

KG
11365
31

A.31

Transit Circle.
Jan. 24th 1859.
to
Aug. 17. 1859.

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



KG-11365.31

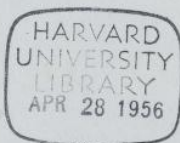
For reducing the two imperfect transits of the Moon contained
in this book I have used the following intervals of the wires.

Ill. East,	A to M	+ 6.968
	B " "	+ 3.430
	C " "	+ 0.031
	D " "	- 3.385
	E " "	- 6.983

Dec. 7. 1859

A. H.

KG 11365,31



Jan. $\frac{24}{25}$. 1859

M. East

 $a = -.64$
 $b = +.02$
 $c = -.01$

A.H.

58. Virginis	α Virginis	Moon H.V.	α Bootis
13 7 48.2	13 15 29.9	13 43 0.2	14 6 56.8
51.8	33.5	4.0	0.5
-9° 48 55.2	37.2	-15° 45 7.6	4.2
58.7	40.5	11.4	7.8
<u>22.2</u>	<u>44.2</u>	<u>15.3</u>	<u>11.8</u>
286.1	185.3	38.5	81.1
43.22	37.06	7.70	16.22
13 7 43.22	13 15 37.06	13 43 7.70	14 7 4.22
-49	-.51	-.57	-.26
+ .01	+ .01	+ .01	+ .01
- .01	- .01	- .01	- .01
13 7 54.73	13 15 36.55	13 43 7.13	14 7 3.96
13 10 5.27	13 17 47.10		14 9 14.70
-2 10.54	-2 10.55		-2 10.74

13 10 5.31 13 17 47.14 13 45 17.74 14 9 14.61

13 38 -2 10.61

E.L. was taken down and cleaned on Jan 26. by R.C.B.

Feb. 3/4. 1859.

 $a = -.50$
 $b = +.00$
 $c = +.01$

Feb. 4/5 A.H.

Ill. East

A.H.			Feb. 5 A.H.			Ill. East		
α Lyrae			α Lyrae			β Arietis		
18 41	18.8		18 41	18.3		1 56	2.5	2 8 24.8
	23.3			22.8			6.4	28.7
	27.7			27.3			10.0	32.4
	32.0			31.8			13.6	36.2
	36.9			36.4			17.3	40.0
	138.7			136.6			49.8	162.1
	27.74			27.32			9.96	32.42
18 41	27.74		18 41	27.32		1 56	9.96	2 8 32.42
	-0.04			-0.04			-1.19	-1.18
	+0.00			+0.00			+0.00	+0.00
	+0.01			+0.01			+0.01	+0.01
18 41	27.71		18 41	27.29		1 56	9.78	2 8 32.25
18 32	8.96		18 32	8.99		1 46	51.78	1 59 14.33
EC +9	18.75		9	18.30		9	18.00	9 17.92
								18.00
								9 17.96

Feb 10, 1859

 $a = .55$
 $b = .00$
 $c = .03$

Ill. East

A.H.			" "			Moon I.V. very unsteady			" Jauri			" Jauri		
α Beti			δ Aielis											
3	4	6.8	3	12	46.1	3	25	52.5	3	41	32.8	3	48	18.2
		10.3			49.8			56.8			36.9			22.0
		14.0	+19°		53.3	+23	41	0.8	+24	52	40.6	+23	40	25.7
		17.4			57.0			4.4			44.3			29.3
		21.0			0.8			8.5			48.3			33.4
		69.5			207.0			123.0			202.9			128.6
		13.90			41.40			24.60			40.58			25.72
3	4	13.90	3	12	53.40	3	26	0.60	3	41	40.58	3	48	25.72
		-.35			-.23			-.19			-.18			-.19
		.00			.00			.00			.00			.00
		-.03			+.03			-.03			-.03			-.03
3	4	13.52	3	12	53.16	3	26	0.38	3	41	40.37	3	48	25.50
2	54	55.45	3	3	35.14				3	32	22.36	3	39	7.56
	+9	18.07		+9	18.02					+9	18.01		+9	17.94
2	54	55.51	3	3	35.15	3	16	42.37	3	32	22.36	3	39	7.49
			3	4	+9	18.07								
				13		18.02								
				42		18.01								
				48		17.94								
			3	22	+9	18.01								

Feb. 10, there was no fire in the computing room, and the rate of
 26 may have been changed by the cold.

A.H.

Feb. 12. 1859.

M. East.

 $a = .51$
 $b = .01$
 $c = .00$

A. H.			v' Tauri			τ Tauri			Moon H. V.			5 Geminor			κ Aurigae		
4	28	5.8	4	43	0.7	5	34	37.7	6	12	7.3	6	15	36.9			
		9.7			4.3			41.8			11.3			41.2			
+22	29	13.3	+22	41	8.2	+28	6	45.8	+24	27	15.2	+29	33	45.2			
		17.0			11.7			49.8			18.9			49.0			
		21.0			15.7			53.9			23.0			53.2			
		66.8			40.6			229.0			75.7			225.5			
		13.36			8.12			45.80			15.14			45.10			
4	28	13.36	4	43	8.12	5	34	45.80	6	12	15.14	6	15	45.10			
		-.21			-.20			-.16			-.19			-.13			
		+ .01			+ .01			+ .01			+ .01			+ .01			
		00			00			00			00			00			
4	28	13.16	4	43	7.93	5	34	45.65	6	12	14.96	6	15	44.98			
4	17	53.84	4	33	48.62				6	2	55.50	6	6	25.74			
+9		19.32	+9		19.31				+9		19.46	+9		19.24			
4	17	53.83	4	33	48.60	5	25	26.32	6	2	55.63	6	6	25.65			

+9^m 19^s 33

Feb. 14. 1859.

Ill. East.

 $a = -.55$
 $b = +.01$
 $c = +.02$

A.H.											
δ Geminor			i Geminor			β Geminor			Moon I.V.		
7	20	57.6	7	26	13.0	7	45	56.2	7	51	21.5
		1.4			17.2			0.3			25.6
		5.0	+28	4	21.2			4.2	+24	25	29.5
		8.8			24.9			8.2			33.3
		12.7			29.0			12.2			37.4
		85.5			105.3			81.1			147.3
		17.10			21.06			16.22			29.46
7	21	5.10	7	26	21.06	7	46	4.22	7	51	29.46
		-.20			-.15			-.15			-.19
		+.01			+.01			+.01			+.01
		+.02			+.02			+.02			+.02
7	21	4.93	7	26	20.94	7	46	4.10	7	51	29.30
7	11	44.30	7	17	0.43	7	36	43.52	7	42	8.68
86 + 9		20.67	+9		20.51	86 + 9		20.58			

65- 7 11 44.31 7 17 0.32 7 36 43.48 7 42 8.68

20.67

20.51

20.58

.186

+9

20.62

1859phae. pr														
M. East Feb. 21.														
A. H.														
η Draconis			ε Herculis			κ Ophiuchi			α Leporis			ε Orionis		
16	31	10.6	16	45	11.1	17	0	14.0	5	35	46.4	5	38	19.7
		18.2			15.3			17.6			50.2			23.3
		25.7			19.3			21.1			53.8			26.8
		32.8			23.4			24.5			57.3			30.2
		40.5			27.8			28.2			1.1			33.7
		127.8			96.9			105.4			208.8			133.7
		25.56			19.38			21.08			41.76			26.74
16	31	25.56	16	45	19.38	17	0	21.08	5	35	53.76	5	38	26.74
		+ .89			- .12			- .31			- .50			- .38
		+ .00			+ .00			+ .00			+ .01			+ .01
		- .07			- .04			- .03			- .05			- .05
16	31	25.88	16	45	19.22	17	0	20.74	5	35	53.22	5	38	26.32
16	22	6.02	16	35	58.79	16	51	0.34	5	26	32.14	5	29	5.04
+ 9		19.86	+ 9		20.33	+ 9		20.40	9		21.08	9		21.28

Feb. 24. 1859.

M. East.

A. H.

 β Tauri α Leporis ϵ Orionis

5	26	39.0	5	35	47.7	5	38	21.0
		43.2			51.6			24.5
		47.2			55.1			27.8
		51.0			58.7			31.1
		55.0			2.4			34.7
		235.4			215.5			139.1
		47.08			43.10			27.82
5	26	47.08	5	35	55.10	5	38	27.82
		-.15			-.60			-.38
		+.02			+.01			+.01
		-.03			-.03			-.03
5	26	46.92	5	35	54.48	5	38	27.42
5	17	24.45	5	26	32.09	5	29	5.00
9		22.47	9		22.39	9		22.42

March. 1. 1859.

Ill. East

A.H.			" "			" "			Mar 1/2 A.H.		
♂ Orionis			♂ Leporis			♂ Orionis			♂ Cygni		
5	34	7.6	5	35	49.5	5	38	23.1	20	45	51.3
		11.3			53.3			26.6			56.3
		14.7			57.2			29.9			1.4
		18.0			0.9			33.3			6.0
		<u>21.5</u>			<u>4.8</u>			<u>36.9</u>			<u>11.2</u>
		73.1			165.7			149.8			127.2
		14.62			33.14			29.96			25.44
5	34	14.62	5	35	57.14	5	38	29.96	20	46	1.44
		-.37			-.50			-.38			+ .04
		+ .01			+ .01			+ .01			+ .03
		<u>-.03</u>			<u>-.03</u>			<u>-.03</u>			<u>-.04</u>
5	34	14.23	5	35	56.62	5	38	29.56	20	46	1.47
5	24	49.62	5	26	32.00	5	29	4.92	20	36	36.34
9		24.61	9		24.62	9		24.64	9		25.13

Mar. 4. 1859.

M. East

A. H.			" "			" "			" "			" "		
α Geminor			α Can. Min.			β Geminor			δ Cancri			γ Argus		
7	34	55.9	7	40	35.7	7	46	1.2	8	4	11.8	8	10	52.9
		0.1			39.3			5.3			15.8			56.8
		4.2			42.9			9.3			19.6			0.5
		8.2			46.2			13.2			23.4			4.2
		12.6			49.9			17.2			27.6			8.2
		81.0			214.0			46.2			98.2			122.6
		16.20			42.80			9.24			19.64			24.52
7	35	4.20	7	40	42.80	7	46	9.24	8	4	19.64	8	11	0.52
		-0.12			-0.37			-0.17			-0.17			-0.62
		+0.01			+0.01			+0.01			+0.01			+0.00
		-0.06			-0.05			-0.06			-0.06			-0.05
7	35	4.03	7	40	42.39	7	46	9.02	8	4	19.42	8	10	59.85
7	25	38.33	7	31	57.08	7	36	43.37	7	54	53.76	8	1	34.20
	9	25.70					9	25.65		9	25.66		9	25.65

March 7. 1859.

 $a = -54$
 $b = .00$
 $c = +01$

Mar. 7.

Ill. East.

A. H.			A. H.			(very faint) Moon I.U.			(very faint) S. Arctis			α Persei		
Polaris			Polaris											
1	11	18.7	1	11	20.8	3	8	12.7	-	-	-	3	23	33.4
	13	40.9		13	42.9			16.8	-	-	-			39.0
	15	58.1		15	56.6	+12°		20.4	3	13	2.55			44.3
	18	13.2		18	8.2			24.4	+19					49.4
	20	35.4		20	39.1			28.2						54.9
		166.3			167.6			102.5						221.0
		33.26			33.52			20.50						44.20
1	15	57.26	1	15	57.52	3	8	20.50	3	13	2.55	3	23	44.20
		+17.68			+15.40			-.28			-.23			+1.10
		+0.27			-0.27			.00			-.00			-.02
		-1.93			+0.77			+0.01			+0.01			+0.02
1	16	13.28	1	16	13.42	3	8	20.23	3	13	2.33	3	23	44.32
1	6	46.92		6	46.15		9	27.62	3	3	34.74	3	14	16.69
	9	26.36	1	9	27.27	2	58	52.61		9	27.56		9	27.63
~~Regulus to mid. wire~~														
~~+0.56~~														
						2	58	52.61	3	3	34.71	3	14	16.70

March. $\frac{10}{11}$. 1859

Ill. East

A. H.			" Hercules			" Draconis		
Ophiuchi								
17	37	45.2	17	50	17.0	18	2	36.2
		48.9			21.2			42.2
		52.4			25.2			47.7
		55.9			28.9			53.4
		59.7			33.1			59.1
		262.1			125.4			238.6
		52.42			25.08			47.72
17	37	52.42	17	50	25.08	18	2	47.72

March. 14. 1859

All. East.

The haze became so thick that the moon was lost.

A.H.			"			"		
δ Geminor			α^2 Geminor			β Geminor		
7	21	4.8	7	34	57.9	7	46	3.7
		8.6			2.2			7.8
		12.2			6.3			11.7
		15.9			10.4			15.5
		19.8			14.8			19.6
		61.3			91.6			58.3
		12.26			18.32			11.66
7	21	12.26	7	35	6.32	7	46	11.66

March. 16. 1859.

Ill. East.

$$\begin{array}{r} a - .42 \\ b + .09 \\ c \quad .00 \end{array}$$

A. H.

A. H.			" "			" "			" "			" "		
Mrs. Maj.			e Leonis			B. A. C. 33 45			s Leonis			α Leonis		
9	32	46.3	9	47	15.0	9	49	23.2	10	0	3.0	10	10	16.6
		51.8			18.9			26.8			6.7			20.3
		57.5			22.7	+12	5	30.4	+13	7	10.3			23.8
		2.8			26.5			33.7			13.7			27.2
		8.7			30.5			37.5			17.4			30.9
		167.1			113.6			151.6			51.1			118.8
		33.42			22.72			30.32			10.22			23.76
9	32	57.42	9	47	22.72	9	49	30.32	10	0	10.22	10	10	23.76
		+ .11			- .14			- .21			- .21			- .21
		+ .14			+ .09			+ .08			+ .08			+ .08
		.00			.00			.00			.00			.00
9	32	57.67	9	47	22.67	9	49	30.19	10	0	10.09	10	10	23.63
9	23	28.04	9	37	53.16	9	40	0.91	9	50	40.53	10	0	54.05
+ 9		29.63	+ 9		29.51			29.28	+ 9		29.56	+ 9		29.58

9	37	53.11	9	40	0.63	9	50	40.53	10	0	54.07	10
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$$\begin{array}{r} + 9 \\ 29.63 \\ 29.51 \\ 29.56 \\ 29.58 \\ 29.54 \\ 29.50 \\ 29.61 \\ \hline 29.55 \\ + 9 \\ 29.56 \end{array}$$

March 16, 1859

Ill. East

A. H.			Moon I.V.			45 " Leonis			p " Leonis			b " Leonis			α Urs. maj		
6	10	25	4.2	10	29	37.0	10	34	48.1	10	51	15.8	11	4	18.4		
3			8.0			40.6			51.7			19.4			26.7		
8	+18	16	11.6	+10	29	44.1	+10		55.2	+11	17	22.9			33.9		
2			15.0			47.6			58.6			26.3			41.2		
9			18.9			51.2			2.4			30.0			49.2		
8			57.7			220.5			216.0			114.4			169.4		
6			11.54			44.10			43.20			22.88			33.88		
26	10	25	11.54	10	29	44.10	10	34	55.20	10	51	22.88	11	4	33.88		
21			-.22			-.22			-.22			-.21			+ .31		
08			+ .08			+ .08			+ .08			+ .08			+ .18		
00			.00			.00			.00			.00			.00		
53	10	25	11.40	10	29	43.96	10	34	55.06	10	51	22.75	11	4	34.87		
05				10	20	14.42	10	25	25.56	10	41	53.14	11	55	4.82		
58				+9		29.54	+9		29.50	+9		29.61	+9		29.55		
07	10	15	41.84	10	20	14.40	10	25	25.50	10	41	53.19	11				

March. 21. 1859.

Ill. East.

A. H.

μ Geminor			51 (Hev.) Cephei			Sirius			ε Can. Maj			δ Geminor		
6	23	50.5	6	40	19.4	6	48	20.9	7	2	29.1	7	21	7.0
		54.4		41	37.4			24.8			33.3			11.0
		58.1		42	46.4			28.3			37.1			14.8
		1.8		44	0.6			31.8			41.0			--
		5.8		45	12.0			35.4			45.2			--
		170.6			115.8			141.2			185.7			
		34.12			23.18			28.24			37.14			
6	23	58.12	6	42	47.18	6	48	28.24	7	2	37.14			
		- .15			+ 6.18			- .38			- .45			
		- .10			- 1.48			- .05			- .04			
		+ .00			+ 0.02			1.00			1.00			
6	23	57.87	6	42	51.90	6	48	27.81	7	2	36.65			
6	14	27.31	6	33	28.42	6	38	57.42	6	53	6.26			
	9	30.56		9	27.98		9	30.39		9	30.39			

March, 28. 1859.

Used $a = -0.462$ } Not very reliable
 $b = +0.022$ }
 $c = +0.010$ }
 Ill. East

A.H.

δ urs. min. S.P.			51 (Thev) Cephei			Sirius			ε Leon. Maj.			γ Leon. Maj.		
6	25	18.8	6	40	20.0	6	48	19.8	7	2	28.3	7	6	46.9
	26	20.5		41	35.3			23.6			32.4			50.6
	27	17.0		42	46.0			27.2			36.3			54.2
	28	15.0		43	56.6			30.8			40.2			57.7
	29	15.9		45	12.2			34.5			44.3			1.3
		87.2			170.1			135.9			181.5			290.7
		17.44			34.02			27.18			36.30			42.14
6	27	17.44	6	42	46.02	6	48	27.18	7	2	36.30	7	6	54.14
		-6.05			+6.79			-0.41						
		-0.23			+ .33			+ 0.01						
		-0.19			+ 21			+ 0.01						
6	27	10.97	6	42	53.35	6	48	26.79						
	17	42.51		33	21.04		38	57.29						
	9	28.46		9	32.31		9	29.50						

March 28, 1859.

Ill. East.

A.H.			H.P.T.			Mar. 30. A.H.			" "			" "		
δ Geminor			Saturn I. Limb			δ Geminor			α Can. Min			β Geminor		
7	21	6.0	8	41	35.7	7	34	58.6	7	41	18.9	7	46	4.2
		9.8			39.2			2.9			22.6			8.2
		13.5			43.0			6.9			26.1			12.2
		17.1			46.5			10.8			29.5			16.0
		21.1			50.3			15.4			33.2			20.0
		67.5			214.7			94.6			130.3			60.6
		13.50			42.94			18.92			26.06			12.12
7	21	13.50	8	41	42.94	7	35	6.92	7	41	26.06	7	46	12.12

Apr. 1. 1859

Apr. 4.

Ill. East.

A. H.			"		
β Geminor			α Geminor		
7	46	3.4	7	34	57.2
		7.5			1.4
		11.4			5.6
		15.4			9.4
		19.4			13.7
		57.1			87.3
		11.42			17.46
7	46	11.42	7	35	5.46
					-.10
					-.02
					+.01
			7	35	5.35
			7	25	37.80
			9		27.55

Apr. 5. 1859.

Ill. East.

A. H.			8 ["] Geminor			2 ["] Geminor			α lean Min			β ["] Geminor		
ε lean Maj.														
7	2	25.8	7	21	3.5	7	34	56.9	7	41	17.4	7	46	2.4
		30.0			7.4			1.0			21.0			6.6
		33.9			11.2			5.2			24.5			10.5
		37.8			14.8			9.2			27.9			14.4
		41.9			18.7			13.5			31.3			18.4
		169.4			55.6			85.8			122.1			52.3
		33.88			11.12			17.16			24.42			10.46
7	2	33.88	7	21	11.12	7	35	5.16	7	41	24.42	7	46	10.46
		-.53			-.18			-.10			-.29			-.13
		-.01			-.02			-.02			-.02			-.02
		+ .01			+ .01			+ .01			+ .01			+ .01
7	2	33.35	7	21	10.93	7	35	5.05	7	41	24.12	7	46	10.32
6	53	5.95	7	11	43.61	7	.25	37.78	7	31	56.61	7	36	42.86
	9	27.40		9	27.31		9	27.27		9	27.51		9	27.46

Apr. 7. 1859.

 $a = -0.48$
 $b = +0.02$
 $c = +0.01$

Ill. East.

A. H. (cloudy) Moon I.V.				" α Aurigae		" β Tauri (unsteady)		" ϵ Orionis			
4	52	22.3	5	15	34.5	5	26	43.0	5	38	24.8
		26.4			39.5			47.4			28.5
+27°		30.2			44.6			51.2			31.9
		34.3			49.6			55.0			35.3
		38.4			54.7			59.3			38.8
		151.6			222.9			255.9			159.3
		30.32			44.58			51.18			31.86
4	52	30.32	5	15	44.58	5	26	51.18	5	38	31.86
		-.15			-.05			-.13			-.33
		+.02			+.03			+.02			+.01
		+.01			+.08			+.01			+.01
4	52	30.20	5	15	44.57	5	26	51.08	5	38	31.55
	9	27.21	5	6	17.54	5	17	23.72	5	29	4.32
				+ 9	27.03		+ 9	27.36		+ 9	27.23
								.03			
								.23			
							+ 9	27.21			
4	43	2.99	5	6	17.36	5	17	23.87	5	29	4.34

Apr. 8. 1859

$a = -0.48$

$b = +0.01$

$c = +0.01$

M. East

A. M.

Moon I.V.

 μ Gemino γ Gemino

5	58	best	6	23	46.6	6	38	55.1
		11.4			50.6			59.0
+29°	54'	15.4			54.3			2.6
		19.3			58.0			6.0
		23.6			1.9			9.9
		69.7			211.4			132.6
		17.42			42.28			26.52
5	58	15.42	6	23	54.28	6	38	26.52
		-.14			-.18			-.22
		+1.01			+1.02			+1.01
		+1.01			+1.02			+1.01
5	58	15.30	6	23	54.14	6	38	26.32
	9	27.12	6	14	27.00	6	29	35.22
				+9	27.14		+9	27.16
							+9	27.12
5	48	48.18	6	14	27.02	6	29	35.20

Eq. Dist. Mean -1.7245

log 0.2366_nlog p_{γ} 0.0537sec δ 0.01170.3020_n

cor = - 2.00

Apr. 9. Mr. Bond has set E. C. back about 9 minutes

Apr. 9. 1859.

Ill. East

 $a = -0.48$
 $b = +0.01$
 $c = +0.01$

A.H.			"			"			"			"		
κ Aurigae			μ Geminor			Moon I.V.			ι Geminor			ν Geminor		
6	15	43.9	6	23	46.5	7	3	53.8	7	26	18.8	7	36	34.8
		48.0			50.3			58.0			22.8			38.8
		51.9			54.2			2.1			26.7			42.6
+ 30°		55.7	+ 23		57.9	+ 26		5.8	+ 28		30.5	+ 27		46.3
		~~59.9~~			~~1.8~~			~~10.0~~			~~34.7~~			~~50.3~~
		259.4			210.7			129.7			133.5			212.8
		51.88			42.14			25.94			26.70			42.56
6	15	51.88	6	23	42.14	7	4	1.94	7	26	26.70	7	36	42.56
		- .12			- .17			- .15			- .14			- .15
		+ .01			+ .01			+ .01			+ .01			+ .01
		+ .01			+ .01			+ .01			+ .01			+ .01
6	15	51.78	6	23	53.99	7	9	1.81	7	26	26.58	7	36	42.43
6	6	24.79	6	14	26.98	7	9	26.94	7	16	59.64	7	27	15.60
+ 9		26.99	+ 9		27.01					+ 9	26.94		+ 9	26.83

6	6	24.84	6	14	27.05	6	59	34.87	7	16	59.64	7	27	15.49
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26.99

27.01

26.94

26.83

+9 26.94

Apr. 12. 1859

Ill. East.

$a = -0.47$

$b = +0.01$

$c = +0.02$

A. H.				"				"				"			
Moon I.V.				α Leonis				γ Leonis				45 Leonis			
9	54	35.6	10	1	12.9	10	12	32.8	10	20	33.3	10	25	44.5	
		39.3			16.5			36.5			37.0			48.1	
		43.0			19.9			40.2			40.4			51.6	
+13°		46.4			23.4	+21		43.7	+10.5		43.8	+10		55.0	
		50.3			27.3			47.6			47.4			58.7	
		214.6			100.0			200.8			201.9			257.9	
		429.2			20.00			40.16			40.38			51.58	
9	54	42.92	10	1	20.00	10	12	40.16	10	20	40.38	10	25	51.58	
		-.23			-.24			-.18			-.24			-.25	
		+.01			+.01			+.01			+.01			+.01	
		+.02			+.02			+.02			+.02			+.02	
9	54	42.72	10	1	19.79	10	12	40.01	10	20	40.17	10	25	51.36	
		25.92	10	0	53.85	10	12	14.13	10	20	14.45	10	25	25.42	
					+25.94			+25.88			+25.72			+25.94	
9	54	16.80	10	0	53.87	10	12	14.09	10	20	14.25	10	25	25.44	

25.94

25.88

25.72 $W = \odot$

25.94

+25.92

Apr. 15. 1859

All. East

A H			" "		
η Cancri			ϵ Hydrae		
8	24	52.2	8	39	38.0
		56.2			41.7
		59.9			45.2
		3.4			48.5
		<u>7.3</u>			<u>52.1</u>
		179.0			225.5
		35.80			45.10
8	24	59.80	8	39	45.10
		-.19			-.27
		-.01			-.01
		<u>+.02</u>			<u>+.02</u>
8	24	59.62	8	39	44.84
8	24	34.88	8	39	20.17
EB fast	24.74		EB fast	24.67	

Apr. 16. 1859.

M. East.

$a = -0.47$

$b = +0.02$

$c = +0.04$

H. P. J.

β Corvi			γ Virginis			ψ Virginis			η Virginis			Moon I.U.		
12	27	19.0	12	34	51.2	12	47	21.8	13	2	13.2	13	22	24.2
		22.9			54.9			25.3			16.7			27.8
		26.7			58.2			28.8			20.4			31.7
		30.1	-1		1.5	+9		32.1	+10		23.8	-13		35.1
		34.0			5.2			35.8			27.3			38.9
		132.7			171.0			143.8			101.4			157.7
		26.54			34.20			28.76			20.28			31.54
12	27	26.54	12	34	58.20	12	47	28.76	13	2	20.28	13	22	31.54
		-46			-32			-36			-37			-39
		+0.01			+0.01			+0.01			+0.01			+0.01
		+0.04			+0.04			+0.04			+0.04			+0.04
12	27	26.13	12	34	57.93	12	47	28.45	13	2	19.96	13	22	31.20
12	27	1.55	12	34	33.58	12	47	4.02	13	0	33.41			24.50
		+24.58			+24.35			24.43						
					24.58									
					24.43									
					131									
					24.44									
12	27	1.63	12	34	33.43	12	47	3.95	13	1	53.46	13	22	6.70

This star appears not to be of Virginis

Apr. 16 1859

Apr. ¹⁸19. 1859

Ill. East.

 $a = -.46$
 $b = +.03$
 $c = +.05$

H. P. J.

H. P. J.

Weise 573?

B. A. b. 4896

B. A. b. 4923

ψ Bootis

β Librae

13	34	16.2	14	44	2.5	14	50	34.2	14	58	43.4	15	9	45.6
		19.4			5.9		49	38.0			47.4			49.3
		23.0			9.6			41.7			51.3			52.8
		26.3	-17		13.0	-21		45.2 + 27.5			55.0	-9		56.1
		30.2			16.9			49.2			59.3			59.8
		115.1			47.9			208.3			256.4			263.6
		23.02			9.58			41.66			51.28			52.72
13	34	23.02	14	44	9.58	14	50	41.66	14	58	51.28	15	9	52.72
					-41			-44			-14			-36
					+01			+01			+04			+02
					+05			+05			+06			+05
			14	44	9.23	14	49	41.28	14	58	51.22	15	9	52.33
			14	43	44.68	14	49	16.83	14	58	27.05	15	9	27.98
					+24.55			+24.45			+24.17			+24.35

14	43	44.84	14	49	16.89	14	58	26.83	15	9	27.94
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Apr. ¹⁸/₁₉. 1859.

H. P. L.

W. East

Apr. ¹⁹/₂₀

A. W.

Moon II. V.			♏ Scorpii			♏ Scorpii			Polaris		
15	12	59.7	15	41	49.9	15	48	30.6	1	2	19.4
	11	3.8		42	54.1			34.8		4	39.0
		7.5			58.0			39.0		6	59.1
-23		11.3	-25		1.4	-29		42.6		9	11.2
		15.4			5.7			46.8		11	35.5
		97.7			169.1			193.8			164.2
		19.54			33.82			38.76			32.84
15	13	7.54	15	41	57.82	15	48	38.76	1	6	56.84
μ		-.46			-.47			-.50			
$\frac{2}{6}$		+.01			+.01			+.01			
$\frac{1}{6}$		+.05			+.05			+.06			
15	12	7.14	15	42	57.41	15	48	38.33			
15	13	24.39	15	42	33.12	15	48	13.98			
					+ 24.29			+ 24.35			

15 11 42.75 15 42 33.02 15 48 13.94

Apr. 20. 1859

M. East

A. H.			" Mrs. Maj.		
E Hydraz					
8	39	36.6	8	49	47.6
		40.3			53.1
		43.8			58.5
		47.2			3.4
		50.8			9.0
		218.7			171.6
		43.74			34.32
8	39	43.74	8	49	58.32
		-.26			+.08
		-.03			-.06
		+.06			+.09
8	39	43.51	8	49	58.21
8	39	20.10	8	49	34.73
Eb fast		23.41	Eb fast		23.48

I have counted from the beginning of the book to this page the number of times that I have estimated each tenth of a second in reading off the sheets. The following is the result.

Apr. 22. 1859

A. H.

Tenth	No. of Estimations
.0	71 + 16.3
.1	30 - 24.7
.2	80 + 25.3
.3	68 + 13.3
.4	62 + 7.3
.5	37 - 17.7
.6	31 - 23.7
.7	49 - 5.7
.8	74 + 19.3
.9	45 - 9.7
	571.7

Apr. $\frac{24}{25}$ 1859.

$a = -0.40$

$b = +0.03$

$c = 0.04$

M. East

A.H.

β Aquilae		α^2 Capricorn		α Cygni		Moon II U	
19	48	29.0	20 10	19.6	20 36	38.9	20 43 9.1
		32.5		23.2		44.0	13.2
		36.0		26.7		49.0	16.9
		39.3		30.2		53.7 - 20°	20.6
		43.0		34.0		58.8	24.6
		179.8		133.7		244.4	84.4
		35.96		26.74		48.88	16.88
19	48	35.96	20 10	26.74	20 36	48.88	20 43 16.88
		-.24		-.33		+.03	-.38
		+.02		+.02		+.04	+.01
		+.04		+.04		+.06	+.04
19	48	35.78	20 10	26.47	20 36	49.01	20 43 16.55
19	48	24.74	20 10	15.39	20 36	38.06	11.08
		+ 11.04		+ 11.08		+ 10.95	20 43 5.52

19 14 24.75 20 10 15.42 20 36 37.98 20 43 5.52

Apr. $\frac{24}{25}$ 1859.

The rate of E.C. has been affected by altering the break circuit on Apr. 21.

A.H.

P.S. Mr. R. F. Bond altered the break circuit on the evening of Apr. 24, after the previous change.

A.H.

Apr. 27. 1859

Ill. East

A. H.			" "			" "			" "			" "		
p Leonis			h Leonis			α Urs Maj			χ Leonis			δ Leonis		
10	25	29.1	10	41	56.7	10	54	59.1	10	57	50.7	11	6	42.2
		32.8			0.4			7.0			54.4			46.0
		36.2			3.9			14.6			57.8			49.7
		39.5			7.4			21.8			1.0			53.4
		43.3			11.0			29.7			4.8			57.3
		180.9			79.4			132.2			168.7			248.6
		36.18			15.88			26.44			33.74			49.72
10	25	36.18	10	42	3.88	10	55	14.44	10	57	57.74	11	6	49.72
		-.21			-.20			+.29			-.22			-.15
		-.03			-.03			-.06			-.02			-.03
		+.03			+.03			+.06			+.03			+.03
10	25	35.97	10	42	3.68	10	55	14.73	10	57	57.53	11	6	49.57
10	25	25.26	10	41	52.86	10	55	4.06	10	57	57.84	11	6	38.86
E6 fast		10.71			10.82			10.67			10.69			10.71
								.71						
								82						
								69						
								71						
								360						
E6 fast								10.72	at 10 ^h 50 ^m					

1859. Apr. $\frac{25}{26}$.

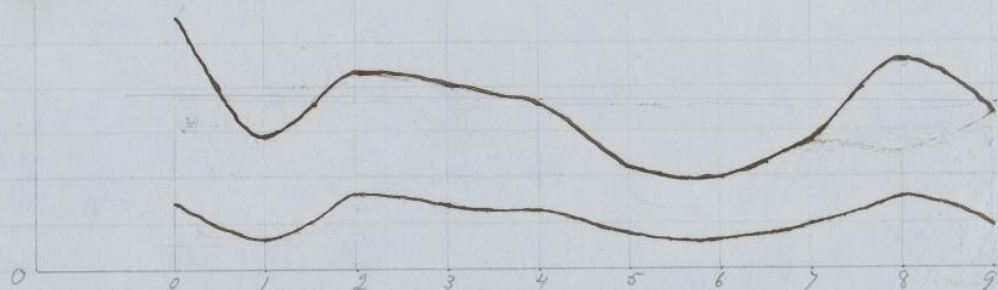
I have counted my estimations of the tenths of a second in all the observations contained in the preceding transit book. The following is the result.
A.H.

Tenths	No. of Estimations		
.0	275	+	98.9
.1	143	-	33.1
.2	215	+	38.9
.3	201	+	24.9
.4	180	+	3.9
.5	111	-	65.1
.6	100	-	76.1
.7	138	-	38.1
.8	227	+	50.9
.9	171	-	5.1
	176.1		

Curve of The Estimations
on the preceding pages.

The upper curve corresponds to the estimations on
the preceding page.

A. H.



Apr. 29. 1859

Ill. East

May. 2.

A H			A H			A H			A H			A H		
ϵ Leonis			π Leonis			α Leonis			β Corvi			γ' Virginis		
9	37	54.6	9	52	50.2	10	0	56.1	12	27	2.2	12	34	34.8
		58.4			54.0			59.9			6.1			38.3
		2.3			57.4			3.4			9.9			41.7
		5.9			0.9			6.9			13.7			45.1
		10.0			4.4			10.6			17.4			48.7
		131.2			166.9			136.9			49.2			208.6
		26.24			33.38			27.38			9.84			41.72
9	38	2.24	9	52	57.38	10	1	3.38	12	27	9.84	12	34	41.72
		-.13			-.19			-.20			-.38			
		-.03			-.03			-.03			-.01			
		+ .03			+ .03			+ .03			+ .03			
9	38	2.11	9	52	57.19	10	1	3.18	12	27	9.48			
9	37	52.65	9	52	47.57	10	0	53.64	12	27	1.54			
86		+ 9.46			+ 9.62			9.54			7.94			
								.62						
								.46						
						86		+ 9.54						

May. 13. 1859

M. East

A.H.

α Leonis			γ' Leonis			ρ Leonis		
10	0	48.8	10	12	8.3	10	25	20.0
		52.1			12.1			23.7
		55.6			15.8			27.1
		59.0			19.4			30.6
		28			23.2			34.2
		217.8			78.8			135.6
		43.56			15.76			27.12
10	0	43.56	10	12	15.76	10	25	27.12
		- .12			- .09			- .12
		+ .05			+ .05			+ .05
		+ .12			+ .13			+ .12
10	0	55.61	10	12	15.85	10	25	27.17
10	0	53.48	10	12	13.76	10	25	25.09
EC	+	2.13			2.09			2.08

May 18. 1859

Ill. East

A. H.			" "			" "			" "			" "		
E Corvi			γ Virginis			β Corvi			γ Virginis			12 Can. Ven.		
12	1	45.2	12	12	34.8	12	26	51.9	12	34	24.1	12	49	17.1
		49.0			38.3			55.6			27.8			21.9
		52.7			41.9			59.4			31.2			26.1
		56.3			45.2			3.1			34.7			30.5
		0.2			48.8			7.0			38.1			35.1
		203.4			209.0			177.0			155.9			130.7
		40.68			41.80			35.40			31.18			26.14
12	1	52.68	12	12	41.80	12	26	59.40	12	34	31.18	12	49	26.14
								-0.26						-0.02
								+0.05						+0.16
								+0.08						+0.10
						12	26	59.27				12	49	26.38
						12	27	1.46				12	49	28.60
						EC		-2.19				EC		-2.22
								2.22						
						EC		-2.21						
								+2.10						
						57		4.31						
						Rate	=	-0.86						

May 23. 1859.

M. East

May ²³/₂₄

A.H.			"			"			A.H.		
Hyd. Crat.			v Leonis			β Leonis			α Cephei		
11	12	5.6	11	29	32.1	11	41	40.1	21	14	50.7
		9.3			35.7			43.9			58.4
		12.8			39.2			47.4			5.8
		16.3			42.6			50.9			13.0
		20.0			46.2			54.7			21.1
		64.0			195.8			237.0			149.0
		12.80			39.16			47.40			29.80
11	12	12.80	11	29	39.16	11	41	47.40	21	15	5.80
											+ .06
											+ .26
											+ .11
									21	15	6.23
									21	15	13.66
											- 7.43

May $\frac{23}{24}$ 1859.

M. East

 $a = -.09$
 $b = +.13$
 $c = +.05$

A.H.			"			"			"			"		
β Aquarii			γ Capricorn (faint)			ϵ Pegasi			δ Capricorn (faint)			Morn II.V.		
21	23	55.9	21	32	4.5	21	37	3.0	21	39	3.1	21	57	38.1
		59.6			8.0			6.8			6.9			42.0
		3.0	-17		11.6			10.2	-17		10.5	-7		45.6
		6.3			15.2			13.6			14.1			49.1
		10.1			19.0			17.4			17.8			53.0
		134.9			58.3			51.0			52.4			227.8
		26.98			11.66			10.20			10.48			45.56
21	24	298	21	32	11.66	21	37	10.20	21	39	10.48	21	57	45.56
		-.07			-.08			-.05			-.08			-.07
		+.09			+.04			+.11			+.04			+.05
		+.05			+.05			+.05			+.05			+.05
21	24	3.05	21	32	11.67	21	37	10.31	21	39	10.49	21	57	45.59
21	24	10.13	21	32	18.77	21	37	17.50	21	39	17.48			
		-7.08			-7.10			-7.19			-6.99			
21	24	10.15	21	32	18.77	21	37	17.42	21	39	17.60	21	57	52.71

May 27. 1859

All. East

A. H.

12	Can.	Ven.	"	Polaris	S.P.	"	Spica	
12	49	7.6	13	2	19.0	13	17	29.8
		12.2		4	40.3			33.4
		16.6		6	54.8			36.9
		21.3		9	10.9			40.4
		<u>25.8</u>		11	<u>36.0</u>			<u>44.0</u>
		83.5			161.0			184.5
		16.70			32.20			36.90
12	49	16.70	13	6	56.20	13	17	36.90
		-0.00			-1.81			-0.03
		+0.16			-3.02			+0.07
		+0.06			-2.05			+0.05
12	49	16.92	13	7	49.82	13	17	36.99
12	49	<u>28.50</u>	13	7	<u>3.26</u>	13	17	<u>48.74</u>
86		-11.58			-13.44	86		-11.75
					2 mid = wire			-0.82
								-14.26

June 6. 1859

M. West

 $a = -.05$
 $b = +.22$
 $c = -.10$

June 6

A.H.			"			"			"			"		
α Leonis			Moon IV.			β Leonis			γ Urs Maj			α Pegasi		
10	0	26.9	10	13	48.2	11	41	27.7	11	45	55.3			
		30.6			51.9			31.4			1.6			
		34.0	+10	3	55.3			34.9			7.4	23	57	26.9
		37.5	clouds		—			38.4			13.3			
		41.2	"		—			42.2			19.5			
		170.2			155.4			174.6			97.1			
		34.04			51.80			34.92			19.42			
10	0	34.04	10	13	55.41	11	41	34.92	11	46	7.42			
		-.03			-.03			-.02			-.02			
		+.22			+.19			+.20			+.37			
		-.09			-.10			-.10			-.17			
10	0	34.14	10	13	55.47	11	41	35.00	11	46	7.60			
10	0	53.22			-19.10	11	41	54.10	11	46	26.82			
		-19.08						-19.10			-19.22			

10 0 53.22 10 14. 14.57 11 41 54.16 11 46 26.76

 $E_{\gamma} \text{ in } \mu\text{m} + 3.476$
 $\log = 0.5411$
 $\log p = 0.0100$
 $\text{red} 0.0067$
 $\text{cut} = + 3.61 \quad 0.5578$

June 7. 1859

M. West

 $a = -0.05$
 $b = +0.23$
 $c = -0.10$

A. He.			Moon I.T.			S Hyd. Cart		
α Urs Maj								
10	54	27.9	11	5	55.4	11	11	52.8
		35.7			59.2			56.4
		43.0			2.6			59.9
		50.4	+3		6.0	-15		3.5
		58.3			9.8			7.2
		215.3			133.0			179.8
		43.06			26.60			35.96
10	54	43.06	11	6	26.60	11	11	59.96
		+ .04			- .03			- .04
		+ .47			+ .18			+ .13
		- .22			- .10			- .10
10	54	43.35	11	6	26.65	11	11	59.95
10	55	2.70			19.36	11	12	19.32
		-19.35						-19.37

10 55 2.71 11 6 46.01 11 12 19.31

June 9/10 1859.

M. West

 $a = -.042$
 $b = +.260$
 $c = .112$

A.H.

32 Vulpeculae			61' Cygni			5' Cygni			α Cephei			β Aquarii		
20	48	8.2	21	0	8.9	21	6	31.0	21	14	40.1	21	23	44.4
		12.2												
		16.1			13.6			35.3			47.6			48.0
		20.0			17.7			39.1			54.7			51.3
		24.0			22.1			42.9			2.0			54.9
		~~58.3~~			26.7			47.2			9.9			58.4
		80.5			89.0			195.5			154.3			257.0
		16.10			17.80			39.10			30.86			51.40
20	48	16.10	21	0	17.80	21	6	39.10	21	14	54.86	21	23	51.40
azim. cor.		-.01			.00			-.01			+.03			-.03
lv. "		+.28			+.33			+.29			+.52			+.77
coll. "		-.12			-.14			-.12			-.23			-.11
20	48	16.25	21	0	17.99	21	6	39.26	21	14	55.18	21	23	51.43
20	48	35.44	21	0	36.88	21	6	58.39	21	15	14.42	21	24	10.63
E.l.		-19.19			-18.89			-19.13			-19.24			-19.20
								.19						
								.24						
								.20						
						E.l.		-19.19						

June $\frac{10}{11}$. 1859.

M. West

H. P. J.

61' Cygni

5 " Cygni

21 0 8.8 21 6 30.9

13.2 35.2

17.3 38.8

21.9 42.9

26.9 47.0

88.1 194.8

17.62 38.96

21 0 17.62 21 6 38.96

June 11. 1859

Weat
M. Easta, .03
b, +.26
c, -.11

A. H.

p Bootis			Moon I.V.			2 ² Librae			i ² Librae		
14	25	20.2	14	28	51.8	14	42	41.0	15	3	47.8
		24.3			55.3			44.9			51.7
		28.2			59.1			48.6			55.2
+31		32.4 - 20			3.0			52.0 - 19			58.9
		36.6			6.8			55.8			25
		141.7			176.0			242.3			216.1
		28.34			35.20			48.46			43.22
14	25	28.34	14	28	59.20	14	42	48.46	15	3	55.22
		-.01			-.03			-.03			-.03
		+.30			+.13			+.14			+.13
		-.13			-.11			-.11			-.12
14	25	28.50	14	28	59.19	14	42	48.46	15	3	55.20
14	25	48.17				14	43	8.06	15	4	14.79
		-19.67						-19.60			-19.59
14	25	48.12	14	29	18.81	14	43	8.08	15	4	14.82

June 14. 1859.

All. West

A.H.

12	49	1.1	13	2	16.2	13	17	23.2	13	27	8.0
		5.7			19.9			27.0			11.7
		10.1			23.3			30.4			15.0
		—			26.8			33.9			18.4
		19.1			30.3			37.6			22.0
					116.5			152.1			75.1
					23.30			30.42			15.02
			13	2	23.30	13	17	30.42	13	27	15.02

June 19/20. 1859.

Ill. West.

$a = +.05$

$b = +.19$

$c = -.09$

A.H.

 β Aquarii γ Capricor

Moon II V.

21	20	7.1	21	29	15.3	21	37	17.3
		10.8			19.2			21.1
		14.2			22.9			24.8
		17.6	-17		26.6	-14		28.3
		21.2			30.2			32.2
		70.9			114.0			123.7
		14.18			22.80			24.74
21	20	14.18	21	29	22.80	21	37	24.74
		-.04			-.04			-.04
		+.12			+.10			+.11
		-.09			-.09			-.09
21	20	14.17	21	29	22.77	21	37	24.72
21	24	10.93	21	32	19.80		2	56.85
	2	56.76		2	57.03			
					56.76			
				2	56.85			

21	24	11.02	21	32	19.62	21	40	21.57
----	----	-------	----	----	-------	----	----	-------

June 25. 1859.

J. H. West

 $a = -0.01$
 $b = +0.15$
 $c = -0.08$

A. H.

γ Urs. maj			γ Bootis			τ Virginis			α Bootis			ρ Bootis		
13	42	48.5	13	48	51.2	13	55	21.8	14	10	6.9	14	26	37.7
		54.2			55.1			25.5			10.9			41.9
		59.4			58.7			29.0			14.3			45.8
		4.8			2.4			32.5			18.0			49.8
		10.4			6.1			36.0			22.0			54.0
		177.3			173.5			144.8			72.1			229.2
		35.46			34.70			28.96			14.42			45.84
13	42	59.46	13	48	58.70	13	55	28.96	14	10	14.42	14	26	45.84
		.00			.00			-.01			.00			.00
		+.23			+.15			+.12			+.15			+.16
		-.12			-.08			-.08			-.08			-.09
13	42	59.57	13	48	58.77	13	55	28.99	14	10	14.49	14	26	45.91
13	42	1.75	13	48	0.92	13	54	31.03	14	9	16.57	14	25	48.06
		57.82			57.85			57.96			57.92			57.85
								.85						
								.82						
								.92						
								.85						
								4.40						
								57.88						

June 25.

I have divided the reading scale into half seconds and used it for the first time in reading the observations on this page.

A. H.

June 26, 1859

June 30.

July 1. Ill. West.

A. H.

1859ph

α Virginis	ρ Bootis	γ Bootis	α Bootis	ρ Bootis
13 48 42.2	14 26 43.7	13 48 58.9	14 10 14.5	14 26 45.3
46.0	47.9	2.8	18.5	53.6
49.4	51.9	6.4	22.2	57.5
52.9	55.8	10.1	25.7	1.7
56.5	0.0	13.9	29.5	49.6
247.0	199.3	92.1	110.4	207.7
49.40	39.86	18.42	22.08	41.54
13 18 49.40	14 26 51.86	13 49 6.42	14 10 22.08	14 26 53.54
- .01		+ 0.08	+ 0.08	+ 0.05
+ .09		+ 0.30	+ 0.30	+ 0.34
- .08		- 0.10	- 0.10	- 0.10
13 18 49.40		13 49 6.70	14 10 22.36	14 26 53.83
13 17 48.54		13 48 0.86	14 9 16.51	14 25 47.99
1 0.86	E.C. + 1	5.84	1 5.85	1 5.84

July 5. 1859.

O. W. West

 $a = +.16$
 $b = +.27$
 $c = -.09$

A. H.

Moon I. O.			β Virginis			γ Urs. Maj.			η Virginis		
11	40	37.3	11	44	27.2	11	47	25.3	12	13	48.0
		41.0			30.8			31.5			51.7
		44.4			34.2			37.3			55.0
-1°		48.1	+3°		37.7			43.2	0°		58.4
		51.7			41.2			49.5			2.0
		222.5			171.1			186.8			215.1
		44.50			34.22			37.36			43.02
11	40	44.50	11	44	34.22	11	47	37.36	12	13	55.02
		+ .10			+ .10			+ .06			+ .10
		+ .20			+ .21			+ .45			+ .20
		-.09			-.09			-.15			-.09
11	40	44.71	11	44	34.44	11	47	37.72	12	13	55.23
	1	11.57	11	43	22.95	11	46	26.13	12	12	43.54
			+ 1	11.49		+ 1	11.59		+ 1	11.69	
							.49				
							.69				

+ 1 11.59 at 11^h 55^m
 Gliese + 0.07

11 39 33.14 11 43 22.87 11 46 26.14 12 12 43.62

July 6. 1859

Ill. West-

A. H.

β Virginis			γ Urs. Maj.			η Virginis		
11	44	28.7	11	47	26.7	12	13	49.4
		32.4			32.9			53.0
		35.7			38.7			56.3
		39.1			44.6			59.8
		42.7			50.9			3.4
		178.6			193.8			221.9
		35.72			38.76			44.38
11	44	35.72	11	47	38.76	12	13	56.38
		+ .28			+ .45			+ .27
11	44	36.00	11	47	39.21	12	13	56.65
11	43	22.94	11	46	26.11	12	12	43.54
	1	13.06		1	13.10		1	13.11

Moon lost by pen failing to record.

July. 7. 1859 *Adams*

Ill. West

$$\begin{aligned} a &= +.15 \\ b &= +.25 \\ c &= -.09 \end{aligned}$$

A.H.			"Can. Ven."			Polaris S.P.			"Virginis"			Moon I.V.		
"Virginis"			12			13			13			13		
12	35	40.3	12	50	33.2	13	4	13.0	13	18	55.7	13	22	15.3
		44.0			37.9		6	33.8			59.4			19.1
		47.4			42.2		8	51.1			2.9			22.7
-1		50.8	+39		46.6		11	3.8			6.4	-14		26.3
		54.4			51.2		13	26.6			10.0			30.1
		236.9			211.1			128.3			134.4			113.5
		47.38			42.22			25.66			26.88			22.70
12	35	47.38	12	50	42.22	13	8	59.66	13	19	2.88	13	22	22.70
		+.10			+.01			-4.50			+.11			+.13
		+.19			+.32			+6.50			+.15			+.15
		-.09			-.11			+3.57			-.09			-.09
12	35	47.58	12	50	42.44	13	8	55.23	13	19	3.05	13	22	22.89
12	34	33.12	12	49	27.89	13	7	38.47	13	17	48.45		1	14.55
	+1	14.46		+1	14.55		+1	16.76		+1	14.60			
					.60									
					47									
				1	14.54									
12	34	33.05	12	49	27.90	13	7		13	17	48.50	13	21	8.34

I have computed the coefficients for the instrumental corrections of Polaris for the above observation and find

$$\log \sec \delta = 1.59880$$

$$\log \frac{\sin(\phi + \delta)}{\cos \delta} = 1.47702$$

$$\log \frac{\cos(\phi + \delta)}{\cos \delta} = 1.41516n$$

A.H.

July. 7. 1859

Ill. West

1859phae.

A. H.		5 Virginis		η Urs. maj.		η Bootis		α Bootis		ρ Bootis					
13	28	40.5	13	43	5.0	13	49	7.8	14	10	23.4	14	26	54.1	
		44.1			10.6			11.6			27.2			58.2	
		47.4			15.8			15.2			30.8			2.1	
0		50.8	+50		21.1	+19		18.8			34.4	+31		6.2	
		54.4			26.6			22.5			38.2			10.3	
		237.2			79.1			75.9			154.0			130.9	
		47.44			15.82			15.18			30.80			26.18	
70	13	28	47.44	13	43	15.82	13	49	15.18	14	10	30.80	14	27	2.18
13			+1.0			-1.03		+1.06			+1.06			+1.03	
5-			+1.19			+1.89		+1.24			+1.25			+1.28	
09			-1.09			-1.14		-1.10			-1.16			-1.10	
89	13	28	47.64	13	43	16.04	13	49	15.38	14	10	31.01	14	27	2.39
55-	13	27	33.10	13	42	1.48	13	48	0.79	14	9	16.44	14	25	47.92
		+1	14.54		+1	14.56		+1	14.59		+1	14.57		+1	14.57
			.56												
			.59												
			.57												
			.47												
		1	14.55												
13	27	33.09	13	42	1.49	13	48	0.83	14	9	16.46	14	25	47.84	

July. 9. 1859.

Ill. West

a. +.12
b. +.19
c. -.10

A. H.

α^2 Librae			β Urs. Maj.			γ Bootis			Moon I.V.			β Librae		
14	44	17.4	14	52	2.7	14	59	35.8	15	7	45.6	15	10	38.2
		21.2			16.6			39.8			49.3			41.8
		24.7			29.4			43.7	-2.3		53.3			45.2
		28.3			42.5			47.6			57.2			48.8
		31.9			56.2			51.6			1.2			52.4
		123.5			147.4			218.5			206.8			226.4
		24.70			29.48			43.70			41.36			45.28
14	44	24.70	14	52	29.48	14	59	43.70	15	7	53.36	15	10	45.28
		-.11			+.24			+.04			+.12			+.09
		+.11			+.61			+.21			+.09			+.12
		-.10			-.38			-.11			-.10			-.10
14	44	24.60	14	52	29.95	14	59	43.84	15	7	53.47	15	10	45.39
14	43	7.94	14	51	18.03	14	58	27.82				15	9	28.42
+ 1		16.66	+ 1		16.92	+ 1		16.72				+ 1		16.97

14	43	7.79	14	51	13.	14	58	27.00	15	6	36.63	15	9	28.55
----	----	------	----	----	-----	----	----	-------	----	---	-------	----	---	-------

14	44	16.66
	52	16.92
15	10	16.72
	18	16.97
	30	16.87
	33	16.80
	39	16.93

 15^h 13 +1 16.84

July 9. 1859

Ill. West

A. N.

	39 Librae			42 Librae			α Serpentis		
2.2	15	29	40.7	15	33	9.6	15	38	32.2
.8			44.8			13.5			35.8
2.2	-28		48.6	-23		17.2			39.2
5.8			52.5			21.0			42.8
2.4			56.6			24.9			46.4
6.4			243.2			86.2			196.4
2.8			48.64			17.24			39.28
28	15	29	48.64	15	33	17.24	15	38	39.28
0.9			+ .13			+ .12			+ .07
12			+ .08			+ .09			+ .16
10			- .10			- .10			- .10
39	15	29	48.70	15	33	17.35	15	38	39.43
42	15	28	31.88	15	32	0.55	15	37	22.48
97		+ 1	16.87		+ 1	16.80		+ 1	16.93
53	15	28	31.89	15	32	0.49	15	37	22.54

$$\begin{array}{l} a_1 + .12 \\ b_1 + .19 \\ c_1 - .10 \end{array}$$

Ill. West

A. H.

11. *Ophiichthys*

11
Moon I.V.

A. H.			A. H.			A. H.			A. H.			Moon I.T.		
Scorpii			Scorpii			Herculis			Herculis			Moon I.T.		
16	13	52.4	16	22	1.2	16	37	12.3	16	52	15.1	16	59	52.3
		56.5			5.2			16.5			18.8			56.4
-25		0.2			9.0	+32		20.5	+10		22.1	-28		0.5
		4.0			12.9			24.5			25.6			4.3
		8.0			16.9			28.8			29.3			8.5
		121.1			45.2			102.6			110.9			122.0
		24.22			9.04			20.52			22.18			24.40
16	14	0.22	16	22	9.04	16	37	20.52	16	52	22.18	17	0	0.40
		+12			+12			+22			+16			+13
		+08			+08			+03			+07			+07
		-13			-11			-14			-10			-13
16	14	0.29	16	22	9.13	16	37	20.63	16	52	22.31	17	0	0.47
16	12	41.13	16	20	49.77	16	36	1.32	16	50	3.04			
+1		19.16	+1		19.36	+1		19.31			19.27			
16	12	40.99	16	20	49.80	16	36	1.30	16	50	2.96	16	58	41.12

16	14	19.16
	22	19.36
	37	19.21
	52	19.27
17	10	19.47
	15	19.40
	20	19.44
16	50	19.35

July. 11. 1859

Ill. West

July. 12.

A. H.			A. H.			A. H.			A. H.			A. H.		
α Herculis			o Opinchi			d Opinchi			Polaris S.P.			Spica		
17	9	28.5	17	14	36.7	17	19	36.6	13	4	21.5	13	19	1.2
		32.2			40.8			40.8		6	43.4			5.0
		35.7	-25		44.5	-30		44.7		9	0.7			8.4
		39.2			48.2			48.7		11	12.7			11.9
		42.9			52.1			52.8		13	37.5			15.6
		178.5			222.3			223.6			115.8			42.1
		35.70			44.46			44.72			23.16			8.42
17	9	35.70	17	14	44.46	17	19	44.72	13	8	59.16	13	19	8.42
		+ .06			+ .12			+ .13						
		+ .17			+ .08			+ .07						
		- .10			- .13			- .13						
17	9	35.83	17	14	44.53	17	19	44.79						
17	8	16.36	17	13	25.13	17	18	25.32						
	+1	19.47		+1	19.40		+1	19.44						
17	8	16.45	17	13	25.15	17	18	25.40						

July. 12. 1859.

M. West.

 $a, +11$
 $b = +20$
 $c = -10$

A. H.

Ophiuchi			d Ophiuchi			Moon I.V.			Sagittarii			Sagittarii		
17	14	37.6	17	19	37.5	17	56	38.8	18	13	14.4	18	20	32.7
		41.6			41.6			43.0			18.7			36.7
-25		45.2	-30		45.4	-27		46.9	-30		22.6	-25		40.5
		49.1			49.3			51.0			26.5			44.4
		53.1			53.6			55.0			30.8			48.3
		226.6			227.4			234.7			113.0			202.6
		45.32			45.48			46.94			22.60			40.52
17	14	45.32	17	19	45.48	17	56	46.94	18	13	22.60	18	20	40.52
		+11			+12			+12			+12			+11
		+09			+07			+08			+07			+09
		-11			-13			-12			-13			-11
17	14	45.41	17	19	45.54	17	56	47.02	18	13	22.66	18	20	40.61
17	13	25.13	17	18	25.33				18	12	2.41	18	19	20.38
+1		20.28	+1		20.21				+1		20.25	+1		20.25
17	13	25.17	17	18	25.30	17	55	26.78	18	12	2.42	18	19	20.37
						17	15	+1						
							20							
						18	18							
							21							
						17	48	+1						

July. 14. 1859.

M. West.

 $a = +.11$
 $b = +.22$
 $c = -.10$

1859phae.

A. H.

τ Sagittarii	π Sagittarii	α Aquilae	δ Aquilae	κ^2 Sagittarii
18 59 26.9	19 2 41.7	19 12 30.8	19 19 42.3	19 29 26.4
31.2	45.6	34.4	45.9	30.6
35.0	49.2	37.8	49.4	34.2
-28 38.8	-21 52.9	+11 41.4	+13 52.8	-25 38.0
43.0	56.7	45.0	56.5	42.0
174.9	246.1	189.4	246.9	171.2
34.98	49.22	37.88	49.38	34.24
18 59 34.98	19 2 49.22	19 12 37.88	19 19 49.38	19 29 34.24
+12	+10	+06	+05	+11
+08	+10	+19	+19	+09
-11	-10	-10	-10	-10
18 59 35.07	19 2 49.32	19 12 38.03	19 19 49.52	19 29 34.34
18 58 12.49	19 1 26.72	19 11 15.32	19 18 26.89	19 28 11.59
+1 22.58	+1 22.60	+1 22.71	+1 22.63	+1 22.75
18 58 12.40	19 1 26.65	19 11 15.36	19 18 26.85	19 28 11.67

19	0	1	22.58
19	3		22.60
19	13		22.71
19	20		22.63
19	30		22.75
19	52		22.75
	118		402
19	12	1	22.67

July. 14. 1859

M. West

A. H.

Moon I.V.			Moon II.V.			A Sagittarii		
19	45	27.7	19	47	41.3	19	51	40.8
		31.8			45.1			44.6
		35.5			48.9			48.3
-24		39.2			52.6	-27		52.0
		43.6			56.7			56.2
		177.8			244.6			241.9
		35.56			48.92			48.38
19	45	35.56	19	47	48.92	19	51	48.38
		+ .11			+ .11			+ .12
		+ .10			+ .10			+ .09
		- .10			- .10			- .11
19	45	35.67	19	47	49.03	19	51	48.48
	1	22.67		1	22.67	19	50	25.73
							+ 1	22.75
19	44	13.00	19	46	26.36	19	50	25.81

July. 7/18 1859

W. West

$a = +.09$

$b = +.21$

$c = -.09$

A. H.

γ Capricorni			δ Capricorni			Moon II. V.			η Aquarii			ϵ^2 Aquarii		
21	33	41.0	21	40	39.9	22	11	19.1	22	29	31.0	22	43	31.5
		44.8			43.4			23.0			34.5			35.3
		48.3			47.1			26.6			37.8			38.9
-17		51.6	-17		50.6	-10		30.0	-1		41.3	-14		42.4
		55.6			54.4			33.6			44.9			46.0
		241.3			235.4			132.3			189.5			194.1
		48.26			47.08			26.46			37.90			38.82
21	33	48.26	21	40	47.08	22	11	26.46	22	29	37.90	22	43	38.82
		+ .08			+ .08			+ .07			+ .06			+ .08
		+ .11			+ .11			+ .13			+ .16			+ .12
		- .09			- .09			- .09			- .09			- .09
21	33	48.36	21	40	47.18	22	11	26.57	22	29	38.03	22	43	38.93
21	32	20.35	21	39	19.06		1	28.06	22	28	9.91	22	42	10.93
	+1	28.01		+1	28.12					+1	28.12		+1	28.00
21	32	20.30	21	39	19.12	22	9	58.51	22	28	9.97	22	42	10.87

July. 18. 1859

M. West

A. H.

β Librae			β Urs. Min			β Librae			α Cor. Bor.			α Serpentis		
14	44	30.1	14	52	15.0	15	10	50.9	15	30	7.5	15	38	45.0
		33.9			28.8			54.4			11.7			48.6
		37.4			41.3			57.8			15.4			52.0
		40.9			54.6			1.4			19.2			55.5
		44.6			8.3			4.9			23.3			59.1
		186.9			148.0			169.4			77.1			260.2
		37.38			29.60			33.88			15.42			52.04
14	44	37.38	14	52	41.60	15	10	57.88	15	30	15.42	15	38	52.04
		+ .10			-.22			+ .09			+ .03			+ .06
		+ .12			+ .71			+ .14			+ .24			+ .18
		-.10			-.38			-.10			-.11			-.10
14	44	37.50	14	52	41.71	15	10	58.01	15	30	15.58	15	38	52.18
14	43	7.85	14	51	12.34	15	9	28.35	15	28	45.89	15	37	22.42
E.C. +	1	29.65		1	29.37		1	29.66		1	29.69		1	29.76
Rw. to mid-air					+ 0.88									
					1 29.29									

July 29/21 1859

J.W. West

 $a = +.07$
 $b = +.20$
 $c = -.08$

1859phae.

A. H.			"			"			" (very faint)			"			
26 Piscium			w Piscium			Moon II. V.			B. A. 6. 149			8 Piscium			
0	23	49	25.7	23	53	348	D	24	6.6	D	30	7.3	D	42	52.7
6			29.3			38.5			10.2			11.1			56.2
0			32.8			41.7			13.6			14.1			59.8
.5	+6		36.2	+6		45.3	+7		17.1	+12		17.7	+7		3.1
1			39.9			49.0			20.9			21.5			6.7
2			163.9			209.3			68.4			71.7			178.5
4			32.78			41.86			13.68			14.34			35.70
04	23	49	32.78	23	53	41.86	1	24	13.68	1	30	14.34	1	42	59.70
06			+1.04			+1.04			+1.04			+1.03			+1.04
18			+1.16			+1.16			+1.16			+1.17			+1.16
10			-.08			-.08			-.08			-.08			-.08
18	23	49	32.90	23	53	41.98	D	24	13.80	D	30	14.46	D	42	59.82
42	23	47	58.17	23	52	7.33		1	34.73	0	28	40.30	0	41	24.89
76		+1	34.73		+1	34.65					+1	34.16		+1	34.93

23 47 58.21 23 52 7.29 0 22 39.07 0 28 39.70 0 41 25.05

July 29, 1859

 $a + 0.060$
 $b + 0.201$
 $c - 0.090$
 $+ 0.074$ 30.00 $+ 0.056$
 $+ 0.197$ 21.02 $+ 0.185$
 $- 0.087$ $- 0.079$
M. West
July 21. A. H.

July 23 A. H.

A. H.

Andromeda

Polaris

Polaris S.P.

Polaris

0	2	35.9	1	4	46.9	13	4	46.3	1	4	54.0
		40.0		7	9.6		7	8.0		7	15.7
		43.8		09	22.3		9	24.1		9	29.6
		47.6		11	44.0		11	36.2		11	48.0
		51.7		14	6.4		14	0.8		14	9.0
		219.0			129.2			115.4			156.3
		43.80			25.84			23.08			31.26
1.0	2	43.80	1	9	25.84	13	9	23.08	1	9	31.26
a		+0.02			-2.30			+2.22			-1.60
b		+22			+5.56			-5.13			+5.08
c		-10			-3.58			+3.46			-3.14
1.0	2	43.94	1	9	25.52	13	9	23.63	1	9	31.60
	1	9.13		7	49.44		7	49.87		7	51.15
E	1	34.82		1	36.08		1	33.76		1	40.45
					-0.82			+0.82			-0.82
				1	35.26	0	1	34.58			39.63

from dr. above pole interpolates 36.35
 $+1.77$

July 23 1859

M. West

a +0.058
 b +0.189
 c -0.080
 July 23. 1859.
 A.H.

A.H.			"			Moon II.V.			Polaris S.P.			Spica		
η Piscium			β Arietis											
1	25	31.5	1	48	26.0	2	0	57.9	13	4	53.6	13	19	21.8
		35.3			29.9			1.7		7	15.1			25.5
		38.8			33.4			5.4		9	30.6			29.0
+15		42.2+20			37.0	+18		9.1		11	43.7			32.5
		45.9			41.0			13.0		14	9.0			36.1
		193.7			167.3			87.1			152.0			144.9
		38.74			33.46			17.42			30.40			28.98
1	25	38.74	1	48	33.46	2	1	5.42	13	9	30.40	13	19	28.98
		+0.03			+0.02			+0.02			+2.32			+0.05
		+0.17			+0.19			+0.18			-4.91			+0.11
		-0.08			-0.08			-0.08			+3.18			-0.08
1	25	38.86	1	48	33.59	2	1	5.54	13	9	30.99	13	19	29.06
1	23	59.09	1	46	53.89	1		39.73	13	7	51.58	17		48.29
		39.77			39.70					1	39.41			40.77
									Rev. to mid. + 0.82					
									+1 40.23					
1	23	59.13	1	46	53.86	1	59	25.81						

July 25. 1859.

July. 26/27

M. West

A.H.

A.H.

"

Polaris S.P.

 β Arietis α Arietis

13	5	1.2	1	48	3.53	2	0	57.6
	7	23.4			39.5			1.6
	9	38.7			43.3			5.2
	11	50.0			46.4			8.8
	14	16.2			50.2			12.8
		129.5			214.7			86.0
		25.90			42.94			17.20
13	9	37.90	1	48	42.94	2	1	5.20

July. 27. 1859

M. West

A. H.			" "			" "			" "			" "		
δ Ophiuchi			α Scipii			δ Herculis			κ Ophiuchi			ε Urs. Maj		
16	8	44.0	16	22	31.9	16	37	42.9	16	52	46.1	17	1	33.7
		47.6			36.2			47.3			49.8		2	0.4
		50.9			40.0			51.3			53.2			25.1
		54.3			43.7			55.2			56.6			51.1
		57.9			47.8			59.5			0.3		3	17.5
		254.7			199.6			256.2			206.0			127.8
		50.94			39.92			51.24			46.20			25.56
16	8	50.94	16	22	39.92	16	37	51.24	16	52	53.20	17	2	25.56
		+ .04			+ .06			+ .01			+ .05			- 0.26
		+ .13			+ .07			+ .21			+ .15			+ 1.05
		- .08			- .09			- .09			- .09			- 0.98
16	8	51.03	16	22	39.96	16	37	51.37	16	52	53.31	17	2	25.97
16	7	0.66	16	20	49.67	16	36	1.17	16	51	2.95	17	0	36.19
	1	50.37		1	50.29		1	50.20		1	50.36		1	49.78

July. 28. 1859

 $\alpha + 0.078$
 $\delta + 0.257$
 $\epsilon - 0.063$

 M. West
 July. 29. A. H.
 y Draconis

A. H.

Polaris S. P.

Spica

13	5	11.9	13	19	33.6	17	56	6.6
	7	~~33.0~~			37.2			12.5
	9	50.1			40.6			17.7
	12	2.0			44.1			23.4
	14	27.7			47.8			29.1
		124.7			203.3			89.3
		24.94			40.66			17.86
13	9	48.94	13	19	40.66	17	56	17.86
		+ 2.34			+ 0.06			-.01
		- 6.16			+ 0.15			+ .29
		+ 3.30			- 0.09			-.13
13	9	48.42	13	19	40.78	17	56	18.01
13	7	55.78	13	17	48.24	17	53	22.84
		1 52.64					1	55.17
Rev. to mid. w.		+ 82			-.02			
		1 53.46			1 52.52			

Aug. 1. 1859.

Ill. West

A. H.

β Draconis			α Ophiuchi			μ Herculis		
17	29	8.0	17	30	21.6	17	42	53.5
		14.0			25.2			87.7
		19.6			28.7			1.5
		25.1			32.2			5.4
		31.0			35.9			9.4
		97.7			143.6			127.5
		19.54			28.72			25.50
17	29	19.54	17	30	28.72	17	43	1.50

Aug. 4. 1859.

M. West

$$\begin{aligned}
 a &= +14 \\
 b &= +21 \\
 c &= -.13
 \end{aligned}$$

A.H.

Virginis			" Bootis			" Moon IV.			" Bootis		
13	19	49.2	13	50	1.1	13	56	44.4	14	11	17.0
		52.9			5.1			48.3			20.9
		56.3			8.6			51.9			24.4
		59.8			12.2	-17		55.5			28.0
		3.5			16.1			59.4			31.8
		221.7			43.1			259.5			122.1
		44.34			8.62			51.90			24.42
13	19	44.34	13	50	8.62	13	56	51.90	14	11	24.42
		+.11			+.06			+.12			+.06
		+.13			+.20			+.11			+.21
		-.13			-.14			-.13			-.14
13	19	56.45	13	50	8.74	13	56	52.00	14	11	24.55
13	17	48.16	13	48	0.45				14	9	16.09
	+2	8.29		+2	8.29				+2		8.46

+2 8.35 at 13^h 49^m

13 17 48.13 13 48 0.39 13 54 43.65 14 9 16.17

Aug. 6. 1859.

 $a = +.15$
 $b = +.21$
 $c = -.13$

M. West.

A. H.

α Cor. Bor.			α Serpenti			Moon I. V.			σ Scorpion			α Scorpion		
15	30	50.6	15	39	27.9	15	46	12.5	16	14	46.1	16	22	54.6
		54.7			31.7			16.7			50.0			58.6
		58.4			38.5			20.4			53.8			2.4
		2.3			42.1	-25		24.3-25			57.6			6.2
		6.3			35.0			28.4			1.4			10.3
		172.3			175.2			102.3			208.9			132.1
		34.46			35.04			20.46			41.78			26.42
15	30	58.46	15	39	35.04	15	46	20.46	16	14	53.78	16	23	2.42
		+ .05			+ .09			+ .15			+ .15			+ .16
		+ .23			+ .17			+ .09			+ .09			+ .09
		- .15			- .13			- .14			- .14			- .14
15	30	58.59	15	39	35.17	15	46	20.56	16	14	53.88	16	23	2.53
15	28	45.62	15	37	22.22		2	12.97	16	12	40.91	16	20	49.56
	+2	12.97		2	12.95					+2	12.97		+2	12.97
15	28	45.62	15	37	22.20	15	44	7.59	16	12	40.91	16	20	49.56

Aug. 8. 1859.

Ill. West.

 $a = +10$
 $b = +.22$
 $c = -.11$

A. H.

α Ophiuchi			ϵ^2 Ophiuchi			β Draconis			Moon I.V.			α Hercules		
17	20	34.8	17	25	2.9	17	29	23.2	17	39	41.8	17	43	8.9
		38.7			6.9			29.3			46.0			13.2
		42.6			10.4			34.9			50.0			17.0
-30		46.6	-24		14.1			40.4	-28		53.8	+28		20.9
		50.8			18.0			46.3			58.1			24.9
		213.5			52.3			174.1			249.7			84.9
		42.70			10.46			34.82			49.94			16.98
17	20	42.70	17	25	10.46	17	29	34.82	17	39	49.94	17	43	16.98
		+.11			+.10			-.03			+.11			+.03
		+.08			+.10			+.36			+.08			+.24
		-.12			-.11			-.18			-.12			-.12
17	20	42.77	17	25	10.55	17	29	34.97	17	39	50.01	17	43	17.13
17	18	25.19	17	22	52.99	17	27	17.40		2	17.62	17	40	59.44
+2		17.58	+2		17.57	+2		17.57				+2		17.69
17	18	25.18	17	22	52.96	17	27	17.37	17	37	32.39	17	40	59.50

Aug. 8, 1859

M. West

A H

4 Sagittarii

γ Draconis

17 53 25.2 17 55 28.9

28.9 34.7

32.7 40.1

-24 36.5 45.6

40.3 51.4

163.6 200.7

32.72 40.14

17 53 32.72 17 55 40.14

+10 - .03

+10 + .35

- .11 - .18

17 53 32.81 17 55 40.28

17 51 15.14 17 53 22.63

+ 2 17.67 + 2 17.65

17 51 15.17 17 53 22.63

Aug. 9. 1859.

M. West

$$a = + 0.11$$

$$b = + 0.20$$

$$c = - 0.09$$

A.H.

3 Sagittarii			4 Sagittarii			Moon I.V.			q Sagittarii			o Sagittarii		
17	40	57.3	17	53	27.4	18	35	36.3	18	39	7.3	18	48	47.8
		1.4			31.4			40.4			11.2			51.8
		5.2			35.1			44.1			15.1			55.6
-24		9.0	-24		38.8	-27		48.2	-27		19.0	-26		59.4
		13.2			42.7			52.3			23.0			3.4
		86.1			175.4			221.3			75.6			218.0
		17.22			35.08			44.26			15.12			43.60
17	41	5.22	17	53	35.08	18	35	44.26	18	39	15.12	18	48	55.60
		+ .12			+ .11			+ .12			+ .12			+ .12
		+ .08			+ .09			+ .08			+ .08			+ .08
		- .10			- .09			- .10			- .10			- .10
17	41	5.32	17	53	35.19	18	35	44.36	18	39	15.22	18	48	55.69
17	38	45.13	17	51	15.13		2	20.05	18	36	55.20	18	46	35.76
	+ 2	20.19		+ 2	20.06					+ 2	20.02		+ 2	19.93
17	38	45.27	17	51	15.14	18	33	24.31	18	36	55.17	18	46	35.64

Aug. 12, 1859.

M. West

 $a = +0.09$
 $b = +0.21$
 $c = -0.09$

H. P. J.

	β Sagittarii			γ Aquilae			α Aquilae			δ Capricorn			ρ Capricorn		
8	19	30	31.0	19	41	56.8	19	46	17.7	20	12	37.7	20	23	12.9
8			35.2			0.4			21.3			41.6			16.8
6			38.9			3.8			24.8			44.9			20.5
4	-25		42.8			7.3			28.3			48.4	-18		24.1
4			46.7			11.1			31.9			52.1			27.7
0			194.6			79.4			124.0			224.7			102.0
0			38.92			15.88			24.80			44.94			20.40
60	19	30	38.92	19	42	3.88	19	46	24.80	20	12	44.94	20	23	20.40
12			+1.09			+1.05			+1.05			+1.08			+1.08
08			+1.09			+1.18			+1.18			+1.12			+1.11
10			-1.09			-1.09			-1.09			-1.09			-1.09
69	19	30	39.01	19	42	4.02	19	46	24.94	20	12	45.05	20	23	20.50
76	19	28	11.74	19	39	36.90	19	43	57.82	20	10	17.82	20	20	53.05
93		+2	27.27		+2	27.12		+2	27.12		+2	27.23		+2	27.45

19 28 11.81 19 39 36.81 19 43 57.72 20 10 17.78 20 20 53.21

Aug. 12, 1859

H. P. J.

Moon I.V.

21 9 22.5

26.4

30.0

33.3

37.6

149.8

29.96

21 9 29.96

+.08

+.11

-.09

21 9 30.06

2 27.36

21 7 2.70

Aug. 16. Ill. West
A. H.

$$a = +0.055$$

$$b = +0.250$$

$$c = -0.055$$

 β Draconis μ Herculis γ Draconis

17 29 40.7

17 43 26.7

18 55 46.2

46.7

30.8

52.0

52.2

34.5

57.5

58.0

38.3

3.0

3.7

42.3

8.7

201.3

172.6

167.4

40.26

34.52

33.48

17 29 52.26

17 43 34.52

18 55 57.48

-0.02

+0.01

-0.07

+0.40

+0.27

70.40

-0.14

-0.09

-0.13

17 29 52.50

17 43 34.71

18 55 57.74

17 27 17.88

17 40 59.32

17 53 22.43

2 35.32

2 35.39

2 35.31

31

32

2 35.34

Aug 16th

G. P. B.

Ph. East.

$a = +0.05$

$b = +0.25$

$c = -0.08$

$C = +.08$

G II.

d Picum

45 Picum

0 10 37.5

0 15 52.8

0 20 58.5

41.5

56.5

1.7

+5 45.0

+7 16 0.0

+7 5.2

48.5

3.3

8.3

52.3

7.0

12.2

0 10 45.04

0 15 59.92

0 21 5.18

+.03

+.03

+.03

+.19

+.19

+.19

-.08

-0.08

-0.08

0 10 45.18

0 16 0.06

0 21 5.32

2 35.90

0 13 24.22

0 18 29.35

+2 35.44

+2 35.97

0 8 9.28

0 13 24.16

0 18 29.42

Aug. 16

Telegraphs
1859

Signals from Cambridge

E.B.

236

at 5^h 0^m 25^s. received at Clinton

Camb. sigs to Clin.

Δ
 Eb = 20^h 40^m 55^s
 41 00
 41 5-

Δ 20 41 55-
 42 0
 42 5-

Δ 20 42 55-
 43 0
 43 5-

Δ 20 43 55-
 44 0
 44 5-

Aug 16.

Clinton records received at Cambridge

clin sigs to Camb.

20 = 20 48 49.3
54.3
59.4

49 49.4
54.4
59.4

50 49.5
54.5
59.5

49.

Aug. 16.

Spr. Gov. Set off. at 9.0. =

Both Clocks were next put on the circuit together. Clinton seemed to send signals also.

The line marked with red dashes was the commencement of $21^h.12^m$ tried to mark zero seconds in red ink & one in pencil

Observed Transit of β Aquarii recorded at Cambridge on Spr. Gov. (Not received at Clinton)

ϵ Pegasi at Camb. & at Clinton G.P.B.

α Aquarii at Camb. G.P.B.

Aug. 16th 1889
C. P. B.

Ill. West

Telegraph to Clinton

β Aquarii	ϵ Pegasi	α Aquarii	32 " Pegasi	33 " Pegasi
21 26 40.6	21 39 47.8	22 1 5.0	22 17 19.9	22 19 26.4
44.5	51.6	8.7	24.1	28.3
47.7	55.0	12.0	28.2	31.9
51.3	58.5	15.4	32.0	35.6
54.9	1.8	19.2	36.0	39.3
4				
47.80	21 39 54.94	22 1 12.06	22 17 28.04	22 19 31.90

Clinton.

21 56 55.9	22 18 12.7	22 34 (28.0)
58.9	15.3	31.5
1.5	18.2	34.6
4.8	21.6	38.0
7.5	24.3	41.0
21 57 1.72	22 18 18.42	22 34 34.62

Aug. 16.
G.P.B.

Ill. West

Telegraph to Clinton

34 Pyraei	36 Pyraei	38 Pyraei	39 Pyraei	82 Lauretae
22 20 59.3	22 24 38.1	22 26 6.0	22 28 18.6	22 32 6.4
22 3.0	41.7	10.4	22.5	11.0
6.4	45.2	14.2	26.0	15.2
9.8	48.7	18.3	29.7	19.7
13.4	52.4	22.3	33.6	24.5
22 22 6.38	22 24 35.22	22 26 14.24	22 28 26.08	22 32 15.36

Mr. West, Aug. 16.
L.P.B.

~~Mr. West~~
Mr. West

Reversed Telegraph to Clinton
Mr. East.

10 Lacusae	5 Regis	13 Lacusae	5 Regis	59 Regis
22 35 26.6	22 36 58.1	22 40 18.4	23 4 58.8	23 7 9.3
31.2	37 2.0	23.0	5 0.5	13.0
35.4	5.3	27.7	11.0	16.5
39.8	8.8	32.2	7.3	29.9
44.3	12.5	36.9	11.2	23.6
22 35 35.46	22 37 5.34	22 40 27.64	23 5 3.96	23 7 11.48

Aug. 16.
G.P.B.

Ill. East

Telegraph to Clinton

"Pegasi" 307913m				"Antromedae"				"Pegasi"				"Antromedae"			
23	10	36.3		23	14	12.3		23	16	26.7		23	16	30.1	
		40.6				17.2				30.8				33.9	
		44.2				21.6				34.8				37.4	
		48.2				25.9				38.6				40.7	
		52.2				30.8				42.8				44.6	
23	10	44.26		23	14	21.56		23	16	24.74		23	18	37.34	
												23	27	1.02	

Aug. 16 1859
G. P. B.

Ill. East

Telegraph to Clinton

15 Anomalous			1 Anomalous			36 Anomalous			7 Anomalous			Br. 107		
23	30	14.2	23	33	43.6	0	50	7.3	0	52	12.7	0	55	3.6
		18.8			48.2			11.4			16.3			7.2
		23.1			52.7			15.1			20.1			10.5
		27.5			57.7			18.7			23.7			14.1
		32.0?		34	2.2			22.8			27.7			17.4
23	30	23.12	23	33	52.88	0	50	15.06	0	52	20.10	0	55	10.56

Aug. 16. 1859

G. P. B.

Ill. East

Telegraph to Clinton

2 Horse kin

1 5 56.0

8 16.3

10 34.2

12 47.9

15 10.9

1 10 32.06

b + 7.38

a + 1.58

e + 2.11

1 10 40.97

8 10.84

7 2 30.13

a + 2.04

b + 7.38

c + 1.87

+ 3.47

Coincidences with Clinton W.T. Clock.

Sub. Time of Clinton Clock.			Returned to mean		
20	0	38.00	20	0	38.00
		39.03			38.03
		40.08			38.07
		41.06			.05
		42.10			.09
		43.06			.05
		44.10			.08
		45.08			.06
		46.10			.08
		47.09			.07
		48.11			.08
		~~49.1~~	20	0	38.06
		~~50.1~~			
		~~51.1~~			
		~~52.1~~			
		~~53.1~~			
		~~54.1~~			
		~~55.1~~			
		~~56.1~~			
		~~57.1~~			
		~~58.1~~			
		~~59.1~~			
		~~60.1~~			
		~~61.1~~			
		~~62.1~~			
		~~63.1~~			
		~~64.1~~			
		~~65.1~~			
		~~66.1~~			
		~~67.1~~			
		~~68.1~~			
		~~69.1~~			
		~~70.1~~			
		~~71.1~~			
		~~72.1~~			
		~~73.1~~			
		~~74.1~~			
		~~75.1~~			
		~~76.1~~			
		~~77.1~~			
		~~78.1~~			
		~~79.1~~			
		~~80.1~~			
		~~81.1~~			
		~~82.1~~			
		~~83.1~~			
		~~84.1~~			
		~~85.1~~			
		~~86.1~~			
		~~87.1~~			
		~~88.1~~			
		~~89.1~~			
		~~90.1~~			
		~~91.1~~			
		~~92.1~~			
		~~93.1~~			
		~~94.1~~			
		~~95.1~~			
		~~96.1~~			
		~~97.1~~			
		~~98.1~~			
		~~99.1~~			
		~~100.1~~			

Coincidence with Antler clock.

Start 23^h 23^m 50^s

2

Reg. 23^h 23^m 50^s

1st trial 23^h 22^m 52.65 .14
 23 52.70 .03
 24 52.87 .03
 25 53.00 .00
 26 53.22 .06
 27 53.38 .05
 28 53.52 .03
 53.05

23	22	30.48-.03	31.50-.01	32.50-.01	33.53+.02
23		30.62-.05	31.66-.01	32.66	.68+.01
24		30.80-.04	31.83-.01	32.84	.87
25		—	32.00.00	33.00	84.00
26		—		32.07	.17
27		31.30-.03	32.32-.01	33.33	34.33
28		31.50+.01	32.50+.01	33.48	34.50
		30.97	31.99	33.00	34.01

Coincidence 23^h 25^m 33^s.

23	22	34.50	35.53	.02
	23	34.68	35.70	.03
	24	34.83	35.84	.01
	25	35.00	36.00	.00
	26	(35.17)	36.17	
	27	35.30	36.35	.02
	28	35.52	36.52	.03
	25	35.01	36.02	

Coincidence Δ with Chrono Clock.

~~0^h 32^m~~

1st approx

0 29 30.53
30 30.72
31 3 —
32 —
33 —
34 31.33
35 31.53

0 29 11.50
12.66
12.83
12.00
12.16
12.32
12.48

0 29 12.50
12.66
12.84
13.00
13.15
13.34
13.50

0 29 13.48
13.68
13.82
14.00
14.17
14.34
14.50

0 29 12.993

0 29 12.999

13.999

0 29 14.52
14.69
14.86
14.98
15.17
15.33
15.48

0 29 15.48 - .03
30 15.68 + .01
31 15.83 - .01
32 16.00 .00
33 16.16 .00
34 16.32 - .01
35 16.48 - .01
1 .007

0 29 16. —
30 16.71 + .04
31 16.86 + .02
32 17.00 .01
33 17.18 + .02
34 17.35 + .02
35 17.52 + .03

0 30 17.66 - .01
17.83 - .01
18.00 .00
18.20 + .04
18.32 - .01
18.52 + .03

30 18.70
18.88
19.00

0 29 15.003

32 15.993

0 32 17.022

0 32 18.006

0 32 19.023

Coincidence ✓
0 32 15

Telegraph with Clinton

13 Pegasi				21 Pegasi			π^1 Pegasi			π^2 Pegasi			1 Lacertae		
Signals from Clinton															
22	21	3	6.0	21	16	4.3	22	22	37.9	22	23	22.6	22	29	28.0
			9.0			6.8			41.0			25.9			---
			12.1			9.7			44.4			29.6			---
			15.0			12.8			48.0			33.0			39.2
			18.2			15.5			51.0			35.8			---

Aug 16 1859

Telegraph with Clinton

32 Pegasi	8 ² Lacertae	5 Pegasi	13 Lacertae	a Pisc. Austr	26 Piscium
~~2 32 27.0~~					
~~2 32~~					
22 32 27.0					0 7 35.6
30.5		"	"	"	38.5
33.6					41.5
37.0					---
40.0					---

Not received at
Cambridge

86 K Pegasi

 γ Pegasi θ Andromedae ρ Andromedae

41 Andromedae

Not received

0 25 —

0 29 . 23.6

0 33 22.0

1 19 35.5

27.2

25.3

39.1

44.9 ?

30.6

28.8

42.9

48.3

34.2

32.2

46.8

50.9 ??

37.9

36.0

51.0

Telegraph from Clinton

Androm.

& Urs. Min.

1 21 30.5

33.9

37.3

40.8

44.3

Probably
misread.

Star Names	Obs'd Transit	Corrections for			Comp'd R.	Clock Error	C. F.		M. W.
		Az.	lev.	Coll.			Reductn	23 ^N	
<i>B. A. 11</i>	21 26 47.80	-0.06	+0.18	-0.06	21 24 12.12	42 35.74	+2	35.85	
2 <i>Pegasi</i>	39 54.94	.05	.22	.06	37 19.40	35.65		.75	
2 <i>Aquarii</i>	61 12.06	.06	.19	.06	58 36.36	35.77		.84	
3 <i>Pegasi</i>	22 17 28.04	.02	.19	.07	22 14 52.58	35.66		.73	
33 —	19 31.90	.03	.26	.07	16 56.33	35.73		.78	
34 —	22 6.38	.05	.21	.06	19 30.53	35.95		36.00	
36 —	24 45.22	.05	.22	.06	22 9.62	35.71		35.75	
38 —	26 14.24	.02	.31	.08	23 38.60	35.85		.89	
39 —	28 26.08	.04	.36	.07	25 50.49	35.74		.78	
8 <i>Lacertae</i>	32 15.36	.01	.33	.08	29 39.63	35.97		36.00	
10 —	35 35.46	.01	.34	.08	32 59.83	35.88		35.91	
3 <i>Pegasi</i>	37 5.34	.05	.23	.06	34 29.49	35.97		36.00	
13 <i>Lacertae</i>	40 27.64	.00	+0.35	-0.09	37 51.98	35.92		35.95	Reversed
57 <i>Pegasi</i>	23 5 3.26	-0.06	+0.22	+0.08	23 2 28.22	2 35.93		.92	M. For
59 —	7 16.48	.06	.22	.03	4 40.73	35.94		.93	
3079 <i>Bradley</i>	10 44.26	.03	.29	.04	8 8.80	35.76		.75	
9 <i>Andromedae</i>	14 21.56	.00	.36	.05	11 45.94	36.03		36.01	
5 <i>Pegasi</i>	16 34.74	.02	.30	.04	13 58.94	36.12		.10	
66 <i>Pegasi</i>	18 37.34	.04	.23	.03	16 1.67	35.89		35.87	
14 <i>Andromedae</i>	27 1.02	.00	.34	.04	24 25.36	36.03		36.00	
15 —	30 23.12	.00	.35	.04	27 17.66	35.83		35.80	
7 —	52 20.10	.03	.27	.04	0 49 44.56	35.82		35.76	
107 <i>Bradley</i>	55 10.56	-.05	0.22	.03	52 34.71	36.05		35.99	
<i>Polaris</i>	10 33.06	+0.41	+0.38	+1.35	1 8 10.34	2 33.89		33.75	

$$a = -0.085 \quad b = -0.264 \quad \text{at } 23^{\circ} = -0.268 \text{ after.}$$

$$c = -0.064 \quad \left. \begin{array}{l} \text{Before} \\ +0.034 \end{array} \right\} \text{ Reversals.}$$

N.B. Daily Mercurials included in c.

Clock Rate + 0.122 in 100 minutes

$+0.250$ $+0.200$ *Hydrogen* 20°

