

1840phae.proj.1558

KG
11365
155

a.g

H α

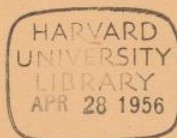
Equatorial Reductions
June 21st 1860 to

Sold by T. Groom & Co., Stationers, India Building, 82 State St., Boston.

KG-11365,155



KG-11365.155



Amet 1860. III.

Index.

Comet 1860. III.

No. Bailey	Star photos from Bailey					
	13324	14190	14248	147 ⁴¹ ₄₂	213 ²⁴ ₂₅	12918
α (Jan. 1830.0)	6 ^h 45 ^m 53.0	7 ^h 10 ^m 7.9	7 ^h 11 ^m 37.2	7 ^h 25 ^m 36.9	10 ^h 59 ^m 35.8	6 ^h 34 ^m 47.9
δ "	41° 55' 20	41° 37' 29	41° 40' 68	41° 12' 71	-0° 59' 04	42° 12' 36
$\log \alpha$	9.95322	9.94866	9.94953	9.94740	-8.2348	9.95757
$\sin \alpha$	+9.99124	9.97934	9.97844	9.96897	9.41583	9.99497
					-7.6507	9.95154
$\cos \alpha$	-9.29857	-9.47893	9.48776	9.58222	-9.98474	-9.17971
$\Delta \alpha$	1 10.59	1 7.96	1 7.96	1 5.41	-0.36	+1 11.91
$\Delta \delta$	4 14.80	4 12.17	4 12.17	4 9.62	3 3.85	4 16.12
$\log \Delta \delta$	2.27892	2.55929	2.56809	2.64257	3.06509	2.26006
					19.217	

$$\Delta \alpha = 3'' 4'.212 + (1.90426)^{32} \sin \alpha \log \alpha$$

$$\Delta \delta = (3.08085)_{41} \cos \alpha$$

Comet 1860.III.

3.

Star = places from Bailey

Mag.

13324	1800.0	- 6 ^h 13 ^m 45.77	+ 41° 57' 12.6	7½
	$\Delta\alpha$	4 14.80	- 3 59.3	
14190	1800.0	7 8 1.82	41 40 18.8	8
	$\Delta\alpha$	4 12.17	- 6 2.5	
14248	1800.0	7 9 31.09	41 43 45.4	8
	$\Delta\alpha$	4 12.17	- 6 9.9	
14741 42	1800.0	7 23 32.17	41 16 22.6	8½
	$\Delta\alpha$	4 9.62	- 7 19.1	
21324 25	1800.0	10 58 3.60	- 0 49 19.6	6½
	$\Delta\alpha$	3 3.85	- 19 21.7	
12918	1800.0	6 32 39.77	42 13 51.4	
		4 16.12	- 3 2.9	
1860.0		6 48 0.57	+ 41 53 13.3	
		7 12 13.99	41 34 16.3	
		13 43.26	41 37 35.5	
		27 41.79	+ 41 9 3.5	
		11 1 7.45	- 1 8 41.3	
		6 36 55.89	+ 42 10 48.4	

Comet 1860. III.

Star = photos from Groombridge

No.	1224	1246
α° (1835)	6 39 5.2	6 46 14.2
δ°	41 57.99	41 54.89
$\lg \delta^\circ$	9.95393	9.95314
$\lg \alpha^\circ$	9.99365	9.99110
$\sin \alpha^\circ$	-9.22974	-9.30185
$\lg \sin \lg \delta^\circ$	+1.77265	+1.76931
$\lg \sin \alpha^\circ$	-2.23090	-2.30301
$\sin \delta^\circ$	59.24	58.79

$\alpha. \delta. 1810.0$	6 37 18.77	41 59' 24.7	Ng.
$\Delta \alpha. \Delta \delta$	3 32.76	-2 50.2	4
$\alpha. \delta. 1810.0$	6 44 28.04	41 56 34.1	7.8
$\Delta \alpha. \Delta \delta$	3 32.31	-3 20.9	
1860.0	6 40 51.53	41 56 34.5	
	6 48 0.35	41 53 13.2	

$$\Delta \alpha = 2^{\circ} 33'.515 + \left[1.825 \frac{13.2}{\delta} \right] \sin \alpha^\circ \lg \delta^\circ$$

$$\Delta \delta = \left[3.001 \frac{16}{\delta} \right] \sin \alpha^\circ$$

Comet 1860. III.

5.

Star = places from Bessel's Zones.

a. Reduction to 1825.00

Zone 516. Wimmer's Correction + 0.236

(A.N. no. 1164)

f	6	28	12.20	+ 42° 8' 36.47	8
K	-1	18.44		+ 1.5	
K' $\frac{2-2}{100}$	-	0.04		+ 0.1	
W.	+	0.24			

f	6	39	41.21	41 58 20.1	6
K	-1	18.44		+ 8.2	
K' $\frac{2-2}{100}$	+	0.01		+ 0.0	
W.	+	0.24			

f	6	46	50.10	41 55 15.8	78
K	-1	18.43		+ 12.3	
K' $\frac{2-2}{100}$	+	0.02		- 0.1	
W.	+	0.24			

Zone 522. W. Correction + 0.236

f	6	28	30.65	42 8 42.5	8.
K	-1	37.03		+ 2.5	
K' $\frac{2-2}{100}$	-	0.04		+ 0.1	
W.	+	0.23			

Zone 492.

f	7	2	55.17	42 4 47.3	8.9
K	-	35.54		+ 17.2	
K' $\frac{2-2}{100}$	-	0.02		+ 0.1	

f	7	6	8.33	42 5 44.1	8.
K	-	35.53		+ 18.5	
K' $\frac{2-2}{100}$	-	0.02		+ 0.1	

Comet 1860 III.

Star places from Bessel's Zones.

x

— 492 —

7	6	18.72	+ 12	10	12.7	8	237
		- 35.54			+ 18.8		
		- 0.03			+ 0.1		

7	10	22.89	41	37	27.7	7.8	246
		- 35.52			+ 20.2		
		+ 0.08			- 0.3		

7	11	51.70	41	40	53.0	8	295
		- 35.52			+ 20.9		
		+ 0.06			- 0.3		

7	18	59.87	42	14	10.7	7	633
		- 35.50			+ 22.8		
		- 0.05			+ 0.2		

7	25	51.10	41	12	54.7	7.8	862
		- 35.46			+ 26.5		
		+ 0.16			- 0.6		

7	35	52.14	41	9	19.9	8	862
		- 35.46			+ 26.6		
		+ 0.17			- 0.7		

— 452 —

orig	7	24	54.30	+ 11	13'	3.4"	7.8
			+ 24.05			+ 17.7	
			- 0.19			+ 1.0	

orig	7	24	52.82	41	9	30.6	8
			+ 24.05			+ 17.7	
			- 0.18			+ 0.9	

264	7	37	55.80	40	11	39.6	7
			+ 24.11			+ 22.4	
			- 0.03			+ 0.2	

Comet 1860. III.

7.

Star-places from Bessel's Zones

- 347 -

650 9 19 30.20 25° 26' 30" 0 9.
 + 29.92 + 1.8
 + 0.02 - 0.7

697 9 20 55.43 25 10 49.4 9.
 + 29.92 + 1.8
 + 0.03 - 1.0

- 345 -

698 9 20 56.50 25 10 42.5 9
 + 29.27 - 6.6
 - 0.04 + 1.5

- 64 -

10 33 41.62 + 5 41 37.5 7
 + 34.02 - 1 52.8
 - 0.01 - 0.7

- 68 -

10 58 14.52 - 0 55 19.0 8
 + 1 6.39 - 2 11.1
 + 0.01 + 3.4

- 234 -

11 28 17.13 - 9 26 11.7
 - 43.83 - 2 5.9
 .00 + 3.1

8.

11.

$$\Delta a = 107.466 + \sqrt{1.69021} \text{ in } a$$

$$\Delta d = \sqrt{2.84630} \text{ in } a$$

No.

α°	$6^\circ 28' 8.5''$	$6^\circ 39' 37.4''$	$6^\circ 46' 46.1''$	$7^\circ 3' 33.6''$	$7^\circ 8' 46.7''$	$7^\circ 7' 27.2''$
δ°	$42^\circ 8' 02''$	$41^\circ 57' 50''$	$41^\circ 54' 33''$	$42^\circ 3' 47''$	$42^\circ 4' 36''$	$42^\circ 8' 83''$

$\log \alpha^\circ$	9.95647	9.95380	9.95300	9.95532	9.95554	9.95668
$\log \alpha^\circ$	9.99672	9.99348	9.99089	9.98308	9.98130	9.98091
	9.95319	9.94728	9.94389	9.93840	9.93684	9.93759
$\log \alpha^\circ$	-9.08807	9.23560	9.30675	9.43742	9.45829	9.46253

$\log \sin \alpha^\circ$	1.62335	1.61744	1.61405	1.60856	1.60700	1.60775
$\log \tan \alpha^\circ$	-1.93432	2.08185	2.15300	2.28367	2.30454	2.30878
$\log \sin \alpha^\circ$	42.011	41.442	41.120	40.603	40.457	40.527

No.

α°	$7^\circ 11' 1.0''$	$7^\circ 12' 29.7''$	$7^\circ 19' 38.0''$	$7^\circ 26' 28.7''$	$7^\circ 26' 29.5''$
δ°	$41^\circ 36' 00''$	$41^\circ 39' 41''$	$42^\circ 12' 59''$	$41^\circ 11' 20''$	$41^\circ 7' 64''$

$\log \alpha^\circ$	9.94834	9.94920	9.95763	9.94202	9.94111
$\log \alpha^\circ$	9.97881	9.97790	9.97324	9.96832	9.96831
	9.92715	9.92710	9.93087	9.91034	9.90942
$\log \alpha^\circ$	9.48421	9.49286	9.53214	9.56637	9.56643

$\log \sin \alpha^\circ$	1.59731	1.59726	1.60103	1.58050	1.57958
$\log \tan \alpha^\circ$	2.33046	2.33911	2.37839	2.41262	2.41268
$\log \sin \alpha^\circ$	39.564	39.56	39.905	38.063	37.583

Comet 1860. III.

9

Star-phases from Bessel's Zones.
to Reduction to 1860.0

	α	δ	No. Ph.	
1860.0 X $\Delta \alpha \Delta \delta$	6 ^h 26 ^m 53.88 2 29.48	42 ^h 8' 41.7 45.1 -1 26.0	2.1	Der of 2. ⁵¹⁶ omitted
1860.0 $\Delta \alpha \Delta \delta$	6 38 23.02 2 28.91	41 58 26.3 -2 0.7	1	
1860.0 X $\Delta \alpha \Delta \delta$	6 45 31.93 2 28.59	41 55 28.0 -2 22.2	1	
1860.0 $\Delta \alpha \Delta \delta$	7 2 19.61 2 28.07	42 5 4.6 -3 12.2	1	
1860.0 $\Delta \alpha \Delta \delta$	7 5 32.78 2 27.92	42 6 2.7 -3 21.6	1	
1860.0 $\Delta \alpha \Delta \delta$	7 6 13.15 2 27.99	42 10 31.6 -3 23.6	1	
1860.0 X $\Delta \alpha \Delta \delta$	7 9 47.45 2 27.03	41 37 47.6 -3 34.0	1	
1860.0 X $\Delta \alpha \Delta \delta$	7 11 16.24 2 27.03	41 41 13.6 -3 38.3	1	
1860.0 X $\Delta \alpha \Delta \delta$	7 18 24.32 2 27.37	42 14 34.7 -3 59.0	1	
1860.0 X $\Delta \alpha \Delta \delta$	7 25 15.98 2 25.53	41 13 21.4 -4 18.6	2	
1860.0 $\Delta \alpha \Delta \delta$	7 25 16.77 2 25.45	41 9 47.5 -4 18.6	2	

Comet 1860. III

No.						
α°	$7^h 39^m 31.5$	$7^h 21^m 1.0$	$7^h 22^m 26.7$	$10^h 35^m 10.4$	$11^h 0^m 14.3$	$11^h 38^m 26.5$
δ°	$+40^\circ 9' 57$	$+25^\circ 22' 02$	$+25^\circ 6' 31$	$+5^\circ 34' 28$	$-1^\circ 3' 10$	$-9^\circ 34' 03$
$\log \delta^\circ$	9.92627	9.67590	9.67075	8.9892	-8.2638	9.2267
$\sin \alpha^\circ$	9.95770	9.80576	9.80257	9.5584	9.4113	9.1376
	9.88392	9.48166	9.47326	8.5476	-7.6741	8.3643
$\cos \alpha^\circ$	-9.62401	-9.88587	-9.88809	-9.96954	9.98506	9.99587
$\log \tan \alpha^\circ$	1.55413	1.15182	1.14342	+0.2178	-9.3443	-0.0344
	-2.47026	-2.73212	-2.73434	-2.81579	-2.83131	-2.84212
$\log \sin \alpha^\circ$	+35.820	+14.184	+13.914	+1.657	-0.222	-1.082

Comet 1860. III.

11.

Star-places from Bessel's Zones.

b. Reduction to 1860.0

	α .			δ .			Prob.
1825.0	7	38	19.88	+40	12	2.2	1
$\Delta \alpha \Delta \delta$		+2	23.29		-4	55.4	
1825.0	9	20	0.14	25	26	31.1	1
$\Delta \alpha \Delta \delta$		+2	1.65		-8	59.7	
1825.0 X	9	21	25.58	25	10	50.2	2.13
$\Delta \alpha \Delta \delta$		+2	1.38		-9	37.4	
						2.4	
1825.0	10	34	15.73	+5	39	44.0	1
$\Delta \alpha \Delta \delta$		+1	49.12		-10	54.3	
1825.0	10	59	20.72	-0	57	27.2	2
$\Delta \alpha \Delta \delta$		+1	47.24		-11	18.1	
1825.0	11	27	33.30	-9	28	14.5	1
$\Delta \alpha \Delta \delta$		+1	46.38		-9	11	35.2
							1
1825.0							
$\Delta \alpha \Delta \delta$							

Note here

44.

Comet 1860 III.

Star = places from Johnson. No. 10.
 Then in from vv. I-XIV, Radcl. Obs.

1851.0	6	28	44.76	42	7	45.1	2	3	7.5
$\Delta \alpha \Delta \delta$			+38.43			-22.8			
1852.0			49.24				1		8.0
$\Delta \alpha$			+34.16						
1841.0	6	39	30.98					4	
$\Delta \alpha$			+1						
1842.0				+41°	57	36.3		1	
$\Delta \delta$						1		03.2	
1843.0				41	57	32.8		1	
$\Delta \delta$						-59.7			
1845.0				41	57	24.3		1	
$\Delta \delta$						-52.6			
1846.0				41	57	22.4		1	5
$\Delta \delta$						-49.2			
1849.0	6	40	5.05					1	5
$\Delta \alpha$			+46.79						
1851.0	6	40	13.52					1	
$\Delta \alpha$			38.28						
1852.0	6	40	17.67					1	
$\Delta \alpha$			34.03						
1844.0				41	54	19.1		1	7
$\Delta \delta$						-1		5.9	
1845.0	6	46	56.78					2	7.7
$\Delta \alpha$			+1						
1846.0				41	54	11.0		1	7.8
$\Delta \delta$						-57.8			
1850.0				41	53	53.7		1	7.0
$\Delta \delta$						-41.4			
1851.0	6	47	22.31					1	7.0
$\Delta \alpha$			38.20						
1852.0				41	53	46.8		1	7.3
$\Delta \delta$						-33.2			

Comet 1860. III

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	1840	1860	1840	1860	1840	1860
α	6 27 57.8	6 27 23.2	6 39 26.7	6 40 54.8	6 46 35.6	6 48 0.4
δ	+42 8.21	+42 7.38	41 57.72	41 56.55	41 54.59	41 53.22
$\log r$	9.95652	9.95631	9.95386	9.95358	9.95306	9.95271
$\log a$	9.99676	9.99642	9.99354	9.99306	9.99095	9.99040
	+32.18	+32.12				
$\log u$	-9.08532	-9.10677	-9.23366	-9.24884	-9.30515	-9.31794
$\log m$	0.07937	0.07877	0.07349	0.07266	0.07011	0.06915
$\log n$	-0.38750	-0.40890	-0.53584	-0.55297	-0.60733	-0.62007
$\log a$	1.2005	1.1789	1.1844	1.1821	1.1752	1.1726
$\frac{da}{dt}$	4.2709	4.2697	4.2548	4.2529	4.2456	4.2434
$\frac{da}{dt}$	-2."441	-2."564	-2."434	-3."556	-4."049	-4."169

Residuals

6 27 23.2 41 57.72 9.95386 9.99354 -9.23366 -0.07349 -0.53584 1.1844 4.2548 -2."434

Comet 1860. III

Calculations for next page						
R.	2034	2133	2170	2187	2203	2246
α°	$6^\circ 47' 9.3''$	$7^\circ 4' 18.7''$	$7^\circ 7' 50.1''$	$7^\circ 11' 23.9''$	$7^\circ 14' 8.8''$	$7^\circ 20' 1.4''$
δ°	$41^\circ 54' 05''$	$42^\circ 19' 04''$	$42^\circ 8' 30''$	$41^\circ 35' 44''$	$42^\circ 15' 46''$	$42^\circ 12' 10''$
log. α°	9.95292	9.95927	9.95654	9.94819	9.95836	9.95751
sin α° +	9.99074	9.98262	9.98069	9.97857	9.97686	9.97297
cos α° -	9.31027	9.44239	9.46491	9.48646	9.50230	9.53417
log. δ°	1.44994	1.44822	1.44357	1.43304	1.44150	1.43656
tan α°	1.99264	2.12476	2.14728	2.16883	2.18467	2.21654
	28.180	28.069	27.766	27.104	27.638	27.325

1836-1860

m 46.0585
~~27.6351~~
 73.694

1.5 0.70412
 1.30216
~~1.38021~~

1.6 n 1.50628 34
 24 n ~~2.68237~~ 43

Comet 1860.IV.

17.

Star-places from Rümker system.

						do. do.	deg
1836.0	6	46	18.397	41	54	50.94	7.4
$\Delta\alpha\Delta\alpha$		1	41.874	-1		38.32	6
1836.0	7	3	27.820	42	20	8.28	4
$\Delta\alpha\Delta\alpha$		1	41.763	-2		13.28	-
1836.0	7	6	59.392	42	9	27.14	2
$\Delta\alpha\Delta\alpha$		1	41.460	-2		20.37	-
1836.0	7	10	33.457	41	36	39.48	1
$\Delta\alpha\Delta\alpha$		1	40.798	-2		27.51	-
1836.0	7	13	18.135	42	16	43.99	1
$\Delta\alpha\Delta\alpha$		1	41.332	-2		32.99	-
1836.0	7	19	10.879	42	13	27.54	1
$\Delta\alpha\Delta\alpha$		1	41.019	-2		44.64	7

18.

Comet 1860. III.

Star-places from various sources.

Mädler.

38. Amiga

1850.0

100 2 17.86 41 57 5.43

M. 592

- 0.14

- 1.20

+ 10 38.10

- 34.96

- 0.06

- 0.31

100 12 55.76

1860.0

6 40 51.68

41 56 29.0

35. Schinip

M. 1487

158 53 23.02 +5 31 59.29

+ 0.16

- 0.53

+ 7 47.57

- 3 7.09

- 0.02

- 0.04

159 1 10.73

+ 5 28 51.6

1860.0

10 35 47.72

+ 5 28 51.6

Challis

1851

9 22 56

+ 25° 4' 2.15"

206

m co° 18893

- 2 19.85

1.3022

1860.0

2

2

1.1915

Comet 1860. III.

23.

Mean Places for 1860.0 of Comparison Stars

~~(not to be published)~~

June 21.		a.	S.C.	S.	S.C.	Mag.
a. Comp. with b.	(not to be copied)	b 29 31.46		+41° 57' 25.9"		
~~at~~						
June 21						
b. B.Z. 516.522	X	b 29 23.36		+42 7 19.7		8
Johnson 405	X	23.26	+0.04	7 22.3	-1.8	
Adopted		23.32		7 20.1		
c. Master (58.44) X		b 40 51.68		41 56 29.0		
Joh						
d. Baily 13324	X	b 48 0.57	+0.11	41 53 13.3	-2.2	
Groombridge 1246	X	48 0.35	"	53 13.2		
B.Z. 516.	X	48 0.52		53 5.8		7.8
Runkin 2034	X	48 0.27	-0.07	53 12.6	+0.7	
Johnson	X	48 0.46	+0.04	53 12.1	-1.8	
Adopted		48 0.40		53 12.0		
e. Comp. with b.						
f. Comp. with b. (Ad)		b 36 56.09		+42° 10' 52.4"		
e. Baily 12918		55.89		48.4		
June 24.						
f. Runkin 2133	X	7 5 9.58	-0.07	42 17 55.0	+0.7	
g. Runkin 2293	X	7 14 59.47	-0.07	42 14 11.0	+0.7	
h. B.Z. 492	X	7 20 51.69		42 10 35.7		7
Runkin 2714	X	20 51.90	-0.07	10 42.9	+0.7	
June 25 Adopted.		20 51.76				
i. B.Z. 492.	X	7 4 47.68		42 1 52.4	8.9	8.9

* Dec. of Z. 516 omitted.

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24.

June 25										
j.	B. Z. 492	X	7	8	0.70		42	2	41.1	8
h.	B. Z. 492	X	7	8	41.14		42	7	8.0	8
	R. 2170	X			40.85	-0.07		7	6.8	+0.7
June 26	Adopted		7	8	40.96		42	7	7.8	
	Baily 14190	X	7	12	13.99	+0.10	41	34	16.3	-2.3
	B. Z. 492	X			14.48				13.6	7.8
	R. 2187	X			14.26	-0.07			12.0	+0.7
	Adopted		7	12	14.27		41	34	13.3	
m.	Baily 14248	X	7	13	43.26	+0.10	41	37	35.5	-2.3
	B. Z. 492	X			43.27	-0.07			35.3	+0.7
June 27	Adopted				43.25				35.1	
n.	Baily 14741	X	7	27	41.79	+0.10	41	9	3.5	-2.2
	B. Z. 492	X		27	41.57			9	2.8	7.8
	Adopted			27	41.63			9	2.3	
o.	B. Z. 492	X	7	27	42.22		41	5	28.9	8
June 28										
p.	B. Z. 452	X	7	40	43.17		40	7	6.8	7
July 6										
q.	B. Z. 347	X	9	22	1.79		25	17	31.4	9
r.	B. Z. 345.347	X	9	23	26.94		25	11	41.4*	9
	Challis	X						1	42.3	
	Adopter		9	23	26.94		25	1	42.3	
s.			10	2	40		+15	42		

+ mean of two positions differing 12.8

	Precessions for 1860.				
	l	m	n	u	v
l_5	9.94789	9.94874	9.94147	-6.3010	-9.29117
m_5	+ 9.97806	9.97714	9.96740	9.40490	+9.12527
n_5	- 9.49137	- 9.49987	9.57213	9.98551	9.99610
	0.05205	0.05198	0.03497	-7.8720	- 8.4825
u_5	4.1981	4.11980	4.1546	3.0633	3.0405
v_5	-6.217	-6.540	-7.487	-19.396	-19.875

26

Somed 1860. III.

27

	Rw to		apparent		places.			
	a	f	c	d	e	f	g	h
h		343 8			343.12	343.25		
a	97.23	97.21	100.13	102.0	99.14	106.17	108.45	110.13
H		179.15			178.25	176.38		
h ₀	9.9539	+9.9562	9.9534	9.9527	9.9572	9.9590	9.9580	9.9572
h(G+a)	9.9940	+9.9940	9.9971	9.9984	9.9962	0.0000	9.9997	9.9991
g		1.1997			1.2012	1.2055		
m(G+a)	9.2168	+9.2184	9.0637	8.9286	9.1195	+7.7190	-8.5776	-8.8019
h ₀	0.1287	0.1297	0.1285	0.1281	0.1312	0.1310	0.1305	0.1301
h(H+a)	-9.9971	-9.9971	-9.9940	-9.9916	9.9961	9.9889	9.9841	9.9809
h ₀		1.3105			1.3105	1.3105		
h(H+a)	+9.0626	+9.0605	9.2161	9.2902	+9.1242	9.3493	9.4237	9.4122
h ₀	9.8252	+9.8266	9.8250	9.8245	9.8270	9.8280	9.8275	9.8270
f		+34.81			34.95	+35.33		
g ₀	14.05	14.12	14.13	14.15	14.28	14.60	14.63	14.51
h ₀	-27.31	-27.50	27.10	26.93	27.34	-26.94	26.61	26.39
Δa	21.45	21.43	21.84	22.03	21.89	22.99	23.35	23.45
g'	+2.61	+2.62	1.83	1.34	+2.09	+0.08	-0.61	-1.02
h	+1.58	+1.58	2.24	2.66	1.83	+3.08	+3.64	+3.98
h	+0.09	+0.09	0.09	0.09	+0.18	+0.38	+0.38	+0.38
Δh	+4.28	+4.29	4.16	4.09	+4.10	+3.54	3.41	3.34

28.

	i	j	k	l	m	n	o	p
g	343 30			343 36		343 41		
a	106 12	107 0	107 10	108 3	108 26	111 55	111 56	
H	175 48			174 54		174 3		
h ₅	9.9550	9.9552	9.9562	9.9478	9.9488	9.9415	9.9404	
m(b+a)	+0.0000	0.0000	0.0000	9.9998	9.9997	9.9979	9.9979	
g	1.2071			1.2090		1.2116		
a(b+a)	+7.7190	-7.9408	-8.0658	-8.4593	-8.5500	-8.9894	-8.9907	
h ₅	0.1292	0.1293	0.1297	0.1260	0.1264	0.1232	0.1228	
m(H+a)	+9.9904	-9.9891	-9.9888	9.9888	9.9881	9.9829	9.9829	
k	1.3103	1.3103		1.3103		1.3103		
a(H+a)	+9.3179	9.3455	+9.3510	9.3504	9.3629	9.4325	9.4399	
h ₅	9.8258	9.8259	9.8265	9.8218	9.8224	9.8182	9.8177	
f	35.49			35.67		35.84		
g ₀	+14.52	+14.53	+14.56	14.34	14.37	14.16	14.12	
h ₀	-26.91	-26.84	-26.90	-26.61	-26.60	-26.09	-26.06	
Δa	+23.10	23.18	23.15	23.40	23.44	23.91	23.90	
g ₁	+0.08	-0.14	-0.19	-0.47	-0.58	-1.59	-1.59	
h ₁	+2.85	+3.03	+3.17	+3.03	+3.13	+3.64	+3.68	
i ₁	+0.48	+0.48	+0.48	+0.59	+0.59	+0.69	+0.69	
Δδ	+3.41	+3.37	+3.46	+3.15	+3.14	+2.74	+2.78	

	p	z	r	v	t	u	w
Q	$343^{\circ} 46'$	$344^{\circ} 19'$			$344^{\circ} 39'$	$344^{\circ} 44'$	$344^{\circ} 51'$
a	145 11	140 30	140 52		159 1	165 17	172 28
H	173 9	166 6			160 46	158 58	156 18
	9.9256	9.6746	9.6693		+8.9822	-8.3026	-9.2313
	9.9947	9.9143	9.9124		+9.7727	+9.6987	+9.5862
	1.2130	1.2276	1.2276		1.2363	1.2420	1.2470
	-9.1919	-9.7566	-9.7606		-9.9061	-9.9376	-9.9650
	0.1165	0.0438	0.0428		0.0020	0.0001	0.0862
	-9.9774	-9.9046	-9.9025		-9.8100	-9.7665	-9.7148
	1.3101	1.3088	1.3088		1.3062	1.3054	1.3041
	+9.4977	+9.7754	+9.7791		+9.8828	+9.9093	+9.9320
	9.8091	9.6308	9.6265		+8.9803	-8.3025	-9.2251
f	+36.01	+37.37	+37.37		+38.36	+38.69	+39.17
g°	+13.59	6.55	6.45		+0.99	-0.17	-1.16
w°	-25.35	-18.08	-17.87		-13.13	-11.81	-10.60
Δa	+24.25	+25.84	+25.95		+26.22	+26.71	+27.41
g_1	-2.54	-9.64	-9.73		-13.94	-15.12	-16.29
w	+4.14	+5.19	+5.06		+1.47	-0.33	-2.90
i_1	+0.81	1.92	1.92		+2.88	+3.14	+3.50
$\Delta \delta$	+2.41	-2.53	-2.75		-9.59	-12.31	-15.69

Comet III, 1860.

Computation of Mean Time (cont. Washington obs.)

	June 21	22	24	25	26	27	28	26
Obs.	236.	246.	26.	26.	26.	26.		
Obs. Time	15 54 55	14 32 0	15 31 53	14 44 56	14 58 4	14 49 14	15 23 16	14 50 4
Fast	0 24	51.	54	55	55	57	58	55
Std Time	15 54 31	14 31 9	15 30 59	14 44 1	14 57 9	14 48 17	15 22 18	14 49 9
	- 0 23	- 6 4 20	- 6 12 13	- 6 16 40	6 20 6	6 24 26	6 27 59	6 20 45
	- 1 37	- 1 23	- 1 31	0-1 23	1 25	1 22.6	1 28	1 27.5
Sum mt	9 52 31	8 25 26	9 17 15	8 26 28	8 35 38	8 22 52	8 52 51	8 27 39
	x		x	x	x	x	x	
See at front.								

	July 6	9	12	14	17	June 21	July 6
Obs.	Band L.	idem	idem	idem	idem		
Fast	15 58 0	16 37 42	16 17 30	16 42 17	16 17 1	15 39 0	15 53 42
	+ 1 19	1 24	1 39	1 49	2 3	24	1 19
Std Time	15 56 41	16 36 18	16 15 51	16 40 28	16 14 58	15 38 36	15 52 23
	6 59 31.6	7 11 21.2	7 23 10.9	7 31 4.0	7 42 53.7	6 0 23	6 59 31.6
	1 28.0	1 32.6	1 27.3	1 30.0	1 33.7	-1 35	1 27.3
Sum mt.	8 55 41	9 23 24	8 51 13	9 7 54	8 30 31	9 36 38	8 51 24
	x	x	x	x			

31.

2
55
9
45
23.5
39

Comet 1860. III.
Comparisons with Stars

1860

Obs. Time

June 21 st	b.	a	15 34 41.5	-0.30.10	Motion	-0 34	Motion	wires
			35				+3"4	
			35 19.0	0 30.00				
			15 36 41.4	0 29.60		0 28	1.7	
			37					
			37 19.0	0 29.50				
			15 45 31.0	0 26.80		0 22	-5.6	
Hourly Motion					+20.4		+0.86	
Means.			15 35 0	-0 30.05	+1.36	-0 34		2
			37 0	-0 29.55	+0.68	0 28		2
			45 31	-0 26.80	-2.22	0 22		1
Hydr.								
Reduced to			15 39 0	-0 28.69		-0 30.6		
				28.87		26.3		
				29.02		27.6		
Mean altitudes for number of wires				-0 28.83		-0 28.2		
Refr.				-0.06		-1.2		
Temp.			Comb. M. Time					
Mean Time				-0 28.89		-0 29.4		
June 21 st	a	2	15 52 16.0	-0 12.2				
Refr.			53.4	-2.13				
Mean Time			55 11.2					
June 22 nd	d	c	15 54 38.0	-11 44.5 + 0.09				
			53.4					
			55 11.2	-11 43.8 - 0.09				
			15 54 55	-11 44.15		+0 50.0		
				+ 0.16		+ 4.1		

Computation of Refr. for Star a

$ \begin{array}{r} H A \\ + \\ \text{ad } \eta \\ \text{in } (4 \pm 0) \\ \frac{10}{2} \phi \\ 4 \phi \\ K \\ \frac{10}{10} \phi \\ \text{in } (4 \pm 0) \\ \Delta \phi \text{ from } 10' \end{array} $	$ \begin{array}{r} h \\ 9.10^m \\ - 38.56.1 \\ + 9.76.0 \\ + 3.1 \\ 87^{\circ} 23' \end{array} $	$ \begin{array}{r} 8.72.1 \\ 9.93.8 \\ 8.65.9 \\ 1.38.8 \\ 8.12.2 \\ \hline 1.41.0 \\ 7.76.0 \\ 1.75.7 \\ 9.85.0 \\ \hline 1.27.7 \end{array} $	$ \begin{array}{r} 25.7 \\ 1.52.6 \end{array} $
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$$\begin{array}{r} \text{H.A. } 926 \\ - 4037.0 \\ \hline 2849 \end{array}$$

* M. P.	b 29	31.46	Li 57	25.9	a
		+ 16.53		+ 4.3	
S - *	b 29	28.89	Li 57	29.4	
G. a. S.	b 29	4.00	Li 57	1.8	
* M. P. +	b 29	23.32			b.
Riv.		+ 1.43			
S - *		- 14.23			
G. a.	b 29	10.52			
* M. P.	b 40	51.68	Li 56	29.0	c.
		+ 1.46		+ 4.2	
	- 11	43.97		+ 54.1	
G. a. S.	b 29	7.17	Li 57	27.3	

24

Comet 1860. III.

Comparison with stars.

June 21	d	15 54 38.0	-18 55.0			
		15 55 11.2	18 53.5			
Mean		15 54 55	-18 54.25	+ 3' 46"		
Ref.			+0.82	+18.5		
Temp.				< 12.4		
Mean Time						
		H. M. + 21.7 + 0.47				
June 22	e	14 28 31.7	+ 7.3			
		29 2.7	7.9			
		9.0	7.6			
		14 29 44.3	+ 7.9			
		30 16.2	8.3			
		30 21.7	8.3			
		14 30 55.9	8.1			
		31 26.0	8.7			
		31 33.2	8.5			
		14 32 31.0	8.8			
		33 2.8	8.8			
		8.2	9.0			
		14 33 50.8	9.3			
		34 22.6	9.7			
		28.0	9.8			
Mean		14 28 54.8	+ 7.60 + 1.12	+ 1 6	+ 1.5	
		30 7.4	8.17 0.68	1 18	0.9	
		31 19.0	8.43 + 0.25	1 19	+ 0.3	
		32 54.0	8.87 - 0.33	1 19	- 0.4	
		34 13.8	9.60 0.78	1 19	1.1	
Reduced		14 32 0	8.72	1 17.5		
			8.85	18.9		
			8.68	19.3		
			8.54	18.6		
			8.82	17.9		

1860.0

6.48 0.40

+ 1.47

- 18.53.53

6 29 8.44

41 53 12.0 d

+ 4.1

+ 4.1 4.1

41 57 20.2

35.

June 1860. III. Comparisons with Stars

June 22. ^d Ref. Temp. Mean Time	e	14 32 0	+ 8.72 + 0.02	+ 18.4 + 0.3 + 0.0	H.A. 756" Dec. 62.2 + 2.4 + 0.164
June 24. th	a	f	H.A. + 23.5 15 31 30.1 42.0	-9 12.80 + 0.17 13.10 0.08	H.A. 8 35 Dec. 62.35 + 7.1 + 0.39
Mean		15 31 56.	-9 12.82	- 2 56	
b	g	15 31 30.1 42.0 32 13.6 19.2	-19 12.9 3.0 2.5 2.7		
Mean		15 31 56	-19 2.78	+ 0 54	
c.	h	15 31 30.1 31 42.0 32 13.6 32 19.2	-24 55.3 55.6 54.8 54.5		
Mean		15 31 56	-24 55.05	+ 4 34	
For f	Ref. Temp.		- 0.11	- 2.1 + 0.1	
g	Ref. Temp.		+ 0.04	+ 0.6 0.0	
h	Ref. Temp.		+ 0.18	+ 3.3 - 0.2	
Comparisons		15 31 56			

Star e 1860.0
Rev. to app.

h m s		
6 36	56.09	42° 10' 52.4"
	+1.46	+4.1
	-8.74	+1 18.7
6 37	56.29	42 12 15.2

1860.0 f

7 5	9.57	42 17 55.7
	+1.53	+3.5
- 9	12.93	- 2 58.0
6 55	58.11	42 15 1.2

1860.0 g

7 14	59.40	42 14 11.7
	+1.56	+3.4
-19	2.94	+ 54.6
6 55	58.22	42 15 9.7

1860.0 h

7 20	51.76	42 10 39.6
	+1.56	+3.8
- 24	53.87	+ 4 37.1
6 55	58.45	42 15 26.5

mean

6 55	58.26	42 15 11.8
------	-------	------------

Comet 1860. III

Comparisons

June 25 th	a	i	14 44 30.0	+ 54.7				
			44 42.0	54.4				
			45 13.6	55.2				
			45 18.9	54.7				
			14 50 42.0	+ 57.1				
			57.1	57.3				
			51 25.7	57.5				
			31.1	57.6				
H.M. + 25.9 - 0.79								
Mean			14 44 56	+ 54.75		+ 0' 10"		
			51 8	57.37	- 2.68	0 5	+ 4.9	
Comet - i			14 44 56	+ 54.72		+ 9.9		A.A. 740 ^m
Ref.				0.00		0.0		Star. + 420
Temp.						0.6		+ 0.098
								+ 1.78
	b	j	14 44 30.0	- 2 18.2	- 0 40			
			44 42.0	18.1				
			44 56		- 0 40	- 0' 40"		
			50 42.0	- 2 15.4				
			57.1	15.3				
			57 8		- 0 46	- 0 46	+ 4.9	
			14 36 16.0	- 2 21.5	- 0 34	- 0 34	- 0.6	
			27.9	2 21.6				
			42.		- 0 34	- 0 34	6.4	
Mean			14 36 22.	- 2 21.55	+ 3.70			
			44 36	18.15	+ 0.14			
			57 48	15.35	- 2.53			
			14 44 56	- 2 17.85		- 0 40.4		
				18.01		41.1		
				17.88		40.0		
Comet - j			14 44 56	- 2 17.91		- 0 40.5		
				- 0.01		- 0.1		

1860.0 i 7 4 47.18 +hr 1 52.4
 + 1.54 + 3.4
 + 54.72 + 9.9
 7 5 43.94 42 2 5.7

1860.0 j 7 8 0.70 +hr 2 41.1
 + 1.55 + 3.4
 - 2 17.92 - 0 40.6
 7 5 44.33 +hr 2 ~~55.1~~
 3.9

Comet 1860 III

Comet
1860 June 25th

C K

14 36 16.0

-3 2.2

-5 2

27.9

2.3

59.8

2.2

37 5.2

2.4

14 44 30.0

-2 58.6

42.0

58.6

45 13.6

59.0

16.9

58.9

14 50 62.0

-2 58.2

50 54.1

58.0

51 25.7

58.2

51 31.1

58.1

14 36 62

-3 2.28 + 3.56

-5 2.0 - 6.4

44 56

2 58.77 0.00

8.0 0.0

51 8

2 58.12 - 2.68

13.5 + 4.9

Comet - K

14 44 56

-2 58.76

-5 8.3

Refr.

- 0.05

- 0.9

Temp.

+ 0.3

Res.

H.A. 27.3 - 1.52

1860 June 26

a

14 56 43.5

+ 4. 9.6

7

Refr.

14 57 0

- 0.47

+ 3. 17" - 1.4

15 4 48.3

4 14.5

J.A. 7.0"

4 58.2

14.7

Dec. 14.6

5 29.7

15.0

+ 0.104

5 38.3

15.4

- 1.86

5 13.

14.90 - 3.25

3 7 + 9.7

14 58 4

4 11.65

+ 3 16.2

+ 0.03

+ 0.6

0.0

Mean

Summit 1860. III

1860

1860 June 26	I	m	I 14 49 32.8	+ 2 38.8	0' 0"	H.A. 7 ^m 36	
			42.5	38.6		Dec. 41° 6'	
			50 13.8	38.6		+ 0.096	
			49.2	38.8		+ 1.72	
Mean			14 50 4	+2 38.70	0 0		
Ref.							
Temp.							
	H.A.	+ 28.6	- 1.75				
1860 June 27	A	n	14 49 6.4	- 10.9 + 0.06	- 7 12	- 0.2	H.A. 7 ^m 40
			50 15.8	10.4 - 0.49	7 15	+ 1.8	Dec. 41°
							+ 0.872
							+ 1.30
Revised - mean			14 49 14.	- 10.865	- 7 12.7		
Ref.				- 0.95	- 0.9		
Temp.					+ 0.4		
1860 June 28	2.	a.	14 49 6.4	- 11.9 + 0.06	- 3 36	- 0.2	
			50 15.8	11.1 - 0.49	3 39	+ 1.8	
Revised - mean			14 49 14	- 11.72	- 3 36.7		
Ref.				+ 0.07	- 0.5		
Temp.					0.0		
	H.A.	+ 39.6	- 2.19				
1860 June 28	P.		15 22 3.0	- 1 17.50			H.A. 7 ^m 45
			8.5	17.00			Dec. 40° 10'
			15 21 56		+ 5 44	- 2.9	+ 0.138
Mean			15 22 6	- 1 17.25 + 0.58			+ 2.30
			15 24 17.0	- 1 16.00			
			47.9	15.90			
			53.3	15.50			
Mean (gr. R)			15 24 39.4	15.80 - 0.69	+ 5 36	+ 3.1	
Ref. to (Mean)			15 23 16	- 1 16.58	+ 5 40.1		
Ref.				+ 0.08	+ 1.3		
Temp.					+ 0.1		

1860.0 m

7	13	43.25	+41	37	35.1
		+ 1.56			+ 3.1
		+ 2		0	0.0
7	16	23.51	41	37	38.2

1860.0 n

7	27	41.63	+41	9	2.3
		+ 1.59			+ 2.7
		+ 10.92		- 7	13.5
7	27	32.30	41	1	51.5

1860.0 o

7	27	42.22	+41	5	28.7
		+ 1.59			+ 2.8
		- 11.75		3	37.2
7	27	32.06	+41	1	54.3

1860.0 p

7	40	43.17	40	7	6.8
		+ 1.62			+ 2.4
		- 1		5	41.5
7	39	28.29	40	12	50.7

L3.

Comet 1860. IV

1860 July 6

x

9

15 53 27 +1 38.8

32 38.9

53 38.3

57 38.3

15 53 42 +1 38.58

= 1.11

- 9 46

Mean
Refr.
Temp.

- 9 46

- 1.7

+ 0.5

HA 6.29

Dec. 25° 13'

+ 0.111

+ 1.78

H.M. 33.2 - 7.18

y

r

15 54 47 +14.3

52 14.4

55 6

54 49 +14.35 +1.76

+5 40 -20.8

Mean

57 15. + 15.7

57 24. 15.9

57 37

+5 23 -2.8

Mean

57 20 15.80 +0.37

58 44 16.2

53 16.4

59 5

5 11 +5 10 +7.8

Mean

58 48 16.30 -0.44

16 0 27 17.4

36 17.4

48

31 17.40 -1.39 5 0 +18.1

Mean

Red to
Refr.
Temp.

15 58 0 +16.04

+0.08

+5 18.8

+ 1.1

- 1.3

H.D. 6.33

Dec. 25° 41'

+ 0.143

+ 2.03

1560.0 7

9 22 1.79

+ 1.72

+ 1 38.47

9 23 41.98

+ 25 17 31.4

- 2.5

- 9 47.2

+ 25 7 41.7

1860.0 7

9 23 26.94

+ 1.73

+ 16.12

9 23 44.79

25 1 42.3

- 2.8

+ 5 19.6

25 6 59.1

45.

Cont 1860. II

1860 July 9 H.A. 32.0
1860 July 9

5.

- 8.35

16 33 39.1

+ 14.70

+ 2.10

25.

16 36 16

- 4.33

- 33.0

5 43

- 12.0

22.2

15.20

26.6

15.50

Mean

36 24.4

+ 15.35

+ 0.67

16 37 33

3 51

- 1.3

1 38.8

16.1

Mean

43.1

16.1

37 41

+ 16.10

+ 0.01

16 38 45

6 2

+ 8.8

51.5

16.8

55.6

16.7

Mean

38 53.6

+ 16.75

- 0.62

16 39 55

6 8

+ 18.6

40 41.5

17.50

55.6

17.4

Mean

40 31.6

17.45

- 1.22

40 53.

1 12

+ 26.6

57.7

17.5

41 4.2

17.5

41 2.

17.50

- 1.72

Revised Values

16 37 42

16.80

16.80

6 6.0

9 50 20

.02

6 1.0

+ 17 16

.11

5 52.3

H.A. 6 40

.13

5 53.2

Dec. 17 20

16 23

5 49.4

+ 0.59

15.78

5 60.4

+ 8.42

16 37 42

+ 16.12

16.12

- 5 54.6

+ 0.35

- 4.9

16.47

- 0.1

- 5 59.6

Mean (revised)

Refr.

Temp.

47.
2
1860 July 12.

Ornet 1860. IV.

Mean

H.M.	+27 ⁹	-8 ¹⁵		
f	16 10 29			+1 ⁹ -59 ⁶
	38.	+1 40.3		
	42.	40.5		
	40	1 40.40 +3.18		
	16 12 44			+0 46 -40.6
	53.4	1 41.4		
	57.7	41.5		
	55.5	41.45 +2.13		
	16 15 27			+0 23 -17.4
	35.8	1 42.3		
	39.8	42.1		
	37.8	1 42.20 +0.87		
	16 18 9			+0 2 +5.5
	18.2	1 43.9		
	22.5	43.9		
	20.3	1 43.90 -0.39		
	16 22 34			-0 32.7 (+43.1)
	43.2	1 45.8		
	47.6	46.2		
	45.4	1 46.00 -2.44		
	16 25 2.			-1 6 +4.0
	11.2	1 47.5		
	15.1	47.2		
	13.2	1 47.35 -3.59		

Returned to

16 17 30	1 43.58	+0 9.4
	.58	5.4
	.07	5.6
	.51	7.5
	.56	—
	.76	- 2.0

Mean
Ref
Temp.

16 17 30	1 43.51	+0 5.2
	0.00	0.0
	0.00	0.0

H.A. 5³⁸
Sta. +5³⁰
+0.75
+3⁵

1860-a	4	h	m	s		
		10	36	4.72	+5° 28' 51.6"	
				+ 1.76	- 9.6	
				+ 43.51	+ 5.2	
		10	37	49.99	+5 38 47.2	

49

Somet 1860 III

1860 July 14

H.M. + 25.6 - 7.9

n	16	39	5.5	-1	50.1			
			28.6		51.0			
			33.7		49.8			

Mean

39	23.	-1	50.30	+1.24	+2' 22"	-22.9
----	-----	----	-------	-------	---------	-------

41	56.0	1	50.5			
----	------	---	------	--	--	--

112	20.6		49.0			
-----	------	--	------	--	--	--

112	24.9		48.8			
-----	------	--	------	--	--	--

Mean

112	141.	-1	49.43	+0.02	+2 2	-0.4
-----	------	----	-------	-------	------	------

44	53.	1	47.8			
----	-----	---	------	--	--	--

115	19.		47.0			
-----	-----	--	------	--	--	--

115	22.		47.7			
-----	-----	--	------	--	--	--

Mean

115	11	-1	47.50	-1.24	+1 37	+22.9
-----	----	----	-------	-------	-------	-------

Mean (reduced)
Refr.
Temp.

16	42	17	-1	47.24	+2 0.2	
				+0.21	+ 2.9	
					- 0.1	

H.A. 5 41"
Sec. -1° 8'

+12"

H.M. + 23.23 - 7.11

1860 July 17

16	9	11.7	-1	41.9		
		34.9		42.8		
		39.2		42.6		

Mean

16	9	29	-1	42.43	+2.92	-7 50	-53.5	51
----	---	----	----	-------	-------	-------	-------	----

16	15	18	-1	40.2			
----	----	----	----	------	--	--	--

Refr.

15	27			39.1		
----	----	--	--	------	--	--

15	50			40.7		
----	----	--	--	------	--	--

15	54			40.7		
----	----	--	--	------	--	--

Mean

16	15	41	-1	40.52	+0.52		
----	----	----	----	-------	-------	--	--

16	23	35	-1	37.7			
----	----	----	----	------	--	--	--

23	43			37.6		
----	----	--	--	------	--	--

23	39		-1	37.65	-2.56	-9 11	
----	----	--	----	-------	-------	-------	--

23	56					-9 11	+49.1
----	----	--	--	--	--	-------	-------

16	27	53	-1	36.4	-3.89		
----	----	----	----	------	-------	--	--

27	17					-9 27	+1 12.9
----	----	--	--	--	--	-------	---------

16	31	57	-1	33.5			
----	----	----	----	------	--	--	--

32	5			32.5			
----	---	--	--	------	--	--	--

16	32	1	-1	32.50	-5.81		
----	----	---	----	-------	-------	--	--

32	18					-9 58	+1 18.5
----	----	--	--	--	--	-------	---------

Mean

1860.0 u 11 1 7.70 - 1 8 45.1
 + 1.78 - 12.3
 - 1 47.03 + 2 3.0

 10 59 22.45 - 1 6 54.4

Comp of Refr.

2 m
 = 5 11
 ↓ 5 11.0
 σ = -1 8
 m + 1 3.0

8.849

0.002

0.2 87 17
~~22 54~~
 2.12
 100 10'
 12.6

9.829

~~9.022~~ 8.676

1.639 399

9.766

1.405 + ~~20.44~~

0.036 14.6

0.000

9.999

1.440 + 27.6

200 1.84

1.176

0.024 1.506

1860.0 v 11 29 19.68 - 9 39 49.7
 + 1.83 - 15.7
 → 1 39.84 - 8 26.6
 11 ~~21 12.5~~ - 9 18 32.0
 27 41.67

54

Red.

Mean reduced,
Rise.
Temp.

				Wt	
16	17	1	- 1	39.51	3
				10.01	3
				40.21	2
				40.29	1
				39.31	2
16	17	1	- 1	39.51	- 8
				- 0.03	22.2
					- 4.5
					+ 0.1

H. A. 4 1/2
 500 - 9 1/2
 + 0.038
 + 5.14
 + 4.38

Orbit 1860. III.

Parallax - Coefficients and Parallaxes

	June 21 ^a	21 ^b	22	24	25	26	27	28	July 6 ^c	9
Sid Time	15 38.6	15 54.5	14 31.2	15 31.0	14 44.0	14 57.2	14 48.3	15 22.3	15 56.7	16 36.3
R.A.	6 29.1	6 29.2	6 37.1	6 56.0	7 5.7	7 16.5	7 27.5	7 39.5	9 23.7	
Dec.	42.0	42.0	42.2	42.3	42.0	41.6	41.0	40.2	25.1	
	9 9.5	9 25.3	7 54.1	8 35.0	7 38.3	7 40.7	7 20.8	7 42.8	6 33.0	
Coeff. α	0.5385	0.5356	0.5502	0.5446	0.5514	0.5512	0.5526	0.5499	0.5463	
Δ	0.900	0.910	0.863	0.794	0.753	0.720	0.687	0.657	0.483	
Coeff. δ	+7.40	+7.59	+6.30	+6.93	+6.04	+6.09	+5.78	+6.17	+5.59	
Par. α	+0.43	0.40	0.58	0.56	0.68	0.71	0.77	0.76	0.96	
Par. δ	+8.2	8.4	7.3	8.7	8.0	8.5	8.3	9.4	11.6	

	July 12	14	17	June 26	July 6
Sid Time	16 15.8	16 40.5	16 15.0	14 49.2	15 52.4
R.A.	10 37.8	10 59.4	11 31.0	7 16.4	9 23.7
Dec.	+5.5	-1.1	-9.8	+41.6	25.1
	5 38.0	5 41.1	4 44.0	7 32.8	6 28.7
Coeff. α	0.5423	0.5421	0.5406	0.5520	0.5466
Δ	0.462	0.475	0.513	0.720	0.483
Coeff. δ	+5.67	+5.76	+6.02	+5.96	+5.54
	0.92	0.89	0.79	0.72	0.96
	12.3	12.1	11.7	8.3	11.5

53

Observations of Comet 1860 III made at the Observatory of
Harvard College.

1860	M. J. Munt.	$\Delta \alpha$	$\Delta \delta$	α app.	Par	δ app.	Par.	Star.
June 21	9 36 38	-0 26.89	-0 29.4	6 29 4.00	+0.43	41 57 0.8	+8.2	a
21	9 42 31	-0 14.23		6 29 10.52	0.40			b
	9 52 31	-11 43.97	+0 54.1	6 29 9.17		41 57 27.3	8.4	c
	9 52 31	-18 53.63	+4 4.1	6 29 9.44		41 57 20.2		d
22	8 25 26	+0 8.74	+1 16.7	6 37 6.29	0.58	42 12 15.2	7.3	e
24	9 17 15	-9 12.93	-2 58.0	6 55 56.11	0.56	42 15 1.2	8.7	f
	9 17 15	-19 2.74	+0 54.6	6 55 58.22		42 15 9.7		g
	9 17 15	-24 53.87	+4 37.1	6 55 58.26	65	42 15 24.5	11.6	h
25	8 26 28	+0 56.72	+0 9.9	7 5 43.94	0.68	42 2 5.7	8.0	i
	8 26 28	-2 17.92	-0 40.6	7 5 44.33		42 2 3.9		j
	8 26 28	-2 58.81	-5 8.9	7 5 43.69		42 2 2.4		k
26	8 27 39	+2 38.70	0 0.0	7 16 27.51	0.72	41 37 38.2	8.3	m
	8 25 38	+4 11.68	+3 16.8	7 16 27.51	0.71	41 37 33.2	8.5	l
27	8 22 52	-0 10.92	-7 13.5	7 27 32.30	0.77	41 1 51.5	8.3	n
	8 22 52	-0 11.75	-3 37.2	7 27 32.06		41 1 54.3		o
28	8 52 51	-1 16.50	+5 41.5	7 39 28.29	0.76	40 12 50.7	9.4	p
July 6	8 51 24	+1 38.47	-9 47.2	9 23 41.98	0.96	25 7 41.7	11.5	q
	8 55 41	+0 16.12	+5 19.6	9 23 44.79	0.96	25 6 59.1	11.6	r
9	9 23 24	+0 16.67	-5 59.6					s
12	8 51 13	+1 43.51	+0 5.2	10 37 49.99	0.92	+5 28 47.2	12.3	t
14	9 7 54	-1 47.03	+2 3.0	10 59 22.45	0.89	-1 6 54.4	12.1	u
17	8 30 31	-1 39.84	-8 26.6	11 27 41.67	+0.79	-9 48 22.0	+11.7	v

Various Observations in 1859-1860.

Stars from Fedorenko and Bailey's Catalogue.

Fed. 875	6 ^h 145.58 + 5 55.28	58° 18' 43.8 - 28.9	9.
Fed. 902.	6 841.46 + 5 55.42	56 22 24.3 - 1 11.4	6.
Baily 20824	10 38 33.08 3 9.50	+ 11 12 40.3 - 18 52.9	7½
Baily 20869	10 40 54.16 3 5.89	+ 3 47 15.2 - 18 55.2	7½
Baily 21205	10 53 18.53 3 8.03	+ 9 48 13.7 - 19 15.1	7½
Baily 21317	10 57 40.43 3 7.90	+ 10 6 13.8 - 19 21.4	7½
Baily 21762	11 15 47.96 3 4.72	+ 2 8 21.0 - 19 42.6	8
Baily 38932	20 7 16.01 3 26.78	- 18 28 5.2 + 10 42.1	8
Baily 47342	23 58 37.47 + 3 4.21 - 3 07	- 0 25 12.8 + 20 3.4 - 20.0	8

57.

Stars from Groombridge

$$\Delta \alpha = \frac{153.516}{76.755} + (1.82513) \sin \alpha^\circ \log \delta^\circ$$

$$\Delta \delta = (3.00122) \cos \alpha^\circ$$

α°	$6^\circ 5' 33.9$	$6^\circ 12' 29.8$
δ°	$+56^\circ 18' 48$	$56^\circ 21' 69$
$\log \delta''$	0.17606	0.17694
$\sin \alpha^\circ$	0.99987	0.99935
	0.17593	0.17629
$\cos \alpha^\circ$	0.08527	0.08639
$\log \delta''$	2.00106	2.00142
$\log \sin \alpha^\circ$	1.38649	1.73761
$\log \cos \alpha^\circ$	100.244	100.328

6 27.11
4 13.76

56 18 40.7
4-22.3

8.

6 10 22.97
4 13.84

56 22 8.5
-54.7

7.

Hansford

Various Narrations 1859, 1860.

18

Star places from Bessel's Zones.

B.Z. 49.	8	1 ^m 3.87 + 48.654 + 0.058	+ 9° 14' 59".4 - 1 33.29 + 2.75	9.
B.Z. 49.	8	3 28.40 48.654 + 0.054	+ 9 11 18.1 - 1 33.78 + 2.63	9.
B.Z. 40	23	59 21.50 + 33.088 - 0.002	- 0 16 26.3 - 26.81 + 0.76	7.
(7)				
B.Z. 55	7	46 39.96 + 1 13.782 - 0.001	+ 9° 58' 11".9 - 1 25.78 - 0.05	9.
B.Z. 66.	10	53 46.45 + 50.077 - 0.001	+ 9 41 54.9 - 1 42.66 - 0.56	9
B.Z. 66.	10	58 8.73 + 50.059 0.000	+ 9 59 51.5 - 1 42.93 0.00	8.9
B.Z. 66	10	39 56.20 + 50.137 + 0.006	+ 10 46 32.8 - 1 42.17 + 1.44	9
B.Z. 152	11	17 5.56 - 1.073 .001	+ 2 1 45.7 - 1 43.07 + 0.08	9
B.Z. 66.	10	39 14.8 + 50.141 + 0.012	+ 11 6 28.4 - 1 42.11 + 2.06	8.
B.Z. 71	10	38 43.33 1 8.945 - 0.009	+ 11 6 30.3 - 1 38.91 - 1.50	7.8

(See next page)

Weisse has probably
used new reduction tables

59.

$$1515-1559 \Delta v = 104.395 + (1.65763) \sin \alpha^{\circ} \text{ hgt. } \delta$$

$$1525-1560 \quad 107.466 + (1.67021) \sin \alpha^{\circ} \text{ hgt. } \delta$$

$$\Delta \alpha = (2.83372) \alpha_1 \alpha^{\circ}$$

$$(2.84630) \alpha_1 \alpha^{\circ}$$

α°	$8^{\circ} 2' 18.0$	$8^{\circ} 5' 17.4$	$0^{\circ} 0' 46.8$	$7^{\circ} 48' 57.1$	$10^{\circ} 55' 31.4$	$10^{\circ} 59' 53.6$
δ°	$+9^{\circ} 18' 60$	$+9^{\circ} 48.5$	$-0^{\circ} 11' 21$	$+9^{\circ} 54' 12$	$+9^{\circ} 34' 58$	$+9^{\circ} 52' 50$
hgt. δ°	9.20830	9.20528	7.51333 _n	9.24195	9.22715	9.24074
$\sin \alpha^{\circ}$	9.93443	9.93168	7.53191	9.94905	9.44348	9.41375
	9.14273	9.13696	5.04524 _n	9.19100	8.67063	8.65449
$\cos \alpha^{\circ}$	9.70803 _n	9.71562 _n	0.00000	9.66020 _n	9.98258 _n	9.98489 _n
lg. hgt. δ°	0.80036	0.79459	6.70187 _n	0.86121	0.34084	0.32470
lg. hgt. α°	2.54175 _n	2.54934 _n	2.83372	2.50650 _n	2.82888 _n	2.83119 _n
hgt. α°	+6.315	+6.231	-0.041	+7.265	+2.192	+2.112
					for 1836 to 1860 Δv 73.694 + (1.50637) $\sin \alpha^{\circ}$ (2.68243) α°	
α°	$10^{\circ} 41' 41.6$	$11^{\circ} 17' 58.5$	$10^{\circ} 40' 47.5$	$10^{\circ} 43' 5.4$	$7^{\circ} 46' 24.5$	$10^{\circ} 41' 4.3$
δ°	$+10^{\circ} 39' 36$	$+1^{\circ} 54' 30$	$+10^{\circ} 59' 32$	$+3^{\circ} 32' 76$	$+53' 17.48$	$+10^{\circ} 57.6$
hgt. δ°	9.27452	8.52193	9.28819	8.79217	0.12748	9.28705
$\sin \alpha^{\circ}$	9.52513	9.26088	9.52994	9.51759	9.95141	9.52843
	8.79965	7.76281	8.81813	8.30976	0.07889	8.81548
$\cos \alpha^{\circ}$	9.97414 _n	9.99266 _n	9.97353 _n	9.97507 _n	9.65107 _n	9.97372 _n
	0.46986	9.45302	0.48834	9.97997	1.58523	0.37182
	2.82044 _n	2.83896 _n	2.81983 _n	2.82137 _n	2.33350 _n	2.65615 _n
	+2.950	+0.284	+3.079	+0.955	+38.480	+2.096

Various Observations 1859-1860.

Bessel's Zones. (to m. eq. by W.)

49 45	8 ⁿ 1 ^m 52.58 1 50.71	+ 9° 10' 78.9 - 5 48.1	VIII. 53.	1859.	
49	8 4 17.10 1 50.63	+ 9 9 47.0 - 5 54.3	III. 118	1859	
40	23 59 52.59 1 44.39	- 0 16 53.9 + 11 21.9	~~III~~ 126	1859	Baily 47342
55	7 47 53.74 1 54.73	+ 9 56 46.1 - 5 21.0	III. 1469	1860.	
66	10 54 36.53 1 49.66	+ 9 40 11.7 - 11 14.3	~~II~~ 1006		Baily 21205 +
66	10 58 58.79 1 49.58	+ 9 58 8.6 - 11 17.9	~~I~~ 1094		Baily 21317 +
66	10 40 46.34 1 50.42	+ 10 44 52.1 - 11 1.4	~~I~~ 757		+ -
152	11 17 4.49 1 47.75	+ 2 0 2.7 - 11 30.2	~~II~~ 37		Baily 21762 -
66 71 Mean	10 39 51.63 52.27 10 39 51.95 1 + 11 50.55	+ 11 4 48.4 4 49.9 11 4 49.2 - 11 0.4	~~II~~ 741		Baily 20624 + No. 2247
for Dorn 10.7.159 17 16' (200)	out of place 10 41 54.10 + 17.158 - 0.002	+ 3 39 53.4 - 1 35.68 - 0.80	8.		
1825.0	10 42 11.56 + 1 48.42	+ 3 38 16.7 - 11 2.8	WI. 789		Baily 20889

61.

L^0	$6^h 6^m 55.6^s$	$6^h 7^m 2.5^s$	$6^h 13^m 50.9^s$	$7^h 52^m 1.9^s$	$55.271 + (1.38140) \sin \alpha^0 \text{ lat. } \alpha^0$ $(2.56749) \cos \alpha^0$
L^0	$56^\circ 18' 35''$	$56^\circ 14' 53''$	$56^\circ 21' 43''$	$53^\circ 9' 97''$	
$\log \delta^0$	0.17602	0.17498	0.17687	0.17373	
$\sin \alpha^0$	9.99980	9.99967	9.99921	9.90330	
	0.17582	0.17465	0.17608	0.07793	
$\cos L^0$	8.48028 _n	8.59595 _n	8.78095 _n	9.67172 _n	
	1.55722	1.55605	1.55748	~~1.58102~~ 45843	
	1.03777 _n	1.15344 _n	1.33864 _n	2.22921 _n	
	1-31.35	1-31.25		26.736	
			36.097	31.698	

1860

1860

1855

	$9^h 11.27$	$9^h 11.49$			$19^h 4.57$ $-26^h 11.8$
$\log \delta^0$	9.99995	9.99955	0.17600	0.17681	9.69196 _n
$\sin \alpha^0$	0.17611	0.17706	9.99976	9.99912	9.98004 _n
$\sin \alpha^0 \text{ lat. } \alpha^0$	0.17606	0.17661	0.17576	0.17593	9.67200
$\cos \alpha^0$	8.17785 _n	8.65598 _n	8.52550 _n	8.86616 _n	9.47172
	0.30227	0.30282	0.30186	0.30203	9.79811
	7.48015 _n	7.45828 _n	7.82770 _n	0.10636 _n	0.77399
α^0	5.0755	5.0781	5.0746	5.0754	~~6.990~~ +3.5106
δ^0	+0.302	-0.908	-0.672	-1.278	+5.943

Various Observations 1859-60

from Applanis Jones

-174.32 6^{hr} 6^m 25.56 56° 18' 29.1 7.8
 -15.16 - 4.5
 - 0.12 + 0.6
 + 0.5

corrected p. 222.

1842.0 6 6 9.88 56 18 25.7
 $\Delta\alpha$ + 1 31.35 -10.9

= Gr. 1127 = Fed. 875.

-174.33 6 8 32.13 56 14 41.5 9.
 -15.18 - 4.2
 - 0.11 + 0.6
 + 0.5

Corr p. 222

1842.0 6 8 16.84 56 14 38.4
 $\Delta\alpha \Delta\delta$ + 1 31.25 -14.2

-174.40 6 13 20.40 56 21 38.0 6
 - 15.22 - 3.5
 - 0.13 + 0.7

= Gr. 1143 = Fed. 902 = B.A. 2046

1842.0 6 13 5.05 56 21 35.2
 + 0.5

6 13 12.87 56 21 40.5 6.7
 - 7.42 - 4.6
 - 0.13 + 0.7
 + 0.1

Mean 1842.00 6 13 5.32 56 21 36.7
 $\Delta\alpha \Delta\delta$ + 1 31.37 - 21.8

-169.157 7 51 25.85 53 11 3.1
 - 5.69 + 19.2
 - 10 + 0.7

1842.00 7 51 20.06 53 11 23.0
 $\Delta\alpha \Delta\delta$ + 1 24.01 - 2 47.5

Applanis Southern Zone

239.18. 19 9 12.50 -26 11 18.7
 - 34.14 + 1.8

1850.0 19 8 38.32 - 26 11 20.2
 + 36.99 + 59.4

63

Various Observations 1850-60

Angland's Southern Zone.

252.107	20 10 43.26	- 18 19 0.1
	- 34.88	- 5.8
	+ 0.01	- 2.2

Proc
1800 3.649 + 10.575
1850 + 10.765
1851 3.444

1850.0	20 10 8.39	- 18 19 8.1
	+ 34.44	+ 11 48.1

Bailey 38932

1860.0	~~20 10 42.83~~	~~- 18 17 20.0~~
--------	------------------------	-------------------------

Robinson

Armstrong Catalogue

F. Loomis

11 15 49.61
+ 46.207
+ 15.40
+ 0.02

+ 2 17 6.49
- 6 33.84
- 0.29

Gr. 1127	7.11	5.11.13
1149	7.12	5.11.12

Gr. 1127

A. 1860.0

11 16 51.24	+ 2 10 32.5
-------------	-------------

Proc. 1860

Martin

F. Loomis

169 5 6.89
+ 0.10
+ 7 42.06

2 13 49.13
- 0.32
- 3 16.96

A. 1860.0

169 12 49.05
11 16 51.27
+ 2 10 31.8

Jacob.

Proc. 1855.0

+ 5.076

- 12.41

A. 1860.0

6 13 45.39

56 21 27.25

6 14 36.15

58 21 14.8

Challis

1849

20 10 4.93
+ 37.88

- 18 19 22.19
+ 1 58.84

1/1

1850

- 18 19 9.09

1/2

1851

20 10 31.74
30.99

+ 1 48.06

1/0

Amson - Pöhlke Kerkens

1844	1	26.20	56	18	26.2	0/2	8.5
1846	6	29.79			9.8	2/0	8
1850	1	11.05			8.7	2	76
	6	50.19		18	22.5	1/1	
		50.75			6.3		
1852				18	21.5	1/2	8.0
		20.60			5.6		
1844	6		56	18	16.4	1/2	
46	7	40.84				1/0	
50	7	40.94			16.2	1/1	
52					16.4	1/2	

Dec. 1860 5.0758 - 0.302
1861 5.0726 - 0.672

Spring 1844				56	21	34.95	% ₂	1.3
						- 19.50		
1846	6	13	25.13				% ₀	6
		+ 1	71.06					
1850				56	21	27.7	% ₁	
						- 12.4		5.7
1851				56	21	27.4	% ₁	
						- 11.2		6.2
1852	6	13	55.93				% ₀	6.3
		+ 40.60						
1844	6			56	21	15.45	% ₂	
1846		14	36.49				% ₁	
1850						15.3	% ₁	
1851						15.2	% ₁	
1852		14	36.53				% ₁	

Mar. 1810 5.0761 - 0.906
 1860 5.0752, - 1.278

Prümker's Catalogue (see pg. 59)

2324	7 45 28.384	53 19 15.73	
	1 52.174	- 3 35.53	1/1
3347	10 40 26.441	11 1 23.81	
	1 15.792	- 7 33.06	7/4

65.

Harvard College Jones.

22/3 96 7	0 5 56.88 + 21.50	+ 0 1 29.8 + 2 20.3	9.
97	0 6 26.55 + 21.50	0 2 46.6 + 2 20.3	9.
(Mrs) 19/80 57	0 13 49.26 + 18.43	0 33 34.6 + 2 0.1	9.10
10	0 16 7.00 + 18.43	0 30 21.3 + 2 0.0	10*
Mrs. M.	0 16 40.72 + 3.07	0 45 23.2 + 10.0	
+	0 17 3.34 + 3.07	0 43 42.4 + 20.0	not used
2	0 22 49.75 + 3.07	0 59 2.2 + 20.0	
10/102 Mrs.	11 36 52.17 + 15.36	+ 0 75 6.4 - 1 39.8	
	11 37 1.07 + 15.36	+ 0 26 32.2 - 1 39.8	
103/105 Mrs.	11 30 32.19 + 15.36	+ 0 31 40.2 - 1 39.5	
	11 30 55.81 + 15.36	+ 0 35 7.0 - 1 39.5	

Mean Places for ¹⁸⁵⁹1860 of Comparison Stars.

					S.B.		S.B.
Lactitia ~~for~~							
a Bessel Z. 49	^{1859.0}	8	3	43.29	+9	7	40.8
b Bessel Z. 49	^{1860.0}	8	6	7.73	9	3	52.7
c B. Z. 55		7	49	48.47	9	51	25.1
Monemosyne ^{1859.0}							
d) Bailey 47342		0	1	38.61	-0.01	0	5 29.4 -4.2
B. Z. 40		0	1	38.98		5	32.0
Adopted.		0	3	20.57	-0	5	32.5
e) H.C. Z. 22/3		0	6	18.38	+0	3	57.1
			6	46.05		5	6.9
f) H. Z. 22/3	^{1860.0}	0	14	7.69	0	35	34.7
g) H. Z. 48.		0	14	7.69	0	35	34.7
e) H. Z. 48.		0	16	25.43	0	32	21.3
f) H. Z. 48.		0	16	43.79	0	45	43.2
g) H. Z. 48.		0	22	52.82	0	59	22.2
Urania 1860.0							
a H. Z. 48.		11	37	7.53	0	23	26.6
b. "		11	37	16.43	0	24	52.4
c. "		11	30	47.55	0	30	0.7
d. "		11	31	11.17	0	33	27.5
e) Aglaja. 1860.0							
a) Bailey 21205		10	56	26.56	+0.01	9	28 58.6 -4.2
B. Z. 66				26.19			57.4
Adopted.				26.29			57.6
f. 79				26.31			56.4
e. Bailey 21317		11	18	52.68	0.00	+1	48 38.6 -4.2
B. Z. 152				52.24			32.5
Adopted				52.39			33.1

Also in Prassi.~~and 1 sample~~Examine
(minute of day)

67.

Mean Photos for 1860 of Comparison Stars

Vega cont.

b) Baily 21317
B.Z. 66
Ad.

11	0	48.33	+0.01	9	46	52.4	-4.2
		48.37				50.2	
		48.36				49.19	

c) B.Z. 66

10	42	36.76		10	33	50.7	
----	----	-------	--	----	----	------	--

d) Baily 20824
B.Z. 66
Ad.
B.Z. 3347
Adopted.

10	41	42.64	+0.01	10	53	47.4	-4.2
		42.50				48.8	
		42.23	+0.07			50.75	-0.7
		42.40				49.4	

Doris.

a) Baily 20889
B.Z. 159.
Adopted

10	44	0.05	+0.01	+3°	28' 20.0	(marg)	-4.2
	43	59.58			27	13.9	
	44	000			27	13.9	

Met 1860 II.

a) Fedorenko 875
Groombridge 1127
Arglander 17432
Johnson
Adopted.

6	7	40.84		+56° 18' 14.9"		-0.7
		40.62	+0.23		16.4	-0.1
		41.23			14.8	-0.7
		40.82	+0.04		16.4	-1.8
		41.06			14.9	-0.7

b) Arglander 17433
Com with "a"
Adopted.

6	9	48.09	1.00	56	14	24.2	-0.7
	9	48.34				24.3	
	9	48.21				24.2	

c) L.C. 702
Ad.B.Z. 1149.
Arg. Z. 174.40
Johnson
Jacob.
Adopted

6	14	36.88		56	21	12.9	-0.7
		36.81	+0.23		21	13.8	-0.1
		36.53			21	14.4	-0.7
		36.50	+0.04		21	15.4	-1.8
		36.15			21	14.8	-0.7
		36.30			21	13.7	

d) Comp. with a.

6	15	40.59		56	15	13.4	
---	----	-------	--	----	----	------	--

e) Rinken 2374

7	17	20.56	+0.07	+53	15	40.2	-0.7
---	----	-------	-------	-----	----	------	------

f) A.Z. 169.151.

7	52	44.07		+53	8	33.5	-0.7
---	----	-------	--	-----	---	------	------

Mean Meris for 1860.0 of Comparison-Start,

g) Comparison with f.

Europa

a) Baily 38932.

Aug. 25. 197

Challis - Deputed

Adopted

b) Comp. with a.

Itis (misplaced)

Aug. 23. 18.

7 52 38.58

53 00 5.7 -

29 10 42.77 -0.05

-18 17 23.1 -4.2

10 42.83 0.00

17 20.0 -1.8

10 42.77

17 22.2

~~10 42.80~~

~~17 22.9~~

~~17 22.9~~ Qu

19 9 15.36 0.00

-26 10 20.8 -1.9

59. Various Observations 1859-60.

	Lat. n 1859 Dec 12	Lat. S. 12	Lat. c. 1860 Jan. 2	Armeno. ad. 1859 Dec 21	Armeno. 2. 1859 Dec. 23	Armeno. 1. 1859 Dec. 23	Armeno. 9. 1860 Jan. 2.	Armeno. 1. Jan. 2
G.	346° 6'	346° 6'	312° 29'	346 40	346 46	346 46	312 29	312 29
α.	170 56	171 32	117 27	0 25 ^{0.50}	1 35	1 42	3 32	4 6
H.	8 44	8 44	349 3	0 14	358 26	358 26	349 3	349 3
g	9.206	9.203	9.246	7.163 n	7.066	7.163	8.020	7.969
h (G+α)	9.981	9.979	9.973	9.949 n	9.905 n	9.901 n	9.842 n	9.837 n
g	1.388	1.388	0.493	1.400	1.402	1.402	0.893	0.893
m (G+α)	9.467 n	9.481 n	9.535	9.989	9.991	9.991	9.857	9.867
h. α	0.005	0.005	0.006	0.000	0.000	0.000	0.000	0.000
h (H+α)	9.886	9.883	9.982	8.07 8.296	6.464	7.367	7.111 n	9.077 n
h	1.311	1.311	1.309	1.311	1.311	1.311	1.309	1.309
h (H+α)	9.885 n	9.810 n	9.453 n	0.000	0.000	0.000	7.996	9.997
h. α	9.201	9.198	9.233	7.163 n	7.066	7.163	8.020	7.969
i	+1.34	+1.34	-1.68	+0.05	+0.24	-0.24	-1.68	-1.68
f	54.48	54.48	+12.11	56.07	56.43	56.43	+12.11	+12.11
g ⁰	+3.8	3.7	+1.28	0.01	-0.01	-0.01	-0.06	-0.05
h ⁰	+15.9	15.8	+19.83	+0.26 0.40	+0.19	+0.05	-2.63	-2.42
Δx	74.2	74.0	33.32	56.34 56.67	56.43	56.42	9.42	9.64
	4.95	4.93	+2.22	3.76 3.77	3.76	3.76	+0.63	+0.64
g'	-7.17	-7.40	+2.68	+24.5	+24.7	+24.7	+5.62	+5.68
h'	-2.08	-2.09	-0.99	-0.13	+0.02	+0.03	+0.21	+0.18
i'	+1.33	+1.33	-1.66	+0.05	0.24	-0.24	-1.68	-1.68
Δα	-7.7	-8.2	+0.0	+24.5	+24.5	+24.5	+4.15	+4.18
	x	x	x	x	x	x	x	x

	Mean. f. Jan 5.	Mean. g. Jan. 12.	Mean. $\frac{a+b}{2}$ Feb. 21	Mean. $\frac{c+d}{2}$ Feb. 23	Apog. $\frac{a}{2}$ Feb. 23	Apog. $\frac{b}{2}$ Feb. 26	Apog. $\frac{c}{2}$ Feb. 10	Apog. $\frac{d}{2}$ Feb. 14.
1860				five in next page				
	313 38	315 59	323 23	323 37	323 37	323 58	325 30	326 0
	4 11	5 43	174 18	172 15	164 7	165 12	160 39	160 26
	346 14	339 35	299 25	297 18	297 18	294 7	280 9	275 49
	8.127	8.235	7.844	7.969	9.213	9.237	9.271	9.285
	9.877 _n	9.792 _n	9.878	9.839	9.898	9.889	9.907	9.906
	0.901	0.922	1.022	1.025	1.025	1.030	1.049	1.055
	9.870	9.895	9.869 _n	9.860 _n	9.767 _n	9.800 _n	9.771 _n	9.774 _n
	0.000	1.000	0.000	0.000	0.006	0.006	0.008	0.008
	9.221 _n	9.404 _n	9.962	9.973	9.991	9.994	9.994	9.987
	1.308	1.305	1.282	1.281	1.281	1.279	1.274	1.274
	9.994	9.991	9.604 _n	9.535 _n	9.297 _n	9.209 _n	9.204	9.276
	8.127	8.235	7.844	7.969	9.217	9.221	9.262	9.272
	-2.10	-2.65	-7.22	-7.34	-7.34	-7.52	-8.02	-8.09
	+12.63	+13.81	+19.38	+19.64	+19.64	+19.93	+21.24	+21.63
	-0.07	-0.09	+0.05	+0.07	+1.40	+1.43	+1.69	+1.76
	-3.38	-5.13	+17.56	+17.96	+18.97	+19.00	+18.92	+18.60
	+9.18	+8.50	+36.99	+37.63	+36.97	+40.36	+40.85	+41.99
	+0.61	0.57	2.67	2.51	2.66	2.69	2.72	2.80
	+5.90	+6.56	-7.72	-7.68	-6.40	-6.76	-6.60	-6.74
	+0.27	+0.34	-0.06	-0.06	-0.62	-0.52	+0.55	+0.85
	-2.10	-3.06	-7.22	-7.34	-7.23	-7.41	-7.96	-7.93
	+4.1	+3.8	-15.1	-15.1	-14.3	-14.7	-12.9	-13.8
	X	X	ex.	ex.		ex.		

71

	Urania (a)	Donis (a)	Isis (a)	Europa (a) E ₁	(a)	(a)	Mona (a)	Urania f.
	1860 Dec. 14.	1860 Feb. 26.	1860 June 18.	1860 July 20.	July 21.	July 23.		Nov. 14.
g.	326° 0'	323° 58'	342° 48'	344° 57'	344° 58'	345° 1'	h. B	8.8163m
α.	169 43	161 0	267 19	302 41	302 41	302 41	h. A	1.2712 m
H.	275 49	294 7	181 58	153 37	152 42	150 53	h. C'	9.6296m
h. S	8.501	8.782	9.691m	9.519m	9.519m	9.519m	m. B	8.1015
h. (H+)	9.844	9.914	0.000m	9.979m	9.979m	9.979m	m. B	0.2794
g.	1.054	1.030	1.192	1.252	1.253	1.257	m. B'	8.5823m
α. (H+)	9.855m	9.758m	7.709	9.487	9.487	9.483		
h. S	0.000	0.001	0.047	0.022	0.022	0.022	h. C	0.4886
h. (H+)	9.999	9.998	9.975	9.997	9.998	9.999	m. B	9.6816
h.	1.273	1.279	1.314	1.303	1.302	1.301	h. C'	1.2943m
α. (H+)	8.891	8.950m	9.519m	9.060m	8.972m	8.794m	g. I	7.4065m
h. S	8.501	8.781	9.691m	9.497m	9.497m	9.497m	g. D.	0.8028m
							g. D'	9.2772m
i	-8."09	-7."52	-0."30	+3."87	+3."99	+4."22	h. A	+1.223
f	+21."63	+19."93	+34."28	+39."63	+39."79	+40."10	h. B	+0.024
g"	+0.75	+0.53	+7.64	+5.65	+5.66	+5.69	C	+1.447
h"	+18.71	+18.92	+21.55	+21.00	+21.00	+21.00	D	+0.016
z	+40.59	79.38	63.47	66.26	66.43	66.79		
Δ (see below)	+2.71	+2.63	+4.23	+4.42	+4.43	+4.45		+2.71
g'	-8.11	-6.14	+0.03	+5.47	+5.43	+5.49		-7.96
h'	+0.04	-0.10	+2.98	+0.72	+0.59	+0.39		-0.07
i'	-8.09	-7.50	-0.30	+3.67	+3.90	+4.01		-9.26
Δ (see below)	16"2	-13.7	+2.7	+9.8	+9.9	+9.9		+1.20
for below								
Δ+	+2.67		✓					
Δ-	-16"0							

Comet 1860 II (a)	(b)	(c)	(d)	(e)	(f)	(g)
1860 May 23	May 23.	May 24	May 24	June 11.	June 12.	June 12.
338 55	338 55	339 6	339 6	341 57	342 5	342 5
91° 55'	92° 27'	92° 39'	93 55	116 50	118 11	118 10
205 4	205 4	204 9	204 9	188 6	187 13	187 13
0.176	0.175	0.177	0.175	0.127	0.125	0.123
9.975	9.977	9.980	9.981	9.995	9.993	9.993
1.145	1.145	1.147	1.147	1.180	1.182	1.182
9.516	9.504	9.472	9.466	9.184n	9.251n	9.250n
0.256	0.255	0.256	0.255	0.223	0.222	0.221
9.950n	9.948n	9.947n	9.946n	9.914n	9.911n	9.911n
1.303	1.303	1.304	1.304	1.310	1.310	1.310
9.657	9.665	9.669	9.673	9.758	9.763	9.763
9.920	9.920	9.920	9.920	9.904	9.903	9.902
-3.70	-3.70	-3.67	-3.57	-1.24	-1.11	-1.11
+29.93	29.93	30.09	30.09	33.07	33.25	33.15
+19.77	19.82	20.14	20.09	20.05	19.96	19.87
-32.34	32.08	32.13	32.0	28.0	27.7	26.85
+17.4	17.75	18.1	18.2	25.1	25.5	26.37
+1.16	1.18	1.21	1.21	1.67	1.70	1.75
+4.69	+4.46	+4.15	+4.11	-2.32	-2.72	-2.70
+7.59	7.73	7.82	7.89	+9.38	+9.46	+9.43
-2.15	-2.16	-1.98	-1.98	-0.74	-0.53	-0.53
+10.1	10.0	10.0	10.0	+6.3	6.2	6.2

73.

1859 Dec. 12

El.

repacked.

Hrs. Mot.

- 1.5 + 1.5

4	1 48.6	+1	6.5	-0.19	- 5 38"	+ 0.25
	6 30.8		7.6	-0.10	5 35	+0.13
	550		6.3	-0.09		
11	6.4		6.5	-0.02		
	10.0		6.3	-0.02	5 34	+0.02
	30.8		6.6	-0.01		
	35.0		6.7	-0.01		
15	39.3		6.6	+0.07		
	42.7		6.2	+0.07		
16	3.6		6.5	+0.07	5 33	-0.10
	7.7		6.4	+0.07		

Red to. El.

4	12 0	1	6.31	- 5 37.75
			6.21	5 36.87
			6.48	
			6.28	5 33.98
			6.29	
			6.69	
			6.67	
			6.27	
			6.57	5 33.10
			6.47	

Mean

Refr.

Temp. 10"

+1	6.434	- 5 34.92
	+0.008	- 0.26
	+0.008	+ 0.17

Planet - B. El.

4	1 48.6	-1	17.50	-0.19	- 1 56.0	+0.25
	6 30.8		17.60	-0.10	1 57.0	+0.13
	6 550		17.60	-0.09		
15	39.3		17.90	+0.07	1 57.0	-0.10
15	42.7		18.00	+0.07		
16	3.6		17.90	+0.07		
16	7.7		18.10	+0.07		

Mean red. to

El.

El. Refr.

Temp.

4	12 0	-1	17.79	- 1 52.6
	20' fast.		0.00	- 0.1
			0.00	+ 0.6

75.

1860 Jan 2.

Lactitia

α

Hor. Mot.

$-2.1 + 9''$

El.

4 43 20	+1	9.80	-0.12	-6	28.0	+0.5
4 45 55		9.62	-0.03		25.0	+0.1
4 48 0		9.65	+0.04		26.0	-0.2
4 50 9		9.37	+0.12		24.0	-0.5

Red. to El.

(just 175)

4 46 50

1	9.68	6	27.5
	9.59		24.9
	9.69		26.2
	9.49		24.5

Mean (Planet-Star)

Refr.

Temperature.

+1	9.61	-6	25.8
	+0.01		-0.2
	~~+0.01~~		+0.2

Memorize.

Abd. +2.04 + 3.8

1859 Dec. 21

α'

α

+1	41.60	+5	6
	41.72		5 5
1	41.66		5 5.5
			+0.2
			-1.2
			0.0

This star is in Argland's Sternverzeichnis marked B.

Refr.

Temp.

Red of α' + 3.77 α 3.76 + 16.5 26.5

- Diff. Ref.

El.

Memos.

α'

1	16	16.5	-19.55	+0.09	+6	57	+0.2
	18	18.3	19.60	0.02	6	58	0.1
	19	3.7	19.20	0.00	7	0	0.0
	20	11.2	19.25	-0.04	6	57	-0.1
	21	20.5	19.20	-0.08	6	58	-0.1

Half wt.

Reduc. to El.

(just 37)

1 19 2.0

-1932	+6	58.0
	+0.2	
	-1.6	

Refr.

Temp.

1859 Dec. 23

El.	Mercury	B.	3 24 25	- 1 34.23	+ 6 07.2
(fast 41)		c	3 24 25	- 2 33.73	+ 4 43.2
Refr. for 6				+ 0.04	+ 0.3
Temp. 11.					- 1.7
Refr. for 5				+ 0.04	+ 0.2
Temp. "					- 1.4

El.

41¹/₂ feet.

1860 Jan 2.	Mercury	B.	2 32 3.1	- 18.45	- 1 58.0.
			2 35 53.5	- 18.15	- 2 1.0
			2 38 0.8	- 18.20	- 1 57
			2 39 1.0	- 18.15	- 1 58
			2 41 0.8	- 18.01	- 1 59
			2 41 47.9	- 18.05	- 1 58

Mean (El)	fast 1 ¹ / ₂ ft	2 34 58.	- 18.17	- 1 58.5
Refr.		~~10~~	00	- 0.8
Temp.				+ 0.6.

1860 Jan 7.	Mercury	B.	2 32 3.1	- 2 36.05	+ 1 15.0
Refr.				.00	+ 0.5
186 Temp.					+ 0.4

1860 Jan 5.	Mercury	f.	4 13 21.	+ 8.75	+ 2 33.
			15 14.	8.20	36.
			16 41.	8.25	37.
			18 19.	8.95	39.
			19 11.	8.75	38.

Mean	(El) fast 1 ¹ / ₂ ft	4 16 33	+ 8.48	+ 2 36.6
Red. for time		X		0.0
Refr.			+ .01	+ 0.2
Temp.				+ 0.8

El. fast.

1 9

77.

1860 Jan 12.	Mercur.	g	3 14 19	+ 1 16.35	9 3
			17 26	16.60	9 4
Δ Δ Δ	Planet - Star	3 15 52.	1 16.48	+ 0.35	+ 0.4
Ref.			+ 0.01		- 2.6
Temp.					
El. just 1 st 22			1 22.		
1860 Feb. 21.	Uranus	a	9 58 58	- 1 17.50	+ 0 27
			10 2 42	17.75	0 27
			5 6	17.60	0 24
			10 47	18.30	0 28
			13 50	18.35	0 26
			16 16	18.40	0 24
			19 53	18.40	
Mean.			10 9 39	- 1 18.04	+ 0 26.0
			7 56		+ 0.3
Reduction to			10 9 39		0.0
Ref.				0.04	- 0.1
Temp.					
1860 Feb. 23.	Uranus	b	9 58 58	- 1 26.55	- 1 0
			10 2 42	26.45	0 59
			5 6	26.35	0 58
			10 47	26.90	0 59
			13 50	27.15	0 57
			16 16	27.00	0 59
			19 53	27.10	
Mean			10 9 39	- 1 26.79	- 0 58.7
			7 56		+ 0.3
Red. to	(El. just 2 48)		10 9 39		0.0
Ref.				0.00	- 0.1
Temp.					

1860 Feb. 23	Uranus	α	$-2.11. + 11."$		
			10 55 47	+3 20.00	1/4 wt.
			11 1 31	3 19.90	+1 42.0
			6 28	19.85	1 45.2
			10 55	19.55	1 42.5
			15 45	19.40	1 46.5
Mean			11 7 7	+3 19.71	~~+1 44.0~~
			11 8 40		+1 46.0
Red. to	(EL just 252)		11 5 0	- 0.07	- 0.7
Ref.				0.00	+ 0.1
Temp.					- 0.3
	Uranus	δ	10 55 47	+2 56.20	
			11 1 31	- 55.95	-1 45.0
			11 6 28	55.75	42.3
			11 10 55	55.75	43.5
Mean			11 4 48	+2 55.87	
			11 6 18		-1 43.6
Red. to	(EL just 252)		11 5 0	+ 0.01	- 0.2
Ref.				0.00	- 0.1
Temp.					+ 0.3
1860 Apr. 10	Uranus	ϵ	10 22 18	+0 23.45	+5 12
			23 38	23.90	5 15
			24 56	23.80	5 13
			26 4	23.90	5 14
			27 9	23.75	5 14
			29 44	23.80	5 15
Mean	(EL just 320)		10 25 38	+0 23.77	+5 13.8
Ref.					+ 0.2
Temp.					- 1.4

1860 Nov 14

Lumin. f.

13 45 32

+1 32.00

+6 2

48 36

32.20

6 5

51 38

32.40

6 3.5

Mean (EL)

13 47 50

-1 32.15

+6 3.5

13 48 35

- 0.2

13 47 59

+0.01

+0.2

-1.3

Reduce to
Ref.
Temp.

1860 Feb. 23

Alyssa a.

9 37 28

+3 22.85

+8 12.

47 52

22.65

8 18

52 20

22.40

8 17

57 23

22.20

8 16

10 2 9

22.10

8 16.5

7 31

8 18.5

Mean

9 51 26

+3 22.44

+8 16.3

54 7

- 0.3

Reduce to (EL) Feb 25

9 52 0

- 0.02

+ 0.2

- 1.2

Ref.
Temp.

1860 Feb. 26

Alyssa b.

9 57 39

3 28.00

+2 30

9 58 8

-3 28.20

2 30

10 2 51

27.85

2 29

8 18

28.15

2 31

13 36

28.05

2 31

Mean

10 4 7

3 28.05

+2 30.0

10 5 44

+ 0.3

Red. to
Ref.
Temp.

(EL) Feb 25

10 4 0

0.00

+ 0.1

- 0.6

2 = m + n

	1860 Nov 10	Apheja	o.	9 45 40 58 14 10 3 14	- 3 55.95 - 0.35 3 59.30 + 0.08 3 54.95 + 0.25	+ 4 47 4 46 —	+ 1.5 - 0.3 —
Reduced to Refr. Temp.	26 (Jan 3 10)			09 56 0.	3 55.39	+ 4 48.1	+ 0.1 - 1.3
	1860 Nov 14	Apheja	d.	13 12 40.9 26 27.3	+ 1 32.35 - 0.22 + 1 31.70 + 0.23	- 1 22 - 1 20	+ 0.9 - 0.9
Red. to Refr. Temp.	26 (Jan 3 10)			13 19 30.	+ 1 32.03	- 1 21.0 - 0.0 + 0.3	
Doris later							
	1860 May 23	B. 1860 II	B.	13 4 54 12 20 19 8	- 7 33 + 1.75 + 9.25 - 3.97 - 1.60		
Red. to (26. Jan 26)				13 12 20	- 5.58 0.00	+ 1 36.5 + 0.6 0.0	
Refr. Temp.							
		B.	a	12 15 27.5 13 15 15	+ 2 7.20 2 7.32 2 7.30 + 0.02	+ 3 50 + 0.4 3 51 + 0.2 + 3 50.8 + 0.1 - 0.3	12 15 13 25

81.

1860 May 24

1860 D

2.

H.M. +12.9 - 9"

13	27	7	-	13.60	hwt.
	27	52		13.65	
	28	39		12.80	
	29	23		12.90	
13	34	16			
	36	50			
	45	58			
	47	17			
13	50	6		9.45	
	51	9		8.85	
	51	43		8.70	
	52	18		8.35	
	52	59		7.90	

- 19.57
18.75
19.85
19.55

Means.

13	28	16	-	13.31	+2.97 5 1/2
13	41	6			
13	51	41	-	8.65	-2.46 5

- 19.43

Red. to
Ref.
Temp.

(Elphinst 263)

13	41	6	-	10.84	- 3' 10.4
				0.09	- 0.2
					+ 0.0

2 0.

13	21		+	1 4.30	- 6 0
	25		+	1 4.30	- 6 0
13	23		+	1 4.30	- 6 0
					- 0.3
					+ 0.0
					0.0

Mean
Ref.
Temp.
Red. to 1860.0

- 0.01

1860 June 11.	Comet. 1860	~~15 52 19~~	~~-24.60~~	~~+2~~
		16 12 8		-16.00
		16 16 3	-24.53	
Red. to	(Dist 236 ft 126)	16 16 3	-24.53	-239.2
Ref.			-0.01	-0.4
Temp.				
1860 June 12	Comet. 1860	15 28 13	+17.92	2 1/2
		37 46		-47.025 + 0.9
		46 26	23.95	2
Red. to	(Dist 236)	15 36 20	+20.60	-127.6
Ref.	(fast 1 ^m 27)		-0.01	-0.1
Temp.				0.9
		15 0	-5.6	
		10	5.2	
		11	5.5	
		11	5.4	
Mean		15 8	-3.42	
		th 54	-0.00	-827.0
Ref.			-0.02	-0.6
Temp.				-0.2
Red. to 1860.0			-0.05	0.0

Doris		10 43 34	+1 9.20	+7' 5"
1860 Feb 26.		46 7	9.20	77
		49 15	9.15	77
		51 18	8.85	76
		53 20	8.80	77
		55 23	8.65	78
		59 34	8.70	710
Mean	SC (fast 258)	10 52 6	77.2	77.2 -0.1
Red. to		51 14	+1 8.96	+77.1
Ref.				+0.2
Temp.				-0.2

1860 June 18	Sw	a	19 3 39	+ 57.00		~~57.00~~
			5 39	56.80		1.1
			8 46	57.30		1.1
			19 29.	57.45		1.3
Mean	Sw (Jan 49)		19 7 8	- 57.14		- 1 0.5
Ref.	Sw		19 7 8	0.00		- 0.1
Temp.						0.0
1860 July 20	Europa	a	19 8 41	+ 3 49.00 - 0.11	+ 9 27	
			15 33	3 48.95 + 0.11	9 30	
Red to	(20 b.)		19 12 3	+ 3 48.98	+ 9 28.5	
Ref.			- 1.93	- 10.10		
Temp.						
1860 July 20	Europa	b.	18 47	+ 5.9 - 0.25	+ 8 14	- 1.4
			18 48	5.9 0.22	8 10	- 1.2
			19 49	5.8 0.19	8 12	- 1.0
			18 51	5.8 - 0.13	8 12	- 0.7
			18 57	5.2 + 0.07		
			19 17	4.6 0.74		
Red to	Chr. 236 Jan. 122		18 54 50	+ 5.53	+ 8 10.9	
Ref.				- 0.01	+ 0.1	
Temp.					+ 0.2	
1860 July 21	b.	a.	18 0.	+ 3 42.60	+ 1 23.	
Ref.				0.00	+ 0.1	
Temp.					0.0	
Europa - a			18 54 50	+ 3 42.92	+ 9 34.8	
			19 12 3	3 42.98	9 28.5	
1860 July 21	Europa	a.	18 1 28	+ 3 4.25 - 0.73		
			15 55		+ 5 26	- 1.4
			21 11	4.05 - 0.09	5 24	- 0.5
			25 17	3.75 + 0.06	5 26	+ 0.3
			36 47		5 25	+ 2.2
			39.1	3.00 + 0.49	5 25	+ 2.6
Mean (20 ha)	Chr. 236 Jan. 122		18 24 0	3 3.69	+ 5 25.7	
				- 0.01	+ 0.5	
					0.0	

Mk. - 1.95 - 10.3

1860 July 23.	Europa.	a.	19 47 27	+1 27.00	-0.72	-3 2.0
			46 50	1 27.15	-0.29	3 6.5
			58 6	1 26.80		3 5.0
			20 3 5	1 26.40		3 9.5
			5 44	1 26.90		3 9.0
Mean	Choc (Band S)		19 56 38	+1 26.85		-3 6.4
				0.0		
Org chro. 236			19 43 43	+1 27.20		
			107 59 26	26.69		
	Choc. 236.		19 51 34 +140	+1 26.90	-0.11	
Red for	Band S.		19 56 38			
Mean	Band S.		19 56 38	+1 26.83		-3 6.4
Refr.				0.00		- 0.2
Temp:	Band S.		+ 3 12 feet			0.11

Various Observations

Imputation of Ocean Time

Computation of Ocean Wave							
Lalibela		Menemsoyne River					
1859 Jan. 12	1860 Jan. 2.	1859 Jan. 21	Jan. 23	1859 Jan. 2.	Jan. 2.	Jan. 5.	Jan. 12.
26.							
4 12 0	4 46 50	1 19 2	3 24 25	2 37 58	2 32 3	4 16 33	3 15 52
-20	-1 2	-37	-41	-1 2	-1 2	-1 8	-1 22
4 11 40	4 45 48	1 18 25	3 23 44	2 36 56	2 31 1	4 15 25	3 14 30
17 23 25	18 46 12	17 58 54	18 6 47	18 46 12	18 46 12	18 58 2	19 27 27
10 48 15	9 59 36	7 19 31	9 16 57	7 50 44	7 44 49	9 17 23	7 27 3
1 46	1 38	1 12	1 31	1 17	1 16	1 31	1 17

10 46 29	9 57 38	7 18 19	9 15 26	7 49 24	7 43 33	9 10 52	7 47 35
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10 939	11 50	10 25 38	13 47 50	9 52 0	10 40	9 56 00	13 10 30
-2 48	-2 52	-3 20	-3 27	-2 52	-2 58	-3 20	-3 27

22 3 20	22 11 13	23 14 18	23 30 4	22 11 13	22 23 3	23 14 18	23 30 4
12 3 31	12 50 55	11 8 0	14 14 19	11 37 55	11 37 59	10 38 22	13 45 59
1 58	2 6	1 49	2 20	1 54	1 54	1 45	2 15

12 1 33 12 48 49 14 6 11 14 11 59 11 36 1 11 36 5 10 36 37 13 43 44
(Svin) (Comel 1864 II) (Fris Europa)

1860 Feb. 26 1860 May 23 May 24 June 11 June 12 June 18 July 29 July 31

47 14 10 ~~5~~ 6	13 12 20	13 41 6	16 16 3	15 36 20	19 7 8	18 26 0
-2 58	-26	-26	-1 26	-1 27	-9 49	-1 23
22 13 3	4 6 3	4 10 0	5 20 58	5 24 54	5 48 34	7 58 40
12 26 5	9 5 51	9 30 40	10 53 39	10 9 59	13 17 45	10 23 57
2 2	1 29	1 33	1 47	1 40	2 11	1 52

12 ^{23 11} ~~44 3~~ 9 1 22 9 29 7 10 51 52 10 8 ³⁹ ~~49~~ 13 15 34 ^{11 - 2 40} ~~10 56 57~~ 10 22 15

1860 July 23

19 56 38

f 6 3.3

11 50 5

156

Am. t. 11 48 9

~~1859~~ 0° 0154
-3219 9.664

	Lactina		Macmoyne		Jan 2		Jan 5		Jan 12	
	1859 Dec. 12	1860 Jan 2	1859 Dec. 21	Dec. 23	Jan 2	Jan 2	Jan 5	Jan 5	Jan 12	Jan 12
α	8 ^h 4 ^m 9 ^s	7 ^h 57 ^m 0 ^s	8 ^h 3 ^m 0 ^s	8 ^h 4 ^m 7 ^s	8 ^h 13 ^m 8 ^s	8 ^h 13 ^m 8 ^s	8 ^h 16 ^m 9 ^s	8 ^h 16 ^m 9 ^s	8 ^h 20 ^m 1 ^s	8 ^h 20 ^m 1 ^s
τ	-3 53.2	-3 5.2	+1 15.4	+3 19.0	+2 23.1	+2 17.2	+3 58.5	+3 58.5	+2 50.4	+2 50.4
δ	0° 2'	0° 45'	+0° 7'	+0° 10'	+0° 34'	+0° 34'	+0° 48'	+0° 48'	+1° 6'	+1° 6'
Ref. corr. α	-0.017	-0.009	+0.003	+0.018	+0.009	+0.008	+0.034	+0.034	+0.014	+0.014
" δ	+0.41	+0.32	+0.33	+0.50	+0.38	+0.36	+0.68	+0.68	+0.40	+0.40
Par. corr. α	-0.364	-0.309	+0.137	+0.323	+0.247	+0.237	+0.365	+0.365	+0.286	+0.286
" δ	+5.16	+4.93	+5.75	+5.74	+5.70	+5.70	+5.70	+5.70	+5.67	+5.67
Thr.	(10)	-1°	30°	19°	0°	0°	8°	8°	18°	18°
	Mramia				Aglaja					
	Feb. 21	Feb. 23	Mar. 10	Mar. 14	Feb. 23	Feb. 26	Mar. 10	Mar. 10	Mar. 14	Mar. 14
α	11 35.9	11 34.2	11 19.3	11 15.4	11 0.1	10 57.7	10 46.8	10 46.8	10 42.6	10 42.6
τ	-1 29.1	-0 32.1	-0 47.0	+2 30.0	-1 11.0	-0 56.7	70 54.1	70 54.1	+2 32.4	+2 32.4
δ	+0° 23'	+0° 31'	+1° 53'	+2 16'	+9° 37'	+9° 49'	+10° 39'	+10° 39'	+10° 52'	+10° 52'
Ref. corr. α	-0.004	---	---	+0.009	---	---	---	---	+0.004	+0.004
" δ	+0.33	+0.30	+0.30	+0.35	+0.24	+0.24	+0.24	+0.24	+0.28	+0.28
Par. corr. α	-0.162	-0.059	-0.104	+0.258	-0.131	-0.106	-0.101	-0.101	+0.266	+0.266
" δ	+5.72	+5.69	+5.55	+5.55	+4.62	+4.62	+4.52	+4.52	+4.71	+4.71
Thr.	(33°)	(43°)	(23°)	(33°)	(44°)	(24°)	(23°)	(23°)	(33°)	(33°)
	Doris Feb. 26		Comel. May 23	May 24	June 11	June 12	Isis June 18	Europa July 20	July 21	July 21
α	10 45.2	6 ^h 9.7	6 ^h 15.5	7 ^h 47.0	7 52.3	19 8.7	20 14.4	20 14.4	20 15.6	20 15.6
τ	+0 4.6	+7 2.2	+7 25.2	+8 27.6	+7 42.6	-0 2.4	-1 20.9	-1 20.9	-1 51.0	-1 51.0
δ	+3 33	+56° 16'	+56° 12'	+53° 13'	+52° 58'	-26° 11'	-18° 8'	-18° 8'	-18° 12'	-18° 12'
Ref. corr. α	+0.007	+0.39	+0.003	+0.056	+0.020	0.000	-0.018	-0.018	-0.022	-0.022
" δ	+0.27	+0.39	+0.50	+1.40	+0.75	+1.22	+0.76	+0.76	+0.85	+0.85
Par. corr. α	+0.008	+0.734	+0.709	+0.566	+0.635	-0.005	-0.154	-0.154	-0.207	-0.207
" δ	+5.36	+4.61	+5.11	+6.50	+5.68	+7.96	+7.37	+7.37	+7.22	+7.22
Thr.	23°	52°	50°	58°	63°	67°	71°	71°	July 23	July 23
α										
τ										
δ										
Ref. corr. α										
" δ										
Par. corr. α										
" δ										

Laetitia

1859 Dec 12. 10 46 29 +1 6.44 - 5 33.5
 +4.95 - 7.9
 8 3 43.29 9 7 40.8

(39) α d 8 4 54.68 + 9 1 59.4

Dec 12 10 46 29 -1 17.79 -1 52.1
 +4.95 - 8.2
 8 6 7.73 9 7 52.7

(39) α d 8 4 54.87 9 1 52.4

1860 Jan 2 9 57 58 +1 9.62 - 6 25.8
 + 2.22 0.0
 7 49 48.47 9 51 25.1
 7 50 0.11 + 9 44 59.3

to this R. 2 stars

Harmonia Menispha

1859 Dec 21. 7 18 19 - 19.32 + 6 56.6
 + 3.76 + 24.5
 a) 0 3 20.51 - 0 0 28.0

(59) α d 0 3 4.95 + 0 6 53.1

1859 Dec 23 9 15 26 -1 34.22 + 5 58.8
 + 3.76 + 24.5
 b) 0 6 18.34 0 3 50.1

(59) α d 0 4 47.92 + 0 10 13.4

-2 3.72 + 4 42.0
 6 + 3.76 + 24.5
 c) 6 48.05 + 5 6.7

(59) α d 0 4 48.09 + 0 10 13.4

1860 Jan 2.
7^h 43^m 33^s

(2)

- 2 36.05 +1 15.1
+0.64 +4.2
0 16 15.43 0 32 21.3

(57) α. δ

0 13 59.02 0 33 40.6

7^h 49^m 27^s

- 15.17 - 1 58.7
+0.63 +4.1
0 14 7.69 0 35 34.7

(57) α. δ

0 13 50.15 0 33 40.1

1860 Jan 5
7^h 15^m 52^s

+8.47 + 2 36.0
+0.61 +4.1
0 16 43.79 0 45 43.2

(57) α. δ

0 16 52.87 0 43 11.3

1860 Jan 12.
7^h 47^m 35^s

+1 16.49 + 9 1.3
+0.57 +3.8
0 22 52.82 0 59 22.2

0 24 9.88 +1 8 27.3

Minnia (30)

1860 Feb. 21.
12^h 1^m 33^s

a)

16.04 +0 26.2
-1 26.79 -0 58.5
+2.47 -15.1
11 37 74.53 +0 23 26.6
51.95 23 37.7
11 35 43.21 0 22 13.0

Minute of Sec. ?

Urania (30) continued

1860 Feb. 21. ✓
12^h 1^m 33^s

b)

(30) α d

1860 Feb. 23
12^h 48^m 49^s

a.

(30) α d

1860 Feb. 23

d.

(30) α d

1860 Mar. 10
11 6 11

(30) α d

1860 Mar. 14
14 11 59

(30) α d

- 1 26.79 - 0 58.5

+ 2.47 - 15.1

11 37 16.43 + 0 24 52.4

11 35 52.11 + 0 23 38.8

+ 3 19.64 + 1 113.1

+ 2.57 - 15.1

11 30 17.55 0 30 9.7

11 34 9.70 0 31 28.7

+ 2 55.88 - 1 113.6

+ 2.57 - 15.1

11 31 11.17 0 33 27.5

11 34 9.56 0 31 28.8

+ 0 23.77 + 5 12.6

+ 2.67 - 16.0

11 18 52.39 + 1 18 33.1

11 19 18.83 + 1 53 29.7

- 1 32.14 + 6 2.2

+ 2.71 - 16.1

11 16 51.25 + 2 10 32.2

11 15 21.82 + 2 16 18.3

12 1 33

+ 5 38 5.6

- 13 21

17 26 17. 3.04623 n

2.4092 n

7.8884 n

1.6966 n

C 11 35 53.11 0 22 37.5

O. 52.04 36.2

Par. - 0.10 + 3.6

+ 1.17 - 4.3

12 48 49

5 38 5.6

18 13 36 2.5724

12 48 49 7.7088 n

7.4140

2.1770

C 11 34 10.82 + 0 31 28.6

O. 9.63 26.8

Par. - 0.04 + 3.6

+ 1.23 - 3.8

11 6 11

5 38 6

- 13 8

16 31 9 2.4332

9.2748

1.4617

2.5206

C 11 19 20.06 1 53 25.7

O. + 18.83 29.7

Par. - 0.07 + 3.5

+ 1.30 - 7.5

14 11 59

5 38 6

- 13 9

19 36 56 1.7539 n

9.5015

2.5198

C 11 15 23.36 2 16 16.4

O. 21.82 16 15.3

Par. - 0.16 3.5

+ 1.38 - 5.4

1860 Feb. 23. (17)

11 36 1

+ 3 22.42
+ 2.66

+ 8' 15.0
- 14.3

- 12 29 C
- 42 11 O

8.6
164 59 14.7
57 50.85

(Aug. 11.5)

10 56 26.31

9 28 56.4

10 53 50 Pm

- 1.9

10 59 51.39

+ 9 36 57.1

8.6623n C

9 36 20.7

2.8642n O

36 57.1

2.3826 Pm

+ 2.1

1860 Feb. 26.

11 36 5

- 3 28.05

+ 2 29.2

- 12 29 C

9.9
164 22 19.4

+ 2.69

- 14.7

- 42 9 O

20 45.0

(Aug. 11.7)

11 0 48.36

9 46 49.9

10 53 56 Pm

- 0.7

10 57 23.00

9 49 4.4

8.7656n C

9 48 23.6

2.8782n O

49 4.4

2.3811 Pm

+ 2.1

1860 March. 10

10 36 37

+ 3 55.39

+ 4 46.9

- 14 5 C

11.2
161 40 10.6

+ 2.72

- 13.9

- 42 8 O

38 43.0

10 42 36.76

+ 10 33 50.7

9 54 29 Pm

- 0.7

10 46 34.87

+ 10 38 23.7

8.9493n C

10 37 47.9 50.6

2.8650n O

36 23.7

2.3208 Pm

+ 2.0

1860 March. 14

13 43 44

+ 1 32.03

- 1 20.7

- 12 14 C

160 50 39.1

+ 2.80

- 13.8

- 42 14 O

49 18.4

(Aug. 11.5)

10 41 42.40

10 53 49.4

13 42 38 Pm

+ 1.8

10 43 17.23

+ 10 52 14.9

8.6345n C

40 51 36.2

2.8679n O

52 14.9

2.3817 Pm

+ 2.1

C - O

Feb 23 + 78.7 - 35.4

26 85.6 38.9

Arch 10 88.9 35.1

14 + 79.0 - 27.8

Mean + 53.0 - 36.8

Donis. (48)

1860 Feb 26 12^h 23^m 11^s

	+ 1	8.96		+ 7	7.1
		+ 2.63			- 13.7
10	44	0.00	+3	27	13.9
10	45	11.59	+3	34	7.3

+ 5	38	6.	1.6410 n	-10.45
-	17	17	9.2782	
17	44	0	<u>2.5664</u>	+ 88.0
-	43.75			
+ 6	8.5			

C.	10	45	12.16	+ 3	33	50.7
O.			11.59		34	7.3
Par			0.08			+ 2.6
			+ 0.57			-19.2

Jovis. (42)

1860 June 18.

13 15 34

	-	57.14		- 1	0.6
	+	4.23		+	2.7
19	9	15.36	+26	10	22.7
19	8	22.45	-26	11	20.6

+ 5	29	57
18	45	31
1.6132 n		
9.4496		
2.7236 n		

C.	19	8	41.98	-26	11	9.5
O.		8	22.45	-26	11	20.6
Par.			-0.01			+8.1
			+19.54			+ 3.10

Europa +8

1860 July 20.

11 2 40

	+ 3	49.61		+ 9	32.7
20	10	42.77	-18	17	22.2
		+ 4.42			+ 9.9
20	14	36.80	-18	7	39.7
		-0.07			+3.1

11	2	40	1.6675 n	20	14	25.84
5	38	6	9.2583	C-0		-10.89
-	19	47	2.3944	-18	7	52.8
16	20	59-				-16.2

1860 July 21.

10 22 15

	+ 3	3.68		+ 5	26.2
20	10	42.77	-18	17	22.2
		+ 4.43			+ 9.9
20	13	50.88	-18	11	46.1
		-0.09			+3.0

10	22	15	1.6688 n	20	13	40.55
5	38	6	9.1852	C-0		-10.24
-	19	46	2.3957	-18	11	54.0
15	40	35-				-10.9

1860 July 23

11 48 9

	+ 1	26.83		- 3	6.6
		+ 4.45			+ 9.9
20	10	42.77	-18	17	22.2
		-0.01			+3.1
20	12	14.05	-18	20	18.9

11	48	9	1.6701 n	20	12	4.30
			9.3281	C-0		-9.74
			2.3955	-18	20	26.0
17	6	29-				-10.2

Mean C-0 -154.3 -12.4

1860 May 23
9^h 43^m 22^s

— 5.58	+ 136.6
+1.18	+10.0
6 9 48.21	56 14 24.2
6 9 43.81	56 16 10.8

1860 May 24
9 29 7

— 10.84	— 310.6
+1.21	+10.0
6 15 40.59	56 15 13.4
6 15 30.96	56 12 12.8

1860 Jun 11
10 51 52

— 24.54	— 2 39.6
+1.67	+6.3
7 47 20.63	53 15 39.5
7 46 57.76	53 13 6.2

1860 June 12
10 8 39

— 20.59	— 1 27.7
+1.75	+6.2
7 52 38.58	53 0 5.0
7 52 19.72	52 58 43.5

~~1861 Jan 22~~

Melpomene

Comb. m. t.

Planet - Sun

Jan 22 9 53 43

+ 2^m 51.82 - 4' 20" 5

9 5

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