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Date	Date	Page
13914	Oct. 28. 1917	1
13915	Oct " "	11
13958	" 31. "	21

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1917pasp..29..1.

13914

Star Measures.

1	17670	18540	16832	17130
17.2	15762 64	10460 56	14212 14	9742
12.2	66	52	16	42
	70	40	32	30
	17.1906	17.1916	12.2618	12.2612
2	17230	17672	16750	16154
2.63	13310 06	11596	9262	13638
26.8	02	96	62	38
	30	72	50	54
	26.3924	26.3924	26.7488	26.7484
3	16294	18928	16954	17498
30.4	11718 22	13500	13110 14	11332
11.4	26	00	18	32
	94	28	54	98
	30.4572	30.4572	11.3840	11.3834

Moon

1	18478		16946
23.	11458		13972
14.8	58		72
	78		46
	14.7020		14.7026
2	16762		17522
22.	15392		8890
15.1	92		90
	62		22
	15.1370		15.1368
3	18004	16780	
21.4	14115 21	10670 69	
16.	27	68	
	04	80	
	21.3883	31.3899	

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Star Measures.

1	17670	18540	16832	17130
17.2	15762 64	10460 56	14212 14	9742
12.2	66	52	16	42
	70	40	32	30
	17.1906	17.1916	12.2618	12.2612
2	17230	17672	16750	16154
2.63	13310 06	11596	9262	13638
26.8	02	96	62	38
	30	72	50	54
	26.3924	26.3924	26.7488	26.7484
3	16294	18928	16954	17498
30.4	11718 22	13500	13110 14	11332
11.4	26	00	18	32
	94	28	54	98
	30.4572	30.4572	11.3840	11.3834

Moon

1	18478		16946
23.	11458		13972
14.8	56		72
	78		46
	14.7020		14.7026
2	16762		17522
22.	15392		8890
15.1	92		90
	62		22
	15.1370		15.1368
3	18004	16780	
21.4	14115 21	10670 69	
16.	27	68	
	04	80	
	21.3883	21.3899	

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1391 4

Star Measures.

1	17670	18540	16832	17130
17.2	15 7 6 2 64	10460 52	14212 14	9742
12.2	66	52	16	42
	70	40	32	30
	17.1906	17.1916	12.2618	12.2612
2	17230	17672	16750.	16154
26.3	13310 06	11596	9262	13638
26.8	02	96	62	38
	30	72	50	54
	26.3924	26.3924	26.7488	26.7484
3	16294	18928	16954	17498
30.9	11718 22	13500	13110 14	11332
11.4	26	00	18	32
	94	28	54	98
	30.4572	30.4572	11.3840	11.3834

Moon

1		18478		16946
23.		11 45 58		13972
14.8		56		72
		78		46
		14.7020		14.7026
2		16762		17522
22.		15 3 9 2		8840
15.1		92		40
		62		22
		15.1370		15.1368
3	18004	16780		
21.4	14115 21	10670 69		
16.	27	68		
	04	80		
	21 3 4 8 3	31.3849		

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Moon

4

	18348	16526
21.2	15790 94	9086
16.2	98	86
	48	26
	21.2554	21.2560

5

	18760	16526
21.2	15986	92902 92
17.0	86	94
	60	26
	21.2774	21.2766

6

22		
18.2		
	18276	16202
	15460 56	9014 17
	52	20
	76	02
	18.2820	18.2815

7

23.		
18.7		
	17490	16926
	1028178	14128
	75	28
	90	26
	18.7212	18.7202

8

23.2		
18.8		
	16970	16282
	9600	13645 49
	00	53
	70	82
	18.7370	18.7367

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Moon

.	18348	16526
1.2	15790 54	9086
6.2	98	86
	48	26
	21.25 54	21,25 60

5/	18760	16526
1.2	15986	99290 42
7.0	86	94
	60	26
	21.27 74	21.27 66

=	18276	16202
22	15460 56	9014 17
8.2	52	20
	76	02
	18.28 20	18.28 15

2	17490	16426
3	10281 78	14428
8.7	75	24
	90	26
	18.72 12	18.72 02

8/	16970	16282
2.2	9600	13645 49
1.84	00	53
	70	82
	18.73 70	18 73 67

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13914 Times Etc.

Date Oct 28, 1917

Exp. ☆ Stars	04	23	"	4	35"	
" " Moon	04	28	57.7"	4	28	57.9"
Clock Slow		01	18.3"			
H. Sid Time	04	30	16.1"			
H. Long	04	44	31.05"	θ = +3h 17m		
G. Sid. Time	09	14	47.15"			
" " " M.N	14	25	02.20"			
Interval	18	49	44.95"			
Red		03	05.08"			
G. M.T	18	46	39.87"	18h	7m	7.7"

From Naut. Alman.		R.A.		Dec.		
Moon 18h	01	11	55 55.58"	+12	50	02.2"
Motion 1m			2.34555"			+12.948"
" 46.6645"		01	49.45"	+10		04.2"
Tabular Place.	01	13	45038"	+13	0	06.4"

934" = 9.8"

Moon's Age 13d

Parallax	60	06.35"
Semi-diam	16	24.1"
R		984.1"
Aug		10.8"
Dec 4		-0.4
R		994.5"
R		2.1318"
aR		1018"
(1+a)R		2.03000"
R²		4.1209"

a = −501.8
+24.0
−477.8

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13914 Times Etc.

Date Oct 28, 1917

Exp. ♄ Stars	04	23		4	35	
" Moon	04	28	57.7	4	28	57.9
Clock Slow		01	18.3			
H. Sid Time	04	30	16.1			
H. Young	04	44	31.05	θ = +3	17	
G Sid Time	04	14	47.15			
" M.N	14	25	02.20			
Interval	18	49	44.95			
Red		03	05.08			
G. M.T	18	46	39.87	18	7777	

From Naut. Alman.		R.A.		Dec.		
Moon 18h	01	11	55.56	+12	50	02.2
Motion 1m			2.3455			+12.948
" 46.6645		01	49.45		+10	04.2
Tabular Place	01	13	45.03	+13	0	06.4

93.4" : 98

a = −5°01.8
+24.0
−4718

Moon's Age 13d

Parallax	60	06.35
Semi diam	16	24.1
R		484.1
Aug		10.8
Dr 4		−0.4
R		9945
R	2.1	318
q R		1018
(1+n) R	20	300
R²	4.1	209

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	S_0	η_0	ΔS	-2.65	$+.2\eta$	-3
	-5.37	-5.96	-10	$+14 = +4$	$-1 = +3$	
	$+4.39$	$+9.19$	$+12$	$-11 = +1$	$+2 = +3$	
	$+8.55$	-6.99	$+26$	$-22 = +4$	$-1 = +3$	
M	$+1.06$	-1.33		-3	$0 = -6 = -0.02$	

$\Delta\eta$	-2.7η	$+.7S$	-2
-10	$+16 = +6$	$-4 = +2$	
$+24$	$-25 = -1$	$+3 = +2$	
-22	$+19 = -3$	$+6 = +3$	
	$+4$	$+1 = +3 = +0.1$	

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13914 Standard Coordinates 4

	Cafe No. 164 Aug. 7.1		Cafe No 177 Aug 6.4		Cafe No 180 Aug. 8.3	
C	01 07	03.86	01 12	14.86	01 14	25.99
G		03.87		14.44	"	26.01
E		03.86		14.86		26.01
M	01 07	03.86	01 12	14.89	01 14	26.00
Rec		53.61		53.97		53.74
a	01 07	57.47	01 13	08.86	01 15	19.74
A	01 10	48.30	01 10	48.30m	01 10	48.30
A-A	- 02	50.83	+ 2	20.56	+ 4	31.44
Sin		-170.83		+140.56		+271.43
log	2.232576n		2.14787		2.433366	
Co δ₀	9.990655		9.998727		9.999087	
log S₀	0.730435n		0.642238		0.931177	
S₀	-5.37599		+ 4.38911		+ 8.54628	
S₁	- 9		+ 12		+ 26	
S	16.62232		26.39903		34.54888	
X	17.19111		26.39924		30.45772	
X-S	+ .56879		+ 00021		- .09116	
C	+11 45	06.8	+13 42	57.6	+11 37	13.3
G		06.8		57.6		12.4
E		06.8		56.7		12.3
M	11 45	06.8	+13 42	57.3	+11 37	12.7
Rec	+ 05	26.1	+ 05	23.8	+ 05	22.17
S	+11 50	32.9	+13 48	21.1	+11 42	35.4
D	12 36	54.3	12 36	54.3	12 36	54.3
δ-D	- 46	21.4	+ 1 11	26.8	- 54	18.9
tan		-2781.5		+4287.3		-3259.1
log	3.444428n		3.632118		3.513097n	
log M₀	0.775433n		0.963313		0.844294n	
Tan δ	9.32116		9.39907		9.31655	
S₂	1.46099		1.28488		1.46355	
η₁	7.83559		7.72289		8.23334	
η₀	-5.96226		+ 9.19022		- 6.96611	
η₁	+ 68		53		+ 171	
η	12.04442		27.19555		11.03110	
y	12.26135		26.74886		11.13837	
y-η	+.21693		- .44669		+ .35271	

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13914 Standard Coordinates 4

	Cape No. 164	Aug 7.1	Cape No 177	Aug 6.4	Cape No 180	Aug. 8.3
c	01 07	03.86	01 12	14.86	01 14	25.99
ζ		03.87		14.94		26.01
ε		03.86		14.86		26.01
m	01 07	03.86	01 12	14.89	01 14	26.00
Rec		53.61		53.97		53.79
λ	01 07	57.47	01 13	08.86	01 15	19.74
A	01 10	48.30	01 10	48.30	01 10	48.3
λ-A	02	5°08.3	+ 2	20.56	+ 4	31.4
Sum		-170.83		+140.56		+271.4
log	2.23256		2.14787		2.43366	
Co. S.	9.99065		9.98727		9.99087	
S.	0.73045		0.64238		0.93117	

S.	-5.37559	+4.38980	+8.54628
S.	- 9	+ 12	+ 26
S	16.62232	26.39903	30.54688
I	17.99111	26.39924	30 45.72
λ-S	+.56879	+ 0021	- .09160

c	+11	45°	06.8	+13	42	57.6	+11	37 13.3
ζ			06.8			57.6		12.4
ε			06.8			56.7		12.3
m	11	45°	06.8	+13	42	57.3	+11	37 12.7
Rec	+1	+05	26.1		+05°	23.8		+05° 22.7
S	+11	50	32.9	+13	48	21.1	+11	42 35.4
☉	12	36	54.3	12	36	54.3	12	36 54.
S-☉		-46	21.4	+ 1	11	26.8		-54 18
tan			-2781.5°			+4287.3		-325°9.
log		3.44428		3.63218			3.51309	
η₀		0.17543		0.96333			0.84424	

Tan d	9.32166	9.39907	9.31665°
S.	1.46099	1.26488	1.86335°
η.	7.83559	7.72289	8.23334

η₀	-5°96226	+9.19022	-6.98661
η₁	+ 68	5°3	+ 171
η	12.04242	27.19555°	11.03110
ψ	12.26135°	26.74886	11.13837
ψ-η	+.21893	- .44669	+ .35273

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13414

5

Plate Center + Constants.

26.39.24 26.7486 01 13 08.86 + 13 48 21.1
22. 18. -02 20.56 - 7 11 26.8
-43924 -8.7486
32 490"

A 01 10 48.30

Plate Center

D +13 36 56.3

X-S. +5.00X +71.8Y +1.8X-15.185
+5679+8595 = 14274+880 = 15154+31 = 15185
+0021+13196 = 13217+1920 = 15137+48 = 15185
-0916+15229 = 14313+817 = 15130+55 = 15185
23.2860+11643 +1200 +42 = 23.0560

Y-n +5.00Y -68.8X +2.2Y -7149
+2173+6131 = 8304-1182 = 7122+27 = 7149
-4469+13374 = 8905-1815 = 7098+51 = 7149
+3527+5642 = 9219-2095 = 7124+25 = 7149
16.7097+8355 -1602 +37 = 16.6738

Taffler Q = -1.9 ℓ = -2.1 Q-ℓ = +0.2 A+d = -4.5
Abs. -501.8 -502.2 = +0.4 = -3.0

-499.9 -501.1 +0.2 +1.5

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5"

Plate Center + Constants.

26 39 29 | 26.7486 | 01 13 | 08.86 + 13 48 21.1
22. | 18. | -02 | 20.56 - 1 41 26.8
-43924 | -8.7486
32

A 01 10 48.30

Plate Center

B +12 36 5"43

X-S +5"00X + 71.8 y + 18x - 15"185

+5679 + 85 95" = 14274 + 880 = 15154 + 31 = 15"185
+0021 + 13196 = 13217 + 1920 = 15137 + 48 = 15"185
-0916 + 15229 = 14313 + 817 - 15130 + 55 = 15"185
232860 + 11643 + 1200 + 42 = 23.0560

y - η +5"00 y - 68.8 x + 2.2 y - 7149

+2173 + 61 31 = 8304 - 1182 = 7122 + 27 = 7149
-4469 + 13374 = 8905" - 1815" = 7091 + 55 = 7149
+3521 + 5642 = 9219 - 2095" = 7124 + 25" = 7149
16.7097 + 835"5" - 1602 + 37 = 16.6738

Latitude G = -1.9 ℓ = -2.1 G - ℓ = +0.2 ½(G+ℓ) = -4.5"
Obs. -501.8 -502.2 +0.4 -3.0

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Moon Center

		Δx	$(x-x_0)^2$		O-C
1	23.0000	−0.2840 − 9	0.0811	4.1079	− 130
2	22.0000	−1.2840 − 7	1.6504	4.1219	+ 10
3	21.3860	−1.8980 − 3	3.6035	4.1062	− 147
4	21.2557	−2.0283 0	4.1140	4.1140	− 69
5	21.2770	−2.0070 + 1	4.0276	4.1123	− 86
6	22.0000	−1.2840 + 7	1.6469	4.1205	− 4
7	23.0000	−0.2840 + 9	0.0802	4.1271	+ 62
8	23.2840	0.0000 + 9	0.0000	4.1120	− 89
			$2037R^2$	4.1209	

		Δy		arc	
1	14.7023	−2.0067 0	4.0268	188	⌐
2	15.1369	−1.5721	2.4715	219	
3	16.0000	−0.7090	0.5027	250	
4	16.7090	0.0000	0.0000	270	
5	17.0000	+0.2910	0.0847	278	
6	18.2818	+1.5728	2.4736	321	
7	18.7207	+2.0117	4.0469	352	
8	18.7368	+2.0278	4.1120	360	⌐
			6782	Range	172

X = 22 y = 15.1369
18.2818
33.4187
y_0 16.7093
y_{max} 18.7368
R 2.0275
Com R 2.0300
X_{min} 21.2557
X_0 23.2857

Moon Center

$X_0 = 13.2840$

$Y_0 = 16.7090$

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13914 Moon Center

	Δx	$(x-x_0)^2$		O - C
1. 23.0000	- 0 2840 - 9	0.0811	4.1079	- 130
2 22.0000	- 1 2840 - 7	1650.9	4.1219	+ 10
3 21.3880	- 1.8980 - 3	3.6035	4.1062	- 147
4 21.2557	- 2.0283 0	4.1140	4.1140	- 69
5 21.2770	- 2.0070 + 1	4.0276	4.1123	- 86
6 22.0000	- 1.2840 + 7	1.6469	4.0205	- 4
7 23.0000	- 0.2840 + 9	0.0802	4.1271	+ 62
8 23.2840	0.0000 + 9	0.0000	4.1120	- 89

R^2 4.1209

	Δy			arc
1 14.7023	- 2.0067 0	4.0268		188
2 15.1369	- 1.5721	2.4715		219
3 16.0000	- 0.7090	0.5027		250
4 16.7090	0.0000	0.0000		270
5 17.0000	+ 0.2910	0.0847		278
6 18.2818	+ 1.5728	2.4736		321
7 18.7207	+ 2.0117	4.0469		352
8 18.7368	+ 2.0278	4.1120		360

Range 172

X = 22 y = 15.1369
18.2818
33.4187
y_0 16.7093
y-max 18.7368
R 2.0275
Corr R 2.0300
X mm 21.2557
X_0 23.2857

Moon Center

X_0 = 23.2840
Y_0 = 16.7090

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Formation of Normals.

1	+0.56	+ 36.4	+261.8
2	+2.01	- 12.8	- 15.7
3	+1.35	+279.2	+104.3
4	0.00	±140.0	0.0
5	-0.58	+173.0	- 24.9
6	-2.01	+ 5.1	- 6.3
7	-0.56	- 7.3	+124.8
8	0.00	0.0	-180.5
	+3.92	+633.7	+490.9
	-3.15	- 201	-227.4
	+0.77	+613.6	+283.5

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13914 Conditional Equations. 7

							O-C
1	−0.28	−2.01	= −130	−11	−29	= −40	−90
2	−1.28	−1.57	= +10	−51	−22	= −73	+83
3	−1.90	−0.71	= −147	+75	−10	= −85	−62
4	−2.03	0.00	= −69	−80	0	= −80	+11
5	−2.01	+0.29	= −86	−80	+4	= −76	−10
6	−1.28	+1.57	= −4	−51	+22	= −29	+25
7	−0.28	+2.01	= +62	−11	+29	= +18	+44
8	0.00	+2.03	= −89	0	+29	= +29	−118
							+163 −280
						av	55

+15.20 + 0.77 = +613.6

+ 0.77 + 17.68 = +283.5

−( ) − (0.04 = − 31.0

+17.68 = +252.5 h = +14.3″

+15.20 = +613.6 − 11.0 = 602.6 a = +39.6″

arc 172

$\frac{p}{n}$ = 30′

$\frac{\Sigma v}{n}$ = −14.6″

$\frac{-14.6}{30}$ = −48.6″

ΔR = −0.6″

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13115⁻ Conditional Equations. 7

							O-C
1	-0.28	-2.01	= -130	- 11	- 29	= -40	- 90
2	-1.28	-1.57	= + 10	- 51	- 22	= -73	+ 43
3	-1.90	-0.71	= -147	- 75⁻	- 10	= -85⁻	- 62
4	-2.03	0.00	= - 65	- 80	0	= -80	+ 11
5⁻	-2.01	+0.29	= - 86	- 80	+ 4	= -76	- 10
6	-1.28	+1.57	= - 4	- 51	+ 22	= -29	+ 25
7	-0.28	+2.01	= + 62	- 11	+ 29	= +18	+ 44
8	0.00	+2.03	= - - 85	0	+ 29	= +29	- 118
							+163 - 210

arc 55⁻

+15.20 + 0.77 = +613.6

+ 0.77 + 17.68 = +283.5⁻

-11 - 10.04 = - 31.0

+17.68 = +2525⁻ ∴ + 14.3

+15.20 = +613.6 - 11.0 = 602.6 q = + 39.6

arc 172

$\frac{p}{3} = 30$

$\frac{\Sigma v}{2} = -146$

$\frac{-146}{30} = -4.86$

$\Delta R = -0.6^{s}$

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13914 Moon's Mean Position.

X_0 23.2840″
+20
23.2860″

Y_0 16.7090″
+7
16.7097″

From Plate Constants.

23.0560
22.
+1.0560″

16.67.38
18.
−1.3262″

0.02366″
9.98968″
8.50724
1.52674″

9.34334″
00473″
7.0534
6.44411″

$\alpha - A$ + 33.63″

n_1 +0.0003
n_0 −1.3265″

A = 01 10 48.30

α_0 01 11 21.93″

0.12270 n″
7.33115
2.79155 n″

Red + 4.83

α' 01 11 26.76″

−618.8″
−10 18.8

D = +12 36 54.3

δ_0 +12 26 35.5″

Red +29.9

δ' +12 27 05.4″

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13914 Moons Mean Position.

X_0 23.2840
+20
23.2860

Y_0 16.7090
−7
16.7097

From Plate Constants.

23.0560
22.
+1.0560

16.6738
18.
−1.3262

0.02366
9.98968
8.50724
1.52679

93434
00473
9.05334
6.94441

$\alpha - A$ +3363

η_1 +00003
η_0 −1.3265

A 01 10 4830

α_0 01 11 21.93

0.12270 ~
7.33115
2.79155 ~

Red +4.83

α' 01 11 26.76

−618.8
−10 18.8

δ +12 36 54.3

δ_0 +12 26 35.5

Red +29.9

δ' +12 27 05.4

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1. 01 09 28 37 6
23.597
+4.779

2. 01 13 35 7 30
30.988
+4.742

1 14 59.105
54.019
+5.086

+ 7 08 41.84
12.37
+29.47

3 11 8.59
10 39.65
+28.94

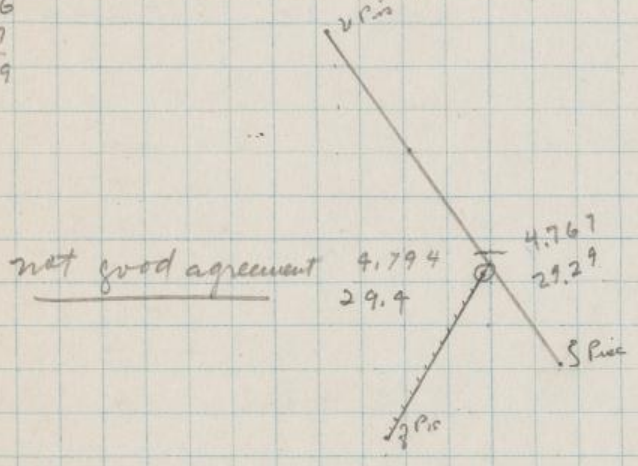
26 50 12.04
49 41.37
+30.67

4.779
4.742
0.037

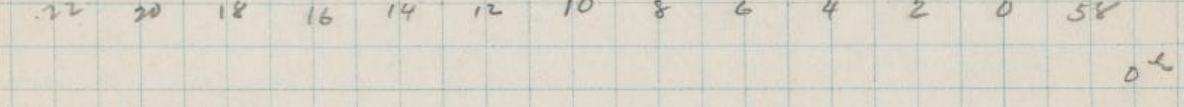
5.086
4.767
0.319

29.47
28.94
0.53

30.67
29.29
1.38



not good agreement



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13914 Red. & Aff. Place.

$H+\alpha_0$	04	40.7	70°	10.5′	δ_0	+ 12°	26.6
H	03	29.3					
α_0	01	11.4			$\cos \delta_0$		9.9897
G	23	49.6			log i		+ 0.8227
$G+\alpha_0$	01	01.0	15°	15′	" (i)		0.8124

		$\sin \delta_0$	9.3334
$\cos G+\alpha_0$	9.9844	$\cos H+\alpha_0$	9.5304
g	1.3579	h	1.2869
$\sin G+\alpha_0$	9.4200	$\sin H+\alpha_0$	9.9734
Tan δ_1	9.3437	sec δ_0	0.0103
	8.8239		8.8239

		h'	0.1507
g'	1.3423	h	0.0945
g	8.9455		

		g'	+ 21.990
f	+ 3.5504	g'	+ 1.415
g	+ 0.088	i	+ 6.492
h	+ 1.243	Red.	+ 29.897
Red	+ 4.835		

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3914 Red to Aff Place.

$H+\chi_0$	04	40.7	70°	$10.5'$	δ_0	$+\ 12^\circ$	26.6
H	03	29.3					
λ_0	01	11.4			$\cos \delta_0$		9.9897
G	23	49.6			$\log i$		0.3227
$G+\chi_0$	01	01.0	15°	$15'$	$i\ (i')$		0.8124
					$\sin \delta_0$		9.3334
$\cos G+\chi_0$		9.9844			$\cos H+\chi_0$		9.5304
q		1.3519			h		1.2869
$\sin G+\chi_0$		9.4200			$\sin H+\chi_0$		9.9734
$\log \delta_0$		9.3437			$\sec \delta_0$		0.0103
		8.8239					8.8239

h'		h	0.1507
q'	1.3423	h	0.0945
q	8.9455		

q'			$+\ 21.9910$
f	$+\ 3.5^\circ 04$	k'	$+\ 1415''$
q	$+\ 0088$	i	$+\ 6.4922$
k	$+\ 1.2423$	Red.	$+\ 29.8917$
Red	$+\ 4.8335'$		

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13914

Lunar Parallax

α'	01	11	26.76 ν	IT	60′ 06.35″ ν
Θ	04	30	16.10 ν		
$\Theta-\alpha'$	+03	18	49.34 ν		9.869913
=	+49	42	20.10 ν		8.242262 ν
$\frac{1}{2}\alpha-\alpha'$		17	24.24		9.882377 ν
$\Theta-\alpha'-\frac{1}{2}\alpha-\alpha'+49$		24	55.86		0.011289 ν
					8.005540

9.995727
9.999999 ν
0.186771 ν
0.143977 ν

$\alpha-\alpha'$ +34′ 48.48 ν

= + 2″ 19.23 ν

χ 54 19 39.2 ν

δ′ +12 27 05.4 ν

χ − δ′ 41 52 33.8 ν

9.826400
8.242262 ν
9.824477 ν
0.090026 ν
7.983755 ν

+33 06.9

δ +13 0 12.3

sph δ +13 0 06.4 ν

O − C +5.9

corr +0.1 ν

2nd Coord. Ref. −0.0

δ +13 0 12.4

O − C +6.8

α 01 13 45.99 ν

α = 01 13 45.03 ν

O − C +0.96 ν

corr −0.02 ν

α 01 13 45.97

δ − C + 0.94

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13914 Lunar Parallax 10

α'	01	11	26.76	π	60′ 06.35″
θ	04	30	16.10		
$\theta - \alpha'$	+03	18	49.34		9869 13
=	+49	42	20.10		8242 62
$\frac{1}{2}(\alpha - \alpha')$		17	24.24		9882 37
$\theta - \alpha' - \frac{1}{2}(\alpha - \alpha')$	+49	24	55.86		0.04128
					8.00540

9.95727
9.99999
0.18671
0.14397

$\alpha - \alpha'$ +34′ 48.48

= +2′ 19.23

α 54 19 34.2

δ' +12 27 05.4

$\gamma - \delta'$ 41 52 33.8

9.82640
8.24262
9.82448
0.09026
7.98375

+33 06.9

δ +13 0 12.3 α 01 13 45.99

Cyl δ +13 0 06.4 α = 01 13 45.03

C - C +5.9 O - C +0.96

Corr +0.1 Corr −0.02

Final Red 00 α 01 13 45.97

δ +13 0 12.4 O - C +0.94

O - C +6.0

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1391 S

11

Star Measures

1	16198	17620	17845	16172
17.0	15976	7844	882729	15192
11.9	76	44	31	92
	98	20	45	72
	17.0222	17.0224	11.9016	11.9020

3	17378	18063	17015	16780
26.3	15226 34	10230 31	130824	10710
26.3	22	32	86	10
	78	63	15	80
	26.2154	26.2168	26.3931	26.9930

3	17910	18242	16260	18842
30.3	15008 10	11142	15970 66	9148
11.0	12	42	62	48
	10	42	60	42
	3029.00	3029.00	11.0294	11.0306

Moon

1	16660	16142
23	8234	145 6066
14.9	34	72
	60	42
	14.8426	14.8424

3	17936	17895
328	10666 72	15148 53
15.0	98	58
	36	95
	22.7264	22.7258

3	17394	16258
21.9	7770	15888
16	70	88
	94	58
	21.9624	21.9630

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1391.5

Star Measures.

1	16198	17620	17845	16172
17.0	15916	7844	8827.29	15192
11.9	76	44	31	92
	98	20	45	72
	17.0232	17.0224	11.9016	11.9020
2	17378	18063	17015	16780
26.3	15226 24	10230 31	13082 84	10710
26.3	22	32	86	10
	78	63	15	80
	26.2154	26.2168	26.3931	26.4930
3	17910	18242	16260	18842
30.3	15008 10	11142	15.9.7066	9148
11.0	12	42	62	48
	10	42	60	42
	30.2900	30.2900	11.0294	11.0306

Moon

1			16660	16142
13			8234	15.6066
4.9			34	72
			60	42
			14.8426	14.8424
2	17936	17895		
22.8	10666 72	15148 53		
15.0	98	58		
	36	95		
	22.7264	22.7258		
3	17394	16285		
21.9	7710	15888		
16	10	88		
	94	58		
	21.9624	21.9630		

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13915 Moon

4
2.9
16.4

17670 16192
92108 14664 5-8
06 52
70 92
21.84662 21.84666

5
2.9
18.0

17050 17315
13620 18 10742 47
16 52
50 15
22.34432 22.34432

6
23.
18.5

16370 16080
11368 66 11080
64 80
70 80
18.5004 18.5000

7
23.8
18.1

16688 16680
9702 136 72 70
02 68
88 80
18.6986 18.6990

8
24
18.7

16210 16503
93406 13372 76
32 80
10 03
18.68774 18.68773

did not use this point.

y y remise

9
2.4
14.6

16842 16520
10392 12970
92 70
42 20
14.64450 14.64450

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13915

	17670	16192
21.9	9210 08	14664 5·8
16.9	06	5·2
	70	92
	21.84662	21.84666

	17050	17315
29	13620 18	10742 47
8.0	16	5·2
	5·0	15
	22.34432	22.34432

	16370	16080
23	1136 8	11080
4.5	64 66	80
	70	80
	18.5004	18.5000

I	16688	16880
23.8	9722	13671270
18.1	22	64
	88	80
	18.6966	18.6980

	16210	16503
24	9340 36	13372 76
18.7	32	80
	10	03
	18687 4	18673

did not use the point.

	y	y prime
9	16842	16520
24	10392	12970
14.6	92	70
	42	20
	14.6950	14.6950

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13915 Times Etc

Date Oct. 28. 1917

Exp. ☆ Stars	04	37	"	04	49	"
" " Moon	04	42	45.6"	04	42	45.8"
Clock slow		01	18.3"			
H. Sid. Time	04	44	04.0"			
" Young	04	44	31.05"	Φ =	+3h	30"
G. Sid. Time	09	28	35.05"			
" " " M.N	14	25	02.20"			
Sidereal	19	03	32.85"			
Red		03	07.34"			
G. M.T.	19	0	25.51"	19h	00	7.1"

From Naut. Almac		R.A.		Dec.		
Moon 19h	01	14	16.33"	+13	02	58.6"
Motion 1m			2.3474"			+12.897"
Motion 0m.42s-17"			+1.00"			+ 5.5"
Tabular Place	01	14	17.33"	+13	03	04.1"

Moon's age 13d

Parallax	60	06.2"
Semi-diam	16	24.1"
R		984.1"
aug		10.3
Dec 4		-0.4
R		994.0"
R		2.1308"
aR		1016"
(1+a)R		2.0292"
R²		4.11776"

934" = 9.3

q = -5' 01
+ 24
-477

Feb. 1

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13 9 15 Times Etc

Date Oct 28 1917

Exp & Stars	04	37		04	49	
" " Moon	04	42	45.6	04	42	45.8
Clock slow		01	18.3			
H Sid. Time	04	44	04.0			
" Long	04	44	31.05			
G Sid Time	09	25	35.05			
" " M.N	14	25	02.20			
Interval	19	03	32.85			
Red		03	07.39			
G. M.T.	19	0	25.51			

$\lambda = +3^h\ 30^m$

19.00071

From Naut. Alman		RA			Dec.		
Moon 19^h	01	14	16.33		+13	02	58.6
Motion 1^m			23474				+12.897
Motion $0^m 42^s.17$			+1.00				+ 5.5
Tabular Place	01	14	17.33		+13	03	04 1.

Moons age 13^d

Parallax	60	06.2
Semi-diam	16	24 1
R		9849.1
Aug		10.3
Corr 4		-0.4
R		9940
R		2.1308
a R		1016
11+9/R		2.0292
÷ R^2		4.1176

934" = 9.3

$\varphi = 5^\circ 01$
$+ .24$
$- 4.17$

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1391 S⁻ Plate Constants.

X	17.0223	26.2161	30.2900
S	16.6232	26.3903	30.5488
	.3991	−1742	− 2588

Y	11.9018	26.3930	11.0300
3	12.0442	27.1935⁻	11.0310
	− 1424	− 8025	+ 0010

X−S +500X +78.2Y +1X −13449

+3991 + 8511 = 12502 +930 = 13432 +17 = 13449

+1742 + 13108 = 14850 +2064 = 13422 +26 = 13448

−2588 + 15145 = 12557 +862 = 13419 +30 = 13449

23.8773 +11939 +1304 +24 = 23.8591⁻

Y−η +500Y −73.6X +2.3Y −3301

−1424 + 5951 = 4527 − 1253 = 3274 + 27 = 3301

−8025 + 13197 = 5172 − 1930 = 3242 + 60 = 3302

−0010 + 5515⁻ = 5505 − 2229 = 3276 + 25 = 3301

16.6706 +8335⁻ −1757 +38 = 17.0021⁻

Tables · q: −2.3 e: −2.3 q−e: 0.0 t+d: −5.6

Obs −501.0 −502.3 = +1.3 = −4.6

−498.7 −500.0 +1.3 +1.0

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13915 Moon Center 15

	X	$X - X_0$	ΔX			O - C
1	23.00000	- 0.8740	- 9	0.76554	4.1049	- 127
2	22.7261	- 1.1479	- 8	1.3195	4.1084	- 92
3	21.9627	- 1.9113	- 3	3.6542	4.1031	- 145
4	21.8464	- 2.0276	0	4.1111	4.1111	- 65
5	22.3432	- 1.5308	+ 7	2.3412	4.1101	- 75
6	23.00000	- 1.8740	+ 9	0.7623	4.1119	- 57
7	23.8740	0.00000	+ 10	0.00000	4.1160	- 16
8	24.00000	+ 0.1260	+ 10	0.0161	4.1167	- 9
					R^2: 4.1176	

	y	y_0 $\Delta y = 0$		ave
1	14.8425	- 1.8275	3.3395	206
2	15.00000	- 1.6700	2.7889	215
3	16.0000	- 0.6700	0.4489	289
4	16.6700	0.00000	0.00000	270
5	18.00000	+ 1.3300	d.7689	311
6	18.5002	+ 1.8302	3.3496	335
7	18.6988	+ 2.0263	4.1160	360
8	14.6450	+ 2.0250	4.1006	4

Range 158

Y = 23 y = 14.8425
18.5002
33.3427
y_0 16.6713

y_{max} 18.6963
R 2.0250
Corr R 2.0242

X_{min} 21.8464
X_0 23.8714

X_0 23.8740

Moon Center

y_0 16.6700

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13 9 15" Moon Center 15"

	X	X − X₀	Δx			O − C
1	23.0000	− 0.8740	− 9	076 54	41049	− 127
2	22.7261	− 1.1479	− 8	13195	41084	− 92
3	21.6627	− 1.9043	− 3	36542	41081	− 145
4	21.8464	− 2.0276	0	41111	41111	− 65
5	22.3432	− 1.5308	+ 7	23412	41101	− 75"
6	23.0000	− 1.8740	+ 9	07623	41119	− 57
7	23.8740	0.0000	+ 10	00000	41066	− 111
8	24.0000	+ 0.1260	+ 10	00161	41167	− 9

R² 4.1176

	Y	Y₀	Δy=0		are
1	14.5425"	− 1.8275"		33395	
2	15.0000	− 1.6700		27549	
3	16.0000	− 0.6700		04489	
4	16.6700	0.0000		00000	270
5	18.0000	+ 1.3300		17689	
6	18.3002	+ 1.6302		33496	
7	18.6988	+ 2.0263		41050	360
8	19.6485"	+ 3.0025"		41006	

X = 23 Y = 14.5425"
18.5002
33342 7
Y₀ 16.0713

Y mean 18.6963
R 2.0250
Corr R 20292

X mean 21.5464
X₀ 23.8714

X₀ 23.8740

Moon Center

Y₀ 16.6700 =

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1	+ 1.59	+ 1106	+ 232.0
2	+ 1.92	+ 105.8	+ 153.8
3	+ 1.28	+ 277.0	+ 97.0
4	0.00	+ 132.0	0.0
5	− 2.03	+ 115.0	− 100.0
6	− 3.42	+ 106.8	− 104.2
7	0.00	0.0	− 32.5
8	+ 0.26	− 1.2	− 18.2
	+ 30.5	+ 847.2	+ 4828
	− 5.45	− 1.2	− 2549
	− 0.40	+ 8460	+ 2279

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13915 Conditional Equations 16

				O − C	
1	−0.87	−1.83	= −127	−57 − 23 = −80	− 47
2	−1.15	−1.67	= − 93	− 75 − 21 = − 96	+ 4
3	−1.91	−0.67	= −145	− 125 − 8 = −133	− 12
4	−2.03	0.00	= − 65	− 133 0 = −133	+ 68
5	−1.53	+1.33	= − 75	− 100 + 17 = − 83	+ 8
6	−1.87	+1.83	= − 57	− 123 + 23 = − 101	+ 43
7	0.00	+2.03	= − 16	0 + 26 = + 26	− 42
8	+0.13	+2.02	= − 9	+ 9 + 26 = + 35	− 44

+123 − 145

ar 34

+12.97 − 0.40 = +846.0

− 040 +19.91 = +2279

+ − 0.01 = + 26.1

+1990 = +2540 h = +12.7″

+12.97 = +846.0 + 5.1 = +851.1 q = + 65.6″

arc 158

$\frac{p}{n} = .21''$

$\frac{\varepsilon k}{n} = -2.75''$

$\frac{-2.75''}{21} = -13''$

$\Delta R = -0.2''$

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1915 Conditional Equations 16

								O - C
1	-0.87	-1.83	= -127	-57	-23	= +80		-47
2	-1.15	-1.67	= -92	-75	-21	= -96		+4
3	-1.91	-0.67	= -145	-125	-8	= -133		-12
4	-2.03	0.00	= -65	-133	0	= -133		+68
5	-1.53	+1.33	= -75	-100	+17	= -83		+8
6	-1.87	+1.83	= -57	-123	+23	= -101		+43
7	0.00	+2.03	= -16	0	+26	= +26		-42
8	+0.13	+2.02	= -9	+9	+26	= +35		-44

+123 · 145
av 34

+12.97 - 0.40 = +8460

- 0.40 +19.91 = +2279

+ - 0.01 = +26.1

+1990 = +2540 h = +12.7

+12.97 = +8460 + 5.1 = +8511 G = +65.6

arc 15

$\frac{P}{n} = .21$

$\frac{\Sigma V}{n} = -2.75$

$\frac{-2.75}{.21} = -13$

$\Delta R = -0.2$

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13915 Moon's Mean Position 17

X_0 23 87 40″
+ 33″
23, 87 73

Y_0 16 67 00″
+ 6″
16 67 06

From Plate Constants:

23 85 91″
22.
+1. 85 91

17. 00 21″
18.
−0. 99 79

0.26 93 0″
9.98 96 1″
8.50 7 24
1.77 24 5″

9.34 46″
7.05 34
05 38 6
6, 9 36 6″

n_1 + 0.00 09″
n_0 − 0.99 88″

$\alpha - A$ + 59.22″

9.99 94 8
7.33 1 15
2.66 83 3

A = 01 10 48.30

α_0 01 11 47.52

−4 65.9″

+ 4.83

−07 45.9″

α' 01 11 52.35″

Θ = +12 36 54.3

δ_0 +12 29 08.4″

+ 30.0

δ' +12 29 38.4″

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X_0 23.87140
+ 33
23.87173

Y_0 16.67100
+ 6
16.67106

From Plate Constants

23.85-91
22.
+1.85-91

17.0021
18.
-0.9979

0.26930
9.98961
8.50724
1.77245-

9.93446
7.0534
0.5386
6.9366

γ -0.0009
η_0 -0.4988

$\alpha - A$ + 54.22

A = 01 10 48.30

α_0 01 11 47.52
+ 483
α 01 11 52.35-

9.99948 ~
7.33115-
2.66833 ~
-465.9
-07 45.9
θ = +12 36 54.3
δ_0 +12 29 08.4
+30.0
δ +12 29 38.4

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13915 Reduction to apparent Place.

$H+\alpha_0$	4	41.1	70°	16.5	δ_0 12 28.9
H'	03	29.3			
α_0	01	11.8			
α	23	49.6			
$\eta+\alpha_0$	1	01.4	15°	21.0	

	0.8236
	9.9896
	8.8132
	9.3348
	9.5286
	1.2869
	9.9737
	0.0104
	8.8239

	9.9862
	1.3579
	9.3942
	9.3452
	8.8239

h'	0.1503
h	0.0949

q'	1.3441
q	8.9212

i	+6.5504
q'	+22.0855
l'	+1.4143
	+30.0003

λ	+3.5504
β	+0.0833
k	+1.2444
	+4.8331

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13915 Reduction to apparent Place.

$H+\chi_0$	4	41	1
H'	03	29	3
α_0	01	11.	8
$\odot$	23	49.	6
$\eta+\chi_0$	1	01.	7

70° 16.5'

15° 21.0

δ_0 12 28 9

0 8236
9 9896
0.8132
9.3348
9.5286
1.2869
9.9737
0.0104
8.8239

9.9862
1.3519
9.3942
9.3452
8.8239

l' 0.1503
l 0.0949

η' 1.3441
ξ_1 8.9212

i +65°04
η' +22.085'
l' +1.414
+30.003

ξ : +3.504
η +0.083
l +1.244
+4831

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13915

Lunar Parallax

α'	01	11	52.35
Θ	04	44	04.00
$\Theta - \alpha'$	+3	32	11.65
=	+53	02	54.75
$\frac{1}{2}\alpha - \alpha'$		18	14.25
$\Theta - \alpha' - \frac{1}{2}\alpha - \nu' + 52$		44	40.50

π	60 06.2
	9.869113
	8.242260
	9.902262
	0.011136
	8.025571

	9.957727
cos $\frac{1}{2}\alpha \cdot \alpha$	9.999999
sec $\Theta - \alpha' - \nu$	0.217798
log tan γ	0.175524

$\alpha - \alpha'$ +36 28.50

= +2 25.90

γ	56	15	28.9
δ'	+12	29	38.4
$\gamma - \delta$,	43	45	50.5

	9.826640
	8.242260
	9.839911
	0.080111
	7.989021

$\delta - \delta'$ +33 31.2

δ	+13	03	09.6
Eph. δ	+13	03	04.1
O - C			+5.5
curv.			+0.1
2nd Ord. Ref.			0.0
δ	+13	03	09.7
O - C			+5.6

α	01	14	18.25
Eph. α	01	14	17.33
O - C			+0.92
curv.			-0.02
α	01	14	18.23
O - C			+0.90

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1391 5

Lunar Parallax.

α'	01	11	52.35	IT	60 06.2
θ_0	04	44	09.00		
$\theta - \alpha$	+3	32	11.65		946913
=	+53	02	54.75		824260
$\frac{1}{2} \chi \cdot \alpha'$		18	14.25		990262
$\theta - \alpha - \frac{1}{2}\alpha \cdot \alpha' + 52$		44	40.50		001136
					802691

	995727	$\alpha - \alpha'$	+36 28.50
$\log \frac{1}{2} \chi \cdot \chi$	999999	=	+2m 25.90
$\log \theta - \alpha' - u$	0.217198		
log tan y	0.175529		

y	56	15	28.9
δ'	+12	29	28.4
$y - \delta_0$	43	45	50.5

982640	
824260	
983998	
008011	
798904	

$\delta - \delta'$		+33	31.2				
δ	+13	03	09.6	α	01	14	18.25
Eph δ	+13	03	04.1	Eph α	01	14	17.33
O-C		+5.5		O-C		+0.92	
corr.		+0.1		corr		-0.02	
2nd Aud. Ry		0.0					
δ	+13	03	09.7	α	01	14	18.23
O-C		+5.6		O-C		+0.90	

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13958

Star Measures.

1	16308	16770	16803	16700
15.6	10994 42	12100 94	74707 1	16026
8.9	90	88	72	26
	08	70	03	00
	15.5316	15.5324	8.9332	8.9326
2	18248	16746	16792	18148
24.8	10158	14832	16340	8588 90
28.0	58	32	40	92
	48	46	92	48
	24.8090	24.8086	28.0452	28.0442
3	16626	18070	17910	16432
27.0	15860	8835 36	14522 10	98324
4.3	60	37	18	18
	26	70	10	32
	27.0766	27.0766	4.3390	4.3392

Moon Measures.

1			16078	16200
24			9832 34	12432
14.8			36	32
			78	00
			14.6244	14.6232
2	18598	17786		
15	14084	12282 91		
24.4	84	00		
	98	86		
	24.4514	24.4505		
3	17992	17526		
24.9	8740	9770 77		
16	40	84		
	02	26		
	24.9261	24.2251		

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1395·8

Star Measures.

L	16·308	16770	16803	16700
3.6	10994 42	12100 94	74707 1	16026
2.9	90	88	72	26
	08	15·70	03	00
	15·5·316	15·5·324	8.9332	8.9326

2	18248	16746	16792	18148
18	10158	14832	16340	85·88 40
8.0	58	32	40	92
	48	46	92	48
	24.8090	24.8086	28.0452	28.0442

3	16626	18070	17910	16432
7.0	15·860	88325 36	145·22 20	98 3024
4.3	60	37	18	18
	26	70	10	32
	27.0766	27.0766	4.3390	4.3392

Moon Measures.

L			16078	16200
24			9832 34	12432
14.8			36	32
			78	00
			14.6294	14.6232

2	185·98	17786
5	14084	12282 91
4.4	84	00
	98	86
	24.45·14	24.45·05

3	17992	175·26
24.9	81 40	97 10 77
16	40	84
	02	26
	249261	24.225·1

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13958 Moon Measures 22

4	16260	16137
24.9	6780 78	15638
16.3	76	38
	70	37
	24.94901	24.95001

5	16548	17750
24.8	8310	15988 89
17.0	10	94
	48	50
	24.82446	24.82389

6	17910	16330
24.0	7995 92	1.627671
17.9	89	66
	20	40
	17.99227	17.99931

7	16272	16940
23.9	6328 30	16890
18.0	32	90
	82	50
	23.99451	23.99949

8	16648	16058
23.0	13806	8898
18.2	06	98
	58	68
	18.28444	18.28842

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13958 Moon Measures. 22

4	16260		16127
24.9	6780	78	15638
16.3	76		38
	70		27
	24.9491		24.9501

	16548		17750
9.8	8310		15988 89
7.0	10		94
	48		50
	24.8246		24.8239

	17910		16330
4.0	7995	92	1.627671
7.9	89		66
	20		40
	17.9927		17.9931

4	16272		16940
3.9	6328	30	16890
7.0	32		90
	82		50
	23.9951		23.9949

	16648		16058
3.0	13806		8898
8.2	06		98
	58		68
	18.2844		18.2842

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13958 Juno Etc. 23

Date Oct. 31. 1917

Exp. & Stars	06	30		06	42	
" " Moon	06	36	07.2	06	36	07.4
Clock slow	+	01	21.8			
M. Sid. Time	06	37	29.1	Φ = + 2h 23m		
+ Long	04	44	31.05			
G. Sid Time	11	22	00.15			
" " " M.N	14	36	51.87			
Interval	20	45	08.28			
Red		03	23.98			
G. M. T.	20	41	44.30	20h 695 64		

From Naut. Alman.

	R.A.			Dec.		
Moon 20h	04	12	31.06	+23	32	18.6
Motion 1m			2.4855			+ 3.442
" 41.7383		01	43.74		+ 02	23.7
Tabular Place	04	14	14.80	+ 23	34	42.3

934" = 12.8

Moon's Age 16d

$a = -502.4 + 240 = -478.4$

Parallax	5-8	12.9
Semi-diam.	15	53.3
R		953.3
aug.		13.3
2rv 5		-0.3
R		966.3
R		2.0714
qR		-991
(1+q)R		1.9723
R^2		3.8900

Feb. 4. 1918

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13958 Times Etc. 23

Date Oct. 31. 1917

Exp & Stars	06	30		06	42	
" " Moon	06	36	07.2	06	36	07.4
Clock slow	+	01	21.8			
M. Sid Time	06	37	29.1			
# Taus	04	44	31.05			
C. Sid Time	11	22	00.15			
" " " M.N	14	36	51.87			
Interval	20	45	08.28			
Red		03	23.98			
G. M. T.	20	41	44.30			

ϕ = + 2h 23m

20h 69m 64

From Naut Alman.

		R.A.			Dec.		
Moon 20h	04	12	31.06	+23	32	18.6	
Motion 1m			2.485			+ 3.442	
" 41.7383		01	43.74		+ 02	23.7	
Tabular Place	04	14	14.80	+23	34	42.3	

934" = 12.8

Moon Age 16d

a = -5024
+240
-4784

Parallax 5.8 12.9"
Sem. diam 15' 53.3"
R 953.3
Ang. 133
Dr 5" -0.3
R 966.3
R 20714
cR -991
1+cR 1.9723
R² 3.8900

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S_0	n_0	ΔS	$-4.6\,S$	$+3\,\eta$	-3
-7.00	-9.5^{-1}	-25^{-}	$+32 = +7$	$-3 = +4$	
$+2.79$	$+10.5^{-6}$	$+13$	$-13 = 0$	$+3 = +3$	
$+5.11$	-14.36	$+31$	$-24 = +7$	$-4 = +3$	
$+0.83$	-1.76		-4	$0 = -7 = -0.02$	

$\Delta\eta$	$-4.2\,\eta$	$+2.2\,S$	$+8$
-33	$+40 = +7$	$-15 = -8$	
$+31$	$-44 = -13$	$+6 = -7$	
-80	$+60 = -20$	$+11 = -9$	
	$+7$	$+2$	$= +17 = +0.8$

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13958 Standard Coordinates 24

	Cafe No. 611 mg 6.1			Cafe No. 620 mg 8.7			Cafe No. 623 mg 5.2		
C	04	06	55 39	4	12	24.87	4	13	41.45
2			55.41			24.91			41.47
2			55.37			24.83			41.42
m	04	06	55 39	4	12	24.87	4	13	41.45
Pec		01	0.40		01	01.60		01	-0.28
α	04	07	55 79	4	13	26.47	4	14	41.73
A	4	11	50.97	4	11	50.97	4	11	50.97
α-A		-03	55.18		+1	35.50		+2	50.76
Sin			-235.17			+95.50			+170.76
log			2.37138 m			1.98000			2.23239
cos δ_0			9.96655			9.95798			9.96846
log S_0			0.84517 m			0.44522			0.70809
S_0			-7.00172			+2.78755			+5.10691
S.			-25			+7			30
S			14.99963			24.78882			27.10921
X			15.53207			24.80888			27.07666
X-S			+.53357			+.02006			-.03255
δ	+22	09	22.7	+24	45	31.2	21	31	54.7
3			23.3			31.6			54.7
2			23.1			31.3			55.0
m_1	+22	09	23.0	+24	45	31.4	21	31	54.8
Pec		+02	40.7		+02	33.5		+02	31.3
δ	+22	12	03.7	+24	48	04.9	21	34	26.1
Θ	23	26	01.0	23	26	01.0	23	26	01.0
S-Θ	-1	13	57.3	+1	22	03.9	-1	51	34.9
Sin			-4438.0			+4924.8			-6697.3
log			3.64719 m			3.69239			3.82590 m
m_0			0.97834			1.02354			1.15705
cos δ			9.61085			9.66475			9.59970
S_0^2			16903			08904			14162
m_1			8.35545			7.60855			8.06666
m_0			-9.51355			+10.55771			+14.35567
m_1			+0.00226			+.00041			+0.00116
m			8.50911			28.56126			3.65549
Y			8.93229			28.04470			4.33391

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13938 Standard Coordinates 14

	Cape No. 611 mg 6.1			Cape No. 620 mg 8.7			Cape No. 623 mg 5.2		
C	04	06	55 39	4	12	24.87	4	13	41.45
1			55 41			24.91			41.47
2			55 37			24.83			41.42
m	04	06	55 39	4	12	24.87	4	13	41.45
Red		01	0.40		01	01.60		01	0.28
x	04	07	55 19	4	13	26.47	4	14	41.73
A	4	11	50.97	4	11	50.97	4	11	50.97
x-A		-03	55 18		+1	35.50		+2	50.76
Sin			-235.17			+95.50			+17076
log			2.371138			1.956000			2.232239
cos δ_0			9966 55			9957 98			9968 46
log S_0			0.84517			0.94322			0.70809
S_0			-7.0012			+2.78825			+5.1061
S.			-25			+1			30
S			14.9963			24.7882			27.1091
A			15.5320			24.8088			27.0766
A-S			+5.3357			+.0206			-.0325

E	+22	04	22.7	+24	45	31.2	21	31	54.7
1			23.3			31.6			54.7
2			23.1			31.3			55.0
m	+22	04	23.0	+24	45	31.4	21	31	54.8
Red		+02	40.1		+02	33.5		+02	31.3
S	+22	12	037	+24	48	049	21	34	261
E	23	26	01.0	23	26	01.0	23	26	01.0
S-E	-1	13	51.3	+1	22	03.9	-1	51	39.9
cos			-4438.0			+4924.8			-6697.3
log			3.647149			3.692388			3.825790
η_0			0.918344			1.023354			0.151705
cos δ			9.61087			9.66477			9.99800
S.			16903			08904			14162
η_1			8.35457			7.60857			8.06600
η_0			-9.5135			+10.55710			+14.35467
η_1			-00226			+.00491			+0.00116
η			8.50913			28.56212			3.65549
γ			8.99329			28.04721			4.33391

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13958 Plate Center + Constants

24.8088	28.0447	04 13 26.47	2.4 48. 04.9
22.	18.	- 01 35.50	-1 22 3.9
-2.8088	-10.0487	04 11 50.97	
34	490		

A = 4 11 50.97

Plate Center

D = +23 26 01.0

y-5 +500y	+25.7y	+2.4x -13389
+5357 + 7766 = 13123	+ 230 = 13353	+ 36 = 13389
+0.206 + 12404 = 12610	+ 721 = 13331	+ 58 = 13389
-0325 + 13538 = 13213	+ 111 = 13324	+ 66 = 13389
92.9768 + 11488	+ 419	+ 55 = 22.8341

y-η +500y	-25x	+4.1y -8353
+4238 + 4466 = 8704	- 388 = 8316	+ 37 = 8353
-5165 + 14022 = 8857	- 620 = 8237	+ 115 = 8352
+6842 + 2170 = 9012	- 677 = 8335	+ 18 = 8353
16.3101 +8150	-574	+ 67 = 16.2391

Tabs	a = -1.1	e = -0.9	a-e = -0.2	t+d = -1.6
Obs.	-5024	-5041	+1.7	-0.7
	-5013	-5032	+1.9	+0.9

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13958 Plate Center & Constants 2

248088 2804.41 04 13 26.97 2.4 48 049
22 18 01 35.50 -1 22 3.9
28088 10.0481 04 11 5097
34 490

A = .4 11 5097

Plate Center

D = +23 26 01.0

Y-5 +5°00Y +25.7X +2.4X-13389
-535°7 + 7766 = 13123 + 230 = 13353 + 36 = 13389
0206 + 12404 = 12610 + 721 = 13331 + 58 = 13389
0325 + 13538 = 13213 + 111 = 13324 + 65 = 13389
22.9768 + 11488 + 419 + 53 = 22.8391

4-7 +500X -25°Y +4.1Y -8353
+4238 + 4466 = 8704 - 388 = 8316 + 37 = 8353
-5165 + 14022 = 8857 - 620 = 8237 + 115 = 8352
+6842 + 2170 = 9012 - 677 = 8335 + 18 = 8353
P623108 +5150 -574 + 07 = 162391

Tables
Am. -5024 -5041 +1.7 -0.7

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1395-8 Moon Center.

		Δx=			O-C
1	24.00000	+1.02550	-2	1.05022	3.8935 +35
2	24.45510	+1.47760	-2	2.17780	3.8941 +41
3	24.92556	+1.95066	-1	3.80455	3.9006 +106
4	24.99496	+1.99746	0	3.89900	3.8990 +90
5	24.82422	+1.84922	+1	3.41999	3.8960 +60
6	24.00000	+1.02550	+2	1.05510	3.8832 -68
7	23.99950	+1.02001	2	1.04081	3.8969 +69
8	22.99750	0.00000	+3	0.00000	3.8979 +79
				16.94344	3.8900

		Δy=0			arc.
1	14.62388	-1.68662		2.84433	149
2	15.00000	-1.31100		1.71611	132
3	16.00000	-0.31100		0.09611	99
4	16.31100	0.00000		0.00000	90
5	17.00000	+0.68900		0.47611	70
6	17.49929	+1.68829		2.83222	31
7	18.00000	+1.68900		2.85611	30
8	y 18.28843	+1.97743		3.89979	0
				14.71148	Range 149

x = 24 y = 14.6238
17.9929
32.6167
16.3083

y max 18.2843
R 1.9760
Corr R 1.9723
X max 24.9496
X_0 22.9736

Y_0 16.3100

Moon Center

X_0 22.9750

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1395-8 Moon Center. 26

		Δ1		O-C
1	24 00 00	+ 1.0 25 50 - 2	1.0 5 02	38 93 5 + 35
2	24 45 10	+ 1.4 7 60 - 2	2.1 7 80	3,8 9 4 1 + 41
3	24 92 56	+ 1.9 5 06 - 1	3 8 0 45	3.9 0 0 6 + 106
4	24 99 96	+ 1.9 7 46 0	3 8 9 9 0	3 8 9 9 0 + 90
5	24 82 42	+ 1.8 4 9 2 + 1	3. 4 1 9 9	3. 8 9 6 0 + 60
6	24 00 00	+ 1.0 2 5 0 + 2	1. 0 5 1 0	3. 8 8 3 2 - 68
7	23 9 9 5 0	+ 1.0 2 0 0 + 2	1.0 4 0 8	3 8 9 8 9 + 69
8	22 9 7 5 0	0 0 0 0 0 + 3	0 0 0 0 0	3 8 9 7 9 + 71
				3 8 9 0 0

		Δy.0		arc.
1	14. 62 38	- 1. 6 8 6 2	2. 8 4 3 3	149
2	15. 0 0 0 0	- 1. 3 1 0 0	1. 7 1 6 1	132
3	16. 0 0 0 0	- 0 3 1 0 0	0 0 9 6 1	99
4	16 31 00	0 0 0 0 0 0	0 0 0 0 0	90
5	17. 0 0 0 0	+ 0 6 4 0 0	0 4 7 6 1	70
6	17 99 29	+ 1. 6 8 29	2. 8 3 2 2	31
7	18. 0 0 0 0	+ 1. 6 9 0 0	2. 8 5 6 1	30
8	18 28 43	+ 1. 9 7 4 3	3. 8 9 7 9	0

Range 149

X = 24 Y = + 14. 62 38
17. 99 29
32, 61 67
16. 30 83
y max 19. 28 43
R 1. 9 7 60
Corr R 1. 9 7 23
X max 24 99 49 6
Y_0 22. 9 7 36

Moon Center y_0 16 31 00
X_0 22 9 7 5-0

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Formation of Normals.

1	− 1.72	+ 348	− 59.2
2	− 1.93	+ 60.7	− 53.6
3	− 0.60	+ 206.6	− 32.9
4	0.00	+ 171.0	+ 0.0
5	+ 1.28	+ 111.0	+ 41.5
6	+ 1.72	− 69.3	− 114.0
7	+ 1.73	+ 70.3	+ 116.8
8	0.00	.00	+ 155.5
	+4.73	+6604	+3138
	-4.25	69.3	-259.7
	+0.48	+5911	+541

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1395-8 Conditional Equations.

							O-C
1	+ 1.02	− 1.69	= + 35″	+ 37	− 4	= + 33	+ 2
2	+ 1.48	− 1.31	= + 41	+ 53	− 3	= + 50	− 9
3	+ 1.95	− 0.31	= + 106	+ 70	− 1	= + 69	+ 37
4	+ 1.97	0.00	= + 90	+ 71	0	= + 71	+ 19
5	+ 1.85	+ 0.69	= + 60	+ 66	+ 1	= + 67	− 7
6	+ 1.02	+ 1.68	= − 68	+ 37	+ 4	= + 41	− 109
7	+ 1.02	+ 1.69	= + 69	+ 37	+ 4	= + 41	+ 28
8	0.00	+ 1.97	= + 79	0	+ 5″	= + 5″	+ 74
							+ 160 − 125″
							ar 35″

+ 16.44 + 0.48 = + 591.1

+ 0.48 + 14.71 = + 54.1

−(1 − 0.01 = − 17.2

+14.7 = + 36.9 h = + 2.5″

+ 16.44 = + 591.1 − 1.2 = + 589.9 q = + 35.8″

arc 149

$\frac{p}{n}$ = .15″

$\frac{\Sigma v}{n}$ = + 4.4″

$\frac{+4.4}{.15}$ = + 29″

Δ R = + 0.4″

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3958. Conditional Equations.

							O-C
	+1.02	-1.69	= + 35"	+37	- 4	= +33	+ 2
2	+1.48	-1.31	= + 41	+53	- 3	= +50	- 9
	+1.95	-0.31	= +106	+70	- 1	= +69	+37
	+1.97	0.00	= + 90	+71	0	= +71	+19
	+1.85	+0.69	= + 60	+66	+1	= +67	- 7
	+1.02	+1.68	= + 64	+37	+ 4	= +41	-109
	+1.02	+1.69	= + 69	+37	+ 4	= +41	+ 28
	0.00	+1.97	= + 79	0	+ 5"	= + 5"	+ 74
							+160 -125"
							av 35"

-1644 +048 = +591.1

+048 +14.71 = + 59.1

-(1 - 0.01 = - 17.2

+14.7 = + 36.9 h = + 25"

+1644 = +591.1 - 1.2 = 589.9 a = + 35.8

arc 149

$\frac{P}{n} = .15"$

$\frac{\Sigma v}{n} = +4.4$

$\frac{+44}{.15} = +29$

ΔR = + 0.4

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1395-8 Moon's Mean Position. 28

X_0 22.9750
+ 18
22.9768

Y_0 16.3100
+1
16.3101

From Plate Constants.

22.8341 ν
22.
+0.8341

16.2391 ν
18.
−1.7609 ν

9.92122 ν
9.96336 ν
8.50724
1.45062 ν

9.63204 ν
9.84244 ν
7.05734
6.52788 ν

x_1 +0.0003
y_0 −1.7612 ν

+28.22 ν

0.245811 ν
7.33115
2.91466 ν

A 4 11 50.97 ν
α_0 −4 12 19.19 ν
Red + 5.41
α' 4 12 24.60 ν

Zen d-D −821.6 ν
S-D −13 41.6 ν
D = +23 26 01.0 ν
δ_0 +23 12 19.4 ν
+14.1
δ' +23 12 33.5 ν

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1345-8 Moons Mean Position. 28

λ_0 22.9150
+ 18
22.9768

γ_0 16.3106
+1
16.3107

From Plate Constants.

22.8341
22
0.8341

16.2391
18.
-1.7609

9.9212 22
9.9963 36
8.5072 4
1.4506 2

9.6320
9.8424
7.0539
6.5278

+2822

$\lambda - \lambda_0$ +0.0003
$\gamma - \gamma_0$ -1.7612

0.2456 1
7.3311 5
2.9146 6

A 4 11 50.97

α_0 4 12 19.19

Red + 5.41

α' 4 12 24.60

$\Delta\alpha$ -821.6

$\delta - \Delta$ -13 41.6

Δ +23 26 01.0

δ_0 +23 12 19.4

+14.1

δ' +23 12 33.5

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44.697
4 02 37.844 v
+6.753

9.216
4 15- 4.077
+5.139

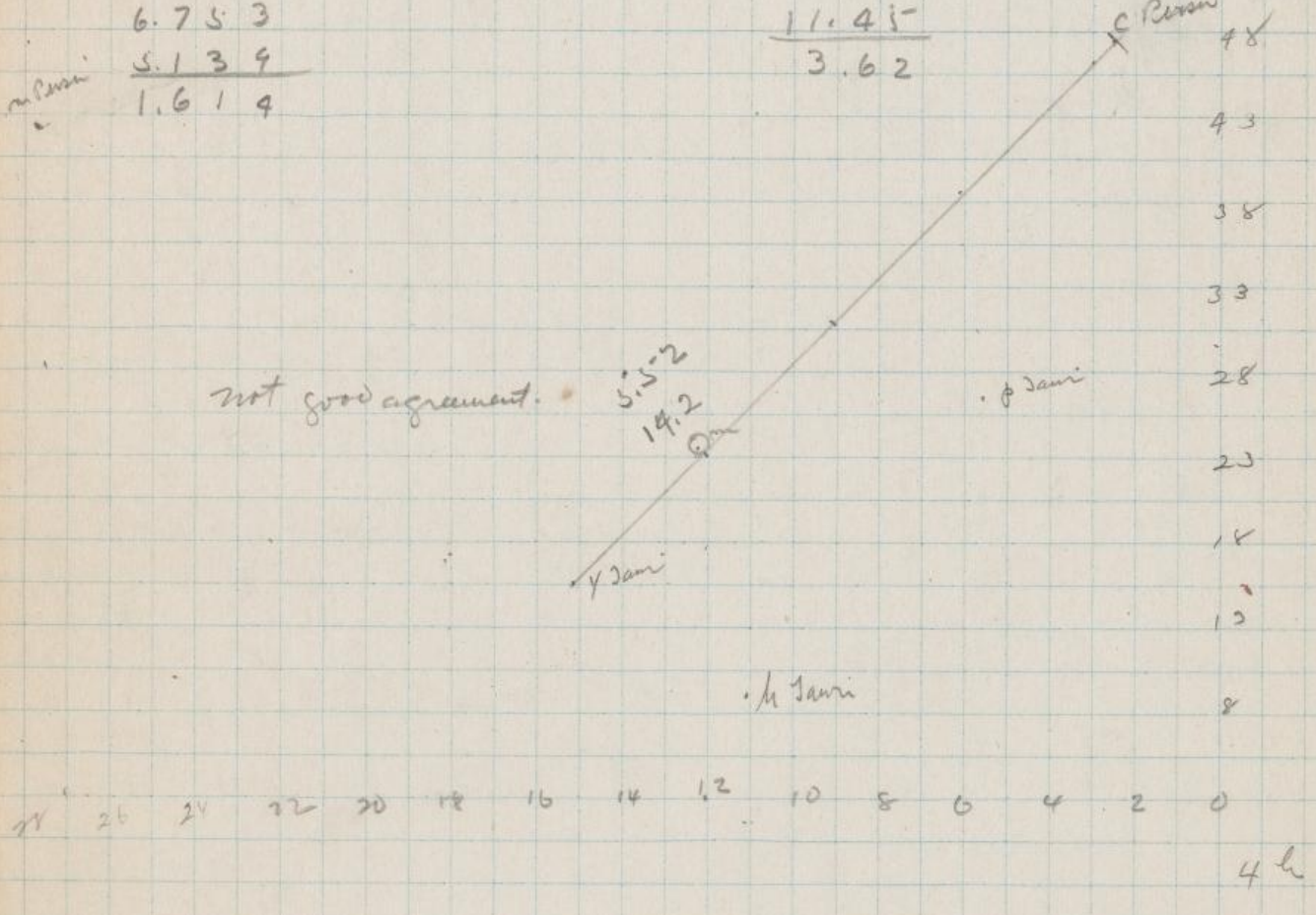
40.635
4 27 34.256
6.399

6.753
5.139
1.614

42.84
47 29 31.39
+11.45 v

56.39
15- 25 41.32
+15.07

24.70
42 53 15.99
15.07 18.71
11.45
3.62



not good agreement.

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13858 Reduction to Apparent Place 29

$H+\alpha'$	7	28.9	112°	13.5′	δ_0	+23°	42.3
H	3	16.6					
α_0	4	12.3			$\cos\delta_0$		9.9634
G	23	51.8			log 1		0.8050
$b+\alpha_0$	4	04.1	61	01.5″	(1)		0.7684

			$\sin\delta_0$	9.5955
$\cos b+\alpha_0$	9.9852		$\cos H+\alpha_1$	9.5778
q	1.3613		h	1.2889
$\sin b+\alpha_0$	9.9419		$\sin H+\alpha_0$	9.9665
$-\tan\delta_0$	9.6321		$\sec\delta_0$	0.0366
	8.8239			8.8239

q'	1.0465	h'	0.4622
q	9.7592	h	0.1159

q	+3.528	q'	+11.130
η	+0.574	h	−2.899
H	+1.306	$1'$	+5.867
Red	+5.408	Red.	+14.098

small

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13858 Reduction & Apparent Place 29

H + x	7	28.9	112°	13.5	δ_0	+ 23°	12.3
H	3	16.6					
x_0	4	12.3			Cos δ_0		9 9 6 3 4
G	23	51.8			log 1		0 8 0 5 0
$\delta + x_0$	4	04.1	61	01.5	(1)		0.8 6 8 4

		Sin δ_0		9.5 9 5 5
Cos $\delta + x_0$	9 6 8 5 2	Cos H + x,		9 5 7 7 8
q	1.3 6 1 3	l		1.2 8 8 9
Sin $\delta + x_0$	9 9 4 1 9	Sin H + x_0		9.9 6 6 5
Tan δ_0	9 6 3 2 1	Sec δ_0		0 0 3 6 6
	8 8 2 3 9			8.8 2 3 9

q'	1.0 4 6 5	l'	a 4 6 2 2
q	9 7 5 9 2	l	0.8 1 5 9

q	+ 3.5 2 8
p	+ 0.5 7 4
R	+ 1.3 0 6
Red	+ 5.4 0 8

q'	+ 11.1 3 0
l'	- 2 8 9 9
i'	+ 5 8 6 7
Red.	+ 14.0 9 8

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1395-8

Lunar Parallax.

α'	04	12	24.60
θ	06	37	29.10
$\theta-\alpha'$	+02	25	04.50
=	+36	16	07.50
$\frac{1}{2}(\alpha-\alpha')$		+13	53.96
$\theta-\frac{1}{2}(\alpha+\alpha')$	36	02	13.54

π	58 12.9
	9.869913
Sin π	8.228774
Sin $\theta-\alpha'$	9.772202
Sec $\frac{1}{2}\delta$	0.003786
Sin $\alpha-\alpha'$	7.907775

	9.995727
Cos $\frac{1}{2}(\alpha+\alpha')$	0.000000
$\delta-\delta'$	0.009225
Log tan γ	0.004952

$\alpha-\alpha'$ +27 47.92

= +1 51.19

γ	48	15	33.6
δ'	+23	12	33.5
$\gamma-\delta'$	+25	03	00.1

	9.826400
	8.228774
	9.626976
	0.127179
	7.809077

$\delta-\delta'$ +22 08.9

δ	+23	34	42.4
$\frac{1}{2}\delta$	+23	34	42.3
O-C			+0.1
Corr			+0.7
2nd Obs Reg			0.0
δ	+23	34	43.1
O-C			+0.8

α	04	14	15.79
$\frac{1}{2}\alpha$	04	14	14.80
O-C			+0.99
Corr.			−0.02
α	04	14	15.77
O-C			+0.97

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1395·8

30

Lunar Parallax.

α'	04	12	24.60
θ	06	37	29.10
$\theta - \alpha'$	+02	25·	04.50
=	+36	16	07.5·0
$\frac{1}{2}(x - x')$		+13	53.96
$\phi - \frac{1}{2}(x' - \frac{1}{2} x \cdot x')$	36	02	13.54

π	58 12.9
	9.86913
Sin π	8.22874
Sin $\theta - x'$	9.71202
Sec ϕ·5·	0.03786
Sin $\frac{1}{2} x \cdot x'$	7.90175·

	9.95·727
Cos $\frac{1}{2} x \cdot x$	0.00000
$\phi - x' - \frac{1}{2}$	00 9.23·-
Log tan γ	0.04952·

$\alpha - \alpha'$	+27	47	7.92
=	+	1·	5·1.9

γ	48	15·	32.6
δ'	+23	12	33.5·
$\gamma - \delta'$	+25·	03	00.0·

	9.82640
	8.22874
	9.62678
	0.12719
	7.80907·

$\delta - \delta'$		+22	08.9·
δ	+23	34	42.4·
δ [S]	+23	34	42.3
O-C			+0.1
Corr			+0.7
2nd Ad Rq			0.0
δ	+23	34	43.1
O-C			+0.8

α	04	14	15.79
α [S]	04	14	14.80
O-C			+0.99
Corr.			-0.02
α	04	14	15.77
O-C			+0.97

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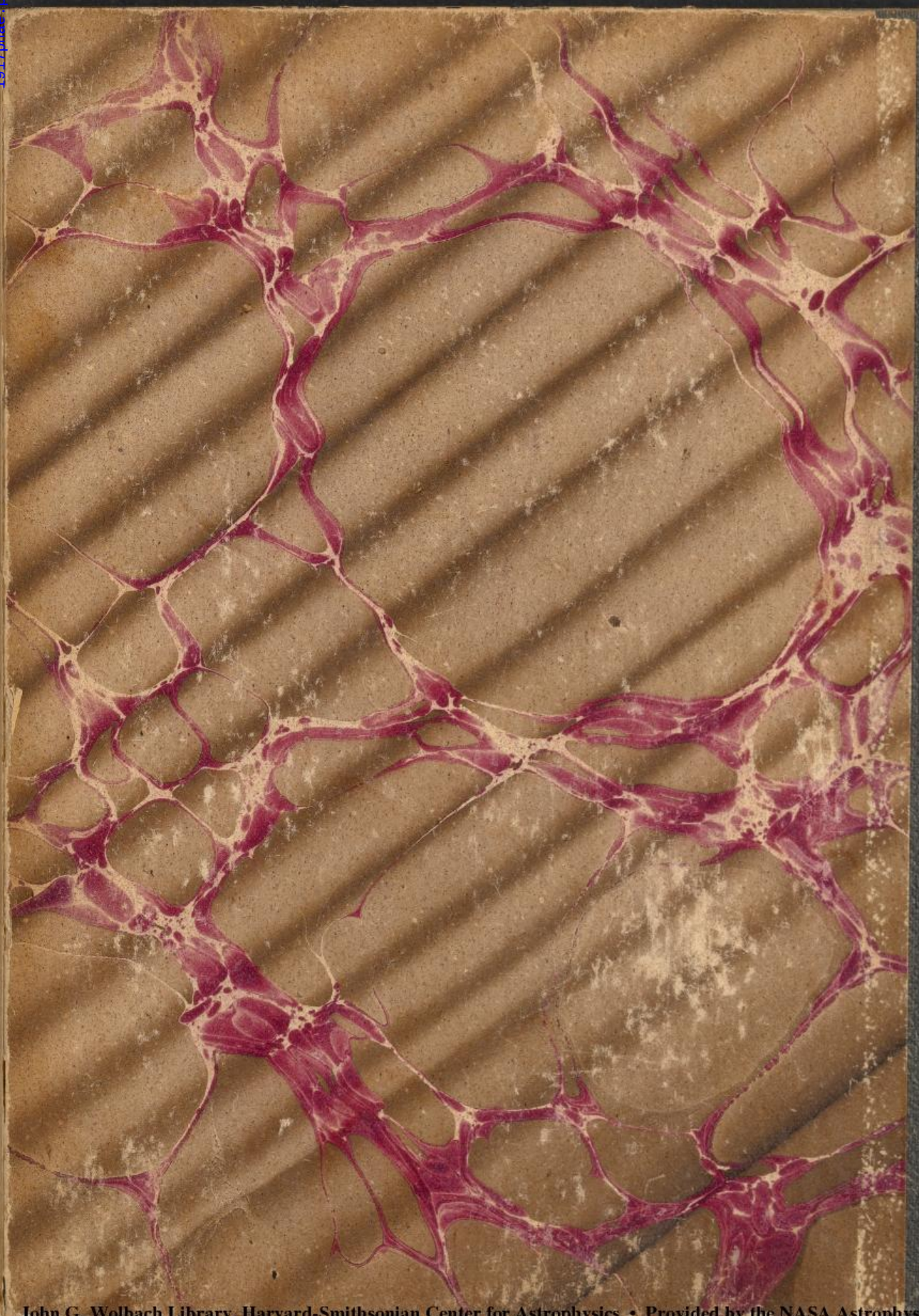
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