

KG
11365
350

19

Records of errors
of clocks, transit
instrument, etc.

1866 — 1869

THOMAS GROOM & CO.
STATIONERS,
82 State Street
BOSTON.

KG 11365.350

Sid. Time of Cambridge. mean noon
= Sid. Time Washⁿ mean noon - 3.^s89

1866phae.proj..351.
Clock stopped Sunday
dawning

E C Slow 2^{am} 38.5^s

March 22 1866

took out 30 Shot
from Each pendulum

March 24 1866 at friends

Bond & Son No 1 ~~Error~~ 32

Adie No 1 33.

Standard 15.21

Bond & Son 4 32

Fastie Standard 15-2.5-

15-2.4

15-2.6

+ 3.88

Comparison of Clock &
Chronometers

March 6 1866

236	3 ^h	37	15.				
2124	4	45	35.				
	1	8	20				
236	3	40	20				
2124	4	48	39.5				
	1	8	19.5				
EC	3	45	45.0		4	53	28.0
2124	4	53	28.0	all	4	52	15.56
	1	7	43.0		1	3	12.44
					3	48	55.68
EC	3	48	52.		3	48	16.79
2124	4	56	34.5	EC	3	48	37.34
	1	7	42.5	SL	3 ^m	45	54.13
							45.00
							9.13
							9.30
							9.28

all 7 at 5 o'clock 1^h 3^m 55.65

Did not

3 41 0.

21 24

fast

3 44 - 36 21
 4 44 19.44
 4 45 35.00
 1 15.56

3 51 23.29

38.01

3 52 1.30

48 52.00

3 9.30

3 44 5.

- 36 71

4 47 23.94

4 48 39.50

1 15.56

KG 11365.350

March 7 1866

EC	3 ^h	33 ^m	4 ^s	3 ^h	36 ^m	0 ^s
----	----------------	-----------------	----------------	----------------	-----------------	----------------

2124	4	36	51	4	39	46.5
------	---	----	----	---	----	------

1	3	47	1	3	46.5
---	---	----	---	---	------

236	3	38	12	3	41	14
-----	---	----	----	---	----	----

2124	4	42	34.5	4	45	36
------	---	----	------	---	----	----

1	4	22.5	1	4	22.0
---	---	------	---	---	------

M 7 at Sid	0 ^h	0 ^h	59 ^m	59 ^s	74
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236 slow	3 ^m	43.0	3	41	55.0
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4	44	36.36
---	----	-------

42	34.50
----	-------

2124 fast	1	16.12
-----------	---	-------

0	59	59.74
---	----	-------

3	44	57.00
---	----	-------

—	36.85
---	-------

4	44	19.89
---	----	-------

4	45	36.00
---	----	-------

2124 fast	1	16.11
-----------	---	-------

4	36	51.0
---	----	------

1	16.11
---	-------

4	35	34.89
---	----	-------

0	59	59.74
---	----	-------

3	35	35.15
---	----	-------

35	42
----	----

3	36	10.57
---	----	-------

33	4.00
----	------

EC SL	3	6.57
-------	---	------

4	39	46.50
---	----	-------

1	16.11
---	-------

4	38	30.39
---	----	-------

0	59	59.74
---	----	-------

3	44	30.63
---	----	-------

35	8.9
----	-----

3	39	8.54
---	----	------

36	0.
----	----

2C SL	3	6.54
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March 8th 1866

EC	2 ⁿ	59 ^m	52	3	3.8	0
2124	3	59	46	4	2.0	58.5
	0	59	54.4	0	59	53.5
236	3	07	10	3	910	06
2124	4	74	40.0	4	40	35.5
	1	4	30.0	1	4	29.5

M T at Sid 0ⁿ

236 Slow	3 ^m	40.5.6	0	56	3.84
			3	10	30.6
			4	06	31.25A
			4	7	23.19
			4	7	40.0
				1	16.81
			3	13	46.6
					31.74
			4	9	18.70
			4	10	35.50
				1	16.80
			3	59	46.
				1	16.81
			3	58	29.19
			0	56	3.84
			3	2	25.35
					29.97
			3	2	55.32
			2	59	52.
				3	3.32

March 9 1866

E 6	4 ^h	6 ^m	37 ^s	4	9	40
2124	5	2	21	5	5	23.5
	1	55	44		55	435
236	4	10	40	4	13	44
2124	5	7	1.5	5	10	5
		56	21.5		56	21
M 7 at Sid	0 ^h	=	0	52		7.94

Track out to Shat after Camp.

March

10

1866

26 2^h 23^m 26^s 2 29 18

2124 3 15 29 3 21 20

52 3 52 2

236 2 32 10 2 35 24

2124 3 24 50.5 3 28 4

52 40.5 52 40.

March April 1

Sheet 10^h 30^m Cloud 11^h 8^m

5 lions observed on last 4 wires of middle tally

Sheet 11 25⁻ Cloud 11 45⁻

91 lions on middle tally

3 lions on middle "



Σ
h
Σ

April 10 1866

23.6				E.C		Diff	
8	40	30	8	42	23.7	1	53.7
		45-			38.8		53.8
31		0			53.8		53.8

21 24				E.C			
7	30	30	8	44	24.1	1	43 54.1
		45-			39.1		54.1
31		0			54.1		54.1

E.C 8 47 20 8 ^h 48 30
 424 7 40 17 41 2 6.5
 4 24 set back
 E.C 9 6 50 7 50.
 7 47 43.5 48 43.5

April 11 1866

ΣC 6 35 0 = $5^h 15^m 57^s$ M Σ
 2124 5- 17 32 just 1 35-
 28

ΣC 6 36 40 37 25-
 236 34 49.2 35- 34 2
 1 50.8

ΣC 6 38 40 39 30
 424 5- 16 8.5- 16 58.5-
 ΣC 6^h 38^m 40^s = 5- 19 37 M Σ 2
 16 8
 3 29

ΣC 6 49 40
 424 5- 30 7.

April 12 1866

Σ C 6 4 35- 6 0

4244 41 22.2 42 47

April 13 1866

Σ C 5- 21 50 = 3 55- 8.5-

4243 54 54.2 44 3

Σ C 5- 30 46 = 4 4. 03

2124 4 5- 41.5- 1 38.5-

April 14 1866

EC 6 10 10

236 6 8 30.8 1 39

after winding EC

EC 6 16 50

236 15 19 1 31

EC 6 20 ⁴³38 = 4 49 59

2124 4 51 39.5 first 1^m 40.5

EC 6 22 ⁴³6 = 4 51 27

224 4 51 18.8 8

April 17 1866

ΣC 6 8 10 = 4 25-47
 2124 4 27 28.5 1 41.

ΣC 6 10 35 = 4 28 12
 424 3 28 30 18

April 18 1866

ΣC 6 23 10
 424 3 37 14

$22 \frac{3}{4}$ $11 \frac{4}{5}$ $3 \frac{1}{3}$ 1.46 1294
 213 14 1.37 128
 April 22^d 1866 $1 \frac{41.4}{42.7}$

EC 0^h 8^m 0^s 0 8 45-

236 0 13 17.5- 0 14 2.5-

5- 17.5-
1 11.6

EC slow 7^m 3.5-

April 23 1866

EC 5- 47 40

236 5- 46 10.6

EC 8 19 0

236 8 17 31.5-
1 28.5-

April 24 1866

EC 5- 44 10

236 5- 42 51.
1 19

32

1.41

138

April 25 1866
 EC 6 21 10
 23 6 20 1.
 1 9.

April 26 1866
 EC 6 19 8. = 4 1 11
 2124 4 2 38.5 fast 1 47.5

EC 6 22 30.
 236 6 21 30.8

EC 6 24 0 = 4 6 2.1
 424 4 7 3.8 fast 1 1.7

Many
 E C 8 11 25.5 = 1866_h 8^h 12 32.3
 236 8 11 18.5 slow 1 138

E C 8 14 0 = 5-36 36.7
 424 5 38 11.4 fast 1 34.7

Clock.

Date	Time.	ΔT .	Daily rate	Hourly rate.
1866 Apr. 30	Sid. 0. ^h	+ 0. ^m 59. ^s 31		
May 2	"	+ 1. 11. 40.	6. ^s 04	0. ^s 252
" 4	"	+ 1. 24. 95	6. 77	. 282
" 6.	"	+ 1. 22. 78.		
" 6	sid 14. ^h	+ 1. 20. 84		
" 7	" 0. ^h	+ 1. 20. 45.	- 0. ^s 85.	- 0. ^s 035
" 8	" 0.	+ 1. 20. 07.	- . 38.	- 0. 015.
" 10	" 0.	+ 1. 19. 34	- . 36	- 0. 015
" 11	" 0	+ 1. 19. 23	- . 11.	- 0. 005
" 12	" 0	+ 1. 19. 04	- 19	- 0. 008
" 14	" 0	+ 1. 18. 19	- 42	- 0. 017
" 15	"	1 17 42	- 77	- 0. 032
" 16	Clock Stopped.			
May 19	Sid 0. ^h	ΔT_2 - 19. 58.		
" 23	"	" - 53. 10	- 8. 38	- . 35
" 24	"	" - 59. 57		
" 26	"	" - 1. 01. 56	- . 99	- . 04
" 28	"	clock Stopped.		
" 28	"	+ 43. 46		
" 30	"	+ 40	- 1. 70	
" 31	"	+ 38. 49	- 1. 51	

Arnold's Chron^r

Time	A.T.	Daily rate
Mean Vorn		
Mean Vorn	1. 57. 80	-08. 03
Mean V ⁿ	2. 19. 87	-07. 35
Mean V ⁿ	3. 02. 50	-10. 09

31

Chron^r Ran down

Clock. June. 1866

date	"	$\Delta T.$	Daily rate	Hourly rate
1 st	Sid. 0 ^h	+ 37.12 ^{sec}	+1.37	+0.057
2	" "	+ 35.48	+1.64	+0.068
7	" "	+ 27.50	+1.59	+0.065
May. 9. Clock. lost. about. 4.3 in winding				
9	" "	+ 23.91	1.79	
"	" 12 h.	+ 27.59		
15	" 0 ^h	+ 19.00	1.43	0.060
16	" 0 ^h	+ 17.67	1.33	.055
19	" 0 ^h	+ 12.67	1.66	.069
20	" 0 ^h	+ 11.27	1.40	.058
21	" 0 ^h	+ 10.	1.27	.053
21	" <u>12^h</u>	+ 8.97		
22	" "	+ 7.29		
23	" "	+ 5.70	1.53	.064
25	" "	+ 2.54		
26	" "	+ 1.32	1.46	.060
30	" "	- 5.70	1.75	

Chronometers. June 66

M.T.	Arnold	Daily rate	Sid. ^o T	Bond.	Daily rate.
10. ^h	^m ^{sec} -1.03.36		15. ^h	^m -1.04	

10.47	^m +2.14.28	^s +5.91	15.49	+1.18.4	-1.2
-------	-----------------------	--------------------	-------	---------	------

2.41.92	3.45	17.	1.18.6.
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11.35 AM	2.57.94	5.21	1.29.8
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2.51	3.11.44		1.39.27
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11 76
5.88

Sidereal Clock.

July 1866

Date	Time	ΔT	Correction Daily rate	Correction Hourly rate	Therm.
2	Sid. ⁶ 12 h.	- 8. ⁵ 80.			
3	" "	- 8.56	- 0. ⁵ 24.	0. ⁵ 010	+78. ⁰ 7.
5	" "	- 8.44	- . ⁰⁶ 12	.005	+82. ⁰
6	" "	- 8.48	+ .04		
9	" "	- 8.51	+ . ⁰⁶		
10	" "	- 8.49	- .02		
12	" "	- 8.25	- .12		
13	" "	- 8.17	- .08		
14	" "	- 8.09	- .08		
16	" "	- 7.93	- .08		
17	" "	- 7.83	- .10		
19	" "	- 7.99	+ .08		
22	" "	- 8.30	+ .10		
24	" "	- 8.50	+ .10		
26	" "	- 8.48	- 01		77
29	" "	- 8.98	+ 17		
31	" "	- 9.41	+ 21		72.

Remarks.

Sidereal Clock

August. 1866

Date	Time	ΔT	Daily rate	Hourly rate	Therm?
1 Aug					9 P.M. = 19 h. 54
2	Sid. 12 ^h	-10.03	+ .31		79
3	"				77
4	"	-10.57	+ .18		76
5	"				75
6	"	-10.77	+ .20		74
7	"				75
8	"	-11.22	+ .22		75
9	"				68
10	"	-12.17	+ .48		71
11	"	-12.58	+ .40		73
12	"	-12.76	+ .28		75
13	"	-13.23	+ 47		74.5
14	"	-13.40	+ 17		73.5
16	"	-14.25	+ 44		67
17	"	-14.81	+ 56		67
18	"	-15.26	+ 45		74
20	Sid. 18 ^h	-16.06	+ 36		70
21	"	-16.54	+ 48		66
22	"	-16.88	+ 34		69
23	"				64
24	"	-17.98	+ 55		66
25	"	-18.63	+ 65		68
27	"	-19.53	+ 45		72.6
28	"	-19.80	+ 27		73.5
30	"	-20.63	+ 41		
Sept 1	"	-21.50	+ 44		
2	"	-22.05	+ 55		

Remarks.—

[illegible]

Sidereal Clock

September/66

Date	Time	ΔT	Daily rate	Therm
1866 Sept 1	Sid. 18 ^h	- 21.50	+ .44	74°
2	" "	- 22.05	+ .55	78
3	" "	- 22.38	+ .33	82
6	" "	- 23.65	+ 42	73 (4) 70 (3) 74
8	" "	- 24.79	+ 52	76
9	" "	- 25.26	+ 47	69
10	" "	- 25.59	+ 33	68
12	" "	- 26.30	+ 35	72 (11) 76
13	" "	- 27.06	+ 76	74
15	" "	- 28.22	+ 58	mean at 2 1/2 & 9 from the 13 to the 15 = 68
16	" "	- 28.47	+ 25	15 " 16 64
17	" "	- 28.88	+ 41	16 " 17 68
22	" "	- 31.16	+ 46	17 " 22 &c 67
23	" "	- 31.91	+ 75	61
27	" "	- 33.96	+ 51	65
28	" "	- 34.27	+ 31	66
30	" "	- 35.44	+ 58	69
Oct 1	" "	- 35.85	+ 41	67
" 4	" "	- 37.70	+ 62	2 3 4 67 64 63
" 5	" "	- 37.92	+ 22	67
" 7	" "	- 38.82	+ 45	6 68 71

Date	Sid. Time	ΔT	Daily rate	Observer	Therm
1866 Oct 11	21 ^h 0 ^m	-40.28	+36	L	70.8
15	"	-42.60	+58	S	67.6
18	"	-43.54	+31	S	70.9
22	"	-46.22	+67	S	68.3
24	"	-47.69	+74	S	65.6
25	"	-48.39	+70	S	60.8
28	"	-49.54	+38	S	67.1
31				S	
Nov 1				D	
2				D	
4				S	
5	0 0	+1 33.59 put forward 2 ^m .	-2.51	S	67.8
6	"	-0 23.90	-2.66	S	68.4
7	"	-0 21.24 Rate altered		S	
8	"	-0 20.40	+6.80	S	68.2
9	"	-0 27.20 Rate altered at 2 ^h 5		S	
10	"	-0 28.26 Rate altered at 1 ^h	+0.42	S	70
11	"			S	71.8
12	"	Rate altered at 22 ^h 30 ^m . -0 28.62		S	
13	"	-0 28.14	-0.48	S	73.1
14	"	-0 27.45	-0.69	S	74.0

Date	Sid. T.	ΔT	Daily Rate	Observer	Therm
1866					72.8
Nov 16	0 ^h 0 ^m	-26.79	-0.33 altered	SMS	
17	0 ^h 0 ^m	-26.76	+0.27	"	70.4
18	"	-27.03	+0.34	"	70.1
21	"	-28.05	+0.28	"	68.0
23	"	-28.61	+0.06	"	67.4
25	"	-28.72	-0.31	"	71.5
26	"	-28.41	+0.30	"	73.0
27	"	-28.71	+0.47	"	
30	"	-30.13	+0.44	"	
Dec 2	"	-31.01	+0.38	"	69
3	"	-31.39 Clock stopped		"	
4	"	+11.62	-0.75	"	75
5	"	+12.37	-0.65	"	70.8
9	"	+14.97	-0.65	"	70.5
10	"	+15.62	-0.45	"	69.3
11	"	+16.07	-0.55	"	66.7
13	"	+17.17	-0.44	"	68.0
15	"	+18.06	-0.24	"	67.1
18	"	+18.79	-0.64	"	68.3
20	"	+20.08	-1.11	"	
26	"	+26.75		"	

Date	Sid t.	ΔT	Daily Rate	Observer	Thermi
1866 Dec 28	0 ^h 0 ^m	+28.54	losing 0.90	GMS	70.0
		lost several seconds in winding on the 29 th and more subsequently			
30	"	+1 11.30		"	
1867 Jan 3	"	+1 13.80	0.62	"	
4	"	+1 14.24	0.44		
7	1 ^h 50 ^m	+2 56.46		"	
		lost in winding stopped in winding			
14	1 15	+ 25.12		"	
			0.32		
22	1 50	+ 27.69		"	
28	2 15	+ 29.36	0.28	"	
Feb 4	2 10	+ 31.83	0.35	"	
			0.56		
11	3 5	+ 35.73		"	
			0.31		
17	7 0	+ 37.60		"	
25	3 15	+ 32.91	gaining 0.58	"	
			0.88		
Mar 8	3 5	+ 23.22		"	
			1.22		
15	5 0	+ 14.54		"	
			1.35		
22	11 5	+ 4.82		"	
		-6.07	1.56		
29	7 30	+53.93		"	
Apr 2	5 45	-12.50	1.65	"	9.9
		-12.7			
6	11 45	-20.36	1.85	"	
			1.57		
9	11 30	-25.07		"	
			1.98		
12	9 30	-30.84			

2.8
5.6

Date	Sid. time	ΔT	Daily rate	observer	Therm
1867 Apr 19	13 ^h 30 ^m	-40.57	gaining 1.36		
20	block stopped	for several seconds	in winding.		
21	16 30	-5.51			
26	9 20	-10.07	0.97		
May 1	19 45	-15.52	1.00		
10	13 30	-19.49	0.45		
17	20 0	-20.73	0.17		
24	11 0	-18.70	losing 0.31		

Remarks

6.6

East block

1866phae.proj..351.

Date 1867	Sid Time	AT	Daily rate	Obsr.	Therm.
July 11	17 ^h	~~-14.1~~ ~~-13.7~~ approx.		W & S.	
13	18 30	-13.56	losing .41	S	
14	" "	-13.15		S	
15	" "	-12.60	.55	S	
16	" "	-12.00	.60	S	
23	19 45	-10.83	.17	S	
28	18 40	-10.04	.16	S	
Aug 6	19 45	-11.70	gaining .18	S	
16	19 30	-11.22	losing .05	S	
			.13		
20	20 45	-10.68	.40		
21	19 45	-10.28	gaining .04		
24	20 45	-10.40	losing .19		
25	" "	-10.21	.21		
26	" "	-10.00	.68		
27	" "	-9.32	gaining		
28	" "	-9.35	.03		
30	" "	-9.70	.15		
31	" "	-9.68			
Sept 1	" "	-9.91			
3	3 " "	-9.70			

South block

~~Am 1111~~

Aug 8. 17^h 45^m -12.32 SMS

20	20 45	-11.28	losing	S	computed
21	19 45	-10.84	rate adj. ~~.XX~~	S	11.22 rate
24	20 45	-10.53	.10	S	= 1.37
25	" "	-10.48	.05	S	10.67
26	" "	-10.55	gaining .07	S	10.54
27	" "	-10.25	losing .30	S	10.40
28	" "	-10.45	gaining 20	S	10.26
30	" "	-10.70	10. losing	S	10.12
31	" "	-10.50	20. gaining	S	
Sept 1	" "	-10.52	02	S	
3	" "	-10.33	10. losing	S	

2. Sept. Capella therm.
att. to clock. temp. 68°

Relative rate . S & E. Clocks.

	10 A.M.	4 P.M.	9 P.M.
Date 1867	S-E	S-E	S-E
Aug 26	+0.42	+0.42	+0.55
27	+0.70		+0.90
28	+1.00	+1.07	+1.12
29	+1.13	+1.09	+1.00
30	+0.90	+0.95	+1.00
31	+0.85		+0.82
Sept 1	+0.67	+0.62	+0.60
2	+0.55	+0.48	+0.43
3	+0.55		+0.62
4	+0.73	+0.77	+0.72
5	+0.68	+0.59	+0.52
6	+0.23	+0.16	+0.18
7	+0.33		+0.45
8	+0.55	+0.60	+0.68
9	+0.90	+0.93	+0.95
10	+1.11		+1.19
11	+1.35		+1.34
12	+1.04	+0.80	+0.63
13	+0.38		
14	+0.21	+0.12	+0.05
15	-0.31	-0.58	-0.72

continued.

Date	10 A.M.		4 P.M.		9 P.M.
Sept 16	- 0.82				- 1.05
17	- 1.18				
18			- 1.72		- 1.83
19	- 2.22				- 2.58
20					- 3.28
21	- 3.48	2 $\frac{1}{2}$ P.M. 3.54			- 3.60
22					- 3.80
23			- 3.95		- 3.98
24					- 4.78
25	- 5.12				
26					
27					- 7.07
28					8 P.M.
29	- 8.10				- 8.22

East Clock

1866phae.proj..351.

1867	Sid. t.	ΔT	Daily rate	Obs	Remarks
Sept 4	20 45	-9.64	gaining	.	
6	" "	-10.37	0.36		
11	" "	-10.64	0.07		
12	" "	-11.45	0.81		
14	" "	-11.93	0.24		
15	" "	-12.82	0.89		
16	" "	-13.07	0.25		
18	" "	-13.88	0.40		
19	" "	-14.52	0.64		
22	" "	-16.23	0.57		
23	" "	-16.34	0.11		
24	" "	-17.13	0.79		
27	" "	-19.58	0.82		
29	" "	-21.45	0.94		
Taken down Oct 1. to be adjusted to mean time with one pendulum.					

South Clock

1867	Sid. t.	ΔT	Daily rate	Obs.	Remarks.
Sept 4	20 45	-10.36		S	
6	" "	-10.56	.10	S	
11	" "	-11.98	.28	S	pan containing mercury put in between Sept 6 and 11 to test the stability of the clock; removed about the 11 or 12. Pendulum found Sept 19 to be strongly magnetic, the lower end having N polarity.
12	" "	-12.08	.10	S	
14	" "	-11.98	.05	S	
15	" "	-12.10	.12	S	
16	" "	-12.02	.08	S	
18	" "	-12.05	.02	S	
19	" "	-11.94	.11	S	
22	" "	-12.43	.16	S	pan replaced immediately after obs as of 19th clock open some time for exhibition.
23	" "	-12.36	.07	S	
24	" "	-12.35	.01	S	
27	" "	-12.51	.05	S	
29	" "	-13.23	.36	S	
Oct 1	" "	-13.21	.01	S	cup and mercury added: clock open for exhibition window open letting sun on.
3	" "	-13.46	.12	S	
6	" "	-13.20	.09	S	one star, faint thro' clouds.
10	" "	-12.24	.24	S	one star
14	22 35	-12.48	.06	S	
16	22 50	-11.44	.52	S	
17	" "	-11.81	.37	S	

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South block

1867	Sid: t	ΔT	Daily rate	Obs.	Remarks
Oct 23	22 50	- 9.94	losing .31	GMS	
28	0 0	- 8.21	.34	EPA	
Nov 5	18 30	- 6.08	.27	GMS	
11	23 20	- 2.85	.52	"	
13	1 20	- 1.83	.49	"	
17	1 50	+ 0.16	.50	"	
27	23 30	+ 6.68	.66	"	
Dec 8	5 45	+ 14.64	.71	"	
16	2 20	+ 22.69	1.03	EPA	
18	3 0	+ 25.05	1.14	"	
26	4 30	+ 36.06	1.37	"	
1868 Jan 6	1 45	+ 51.09	1.38	"	
9	5 50	+ 55.44	1.37	GMS	
11	2 30	+ 58.13	1.42	EPA	
17	2 45	+ 68.66	1.75	"	
30	5 30	+ 90.43	1.66	"	
Feb 3	4 0	+ 97.46	1.78	"	
11	6 45	+ 116.34	1.84	"	Feb 10 9 P.M. Clock opened, lost 2 sec. in adjusting break circuit
15	4 45	+ 4.62	1.68	"	Clock put forward 2 minutes on the 12 th at 2 P.M.
20	9 0	+ 12.29	1.83	GMS	
23	7 15	+ 17.87	1.90		

East block
mean time.

(by comparison with
south clock.)

Date 1868	Mean time	ΔT	Daily rate		
Feb 22	11 0	^{25 58} ~~-25 58~~			
23	11 15	^{25 11} ~~-25 11~~	0.476		
25	8 50	-25.37	0.148		
28	8 50	-19.45	1.976		

South block
sidereal time.

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Date 1868	Sid. time	ΔT	Daily rate <i>losing</i>	Obsr.	Remarks
Feb 25	7 15	+21.64	1.88	EPA	
28	5 30	+27.18	1.89	"	
Mar 5	8 30	+38.21	1.80	"	
11	8 50	+52.44	2.37	"	
13	21 35	+58.64	2.45	"	
19	8 50	+71.63	2.37	"	
23	9 20	+80.61	2.23	"	
24	Clock stopped and rate adjusted.				
24	10 55	-0.17	losing 0.62	"	
25	3 30	+0.26		"	
31	9 9	+6.89	1.07		

Up to July 18, the rates
stand opposite the ends
of the intervals to which
they apply.

Date 1868	Correction required at 0 ^h mean time by		Daily rate of	
	South Clock	Chron. F. 3424	South Clock.	Chron. F. 3424
April 30	+ 8 ^s .90			
May 1	+ 8 ^s .61		- 0 ^s .29	
2	+ 8 ^s .49	- 1 ^m 23 ^s .90		
3	+ 8 ^s .37		- 0 ^s .12	
4	+ 7 ^s .99	- 1 ^m 14 ^s .80		
5	+ 7 ^s .61	- 1 ^m 0 ^s .44		
6	+ 7 ^s .21	- 0 ^m 53 ^s .88		
7	+ 6 ^s .83	- 1 ^m 12 ^s .38		
8	+ 6 ^s .45	- 1 ^m 49 ^s .34	- 0 ^s .38	- 8 ^s .63
9	+ 6 ^s .22	- 2 ^m 16 ^s .09	- 0 ^s .23	- 26 ^s .75
10	+ 6 ^s .20			
11	+ 6 ^s .19	- 1 ^m 55 ^s .53	- 0 ^s .02	+ 10 ^s .28
12	+ 6 ^s .28	- 1 ^m 59 ^s .11	+ 0 ^s .09	- 3 ^s .58
13	+ 6 ^s .20	- 1 ^m 46 ^s .24		
14	+ 6 ^s .12	- 1 ^m 30 ^s .15	- 0 ^s .08	+ 14 ^s .48
15	+ 5 ^s .74	- 1 ^m 1 ^s .94		
16	+ 5 ^s .36	- 0 ^m 51 ^s .04		
17	+ 4 ^s .98			
18	+ 4 ^s .60	- 0 ^m 19 ^s .73		

*Thermometer**readings**Max.**Min.*

69

55

71

59

Up to July 18 the rates stand opposite the ends of the intervals to which they apply.

Date 1868		Correction required at 0 ^h mean time by		Daily rate of	
		South Clock	Chron. F. 3424	South Clock	Chron. F. 3424
May	19	+	4 ^s .24 - 0 ^m 31 ^s .93		
	20	+	3 ^s .86 - 0 ^m 34 ^s .94		
	21	+	3 ^s .48 - 0 ^m 48 ^s .11		
	22	+	3 ^s .10 - 1 ^m 10 ^s .50	- 0 ^s .38	+ 2 ^s .72
	23	+	2 ^s .59 - 1 ^m 10 ^s .73		
	24	+	2 ^s .08		
	25	+	1 ^s .55 - 1 ^m 41.21		
	26	+	1 ^s .04 - 1 ^m 50 ^s .82		
	27	+	0 ^s .53 - 1 ^m 54 ^s .89	- 0 ^s .51	- 8 ^s .88
	28	+	0 ^s .31 - 1 ^m 57 ^s .27	- 0 ^s .22	- 2 ^s .38
	29	-	0 ^s .18 - 1 ^m 38 ^s .88		
June	30	-	0 ^s .67 - 1 ^m 27 ^s .03		
	31	-	1 ^s .15	- 0 ^s .49	
	1	-	1 ^s .78 - 0 ^m 52 ^s .41		
	2	-	2 ^s .40 - 0 ^m 30 ^s .02		
	3	-	3 ^s .03 - 0 ^m 16 ^s .83	- 0 ^s .63	+ 16 ^s .79
	4	-	3 ^s .63 - 0 ^m 20 ^s .03	- 0 ^s .60	- 1 ^s .20
	5	-	4 ^s .30 - 0 ^m 31 ^s .09		

Thermometer readings

Max. Min.

65½ 61½

64 60

62 59

66½ 60½

64½ 59½

63 60

65 61½

66 61

67 64½

65½ 64

67 63½

71 66

70 64

68 62

66 61

65 59½

Only one star observed on the 27

Only γ^1 Leonis

Up to July 18 the rates
stand opposite the ends of
the intervals to which
they apply.

Date 1868	Correction required at 0 ^h mean time by		Daily rate of	
	South Clock.	Chron. F.3424	South Clock	Chron. F.3424
June 6	—	4 ^s .97 — 0 ^m 32 ^s .18	—	0 ^s .67 — 6 ^s .07
7	—	5 ^s .65		
8	—	6 ^s .33 + 0 ^m 32 ^s .07	—	0 ^s .68 + 32 ^s .12
9	—	7 ^s .07 + 0 ^m 44 ^s .75		
10	—	7 ^s .81 + 1 ^m 10 ^s .00	—	0 ^s .74 + 18 ^s .96
11	—	8 ^s .76 + 1 ^m 18 ^s .57		
12	—	9 ^s .71 + 0 ^m 59 ^s .24		
13	—	10 ^s .67 + 0 ^m 33 ^s .77		
14	—	11 ^s .64		
15	—	12 ^s .59 + 1 ^m 13 ^s .18		
16	—	13 ^s .54 + 2 ^m 3 ^s .68	—	0 ^s .95 + 8 ^s .95
17	—	14 ^s .55	—	1 ^s .01
18	—	15 ^s .80 + 3 ^m 40 ^s .50		
19	—	17 ^s .06 + 4 ^m 30 ^s .99	—	1 ^s .25 + 49 ^s .07
20	—	18 ^s .24 + 5 ^m 42 ^s .50	—	1 ^s .18 + 1 ^m 11 ^s .51
21	—	19 ^s .62		
22	—	22 ^s .00 + 8 ^m 21 ^s .12		
23	—	22 ^s .38 + 8 ^m 30 ^s .33	—	1 ^s .38 + 0 ^m 55 ^s .94
24	—	23 ^s .70 + 8 ^m 42 ^s .50		

Thermometer readings		
24	Max.	Min.
7	69	61½
2	74	64
	68	64
6	71	64
	67	63
	63½	61
	64½	59½
	69	64
	70	66
5	75	69½
	74½	70
	73½	69
7	74	70
51	78	72
	83	68
94	68	62
	68	64½

Up to July 18 the rates
stand opposite the ends of
the intervals to which
they apply.

Date 1868	Correction required at 0 ^h mean time by		Daily rate of	
	South Clock Chron. F.3424		South Clock Chron. F.3424	
June 25	—	25 ^s .03 + 8 ^m 56 ^s .62	—	1 ^s .32 + 0 ^m 13 ^s .14
26	—	26 ^s .45 + 9 ^m 32 ^s .22		
27	—	27 ^s .87 + 10 ^m 27 ^s .72		
28	—	29 ^s .27		
29	—	30 ^s .73 + 12 ^m 22 ^s .98		
30	—	32 ^s .15 + 12 ^m 53 ^s .93	—	1 ^s .42 + 0 ^m 47 ^s .46
July 1	—	33 ^s .55 + 13 ^m 35 ^s .34	—	1 ^s .40 + 0 ^m 41 ^s .41
2	—	34 ^s .74 + 14 ^m 28 ^s .33	—	1 ^s .19 + 0 ^m 52 ^s .99
3	—	36 ^s .18 + 15 ^m 47 ^s .08	—	1 ^s .44 + 1 ^m 18 ^s .75
4	—	37 ^s .62	—	1 ^s .44
5	—	39 ^s .34 + 19 ^m 46 ^s .90		
6	—	41 ^s .06 + 21 ^m 51 ^s .66		
7	—	42 ^s .79 + 22 ^m 40 ^s .31		
8	—	44 ^s .51 + 23 ^m 41 ^s .36		
9	—	46 ^s .23 + 24 ^m 29 ^s .76		
10	—	47 ^s .95 + 25 ^m 4 ^s .80	—	1 ^s .72 + 1 ^m 19 ^s .67
11	—	49 ^s .54 + 25 ^m 42 ^s .41		
12	—	51 ^s .13		
13	—	52 ^s .72 + 29 ^m 9 ^s .96		

Thermometer readings

Max. Min.

24	68	64
14	73	66
	75½	70
	79	66
46	71	66
1	73	68½
9		
15	80	75(?)
	82(?)	77
	77	68½
	75	72
	73½	68½
7	70	66
	75½	69
	85	75½

Up to July 18, the rates stand opposite the ends of the intervals to which they apply.

Date 1868	Correction required at 0 ^h mean time by South Clock Chron. F. 3424		Daily rate of South Clock Chron. F. 3424		
July 14	-	54 ^s .32 + 30 ^m	56 ^s .18		
15	-	55 ^s .91 + 32 ^m	54 ^s .95		
16	-	57 ^s .50 + 35 ^m	7 ^s .72	-	1 ^s .59 + 1 ^m 40 ^s .49
17	-	59 ^s .26 + 36 ^m	38 ^s .79		
18	-	61 ^s .03 + 37 ^m	41 ^s .09	-	1 ^s .76 + 1 ^m 16 ^s .68
19	-	1 ^m 2 ^s .93		-	1 ^s .90 + 1 ^m 8 ^s .59
20	-	1 ^m 4 ^s .83			
21	-	1 ^m 6 ^s .74			
22	-	1 ^m 8 ^s .64			
23	-	1 ^m 10 ^s .54 + 43 ^m	44 ^s .15		
24	-	1 ^m 12 ^s .45 + 44 ^m	42 ^s .25		
25	-	1 ^m 14 ^s .35 + 45 ^m	24 ^s .72		
26	-	1 ^m 16 ^s .25			
27	-	1 ^m 18 ^s .16 + 47 ^m	13 ^s .61		
28	-	1 ^m 20 ^s .06			
29	-	1 ^m 21 ^s .97 + 49 ^m	11 ^s .57		
30	-	1 ^m 23 ^s .87 + 50 ^m	6 ^s .21		
31	-	1 ^m 25 ^s .78 + 51 ^m	7 ^s .63		
Aug. 1	-	1 ^m 27 ^s .68 + 52 ^m	36 ^s .35		

Thermometer readings	
Max.	Min.
83	77
85	80
87 $\frac{1}{2}$	81
80	74
76	71
80	74
75	70
75	72
79 $\frac{1}{2}$	74
74	70
72	70
73 $\frac{1}{2}$	70 $\frac{1}{2}$
75	69
76	72
74	70
74 $\frac{1}{2}$	70
76 $\frac{1}{2}$	72
79 $\frac{1}{2}$	76 $\frac{1}{2}$

Date 1868	Correction required at 0 ^h mean time by		Daily rate of	
	South Clock	Chron. F. 3424	South Clock	Chron. F. 3424
Aug. 2	- 1 ^m 29 ^s .58			
3	- 1 ^m 31 ^s .49	+ 55 ^m 58 ^s .50	- 1 ^s .91	+ 0 ^m 58 ^s .27
4	- 1 ^m 33 ^s .39	+ 57 ^m 50 ^s .66		
5	- 1 ^m 35 ^s .30	+ 59 ^m 3 ^s .74		
6	- 1 ^m 37 ^s .21	+ 59 ^m 53 ^s .86		
7	- 1 ^m 39 ^s .13	+ 60 ^m 33 ^s .04		
8	- 1 ^m 41 ^s .05	+ 61 ^m 4 ^s .13		
9	- 1 ^m 42 ^s .97		- 1 ^s .85	
10	- 1 ^m 44 ^s .82	+ 62 ^m 46 ^s .39	- 1 ^s .88	+ 0 ^m 54 ^s .45
11	- 1 ^m 46 ^s .70	+ 63 ^m 46 ^s .71		
12	- 1 ^m 48 ^s .58	+ 64 ^m 43 ^s .73		
13	- 1 ^m 50 ^s .46	+ 65 ^m 29 ^s .73	- 1 ^s .86	+ 0 ^m 35 ^s .60
14	- 1 ^m 52 ^s .32	+ 66 ^m 5 ^s .33	- 1 ^s .87	+ 0 ^m 55 ^s .99
15	- 1 ^m 54 ^s .19	+ 67 ^m 1 ^s .55		
16	- 1 ^m 56 ^s .07			
17	- 1 ^m 57 ^s .94	+ 68 ^m 53 ^s .30	- 1 ^s .85	+ 0 ^m 55 ^s .26
18	- 1 ^m 59 ^s .79	+ 69 ^m 29 ^s .83		
19	- 2 ^m 1 ^s .64			
20	- 2 ^m 3 ^s .48	+ 71 ^m 20 ^s .87		

Thermometer readings		
4	Max.	Min.
	80	$76\frac{1}{2}$
27	$81\frac{1}{2}$	78
	83	$77\frac{1}{2}$
	$77\frac{1}{2}$	$72\frac{1}{2}$
	$72\frac{1}{2}$	70
	72	$67\frac{1}{2}$
	$69\frac{1}{2}$	$67\frac{1}{2}$
	$74\frac{1}{2}$	69
5	$75\frac{1}{2}$	71
	74	71
60	74	$66\frac{1}{2}$
9	72	$66\frac{1}{2}$
	75	$70\frac{1}{2}$
6	76	$67\frac{1}{2}$
	72	$67\frac{1}{2}$
	73	69
	$77\frac{1}{2}$	73

From 4 stars with old instrumental corrections.

After Aug. 21 chronometer F. 3424
is reduced to South Clock time.

Date 1868	Correction required at 0 ^h mean time by South Clock	Daily rate of
	South Clock Chron. F. 3424	South Clock Chron. F. 3424
Aug. 21	- 2 ^m 5 ^s .33 + 72 ^m 34 ^s .34	- 1 ^s .84
22	- 2 ^m 7 ^s .17 + 75 ^m 41 ^s .47	
23		
24		
25		
26	+ 79 ^m 6 ^s .63	
27	+ 80 ^m 5 ^s .38	
28	+ 81 ^m 3 ^s .20	
29		
30		
31	+ 84 ^m 5 ^s .24	
Sept. 1		
2		
3	+ 87 ^m 32.09	
4		
5	- 2 ^m 34 ^s .05 + 89 ^m 41 ^s .28	- 2 ^s .00
6		
7	+ 89 ^m 49 ^s .28	
8	+ 90 ^m 44 ^s .79	

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Thermometer		Reduction to South Clock		
readings at 0 ^h mean time of				
24	Max.	Min.	East Clock. North Clock.	
	77	73	+1 ^m 28. ^s 44	
	76	69½	+1 ^m 30. ^s 63	
			~~+1^m 35.^s75~~	
	74	68	+1 ^m 35. ^s 25	
	76	71	+1 ^m 37. ^s 54	
	77½	72½	+1 ^m 39. ^s 77	
	78	73	+1 ^m 41. ^s 86	
	73½	66	+1 33.48(?)	
	71½	66	~~+1 43.44(?)~~	
	80(?)	69	+1 ^m 58.34(?)	
	76½	72	+1 ^m 52. ^d 67	
	78	70	~~+1^m 56.^d43~~	
	73	66½	+1 ^m 56. ^d 43	
	69	65		
			+1 ^m 58. ^s 30	
	73	66½		
	71	68½	+2 ^m 2.28	
			+2 3.99	

Date 1868	Correction at 0 ^h mean time for	Reduction to South Clock of	Daily rate	
			South Clock	Chron. F. 3424
Sept. 9		+ 8 ^m 98.41		
10		+ 9 ^m 17.65		
11		+ 9 ^m 47.02		
12		+ 9 ^m 48.81		
13				
14		+ 9 ^m 33.16		
15		+ 9 ^m 15.83		
16		+ 9 ^m 35.91		
17		+ 9 ^m 46.71		
18	+ 3 ^m 00.03	+ 9 ^m 24.65	—	1 ^s .94
19	— 3 ^m 1.97	94 53.19	—	1 ^s .99
20				
21	— 3 ^m 5.96	+ 9 ^m 6.86	—	2 ^s .06
22	— 3 ^m 8.02	+ 9 ^m 36.68	—	2 ^s .01
23		+ 9 ^m 28.50		
24		93.09.2		
25		92 15.0		
26				
27				

Thermometer Reduction to South clock readings

24	Max	Min	East Clock	North Clock
72	65	+2 ^m	5.93	+2.75
68	66.5	+2 ^m	7.95	+7.00 ^{Regulated}
72	67.2	+2 ^m	9.98	+7.0
75	71.2	+2 ^m	11.79	+12.0
72½	69			+ ~~20.3~~ neg
74	69	+2 ^m	15.64	+20.3
71	66	+2 ^m	17.66	+20.2
69½	65.5	+2	19.22	+20.0
67	60.7	+2	20.94	+20.7
63.5	54.7	+2	22.54	20.15 12.7
64.0	56.0	+2	24.27	
63	58			
61.5	59.5	+2 ^m	28.80	
64.0	56.0	+2 ^m	30.9	
59.7	57.0	+2	32.91	+
61.0	58.0	+2	34.89	
60.5	57	+2	36.84	+31.7
63½	57½			

South Clock was stopped Oct. 8, 1868, at 5^h mean time. The arc of vibration was found to be 1.7. The pendulum was lengthened 2 divisions.

Date. 1868	Correction at 0 ^h mean time for	Reduction to South Clock of	Daily rate of
	South Clock	Chron. 73424	South Clock
Sept. 28	- 3 ^m 20.10		- 1.90
29			
30		+ 90 ^m 36.44	
Oct. 1		+ 89 ^m 6.57	
2		+ 89 ^m 27.09	
3	- 3 ^m 29.60	+ 89 48.01	- 1.93
4			
5		87. 23.47	
6	- 3 ^m 35.39	86. 43.20	
7		86 11.92	
8		85 44.99	
South Clock regulated 9	+ 1 ^m 2.97	~~84~~ 54.64	- 0.76
10		80 2.92	
South Clock set forward one minute.			
11	+ 1 ^s 44		- 0.86
12	+ 0 ^s 58	80 38.23	- 0.66
13	- 0.45	80 20.98	
14	- 0.74	79 59.86	
15	- 1.46	79 48.85	
16	- 2.08		- 0.70

Thermometer
readings

Reduction to
South Block
of

Max Min. East Block North Block

63 58½

65½ 60

63 56 + 2^m 49.40 - 1.9

60.3 57.9 2 49.29 - 1.1

61.5 56.0 2 51.07 - 0.2

59.5 56.5 2 53.06 + 0.9

60 55 + 2.1

60.4 54.5 2 56.62 + 2.1

58 55 2 58.72 + 2.0

62 51 3 60.62 + 1.8

62.5 52.5 3 62.48 + 0.4

69.4 52.5 - 1^m 39.14 - 3^m 58.

59 52 - 1^m 39.23 ~~39.23~~ Reg.

64 56½

65 62. - 0 37.88 - 0 5.7

64 58.5 - 0 37.28 - 0 7.3

64 59.5 - 0 37.16 - 0 9.6

63 59.5 - 0 37.36 - 0 13.0

Date 1868	Correction at Reduction 5 ^h mean time to South block for		Daily rate Tab.	
	South block	Chron. F. 3424	South block,	
Oct 17	- 2 ^s .78	^{20.} 79 - 15 ^s .43	- 0.24	
18				
19.	4.18	78 - 17.57		
20.	- 3 ^s .50	79 11.75	- 0.68	
21	5 58	77 53.72		
22	- 6.28	76 33.23		
23	- 5 ^s .54	+77-13.93	- 0.25	
24		+77-13.90		
26		+76-54.01		
27		+76 51.82		
28		+76-55.84		
29	- 7 ^s .05	+77-0.59	- 0.17	
30		+76-55.28		
31		+76-35.41		
Nov. 1				
2				
3	- 7 ^s .92		- 0.20	
4.	- 8 ^s .12		- 0.23	

Thermometer Reduction to South block readings of

Max	Min.	East block	North block
64p	59.0	-36.53	-0 20.2
62	54½		
63	60	-45.08	-0 -37.8
		-34.12	-0 -29.9
64.5	59.5	-33.47	-0 -32.8
61.6	58.2	-32.77	-0 -35.7
64.	58	-32.05	-0 -37.3
63.5	59	-31.62	-0 -47.1
66.5	59.5		
66.	61.5	-30.73	-0 -58.1
		-30.38	-1 ^m 00.8
67.	57.	-29.90	-1 -03.1
66.5	61.	-29.94	-1 -06.5
65.5	59.	-31.86	-1 -13.1
64.5	56.5	-31.23	-1 -21.6
68.0	59.5		
68.5	61.0		
66.5	60.5		
64.5	59.5		

Date. 1868.	Cor. at 0 ^h mean time for	Reduc. to So. Clock of	Daily rate of
	South Clock	Ch. F. 3424	South Clock
Nov. 5.		+ 76 14.34	
6	- 8 ^s .58	+ 76 4.92	+ 0 ^s .07
7	- 8 ^s .51	+ 75 47.69	- 0 ^s .09
8		+ 75 15.53	
9		+ 75 15.53	
10		+ 75 18.07	
11		+ 75 20.43	
12	- 8 ^s .97	+ 75 7.22	- 0 ^s .18
13	- 9 ^s .15	+ 74 39.54	+ 0 ^s .03
14		+ 74 26.31	
15		+	
16	- 9 ^s .07	+ 73 54.21	+ 0 ^s .04
17		+ 73 38.58	
18		+ 73 07.26	
19	- 8 ^s .95	+ 72 41.03	- 0 ^s .24
20		+ 72 21.44	
21		+ 71 57.89	
22			
23	- 9.90	+ 71 19.05	- 0 ^s .10

Thermometer Readings Reduction to South Clock of

Heat.	Hum.	East Clock	North Clock.
65.	60.5	- 29.18	- 1 45
64.5	60.5	- 29.01	- 1 50
64.5	60.5	- 28.91	- 1 58.9
65.5	55.5		
64.0	60.5	- 28.35	- 2 19.9
66.5	63.0	- 28.31	- 2 29.3
66.0	63.5	- 28.23	- 2 38.8
64.5	58.5	- 28.21	- 2 46.9
63.0	55.5	- 28.98	- 2 58.5
65.0	57.0	- 28.93	- 3 9.6
66.0	58.5		
64.0	59.5	- 29.16	- 3 31.3
65.5	57.0	- 29.34	- 3 48.8
61.5	57.0	- 30.03	- 4 08.1
62.5	58.0	- 29.68	- 4 4
63.0	57.5	- 29.82	- 4 42.40
63.0	59.0	- 29.87	- 5 2.00
63.0	59.0		
64.5	58.0	- 29.32	- 5 38.9

Date 1868.	Cor. at 0 ^h . mean time for	Reduc. to So. Clock of	Daily rate of
	So. Clock.	Ch. F 3424 So. Clock.	
Nov. 24.		+71 ^{m.} 8. ^{s.} 56	
25			
26		+69 33.46	
27	- 10 ^s .31	+70 16.63	- 0 ^s .26
28		+70 4.46	
29			
30		+69 12.08	
Dec. 1.		+68 50.35	
2		+67 53.68	
3	- 11 ^s .88	+66 53.76	- 0.05
4	- 11 ^s .93	+66 11.20	- 0.04
5		+65 26.00	
6			
7		+64 17.92	
8	- 12 ^s .08	+63 56.75	- 0.04
9		+63 35.58	
10	- 12 ^s .17	+62 53.52	+ 0.28
11		+61 57.81	
12		+61 5.43	

Thermom. Readings.		Reduc. to So. Clock of		
Max.	Min.	East Clock	North Clock.	
66.0	60.5	- 29.16 ^{s.}	- 6 ^{in.}	1.2 ^{s.}
65.0	57.5	- 29.22	- 6	52.7
66.0	60.0	- 29.22	- 7	6.4
66.0	57.0	- 29.62	- 7	29.0
62.0	58.0			
64.0	58.5	- 29.46	- 4	2.2
63.5	57.5	- 29.54	- 6	7.0
59.0	49.5	- 29.98	- 8	12.4
58.5	52.0	- 30.71	- 10	24.3
60.5	54.5	- 30.78	+ 0	6.2
60.5	56.5	- 31.15		
62.0	56.5			
62.5	56.5	- 31.50		
64.5	59.0	- 31.18		
64.5	54.5	- 31.54		
63.0	59.5	- 32.22		
58.5	51.5	- 33.02		
59.0	53.5	- 33.67		
64.0	57.5			

Date 1868	Correction required by South Clock at 0 ^h mean time	Daily rate of South Clock	Reduction to South Clock, at 0 ^h mean time			Thermometer readings	
			Chronometer F.3424	East Clock	North Clock	Max.	Min.
Dec. 14			m s	s			
			+ 60 9.54	- 34.41	- 10 ^s .6	63.0	57.5
15	- 10 ^s .79	+ 0.21	+ 59 31.67	- 35.20	- 13 ^s .4	62.5	55.0
16			+ 59 10.06	- 36.21	- 20 ^s .1	65.0	60.0
17			+ 58 52.06	- 36.99	- 24 ^s .7	69.0	58.0
18	- 10 ^s .17	+ 0.36				67.0	60.5
19	- 9 ^s .81	+ 0.34	+ 56 15.48	- 39.15	- 33 ^s .0	67.5	52.5
20					<i>N. Clock regulated</i>	62.0	54.5
21			+ 57 9.63	- 40.82	- 38 ^s .8	66.5	58.5
22	- 8 ^s .76	+ 0.47	+ 57 1.08	- 41.96	- 40 ^s .4	67.0	59.0
23							
24							
25							
26							
27							
28	- 5.94	+ 0.33	- 1 53.7	+ 10.85	- 60.8	65.0	50.5
29			- 2 13.71	+ 9.58	- 63.6	62.5	58.0
30			- 2 50.40	+ 6.37		59.5	57.5
31			- 3 24.20	+ 7.09	- 68.7	61.0	56.0
1869 Jan. 1			- 3 54.49	+ 6.09	- 71.3	62.0	56.0
2			- 4 23.09	+ 4.70	- 75.7	62.0	56.0
3						62.0	55.0

Date	Cor. for South clock rate at 0 ^h mean time.	Daily rate of South Clock.	Reduction to So. Clock. at 0 ^h mean time. of			Thermom. Readings.	
			Chronom.	East Clock	North Clock	Heat.	Wine.
1869			^{m.} ^{s.} ~~34.48~~ + 2.48		^{m.} ^{s.} ~~1~~ 8.24	64.5	60.0
Jan 4							
5	- 3 ^s .26	+ 0.19					
6			- 6 1.31 + 0.06	- 1 21.8		64.5	57.5
7	- 2 ^s .87	+ 0.15	- 5 17.69 - 0.97	- 1 27.7		65.0	59.0
8			- 6 18.69 - 2.07	- 1 27.6		67.5	56.5
9			- 6 7.08 - 3.19			62.5	62.5
10						67.0	61.5
11			- 6 26.76 - 5.45			66.0	60.0
12			- 6 37.98 - 6.70	- 1 39.7		64.0	60.5
13	- 1 ^s .96	+ 0.25	- 6 54.57 - 8.37	- 1 42.3		64.5	58.5
14			- 7 11.84 - 9.89	- 1 45.1		64.0	59.5
15			- 7 30.59 - 11.07	- 1 47.8		64.5	59.0
16	- 1 ^s .20	+ 0.09	- 7 57.31 - 12.69	- 1 52.5		62.5	58.5
17						62.5	56.5
18			- 9 10.73 - 15.73	- 1 56.7		60.0	55.0
19	- .92	0.28	- 9 59.96 - 7.05	- 2 1.2		58.5	55.0
20			- 10 41.88 - 8.31	- 2 4.1		60.0	53.0
21			- 11 28.30 - 9.52	- 2 7.0		62.0	55.0
22			- 12 3.04 - 10.84	- 2 10.3		61.0	54.5
23	+ .54	0.27	- 12 49.35 - 12.11	- 2 16.3		59.5	54.0
24						62.5	53.5

Date	Correction required by So. Clock at 0 ^h mean time.	Daily rate of South Clock.	Reduction to South Clock at 0 ^h mean time of			Ther. readings.		I
			Chronom.	East Clock.	West Clock.	Max.	Min.	
1869			3424					
Jan. 24.								
25	+1.95	0.80	-14	2.65	-14.36	Stop/ed.	63.0	59.0
26	+1.75	0.67	-14	32.76	-15.43		62.0	56.0
27	+2.36	+0.50	-15	11.51	-16.71		60.0	56.5
28	+2.86	0.39	-15	41.33	-17.94		62.5	58.5
29	-1.00		-15	59.08	-18.15		64.0	59.0
30	-1.00		-16	8.65	-20.23		65.0	61.5
31	+4.02	0.52					65.0	54.0
Feb. 1.	+4.54	0.68	-18	10.56	-23.94		57.5	44.5
2.	+5.32	0.49	-19	11.42	-25.26		62.0	53.0
3			-19	32.08	-26.30		63.0	58.5
4			-20	3.21	-28.65		61.5	57.0
5			-20	47.45	-28.74	- 0.9	60.5	53.5
6			-21	30.62	-29.66	- 2.9	61.0	55.5
7	+7.67	0.67					65.0	58.0
8			-22	12.84		- 3.4	65.0	56.0
9	+9.11	0.48	-22	25.07		- 3.4	64.5	60.5
10			-23	35.39	+1.85	- 3.9	65.0	60.0
11			-22	51.54	+0.56	- 4.1	64.0	60.5
12	+10.46	0.43	-23	7.86	-0.79	- 4.2	63.0	59.0
13	+10.89	0.41	-23	10.21	-1.87	- 4.4	72.0	62.0

Date 1869	Cor. for S. Clock at 0 hrs mean time	Daily rate of S. Clock	Reduct. to S. Clock at 0 hours mean time of Ther. Read.			Max.	Min.
			Chr. 3424	E. Clock.	No. Clock.		
Feb. 14						69.0	62.0
15			-23 4.76	-4.80	-4.4	65.5	62.0
16			-23 15.04	-6.17	-4.6	65.5	60.5
17	+12.54	-0.01	-23 23.50	-7.17	-4.7	65.0	62.0
18	+12.53	+0.20	-23 28.74	-8.03	-5.0	68.0	62.0
19	+12.73	+0.40	-23 44.62	-8.48	-5.0	64.0	57.5
20			-23 21.85	-9.25	-5.5	64.0	58.5
21						62.5	57.0
22			-25 9.61	-10.82	-6.1	65.0	55.5
23			-25 31.26	-11.95	-6.2	61.5	60.0
24	+14.74	+0.57	-26 14.10	-13.42	-6.4	61.0	52.5
25	+15.31						
26							
27							
28						64.0	51.0
March 1							
2			-30 44.69	-20.15	-12.45	60.0	52.5
3			-31 47.96	-21.22	-13.85	59.0	52.0
4			-32 38.74	-22.44	-14.85	60.5	56.5
5			-33 28.70	-23.96	-16.05	60.5	48.5

Date 1869	Correction required by South Clock at 0 ^h mean time	Daily rate of South Clock	Reduction to South Clock, at 0 ^h mean time, of			Thermometer readings.	
			Chron. F. 3424	E. Clock	S. Clock	Max.	Min.
March 6			m s	s	s		
			-34 21.16	-25.38	-19.18	59.0	50.0
7						59.0	53.0
8			-36 12.50	-27.88	-24.66	60.5	54.0
9							
10							
11							
12							
13							
14							
15							
16							
17							
18			-41 0.62	-43.87	-35.46	67.0	53.0
19			-41 40.03	-45.61	-37.60	63.0	54.0
20			-42 8.00	-47.34	-39.56	61.0	58.0
21						63.0	55.5
22			-43 19.89	-50.63	-41.57	62.5	55.0
23			-44 9.17	-52.63	-43.46	61.0	53.0
24			-44 56.14	-54.46	-46.07	64.0	54.5
25							

Corrections
Instrumental (Errors) used in reduction

Date of Obs.	Observed	<u>m</u>	<u>n</u>	<u>c</u>	<u>a</u>	<u>b</u>	III
Apr. 30	E.P.A.	^s -.460	^s +.100	^s -.220			E
May 1	"	-.460	+.090	-.155	^s -.377	^s -.280	
" 15	S.P.L.	-.496	+.058	-.155	-.377	-327	
" 28	"	-.142	-.297	+.152	+.125	-307	W
June 23	"	+.014	-.163	+.050	+.130	-100	E
" 25	"			+.300			E
" 27	"			-.167			W
July 2	"	+.096	-.210	-.167	+.220	-.070	"
" 5	gms.	+.11	-.26	-.11			"
" 9	"	+.20		-.123			"
" 10	"	+202	-262	-123	+330		"
" 13	"	+.170	-288		+330	-067	
" 16	S.P.L.					-047	
" 19	"	+.17	-.20	-20	+.26	-.01	W
" 24	gms.	.00	+.34	-16	+.22	-.25	W
" 26	"	-.02	-.13			-.10	W
" 29	"	-.01	-.05	-.25	+.03		
" 31	S.P.L.	+.05	-.14	-.06	+14	-06	"

of Transit Observations V 866

Determining Stars

Instrumental Corrections used in

Date of obs.	Observed?	<u>m</u>	<u>n</u>	<u>c</u>	<u>a</u>	<u>b</u>	alt. ^m
Aug 1	S.P.L.	+ .37	- .13	+ .16	+ 29	+ .11	E
" 5	G.M.S.	+ .18	- 20				
" 8	"	+ .11	- .09	+ 057			E
" 10	"	+ 05	- 06			+ 04	
" 11	"		- 05			- 02	
" 13	"	+ .10	- 13	- .10			W
" 14	S.P.L.	+ .01	- .10	- 02	+ .14	. 00	E
" 16	"	+ 08	- 09				
" 17						+ 10	W
" 20	G.M.S.	+ 20	- 07	- .02			
" 21	"	+ 24	- 11	. 00		+ 10	
" 22	"	+ 25	- 14			+ 09	
" 24	"	+ 15	- 06	+ 07		+ 08	E
" 27	S.P.L.	+ 10	- 11	+ 02		+ 04	
Sept. 1	G.M.S.	+ 22	- 06	+ 02		+ 12	
" 2	"	+ 28	+ 12	+ 02		+ 13	
" 6	S.P.L.	+ 30	- 17	- 07			W
" 8	G.M.S.	+ 50	- 19			+ 25	
" 10	S.P.L.	+ 16	- 15	- 06		+ 02	
" 13	"	+ 32	- 20	+ 06		+ 10	E.
" 15							

reduction of Transit Observations 1866.

determining Stars for a. or n

S Urs. Min & 51 Cephei.

w. Draco. Groombridge. 966 & 2 time stars.

" " 4 " "

S Urs. Min. & 3 time Stars

51 Ceph. 50 Draco & 4 " "

4 Draco. & 3 " "

S Urs Min & 51 Ceph.

" "

50 Draco & Draco & 2 Time Stars.

4 Draco pr., S Urs. Min. 22 Camel. & 2 time stars

22 Camelop, S Urs. Min., & 2 time Stars.

" - 4 Draco pr. & 3 time Stars.

50 Draco (51 Cephei) & 2 Time Stars.

S Urs. Min. 50 Draco. & 4 Time Stars.

4 Draconis γ^2 Sagittarii

From 2 Urs. Min & Cephei & 2 Time Stars (by least squares)

S Urs. Min & 51 Cephei

S Draco, & Piassi VII 67

Instrumental Corrections used in

Date of obs.	Observer	<u>m</u>	<u>n</u>	<u>c</u>	<u>a</u>	<u>b</u>	gM^n
Sept 16	GMS	+17	-15'	+06		+03	E
17	GMS	+24	-16	+06		+07	E
22	"	+13	-10	+06		+03	w
27	"	+31	+04	-06		+26	w
28	"	+20 b sec φ	+12	-06		+23	w
30	"	+42	+01	+06			w
Oct 1	"	+34	+22	-06			w
4		+21	+03	-06			w
5		+21	+03	-06			w
7		+21	+03	-06			w
11		+21	+03	-06			w
15		+34	+10	-06			w
18		+37	+19	-06			w
22		+41		-06			w
24		+34	+20	-06			w
25		+30	+20	-06			w
28		+33	+34	-06			w
31							
Nov 1							
2							
4							

reduction of Transit Observations 1866

Determining stars for a or n β Lyrae & σ Sagittarii (no other stars observed.)32 Camelopard. foll. δ C. α Cassiope. & 2 time stars
by least squares. ϵ Draconis, 3 Urs. Maj. δ C. & 4 time stars; by least squares. ϵ Draconis & 3 time stars

3 time stars

 γ Draconis pr. and 2 time stars

2 time stars

3 Urs. Maj. δ C. & κ Cephei

values of last night

 ι Cephei & 2 time stars

values of last night

50 Draconis & σ Sagittarii79 Draconis & μ Capricorni

value of last night

Polaris & θ Beti50 Cassiope, α Cassiope. & two time stars α Cassiope. & β Beti.

Instrumental Corrections used in

Date	Observer	m - b sec ϕ	n	c	a	gll.
Nov 5	GMS	+08	+14	-06		w
6	"	+14	+14	-06		w
7	"	+12	+12	+03	new determination	E
8	"	+19	+10	+03		E
9	"	+17	+10	+03		E
10	"	+23	+21	+03		E
12	"	+20	00	+03		E
13	"	+22	-06	+03		E
14	"	+06	-06	+03		E
16	"	+15	+10	+03		E
17	"	+13	+11	+03		E
18	"	+04	00	+03		E
21	"	+21	+10	+03		E
23	"	+03	+10	+03		E
25	"	+02	+12	+03		E
26	"	+02	00	+03		E
27	"	+19	+11	+03		E
30	"	+06	-02	+03		E
Dec 2	"	-05	+04	+03		E
3	"	-02	+04	+03		E

Reduction of Transit Observations 1866.

Determining stars for n

Values of Nov 6 used

 κ Draconis L.C. and α Cassiopeae

Polaris, 4 circumpolars, & 3 time stars

 σ Cephei & λ Aquarii

Value of last night used

226 Cephei and 32 Urs Maj. L.C.

Value of Nov 10 & 13

 ϵ Delphini, Groomb. 3241 & α Cygni by least squares

Value of Nov 13

48 Cephei & α Beti σ Cephei & λ Draconis L.C.50 Cassiop. & σ Piscium

Value of Nov 16 & 17 (only one star observed, and that in zenith.)

 θ Beti & λ Cassiopeae. ω Piscium & 4 Draconis L.C.Only α Cygni observed (n immaterial)

Three time stars by least squares

21 & λ Cassiopeae & ^{three} time stars, by least squares σ Piscium & 50 Cassiopeae

Value of last night

Instrumental Corrections

Date 1866	Observer	$\bar{m}$ - b sec ϕ	n	c	α	gM
Dec. 4	SMS	-02	00	+03		E
5	"	+10	-06	+03		E
9	"	+04	-09	+03		E
10	"	+03	-09	+03		E
11	"	00	-07	+03		E
13	"	+03	00	+03		E
15	"	-13	+03	+03		E
18	"	-11	00	+03		E
20	"	-23	+02	+03 mw deform- ation		E
26	"	+03	+09	-10		W
28	"	-11	+24	-10		W
1867 Jan 30	"	+01	+13	-10		W
3	"	-09	-06	-06	difference of middle wire from mean allowed for	W
4	"	-17	-06	-06		W
7	"	-11	+10	-06		W
14	"	-20	+28	-06		W
22	"	-26	+10	-06		W
28	"	-09	+19	-06		W
Feb 4	"	-05	+06	-06		W
11	"	-09	+23	-06		W
17	"	-10	+08	-06		W

used in Reduction of Transit Obsns. 1866

Determining stars for n

Mean of values of Dec 3 & 5

α Cephei & mean of α & γ Cygni

α Aquarii and 32 Urs. Maj. L.C.

Value of last night

15 Draconis L.C. and α Camelopard.

Values of Dec 11 & 15

κ Draconis L.C. and α Cassiopeae

ν Cephei & α Pisc. Aust.

ϵ Drac. L.C. & two time stars.

ν Cephei & α Pisc. Aust.

λ Drac. L.C. & Groomb. 4163

Gr. 4163 & two time stars.

κ Drac. L.C. & three time stars.

Value of last night

50 Cassiope. & two time stars

50 Cassiope. & two time stars; ~~one~~ of them a different ^{one from the 7th}

50 Cassiope. & two time stars (~~different ones~~) same as ^{on the 7th}

δ i Cassiope. & 5 Urs. Min L.C.

ν Cass. & 5 Urs. Min L.C.

α Beti & α Persei

δ Draconis L.C. & γ Geminorum

Instrumental Corrections

Date 1867	observer	m - t sec q	n	c	a	M.
Feb 25	GMS	-09	+08	-06		W
Mar 8	"	-21	+14	-06		W
15	"	-15	+16	-06		W
22	"	-15	+22	-06		W
29	"	-13	-40	-06		W
Apr 2	"	-10	+31	-06		W
6	"	-08	+31	-06		W
9	"	-14	+14	-06		W
12	"	-07	+05	-06		W
19	"	-05	+05	-06		W
21	"	+01	-04	-06		W
26	"	-10	+43	-06		W
May 1	"	+02	+17	-06		W
10	"	-06	+19	-06		W
17	"	00	+06	-06		W
24	"	+06	+22	-06		W
Aug 16	"	+68	+44	-28	including dysin. aberr.	E.
18	"	+77	+28	"		E
19	"	+77	+35	"		E
20	"	+81		"		E

used in Reduction of Transit Obsns. 1867

Determining stars for n

α Ceti, α and δ Persei.

α ~~Ceti~~ & α Persei

α Aurigae & β Orionis

α Urs. Maj. & δ Crateris

Three time stars.

Value of Apr 6

β Leonis & γ Urs. Maj.

λ Draconis & β Leonis.

3 time stars by least squares

3 time stars by least squares

ζ Ophiuchi & η Herculis

β Cephei (1 wire) and two time stars

α Aquilae & ϵ Draconis

α Virginis & η Urs. Maj.

3 Urs. Maj. L. C. and α Cephei

α Urs. Maj. & δ Leonis

δ Draconis & 2 time stars.

α' Herculis and ι Ophiuchi

γ Draconis & 22 Camel. L. C.

Instrumental Corrections

Date 1867	Obsr.	$\bar{m}$	n	a	c	$IM.$
Aug. 21	G.M.S.	+85	+30		-28	E
24	"	+85 assumed	+30 assumed		"	"
25	"	+77	"		"	"
26	"	+94	"		"	"
27	"	+68	+37		"	"
28	"	+85	+43		"	"
30	"	+77	+37		"	"
31	"	+77	+27		"	"
Sept 1	"	+86	+43		"	"
3	"	+85	assumed		"	"
4	"	+77	+28		"	"
6	"	+79	+59		"	"
11	"	+79	+41		"	"
12	"	+80	+43		"	"
14	"	+49	+41		new determ. -36	"
15	"	+77	+38		"	"
16	"	+90	+33		+33	W
18	"	+96	+33		"	"
19	"	+85	+31		"	"
22	"	+94	+45		"	"
23	"	+88	+47		"	"

used in Reduction of Transit Obsns. 1867

Determining stars for μ
 & Draconis and two time stars.

μ Aquarii & mean of α and γ Cygni
 " " " "

μ Aquarii & γ Cygni (α Cygni lost)
 " " " "

μ Aquarii & mean of α and γ Cygni

" " " "

μ Aquarii & α Cygni

μ Aquarii & mean of α and γ Cygni

" " " "

" " " "

" " " "

σ^2 Urs. Maj. to δ and α Cephei

μ Aquarii & mean of α and γ Cygni

" " " "

" " " "

" " " "

Instrumental corrections used in

Date 1867	obsr.	$\bar{m}$	n	a	c	P.M.
Sept 24	GMS	+1.03	+42		+33	W
27	"	+90	+34		"	"
29	"	+1.10	+44		"	"
Oct 1	"	+81	assumed		"	"
3	"	+77	assumed		"	"
6	"	+75	assumed		"	"
10	"	+85	assumed		"	"
14	"	+1.13	+50		"	"
16	"	+69	+52		"	"
23	"	+59	+35		"	"
28	EPA	+75 assumed	+50 assumed		48 new determ.	S
Nov 5	GMS				+70	W
11	"	+73	+41		"	"
13	"	+49	+44		"	"
17	"	+46	+48		"	"
27	EPA	+61	+45		"	"
Dec 8	GMS	+36	+53		"	"
16	EPA	+50 assumed	+50		"	"
18	"	+36	+41		"	"
26	"	+49	+38		"	"

Reduction of obsns. with E. Transit 1867

Determining stars for n

μ Aquarii and mean of α and γ bygni
" " " " "
" " " " "

ϵ Cephei and mean of η Aquarii & ζ Pegasi
 ϵ Cephei & Fomalhaut
Fomalhaut & α Pegasi

λ Draconis & δ and γ Cephei
 δ Cassiopei & δ' Beti

50 " & mean of β & α Arietis

λ Draconis & ϵ & γ Cephei

δ' Drac. pr. & α Orionis

assumed.

48 Cephei & α Beti

γ Tauri & α Camelopardis

Instrumental corrections used

Date 1868	Obsr.	m	n	a	c	PM.
Jan 6	EPA	+26	+42		+70	w
9	GMS	+35	+25		"	"
11	EPA	+35	+32		"	"
17	EPA	+25	+56		"	"
30	"	+37	+23		new determ -74	Reversal on E Jan. 20
Feb. 3.	"	+26	+08		"	"
11	"	+25	+21		"	"
16	"	+43	+39		"	"
		+43	+52		"	"
20	GMS	+52	+43		"	"
23	EPA	+40 assumed	+37		"	"
25	"	"	+20		"	"
28	"	"	+43		"	"
Mar 4	"	+23			"	"
Mar 5	"	30 assumed	+26		new determ	Reversal on March 6
11	"	"	+46		+64	w
22		+30				
23	"	assumed	+28		"	"
24	"	+47 assumed	+14 assumed		"	"
25	"	+47	+14		"	"
31	"	+35	+41		"	"
Apr 3	"	+42	+51		"	"
9		+30				

in reduction of Transit Observations 1868.

Determining stars for n.

50 Cassiope. & α Piscium.

22 Camelopard. & α Columbae

1 Cassiope. & γ beta

5 Urs. Min. L. C. & 48 Cephei

δ Drac. L. C. & 22 Camelopard.

3 Urs. Min. L. C. & mean of η Tauri γ Tauri ζ Persei.

50 Draconis L. C. & γ Gemmorum.

α Camelopard. & mean of α Tauri & 11 Orionis.

mean of σ^2 Urs Maj & δ Draconis, mean of ϵ Hydrae, α Hydrae, δ U. M.

Piazzi VII 67, and mean of δ Can. Maj δ Gemm.

τ Draconis L. C. " " " " " "

Gr. 966 and mean of δ Orionis & α Leporis

σ^2 Urs Maj and mean of ϕ Gemm. & ϵ Hydrae.

J. Y. C. 1879 L. C. and mean of i Urs Maj & κ Cancri

1 Draconis and mean of α Hydrae & δ Urs Maj

γ^2 Urs Min L. C. and mean of α Persei & η Tauri

24 Ursae Maj δ 11 Cephei L. C.

J. Y. C. 1879 L. C. & 24 Ursae Maj

Instrumental corrections. Observer E. P. A.

Date	m	n	c	Ill.	Determining stars for
Apr. 14	+ .34				
Apr 23	+ .25				
Apr. 26.					
28	+ .20				
29					
30					
May 1		+ .566	+ .45	W	
2					
3	+ .32	+ .603	+ .45	W.	
4	+ .54				
5					
6					
7					
8	assume + .35	-.0775	-.45	E	Upper & Lower Circump.
9	assume + .35	-.0508			" " "
10					
11	+ .35	-.160			Polaris
12		-.106			Circump. and Virginis
14		-.146			Means of U & L Circump.
22	assume + .35	-.139	.00	W	" " " " " " Min 7 Bootis & Librae & Ursa Major
28	+ .56	-.265	.00	W	4 Drae H and B Corvi
31	assume + .56	-.336	.00	W	5 Ursa Maj and Virginis
					21 and 50 Cassiopea and 4 Drae.

See next page

Instrumental Corrections used

1866phae.proj...351.

Date 1868	Observer	m	n	c	Ill.
April 30	E.P.A.	²⁰ + .25	+ .58	^{+ .64 on last} ^{francisco} ^{determination} March 11 + .45	W.
May 1	E.P.A.	⁷⁰ + .30	+ .45	^{instrument} ^{reversed} May 3 + .45	W.
May 3	E.P.A.	^{level} ^{observed} May 4 + .40	+ .60	+ .45	W.
May 8	E.P.A.	^{32.854} + .35	- .05	- .48	E.
May 9	E.P.A.	+ .35	- .01	- .49	E.
May 11	E.P.A.	^{level obsd.} ^{then by obs. of last} ^{month of May} ^{m = .35} + .35	- .05	- .50	E.
May 12	E.P.A.	+ .35	- .03	- .51	E.
May 14	E.P.A.	+ .35	- .06	- .52	E.
May 22	E.P.A.	+ .56	+ .20	^{coll. 58} ^{from Aug 21} ^{thompson} ^{reversed} .00	W.
May 28	E.P.A.	^{level obsd.} ^{May 27} ^{with 27.75} ^{month of May} ^{m = .56} + .56	+ .27	+ .01	W.
May 31	E.P.A.	+ .56	+ .30	+ .01	W.
June 25	A.S.	+ .56	+ .12	^{instr.} ^{reversed} June 25 + .03	W.
July 1	E.P.A.	+ .56	+ .20	+ .03	W.
July 10	A.S.	^{level} ^{observed} July 10 + .74	+ .23	+ .03	W.
July 16	E.P.A.	^{level} ^{observed} July 17 + .83	+ .12	+ .03	W.
Aug. 3	A.S.	^{level} ^{observed} July 31 + .92	+ .20	+ .03	W.
Aug. 9	E.P.A.	^{level} ^{observed} Aug. 7 + .91	+ .25	+ .03	W.
Aug. 10	E.P.A.	+ .91	+ .22	+ .03	W.
Aug. 14	E.P.A.	^{level} ^{observed} Aug. 14 + .88	+ .25	+ .03	W.
Aug. 21	E.P.A.	+ .88	+ .20	+ .03	W.
Aug. 29		^{level} ^{observed} Aug. 29 + .95			W.

in reduction of Transit Observations, 1868.

Determining stars for n .

γ Cephei & γ Ursae Majoris.

- (4 Draconis H. & β Corvi, give $n = +.56$) (ϵ Cephei & α Urs. Maj. give $n = +.35$)
 [*correction for aberration neglected May 11.*]
 (γ Cephei & γ Urs. Maj. $n = .53$) (4 Draconis H. & γ Cephei, $n = .61$) (4 Draconis H. & 21 Cassiopeae, $n = .65$)
 (32 Cam. & Polaris, $n = -.05$) (α Virginis & Polaris, $n = -.07$) (λ Draconis & Polaris, $n = -.06$)
 (β Corvi & 32 Cam., $n = .00$) (λ Draconis & γ Cephei, $n = -.03$)
 (δ Crateris & λ Draconis, $n = .00$) (β Corvi & Polaris, $n = -.08$) (λ Draconis & Polaris, $n = -.09$)
 (32 Cam. & Polaris, $n = -.03$) (κ Draconis & 21 Cassiopeae, $n = -.04$)
 (4 Draconis H. & Gr. 4163, $n = -.06$) (4 Draconis H. & β Corvi, $n = +.03$) (γ Urs. Maj. & Gr. 4163, $n = -.04$)

α^2 Librae and β Ursae Minoris.

4 Draconis H. & β Corvi.

50 Cassiopeae and α Draconis.

ϵ Cassiopeae and 5 Ursae Minoris.

- (α^2 Librae & β Urs. Minoris, $n = +.24$) (β Urs. Min. & 48 Cephei, $n = +.16$)

Gr. 2320 and α Scorpii.

- (α Camelopardalis, $n = +.16$) (ϵ Urs. Min., $n = +.07$) (β Urs. Min., $n = +.12$) (α^2 Librae, $n = +.12$) (α Scorpii, $n = +.12$)

Polaris and 5 Ursae Minoris.

- (δ Urs. Min. & 51 Cephei, $n = +.26$) (50 Draconis & σ Sagittarii, $n = +.23$)
 (δ Urs. Min. & γ^2 Sagittarii, $n = +.26$) (ϵ Urs. Min. & α Camelopardalis, $n = +.19$)
 (ϵ Urs. Min. & Gr. 966, $n = +.20$) (δ Urs. Min. & 22 Camel., $n = +.25$) (ω Draconis & γ^2 Sagitt., $n = +.30$)
 (22 Cam. & λ Urs. Min. $n = .19$)

Instrumental Corrections used in

Date, 1868	Illumination	$\frac{1}{2}$ sec ϕ (or m)		c		n	Observer	Remarks
		Observed	Assumed	Observed	Assumed			
Sept. 5	$\left\{ \begin{array}{l} H. \\ E. \end{array} \right\}$	$\left\{ \begin{array}{l} +1.00 \\ - \end{array} \right\}$	$\left\{ \begin{array}{l} 1.00 \\ 1.00 \end{array} \right\}$	$\left\{ \begin{array}{l} -.125 \\ +.125 \end{array} \right\}$		$+ .334$	E.P.A.	c obtained from stars
" 8	E.	$+0.96$						
" 12	E.	$+0.88$						
" 19	E.	$+0.77$		$+ .125$	$+ .30$		E.P.A.	
" 21	E.		$+0.77$	$+ .125$	$+ .35$		E.P.A.	
" 26	E.	$+0.80$						
" 28	E.		$+0.80$	$+ .125$	$+ .16$		E.P.A.	
Oct. 3	E.	$+0.78$		$+ .125$	$+ .30$		E.P.A.	
" 6	E.		$+0.78$	$+ .125$	$+ .34$		G.I.A.	
" 9	E.		$+0.78$	$+ .125$	$+ .30$		G.I.A.	Clock opened & regulated
" 10	E.	$+0.75$						
" 11	E.		$+0.75$	$+ .125$	$+ .30$		G.I.A.	
" 12	E.		$+0.75$	$+ .125$	$+ .25$		A.S.	
" 16	E.		$+0.75$	$+ .125$	$+ .15$		A.S.	
" 17	E.	$+0.75$		$+ .125$	$+ .15$		O.C.W.	
" 20	E.		$+0.75$	$-.321$	$+ .67$		O.C.W.	c and
" 28	E.	$+0.74$						
" 29	$\left\{ \begin{array}{l} H. \\ E. \end{array} \right\}$	$\left\{ \begin{array}{l} +0.74 \\ - \end{array} \right\}$		$-.04$	$+ .44$		O.C.W.	c from N. mer. mark tree obstructing now being cut away.
Nov. 3	E.		$+0.74$	$-.04$	$+ .40$		A.S.	
" 4	E.		$+0.74$	$-.04$	$+ .50$		E.P.A.	
" 7	E.	$+0.61$		$-.04$	$+ .58$		A.S.	

in determining transit observations.

Mode of determining n .

From all the stars. Value 0.334 selected by E.P.H. as the most probable.

Pair of stars.

" " "

Pair of stars.

" " "

" " "

n assumed without computation

n assumed without computation.

From ϵ Draconis & κ Cephei.

" Piazzi VII 67 & ϵ Draconis.

n assumed without computation.

n obtained by Cauchy's method from all the stars.

ι Cephei & η Draconis.

λ Urs. Min. & π Capricorni.

Groombridge 4163 & γ Draconis

226 Cephei & η Draconis

Instrumental Corrections used in

Date, 1868	Altitude	Refraction (or m)		c		n	Observer
		Observed	Assumed	Observed	Assumed		
Nov. 12	E.		+ .61		-.04	+ .39	C. C. W.
" 14	E.	+ .55					
" 16	E.		+ .55		-.04	+ .33	A. S.
" 19	E.		+ .55		-.04	+ .27	C. C. W.
" 21	E.	+ .51					
Dec. 2	E.	+ .39					
" 10	E.		+ .39		+ .148	+ .365	A. S.
" 11	E.			+ .148			
" 12	E.	+ .33					
" 15	E.		+ .39		+ .148	+ .29	A. S.
" 18	E.		+ .39		+ .148	+ .25	A. S.
" 19	E.	+ .37			+ .148	+ .23	A. S.
" 22	E.		+ .37		+ .148	+ .30	A. S.
" 28	E.		+ .37		+ .148	+ .60	A. S.
" 30	E.	+ .36					
1869							
Jan. 5	E.		+ .36		+ .148	+ .50	C. C. W.
7	E.		+ .36		+ .148	+ .30	A. S.
9	E.	+ .44					
13	E.		+ .44		+ .148	+ .30	A. S.
16	E.	+ .41			+ .148	+ .32	A. S.

in determining transit observations.

Mode of determining n .

α Cephei & α Draconis.

γ 4163 & α Pisc. Austr.

Polaris & 32 Camelop.

Polaris & 32 Camelop.

21 Cassiopeae & 32 Camelop.

Polaris & 32 Camelop.

Polaris & 32 Camelop.

50 Cassiop. & 32 Camelop.

50 Cassiop. & α Draconis.

By estimation.

α Cassiopeae & 5 Urs. Min.

β Urs. Min. & 48 Cephei

γ^2 Urs. Min. & time stars.

West-Screw = 55.807

South Screw 61.470

Measured
Nov. 21S₆40 • 60 • 80 • 100 • 120

18,162 104,893 217 897 328 888 238 866 265 948

180 877 227 922 329 881 265 915 258 943

183 882 256 891 337 892 280 878 253 940

199 912 230 897 328 912 218 913 252 928

211 882 256 887 324 895 252 907 246 948935 356 186 454 146 448 295 331 274 210

187 237 329 259 255

871 899 896 966 942

86,684 .662 .567 707 .687

43.34 Mean 86.691

61.47

13

655

W.S.

15, 520 102,222 572 203 552 237 492 277 500 307

538 217 60 2223 562 240 574 287 521 297

558 407 600 216 540 242 576 295 517 292

529 208 553 217 572 230 483 302 498 286

537 218 575 208 558 228 490 302 196 3061460 42 2902 67 284 197 2485 463 2532 1488

15,536 580 557 497 506

102,208 213 235 293 258

86,692 633 678 796 792

Mean 86.681

758
655
100

Sept 21 1871 $SD = 15'' 58.8'' = 9588''$
 $1917.6''$

$\delta = +0.42$ $2.D = 41^{\circ} 41'$

<u>140</u>	<u>160</u>	<u>180</u>	<u>200</u>	<u>220</u>
222 883	187 906	158 867	123 808	162 892
202 877	221 905	172 895	117 828	163 890
243 900	180 892	173 898	131 899	166 898
211 895	221 897	150 888	132 802	175 880
<u>204</u> <u>906</u>	<u>205</u> <u>882</u>	<u>167</u> <u>907</u>	<u>102</u> <u>882</u>	<u>172</u> <u>887</u>
82 4461	1014 4482	320 4465	105 4519	341 447
<u>216</u>	<u>203</u>	<u>164</u>	<u>123</u>	<u>168</u>
892	896	893	904	889
.676	.693	.729	.783	.721

Major axis = .732

at about 200''

One Revolution of Secor's wheel = $22'' \frac{1}{67}$

One division = $22'' \frac{1}{67} \times 2261$

443 148	465 73	456 113	474 112	470 134
478 152	483 82	472 113	485 124	477 130
477 187	492 83	466 123	487 124	478 123
477 178	480 67	438 107	488 144	481 133
<u>483</u> <u>170</u>	<u>496</u> <u>64</u>	<u>457</u> <u>116</u>	<u>488</u> <u>127</u>	<u>460</u> <u>150</u>
396 335	416 369	289 82	442 131	356 174
478	483	458	488 126	471 135
<u>117</u>	<u>094</u>	<u>116</u>	<u>126</u> ~~411~~	<u>135</u>
689	591	658	638	.664

Minor axis = .638

782

084

Nov 22 1871

New readings for center

S 6 61.440

W 6 60.631

20° . 25° . 30° 35° 40° 45° 50° 55° 60°18.

146	144	098	147	091	138	166	152	148
161	127	116	146	010	154	155	146	170
137	118	123	150	088	170	183	172	130
146	137	112	163	128	182	165	162	148
167	140	136	180	118	186	190	163	152
148	143	110	140	112	177	156	192	158
149	154	098	163	126	180	152	163	144
138	128	127	148	140	155	196	178	158
118	138	111	180	128	170	180	173	147
144	137	095	167	125	175	172	170	159
1452	1366	1126	1584	1066	1687	1715	1671	1514

114

940	875	895	910	867	823	802	762	790
907	852	850	903	862	843	805	777	781
918	870	855	893	867	853	798	743	775
937	862	866	918	852	854	837	792	763
900	877	878	887	867	833	837	742	750
911	827	877	892	837	857	826	770	738
891	866	872	908	856	822	832	785	753
895	892	888	873	848	866	812	743	747
902	878	863	877	872	872	864	750	738
880	870	843	868	862	844	818	787	738
91081	8669	8687	8929	8890	8467	8231	7651	7573
1452	1366	1126	1584	1066	1687	1715	1671	1514
7629	7303	7561	7345	7424	6780	6576	5980	6059

86.

65°	70°	75°	80°	85°	90°	95°	100°
102	087	129	140	196	130	108	087
117	102	133	152	175	131	090	097
132	120	143	153	194	115	107	080
112	113	132	158	189	146	087	088
146	119	128	158	168	148	098	085
105	112	137	163	189	135	083	102
145	118	147	188	165	137	097	112
135	132	153	140	178	133	083	093
162	102	162	150	162	133	093	097
150	118	183	149	189	130	080	175
<u>1309</u>	<u>1123</u>	<u>1397</u>	<u>1551</u>	<u>1805</u>	<u>1338</u>	<u>926</u>	<u>1016</u>

784	687	702	707	737	752	757	751
797	717	717	723	711	740	753	751
777	713	707	709	715	747	773	774
790	687	690	723	723	743	773	762
740	704	709	678	743	750	749	743
757	721	707	718	732	756	753	732
749	695	732	713	709	774	737	785
772	708	700	712	713	753	749	773
798	706	692	723	707	777	723	752
787	685	705	685	713	772	749	763
<u>7751</u>	<u>7023</u>	<u>7061</u>	<u>7094</u>	<u>7203</u>	<u>7564</u>	<u>7516</u>	<u>7586</u>
1309	1123	1397	1551	1805	1338	926	1016
6442	5900	5664	5543	5398	6226	6590	6590

105°	110°	115°	120°	125°	130°
070	065	112	080	087	081
077	110	102	087	088	082
073	103	123	092	097	082
085	105	100	105	094	082
079	110	117	112	086	078
086	099	107	107	105	098
075	077	118	105	092	097
064	098	105	095	097	097
073	113	110	082	074	099
<u>075</u>	<u>124</u>	<u>122</u>	<u>088</u>	<u>073</u>	<u>075</u>
757	1007	1116	953	893	871

740	812	813	800	721 ^{+0.5}	770
753	820	788	802	~~727~~	792
762	787	782	772	725	787
748	747	792	723	702	805
724	782	754	762	707	776
732	747	767	785	713	780
740	730	785	760	725	805
762	763	783	723	730	800
715	732	802	715	745	812
<u>752</u>	<u>750</u>	<u>792</u>	<u>723</u>	<u>743</u>	<u>807</u>
7428	7670	7858	7865	728	7934
0757	1107	1116	953	739	871
<u>6671</u>	<u>6663</u>	<u>6742</u>	<u>6912</u>	<u>893</u>	<u>7063</u>
				6846	

135° 140° 145° 150° 155° 160°

134	105	122	116	094	107
612	099	135	122	107	110
150	112	124	107	080	111
140	118	116	112	087	126
137	124	118	107	117	112
127	112	142	107	123	107
121	109	133	108	133	127
137	121	146	108	112	128
107	137	128	125	110	120
<u>138</u>	<u>138</u>	<u>127</u>	<u>106</u>	<u>123</u>	<u>113</u>
1303	1175	1291	1118	1086	1161

773	750	763	715	772	729
800	794	757	754	757	690
777	777	742	744	738	703
755	767	753	761	757	655
761	787	757	767	764	710
757	770	756	756	732	690
770	783	733	765	748	705
752	768	737	792	745	695
738	785	737	783	748	708
<u>765</u>	<u>757</u>	<u>767</u>	<u>765</u>	<u>733</u>	<u>700</u>
7645	7735	7502	7602	7494	6985
1303	1175	1291	1118	1086	1161
1355	11560	1211	1184	1086	1161
				6408	5824

165° 170° 175° 180° 185° 190°

079	032	040	038	028	049
055	030	056	052	042	030
070	042	048	059	033	008
057	018	056	048	037	045
077	005	046	047	037	051
087	023	000	027	052	012
057	037	053	012	037	017
092	003	056	000	012	016
062	042	042	037	037	013
052	003	057	031	022	012
<u>688</u>	<u>235</u>	<u>457</u>	<u>351</u>	<u>338</u>	<u>253</u>

690	693	742	776	812	809
698	710	720	793	813	806
655	695	697	782	820	782
699	672	690	799	823	792
706	687	726	807	798	803
698	716	747	828	798	803
688	696	723	807	787	789
712	692	738	775	779	812
688	695	730	777	775	796
698	712	745	773	768	793
6862	6968	7258	7914	7673	7935
688	235	454	351	338	253
<u>6174</u>	<u>6734</u>	<u>6804</u>	<u>7563</u>	<u>5333</u>	<u>7682</u>

S. B.

Q. B.

1950 - 2000

		20	86.763	86.724	-04
		25	730	770	+4
		30	756	731	-3
013	-022	35	734	763	+3
008	-013	40	742	752	+1
027	-007	45	678	660	-2
013	+037	50	652	669	+2
030	-022	55	598	671	+7
030	-030	60	606	713	+10
044	-027	65	644	698	+6
028	-010	70	590	696	+11
017	-025	75	566	634	+7
~~004~~	-031	80	554	706	+15
<u>030</u>		85	540	761	+27
240	187	90	622-613	727 238	+11 (120)
	-0110	95	659	785	+7

100	657	755	+9
105	667	824	+15
110	666	840	+14
115	674	790	+12
120	691	791	+10
125	685	746	+6
130	706	765	+6
135	635	722	+9
140	656	699	+4
145	621	648	+3
150	648	710	+6
155	641	713	+7
160	582	624	+4
165	617	622	+0
170	673	620	+5
175	680-(685)	547	-10
180	706	678(666)	0-016
185	733	732	-2
190	768	712	-2
195	714	719	-5
200	785	713	0

743	757
723	785
770	763
761	777
733	767
735	770
718	763
722	777
737	810
737	770
<u>7382</u>	<u>7739</u>
240	-110
7142	7849

24652

86.669

120

37) 263 79 (713 13
 119
 43 004
 1004
 86.713 16

E=072

R=22"594

19

16

Mina to East Screen

	20	25	30	35	40	45	50
103	91.2 90.0 92.6 93.5 92.7 <u>100</u> 9200	93.0 94.1 95.8 95.2 92.8 <u>249</u> 9498	91.2 91.4 90.6 91.0 89.0 <u>452</u> 9064	90.8 91.8 90.1 91.3 91.2 <u>52</u> 9104	92.3 92.7 92.0 91.0 91.2 <u>92</u> 9184	86.0 85.5 88.2 91.6 89.8 <u>441</u> 8822	85.6 85.8 88.0 88.4 87.2 <u>350</u> 8700
17	21.5 20.2 20.3 20.2 21.0 <u>32</u> 20.63 86. 7237	19.3 18.5 16.6 19.0 16.4 <u>398</u> 1796 7702	16.3 17.2 17.8 18.6 18.0 <u>879</u> 1758 7306	15.3 14.0 14.6 14.6 <u>235</u> 1470 7634	13.2 16.6 18.2 18.2 <u>331</u> 1662 7522	20.6 24.4 22.2 22.0 <u>109</u> 2218 6604	21.2 17.5 20.0 19.4 22.2 <u>1003</u> 2006 6694
	120	125	130	135	140	145	150
	84.0 86.1 83.0 85.7 86.3 <u>241</u> 8582	81.8 82.5 78.2 79.8 81.8 <u>4041</u> 8082	83.8 82.6 83.3 84.3 84.8 <u>188</u> 8398	80.8 82.0 81.8 80.9 82.8 <u>83</u> 8166	81.0 78.7 80.6 77.2 77.1 <u>3946</u> 7892	78.6 75.7 75.8 79.8 79.2 <u>391</u> 7782	80.6 82.3 83.1 81.2 81.8 <u>90</u> 8180
	7.2 4.0 6.2 10.5 5.8 <u>337</u> 0672	3.8 6.1 4.0 9.8 7.6 <u>313</u> 0626	4.6 4.7 8.0 7.8 8.3 <u>364</u> 0728	8.8 9.7 10.3 7.0 11.7 <u>475</u> 0950	8.0 7.2 9.2 11.8 9.0 <u>452</u> 0904	13.7 11.2 13.6 13.3 13.2 <u>150</u> 1300	10.2 9.3 12.2 10.0 12.2 <u>539</u> 1078
	7910	7456	7650	7216	6988	6482	7102

55	60	65	70	75	80
86.0	84.7	84.8	86.7	80.8	80.6
85.7	84.4	84.2	84.8	80.9	80.2
88.2	88.8	88.2	82.6	83.4	79.7
87.8	90.2	84.8	87.7	80.5	81.6
87.4	87.7	89.0	87.8	80.8	79.7
<u>351</u>	<u>4408</u>	<u>310</u>	<u>296</u>	<u>64</u>	<u>4018</u>
8702	8816	8620	8592	8128	8036
20.0	16.7	15.6	15.6	17.6	9.0
19.0	16.6	19.2	16.3	18.4	8.4
20.2	15.3	15.0	15.6	17.3	10.4
20.7	19.2	16.3	16.7	17.2	10.3
19.8	16.3	16.0	17.3	16.7	10.7
<u>997</u>	<u>341</u>	<u>321</u>	<u>315</u>	<u>374</u>	<u>488</u>
1994	1682	1642	1630	1789	0976
<u>6708</u>	<u>7134</u>	<u>6978</u>	<u>6962</u>	<u>6339</u>	<u>8276</u>
155	160	165	170	175	180
82.6	83.5	84.7	85.1	79.6	84.1
83.8	83.4	84.1	80.0	79.8	~~84.1~~
82.8	84.7	83.2	81.8	78.0	82.7
82.2	86.7	82.0	83.1	80.2	83.3
81.7	81.5	83.0	82.6	79.0	84.0
<u>131</u>	<u>198</u>	<u>170</u>	<u>126</u>	<u>3966</u>	<u>189</u>
8262	8296	8340	8252	7932	8378
9.3	16.9	20.3	20.0	20.1	18.7
10.9	20.2	20.2	19.8	22.6	18.7
9.6	22.5	20.6	19.6	21.2	16.8
13.2	21.2	22.7	21.8	22.2	14.0
13.8	22.2	22.4	21.3	21.8	12.8
668	1030	62	1025	79	310
1136	2060	2124	2050	2158	1620
7126	6236	6216	6202	5974	6758

85	90	95	100	105	110	115
89.5	84.1	81.2	88.2	84.4	89.0	85.2
~~88.8~~	85.2	81.6	84.8	84.2	90.7	85.3
89.1	84.3	83.3	85.4	88.2	88.0	85.7
89.6	85.0	85.4	87.8	89.0	85.0	87.8
88.6	84.5	85.3	84.9	88.2	83.5	87.7
<u>466</u>	<u>231</u>	<u>168</u>	<u>311</u>	<u>390</u>	<u>4362</u>	<u>317</u>
8912	8462	8336	8622	8780	8724	8634

11.4	12.7	9.7	10.8	8.8	9.5	7.8
13.0	11.8	9.7	10.0	3.0	5.6	6.5
15.6	13.6	10.6	12.4	3.8	5.4	6.4
10.7	10.3	8.4	11.4	4.8	4.8	8.2
14.3	11.4	12.0	9.0	6.7	5.8	7.2
<u>150</u>	<u>98</u>	<u>504</u>	<u>536</u>	<u>271</u>	<u>311</u>	<u>361</u>
1300	1194	1008	1072	0542	0622	0722
7612	7266	7328	7550	8238	8102	7912

185	190	195	200	205	210
90.3	89.6	90.6	86.7		
89.2	88.7	87.0	85.6		
87.2	87.1	90.6	88.2		
87.2	89.6	89.8	86.8		
88.0	87.3	90.7	87.6		
<u>4429</u>	<u>423</u>	<u>4487</u>	<u>349</u>		
8858	8846	8974	8688		

14.4	15.5	14.4	17.7
12.7	17.7	14.9	13.6
16.3	18.3	16.8	13.8
16.3	17.7	16.2	16.6
17.1	17.3	16.8	16.8
<u>268</u>	<u>365</u>	<u>391</u>	<u>285</u>
1536	1730	1782	1570
7322	7116	7192	7128

	20	25	30	35	40	45	50	55
5	16.4	16.4	13.7	13.8	13.2	16.8	17.2	17.7
2	20.0	16.0	15.8	13.7	14.2	18.8	17.7	19.7
3	18.2	16.6	14.2	12.3	14.4	17.0	17.8	18.6
7	16.5	15.7	14.8	13.8	13.7	18.7	17.7	18.0
8	18.3	15.1	13.8	14.2	14.2	18.2	17.2	18.7
17	554	298	223	178	197	395	26	427
34	1288	1558	1446	1356	1394	1790	1752	1854

90.8	87.2	87.7	83.7	83.5	82.2	82.0	83.9
88.3	85.3	87.4	83.9	85.5	80.4	80.0	84.2
89.7	85.0	85.4	87.0	83.5	87.5	82.3	83.4
86.3	85.8	85.0	86.1	84.6	83.7	83.3	84.5
88.6	88.5	85.2	85.7	85.3	84.7	85.7	82.8
4437	318	308	264	224	185	133	188
8874	8636	8616	8528	8448	8370	8266	8276
7086	7038	7170	7172	7054	6580	6514	6522

130	135	140	145	150	155
+5.8	+4.8	+6.2	+9.3	+7.3	8.8
+5.1	+3.7	+8.3	+8.7	+7.9	7.2
+6.2	+6.8	+7.6	+7.8	+7.2	8.3
+4.2	+5.8	+7.8	+7.2	+6.4	9.0
+3.8	+6.7	+6.8	+9.8	9.0	10.0
251	278	367	428	378	433
.05028	.05568	.0734	.0856	.0756	.0866

78.6	80.8	77.4	79.0	82.2	81.2
82.3	78.8	78.2	78.8	80.2	80.4
80.6	81.8	78.2	78.7	81.8	80.2
78.8	78.0	80.2	78.9	81.5	81.8
80.3	80.9	78.0	77.7	80.4	79.6
4006	4005	4000	431	61	4032
.08012	.0806	.08000	.07862	.08122	.08064
7510	7450	7266	7006	7366	7198

60 , 65 , 70 , 75 , 80 , 85 , 90 , 95

14.8	15.2	13.8	11.0	5.0	8.3	11.8	9.0
15.8	17.3	12.6	11.4	6.2	9.8	10.8	9.8
13.8	14.8	13.6	12.2	6.7	9.0	9.8	10.1
16.0	16.1	14.4	11.3	6.3	10.2	11.2	8.7
14.3	16.0	13.8	11.1	5.3	10.0	11.3	9.0
297	294	182	70	295	473	449	466
1494	1588	1364	1140	1590	0946	0858	0932

82.8	87.0	79.2	77.8	76.1	82.1	84.2	83.5
83.2	85.2	78.4	77.2	77.7	83.8	84.6	84.0
81.0	82.4	78.5	74.9	80.8	81.6	81.3	85.2
83.4	84.8	76.4	75.3	80.9	85.7	80.2	84.5
83.2	81.8	79.4	75.0	80.4	83.2	82.0	86.1
136	212	419	302	3959	164	123	233
8272	8424	7838	7604	7918	8328	8246	8466
6778	6836	6474	6464	6328	7382	7348	7534

160 165 170 175 180 185

19.2	17.6	18.3	18.8	13.7	12.7
19.3	21.2	19.8	17.2	13.8	13.5
18.8	20.0	20.6	16.8	15.2	16.2
18.7	20.4	20.0	16.7	14.2	18.3
21.5	19.3	19.8	17.6	13.8	18.0
975	985	985	373	207	287
1950	1970	1970	1746	1414	1574

82.3	82.3	83.0	81.4	85.0	89.0
81.3	84.8	83.0	80.7	84.9	85.4
82.3	85.1	84.8	80.6	83.2	88.6
83.7	84.0	81.6	80.8	84.6	88.8
81.6	83.6	80.6	82.7	83.7	88.4
112	198	130	62	214	352
8224	8396	8260	8124	8428	8704
6284	6426	6290	6378	7014	7130

100	105	110	115	120	125
7.8	6.2	- 1.2	+2.4	2.3	- 1.2
7.0	4.2	- 0.7	5.0	1.4	- 2.4
6.7	4.4	+ 0.3	3.8	2.7	- 1.8
5.3	3.7	+ 1.2	3.0	1.1	- 1.2
8.6	4.8	+ 0.0	3.7	2.4	- 0.5

354	233	- 6008	179	99	71
0708	+ 0466		+ 0358	+ 0198	- 0142

84.2	81.3	83.2	86.8	82.7	80.7
82.2	86.7	81.4	85.0	84.4	79.8
82.7	84.2	82.2	87.8	83.7	80.6
85.4	82.3	80.8	87.3	85.3	78.8
84.8	84.3	83.7	87.4	86.7	79.4
<u>193</u>	<u>188</u>	<u>113</u>	<u>343</u>	<u>228</u>	<u>3993</u>
8286	8376	8226	8686	8456	7986
7578	7910	8234	8528	8258	8128

190	195	200
11.7	12.7	9.3
14.0	14.9	8.0
14.9	14.8	11.3
16.2	13.7	11.7
16.7	15.9	12.0
<u>235</u>	<u>220</u>	<u>523</u>
1470	1440	1046

1116

86.7	88.0	88.2
87.7	88.4	86.2
88.7	87.5	88.0
90.7	89.0	85.7
88.7	88.6	85.7
<u>4418</u>	<u>415</u>	<u>338</u>
8836	8830	8676
7366	7390	7560

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Sun lightArtificial illumination

	S.C.	N.S.	N.S.	S.C.
20	86.763	86.724	709	773
25	730	770	704	779
30	756	731	717	759
35	734	763	717	755
40	742	752	705	749
45	678	660	658	746
50	652	669	651 (657)	700
55	598	671	652	688
60	606	713	678	678
65	644	698	684	688
70	590	696	647	617
75	566	634	646	624
80	554	706	733	627
85	540	761	738	627
90	622	727	735	612
95	659	733	753	663
100	657	755	758	705
105	667	824	791	686
110	666	810	823	686
115	674	791	853 (821)	680
120	691	791	826	680
125	685	748	813	707
130	706	765	751	746

135	635	722	745	664
140	656	699	727	643
145	621	648	701	646
150	648	710	737	649
155	641	713	720	698
160	582	724	627	689
165	617	722	643	680
170	673	720	629	734
175	680	577	638	722
180	756	678	701	703
185	733	732	713	720
190	768	712	737	756
195	714	719	739	767
200	785	713	756	798
	<u>86,669</u>	<u>86,713</u>	<u>86,718</u>	<u>86,698</u>
	2259	2261	2264	
			86821	
			43410	

20	25	30	35	40	45	50
18 23.5	22.7	23.8	22.8	23.2	23.8	26.8
24.8	20.7	22.2	25.2	23.7	24.2	24.9
22.6	20.8	19.8	26.6	23.6	26.9	26.6
24.7	20.8	21.4	26.8	22.3	23.8	25.7
23.7	19.0	22.5	24.0	21.4	24.2	27.4
1193	1068	1097	1234	1142	1229	1314
23.86	20.9	21.94	24.68	22.84	24.58	26.28

105 0.2	97.2	94.2	99.9	96.2	96.4	95.7
-0.2	100.2	97.7	101.2	97.8	94.8	96.2
+3.0	98.6	98.8	100.7	100.6	95.1	95.6
+1.5	98.2	98.8	99.2	96.1	95.1	96.8
+1.4	98.8	99.9	99.9	98.0	93.7	97.2
59	4930	5894	5009	4887	261	315
01.18	98.60	5788	100.18	97.74	95.22	96.30
77.32	779	759	755	749	746	700

55	60	65	70	75	80	85
24.2	26.2	23.2	24.2	21.8	22.7	25.6
24.2	25.0	25.5	23.5	21.8	24.5	27.2
27.4	27.7	26.4	21.8	23.6	20.2	26.1
27.5	25.5	24.1	22.2	22.2	23.0	29.2
25.5	25.0	26.6	25.5	21.4	22.7	26.6
<u>1288</u>	<u>1294</u>	<u>1258</u>	<u>1172</u>	<u>1098</u>	<u>1131</u>	<u>1347</u>
25.76	25.88	25.16	23.44	21.96	22.62	26.94
94.8	91.9	93.8	85.6	85.0	85.3	83.3
93.8	93.2	93.6	87.0	83.6	87.2	83.3
93.7	94.8	93.6	84.2	82.6	84.0	84.0
93.9	94.9	94.0	84.2	85.2	86.0	83.3 +5
96.7	93.8	94.6	84.8	83.8	84.3	84.4
229	186	196	258	202	268	183
9458	93.72	93.92	85.16	84.04	85.36	85.66
						+5
6882	6784	6876	6172	6208	6270	6272

90	95	100	105	110	115	120
25.2	18.8	17.0	18.5	20.9	20.2	17.0
24.3	17.8	16.0	17.9	22.8	18.9	18.2
23.4	20.8	19.3	16.2	20.3	20.6	20.0
24.2	18.9	16.6	18.1	21.2	18.8	18.8
25.7	19.7	15.5	18.6	21.3	22.2	18.7
<u>122.8</u>	<u>96.0</u>	<u>84.4</u>	<u>89.3</u>	<u>106.5</u>	<u>100.7</u>	<u>92.7</u>
24.56	19.20	16.88	17.86	21.30	20.14	18.54
85.3	84.8	87.2	86.6	90.6	88.8	89.6
86.2	84.8	88.2	89.0	87.3	88.1	87.0
85.0	85.0	87.9	86.7	91.4	87.8	89.9
85.2	86.0	86.3	87.6	90.1	90.6	87.6
87.0	87.2	87.2	87.6	90.3	90.6	88.8
<u>287</u>	<u>275</u>	<u>368</u>	<u>375</u>	<u>449.7</u>	<u>445.9</u>	<u>429</u>
85.74	85.50	87.36	87.50	89.94	89.18	88.58
6118	663	705	696	686	690	700

125	130	135	140	145	150	155
15.6	18.1	20.6	19.6	19.6	18.2	16.7
19.7	17.9	20.0	21.2	23.0	21.0	18.6
17.8	17.5	18.7	20.0	19.8	21.6	18.2
18.2	16.8	20.6	21.3	20.3	19.8	18.7
15.0	16.8	20.6	21.7	21.2	20.6	16.8
<u>86.3</u>	<u>87.1</u>	<u>100.5</u>	<u>103.8</u>	<u>103.9</u>	<u>101.2</u>	<u>89.0</u>

17.26 17.42 20.10 20.76 20.78 20.24 17.80

86.8	88.2	88.6	84.2	84.5	86.6	87.8
88.2	90.3	87.2	85.9	85.8	85.8	88.6
86.8	88.7	85.7	84.8	85.6	84.0	88.0
88.8	89.1	85.7	84.8	85.8	84.2	85.4
89.2	88.6	85.5	85.4	85.4	85.3	88.3
<u>398</u>	<u>4449</u>	<u>327</u>	<u>251</u>	<u>271</u>	<u>259</u>	<u>383</u>
87.96	88.98	86.54	85.02	85.42	85.18	87.62

7070 7156 6644 6426 6464 6494 6982

	160	165	170	175	180	185	190	195
5	16.0	13.5	8.8	11.6	12.8	12.6	8.9	5.3
7	16.8	14.0	8.4	10.7	10.6	13.4	10.3	7.8
6	13.6	14.6	10.7	10.8	15.0	11.7	7.5	6.0
12	15.4	15.4	10.3	12.2	14.8	13.2	12.2	5.5
7	13.8	14.6	9.8	12.7	11.4	12.3	7.8	8.8
15	14.2							
0	<u>73.8</u>	<u>72.1</u>	<u>48.0</u>	<u>58.0</u>	<u>64.6</u>	<u>63.2</u>	<u>46.7</u>	<u>36.4</u>
50	14.76	14.42	9.60	11.60	12.92	12.64	9.34	7.28

	82.8	81.6	82.0	82.6	82.0	85.2	87.7	83.8
6	84.4	81.2	82.8	83.6	84.5	85.4	87.7	83.3
2	84.2	83.8	83.2	85.6	83.3	84.4	88.0	83.8
4	83.3	82.4	83.8	83.2	82.8	84.2	87.8	83.7
3	83.8	83.0	83.2	83.4	83.7	83.8	86.8	85.2
3	<u>18.5</u>	<u>12.0</u>	<u>15.0</u>	<u>18.9</u>	<u>16.3</u>	<u>23.0</u>	<u>38.0</u>	<u>19.8</u>
62	83.70	82.40	83.00	83.78	83.26	84.60	87.60	83.96
2	6894	6798	7340	7218	7034	7196	~~7586~~	7668

$$\begin{array}{r}
 200 \\
 \hline
 05.6 \\
 4.0 \\
 5.7 \\
 5.7 \\
 4.0 \\
 \hline
 250 \\
 \textcircled{2} 5.00
 \end{array}$$

$$\begin{array}{r}
 85.2 \\
 83.6 \\
 85.6 \\
 86.3 \\
 83.2 \\
 \hline
 823.9 \\
 \textcircled{8} 4.78 \\
 \hline
 6022 \\
 848 \\
 \textcircled{7} 9.8
 \end{array}$$

Apr 23 1872

Record of photograph work for
testing reproduction tables

A Seares photograph
VSK recorder.

Chronometer used - 236

236 = 1^m 11^s fast.

Time	hr.	Level	E	W
2 ^h 50 ^m 35 ^s	1		4	10
			10	5
3 17 18	2		4	10
			~~10~~	~~4~~
			7	7
5 23 27	3		13	2
			8	6
			21 ^s	8
				4.0

Ann

Tam no.
5 44 29 } 4

Level
W E
4 10
0 15
4 25
2 12

7 4 } 5
7 44 38 } 5

7 7
5 9

8 04 24 } 6

1 12
4 10

Note June 4, 1877. The above seems to be the record of an unsuccessful attempt to photograph the sun near the horizon in order to examine the distortion of the disk by refraction.

vol 2	part 1	106
vol 1	part 1	360
vol 1	part 2	115
vol 3	great Comet	100
"	" bound	13
vol 4	part 1	138
description of Observatory in mechanical		
Observations		5

14 h 55 m



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