

KG
11366
v.1035

CLXXXIV

184

Plate No.	Date	Page.
✓ 13085	Aug. 3, 1917	1
13274	" 27 "	11
13273	" " "	21

19875
13020
— 55

1
2
8
21

1
16
18

3
28
21

4
3
8

1
24
13

2
2
16

130 85

Star Measures

1

2	18688	19988	19006	16665
89	13264	15410	9720	15940.44
21.5	64	10	20	48
	88	80	06	65
	<u>21.5424</u>	<u>21.5430</u>	<u>89286</u>	<u>8.9279</u>

L	19252	19232	19808	16580
16.	18630	9852	12943	1343638
186	30	52	41.42	40
	52	32	08	80
	<u>16.0622</u>	<u>16.0620</u>	<u>18.6866</u>	<u>18.6858</u>

3	17046	17942	16698	17192
289	8078	16925.20	9158	14732
21.8	78	15	58	32
	46	42	98	92
	<u>28.8968</u>	<u>28.8978</u>	<u>21.7540</u>	<u>21.7540</u>

4	17678	18176	17982	16752
32.6	10978	1487076	8932	15798
89	78	82	32	98
	78	76	82	52
	<u>32.6700</u>	<u>32.6700</u>	<u>8.9050</u>	<u>8.9046</u>

Mean

L			18796	17197
24			958590	1639899
13.9			95	00
			96	97
			<u>13.9206</u>	<u>13.9202</u>

2	16450	16622		
249	793536	1515045		
15.0	37	40		
	50	22		
	<u>24.8514</u>	<u>24.8523</u>		

13085°

Star Measures

1

2	18688	19980	19006	16665°
180	13264	15410	9720	15940.44
189	64	10	30	48
	88	80	06	65°
	<u>215424</u>	<u>215430</u>	<u>189286</u>	<u>8.9279</u>

L	19252	19232	19808	16580°
6	18630	9852	12943	1349638
88	30	52	41.42	40
	52	32	08	80°
	<u>160622</u>	<u>160620</u>	<u>186866</u>	<u>18.6858</u>

3	17046	17942	16698	17192
281	8078	16925.20	9158	14732
18	78	15	58	32
	46	42	98	92
	<u>28.8968</u>	<u>28.8978</u>	<u>21.7540</u>	<u>21.7540</u>

4	17678	18176	17982	16752
32.6	10978	1487076	8932	15798
89	78	82	32	98
	78	76	82	52
	<u>32.6700</u>	<u>32.6700</u>	<u>89050</u>	<u>8.9046</u>

Moon

L		18796	17197
24		9585.90	1639899
13.9		95	00
		96	97
		<u>13.9206</u>	<u>13.9202</u>

2	16450	16622	
249	7935.36	15150.45	
150	37	40	
	50	22	
	<u>24.8514</u>	<u>24.8523</u>	

13085

Moon

2

<u>3</u>	16478	16590
24.9	690813	1615051
5.5	18	52
X	78	90
	<u>24.9565</u>	<u>24.9561</u>

<u>4</u>	16490	16580
24.9	717372	15902
16.0	71	02
	90	80
	<u>24.9318</u>	<u>24.9322</u>

<u>5</u>	17520	16525
24.5	1284237	1121516
17.0	32	17
	20	25
	<u>24.4683</u>	<u>24.4691</u>

<u>6</u>		17148	16040
24		1309691	1008687
17.4		86	88
		48	40
		<u>17.4057</u>	<u>17.4047</u>

<u>7</u>	15	118673	16550
23.		1138076	13842
17.8		74	42
		73	50
		<u>17.7297</u>	<u>17.7292</u>

<u>8</u>		18278	16900
22		1298076	1219085
17.4		72	80
		78	00
		<u>17.5302</u>	<u>17.5285</u>

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Moon

2

<u>3</u>	16478	16590
24.9	690813	161505-1
15.5	18	5-2
	78	90
	<u>24.9565</u>	<u>24.9561</u>

<u>4</u>	16490	16580
24.9	717372	15902
16.0	71	02
	90	80
	<u>24.9318</u>	<u>24.9322</u>

<u>5</u>	17520	16525
24.5	1284237	11215-16
17.0	32	17
	20	25
	<u>24.4683</u>	<u>24.4691</u>

<u>6</u>		17148	16040
24		1309691	1008687
17.4		86	88
		48	40
		<u>17.4057</u>	<u>17.4047</u>

<u>7</u>	15	18673	16550
28		1138076	13842
17.8		74	42
		73	50
		<u>17.7297</u>	<u>17.7292</u>

<u>8</u>		18288	16900
22		1298076	1219085
17.4		72	80
		78	00
		<u>17.5302</u>	<u>17.5285</u>

13085

Times Etc.

Date Aug 3 1917

Exp. & Stars

23

26

-

23

38

" " Moon

23

32

27.5

23

32

27.7

Clock Slow

+ 12.4

H. Sid. Time

23

32

40.0

 $\Theta = +1^h 41^m$

H. Long.

04

44

31.05

G. Sid. Time

4

17

110.5

G. Sid. Time M.N

8

45

58.58

Interval

19

31

12.47

Red

03

11.87

G. M.T

19

28

0.60

19.4668

From Naut. Alman

R.A

Dec.

Moon 19^h

21

50

12.79

-

9

06

30.6

Motion 1^m

2.356

+15.025

" 28^h 01^m

01

05.99

+

07

0.8

Tabular Place

21

51

18.78

-

8

59

29.8

Moon's App 16^d

934" = 8.6

A = -505.8

+24.

-481.8

Parallax

61 14.7

Semi-diam

16' 42.7

R

1002.7

Aug.

9.9

Incl.

5

-0.3

R

1012.3

R

2170.0

aR

-104.5

(1+a)R

2065.5

R²

42663

13085

Times Etc.

Date Aug 3 1917

Exp to Stars

23 26

23 38

" " Moon

23 32 27.5

23 32 27.7

Clock Slow

- 12.4

H Sid Time

23 32 40.0

 $\phi = +1^h 41^m$

H Long

04 44 31.05

G Sid Time

4 17 11.05

G Sid Time M.N

8 45 58.58

Internal

19 31 12.47

Red

03 11.87

G. M.T

19 28 0.60

19^h 46 68

From Naut. Alman

R.A.

Dec.

Moon 19^h

21 50

12.79

- 9

06

30.6

Motion 1^m

2.356

+15.025

" 28.01

01

05.99

+ 07

08

Tabular Place

21

51

18.78

- 8

59

29.8

Moon Aug 16th

934" = 8.65"

4 - 505.8

+ 24

- 48 1.8

Parallax

61 14.7

Semi-diam

16' 42.7

R

1002.7

ang

9.9

In 5'

- 0.3

R

1012.3

R

2170.0

a R

- 1045

(1+a) R

2.0655

R2

4.2653

13085

2

Plate Constants

4

$$\begin{array}{r} \times 21.5427 \\ 3 23.0959 \\ - 1.5532 \end{array}$$

$$\begin{array}{r} 16.0621 \\ 17.3937 \\ - 1.3316 \end{array}$$

$$\begin{array}{r} 28.8973 \\ 30.9008 \\ 2.0035 \end{array}$$

$$\begin{array}{r} 32.6700 \\ 34.7821 \\ 2.1121 \end{array}$$

$$\begin{array}{r} y 8.9282 \\ 7 10.0637 \\ - 1.1355 \end{array}$$

$$\begin{array}{r} 18.6862 \\ 20.3509 \\ - 1.6647 \end{array}$$

$$\begin{array}{r} 21.7540 \\ 23.5008 \\ - 1.7468 \end{array}$$

$$\begin{array}{r} 8.9048 \\ 9.9796 \\ - 1.0748 \end{array}$$

$$\begin{array}{r} Y-S + 500X \\ - 1.3316 + 8031 = -52.85 + 1139 = -41.46 + 93 = -4053 \\ - 1.5532 + 10771 = -47.61 + 544 = -42.17 + 125 = -4092 \\ - 2.0035 + 14449 = -55.86 + 1327 = -42.59 + 167 = -4192 \\ - 2.1121 + 16335 = -47.86 + 543 = -42.43 + 190 = -4053 \\ 22.8929 + 11447 \quad + 9557 \quad + 133 = 245536 \end{array}$$

$$\begin{array}{r} y-\eta + 500y \\ - 1.6647 + 9343 = -73.04 - 894 = -819.8 + 162 = -8036 \\ - 1.1355 + 4464 = -68.91 - 1200 = -809.1 + 78 = -8013 \\ - 1.7468 + 10877 = -65.91 - 1610 = -820.1 + 188 = -8013 \\ - 1.0748 + 4452 = -62.96 - 1819 = -811.5 + 78 = -8037 \\ 15.6640 + 7832 \quad - 1275 \quad + 136 = 17,1358 \end{array}$$

$$\text{Tables } a = -1.2 \\ \text{am. } -505.8$$

$$b = -5.6 \quad a-b = +4.4 \\ -508.7 \quad +2.9$$

$$c+d = -4.5 \\ -5.3$$

$$-514.6$$

$$-503.1$$

$$-1.5$$

$$-0.8$$

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4

Plate Constants

+

X	21.5427	16.0621	28.8973	32.6700
3	23.0959	17.3937	30.9008	34.7821
	-1.5532	-1.3316	2.0035	2.1121

y	8.9282	18.6862	21.7540	89048
7	10.0637	20.3509	22.5008	99796
	-1.1355	-1.6647	-1.7468	-1.0798

$$\begin{aligned}
 &Y-S + 5.00X && + 61.9 && + 5.8X + 4072 \\
 &-1.3316 + 8031 = -5285 + 1139 = -4146 + 93 = -4053 \\
 &-1.5532 + 10771 = -4761 + 544 = -4217 + 125 = -4092 \\
 &-2.0035 + 14449 = -5586 + 1327 = -4259 + 167 = -4092 \\
 &-2.1121 + 16335 = -4786 + 543 = -4243 + 190 = -4053 \\
 &22.8924 + 11447 && + 955 && + 133 = 245836
 \end{aligned}$$

$$\begin{aligned}
 &Y-\eta + 5.00Y && -55.7X && + 8.7Y + 8025 \\
 &1.6647 + 9343 = -7304 - 894 = -8198 + 162 = -8036 \\
 &1.1355 + 4464 = -6891 - 1200 = -8091 + 78 = -8013 \\
 &1.7468 + 10877 = -6591 - 1610 = -8201 + 188 = -8013 \\
 &10748 + 4452 = -6296 - 1819 = -8115 + 78 = -8037 \\
 &15.6640 + 7832 && -1275 && + 136 = 171358
 \end{aligned}$$

$$\begin{aligned}
 &2\text{H} \alpha = -1.2 && e = -5.6 && 4-e = +4.4 && f+d = -4.5 \\
 &M. -505.8 && -508.7 && +2.9 && +5.3
 \end{aligned}$$

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Mean Center

5.

0-C

1	24.00.00	+ 1.1100 - 7	1.2306	4.2700	+ 5/0
2	24.85.18	+ 1.9618 - 3	3.8474	4.2874	+ 22/4
3	24.95.63	+ 2.0663 0	4.2696	4.2696	+ 4/6
4	24.93.20	+ 2.0420 + 1	4.1702	4.2839	+ 18/9
5	24.46.87	+ 1.5787 + 5	2.4935	4.2830	+ 18/0
6	24.00.00	+ 1.1100 + 7	1.2336	4.2716	+ 6/6
7	22.89.00	0.0000 + 8	0.0000	4.2737	+ 8/8
8	22.00.00	- 0.8900 + 7	0.7905	4.2765	+ 11/5

Cm R. 4.2663

arc' new 0-C

1	13.9204	- 1.7426 - 8	3.0394	148°	+ 37
2	15.0000	- 0.6630 - 3	0.4400	109°	+ 21/1
3	15.6630	0.0000 0	0.0000	90°	+ 33
4	16.0000	+ 0.3371 + 1	0.1137	81°	+ 17/6
5	17.0000	+ 1.3370 + 6	1.7892	50°	+ 16/7
6	17.4052	+ 1.7422 + 8	3.1380	33°	+ 53
7	17.7294	+ 2.0664 + 9	4.2737	0°	+ 74
8	17.5292	+ 1.8662 + 8	3.4857	335°	+ 102

Range 173

Y = 24

y = 13.9204

17.4052

31.3256

y₀ 15.6628y_{max} 17.7294

R 2.0666

Cm R. 2.0655

Y_{max} 24.9563Y₀ 22.8897

Mean Center {

Y₀ 22.8900

y₀ 15.6630

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Mean Center

5°

0-C

1	24.00.00	+1.1100	-77	1.23.06	4.27.00	+50
2	24.25.18	+1.9618	-3	3.84.74	4.28.74	+224
3	24.95.63	+2.0663	0	4.26.96	4.26.96	+46
4	24.93.20	+2.0420	+1	4.17.02	4.28.39	+189
5	24.46.27	+1.5787	+5	2.49.35	4.28.30	+180
6	24.00.00	+1.1100	+7	1.23.36	4.27.16	+66
7	22.89.00	0.0000	+8	0.00.00	4.27.37	+87
8	22.00.00	-0.8900	+7	0.79.05	4.27.65	+115

Cm R 4.26.63

anc. new 0-e

13.92.04	-1.7426	-8	3.09.94	148	+37
15.00.00	-0.6630	-3	0.44.00	109	+211
15.66.30	0.0000	0	0.00.00	90	+33
16.00.00	+0.3371	+1	0.11.37	81	+176
17.00.00	+1.3370	+6	1.78.92	50	+167
17.40.52	+1.7422	+8	3.13.80	33	+53
17.72.94	+2.0664	+9	4.27.37	0	+74
17.52.92	+1.8662	+8	3.48.57	33.5°	+102

Range 173

$Y = 24$	$Y = 13.92.04$
	17.40.52
	31.32.56
Y_0	15.66.28
Y_{max}	17.72.94
R	2.06.66
$Cm R$	2.16.55
Y_{max}	24.95.63
Y_0	22.88.97

Mean Center	Y_0 22.89.00
	Y_0 15.66.30

Formation of normals

1	- 1.9 2	+ 55.0	- 87.0
2	- 1.2 9	+ 438.0	- 147.8
3	0.0 0	+ 95.3	0.0
4	+ 0.6 9	+ 385.0	+ 64.2
5	+ 2.1 2	+ 295.0	+ 242.0
6	+ 1.9 3	+ 73.4	+ 115.0
7	+ 0.0 0	+ 0.0	+ 180.0
8	+ 1.6 7	- 102.8	+ 216.0
	+ 6.4 1	13317	+ 817.2
	- 321	- 102.8	- 234.8
	+ 3.2 0	+ 1228.9	+ 582.4
	corr -	116.6	- 64.4
		+ 1112.3	+ 518.0

	a	b	c	O-S (corr)
a = + 4	+ 4	- 3	- 7	+ 2
	+ 8	- 1	- 1	+ 110
	+ 8	0	0	- 87
b = + 2	+ 8	+ 1	+ 1	+ 53
	+ 6	+ 3	+ 1	+ 49
c = - 8	+ 4	+ 3	- 1	- 49
	+ 0	+ 4	- 3	+ 29
	- 3	+ 4	- 7	+ 109

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Conditional Equations

6

con-13

0-c

1	+ 1.10	- 1.74 = +5.0	+ 64	- 36 = +28	+ 9
2	+ 1.96	- 0.66 = +2.24	+ 114	- 14 = +100	+ 11.1
3	+ 2.07	0.00 = + 46	+ 120	0 = +120	- 87
4	+ 2.04	+ 0.34 = +1.89	+ 118	+ 7 = +125	+ 51
5	+ 1.58	+ 1.34 = +1.80	+ 92	+ 27 = +119	+ 48
6	+ 1.11	+ 1.74 = + 66	+ 65	+ 36 = +101	- 48
7	0.00	+ 2.07 = + 87	0	+ 42 = + 42	+ 32
8	- 0.89	+ 1.87 = +115	- 52	+ 38 = - 14	+ 116

+ 367 - 135

ar. 63

$$+ 18.04 + 3.20 = + 1228.9 + 8.97$$

$$+ 3.20 + 16.18 = + 582.4 + 4.96$$

$$- () - 0.57 = - 218.0 - 1.60$$

$$+ 15.61 = + 364.4 + 3.36 f = + 23.3$$

$$+ 18.04 = + 1228.9 - 74.5 = + 1154.4 \quad a = + 64.0$$

$$+ 18.04 + 3.20 = + 1112.3 + 8.97$$

$$+ 3.20 + 16.18 = + 518.0 + 4.96 \quad f = + 20.5$$

$$- () - 0.57 = - 1197.8 - 1.60 \quad a = + 58.0$$

$$+ 15.61 = + 320.2 + 3.36 \quad + 0.46 \Delta$$

$$+ 18.04 = + 1112.3 - 65.7 = + 1046.6$$

$$\text{arc} = 173$$

$$\Delta R = + 1.2$$

$$R = 2.06$$

$$\frac{P}{m} = 3.0$$

$$\text{cons} + 0.1$$

$$-2Rc = -0.41$$

$$\frac{\Sigma v}{m} = + 29$$

$$\text{Tuned } \Delta R = + 1.1$$

$$\Delta t = -0.08 \quad \Delta \delta = -0.0$$

$$+ 29 = + 96.6$$

$$\Delta a = -0.19 \quad \Delta \alpha = -0.01$$

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Conditional Equation

6

con. 13

0-6

1	+ 1.10	- 1.74 = +5.0	+ 64 - 36 = +28	+ 29
2	+ 1.96	- 0.66 = +2.24	+ 114 - 14 = +100	+ 114
3	+ 2.07	0.00 = + 46	+ 120 0 = +120	- 87
4	+ 2.04	+ 0.34 = +1.84	+ 118 + 7 = +125	+ 54
5	+ 1.58	+ 1.34 = +1.80	+ 92 + 27 = +119	+ 48
6	+ 1.10	+ 1.74 = + 66	+ 65 + 36 = +101	- 48
7	0.00	+ 2.67 = + 87	0 + 42 = +42	+ 32
8	- 0.89	+ 1.87 = +115	- 52 + 38 = -14	+ 106

+ 367 - 135

or 63

$$+ 18.04 + 3.20 = + 1228.9 + 897$$

$$+ 3.20 + 16.18 = + 582.9 + 496$$

$$- (1) - 0.57 = - 218.0 - 160$$

$$+ 15.61 = + 364.4 + 336 f = + 23.3$$

$$+ 18.04 = + 1228.9 - 74.5 = + 1154.4 \quad a = + 64.0$$

$$+ 18.04 + 3.20 = + 1112.3 + 897$$

+ 0.21

$$+ 3.20 + 16.18 = + 518.0 + 496 \quad f = + 20.5$$

$$- (1) - 0.57 = - 197.8 - 160 \quad a = + 58.0$$

+ 3.26

+ 0.460

$$+ 15.61 = + 320.2$$

$$+ 18.04 = + 1112.3 - 65.7 = + 1046.6$$

Arc = 173

DR = +1.2

R = 2.06

 $\frac{P}{\gamma} = .30$

Cons = +0.1

 $-2Re = -0.41$ $\frac{E}{\gamma} = +29$

Line DR = +1.1

 $\Delta L = 0.08 \quad \Delta S = -0.0$

$$+ 29 = + 96.6$$

$$\Delta a = -0.19 \quad \Delta \alpha = -0.01$$

30

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Mean Mean Position

7

$$\begin{array}{r} X_0 \quad 22.8900'' \\ \quad + 29 \\ \hline 22.8929'' \end{array}$$

$$\begin{array}{r} Y_0 \quad 15.6630'' \\ \quad + 10 \\ \hline 15.6640'' \end{array}$$

From Plate Constants

$$\begin{array}{r} 24.5536'' \\ \quad + 22 \\ \hline + 2.5536'' \end{array}$$

$$\begin{array}{r} 17.1358'' \\ \quad + 78 \\ \hline + 0.8642'' \end{array}$$

$$\begin{array}{r} S_0 \quad 0.40713'' \\ \cos \delta \quad 9.99364 \\ \quad 8.50724 \\ \hline \sin \alpha - A \quad 1.90627'' \end{array}$$

$$\begin{array}{r} \log \tan \delta \quad 9.2366'' \\ S_0 2 \quad 0.8143'' \\ \quad 7.0534'' \\ \log \eta_1 \quad 7.1043'' \end{array}$$

$$\alpha - A \quad + 01 \quad 20.59''$$

$$\begin{array}{r} \eta_1 \quad - 0.0013'' \\ \eta_0 \quad - 0.8629'' \end{array}$$

$$A \quad 21 \quad 48 \quad 35.14''$$

$$\begin{array}{r} \log \eta_0 \quad 9.93596'' \\ \quad 7.33115'' \end{array}$$

$$\alpha_0 \quad 21 \quad 49 \quad 55.73''$$

$$\log \tan \delta - \delta \quad 2.60481''$$

$$\text{Red} \quad + 4.32''$$

$$\tan \delta - \delta \quad - 402.5''$$

$$\alpha' \quad 21 \quad 50 \quad 0.05''$$

$$\begin{array}{r} - 6 \quad 42.5'' \\ \delta - 9 \quad 40 \quad 28.9'' \end{array}$$

$$\delta_0 \quad - 9 \quad 47 \quad 11.4''$$

$$\text{Red.} \quad + 21.7''$$

$$\delta' \quad - 9 \quad 46 \quad 49.7''$$

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Means Mean Position

7

$$\begin{array}{r} X_0 \quad 22 \ 89 \ 00 \\ \quad \quad + \ 32 \\ \hline 22 \ 89 \ 32 \end{array}$$

$$\begin{array}{r} Y_0 \quad 15 \ 66 \ 30 \\ \quad \quad + \ 10 \\ \hline 15 \ 66 \ 40 \end{array}$$

From Plate Constants

$$\begin{array}{r} 24.5536 \\ \quad \quad + \ 22. \\ \hline + \ 2.5536 \end{array}$$

$$\begin{array}{r} 17.1358 \\ \quad \quad + \ 18. \\ \hline -0.8642 \end{array}$$

$$\begin{array}{r} S_0 \quad 0.40725 \\ \cos \delta \quad 999.364 \\ \hline 85.0724 \\ S \times A \quad 1.90632 \end{array}$$

$$\begin{array}{r} \log \tan \delta \quad 9.2366 \\ S_0^2 \quad 0.8149 \\ \hline 7.0534 \\ \log \eta_1 \quad 7.1040 \end{array}$$

$$X-A \quad + \ 01. \quad 20.59$$

$$\begin{array}{r} \eta_1 \quad -0.0013 \\ \eta_0 \quad -0.8629 \end{array}$$

$$A \quad 21 \ 48 \ 35.14$$

$$\begin{array}{r} \log \eta_0 \quad 9.93596 \\ \hline 7.33115 \end{array}$$

$$X_0 \quad 21 \ 49 \ 55.78$$

$$\log \tan \delta \cdot R \quad 2.60481$$

$$\text{Red} \quad + \ 4.32$$

$$\begin{array}{r} \log \delta \cdot R \quad -4.02.5 \\ \hline -6 \ 42.5 \end{array}$$

$$X' \quad 21 \ 50 \ 00.5$$

$$R \quad -9 \ 40 \ 28.9$$

$$\delta_0 \quad -9 \ 41 \ 11.4$$

$$\text{Red} \quad +21.7$$

$$\delta' \quad -9 \ 46 \ 49.7$$

13085

Lunar Parallax

8

$$\begin{array}{rcl}
 \alpha' & 21 & 50 \quad 0.05'' \\
 \delta & 23 & 32 \quad 40.0'' \\
 \delta - \alpha' & + 1 & 42 \quad 39.95'' \\
 = & + 25^\circ & 39' \quad 59.25'' \\
 \frac{1}{2} \alpha - \alpha' & + 9 & 56.05'' \\
 \delta - \alpha' - \frac{1}{2} (\alpha - \alpha') + 25 & 30 & 03.25''
 \end{array}$$

$$\begin{array}{rcl}
 \pi & 61 & 147'' \\
 & 9.86913 \\
 \log \sin \pi & 8.25077'' \\
 \sin \delta - \alpha' & 9.63662'' \\
 \sec \delta & 0.00537'' \\
 \sin \alpha - \alpha' & 7.76189''
 \end{array}$$

$$\begin{array}{rcl}
 & 9.95727 \\
 \cos \frac{1}{2} \alpha - \alpha' & 0.00000 \\
 \sec (\delta - \alpha' - \frac{1}{2} (\alpha - \alpha')) & 0.04451'' \\
 \log \tan \gamma & 0.00178''
 \end{array}$$

$$\begin{array}{rcl}
 \alpha - \alpha' & + & 19' \quad 52.11'' \\
 = & + & 1'' \quad 19.47''
 \end{array}$$

$$\begin{array}{rcl}
 \gamma & 45 & 07 \quad 02.4'' \\
 \delta' & -9 & 46 \quad 49.7'' \\
 \gamma - \delta' & 54 & 53 \quad 52.1''
 \end{array}$$

$$\begin{array}{rcl}
 & 9.82640 \\
 \log \sin \pi & 8.25077'' \\
 \sin \gamma - \delta' & 9.91282'' \\
 \csc \gamma & 0.14963'' \\
 \sin \delta - \delta' & 8.13962''
 \end{array}$$

$$\delta - \delta' \quad + 47 \quad 24.9''$$

$$\begin{array}{rcl}
 \delta & -8 & 59 \quad 29.8'' \\
 \text{gk } \delta - 8 & 59 & 29.8''
 \end{array}$$

$$O-C \quad + \quad 5.0$$

$$\text{curr.} \quad + \quad 0.2''$$

$$\text{2nd Ord. Pgt} \quad + \quad 0.1$$

$$\left\{ \begin{array}{rcl}
 \delta - - 8 & 59 & 24.5'' \\
 O-C & + & 5.3
 \end{array} \right.$$

$$\alpha \quad 21 \quad 51 \quad 19.52''$$

$$\text{gk } \alpha \quad 21 \quad 51 \quad 18.78''$$

$$O-C \quad + 0.74''$$

$$\text{curr.} \quad - 0.03''$$

$$\alpha = 21 \quad 51 \quad 19.49$$

$$+ 0.71$$

13085

Lunar Parallax

8

$$\begin{array}{rcl}
 \alpha' & 21 & 50 & 0.06'' \\
 \epsilon & 23 & 32 & 40.0'' \\
 \epsilon - \alpha' & + 1 & 42 & 39.94'' \\
 & + 25^\circ & 39' & 59.29'' \\
 \frac{1}{2} \alpha - \alpha' & & - 9 & 56.05'' \\
 \epsilon - \alpha' - \frac{1}{2} (\alpha - \alpha') + 25 & 30 & & 03.25''
 \end{array}$$

$$\begin{array}{rcl}
 \pi & 61 & 14.7'' \\
 & & 9.86913 \\
 \log \sin \pi & & 8.25077'' \\
 \sin \epsilon - \alpha' & & 9.63662'' \\
 \sec \frac{1}{2} \delta & & 0.00537'' \\
 \sin \alpha - \alpha' & & 77.6189''
 \end{array}$$

$$\begin{array}{rcl}
 & & 9.95727 \\
 \cos \frac{1}{2} \alpha - \alpha' & & 9.00000 \\
 \sec (\epsilon - \alpha' - (\alpha - \alpha')) & & 0.04451'' \\
 \log \tan \gamma & & 0.00178''
 \end{array}$$

$$\alpha - \alpha' + 19' 52.11''$$

$$= + 1'' 19.47''$$

$$\gamma \quad 48 \quad 27 \quad 02.4''$$

$$\delta' \quad -9 \quad 46 \quad 49.7$$

$$\gamma - \delta' \quad 54 \quad 53 \quad 52.7$$

$$\begin{array}{rcl}
 & & 9.82640 \\
 \log \sin \pi & & 8.25077'' \\
 \sin \gamma - \delta' & & 9.91282'' \\
 \cos \epsilon & & 0.14963'' \\
 \sin \delta - \delta' & & 8.13962''
 \end{array}$$

$$\delta - \delta' \quad + 47 \quad 24.9''$$

$$\delta \quad -8 \quad 59 \quad 24.8$$

$$\gamma - \delta \quad -8 \quad 59 \quad 29.8''$$

$$D.C. \quad + \quad 5.0$$

$$\text{curr.} \quad + \quad 0.2$$

$$\text{2nd Ord Ref} \quad + \quad 0.1$$

$$\left\{ \begin{array}{l} \delta - -8 \quad 59 \quad 24.5'' \\ D.C. \quad + \quad 5.3 \end{array} \right.$$

$$\alpha \quad 21 \quad 51 \quad 19.52''$$

$$\gamma - \alpha \quad 21 \quad 51 \quad 18.78''$$

$$D.C. \quad + 0.74''$$

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

$$\alpha \quad 21 \quad 51 \quad 19.49$$

$$+ 0.71$$

1
4
79
19
2
18
24
3
34
7
1
2
2
1
3
7
1

13274

Star Measures

11

1	18428	17222	17772	16804
19	9108	16550	10978	13508.0
199	08 ⁶²	54 ⁵²	78	12
	28	22	72	04
	<u>7.9320</u>	<u>7.9330</u>	<u>19.6794</u>	<u>19.6706</u>

2	17440	16968	17880	16158
18.9	850408	15910 ⁰⁶	9418 ²⁰	14610
24.9	12	02	22	10
	40	68	80	58
	<u>18.8932</u>	<u>18.8938</u>	<u>24.8460</u>	<u>24.8452</u>

3	17380	16422	16460	16886
34.7	12068 ⁶⁶	11740	14720 ¹²	8630
7.2	64	40	04	30
	80	22	60	86
	<u>34.5314</u>	<u>34.5318</u>	<u>7.1748</u>	<u>7.1744</u>

Moon

1	19887	16995	17300	16956
24.7	13446	13435 ⁴⁰	15715 ²⁰	8540
14.1	48 ⁴⁷	45	25	44 ⁴²
	87	95	00	56
	<u>24.6440</u>	<u>24.6450</u>	<u>14.1580</u>	<u>24.1586</u>

2			17675	16758
24.0			1387672	10558
14.4			68	60
			75	58
			<u>14.3803</u>	<u>14.3801</u>

3	17080	17485		
23.3	1388688	1067578		
15.0	90	81		
	80	85		
	<u>23.3192</u>	<u>23.3193</u>		

3274

Star Measures

11

18428

9108

08

28

7.9320

17022

16550

5452

22

7.9330

17772

10978

78

72

19.6794

16804

13508,0

12

04

19.6706

17440

850908

12

40

18.8932

16968

15910,06

02

68

18.8938

17880

941820

22

80

24.8460

16158

14610

10

58

24.8452

17380

1206866

64

80

34.5314

16422

11740

40

22

34.5318

16460

1472012

04

60

7.1748

16886

8630

30

86

7.1744

Moon

19887

13446

4847

87

24.6440

16995

1343540

45

95

24.6450

17300

1571520

25

00

14.1580

16956

8540

44

56

24.1581

17080

1388688

90

80

23.3192

17485

1068574

81

85

23.3193

17675

1387672

68

75

14.3803

16758

10555

60

58

14.3801

1
4
2
1
5
23
17
6
23
1
3
2
1
8
2
1

13274

Moon

12

4	1 7 4 6 0	1 6 8 3 6
22.9	7 6 5 2	1 6 6 4 0
16.0	5 2	4 0
	6 0	3 6
	<u>2 2.9 8 0 8</u>	<u>2 2.9 8 0 4</u>

5	1 8 5 7 3	1 6 0 0 4
23.2	1 6 6 5 1	7 9 2 4
17.0	5 1	2 4
	7 3	0 4
	<u>2 3.1 9 2 2</u>	<u>2 3.1 9 2 0</u>

6	1 8 0 8 6	1 6 7 4 4
23.6	1 2 7 5 2 5 6	1 2 0 7 5 7 6
17.4	6 0	7 7
	8 6	4 4
	<u>2 3.5 3 3 0</u>	<u>2 3.5 3 3 2</u>

1 8 3 1 8	1 6 3 1 3
1 3 4 8 4	1 1 1 3 8 4 3
8 4	4 8
1 8	1 3
<u>1 7 4 8 3 4</u>	<u>1 7.4 8 3 0</u>

7	1 8 5 3 8	1 6 1 1 8
24.0	1 0 1 6 3 6 8	1 4 4 8 0
17.9	7 3	8 0
	3 8	1 8
	<u>1 7.8 3 7 0</u>	<u>1 7.8 3 6 2</u>

8	1 7 3 9 4	1 7 7 4 2
24.3	1 3 4 8 0	1 1 6 6 0
18.0	8 0	6 0
	9 4	4 2
	<u>2 4.3 9 1 4</u>	<u>2 4.3 9 1 8</u>

3274

Moon

12

1	1 7 4 6 0	1 6 8 3 6
29	7 6 5 2	1 6 8 4 0
5.0	5 2	4 0
	6 0	3 6
	<u>2 2.9 8 0 8</u>	<u>2 2.9 8 0 4</u>

2	1 8 5 7 3	1 6 0 0 4
.0	1 6 6 5 1	7 9 2 4
	5 1	2 4
	7 3	0 4
	<u>2 3.1 9 2 2</u>	<u>2 3.1 9 2 0</u>

1	1 8 0 8 6	1 6 7 4 4
1.6	1 2 7 5 2 5 6	1 2 0 7 5 7 6
7.4	6 0	7 7
	8 6	4 4
	<u>2 3.5 3 3 0</u>	<u>2 3.5 3 3 2</u>

1 8 3 1 8	1 6 3 1 3
1 3 4 8 4	1 1 1 3 8 4 3
8 4	4 8
1 8	1 3
<u>1 7.4 8 3 4</u>	<u>1 7.4 8 3 0</u>

2	1 8 5 3 8	1 6 1 1 8
4.0	1 0 1 6 3 6 8	1 4 4 8 0
7.9	7 3	8 0
	3 8	1 8
	<u>1 7.8 3 7 0</u>	<u>1 7.8 3 6 2</u>

2	1 7 3 9 4	1 7 7 4 2
43	1 3 4 8 0	1 1 6 4 0
8.0	8 0	6 0
	9 4	4 2
	<u>2 4.3 9 1 4</u>	<u>2 4.3 9 1 8</u>

13274

Times etc.

13

Date. Aug 27, 1917

Exp. to Stars	19	13		19	25	
" " Moon	19	18	37.3	19	18	37.9
Clock slow			+ 28.2			

H. Sid. Time	19	19	25.8		
H. Long	04	44	31.05	8 ^m	+1 ^h 08 ^m
G. Sid. Time	24	03	56.85		
" " " M. V	10	20	35.90		
Interval	13	43	20.95		
Red.		02	14.88		
G. M. T.	13	41	06.07	13	68 50.2

From Naut. Alman.			R. A.		Dec.
Moon 13 ^h	18	09	31.08	-24	03 55.5
Moon 1 ^m			2.5408		+3.727
" 41.10117		01	44.43	+02	33.2
Jupiter Place	18	11	15.51	-24	01 22.3

Moon's Age 10d.

934" = 58

$a = 501.2$
 $+ 24.0$
 $- 477.2$

Parallax	58	56.9
Semi diam	16	05.3
R		965.3
Aug		6.2
3 rd 5		-03
R		971.2
R		2.0818
AR		-993
(1+a)R		1.9825
R ²		393.08

3274

Times etc.

13

Date. Aug 27, 1917

Exp to Stars	19	13		19	25	
" " Moon	19	18	57.3	19	18	57.9
Clock slow			+ 28.2			

H Sid Time	19	19	25.2			
H Long	04	44	31.05	6 ^m	+ 1 ^h	08 ^m
G Sid Time	24	03	56.85			
" " " M.W.	10	20	35.90			
Interval	13	43	20.95			
Red		02	14.88			
G.M.T.	13	41	00.07	13	68	50.2

From Naut. Alman.			R.A.		Dec.	
Moon 13 ^h	18	09	31.08	-24	03	55.5
Moon 1 ^m			2.5408			+3.727
" 41.10117		01	44.43		+02	33.2
Abular Place	18	11	15.51	-24	01	22.3

Moon's Age 10d.

734" - 58

a 4-501.2
 + 24.0
 - 417.2

Parallax	58	56.9
Semi-diam	16	05.3
R		965.3
Ang		5.8
2 nd		-0.3
R		974.5
R		2081.8
a R		-993
(1+a) R		1982.5
R ²		393.03

S_0	η_0	ΔS	-6.35	-15^-
-14.64	$+1.91$	-78	$+92 = +14$	
-3.11	$+7.19$	-5^-	$+20 = +15^-$	
$+13.22$	-11.36	$+98$	$-83 = +15^-$	
$+3.22$	-2.02		$-20 = -35^- = -0.12^v$	

$\Delta \eta$	-3.6η	$+1.85$	$+22^v$
$+11$	$-7 = +4$	$-26 = -22$	
$+11$	$-26 = -15^-$	$-6 = -21$	
-85	$+41 = -44$	$+24 = -22$	
	$+7$	$+6 = +35 = +1.7$	

13274			Standard Coordinates						14		
Cape No. 2474 mag. 6.8			Cape No. 2490 mag. 5.3			Cape No. 2507 mag. 6.7					
C	17	59	02.50	18	05	37.17	18	14	59.72		
g			02.56			37.19			59.76		
E			02.55			37.22			59.72		
m	17	59	02.54	18	05	37.19	18	14	59.73		
Pre		01	02.54		01	02.20		01	03.35		
Q	18	0	05.08	18	06	39.39	18	16	03.08		
A	18	08	25.01	18	08	25.01	18	08	25.01		
Q-A	-	08	19.93	-	01	45.62	+	07	38.07		
sin		-499.83			-105.62			+457.99			
log		2.69882n			2.02374n			2.66086			
cos		9.95936			9.96167			9.95321			
S		1.16542n			0.49265n			1.12131			
S		-14.6360			-3.1092			+13.2224			
S		-77			-5			+96			
S		7.3563			188903			35.2320			
X		7.9325			18.8935			34.5316			
X-S		+5762			+0.0032			-7004			
C	-24	24	12.8	-23	43	17.6	-26	07	45.7		
g			13.2			17.5			46.0		
E			12.7			18.2			44.0		
m	-24	24	12.9	-23	43	17.8	-26	07	45.2		
Pre			-10.7			+8.4			+23.1		
δ	-24	24	13.6	-23	43	09.4	-26	07	22.1		
δ	-24	39	03.7	-24	39	03.7	-24	39	03.7		
δ-δ		+14	50.1		+55	54.3	-1	28	18.4		
tan		+890.1			+335.46			-5299.6			
log		2.94940			3.52564			3.72424n			
log		0.28055			0.85679			1.05539n			
tan		9.6568n			9.6428n			9.6905n			
S ²		2.3308			8.9853			2.2426			
log		9.0410n			5.6815n			8.9865n			
no		+1.9079			+7.1910			-11.3603			
ny		-0.1099			0			-0.0969			
n		19.7980			25.1910			6.5428			
y		19.6800			24.8456			7.1746			
q-y		-1.180			-3.454			+6.318			

Standard Coordinates										14
Cape No. 2474 mag 6.8	Cape No. 2490 mag 5.3									Cape No. 2507 mag 6.7
C	17	59	02.50	18	05	37.17	18	14	59.72	
q			02.56			37.19			59.76	
E			02.55			37.22			59.72	
m	17	59	02.54	18	05	37.19	18	14	59.73	
Proc		06	02.54		01	02.20		01	03.35	
Q	18	0	05.08	18	06	39.39	18	16	03.08	
A	18	08	25.01	18	08	25.01	18	08	25.01	
A-A	-	08	19.93	-	01	45.62	-	07	38.07	
Sum		-49883			-10562			+45799		
log		2.69882			2.02374			2.66086		
cos		995936			996167			995321		
S		1.16542			0.49265			1.12131		
S	-14.6360			-31092				+13.2224		
S	-	77		-	5			+96		
S	7.3563			188908				85.2320		
I	7.9325			188935				34.5316		
X-S	+5762			+00032				-7004		
C	-24	24	12.8	-23	43	17.6	-26	07	457	
q			13.2			17.5			46.0	
E			12.7			18.2			44.0	
m	-24	24	12.9	-23	43	17.8	-26	07	45.2	
Proc			-10.7			+8.4			+23.1	
Q	-24	24	13.6	-23	43	09.4	-26	07	22.1	
Q	-24	39	03.7	-24	39	03.7	-24	39	03.7	
S-E	+14	50.1		+55	54.3		-1	28	18.4	
Sum		+890.1			+3354.6			-5299.6		
log		2.94940			3.52564			3.72424		
cos		0.28055			0.85679			1.05539		
S		9.6568			9.6428			9.6905		
S		2.3308			8.9853			2.2426		
log		9.0410			5.6815			8.9865		
h ₀	+0.9079			+7.1910				-11.3603		
m ₁	-0.1099			0				-0.0969		
m	19.7980			25.1910				6.5428		
q	19.6800			24.8456				7.1746		
q-q	-1.180			-3.454				+6.312		

13274

Plate Center + Constants.

15

$$\begin{array}{r}
 18.8935 \quad 24.8456 \quad 18.06 \quad 39.39 \quad -23 \quad 43 \quad 0.94 \\
 22. \quad 18. \quad +01 \quad 45.62 \quad -55 \quad 54.3 \\
 +3.1065 \quad -6.8456 \quad 18.08 \quad 25.01 \\
 \hline
 34^{\circ} \quad 490
 \end{array}$$

Plate Center

$$A = 18 \quad 08 \quad 25.01$$

$$D = -24 \quad 39 \quad 03.7$$

$$\begin{array}{r}
 X-S + 500 X \quad + 45.3 y \quad + 1.2 x \quad - 10628 \\
 +5762 + 3966 = 9728 + 891 = 10619 + 10 = 10629 \\
 +0032 + 9447 = 9479 + 1126 = 10605 + 23 = 10628 \\
 -7004 + 17266 = 10262 + 325 = 10587 + 41 = 11628 \\
 24.9631 + 12482^{\circ} \quad + 730^{\circ} \quad + 30^{\circ} = 25.2245^{\circ}
 \end{array}$$

$$\begin{array}{r}
 y-z + 500 y \quad - 37.5x \quad + 19.6y \quad - 8749 \\
 -1180 + 9840 = 8660 - 297 = 8363 + 386 = 8749 \\
 -3454 + 12423 = 8969 - 708 = 8261 + 487 = 8748 \\
 +6318 + 3587 = 9905 - 1296 = 8609 + 140 = 8749 \\
 16.1081 + 8054^{\circ} \quad - 935^{\circ} \quad + 316 = 15.9767^{\circ}
 \end{array}$$

Tables

$$\begin{array}{r}
 a = -0.2 \quad l = -16.2 \quad a-l = +16.0 \quad t+d = -8.0 \\
 -501.2 \quad -519.6 \quad = +18.4 \quad -7.8 \\
 -501.0 \quad -5034 \quad +2.4 \quad +0.2
 \end{array}$$

13274

Plate Center + Constants

15

18.8935	248456	18	06	39.39	-23	43	09.4
22.	18.491		01	45.62		-55	59.3
+3.1065	-6.8456	18	08	25.01			
<u>34</u>	<u>490</u>						

Plate Center

A = 18 08 25.01

D = -24 39 03.7

X-S + 500 X	+ 45.3 y	+ 1.2 x	- 106.28
-5762 + 3966 = 9728	+ 891 = 10619	+ 10 = 10629	
+ 0032 + 9447 = 9479	+ 1126 = 10605	+ 23 = 10628	
- 7004 + 17266 = 10262	+ 325 = 10587	+ 41 = 10628	
24.9631 + 12482	+ 730	+ 30 = 25.2245	

-y + 500 y	- 37.8 x	+ 19.6 y	- 87.99
1180 + 9840 = 8660	- 299 = 8368	+ 386 = 8749	
3454 + 12423 = 8969	- 708 = 8257	+ 487 = 8748	
6318 + 3587 = 9905	- 1298 = 8607	+ 140 = 8749	
16.1081 + 8054	- 935	+ 392 = 15.9767	

Tables

a = -0.2	b = -16.2	a - b = +16.0	b + d = -8.0
-501.2	-519.6	= 18.4	-7.8

13274

Moon Center

16

		Δx	$(x-x_0)^2$		Δy	$(y-y_0)^2$	ΔC
1	24.6445	-0.3175 - 14	0.1017	3.9140	-163		
2	24.0000	-0.9620 - 13	0.9280	3.9226	-77		
3	23.3192	-1.6428 - 8	2.7014	3.9326	+23		
4	22.9806	-1.9814 0	3.9260	3.9260	-43		
5	23.1921	-1.7699 + 7	3.1301	3.9280	-23		
6	23.5331	-1.4289 + 10	2.0389	3.9356	+53		
7	24.0000	-0.9620 + 13	0.9229	3.9200	-103		
8	24.3916	-0.5704 + 14	0.3238	3.9140	-163		
				3.9303			

		Δx		arc
1	14.1583	-1.9497 -28	3.8123	1890 ✓
2	14.3802	-1.7278 -26	2.9946	209
3	15.0000	-1.1080 -16	1.2312	236
4	16.1080	0.0000 0	0.0000	270
5	17.0000	+0.8920 +13	0.7979	296
6	17.4832	+1.3752 +20	1.8967	314
7	17.8366	+1.7286 +26	2.9971	331
8	18.0000	+1.8920 +28	3.5902	343 ✓
			Range	154 ✓

$$x = 24 \quad y = 14.3802$$

$$17.8366$$

$$322.168$$

$$y_0 = 16.1084$$

$$x_{min} = 22.9806$$

$$\text{Corr } R = 1.9825$$

$$x_0 = 24.9631$$

Moon Center

$$x_0 = 24.9620$$

$$y_0 = 16.1080$$

13274

Moon Center

16

		Δx	$(x-x_0)^2$		$O-C$
1	24.6445	-0.3175 - 14	0.1017	3.9140	-163
2	24.0000	-0.9620 - 13	0.9280	3.9226	-17
3	23.3192	-1.6428 - 8	2.7019	3.9326	+23
4	22.9806	-1.9814 0	3.9260	3.9260	-43
5	23.1921	-1.7699 + 7	3.1301	3.9280	-29
6	23.5331	-1.4289 + 10	2.0389	3.9356	+53
7	24.0000	-0.9620 + 13	0.9229	3.9200	-103
8	24.3916	-0.5704 + 14	0.3238	3.9140	-163
				3.9220B	

		Δy		$O-C$
1	14.1583	-1.9497 - 28	3.8123	1890
2	14.3802	-1.7278 - 26	2.9946	209
3	15.0000	-1.1080 - 16	1.2312	236
4	16.0080	0.0000 0	0.0000	270
5	17.0000	+0.8920 + 13	0.7979	296
6	17.4832	+1.3752 + 20	1.8967	314
7	17.8366	+1.7286 + 26	2.9971	331
8	18.0000	+1.8920 + 28	3.5902	343
				Range 154

$$x = 24 \quad y = 14.3802$$

$$17.8366$$

$$322168$$

$$y_0 = 16.1084$$

$$x_{\text{mean}} = 22.9806$$

$$\text{Corr } R = 1.9825$$

$$x_0 = 24.9631$$

Moon Center

$$x_0 = 24.9620$$

$$y_0 = 16.1080$$

$$\begin{array}{r}
 1 \quad + 0.62 \\
 2 \quad + 1.66 \\
 3 \quad + 1.82 \\
 4 \quad 0.00 \\
 5 \quad - 1.58 \\
 6 \quad - 1.97 \\
 7 \quad - 1.66 \\
 8 \quad - 1.08 \\
 \hline
 + 4.10 \\
 - 6.29 \\
 \hline
 - 2.19
 \end{array}$$

$$\begin{array}{r}
 + 52.2 \\
 + 73.8 \\
 - 38.8 \\
 + 85.2 \\
 + 40.7 \\
 - 75.7 \\
 + 98.0 \\
 + 93.0 \\
 \hline
 + 442.9 \\
 - 114.5 \\
 \hline
 + 328.4
 \end{array}$$

$$\begin{array}{r}
 + 318.0 \\
 + 133.1 \\
 - 25.5 \\
 0.0 \\
 - 20.4 \\
 + 73.2 \\
 - 178.0 \\
 - 308.0 \\
 \hline
 + 524.3 \\
 - 531.9 \\
 \hline
 - 07.6
 \end{array}$$

	a	f	c	$Cor\ 0-a$
$a = -5$	$+ 2$		$- 6$	$- 157$
	$+ 5$		$- 3$	$- 54$
$f = 0$	$+ 8$		0	$+ 64$
	$+ 10$		$+ 2$	$+ 5$
$c = 8$	$+ 9$		$+ 1$	$+ 16$
	$+ 7$		$- 1$	$+ 82$
	$+ 5$		$- 3$	$- 88$
	$+ 3$		$- 5$	$- 160$

check again

13274

Conditional Equations

0-e 17

1	-0.32	-1.95	= -1.63	-7	-5	= -1.2	-1.51
2	-0.96	-1.73	= -77	-22	-4	= -26	-51
3	-1.64	-1.11	= +23	-38	-3	= -41	+64
4	-1.98	0.00	= -43	-46	0	= -46	+3
5	-1.77	+0.89	= -23	-40	+2	= -38	+15
6	-1.43	+1.38	= +53	-33	+3	= -30	+83
7	-0.96	+1.73	= -1.03	-22	+4	= -18	-85
8	-0.57	+1.89	= -1.63	-13	+5	= -8	-155

$$\begin{array}{r} 389 \\ -279 \\ \hline \end{array}$$

+165 - 442

av 76

$$\begin{array}{rclcl} +14.07 & - & 2.19 & = & +328.4 & -9.63 \\ -2.19 & + & 17.32 & = & -7.3 & +1.10 \\ +1 & - & 0.34 & = & +51.3 & -1.50 \end{array}$$

-0.02 Δ

$$+17.66 = +44.0 \quad -0.40 \quad + = +2.5$$

$$+14.07 = +328.4 + 5.6 = +322.8$$

$$a = +22.9 \text{ v}$$

-0.68 Δ

ave 154

$$R = 1.98$$

$$\frac{P}{m} = 1.8$$

$$-2Re = -0.40$$

$$\frac{\Sigma v}{m} = -34.6$$

$$\Delta t = +0.0 \quad \Delta \delta = +0.0$$

$$\frac{-34.6}{1.8} = -19.2$$

$$\Delta a = +0.27 \quad \Delta \alpha = +0.01$$

$$\Delta R = -2.4$$

$$\text{conv} = +0.1$$

$$\text{True } \Delta R = -2.5$$

13274

Conditional Equations

17

0 - e

1	-0.32	-1.45	= -1.63	-7	-5	= -1.2	-1.51
2	-0.96	-1.73	= -77	-22	-4	= -26	-51
3	-1.64	-1.11	= +23	-38	-3	= -41	+64
4	-1.98	0.00	= -43	-46	0	= -46	+3
5	-1.77	+0.89	= -23	-40	+2	= -38	+15
6	-1.43	+1.38	= +53	-33	+3	= -30	+83
7	-0.96	+1.73	= -1.03	-22	+4	= -18	-85
8	-0.57	+1.89	= -1.63	-13	+5	= -8	-155

$$+1.65 - 442$$

$$\approx 76$$

$$+14.07 - 2.19 = +328.9 - 9.63$$

$$-2.19 + 17.32 = -7.3 + 1.10$$

$$+1 - 0.39 = +51.3 - 1.50$$

$$-0.020$$

$$+17.66 = +44.0 - 0.40 \quad \dagger = +2.5$$

$$+14.07 = +328.9 + 5.6 = +322.8$$

$$q = +22.9$$

$$-0.680$$

$$\text{are } 15^{\circ}4$$

$$R = 1.98$$

$$P_m = 18^{\circ}$$

$$-2Re = -0.40$$

$$\frac{\Sigma V}{m} = -34.6^{\circ}$$

$$\Delta t = +0.0 \quad \Delta \delta = +0.0$$

$$\frac{-34.6}{1.9} = -19.2^{\circ}$$

$$\Delta a = +0.27 \quad \Delta \alpha = +0.01$$

$$\Delta R = -2.4^{\circ}$$

$$\text{conv.} = +0.1$$

$$\text{True } \Delta R = -2.5^{\circ}$$

13274

Mean Mean Position

18

$$\begin{array}{r}
 Y_0 \quad 24.9620 \checkmark \\
 \quad \quad + 11 \\
 \quad 24.9631 \checkmark
 \end{array}$$

$$\begin{array}{r}
 y_0 \quad 16.1080 \checkmark \\
 \quad \quad + 1 \\
 \quad 16.1081 \checkmark
 \end{array}$$

From Plate Constants

$$\begin{array}{r}
 25.2245 \checkmark \\
 \underline{22.} \\
 S_0 \quad + 3.2245 \checkmark
 \end{array}$$

$$\begin{array}{r}
 15.9767 \checkmark \\
 \underline{18.} \\
 -2.0233 \checkmark
 \end{array}$$

$$\begin{array}{r}
 \log S_0 \quad 0.50846 \checkmark \\
 \quad 9.95759 \checkmark \\
 \quad 8.50724 \\
 \quad 2.04363 \checkmark
 \end{array}$$

$$\begin{array}{r}
 9.6667 m \\
 1.0169 \checkmark \\
 7.0534 \\
 7.7370 m
 \end{array}$$

$$\begin{array}{r}
 \alpha - A \quad + 110.57 \checkmark \\
 \quad \quad + 01 \quad 50.57 \checkmark \\
 A = 18 \quad 08 \quad 25.01 \checkmark
 \end{array}$$

$$\begin{array}{r}
 m_1 - 0.0053 \checkmark \\
 m_0 - 2.0178 \checkmark
 \end{array}$$

$$\alpha_0 \quad 18 \quad 10 \quad 15.58 \checkmark$$

$$\begin{array}{r}
 0.30488 m \\
 7.33115 \checkmark \\
 2.97373 \checkmark \\
 941.3
 \end{array}$$

$$\text{Red} \quad + 4.45 \checkmark$$

$$-15 \quad 41.3 \checkmark$$

$$\alpha' \quad 18 \quad 10 \quad 20.03 \checkmark$$

$$\ominus \quad -24 \quad 39 \quad 03.7 \checkmark$$

$$\delta_0 \quad -24 \quad 54 \quad 45.0 \checkmark$$

$$\text{Red} \quad - 1.0 \checkmark$$

$$\delta' \quad -24 \quad 54 \quad 46.0 \checkmark$$

13 2 74

Mean Mean Position

18

$$\begin{array}{r}
 \gamma_0 \quad 24.9620 \\
 \quad \quad + 11 \\
 \hline
 \quad \quad 24.9631
 \end{array}$$

$$\begin{array}{r}
 \gamma_0 \quad 16.1080 \\
 \quad \quad + 1 \\
 \hline
 \quad \quad 16.1081
 \end{array}$$

From Plate Constants

$$\begin{array}{r}
 25.2245'' \\
 \underline{22.} \\
 \delta_2 \quad + 3.2245''
 \end{array}$$

$$\begin{array}{r}
 15.9767'' \\
 \underline{18.} \\
 - 2.0233''
 \end{array}$$

$$\begin{array}{r}
 \log s_1 \quad 0.50846'' \\
 \quad \quad 9.95759'' \\
 \quad \quad 8.50724'' \\
 \quad \quad 2.04363''
 \end{array}$$

$$\begin{array}{r}
 9.6680'' \\
 1.0169'' \\
 7.0534'' \\
 7.7370''
 \end{array}$$

$$\begin{array}{r}
 \alpha - A \quad + 110.57'' \\
 \quad \quad + 0.150.57''
 \end{array}$$

$$\begin{array}{r}
 \alpha_1 - 0.0055'' \\
 \alpha_0 - 2.0178''
 \end{array}$$

$$A = 18 \quad 08 \quad 25.01$$

$$0.30488''$$

$$\alpha_0 \quad 18 \quad 10 \quad 15.58''$$

$$7.33115''$$

$$2.97373''$$

$$\text{Red} \quad + 4.45''$$

$$94.1.3$$

$$-15' \quad 41.3''$$

$$\alpha' \quad 18 \quad 10 \quad 20.03''$$

$$\ominus \quad -24 \quad 39 \quad 03.7''$$

$$\delta_0 \quad -24 \quad 59 \quad 45.0''$$

$$\text{Red} \quad - 1.0''$$

$$\delta' \quad -24 \quad 59 \quad -46.0''$$

$$\begin{array}{r}
 1 \quad 18 \quad 08 \quad 52.253 \\
 47.943 \\
 + 4.310 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 -21 \quad 04 \quad 53.84 \\
 53.84 \\
 \hline
 0.00
 \end{array}$$

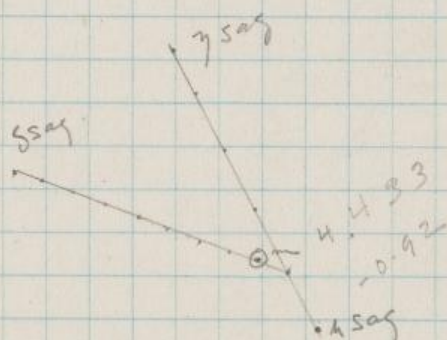
$$\begin{array}{r}
 18 \quad 12 \quad 05.622 \\
 0.696 \\
 + 4.926 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 -36 \quad 47 \quad 19.78 \\
 47 \quad 15.14 \\
 - 4.64 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 18 \quad 15 \quad 45.480 \\
 40.823 \\
 + 4.657 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 -29 \quad 51 \quad 54.37 \\
 52.34 \\
 - 2.03 \\
 \hline
 \end{array}$$

.616



-39

-34

-29

-24

-19

-14

-9

20 18 16 14 12 10 8 6 4 2 0

18

13274

19

Reduction & Apparent Place

$H + \alpha'$	2	01.3	30°	19.5	δ_0	-24	54.7
H	7	51.0			$\cos \delta_0$	9.9576	
α_0	18	10.3			$\log l$	0.8654	
G	23	42.2			"(1)	0.8230	
$b + \alpha_0$	17	52.5	268°	7.5			

$\cos b + \alpha_0$	8.5148	m
q	1.3078	
$\sin b + \alpha_0$	9.9998	m
$\tan \delta_0$	9.6669	m
	8.8239	

$\log q'$	9.8226	m
$\log q$	9.7984	

q	+3.107	
q	+0.629	
h	+0.709	
Red.	+4.445	

$\sin \delta_0$	9.6245	m
$\cos H + \alpha_0$	9.9361	
h	1.2813	
$\sin H + \alpha_0$	9.7032	
$\sec \delta_0$	0.0424	
	8.8239	

$\log h'$	0.8419	m
$\log h$	9.8508	

q'	-0.665	
h'	-6.949	
l'	+6.653	
Red.	-0.961	

3274

19

Reduction to Apparent Place.

$H+x'$	2	01.3	$30^{\circ} 19.5'$	$\delta_0 - 24^{\circ} 54.7'$
H	7	51.0		$\cos \delta_0$ 99576
α_0	18	10.3		$\log l$ 0.8654
ζ	23	92.2		$\log (1)$ 0.8230
$\delta+x_0$	17	52.5	$268^{\circ} 7.5'$	
$\cos \zeta+x_0$		8.5148 m		$\sin \delta_0$ 9.6245 m
q		1.3078		$\cos H+x_0$ 99361
$\sin \zeta+x_0$		9.9998 m		h 1.2813
$\tan \delta_0$		9.6669 m		$\sin H+x_0$ 9.7032
		8.8239		$\sec \delta_0$ 0.0424
$\log q'$		9.8226 m		8.8239
$\log q$		9.7984		$\log l'$ 0.8419 m
f		+3.107		$\log h$ 9.8508
g		+0.629		h
h		+0.709		$q' - 0.665$
Red.		+4.495		$q' - 6.949$
				$i' + 6.653$
				$\text{Red.} - 0.961$

13274

Lunar Parallax

20

α	18	10	20.03 ^v	π	58	569 ^v
δ	19	19	25.80 ^v			
$\theta - \alpha$	+1	9	05.77		9.86913	
$=$	+17°	16	26.55 ^v		8.23418 ^v	
$\frac{1}{2} \alpha - \alpha$		+7	05.33 ^v		9.47267 ^v	
$\theta - \frac{1}{2} \alpha - \frac{1}{2} \alpha + 17$		09	21.22 ^v		00.3935 ^v	
				$\sin \alpha - \alpha$	7.61533 ^v	

9.95727

0.00000

001976^v9.97703^v $\alpha - \alpha'$ +14' 10.67^v $=$ +56.71^v

γ	43	29	07.2 ^v
δ'	-24	54	46.0 ^v
$\gamma - \delta'$	68	23	53.2 ^v

9.82640

8.23418^v9.96837^v016230^v

8.19125

 $\delta - \delta'$ +53' 24.0

δ	-24	01	22.0 ^v	α	18	11	16.74 ^v
$\gamma - \delta$	-24	01	22.3 ^v	$\gamma - \alpha$	18	11	15.51 ^v
$\theta - \alpha$			+0.3 ^v	$\theta - \alpha$			+1.23 ^v

curr. +1.5^vcurr. -0.10^v $\pm$ 2nd Ord. Ref. +0.3 α 18 11 16.64 δ -24 01 20.2 $\theta - \alpha$ +1.13 $\theta - \alpha$ +2.1

13279

Lunar Parallax

20

$$\begin{array}{rclcl}
 \alpha & 18 & 10 & 20.03 & \\
 \delta & 19 & 19 & 25.8 & \\
 \alpha - \alpha' & +1 & 9 & 05.77 & \\
 = & +170 & 16 & 26.55 & \\
 \frac{1}{2} \lambda \cdot \alpha & & +7 & 05.33 & \\
 \alpha - \alpha' = \frac{1}{2} \lambda \alpha + 17 & 09 & 21.22 & &
 \end{array}$$

$$\begin{array}{rcl}
 \pi & 58 & 56.9 \\
 9.86413 \\
 8.23418 \\
 9.47267 \\
 00.3935 \\
 \text{Sun } \alpha - \alpha' & 76 & 15.83
 \end{array}$$

$$\begin{array}{r}
 9.95727 \\
 0.00000 \\
 001976 \\
 9.91103
 \end{array}$$

$$\begin{array}{rcl}
 \alpha - \alpha' & +14 & 10.67 \\
 = & +58 & 59.1
 \end{array}$$

$$\begin{array}{rcl}
 \gamma & 43 & 29 \quad 07.2 \\
 \delta' & -24 & 54 \quad 46.0 \\
 \gamma - \delta' & 68 & 23 \quad 53.2
 \end{array}$$

$$\begin{array}{r}
 9.82640 \\
 8.23418 \\
 99.6837 \\
 01.6230 \\
 8.181125
 \end{array}$$

$$\begin{array}{rcl}
 \delta - \delta' & +53 & 24.0
 \end{array}$$

$$\begin{array}{rcl}
 \delta & -24 & 04 \quad 22.0 \\
 \gamma - \delta & -24 & 01 \quad 22.3
 \end{array}$$

$$\begin{array}{rcl}
 O.C. & & +0.3
 \end{array}$$

$$\begin{array}{rcl}
 \text{curr} & & +1.5
 \end{array}$$

$$\begin{array}{rcl}
 2^{\text{nd}} \text{ Ord. Ref} & & +0.3
 \end{array}$$

$$\begin{array}{rcl}
 \delta & -24 & 01 \quad 20.2
 \end{array}$$

$$\begin{array}{rcl}
 O.C. & & +2.1
 \end{array}$$

$$\begin{array}{rcl}
 \alpha & 18 & 11 \quad 16.74
 \end{array}$$

$$\begin{array}{rcl}
 \gamma - \alpha & 18 & 11 \quad 15.51
 \end{array}$$

$$\begin{array}{rcl}
 O.C. & & +1.23
 \end{array}$$

$$\begin{array}{rcl}
 \text{curr} & & -0.10
 \end{array}$$

$$\begin{array}{rcl}
 \alpha & 18 & 11 \quad 16.64
 \end{array}$$

$$\begin{array}{rcl}
 O.C. & & +1.13
 \end{array}$$

1
7
193
18
243
34
71
23
143
2
121
15

13273

Star Measures

21

1	18520	17595	17200	17152
7.7	12540	13579	9892	14460
19.7	3638	8180	8890	60
	20	95	00	52
	<u>7.5982</u>	<u>7.5985</u>	<u>19.7310</u>	<u>19.7308</u>

3	17348	16170	13960	16402
18.6	11650	11884	8238	15122
24.9	4246	8082	38	22
	48	70	60	02
	<u>18.5702</u>	<u>18.5712</u>	<u>24.8722</u>	<u>24.8720</u>

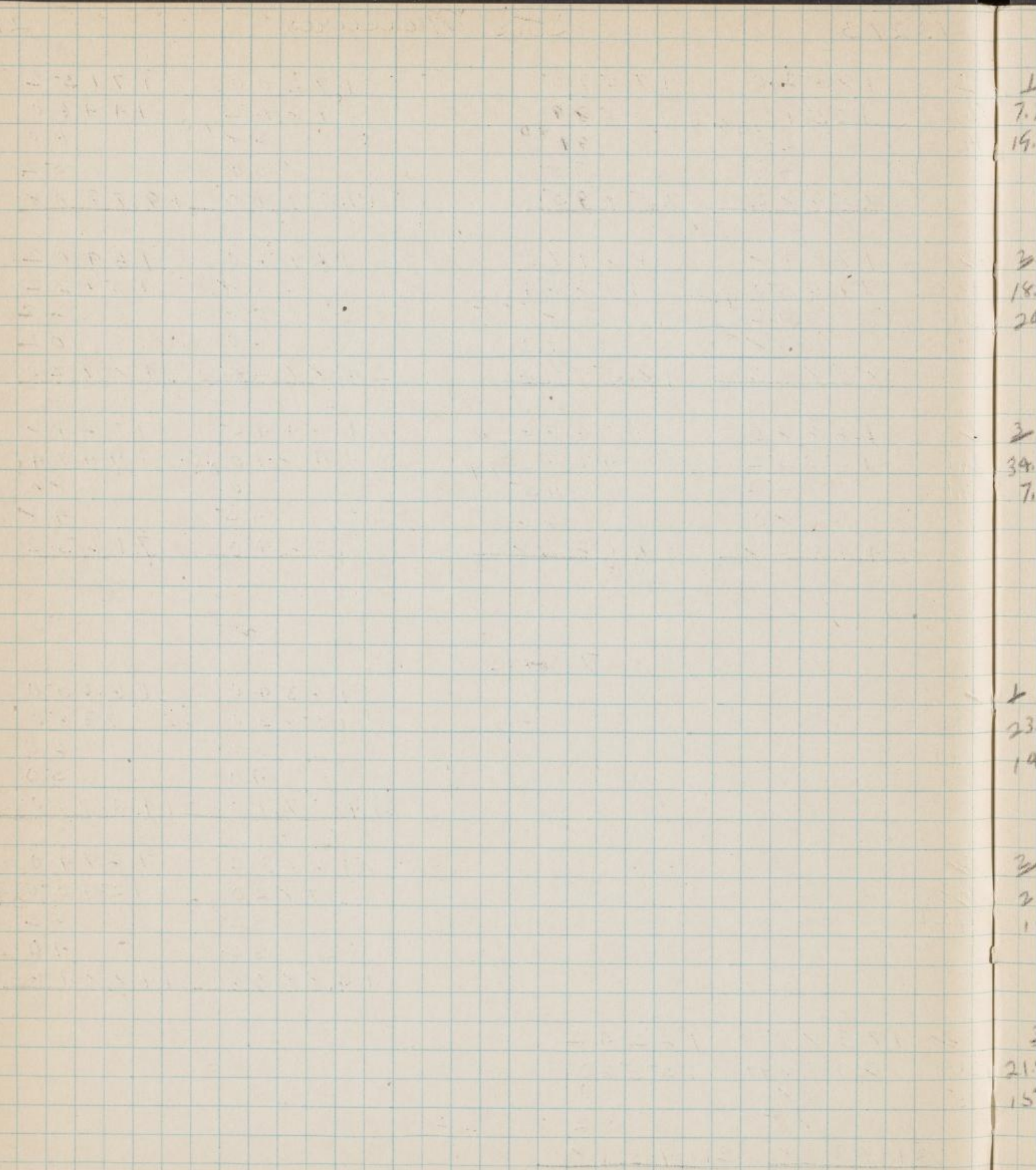
3	16680	17466	16445	17848
34.1	15052	9093	14810	9474
7.1	52	9594	0	86
	80	66	45	48
	<u>34.1628</u>	<u>34.1628</u>	<u>7.1640</u>	<u>7.1632</u>

Moon

1	16340	16650
23.0	15630	7360
14.1	30	60
	40	50
	<u>14.0710</u>	<u>14.0710</u>

3	16732	16940
22.9	7920	15750
14.9	32	62
	32	40
	<u>14.8806</u>	<u>14.8816</u>

3	17385	16242
21.9	80767	15560
15	78	60
	85	42
	<u>21.9308</u>	<u>21.9318</u>



13273

Star Measures

21

1	185-20	17595	17200	17152
7.7	12540	13599	9892	14460
19.7	36 38	8180	2890	60
	20	95	00	52
	<u>7.5982</u>	<u>7.5985</u>	<u>197310</u>	<u>197308</u>

3	17348	16170	18960	16402
18.6	11650	11884	8238	15122
24.9	42 46	8082	38	22
	48	70	60	02
	<u>18.5702</u>	<u>18.5712</u>	<u>24.8722</u>	<u>24.8720</u>

2	16680	17466	16445	17848
34.1	15052	9093	14810	9474
7.1	52	9594	0	86
	80	66	45	48
	<u>34.1628</u>	<u>34.1628</u>	<u>7.1640</u>	<u>7.1632</u>

Moon

1		16340	16650
23.0		15630	7360
14.1		30	60
		40	50
		<u>14.0710</u>	<u>14.0710</u>

3		16732	16990
22		7920	15750
14.9		32	62
		32	40
		<u>14.8806</u>	<u>14.8816</u>

3	17385	16242	
21.9	807677	15560	
15	78	60	
	85	42	
	<u>21.9305</u>	<u>21.9318</u>	

169
17105
16970
0135

1
4
2
18
5
20
16
6
22
17
2
23
14
8
23
17

13273

Moon Measures

22

4 17450 16177

21.7 10440 13187

16.0 40 87

50 77

21.7010 21.7010

5

22.0

16.9

16738 16394

689892 16220

86 20

38 94

169846 169826

6 16960 18760

22.0 16830 890400

17.0 30 96

60 60

22.0130 22.0140

I 16373 16330

23.2 1397673 873032

14.0 66 34

73 30

23.2402 23.2402

8

23

17.7

16470 16040

8564 13940

64 40

70 40

17.7906 17.7900

1327.3

Moon Measures

22

4 17450 16177

21.7 10440 13187

16.0 40 87

50 77

21.7010 21.7010

5

22.0

16.9

16738 16399

689892 16220

86 20

38 94

169846 169826

6

22.0

17.0

16960 18760

16830 890400

30 96

60 60

22.0130 22.0140

I

16373 16330

1397673 873036

66 34

73 30

23.2400 23.2402

8

16470 16040

8564 13940

64 40

70 40

17.7906 17.7900

13273

Juvies Etc

23

Date Aug. 27. 1917

Ex to Stars	18	53		19	05	
" " Moon	18	59	44.9 ^v	18	59	45.6 ^v
Clock Slow			28.2 ^v			
	1	0	13.45 ^v			
H Sid Time	19	0	13.45 ^v			
N Gauge	4	44	31.05	$\Phi = +0^h$	50 ^m ^v	
G Sid Time	23	44	44.50 ^v			
" " " M.N	10	20	35.90 ^v			
Interval	13	24	08.60 ^v			
Red		-02	11.74 ^v			
G. M. T	13	21	56.86 ^v	13.36	58 ^v	

From Naut Almanac

R.A.

Dec

Moon 13 ^h 18	18	09	31.08 ^v	-24	03	55.5 ^v
Motion 1 ^m			2.5406 ^v			+3.761 ^v
" 21 ^m 9477 ^v			55.76 ^v		01	21.2 ^v
Tabular Place	18	10	26.84 ^v	-24	02	34.3 ^v

Moon's Age 10^d

$$934'' = 59''$$

$$a = -502.9$$

$$+24$$

$$-478.9$$

$$\text{Parallax } 5.8 \quad 56.13''$$

$$\text{Semi-diam } 16 \quad 05.2''$$

$$R \quad 965.2''$$

$$\text{Aug: } 6.8$$

$$\text{Dur 4 } -0.4$$

$$R \quad 971.1''$$

$$R \quad 20817''$$

$$aR \quad -997''$$

$$(1+R) \quad 19820''$$

$$R^2 \quad 39283''$$

13273

Juno Etc

23

Date Aug 27. 1917

Sp. to Stars	18	53		19	05	
Moon	18	59	44.9	18	59	45.6
Clock Slow			28.2			
	1	0	13.95			
H Sid Time	19	0	13.45			
H Yang	4	44	31.05			
C Sid Time	23	44	44.50			
M.N	10	20	35.90			
Interval	13	24	08.60			
Red		-02	11.74			
C M T	13	21	56.86			
				13	36	58

From Hunt Along

RA

Dec

Moon 13 ^h	18	09	31.08	-24	03	55.5
Motion 1			2.5406			+3.701
21 ^m 9497			55.76		01	21.2
Tabular Place	18	10	26.84	-24	02	34.3

Moon's Age 10^d

934" = 59

a = -5° 02.9

+24

-478.9

Parallax	58	56.13
Semi-diam	16	05.2
R		965.2
ang.		63
Dir 4		-0.4
R		971.1
R		20817
a R		-997
(H+R)		19820
R2		39283

X
8
+
-
-
2
y
1
-
+
15
2

13273

Plate Constants

24

$$\begin{array}{r} X \quad 7.5984 \\ S \quad 7.3563 \\ \quad +2421 \end{array}$$

$$\begin{array}{r} 18.5707 \\ 18.8903 \\ - .8196 \end{array}$$

$$\begin{array}{r} 34.1628 \\ 35.2320 \\ - 1.0692 \end{array}$$

$$\begin{array}{r} \eta \quad 19.7309 \\ \eta \quad 19.7980 \\ \quad - .0671 \end{array}$$

$$\begin{array}{r} 24.8721 \\ 25.1910 \\ - 0.3189 \end{array}$$

$$\begin{array}{r} 7.1636 \\ 6.5428 \\ + .6208 \end{array}$$

$$\begin{array}{r} X-S + 500X \quad + 19.5\eta \quad + 2.9X - 6628 \\ +2421 + 3799 = -6220 + 385 = 6605 + 22 = 6627 \\ -3196 + 9285 = 6089 + 485 = 6574 + 54 = 6628 \\ -1.0692 + 17081 = 6889 + 140 = 6529 + 99 = 6628 \\ 23.6818 + 19841 \quad + 311 \quad + 69 = 24.2411 \end{array}$$

$$\begin{array}{r} \eta - \eta + 500\eta \quad - 13.6X \quad + 18.6\eta - 9458 \\ -0671 + 9865 = 9194 - 103 = 9091 + 367 = 9458 \\ -3189 + 12436 = 9247 - 252 = 8995 + 462 = 9457 \\ +6208 + 3582 = 9790 - 465 = 9325 + 133 = 9458 \\ 15.9282 + 7964 \quad - 322 \quad + 297 = 15.7763 \end{array}$$

$$\begin{array}{r} \text{Totals} = +0.8 \quad = -15.2 \quad = +16.0 \quad = -6.0 \\ \quad -502.9 \quad -518.6 \quad +15.7 \quad -5.9 \\ \quad -503.7 \quad -503.4 \quad -0.3 \quad +0.1 \end{array}$$

13273

Plate Constants

24

$$\begin{array}{r} X \quad 7.5984 \\ S \quad 735.63 \\ +2421 \end{array}$$

$$\begin{array}{r} 18.5707 \\ 18.8903 \\ -0.3196 \end{array}$$

$$\begin{array}{r} 34.1628 \\ 35.2320 \\ -1.0692 \end{array}$$

$$\begin{array}{r} y \quad 19.7309 \\ 19.7980 \\ -0.0671 \end{array}$$

$$\begin{array}{r} 24.8721 \\ 25.1910 \\ -0.3189 \end{array}$$

$$\begin{array}{r} 7.1636 \\ 6.5428 \\ +0.6208 \end{array}$$

$$\begin{array}{r} X-S + 500X \quad + 19.5X \quad + 2.9X - 6628 \\ +2421 + 3799 = -6220 + 385 = 6605 + 22 = 6627 \\ -3196 + 9285 = 6089 + 485 = 6574 + 54 = 6628 \\ -1.0692 + 17081 = 6389 + 140 = 6529 + 99 = 6628 \\ 3.6818 + 11841 \quad + 311 \quad + 69 = 24.2411 \end{array}$$

$$\begin{array}{r} y-\eta + 500y \quad - 13.6X \quad + 18.6y - 9458 \\ 10671 + 9865 = 9194 - 103 = 9091 + 3687 = 9458 \\ -3189 + 12436 = 9247 - 252 = 8995 + 462 = 9457 \\ +6208 + 3582 = 9790 - 465 = 9325 + 133 = 9458 \\ 79282 + 7964 \quad - 322 \quad + 297 = 15.7763 \end{array}$$

$$\begin{array}{r} \eta/\mu = +0.8 \quad = -15.2 \quad = +16.0 \quad = -6.0 \\ -5.029 \quad -5.986 \quad +15.7 \quad -5.9 \end{array}$$

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Moon Center

25

0-C

1	23.2402	-0.4428	-10	0.1969	3.9369	+86
2	23.0000	-0.6830	-9	0.4678	3.9378	+95
3	22.0000	-1.6830	-5	2.8342	3.9398	+115
4	21.9313	-1.7517	-5	3.0702	3.9396	+113
5	21.7010	-1.9820	-10	3.9283	3.9283	0
6	22.0000	-1.6830	+5	2.8308	3.9354	+71
7	22.0135	-1.6695	+5	2.7856	3.9249	-34
8	23.0000	-0.6830	+9	0.4652	3.9117	-166

Q² 3.9283

165790

arc

1	14.0000	-1.9310	-29	3.7400	193
2	14.0710	-1.8600	-28	3.4700	200
3	14.8811	-1.0499	-16	1.1056	238
4	15.0000	-0.9310	-14	0.8694	242
5	15.9310	-0.0000	0	0.0000	270
6	16.9836	+1.0526	-16	1.1046	302
7	17.0000	+1.0690	-16	1.1393	303
8	17.7903	+1.8593	-28	3.4465	340

48754

Range 147

X = 23 Y = 14.0710

17.7903

31.8613

Y₀ 15.9306

Open R = 1.9820

X_{min} = 21.7010X₀ 23.6830

Moon Center

X₀ 23.6830Y₀ 15.9310

1
2
3
4
5
6
7
8

13273

Moon Center

25

0-C

1	23.2402	-0.4428	-10	0.1969	3.9369	+86
2	23.0000	-0.6830	9	0.4678	3.9378	+95
3	22.0000	-1.6830	5	2.8342	3.8388	+115
4	21.9813	-1.7517	5	3.0702	3.9396	+113
5	21.7010	-1.9820	10	3.9283	3.9283	0
6	22.0000	-1.6830	5	2.8308	3.9354	+71
7	22.0135	-1.6695	8	2.7856	3.9249	-34
8	23.0000	-0.6830	9	0.4652	3.9118	-166

R² 3.9283

arc

1	14.0000	-1.9310	-29	3.7400	193
2	14.0710	-1.8600	-28	3.4700	200
3	14.8811	-1.0499	-16	1.4456	238
4	15.0000	-0.9310	-14	0.8694	242
5	15.9810	-0.0000	0	0.0000	270
6	16.9836	+1.0526	-28	1.1046	302
7	17.0000	+1.0690	-16	1.1393	308
8	17.7903	+1.8593	-28	3.4465	340

Range 147

X = 23 Y = 14.0710

17.7903

31.8613

40 15.9306

Cen R = 1.9820

X mm = 21.7010

X₀ 23.6830X₀ 23.6830

Moon Center

40 16.9310

1	+ 0.85	- 37.8	- 166.0
2	+ 1.26	- 64.6	- 176.3
3	+ 1.77	- 193.0	- 120.8
4	+ 1.63	- 197.7	- 105.0
5	0.00	0.0	0.0
6	- 1.77	- 119.3	+ 74.5
7	- 1.79	+ 56.8	- 36.4
8	- 1.26	+ 113.0	- 309.0
	+ 5.51	+ 169.8	+ 74.5
	- 4.82	- 612.4	- 913.5
	+ 0.69	- 442.6	- 839.0

722.2

	a	b	c	0-c (con)
a - 25	+ 11	+ 8	- 21	- 54
	+ 17	+ 7	- 16	- 42
	+ 42	+ 4	+ 6	+ 21
b - 4	+ 44	+ 4	+ 8	+ 26
	+ 50	+ 0	+ 10	- 38
c - 40	+ 42	- 4	- 2	+ 87
	+ 42	- 4	- 2	- 17
	+ 17	- 7	- 30	- 109

much noise

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Conditional Equations:

26

O-C

1	-0.44	-1.93	= +86	+11	+108	= +119	= -	33
2	-0.68	-1.86	= +95	+17	+104	= +121	= -	26
3	-1.68	-1.05	= +115	+41	+59	= +100	= +	15
4	-1.75	-0.93	= +113	+43	+52	= +95	= +	18
5	-1.98	-0.00	= 0	+48	0	= +48	= -	48
6	-1.68	+1.05	= +71	+41	-59	= -18	= +	99
7	-1.67	+1.07	= -34	+41	-60	= -19	= -	15
8	-4.68	+1.86	= -166	+17	-104	= -87	= -	79

$$+122 - 201$$

$$\text{ar} \quad 323$$

$$\text{ar} \quad 41$$

$$+16.58 + 0.69 = -442.6 - 10.56$$

$$+ 0.69 + 14.86 = +839.0 - 1.79$$

$$- () - 0.03 = + 18.1$$

$$+14.83 = -820.9$$

$$- 0.09$$

$$k = -55.8 \checkmark$$

$$+10.58 = -442.6 + 38.5 = -404.1 \quad a = -24.4 \checkmark$$

$$- 0.63$$

$$\text{arc } 147$$

$$R = 1.98$$

$$\frac{P}{m} = .14 \checkmark$$

$$-2Rc = -1.98$$

$$\frac{EK}{m} = -9.9$$

$$\Delta t = +0.18 \quad \Delta \delta = +0.1$$

$$\frac{-9.9}{.14} = -71$$

$$\Delta a = +1.25 \quad \Delta \alpha = +0.04$$

$$\Delta R = -0.9 \checkmark$$

$$\text{corr } A \quad +0.5$$

$$\text{True } \Delta R = -1.4$$

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Moon's Mean Position

27

$$\begin{array}{r} \chi_0 \quad 23.6830'' \\ \quad - 12'' \\ \hline 23.6818'' \end{array}$$

$$\begin{array}{r} \chi_0 \quad 15.9310'' \\ \quad - 28'' \\ \hline 15.9282'' \end{array}$$

Transit Plate Constants

$$\begin{array}{r} 24.2411'' \\ \quad 22'' \\ \hline + 2.2411'' \end{array}$$

$$\begin{array}{r} 15.7763'' \\ \quad 18'' \\ \hline - 2.2237'' \end{array}$$

$$\begin{array}{r} 0.35046 \\ 995749'' \\ 8.50724 \\ 1.88573'' \end{array}$$

$$\begin{array}{r} 9.6677'' \\ 0.7009 \\ 7.0534 \\ 7.4220'' \end{array}$$

$$+ 7.687''$$

$$\begin{array}{r} \eta_1 = + 0.0026'' \\ \eta_0 = - 2.2263'' \end{array}$$

$$+ 01 \quad 10.87''$$

$$0.34759''$$

$$A \quad 18 \quad 08 \quad 25.01''$$

$$7.33115''$$

$$3.01644''$$

$$\alpha_0 \quad 18 \quad 09 \quad 41.88''$$

$$- 1038.6''$$

$$\text{Red} \quad + 4.45''$$

$$- 17 \quad 18.6''$$

$$\delta - 24 \quad 39 \quad 03.7''$$

$$\alpha' \quad 18 \quad 09 \quad 46.33''$$

$$\delta_0 - 24 \quad 56 \quad 22.3''$$

$$\text{Red} \quad - 1.0''$$

$$\delta' - 24 \quad 56 \quad 23.3''$$

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Moss's Mean Position

27

$$\begin{array}{r} \gamma_0 \quad 23.6830'' \\ \quad \quad - 1.2'' \\ \hline 23.6818'' \end{array}$$

$$\begin{array}{r} \gamma_0 \quad 15.9310'' \\ \quad \quad - 2.8'' \\ \hline 15.9282'' \end{array}$$

From Plate Constants

$$\begin{array}{r} 24.2411'' \\ \quad \quad 22'' \\ \hline + 2.2411'' \end{array}$$

$$\begin{array}{r} 15.7763'' \\ \quad \quad 18'' \\ \hline - 2.2237'' \end{array}$$

$$\begin{array}{r} 0.35046 \\ 995.749'' \\ 850.724 \\ 1.88573'' \end{array}$$

$$\begin{array}{r} 9.6677'' \\ 070.09 \\ 7.0534 \\ 7.4220'' \end{array}$$

$$+ 76.87''$$

$$\begin{array}{l} \eta = + 0.0026'' \\ \eta_0 = - 2.2263'' \end{array}$$

$$+ 0.1 \quad 10.87''$$

$$A \quad 18 \quad 08 \quad 25.01''$$

$$\begin{array}{r} 0.34759'' \\ 7.33115'' \\ 3.01644'' \end{array}$$

$$\alpha_0 \quad 18 \quad 09 \quad 41.88''$$

$$- 1.0386''$$

$$\text{Red} \quad + 4.45''$$

$$- 1.7 \quad 18.6''$$

$$\alpha' \quad 18 \quad 09 \quad 46.33''$$

$$B - 24 \quad 39 \quad 03.7''$$

$$\beta_0 - 24 \quad 56 \quad 22.3''$$

$$\text{Red} \quad - 1.0''$$

$$\delta' - 24 \quad 56 \quad 23.3''$$

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Lunar Parallax.

28

$$\begin{array}{rcl}
 \alpha & 18 & 09 & 46.33^{\circ} \\
 \theta & 19 & 00 & 13.45^{\circ} \\
 \theta - \alpha & + & 50 & 27.12^{\circ} \\
 = & + & 12 & 36 & 46.80^{\circ} \\
 \frac{1}{2} \alpha - \alpha & + & 5 & 12.75^{\circ} \\
 \theta - \alpha - \frac{1}{2} \alpha - \alpha & + & 12 & 31 & 34.05^{\circ}
 \end{array}$$

$$\begin{array}{r}
 9.95727 \\
 0.00000 \\
 0.01046^{\circ} \\
 9.96773^{\circ}
 \end{array}$$

$$\gamma = 42 \quad 52 \quad 24.0^{\circ}$$

$$\delta = -24 \quad 56 \quad 23.3^{\circ}$$

$$67 \quad 48 \quad 47.3^{\circ}$$

$$\begin{array}{r}
 9.82640 \\
 8.23408^{\circ} \\
 9.96659^{\circ} \\
 0.16725^{\circ} \\
 8.19432
 \end{array}$$

$$+53 \quad 46.7^{\circ}$$

$$\delta = -24 \quad 02 \quad 36.6^{\circ}$$

$$\text{gh } \delta = -24 \quad 02 \quad 34.3^{\circ}$$

$$o-c = -2.3^{\circ}$$

$$\text{curr.} = +1.5^{\circ}$$

$$\text{3rd Ord. Ref.} = +0.3$$

$$\delta = -24 \quad 02 \quad 34.8$$

$$o-c = -0.5$$

$$\pi = 58 \quad 56.13^{\circ}$$

$$9.86913$$

$$8.23408^{\circ}$$

$$9.33918^{\circ}$$

$$0.03941^{\circ}$$

$$\sin \alpha = 7.48180$$

$$\alpha - \alpha = +10 \quad 25.50^{\circ}$$

$$= +41.70^{\circ}$$

$$\alpha = 18 \quad 10 \quad 28.03^{\circ}$$

$$\text{gh } \alpha = 18 \quad 10 \quad 26.84^{\circ}$$

$$o-c = +1.19^{\circ}$$

$$\text{curr} = -0.10^{\circ}$$

$$\alpha = 18 \quad 10 \quad 27.93$$

$$o-c = +1.09$$

13273

Lunar Parallax.

28

$$\begin{array}{rcl}
 \alpha & 18 & 09 & 46.33'' \\
 \delta & 19 & 00 & 13.45'' \\
 \epsilon - \alpha & + & 50 & 27.12'' \\
 = & + & 12 & 36 & 46.80'' \\
 \frac{1}{2} \epsilon - \alpha & + & 5 & 12.75'' \\
 \delta - \alpha - \frac{1}{2} \epsilon - \alpha & + & 12 & 31 & 34.05''
 \end{array}$$

$$995727$$

$$0.00000$$

$$0.01046''$$

$$996773''$$

$$\gamma \quad 42 \quad 52 \quad 24.0''$$

$$\delta \quad -24 \quad 56 \quad 23.3''$$

$$67 \quad 48 \quad 47.3''$$

$$982640$$

$$823408''$$

$$996659''$$

$$0.16725''$$

$$819432$$

$$+53 \quad 46.7''$$

$$\delta \quad -24 \quad 02 \quad 36.6''$$

$$\epsilon - \delta \quad -24 \quad 02 \quad 34.3''$$

$$0 - \epsilon \quad - \quad 2.3''$$

$$\text{curr.} \quad + \quad 1.5''$$

$$\text{Ind. And. Ref.} \quad + \quad 0.3''$$

$$\delta \quad -24 \quad 02 \quad 34.8''$$

$$0 - \epsilon \quad -0.5''$$

$$\pi \quad 58 \quad 56.13''$$

$$9.86913$$

$$8.23408''$$

$$9.33918''$$

$$0.03941''$$

$$\text{Sun} - \alpha \quad 7481.80$$

$$\alpha - \alpha' \quad +10 \quad 25.50''$$

$$= \quad + \quad 41.70''$$

$$\alpha \quad 18 \quad 10 \quad 28.03''$$

$$\epsilon - \alpha \quad 18 \quad 10 \quad 26.84''$$

$$0 - \epsilon \quad + \quad 1.19''$$

$$\text{curr.} \quad - \quad 0.10''$$

$$\alpha \quad 18 \quad 10 \quad 27.93$$

$$0 - \epsilon \quad + \quad 1.09''$$

