

KG
11366
7971

CXVIII
118
7965
7966
7990

7965

x Stars - measures.

1916 Apr 24.

d
1 14750
2 13930
9 3937

v
1079
-7579
9450

d 8
11270
10579
7176

v
12509
9895
11823

12.0815.08259.0695.0678

2
27.1 10637
24.6 10730 30
30

9077
9075-71
8674

17059
11469
7063
79

14703
10330
224-
20

27.0407.039924.5604.5615

3
32.2 14325
11.5 12758
5961
43

19079
10669
6567
03

20024
14960
6163
45

20076
15150
5450
60

32.1570.156811.5074.5063

Moon - measures.

1
22.0
14.6

19396
14230
2538
20

16598
14795
9090
20

14.5177.5187

2
21.8
14.5
min
8

18396
13324
1910
20

17601
12698
9089
20

14.5090.5082

3
21.0
14.7

17447
10250
6040
61

17570
14779
7080
85

14.7207.7202

7965

Star - measures

1916 Apr 24.

1 14750
 11 13930
 91 3937

10279
 7579
 9430

11270
 10579
 7176

12509
 9895
 11525

12.0815.08259.0695.0678

2
 271 10637
 246 10230 30
 30

907271
 9071
 8674

17059
 11469
 7063
 79

14703
 10330
 2220
 20

27.0407.039924.5604.5615

3
 322 14325
 115 12758 61
 59
 43

19079
 10669
 6567
 03

22024
 14960
 6463
 65

20076
 15150
 5450
 60

32.1570.156811.5074.5063

Moon - measures.

1
 10
 16

19396
 14230
 2538
 20

16590
 1175590
 90
 20

14.5177.5187

2
 8
 15
 16

18396
 1332410
 19
 20

17601
 12698
 9089
 20

14.5090.5082

3
 210
 147

17447
 10250
 6040
 61

17570
 1477980
 70
 85

14.7207.7202

1916

Lunar

Mars

1916 Apr 24

d

N

d

8

N

$$\begin{array}{r}
 4 \\
 10.7 \\
 15.0 \\
 \hline
 16694 \\
 1064132 \\
 3032 \\
 20 \\
 \hline
 20.6076
 \end{array}$$

$$\begin{array}{r}
 17628 \\
 1369598 \\
 9198 \\
 50 \\
 \hline
 6058
 \end{array}$$

$$\begin{array}{r}
 5 \\
 20.1 \\
 16.0 \\
 \hline
 11604 \\
 1172020 \\
 07 \\
 \hline
 20.0488
 \end{array}$$

$$\begin{array}{r}
 1291919 \\
 1219 \\
 12430 \\
 0487 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 6 \\
 10.0 \\
 16.3 \\
 \hline
 11620 \\
 11460 \\
 5865 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 1357879 \\
 7079 \\
 13420 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 1 \\
 \hline
 200159
 \end{array}$$

$$\begin{array}{r}
 0156 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 7 \\
 20.2 \\
 17.0 \\
 \hline
 20149 \\
 18800 \\
 6389 \\
 71 \\
 \hline
 20.1334
 \end{array}$$

$$\begin{array}{r}
 18985 \\
 1035345 \\
 5045 \\
 15 \\
 \hline
 1338
 \end{array}$$

$$\begin{array}{r}
 8 \\
 21.0 \\
 17.9 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 1505051 \\
 50 \\
 14725 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 13947 \\
 1364031 \\
 42 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 9 \\
 21.1 \\
 18.0 \\
 \hline
 14250
 \end{array}$$

Density 1.

$$\begin{array}{r}
 179675 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 9691 \\
 \hline
 \end{array}$$

7965 Times etc.

Epitclan 1915 Feb 20 5h 55^m - 6^m 07^m
 ... hon 6 00 33.6 - 6 00 34.1
 clock slow 0 22.2

H. Sid T. 6 00 56.05^v 0-α- + 2^m 59^m 07^s
 H Long. 4 44 31.05^v
 G Sid T. 10 45 27.10^v
 Sid T. in hon 21 57 21.07^v
 Interval 12 48 06.03^v
 Red. 2 05.83^v
 G. in T. 12 46 00.20^v

From Kant. Alu R. A. W. ecl.
 hon 13^m 3 02 18.13^v + 22 40 25.6^v
 horizon 2.0433^v 8.595^v
 ... -13.997^v - 2 00.3^v
 Tabula place 3 01 49.53^v + 22 38 25.3^v

Moon's age 7 days.

parallax 54 92.59

semidiam 14 47.9

R

887.9

934 = 11.6

Augmentation

10.5

10.5

888 = 10.0

Irradiation 1

+ 0.2

R

898.6

R

1.9263

α = -499.9

α R

- 917

+ 24.

(14α) R

1.8346

- 475.9

R²

33658

7965 Times etc

Sp. H. L. 1915 Feb 20	5h 55m	-6 07	
h. m.	6 00	33.6	-6 00 34.1
clock show	0	222	
H. L. T.	6 00	56.05	0.2 - + 2 59 07
H. Long.	4 44	31.05	
G. Sid. T.	10 45	27.10	
Sid. Th. h. m.	21 17	21.07	
Interval	12 48	06.03	
Red.	2	05.83	
G. h. T.	12 46	00.20	

From Kant Alm	R A.	Week	
moon 13	3 02	18.13	+ 22 40 25.6
h. m. 13.0433			8.591
... - 13.997	-	28.60	- 2 00.3
Tabular place	3 01	49.53	+ 22 38 25.3

Moon age 7 days.

parallax

54 12.59

semidiameter

14 47.9

R

887.9

Augmentation

105

Irradiation

+ 0.2

R

898.6

R

1.9263

W

917

(H. A. R)

1.8346

R

3.3658

7965

Plate center, constant etc.

4

	γ	R.A	Decl.
1 2.0820	9.0686	2 54 00	+21 46 41
27.0403	24.5610	3 02 55	23 21 45
32.1569	11.5068	3 05 46	21 34 20
3 71.28	45.14	18 61 101	5 71 106
23.76	15.05	3 00 54	22 04 15
-22	-18	- 55	+ 22 55
1.76	2.95	3 00 00	22 27 10
31	466		
55 ^s	1375"		

= 22' 55"

 Center $\left\{ \begin{array}{l} A = 3^h 00^m 00^s \\ D = +22 \quad 27 \quad 10 \end{array} \right.$

$$\begin{array}{rclcl}
 x - \bar{x} + 500x & +150.8y & -1x & -15975. & \\
 +8566 + 6041 = +14607 + 1368 & +15975 - 1 = +15974 & = & -1 & \\
 -1246 + 13520 = +12274 + 3704 & +15978 - 3 = +15975 & = & 0 & \\
 -1835 + 116078 = +14243 + 1735 & +15978 - 3 = +15975 & = & 0 & \\
 +18506 + 10925 & +2465 & -2 & = 21.5919 &
 \end{array}$$

$$\begin{array}{rclcl}
 y - \bar{y} + 500y & -146.4x & +1x & -3599 & \\
 +833 + 4534 = +5367 - 1769 & +3598 + 1 = +3599 & = & 0 & \\
 -4725 + 12280 = +7555 - 3959 & +3596 + 3 = +3599 & = & 0 & \\
 +2550 + 5753 = +8303 - 4708 & +3595 + 3 = +3598 & = & -1 & \\
 16.3454 + 8172 & -3199 & +2 & = 16.4830 &
 \end{array}$$

 Tables $a = -0.5$ $e = -0.3$ $a - e = -0.2$ $b + a = -2.3$
 Obs $a = -499.9$ $e = -500.0$ $a - e = +0.1$ $b + a = -4.5$
-4994^v-499.7^v-2.2^v

7965 • Plate Center, constant etc

4

α	δ	R.A.	Decl.
120820	9.0686	2 54 00	21 46 41
27.0403	24.5610	3 02 55	23 21 45
32.1569	11.5068	3 05 46	21 34 20
71.28	45.14	8 61 10.1	5 71 10.6
23.76	15.05	3 00 54	22 04 15
22	18	55	22 22 55
176	2.95	3 00 00	22 27 10
51	7.66		
55	13.75		
	22' 55"		

$$\text{Center } \left\{ \begin{array}{l} A = 3^h 00^m 00^s \\ D = +22 \quad 27 \quad 10 \end{array} \right.$$

$$\begin{array}{rclcl} 2-3 +500x & +150.8y & -1x & -15975 \\ +8566 + 6041 & +14607 + 1368 & +15975 - 1 & +15975 \\ -1246 + 13520 & +12274 + 3704 & +15975 - 3 & +15975 \\ -1835 + 16078 & +14243 + 1735 & +15975 - 3 & +15975 \\ 215506 + 10925 & +1465 & -2 & = 215979 \end{array}$$

$$\begin{array}{rclcl} y - \eta + 500y & -146.4x & +1x & -3597 \\ +833 + 4534 & +5367 + 1769 & +3598 + 1 & +3599 \\ -4725 + 12220 & +7555 - 5959 & +3596 + 3 & +3599 \\ +2550 + 5753 & +8303 - 4708 & +3595 + 3 & +3598 \\ 16.3484 + 8172 & -3199 & +2 & = 164836 \end{array}$$

$$\begin{array}{l} \text{Tables } a = -0.5 \quad b = -0.3 \quad a - c = -0.2 \quad b + d = -2.3 \\ \text{Obs } a = -499.9 \quad b = -500.0 \quad a - b = +0.1 \quad b + d = +1 \end{array}$$

S	η	ΔS	$-4.3S$	$+3\eta$	$+8$
-10.77	-9.06	-52	$+46 = -6$	$-3 = -9$	
$+5.16$	$+7.21$	$+11$	$-22 = -11$	$+2 = -9$	
$+10.34$	-6.80	$+38$	$-44 = -6$	$-2 = -8$	
-0.41	-1.52		$+2$	$-0 = +10$	

$\Delta \eta$	-3η	$-6S$	$+11$
-44	$+27 = -17$	$+6 = -11$	
$+14$	$-22 = -8$	$-3 = -11$	
-25	$+20 = -5$	$-6 = -11$	
$+4$		$-0 = +15$	

$$\text{curr} \begin{cases} \alpha = +0.03 \\ \delta = +0.7 \end{cases}$$

7965 Standard Coordinates.

Cape No. 434 mag 6.7				Cape No. 455 mag 7.8				Cape No. 460 mag 7.7			
C	2	53	09.07	3	02	02.65	3	04	53.91		
L			02			.70			90		
E			04			.66			.91		
mean	2	53	09.04	3	02	02.67	3	04	53.91		
Prec		+	51.49		+	52.27		+	51.81		
α	2	54	00.53	3	02	54.94	3	05	45.72		
A	3	00	00	3	00	00	3	00	00		
$\alpha-A$	-05		59.47	+	2	54.94	+	5	45.72		
$\sin(\alpha-A)$	-3	59.43		+	17	4.94	+	34	5.68		
log.	2.55	562	m	2.24	289		2.53	868			
WSS	9.96	934		9.96	285		9.96	846			
Σ	1.03	220	m	0.71	248		1.01	438			
Σ_0	-10.76	95		+	5.16	39	+	10.33	67		
Σ_1	-	51		-	10		+	37			
Σ	11.22	54		27.16	49		32.34	04			
α	12.08	20		27.04	03		32.15	69			
$2-\Sigma$	+	.85	66	-	12	46	-	18	35		
C	+21	13	03.6	+23	18	14.6	+21	30	52.6		
L			03.6			15.1			52.3		
E			03.2			13.9			52.2		
mean	+21	13	03.5	+23	18	14.5	+21	30	52.4		
Prec	+	3	37.9	+	3	30.3	+	3	27.6		
S	+21	16	41.4	+23	21	44.8	+21	34	20.0		
D	+22	27	10	+22	27	10	+22	27	10		
S-D	-1	10	28.6	+	54	34.8	-		52.50.0		
$\tan(S-D)$	-4	22	9.2	+	32	75.1	-	31	70.3		
log.	3.62	626	m	3.51	522		3.50	110	m		
η_0	0.95	741	m	0.84	637		0.83	225	m		
$\tan S$	9.59	04		9.63	54		9.59	70			
Σ^2	206	44		142	65		202	88			
η_1	8.70	82		8.11	53		8.67	92			
η_0	-9.06	58		+	7.02	05	-	6.79	60		
η_1	+	511		+	130		+	478			
η	8.98	53		25.03	35		11.25	18			
η	9.06	86		24.56	10		11.50	68			
η	+	833		-	4725		+	2550			

1965 Standard Coordinates

Cape No. 434 - 196.7 Cape No. 435 - 197.8 Cape No. 460 - 197.7

C	2	53	09.07	3	02	02.65	3	04	53.91			
L			02			70			90			
E			04			66			91			
Mean	2	53	09.04	3	02	02.67	3	04	53.91			
Pure		+	51.49		+	52.27		+	51.81			
α	2	54	00.53	3	02	54.94	3	05	45.72			
A	3	00	00	3	00	00	3	00	00			
$\alpha-A$		-05	59.47		+	2	54.94		+	5	45.72	
$\sin(\alpha-A)$			-359.43			+	174.94			+	345.68	
log.	2	55	562		2	24	289		2	53	868	
cos	9	96	934		9	96	284		9	96	846	
δ_0	1	03	220		0	71	298		1	01	438	
δ_0		-10	76.95		+	5	16.39		+	10	33.67	
δ_1			51		-		10		+		37	
δ		11	22.54		2	71	64.9		3	23	40.4	
α		12	08.10		2	70	40.3		3	21	56.9	
$\alpha-\delta$		+	85.66		-	1	24.6		-	1	83.5	
C	+	21	13	03.6	+	23	18	14.6	+	21	30	52
L				03.6				15.1				12
E				03.2				13.9				52
Mean	+	21	13	03.5	+	23	18	14.5	+	21	30	52.1
Pure		+	3	37.9		-	3	30.3		+	3	27
δ	+	21	16	41.4	+	23	21	44.8	+	21	34	20
D	+	22	27	10	+	22	27	10	-	22	27	10
$\delta-D$	-	1	10	28.6	+		54	34.8	-		52	50.0
$\tan(\delta-D)$			-42292				+	3275.1			-31703	
log.	3	62	626		3	51	122		3	50	110	
η_0	0	95	741		0	84	637		0	83	225	
$\tan \delta$	9	59	04		9	63	54		9	59	70	
δ^2	2	06	44		1	42	65		2	02	88	
η_1	8	70	82		8	11	53		8	67	92	
η_0	-	9	06.58		+	7	02.05		-	6	99.60	
η_1	+		511		+		130		+		478	
η_2	8	98	53		2	15	03.35		1	12	51.8	
η_3	9	06	86		2	45	61.0		1	15	06.8	
η_4	+		833		-	4	72.5		+	2	55.0	

7965		Moon's Center						
	x	$x - X_0$	Δx	$(x - X_0)^2$	$(x - X_0)^2 + (y - Y_0)^2$	$0 - c$		
1	22.0000	+0.1500	-4	0.0224	3.3556	-	65	
2	21.8500	0.0000	-4	0.0000	3.3683	+	62	
3	21.0000	-0.8500	-4	0.7232	3.3589	-	32	
4	20.6067	-1.2433	-3	1.5465	3.3528	-	93	
5	20.0488	-1.8012	-1	3.2443	3.3626	+	5	
6	20.0158	-1.8342	-0	3.3643	3.3643	+	22	
7	20.1346	-1.7154	-2	2.9433	3.3736	+	115	
8	21.0000	-0.8500	-4	0.7232	3.3612	-	9	

3.3621
3.3658

	y	$y - Y_0$	Δy	$(y - Y_0)^2$		
1	14.5182	-1.8258	+1	3.3332	175	
2	14.5086	-1.8354	+1	3.3683	180	
3	14.7204	-1.6236	+1	2.6357	208	
4	15.0000	-1.3440	0	1.8063	223	
5	16.0000	-0.3440	0	0.1183	259	
6	16.3440	0.0000	0	0.0000	270	
7	17.0000	+0.6560	0	0.4303	291	
8	17.9683	+1.6243	+1	2.6380	332	157

$$\begin{aligned}
 x &= 21.0 & y &= 14.7204 \\
 & & & 17.9683 \\
 & & & \hline
 & & & 32.6887 \\
 y &= 16.3444 \\
 y - \text{min} &= 14.5086 \\
 R &= 1.8358 \\
 x - \text{min} &= 20.0158 \\
 x &= 21.8516
 \end{aligned}$$

$$\text{center} \begin{cases} x = 21.8500 \\ y = 16.3440 \end{cases}$$

6

	x	y	$x - X_0$	$y - Y_0$	$(x - X_0)^2$	$(y - Y_0)^2$	$(x - X_0)(y - Y_0)$	$u - c$
1	22.0000	14.5182	-0.1500	-1.8258	0.0224	3.3332	-0.2742	-65
2	21.8500	14.5086	0.0000	-1.8354	0.0000	3.3683	0.0000	+62
3	21.0000	14.7204	-0.8500	-1.6236	0.7225	2.6357	1.1632	-32
4	20.6067	15.0000	-1.2433	-1.3440	1.5465	1.8063	1.6667	-93
5	20.0488	16.0000	-1.8012	0.3440	3.2443	0.1183	-0.6232	+5
6	20.0158	16.3444	-1.8342	0.0000	3.3643	0.0000	0.0000	-22
7	20.1346	17.0000	-1.7154	0.6560	2.9433	0.4303	-1.1232	+115
8	21.0000	17.9683	-0.8500	1.6243	0.7225	2.6380	-1.3806	-9
							3.3621	

	x	y	$x - X_0$	$y - Y_0$	$(x - X_0)^2$	$(y - Y_0)^2$	$(x - X_0)(y - Y_0)$
1	14.5182	14.5182	-1.8258	-1.8258	3.3332	3.3332	5.9525
2	14.5086	14.5086	-1.8354	-1.8354	3.3683	3.3683	11.3000
3	14.7204	14.7204	-1.6236	-1.6236	2.6357	2.6357	4.2667
4	15.0000	15.0000	-1.3440	-1.3440	1.8063	1.8063	2.2311
5	16.0000	16.0000	0.3440	0.3440	0.1183	0.1183	0.1183
6	16.3444	16.3444	0.0000	0.0000	0.0000	0.0000	0.0000
7	17.0000	17.0000	0.6560	0.6560	0.4303	0.4303	0.4303
8	17.9683	17.9683	1.6243	1.6243	2.6380	2.6380	4.2667
							157

$x = 21.0$ $y = 14.7204$
 $\quad \quad \quad 17.9683$
 $\quad \quad \quad 22.6887$
 $y = 16.3444$
 $\quad \quad \quad 14.5086$
 $R = 1.8358$
 $\quad \quad \quad 20.0158$
 $x = 21.8516$

center } $x = 21.8500$
 } $y = 16.3440$

formation

1	- 0.27	-	9.7	+	118.5
2	- 0.00	+	0.0	-	113.8
3	+ 1.38	+	27.2	+	51.9
4	+ 1.66	+	115.2	+	124.8
5	+ 0.61	-	9.0	-	1.7
6	+ 0.00	-	40.3	+	0.0
7	- 1.14	-	198.2	+	75.9
8	- 1.38	+	7.6	-	14.6
	+ 0.86	-	122.4	+	241.0

corr to radius - 37

[an] [bn]

-	6	+	68
-	0	+	68
+	31	+	60
+	46	+	50
+	67	+	13
+	68	-	0
+	64	-	24
+	31	-	60
+	301	+	175
-	122	+	241
+	179	-	416

- a	- 6	+	73
+	7	-	38
+	0	-	38
-	39	-	34
-	57	-	28
-	83	-	7
-	85	+	0
-	79	+	14
-	39	+	34

$$\begin{aligned} \Delta R &= -0.5 \\ \text{corr} &= -1.0 \\ \text{True } \Delta R &= +0.5 \end{aligned}$$

$$-2R = -3.67 \quad -2R \text{ corr} = +3.67 \quad +73.$$

$$\Delta \theta = -1.06 - 21 \quad \Delta \delta = -0.5$$

$$\Delta a = -2.31 - 46 \quad \Delta \alpha = -0.08$$

1965 Moon's Center

7

	O	C	O-C	Corr
1	+0.15 - 1.83 = -65	- 2 - 32 = -34	- 31	+ 11
2	+0.00 - 1.83 = -62	- 0 - 32 = -32	+ 94	+ 129
3	-0.85 - 1.62 = -32	+ 9 - 28 = -19	- 13	- 13
4	-1.24 - 1.34 = -93	+ 14 - 23 = -9	- 84	- 96
5	-1.80 - 0.34 = -55	+ 20 - 6 = +14	- 9	- 26
6	-1.83 + 0.00 = -22	+ 20 + 0 = +20	+ 2	+ 14
7	-1.72 + 0.66 = -115	+ 19 + 12 = +31	+ 84	+ 92
8	-0.85 + 1.62 = +9	+ 9 + 28 = +37	- 28	+ 40
9	-8.14 - 4.68			
			+180	- 165

Average = +43

Normal Equations

$$+12.57 + 0.86 = -122$$

$$+ 0.86 + 14.33 = +241$$

$$- 0.86 - 0.06 = + 8$$

$$+ 14.27 = +249$$

Wrong radius
see below.

$$r = +17.48$$

$$+12.57 = -122 - 15 = -137$$

$$a = -10.9$$

New O-C	C	O-C	new C
-102	+ 2 - 52 = -50	-52	-10
+ 25	+ 0 - 52 = -52	+77	+112
- 69	- 14 - 46 = -57	- 12	- 12
-130	- 15 - 38 = -53	-77	- 89
- 32	- 22 - 10 = -32	0	- 17
- 15	- 23 + 0 = -23	+ 8	+20
+78	- 21 + 19 = -2	+80	+88
-46	- 11 + 46 = +35	-81	- 13

$$+165 - 222$$

Average = 48

New Normals

$$+12.57 + 0.86 = +179 - 8.14$$

$$+ 0.86 + 14.33 = +416 - 4.68$$

$$- 0.86 - 0.06 = - 12 + 0.56$$

$$+ 14.27 = +404 - 4.124 = +28.3 - 0.29$$

$$+12.57 = +179 - 24 = +155$$

$$a = +12.3 - 0.63$$

$$arc 157 \quad \Delta = 18$$

$$\frac{34}{18} = -7.1 \quad \frac{-71}{18} = -3.9 \quad \Delta R = -0.5$$

7965 Lagoon Center

	C	C	O-C
1	+0.15 - 1.83 = -65	-2 - 32 = -34	-31
2	-0.00 - 1.83 = -62	0 - 32 = -32	-34
3	-0.85 - 1.62 = -30	+9 - 28 = -19	-13
4	-1.34 - 1.34 = -93	+14 - 23 = -9	-84
5	-1.80 - 0.34 = -75	+28 - 6 = +22	+9
6	-1.83 + 0.00 = -72	+20 + 0 = +20	+2
7	-1.72 + 0.66 = -115	+19 - 12 = +7	+84
8	-0.53 + 1.62 = +9	-4 + 21 = +17	+128
9			-180 = 165
			Average +43

Normal Equation

$$+12.57 = 0.86 = -122$$

$$+0.86 + 14.33 = +241$$

$$-0.86 - 0.06 = -8$$

$$+1427 = +249$$

Wrong radius
See below.

$$k = +17.45$$

$$+12.57 = -122 - 15 = -137$$

New O-C

$$+102$$

$$+25$$

$$-69$$

$$-130$$

$$-32$$

$$-15$$

$$+78$$

$$-46$$

$$+2 - 52 = -50$$

$$+0 - 52 = -52$$

$$-18 - 46 = -57$$

$$-15 - 38 = -53$$

$$-22 - 10 = -32$$

$$-23 + 0 = -23$$

$$-21 - 19 = -2$$

$$-11 + 46 = +35$$

C

$$O-C$$

$$-52$$

$$+77$$

$$-12$$

$$-77$$

$$0$$

$$+8$$

$$+50$$

$$-81$$

$$-165 = -222$$

$$Average = +8$$

New Normals

$$+12.57 + 0.86 = +139$$

$$+0.86 + 14.33 = +416$$

$$-0.86 - 0.06 = -12$$

$$+1427 = +404$$

$$k = +28.3$$

$$+12.57 = +139 = 242 = +115$$

$$a = +12.3$$

$$\text{Arc } 157 \quad \frac{D}{2} = 18 \quad \frac{2k}{2} = -7.1 \quad \frac{-71}{18} = -39 \quad \Delta R = -0.5$$

7965

Moon's Mean Position (1915.0)

$$\begin{array}{r} X = 21.8500 \\ + 6 \\ \hline 21.8506 \end{array}$$

$$\begin{array}{r} Y = 16.3440 \\ + 14 \\ \hline 16.3454 \end{array}$$

From plate constant $X = 21.5919$ $Y = 16.4836$

$$Z = -0.4081$$

$$\eta = -1.5170$$

$$\begin{array}{r} \log \bar{z} = 9.61077 \\ \log S = 9.96638 \\ - \\ \hline 8.50724 \end{array}$$

$$\begin{array}{r} \log \tan S = 9.6100 \\ 9.2239 \\ \hline 7.0534 \\ \hline 5.8873 \end{array}$$

$$-(A-A) = 1.13775$$

$$A-A = 13.71$$

$$A = 3 \ 00 \ 00$$

$$d = 2 \ 59 \ 46.29$$

$$\text{Red.} = + 0.71$$

$$\alpha' = 2 \ 59 \ 47.00$$

$$\eta_0 = -1.5171$$

$$\begin{array}{r} \log \eta_0 = 0.18102 \\ 7.33115 \\ \hline 2.84987 \end{array}$$

$$S-D = 1 \ 1 \ 47.7$$

$$D = + 22 \ 27 \ 10$$

$$S = + 22 \ 15 \ 22.3$$

$$\text{Red.} = + 10.9$$

$$S' = + 22 \ 15 \ 33.2$$

7965

Moon's Mean Position (1915.0)

$$\begin{array}{r} x = 21.8500 \\ + 6 \\ \hline 21.8506 \end{array}$$

$$\begin{array}{r} y = 16.3440 \\ + 14 \\ \hline 16.3454 \end{array}$$

From plate constant $\lambda = 21.5949$ $\gamma = 16.4830$

$$z = -0.4082$$

$$\eta = -1.5170$$

$$\begin{array}{r} \log z = 9.61077 \\ \cos S = 9.96638 \\ - 8.50724 \end{array}$$

$$\begin{array}{r} \log \tan S = 9.6100 \\ 9.2239 \\ \hline 7.0534 \\ 5.8473 \end{array}$$

$$(A-A) = 1.13725$$

$$\eta_0 = -1.5175$$

$$\lambda - A = 13.75$$

$$\begin{array}{r} \log \eta_0 = 0.18102 \\ 7.32115 \\ \hline 2.84987 \end{array}$$

$$A = 3.00.00$$

$$d = 2.59.46.29$$

$$S-D = 11.47.7$$

$$Red. = 0.71$$

$$D = +22.27.10$$

$$\alpha' = 2.59.47.00$$

$$S = +22.15.22.3$$

$$Red. = 10.9$$

$$S = +22.15.33.2$$

$$\begin{array}{r} 2 \quad 44 \quad 59.14 \\ \underline{58.58} \\ + 0.59 \end{array}$$

$$\begin{array}{r} + 26 \quad 54 \quad 51.6 \\ \underline{39.2} \\ + 12.4 \end{array}$$

$$\begin{array}{r} 2 \quad 46 \quad 48.47 \\ \underline{47.81} \\ + 0.66 \end{array}$$

$$\begin{array}{r} + 14 \quad + 3 \quad 64.6 \\ \underline{56.4} \\ + 8.2 \end{array}$$

$$\begin{array}{r} 2 \quad 54 \quad 21.57 \\ \underline{20.88} \\ + 0.69 \end{array}$$

$$\begin{array}{r} + 21 \quad 00 \quad 14.1 \\ \underline{03.7} \\ + 10.4 \end{array}$$

$$\begin{array}{r} 3 \quad 06 \quad 46.71 \\ \underline{45.94} \\ + 0.77 \end{array}$$

$$\begin{array}{r} + 19 \quad 24 \quad 31.7 \\ \underline{21.7} \\ + 40.0 \end{array}$$

$$\begin{array}{r} 2 \quad 59 \quad 44.08 \\ \underline{43.45} \\ + 0.63 \end{array}$$

$$\begin{array}{r} + 38 \quad 30 \quad 58.3 \\ \underline{41.8} \\ 16.5 \end{array}$$

$$45 \quad 50 \quad 55 \quad 0 \quad 5 \quad 10 \quad + 30$$

1.

$$\begin{array}{r} + 25 \\ + 20 \\ + 15 \end{array}$$

$$\begin{array}{r} 7.4 \\ \underline{0.64} \\ 6.76 \end{array}$$

$$\begin{array}{r} 6.1 \\ \underline{10.2} \\ 16.3 \end{array}$$

7965

Red, ad Brown app.

7

S + 22° 15' 22"

$$H + \alpha \quad \sqrt{3} \quad 029 = 345^\circ 45'$$

$$H \quad \sim \quad 23.1$$

$$\alpha \quad 2 \quad 59.8$$

$$G \quad 20 \quad 44.3$$

$$G + \alpha \quad \sqrt{3} \quad 44.1 = 356^\circ 2'$$

$$l \cos S \quad 9.9664$$

$$i \quad \underline{0.8542m}$$

$$(i) \quad 0.8206m$$

$$l \cos(G + \alpha) \quad 9.9990$$

$$g \quad 1.0203$$

$$\sin \quad 8.8400m$$

$$\tan S \quad 9.6120$$

$$8.8239$$

$$l \sin S \quad 9.5783$$

$$\cos(H + \alpha) \quad 9.9864$$

$$h \quad 1.2829$$

$$\sin \quad 9.3912m$$

$$\sec S \quad 0.0336$$

$$8.8239$$

$$g' \quad 1.0193$$

$$8.2962m$$

$$h' \quad 0.8476$$

$$h \quad 9.5316m$$

$$g \quad +1.07$$

$$g \quad -0.02$$

$$h \quad -0.34$$

$$\underline{+0.71}$$

$$g' \quad +10.45$$

$$h \quad +7.04$$

$$i \quad -6.62$$

$$\underline{+10.87}$$

7961

Red. ad. Green. app.

9

S 1 22° 15' 22"

$$H + \lambda \quad v3 \quad 029 - 345^\circ 45'$$

$$H \quad w \quad 03.1$$

$$a \quad 2 \quad 59.8$$

$$G \quad 20 \quad 44.3$$

$$G + \lambda \quad v3 \quad 44.1 - 356^\circ 2'$$

$$\cos(G + \lambda) \quad 9.97790$$

$$g \quad 1.0203$$

$$\sin \quad 8.8400 \sim$$

$$\tan S \quad 9.6120$$

$$8.6239$$

$$g' \quad 1.0193$$

$$r \quad 8.2962 \sim$$

$$d \quad +1.07$$

$$g \quad -0.02$$

$$h \quad -0.34$$

$$-0.71$$

$$\cos S \quad 9.9664$$

$$v \quad 0.8542 \sim$$

$$(u) \quad 0.8206 \sim$$

$$\sin S \quad 9.5783$$

$$\cos(H + \lambda) \quad 9.9864$$

$$h \quad 1.2829$$

$$\sin \quad 9.3912 \sim$$

$$\cos S \quad 0.0336$$

$$8.8239$$

$$h' \quad 0.8476$$

$$h \quad 9.5316 \sim$$

$$g' \quad +10.45$$

$$h \quad +7.04$$

$$i \quad -6.12$$

$$+10.87$$

7965

Lunar parallax

10

$$\begin{array}{rcl}
 \alpha & = & 2^h 59^m 47.00 \\
 \delta & = & 6 \quad 00 \quad 56.05 \\
 \theta - \alpha & = & 3 \quad 01 \quad 09.05 \\
 & = & 45^\circ 17' 16''
 \end{array}$$

$$- \quad \quad \quad 15 \quad 26''$$

$$45 \quad 01 \quad 50''$$

$$9.95727''$$

$$0.00000$$

$$0.15075''$$

$$0.10802''$$

$$\gamma = 52^\circ 03' 12''$$

$$22 \quad 15 \quad 33''$$

$$29 \quad 47 \quad 39''$$

$$9.82640''$$

$$8.19779''$$

$$9.69624''$$

$$0.10315''$$

$$7.82358''$$

$$S - S' = +22 \quad 54.1''$$

$$S = +22 \quad 38 \quad 27.3''$$

$$\text{Am. El. } S = +22 \quad 38 \quad 25.3$$

$$O - C \quad \quad \quad + 2.0$$

$$\text{Curr.} \quad \quad \quad + 0.7$$

$$\text{Inv. Corr.} \quad \quad - 0.5'$$

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

$$\delta = +22 \quad 38 \quad 26.8$$

$$O - C \quad \quad \quad + 1.5$$

$$\delta = +22^\circ 15' 33.2''$$

$$\Pi \quad 54' 12.59''$$

$$9.86915''$$

$$8.19779''$$

$$9.85165''$$

$$0.03482''$$

$$7.95339''$$

$$\alpha - \alpha' = 30 \quad 52.78''$$

$$= +2 \quad 03.52''$$

$$\alpha \quad 3 \quad 01 \quad 50.52$$

$$\alpha = -3 \quad 01 \quad 49.53$$

$$+ 0.99''$$

$$\text{Curr.} \quad \quad \quad + 0.03$$

$$\text{Inv. Corr.} \quad \quad - 0.08$$

$$\alpha \quad 3 \quad 01 \quad 50.44$$

$$O - C \quad \quad \quad + 0.91$$

7965 Lunar parallax

10

$$\begin{array}{rcl}
 \alpha & 2 & 59 \quad 48.90 \\
 \delta & 6 & 00 \quad 56.05 \\
 \alpha - \delta & 3 & 01 \quad 09.09 \\
 & & = \quad 45 \quad 17 \quad 16
 \end{array}$$

$$\begin{array}{rcl}
 & & 15 \quad 26 \\
 & 45 & 01 \quad 50
 \end{array}$$

$$\begin{array}{r}
 9.95727 \\
 0.00000 \\
 \hline
 0.15075 \\
 0.10802
 \end{array}$$

$$p = 52^{\circ} 03' 12''$$

$$22 \quad 15 \quad 33$$

$$29 \quad 47 \quad 35$$

$$\begin{array}{r}
 9.82640 \\
 8.19779 \\
 9.69624 \\
 \hline
 0.10315 \\
 7.82358
 \end{array}$$

$$S - S' = +22 \quad 54.1$$

$$S = +22 \quad 38 \quad 27.3$$

$$\text{Cur. Ecl. S} = +22 \quad 38. \quad 25.3$$

$$O - C = +2.0$$

$$\begin{array}{rcl}
 \text{Cur.} & & +0.7 \\
 \text{2nd Cur.} & & -0.5 \\
 \text{2nd Cor. Ref.} & & 0.0 \\
 O - +22 \quad 38 \quad 26.8 & & +1.1
 \end{array}$$

$$S = +22^{\circ} 15' 33.2''$$

$$\pi \quad 54' 12.59''$$

$$\begin{array}{r}
 9.86913 \\
 8.19779 \\
 9.85165 \\
 \hline
 0.03482 \\
 7.95339
 \end{array}$$

$$\alpha - \delta = 30 \quad 52.78$$

$$-12 \quad 03.52$$

$$\alpha \quad 3 \quad 01 \quad 50.82$$

$$\alpha - \delta \quad 3 \quad 01 \quad 49.53$$

$$+0.99$$

$$\begin{array}{rcl}
 \text{Cur.} & & +0.03 \\
 \text{2nd Cur.} & & -0.08 \\
 \alpha \quad 3 \quad 01 \quad 50.44 & & \\
 O - C & & +0.91
 \end{array}$$

1
17
8

2
17
2

3
3
1

4
2

6

7
2
2

7966

d

Stars - measures

n

d

y

1916 Apr. 26. 11

n

1 20090
12.5 15541
8.8 4549
81

12.4540

19540
14071
7867
38

.4533

20362
12065
6270
61

8.8295

19786
18067
7361
08

.8217

27.5 18719
24.2 1322024
24
22

27.5498

18635
14127
2430
40

.5490

17756
15898
0993
72

24.1859

19409
11268
7173
12

.1860

3 18390
326 1290000
11.1 0000
55

32.5488

18805
1228785
87
10

.5478

12338
1149090
90

11.0848

1202020
2520
11170

.0852

Moon - measures.

23.9
14.6
wing

17079
10959
6563
82

14.6119

19879
16022
2107
89

.6134

23.0
14.8

17087
873030
34
10

14.8375

19810
1819687
0087
31

.8381

22.7 15992
15.0 842526
30
84

22.7574

16040
13580
7569
35

.7536

7966

d

Stars - measures

d

1916 Apr. 26.14

N

1 20090

12.5 15541

8.8 4549

81

12.4540

2

27.5 18719

27.2 13220

2424

22

27.5498

3 18390

32.6 12900

11.1 0000

85

32.5488

19540

14071

7867

38

4533

18635

14127

2730

40

5490

16805

12287

87

10

5478

20362

12065

6270

61

88295

17756

15898

0993

72

24.1859

12338

11490

9090

11.0848

19786

18067

7361

08

8217

19409

11268

7173

12

1860

12020

2520

11170

0852

Moon - measures

1

23.9

14.6

wing

2

23.9

14.8

3

22.7 15992

15.0 8425

30

04

22.7574

17079

10959

6543

82

14.6119

17087

8730

34

10

14.8375

19879

16022

2107

89

6134

19810

18196

0087

31

8381

16040

13580

7569

35

17.536

1966 x Moon's Center Measures

1916 Apr. 26.12

4 19854 19530
 22.1 18820 13 1057383
 16.0 12 76
 34 22
22.1037 .1054

5 19842 14320
 22.1 19430 25 676058
 16.4 22 54
 min 51 21
22.0416 .0436

6 19879 17280
 22.2 18542 862418
 17.0 60 50 08
 80 86
22.1328 .1332

7 18930 17198
 22.9 9849 162617
 18.0 29 34 65
 35 15
22.9098 .9068

8
 23.0
 18.1

14201 1372125
 13650 29
 5971 13184
18.0541 .0541

Density 1

0272.1 0.50
3505.1 1.50
0.50 1.50
0.50 1.50
3505.1 1.50

0.50 1.50
0.50 1.50
0.50 1.50
0.50 1.50
0.50 1.50

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0.50 1.50
0.50 1.50
0.50 1.50
0.50 1.50
0.50 1.50

7966 x Moon's Center measure

1916 Apr 26 12

$$\begin{array}{r}
 4 \quad 19854 \quad 195300 \\
 221 \quad 1882013 \quad 10573873 \\
 160 \quad 12 \quad 76873 \\
 34 \quad 220 \\
 \hline
 221037 \quad 10548
 \end{array}$$

$$\begin{array}{r}
 5 \quad 19842 \quad 16320 \\
 221 \quad 1943021 \quad 676058 \\
 164 \quad 22 \quad 54 \\
 22 \quad 21 \\
 51 \quad 0436 \\
 \hline
 220416 \quad 0436
 \end{array}$$

$$\begin{array}{r}
 6 \quad 19879 \quad 17280 \\
 222 \quad 18542 \quad 862418 \\
 170 \quad 6050 \quad 0818 \\
 80 \quad 86 \\
 \hline
 221328 \quad 1332
 \end{array}$$

$$\begin{array}{r}
 7 \quad 18930 \quad 17198 \\
 229 \quad 9849 \quad 1626177 \\
 180 \quad 2934 \quad 6577 \\
 35 \quad 15 \\
 \hline
 229098 \quad 9068
 \end{array}$$

$$\begin{array}{r}
 8 \quad 14201 \quad 1372121 \\
 230 \quad 13650 \quad 29 \\
 181 \quad 5971 \quad 13184 \\
 \hline
 180541 \quad 0541
 \end{array}$$

Density 1

7966 Times etc.

13

Exp. to Stars 1915 Feb. 20.

moon	6 ^h	31 ^m		- 6 ^h	43 ^m
clock ~~show~~	6	36	42.8	- 6	36 44.4
		0	22.2		

H. Sid T.	6	37	05.8	✓	0-8-+3 ^h 34 ^m
H. Comp	4	44	31.05		
G Sid T.	11	21	36.85	✓	
Sid T. in hour	21	57	21.07	✓	
Interval	13	24	15.78	✓	
Red		2	11.76	✓	
G. in T.	13	22	04.02	✓	

From Mount Allen

Moon 13^hmotion in 1^h 2 0445

" " 22.067

Tabular place

	R. A.		Decl.
3 ^h 02 ^m	18 ^s 13	+ 22° 40'	25.6
		8.565	
+	45.12	+	3 09.0
3 03	03.25	+ 22 43	34.6

Moon's age 7 days.

" parallax

" semidiameter

R

Augmentative

Irradiative 1

R

R

AR

(1+AR

R²

938 = 10.5

888 = 7.9

a = -501.4

+ 24

477.4

54 12.54

14 47.9

887.9

+ 9.5

+ 0.2

897.6

1.9241

- 919

1.8322

3.3569

67581
27-4-8

7966 Times etc

Exp. 1 Stars 1915 Feb. 20.

Moon

clock ~~show~~6^h 31^m- 6^h 43^m

6 36

42.8

- 6

36

44.4

0

22.2

H. Sid T

6 37

05.8

04.1 + 3^m 54^m

H. Long

4 44

31.05

G Sid T

11 21

36.85

Sid T in Moon

21 57

21.07

Int. Moon

13 24

15.78

Rel

2

11.76

G in T

13 22

04.02

Transit of Alas

Moon 13^hMoon in 1st 204 + 1st

22.067

R A

Clock

3^h 02^m

18.13

+ 22^m + 0^m

25.6

8.565^m

+

45.12

+

3

09.0

Tabular place

3 03

03.25

+ 22^m 43^m

34.6

Moon age 7 days.

parallel

5.4

12.54

semidiam

14

47.9

R

887.9

Augmentation

+ 9.5

Irradiation

+ 0.2

R

847.6

R

19241

AR

- 919

(1st) R

1.8322

R²

3.3569

932 = 10.1

818 = 7.9

0 = 501.4

= 24

477.4

7966 Photo Constants

x	12.4536	27.5494	32.5483
3	11.2254	27.1649	32.3404
2-3	+1.2282	+0.3845	+0.2079
y	8.8286	24.1860	11.0850
7	8.9853	25.0325	11.2518
7-7	-1567	-8475	-1668

$$\begin{array}{rcllcl}
 2-3 & +500\mu & +56.6\mu & +1.4\lambda & -1\mu & -19025 \\
 +1.2282 + 6227 & = +18509 + 500 & = +19009 + 17 & = +19026 - 1 & = +19025 = 0 \\
 +0.3845 + 13775 & = +17620 + 1369 & = +18989 + 39 & = +19028 - 2 & = +19026 = +1 \\
 +0.2079 + 16274 & = +18353 + 627 & = +18980 + 46 & = +19026 - 1 & = +19025 = 0 \\
 23.8288 + 11939 & & +931 & +33 & -2 = 23.2664
 \end{array}$$

$$\begin{array}{rcllcl}
 y-7 & +500\mu & -51.1\lambda & +1\mu & -2212 \\
 -1567 + 4414 & = +2847 - 636 & = +2211 + 1 & = +2212 & = 0 \\
 -8475 + 12093 & = +3618 - 1408 & = +2210 + 2 & = +2212 & = 0 \\
 -1668 + 5542 & = +3874 - 1663 & = +2211 + 1 & = +2212 & = 0 \\
 16.4458 + 8223 & & -1220 & +2 & = 16.9251
 \end{array}$$

$$\begin{array}{rcllcl}
 \text{Tables. } a & = -1.3 & e & = -0.7 & a-e & = -0.6 & 1+a & = -3.8 \\
 \text{Obs } a & = -501.4 & e & = -500.1 & a-e & = -1.3 & 6+a & = -5.4 \\
 & & & & & & & -1.6
 \end{array}$$

1966 Plate Constants

x	12.4556	27.15494	32.5483
y	11.2254	27.1649	32.3404
z	+1.2282	+0.3845	+0.2079
u	8.8286	24.1860	11.0850
v	8.9853	25.0335	11.2518
w	-1567	-8475	-1668

$$\begin{aligned}
 &L-3 \quad +5041 \quad +56.64 \quad +1.42 \quad -1.6 \quad -19021 \\
 &+ 1.2282 + 622.7 : +18509 + 500 : +19009 + 17 : +19026 + 1 : +19021 : 0 \\
 &+ 0.3845 + 13775 : +17620 + 1369 : +18989 + 39 : +19028 - 2 : +19000 : 1 \\
 &+ 0.2079 + 16274 : +12353 + 627 : +18980 + 46 : +19026 - 1 : +19021 : 0 \\
 &23.8788 + 11939 \quad + 951 \quad + 33 \quad - 2 : 23.2664
 \end{aligned}$$

$$\begin{aligned}
 &+ 1567 + 4414 : +2847 - 636 : +2211 + 1 : +2212 : 0 \\
 &8471 + 12092 : +3618 - 1408 : +2212 + 2 : +2212 : 0 \\
 &1668 + 5542 : +3874 - 1663 : +2211 + 1 : +2212 : 0 \\
 &16.4458 + 8223 \quad - 1220 \quad + 2 \quad 16.9251
 \end{aligned}$$

Tables. $a = 1.3$ $b = -0.7$ $c = -0.6$ $d = -3.8$
 Obs $a = 501.4$ $b = 500.1$ $c = -1.3$ $d = 54$

1966

Mooris Centre

15

	x	$x - X_0$	Δx	$(x - X_0)^2$	$(x - X_0)^2 + (y - Y_0)^2$	$O - C$
1	23.8750	0.0000	-6	0.0000	3.3569	0
2	23.0000	-0.8750	-6	0.7667	3.3491	-78
3	22.7555	-1.1195	-5	1.2544	3.3421	-148
4	22.1046	-1.7704	-2	3.1343	3.3323	-246
5	22.0426	-1.8324	+0	3.3577	3.3577	+8
6	22.1330	-1.7420	+2	3.0339	3.3418	-151
7	22.9083	-0.9667	+5	0.9336	3.3510	-59
8	23.0000	-0.8750	+6	0.7646	3.3532	-37

3.3569

	y	$y - Y_0$	Δy	$(y - Y_0)^2$	L
1	14.6126	-1.8324	+2	3.3569	180
2	14.8378	-1.6072	+2	2.5824	208
3	15.0000	-1.4450	+1	2.0877	217
4	16.0000	-0.4450	0	0.1980	256
5	16.4450	0.0000	0	0.0000	270
6	17.0000	+0.5550	-1	0.3079	288
7	18.0000	+1.5550	-2	2.4174	328
8	18.0541	+1.6091	-2	2.5886	332

152

$$x = 23.0 \quad y = 14.8378$$

$$18.0541$$

$$32.8919$$

$$y = 16.4460$$

$$y - \text{min} = 14.6126$$

$$R = 1.8334$$

$$x - \text{min} = 22.0426$$

$$X = 23.8760$$

$$\text{Centre} \left\{ \begin{array}{l} X = 23.8750 \\ Y = 16.4450 \end{array} \right.$$

1966 *Urosalpinx* Centre

	x	$x - \bar{x}$	Δ	$(x - \bar{x})^2$	$(x - \bar{x}) \cdot (y - \bar{y})$	$O - C$
1	23.4750	0.0000	-6	0.0000	3.3569	0
2	23.0000	-0.8750	-6	0.7667	3.3491	-78
3	22.7555	-1.1195	-5	1.2544	3.3421	-148
4	22.1046	-1.7704	-2	3.1343	3.3323	-246
5	22.0426	-1.8324	+0	3.3577	3.3577	+8
6	22.1330	-1.7420	+2	3.0339	3.3418	-151
7	22.9083	-0.9667	+5	0.9336	3.3510	-59
8	23.0000	-0.8750	+6	0.7646	3.3532	-37
					3.3569	

	y	$y - \bar{y}$	Δy	$(y - \bar{y})^2$	Σ
1	14.6126	-1.8324	+2	3.3569	180
2	14.8378	-1.6072	+2	2.5824	208
3	15.0000	-1.4450	+1	2.0877	217
4	16.0000	-0.4450	0	0.1980	256
5	16.4750	0.0000	0	0.0000	270
6	17.0000	+0.5550	-1	0.3079	288
7	18.0000	+1.5550	-2	2.4174	328
8	18.0541	+1.6091	-2	2.5886	332
					152

$$\begin{aligned}
 x &= 230 & y &= 14.8378 \\
 & & & 18.0541 \\
 & & & \hline
 & & & 32.8919 \\
 y &= 16.4460 \\
 y - \bar{y} &= 14.6126 \\
 R &= 1.8334 \\
 x - \bar{x} &= 22.0426 \\
 X &= 23.8760
 \end{aligned}$$

$$\text{Centre} \left\{ \begin{aligned} X &= 23.8750 \\ Y &= 16.4450 \end{aligned} \right.$$

Formation of Normals.

$$\begin{array}{rcl}
 1 & +0.00 - 1.83 & = 0 \\
 2 & -0.88 - 1.61 & = \\
 3 & -1.12 - 1.44 & = \\
 4 & -1.77 - 0.44 & = \\
 5 & -1.83 + 0.00 & = \\
 6 & -1.74 + 0.56 & = \\
 7 & -0.97 + 1.56 & = \\
 8 & -0.88 + 1.61 & =
 \end{array}$$

1	-0.00	+	0.0	-	0.0
2	+1.42	+	68.6	+	125.6
3	+1.61	+	165.9	+	213.0
4	+0.78	+	435.0	+	108.3
5	-0.00	-	14.6	+	0.0
6	-0.97	+	262.5	-	84.5
7	-1.51	+	57.2	-	92.0
8	-1.42	+	32.5	-	59.5
	-0.09		+1007.1		+210.9

		+73
- a	- b	+ ac
- 0	- 16	+ 57
- 44	- 14	+ 15
- 56	- 13	+ 4
- 88	- 4	- 19
- 91	+ 0	- 18
- 87	+ 5	- 9
- 48	+ 14	+ 39
- 44	+ 14	+ 43

7966 Inwood's Center.

[illegible]

Normal Equations.

+194 - 181
Average: 47

$$+ 13.25 - 0.09 = + 1007 - 9.19$$

$$- 0.09 + 13.54 = + 211 - 1.59$$

$$-0.09 + 0.00 = -0.09 \quad +0.06$$

$$+13.54 = +204 - 1.65 \quad b = +15.2 - 0.12$$

$$+13.25 - +1007 + 1 - +1008$$

$$a = + 76.0 - 0.69$$

Ans 152

$$\frac{\Sigma V}{2}$$

$$\frac{p}{n} = .155$$

41.6

$$\frac{+1.6}{15} = +.10 \quad \Delta R = +0.1$$

Corre - 1.0

Line $AR = +1.1$

$$-2R = -3.66 \quad -2R_{\text{corr}} = +3.66 \quad +7.3$$

$$\Delta b = -0.44 - 9 \quad \Delta \delta = -0.2$$

$$\Delta a = -2,52 - 50 \quad \Delta \alpha = -0,09$$

7966 Moon's mean Position (1917.0)

17

$$\begin{array}{r}
 x_0 = 23.8750 \\
 + \quad 38 \\
 \hline
 23.9138
 \end{array}
 \quad
 \begin{array}{r}
 y_0 = 16.4450 \\
 + \quad 8 \\
 \hline
 16.4538
 \end{array}$$

From plate to instant $x = 23.2664$ $y = 16.9251$

$$z = +1.2664$$

$$\eta = -1.0749$$

$$\begin{array}{r}
 \log z = 0.10257 \\
 - \log 8 \quad 9.96620 \\
 \hline
 8.50724
 \end{array}$$

$$\begin{array}{r}
 \log \tan \delta = 9.6118 \\
 0.2051 \\
 \hline
 7.0534 \\
 6.8703
 \end{array}$$

$$-(\alpha - A) = 1.62913$$

$$\eta = +7$$

$$\alpha - A \quad + \quad 42.57$$

$$\eta_0 = -1.0756$$

$$A \quad 3 \quad 00 \quad 00$$

$$\begin{array}{r}
 \log \eta_0 = 0.03165 \\
 7.33115
 \end{array}$$

$$\alpha \quad 3 \quad 00 \quad 42.57$$

$$-(\delta - D) = 2.70050$$

$$+ 0.71$$

$$\delta - D = -8 \quad 21.7$$

$$\alpha' = 3 \quad 00 \quad 43.28$$

$$D = +22 \quad 27 \quad 10$$

$$S = +22 \quad 18 \quad 48.3$$

$$+ 10.5$$

$$S = +22 \quad 18 \quad 59.2$$

7966 Moon's linear Position (1915.0)

17

$$\begin{array}{r} X = 23.8750 \\ \hline 23.8788 \end{array} \quad \begin{array}{r} Y = 16.4450 \\ \hline 16.4458 \end{array}$$

From plate constant $X = 23.2664$ $Y = 16.9251$

$$S = +12664$$

$$\eta = -1.0749$$

$$\begin{array}{r} \log S = 0.10257 \\ \log 7966 = 3.9020 \\ \hline 8.50724 \end{array}$$

$$\begin{array}{r} \log \tan S = 9.6118 \\ 0.2051 \\ \hline 7.0534 \\ 68703 \end{array}$$

$$(S-A) = 162913$$

$$\eta = +7$$

$$X-A = 4257$$

$$\eta_{\infty} = -1.0756$$

$$A = 30000$$

$$\begin{array}{r} \log \eta_{\infty} = 0.035654 \\ 733115 \end{array}$$

$$X = 30042.57$$

$$(S-D) = 270050$$

$$+0.71$$

$$S-D = 821.7$$

$$X'' = 30043.28$$

$$D = +222710$$

$$S = 1221848.3$$

$$+10.9$$

$$S = 1221859.2$$

7966

Red ad locum app.

18

$$S = +22^{\circ} 18' 44''$$

$$H + \alpha \quad 23 \quad 03.7 = 345^{\circ} 56'$$

$$H \quad 20 \quad 03.0$$

$$\alpha \quad 3 \quad 00.7$$

$$G \quad 20 \quad 44.3$$

$$G + \alpha \quad 23 \quad 45.0 = 356^{\circ} 15'$$

$$\log \cos S \quad 9.9662$$

$$i \quad 0.8543 m$$

$$(ii) \quad 0.8205 m$$

$$\log \cos(G + \alpha) \quad 9.9991$$

$$g \quad 1.0204$$

$$\sin \quad 8.8156 m$$

$$\tan S \quad 9.6132$$

$$8.8239$$

$$\log \sin S \quad 9.5794$$

$$\cos(H + \alpha) \quad 9.9868$$

$$h \quad 1.2829$$

$$\sin \quad 9.3857 m$$

$$\sec S \quad 0.0338$$

$$8.8239$$

$$g' \quad 1.0195$$

$$g \quad 8.2731 m$$

$$h' \quad 0.8491$$

$$h \quad 9.5263 m$$

$$f \quad +1.070$$

$$g \quad -0.019$$

$$h \quad -0.336$$

$$+0.715$$

$$g' \quad +10.46$$

$$h' \quad +7.06$$

$$i \quad -6.61$$

$$+10.91$$

7966

Red ad locum - apt.

18

$$H + \alpha \quad 23^{\circ} \quad 037 = 345^{\circ} 56'$$

$$H \quad 20 \quad 030$$

$$\lambda \quad 3 \quad 007$$

$$G \quad 20 \quad 443$$

$$G + \alpha \quad 23 \quad +5.0 = 356^{\circ} 15'$$

$$\log S \quad 7.9662$$

$$i \quad 0.8543$$

$$H \quad 0.8205$$

$$\log \cos(G + \alpha) \quad 9.9991$$

$$g \quad 1.0264$$

$$\sin \dots \quad 8.8156$$

$$\tan S \quad 9.6132$$

$$8.8239$$

$$g' \quad 1.0195$$

$$g \quad 8.2731$$

$$f \quad +1.070$$

$$g \quad -0.019$$

$$h \quad -0.336$$

$$+0.715$$

$$\log S \quad 9.5794$$

$$\cos(H + \alpha) \quad 9.9868$$

$$h \quad 1.2829$$

$$\sin \dots \quad 9.3857$$

$$\sec S \quad 0.0338$$

$$8.8239$$

$$h' \quad 0.8491$$

$$h \quad 9.5263$$

$$g' \quad +10.46$$

$$h \quad -7.06$$

$$i \quad -6.61$$

$$+10.91$$

7966 Human Parallax

19

$$\begin{aligned} \alpha &= 3^h 00^m 43.528^s \checkmark \\ \theta &= 6 \ 27 \ 05.8 \\ \theta - \alpha &= +3 \ 36 \ 22.52 \\ &+ 54^\circ \ 05' \ 37.8 \end{aligned}$$

$$+ \quad \quad \quad 17 \ 36.5'$$

$$+ 53 \ 48 \ 01.3'$$

$$9.95727 \checkmark$$

$$9.95599 \checkmark$$

$$0.22820$$

$$0.18596$$

$$\gamma = 56 \ 54 \ 30.0$$

$$22 \ 18 \ 59$$

$$34 \ 35 \ 31$$

$$9.82640 \checkmark$$

$$8.19778 \checkmark$$

$$9.75414$$

$$0.07686$$

$$7.85518 \checkmark$$

$$\delta - \delta' = +24 \ 37.7 \checkmark$$

$$\delta = +22 \ 43 \ 36.9 \checkmark$$

$$\text{Am Eph } \delta = +22^\circ 43' 34.6'' \checkmark$$

$$O-C \quad \quad \quad + \ 2.3 \checkmark$$

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

$$\text{Inv. Corr.} \quad \quad \quad - \ 0.2$$

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

$$\delta = +22 \ 43 \ 36.7$$

$$O-C \quad \quad \quad + \ 2.1$$

$$\delta = +22^\circ 18' 59.2'' \checkmark$$

$$\Pi \quad 54' \ 12.54'' \checkmark$$

$$9.86913 \checkmark$$

$$8.19778 \checkmark$$

$$9.90848$$

$$0.03510$$

$$9.01049$$

$$\delta - \alpha' = +35 \ 13.10$$

$$+ \ 2 \ 20.87$$

$$\alpha \ 3 \ 03 \ 04.15'' \checkmark$$

$$\alpha \ 3 \ 03 \ 03.25'' \checkmark$$

$$+0.90 \checkmark$$

$$\text{curr.} \quad \quad \quad + \ 0.03$$

$$\text{Inv.} \quad \quad \quad - \ 0.09$$

$$\alpha \ 3 \ 03 \ 04.06$$

$$O-C = +0.81$$

7966 human Parallax

$$\alpha = 3^h 00^m 43.28$$

$$\delta = 6^{\circ} 37' 05.8''$$

$$G-A = 3 \quad 36 \quad 22.52$$

$$= 54^{\circ} 05' 37.8''$$

$$+ \quad 17 \quad 36.6$$

$$+ 53 \quad 48 \quad 00$$

$$9.95727$$

$$9.95559$$

$$0.22870$$

$$9.18596$$

$$\alpha = 56 \quad 54 \quad 30$$

$$22 \quad 18 \quad 59$$

$$34 \quad 35 \quad 31$$

$$9.82640$$

$$8.19778$$

$$9.75414$$

$$0.07626$$

$$7.85518$$

$$S-S = 24 \quad 37.7$$

$$S = +22^{\circ} 43' 32.4''$$

$$\text{Ann Eph. } S = +22^{\circ} 43' 34.6''$$

$$O-C = -2.2$$

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

$$\text{2nd corr.} - 0.2$$

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

$$S = 22^{\circ} 43' 36.7''$$

$$O-C = +2.1$$

$$S = +22^{\circ} 18' 59.2''$$

$$\Pi = 54' 12.54''$$

$$9.86913$$

$$8.19778$$

$$9.90848$$

$$0.03510$$

$$9.01049$$

$$\alpha - \alpha' + 35 = 13.10$$

$$2 = 20.87$$

$$\alpha \quad 3 \quad 03 \quad 04.15$$

$$\alpha \quad 3 \quad 03 \quad 03.25$$

$$+0.90$$

$$\text{curr.} + 0.03$$

$$\text{2nd.} - 0.09$$

$$\alpha \quad 3 \quad 03 \quad 04.06$$

$$O-C = +0.81$$

$$\begin{array}{r} 12339 \\ + 640 \\ \hline 12226 \end{array}$$
13.9886

$$\begin{array}{r} 10348 \\ 10244 \\ \hline 4040 \end{array}$$
9893

$$\begin{array}{r} 10110 \\ 9160 \\ \hline 5752 \end{array}$$
18.0550

$$\begin{array}{r} 9269.74 \\ 60 \\ \hline 8699 \end{array}$$
0.569

2990

Stars - measures

1916 Apr. 26.

α	δ	α	δ	α	δ	α	δ
1	16577	19529	16369	16530			
13.8	8376	17739	13469	945040			
183	6971	3930	6668	40			
	90	49	69	52			
	<u>13.8215</u>	<u>.8203</u>	<u>18.2901</u>	<u>.2858</u>			
2							
29.4	15194	19640	16015	19922			
7.4	11927	1291010	13383	1254951			
	20	05-10	80	49			
	02	52	39	40			
	<u>29.3272</u>	<u>.3260</u>	<u>27.2638</u>	<u>.2615</u>			
3							
34.3	19770	18289	20173	18132			
27.6	17808	10233	1323638	1506471			
	0605	3938	3538	75			
	75	89	89	58			
	<u>34.1965</u>	<u>.1948</u>	<u>27.6948</u>	<u>.6930</u>			

Moon - measures.

1	24.0	13770	12353
	14.9	6261	1183530
		13240	37
		<u>14.9476</u>	<u>.9481</u>
2			
23.9	17966	16001	
15.0	8870	15129	
	6566	3231	
	91	19	
	<u>23.9122</u>	<u>.9128</u>	
3			
23.1	17011	15933	
16.0	16081	690989	
	8980	90	
	40	40	
	<u>23.0931</u>	<u>.0957</u>	

$\times$
 14.0 12339
 18.2 42 40
 12226

13.9886

103#8
 10244
 4040

.5893

10110
 9560
 5452

18.0550

926974
 60
 8699

.6569

7590

Stars - measures

1916 Apr 26

α	δ	α	δ	α	δ	α	δ
1 16577	13.8	19529	17739	16369	13469	16530	945040
183 8376	6971	3930	6668	69	52	2898	
90		49					
13.8215		8203		182901			
2 244 15194	14	19640	12910.0	16015	13383	19922	1254451
2026	02	05	52	8089	39	40	
293272		3260		7.2638		2615	
3 34.3 19770	27.6	18289	10233	20173	1323638	18132	1506471
0605	06	3938	89	3138	89	71	58
75		89				6950	
34.1965		1948		27.6948			

known - measures

1 244	149	13770	6261	12313	1183530
		13240		37	
		14.9476		9481	

2 219 17966	154	16001	15129	3231	19
61406	91				
23.9122		9128			
3 231 17011	160	15933	6909	189	40
8950	40				
23.0931		0957			

7990 moon-measures

1916 Apr. 26.

<u>4</u>	12712	11550
22.9	3030	11399
16.4	12574	6088
<u>min</u>		
<u>22.9850</u>		<u>.9846</u>
<u>5</u>		
23.0	11600	11728
17.0	1136478	13232
	70	11505

<u>23.0229</u>	<u>.0226</u>
----------------	--------------

<u>6</u>	19585	17680
23.6	197080	1328090
18.0	74	80
	18	92
<u>23.5626</u>		<u>.5597</u>

<u>2</u>	
24.0	
18.4	

20010	18937
16864	12107
6569	0499
36	60
<u>18.3152</u>	<u>.3150</u>

19960	20012
14596	15385
8590	9991
72	31
<u>18.5376</u>	<u>.5372</u>

18913	20059
1361910	15409
18	9901
63	70
<u>18.5342</u>	<u>.5348</u>

<u>8</u>	
24.8	
18.5	
month	
7	

<u>9</u>	
25.0	
18.5	

7990 Moon - measures

1916 Apr 26

4	12712	11550
235	3030	11399
164	12574	6088
22		
	<u>229850</u>	<u>9846</u>
5		
230	11600	11728
170	1136478	13232
	70	11505
	<u>230229</u>	<u>0226</u>
6		
256	19585	17680
110	1597080	1328090
	74	80
	18	92
	<u>235626</u>	<u>5597</u>

20010	18937
16864	12107
6569	0499
36	60
<u>18.3152</u>	<u>3150</u>
19960	20012
14596	15385
8590	9991
72	31
<u>18.5376</u>	<u>5372</u>
18913	20059
1361910	15409
18	9901
62	70
<u>18.5342</u>	<u>5345</u>

7990 Times etc.
 Exp to stars 1915 Feb 25 8^h 20^m - 8^h 32^m
 " " Moon 8 25 37.4 - 8 25 37.6
 Clock slow 0 20.0

H. Sid T. 8 25 57.5 $\theta - \alpha = 0^h 52^m$
 H hour 4 44 31.05
 G. Sid T. 13 10 28.55
 Sid T. in hour 22 17 03.84
 Interval 14 53 24.71
 Red. 2 26.36
 G. Sid T. 14 50 58.35

From Kant Allen. R. A. Decl.
 Moon 15 7^h 34^m 20.52 + 24° 46' 05.9
 Motion 2.2765 7.426
 " " - 9.0275 - 20.55 + 1 07.0
 Tabular place 7 33 59.97 + 24 47 12.9

Moon's age 12 days
 parallax 56' 08".95
 semidiameter 15 19.7
 R 919.7
 Augmentation 14.2
 Irradiation (3) - 0.3
 R 933.6
 R 2,001.3
 alt 949
 (1+alt)R 1,906.4
 R² 3,634.3

$$934 = 14.6$$

$$920 = 14.2$$

$$a = 498.1$$

$$24.$$

$$474.1$$

7990 Times etc.
 Exp. 19.15 Feb 25 8' 20" - 8' 32"
 Moon 8 25 37.4 - 8 25 37.6
 Clock slow 0 20.0

H. Sid T. 8 25 57.5 0-x: 0' 52"
 H. Long 4 44 31.05
 G. Sid T. 13 10 28.55
 Sid T. the Moon 22 17 03.84
 Interval 14 53 24.71
 Red 2 26.36
 Obs. T. 14 50 58.35

From Hunt Allen R. A. Recd.
 Moon is 7' 34" 20' 52" + 24' 46" 05' 9"
 Interval 2.2265 7.426
 - 9.021 - 20.55 + 1 07.0
 Tabular place 7 33 59 97 + 24 47 12.9

Moons age 18 days.

parallax 56 08' 95"

Semidiameter 15 19.7

R 919.7

Amplification 14.2

Inactivation (3) - 0.3

R 933.6

R 2.0013

atc 949

(1+atc)/R 1.9064

R² 36343

934 = 14.6

9m = 17.2

C = 498.1

24

474.1

7990

Plate Center + Constants.

$$\begin{array}{r}
 13.9890 \\
 13.9890 \\
 29.3266 \\
 34.1956 \\
 \hline
 77.34 \\
 25.78 \\
 \hline
 3.78 \\
 431 \\
 379 \\
 \hline
 1134 \\
 11.719
 \end{array}$$

18.8560

18.8560

7.2626

27.6939

53.25

17.75

-18

.25

466

116"

= 1456"

R. A

Decl.

$$\begin{array}{r}
 7 \quad 26 \quad 45 \quad 24 \quad 41 \quad 00 \\
 35 \quad 53 \quad 23 \quad 12 \quad 57 \\
 38 \quad 56 \quad 25 \quad 59 \quad 15 \\
 \hline
 1 \quad 99 \quad 154 \quad 112 \quad 72 \\
 7 \quad 33 \quad 51 \quad 24 \quad 37 \quad 44 \\
 - \quad 1 \quad 57 \quad + \quad 1 \quad 56 \\
 \hline
 7 \quad 31 \quad 54 \quad +24 \quad 39 \quad 40
 \end{array}$$

$$\begin{array}{l}
 \text{Center } \left\{ \begin{array}{l} \lambda = 7^h 31^m 50^s \\ \delta = +24^\circ 39' 40'' \end{array} \right.
 \end{array}$$

$$\begin{array}{r}
 2-3 + 500x \quad +6.34 \quad -1.9x \quad -16000 \\
 +8919 + 6994 = +15913 + 114 = +16027 - 27 = +16000 = 0 \\
 +1347 + 14663 = +16010 + 46 = +16056 - 56 = +16000 = 0 \\
 -1208 + 17098 = +15890 + 175 = +16065 - 65 = +16000 = 0 \\
 24.8926 + 12446 \quad +105 \quad -47 \quad = 24.5430
 \end{array}$$

$$\begin{array}{r}
 y - \eta + 1500y \quad -6.3x \quad +0.4y \quad -7373 \\
 -1575 + 9028 = +7453 - 88 = +7365 + 7 = +7372 = -1 \\
 +3924 + 3631 = +7555 - 185 = +7370 + 3 = +7373 = 0 \\
 -6270 + 13847 = +7577 - 215 = +7362 + 11 = +7373 = 0 \\
 16.6323 + 8316 \quad -157 \quad +7 \quad = 16.7116
 \end{array}$$

$$\text{Tables} - a = +0.6 \quad c = +0.6 \quad a - c = 0.0 \quad b + d = 0.0$$

$$\text{Obs} \quad a = -498.1 \quad c = -500.4 \quad a - c = +2.3 \quad b + d = 0.0$$

$$-498.7 \quad -501.0 \quad 0.0$$

7990 Plate Center + Constants

R A

Decl.

<u>139890</u>	<u>150560</u>	7	26	45	24	41	00
29.3266	7.2626		35	53	22	12	57
<u>34.1956</u>	<u>27.6939</u>		<u>38</u>	<u>56</u>	<u>25</u>	<u>59</u>	<u>11</u>
77.34	-3.25		99	154		112	72
25.78	17.75	7	33	51	24	37	44
		-	1	57	5	1	56
		7	31	54	+24	39	40
3.78	.05						
31	1.16						
8.75	1.56						
<u>11.34</u>							
11.717							

Center } A = 7° 31' 50"
 (0° +24' 39" 40"

$$\begin{aligned}
 x &= 3 + 5001 & -6.34 & -1.92 & -16000 \\
 -8919 - 6994 & = +13913 + 114 & = +16027 - 27 & = +16000 & = 0 \\
 +1327 + 14662 & = +16010 + 46 & = +16056 - 56 & = +16000 & = 0 \\
 -1208 + 17098 & = +15890 + 175 & = +16065 - 65 & = +16000 & = 0 \\
 24.8926 + 12446 & & +105 & -47 & = 145430
 \end{aligned}$$

$$\begin{aligned}
 y &= 4 + 15024 & -6.32 & +0.42 & -7373 \\
 -1171 + 9028 & = +7453 - 88 & = +7365 + 7 & = +7372 & = -1 \\
 +3921 + 3631 & = +7555 - 185 & = +7370 + 3 & = +7373 & = 0 \\
 -6270 + 13847 & = +7577 - 211 & = +7366 + 11 & = +7373 & = 0 \\
 10.6323 + 8316 & & -117 & +7 & = 16.7116
 \end{aligned}$$

Tables - $a = 40.6$ $b = 40.6$ $c = 0.00$ $d = 0.0$ Obs $a = 498.1$ $b = 1004$ $c = 123$ $d = 0.0$

S	η	ΔS	$-3.9S$	-1.2η	-18
-8.90	$+0.17$	-17	$+35 = +18$	$-0 = +18$	
$+7.19$	-11.15	$+32$	$-27 = +5$	$+13 = +18$	
$+12.31$	$+10.24$	$+77$	$-48 = +29$	$-12 = +17$	
$M+2.54$	-1.29		-10	$+1 = -27$	<u><u></u></u>

$\Delta\eta$	-5.2η	$-.6S$	-4
$+0$	$-1 = -1$	$+5 = +4$	
-49	$+57 = +8$	$-4 = +4$	
$+65$	$-53 = +12$	$-7 = +5$	
$+7$	$-1 = +2$		<u><u></u></u>

$$\text{curr.} \begin{cases} \alpha = -0.09 \\ \delta = +0.1 \end{cases}$$

1990 Standard Coordinates

Cape W. 1057 m.p. 8.2 Cape W. 1076 m.p. 6.3 Cape W. 1082 m.p. 5.5

C	7	25	50.61	7	34	59.31	7	38	01.01
L			.71			.35			.01
E			.62			.29			.02
mean	7	25	50.65	7	34	59.32	7	38	01.01
Prec		+	54.66		+	53.96		+	54.93
X	7	26	45.31	7	35	53.28	7	38	55.94
A	7	31	50	7	31	50	7	31	50
a-A	-	5	04.69	+	4	03.28	+	7	05.94
Diff-A)	-	3	04.67	+	2	43.27	+	4	25.87
log ₁₀			2.48383m			2.38609			2.62928
-cos			9.95839			9.96333			9.95371
Σ			0.94946m			0.85666			1.09023
Σ_0			-8.9014			+7.1888			+12.3091
Σ_1			-			31			73
Σ			13.0971			29.1919			34.3164
X			13.9890			29.3266			34.1956
X-3			+ .8919			+ 1347			- 1208
B	+24	42	51.1	+23	14	58.9	+26	01	20.5
L			51.2			59.2			20.9
E			50.6			58.7			20.6
mean	+24	42	51.0	+23	14	59.0	+26	01	20.7
Prec	-	1	50.6	-	2	01.6	-	2	05.7
S	+24	41	00.4	+23	12	57.4	+25	59	15.0
D	+24	39	40	+24	39	40	+24	39	40.
S-D	+	1	20.4	-1	26	42.6	+	1	49 35.0
tan(S-D)		+	80.4		-	5203.7		+	47 75.8
log ₁₀			1.90526			3.71631m			3.67904
η_0			9.23641			1.04746m			1.01019
tan η_0			9.6624			9.6324			9.6879
Σ^2			18989			1.7133			21805
η_1			8.6147			8.3991			8.9218
η_0			+0.1723			-11.1549			+10.2374
η_1			+ 412			+ 251			+ 835
η_2			18.2135			6.8702			28.3209
η_3			18.0560			7.2626			27.6939
η_4			-1575			+3924			-6230

7990

Standard Coordination

C 7 25 50.61 7 34 59.61 7 38 01.01

mean 7 25 50.65 7 34 59.32 7 38 01.01

Prac + 54.66 + 50.56 + 54.56

$x = 7 \quad 26 \quad 45.31 \quad 7 \quad 35 \quad 53 \quad 28 \quad 7 \quad 38 \quad 55 \quad 24$

083000 109023

$$-8.9014 \quad +7.1888 \quad +12.3401$$

$\frac{1}{x^2} = x^{-2}$

2 13.9890 25 32.61 34 15.16

$$A = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 2 & 3 & 4 & 5 \\ 3 & 4 & 5 & 6 \\ 4 & 5 & 6 & 7 \end{pmatrix} \quad B = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 2 & 3 & 4 & 5 \\ 3 & 4 & 5 & 6 \\ 4 & 5 & 6 & 7 \end{pmatrix}$$

2. $+24 \cdot 42 \cdot 51 \cdot 1 + 22 \cdot 14 \cdot 15 \cdot 16 \cdot 21$

$\text{mass} + 24 \quad 42 \quad 50.8 \quad 58.3$

Proc - 1 50.6 - 2 01.6 - 3

$$S = 2^4 \cdot 41 \cdot 004 + 2^3 \cdot 12 \cdot 27.44 + 2^2 \cdot 12 \cdot 27.44 + 2^1 \cdot 12 \cdot 27.44 + 2^0 \cdot 12 \cdot 27.44$$

2	124	35	40	124	35	40	124	35	40
---	-----	----	----	-----	----	----	-----	----	----

$\lambda = 0$ $\tau = 1$ 20.4 -1 20.6 $4 \frac{1}{2}$ 4 $+9$

$$\text{max}(d=1) \rightarrow 50,4$$

1	5.11031	5.67904
2	4.23641	1.04741

29 18 2135 6.8702 29 3209

18.0560	72626	27.6535
---------	-------	---------

$$4-3 = 1575 \quad + 3924 \quad - 6270$$

799.0

Moon's Center

	x	$x - X_0$	$(x - X_0)^2$	$(x - X_0) + (y - Y_0)^2$	$O - C$
1	24.0000	-0.8910	0.7939	3.6271	- 72
2	23.9125	-0.9785	0.9574	3.6176	- 167
3	23.0944	-1.7966	3.2278	3.6260	- 83
4	22.9848	-1.9062	3.6336	3.6336	- 7
5	23.0228	-1.8682	3.4902	3.6264	- 79
6	23.5612	-1.3298	1.7684	3.6426	+ 83
7	24.0000	-0.8910	0.7939	3.6301	- 42
8	24.8910	0.0000	0.0000	3.6343	0
9	25.0000	+0.1090	0.0119	3.6352	+ 9

3.6343

	y	$y - Y_0$	$(y - Y_0)^2$	L
1	14.9478	-1.6832	2.8332	208
2	15.0000	-1.6310	2.6602	211
3	16.0000	-0.6310	0.3982	251
4	16.6310	0.0000	0.0000	270
5	17.0000	+0.3690	0.1362	281
6	18.0000	+1.3690	1.8742	316
7	18.3151	+1.6841	2.8362	332
8	18.5374	+1.9064	3.6343	360
9	18.5345	+1.9035	3.6233	360 + 3 152

$$x = 24.0 \quad y = 14.9478$$

$$18.3151$$

$$33.2629$$

$$Y_0 = 16.6314$$

$$y_{\text{max}} = 18.5374$$

$$R = 1.9060$$

$$x_{\text{min}} = 22.9848$$

$$X_0 = 24.8908$$

$$\text{Center } \begin{cases} X_0 = 24.8910 \\ Y_0 = 16.6310 \end{cases}$$

7990

Linear Center

	x	$x - \bar{x}$	$(x - \bar{x})^2$	$(x - \bar{x})(y - \bar{y})$	$y - \bar{y}$
1	24.0000	-0.8910	0.7939	3.6271	-7.2
2	23.9125	-0.9785	0.9574	3.6176	-16.7
3	23.0944	-1.7966	3.2278	3.6260	-8.3
4	22.9848	-1.9062	3.6336	3.6336	-7
5	23.0228	-1.8682	3.4902	3.6264	-7.9
6	23.5612	-1.3298	1.7684	3.6426	-8.3
7	24.0000	-0.8910	0.7939	3.6301	-7.2
8	24.8910	0.0000	0.0000	3.6343	0
9	25.0000	0.1090	0.0119	3.6352	7.9
				3.6343	

	y	$y - \bar{y}$	$(y - \bar{y})^2$	$\bar{y}$
1	14.9478	-1.6832	2.8332	20.8
2	15.0000	-1.6310	2.6602	21.1
3	16.0000	-0.6310	0.3982	25.1
4	16.6310	0.0000	0.0000	27.0
5	17.0000	+0.3690	0.1362	28.1
6	18.0000	+1.3690	1.8742	31.6
7	18.3151	+1.6841	2.8362	33.2
8	18.5374	+1.9064	3.6343	36.0
9	18.5345	+1.9035	3.6233	36.0 + 13.2

$$\begin{aligned}
 x &= 24.0 & y &= 14.9478 \\
 & & & 18.3151 \\
 & & & \hline
 & & & 33.2629 \\
 & & \bar{y} &= 16.6314 \\
 y_{\text{max}} &= 18.5374 \\
 R &= 19.060 \\
 x_{\text{min}} &= 22.9848 \\
 \bar{x} &= 24.8908
 \end{aligned}$$

$$\text{Center } \begin{cases} \bar{x} = 24.8910 \\ \bar{y} = 16.6310 \end{cases}$$

Formation of Normals.

1	+ 1.50	+ 64.1	+ 121.0
2	+ 1.60	+ 164.0	+ 272.5
3	+ 1.54	+ 149.5	+ 52.4
4	- 0.00	+ 13.4	- 0.0
5	- 0.69	+ 147.8	- 29.2
6	- 1.82	- 110.5	+ 113.9
7	- 1.50	+ 37.4	- 70.5
8	+ 0.00	+ 0.0	+ 0.0
9	+ 0.21	+ 1.0	+ 17.1
	+ 0.44	+ 466.7	+ 477.2

-a	-b	+15	+AC
- 9	+ 5	+ 11	
- 10	+ 5	+ 10	
- 18	+ 2	- 1	
- 19	- 0	- 4	
- 19	- 1	- 5	
- 13	- 3	- 1	
- 9	- 3	+ 3	
+ 0	- 4	+ 11	
+ 1	- 4	+ 12	

7990 Moon's Center.

	a	b	c	0-c	corr.
1	-0.89	-1.68	-72	-28 - 43 = -71	-1 +10
2	-0.98	-1.63	-167	-30 - 42 = -72	-95 - 85
3	-1.80	-0.63	-83	-56 - 16 = -72	-11 - 1.2
4	-1.91	+0.00	-7	-59 + 0 = -59	+52 + 48
5	-1.87	+0.37	-79	-58 + 9 = -49	-30 - 35
6	-1.33	+1.37	+83	-41 + 35 = -6	+89 + 88
7	-0.89	+1.68	-42	-28 + 43 = +15	-57 - 54
8	+0.00	+1.91	0	+0 + 49 = +49	-49 - 38
9	+0.11	+1.90	+9	+3 + 49 = +52	-43 - 31
	-9.47	+329			+141 - 286

Normal Equations

Average = 47.

$$+14.68 + 0.44 = +467 - 9.47$$

$$+ 0.44 + 18.00 = +477 + 3.29$$

$$- 0.44 - 0.01 = -14 + 0.28$$

$$+ 17.99 = +463 + 3.57 \quad b = +25.7 + 0.20$$

$$+14.68 = +467 - 11 = +456$$

$$a = +31.1 - 0.64$$

Arc meas. 15.2

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

$$\frac{p}{n} = .16$$

$$-16$$

$$\frac{-16}{.16} = -1.00 \quad \Delta R = -1.2$$

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

$$\text{True } \Delta R = -1.0$$

$$-2R = -3.81 - 2R \text{ corr} + 0.76 + 15$$

$$\Delta \delta = +0.15 + 3 \quad \Delta \delta = +0.1$$

$$\Delta a = +0.49 - 10 \quad \Delta a = -0.02$$

7990 Moon's Center

	a	b	c		c	0-c
1	-0.89	-1.68	+72	-28 - 43 =	-71	-1
2	-0.98	-1.63	+167	-30 - 42 =	-72	-95
3	-1.80	-0.63	-83	-56 - 16 =	-72	-11
4	-1.41	+0.00	-7	-59 + 0 =	-59	+52
5	-1.87	+0.37	-79	-58 + 9 =	-49	-30
6	-1.33	+1.37	+83	-41 + 35 =	-6	+89
7	-0.89	+1.68	-42	-28 + 43 =	+15	-57
8	+0.00	+1.91	0	+0 + 49 =	+49	-49
9	+0.11	+1.90	+9	+3 + 49 =	+52	-43

+141 = 286

Average = 47.

Normal Equations

$$+1468 + 0.44 = +467$$

$$+044 + 1800 = +477$$

$$-044 - 0.01 = -14$$

$$+17.99 = +463$$

$$+1468 = +467 - 11 = +456$$

$$b = +257$$

$$a = +31.1$$

Arc Meas. 15.2

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

$$\frac{p}{n} = .16$$

$$-16$$

$$-\frac{16}{16} = -1.00$$

$$AR = -1.2$$

7990 Moon's Mean Position (1915.0)

$$\begin{array}{r} X_0 = 24.8910 \quad Y_0 = 16.6310 \\ \hline \dot{X}_0 = +16 \quad \dot{Y}_0 = +13 \\ \hline 24.8926 \quad 16.6323 \end{array}$$

From plate constants $X = 24.5430 \quad Y = 16.7116$

$$\xi = +2.5430$$

$$\eta = -1.2884$$

$$\begin{array}{r} \log \xi = 0.40535 \\ \therefore \cos \xi = 9.95904 \\ 8.50724 \end{array}$$

$$\begin{array}{r} \log \tan S = 9.6567 \\ 0.8107 \\ \hline 7.0534 \\ 7.5208 \end{array}$$

$$\therefore (X-A) = 1.93907$$

$$\eta_1 = +33$$

$$X-A + 1 \quad 26.91$$

$$\eta_0 = -1.2917$$

$$A \quad 7 \quad 31 \quad 50$$

$$\begin{array}{r} \log \eta_0 = 0.11118 \\ 7.33115 \end{array}$$

$$X \quad 7 \quad 33 \quad 16.91$$

$$\therefore (Y-D) = 2.78003$$

$$\text{Red} \quad + \quad 2.46$$

$$S-D = - \quad 10 \quad 02.6$$

$$A' = 7 \quad 33 \quad 19.37$$

$$D = +24 \quad 39 \quad 40$$

$$S = +24 \quad 29 \quad 37.4$$

$$\text{Red.} \quad + \quad 2.8$$

$$S' = +24 \quad 29 \quad 40.2$$

7990 Moon's mean Position (1915.0)
 $X = 24.8910$ $Y = 16.6310$
 $\frac{24}{16} = \frac{+16}{+13}$
 24.8926 16.6323

From plate constant $X = 24.5430$ $Y = 16.7116$

$$Z = +2.5430$$

$$\eta = -1.2884$$

$$\log S = 0.40535$$

$$\cos S = 9.91904$$

$$8.50724$$

$$\log \tan S = 9.6567$$

$$0.8107$$

$$7.0534$$

$$7.5208$$

$$(x-A) = 1.93907$$

$$\eta = +33$$

$$X-A + 1 = 26.91$$

$$y_0 = -1.2917$$

$$A = 7.3150$$

$$\log y_0 = 0.11118$$

$$7.33115$$

$$X = 7.331691$$

$$(H-D) = 2.78003$$

$$h_a = +2.46$$

$$S-D = 10.026$$

$$A = 7.3319.37$$

$$D = +24.3940$$

$$S = +24.2937.4$$

$$\text{red.} = +2.8$$

$$S = +24.2940.2$$

$$\begin{array}{r} 7 \quad 23 \quad 40.38 \\ 38.79 \\ + 7.59 \\ \hline \end{array}$$

$$\begin{array}{r} + 31 \quad 57 \quad 22.4 \\ 16.9 \\ + 5.5 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \quad 29 \quad 13.35 \\ 10.74 \\ + 1.61 \\ \hline \end{array}$$

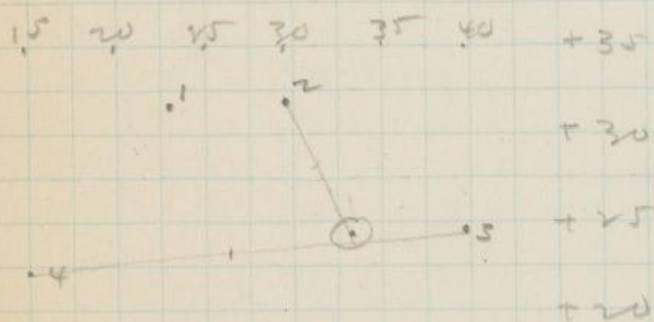
$$\begin{array}{r} + 32 \quad 04 \quad 39.6 \\ 34.4 \\ + 5.2 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \quad 39 \quad 20.60 \\ 19.12 \\ + 2.48 \\ \hline \end{array}$$

$$\begin{array}{r} + 24 \quad 36 \quad 17.1 \\ 09.7 \\ 2.4 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \quad 15 \quad 05.23 \\ 02.91 \\ + 2.32 \\ \hline \end{array}$$

$$\begin{array}{r} + 22 \quad 08 \quad 26.8 \\ 23.3 \\ 3.5 \\ \hline \end{array}$$



$$\begin{array}{r} 2.44 \\ 2.46 \\ \hline \end{array} \quad \begin{array}{r} 2.7 \\ 3.0 \\ \hline \end{array}$$

7990

Red. ad lower app.

S $+24^{\circ} 29' 37''$

$$\begin{array}{rcl}
 H+K & 3^h & 14.9 = 48^{\circ} 44' \\
 H & 19 & 41.6 \\
 K & 7 & 33.3 \\
 G & 20 & 50.2 \\
 G+K & 4 & 23.5 = 65^{\circ} 52'
 \end{array}$$

$$\begin{array}{rcl}
 l \cos S & & 9.9590 \\
 0 & & \underline{0.8732} \\
 (i) & & 0.8322 \text{ m}
 \end{array}$$

$$\begin{array}{rcl}
 l \cos(G+K) & & 9.6116 \\
 g & & 1.0314 \\
 \sin & & 9.9603 \\
 \tan S & & 9.6586 \\
 & & 8.8239
 \end{array}$$

$$\begin{array}{rcl}
 l \sin S & & 9.6176 \\
 \cos(H+K) & & 9.8193 \\
 h & & 1.2801 \\
 \sin & & 9.8760 \\
 \sec S & & 0.0410 \\
 & & 8.8239
 \end{array}$$

$$\begin{array}{rcl}
 g' & & 0.6430 \\
 8 & & 9.4742
 \end{array}$$

$$\begin{array}{rcl}
 l' & & 0.7170 \\
 h & & 0.0210
 \end{array}$$

$$\begin{array}{rcl}
 b & & +1.11 \\
 8 & & +0.30 \\
 h & & \underline{+1.05} \\
 & & +2.46
 \end{array}$$

$$\begin{array}{rcl}
 g' & & +4.40 \\
 h & & +5.21 \\
 i & & \underline{-6.60} \\
 & & +2.81
 \end{array}$$

7990.

Red. ad. com. up.

S +24° 29' 37"

$H + \alpha$ 3^m 14.9 = 48° 44'
 H 19 41.6
 α 7 33.3
 G 20 50.2
 $G + \alpha$ 4 23.5 = 65° 52'

$L \cos S$ 9.9590
 L 0.8732
 (L) 0.8322 m

$L \cos(G + \alpha)$ 9.6115
 S 1.0314
 $L \sin$ 9.9603
 $L \cos S$ 9.6586
 S 8.8239

S' 0.6420
 S 9.4742

b +1.11
 S +0.35
 h +1.07
 $+246$

$L \sin S$ 9.6176
 $\cos(H + \alpha)$ 9.8193
 L 1.2801
 $\sin$ 9.8769
 $\cos S$ 0.0410
 S 8.8239

S' 0.7170
 h 0.0250

S' +6.95
 h +5.23
 i -6.50
 $+2.81$

7990

Lunar parallax.

$$\begin{array}{r} \alpha = 7^{\text{h}} 33^{\text{m}} 19.37^{\text{s}} \\ \theta = 8^{\circ} 25' 57.5'' \\ \theta - \alpha = 0^{\circ} 52' 38.13'' \\ = +13^{\circ} 09' 32'' \end{array}$$

$$5 \quad 12$$

$$13 \quad 04 \quad 20$$

$$\begin{array}{r} 9.95727 \\ 0.00000 \\ 0.01140 \\ \hline 9.96867 \end{array}$$

$$\gamma = 42^{\circ} 56' 07''$$

$$24 \quad 29 \quad 40$$

$$18 \quad 26 \quad 27$$

$$\begin{array}{r} 9.82640 \\ 8.21306 \\ 9.50013 \\ 0.16674 \\ \hline 7.70633 \end{array}$$

$$S - S' = +17 \quad 29.0$$

$$S \quad +24-47 \quad 09.2$$

$$\text{Sun Eph } S = +24 \quad 47 \quad 12.9$$

$$\theta - C = -3.7$$

$$\begin{array}{r} \text{Curr.} \quad + \quad 0.1 \\ \text{Sun. Corr.} \quad + \quad 0.1 \\ \text{2nd. Ord. Ref.} \quad 0.0 \\ S \quad +24 \quad 47 \quad 09.3 \\ \theta - C \quad -3.6 \end{array}$$

$$S = +24^{\circ} 29' 40.2''$$

$$\pi \quad 5-6^{\circ} 08' 9.5''$$

$$\begin{array}{r} 9.86913 \\ 8.21306 \\ 9.35727 \\ 0.04197 \\ \hline 7.48143 \end{array}$$

$$\alpha - \alpha' = +10 \quad 24.97$$

$$= +41.66$$

$$\alpha \quad 7 \quad 34 \quad 01.03$$

$$\alpha = 7 \quad 33 \quad 59.97$$

$$+1.06$$

$$\text{Curr.} \quad - \quad 0.09$$

$$\text{Sun. Corr.} \quad - \quad 0.02$$

$$\alpha \quad 7 \quad 34 \quad 01.01$$

$$\theta - C = +1.04$$

7990

human parallel

$$\begin{array}{r}
 \alpha: 7^{\circ} 33' 19.37 \\
 \theta: 8^{\circ} 25' 17.5 \\
 \phi - \lambda: 0^{\circ} 52' 38.13 \\
 \quad + 13^{\circ} 09' 32'' \\
 \quad \quad \quad 5^{\circ} 12' \\
 \quad \quad \quad 15^{\circ} 04' 20''
 \end{array}$$

$$\begin{array}{r}
 995727 \\
 000000 \\
 001140 \\
 \hline
 996867
 \end{array}$$

$$\begin{array}{r}
 \gamma: 42^{\circ} 56' 07'' \\
 \quad 27^{\circ} 29' 40'' \\
 \quad 18^{\circ} 26' 27''
 \end{array}$$

$$\begin{array}{r}
 982640 \\
 821306 \\
 950013 \\
 016674 \\
 \hline
 770633
 \end{array}$$

$$S - S' = + 17^{\circ} 29.0$$

$$S = 24^{\circ} 47' 09.2$$

$$\text{Qu. Sph. S} = + 24^{\circ} 47' 12.9$$

$$O - C = - 3.7$$

$$\begin{array}{r}
 \text{Curr} \quad + 0.1 \\
 \text{Inv. Corr} \quad + 0.1 \\
 \text{2nd. Ord. Ref.} \quad 0.0 \\
 S + 24^{\circ} 47' 09.3 \\
 O - C \quad - 3.6
 \end{array}$$

$$S = + 24^{\circ} 29' 40.2$$

$$\pi = 56^{\circ} 08.95$$

$$\begin{array}{r}
 986913 \\
 821306 \\
 935727 \\
 004197 \\
 \hline
 748143
 \end{array}$$

$$X - X' = + 10^{\circ} 24.97$$

$$+ 41.66$$

$$X = 7^{\circ} 34' 01.03$$

$$X = 7^{\circ} 33' 59.97$$

$$+ 1.06$$

$$\text{Curr} = - 0.09$$

$$\text{Inv. Corr} = - 0.02$$

$$\lambda = 7^{\circ} 34' 01.01$$

$$O - C = + 1.04$$

