

KG

11366

n956

LXXIX



4271

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4272



4271-

Investigation of effect of curving plates

<u>1</u>	α	γ	α	γ	α	γ	α	γ
13.5	262	15132	19008	11105	15535	10764	18664	13435
		3941	0500	99	6265	29	3030	59
		69						
		<u>26.2099</u>	<u>2102</u>		<u>13.5232</u>		<u>5230</u>	
<u>2</u>	13.8	19795	17685	1026760	19122	17570	17412	891910
	8.4	9287	64	65	7175	26	281915	98
		96						
		<u>8.2603</u>	<u>2594</u>		<u>13.8449</u>		<u>8482</u>	
					sum = 84712		sum = 8491	
<u>3</u>	21.3	17159	16411	788578	17674	9918	15412	13159
	302	7978	7578	02	1218	66	5862	09
		52						
		<u>30.1478</u>	<u>1476</u>		<u>21.2248</u>		<u>2251</u>	
<u>4</u>	21.5	10710	9568	893945	15375	1057370	16046	1081820
	11.9	0908	37		77	70	20	42
		10088						
		<u>11.9377</u>	<u>9372</u>		<u>21.5198</u>		<u>5225</u>	
<u>5</u>	24.8	897275	10621	986055	15760	1358178	13780	593028
	32.9	76	6055		84	47	30	70
		8223						
		<u>32.9249</u>	<u>9239</u>		<u>24.7824</u>		<u>7843</u>	
<u>6</u>	28.9	19784	20192	14650	20349	1920901	20248	1137370
	11.5	1529899	4548	80	07	09	70	34
		97						
		56						
		<u>10.4473</u>	<u>4463</u>		<u>28.8861</u>		<u>8865</u>	

-4272-

1914 Oct 24,

y		x	
a	v	a	v
$\begin{array}{r} 1 \\ 11.8 \\ 26.8 \\ \hline 16658 \\ 801519 \\ 10 \\ 66 \\ 26.8649 \end{array}$	$\begin{array}{r} 20201 \\ 18858 \\ 5657 \\ 98 \\ \hline 8654v \end{array}$	$\begin{array}{r} 15210 \\ 1347266 \\ 6866 \\ 00 \\ \hline 11.8261 \end{array}$	$\begin{array}{r} 19486 \\ 1120093 \\ 91 \\ 76 \\ \hline .8283v \end{array}$
$\begin{array}{r} 2 \\ 12.1 \\ 8.9 \\ \hline 14849 \\ 572125 \\ 21 \\ 45 \\ 8.9123 \end{array}$	$\begin{array}{r} 19038 \\ 1816166 \\ 63 \\ 28 \\ \hline .9126 \end{array}$	$\begin{array}{r} 8800 \\ 0401 \\ 8468 \\ \hline 12.0334 \end{array}$	$\begin{array}{r} 14125 \\ 1377678 \\ 78 \\ \hline .0348 \end{array}$
$\begin{array}{r} 3 \\ 19.5 \\ 30.7 \\ \hline 18990 \\ 1148086 \\ 87 \\ 82 \\ 30.7500 \end{array}$	$\begin{array}{r} 16040 \\ 13540 \\ 4243 \\ 40 \\ \hline .7502 \end{array}$	$\begin{array}{r} 14640 \\ 1018080 \\ 7680 \\ 30 \\ \hline 19.5543 \end{array}$	$\begin{array}{r} 17084 \\ 1151514 \\ 58 \\ 58 \\ \hline .5544 \end{array}$
$\begin{array}{r} 4 \\ 19.6 \\ 12.5 \\ \hline 18946 \\ 1355742 \\ 4850 \\ 30 \\ 12.5392 \end{array}$	$\begin{array}{r} 16160 \\ 1153736 \\ 3936 \\ 50 \\ \hline .5382 \end{array}$	$\begin{array}{r} 19038 \\ 1632824 \\ 30 \\ 40 \\ \hline 19.7288 \end{array}$	$\begin{array}{r} 15120 \\ 2780909 \\ 0909 \\ 08 \\ \hline .7300 \end{array}$
$\begin{array}{r} 5 \\ 23.2 \\ 33.5 \\ \hline 17678 \\ 1263841 \\ 5042 \\ 65 \\ 33.5026 \end{array}$	$\begin{array}{r} 19580 \\ 1459093 \\ 92 \\ 75 \\ \hline .5014 \end{array}$	$\begin{array}{r} 17724 \\ 902630 \\ 3030 \\ 02 \\ \hline 23.1326 \end{array}$	$\begin{array}{r} 14130 \\ 1278090 \\ 9190 \\ 29 \\ \hline .1343 \end{array}$
$\begin{array}{r} 6 \\ 27.1 \\ 11.0 \\ \hline 9556 \\ 6566 \\ 9572 \\ 11.0010 \end{array}$	$\begin{array}{r} 12455 \\ 1241956 \\ 56 \\ \hline .0002 \end{array}$	$\begin{array}{r} 16493 \\ 73493131 \\ 403131 \\ 75 \\ \hline 27.0859 \end{array}$	$\begin{array}{r} 18642 \\ 1777020 \\ 70 \\ 51 \\ \hline .0873 \end{array}$

ξ	η	$\Delta\xi$	-5ξ	$+1\eta$	-3
1 -4.37	+5.80	-5	+22 = +17	+12 = +18	
2 -7.17	-13.86	-20	+21 = +1	-17 = +0	
3 +3.77	+9.78	+9	-19 = -10	+10 = -9	
7 +3.93	-9.65	+11	-20 = -9	-10 = -10	
5 +7.50	+12.38	+38	-37 = +1	+16 = +2	
6 +11.65	-11.27	+77	-58 = +16	-16 = +15	

M +2.33	-2.37	0	-14	+0	<u>-14</u>
		$\Delta\eta$	-9.74	-2.77	+17
		+7	-27 = -17	+12 = +5	
		-65	+59 = -6	+11 = +5	
		+26	-72 = -16	-10 = -26	
		-27	+72 = +10	-11 = +7	
		+63	-57 = +9	-20 = -11	
		-72	+49 = -23	-31 = -54	
		0	+10	-6	<u>+18</u>

$$\begin{aligned}
 &\{ +23.08 - 8.51 = +123 \quad = -36 \\
 &\{ -4.77 + 1.72 = -16 \quad = -66 \\
 &3) +27.85 - 9.93 = +139 \quad = +30 \\
 &\quad +9.28 - 3.31 = +76.3 \quad = +10 \\
 &\{ +11.97 - 37.35 = +65 \quad = -167 \\
 &\{ +6.87 + 27.26 = +42 \quad = +96 \\
 &3) +7.57 - 61.61 = +23 \quad = -260 \\
 &\quad +1.52 - 20.57 = +7.7 \quad = -86.7 \\
 &\quad +[] - .57 = +7.6 \quad = +1.6 \\
 &\quad -20 \quad = +1 \quad = -88.3 \\
 &\quad \eta = +105 = +4.7 \\
 &\quad +9.28 \quad = +76.1 \quad +27.65 \\
 &\quad \xi = +5.0 \quad = +2.7
 \end{aligned}$$

4271 - Stand. Coordinates of Comparison Stars.

Cape no.	3161	mag	0	C. no.	3162	mag	6.1	C. no.	3168	mag	3.8
α	22 ^h	43 ^m	08 ^s .81	22 ^h	43 ^m	14.49		22 ^h	47 ^m	23.89	
δ			.96			.52				.86	
ϵ			.83			.43				.89	
mean	22	43	08.87	22	43	14.48		22	47	23.88	
Prob			+ 40.80 ^v			+ 41.08 ^v				+ 40.71 ^v	
α	22	43	49.67	22	43	55.56 ^v		22	48	04.59	
A.	22	46	07	22	46	07		22	46	07	
$\alpha - A$	- 2		17.33 ^v	- 2		11.44 ^v		+ 1		57.59	
$\sin(\alpha - A)$			- 137.33 ^v			- 131.44 ^v				+ 117.59	
$\log$			2.13777 ^v			2.11873 ^v				2.07037 ^v	
$\cos \delta$			9.99512 ^v			9.99192 ^v				9.99571 ^v	
$\sin \delta$			0.64013 ^v			0.61789 ^v				0.57332	
δ			- 4.3665 ^v			- 4.1485 ^v				+ 3.7438	
δ_1			- 5 ^v			- 20 ^v				+ 9	
δ			13.6330 ^v			13.8495 ^v				21.7447	
δ_2			13.5231			13.8481				21.2250	
$\delta - \delta_2$			- 1.099			- 1.4				- 5.197	
α	- 8	38	24.8	- 11	05	01.2 ^v		- 8	06	42.1	
δ			24.7			01.9				42.1	
ϵ			24.5			01.6				42.7	
mean	- 8	38	24.7	- 11	05	01.6		- 8	06	42.3	
Prob			+ 4 06.2			+ 4 06.6 ^v				+ 4 08.2 ^v	
δ	- 8	34	18.5	- 11	00	55.0 ^v		- 8	02	34.1	
δ_2	- 9	16	17	- 9	16	17		- 9	16	17	
$\delta - \delta_2$			+ 41 58.5	- 1	44	38.8		+ 1	13	42.9	
$\tan(\alpha - \delta)$			+ 25 18.6			- 6 279.9 ^v				+ 4 423.6	
$\log$			3.40116 ^v			3.79795 ^v				3.64578	
$\sin \delta$			0.73231			1.12910 ^v				0.97693	
$\tan \delta$			9.1782 ^v			9.2893 ^v				9.1502 ^v	
δ^2			12803			12358				11466	
η_1			7.5119 ^v			7.5785 ^v				7.3502 ^v	
η_0			+ 5.3990			- 13.4616 ^v				+ 9.4826	
η_1			- 32			- 38 ^v				- 22	
η			27.3958			8.5346 ^v				31.4804	
η			26.2100			8.2598 ^v				30.1477	
$\eta - \eta$			- 1.1858			- 2.748 ^v				- 1.3327	

4271 Stan. Coord. of Compa. Stars

Cape No. 3170 ^{P.M.} mag 6.7 Cape No. 3177 ^{P.M.} mag 6.3 Cape No. 3182 ^{P.M.} mag 6.4

C. 22 ^m	47	30.11	22	49	21.72	22	51	34.80
L		19			75			83
E		17			73			82
mean 22	47	30.16	22	49	21.73	22	51	34.82
Proc		+41.13			+40.60			+40.91
A 22	48	11.29	22	50	02.33	22	52	15.73
A 22	46	07	22	46	07	22	46	07
a-h		+2 04.29			+3 55.33			+6 08.73
Sin(A)		+1 24.29			+2 35.32			+5 68.69
log		2.09444			2.37166			2.56666
cos		9.99264			9.99616			9.99234
Σ		0.59432			0.87500			1.06624
Σ		+3.9294			+7.4990			+11.6476
Σ		+ 11			+ 38			+ 74
Σ		21.9305			25.5028			29.6550
X		21.5212			24.7834			28.8863
μ-Σ		-4093			-7194			-7687

C-10	35	24.9	-7	44	10.2	-10	47	47.9
L		24.7			10.7			47.3
E		25.1			09.8			48.3
mean-10	35	24.9	-7	44	10.2	-10	47	47.8
Proc		+4 08.1			+4 08.0			+4 09.2
S-10	31	16.8	-7	40	02.2	-10	43	38.6
D-9	16	17	-9	16	17	-9	16	17
S-D	-1	14 59.8	+1	36	14.8	-1	27	21.6
tan(S-D)		-4.500.5			+5.7753			-5.242.7
log		3.65326m			3.76157			3.71956m
μ		0.98441m			1.09272			1.05071m
tan		9.2689m			9.1291m			9.2775m
Σ		1.1886			1.7500			2.1325
μ		7.5109m			7.9325m			8.4634m
μ		-9.6474			+12.3800			-11.2385
μ		- 32			- 86			- 291
μ		12.3494			34.3714			10.7324
μ		11.9374			32.9244			10.4468
μ-7		-4120			-14470			-2856

4271

x

13.5231

13.8481

21.2250

21.5212

24.7834

28.8863

y

26.2100

8.2598

30.1477

11.9374

32.9244

10.4468

4271-72 Center of spiral

mean x

mean y

R.A.

Decl

12.675	26.538	22	43	09	-8	38	25
12.941	8.586	22	43	14	-11	05	01
20.350	30.449	22	47	24	-8	06	42
20.625	12.238	22	47	30	-10	35	25
23.958	33.213	22	49	22	-7	44	10
27.986	10.724	22	51	35	-10	47	48
6118.575	11217.48	22	0	134	-54	175	151
19.762	20.291	22	47	02	-9	29	35
-18	-22	-	-	55	+1	3	16
1.76	171	22	46	07	-9	16	17
31	466.5						
55 ^s	798"						

780
13' 18"

Center { A = 22^h 46^m 07^s
D = -9 16 17

4271 -

Preliminary Reduction

$$\begin{aligned}
 x - \bar{x} + 500x & \quad + 70y & \quad - 7501 \\
 -1099 + 6762 & = +5663 + 1835 = +7498 & = -3 \\
 -14 + 6924 & = +6910 + 578 = +7488 & = -13 \\
 -5197 + 10612 & = +5415 + 2110 = +7525 & = +24 \\
 -4093 + 10767 & = +6668 + 836 = +7504 & = +3 \\
 -7194 + 12392 & = +5198 + 2305 = +7503 & = +2 \\
 -7687 + 14443 & = +6756 + 731 = +7487 & = -14 \\
 19.9512 + 9976 & = +20.9488 + 1320 = +21.0808 = 20.3307
 \end{aligned}$$

$$\begin{aligned}
 y - \bar{y} + 500y & \quad - 69x + 4y & \quad - 420 \\
 -11858 + 13105 & = +1247 - 933 + 105 = +419 & = -1 \\
 -2748 + 4130 & = +1382 - 956 + 33 = +459 & = +39 \\
 -13327 + 15074 & = +1747 - 1465 + 121 = +403 & = -17 \\
 -4120 + 5969 & = +1849 - 1485 + 48 = +412 & = -8 \\
 -14470 + 16462 & = +1992 - 1711 + 132 = +413 & = -7 \\
 -02856 + 5223 & = +2367 - 1993 + 42 = +417 & = -3 \\
 18.8581 + 9429 & = 19.8010 - 1377 + 75 = 19.6708 = 19.6288
 \end{aligned}$$

Tallies a = +0.9 d = -4.0 a - d = +4.9 b + d = -2.3
 abs a = -500.4 d = -505.0 a - d = +4.6 b + d = -69.3 + 67.3 = -2.0
 o - c -301.3" -301.0" -0.3 +0.3"

Y
Y
Y

S.S.S. for Plato Constants

x	y	$x-3$	$y-m$
Y 13.63 + 27.40 + 1 =	-3	-1	
13.85 + 4.53 + 1 =	-13	+39	
Y 21.74 + 31.48 + 1 =	+24	-17	
21.93 + 12.35 + 1 =	+3	-8	
Y 25.50 + 34.37 + 1 =	+2	-7	
29.66 + 11.24 + 1 =	-14	-3	

$$\begin{aligned}
 16.41 + 22.47 + 1 &= +2.67 + 7.00 \\
 25.70 + 19.32 + 1 &= -3.00 - 6.00 \\
 21.81 + 10.71 + 1 &= -8.00 + 9.33 \\
 20.29 + 31.08 + 1 &= +7.67 - 8.33
 \end{aligned}$$

$$\begin{aligned}
 -9.29 + 3.15 &= +5.67 + 13.00 \\
 +1.52 - 20.37 &= -15.67 + 17.67
 \end{aligned}$$

$$\begin{aligned}
 -15.2 + 0.52 &= +0.93 + 2.13 \\
 -19.85 &= -14.74 + 19.80 \\
 b &= +0.74 - 1.00
 \end{aligned}$$

$$\begin{aligned}
 -9.29 + 5.67 - 2.34 &= +3.33 \\
 a &= 0.36 = -1.74
 \end{aligned}$$

+2.7	-3.0	-8.0	+7.7	+7.0	-6.0	+9.3	-8.3
+5.9	7.92	+7.4	+7.3	+28.6	+44.7	+38.0	+35.3
-16.7	-14.3	-8.0	-23.1	+22.5	+19.3	+10.7	+31.4
-8.1	-8.1	-8.2	-8.1	+58.1	+58.0	+58.0	+58.1

x	y	$x-3$	$y-m$
-5 + 20 - 8 =	+7	-3	-10
-5 + 6 - 8 =	-7	-13	-6
-7 + 23 - 8 =	+8	+24	+16
-7 + 9 - 8 =	-6	+3	+9
-9 + 25 - 8 =	+8	+2	-6
-11 + 8 - 8 =	-11	-14	-3

$$\begin{array}{r|l}
 -10 & -6 \\
 +16 & \\
 \hline
 -6 & +9 \\
 & -3
 \end{array}$$

$$\begin{array}{r|l}
 -8 & +13 \\
 -6 & \\
 \hline
 +14 & -16 \\
 & +2
 \end{array}$$

$+272$ Plate Countant
 $\begin{matrix} & 4 & & 5 \\ x & 1 & 1.8272 & 19.7294 & 23.1335 \\ y & 1 & 3.6330 & 21.9305 & 25.5028 \\ x-y & 1 & -1.8058 & -2.2011 & -2.3693 \end{matrix}$

$\begin{matrix} y & 26.8652 & 12.5387 & 33.5020 \\ y & 27.3958 & 12.3494 & 34.3714 \\ y-y & -0.5306 & +0.1893 & -0.8694 \end{matrix}$

$\begin{matrix} x-3 & +502x & -1.1x & -0.84 & +1.2178 \\ -1.8058 + 5914 = -1.2144 - 13 = -1.2157 - 21 = -1.2178 & = & 0 \\ -2.2011 + 9865 = -1.2146 - 22 = -1.2168 - 10 = -1.2178 & = & 0 \\ -2.3693 + 11567 = -1.2126 - 25 = -1.2151 - 27 = -1.2178 & = & 0 \\ 18.7943 + 9397 = 19.7340 - 21 & = & 16 & = 20.9555 \end{matrix}$

$\begin{matrix} y-y & +508y & +4.54 & +3.5x & -8.289 \\ -.5306 + 13433 = +8127 + 121 = +8248 + 41 = +8289 & = & 0 \\ +.1593 + 6262 = +8162 + 57 = +8219 + 69 = +8288 & = & -1 \\ -.8694 + 16751 = +8057 + 151 = +8208 + 81 = +8289 & = & 0 \\ 19.9779 + 9989 = 20.9768 + 90 & = & +.66 & = 20.1635 \end{matrix}$

$\begin{matrix} Tables a = +0.4 & e = -4.1 & a-e = +4.5 & b+a = -3.5 \\ du a = -498.9 & e = -504.5 & +56 & b+a = -2.7 \\ b-e = -499.3 & -500.4 & & +0.8 \end{matrix}$

Comparison of 4271 and 4272

4271

4272

X

X

ΔX

1	18.5231	-	11.8272	=	+	16.959
2	13.8481	-	12.0341	=	+	1.8140
3	21.2250	-	19.5544	=	+	1.6706
4	21.5212	-	19.7294	=	+	1.7918
5	24.7834	-	23.1335	=	+	1.6499
6	28.8863	-	27.0866	=	+	1.7997

+664

-1.4689

+	1.6959	+	1.730	=	+	1.8689	=	0
+	1.8140	+	545	=	+	1.8685	=	-4
+	1.6706	+	1990	=	+	1.8696	=	+7
+	1.7918	+	788	=	+	1.8706	=	+17
+	1.6499	+	2173	=	+	1.8672	=	-17
+	1.7997	+	689	=	+	1.8686	=	-3

4

4

1	26.2100	-	26.8652	=	-	6.552
2	8.2594	-	8.9124	=	-	6.526
3	30.1477	-	30.7501	=	-	6.024
4	11.9374	-	12.5387	=	-	6.013
5	32.9244	-	33.5020	=	-	5.776
6	10.4468	-	11.0006	=	-	5.538

-664

-4

+745

-	6.552	-	893	=	-	7.445	-	26	=	-	7.471	=	-	1.8
-	6.526	-	914	=	-	7.440	-	8	=	-	7.448	=	+	5
-	6.024	-	1401	=	-	7.425	-	30	=	-	7.455	=	-	2
-	6.013	-	1420	=	-	7.433	-	12	=	-	7.445	=	+	8
-	5.776	-	1636	=	-	7.412	-	33	=	-	7.445	=	+	8
-	5.538	-	1906	=	-	7.444	-	10	=	-	7.454	=	-	1

Constants

$$a = -0.4$$

$$e = +0.7$$

$$b = -66.4$$

$$d = +67.0$$

$$c = +1.8704$$

$$f = -74.67$$

Least square solution

$$\begin{array}{rcl}
 Y + 13.52 + 26.21 & = & 0 \\
 + 13.85 + 8.26 & = & -4 \\
 Y + 21.22 + 30.15 & = & +7 \\
 + 21.52 + 11.94 & = & +17 \\
 Y + 24.78 + 32.92 & = & -17 \\
 + 28.89 + 10.45 & = & -3
 \end{array}$$

$$\begin{array}{rcl}
 & & -18 \\
 & & +5 \\
 & & -2 \\
 & & +8 \\
 & & +8 \\
 & & -1
 \end{array}$$

$$\begin{array}{rcl}
 + 16.20 + 21.54 & = & +1.00 \\
 + 25.06 + 18.44 & = & -1.00 \\
 + 21.42 + 10.22 & = & +3.33 \\
 + 19.84 + 29.76 & = & -3.33
 \end{array}$$

$$\begin{array}{rcl}
 & & -5.00 \\
 & & +5.00 \\
 & & +4.00 \\
 & & -4.00
 \end{array}$$

$$\begin{array}{rcl}
 - 8.86 + 3.10 & = & +2.00 \\
 + 1.58 - 19.54 & = & +6.67
 \end{array}$$

$$\begin{array}{rcl}
 & & -10.00 \\
 & & +8.00
 \end{array}$$

$$\begin{array}{rcl}
 - 1.58 + 0.55 & = & +0.36 \\
 - 18.99 & = & +7.03 \\
 b & = & -0.37
 \end{array}$$

$$\begin{array}{rcl}
 & & -1.78 \\
 & & +6.22 \\
 b & = & +0.33
 \end{array}$$

$$\begin{array}{rcl}
 - 8.86 = +2.00 + 1.15 = +3.15 \\
 a & = & -0.36
 \end{array}$$

$$\begin{array}{rcl}
 - 8.86 = -10.00 + 1.02 = -8.98 \\
 a & = & +1.01
 \end{array}$$

+1.0	-1.0	+3.3	-3.3	-5.0	+5.0	+4.0	-4.0
+5.8	+8.9	+7.6	+7.1	-16.4	-25.4	-21.7	-20.1
+8.0	-6.8	+3.8	+11.0	+7.2	+6.0	+3.4	+9.8
+14.8	+14.7	+14.7	+14.8	-14.2	-14.4	-14.3	-14.3

	C	O	O-C		C	O	O-C
- 5 - 10 + 15 =	0	0	0	+ 14 - 9 - 14 =	-9	-18	-9
- 5 - 3 + 15 =	+7	-4	-11	+ 14 - 3 - 14 =	-3	+5	+8
- 8 - 11 + 15 =	-4	+7	+11	+ 21 - 10 - 14 =	-3	-2	+1
- 8 - 4 + 15 =	+3	+17	+14	+ 22 - 4 - 14 =	+4	+8	+4
- 9 - 12 + 15 =	-6	-17	-11	+ 25 - 11 - 14 =	0	+8	+8
- 10 - 9 + 15 =	+1	-3	-4	+ 29 - 3 - 14 =	+12	-1	-13

$$\begin{array}{r|l}
 -11 & 0 \\
 +11 & +11 \\
 \hline
 +14 & \\
 -4 & -11
 \end{array}$$

$$\begin{array}{r|l}
 +8 & -9 \\
 +1 & +1 \\
 \hline
 +4 & +8 \\
 -13 &
 \end{array}$$

4271- Times etc.

app. to stars 1913, Nov. 7, $23^h 43^m$ - $23^h 55^m$
 moon 23 49 06.9 - 23 49 07.1
 clock fast 3 16.2

H. dist.	23	45	50.8	$\theta - \alpha = + 58''$
H. long	4	44	31.05	
G. sid. T.	4	30	21.85	
Sid. T. in hours	15	04	19.48	
Interval	13	26	02.37	
Real		2	12.05	
G. sid. T.	13	23	50.32	

From Naut Alman

Moon 13^h	22	47	21.63	- 8	57	36.6
Motion in $1^m = 1.7763$					13.557	
" " 23.8387			+ 42.34		+ 5	23.2
Tabular place	22	48	03.97	- 8	52	13.4

Moon's age 9 days.

Parallax 54' 12.62

Semi-diameter 14' 47.9

R 887.9

Augmentation +6.5

Irradiation (4) -0.6

 $a = -500.4$ $a = -476.4$

R = 895.8

R = 1.9203 - 915

(12a) R 1.8288

R² 3.3445

-4272-

Times etc.

Exp. to stars - 1913 Nov. 7

" - moon

clock fast

0^h 01^m- 0^h 13^m

0 06 46.8

- 0 06 47.0

3 16.2

H. Sid T.

0 03 30.7

0 - α = + 1^h 15^m

H. Long

4 44 31.05

S. Sid T.

4 48 01.75

Sid Th. Moon

15 04 19.48

Interval

13 43 42.27

Red.

2 14.94

S.M.T

13 41 27.33

From Naut. Alman.

Moon 14^h22^h 49^m 08.17

- 8° 44' 02.7

Motion in ^s = 1.7748

13.575

" - 18.5445

- 32.91

- 4 11.7

Tabular place

22 48 35.26

- 8 48 14.4

Moon's Age 9 days

Parallax

54' 12.51

Semidiameter

14 47.8

R

88 7.8

Augmentation

+ 8.6

Irradiation (4)

- 0.6

R

89 5.8

R

1.9203 - 91.5

(1+a) R

1.8288

R²

3.3445

934 - 9.2

8878 8.6

a = - 476

1
19
17

3
17

3
18
18

4
18
18
20

5
18
18

6
18
20

4271 - moon - measures.

1914 Dec. 31.

α μ N
 Scratch
 19.7 1 80 30 1 63 60
 17.1 1749895- 69 65-
 91 17 21
 49 78
17.0542 .0541

2
 17.0 15157 15358
 17.4 1214055- 835756
 40 50
 71 70
17.3016 2989

3
 18.4
 18.0

4
 18.2
 18.8
 min
 in
 20

5
 18.2
 19.0

6 scratch
 18.3 16855- 16390
 19.6 1042031 1281930
 4035- 3830
 85- 96
19.6441 .6437

α μ N
 17121 15961
 13698 9398
 87 85- 9805-
 30 66
19.6566 .6564

14307
 764047
 3648
 15

18.3330

19231-
 1047062
 62
 40
18.1226

18213
 951010
 10
 31
18.1281

16900
 992911
 20
 21
18.3005

14538
 1116976
 69
 28

.3364

19538
 18300
 1008
 35
.1232

19541
 1825351
 56
 60
.1290

18580
 15590
 8292
 91
2995

7
18
20
8
19
2

4271 Moon-measures.

a

y

w

$$\begin{array}{r} 7. \\ 18.6 \\ 20.0 \end{array}$$

$$\begin{array}{r} 16746 \\ 12000 \\ .9490 \\ 60 \\ \hline 18.5242 \end{array}$$

1914 Dec 31.

$$\begin{array}{r} 17511 \\ 1224048 \\ 50 \\ 96 \\ \hline .5255 \end{array}$$

$$\begin{array}{r} 8 \\ 19.0 \\ 20.5 \end{array} \quad \begin{array}{r} 18500 \\ 14302 \\ 1410 \\ 07 \\ \hline 20.4194 \end{array} \quad \begin{array}{r} 15129 \\ 9325 \\ 2530 \\ 40 \\ \hline 4192 \end{array}$$
min. avg = about 17.0290

Grade H.

	p.	p-c	$\lambda \sin(p-c)$	$\beta \cos(p-c)$	λ	Corrections	
	170.7	191.4	- 0.6	- 2.0	+ 1.7	+ 0.9	+ 83
	148.6	169.3	+ 0.5	- 2.0	+ 2.8	- 0.9	- 83
3	118.0	138.7	+ 1.9	- 1.5	+ 3.7	- 0.4	- 37
4	90.0	110.7	+ 2.7	- 0.7	+ 5.7	- 0.5	- 46
5	85.7	106.4	+ 2.8	- 0.6	+ 3.7	- 0.2	- 18
6	64.6	85.3	+ 2.9	+ 0.2	+ 3.0	+ 0.4	+ 37
7	51.5	72.2	+ 2.7	+ 0.6	+ 2.4	+ 0.2	+ 18
8	31.4	52.1	+ 2.3	+ 1.2	+ 1.4	- 0.2	- 18

$$\lambda = + 2.88$$

$$\beta = + 1.43 \quad + 0.6 = + 2.0$$

$$C = 339.3$$

4271 moon's center

	x	x - x_0	Δx	$(x - x_0)^2$	$(x - x_0)^2 + (y - y_0)^2$	O - C	Corr. to Haynes
1	19.6565	-0.2975	-4	0.0887	3.3517	+72	-11
2	19.0000	-0.9540	-3	0.9107	3.3459	+14	+97
3	18.3347	-1.6193	-2	2.6228	3.3631	+186	+223
4	18.1229	-1.8311	0	3.3540	3.3540	+95	+141
5	18.1286	-1.8254	0	3.3321	3.3517	+72	+90
6	18.3000	-1.6540	+2	2.7350	3.3501	+56	+19
7	18.5250	-1.4290	+2	2.0414	3.3422	-23	-41
8	19.0000	-0.9540	+3	0.9095	3.3431	-14	+4

$$R^2 = 3.3445$$

	y	y - y_0	Δy	$(y - y_0)^2$	
1	17.0542	-1.8058	-8	3.2630	189
2	17.3002	-1.5598	-7	2.4352	211
3	18.0000	-0.8600	-4	0.7403	242
4	18.8600	0.0000	0	0.0000	270
5	19.0000	+0.1400	+1	0.0196	274
6	19.6439	+0.7839	+4	0.6151	295
7	20.0000	+1.1400	+5	1.3008	308
8	20.4193	+1.5593	+7	2.4336	329

Range 140

Approx. Center.

$$x = 19.0 \quad y = 17.3002$$

$$20.4193$$

$$37.7195$$

$$y_0 = 18.8598$$

$$y = \text{min} = 17.0290$$

$$R = 1.8308$$

$$x = \text{min} = 18.1229$$

$$x_0 = 19.9537$$

$$\text{Center } \left\{ \begin{array}{l} x_0 = 19.9540 \\ y_0 = 18.8600 \end{array} \right.$$

Formation of Normals

	at	an	bn
1	+ 0.54	+ 3.3	+ 19.9
2	+ 1.48	- 92.1	- 151.2
3	+ 1.39	- 361.0	- 192.0
4	- 0.00	- 258.0	+ 0.0
5	- 0.26	- 164.8	+ 12.6
6	- 1.29	- 31.3	+ 14.8
7	- 1.63	+ 58.6	- 46.8
8	- 1.48	- 3.8	+ 6.2
	- 125	- 849.1	- 336.5

4271 Moon-Conditional Equations.

	a	b	0		c	0-c
1	-0.30	-1.81	= -11	+ 17 + 68	= + 85	- 96
2	-0.95	-1.56	= + 97	+ 53 + 58	= + 111	- 14
3	-1.62	-0.86	= + 223	+ 91 + 32	= + 123	+ 100
4	-1.83	+0.00	= + 141	+ 102 - 0	= + 102	+ 39
5	-1.83	+0.14	= + 90	+ 102 - 5	= + 97	- 7
6	-1.65	+0.78	= + 19	+ 92 - 29	= + 63	- 44
7	-1.43	+1.14	= - 41	+ 80 - 43	= + 37	- 78
8	-0.95	+1.56	= + 4	+ 53 - 58	= - 5	+ 9
						+ 148 - 239

Average = 48

Normal Equations

$$+ 15.99 - 1.25 = - 849 \quad - 10.26$$

$$- 1.25 + 10.81 = - 336 \quad - 0.61$$

$$+ 1.25 - 0.10 = - 66 \quad - 0.80$$

$$+ 10.71 = - 402 \quad - 1.41$$

$$+ 15.99 = - 849 - 47 = - 896$$

$$189$$

$$211 \quad - 0.13$$

$$- 242 \quad b = - 38$$

$$270 \quad - 0.65$$

$$a = - 274 \quad a = - 56$$

	a	b	c	new 0-c
a - 9	+ 3	+ 4	- 8	- 108
b - 2	+ 8	+ 3	- 3	- 17
c - 15	+ 10	+ 2	+ 2	+ 102
	+ 16	- 0	+ 1	+ 90
	+ 16	- 0	+ 1	- 6
	+ 15	- 2	- 2	- 86
	+ 13	- 2	- 4	- 82
	+ 9	- 3	- 9	- 0

$$295$$

$$308$$

$$329$$

$$\text{Range } 140$$

$$\text{Arc measured} = 139^\circ \quad \text{Average } (0-c) = - 11.4$$

$$\frac{pc}{m} = 0.10$$

$$\frac{- 11.4}{10} = - 1.14$$

$$\Delta a = - 1.2 \quad - 1.4$$

$$- 2 RC = - 0.73$$

$$\Delta B = + 0.10 \quad \Delta \delta = + 0.1$$

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

$$\Delta a = + 0.47 \quad \Delta \alpha = + 0.02$$

$$\Delta R = - 1.6$$

4271 Orion's Mean Position (1913.0)

$$X_0 = 19.9540$$

$$\frac{1}{2}a = -28$$

$$19.9512$$

$$Y_0 = 18.8600$$

$$\frac{1}{2}b = -19$$

$$18.8581$$

From Prelim Red.

$$X = 20.3307 \quad Y = 19.6288$$

$$ax = +7 \quad +35$$

$$by = -14 \quad +19$$

$$c = +8 \quad -58$$

$$X = 20.3308 \quad Y = 19.6284$$

$$\xi = +2.3308$$

$$\log \xi = 0.36750$$

$$\cos \delta = 9.99391$$

$$8.50724$$

$$\alpha - A = 1.86635$$

$$\alpha - A = +1.1351$$

$$A = 22 \quad 46 \quad 07$$

$$\alpha_0 = 22 \quad 47 \quad 20.51$$

$$\text{Red. ad. l. app.} \quad +3.39$$

$$\alpha' = 22 \quad 47 \quad 23.90$$

$$\eta = -2.3716$$

$$\log |\tan \delta| = 9.1997m$$

$$0.7350$$

$$7.0534$$

$$6.9881m$$

$$\eta_1 = -10$$

$$\eta_0 = -2.3706$$

$$\log \eta_0 = 0.37486m$$

$$7.33115$$

$$\alpha - D = 3.04371m$$

$$\delta - D = -18 \quad 25.9$$

$$D = -9 \quad 16 \quad 17$$

$$\delta_0 = -9 \quad 34 \quad 42.9$$

$$\text{Red. ad. l. app.} \quad +16.5$$

$$\delta' = -9 \quad 34 \quad 26.4$$

4271 Red. ad. locum apt.

$$\delta_0 = -9^\circ 35'$$

$$H + \alpha \quad 1^h 33^m = 23^\circ 15'$$

$$H \quad 2 \quad 46$$

$$\alpha \quad 22 \quad 47$$

$$G \quad 22 \quad 11$$

$$G + \alpha \quad 20 \quad 58 = 314^\circ 30'$$

$$2 \cos \delta \quad 9.9939$$

$$i \quad 0.7520$$

$$(i) \quad 0.7459$$

$$2 \cos(G + \alpha) \quad 9.8457$$

$$q \quad 1.2975$$

$$\sin \quad 9.8532_m$$

$$\tan \delta \quad 9.2275_m$$

$$\underline{8.8239}$$

$$2 \sin \delta \quad 9.2214_m$$

$$\cos(H + \alpha) \quad 9.9632$$

$$h \quad 1.2939$$

$$\sin \quad 9.5963$$

$$\sec \delta \quad 0.0061$$

$$\underline{8.8239}$$

$$\log \delta' = 1.1432$$

$$\delta = 9.2021$$

$$h' = 0.4785_m$$

$$h = 9.7202$$

$$\frac{1}{b} + 2.70$$

$$\frac{1}{c} + 0.16$$

$$\frac{1}{d} + 0.53$$

$$\underline{+ 3.39}$$

$$\delta' + 13.91$$

$$h' - 3.01$$

$$i + 5.57$$

$$\underline{+ 16.47}$$

4271 - Lunar Parallax.

$$\begin{aligned} \alpha' &= 22^h 47^m 23.90 \\ \theta &= 23 \quad 45 \quad 50.8 \\ \theta - \alpha' &= + 58 \quad 26.9 \\ &+ 14^0 \quad 36' \quad 44'' \end{aligned}$$

$$+ \quad \quad \quad 5 \quad 07$$

$$+ \quad 14 \quad 31 \quad 37$$

$$9.95727$$

$$0.00000$$

$$001411$$

$$\hline 9.97138$$

$$\delta = 43^0 06' 50''$$

$$- 9 \quad 34 \quad 26.4$$

$$52 \quad 41 \quad 16$$

$$9.82640$$

$$819779$$

$$990056$$

$$016529$$

$$\hline 809004$$

$$S - S' = + 42 \quad 17.9$$

$$S = -8 \quad 52 \quad 08.5$$

$$\alpha = 22 \quad 48 \quad 0486$$

$$\text{Lunar alt. } S = -8 \quad 52 \quad 13.4$$

$$\alpha = 22 \quad 48 \quad 0397$$

$$O - C \quad + \quad 4.9$$

$$+ 0.89$$

$$\text{Cur. of Plate} \quad + 0.9$$

$$- 0.05$$

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

$$+ 0.02$$

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

$$\alpha = 22 \quad 48 \quad 04.88$$

$$S = -8 \quad 52 \quad 08.3$$

$$O - C = + 0.91$$

$$O - C \quad + \quad 5.1$$

4272

Moon Measures

1915 Jan 6

1
19.0 14234
183 12620
2520
24
181610

1
17421
902030
3130
10
.1615

2 20223
188 18729
182 2020
15
18.1499
18.1499

17415
890699
00
99
.1501

3 19260
18.0 1592620
184 30
50
18.3332

18374
11680
8987
65
.3316

4
17.3
19.0

19205
11674
7270
88
17.2481

19439
16945
4243
18
.2491

5 scratch

17.1 18650
19.5 14144
1011
45
19.4536

19402
1395149
5049
94
.4552

1305142
5842
12586
17.0462

8729
826062
7062
.0455

6
16.9

2003rd Ord Ref

+ 0.1

min
in
26

13636
1327289
8481

16.9646

907570
71
8730
.9658

2
17
18
19
20
21

4272

moon-measures

1915 Jan. 6.

a

n

a

n

$$\begin{array}{r} 7 \\ 173 \\ 210 \end{array}$$

$$\begin{array}{r} 18500 \\ 1128886 \\ 7279 \\ 89 \end{array}$$
172789

$$\begin{array}{r} 16477 \\ 13670 \\ 6758 \\ 51 \\ 2795 \end{array}$$

$$\begin{array}{r} 18.015755 \\ 21.6947983 \\ 79 \\ 44 \\ \hline 21.6268 \end{array}$$

$$\begin{array}{r} 16160 \\ 12357 \\ 5551 \\ 90 \\ \hline 6258 \end{array}$$

grade 4.

Hayn's correction

	P	P-c	$\lambda_{\text{min}}(p-c)$	$\lambda_{\text{max}}(p-c)$	θ	Corr from Hayn	
1	173.6	194.3	-0.7	-1.9	+1.5	-0.2	-18
2	180.0	200.7	-1.0	-1.9	+1.2	+0.3	+28
3	205.2	225.9	-2.1	-1.4	-0.4	-0.8	-74
4	237.6	258.3	-2.8	-0.4	-2.1	+0.4	+37
5	258.4	274.1	-2.9	+0.1	-2.7	-0.9	-83
6	270.7	291.4	-2.7	+0.7	-3.1	+0.1	+9
7	303.4	324.1	-1.7	+1.6	-3.0	-0.5	-46
8	334.2	354.9	-0.3	+2.0	-2.0	+0.3	+28

$$\lambda = +288$$

$$\beta = +2.0$$

$$C = 339.3$$

4272

Proxima Centauri

Corr. for Magn

	y	x - x_0	Δx	$(x - x_0)^2$	$(x - x_0)^2 + (y - y_0)^2$	O - C	O - C
1	19.0000	+0.2050	-5	0.0416	3.3489	+44	+62
2	18.7950	0.0000	-5	0.0000	3.3482	+37	+9
3	18.0000	-0.7950	-5	0.6328	3.3467	+22	+96
4	17.2486	-1.5464	-3	2.3923	3.3515	+70	+33
5	17.0458	-1.7492	-2	3.0604	3.3358	-87	-4
6	16.9652	-1.8298	0	3.3482	3.3486	+41	+32
7	17.2792	-1.5158	+3	2.2968	3.3402	-43	+3
8	18.0000	-0.7950	+5	0.6312	3.3474	+29	+1

$$R = 3.3445$$

	y	y - y_0	Δy	$(y - y_0)^2$	
1	18.1612	-1.8178	-8	3.3073	174 "
2	18.1500	-1.8290	-8	3.3482	180 "
3	18.3324	-1.6466	-8	2.7139	206 "
4	19.0000	-0.9790	-4	0.9592	237 238
5	19.4544	-0.5246	-2	0.2754	254 253
6	20.0000	+0.0210	0	0.0004	272
7	21.0000	+1.0210	+5	1.0434	305 304
8	21.6263	+1.6473	+8	2.7162	334
					Range 159
					160

Approx. Center

$$x = 180 \quad y = 18.3324$$

$$21.6263$$

$$39.9587$$

$$y_0 = 19.9794$$

$$y - \text{min} = 18.1100$$

$$R = 18.294$$

$$x - \text{min} = 16.9652$$

$$x_0 = 18.7946$$

$$\text{Center} \begin{cases} x_0 = 18.7950 \\ y_0 = 19.9790 \end{cases}$$

Formation of Normals

	ab	an	bn
1	- 0.36	+ 12.4	- 113.0
2	- 0.00	+ 0.0	- 16.5
3	+ 1.32	- 76.7	- 158.2
4	+ 1.52	- 51.1	- 32.3
5	+ 0.91	+ 7.0	+ 2.1
6	- 0.04	- 58.5	+ 0.6
7	- 1.55	- 4.6	+ 3.1
8	- 1.32	- 0.8	+ 1.6
	+ 0.48	- 172.3	- 312.6

4 2 7 2 Conditional Equation.

	a	b	c	0-c	
1	+0.20	-1.82	= +62	- 3 + 34 = +36	+26
2	+0.00	-1.83	= +9	- 0 + 40 = +40	-31
3	-0.80	-1.65	= +96	+ 10 + 35 = +45	+51
4	-1.55	-0.98	= +33	+ 20 + 21 = +41	- 8
5	-1.75	-0.52	= -4	+ 23 + 11 = +34	-38
6	-1.83	+0.02	= +32	+ 24 - 0 = +24	+8
7	-1.52	+1.02	= +3	+ 20 - 21 = -1	+4
8	-0.80	+1.65	= +1	+ 10 - 35 = -25	+26

+115 = 77

Average = 24

Normal Equations.

$$+1240 + 048 = -172 \quad -8.20$$

$$+ 048 + 1436 = -313 \quad -4.11$$

$$- 048 - 002 = + 7 \quad +0.32$$

$$+ 1434 = -306 \quad -3.79 \quad h = -21.4 \quad -0.26$$

$$+1240 - 172 + 10 = -162 \quad a = -13.1 \quad -0.65$$

	a	b	c	new
a -10	-2	+7	-10	0-c
b -7	-0	+7	-8	+16
c -15	+8	+7	0	-39
	+15	+4	+4	+51
	+17	+2	+4	-7
	+18	-0	+3	-39
	+15	-4	-4	+11
	+8	-7	-14	0
				+12

Arc measured = 160°6

Average (0-c) = +4.8

$$\frac{pc}{m} = 0.21$$

$$+ \frac{4.8}{21} = +0.23 \quad \Delta \alpha = +0.2$$

$$-2RC = -0.73$$

$$\Delta b = +0.19$$

$$\Delta a = +0.48$$

$$\Delta \delta = +0.1$$

$$\Delta \alpha = +0.02$$

$$+0.3$$

$$\text{corr} +0.2$$

$$\Delta R = +0.1$$

$$4272$$

$$X_0 = 18.7950$$

$$\frac{1}{2}a = \frac{-7}{18.7943}$$

$$Y_0 = 19.9790$$

$$\frac{1}{2}b = \frac{-11}{19.9779}$$

$$\text{Trompeter constant } x = 20.9555 \quad y = 20.1635$$

$$z = 429555$$

$$\log z = 0.47063$$

$$\cos \delta = 9.99399$$

$$\frac{850724}{1.96940}$$

$$1.96940$$

$$q - A = +1 \quad 33.20$$

$$s = 2246 \quad 07$$

$$X_0 = 22 \quad 47 \quad 40.20$$

$$\text{Red} = + \quad 3.39$$

$$Y' = 22 \quad 47 \quad 43.59$$

$$q = -1.8365$$

$$\log \tan \delta = 9.1997$$

$$09413$$

$$\frac{70534}{71944}$$

$$71944$$

$$m_1 = -16$$

$$m_0 = -1.8349$$

$$\log \gamma_0 = 0.26362m$$

$$\frac{7.33115}{2.93247m}$$

$$2.93247m$$

$$S - D = -14 \quad 16.0$$

$$D = -9 \quad 16 \quad 17$$

$$S_0 = -9 \quad 30 \quad 33.0$$

$$\text{Red} = +16.5$$

$$S' = -9 \quad 30 \quad 16.5$$

4272

Lunar Parallax

$$\alpha' = 22^h 47^m 43.59$$

$$\delta = 0 \quad 03 \quad 30.7$$

$$\delta - \alpha' = +1 \quad 15 \quad 47.1$$

$$+ \quad 18^\circ \quad 56' \quad 45''$$

$$+ \quad 6 \quad 35$$

$$18 \quad 50 \quad 10$$

$$9.95727$$

$$0.00000$$

$$0.02391$$

$$9.98118$$

$$\gamma = 43^\circ 45' 32$$

$$\delta = -9 \quad 30 \quad 16$$

$$\gamma - \delta = 53 \quad 15 \quad 48$$

$$9.82640$$

$$8.19778$$

$$9.90384$$

$$0.16018$$

$$8.08815$$

$$\delta - \delta' = +42 \quad 06.9$$

$$\delta = -8 \quad 48 \quad 09.6$$

$$\text{hant Alm. } \delta = -8 \quad 48 \quad 14.4$$

$$O-C = +4.8$$

$$\text{Cur. of Plate } +0.9$$

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

$$\text{Dir. Corr. } +0.1$$

$$\delta = -8 \quad 48 \quad 09.4$$

$$O-C = +5.0$$

$$\delta' = -9^\circ 30' 16.5$$

$$\pi = 54' 12.51$$

$$9.86913$$

$$8.19778$$

$$9.51145$$

$$0.00514$$

$$7.58350$$

$$\alpha - \alpha' = +13' 10.54$$

$$= +52.70$$

$$\alpha = 22 \quad 48 \quad 36.29$$

$$\alpha = 22 \quad 48 \quad 35.26$$

$$O-C = +1.03$$

$$-0.05$$

$$\text{Dir. } +0.02$$

$$\alpha = 22 \quad 48 \quad 36.31$$

$$O-C = +1.05$$

2nd Ord. Ref + 0.1

