

KG

11365
308

N 25

Reduction of asteroid
observations.

Differences of α & δ between
asteroids and comparison stars
1870.

XG11365.308

Reduction of Asteroid Observations

Marsalia

$B_{air} = 30.0$
 $T = \text{altitude} = 80$
 $R = \text{optimum} = 84$

July 13 Comp. # 14454. Clock 29 ft

Star	20 13 32.44	44.44	50.05	Observed Planet-Star	+2 13.18	+2 13.30	20 14 1 ^s
Planet	15 45.82	60.95	6.325	R.	13.51	13.41	19 43
Planet-Star	+2 13.18	13.51	13.20		13.20	12.97	23 31
Star	20 17 14.40	28.70	32.12	R.	+2 13.55	9.68	57.15
Planet	19 27.95	43.10	48.40		13.40		20 19 05 = Obs. T
Planet-Star	+2 13.55	13.40	13.28		13.28	+2 13.23	-27 = dr
					12.3		20 18 38 = C.S.T.
S	20 21 2.78	14.10	20.40	R.	+2 13.05		
P	23 15.50	30.95	33.93		12.85		
P-S	+2 13.05	12.85	13.03		13.03		
					89.8		

No observation for S

KG-11365.306

$\#a$ 19 15 19.23
 $P_{\#}$ - 2 13.23
 $P_{\#}$ 19 17 32.46
 $R_{\#}$



$\log$
 $\log$
 $\log$
 $\log$

$\log \sin (A+a)$
 $\log \cos (A+a)$

$\log \sin (A+a)$
 $\log \cos (A+a)$

$\log \sin (A+a)$
 $\log \cos (A+a)$

$\log \sin (A+a)$
 $\log \cos (A+a)$

$\log \sin (A+a)$
 $\log \cos (A+a)$

$\log \sin (A+a)$
 $\log \cos (A+a)$

Aug 14

Nehe.

Comp. # N 1249 Clock - 25

Reading of wires
R. 2
a = 24508
b = 49968
c = 75134

Star = #	#	P-#	#	P-#	R. 2.	Apparatus	T. f. m. a
17 35 50.18	5	17 39 57.50	17 42 57.10	18 3 32	56 57.0	a —	17 39 56
38 59.90 + 2	9.72	42 1.10 + 2	45 6.75 + 2	9.65	56 74.0	b —	42 18
67.10		68.30	1350		56 81.0	c —	45 23
70.57	9.47	15.00	2390	9.60	57 48.0		
69.90		71.20	1795		57 23.8		127 17
79.47	9.57	20.90	26.65	9.70	39 75.8		17 42 26
83.60		84.90	30.65		56.952		
93.45	9.85	34.45	40.10	9.45	18 10.21		
	2.61			740			
	9.65		9.66	9.60			
	9.66						
	9.60						
	11						
+ 2	9.63						

18 28 33.75	5	18 31 34.75	18 37 14.50	11.60	19 4 19	59 32.2	18 31 02
20 44.55	10.50	33 45.25	39 26.40	11.60	9 3	432	3204
30.40		51.35	31.70	11.90	12.53	73.2	3946
61.0	11.30	62.63	43.60	11.90	26 25	148.6	103 52
62.60		63.50	44.15	11.37	98 48	59.495	18 34 37
73.60	11.00	74.50	55.52				
67.10		68.12	48.50			59.495	
73.30	11.20	77.33	60.30	11.50		75.139	
	4.30		69	237		15.639	
	11.11		11.67	11.59			
	17						
	59						
	87						
+ 2	11.29						
2	9.63						
	20.92						
2	10.46						

17 39 16
17 42 18
17 45 23
18 31 02
18 33 04
18 39 46
48 50 07
18 8 55
- 28
18 7 57

July 17

Marsalia Clock = -28^s
 Comp. # Altman 19334 Clock. = -30^s

Reading
 of wals
 a 24.808
 b 49.968
 c 75.134

Observer	#	P-#	#	P-#	#	P-#	#	P-#	Position	T _h S	R 2
R	14	31465	5 16 8	2880	16 34	38	57.22	4.20	—	17 45 13	48 30.1
		1935 + 4	470	2823	450	38	56.92	—	—	17 49 17	48 1.8
		2870		570		4935				14.30	
		3220	4.50	1.1	410	5240	305			17 47 15	48 160
		3255		0.7		5150					
		3700	4.95	5.0	4.3	5440					
		5022		15.63		7.17					
		5442	4.20	22.60	3.97	10.10	293				
			18.5		65		1223				
		4	462		1662		3.06				
			4.15		4.15						
			3.06								
			11.83								
P-#		4	394								
#	19	9	3384								
P	19	13	3778								

P-# = +18'11"
 # -21 17 50.3
 Red. to 17^h 17^m -21 17 32.2
 +2.2
 P - 21 17 30.0

d ω -4.48
 dr

17 18 12
 17 47 15
 29 3
 29.05
 484

July 17

Nehe

$P = 73^\circ$

Reading of wires
same as for Marcella

Comp. # N. 1121 clock.

phae. R

$\frac{1}{2}$	$P \#$	$\frac{1}{2}$	$P \#$	$\frac{1}{2}$	$P \#$	T	f	S	R	z	Position		
19.364185		1938	2580	1940	11 00								
37.3190 +	50.05	39	1561	+49.81	41	00.70	+49.70	19	55	07	80	42.5	a —
								29	61	40	80	4.5	b —
36.5874			42.52		27.70				63	59	80	1.0	c —
37.4854	49.80		32.53	50.01	17.48		49.78						
04.50			48.28		33.44				130	96		31.0	
54.53	50.03		38.00	49.72	23.25		49.81		29	00	15	80.170	
										30	24.808		
15.40		59.12			44.30				19	59	45	55.362 =	9' 13.6"
05.85	49.75	49.00		49.88	34.05		49.75						
	199.63			199.42			30.4						
	499.1			498.5			49.76						

Obs. A.

19	462750	48	4073	50	4580
	472360	49	3028	57	~~8480~~
			9.55		9.30
	5064		5763		0245
	4040	9.76	4700	9.37	5162
					9.17
	5660		0360		815
	4642	9.52	5294	9.34	5760
					9.45
	0766		1428		1909
	5700		0370		860
	9.34		9.42		9.60
	182		168		122
	9.64		9.42		9.30

Wm. B.

$$\begin{array}{r} 202 \sqrt{1130} \\ 140 \\ \hline 140 \\ \hline 0 \end{array}$$

Aug 19 1870

Concordia

Reading of wires
same as for Hebe.

Comp. # 87970.

Observed	# P	P-#	# P	P-#	# P	P-#	V _{hrs}	R ₂
R	20 23 3100		20 27 930		20 30 5639		20 44 40	55-9.0
	20 460	2 360	29 920	3315	33 2984	3350	4932	55-20.0
							5918	55-44.0
	3630		14.0		125			
	988	3356	492	3320	3960	33.35		
	4820		26.0		1328			
	2128	3304	5935	33.35	9650	3322		
	570		92.8		3018			
	3260	33.60	1628	3338	360	3392		

R	21 57 3600	
	10 9.4	334
	530	
	263	333
	89	
	3835	3355
	3010	
	99	
	3855	65

Not the plant.!

July 18.

Massalia.

Comp # 78 (Eltzen 19334. Clock. -30°)

Reading of mic same as before

Obs R.

$\{X\}$ P	P-X	$\{X\}$ P	P-X	$\{X\}$ P	P-X	T for S. R. 2	Apparent p. d. in 1/2 and 1/4
17 22 33.6		26 46.80		30 49.00		17 47.10 422 145	
25 37.2	3 03.6	29 50.50	3 37.0	33 52.20	3.3.20	14 52.00 " 160	a -
57.4		04.66		31 06.55		99 10 412.792	b = P
54.9	3 03.5	XX		97.0	3.3.15	1749.35 57.978	c -
55.18		08.50		1033			
58.65	3 34.7	11.60	3 31.0	1350	3.3.17		b = 49968
09.00		22.30					P 57.978
12.65	3 3.65			2740			P-X 80.10 = 1201
	3 5.46		3.40		3.17		# - 21 17 50.3

Obs R.

$\{X\}$ P	P-X	$\{X\}$ P	P-X	T for S. R. 2	Apparent p. d. in 1/2 and 1/4
19 10 45.52		15 24.15		19 30.6 58 79.2	
13 44.50	2 58.98	14 45.44	2 58.75	19 36.6 68.2	
32.0		41.80		66.12 147.4	
22.0	2 59.00	40.50	2 58.70	19 32.6 58.737	59.737
9.00		47.50			
77.8	2 58.78	46.45	2 58.95		
2090		59.18			
2000	2 59.10	58.52	2 59.30		
	2 58.97		58.94		

3. 346
3 240
3 317
2 5897
2 58.94
15 0794
3 159
19 433.8

T for a 172556
1730 8
1734 11
1914 6
1918 42
181236

181236
1933 6
12030
-1344

b = 49968
P-X 58.937
P-X 87.694
= 127.7 or 137.7
Red. to 1/2 in
P-X 127.7
- 21 17 50.3
P - 21 19 18.0
Red. to 1/2 in
P - 21 19 12.0

July 21.

Massachusetts Concordia.

Comp. H - 24 841

Clock = - 32^s

Obs. R.

$\begin{Bmatrix} X \\ P \end{Bmatrix}$	$P-H$	$\begin{Bmatrix} X \\ P \end{Bmatrix}$	$P-H$	$\begin{Bmatrix} X \\ P \end{Bmatrix}$	$P-H$	$\begin{Bmatrix} X \\ P \end{Bmatrix}$	$\begin{Bmatrix} X \\ P \end{Bmatrix}$	$\begin{Bmatrix} X \\ P \end{Bmatrix}$	$\begin{Bmatrix} X \\ P \end{Bmatrix}$
184 50 343	+ 293	4 509 5 188	288	5 ~~350~~ 6 36	286	6 195 453	288	7 47 33.6	28.9
110 401	29.1	588 246	288	407 96	289	253 543	29.0	108 393	28.5

29.3
29.1
28.8
28.8
28.9
28.8
29.0
28.9
28.5
28.7
28.7
100.1
+ 28.86

T. for S. R. r

Obs. R	15 15 0 86 245
	16 0 15.7
	17 30 13.5
	20 30 18.1
Obs. S	15 40 5 85 310
	42 38 81 40.1
	44 24 84 34.2

721
86.180
24.808
61.372 = 10 13.7
18 20^m 07^s
82
18 19 35

Obs. R.

{X P	{X P	{X P	{X P	{X P
1854 370 4	270 55 426 56 279	26.8 56 347 57 14	26.7 57 232 499	26.7 58 90 353
236	490 159	26.9 412 80	26.8 297 562	26.5 153 422

220
26.8
26.9
26.7
26.8
26.7
26.5
26.3
26.9
60.6
+ 26.73
28.84
153.4
27.788

106.1
60.6
3/16.67
5/5.537
7.93
27.93

T. for S.
18 439
5-22
6 7
6 51
7 36
8 35
54 4
57 3
57 5
57 53
58 38
323 53
18 29 33
32
18 29 01

July 21.

Massalia
Comp X's 1-19334. Oct 11.

P = 73.

Obs. R.

$\{P\}$	kt star	#	P-#	#	P-#	#	P-#	#	P-#
1914	229	14	421	26	15	26	2.7	15	204
25.8	+ 2.9	447		53		230	2.6	15	331
247		439		40		218		346	
275	2.8	466	27	6.8	2.8	246	2.8	372	2.6
	17		13		16		14		
	2.85		2.85		2.75		2.70		12
									26.0

15	490		15	592		16	118	
576	2.6	1.8	2.6	146	2.8			
504		16	06	120				
532	2.8	3.6	30	11.0	3.0			
	14		56		58			
	2.70		280		290			

a —
b —
c — x

1
285
65
75
70
60
70
80
90
595
2.74

T_1	R_2	T_w
19 26 32	34.144	19 14 26
27 11 12	330	14 46
27 4 48	294	15 6
19 32	768	15 24
19 27 11	34.256	15 36
32	75.187	15 52
19 26 39	40.931	16 9
	40.931	16 15
	64.93	123 28
		19 15 26
		32
		19 14 54

$\{P\}$	Comp #	100. B.	Oct 11, 19334				
1917	304	18 374	19 488	21	55		
18	25	32.9	19 93	319	20 207	319	376
	462	550	20 64		233		321
	200	33.8	271	32.1	381	317	551
	5						31.8
	505	572	85		255		
	221	31.6	292	32.0	405	32.0	576
		75	60		56		321
		32.25	32.00		31.87		60
							32.00

a —
b — x
c —

3225
32.00
3187
32.00
812
32.03

T_1	R_2	T_w
19 29 22	53.936	19 17 46
31 18	54.268	19 55
32 2	54.290	20 38
		21 53
		80 74
58 00	54.500	
65 00	54.380	
77 40	22.74	21374
19 19 25	54.26	54.275
32		50.826
19 18 53		3.949
		34.48 ±

$P = 253.$

$\left\{ \begin{array}{l} \textcircled{P} \\ X \end{array} \right.$	2nd Comp. $\%.$	$g.$
19 52.150	53 33.0	
490	340 54 ~~365~~	33.5
	54 557	55 294
		33.7
306	487	55 110
53 4.1	33.5 217	44.5
	33.0	33.5
19	65	R
3395	3325	3360
		180 1105
		3360 1953 37
		82
		19 5305

July 23.

Massalia.

Comp # Deltz. 192⁸⁴, 19284. Clock = -34⁵

Obs. R.
No. 1

1837 400
20.6
52.6
33.7
59.5
40.8
38 64

Time R.
1730 53.372 a-
3.55 b-
317 c-

173400 53.160
40 240
270
1774

173200 53.296
34 50.826
173126 2470 = 24.7"

No. 2 19284

Time R.
173530 59.555 a-
67.3 b-
c-

173630 .430
52.5
218.3

173600 59.546
34 50.826
173526 8720" = 1' 27.2"

G. Obs.

Comp # 19280
1949 496
1750 396
0.6
50.5
49.9
7.1
57.4
25.8
57 15.3
50.0
20.02
50.05

1952 458
32 360
56.9
46.8
39
54.0
21.6
11.3
49.7
199.9
49.98

53 40.8
30.8
57.7
41.4
49.7
58.7
48.4
16
16.2
06.0
49.8
199.2
49.80

P-# T_w
5005 1950.60
4998 52.47
4980 53.41
1988.3 718
4994 1952.26
-34
1951.52

Aug 2³
 Obs. $\frac{1}{2}$ P $\frac{1}{2}$ R Comp # 451 W.
 \$ P 18 42 398 46 430 50 570
 \$ # 48 272 49 317 53 460

clock = - 35

488 536 73
 380 427 564

550 01 138
 445 488 27

307
 195

P-H	P-H	P-H	T w
- (2 474)	48.7	2 49.0	18 42.49
49.2	48.1	49.1	46.54
49.5	48.7	48.9	50.7
28.5	26.5	270	139.50
- 2 49.35	48.83	49.00	18 46.37
			- 35

T w 18 46 02

Q 2 4935
 Q 4883
 R. 4800
 2718
 - 2 49.06

T for 5.
 19 4 15
 7 6
 16 06
 27 27
 19 9 9
 - 35
 19 8 24

R₂
 23.285 a=
 22.950 a=P
 22.670 c=
 8.905
 22.968
 54.029
 27.061
 27.06 = 4' 30.6
 22.968
 75.187
 52.219 = 8' 42.2

July 23.

Concordia.
Comp # 844 W.

Obs. R.

 $\begin{Bmatrix} P \\ X \end{Bmatrix}$
 1938 383

 $\begin{Bmatrix} P \\ X \end{Bmatrix}$
 $\begin{Bmatrix} P \\ X \end{Bmatrix}$
 35 470
 37 25

115.5

 $\begin{Bmatrix} P \\ X \end{Bmatrix}$
 $\begin{Bmatrix} P \\ X \end{Bmatrix}$
 38 57
 39 215

115.8

P

 $\begin{Bmatrix} P \\ X \end{Bmatrix}$
 35 552
 107

115.5

 $\begin{Bmatrix} P \\ X \end{Bmatrix}$
 37 237
 194

115.7

 $\begin{Bmatrix} P \\ X \end{Bmatrix}$
 38 225
 383

158

I for 6. R2

 $\begin{Bmatrix} P \\ X \end{Bmatrix}$
 37 85
 242

115.7

 $\begin{Bmatrix} P \\ X \end{Bmatrix}$
 37 172
 327

115.5

 $\begin{Bmatrix} P \\ X \end{Bmatrix}$
 38 260
 577

157

19 46 27

26.010

a - P

c - P

 $\begin{Bmatrix} P \\ X \end{Bmatrix}$
 120
 275

115.5

 $\begin{Bmatrix} P \\ X \end{Bmatrix}$
 38 206
 363

115.7

 $\begin{Bmatrix} P \\ X \end{Bmatrix}$
 38 396
 554

15.8

19 48 40

.325

.292

.276

.903

26.526

50.826

24.600

246.00 = 4' 6.0

26.226

24.800

1.418 = 14.2

Obs. R.

 $\begin{Bmatrix} P \\ X \end{Bmatrix}$
 1957 292
 52 452

 $\begin{Bmatrix} P \\ X \end{Bmatrix}$
 1 15.83
 57

 $\begin{Bmatrix} P \\ X \end{Bmatrix}$
 53 417
 578

1 15.60

 $\begin{Bmatrix} P \\ X \end{Bmatrix}$
 1 15.78
 31

 $\begin{Bmatrix} P \\ X \end{Bmatrix}$
 95.07
 19 47 33

1 16.0

1 16.1

1 15.57

19 34 5

337

460

15.60

35.58

444

23

16.00

38.25

460

587

16.22

51.37

2.3

16.3

15.78

53.49

52 30

54 15.3

29.77

215.04

190

317

1 15.83

19 42 37

1 16.00

1 16.32

164

19 42 02

Obs. G.

 $\begin{Bmatrix} P \\ X \end{Bmatrix}$
 20 2 5.4
 3 22.5
 10.1
 26.2

117.1

 $\begin{Bmatrix} P \\ X \end{Bmatrix}$
 20 4 33.5
 50.5

1.170

10.1

37.2

26.2

54.5

17.3

222

50.1

394

75

17.4

393

74

56.7

247

17.3

282

10

117.05

117.25

P-H

T_w

117.05

20 2 13

17.25

4 40

117.15

20 3 27

95

25

15

20 3 52

July 24.

Massalia.
Comp. X.

Obs. R.

{P X No. 1. altm 19280										
17 11	232		11	402		12	174		12	334
	281	4.9		450	4.8		224	5.0		382
	263			432			202			361
	309	4.6		491	4.9		250	4.8		408
	1	15		80	17			98		15
		4.45			4.85			4.80		4.75
										4.70

Obs R.

13	058									
	106	48								
	87									
	131	44								
		12								
		4.60								

1718	52	371021
19	32	060
19	55	145
28	19	226
1719	36	37075
	84	50826
1718	52	13757
		1375 = 2 14.5

P = 72.15.

a = P
b =
c =

Obs R.

{P X na2. Oeltn. 19284										11/18 52	13457	"	30?
13 478		14 199		14 567		15 328		2 245	17.20.36	31.000			
14 67	18.9	390	19.1	15 162	19.5	576	18.8	17.22.22	060				
								15 15	090	a =			
506		229		599		355		17.21.41	15	h = ?			
95	18.9	417	18.8	190	19.1	545	19.0		31.150	c =			
										50.826			
	18.90		179						19766				
		18.95			1930		18.90		12766				

Obs R.

18.10		18.40		19.50		18.10		19766	
{P 47201.								3' 17.7	
17 24	550	25	143	25	301	25	494	26	202
25	04	5.4	199	5.6	355	5.4	549	5.5	3 277
	593	5.5	188		344		538		
	48		242	5.4	399	5.5	572	5.4	246
		5.45		5.50		5.45		6.45	

Obs R.

{P X No. 2.									
26	202		26	560		27	295		
	397	19.5	27	154	19.4		491	19.6	
	246			03			328		
	442	19.6		197	19.4		532	19.4	
		19.55			19.40			19.50	

19280	
P	Ta
4.75	17 1125
85	1141
90	1218
78	1235
70	1253
60	13 7
5.45	24 57
50	25 16
45	25 32
45	25 57
5040	175 35
- 5.04	1717 33
	34
	171688

19284	
P	Ta
18.90	17 13 48
18.95	14 21
19.30	14 58
18.90	15 39
19.55	26 22
19.40	26 58
19.50	27 32
19.50	139 33
19.21	1719 56
	34
	1719 22

July 24.

Enterprise. Clock = -34^s

Comp X No. 16 30 342 -23 370 Actn. 18487

Obs R.

$\frac{X}{P}$	P-#	$\frac{X}{P}$	P-#	$\frac{X}{P}$	P-#	$\frac{X}{P}$	P-#	$\frac{X}{P}$	Standard
1741 458		43 298		45 82		466 175813	11.588	a- ~~X~~	
327	46.9	165	46.7	58.8		55.30	.310	b- ~~X~~	
502		342		15.3		10843	.620	c-(X)	
371	46.9	212	47.0	2.3		175421	11.506		
36		477		26.9		34	75.187		
507	47.1	345	46.8	13.8	46.9	63.681	"		
218		55		14.4		470 175347	63.681	"	
08.8	47.0	52.5	47.0	31.9		275			
	27.9		27.5			4688			
	46.98		46.88						

17 59 502	18 0 475	
87 0	83.5	46.0
228	56	
9 0	57.3	45.7
354	18.5	
217	4.3	45.8
408	23.3	
26.8	9.4	46.1
	2	23.6
	46.07	45.90

P-#	T
46.98	17 41 41
46.88	43 31
46.88	45 12
46.07	51 12
45.90	60 54
32 71	242 30
46.54	17 48 30
	24
17 47	56

July 25.

Enterprise. Clock = -35
 Comp * 18. 33. 39 -23.57. (1870.0) Armagh 3815

Robo. {P
X

1751	0.3		1755	474	
	<u>1</u>		59	102	3.228
184			56	55	
54	406	- 3.22.2	280		3.225
330			56	200	
553		3.223	426		3.226
363			234		
586		3.223	1759	460	3.226
		8		26	

Tford. R. 2.
 18 10 30 20.730 a—
 12 14 45 585 a—
 25 15 .968 C—X
 405
 577
 690

18 12 37 4255
 18 12 02 20.409
 75.187
 54488 = 9' 04"
 544.8"

R. obs.

1839	06		43	370	
42	250	3.244	47	24	[3.254]
184			557		
430		3.246	263		3.246
365			44	137	
43	07	3.242	385		3.248
395			167		
3.8		3.243	412		3.245
		15			19
		- 3.2438			3.2463

P-X Ta
 -3 2227 175433
 2262 175610
 2438 183923
 2463 184400
 1390 33 1406
 -3 2348 18 1831
 35
 18 1756

Aug 28

Keele

 $a = 20 \quad 3642$ $S = -12'42''$ $\frac{da}{dt} = -2.18$ $\frac{dS}{dt} = -30.6$

Comp# W838 Clock.

Obs.	#p	P-#					
G	1854 32		1858 04		19254		
	58 32 + 2 55.0		19 00 55.8 + 2 55.4		5 0.7 + 2 55.0		
P 242 is	206		174		54		
	158	552	129	555	119	582	
	33		295		227		
	276	553	247	552	244	553	
	371		343		398		
	327	556	293	350	354	552	
		- - 11		11		7	
	+ 2	55.28		2 55.28		2 55.18	

$\pi_{p, S}$	R_z
184117	67.667
184836	67.890
953	2176
184456	67.725
38	50.826
184418	16.899
	2' 49.0

P-#	Ta
2	55.28 185616
	28 18 00 13
	18 19 5 18
	74
2	55.28 19 00 36
	38
	18 59 58

Aug 28 Concordia Clock = -3^s
 $a = 20^{\text{h}} 28^{\text{m}} 47^{\text{s}}$ $\delta = -14^{\circ} 17'$ $\frac{da}{dt} = -2.15$ $\frac{d\delta}{dt} = -1.6''$
 Comp # $a = 20^{\text{h}} 26^{\text{m}} 50^{\text{s}} = 14^{\circ} 10' (1870)$ W.

Obs. $\frac{P}{P}$ $P - \frac{P}{P}$
 R 19 19 48.2 19 22 21.3
 21 21.5 +1 43.3 24 46 +1 43.3
 51 38.4
 48.3 43.2 24.7 43.3
 16.9 50.3
 0.3 43.4 33.3 43.8
 22.2 55.2
 5.4 43.2 38.5 43.3
 11
 + 43.28 +1 43.30

P-# T_w
 +1 43.28 19 21 53
 43.30 19 24 25
 6 18
 1 43.29 19 23 04
 -38
 19 22 31

not the Planet!

T_{true}
 19 32 52 23.84
 .98
 19 35 15 .98
 .86
 747 465
 19 33 53 23 930
 -38 75167
 19 33 15 51257
 8 32.57

1870 Aug 8 Noche.

P	P-#	P	P-#	P	P-#	P	P-#	P	P-#	P	P-#
19 7 34.4	8 0.5	26.1	8 28.8	54.7	25.9	9 33.4	59.4	26.0	19 20 11.4	37.7	26.3
36.2	2.5	26.3	30.5	56.8	26.3	35.2	1.3	26.1	28.3	54.8	26.5
53.2	19.3	26.1	47.4	13.7	26.3	52.0	18.3	26.3	30.7	57.0	26.3
	5	26.1	18.5	26.1	4	26.13		11	26.3	57.0	26.3
	17							16			
	13							16			
	34							16			
	53							16			
	57							16			
	194							16			
	26.325							16			

1915 04

48 Clock Corr -
19.14.16

Pon (a)

T

19 15 37	74895
19 16 38	600
19 17 17	548
19 32	1593
19 16 31	78.531
19.15.43	24.832
	33.699
	8.57.0

Aug. 9 1870

Nebe.

Obs.	Comp. #	P	P#	P	P#	P	P#	P	P#
R	18.1 40.5	36.8	18 130.5	53.9	18 750.3	44.7	544	18 33 47.4	40 48.0
	42.0	0 46.6	32.0	53.7	46.2	542	55.9	34 42.5	43.4
	57.2	38.3	32.0	54.1	46.2	542	51.2	55.1	47.0
	12.1	5.1	47.2	54.1	08.8	542	12.8	55.2	44.3
		47.2	22.1	54.1	03.0	542	8.0	55.2	6.0
		16.1	16.1	54.0	25.7	545	30.0	55.1	1.4
				15.7	20.2	545	28.0	55.1	23.0
				53.92		5432		55.15	18.4
				54.32				55.15	53.4
				55.15				55.15	53.38
				55.38				55.15	53.38
				18.77				55.15	53.38
				55.469				55.15	53.38

π_0
 $18 33 47.4$
 $18 7 52$
 $18 34 6$
 $18 40 59$
 $18 20 54$
 49
 $18.20.5$

Comp. # B.A. 6.7127

P	P#	P	P#	P	P#
18 1 40.5	0 34.6	18 150.3	18 33 47.4	40 48.0	40.8
42.0	6 21.0	5 44.4	37 33.0	46 38.8	45.7
5	38.3	44.4	52.0	44.5	45.7
	22.7	44.4	36.5	44.5	45.7
	5.1	44.5	08.8	44.7	45.7
	34.6	44.5	53.5	44.7	45.7
	12.1	44.7	25.7	44.9	45.9
	16.8	44.7	10.6	28	31
		20			
		5 44.50	5 44.70	5 45.45	5 45.78
		44.70			
		45.45			
		45.78			
		20.43			
		5 45.11			

T₂Same as T₁

R ₂	R ₁	R ₂
(4) 44.281	18 25 07	18 27 25
(5) 35.2	18 26 57	18 30 22
633		18 31 26
44.316	18 26 02	18 31 51
	49	
	18.25.13	
		18 31 13
		49
		18.30.24
		75.169
		62.752
		10.27.52

Aug. 11-170 Nebe.

P#	P-#	P#	P-#	P#	P-#
19 10 31.6		23 6.3		25 28.7	
22 8.0	1 304	37.1	308	26 57.2	305
54.5		23.3		45.6	
28.0	305	54.2	309	16.0	304
58.3		27.2		49.0	
28.8	305	58.3	311	19.8	308
11.7		40.9		2.4	
42.1	304	11.2	303	33.1	307
	18		31		24
	30.45		31.03		30.60
	31.03				
	30.60				
	308				
	30.69				

T_a
 192055
 23.24
 2550
 1009
 1923 23
 51
 19.22 32

T_s R₁ L₁
 19 11 7 44.673
 17 14 7 289
 17 18 52 860
 14 06 1312
 19 14 42 44.437
 19.13.51 50.029
 5.5.92

NO Aug 11 Probe

Obs.

<i>R</i>	<i>P</i>	<i>P-#</i>	<i>P</i>	<i>P-#</i>	<i>P</i>	<i>P-#</i>	<i>P</i>	<i>P-#</i>	<i>T₂</i>
19 41 36.1	42 42.0	459	43 33.9	44 19.6	45 45.5	46 1	47 29.1	48 0	19 41 14
13.0	58.7	457	50.4	36.2	2.3	45.8	31.6	45.8	43 51
16.7	2.6	459	54.2	40.1	6.2	45.9	118.6	46.0	46 08
22.7	15.5	458	7.1	53.0	19.0	45.9	35.6	46.0	47 47
		33		33	5.0	45.0	224	46.0	60 18
		45.82		45.82	5.0	230	18.4	46.0	61 58
						45.45		46.0	300 01
								238	19 50 00
								45.95	51
								15	19.49.09
								82	
								82	
								33.4	

58 46.5	59 53.8		1 43.5	
	40.4	46.5	30.1	46.6
53.0	0.3	46.5	50.0	46.6
	46.8		36.6	
	10.5	46.4	0.2	46.7
	56.9		46.8	
27.1		46.5	17.0	46.5
18.6		19	3.5	24
		46.48		46.60
		60		
		108		
		46.54		

21.

<i>T</i>	<i>R₂</i>
19 51 53	34.988
54 34	34.890
56 4	34.860
1231	2715
19 54 10	34.905
51	50.029
19.53.19	

Aug 17 Planet-111
Comp # 475-70.

Clock at = -7.05

Obs R	# P	P-H	# P	P-H	# P	P-H	# P	P-H	# P	P-H	# P	P-H
21.18.577			16 183		18 50		21 21 55		23.19.4		25 7.9	
14.54.2		56.5	17 150	56.7	19 1.8	56.8	22 21	56.6	24 160	56.6	26.4.1	56.2
14.14.4			30 7		22 0		22 4		36 2		24 7	
15 11 2		56.8	27 2	56.5	18 6	56.6	18 9	56.5	32 5	56.3	20 7	56.0
26 8			35 2		34 3		34 7		48 6		37 2	
23 3		56.5	37 8	56.6	31 0	56.7	31 3	56.6	44 9	56.3	33 1	55.9
31 3			56 0		39 0		39 5		53 2		41 7	
28 0		56.7	24 3		35 5	56.5	35 7	56.2	49 5	56.3	37 7	56.0
Means		56.6		56.6		56.65		56.5		56.4		56.0

56.6
56.6
56.65
56.5
56.4
56.0
27.5
56.46 mean of 1st set.

T for 5. R 2
21.38.18 17.475
41.0. 6.50
42.29 46.2
121.47 158.8
21.40.36 17.629
21.39.36

T for 2 T for 2
21.15.14.2 21.47.20.2
17.22.0 49.76
19.21.6 51.24.8
22.21.9 52.6
24.35.5
26.23.7
30.24.9
21.20.54.15 mean of T's for 1st set.
- 1.00
21.19.54 21.49.17
21.48.17 21.48.17
68.11
21.34.05

21.46.8.1	48	3.4	50	12.8
47 5.4	58.7	55.3	51.80	55.5
13.0	8.3		17.5	
8.1	49.3.4	55.1	12.7	55.2
30.0	25.1		34.3	
25.1	20.6	55.5	29.5	55.2
46.7	42.0		37.2	
42.3	58.4	56.0	46.2	55.0
Means	55.3		55.2	

55.3
55.3
55.2
55.267 Mean of 2nd set.
56.46

114.27
P-H = + 55.863

C = 75.187
P = 17.629
57.568 = 575.6
= 9 35.6

July 18 Aug 18 (111)

Obs.	P#	P#	P#	P#	P#	P#	P#	P#
	21 35283		21 37362		39 54.2		41 9.4	
	26 3613.6	483	223	461	40.0	45.8	24.8	45.6
							41 55.0	
	45.3		53.6		6.7		27.8	
	30.6	45.3	38.8	46.2	52.5	45.8	7.4	45.6
	57.4		5.8		11.2		26.9	
	48.7	45.3	51.7	45.9	52.0	45.8	12.0	46.0
	2.0		10.8					172
	48.0	46.0	56.2	46.2				
			38.8					
			~~22.8~~	46.10		45.80		45.73

Obs. T₅
 G 11 2058
 G 21 23 31
 R 21 25 8
 Rr 68535
 1634
 .664
 G R

Aug 27³⁰ 1870Kiohe. Comp #s
1 = 10.179
2 = 10.184

Obs.	#	# ₂	P # ₁	P # ₂	# ₁	# ₂	P # ₁	P # ₂
R 22	28 490	29 2.4			32 10.6	23.6		
	31 12.4	31 12.4	2 231	2 100	34 33.9	34 33.9	2 231	10.3
	5.8	19.0			27.3	40.6		
	29.2	27.2	23.4	10.2	50.5	51.5	23.2	9.9
	22.5	36.0			44.2	57.4		
	46.0	46.0	23.5	10.0	7.4	7.4	23.2	10.0
			13	2			7	30.2
			2 2343	2 100%			2 2323	2 100%
			32	1.07				
			75					

2 2337 2 100%

Clock Cor. -70

22. 31.12.4
31 29.2
31 46.0
34 33.9
34 50.5
35 7.4

179.4
13.59.2
3. 9.9

22. 3.10

22.2:00 T for L. #₁ + #₂

Ri.
T
22 20 19 76.489
22 23 52 76.738
22 25 43 76.872
75.4 76.299
22 23 18 76.766
-70 50.029
22.22.08 26.737
4.27.37

1870 Sept. 1 Noche

$P_1 = 1^{st}$ - Supposed Planet
 $P_2 = 2^{nd}$ " "

$P_2 = 2^{nd}$ "

[illegible]

Clock Cou. - 72 sec.

(P.)

4

R. 2
81.33

$$\begin{array}{r} 20 \quad 33 \quad 26 \\ 21 \quad 34 \quad 47 \\ \cancel{20} \quad \cancel{38} \quad 27 \\ \hline 313 \\ 4 \end{array}$$

Pomona Sept. 1

#	P	#	P	#	P
21	13.22	21	41.17.3	43	26.5
14	32.6	42	32.0	39.0	12.5
43.8		35.9		43.1	
57.6	1 13.8	48.6	12.9	55.7	12.6
57.2		42.2		56.6	
10.9	13.7	2.0	12.8	9.1	12.5
0.3		52.4		58.6	
13.9	13.6	5.2	12.8	12.3	12.7

1 13.70
 12.75
 12.57
 9.02

1 13.01

1 12.75

1 12.575

Clock Corr. -.72 sec.

21.14.57.6
 15.10.9
 15.13.9
 42.32.0
 42.48.6
 43.20.0
 43.52.0
 42.39.0
 43.55.7
 44.0.1
 44.12.3 - 7466
 23.63
 39.24.63
 21.35.42.4
 7.2
 21.34.30 T for d.

47.60.8
 48.12.5
 1.73.3
 47.86.7
 48.28.3
 48.55.5
 51.50.5
 51.74.0
 7.16
 247.950
 49.590 mean of 83.

Time by Chn.	TS	Rz.
22 00 40		51.740
2 52		51.505
5 55		47.608 - 48.125
9 15		48.120 - 48.445
12 00		48.341 - 48.769
31.22		
22.6.12		
72		
22.5.00	T for d.	50.029

51.740
 51.505
 47.608
 48.125
 48.120
 48.445
 48.341
 48.769
 8.653
 49.082
 8.1082
 50.029
 9.47
 9.47

(111)

Sept. 5.

4 is 25^s fast of lcl.

X P.	X P.	X P.	X P.
21 21.6	33.83.0	35.6.2	
32 20.1	58.5 34 81.4	68.4 36.4.7	58.0
38.4	30.0	23.6	
37.1	58.7 28.2	58.2 21.8	58.2
41.8	33.3	27.0	
40.3	58.6 31.6	58.3 24.9	57.9
55.8	44.0	40.6	
53.8	58.4 45.1	58.1 38.8	58.2
	23	10	323
	+58.55	58.25	58.07

1 15
25
1 40

P.	R ₂
21 42 51	68.475
44 23	69.470
16.11	69.107
13.25	69.152
21 44 29	69.351
1 46	
42 49	

58.55	26.214
58.25	
58.07	283
87	
58.29	292
	139
	26.246

49.351	26.246
29.463	75.223
44.288	48.977
72.09	- 8' 09.8

X P.	X P.	X P.	X P.
21 47.57.2	49.48.6	57.37.2	
48 55.0	43.1	57.6	57.7
59.8	47.8	39.4	
57.3	58.0	36.7	57.3
48.14.1	57.9 50.28	54.2	
12.0	51.0.3	51.6	57.4
31.1	33.3	58.11.2	
28.07	57.8	59.8.3	57.1
	31.5		15

P.
21 32.38
34 29
36 23
49 11
50 53
58 42
262 28
21 43 44
1 40
21 42 04

57.88
57.15
57.38
201
57.67

58.55
58.25
58.07
57.88
57.75
57.38
47.88

+ 57.98 at 21 43 44

Sept. 5 (96)

By Chronometer

By clock

P # P-#
 22 17 19.9
 1948.0 2 281 12 20 58.8
 221 281 28.2 2 285
 58.2 281 23
 365 30.9 281
 4.8 282 170
 631 281 45.1
 216 285 340
 9 21 281
 22822 2 2820

2 2822
 28.20
 .42
 2 2821

23 17 214
 51.8 2222 222 27542
 257 2 304 20 248 306
 384 300 266 2 305 30.6
 386 300 36.6 300 28.6 30.1
 85 289 395 111 30.1
 653 9.4 299 41.2 30.1
 255 302 582 282
 1205 264 302 58.9 30.2
 2 3012 1206 10
 2 3015 2 3025

2 3012
 .15
 .25
 52
 2 3017

TS f (424)
 223310 69.675
 22370 69.270
 224232 69.107

Sept. 8 1870

(424)

(11)

[illegible]

minus 10^s at all the Sec. from 20^h 6^m to 20^h 12^m inclusive.

[illegible]

# P	P-#	# P	P-#	# P	P-#	# P	P-#
20 57 187		20 58		20 58 522		20 59 383	
388	20.1			2.0	19.8	58.3	20.0
289		173		25.8		487	
49.0	20.1	37.3	20.0	22.4	19.9	8.9	19.7
376		24.0		9.6		85.3	
57.5	19.9	43.6	19.6	28.3	19.8	15.2	19.8
	6.01		38.6		25		59.6
	20.03		19.50		19.83		19.87

1870 Sep. 7
Nemaura

P
H

20. 28. 38.0	31. 21.6	33. 58.0	
30. 1.71. 23.7	32	35. 16.5	1.23.5
55.3	37.6	34. 9.9	
18.3 4.22.0		33.4	1.23.6
58.3	41.2	12.9	
21.7 1.23.4	33. 5.0	36.9	1.24.0
24. 11.3	54.5	26.3	
35.0 23.7	18.5 24.0	44.9	1.23.6

53.0.0	55. 14.3		
54. 24.2 1.24.2	56. 38.4 1.24.1		
9.7	22.9	Clock Cor. - 1.43	
32.5 24.1	47.0 24.1		
16.5	30.8		
40.7 24.2	56.0 24.2		
33.0	47.3		
57.3 24.3	57. 14.4 24.1		

1. 23.7	20. 28. 38.0
23.0	28. 55.5
23.4	28. 58
23.7	29. 11
23.8	32 41
24.0	32. 55
23.6	33. 53
24.0	34 10
23.6	34. 13
24.0	34. 26
23.6	34. 0
24.2	53.09
24.1	53. 16
24.2	53.33
24.3	55. 14
24.1	55. 23
24.1	55. 31
24.2	55.47
24.1	56.47

18/15.0 (83)
14.4
60

1.24.83-

18/72.53 (48)
72
38
14.6
49.3
72
16.3
16.2
11

20.41.50
1.43
20.40.07 T for L.

T for L.

20.40.37	62. 102
42.07	62. 505
47.25	62. 177
49.45	62 064
20.44	848
20.45.11	62. 212
1 43	
20 43.28	50.029
	12.183
	2.1.83

1870 Sep. 7

Posmona

#	P	A#
21.5.20.0	6.528	8.26.1
6 14	336	9.6.6
287	7.1.6	34.5
9.5	423	15.4
36.4	9.1	42.5
17.2	50.1	23.0
57.8	25.6	54.0
33.7	8.8.5	39.7

T. for E.

1870 Sept. 7

Parthensaea

P R#

1870 Sept 18

Expt (III)

P	H	R	H						
19.7.34.3				9.20.1		11.20.7			
8.26.5	52.2			10.12.7	52.6	12.12.8	52.1		
51.3				38.2		37.7			
48.5	52.2			29.6	52.4	29.6	52.9		
58.5				44.3		44.5			
50.5	52.0			36.8	52.5	36.6	52.1		
8.8.2				54.3		54.4			
9.0.4	52.2			46.6	52.3	46.6	52.2		
	6				18		3		
	52.15				52.45		52.08		

52.15	19.7.51
52.45	9.36
52.05	11.38
52.50	25.15
52.78	26.2
52.70	28.0
26.6	109.22
52.44	1918.14
	1.43
	1916.31

24.58.3		26.39.4		28.42.0	
25.47.6	52.3	56.1	52.7	34.7	52.7
		56.4			
25.12.0		49.11	52.6	59.2	
26.4.8	52.8			51.7	52.5
17.8		18		29.4.6	
10.87	52.2	54.5	52.7	57.4	52.8
39.0		13.0		15.8	
21.7	52.7	6.0	53.0	8.6	52.8
	20		11.0		28
	52.50		52.78		52.70

Hourly
 Lat. Change in a from Sept 5 to 6 = 16.3⁵
 " " " 6 " 7 1.59
 " " " 7 " 8 1.55

T _{exp} δ	
19.17.14	58.299
18.46	58.281
21.11	58.539
57.11	11.19
19.19.03	
1.93	
19.17.20	58.373
	75.223
	16.850
	2.485

Sept. 7 1870 ~~(XX)~~ Egeria. (Not the Planet.)

Obs. P. R. H.

R 22. 16.46.0 19. 41.0
 18. 32.3 1.46.3 21. 27.1
 17. 6.8 20. 1.6
 53.0 1.46.2 47.7
 10.4 5.0
 56.4 1.46.4 57.2
 27.5 22.2
 19. 13.6 1.46.1 22. 8.2

~~22. 33.0~~

~~23. 10.7 23. 10.7~~
~~25. 17.3 24. 57.0~~

25. 55.5
 27. 41.8

~~31.2 31.2~~
~~20.9 25. 17.3~~

26. 16.3
 28. 2.1

~~34.9 34.9~~
~~20.9 20.9~~

19.6
 5.6

~~52.1 52.1~~
~~37.9 37.9~~

37.0
 23.0

28. 62.7
 30. 28.6

13.4
 59.3

16.8
 31 26

63.8
 24.0

~~43. 28.1 46. 49.1~~ 58. 19.0
~~45. 17.3 48. 38.2~~ 1.46.1

~~48.8 47. 9.7~~
~~55.9 1.46.2~~

~~57.5 18.4~~
~~49. 4.5 1.46.1~~

~~44. 9.4 30.2~~
~~16.1 1.45.9~~

Tyler E.
 22. 37. 57

1870 Sep. 8 Nemuro

Obs. P₁ P₂

R 20. 0.53.9 3.57.8
 25.8 2.2.9 6.11 1.1 2.3.3
 subtract 1" 11.3 14.7
 13.4 2.3.1 17.6 2.9
 19.7 2.2.9 subtract 1" 23.8
 22.6 26.9 3.1
 26.9 from 31.0
 30.0 2.3.1 34.7 3.1

20. 18.0.5 21. 9.8
 20.3.9 2.3.4 23.13.4 3.6
 17.0 26.5
 20.5 3.5 30.2 3.7
 30.3 36.2
 40.0 3.8
 33.6 43.1
 37.0 3.4 46.8 3.7

Chis. Corr. -1.44

2 2.9
 3.1
 2.9
 3.1
 3.2
 2.9
 3.1
 3.1
 3.4
 3.5
 3.4
 3.6
 2.7
 3.8
 3.7
 4.5

2.3.3 mean,

T for 2.

20. 0.53.9
 1. 10.3
 1 19.7
 1 26.9
 3. 57.8
 4 14.7
 4 23.8
 4. 31.0
 18. 0.5
 18. 17.0
 18 32.6
 21. 9.8
 21. 26.5
 21. 26.2
 21. 43.1
 162.44.8
 1 44
 20. 9.07

12
 260
 20
 44
 764
 148

T for 2
 20.11.1
 13.46

Sept. 8 1870

Panopaea

Obs. # P R#

$21.42.57$
 $45.49.4$ 3.13.7 $46.40.3$
 $49.53.6$ 13.3
 26.2 0.3
 39.5 3.13.3 13.7 13.4
 37.9 12.4
 51.5 13.6 25.7 13.3
 46.0 20.5
 59.6 13.6 33.6 13.1

$22.9.11.1$ $12.41.9$
 $11.23.53.12.4$ $15.55.1$ 3.13.2
 28.4 59.6
 12.6 3.13.0
 31.1 2.8
 15.0 12.7
 57.2 (2) 22.6
 $12.6.2$ 35.2 12.6

$21.42.57$ $21.45.19.4$ 3.13.7
 39.5 3
 51.5 6
 59.6 6
 $49.53.6$ 3
 $50.13.7$ 4
 25.7 3
 33.6 1
 $55.6.6$ 34
 $21.45.14.5$ 3.13.4
 Error of 3451, +1.39-
 $21.45.35.5$ C. Sid. time.
 $48.33.10.0$ 6.26.8
 $22.14.25.5$ 3.12.9
 $65.47.35.5$ 9.39.7
 $21.53.42.7$ 3.13.2

$22.15.55.1$ 3.13.2
 $16.12.6$ 0
 15.0 12.7
 35.2 12.6
 17.9 35
 $22.16.4.5$ 3.12.9
 $22.14.25.5$

Chion Cor. -1.44

Iford
 $21.57.6$ 52.890
 $22.1.49$ 53.135
 6.38 53.342
 5.33 367
 $52.1.51$ 53.122
 $22.0.12$ 50.029
 3.093 P₀-H₅

Sept. 10. Panopaea

Obs. R.

 T for δ . Choo. A. 424.

22.39.0 10.1124

41.30 9.58.2

49.30 9.52.3

1.00 21.29

22.40.20 9.71.0

22.41.16 C. sid. time.

75.169

9.71.0

65.4.59

10.54.59

P. - δ .

#1 P	#1 P	#1 P	#1 P	#2 P	#2 P
23.9.38.1	11.39.0	15.12.5	18.17.0	9.6.3	12.6.8
10.41.0 2.2.9	13.41.0 2.2.0	17.15.0 2.2.5	20.19.4 2.2.4		
58.6	59.0	16.9	21.2	26.3	26.6
11.1.5 2.2.9	14.1.2 2.2.2	19.1 2.2.2	23.6 2.2.4		
9.14.7	14.7	32.7	37.6	42.8	42.7
17.2 2.2.5	17.6 2.2.7	35.1 2.2.4	39.2 2.2.6		
18.8	19.0	53.0	57.3	46.5	47.0
21.3 2.2.5	21.5 2.2.5	55.1 2.2.1	59.6 2.2.3		

#2 P	#2 P
15.40.6	18.45.1
44.6	49.2
16.0.4	19.5.1
21.0	25.4

2.2.9

.7

.5

.5

0

2

9

5

5

2

4

1

4

4

6

3

16/73
2.2.46 mean interval at 23.15.56.8 Error of ± 3451 , $1^m 41^s$
fast on C. sid. time
23.14.16. True time.

23.10.41.0

11.1.5

17.2

21.3

13.41.0*

14.1.2

17.6

21.5

17.15.0

19.1

35.1

55.1

20.19.4

23.6

39.2

59.6

4.7

16/908.4

23.15.56.8

15

35

7.27

4.7

Nov 21/70

(112)

P

1 42 16.5
43 6.6 44.1
33.1
17.2 44.1
40.5
24.5 44.0
49.7
38.7 44.0
n
44.04

P

1 45 40.3 44.3
24.6
57.3 43.8
41.1
4.5
48.5 44.0
13.8
57.9 44.1
16.2
44.05

P

1 44 3.1
47.2 44.1
19.4
6.9 44.2
27.2
11.2 44.0
36.0
20.3 44.3
6
44.15

P
#

h m s
1 42 35 - 114.04
44 21 16
45 59 .05
29
12 55
1 44 18 44.08
- 14
1 44.04

= 0 28 27.33
P-# - 44.08
P 0 27 43.25

239

7.011

1.990

1001

001

1870phae.proj..308R

Josephine Press 308R