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KG
11366
v.982



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8702

Star Measures

1	19280	15338 17618	18050	
13.7	12502 03	12192 17018	8632 30	
23.1-	04	5297 12 15	28	
	82	40 5 70	98	
	13.67782	13.68082 3.06002	23.05982	
2	16412	19982 16082	20376	
20.6	8840	17582 15138	11296 98	
7.	40 40	78 80 38	300	
	10	88 86	78	
	20.75570	20.75962 7.0944	7.09202	
3	20446	16794 18946	16652	
34.9	11692	15608 02 8586	15000 09	
22.8	3840	596 86	08	
	44	800 40	42	
	34.88042	34.88062 22.83562	22.83542	

Moon Measures

1				
23			19102	17710
13.9			10072 68	16710 05-
			64	00
			02	06
			13.90342	13.89976
2	18896	17772	18896	
23.1	17248	9418 15	17328	
14	3039	12		
	900	74	82	
	23.16582	23.16422		
3	17582	16742		
23.9	8192	16120 16		
15	9893	12		
	66	52		
	23.93722	23.93792		

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Star Numbers

1	19280	13338	17618	18050
13.7	12502	12172	17018	8602
23.1	079	5277	12	25
	84	90	510	98
	136725	13680823.0600		23052

2	16912	19982 16082	28876
20.6	8840	20582	1129698
7.	90	78	300
	10	88	78
	207370	20.7596	70920

3	20946	16794 16946	16632
39.7	11692	13608 8386	13000
22.8	3870	376 86	00
	99	400 90	72
	398809	39.3806 22833.6	22839

Moon Numbers

1		19102	17710
23		100726	16710
13.9		69	00
		04	06
		139039	139976

2	18896	17112 18896	
23.1	17398	9918 17382	
19	300	12	
	900	79	82
	23.1658	23.1692	

3	17972	16792
23.9	8192	16120
13	9890	12
	66	32
	2397372	2397379

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4 17060 19916
240+ 16588 87 10382
155 86 7275
+x 52 20
24.0972 24.0956

5 10368
24 19478 83
164 88
62
.0889

20368 18848
19478 9668 70
83 oblique 72
62 42
16.0889 16.0828

6 18644 19236
23.5 12598 92 14320 18
17 86 12
46 48
23.5052 23.5076

7 17682 18412
23 13782 12310 15
17.4 8081 2015
82 20
17.3900 17.3898

8 17692 18368
22 11920 16 14618 20
17.6 12 22
+y 90 86
17.6278 17.6287

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8 7 - 2

1. 17060 19916
29. 1638867 10382
15.2 86 7275
+1 52 20
2909726 2909926

2. 10368
29 19978 83
164 28
62
0889

20365 15848
19978 9648 70
83 72
62 42
160889 160328

6. 18699 19236
22.5 13598 72 19320 18
17 86 12
96 98
23.3032 23.3076

7.
33
17.9

17682 14412
13782 12310 20
8081 20
82 20
17.3900 17.3898

8.
22
17.6
+7

17692 15368
11920 16 14618 20
12 22
70 86
17.6278 17.6297

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8732 Lemco & Cte $\Delta\alpha = 5^s$ 3.

June 29 '15

Cyp To Stars	21	38			21	56	
" Moon	21	45	47.4		21	45	47.6
Clock fast		1	56.72				
H Sid Time	21	43	56.32	$\delta - \alpha = +0^h\,14^m$			
H Long.	4	47	21.05				
G. Sid T.	26	28	29.35				
G. M. Moon	6	25	56.76				
Interval	20	02	27.59				
Reduction		3	16.99				
G. M. T.	19	59	10.60				

From Naut. Alm.		R.A.		Dec.	
Moon 19h	21	27	46.95	-14 48	45.7
Motion in 1m			+ 2.2202		+ 13.893
" 59.17.68		+ 2	10.32	+ 13	42.1
Tabular Place	21	29	57.27	-14 35	03.6

Moons Age 17 days

Parallax	58' 42.19
Semid	16 01.3
R	961.3
Aug	+9.0
Err 5^s	-0.8
R	969.5
R	2.0782
a/R	-990
1+a/R	1.9792
R^2	3.9172

$934 = 8.5^s$

$a = -500.4$
24
-476.4

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8734 Venus & Cte a = 3

June 29 '15

Cpt. T. Star	21	38			21	56	
" Moon	21	45	47.4		21	45	47.6
Clock fast		1	54				
H Sid Time	21	43	53.3	+	x =	+0h	14m
H Long.	4	14	31.0				
G Sid T.	26	28	24.3				
G M Moon	6	25	36.6				
Interval	20	02	27.59				
Reduction		3	16.99				
G. M. T.	19	59	10.60				

From Naut. alm.		R. A.		Dec.		
Moon 19h	21	27	46.95	- 19	48	45.7
Motion in 1m			+ 2.2202			+ 13.89
" 59.1763		+	10.32	+	13	42.1
Tabular Place	21	29	57.27	- 19	35	03.6

Moons age 17 days.

Parallax		58'	42.1"
Semid		16	01.2
R			961.2
Aug			+ 9.2
Syz			- 0.8
R			969.5
R		2	07 32"
aR			- 990
Hor R		1	7 7 2
R²		3	1 7 2

934 = 8.5"

a = -300.4

29

- 7 7 6 4

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8732 Plate Constants 4

x	13.6793	20.7583	34.8805
ξ	13.1223	20.5383	35.3841
x-ξ	+.5570	+.2200	−.5036
y	23.0591	7.0932	22.8353
η	22.5797	5.7882	22.3186
y-η	+.4794	+1.3050	+.5169

x-ξ	+500x	+10.8y	+.9x	−12669
+.5570	+.6840	= 12710 + 2992	+12659 +.5	= +12664 = 0
+.2200	+.0379	= 12579 + 772	+12656 +.8	= +64 = 0
−.5036	+.7990	= 12904 + 297	= +12651 +.9	= +65 = +1
22.0673	+.1034	+169	+9	= 21.9221

y-η	+500η	−12.2x	+11.7y	−16427
+.4794	+.1530	= +16327 −167	= +16157 +270	= +16427 = 0
+1.3050	+.3497	= +16597 −253	= +16344 +83	= +16427 = 0
+.5169	+.1918	= +16087 −926	= +16161 +267	= +16428 = +1
10.6763	+.7823	−269	+183	= 14.7773

Tables a = −.5 e = −7.7 a − e = +7.2 b+d = −0.5
Lebo. = −500.4 = −511.7 = +11.3 = +1.9

c − c −499.9 −507.0 +1.9

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8732 Plate Constants 4

x	13.6793	20.7583	37.8805
ξ	13.1223	20.5383	35.3841
x−ξ	+5570	+2200	+0.5036
y	23.0591	7.0932	22.8355
η	22.5797	5.7882	22.3186
y−η	+4794	+1305.0	+5169

x−ξ	+500x	+10.8y	+9x	−12667
+5570	+6840 =	12410 +	299 = +12659 +	5 = +12664 = 0
+2200	+10379 =	12579 +	77 = +12656 +	8 = + 64 = 0
−5036	+17990 =	12904 +	247 = +12651 +	14 = + 65 = +1
22.0673	+11034	+ 169	+ 9	= 21.9221

y−η	+500y	−12.2x	+11.7y	−16427
+4794	+11530 =	+16327 − 167 =	+16157 + 270 =	+16427 = 0
+1305.0	+3547 =	+16397 − 253 =	+16344 + 83 =	+16427 = 0
+5169	+11918 =	+17087 − 926 =	+16161 + 267 =	+16428 = +1
10.6763	+7823	− 269	+ 183	= 19.7773

Tables a = −.5 c = −7.7 a − c = +7.2 b + d = −0.5
lbs. = −500.4 = −511.7 = +11.3 = +1.9

b − c −499.9 −508.0 +1.9

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§ 13 – Plate Constants

x	13.6793	20 72 83	39.8805
y	13.4223	20 33 43	35 38 91
x-y	+ 3570	+ 2200	+ 3536
y	23.0591	7.0932	22.8353
n	22.5797	3.7882	22 3156
y-n	+ 4794	+ 3050	+ 3169

x-y + 3570 + 4590 = 12710 + 297 = + 13007 - 2 = + 13469 - 2
+ 12200 + 10379 = 12379 + 77 = + 12456 + 5 = + 64 - 2
- 2026 + 17990 = 12964 + 297 = + 13261 + 14 = + 62 - 11
22 0673 + 11037 + 147 + 7 = 21 7 = 21

y-n + 3050 - 1226 + 1124 - 16427
+ 4794 + 11330 = 16124 - 167 = + 16127 + 270 = + 16427 = 0
+ 13050 + 3347 = + 16397 - 253 = + 16144 + 83 = + 16227 = 0
+ 3169 + 11917 = + 15086 - 926 = + 14161 + 267 = + 14428 = + 1
15 6963 + 1823 - 267 + 183 = 14 777

Tables a = - 3 c = - 7 2 a · e = + 2 2 b - d = - 6 3
Ubs = - 3 0 4 = - 3 1 1 = + 1 1 3 = + 1 7

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A = +1

B = +7

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8732 Moon Center

	x	$(x-x_0)$	Δx	$(x-x_0)^2$	$(x-x_0)^2+(y+y_0)^2$	O-C
1	23,0000	+ 0,9340	- 2	0,8720	3,9159	- 13
2	23,1650	+ 1,0990	- 2	1,2074	39170	- 2
3	23,9373	+ 1,8713	- 1	3,5014	39179	+ 7
4	+24,0464	+ 1,9804	+ 0	3,9220	39220	+ 48
5	24,0000	+ 1,9340	+ 0	3,7404	39348	+ 176
6	23,5064	+ 1,4404	+ 1	2,0750	39137	- 38
7	23,0000	+ 0,9340	+ 2	0,8728	39216	+ 41
8	22,0660	+ 0,0000	+ 2	0,0000	39303	+ 131

	y	$(x+y_0)$	Δy	$(y-y_0)^2$	$\bar{R}=3,9172$	∠
1	- 13,9015	- 1,7435	- 12	3,0439		152°
2	14,0000	- 1,6450	- 11	2,7096		146°
3	15,0000	- 0,6450	- 4	0,4165		109°
4	15,6450	+ 0,0000	+ 0	0,0000		90°
5	16,0856	+ 0,4406	+ 3	0,1944		77°
6	17,0000	+ 1,3550	+ 9	1,8384		47°
7	- 17,3899	+ 1,7449	+ 12	3,0488		28°
8	+ 17,6261	+ 1,9811	+ 14	3,9303	152°	0°

Approximate Center

$x = 23 \qquad y = 13,9015$

$\qquad\qquad 17,3899$

$\qquad\qquad 31,2914$

$y_0 = 15,6457$

$y_{max} = 17,6261$

$R = 1,9804$

$x_{max} = 24,0467$

$x_0 = 22,0660$

Moon's center $\begin{cases} x_0 = 22,0660 \\ y_0 = 15,6450 \end{cases}$

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+732 Photom. Center

	x	(x-x0)		y	(y-y0)		x-x0	(y-y0)	G
1	220000	-0.9390	-2	220000	-0.9720	-2	3717	3717	-13
2	231650	+1.0970	+2	231650	+1.2074	+2	2917	2917	-2
3	233733	+1.8713	+1	233733	+1.9017	+1	3317	3317	+7
4	240769	+1.9807	+1	240769	+1.9220	+1	3922	3922	+18
5	240000	+1.9390	+2	240000	+1.9409	+2	3139	3139	+176
6	235069	+1.7490	+1	235069	+1.7650	+1	3717	3717	-34
7	220000	-0.9390	+2	220000	-0.9816	+2	3717	3717	+99
8	220660	+0.0000	+2	220660	+0.0000	+2	3903	3903	+131

	y	(y-y0)		x	(x-x0)		R=3917	G
1	139015	-1.7725	-12	139015	-1.7725	-12		132
2	140000	-1.6730	-11	140000	-1.6730	-11		196
3	150000	-0.6730	-4	150000	-0.6730	-4		109
4	156457	+0.0000	+2	156457	+0.0000	+2		90
5	160856	+0.7706	+3	160856	+0.7706	+3		77
6	170000	+1.3530	+9	170000	+1.3530	+9		97
7	173899	+1.7449	+12	173899	+1.7449	+12		28
8	176261	+1.9811	+14	176261	+1.9811	+14	1524	0

Approximate Center

x = 22 y = 139015

173899

231914

y0 = 156457

ymax = 176261

x0 = 19804

xmax = 24.0469

x0 = 220660

Photom. center { x0 = 220660
y0 = 156457

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Formation of Normals.

1	-1.62	- 12.1	+ 22.6
2	-1.80	- 2.2	+ 3.3
3	-1.21	+ 13.1	- 45
4	+0.00	+ 95.0	+ 0.0
5	+0.85	+ 3400	+ 775
6	+1.96	- 545	- 515
7	+1.62	+ 41.0	+ 76.5
8	+0.00	+ 0.00	+ 2595
	+4.43	+489.1	+439.4
	-4.63	- 68.8	- 56.0
	-.20	+420.3	+383.4

		a	b	c	new O-C
a	+25	+23	-12	-29	-22
b	+1	+27	-11	-27	-13
c	-40	+47	-7	+3	-22
		+49	+0	+9	+3
		+48	+3	+11	+125
		+36	+9	+5	-106
		+23	+12	-5	-37
		+0	+17	-26	+57

.0124

-15.0

-0.20 + 15.18 = +1.79

+[ ] - 0 = +1.26

+15.18 = +2.75

+16.19 = +10.18 + .09 = +10.22

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8732 Conditional Equations.

			O		C	O-C
1	+0,93	-1,77	= -13	+ 24 - 44	= -20	+ 7
2	+1,10	-1,69	= - 2	+ 29 - 42	= -13	+ 11
3	+1,87	-0,65	= + 7	+ 49 - 17	= +32	- 25
4	+1,98	+0,00	= +78	+ 52 + 0	= +52	- 4
5	+1,93	+0,79	= +176	+ 51 + 11	= +62	+ 114
6	+1,79	+1,36	= - 38	+ 38 + 35	= +73	- 111
7	+0,93	+1,79	= + 77	+ 29 + 95	= +69	- 29
8	+0,00	+1,98	= +131	+ 0 + 51	= +51	+ 80
						+212 -169

$+16.19 - .20 = +920.3$ $+10.18$

$- .20 + 15.18 = +383.9$ $+1.79$

$+.20 - 0 = +5.2$

$+0.18\Delta$

$+15.18 = +388.6$ $b = +25.6$

$+16.19 = +920.3 + 5.1 = +925.4$ $a = +26.3$

$+0.63\Delta$

Arc measured $15^{\circ}2^{0}$

$\frac{p}{h} = .15^{\circ}5$ $\frac{\Sigma v}{h} = +5.4$

In 5° R 1.98 $\frac{+5.4}{.15^{\circ}5} = +35^{\circ}$ $\Delta R = +0.4$

$-2RC = -1.98$ corr $+0.5^{\circ}$

$\Delta R = -0.1$

$\Delta b = -036$ $\Delta \delta = -0.''2$

$\Delta a = -1.^{s}2\,5^{\circ}$ $\Delta \alpha = -0.^{s}09$

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	O		C	O-C
1	-0.92 +1.17	= +13	+24 -22	= -20 +7
2	+1.10 +1.49	= -2	+29 -42	= -13 +11
3	+1.87 +0.63	= +7	+17 -17	= +22 -15
4.	+1.98 +0.00	= +98	+32 +0	= +32 -4
5	-1.93 +0.37	= +176	+31 +11	= +62 +117
6	+1.77 +1.36	= -38	+38 +32	= +7.2 +111
7	+0.92 +1.17	= +99	+24 +42	= +69 -27
8	+0.00 +1.98	= +131	+0 +31	= +1 +70
				+212 -169

16.17 - .20 = +720.3

- .21 +15.18 = +3473.9

+ .20 - 0 = +3.2

+15.15 = +3476 b = +236

16.17 = +1120.3 +3.31 = +7723.7 a = +26.3

Arc measured 13.2°

$\frac{p}{h}$ = .153 $\frac{\Delta p}{h}$ = +3.4

$\frac{+3.4}{.153}$ = +35° Δi = +0.9

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8732 Moons Mean Position.

x_0 = 22.0660
+ 13
22.0673

y_0 = 15.6450
+ 13
15.6463

From Plate Constants

x = 21.9221
y = - 0.0779

q = 19.7773
η = - 3.2227

log y 8.8915 n
log $\cos\delta$ 9.9841 0
85°07'24"
0.1000 20 n

log tan δ 9.9907
y 7.7834
7.0534
9.2440 6

$\alpha - A$ - 2.51

A 21 29 46

α_0 21 29 43.49

Red + 3.45

α' 21 29 46.94

η_1 0.0000
η_0 -3.2227

log η_0 0.5082 2 n
7.3311 5
3.1770 7 n

- 15°03.4

$\delta - D$ - 2°03.4

D -17°59'37"

δ_0 -15°24'40.4"

Red + 12.4

δ -15°24'28.0"

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8732 Reduction to Apparent Place. 8

	= 135°	34.5
H + α	33	02.3
H	11	32.5
α	21	29.8
G	22	23.5
G + α	43	53.3
	= 298°	19.5

δ −15° 27 9 0

log cos δ 9.9841

i 0.0248 +

i 0.0089

log Sin δ 9.4245 n

cos (H+α) 9.8538 n

h 131 05 -

Sin (H+α) 9.8451 -

Sec δ 0.0159

8.8239 -

log cos G+α 9.6762

9 1.2009

Sin " 9.9446 n

tan δ 9.4409 n

8.8239

log g' 0.8771

" g 9.4103

h' 0.5888

h 9.9547

9.9954

f +2.204

g +0.257

h +0.989

+3.450 -

g' + 7.536

h' + 3.880

i' + 1.002

+12.418 -

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0015.9

9.99597

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8732 Lunar Parallax

α'	21	29	46.98 ⌐	π	58' 42.19 ⌐
ϕ	21	43	53.30 ⌐		
$\theta-\alpha'$	+ 0	14	06.36 ⌐		9.869113
=	+ 3	31	35.40 ⌐		8.232236 ⌐
					8.788899 ⌐
$\frac{1}{2}(\theta-\alpha)$	+ 1		22.81 ⌐		0.017722 ⌐
	+3	30	12.59 ⌐		6.904658 ⌐

log tan ϕ	9.957127			$\alpha-\alpha'$	+ 2	45.63
	0.000000 ⌐					
	0.000081 ⌐			=	+ 0	11.04 ⌐
	9.957208 ⌐					+6.94

γ	4	2	14 20.7 ⌐
δ'	-15°	24	28.0 ⌐
$\gamma-\delta'$	57	38	48.7 ⌐

9.826740
8.232236 ⌐
9.926733 ⌐
0.017248 ⌐
8.153797 ⌐

$\delta-\delta'$		+ 49	27.6 ⌐			
		24	28.0			
δ	-14	35°	00.4 ⌐	α	21	29 5°7.98 ⌐
Am Ephs	-14	35	03.6 ⌐	Am Eph α	21	29 57.27 ⌐
O-C		+ 3.2 ⌐		O-C		+00.71
Corr. of Plate		+0.7				-01
2nd Ind. Ref		+0.1				
Inst Corr		-0.2				-0.04
δ	-14	35°	00.5	α	21	29 57.97
O-C		+ 3.1				+0.67

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Curv of Plate +0.7 -01

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8890 Star Measures.

	d	x	r	d	y	r	
1		18162	17318	19138		18948	
10.8		9938	15552	20778		17306	
29.9		50	4850	76	77	00	03
		68	22	38		98	
		10.8222	10.8232	29.8360		29.8356	
2		18250	20210	16616		20598	
27.6		12350	16130	12490		14718	
7.4		82	30	84	87	20	19
		50	18	14		608	
		27.5904	27.5916	7.4128		7.4116	
3		16212	20022	17160		19932	
30.0		15518	10738	12798		14266	
29.5		20	4843	810	04	66	
		12	38	54		34	
		30.0694	30.0706	29.4354		29.4334	

Moon Measures.

1				18640		20644	
23?				16120		13168	
17.3				12	16	76	72
-4				32		42	
				14.2522		14.2530	
2				18672		19570	
22				13832		14902	
19.6				40	36	00	01
				60		70	
				14.4836		14.4832	
3		16990	19190				
21.4		13360	12866				
15		40	56		50	61	
		92	98				
		21.3640	21.3666				

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5890 Star Measures

1	17162	17318	19138	18998
10.8	9938 99	13232	10778	17306
27.8	30	1830	7677	00 03
	68	22	38	98
	10 8222	10 1232	29 8360	29 8356
2	17230	20210	16616	20398
27.6	12330	16130 30	12990	17718 17
7.7	9276	30	4977	20
	50	18	19	608
	27 5907	27 3916	17128	17116
3	16212	20022	17160	19932
30.0	12318	10138	12798 09	19266
29.3	2019	9893	810	66
	12	38	59	39
	30 0699	30 0706	29 3317	29 4339

Uranus Measures

1	18670		20699
23	16120 16		13168 12
17.3	12		76
-7	32		92
	19 2322		19 2530
2	18672		17570
22	13832 36		17902 01
19.6	40		60
	60		70
	19 9836		19 9832
3	16790	19190	
21.7	13360 30	12866	
15	40	36 61	
	92	98	
	21 3690	21 3666	

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L	10688	17300	16686	19180
0.3	16172	10200	12376	13302
8.2	72	02	72	00 01
	72	08	80	70
	28.1916	28.1379	28.9108	29.1119

Stars remeasured

L	20412	19320	19719
7.8	12186	10932	18072
7.9	90	72	69
	10	22	28
	10.8223	29.8371	29.3352

L	19379	20362	
7.6	13680	16299	
7.7	77	59	
	79	66	
	27.5907	7.9112	

L	13852	20398	
0.0	13161	15996	
9.5	69	99	
		10	
	30687	29.9397	

L	10362	19602	
0.3	16236	17706	
8.2	50	698	
	70	10	
	20912	28.1702	

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7

21
15.7

17408
10692
42
10
15.6766

20350
17160
80 50
80 oblique
15.6804

5

20.9+
16

17190
7912
08 10
82
20.9272

17302
16592
86 89
00
20.9288

6

20.9
16.3
-X

20190
11100
0926
84
20.9088

17292
16402
388 395
302
20.9102

7

21
16.9

20268
11312
08 10
70
16.8960

18914
17888 54
60
38
16.8936

8

21.9
18

18476
9808
22 15
82
21.8666

16692
15432
28 30
96
21.8738

9

22
18.1

19758
19030
2628
58
18.0730

19772
10500
472 786
64
18.0722

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Star No. 4

	y		x	
4	18688	18300	16686	19180
20.3	16772	10200	12576	13302
28.2	72	01	75	01
	92	08	80	90
	28.1916	28.1894	20.4108	20.4114

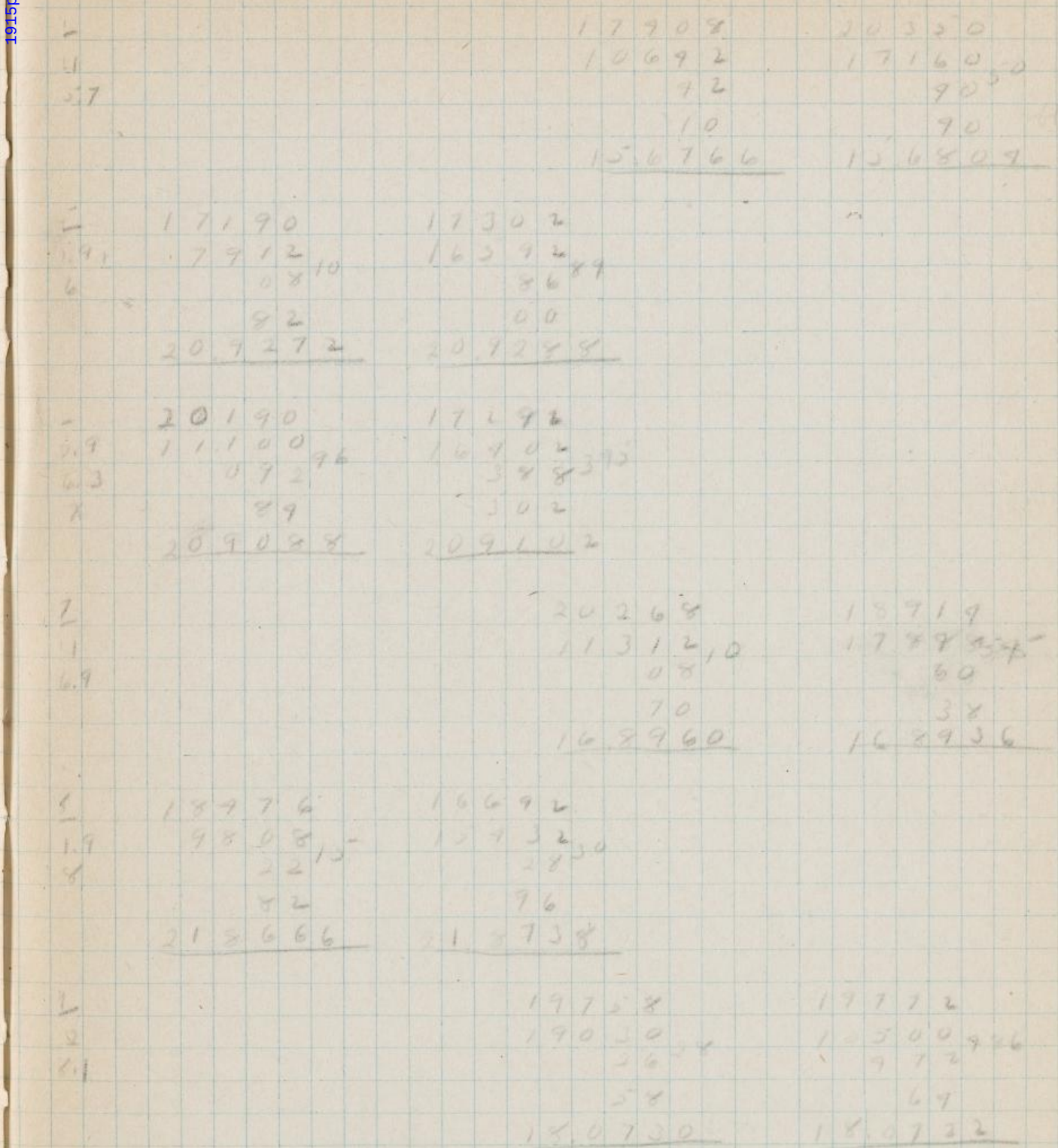
Stars Remeasured

1	20412	19320	19718	
10.8	12186	10952	18072	
28.9	90	42	64	
	10	22	28	
	10.8223	29.8378	29.8352	
2	19574	20362		
27.6	13680	16244		
7.4	74	54		
	79	66		
	27.5907	7.4115		
3	13852	20348		
30.0	17161	15996		
29.5	69	99		
		40		
	30.6887	29.4347		
4	20362	19600		
20.3	16256	17700		
28.2	50	698		
	70	10		
	20.4172	28.1902		

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8890 Moon Hyades 11



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8890 Times & Etc. 10-5" 12

July 24 15"

Eq. two Stars	20	24		20	36	
" " Moon	20	30	24.7"	20	30	27.5"
Clock fast		2	37.9"			
M. Sid Time	20	27	49.55"	$\phi - \alpha = +1^h\ 27^m\ 45^s$		
H Long	7	44	31.05"			
G. Sid T.	25"	12	20.60"			
Sid T. M.N.	8	04	30.70"			
Interval	17	07	49.90"			
Reduction		2	+8.39"			
G. M. T.	17	05	01.51"			

From Naut. Alm.	R. a.		Dec.	
Moon 14h	18 59	51.11	-25° 41	19.5
Motion in 1m		2.6786		+6.5666
" " 05.025 2		+13.46		33.0
Tabular Place	19 0	07.57"	-25 40	46.5"

Moon's Age 12 days.

Parallax	60' 17.71"
Semid.	16 26.5"
R.	986.5"
Aug.	5.8"
Ecc.5	-0.8"
R.	991.5"
R.	2.125.7"
nR.	-100 3"
(1+a)R.	2.0249"
R²	4.1002"

934 = 5.2"

a = -996.7"
24
-472.7"

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x-5 +320 x

~~1008 + 13775 = 12787~~
-2222 + 13035 = 12513
+2324 + 10205 = 12529

y-4 +320 y

~~+8351 +3706 = 12057~~
-3281 +14717 = 11436
-2568 +14095 = 11527

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x-y +500x +12.7y -12879

1008 + 13795 = 12787 + 92 = +12879
-2522 + 15035 = 12513 + 365 = 12878
+2324 + 10205 = 12529 + 349 = 12878

corr to old

22.9321 + 11866 + 202 22.8110 - 27

y-x +500y +6.1x +27.6y -12430

+8351 + 3706 = +12057 + 168 = +12225 + 205 = +12430
-3281 + 17717 = 11736 + 183 = +11619 + 812 = 12431
-2568 + 17095 = 11527 + 125 = +11652 + 778 = 12430

16.2773 + 8139 + 140 + 479 15.9071

corr to old
= -95

Tables a=-2.2 e=-25.4 a-e=+23.2 b+d=-18.5
Obs =-500 =-527.6 =+27.6 =-18.5

b-c -497.8 -502.2 +4.4 0

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8890 Plate Center & Constants.

x	y	α	δ
10.8227	29.8358	18 51 31.06	-24 43 51.8
27.5910	7.4122	19 01 38.08	-27 47 44.6
30.0700	29.4344	19 03 02.98	-24 47 27.6
3)68.4837	66.6824	3)56 55 72.12	75 137 124.0
22.8279	22.2274	18 58 44.04	-25 46 21.3
22	18	-25.66	-32 48.6
-.8279	-4.2274	18 58 18.38	-26 19 09.9
31	466.5		
-25.66	-32' 48".63		
20.4111	28.1905		

Plate Center { A = 18 58 18.
D = -26 19 10.

x-y +500x +11.14 -3.3x -12755

+7040 +5911 = +13751 + 331 = + 12782 - 36 = +12746 = - 9
-1023 +13795 = +12772 + 82 = + 12854 - 91 = +12763 = + 8
-2517 +15035 = +12518 + 327 = + 12845 - 99 = +12746 = - 9
+2319 +10205 = +12519 + 313 = + 12832 - 67 = +12765 = +10
22.9321 + 11.466 + .181 - .076 = 22.8137

y-y +500y -1.4x +23.64 -12098

-3517 +19918 = +11401 - 15 = + 11386 + 704 = +12090 = - 8
+8265 + 3706 = +11971 - 39 = + 11932 + 175 = +12107 = + 9
-3281 + 14717 = +11436 - 92 = + 11394 + 695 = +12089 = - 10
-2624 + 17095 = +11471 - 29 = +11442 + 665 = +12107 = + 9
16.2773 + .8139 - .032 + .384 = 15.9166

Tables a = -2.2 e = -25.7 a-e = +23.2 b+d = -18.5
Obs = -496.7 = -523.6 = +26.9 = -9.7

b-e -498.5 -498.2 +8.8

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Cycle No 2nd Trip 5

B 1h 56 20.76

+50.11
18 37 1 57
1h 58 18
-01 02.73
-062.93
1.79 539
9 1 770
026003

-1.8198
-00
206789
2 9 1 1 1
+02314

B -29 57 07 9

+1 11.1
-29 57 53.8
-26 19 10.0
+1 21 16.2
-1 18 37.1
3 6 8 8 1 6
1 8 1 7 3 1

0
05208
72915

+109 57 6
-0 0 0 17
289528
2 1 19 0 3
26

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1910 Plate Center & Constants.

0.8227	29.8358	18 31 31.06	= 29 43 51.8
1.5710	1.9122	19 01 38.08	27 99 99.6
0.0200	29.9399	19 03 02.98	29 97 27.6
8.9837	6.6829	326 53 72.12	7 5 137 129.0
22.8279	22.2279	18 38 99.09	-25 96 21.3
12	12	-2364	-32 986
-.8279	-9.2279	18 38 18 38	-26 19 09.9
12	1661		
-22.676	-32.1863		

20.71 Plates for 05 Plate Center { A = 18 38 18.
D = -26 19 10.

x-5	+ 5220 x	+ 11.14	- 3.2 x	- 1275	
+7090	+5911	= +12.1	+ -331	= + 12782 - 36	= +12796 = -
-1623	+13795	= +12172	+ 82	= + 12859 - 98	= +12768 = + 2
-2517	+15035	= +12518	+ 327	= + 12895 - 98	= +12798 = -
+2319	+10205	= +12519	+ 313	= + 12832 - 67	= +12765 = +1
22932	1 11966	+ 181	- 76	= 22.8137	

y-4	+3089	-1.9 x	+ 23.64	- 12098	
-3217	+19918	= +11901	- 15	= + 11386 + 709	= +12090 = - 8
+8265	+3716	= +11971	- 39	= + 11932 + 175	= 12107 = + 9
-3281	+19717	= +11936	- 92	= + 11399 + 695	= 12089 = - 10
-2629	+17095	= +11971	- 29	= +11942 1 665	= 12107 = + 9
16.2772	+8137	- 32	+ 389	= 15.9166	

Tables a = -1.2 c = -23.7 a-c = +23.2 Cid = -18.5
Cd = -996.7 = -523.6 +26.9 = -19.7

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Cape No 2615 - Mg 5.8

B 18 56 20.46

$\gamma = -0.02$

$\delta = +0.3$

+55.11

18 57 15.57

18 58 18

-01 02.73

0 -062.73

	ξ	η	Δξ	−4.7ξ	+1η		
1	-1.82	+10.45	-5	+5	= 0	+10 = +10	1,79 53 9 h
2	-11.88	+12.26	-82	+58	= -24	+12 = -12	9,95 74 0
3	+5.69	-11.90	+24	-27	= -3	-11 = -14	0.26 00 3 h
4	+8.32	+16.80	+41	-39	= +2	+12 = +14	

-7.8198

M +0.81 -2.08 0 -4 -2 -6 -05

Δη -6.7η -1.6ξ -7 20.6787

+32 -77 = -45 +3 = -42 20 4 11 1

+87 -82 = +5 +19 = +24 +0.23 14

-76 +76 = +30 -9 = +21

+60 -79 = -19 -13 = -32 24 59 04.9

0 +13 -1 = +5

09.1

-13.70 + 22.71 = -87 + 119 +1 11.1

+18.01 + 9.40 = +65 + 19 -24 57 53.8

-26 19 10.0

+27.71 - 22.31 = +152 - 105 +1 21 16.2

-22.3+149.

+4 8 7 7.1

3.6 8 8 1.6

1.0 1 9 3 1

+3.87 - 0.95 = +19 - 14

- 3.56 +24.06 = -71 + 187

9.6 6 8 0 h

0.52 07

7.2 7 1 5

+7.43 -25.01 = +60 - 161

- 3.97 = +40.6 - 28.2

+10.9 5 7 6

- 0.00 17

28.4 5 2 9

- 19.87 = +19.4 = - 132.8

η = - 1. = + 6.7

28.1 9 0 5

+ 2 6 2 9

27.71 = +129.7 + 44.0

ξ = + 9.7 + 1.6

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8890 Standard Coordinates.

	Cape Nr 2604-Mg 7.3	Cape Nr 2624 - Mg 3.5	Cape Nr 2631-Mg 6.1
c	18 50 35.97		19 02 08.00
I	35.98 B= 19 00 41.86 (1857)		08.02
C			
Mean	18 50 35.96		19 02 08.01
Prec	+5 5.10 (1900)	+5 6.22	+5 4.95 55.00
a	18 51 31.06	19 01 38.08	19 03 02.96
A	18 58 18	18 58 18	18 58 18
a-A	-06 46.94	+03 20.08	+04 44.96
Sin (a-A)	-406.88	+200.97	+284.94
Log "	2.609447 n	2.301118	2.454745
" Cos	9.995822	9.996676	9.995801
" ξ0	1.099493 n	0.755518	0.920000
ξ0	-11.8831	+5.6909	+8.3176
ξ1	-.082	+24	+71
ξ	10.8187	+27.6933	30.3217
x	10.8227	27.5910	30.0700
x-ξ	+27040	-17023	-25117
c	-24 49 58.0		-24 48 48.1
I	58.3 B-27 48 60.0		48.5
C			
Mean	-24 49 58.1	-11.5	-24 48 48.3
Prec	+1 06.3 (1900)	+1 15.7	+1 20.8
δ	-24 43 51.8	-27 47 44.6	-24 47 27.5
D	-26 19 10	-26 19 10	-26 19 10
δ-D	+1 35 18.2	-1 28 34.6	+1 31 42.5
tan (δ-D)	5 7 19.7	-5 3 15.8	+5 5 03.8
log "	3.735738	3.725536 n	3.740646
" η0	1.088553	1.056711 n	1.071833
log tan δ	9.6633 n	9.7219 n	9.6645 n
ξ0	2.1499	1.5183	1.8700
" η1	8.8666	8.2856 n	8.5579 n
η0	+122611	-113950	+117986
η1	-0.0736	-0.0193	-0.0360
η	30.1875	6.5857	29.7625
ζ	29.8358	7.4122	29.4349
ζ-η	-3517	+8265	-3276

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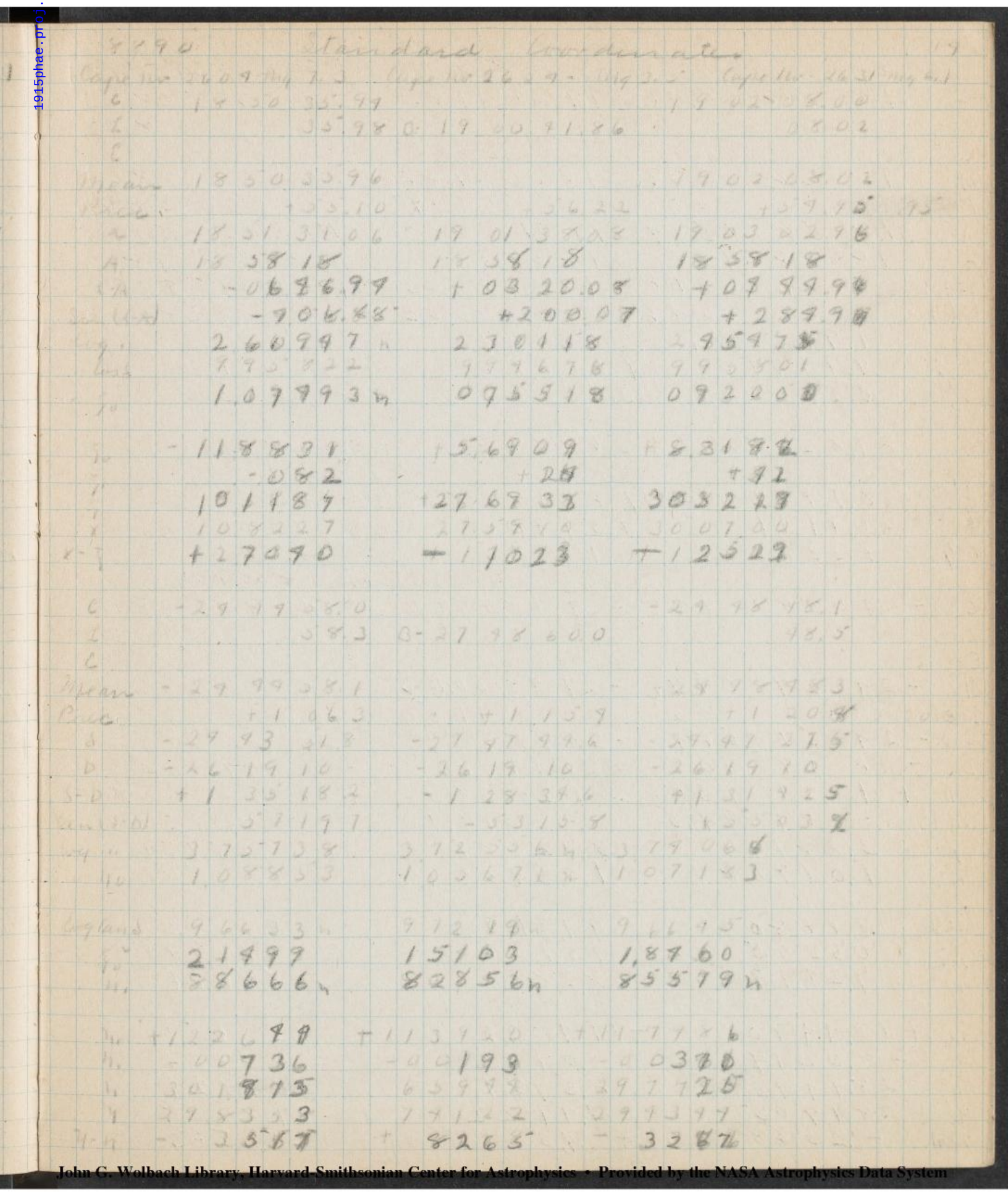
	Boss 9857		Cape 2631 − 1976.1
	18 56 20.96	19 00 41.56	19 02 08.00
			8.02
	18 56 20.96	19 00 41.56	19 02 08.01
	53.08	56.17	54.97
	18 57 15 39	19 01 38.03	19 03 02 98
	18 58 18	18 58 18	18 58 18
	− 1 02.96	+ 320.03	+ 97 97.98
	− 62.86	+ 200.02	+ 289 96
	1.795604	2.301074	2.795978
	9.995780	9.996676	9.995801
	0.260284	0.753507	0.920003
	− 1.8207	+ 5.6899	+ 8.3182
	.6	+ 24	+ 90
	20.17877	27.69718	30.32222
	20.41111	27.72910	30.07000
	+ .2324	− .1008	− .2522

Cape 8890

	− 24 59 09.9	− 27 48 60.00	− 24 44 58.6
			58.3
	− 24 59 09.9	− 27 48 60.0	− 24 44 58.1
	+ 1 8.3	+ 1 11.5	[illegible] 1 08.5
	− 24 57 56.9	− 27 47 48.5	− 24 43 49.6
	− 26 19 10	− 26 19 10	− 26 19 10
	+ 1 21 13.6	− 1 28 38.5	+ 1 35 20.4
	+ 7879.5	− 5319.7	+ 5721.7
	3.687993	3.723589	3.757559
	1.019084	1.057094	1.028469
	9.66880	9.72189	9.66337
	0.52054	1.51014	2.17799
	7.29119	8.28537	8.86664
	+ 10.99490	− 11.90036	+ 12.26557
	− .0017	− .0193	− .0736
	28.99773	6.57771	30.19271
	28.19054	7.91122	29.85358
	− .2568	+ .8331	.3563

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	(1)	(2)	(3)
	B 8835	Bonn 9857	Cape 2631 − Mg 6, 1
t	18 56 20,476	19 00 41,86	19 02 08,00
I			8,02
E			
M	18 56 20,476 v	19 00 41,86 v	19 02 08,01
P	55,08	56,17 v	57,97
τ	18 54 15,37	19 01 38,03	19 03 02,98
A	18 58 18	18 58 18	18 58 18
t-A	− 1 02,76	+ 3 20,03	+ 44,98
Sin( )	− 62,46	+ 200,02	+ 284,96
log.	1,795604	2,301074	2,454784
Cos	9,957401	9,946761	9,958011
z₀	0,260274	0,753074	0,920034
z₀	− 1,8207	+ 5,6894	+ 8,3182
z₁	− 6	+ 24	+ 40
z	20,1787	27,6918	30,3222
x	20,1811	27,5914	30,0700
x-z	+ ,2324	− ,1008	− ,2522
			Cape 8890
t	− 24 59 07,9	− 27 48 60,0	− 24 44 58,0
I			58,3
C			
M	− 24 − 59 07,9 v	− 27 48 60,0 v	− 24 44 58,1
P₁	+ 1 8,5	+ 1 11,5	[p.M=+2,1] 1 08,5
d	− 24 57 56,4	− 27 47 48,5	− 24 43 49,6
D	− 26 19 10	− 26 19 10	− 26 19 10
d-D	+ 1 21 13,6	− 1 28 38,5	+ 1 35 20,4
tan( )	+ 4874,5	− 5319,7	+ 5721,9
log( )	3,688793	3,725889	3,757574
n₁	1,019088	1,057048	1,088869
tang	9,66804	9,72219	9,66334
y₀	0,32054	1,51014	2,17999
n	7,24194	8,28354	8,86664
x₀	+ 10,4490	− 11,8036	12,2657
x₁	− ,0017	− ,0193	− ,0736
x	28,4473	6,5477	30,1921
y	28,1905	7,4122	29,8358
(x-x)	− ,2568	+ ,8351	− ,3563

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8890 Moon's Center 15"

	X	X-X₀	ΔX	(X-X₀)²	(X-X₀)²	O-C
1	22935"0	0,0000	-26 0,0000	4,1225	+ 223	
2	22,0000	-0,9350	-23 0,8785"	4,1136	+ 134	
3	21,3653	-1,5697	-17 2,4693	4,1113	+ 113	
4	21,0000	-1,9350	-8 3,7473	4,1093	+ 091	
5	20,9280	-2,0070	-3 4,0292	4,1073	+ 71	
6	-20,9095"	-2,0255"	-0 4,1026	4,1026	+ 24	
7	21,0000	-1,9350	+8 3,7412	4,1279	+ 217	
8	21,8652	-1,0698	+22 1,1398	4,1134	+ 132	
9	22,0000	-0,9350	+23 0,8699	4,0998	- 4	

$R^2 = 4,1002$

	Y	Y-Y₀	ΔY	(Y-Y₀)²		
1	-14,2526	-2,0264	-90 4,1225		180°	
2	14,9834	-1,7956	-36 3,2371		203°	207
3	15"0000	-1,2790	-25" 1,6422		231°	
4	-15"6785"	-0,6005	-12 0,3620		253°	
5	16,0000	-0,2790	-5" 0,0781		262°	
6	16,2790	-0,0000	-0 0,0000		270°	
7	-16,8948	+0,6158	+12 0,3807		288°	
8	18,0000	+1,7210	+34 2,9736		328°	
9	+18,0726	+1,7936	+36 3,2299		332°	152°

Approx. Center

X = 21 Y = 15"6785"
16,8948
32,5733

Y₀	16,2866
Ymin	14,2526
R	2,0257
Xmin	20,9095"
X₀	22,9349

16,2790

Moon's Center $\begin{cases} X_0 = 22,935"0 \\ Y_0 = 16,2790 \end{cases}$

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8890 Moon's Center

	x	x-x₀	Δx	(x-x₀)²	(x-x₀)²	15° O-C
1	22935.0	0.0000	-26 0.00000	9.1225		+223
2	22.0000	-0.9350	-23 0.87850	9.1156		+154
3	21.3653	-1.5697	-17 2.46693	9.1115		+113
4	21.0000	-1.9350	-8 3.74973	9.1093		+091
5	20.9280	-2.0070	-3 4.02292	9.1073		+71
6	-20.9095	-2.0255	-0 4.10226	9.1026		+29
7	21.0000	-1.9350	+8 3.74912	9.1219		+217
8	21.8652	-1.0698	+22 1.13998	9.1139		+132
9	22.0000	-0.9350	+23 0.86699	9.0998		-9

R = 9.1002

	y	y-y₀	Δy	(y-y₀)²		
1	-19.2526	-2.0264	-90 4.12225		180	
2	19.9839	-1.7951	-36 3.23711		203	
3	15.0000	-1.2790	-25 1.64422		231	
4	15.6785	-0.6005	-12 0.36620		253	
5	16.0000	-0.2790	-5 0.07781		262	
6	16.2790	-0.0000	-0 0.00000		270	
7	16.8998	+0.6158	+12 0.37907		288	
8	18.0000	+1.7210	+39 2.97736		328	
9	+18.0726	+1.7936	+36 3.22299		332	152°

Approx. Center

x = 21 y = 15.6785
16.8998
32.5783

y₀	16.2866
y min	19.2526
R	2.9660
x min	20.0905
x₀	22.9905

16.2790

Moon's Center $\begin{cases} x_0 = 22.9905 \\ y_0 = 16.2790 \end{cases}$

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Formation of Normals.

1 + 0,0	- 00	- 4530
2 + 1,68	- 143.5	- 2775
3 + 2,01	- 177.5	- 1450
4 + 1,16	- 176.0	- 575
5 + 0,56	- 142.5	- 200
6 + 0,00	- 49.0	- 000
7 - 1,20	- 419.0	+ 1345
8 - 1,84	- 141.0	+ 2270
9 - 1,67	+ 3.7	- 72
+ 5.41	+ 3.7	+ 3615
- 4.71	- 1248.5	- 9572
+ 0.70	- 12448	- 5957

	a	b	c	new o-c
a - 27	+ 0	+ 8	-32"	+21"
b - 7	+ 22	+ 7	-11"	+27"
c - 40	+ 38	+ 5	+ 3"	-20"
	+ 46	+ 2	+ 8"	-37"
	+ 48	+ 1	+ 9"	-137"
	+ 49	+ 0	+ 9"	-85"
	+ 46	- 2	+ 4"	+130"
	+ 26	- 7	-21"	+109"
	+ 22	- 7	-25"	-21"

-26^{0}

$+0.70 + 16.02 = -1.86$

$+[\ ] + 0.02 = -.41$

$- + 16.00 = -1.45$

$+20.97 = -12.90 + .06 = -12.34$

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8890 Moon's Mean Position 16

						O-C	
1	- 0,0	- 2,03	= + 223	+ 0	+ 70	= + 70	+ 153
2	- 0,93	- 1,80	= + 157	+ 54	+ 62	= + 116	+ 38
3	- 1,57	- 1,28	= + 113	+ 92	+ 44	= + 136	- 23
4	- 1,93	- 0,60	= + 91	+ 112	+ 21	= + 133	- 42
5	- 2,01	- 0,28	= + 71	+ 117	+ 97	= + 214	- 143
6	- 2,03	- 0,00	= + 29	+ 118	+ 0	= + 118	- 98
7	- 1,93	+ 0,62	= + 217	+ 112	- 21	= + 91	+ 126
8	- 1,07	+ 1,72	= + 132	+ 62	- 60	= + 2	+ 130
9	- 0,93	+ 1,79	= - 7	+ 54	- 62	= - 8	+ 7
						+ 851	- 302

+ 20,97 + 0,70 = - 1244,8 - 12,70

+ 0,70 + 16,02 = - 595,7 - 1,86

+ 0,70 + ,02 = - 41,6

- 0,09 Δ

+ 16, = - 554,1 b = - 34,6

+ 20,97 = - 1244,8 + 24,2 = 1220,6 a = - 58,3

- 0,59 Δ

Arc measured 15°2

$\frac{p}{h}$ = - ,155 $\frac{2v}{h}$ = + 16,6

Irr. 5 R. 202

$\frac{+16,6}{,155}$ = + 107 ΔR = + 1,3

-2RC = - 2,02 Corr = + 0,5

Δb = + 0,18 Δd = + 0,1 ΔR = + 0,8

Δa = + 1,19 Δα = + 0,04

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1890 Moon's Mean Position

						O-C
1	- 0,0	- 2,03	= + 223	+ 0 + 70	= + 70	+ 153
4	- 0,93	- 1,80	= + 1,54	+ 54 + 62	= + 116	+ 38
2	- 1,37	- 1,28	= + 113	+ 92 + 44	= + 136	- 23
4	- 1,93	- 0,60	= + 91	+ 112 + 21	= + 133	- 42
5	- 2,01	- 0,28	= + 71	+ 117 + 97	= + 214	- 143
6	- 2,03	- 0,00	= + 29	+ 118 + 0	= + 118	- 99
7	- 1,93	+ 0,62	= + 217	+ 112 - 21	= + 91	+ 126
8	- 1,07	+ 1,72	= + 132	+ 62 - 60	= + 2	+ 130
9	- 0,93	+ 1,79	= - 9	+ 54 - 62	= - 8	+ 7
						+ 951 - 302

+ 20.97 + 0.70 = - 1299.8

+ 0.70 + 16.02 = - 595.7

+ 0.70 + .02 = - 41.6

+ 16. = - 554.1 b = - 34.6

+ 20.97 = - 1299.8 + 29.2 = 1220.6 a = - 58.3

Arc measured 152°

$\frac{p}{4}$ = - .153 $\frac{2v}{4}$ = + 16.6

$\frac{+16.6}{153}$ = + 107 Δ i = + 1.3

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$x_0 = 22.9350$
-29
22.9321

$y_0 = 16.2790$
-17
16.2773

From Plate Constants

$x = 22.8137$

$\xi \quad +0.8137$

$\log \xi \quad 9.910476$
$\log \delta \quad 9.951457$
8.507219
1.451777

$q - A \quad +28.30$

$A \quad 18\ 58\ 18$

$\alpha_0 \quad 18\ 58\ 46.30$

Red $\quad +4.50$

$\alpha' \quad 18\ 58\ 50.80$

$y = 15.9766$

$\eta \quad -2.0834$

$\log \tan \delta \quad 9.6993_n$
$\xi^2 \quad 9.8209$
7.0534
6.5736_n

$\eta_1 \quad -.0004$
$\eta_0 \quad -2.0830$

$\log \eta_0 \quad 0.318699_n$
7.331135
2.987764_n
-971.7

$\delta - D \quad -16\ 11.7$

$D \quad -26\ 19\ 10$

$\delta_0 \quad -26\ 35\ 21.7$

Red $\quad -0.6$

$\delta' \quad -26\ 35\ 22.3$

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$x_0 = 22\,93\,50^s$
-29^s
$22\,93\,21^s$

$y_0 = +16.2790''$
$-17''$
$16.2773''$

From Plate Constants

$x = 22.8137^s$

$\xi \quad +0.8137^s$

Log ξ 9.910196
Log δ 9.931945
8.507129
8.959270

$\eta = 15.9766''$

$n \quad -2.0834''$

Log Tang δ 9.999983
$\frac{1}{2}$ 9.82099
70539
6.37536 n

$\delta - A \quad +28.30''$

$A \quad 18\,58\,18$

$\delta_0 \quad 18\,58\,46.30''$

Red $+4.50''$

$\delta' \quad 18\,58\,50.80''$

$n_1 \quad -.0009''$
$n_0 \quad -2.0830''$

Log n_0 0.318699 n
733113
2.98754 n

$\delta - D \quad -16\,11.7$

$D \quad -26\,19\,10$

$\delta_0 \quad -26\,35\,21.7$

Red $-0.$

$\delta' \quad -26\,35\,22$

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18 37 41.17 − 9 08 06.6
37.29 5.2
+ 3.93 − 1.7

18 57 16.88 − 30 00 11.3
12.25 10.17
+ 8.63 − 1.16

19 04 46.89 − 21 09 39.7
32.57 34.7
+ 14.32 + 0.3

−5°
−10°
−15°
−20°
−25°
−30°
−35°
−40°

3'
2'

10 0 33" 50 40' 40 35" 40
194 184

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8890 Reduction to Apparent Place 18

$= 75^\circ\ 39'.0$

H+α	29	02	6
H	10	03	.8
α	18	58	.8
G	22	32	.4
G+α	41	31	.2
	$= 262^\circ$	48'	.0

log cos G+α 9.09881n
g 1.2422
sin " 9.99660n
tan δ 9.69944n
8.8239

log g' 0.3403n
g 9.7621

f +2.776
g +0.578
h +1.478
+4.302 ν

δ −26 35 22.

log cos δ 9.9951 β
ν 0 6 23.1 +
i' 0 57 6.2

log sin δ 9.6509n
cos H+α 9.3942
h 1.3017
sin " 9.9862
Sec δ 0.0489
8.8239

h' 0.3468n
h 0.1607

g' −2.189
h' −2.222
i +3769
−0.642 ν

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§ 90 Reduction to Apparent Place

	= 75°	39'.0
H + α	29	02.6
H	10	03.8
t	18	58.8
G	22	32.9
G + λ	91	31.2
	= 262°	98'.0

log cos G + α 9.09881 n
g 12422
sin .. 9.99660 n
tang δ 9699 4n
8.8239

log g' 0.34031 n
g 9.76211 n

f +2,776
g +0.578
h +1.198
+4.502

δ -26 35' 22,

log cos δ 9.95181
ν 0.62311
z 0.57762

log sin δ 9.65094 n
cos H+α 9.39972
h 1.30117
sin .. 9.98622
sec δ 0.04489
8.5239

h' 0.34688 n
h 0.1607

g' -2.189
h' -2.222
z +3769
-0.642

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Lunar Parallax

α' 18 58 50.80 ✓
+ 20 27 49.55 ✓
α − α' + 1 28 58.75 ✓
= + 22° 19' 41".25 ✓
½ (α − α') + 9 21.63
22° + 5 19.62

π 60' 19".71 ✓

9.869113
8.249362 ✓
9.578147 ✓
0.045166 ✓
7.736665 ✓

log tan β 9.957127
0.000000
0.003311
9.990438

α − α' + 18 43.26 ✓
= + 1 19.88 ✓

γ 99 21 55.2

δ − 26 35 22.3 ✓

γ − α 70 57 17.5

9.826470
8.249362 ✓
log sec β 0.155538
9.997555
8.200955

δ − δ' + 57 36.9
35 22.3
δ − 25 40 23.9 α 19 00 05.68 ✓

Am Eph δ − 25 40 46.5 ✓ A.E. α 19 00 04.57 ✓

6 − c + 0.6 6 − c + 1.11 ✓

Corr. of Plate + 0.3 − 0.02
2nd O. Ref. + 0.9

Irr Corr + 0.1 + 0.04
δ − 25 40 44.9 α 19 00 05.72

Note - Diff in Plate constants large.

6 − c + 1.6 + 1.15 ✓

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Lunar Parallax

α'	18	58	30.80	π	60'	19".71	
+	20	27	99.55				
$= -\alpha'$	+1	28	58.75		9.869113		
$= \alpha$	122°	19'	91".25		8.293622		
$\frac{1}{2}(\alpha - \alpha')$		+9	21.63		9.371814		
$\frac{1}{2}$	22°	+5'	19.62		0.095176		
					7.736605		

log tan $\frac{1}{2}$	9.937127	$\alpha - \alpha'$	+18	93.26	
	0.000000	=	+1	19.88	
	003311				
	9.940438				

α 99 21 53.2

δ −26 35' 22.3"

$\phi - \delta$ 70 57 17

	9.826790						
	8.273362						
log cos	0.145538						
	9.970355						
	8.215745						

$\delta - \delta'$ +25 36.9

δ −25° 90 90.9 α 19 00 05.68

Ann Ephs −25° 90 96.5" HCA 19 00 09.57

C − C −0.6 C − C +1.11

Corr w/ Plate +0.3 −0.02

2"-0. Ref +0.9

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8891 Star Measures.

1	18067	17532	18172	20516
8.6	17212 11	14392 87	17378 79	19380 39
29.7	10	82	70	38
	62	32	76	30
	8.6852	8.6859	29.3830	29.3817
2	17950	17272	18986	19590
26.5	12472 45	12280 81	19068 66	19492 90
7	48	82	64	88
	50	70	90	600
	25.5006	25.5010	6.9924	6.9900
3	16610	17900	17002	20578
27.9	7299 93	17256 57	16872 67	10710 05
29.	92	58	62	00
	12	04	04	82
	27.9318	27.9356	29.0136	29.0127
4	15890	20086	16676	19230
18.3	13112 13	12862	91088 10	16746 93
27.7	14	62	12	90
	80	84	46	96
	18.2774	18.2778	27.7536	27.7508

Moon Measures.

1				
21.8			18338	19802
14.2			17006 08	11138 35
-4			10	32
			46	30
			14.1330	14.1308
2			18850	19760
21			15582 86	12560 67
14.3			90	68
			50	88
			14.2767	14.2782
3	17120	19838		
20.1	16318 18	10674 73		
15-	18	72		
	32	34		
	20.0802	20.0838		

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1911 Star Appearances.

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Moon Measures.

1

20
15.2

	18967	19572
	17728 27	10862
	28	62
	70	70 oblique
	15.1238	15.1292

2

19.7
16?
+X

	17886	20882
	10690 85	17872 63
	80	54
	82	72
	19.7198	19.7184

6

19.9
17

	17900	19638
	8902 900	18630 46
	98	42
	02	70
	19.9002	19.9004

7

20
17.1

	18942	19030
	16980 996	10994 36
	012	28
	52	26
	17.1978	17.1910

8

20.9
18

	19638	19650
	10420 23	18860
	26	7266
	42	54
	20.9218	20.9216

9

21
18.1

	20160	18982
	19796	9322 23
	892	24
	66	80
	18.0368	18.0342

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Plates Measures

32

	13767		13572	
	11728		10462	
	2627		62	
	70		70	Hyp
	15132		15126	

	17846		20682	
7.7	10690	82	17872	63
6	80		39	
8	72		72	
	17198		17149	

	17900		19638	
7.7	8902	400	15630	96
7	98		92	
	02		70	
	17902		17907	

	13972		17030	
	18980	996	10799	316
7.1	012		28	
	52		26	
	17198		17110	

	19638		19630	
7.7	10928	73	15760	66
8	26		72	
	92		59	
	20921		20916	

	20160		13784	
1	19796		9322	33
7.1	72		24	
	66		30	
	18036		18092	

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8891 Venus & Etc

July 24'15

Eph. to Sun	20	42			20	54	
" Moon	20	47	58.9		20	47	59.1
Clock fast		2	37.9				
M. Sid Time	20	45	21.1		$\theta-\alpha$ =	+ 1h	45m
M. Long	4	44	31.05				7
G. Sid T.	25	29	52.15				
G.S.T.M.N.	8	04	30.70				
Interval	17	25	21.45				
Reduction		2	51.26				
G.M.T.	17	22	33.19				

From Naut Alm.		R. A.		Dec.	
Moon 17h	18	59	51.11	-25	41	19.5
Motion in 1m		-	2.6777		+	6.593
" in 22.h5532		+1	0.39		+2	28.7
Tabular Place	19	00	51.50	-25	38	50.8

Moon's age 12 days +

Parallax	60'	17.53
Semid.	16	26.4
R.		986.4
Aug.		5.7
Dec 3°		-08
R.		991.0
R.		2.1243
ak.		-1004
(1+a)R		2.0239
R =		4.0962

934 = 9.82

a = -496.6
+24
-472.6

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1915phae.proj.19

x	8.6853	2.3008	27.9337	18.2776
y	10.1187	21.6918	30.3422	20.1787
-y	-19.337	-21.910	-29.885	-19.011

y	29.3822	6.9912	29.0130	27.7522
y	30.1921	6.5771	29.7623	28.4473
-y	-.8099	+.4141	-.7493	-.6951

Table: a = -2.9 e = -.39 a·e = +22.5° +d = -24

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1891 Times + Etc

July 4/15

Eyepiece-Glass	20	42		20	39	
Moon	20	47	39.9	20	47	39.1
Clock fast		2	39.9			
M. Sid Time	20	45	27.1	$\theta - x =$	+ 1	45.6
M. Long	7	44	31.05			
G. Sid T.	25	29	55.15			
Sid T M.N.	8	04	30.70			
Interval	17	25	24.45			
Reduction		2	51.26			
G M T.	17	22	33.19			

From Naut Alm		R. a.		Dec.	
Moon 17h	18	39	51 11	-25° 41	19.5
Motion in 1m		-	2.6777	+	6.593
" " 22m 55.32		+1	0.39	+2	28.7
Tabular Place	19	00	51.50	-25 38	50.8

939 = 1.82

Moon's Age 12 days +

Parallax	60'	14".53
Semid.	16	26.9
R.		986.9
Aug		5.7
Zen		.08
R		991.0
R.		2.12435
ar.		-1009
H+d R		2.02399
12		9.09662

a = -996.6
+129
-472.6

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1915phae.proj.19

X	8.6853	25.5008	27.9337	18.2776
Y	10.1187	27.6918	30.3222	20.1787
X-Y	-1.4334	-2.1910	-2.3885	-1.9011

Y	29.3822	6.9912	29.0130	27.7522
X	30.1921	6.5771	29.7625	28.7473
Y-X	-.8099	+.4141	-.7495	-.9951

Table a = -2.9 c = -25.7 a·c = +22.3 b+d = -22
Obs = = = =

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1915phae.proj.19

8891 Plate Constants. 39

x	8.6853	25.5008	27.9337	18.2776
y	10.1187	27.6933	30.3217	20.1797
x-y	-19334	-21925	-23880	-19021

η	29.3822	6.9912	29.0130	27.7522
ξ	30.1875	6.5857	29.7625	28.4529
η-ξ	-8053	+4055	-7495	-7007

x-y	+580x	+32.9y	+3.9x	+9093
-19334	+4343 =	-9991	+966 =	-9025 +29 = -9054 = -11
-21925	+12750 =	-9175	+230 =	-8945 +87 = -9032 = +11
-23880	+13967 =	-9913	+957 =	-8956 +95 = -9054 = -11
-19021	+9139 =	-9882	+913 =	-8969 +62 = -9031 = +12
21.7407	+10870	+531	+74	23.7777

η-ξ	+580η	-18.9x	+26.3y	-7250
-8053	+14691 =	+6638	-164 =	+6474 +773 = +7247 = -3
-9055	+3496 =	+7551	-482 =	+7069 +184 = +7253 = +3
-7495	+17506 =	+7011	-528 =	+6483 +763 = +7246 = -4
-7007	+13876 =	+6869	-345 =	+6524 +730 = +7254 = +4
16.1540	+8077	-711	+925	16.2381

Tables a = -2.9 e = -25.4 a-e = +22.5 b+d = -22
Obs. = -503.4 = -526.3 = +22.9 = -14.0

e-e -500.5 -500.9 +8.0

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1891 Plate constants

x	8.683	25.008	27.337	28.176
y	10.187	27.693	30.026	28.197
x-y	-1939	-2685	-2889	-2021

x	29.382	6.791	27.013	27.522
y	30.287	6.587	29.762	28.529
y-x	-905	+795	-749	-1007

x-y	+500x	+32.94	-3.9x	+909
-1939	+1373	= -9991	+966 = -9025	-29 = -9054	-1
-2172	+1275	= -9175	+230 = -8945	-87 = -9032	+1
-2388	+1396	= -9713	+757 = -8956	-98 = -9054	-1
-1902	+913	= -9882	+913 = -8969	+62 = -9031	+1
21.77	07	+10.870	+31	+77	+3.7777

y-x	1.207	-12.9x	+26.37	-72.5
-8053	+1.9691	= +6638	-169 = +6469	+773 = +7242	= -
-7055	+1.3996	= +7351	-982 = +6369	+159 = +6528	= +
-7995	+1.7506	= +7011	-328 = +6683	+763 = +7446	= -
-7007	+1.3876	= +6869	-393 = +6476	+730 = +7206	= +
16.15	90	+8077	-111	+42.5	16.2381

Jabbar a: -2.5 c: -26.4 e: +32.5 f+d: -2.2

b: -903.8 -526.3 +22.9 -18.6

d - c -900.5 -900.9 +4.6

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1915phae..pr6j..19

A = +16
B = +22

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1915phae.proj.19

8891 35

Moon's Center

	x	x - x₀	Δx	(x-x₀)²	(x-x₀)+(y-y₀)²	O-C
1	21.7430	0.0000 - 32		0.0000	4.1178	+186
2	21.0000	- 0.7430 - 30		0.5565	4.1018	+ 56
3	20.0820	- 1.6610 - 18		2.7649	4.1070	+108
4	20.0000	- 1.7430 - 16		3.0436	4.1080	+118
5	-19.7191	- 2.0239 . 0		4.0962	4.0962	- 0
6	19.9003	- 1.8427 + 13		3.3908	4.1063	+101
7	20.0000	- 1.7430 + 16		3.0325	4.1122	+160
8	20.9217	- 0.8213 + 30		0.6696	4.0831	- 111
9	21.0000	- 0.7430 + 30		0.5476	4.0956	- 06

R = 4.0962

	y	y - y₀	Δy	(y-y₀)²	∠
1	-14.1319	- 2.0241 - 44		4.1148	180°
2	14.2773	- 1.8787 - 42		3.5453	202°
3	15.0000	- 1.1560 - 25		1.3421	235°
4	15.1265	- 1.0295 - 22		1.0647	270°
5	16.1560	0.0000 0		0.0000	270°
6	17.0000	+ 0.8440 + 19		0.7155	295°
7	17.1929	+ 1.0369 + 22		1.0797	301°
8	18.0000	+ 1.8440 + 41		3.4155	336°
9	18.0355	+ 1.8795 + 41		3.5780	338° 15' 8"

Approx. Center.

x = 21 y = 14.2773

18.0355

32.3126

y_0 = 16.1563

y min = 14.1319

R = 2.0244

x min = 19.7191

x_0 = 21.7431

Moon's Center $\begin{cases} x_0 = 21.7430 \\ y_0 = 16.1560 \end{cases}$

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8891 3=

Moons Center

	x	x - x₀	Δx	(x - x₀)²	(x - x₀)²/(y - y₀)	Δ
1	21.7930	0.0000	- 32	0.0000	4.1178	+ 12
2	21.0000	- 0.7930	- 30	0.5365	4.1018	+ 3
3	20.0820	- 1.6610	- 18	2.7649	4.1070	+ 16
4	20.0000	- 1.7430	- 16	3.0936	4.1080	+ 11
5	-19.7191	- 2.0239	0	4.0962	4.0962	- 0
6	19.9003	- 1.8427	+ 13	3.3908	4.1063	+ 14
7	20.0000	- 1.7430	+ 16	3.0325	4.1122	+ 16
8	20.9217	- 0.8213	+ 30	0.6696	4.0851	- 11
9	21.0000	- 0.7430	+ 30	0.5516	4.0936	- 6

R = 4.0962

	y	y - y₀	Δy	(y - y₀)²	∠
1	-19.1319	- 2.0241	- 44	4.1148	180
2	19.2773	- 1.8787	- 42	3.5293	202
3	15.0000	- 1.1560	- 25	1.3421	235
4	15.1265	- 1.0295	- 22	1.0644	240
5	16.1560	0.0000	0	0.0000	270
6	17.0000	+ 0.8440	+ 19	0.7125	295
7	17.1929	+ 1.0369	+ 22	1.0797	301
8	18.0000	+ 1.8440	+ 41	3.4153	336
9	18.0353	+ 1.8793	+ 41	3.5320	338

Approx. Center.

x = 21 y = 19.2773

18.0353

32312 6

y_0 = 16.1563

y_{min} = 19.1319

R = 2.0244

x_{min} = 19.7191

x_0 = 21.7431

Moons Center $\begin{cases} x_0 = 21.7930 \\ y_0 = 16.1560 \end{cases}$

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Formation of Normals:

1	0.0	+ 0.0	- 376.0
2	+ 1.39	- 41.5	- 105.0
3	+ 1.93	- 179.0	- 125.0
4	+ 1.79	- 205.5	- 121.5
5	+ 0.00	+ 0.0	0.0
6	- 1.54	- 185.5	+ 85.0
7	- 1.81	- 278.0	+ 166.5
8	- 1.51	+ 91.0	- 204.0
9	- 1.39	+ 4.7	- 11.5
	+ 5.11	+ 95.4	+ 251.5
	- 6.25	- 889.5	- 943.0
	- 1.14	- 794.1	- 691.5

		a	b	c	new O-C
a	-25	+ 6	0	-70	+ 64
b	0	+ 18		- 22	- 77
c	-70	+ 41		+ 1	- 17
		+ 43		+ 3	- 1
		+ 50		+ 10	- 83
		+ 76		+ 6	+ 54
		+ 43		+ 3	+ 123
		+ 20		- 20	- 96
		+ 18		- 22	+ 17

$-1.14 + 18.82 = -0.79$

$+[\ ] - 0.07 = -0.71$

$+18.75 = +0.22$

$+18.10 = -11.30 + .01 = -11.29$

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8891 Conditional Equations 36

					O-C
1	0,00	- 2,02	= + 186	0 + 80 = +80	+ 106
2	- 0,74	- 1,88	= + 56	+ 34 + 74 = +108	- 52
3	- 1,66	- 1,16	= + 108	+ 77 + 46 = +123	- 15
4	- 1,74	- 1,03	= + 118	+ 81 + 41 = +122	- 4
5	- 2,02	0,00	= - 0	+ 93 0 = + 93	- 93
6	- 1,88	+ 0,84	= + 101	+ 86 - 33 = + 53	+ 48
7	- 1,74	+ 1,09	= + 160	+ 81 - 41 = + 40	+ 120
8	- 0,82	+ 1,84	= - 111	+ 38 - 73 = - 35	- 76
9	- 0,74	+ 1,88	= - 6	+ 34 - 74 = - 40	+ 34
				+ 310	- 240

+ 18,10 - 1,14 = - 794,1 - 11,30

- 1,14 + 18,82 = - 691,5 - 0,49

+ 1,14 - ,07 - 50,0 +0.0 12 Δ

+ 18,75 = - 741,5 b = - 39,5

18,10 = - 794,1 - 45,0 = - 839,1 a = - 46,3

- 0.62 Δ

Arc Measured 158°

$\frac{p}{h}$ = .185 $\frac{\Sigma v}{h}$ = + 7.7

In 5 R 2.02 $\frac{+7.7}{.185}$ = + 42 Δp = + 0.5

- 2pc = - 2.02 Corr = + .5

Δp = 0

Δ t = - 0.02 = Δ δ = - 0.0"

Δ a = + 1.26 Δ δ = + 0.05

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8891 Conditional Equations 36

					O-C
1	0.00	- 2.02	= + 186	0 + 80 = +180	+ 106
2	- 0.79	- 1.88	= + 56	+ 39 + 79 = +108	- 52
3	- 1.66	- 1.16	= + 108	+ 77 + 96 = +123	- 15
4	- 1.79	- 1.03	= + 118	+ 81 + 91 = +122	- 4
5	- 2.02	0.00	= - 0	+ 93 0 = + 93	- 93
6	- 1.89	+ 0.89	= + 101	+ 86 - 33 = +53	+ 48
7	- 1.79	+ 1.09	= + 160	+ 81 - 91 = +90	+ 120
8	- 0.82	+ 1.89	= - 111	+ 38 - 73 = - 35	- 76
9	- 0.79	+ 1.88	= - 6	+ 39 - 79 = -40	+ 34
				+310	- 290

+ 18.10 - 1.19 = - 799.1

- 1.19 + 18.82 = - 691.5

+ 1.19 - .07 - 50.0

+ 18.75 = - 741.5 b = - 39.5

18.10 = - 799.1 - 950 = - 839.1 a = - 46.3

Arc Measured 15°8

$\frac{\Delta}{h}$ = .15°

$\frac{\Sigma\Delta}{h}$ = + 7.7

$\frac{+7.7}{.15}$ = + 42 ΔR = + 0.5°

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8891 Moons Mean Position.

$\xi_0 = 21,74430$
-23
$21,74407$

$\eta_0 = 16,15460$
-20
$16,15440$

From Plate Constants.

$x = 23,77777$
$y = 16,23871$
$\xi = +1,77777$
$\eta = -1,76191$
Log tan 59.69886
ξ^2 $0,49997$
$7,05374$
$7,25508$
$7,25517$
$n_1 = -,00184$

Log ξ $0,24986$
Log cos $9,95161$
$8,50724$
$1,79101$

$\eta_0 = -1,76011$

$\delta - A$ $+61,80$

A $18\ 58\ 18$

Log n_0 $0,24553n$
$7,33115$
$2,91438n$
$-821,06$

α_0 $18\ 59\ 19,80$

Red $+4,50$

$\delta - D$ $-13\ 41,1$

α' $18\ 59\ 24,30$

D $-26\ 19\ 10$

δ_0 $-26\ 32\ 51,1$

Red $-0,6$

δ' $-26\ 32\ 51,7$

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$\chi_0 = 21.7930$
-23
$21,7907$

$\eta_0 = 16.1560$
-20
16.1540

From Plate Constants.

$x = 23.7777$
$y = 16.2387$
$m = -1.7619$
$\log \tan 59.9\,8\,9\,8\,8\,n$
$y = 0.9997$
7.0539
$7.2508\,n$
7.2517
$m_1 = -.0018$

$y = +1.7777$
$\log y = 0.249986$
$\cos 89.9516\,1$
850724
1.791014

$d-A \quad +6.80$
$h_0 = 1.7601$

$A \quad 18\ 58\ 18$
$\log h_0 \quad 0.2455\,3\,n$
$7.3311\,5$
$2914\,38\,n$
-821.06

$\chi_0 \quad 18\ 59\ 19.80$
$\text{Red} \quad +9.50$
$\chi' \quad 18\ 59\ 29.30$

$\delta - D \quad -13\ 91.1$
$D \quad -26\ 19\ 10$
$\delta_0 \quad -26\ 32\ 51.1$
$\text{Red} \quad -0.6$
$\delta' \quad -26\ 32\ 51.7$

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8891 Reduction to Apparent Place 38

	75°	9,65
H+α	29	03,1
μ	10	3,8
α	18	59,3
G	22	32,4
G+α	41	31,7
	262°	55,5

Log cos G+α 9.0905n
g 1,2722
Sin 9.9969n
tang 9.6986n
8,8239

Log g' 0.3327n
g 9.7616

f +2,476
g +0,577
h +1,447
+4,500

δ -26 32 51,1

Log cos δ 9.9516
+0.6259+
+0.3770

Log sin δ 9.6502n
cos H+k 9.3905
k 1,3016
Sin H+α 9.9865
Sec δ 0.0484
8.8239

k' 0.3423n
k 0.1604

g' -2,151
k' -2,200
i' +3,782
-0,569

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1891 Reduction to Apparent Place

	275°	46.5'
H+α	29	03.1
H	10	3.8
αo	18	59.3
G	22	32.9
G+α	91	31.7
	262°	55.2

log cos (G+α) 9.0905n
q 1.2922
Sum 9.9969n
tang δ 9.6986n
δ 8.8239

log q' 0.3327n
q 9.7616

f +2.476
g +0.577
k +1.477
+4.500

δ -26 32 51.1

log cos δ 9.9516
+ 0.6259
i 0.5770

log Sin δ 9.6502n
cos H+α 9.3905
k 1.3016
Sin H+α 9.9863
Sec δ 0.0489
- 8.8239

k' 0.3923n
k 0.1604

g' +2.151
k' -2.200
i +3.782
-0.569

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1915phae.proj.19

8891 Lunar Parallax

α' 18 59 24.30
φ 20 45 24.1
θ-α' +1 45 59.80
= +26° 29' 57.00
½(α'') +11 01.76
+26 18 55.24

9.957127
0.000000
0.047752
0.004879

π 60' 19''.53

9.869113
8.243360
9.699952
0.045705
7.807130

α-α' 22 03.52
59 24.30
= +1 28.23

δ 45 18 57.5

δ -26 32 51.7

γ-δ 71 51 49.2

9.826490
8.243360
9.977787
0.148819
8.196601

δ-δ' 53 59.3

δ -25 38 52.4

Am Eph δ -25 38 50.8

O-C -1.6

Corr. of Plate +0.3
2nd Order Ref +0.8

Far Corr -0.0
δ -25 38 51.5
O-C -0.7

α 19 00 52.53

Am Eph α 19 00 51.50

O-C +1.03
-0.02

+0.05

α 19 00 52.58
O-C +1.08

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1915phae.proj.19

8891 Lunar Parallax

α' 18 39 29.30"
φ 20 9 29.1"
φ - α' +1 9 5 59.80"
= 126° 29' 57'00"
½(φ-α') +11. 01.76"
+26 18 55.24"

9.993727
0.000000"
0047521"
0.004779"

δ 9 5 18 57.5"

δ -26 32 31.7"

φ - δ 71 31 49.2"

9.826490
8.243650"
9.977187"
0.149819"
8.196801"

δ - δ' 33 59.3"

δ - 25 38 29.4" α 19 00 25.53"

am Eph δ - 25° 38 30.8" Am Eph α 19 00 31.50"

O-C - 1.4" O-C + 1.03"

-0.04

Corr. of Plate +0.3
2nd Wilder Ref +0.9

Far Corr - 0.0 +0.0"

δ - 25° 38 31.5" α 19 00 32.58

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1915phae.proj.19

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1915phae.proj.1986B

+5x +34y +6x -.9y

9160 + 127 = -9033 + 238 = -8795 + 153 = -8642 - 3
9918 + 180 = -9778 + 986 = -8792 + 167 = -8625 - 15
9872 + 91 = -9781 + 943 = -8738 + 109 = -8629 - 14

-2(x+y)

-8675 - 6 = -8651
-8670 - 11 = -8651
-8673 - 9 = -8652

+32.9y
+10.8x

-26° 19'

+28.4y -17.9x +5(x+y) -37y

+7637 + 198 = 7835 - 444 = 7391 + 162 = 7553 - 26
+7011 + 824 = 7835 - 486 = 7349 + 285 = 7634 - 107
+6925 + 788 = 7713 - 318 = 7395 + 230 = 7625 - 103

-8x +1y

7527 - 10 = 7517 1 + 7518
7527 - 11 = 16 3 + 19
7522 - 7 = 15 3 + 18

-12.8x
+29.8y

Tables 2.9 = 25.4 +22.5 -22.

a = -500.9x = 529.8y = +28.9 - 21.6
+1y -1x +1y

+32.9y

-9160 + 230 = -8930 + 7 = -8923 - 25 = -8948+6
9918 + 905 = -8953 + 29 = -8924 - 28 = -8952+11
9872 + 913 = -8959 + 28 = -8931 - 18 = -8949+9

+1y +33.9y -0.9x

-8972 - 1 = 3
8971 - 3 = 4
8970 - 3 = 3

-12.8x +29.8y

+7637 - 326 = 7311 + 208 = 7519
7011 - 358 = 6653 + 865 = 7518
6925 - 234 = 6691 + 827 = 7518

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$-14337 + 4343 = -9991$ 8891
$21910 + 12750 = -9160$
$-23885 + 13967 = -9918$
$-19011 + 9139 = -9872$

$-8099 + 14691 = +6592$
$+4141 + 3496 = +7637$
$-7495 + 14506 = +7011$
$-6951 + 13876 = +6925$

$8.69 + 29.38 = -9991 \quad +6592$
$25.50 + 6.99 = -9160 \quad +7637$
$27.93 + 29.01 = -9918 \quad +7011$
$18.28 + 27.75 = -9872 \quad +6925$

$53.43 + 36.00 = -19078 = +17698$
$26.97 + 37.13 = -19863 = +13517$

$+26.86 - 21.13 = +785 = +11.31$

$= -792.8 = -733.2$
$+26.46 = -7.8 = +397.8$
$= -.13 = +15.0$

$36.62 + 58.39 = -19909 = +13603$
$45.48 + 34.74 = -19032 = +14562$

$+9.16 - 23.65 = +877 = +959$
$0.3841[\ ] - 7.31 = +271.6 = +391.3$
$-16.34 = +605.4 = +567.7$
$= -37.0 = -34.7$

$a = -500.3 \quad c = -534.7 \quad a-c = +34.7 \quad b+d = -22.0$
Tables $-2.9 \quad -25.7 \quad +22.5 \quad -22$
$+33.9 \quad +.64 \quad +.7x$

$-9160 + 237 = -8923 + 4 = -8919 + 18 = -8901$
$-9918 + 983 = -8935 + 17 = 8918 + 19 = 8899$
$-9872 + 941 = -8931 + 17 = 8917 + 13 = 8901$

$+34.57$
$+0.7x$

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