06	46.0 -4 06 46.5
Clock slow		0	31.0
H. Sid. T.	4	07	17.25 ^c $\theta - \kappa = -0^h 56^m$
H. Hourly	4	44	31.05 ^c
G Sid. T.	8	51	48.30 ^c
Sid. T. in known	20	18	47.17 ^c
Interval	12	33	01.13 ^c
Red		2	03.36 ^c
G. M. T.	12	30	57.77 ^c

From Kant. Alm.	R. H.	Decl.
known 12 ^h	5 ^h 02 ^m 02.30	+27 ^o 43' 04"2
known in 2.2772 ^c		2.027
" 30.942	+1 10.51	+1 02.8
Tabular place	5 ^h 03 12.81	+27 44 07.0

Known's age 11 days.

	Parallax	54	46.03	
	Secundium	14	57.0	56.9?
934 = 14.5	R		897.0	
897 = 13.8	Augmentation		+13.8	
	Irradiation (1)		+0.2	
	R		911.0	
	R		1.9528	
a = -499.8	aR		-929	
+ 24	(1+a)R		1.8599	
475.8	R ²		3.4592	

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Times etc.

Exp. time 1915 Jan 26, $4^h 01^m - 4^h 13^m$
 Moon $4 06 46.0 - 4 06 46.5$
 Clock shows $0 31.0$

H Sid T. $4 07 17.25 \quad \theta - \alpha = -0^h 56^m$
 H. long. $4 44 31.05$
 G Sid T. $8 51 48.30$
 Sid T. in hour $20 18 47.17$
 Interval $12 33 01.13$
 Red $2 03.36$
 G in T. $12 30 57.77$

From horizontal

R H

Decl.

Moon $12^h 5^m 02^s 02.30 - 27^h 43' 04.2$

longitude $2 27.72 \quad 2 02.7$

$30.942 \quad + 1 10.56 \quad + 1 02.8$

Tabular place $5^m 03 12.81 \quad + 27 44 07.0$

Moon's age 11 days.

Parallax $54 46.03$

Secundium $14 57.0$

$934 = 14.9$

$897 = 13.8$

R
 Augmentation

Irradiation (1)

R

R

aR

(1+a)R

R²

897.0

$+ 13.8$

$+ 0.2$

911.0

1.9528

$- 929$

18599

3.4592

$a = -499.8$

$1 24$

475.8

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Plate Constants

x	17.3178	23.4507	27.9702
z	17.6059	24.1231	28.7932
$x-z$	-2881	-6724	-8230
y	8.9112	20.7709	9.2944
η	9.8929	20.3071	8.2229
$y-\eta$	+1.0183	+4638	+1.0715

$$\begin{array}{rclcl}
 x-z & +5004 & & +65.74 & -0.2x & -6360 \\
 -2881 + 8659 & = +5778 & +585 & +6363 - 3 & = +6360 & = 0 \\
 -6724 + 11725 & = +5001 & +1365 & +6366 - 5 & = +6361 & = +1 \\
 -8230 + 13985 & = +5755 & +611 & +6366 - 6 & = +6360 & = 0 \\
 22.7212 & +11361 & +1150 & -5 & = 23.3364
 \end{array}$$

$$\begin{array}{rclcl}
 y-\eta & +5009 & & -67.9x & +2.84 & -13489 \\
 +1.0183 + 4456 & = +14639 & -1176 & +13463 + 25 & = +13488 & = -1 \\
 +4638 + 10345 & = +15023 & -1592 & +13431 + 58 & = +13489 & = 0 \\
 +1.0715 + 4647 & = +15362 & -1899 & +13463 + 26 & = +13489 & = 0 \\
 17.5926 & +8796 & -1543 & +49 & = 16.9739
 \end{array}$$

$$\begin{array}{rclcl}
 \text{Tables } a & = +4.7 & a & = +0.7 & a & = -1 & 0.0 & b+a & = 0.0 \\
 \text{Obs } a & = -499.8 & a & = -502.8 & & +3.0 & & b+a & = +22 \\
 & -500.5 & & -503.5 & & & & & +2.2
 \end{array}$$

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Plate Constants

x	17.3178	23.4507	27.9702
y	17.6059	24.1231	28.7932
$x-y$	-2881	-6724	-8230
y	8.9112	20.7709	9.2944
x	7.8929	20.3071	8.2229
$y-x$	+1.0183	+4.638	+1.0715

$$\begin{aligned}
 x-3 &+ 100x & +62.74 & -0.2x & -6360 \\
 -2881 + 8659 & + 5778 & - 585 & + 6363 & - 3 = +6360 = 0 \\
 -6724 + 11725 & + 5001 & - 1365 & + 6366 & - 5 = +6361 = +1 \\
 -8230 + 13985 & + 5755 & + 611 & + 6366 & - 6 = +6360 = 0 \\
 22.7212 + 11361 & + 1156 & - 5 & & = 233347
 \end{aligned}$$

$$\begin{aligned}
 y-x &+ 1.0183 & -67.9x & +2.8y & -13489 \\
 +1.0183 + 4456 & + 14639 & - 1176 & + 13463 & + 25 = +13488 = -1 \\
 + 4638 + 10365 & + 15023 & - 1592 & + 13431 & + 58 = +13489 = 0 \\
 + 1.0715 + 4647 & + 15362 & - 1895 & + 13463 & + 26 = +13489 = 0 \\
 175926 + 8796 & - 1543 & + 49 & & = 169739
 \end{aligned}$$

Tables $a = +0.7$ $b = -0.7$ $c = 0.0$ $d + a = 0.0$
 Obs $a = +499.8$ $b = -502.8$ $c = +3.0$ $d + a = +22$

1
2
3
4
5
6
7
8
9

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Moon's Center

	x	$x - x_0$	$(x - x_0)^2$	$(x - x_0)^2 + (y - y_0)^2$	$0 - c$
1	22.7180	0.0000	0.0000	3.4462	-130
2	22.0000 - 0.7180		0.5155	3.4540	-52
3	21.7614 - 0.9556		0.9131	3.4539	-52
4	20.9562 - 1.7618		3.1039	3.4567	-25
5	20.8604 - 1.8576		3.4507	3.4507	-85
6	20.9071 - 1.8109		3.2793	3.4441	-151
7	21.5076 - 1.2104		1.4651	3.4419	-173
8	22.0000 - 0.7180		0.5155	3.4499	-93
9	22.7180	0.0000	0.0000	3.4343	-249

$$R^2 = 3.4592$$

	y	$y - y_0$	$(y - y_0)^2$	c
1	15.7376	-1.8564	3.4462	180
2	15.8798	-1.7142	2.9385	203
3	16.0000	-1.5940	2.5408	211
4	17.0000	-0.5940	0.3528	251
5	17.5940	0.0000	0.0000	270
6	18.0000 + 0.4060		0.1648	283
7	19.0000 + 1.4060		1.9768	323
8	19.3070 + 1.7130		2.9344	337
9	19.4472 + 1.8532		3.4343	360 180

$$x = 22.0 \quad y = 15.8798$$

$$19.3070$$

$$35.1868$$

$$y = 17.5934$$

$$y_{\min} = 15.7376$$

$$R = 1.8558$$

$$x_{\min} = 20.8604$$

$$x = 22.7162$$

$$\text{Center} \begin{cases} x_0 = 22.7180 \\ y_0 = 17.5940 \end{cases}$$

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moving Center

	x	$x - x_0$	$(x - x_0)^2$	$(x - x_0)^2 + (y - y_0)^2$	O - C
1	22.7180	0.0000	0.0000	3.4462	-1.30
2	22.0000	-0.7180	0.5155	3.4540	-52
3	21.7614	-0.9586	0.9131	3.4539	-53
4	20.9562	-1.7618	3.1039	3.4567	-25
5	20.8604	-1.8576	3.4507	3.4507	-85
6	20.9071	-1.8109	3.2793	3.4441	-151
7	21.5076	-1.2104	1.4651	3.4419	-173
8	22.0000	-0.7180	0.5155	3.4499	-93
9	22.7180	0.0000	0.0000	3.4343	-249

 $R^2 = 3.4592$

	y	$y - y_0$	$(y - y_0)^2$	
1	15.7376	-1.8564	3.4462	180
2	15.8798	-1.7142	2.9385	203
3	16.0000	-1.5940	2.5408	211
4	17.0000	-0.5940	0.3528	251
5	17.5940	0.0000	0.0000	270
6	18.0000	+0.4060	0.1648	283
7	19.0000	+1.4060	1.9768	323
8	19.3070	+1.7130	2.9344	337
9	19.4472	-1.8532	3.4343	360 180

$$\begin{aligned}
 X &= 22.0 & Y &= 15.8798 \\
 & & & 19.3070 \\
 & & & \hline
 & & & 35.1868 \\
 Y &= 17.5934 \\
 Y_{\text{min}} &= 15.7376 \\
 R &= 1.8558 \\
 X_{\text{min}} &= 20.8604 \\
 X &= 22.7162
 \end{aligned}$$

$$\text{Center} \left\{ \begin{aligned} X_0 &= 22.7180 \\ Y_0 &= 17.5940 \end{aligned} \right.$$

Formation of Normals.

1	- 0.00	- 0.0	+ 242.0
2	+ 1.23	+ 37.4	+ 89.0
3	+ 1.53	+ 50.9	+ 84.2
4	+ 1.04	+ 45.7	+ 14.7
5	- 0.00	+ 158.0	- 0.0
6	- 0.74	+ 274.0	- 62.0
7	- 1.71	+ 209.5	- 243.6
8	- 1.23	+ 67.0	- 159.0
9	+ 0.00	- 0.0	- 463.0
	+ 0.12	+ 842.5	- 497.7

- a	- b	+ 74	+ 20
- 0	- 2	+ 72	
- 36	- 2	+ 36	
- 48	- 2	+ 24	
- 88	- 1	- 15	
- 93	+ 0	- 19	
- 91	+ 0	- 17	
- 60	+ 1	+ 15	
- 36	+ 2	+ 40	
- 0	+ 2	+ 76	

7678 Moon's Center

		O		C	O-C Corr
1	0.00 - 1.86 =	-130	0 +	53 = +53 - 183	-131
2	-0.72 - 1.71 =	-52	- 46 +	~~49~~ = + 3 - 58	- 19
3	-0.96 - 1.59 =	-53	- 61 +	45 = - 16 - 37	- 13
4	-1.76 - 0.59 =	-25	- 112 +	17 = - 95 + 70	+ 55
5	-1.86 + 0.00 =	-85	- 119 -	0 = -119 + 34	+ 15
6	-1.81 + 0.41 =	-151	- 116 -	12 = -128 - 23	- 40
7	-1.21 + 1.41 =	-173	- 77 -	40 = -117 - 56	- 41
8	-0.72 + 1.71 =	-93	- 46 -	49 = - 95 + 2	+ 42
9	+0.00 + 1.85 =	-249	- 0 -	53 = - 53 - 196	- 120
	-8.94 - 0.37			+ 106 - 550	

Normal Equations

or 73

$$+13.24 + 0.12 = +842 - 8.94$$

$$+ 0.12 + 1.7.79 = -498 - 0.37$$

$$- 0.12 - 0.00 = - 8 + 0.08$$

$$+ 1.7.79 = -506 - 0.29$$

$$b = -28.5 - 0.02$$

$$+13.24 = +842 + 4 = +846$$

$$a = +64.0 - 0.67$$

Arc meas 180

 $\frac{\sum v}{n}$

$$\frac{P}{n} = .33$$

$$-49$$

$$\frac{-49}{33} = -1.49 \quad \Delta R = -1.8$$

$$\text{Corr.} = -1.0$$

$$\text{True } \Delta R = -0.8$$

$$-2R = -372 \quad -2R \text{ corr} = +3.72 \quad +74$$

$$\Delta \delta = -0.07 \quad -1 \quad \Delta \delta = -0.0$$

$$\Delta a = -2.49 \quad -50 \quad \Delta x = -0.09$$

7678 Moons Center

		0		C	0-C
1	000 - 186 =	-130	0 +	53 = +53	-183
2	-0.72 - 171 =	-52	- 46 +	49 = +3	-55
3	-0.96 - 159 =	-53	- 61 +	45 = -16	-37
4	-1.76 - 059 =	-25	- 112 +	17 = -95	+70
5	-1.86 + 000 =	-85	- 119 -	0 = -119	+34
6	-1.81 + 041 =	-151	- 116 -	12 = -124	-23
7	-1.21 + 141 =	-173	- 77 -	40 = -117	-56
8	-0.72 + 171 =	-93	- 46 -	49 = -95	+2
9	+0.00 + 185 =	-249	- 0 -	53 = -53	-196
					+106 -556

Normal Equations.

or 13

$$+13.24 + 0.12 = +842$$

$$- 0.12 + 17.79 = -498$$

$$- 0.12 - 0.00 = -8$$

$$+17.79 = -506$$

$$b = -285$$

$$+13.24 = +842 - 4 = +846$$

$$a = +640$$

Arc meas 180

 $\frac{\sum v}{n}$

$$\frac{P}{n} = .33$$

$$-49$$

$$\frac{-49}{33} = -1.49 \quad DR = -1.8$$

7678 Moon's Mean Position (1915.0)

$$\begin{array}{r} x_0 = 22.7180 \\ \frac{1}{2}a = + 32 \\ \hline 22.7212 \end{array} \quad \begin{array}{r} y_0 = 17.5940 \\ \frac{1}{2}b = -14 \\ \hline 17.5926 \end{array}$$

From plate constants $x = 23.3364$ $y = 16.9739$

$$z = +1.3364$$

$$\eta = -1.0261$$

$$\begin{array}{r} \log z = 0.12594 \\ -\cos = 9.94796 \\ \hline 8.50724 \\ 1.67074 \end{array}$$

$$\begin{array}{r} \log \tan S' = 9.7134 \\ 0.2519 \\ \hline 7.0534 \\ 7.0187 \\ 1.0 \end{array}$$

$$\delta - A = + 46.85$$

$$\eta_1 = +$$

$$A = 5 \quad 03 \quad 10$$

$$\eta_0 = -1.0271$$

$$\alpha = 5 \quad 03 \quad 56.85$$

$$\begin{array}{r} \log \eta_0 = 0.01167m \\ 7.33115 \\ \hline 2.68052m \end{array}$$

$$\text{Red} = + 1.97$$

$$x' = 5 \quad 03 \quad 58.82$$

$$\delta - D = - 7 \quad 59.2$$

$$D = +27 \quad 37 \quad 30$$

$$\delta'_0 = +27 \quad 29 \quad 30.8$$

$$\text{Red} = + 11.1$$

$$S' = +27 \quad 29 \quad 41.9$$

7678 Moons Mean Position (1915.0)

$$\begin{array}{r} x = 22.7180 \\ + \quad \quad \quad 32 \\ \hline 22.7212 \end{array} \quad \begin{array}{r} y = 17.5940 \\ - \quad \quad \quad 17 \\ \hline 17.5926 \end{array}$$

$$\begin{array}{r} Y_0 = 17.5940 \\ 16 = -17 \\ \hline 17.5926 \end{array}$$

Iron plate constant $X = 23.3364$ $Y = 16.9739$

$$N = +1.3364$$

$$z = -1.0261$$

$$\begin{array}{r} \log 3 = 0.12594 \\ - \log 5 = 9.94796 \\ \hline 8.50724 \\ \hline 1.67074 \end{array}$$

day 4a 5 -
$$\begin{array}{r} 9.7134 \\ 0.2519 \\ \hline 7.0534 \\ \hline 7.0187 \end{array}$$

$$J-A: + 46.85$$

$$y_1 = 10$$

A: 5 03 10

$$\eta_0^2 = 1.0271$$

$$\alpha = 5.03 \cdot 10^{-6}$$

$$\log 70 = \begin{array}{r} 0.01167 \\ 733115 \\ \hline 2.68052 \end{array}$$

Red. + 197

8-D- - 7 592

$$\alpha' = 503 \quad 58.82$$

15 - + 27 37 30

$$\delta'_0 = +27 \quad 29 \quad 30.8$$

Red T 11.1k

$$S' = +27 \quad 29 \quad 41.9$$

7678 Red. ad locum app.

$$S = +27^{\circ} 29' 30''$$

$$H + K \quad 2^h \quad 49^m = 42^{\circ} 16'$$

$$H \quad 21 \quad 45.1$$

$$A \quad 5 \quad 04.0$$

$$G \quad 20 \quad 24.6$$

$$G + K \quad 1 \quad 28.6 = 22^{\circ} 9'$$

$$\cos(G+K) \quad 9.9667$$

$$\gamma \quad 0.9665$$

$$\sin \gamma \quad 9.5764$$

$$\tan S \quad 9.7163$$

$$8.8239$$

$$8' \quad 0.9332$$

$$8 \quad 9.0831$$

$$\begin{array}{r} p \\ 8 \\ h \end{array} \begin{array}{r} +0.84 \\ +0.12 \\ +1.01 \\ \hline +1.97 \end{array}$$

$$L \cos S = 9.9480$$

$$i \quad 0.6800 m$$

$$(i) \quad 0.6280 m$$

$$L \sin S \quad 9.6643$$

$$\cos(H+A) \quad 9.8692$$

$$h \quad 1.2989$$

$$\sin \gamma \quad 9.8278$$

$$\sec S \quad 0.0520$$

$$8.8239$$

$$h' \quad 0.8324$$

$$h \quad 0.0026$$

$$\begin{array}{r} p \\ 8' \\ L \end{array} \begin{array}{r} + \quad 8.57 \\ + \quad 6.80 \\ - \quad 4.25 \\ \hline + 11.12 \end{array}$$

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Red ad locum app

$$S = +27^{\circ} 29' 30''$$

$$H + \lambda \quad 2^h \quad 49^m 1^s : 42^{\circ} 16'$$

$$H \quad 21 \quad 45.1$$

$$g \quad 5 \quad 04.0$$

$$G \quad 20 \quad 24.6$$

$$G + \lambda \quad 1 \quad 28.6 : 22^{\circ} 9'$$

$$\cos(G + \lambda) \quad 9.9667$$

$$g \quad 0.9665$$

$$\sin \quad 9.5764$$

$$\tan S \quad 9.7163$$

$$88239$$

$$g' \quad 09332$$

$$g \quad 9.0831$$

$$\begin{array}{r} f \\ g \\ h \end{array} \begin{array}{r} +0.84 \\ +0.12 \\ +1.01 \\ \hline +1.97 \end{array}$$

$$L \cos S \quad 9.9480$$

$$i \quad 0.6500$$

$$(i) \quad 0.6280$$

$$L \sin S \quad 9.6643$$

$$\cos(H + \lambda) \quad 9.8692$$

$$h \quad 1.2989$$

$$\sin \quad 9.8278$$

$$\cos S \quad 0.0520$$

$$88239$$

$$h' \quad 08324$$

$$h \quad 0.0026$$

$$\begin{array}{r} g' \\ h' \\ L \end{array} \begin{array}{r} + \quad 8.57 \\ + \quad 6.80 \\ - \quad 4.25 \\ \hline +11.12 \end{array}$$

a

7628 human parallel

$$\begin{aligned} \alpha' &= 5^h 03^m 58.82^s \checkmark \\ \delta &= 4 \ 07 \ 17.25 \checkmark \\ \alpha - \alpha' &= -56 \ 41.57 \\ &= -14^0 \ 10' \ 24'' \end{aligned}$$

$$5 \ 36 \checkmark$$

$$-14 \ 04 \ 48 \checkmark$$

$$\begin{aligned} 995727 \checkmark \\ 0.000000 \checkmark \\ 001324 \checkmark \\ \hline 9.97051 \checkmark \end{aligned}$$

$$\gamma = 43 \ 03 \ 22 \checkmark$$

$$27 \ 29 \ 41$$

$$15 \ 33 \ 41 \checkmark$$

$$\begin{aligned} 9.82640 \\ 8.20222 \\ 9.42857 \\ 0.16576 \checkmark \\ \hline 7.62295 \checkmark \end{aligned}$$

$$\delta - \delta' = +14 \ 25.7 \checkmark$$

$$S \quad +27 \ 44 \ 07.6 \checkmark$$

$$\text{Am Eph } S = +27 \ 44 \ 07.0 \checkmark$$

$$O-C \quad +0.6 \checkmark$$

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

$$\text{Low. Corr.} \quad 0.0$$

$$\text{2nd Ord. Ref} \quad 0.0$$

$$\delta = +27 \ 44 \ 07.6$$

$$O-C \quad +0.6$$

$$S = +27^0 \ 29' \ 41.9'' \checkmark$$

$$\Pi = 54' \ 46.03'' \checkmark$$

$$\begin{aligned} 9.86913 \checkmark \\ 8.20222 \checkmark \\ 9.38891 \checkmark \\ 005301 \checkmark \\ \hline 7.51327 \checkmark \end{aligned}$$

$$\alpha - \alpha' = -11' \ 12.51''$$

$$- \quad 44.83 \checkmark$$

$$\alpha \quad 5 \ 03 \ 1399 \checkmark$$

$$\alpha = 5 \ 03 \ 1281 \checkmark$$

$$+1.18 \checkmark$$

$$\text{Curv.} \quad +0.01$$

$$-0.09$$

$$\alpha \quad 5 \ 03 \ 13.90$$

$$O-C = +1.09$$

7678 human parallel

$$\begin{aligned} \alpha' &: 5^h 03^m 58.82 \\ \theta &: 4 \ 07 \ 17.25 \\ \theta - \alpha' &: -56 \ 41.57 \\ &= -14^\circ 10' 24'' \end{aligned}$$

5 36

-14 04 48

$$\begin{array}{r} 995727 \\ 000000 \\ 001324 \\ \hline 9.97051 \end{array}$$

r = 43 03 22

27 29 51

15 33 41

$$\begin{array}{r} 9.82640 \\ 820222 \\ 9.42857 \\ 0.16576 \\ \hline 7.62295 \end{array}$$

$$S - S' = +14 \ 25.7$$

$$S \quad +27 \ 44 \ 07.6$$

$$\text{Am. Eph. } S = +27 \ 44 \ 07.0$$

$$O - C \quad + \ 0.6$$

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

$$\text{2nd. Corv.} \quad 0.0$$

$$\text{2nd. Arc. Ref.} \quad 0.0$$

$$S \quad +27 \ 44 \ 07.6$$

$$O - C \quad +0.6$$

$$S = +27^\circ 29' 41.9$$

$$\Pi = 54' + 6.03$$

$$\begin{array}{r} 9.86913 \\ 8.20222 \\ 9.38891 \\ 0.05301 \\ \hline 7.51327 \end{array}$$

$$\alpha - \alpha' = -11' \ 12.52$$

$$- \quad 3 \ 44.83$$

$$\alpha \quad 5 \ 03 \ 13.99$$

$$\alpha : \quad 5 \ 03 \ 12.86$$

$$: \ 1.18$$

$$\text{Curv.} \quad +0.01$$

$$-0.09$$

$$\alpha \quad 5 \ 03 \ 13.90$$

$$O - C \quad +1.09$$

Additional stars

$$\begin{array}{r} 21.6 \\ 4.9 \\ \hline \end{array}$$

$$\begin{array}{r} \alpha \\ 18640 \\ 12200 \\ 0101 \\ 40 \\ \hline 21.6439 \end{array}$$

$$\begin{array}{r} \alpha \\ 18298 \\ 14750 \\ 40 \\ 09 \\ \hline 1443 \end{array}$$

$$\begin{array}{r} \alpha \\ 11541 \\ 9800 \\ 10918 \\ \hline 4.9325 \end{array}$$

$$\begin{array}{r} \alpha \\ 14400 \\ 13710 \\ 1003 \\ \hline 9308 \end{array}$$

7692

Stars - measures

1916 Feb. 4.

11

α	δ	α	δ	α	δ	α	δ
1	20289	16680	15240	18214			
15.6	1316058	1381010	676960	1666960			
23.8	52	10	60	60			
	00	86	30	20			
	<u>15.7140</u>	<u>.7128</u>	<u>23.8468</u>	<u>.8448</u>			
2	19101	16999	19330	18869			
27.3	1721005	8892	18220	9972			
27.2	03	9295	1521	7371			
	10	10	40	70			
	<u>27.1897</u>	<u>.1885</u>	<u>27.1112</u>	<u>.1102</u>			
3	16360	16368	18720	17072			
27.4	13920	8804	16608	9185			
9.3	2021	1.09	9900	8080			
	66	70	20	70			
	<u>27.2441</u>	<u>.2440</u>	<u>27.2118</u>	<u>.2112</u>			

scratch Moon - measures.

1	18035	18631	18260	19662
22.6	1177971	14930	1666560	1126972
14.2	70	2930	6060	6372
	42	40	96	76
	<u>22.6266</u>	<u>.6295</u>	<u>14.1599</u>	<u>.1593</u>
2			18320	19468
22.0			1147799	1631929
14.7			8599	127
			31	61
			<u>14.6841</u>	<u>.6854</u>
3	16350	19476		
21.8	833637	17529		
15.0	4637	2630		
	62	90		
	<u>21.8012</u>	<u>.8049</u>		
4	16401	15439		
21.6	1042031	1140115		
15.7	2131	10		
min	11	.34		
	<u>21.5983</u>	<u>.5975</u>		

Additional stars

$$\begin{array}{r} 21.6 \\ -4.9 \\ \hline \end{array}$$

d

$$\begin{array}{r} 18640 \\ 12200 \\ 0101 \\ 40 \\ \hline 21.6439 \end{array}$$

$$\begin{array}{r} 18298 \\ 14750 \\ 4045 \\ 09 \\ \hline 6443 \end{array}$$

$$\begin{array}{r} 11591 \\ 9800 \\ 10918 \end{array}$$

$$\begin{array}{r} 4.9325 \end{array}$$

$$\begin{array}{r} 14400 \\ 13710 \\ 1003 \end{array}$$

$$\begin{array}{r} 1.9308 \end{array}$$

7692

Stars - measures

1916 Feb. 4

11

α	δ	α	δ	α	δ	α	δ
1	20289	1	6680	1	5240	1	8214
13.6	131.60	13.8	10.10	67	69.60	16	66.60
23.8	52.58	10		60		60	
	00	86		30		20	
<u>157140</u>		<u>7128</u>		<u>138468</u>		<u>8448</u>	
2	19101	2	6999	2	9330	2	8869
27.3	17210	88	92	18	220	99	72
27.2	03.05	92	95	15	21	73	71
	10	10		40		70	
<u>271897</u>		<u>1885</u>		<u>271112</u>		<u>1102</u>	
3	16360	3	6368	3	8720	3	7072
27.4	13920	88	04	16	608	91	85
93	2021	11	09	99	00	80	80
	66	70		20		70	
<u>272441</u>		<u>2440</u>		<u>92118</u>		<u>2212</u>	

scratch Moon - measures.

1	18035	1	8631	1	8260	1	9662
22.6	11779	14	930	16	665	11	269
14.2	70	29	30	60	60	65	72
	42	40		76		76	
<u>226266</u>		<u>6295</u>		<u>141599</u>		<u>1593</u>	
2				18	320	19	468
22.0				11	477	16	319
14.7				85	99	12	29
				31		61	
				<u>146841</u>		<u>6854</u>	
3	16350	3	9476				
21.8	8336	17	125				
11.0	4637	26	30				
	62	90					
<u>218012</u>		<u>8049</u>					
4	16401	4	5434				
21.6	10420	11	401				
11.7	2131	10	15				
	11	34					
<u>215983</u>		<u>5975</u>					

5
21
16
6
22
17
7
23
17
8
23
17
9
2
1
10
2
1

4692

d

$$\begin{array}{r} 5 \\ 15409 \\ 21.7 \quad 934047 \\ 16.0 \quad 40 \end{array}$$

29

21.6075

6

$$\begin{array}{r} 22.0 \\ 17.0+ \end{array}$$

2

$$\begin{array}{r} 23.0 \\ 17.6 \end{array}$$

8

$$\begin{array}{r} 23.4 \\ 17.7 \\ \text{max} \\ \text{wg} \end{array}$$

9

$$\begin{array}{r} 24.0 \\ 17.6 \end{array}$$

10 scratch

$$\begin{array}{r} 24.6 \quad 20749 \\ 17.4 \quad 14805 \\ 0002 \\ 54 \end{array}$$
24.5950

Moon - measures

x

N

d

8

N

2916 Feb. 4.

$$\begin{array}{r} 15412 \\ 11481 \\ 9891 \end{array}$$

23

.6074

$$\begin{array}{r} 10860 \\ 10564 \\ 5571 \end{array}$$

$$\begin{array}{r} 13305 \\ 3010 \\ 13011 \end{array}$$
17.02970304

$$\begin{array}{r} 15331 \\ 830606 \\ 2606 \\ 29 \end{array}$$

$$\begin{array}{r} 17760 \\ 1475070 \\ 6870 \end{array}$$
17.70167000

$$\begin{array}{r} 15298 \\ 759877 \\ 6777 \\ 98 \end{array}$$

$$\begin{array}{r} 18802 \\ 1649902 \\ 0002 \\ 25 \end{array}$$
17.77117693

$$\begin{array}{r} 15264 \\ 817281 \\ 85-81 \\ 80 \end{array}$$

$$\begin{array}{r} 18849 \\ 1594343 \\ 48 \\ 61 \end{array}$$
17.70967092

10

$$\begin{array}{r} 18298 \\ 1429887 \\ 91 \\ 10 \end{array}$$
.5985

$$\begin{array}{r} 19260 \\ 1493033 \\ 3033 \\ 60 \end{array}$$
17.4329

$$\begin{array}{r} 18270 \\ 1256962 \\ 79 \\ 65 \end{array}$$
4303

Density 3-

4692

d

$$\begin{array}{r}
 5 \overline{) 15409} \\
 217 \quad 934047 \\
 160 \quad 40 \\
 29 \\
 \hline
 21.6075
 \end{array}$$

$$\begin{array}{r}
 6 \overline{) 220} \\
 170
 \end{array}$$

$$\begin{array}{r}
 7 \overline{) 230} \\
 176
 \end{array}$$

$$\begin{array}{r}
 8 \overline{) 234} \\
 177 \\
 \text{mean} \\
 \text{avg}
 \end{array}$$

$$\begin{array}{r}
 9 \overline{) 240} \\
 176
 \end{array}$$

$$\begin{array}{r}
 10 \text{ scratch} \\
 24.6 \quad 20749 \\
 17.4 \quad 14805 \\
 \quad 0002 \\
 \quad 54 \\
 \hline
 24.5950
 \end{array}$$

Newman - measures

d

$$\begin{array}{r}
 15412 \\
 11481 \\
 9891 \\
 23 \\
 \hline
 .6074
 \end{array}$$

1916 Feb 4

$$\begin{array}{r}
 10860 \\
 10564 \\
 5571
 \end{array}$$

$$\begin{array}{r}
 13305.10 \\
 30 \\
 \hline
 13011
 \end{array}$$

$$\begin{array}{r}
 170297 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 0304 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 15331 \\
 8306.66 \\
 26 \\
 29
 \end{array}$$

$$\begin{array}{r}
 17760 \\
 1471070 \\
 6870 \\
 70
 \end{array}$$

$$\begin{array}{r}
 17.7016 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 7000 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 15298 \\
 7598.77 \\
 8777 \\
 98
 \end{array}$$

$$\begin{array}{r}
 18802 \\
 16499.02 \\
 0002 \\
 25
 \end{array}$$

$$\begin{array}{r}
 17.7711 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 7.693 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 15264 \\
 8172.81 \\
 85-81 \\
 80
 \end{array}$$

$$\begin{array}{r}
 18849 \\
 15943.43 \\
 48 \\
 61
 \end{array}$$

$$\begin{array}{r}
 17.7096 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 7092 \\
 \hline
 \end{array}$$

+6

$$\begin{array}{r}
 19260 \\
 14930.33 \\
 3033 \\
 60
 \end{array}$$

$$\begin{array}{r}
 18270 \\
 12569.62 \\
 79 \\
 65
 \end{array}$$

$$\begin{array}{r}
 174329 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 4303 \\
 \hline
 \end{array}$$

sensitivity 3-

Times etc.

Expt stars 1915 Jan 29 $9^h 39^m$ - $9^h 41^m$
 Moon $9 45 15.5$ - $9 45 15.7$
 Clock slow $0 30.0$

H. Sid T. $9 45 45.6$ $0 - \alpha = +1^h 45^m$
 H. horq $4 44 31.05$ $+ 1^h 44$
 G. Sid T. $14 30 16.65$
 Sid T. in hor. $20 30 36.84$
 Interval $17 59 39.81$
 Recl. $2 56.88$
 G. M. T. $17 56 42.93$

From Kantalen R A Recl.
 Moon 18 $8 02 04.11$ $+ 23^0 04' 03.9$
 Motion in R 22562 9.089
 -3.284 $+ 7.41$ $+ 4 29.8$
 Tabular place $8 01 56.70$ $+ 23 04 33.7$

Moon's age 14 days.
 " parallax $56 29.91$
 " semidiam $15 25.2$
 R $9 25.2$
 Augmentation $+ 13.4$
 Irradiation $3 - 0.3$
 R $9 38.3$
 R 2.0104
 ak $- 9.57$
 $(1+a)R$ 1.9157
 R² 3.6699

$934 = 13.7$
 $921 = 13.4$

$a = -499.9$
 24

 475.9

Times etc.

Expt station 1915 Jan 29 9^h 39^m - 9^h 41^m
 Moon 9 45 15.5 - 9 45 15.7
 Clock slow 0 30.0

H Sid T 9 45 45.6 0 - 2 - + 1^m 45^m
 H horq. 4 44 31.05
 G Sid T 14 30 16.65
 Sid T h hor 20 30 36.84
 Interval 17 59 39.81
 Reel 2 56.88
 G.W.T. 17 56 42.93

From Wank Allen R A Reel
 Moon 18 8 03 44.11 + 23 04 03.9
 Motion - 2 25.62 9.089
 - 3.27845 F1 7.41 + 4 29.8
 Tabula place 8 01 56.70 + 23 04 33.7

Moon's age 14 days.
 parallax 56 29.91
 semidiam 15 25.2
 R 925.2
 Augmentation + 13.4
 Irradiation 3 - 0.3
 R 938.3
 R 201.04
 alt - 9.57
 (14) R 1.9157
 R² 3.6699

934 = 13.7
 921 = 13.4
 959.9
 24
 975.9

7692

Plate Center + Constants

$$\begin{array}{r}
 \times \\
 15.7134 \\
 27.1491 \\
 27.2440 \\
 \hline
 70.15 \\
 23.38 \\
 -22 \\
 \hline
 1.38 \\
 33 \\
 \hline
 46 \\
 \\
 23.8458 \\
 27.1709 \\
 9.2115 \\
 \hline
 60.17 \\
 20.06 \\
 -18 \\
 \hline
 206 \\
 490 \\
 \hline
 1000'' \\
 = 1640
 \end{array}$$

$$\begin{array}{r}
 RA \\
 75556 + 234904 \\
 80246 - 241554 \\
 80246 \\
 \hline
 2359148 + 68113103 \\
 80029 + 231814 \\
 -46 -1640 \\
 \hline
 75943 + 230134
 \end{array}$$

$$\begin{aligned}
 \text{Center } \left\{ \begin{aligned} A &= 7^h 55^m 40^s \\ D &= +23^\circ 01' 30'' \end{aligned} \right.
 \end{aligned}$$

$$\begin{array}{r}
 x-3 \quad +100x \quad -14.5y \quad -1x \quad -10437 \\
 +2928 + 7857 = +10785 - 346 = +10439 - 2 = +10437 = 0 \\
 -312 + 10822 = +10510 - 72 = +10438 - 2 = +10436 = -1 \\
 -2761 + 13595 = +10834 - 393 = +10441 - 3 = +10438 = +1 \\
 -3048 + 13622 = +10574 - 134 = +10440 - 3 = +10437 = 0 \\
 23.5149 + 11757 \quad -230 \quad -2 \quad = 23.6237
 \end{array}$$

$$\begin{array}{r}
 y-7 \quad +100y \quad +13.9x \quad +2.4y \quad -5x+1y -9247 \\
 -2932 + 11923 = +8991 + 218 = +9209 + 57 = +9266 - 8 + 2 = +9260 \\
 +6467 + 2466 = +8933 + 301 = +9234 + 12 = +9246 - 11 + 0 = +9235 \\
 -4753 + 13555 = +8802 + 378 = +9180 + 65 = +9245 - 14 + 3 = +9234 \\
 +4266 + 4606 = +8872 + 379 = +9251 + 22 = +9273 - 14 + 1 = +9260 \\
 15.8556 + 7928 \quad +327 \quad +38 \quad -12+2 \\
 = 15.7592
 \end{array}$$

$$\begin{array}{r}
 \text{Tables } a = 0.0 \quad e = 0.0 \quad a-e = 0.0 \quad b+a = 0.8 \\
 \text{Obs } a = +0.1 \quad e = -2.5 \quad a-e = +2.6 \quad b+a = +1.1 \\
 -499.9'' \quad -502.5'' \quad +1.9''
 \end{array}$$

7692

Plate Center + Constants

x

RA

Decl.

15.7134

23.8458

7 55 56

+23 49 04

27.1891

27.1107

8 02 46

-24 15 54

27.2440

9.2115

8 02 46

21 49 45

70.15

60.17

23 59 148

+68 11 3 103

23.38

20.06

8 00 29

+23 18 14

22

18

- 46

- 16 40

1.38

2.06

7 59 43

+23 01 34

33

490

46

1000"

= 16 40

Center $\left\{ \begin{array}{l} A = 7^h 59^m 40^s \\ D = +23^\circ 01' 30'' \end{array} \right.$

x - 8

+ 520x

- 14.5y

- 1x

- 10437

+ 2928 + 7857 = +10785 - 346 = +10439 - 2 = +10437 = 0

- 312 + 10822 = +10510 - 72 = +10438 - 2 = +10436 = -1

- 2761 + 13595 = +10834 - 393 = +10441 - 3 = +10438 = +1

- 3048 - 13622 = +10574 - 134 = +10440 - 3 = +10437 = 0

23.5149 + 11757 = - 230 = - 2 = 23.6237

y - 7

+ 500y

+ 13.5x

+ 2.4y

- 521.4y - 9297

- 2932 + 11923 = +8991 + 218 = +9209 + 57 = +9266 - 8 + 2 = +9260

+ 6467 + 2466 = +8933 + 301 = +9234 + 12 = +9246 - 11 + 0 = +9235

- 4753 + 13555 = +8802 + 378 = +9180 + 65 = +9245 - 14 + 0 = +9231

+ 4266 + 4606 = +8872 + 379 = +9251 + 22 = +9273 - 74 + 0 = +9260

15.8156 + 7928 = + 327 = + 38 = - 12 + 2 = 15.7592

Tables a = 0.0 e = 0.0 q = e = 0.0 h + a = - 0.8

Obs a = + 0.1 e = - 2.5 a - e = + 2.6 h + a = + 1.1

Calculation 1126 m 7.3
~~Calculation~~ 7. 58 36.30

34

28

7 58 36.31

+ 52.86

7 59 29.17

7 59 40.

- 10.83

- 10.83

1.03463m

5

11

 $\Delta \eta - 2.85$ -1.34

-3

996943

1 -6.58 +6.12 -13 +16 = +3 -1 = +2

951130m

2 +5.76 +9.58 +17 -13 = +8 -12 = +3

3 +5.55 -9.23 +16 -18 = +2 +1 = +3

-0.3246

4 -0.32 -13.72 -1 +2 = +1 +2 = +3

-

21.6753

11 -1.62 -2.27 0 +7 +3 +7

21.6441

- 312

 $\Delta \eta - 3.64$ $+1.35$

+4

+21 17 22.4

 $+12 -22 = -10 + 8 = -2$

22.4

 $+28 -33 = -5 + 7 = -2$

22.9

 $-27 +33 = +6 -7 = -1$

+21 17 22.6

 $-63 +79 = +16 -17 = -1$

- 2 29.2

0 +8

-2 +10

+21 1.4 53.4

+23 01 30

- 1 46 36.6

- 63 98.7

3.80609m

1.13724m

9.5898

9.0226

56658

-13.7151

0

42849

493.6

+ 6465

Standard Coordinates											
Cape W. 1118 mag 6.4						Cape W. 1135 mag 8.3					
Cape W. 1136 mag 5.5											
C	7	55	02.52	8	01	52.49	8	01	52.83	P.M.	
L			.57			.58			.82		
E			.51			.49			.82		
Mean	7	55	02.53	8	01	52.52	8	01	52.82		
Prec		+	53.84		+	53.87		+	53.04		
d	7	55	56.37	8	02	46.39	8	02	45.86		
A	7	59	40	7	59	40	7	59	40		
d-A	-3		43.63	+	3	06.39	+	3	05.86		
sin(d-A)			-223.62			+186.38			+185.85		
log			2.34951			2.27040			2.26916		
cos			9.96135			9.95983			9.96768		
tan			0.81810			0.73747			0.74408		
tan			-6.5781			+5.4635			+5.5482		
tan			-13			+17			+16		
tan			15.4206			27.4652			27.5488		
tan			15.7134			27.1891			27.2440		
tan			+2928			-2760			-3048		
C	+23	51	29.1	+24	18	27.2	+21	52	19.8		
L			28.9			27.3			19.9		
E			28.3			26.8			18.8		
Mean	+23	51	28.8	+24	18	27.1	+21	52	19.5		
Prec	-	2	25.2	-	2	33.0	-	2	34.2		
S	+23	49	03.6	+24	15	54.1	+21	49	45.3		
D	+23	01	30	+23	01	30	+23	01	30		
d-D	+4.7		33.6	+1	14	24.1	-1	11	44.7		
tan(d-D)			+2853.8			+4464.8			-4305.3		
log			3.45542			3.64980			3.63400		
tan			0.78657			0.98095			0.96515		
tan			9.6448			9.6540			9.6027		
tan			16362			14749			14882		
tan			83344			81823			81443		
tan			+6.1174			+9.5708			-9.2290		
tan			+216			+152			+139		
tan			24.1390			27.5860			8.7849		
tan			23.8458			27.1107			9.2111		
tan			-2932			-4753			+4266		

Caluho. 1126 mg 7.3

~~Caluho~~ 7. 58 36.30

34

1.28

7. 58 36.31

+ 52.86

7. 59 29.17

7. 59 40.

- 10.83

- 10.83

1.03463m

9.96943

9.51130m

-0.3246

- 11

21.6753

21.6441

- 312

+ 21.17 22.4

22.4

22.9

+ 21.17 22.6

- 22.2

+ 21.14 53.4

+ 23.01 30.

- 1.46 36.6

- 6398.7

3.80609m

1.13724m

9.5898

9.0226

5.6658

- 13.7151

0

4.2849

4.9316

+ 6467

7693

Standard Coordinates

P.M.

Cape W. 111.8 mag 6.4 Cape W. 113.5 mag 8.3 Cape W. 113.6 mag 5.5

C 7 55 02.52 8 01 52.49 8 01 52.83

L .57 .58 .82

E .51 .49 .82

mean 7 55 02.53 8 01 52.52 8 01 52.82

Prec + 53.84 + 53.87 + 53.04

A 7 55 56.37 8 02 46.39 8 02 45.86

A 7 59 40 7 59 40 7 59 40

A-A -3 43.63 + 3 06.39 +3 05.86

m(A) -223.62 +186.38 +185.85

mag. 2.34951 2.27040 2.26916

loss 9.96135 9.95983 9.96768

30 0.81810 0.73747 0.74408

30 -6.5781 +5.4635 +5.5472

30 - 13 + 17 + 16

30 15.4206 27.4652 27.5488

2 15.7134 27.1891 27.2440

2-3 +2928 -2764 -3058

C +23 51 29.1 +24 18 27.2 +21 52 19.8

L 28.9 27.3 19.9

E 28.3 26.8 18.8

mean +23 51 28.8 +24 18 27.1 +21 52 19.5

Prec - 2 25.2 - 2 33.0 - 2 34.2

S +23 49 03.6 +24 15 54.1 +21 49 45.3

D +23 01 30 +23 01 30 +23 01 30

A-D +47 33.6 +1 14 24.1 -1 11 44.7

m(A-D) +2853.8 +4464.8 -4305.3

mag. 3.45542 3.64980 3.63400

30 0.78657 0.98095 0.96515

100 9.6448 9.6540 9.6027

32 1.6362 1.749 1.4882

y. 8.3344 8.1823 8.1443

30 +61174 +9.5708 -9.2290

30 + 216 + 15.2 + 13.9

30 24.1390 27.5860 8.7849

y 23.8458 27.1107 9.2111

y - 2932 - 4753 +4266

7692 Moon's Center

	x	x - x ₀	(x - x ₀) ²	(x - x ₀) + (y - y ₀) ²	O - C
1	22.6280	-0.8840	0.7815	3.6627	+53 -72
2	22.0000	-1.5120	2.2861	3.6602	-78 -97
3	21.8030	-1.7090	2.9207	3.6551	-129 -148
4	21.5979	-1.9141	3.6638	3.6638	-42 -61
5	21.6074	-1.9046	(3.6275)	3.6479	-201 ¹ / ₂ -340
6	22.0000	-1.5120	2.2861	3.6620	-60 -79
7	23.0000	-0.5120	0.2621	3.6617	-63 -82
8	23.5120	0.0000	0.0000	3.6604	-76 -95
9	24.0000	+0.4880	0.2381	3.6695	+15 -4
10	24.5970	+1.0850	1.1772	3.6566	-114 -135

~~3.6680~~

3.6699

←

	y	y - y ₀	(y - y ₀) ²	
1	14.1596	-1.6974	2.8812	208
2	14.6848	-1.1722	1.3741	232
3	15.0000	-0.8570	0.7344	243
4	15.8570	0.0000	0.0000	270
5	16.0000	+0.1430	(0.0204)	278
6	17.0300	+1.1730	1.3759	308
7	17.7008	+1.8438	3.3996	347
8	17.7702	+1.9132	3.6604	360
9	17.7094	+1.8524	3.4314	15
10	17.4316	+1.5746	2.4794	35

187

$$x = 22.0 \quad y = 14.6848$$

$$17.0300$$

$$31.7148$$

$$y = 15.8574$$

$$y = \text{mean} = 17.7702$$

$$R = 1.9128$$

$$x = \text{min} = 21.5979$$

$$x = 23.5107$$

$$\text{Center} \begin{cases} x_0 = 23.5120 \\ y_0 = 15.8570 \end{cases}$$

7692

Moon's center

	x	x - x ₀	(x - x ₀) ²	(x - x ₀)(y - y ₀)	y - y ₀
1	22.6280	-0.8840	0.7815	3.6627	+53 -72
2	22.0000	-1.5120	2.2861	3.6602	-78 -97
3	21.8030	-1.7090	2.9207	3.6551	-129 -178
4	21.5979	-1.9141	3.6638	3.6638	-42 -61
5	21.6074	-1.9046	3.6275	3.6479	-101 -150
6	22.0000	-1.5120	2.2861	3.6620	-60 -79
7	23.0000	-0.5120	0.2621	3.6617	-63 -82
8	23.5120	0.0000	0.0000	3.6604	-76 -95
9	24.0000	+0.4880	0.2381	3.6695	+15 -4
10	24.5970	+1.0850	1.1772	3.6586	-114 -133

~~3.6680~~

3.6699

L

	y	y - y ₀	(y - y ₀) ²	
1	14.5596	-1.6974	2.8812	208
2	14.6848	-1.1722	1.3741	232
3	15.0000	-0.8570	0.7344	243
4	15.8570	0.0000	0.0000	270
5	16.0000	+0.1430	0.0204	279
6	17.0300	+1.1730	1.3759	308
7	17.7008	+1.8438	3.3996	349
8	17.7702	+1.9132	3.6604	360
9	17.7094	+1.8524	3.4314	15
10	17.4316	+1.5746	2.4794	35

187

$$x = 22.0 \quad y = 14.6848$$

$$17.0300$$

$$31.7148$$

$$y = 15.8574$$

$$y = \text{mean} = 17.7702$$

$$R = 1.9128$$

$$x = \text{min} = 21.5979$$

$$x = 23.5120$$

$$\text{Center} \begin{cases} x_0 = 23.5120 \\ y_0 = 15.8570 \end{cases}$$

				corr. to nadir $\sigma_2 + 19$	
1	+ 1.50	+ 46.7	+ 96.0	+ 16.7	+ 32.3
2	+ 1.77	+ 117.9	+ 91.3	+ 28.7	+ 22.2
3	+ 1.47	+ 220.5	+ 111.0	+ 32.5	+ 16.3
4	- 0.00	+ 80.3	- 0.0	+ 36.3	- 0.0
5	- 0.07	+ 95.4	- 7.0	+ 18.1	- 1.3
6	- 1.77	+ 90.6	- 70.3	+ 28.7	- 22.2
7	- 0.94	+ 32.1	- 115.8	+ 9.7	- 35.0
8	+ 0.00	- 0.0	- 145.0	- 0.0	- 36.3
9	+ 0.83	+ 7.3	+ 27.8	- 9.3	- 35.1
10	- 1.71	- 124.5	- 179.0	- 20.7	- 29.8
	+ 4.50	+ 566.3	- 191.0	+ 140.7	- 88.9
		+ 140.7	- 88.9		
		+ 707.0	- 279.9		

-a	-b	+15 + PC
- 10	+ 10	+ 15
- 17	+ 7	+ 5
- 19	+ 5	+ 1
- 21	- 0	- 6
- 21	- 1	- 7
- 17	- 7	- 9
- 6	- 10	- 1
+ 0	- 11	+ 4
+ 5	- 11	+ 9
+ 11	- 9	+ 17

7692 *Moon's center*

		O	C	O - C	corr
3	1	$-0.88 - 1.70 = -5.3$	$-40 + 35 = -5$	-48	-33
2	2	$-1.51 - 1.17 = -78$	$-69 + 24 = -75$	-3	$+2$
3	3	$-1.71 - 0.86 = -129$	$-78 + 18 = -60$	-69	-68
0	4	$-1.91 + 0.00 = -42$	$-87 - 0 = -87$	$+45$	$+39$
3	5	$-1.96 + 0.14 = -201$	$-86 - 3 = -89$	-56	-119
2	6	$-1.51 + 1.17 = -60$	$-69 - 24 = -93$	$+33$	$+24$
3	7	$-0.51 + 1.84 = -63$	$-23 - 38 = -61$	-2	-3
1	8	$+0.00 + 1.91 = -76$	$+0 - 39 = -39$	-37	-33
8	9	$+0.49 + 1.85 = +15$	$+22 - 38 = -16$	$+31$	$+40$
	10	$+1.09 + 1.57 = -114$	$+50 - 32 = +18$	-96	-79
		$-8.35 + 4.75$		$+109 - 211$	
		<i>normals</i>		<i>average = 44</i>	

$$+14.52 + 4.50 = \cancel{-56.6} + 707 - 8.35$$

$$+ 4.50 + 19.34 = \cancel{-191} - 280 + 4.75$$

$$- 4.50 - 1.40 = \cancel{-176} - 219 + 2.59 - 27.8 + 0.41$$

$$+ 17.94 = \cancel{-367} - 499 + 7.346 = \cancel{-20.5}$$

$$\cancel{+14.52} = \cancel{-56.6} + 92 = \cancel{+65.4}$$

$$+14.52 = +707 + 125 = +832$$

$$a = \cancel{+45.4}$$

$$a = +57.4 - 0.70$$

$$\text{Arc } 187^\circ \quad \frac{\phi}{m} = .39 \quad \frac{\sum v}{n} = -20.2$$

$$-\frac{20.2}{39} = -52 \quad \Delta R = -0.9$$

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

$$\text{True } \Delta R = -0.7$$

$$-2R = -3.83 \quad -2R \text{ Corr} = +0.77 \quad +15$$

$$\Delta b + 0.32 + 6 \quad \Delta \delta = +0.2$$

$$\Delta a - 0.54 - 11 \quad \Delta \alpha = -0.02$$

7692 Moons Center

	O	C	O - C
1	$-0.88 - 1.70 = -2.58$	$-40 + 35 = -5$	-48
2	$-1.51 - 1.17 = -2.68$	$-69 + 24 = -45$	-3
3	$-1.71 - 0.86 = -2.57$	$-78 + 18 = -60$	-69
4	$-1.91 + 0.00 = -1.91$	$-87 - 0 = -87$	$+45$
5	$-1.90 + 0.14 = -1.76$	$-86 - 3 = -89$	$-5.6 (-11)$
6	$-1.51 + 1.17 = -0.34$	$-69 - 24 = -93$	$+33$
7	$-0.57 + 1.84 = +1.27$	$-23 - 38 = -61$	-2
8	$+0.00 - 1.91 = -1.91$	$+0 - 39 = -39$	-37
9	$+0.49 + 1.85 = +2.34$	$+22 - 38 = -16$	$+31$
10	$+1.09 + 1.57 = +2.66$	$+50 - 32 = +18$	-96

 $+107 - 311$

Average = 44

Normals

$$+1452 + 450 = +1902$$

$$+450 + 1934 = +2384$$

$$-450 - 170 = -620$$

$$+1794 = +1174$$

$$b = -205$$

$$+1452 = +166 + 925 + 659$$

$$+1452 = +707 + 125 + 832$$

$$a = +454$$

$$a = +574$$

$$\text{Arc } 187^\circ \quad \frac{\sum v}{n} = -20.2$$

$$- \frac{20.2}{39} = -0.52 \quad \Delta R = -0.9$$

76.92 Moon's mean Position 61915.0

$X_1 = 23.5120$	$Y_1 = 15.8570$
$\quad \quad \quad \pm \quad \quad \quad \frac{2.9}{2.9}$	$\quad \quad \quad \quad \quad \quad \frac{1.4}{1.4}$
23.5149	15.8556

From plate constants $K = 23.6237$ $\gamma = 157.552$

$$\xi = +1.6237$$

$$n = -22408$$

$$\begin{aligned} \log 2 &= 0.21051 \\ \therefore \cos 5 &= 9.96488 \\ &= 8.50724 \end{aligned}$$

$$\begin{array}{r} \log \tan \delta = 9.6243 \\ 0.4207 \\ \hline 7.0534 \\ 7.0984 \\ \hline 12 \end{array}$$

$$\therefore (x-A) \quad 1.73839$$

$$y_1 = + \quad 1 \quad 2$$

$$x - 14 + 54.75$$

$$m_0 = -22420$$

A 7 59 40

$$\log 70 = \begin{array}{r} 0.35064 \\ 7.33115 \\ \hline 3.01949 \end{array}$$

A. 8 00 34.75

3.01949 m

$$S-D = -17.259$$

$\alpha' = 80037.30$

$$D + 23 \quad 01 \quad 30$$

S_0 + 22 44 04.8

Red - 0.2

$$S' = +22 \quad 44 \quad 039$$

7692 Massis Mean Position (1915.0)

X = 23 51 20	Y = 15 85 70
<u> </u>	<u> </u>
23 51 49	15 85 56

From plate constants $K = 23.6237$ $\gamma = 157552$.

$$\Sigma = +1.6237$$

$$\eta = -2.2408$$

long 3 = 0.21058
cos 996488
8.50724

$\text{Avg Tan } \delta = 9.6243$
 04207
 70534

 7.0984

(L-A) 1.73839

$$3, 2 + 12$$

$$a - 13 + 54.75$$

$\gamma_0 = -22420$

A 7 59 40

$$\log 70 = \begin{array}{r} 0.35064 \\ 733115 \\ \hline 3.01949 \end{array}$$

9. 8 00 3475

Red $\rightarrow 255$

$$S-D = -17.259$$

$\alpha' = 8003730$

D 4 2 3 0 1 2 0

$$S_0 + 22 \quad 44 \quad 04.8$$

Red - 0.2

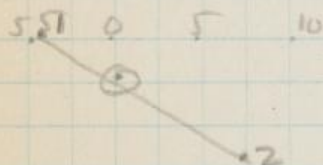
$$S' = +22 \quad 44 \quad 039$$

$$\begin{array}{r}
 7 \quad 55 \quad 50.01 \\
 \underline{47.41} \\
 + 2.60
 \end{array}$$

$$\begin{array}{r}
 + 25 \quad 37 \quad 35.3 \\
 \underline{34.9} \\
 + 0.4
 \end{array}$$

$$\begin{array}{r}
 8 \quad 07 \quad 22.80 \\
 \underline{20.35} \\
 + 2.45
 \end{array}$$

$$\begin{array}{r}
 + 17 \quad 54 \quad 17.2 \\
 \underline{18.2} \\
 - 1.0
 \end{array}$$



$$+ 25$$

$$+ 20$$

$$+ 15$$

7692 Red ad locum - hp. S +22° 44'

H+α 5 32.9 = 83° 14'
 H 21 32.3
 α 8 00.6
 G 20 29.3
 G+α 4 29.9 = 67° 29'

$\sec S$ 9.9649
 i 0.7129
 i 0.6778

$\cos(G+\alpha)$ 9.5831
 q 0.9787
 $\sin$ 9.9656
 $\tan$ 8 9.6222
 8.8239

$\sin S$ 9.5871
 $\cos(H+\alpha)$ 9.0712
 h 1.2969
 $\sin$ 9.9970
 $\sec S$ 00351
 8.8239

8' 0.5618
 8 9.3904

h' 9.9552
 h 0.1529

f +0.88
 g +0.25
 h +0.42
+2.55

g' +3.65
 h' +0.90
 i -4.76
-0.21

7692

Red ad loann - hp

S +22° 44'

$$H + \alpha \quad 5^h \quad 32.9 = 83^\circ 14'$$

$$H \quad 21 \quad 32.3$$

$$\alpha \quad 8 \quad 00.6$$

$$G \quad 20 \quad 29.3$$

$$G + \alpha \quad 4 \quad 29.9 = 67^\circ 29'$$

$$\cos(G + \alpha) \quad 9.5831$$

$$q \quad 0.9787$$

$$\sin \quad 9.9656$$

$$\tan \quad 8 \quad 9.6222$$

$$8.8239$$

$$8' \quad 0.5618$$

$$8 \quad 9.3904$$

$$f \quad +0.88$$

$$8 \quad +0.25$$

$$n \quad +4.42$$

$$+2.55$$

$$\cos S \quad 9.9649$$

$$i \quad 0.7127$$

$$i \quad 0.6778$$

$$\sin S \quad 9.5871$$

$$\cos(H + \alpha) \quad 9.0712$$

$$h \quad 1.2969$$

$$n \quad 9.9970$$

$$\cos S \quad 0.0351$$

$$8.8239$$

$$h' \quad 9.9552$$

$$h \quad 0.1529$$

$$g' \quad +3.65$$

$$h' \quad +0.90$$

$$i \quad -4.76$$

$$-0.21$$

7692

human parallel

$$\alpha' = 8^h 00^m 37.30$$

$$\theta = 9 \ 45 \ 45.6$$

$$+1 \ 45 \ 08.3$$

$$= + \ 26^\circ \ 17' \ 04''$$

$$- \quad \quad \quad 10 \ 04$$

$$26 \ 07 \ 00$$

$$9.95727$$

$$0.00000$$

$$0.04677$$

$$0.00404$$

$$\delta = 45^\circ 16' 00$$

$$22 \ 44 \ 04$$

$$22 \ 31 \ 56$$

$$9.82640$$

$$8.21575$$

$$9.58343$$

$$0.14850$$

$$7.77408$$

$$\delta - \delta' = +20 \ 26.1$$

$$S \quad +23 \ 04 \ 30.0$$

$$\text{Am. Eph. } S = +23 \ 04 \ 33.7$$

$$O-C \quad \quad \quad - \ 3.7$$

$$\text{Curr. of Plate} \quad +0.5$$

$$\text{2nd. Corr} \quad +0.2$$

$$\text{2nd. Ord. Ref} \quad 0.0$$

$$S = +23 \ 04 \ 30.2$$

$$O-C \quad \quad \quad -3.5$$

$$S = +22^\circ \ 44' \ 03.9$$

$$\Pi \ 56 \ 29.91$$

$$9.86913$$

$$8.21575$$

$$9.64624$$

$$0.03622$$

$$7.76734$$

$$\alpha - \alpha' = +20 \ 07.77$$

$$= + \ 1^\circ \ 20.48$$

$$q \ 8 \ 01 \ 57.78$$

$$q = 8 \ 01 \ 56.70$$

$$+1.08$$

$$\text{Curr.} \quad +0.01$$

$$\text{2nd.} \quad -0.02$$

$$\alpha = 8 \ 01 \ 57.76$$

$$O-C \quad +1.06$$

7692

human parallel

$$\alpha = 8^h 00^m 37.30$$

$$\theta = 9 \ 45 \ 45.6$$

$$+1 \ 45 \ 08.3$$

$$+ 26'' \ 17' \ 04''$$

$$- \quad \quad \quad 10 \ 04$$

$$26 \ 07 \ 00$$

$$995727$$

$$000000$$

$$0.04677$$

$$0.00404$$

$$\delta = 45^\circ 16' 00$$

$$22 \ 44 \ 04$$

$$22 \ 31 \ 56$$

$$982640$$

$$827575$$

$$958343$$

$$014850$$

$$777408$$

$$S-S' = +20 \ 26.1$$

$$S \quad +23 \ 04 \ 30.0$$

$$\text{Anthr.} \quad +23 \ 04 \ 33.9$$

$$O-C \quad - \ 3.7$$

$$\text{Curv of Plate} \quad +0.5$$

$$\text{2nd. Corr} \quad +1.2$$

$$\text{2nd Ord. Ref} \quad 0.0$$

$$S-S' \ 23 \ 04 \ 31.2$$

$$O-C \quad -3.5$$

$$S = +22^\circ \ 44' \ 03''$$

$$\pi \ 56 \ 2991$$

$$986913$$

$$821575$$

$$964224$$

$$003622$$

$$776734$$

$$\alpha - \alpha' = +20 \ 07.17$$

$$+ 1'' \ 20.48$$

$$9 \ 8 \ 01 \ 57.78$$

$$9 \ 8 \ 01 \ 56.70$$

$$+1.08$$

$$\text{Curv} \quad +0.01$$

$$\text{2nd} \quad -0.02$$

$$\alpha = 8 \ 01 \ 57.76$$

$$O-C \quad +1.06$$

7693

Extra stars

0.7 d

5416669

938180

75-80

50

20.7277

16034

1332218

18

43

7282

17619

13950

44

98

5.3665

14758

8400

0909

55

3650

7693

Stellar measures 1916 Feb. 5

α	δ	α	δ	α	δ	α	δ
17119	18177	17503	19105				
147 949800	157899	1478080	1178986				
24.3 000	90	74	8986				
20	75	87	89				
<u>14.7621</u>	<u>76.13</u>	<u>24.2720</u>	<u>26.95</u>				
26.3 16179	16430	17109	17316				
275 13852	875360	1854040	1285859				
4949	5860	4040	6059				
71	23	90	99				
<u>26.2327</u>	<u>23.32</u>	<u>27.5550</u>	<u>55.51</u>				
26.4 15397	19346	16090	20190				
9.6 1219089	1252930	950704	1672926				
87	3030	0204	2726				
83	39	58	92				
<u>26.3194</u>	<u>31.89</u>	<u>9.6552</u>	<u>65.36</u>				

Moon-measures

α	δ	α	δ	α	δ	α	δ
224 20400	20070	15995	19270				
14.3 162049	1430100	1376068	1150809				
11	00	70	6509				
92	59	91	65				
<u>22.4195</u>	<u>42.37</u>	<u>14.2228</u>	<u>22.41</u>				
22.0		19836	19268				
14.5		1442520	1466051				
		3020	58				
		08	61				
		<u>14.5392</u>	<u>5.392</u>				
3 18955	19570						
21.6 12323	1621319						
15.0 1921	24						
60	70						
<u>21.6637</u>	<u>66.49</u>						

7693 Extra Stars
 10.7 d N
 5416669 16034
 938180 1332218
 7580 18
 50 43
20.7277 .7282

d u
 17619 14758
 13950 8400
 4444 0909
 98 75
5.3665 .3650

7693 *Stars measures* 1916 Feb. 5

α	δ	α	δ	α	δ	α	δ
1 17119	18177	17503	19105				
147 949800	157899	1478080	1178986				
43 000	901	74	89				
20	75	87	89				
<u>14.7621</u>	<u>.7613</u>	<u>24.2720</u>	<u>.2695</u>				
Σ							
26.3 16179	16430	17109	17316				
271 13852	875360	1154040	1285859				
4949	5860	40	60				
71	23	90	99				
<u>26.2327</u>	<u>.2332</u>	<u>27.5550</u>	<u>.5551</u>				
Σ							
26.7 15397	19346	16090	20190				
96 1219089	1252930	950704	1672926				
87	3030	02	27				
83	39	58	92				
<u>26.3194</u>	<u>.3189</u>	<u>9.6552</u>	<u>6536</u>				

moon-measures

α	δ	α	δ	α	δ	α	δ
1 20400	20070	15991	19270				
143 1620491	1430100	1376068	1150809				
11	00	70	05				
92	59	91	65				
<u>22.4195</u>	<u>.4237</u>	<u>14.2228</u>	<u>.2241</u>				
Σ							
22.0		19826	19268				
145		1442520	1466051				
		3020	58				
		08	61				
		<u>14.5392</u>	<u>.5392</u>				

3 18955	19570		
21.6 12323	1621319		
150 1921	24		
60	70		
<u>21.6637</u>	<u>.6649</u>		

7693

mgon measures

1916. Feb 5

a

N

a

N

4
21.5
15.8
min
2.7

$$\begin{array}{r} 18851 \\ 1492430 \\ 3030 \\ 98 \\ \hline 21.4366 \end{array}$$

19507
1386969
72
19
4356

5
21.8
17.0

$$\begin{array}{r} 18690 \\ 1081820 \\ 31 \\ 94 \\ \hline 21.7870 \end{array}$$

20472
1835548
55
70
7881

6
22.0
17.3

18127
1556062
70
19
17.2561

15140
771224
1424
29
25-85

7
23.0
17.7

18550
1073030
3930
42
17.7811

16211
1398600
9900
12
7784

8
23.3
17.7
max
2.8

18538
1042328
30
20
17.8101

16225
1431815
1715
19
8093

9
24.0
17.6

17510
1051929
20
10
17.6987

17260
1427060
21
20
7007

density 3

7693 *Orion lucanus* 1416 Feb 5

	a	N	a	N
4	18851	19507		
21.5	1452430	1386969		
158	30	72		
man	98	19		
21.4366		4356		
5				
21.5	18690	20472		
17.0	1081820	1835548		
	31	55		
	94	70		
21.7870		7881		

6				
220		18127		15140
17.3		1556062		771224
		70		1424
		19		29
		17.2561		2585
2				
23.0		18550		16211
177		10730		1398600
		3930		99
		42		12
		17.7811		7784
8				
233		18538		16225
177		1042328		1431815
man		30		1715
47		25		19
		17.8101		8093
9				
240		17510		17260
176		10519		1427060
		2029		71
		10		60
		17.6957		7007

Sensitivity 3

7693

Times etc.

Exp. to stars 1915 Jan. 29 9^h 57^m - 10^h 09^m
 Moon 10 02 42.0 - 10 02 42.2
 Clock slow 0 30.0

H Sid T_i 10 03 12.1 $\theta - \alpha = +2^{\circ} 01'$
 H long 4 44 31.05
 G Sid T_i 14 47 43.15
 Sid T_i in Moon 20 30 36.84
 Interval 18 17 06.25
 Red 2 59.73
 G.M.T. 18 14 06.52

Fromhaut Alm R.A. Decl.
 Moon 18^h 02^m 04.11 + 23 04 03.9
 Motion in m 2 25.57 9.108
 14.109 + 31.83 - 2 08.5
 Tabular place 8 02 35.94 + 23 01 55.4

Moon's age 14 days. (before full)

parallax 56' 30".25

semidiam. 15 25.3

R 925.3

934: 13.4

Augmentation

+ 13.2

925: 13.2

Irradiation (3)

- 0.3

R

9.38.2

R

20111

aR

- 955

a = 500

(1+a)R

19156

+ 24

R²

3.6695

- 475

7693

Times etc.

Exp. to stars 1915 Jan 29 9^h 57^m - 10^h 09^m
 Moon 10 02 42.0 - 10 02 42.2
 Clock slow 0 300

H Sid T. 10 03 12.1 G - 2 = + 2^h 01^m
 H long 4 44 31.05
 G Sid T. 14 47 43.15
 Sid T. in hour 20 30. 36.84
 Interval 18 17 06.25
 Red 2 59.73
 Gm T. 18 14 06.52

From hand Alman R A decl.
 Moon 18^h 8^m 02^s 04^s 11 + 23 04 039
 Inter. in 2 25.57 9.108
 14.109 + 31.83 - 2 08.5
 Tabular place 8 02 35.94 + 23 01 55.4

Moon's Age 14 days. (before full)

parallax 56' 30" 25

secidiam. 15' 25.3

R 925.3

934.13.4

Augmentation + 13.2

925.13.2

Immersion (B) - 0.3

R 9.38.2

R 2011.1

a. - 500

aR - 95.5

+ 24

parallel 1915.6

- 47.5

R² 3669.5

7693 Plate Constants

	1	2	4	2
x	14.7617	26.2330	26.3192	20.7280
y	15.4206	27.4651	27.5498	21.6753
x-5	-6589	-12321	-12306	-9473
y	24.2708	27.5556	9.6544	5.3658
y	24.1390	27.5860	8.7849	4.2849
y-3	+1318	-310	+8695	+10809

$$\begin{array}{rcl}
 2-5 & +500x & +4.3y \\
 -6589 + 7381 & = +792 + 104 & = +896 \\
 -9473 + 10364 & = +891 + 23 & = +914 \\
 -12321 + 13116 & = +795 + 119 & = +914 \\
 -12306 + 13160 & = +854 + 42 & = +896 \\
 23.3521 + 11676 & & +68 \\
 & & = 24.4360
 \end{array}$$

$$\begin{array}{rcl}
 4 & +500x & -3.6y & +1.9y & -13436 \\
 +1318 + 12135 & = +13453 - 53 & = +13400 + 46 & +13446 & +10 \\
 +1.0809 + 2683 & = +13492 - 75 & = +13417 + 10 & +13427 & -9 \\
 -310 - 13778 & = +13468 - 95 & = +13373 + 52 & +13425 & -11 \\
 +8695 + 4827 & = +13522 - 95 & = +13427 + 18 & +13445 & +9 \\
 15.8967 + 7948 & & -84 & +30 & = 15.3425
 \end{array}$$

Tables $a = -0.8$ $e = -0.8$ $a-e = 0.0$ $b+a = -1.0$
 Obs $a = -0.0$ $e = -1.9$ $a-e = +1.9$ $b+a = -0.7$

-499.2^v-501.1^v+0.3^v

7693 Plate Constants

	1	3	4	2
x	14.7617	26.2330	26.3192	20.7280
y	15.4206	27.4651	27.5498	21.6753
z	-6589	-1.2321	-1.2306	-9473
u	24.2708	27.5550	9.6544	5.3658
v	24.1390	27.5860	8.7849	4.2849
w	+1318	-310	+8695	+10809

$$\begin{array}{rcl}
 -5 & +500x & +43y \\
 6589 + 7381 & + 792 + 104 & + 896 \\
 9473 + 10364 & + 891 + 23 & + 914 \\
 2321 + 13116 & + 795 + 119 & + 914 \\
 2306 + 13160 & + 854 + 42 & + 896 \\
 233521 + 11676 & + 68 & = 244360
 \end{array}$$

$$\begin{array}{rcl}
 6589 + 7381 & - 53 & + 13406 + 46 + 13446 + 10 \\
 9473 + 10364 & - 75 & + 13417 + 10 + 13427 - 9 \\
 2321 + 13116 & - 95 & + 13373 + 52 + 13425 - 11 \\
 2306 + 13160 & - 95 & + 13427 + 118 + 13445 + 9 \\
 233521 + 11676 & - 84 & + 30 = 13436
 \end{array}$$

Tables a = -0.8 a = -0.8 a = 0.0 b + a = -1.0
 Alls a = -0.0 a = -1.9 a = -1.9 b + a = -0.7

7693 Muvius Center

	x	$x - x_0$	Δx	$(x - x_0)^2$	$(x - x_0)^2 + (y - y_0)^2$	O - C
1	22.4216	-0.9284	-2	0.8623	3.6632	-63
2	22.0000	-1.3500	-1	1.8228	3.6664	-31
3	21.6643	-1.6857	-1	(2.8429)	3.6465	-230 ^{1/2} int.
4	21.4361	-1.9139	0	3.6630	3.6630	-65
5	21.7876	-1.5624	+1	2.4408	3.6574	-121
6	22.0000	-1.3500	+1	1.8222	3.6726	+31
7	23.0000	-0.3500	+2	0.1224	3.6673	-22
8	23.3500	0.0000	+2	0.0000	3.6584	-111
9	24.0000	+0.6500	+2	0.4228	3.6725	+30

$$R^2 = 3.6695$$

	y	$y - y_0$	$(y - y_0)^2$	
1	14.2234	-1.6736	2.8009	209
2	14.5392	-1.3578	1.8436	225
3	15.0000	-0.8970	(0.8046)	272
4	15.8970	0.0000	0.0000	270
5	17.0000	+1.1030	1.2166	305
6	17.2573	+1.3603	1.8504	313
7	17.7798	+1.8828	3.5449	350
8	17.8097	+1.9127	3.6584	360
9	17.6997	+1.8027	3.2497	20

171

$$x = 22.0 \quad y = 14.5392$$

$$17.2573$$

$$31.7965$$

$$y = 15.8982$$

$$y - \text{mean} = 17.8097$$

$$R = 1.9115$$

$$x - \text{mean} = 21.4361$$

$$x = 23.3476$$

$$\text{Center} \begin{cases} x_0 = 23.3500 \\ y_0 = 15.8970 \end{cases}$$

7693 Moon's Center

	x	$x - x_0$	Δx	$(x - x_0)^2$	$(x - x_0)^2 + (y - y_0)^2$	O - C
1	22.4216	-0.9284	-2	0.8623	3.6632	-63
2	22.0000	-1.3500	-1	1.8228	3.6664	-31
3	21.6643	-1.6857	-1	2.8429	3.6465	-230 ^{out}
4	21.4361	-1.9139	0	3.6630	3.6620	-65
5	21.7876	-1.5624	+1	2.4408	3.6574	-121
6	22.0000	-1.3500	+1	1.8222	3.6726	+31
7	23.0000	-0.3500	+2	0.1224	3.6673	-22
8	23.3500	0.0000	+2	0.0000	3.6584	-111
9	24.0000	+0.6500	+2	0.4224	3.6725	+30

$$R^2 = 3.6695$$

	y	$y - y_0$	$(y - y_0)^2$	L
1	14.2234	-1.6736	2.8009	209
2	14.5392	-1.3578	1.8436	225
3	15.0000	-0.8970	0.8046	272
4	15.8970	0.0000	0.0000	270
5	17.0000	+1.1030	1.2166	305
6	17.2573	+1.3603	1.8504	313
7	17.7798	+1.8828	3.5449	330
8	17.8097	+1.9127	3.6584	360
9	17.6997	+1.8027	3.2497	20

171

$$x = 22.0 \quad y = 14.5392$$

$$17.2573$$

$$31.7965$$

$$y = 15.8982$$

$$y_{\text{mean}} = 17.8097$$

$$R = 1.9115$$

$$x_{\text{mean}} = 21.4361$$

$$x = 23.3476$$

$$\text{Center} \left\{ \begin{array}{l} x_0 = 23.3500 \\ y_0 = 15.8970 \end{array} \right.$$

Formation of Noemah

1	+ 1.55	+ 58.6	+ 105.0
2	+ 1.84	+ 41.9	+ 42.1
3	+ 0.38	+ 97.2	+ 51.8
4	- 0.00	+ 124.0	- 0.0
5	- 1.71	+ 188.8	- 133.0
6	- 1.84	- 41.9	+ 42.1
7	- 0.66	+ 7.7	- 41.4
8	+ 0.00	- 0.0	- 211.8
9	+ 1.17	+ 19.4	+ 54.0
	+ 0.73	+ 495.7	- 91.2

- a	- b	+ 115
- 10	+ 6	+ 11
- 15	+ 5	+ 5
- 18	+ 4	+ 1
- 21	- 0	- 6
- 17	- 4	- 6
- 15	- 5	- 5
- 4	- 7	+ 4
- 0	- 8	+ 7
- 7	- 7	+ 1

7693

Polaris Center

0

C

O-C

Corr

1	-0.93	-1.67	= -63	-39	+11	= -28	-35	-24
2	-1.30	-1.36	= -31	-57	+9	= -48	+17	+22
3	-1.69	-0.90	= -230	-36	+8	= -33	-82	-81
4	-1.91	+0.00	= -65	-81	-0	= -81	+16	+10
5	-1.56	+1.16	= -121	-66	-7	= -73	-48	-54
6	-1.35	+1.36	= +31	-57	-9	= -66	+99	+92
7	-0.31	+1.88	= -22	-15	-12	= -27	+5	+9
8	+0.00	+1.91	= -111	+0	-12	= -12	-99	-92
9	+0.65	+1.80	= +30	+27	-12	= +15	+15	+16
	-8.49	+418					+150	-264

Normal Equation

Average: 49

$$+11.87 + 0.73 = +496 - 8.49$$

$$+ 0.73 + 18.97 = -91 + 4.18$$

$$- 0.73 + 0.04 = -31 + 0.52$$

$$+ 18.93 = -122 + 4.70 \quad \mu = -6.45 + 0.25$$

$$+11.87 = +496 + 5 = +501$$

$$\alpha = +42.3 - 0.73$$

Arc 171°

 $\frac{\Sigma r}{n}$

$$\frac{p}{n} = .26$$

$$-13$$

$$\frac{-13}{26} = -0.5$$

$$\Delta R = -0.6$$

$$\text{Obs} - 0.2$$

$$\text{True } \Delta R = -0.4$$

$$-2R = -3.83$$

$$-2R \text{ Corr} = +0.77$$

$$+15$$

$$\Delta b = +0.19 \quad \Delta \delta = +0.1$$

$$\Delta a = -0.56 \quad \Delta \alpha = -0.02$$

7693

Protons Center

0

C

O-C

1	-0.93	-1.67	-63	-39	11	-28	-35
2	-1.35	-1.36	-31	-57	9	-48	+17
$\frac{1}{2} \text{WD}$	-1.69	-0.90	-230	-36	8	-33	-82 (-164)
4	-1.91	+0.00	-65	-81	0	-81	+16
5	-1.16	+1.10	-121	-66	7	-73	-48
6	-1.35	+1.36	+31	-57	9	-66	+97
7	-0.35	+1.88	-22	-15	12	-27	+5
8	+0.00	+1.91	-111	+0	12	-12	-99
9	+0.65	+1.80	+30	+27	12	+15	+15

+150 - 264

Average: 49

Normal Equations

$$+11.87 + 0.73 = +49.6$$

$$+ 0.73 + 18.97 = -91$$

$$- 0.73 = 0.04 = -31$$

$$+ 18.93 = -122$$

$$k = -6.4$$

$$+11.87 + 49.6 + 5 = +50.1$$

$$a = +42.3$$

Arc 171°

 $\frac{\sum r}{n}$

$$\frac{p}{n} = .26 - 13$$

$$\frac{-13}{26} = -45 \quad \Delta R = -0.6$$

7693

Moon's Mean Position (1915)

$$\begin{array}{r} x_0 = 23.3500 \\ \text{mean} + 21 \\ \hline 23.3521 \end{array}$$

$$\begin{array}{r} y_0 = 15.8920 \\ \text{mean} - 3 \\ \hline 15.8967 \end{array}$$

Tromplato Constant $x = 24.4360$ $y = 15.3425$

$$\bar{x} = +2.4360$$

$$y = -2.6575$$

$$\begin{array}{r} \log \bar{x} = 0.38668 \\ \dots \cos 8.50724 \end{array}$$

$$\begin{array}{r} \log \tan 5.96226 \\ 0.7734 \\ \hline 7.0534 \\ 7.4494 \end{array}$$

$$\dots (x-A) 1.91439$$

$$y_1 = +28$$

$$y_0 = -2.6603$$

$$x-A) + 1.2211$$

$$A 7.5940$$

$$x_0 = 8.0102.11$$

$$\begin{array}{r} \log y_0 = 0.42493 \\ 7.33115 \\ \hline 3.09378 \end{array}$$

$$\text{Red} = +2.55$$

$$\dots (x-D) = -20.41.0$$

$$D = +23.01.30$$

$$x' = 8.01.04.66$$

$$S_0 = +22.40.49.0$$

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

$$S' = +22.40.48.8$$

7693

Moon's mean Position (1915)

$$\begin{array}{r} X_0 = 23\ 35\ 00 \\ + 21 \\ \hline 23\ 35\ 21 \end{array}$$

$$\begin{array}{r} Y_0 = 15\ 89\ 70 \\ - 3 \\ \hline 15\ 89\ 67 \end{array}$$

From plate constant $X = 24\ 43\ 60$ $Y = 15\ 34\ 25$

$$Z = + 24\ 360$$

$$y = - 2.6575$$

$$\begin{array}{r} \log 3 = 0.38668 \\ \cos 3 = 996505 \\ 850724 \end{array}$$

$$\begin{array}{r} \log \tan 5 = 96226 \\ 0.7734 \\ 70534 \\ \hline 74494 \end{array}$$

$$(x-A) = 1.91439$$

$$m_1 = + 28$$

$$m_2 = - 26603$$

$$x-A = + 1\ 22.11$$

$$\begin{array}{r} \log \eta_0 = 0.42493 \\ 7.33115 \\ \hline 3.09378 \end{array}$$

$$A = 7\ 59\ 40$$

$$q_0 = 8\ 01\ 02.11$$

$$(q-D) = - 20\ 41.6$$

$$Red = + 255$$

$$D = + 23\ 01\ 30$$

$$\alpha' = 8\ 01\ 04.66$$

$$S_0 = + 22\ 40\ 49.0$$

$$Red = - 0.2$$

$$S' = + 22\ 40\ 48.8$$

7693

Red ad locum affr

S: +22° 40' 49"

$$H + X = 5 \quad 33.3 = 83^\circ 20'$$

$$H = 21 \quad 32.3$$

$$X = 8 \quad 01.0$$

$$G = 20 \quad 29.3$$

$$G + X = 4 \quad 30.3 = 67^\circ 34'$$

$$\begin{array}{r} \text{loss} \quad 99651 \\ i \quad 07130 \\ \hline (i) \quad 06781 \end{array}$$

$$\begin{array}{r} \text{loss}(G+X) \quad 95816 \\ g \quad 09787 \\ \text{sin} \quad 99658 \\ \text{tan} \quad 96211 \\ \quad 88239 \end{array}$$

$$\begin{array}{r} g' \quad 05603 \\ g \quad 93895 \end{array}$$

$$\begin{array}{r} \text{loss} \quad 95861 \\ \text{cos}(H+X) \quad 90648 \\ h \quad 12969 \\ \text{sin} \quad 99970 \\ \text{loss} \quad 00349 \\ \quad 88239 \end{array}$$

$$\begin{array}{r} h' \quad 99478 \\ h \quad 01527 \end{array}$$

$$\begin{array}{r} f \quad +0.88 \\ g \quad -0.25 \\ h \quad +1.42 \\ \hline \quad +2.55 \end{array}$$

$$\begin{array}{r} g' \quad +3.63 \\ h' \quad +0.89 \\ i \quad -4.77 \\ \hline \quad -0.25 \end{array}$$

7653 Human Parallax

$$\begin{array}{r} \alpha' = 8^h 01^m 04^s.66 \\ 6 \quad 10 \quad 03 \quad 12.1 \\ + \quad 2 \quad 02 \quad 07.44 \\ + \quad 300 \quad 31' \quad 52'' \end{array}$$

$$+ \quad 11 \quad 32$$

$$20 \quad 20 \quad 20$$

$$\begin{array}{r} 9.95727 \\ 0.00000 \\ 0.06396 \\ \hline 0.02123 \end{array}$$

$$\delta = 46 \quad 24 \quad 00$$

$$22 \quad 40 \quad 49$$

$$23 \quad 43 \quad 11$$

$$9.82640$$

$$8.21579$$

$$9.60451$$

$$0.14016$$

$$\hline 7.78686$$

$$\delta - \delta' = +21 \quad 02.7$$

$$\delta \quad +23 \quad 01 \quad 51.5$$

$$\text{Cum Eph } \delta = +23 \quad 01 \quad 55.4$$

$$O-C \quad -3.9$$

$$\text{Curv. of Plate} \quad +0.5$$

Dev

$$+0.1$$

2nd Ord. Ref

$$0.0$$

$$\delta = +23 \quad 10 \quad 51.6$$

$$-3.8$$

$$\delta' = +22^\circ 40' 48''.8$$

$$\mu = 56' \quad 30''.25$$

$$9.86913$$

$$8.21579$$

$$9.70587$$

$$0.03608$$

$$\hline 7.82687$$

$$\delta - \delta' = +23 \quad 04.52$$

$$+1^m \quad 32.30$$

$$\alpha \quad 8 \quad 02 \quad 36.96$$

$$\alpha = 8 \quad 02 \quad 35.94$$

$$+1.02$$

$$+0.01$$

$$-0.02$$

$$\alpha = 8 \quad 02 \quad 36.94$$

$$\delta - \alpha = +1.00$$

7693 human Parallax

$$\begin{array}{r}
 \alpha' = 8^{\circ} 01' 04.66 \\
 6 \quad 10 \quad 03 \quad 12.1 \\
 + \quad 2 \quad 02 \quad 07.44 \\
 + \quad 30^{\circ} 31' 52''
 \end{array}$$

$$+ \quad 11 \quad 32$$

$$30 \quad 20 \quad 20$$

$$\begin{array}{r}
 995727 \\
 0.00000 \\
 006396 \\
 \hline
 002123
 \end{array}$$

$$\delta = 46 \quad 24 \quad 00$$

$$22 \quad 40 \quad 49$$

$$23 \quad 43 \quad 11$$

$$9.82640$$

$$8.21579$$

$$9.60451$$

$$0.14016$$

$$7.78686$$

$$\delta - \delta' = +21 \quad 02.7$$

$$S \quad +23 \quad 01 \quad 51.5$$

$$\text{Cur Eph } S = +23 \quad 01 \quad 55.4$$

$$O - C \quad -3.9$$

$$\text{Cur. of Plate} \quad +0.5$$

$$\text{Zinc} \quad +0.1$$

$$\text{3rd Ord. Ref} \quad 0.0$$

$$S = +23 \quad 10 \quad 51.6$$

$$-3.8$$

$$S' = +22^{\circ} 40' 48.8$$

$$\pi = 56' 30.25$$

$$9.86913$$

$$8.21579$$

$$9.70587$$

$$0.03608$$

$$7.82687$$

$$\alpha - \alpha' = +23 \quad 04.52$$

$$+1^{\circ} 32.30$$

$$\alpha \quad 8 \quad 02 \quad 36.96$$

$$\alpha = 8 \quad 02 \quad 35.94$$

$$+1.02$$

$$+0.01$$

$$-0.02$$

$$\alpha = 8 \quad 02 \quad 36.94$$

$$O - C = +1.00$$

