KG
11365
110

C.3

North and South
Meridian Marks
and
Level Readings.

From April 21st 1855 to Sept 8th 1856

KG 11.365.11D

$r = 2^{\vee}.285$

For new value of div of Level
see Transit Book July 1855 –

KG11365,110

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See further obs see 1st page of Mark book 1856

Note Dec 27th 1855

By comparing the collimations obtained directly by reversals with those given by the meridian marks we obtain the following corrections δC_1 & δC_2

$$C_1 = -1.403 + \delta C_1 \;, \quad C_2 = -1.377 + \delta C_2$$

If Mid-Mean $= -0^s.029$		If Mid-Mean $= -0^s.018$ Ill E. $=$	
$\delta C_1 = -0^s.002$	$\delta C_2 = +0^s.031$	$\delta C_1 = +0.009$	$\delta C_2 = +0.020$
.002	+0.030	+.009	+.019
.029	+0.002	−.018	−.009
.035	−0.004	−.024	−.015
$\delta C_1 = -0.017$	$\delta C_2 = +0.015$	$\delta C_1 = -0^s.006$	$\delta C_2 = +0^s.004$

C_1 & C_2 do not appear to have sensibly varied since 1849 –

N B June 27th 1856 ~~The~~ old wires ~~were~~ not ~~removed~~ & A new set of wires was inserted ~~substituted~~ with smaller intervals. First transit with new Diaphragm July 1st

Old wires were not removed

Constants for reduction of Measures of Marks ~~previous~~ to March 3rd 1855.

	Ill. E	Ill. W
For a	0.732	0.732
c	1.430	1.350

N.B. In consequence of a change in the value of the correction (midwire – mean of wires) which took place March 3rd 1855

Mid – Mean previous to March 3 1855 = $-0^{s}.045$
" after " $\underline{-0.018}$

The following values of the constants A & C are to be used in this book

	Ill E	Ill W
For a	$A_1 = -0^{s}.732$	$A_2 = -0^{s}.732$
" c	$C_1 = -1.403$	$C_2 = -1.377$

After July 1st 1856 – If we suppose no reduction from mid-wire to mean we have:

Ill E	Ill W
$A_1 = -0.732$	$A_2 = -0^{s}.732$
$C_1 = -1.390$	$C_2 = -1.390$

using Mid-Mean = $+0^{s}.027$ vide Tr Book Dec. /56
$C_1 = -1.363$ $C_2 = -1.417$

Subsequent discussions gave Mid-Mean = $-0^{s}.029$
By 17 Transits of Polaris and 269 Transits of Eq Stars to Dec 1855

Equatorial Intervals – March 3rd to Dec 1855
(By 17 Transits of Polaris.)

These intervals are deduced in the Reduction of Chron. Expd. 1855

Again changed June 27 1856.

			For Polaris Dec Nearly 88°.32'.15"+x"
A to Mean of 7 wires	= + $40^{s}.681$	A	$+26^{m}..37^{s}.56 + 0^{s}.306x$
B " " "	+ 27.459	B	+17..57.01 .204
C " " "	+ 13.734	C	+8..58.27 102
D " " "	+ 0.027	D	+ 1.06 + .00
E " " "	− 13.188	E	−8..36.87 − 102
F " " "	− 27.562	F	−18..01.03 − 204
G to Mean of 7 wires	− 41.151	G	−26..56.12 − 306x

1855 May 2nd 5^h. Pole

North South

East wind suddenly springing up - The Marks were too much disturbed for observation -

Level

E	W
75.0	68.0 x
75.0	67.0 x
73.6	67.3 x
x 69.8	68.7
x 69.2	68.0
x 69.3	67.5
11 9	4.5
71.98	68.75
68.75	
3.23	
1.61	$= -0^s.12$

Level error $-0^s.12$ E end too high.

a ---
b -0.12
c ---

May 3 1855 6 12h 9.12.13 In West

The nos for c in red ink have been corrected to the new constants

~~0.866~~

N S

0.520
.514
.490
24
0.508
n = ~~$\overset{s}{1}.160$~~
s = ~~1.963~~
~~3.123~~
~~0.803~~
~~1.561~~ –
~~0.402~~

0.866
0.850 Zero
0.860
176
0.859
~~1.963~~

0.508
0.108
0.400
n $\overset{s}{0}.914$
s 1.716
2.630
0.802
1.315 – ~~1.350~~ 1.377 = ~~–0.035~~ ~~–0.0??~~ –0.062 = c_2
0.401 – 0.732 = –0.331 = a

0.859
0.108
0.751
1.716

May 3 In W.

a = $-\overset{s}{0}.331$
b = ----
c = ~~–0.035~~ ~~–0.0??~~ –0.062

1855
May $\frac{4}{5}$. Tr. West.

Mer. marks clear and toe. steady.

Ex. Ther – 49°.0
Int. Ther – 49.5

Level – Cw. reads level

South	MoB North	Zero
0.880	$\overset{s}{0}$.505	0.123
.886	0.485	.120
.900	0.485	.110
.890	0.475	.115
0.890	0.488	.118
446	/438	86
$\overset{s}{0}$.889	$\overset{s}{0}$.487	$\overset{s}{0}$.117
Zero 0.117	0.117	
0.772	0.370	
s = 1.764	n = $\overset{s}{0}$.845	
	s = 1.764	
	2.609	
	0.919	

E	W	Ex Ther 63
+ 71.3	– 70.0	In " 54
+ 71.1	– 70.2	
+ 70.9	– 70.0	
72.3	– 68.1 +	
72.0	– 68.1 +	
72.0	– 68.2 +	
96	4146	
71.60	69.10	
69.10		
2.50		
1.25 = 0.09		

$\frac{1}{2}(s+n) = +1.305$ ~~–1.350~~ –1.377 = = ~~az~~ Coll ~~– 0.045~~ – 0.072

$\frac{1}{2}(s-n) = +0.460$ –0.732 = = az – 0.272

May 4/5 Tr W

a = – 0.272
b = – 0.09
c = ~~– 0.045~~ – 0.072

May 10

		North	South
	Tr W	$0.\overset{s}{8}61$	1.732
	E	1.021	1.829
–0.015	$d b$	2/0.160	2/0.097
–0.029	Mill–Mean	0.080	0.049
– .044	Tr E	049	
+ 014	Tr W	129	

Tr E + 0.064
–044
+014

			obsd	
By	C_1	+ 0.020	+ .022	$\delta C_1 = -0.\overset{s}{0}02$
Reversal	C_2	– 0.050	– 081	$\delta C_2 = +0.031$

May 10th 1855 = 5 P.M. Ext ther 48.7 Int ther Ill West.

North	South	Zero	Level East	Level West
0.480	0.860	0.110	74.2	× 72.4
0.480	0.864	0.110	73.9.	× 72.4
0.495	0.873	0.104	74.3	× 73.2
1.455	197	24	× 73.9	74.2
Mn 0.485	866	108	× 73.9	73.6
Zero 0.108	108		× 74.1	73.3
0.377	0.758		24.3	191
N = 0.861	S = 1.732		74.05	73.18
	N = 0.861			74.05
	2.593 − 1.350			2) 0.87
	0.871 −			0.44 = $0^s.04$

1.296 − ~~1.350~~ −1.377 = ~~−0.054~~ −0.081 = c

0.435 − 0.732 = − 0.297 = a

Ill. West
a = − 0.297
b = − 0.04
c = − ~~0.054~~ − 0.081

Reversed to Ill. East 5 P.M.

North	South
0^r653	0^r312
678	321
652	304
183	37
0^r661	0^r312
Zero 0^r108	0.108
0^r447	0.796
N = 1.021	S = 1.829

S = 1.829
2.850
.808
1.425 − ~~1.350~~ ~~1.430~~ 1.403 = ~~+ 0.005~~ + 0^s.022 = c
.404 − 0.732 = − 0.328 = a

Level alt 0°

E	W
73.7	73.7 ×
73.7	73.6 ×
73.2	74.2 ×
× 74.0	73.0
× 74.0	73.0
× 73.9	73.2
22.5	27
73.75	73.45
	73.75
	.30

0.15 = − 0^s.01 = b

Ill. East
a = − 0^s.328
b = − 0.01
c = ~~+ 0.075~~ ~~+ 0.005~~ + 0.022

1855

May 17 Ann. 9hrs Ill East Ther Ex. 58 Int. 60

MCB

North	South	Zero.
0.754	0.172	0.105
.740	.177	.100
.765	.175	.102
.755	.200	.105
.765	.177	.100
3779	.901	512
0.7558	.1802	.1024
1024	1024	
.347	.922	
N .792	2.107	

S 2.107

S+N 2.899

S−N 1.315

$\frac{S+N}{2}$ 1.450 − 1.403 = + 0.047 = c_1

$\frac{S-N}{2}$ 0.658 − 0.732 = − 0.074 = a

Level

E. B.S.C W Pretty good seeing

62.1 ~ 66.0 +

63.5 ~ 64.4 +

63.0 ~ 64.3 +

+ 61.9 ~ 63.6

+ 62.7 ~ 62.3

+ 62.8 ~ 61.9

16 0 22.5

62.66 63.75

63.75

1.09

+ 0.55 = + 0.03

Rev pos. Circle 180°

E ~ W

+ 63.6 ~ 60.2

+ 63.4 ~ 59.8

+ 62.8 ~ 60.0

60.9 ~ 61.4 +

60.6 ~ 61.3 +

60.2 ~ 61.5 +

11.5 42

61.92 60.70

60.70

1.22

− 0.61 =

$a = -0.074$

$b = +0.03$

$c_1 = +0.047$

144

180

324

May 17 Am 9^{hm}

Level

C.W.T. at Circle reading – 144° – object glass depressed North

	East		West	
	61°.8	–	59.2	+
	61.2	–	59.8	+
	60.3	–	60.2	+
+	58.5	–	61.8	
+	58.7	–	61.5	
+	58.5	–	61.7	
	359 0		42	
	59.83		60.70	
	60.70			
	187			
	+0.43			

C.W.T. Circle reading – 324° – object glass elevated South

Temp. 61° – Int

	E	–	W	
	60.7	–	58.6	+
	60.7	–	58.7	+
	60.2	–	59.0	+
+	58.9	–	60.0	
+	58.7	–	60.1	
+	58.8	–	60.0	
	358.0		356 4	
	59.66		59.40	
	59.40			
	26			
	–0.13			

May 19th 6 PM good seeing Ill East Ex th = 57

South	North	Zero
0.220	0725	0.098
222	731	109
192	771	098
208	737	101
201	758	087
1.043	222	493
0.2086	0.7444	0.0986
.0986	.0986	
.490	.354	

S

N

S + N

S − N

$\frac{S+N}{2}$

$\frac{S-N}{2}$

May 19 Ill East

South	North	Zero (North)
$\overset{r}{0}.219$	$\overset{o}{0}.761$	0.094
.222	.773	.111
0.247	0.723	.109
88	157	314
0.229	0.779	105
1.105	1.105	

$0.876 = \overset{s}{2}.002$ $0.327 = \overset{s}{0}.747$ n

2.002 s

2.749 n + s

1.255 n − s

1.374 $\frac{n+s}{2}$

0.627 $\frac{n-s}{2}$

$\alpha - \overset{s}{0}.732 + \overset{s}{0}.627 - \overset{s}{0}.105$

b − +0.030

c − 1.409 + 1.374 − 0.029

1855 May $\frac{20}{21}$ Cl. East Ext^l Ther 47.5 Int^l 51.2

North	South	Zero
$\overset{r}{0}.726$	$\overset{r}{0}.215$	$\overset{r}{0}.105$
.725	.225	.105
.713	.210	.102
.725	.222	.103
0.717	0.210	0.105
106	82	20
0.717	0.216	0.104
1.104	1.104	

$0.387 = \overset{s}{0}.884\,n$ $0.888 = \overset{s}{2}.029$

2.029 s

2.913 n + s

1.185 n − s

$1.456\ \frac{n+s}{2}$

$0.542\ \frac{n-s}{2}$

Level

	E		W	
+	71.5	−	72.0	
+	71.0	−	72.3	
+	71.0	−	72.5	
	70.2	−	72.3	+
	70.4	−	72.1	+
	70.2	−	72.2	+
	43		14	
	70.71		72.23	
	72.23			
	1.52 = +0.11			

$a = -0.732 + 0.592 = -\overset{s}{0}.140$

$b = \qquad +0.11$

$c = -1.403 + 1.456 \quad +0.053$

Ill East.
June 1st 1855 $\overset{48}{424}$ Marks Unsteady / Int Ther 66
E Ther 70
Observer P. S. Coolidge.   Level

South	North	Zero	E	W
1 .102	$\overset{r}{0}$.833	$\overset{r}{0}$.120	+ 59.2 —	63.2
.100	.816	.098	+ 58.6 —	62.9
.141	.817	.100	+ 58.4 —	62.2
.111	.855	.098	~~61.8 —~~	~~58.3~~ +
.140	0 .793	.118	59.3 —	59.5 +
594	114	34	58.5 — —	59.6 +
0 .119	0 .823	0^r.107	57.7 —	59.9 +
107	107		51.7	73
0 .012	0.716		58.62	61.22
0.988	0.284		61.22	
			2.60	
2.257	0.649		1.30 = + 0.08	

0.649
2.906
1.608
1,453 − 1.403 = + 0.050 = c_1
.804 − 0.732 = + 0.072 = a

$$\begin{cases} a = +\,0\overset{s}{.}072 \\ b = +\,0.08 \\ c_1 = +\,0.05 \end{cases}$$

June 4 9^h A. M. Ill. East. Ext Th. 66° Int 64

Observer W. C. B —

changed suddenly by Bad seeing

North		South		Zero
0.760	.240	0r133	.867	0r100
767		145		122
770		160		112
772		137		108
762		170		108
331		245		60
0r766		0r149		0r112
0 112		0r112		
0r346		0r963		
N 0.790		2.201		

S 2.201

2.991

1.411

$1.295 - 1.403 = +0\overset{s}{.}092 = c_1$

$0.705 - 0.732 = -0.027 = a$

Level

	East		West	
	58.2	—	62.6	+
	57.5	—	63.2	+
	57.8	—	62.8	+
+	57.0	—	63.4	
+	57.0	—	62.8	
+	57.1	—	62.5	
	2.6		17.3	
	57.43		62.89	

62.89

5.46

2.73 ~~=+~~ 0.18

$$\begin{cases} a = -0.027 \\ b = +0.18 \\ c_1 = +0.092 \end{cases}$$

1855

June 8^{t} Am. $\overset{h}{10}..\overset{m}{30}$ – Ill East   Ext Th 64°   Int Th. 64°

mer. marks   steady and clear

South	North	Zero.
1.153=0.847	0.762	0.090
.160	.765	.100
.150	.765	.105
.153	.766	.103
1.250	0.767	0.097
266	25	+ 495
1.153	0.765	0.099
0.099	0.099	
.946	.334	
S . 2.162	762	

N .762

S+N 2.924

S−N 1,400

$\frac{S+N}{2}$ 1.462 −1.403 = + 0.059 = c,

$\frac{S-N}{2}$ .700 − 0.732 = − 0.032 = a

a = − 0.032

b = ――――― +0.18

c, = + 0.059

Circle Readings

June 18^{t} $\overset{h}{10}..\overset{m}{30}$ Am.   Ext Th 66.5   Int 66

Level – Tel. object South Horiz   Level under the Pivots.

I. F. E.

E   W +

54.9 – 63.6

55.0 – 63.4

53.4 – 64.2

+ 55.9 – 60.8

+ 55.7 – 60.6

+ 55.6 – 60.4

30.5   13.0

55.08   62.17

62.17

7.09

+ 3.54 = $\overset{s}{0.23}$

E   W

+ 55.8 – 59.6 – I. F. F. object South

+ 55.3 – 59.7

+ 54.9 – 60.0

53.3 – 60.9 +

52.9 – 61.4 +

52.4 – 61.6 +

6/24 6   3632

54.10   60.53

60.53

6.43

+ 3.07 = 0.21

June 18. 11^{hr} Am - Circle read 180° - Ext Th 66° Int 66
Object glass ~~North~~
Level - J. F. B

E W
53.4 — 60.3 +
52.8 — 60.9 +
52.6 — 60.8 +
+ 50.3 — 62.3
+ 50.2 — 62.0
+ 51.0 — 60.9
10.3 7 2
51.72 61.20
61.20
9.48
+4.74 = 0.32

Mean value of b = $+0^{s}.25$

June 20th — 5.20 PM - Ill East . Ext - Ther 72 - Int 68
Mer. marks W. C. B

North	South	Zero
0^{r}.725	1^{r}.110	0.108
.752	.140	.100
.753	.134	.097
.745	.120	.105
0.745	1.128	0.105
219	.132	15
0.744	1.126	0.103
0.103	0.103	
.359	.977	
0.821	2.232	
	0.821	
	3.053	
	1.411	

1.526 - 1.403 = $+ 0^{s}.123 = c_1$
.705 - 0.732 = - 0.027 = a

1855 June 28 & 29
Mr Flagg found for
value of 1 div. of level
1d = 0".872 ... B = 76

July 1/2 A.M. 9h

G. F. F

Determination of Figure of pivots. Illu East

Ext. Therm. 83°.2 Attach. Therm. 83

Illum: East

I Level

	E	W	
×	37.3	46.8	
×	37.8	45.7	S Alt 35°
×	37.3	45.4	
	38.0	43.3 ×	I 3.75
	37.1	43.3 ×	I' 4.67
	36.0	44.0 ×	4.21 =
	43.5	28.5	$= 0\overset{s}{.}244$
	37.25	44.75	
	-44.75		
	7.50		
	3.75		

Ext. Therm. 83.2 Attach 83.

II Level

	E	W	
	37.3	42.1 ×	
	36.7	42.4 ×	N Alt. 35°
	36.3	42.4 ×	
×	33.8	44.8	II 3.78
×	34.4	43.7	II' 4.08
×	34.8	43.3	3.93
	33.3	18.7	$= 0\overset{s}{.}228$
	35.55	43.12	
	43.12		
	7.57		
	3.78		

4.21
3.93
4.08
4.19
4)16.41
± 4.10

Ext. Therm 85.0 Attach 84.0°

III Level

	E	W	
×	33.9	42.9	
×	33.9	42.8	N. Alt. 0
×	34.1	42.3	
	35.0	40.7 ×	III 3.85
	34.2	41.2 ×	III' 4.31
	33.9	41.4 ×	4.08
	25.0	11.3	$= 0\overset{s}{.}237$
	34.17	41.88	
	41.88		
	7.71		
	3.85		

Ext. Therm. 86°.0 Attach. 85°.0

IV Level

	E	W	
	34.1	40.6 ×	
	33.6	40.8 ×	S. Alt. 0
	32.2	41.0 ×	
×	31.6	42.3	IV 4.25
×	31.6	41.8	IV' 4.14
×	32.9	40.5	4.19
	16.0	7.0	= 0.243
	32.67	41.17	
	41.17		
	8.50		
	4.25		

July 1/2

Ext. Ther. 86°.8 — Attach. Ther 85°.8

IV′ Level

	E	W		
×	33.1	40.1		
×	32.6	40.6		S. Alt. 0
×	32.3	40.4		
	31.9	40.7	×	
	31.9	40.6	×	
	31.7	40.7	×	
	13.5	3.1		
	32.25	40.52		
	40.52			
	8.27			
	4.14			

Ext. 87°.0 Attach 86°.2

III′ Level

	E	W		
	32.2	39.4	×	
	31.6	39.9	×	N. Alt. 0
	31.3	40.0	×	
×	30.3	40.7		
×	30.9	40.3		
×	31.6	39.4		
	7.9	59.7		
	31.32	39.95		
	39.95			
	8.63			
	4.31			

Ext. 87.5 — Attach. 86.4

II′ Level

	E	W		
×	31.5	39.1		
×	31.6	39.1		
×	31.6	38.9		N. Alt. 35°
	30.8	39.4	×	
	30.6	39.7	×	
	30.5	39.4	×	Ex
	6.6	1.6		
	31.1	39.27		Ext. 86.4
	39.27			Att. 87.2
	8.17			
	4.08			11h

Ext. 87.1 Attach. 87.0

I′ Level

	E	W		
	31.1	38.4	×	
	31.2	38.3	×	
	30.4	39.0	×	S Alt. 35°
×	28.5	40.8		
×	28.8	40.6		
×	29.9	38.9		
	59.9	56.0		
	29.98	39.33		
	39.33			
	9.35			
	4.67			

Transit reversed & in the Pivots at 11h 30m

July 2nd P.M. $1^h 30^m$

J. F. F.

Illum ~~West~~ West

Ext. Ther. 91°.8 – Attach 89°.8

A Level

E	W
× 28.4	35.9
× 28.4	35.8
× 29.3	34.9
28.3	35.7 ×
28.1	35.8 ×
28.1	35.9 ×
50.6	84.0
28.43	35.67
35.67	
7.24	
3.62	

N Alt. 0°

A 3.62
A' 3.45
3.53
= 0°.205

Ext. 89°.8 – Attach. 89°.8

B Level

E	W
29.0	35.0 ×
28.4	35.1 ×
28.3	35.4 ×
× 27.8	36.2
× 27.4	36.2
× 27.8	36.1
49.0	34.0
28.17	35.67
35.67	
7.50	
3.75	

N Alt 35°

B 3.75
B' 3.54
3.64
= 0.211

~~0.205~~
0
3.53
3.64
3.67
3.82
1266
3.66

Ext. 89° – Attach. 89.3

C Level

E	W
× 26.6	37.2
× 26.9	37.1
× 27.7	36.2
29.6	34.4 ×
29.5	34.5 ×
29.6	34.4 ×
49.9	33.8
28.92	35.63
35.63	
7.31	
3.65	

S Alt. 35°

C 3.65
C' 3.69
3.67
= 0°.213

Ext. 88°.5 – Attached 89°.0

D Level

E	W
28.3	35.7 ×
28.1	35.9 ×
28.2	36.0 ×
× 27.8	36.7
× 27.9	36.4
× 29.1	35.3
49.4	36.0
28.23	36.0
36.0	
7.77	
3.88	

S. Alt 0°

D 3.88
D' 3.76
3.82
= 0.222

$4^d.10$ – Ill. East
3.66 – " West
2) .44
– .22 Ill. pivot too small

Illum West b = + 0,213

J. F. F.
9 Elem. West

Ext. 88°.7 – Attach. 89°.0

D' Level

E	W
X 29.3	35.1
X 29.6	34.9
X 28.6	35.9
27.9	36.4 X
28.0	36.2 X
27.1	37.1 X
50.5	35.6
28.42	35.93
35.93	
7.51	
3.76	

S. Alt. 0°

Ext. 89.3 — Attach. 89.3

C' Level

E	W
X 28.1	36.0 X
X 28.0	36.1 X
X 27.9	36.2 X
X 27.9	36.4 X
X 29.2	35.1 X
X 29.4	35.0 X
50 5	34.8
28.42	35.80
35.80	
7.38	
3.69	

S. Alt 35°

Ext. 91.8 – Attach 89.0

B' Level

E	W
X 28.0	36.1
X 28.3	35.7
X 28.0	36.1
29.0	34.9 X
28.3	35.6 X
29.1	34.7 X
50.7	33.1
28.45	35.52
35.52	
7.07	
3.54	

N. Alt. 35°

Ext. 91.3
Attach. 89.7

$3^h.00^m$

Ext. 91.0 — Attach 89.0

A' Level

E	W
29.3	34.2 X
29.2	34.6 X
29.1	34.4 X
X 27.3	36.7
X 27.8	36.1
X 28.0	36.1
50.7	32.1
28.45	35.35
35.35	
6.90	
3.45	

N. Alt. 0°

	Illum East			Illum West		
	Level Error	diff. from Mean		Level Error	diff from mean	Resulting
S Alt 35°	0.244	+0.006	S Alt. 35°	0.211	−0.002	+0.002
N Alt 35°	0.228	−0.010	N Alt 35°	0.213	0.000	−0.005
N Alt. 0°	0.237	−0.001	N Alt. 0°	0.205	−0.008	−0.004
S Alt 0°	0.243	+0.005	S Alt. 0°	0.222	+0.009	+0.007

1855. Sept $\frac{9}{10}$

Ext Ther 60

~~South m.c.13 North - pretty steady~~

		~~Zero~~
~~0.985~~	~~0.245~~	
~~0.962~~	~~.240~~	~~0.100~~
~~.975~~	~~.238~~	~~.095~~
~~.987~~	~~.250~~	~~.101~~
~~0.965~~	~~0.258~~	~~.100~~
		~~0.080~~

transferred

July 2nd 1855

Reversed Transit to Ill West

For Level see July 1/2 & 2

	N	G.P.B S	Zero
	0.212	1.007	0.095
	.203	1.031	0.098
	.213	1.030	0.092
	28	68	15
	0.209	1.023	0.095
Zero	0.095	0.095	
	0.114	0.928	
N	0.260	2.120	
S	2.120		
	2.380 − 1.377 = 1.003		
	1.860 − 0.732		

$1.190 - 1.377 = -0.187 = c_2$

$.930 - 0.732 = +0.198 = a$

July $\frac{2}{3}$. Ill. West. 9^h 00^m

N	wob S	S Zero	N Zero
0.280	1.027	0.083	0.098
0.240	1.035	0.090	0.093
0.240	1.020	0.090	0.085
0.257	1.031	0.082	0.087
0.268	1.020	0.090	0.090
285	133	435	453
0.247	1.022	0.072	0.075
0.075	0.072		
0.172	0.950		
N 0.393	2.171		

s 2.171

2.564

1.778

$1.282 - 1.377 = -0.095 = c_2$

$0.889 - 0.732 = +0.157 = a$

$a = +0.157$

July 2 $b = +0.213$

$c_2 = -0.095$

July 15/16 Ill. West 9^h 00

W. 6.38,

Ext Ther. 73.0

Int " 72.5

S	N	Zero
0.975	0.325	0.100
1.020	0.315	0.102
0.985	0.270	0.105
1.020	0.310	0.105
0.992	0.290	0.105
4992	10	17
0.998	0.302	0.103
0.103	0.103	
0.895	0.199	
S 2.045	0.455	
N 0.455		
2.500		
1.590		

Mark, very tremulous

Level. object North

E	W
+49.1	61.8
+49.1	61.2
+50.0	60.8
52.0	56.9 +
57.3	56.6 +
57.2	56.4 +
302.7	353.7
50.45	58.95
	50.45
	8.50
	4.25 = +0.27

$1.250 - 1.377 = -0.127 = c_2$

$.795 - 0.732 = +0.063 = a$

$a = +0.^s063$

$b = +0.27$

$c_2 = -0.127$

1855phae.proj.v.1108

July $\frac{18}{19}$ All West Th Ex 85 Int 83

marks steady Level, object North

North	South	Zero
0.270	1.005	0.090
180	0.980	.105
202	0.995	.090
.195	0.995	.100
0.200	1.000	0.105
47	4.975	490
0.209	0.995	0.098
0.098	0.098	
0.111	0.897	
0.253		

S 2.050
N 0.253
S+N 2.303
S−N 1.797

$\frac{S+N}{2}$ $1.151 - 1.377 = -0.226 = c_2$

$\frac{S-N}{2}$ $0.898 - 0.732 = +0.166 = a$

East	West
+ 39.3	− 49.9
+ 39.3	− 49.0
+ 38.3	− 49.0
40.0	− 46.0 +
39.7	− 45.2 +
39.4	− 45.0 +
2360	441
39.33	47.35
	39.33
	8.02
	4.03 = +0.24

s

$$\begin{cases} a = +0.166 \\ b = +0.24 \\ c_2 = -0.226 \end{cases}$$

July 30/31 9^h Am. Ill. West

Level object North

J. F. F.

East	West
X 44.2	57.9
X 44.3	57.4
X 44.5	57.0
47.4	53.8 X
46.8	54.1 X
46.2	54.4 X
33.4	34.6
4.5.57	55.77

45.57

2)10.2

5,1 $= +0^s.32 = b$

Aug. 1st 6h P.M. Int. Th. 73° Ill. West

W. C. B.

South	North	Zero
0r983	0r270	0r100
982	240	108
985	255	118
1.000	265	097
970	250	112
920	280	35
0.984	0.256	0.112
.112	.112	
0.872	0.144	
1.993	0.329	
0.329		
2.322		
1.614		

Difficult

$1.161 - 1.377 = -0.216 = c_2$

$0.832 - 0.732 = +0.100 = a$

$a = +0\overset{s}{.}100$

$b =$ ——

$c_2 = -0.216$

Aug 8th 12h Moon

N	S	Zero
0,220		0:105
.235		.103
.245		.103
.223		.100
.220		.110
143		21
0, 229		01.04

Aug. 8 6^h P.M. Ext. Th. +65° Ill West

W. C. B

North	South	Zero
0^r253	0^r920	0^r078
260	978	100
270	945	110
253	942	112
260	938	088
296	223	18
0.259	0.945	0.104
0.104	0.104	
0,155	0,841	
0,354	1.921	
1.921		
2,275		
1.567		

$1.137 - 1.377 = -0.240 = c_2$

$0.783 - 0.732 = +0.051 = a$

$a = +\overset{s}{0}.051$

$b =$ ———

$c_2 = -0,240$

1855

Aug. 11th 6h P.M. Ill. West Ex Th. 66.7 Int 66.3

Marks steady and Clear

W. C. B.

	North	South	Zero	Level E	Level W
	$0^{r}265$	$0^{r}973$	$0^{r}103$	57.0	60.7 +
	275	980	110	57.0	60.8 +
	273	980	100	50.6	61.1 +
	263	982	110	+ 49.4	62.0
	270	980	100	+ 49.9	61.8
	46	45	23	+ 50.0	61.6
	0.269	0.979	0.105	1.9	8.0
	0.105	0.105		50.32	61.33
	0.164	0.874			50.32
N	0.375	1.997			2)11.01
S	1.997				$\overset{s}{5.50} = +0.35$
	2.372				
	1.622				

object South C. W. T.

$1.186 - 1.377 = -0.191 = c_2$

$0.811 - 0.732 = +0.079 = a$

$a = +\overset{s}{0}.079$

$b = +0.35$

$c_2 = -0.191$

Ill. West

Aug $\frac{20}{21}$ Micrs

Ex Th 63 / Int Th 64

North	South	Zero.
0.278	0.948	0.107
.270	.950	.108
.290	.940	.110
.300	.945	.110
0.290	0.948	0.103
1428	231	38
0.286	0.946	0.108
108	108	
178	.838	
0.406	1,915	
	0.406	
	2.321	
	1.509	

$1.160 - 1.377 = -0.217 = c_2$

$0.754 - 0.732 = +0.022 = a$

Level

E	W	J.F.T.
+ 49.7	− 69.6	
+ 49.2	− 69.8	
+ 48.8	− 70.0	
58.6	− 60.2 +	
56.4	− 61.3 +	
55.7	− 61.8 +	
318.4	392.7	
53.07	65.45	
65.45		
12.38		
6.19 = + 0.41		

$a = +0.\overset{1}{0}22$

$b = +0.41$

$c_2 = -0.217$

1855 · Mer. West

Sept. 21st . 8h A.M. Ext. Therm. 65° Int 6.2

Marks steady & clear Level - Obj North

S	M	Zero
0.927	0.337	0.101
.926	.343	.103
.925	.345	.105
.925	.350	.107
.925	.340	.103
28	215	13
0.926	0.343	0.103
.103	.103	
.823	0,240	
1.881	0.548	
0.548		
2.429		
1.333		

1.214 − 1.377 = −0.163 = c_2

0.666 − 0.732 = − 0.066 = a

	E		W	
+	56.2	—	69.3	
+	55.6	—	69.4	
+	56.2	—	68.6	
	59.1	—	65.2	+
	58.8	—	66.0	+
	57.3	—	66.0	+
	43.2		46.5	
	57.2		67.42	

57.20

2)10.22

5.11 = +0.35

a = −0.066

b = +0.35

c_2 = −0.163

JH. West

1855 Sept. 9/10th. Ext. Ther. 60°   Ext. Ther. 72°

W. C. B. pretty steady   J. F. F. 10½^{h}

S	N	Zero
0.985	0.245	0.100
.962	.240	0.095
.975	.238	0.101
.967	.250	0.100
.965	.258	0.080
874	231	476
0.975	0.246	0.095
.095	.095	
0.880	0.151	
2.011	0.345	
0.345		
2.356		
1.666		

1.178 − 1.377 = −0.199 = c_2

0.883 − 0.732 = +0.101 = a

		East	West	
object	×	509	59.4	
glass	×	50.2	59.6	
South	×	50.1	59.1	
		50.2	58.9	×
		49.0	59.3	×
		48.9	59.0	×
		59.3	55.3	
		49.88	59.22	
			49.88	
			2) 9.34	
			4.65 = +0.30	

a = +0.101

b = +0.30

c_2 = −0.199

Ill: West

1855 Sept. 12/13 A.m.

Ext. Therm. 85½
Object glass North
Level. J.F.F.

w. C. B.

S	N	zero
0.970	0.240	0.095
.982	0.240	.095
.970	0.250	.100
.980	0.240	.097
.970	0.243	.100
22	13	.487
0.974	0.203	.097
.097	.097	
.877	.106	

S 2.004 0.243
N 0.243
2.247
1.761

1.129 − 1.377 = −0.254 = c_2
0.880 − 0.732 = +0.148 = a

E	W
+ 39.7	− 50.2
39.3	− 50.1
39.6	− 49.1
39.4	− 48.4 +
38.7	− 48.5 +
38.6	− 48.2 +
7.3	545
39.22	49.08

39.22
2) 9.86
4.93 = +0.30

a = +0.148
b = +0.30
c_2 = −0.254

Sept 20th

	N	S
W	0.599	1.820
E	0.747	2.118
	0.148	0.298

Ill. West

1855 Sept. 20/21
8h A.M.
W. 6.33 Marks clear

Ext. Ther. 54.°
Object South
Level - I.F.F.

N	S	zero
0.365	0.903	0.105
0.375	0.892	.107
0.370	.892	.110
0.370	.908	.107
0.367	.900	.106
347	495	35
0.369	0.899	0.107
.107	.107	
.262	.792	
0.599	1.820	
1.820		
2.419		
1.221		

1.210 - 1.377 = - 0.167 = c_2
.610 - 0.732 = - 0.122 = a

E	W
65.2	73.2 +
65.0	73.2 +
64.7	73.2 +
+ 63.3	73.9
+ 62.7	74.2
+ 62.7	73.8
23.6	21.5
63.93	73.58
	63.93
	2) 9.65
	4.82
	+ 0.34

Ill W
a = -0.122
b = +0.34
c_2 = -0.167

Instrument Reversed
Ill. East

10h A.M.

W. 6.33 - bad seeing

object glass South
Level I.F.F.

S	N	zero	zero
0.172	0.800	0.100	0.100
.180	.735	.095	.100
.175	.750	[illegible]	.107
.170	.785	.110	.097
.185	[illegible]	[illegible]	.110
382	380	20	14
0.176	0.776	0.104	0.102
Zero 0.103	0.103		
0.927	0.327		
2.118	0.747		
0.747			
2.865			
1.371			

To be Rejected
Bad seeing

E	W
+ 61.6	72.4
+ 60.7	72.8
+ 60.0	72.9
61.4	70.9+
61.1	70.9+
61.0	70.4+
5.8	10.3
60.97	71.72
	60.97
	2) 10.75
	5.37

a -0ˢ.046
b +0.380
c -0.030

b_1 = +0ˢ.38

1.433 - 1.403 = -0ˢ.030 = c_1
0.686 - 0.732 = +0.046 = a_1

Ill East

Sept. 21 3^h P.M. Ext. Th 65.°0 Int. Th. 65°

W. C. B.

North	South	Zero
0^r678	0^r177	0^r100
688	173	102
687	170	107
690	162	105
680	172	100
423	354	14
0^r685	0^r171	0^r103
103	0 103	
0^r418	0^r932	
2.285	2.285	
2090	4660	
3344	7456	
836	1864	
836	1864	
n=0.955130	s=2.129620	

0.955130

3.084750 s + n

1.174490 s − n

1.542375 $\frac{s+n}{2}$

0.587245 $\frac{s-n}{2}$

1.542 − 1.403 = +0.149 coll.

0.587 − 0.732 = −0.145 az.

a −.15

b

c +.15

Sept. 25/26 A.M. Ill. East Ext. Th 65.0° Int. 62

W. C. B.

North	South	Zero
0^r640	0^r225	0^r117
653	210	110
640	200	100
660	220	110
658	205	105
251	60	42
0^r650	0^r212	0^r108
0 108	0^r108	
0^r458	0^r896	1.046
2.285	2.285	2.048
2290	4480	3.094
3664	7168	1.002
916	1792	
916	1792	

1.547 - 1.403 = + 0.144
.501 - 0.732 = - 0.231

1.046530 m 2.047360 s
1.046530 n
3.093890 = s+n
1.000830 = s−n
1.546945 = $\frac{s+n}{2}$
0.500415 = $\frac{s-n}{2}$

coll. = 1.547 − 1.403 = + 0.144
az. = 0.509 − 0.732 = − 0.232

Level C. W. T.

	East		West	
	62.0	—	71.1	+
	61.2	—	71.2	+
	60.8	—	70.9	+
+	57.6	—	72.5	
+	57.5	—	72.5	
+	57.4	—	71.9	
	3565		101	
	59.4		71.7	

59.4
2/12.3
6.15 = + 0.430

b + 0.430
c_2 − 0.005
a − 0.145

.129
43
.56
+ 01
− .18
+0.37

14
.435
18

October 4th 2h P.M. Ill. East

Marks very distinct and steady

W. C. B.

North	South	Zero
$0^{r}725$	$0^{r}128$	$0^{r}110$
736	123	118
730	132	118
727	130	110
733	137	110
151	150	16
$0^{r}730$	$0^{r}130$	$0^{r}113$
0.113	$0^{r}113$	
$0^{r}383$	$0^{r}983$	
0.875	2.246	
2.246		
3.121		
1.371		

1.560 − 1.403 = +0.157 = c

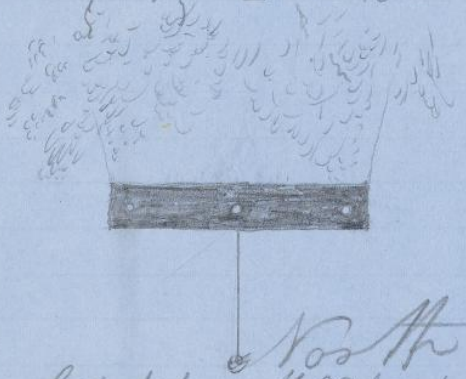
0.685 − 0.732 = −0.047 = a

a −0.047

b +0.430

c +0.157

Oct. 4th 2h P.M. M. East



Clear and well defined

North Meridian Mark

	Left dot		Middle dot		Right hand dot
	0^r 978		0^r 732		1^r 492
W.C.B.	98.2	W.C.B.	735	W.C.B.	48.2
	985		735		482
	985		733		482
	985		735		483
	415		20		11
	0^r 983		0^r 734		1^r 482
	0^r 113		0^r 113		0^r 113
	0^r 870		0^r 379		1^r 631

1855. Octr $\frac{24}{25}$ – Illumination East

Mer marks				Level
South M.B.	North	Zero	E	W
,273	.662	.102		
,273	.660	.090		
.250	.680	.085		
.260	.660	.103		
.273	.670	.100		
331	332	,480		
0.266	0.666	0.096		
.096	.096			
0.830	0.430			
1.897	0.983			
0.983				
2.880				
.914				

1.440 − 1.403 = + 0.037 = c,

0.457 − 0.732 = − 0.275 = a

Nov^r 5^t noon

Ext Th.- 47 Int 46
Object - south -
Level

S	zero	North
0.287	0.125	0.665
0.260	0.120	0.665
0.262	0.120	0.652
0.260	0.115	0.640
0.258	0.118	0.650
277	98	272
0.255	0.120	0.654
.120		.120
.865		.466
1.976		1.065
1.065		
3.041		
.911		

1.520 - 1.403 = + 0.117 = c,
0.455 - 0.732 = - 0.277 = a

E	W
+ 72.3	— 81.7
+ 72.3 -	— 81.3
+ 72.4	— 80.7
74.7	— 78.2 +
73.6	— 78.7 +
73.3	— 78.5 +
18 6	479 1
73.1	79.85
	73.10
	2) 6.75
	3.37 = +0.25

a = - 0.277
b = + 0.25
c, = + 0.117

1855. Novr 9th 4 Pill Ill East - Ext Th 52 - Intl Th 52

South	North -	Zero	Level. E	W
.267	.630	0.095	70.2	75.0x
.260	.625	.100	69.7	74.8x
.260	.632	.103	x66.7	76.3
.260	.635	.102	x67.2	75.7
.262	.635	.101	33.8	21.8
9	7	1	68.45	75.45
0.262	0.631	0.100	75.45	
0.100	0.100		2)7.	
.838	.469		3.50 = +0s.25	
1.915	1.073			
1.073				
2.988				
.842				

1.494 - 1.403 = + 0.091 = c_1

.421 - 0.732 = - 0.311 = a

a = - 0.311
b = + 0.25
c_1 = + 0.091

Nov 13	N	S	N	S
E	~~1.046~~	~~1.911~~	1.046	1.911
W	~~0.407~~	~~1.244~~	0.837	1.652
	~~2)0.639~~	~~2)0.667~~	0.209	0.259
Ill E	~~+ 0.320~~	~~+0.333~~	0.104	0.130
~~mid-Mean +ab~~	~~+ 0.333~~		130	
Ill E	~~+0.326~~		+ 0.117	
Ill E mid-mean + ab	~~- .044~~		- 044	
W	~~+ .014~~		+ 014	
c_1 =	~~+0.282~~	By c_1	+0.073	δc_1 = -0.002
c_2 =	~~-0.312~~	Reversal c_2	-0.103	δc_2 = +0.030

Nov 13 – 5 PM   Ill East   Ext Ther 55 – Int 55
Level

	South	North	
G —	0.278	.663 B	1.911
B —	263	.650 B	1,046
B —	.280	.642 G	2.957
	0.274	652	,865
Zero	0,110	110	1.478 − 1.403 = +0,075 = c_1
	0,836	0,458	,433 − 0.732 = −0,299 = a
	1.911	1,046	

Reversed to

Ill West (After Transits of Aquila)

	South	North	Zero G	B
	840 B	0.490 B	0.120	102
	830 B	.477 B	.126	100
	830 G	.460 G	.122	.103
	0.833	0.476		
Zero	0,110	110	Zero	
	0,723	0,366	G	B
	1.652	0.837	0.110	100
	.837		.120	108
	2,489		.105	100
	,815			

1.244 − 1.377 = −0.133 = c_2
,407 − 0,732 = −0.325 = a

1855 Nov. 13/14 11½ A.M Ext. Ther. 55.0° Int. Ther. 53.0°

J.G.F.

Level Object South

	E.		W.
×	72.0		77.0
×	71.1		77.6
×	71.1		76.7
	72.6	×	73.9
	71.6	×	74.3
	70.8	×	74.2
	9.2		33.5
	71.53		75.58
	75.58		
	2)4.05		
	2.02 = +0.15		

	N	S
E	1.060	1.986
W	0.770	1.737
	2)0.290	2)0.249
	0.145	0.125
	0.125	
Mu. E.	+0.135	
E Mid-mean +ab	− 044	
W "	+ 014	o
c_1 =	+0.091	+0.120
c_2 =	−0.121	−0.123

$\delta c_1 = -0.^s029$

$\delta c_2 = +0.002$

Nov 14th ?

1855 P.S.C Ill West

Ther Ex 57 – Int 55°

South	North	Zero
0.860	0.483	0.121
.889	.440	.121
.898	.446	.122
.891	.458	.126
.873	.470	0.119
411	297	109
0.882	0.459	0.122
.122	.122	
0.760	0.337	
1.737	0.770	
0.770		
2.507		
.967		

1.254 − 1.377 = −0.123 = c_2

0.483 − 0.732 = −0.249 = a

Reversed to Ill East

P.S.C

South	North	Zero
0.212	0.640	.109
.243	.643	.103
.240	.645	.112
.249	.637	.107
.247	.650	.112
191	215	43
0.238	0.643	0.107
.107	.107	
.869	0.464	
1.986	1.060	
1.060		
3.046		
.926		

1.523 − 1.403 = + 0.120 = c_1

0.469 − 0.732 = −0.269 = a

Continuation

Nov ~~13~~ ? 14th 1855 W C B obs IN East
Le Th 56, 6

North	South	Zero
0.632	0.270	0.120
.620	.268	.110
.615	.262	.115
.630	.253	.113
.635	.253	.120
3.132	1306	578
0.626	0.261	0.116
0.116	0.116	
0.490	0.855	
1.121	1.953	
1.953		
3.074		
0.832		

1.537 − 1.403 = +0.134 = c_1
0.416 − 0.732 = −0.316 = a

Nov 13th 1855

Reversed to IN West
W C B obs

South	North	Zero
0.860	0.434	0.103
.862	.465	.106
.845	.482	.100
.855	.465	.100
.850	.470	.120
4272	2316	.529
0.854	0.463	0.106
0.106	0.106	
0.748	0.357	
1.709	0.816	
0.816		
2.525		
1899		

1.262 − 1.377 = −0.115 = c_2
0.446 − 0.732 = −0.286 = a

Nov ~~13~~ 14th 1855 Continuation P. C. obs. T N West

	South	Zero	North
	845	110	477
	845	97	461
	859	107	476
	846	113	472
	840	113	459
	35	108	39
	847		468
Zero	108		108
	0.739		0.360
S	1.689		0.823
n	0.823		
S+n	2.512		
S−n	0.866		

$1.256 - 1.377 = -0\overset{s}{.}121 =$ coll.

$0.433 - 0.732 = -0.299 =$ az

c = −0.121

α = −0.299

b = ____

Nov 14		N	S	N	S
	E	1.121	1.953	1.060	1.986
	W	0.816	1.709	0.823	1.689
−015 +018 +003		0.306	0.244	.237	0.297
		0.153	0.122	.149	0.149
		122		149	
	Ine	+ 0.138		0.134	
		− .044		44	
		+.014		014	

By Reversal { c_1 + 0.094 +0.134 $\delta c_1 = -0.040$ | +0.090 +0.120 $\delta c_1 = -0.030$

c_2 −0.124 −0.115 $\delta c_2 = -0.009$ | −0.120 −0.121 $= \delta c_2 = +0.001$

$\delta c_1 = -0.035$

$\delta c_2 = -0.004$

1855

Nov. 25/26 Ill. West Ext. Ther. 47°.5 In. Th. 26°.0

W. C. B.

N	S	pointing North Zero
0.532	0.787	0.130
.532	.787	0.113
.535	.787	.128
.547	.800	.118
.540	.770	.117
186	431	106
0.537	0.786	0.121
0.121	0.121	
0.416	0.665	
0.951	1.519	

1.519
2.470
.568
$1.235 - 1.377 = -0.142 = c_2$
$0.284 - 0.732 = -0.444 = a$

Level

	East		West	
+	77.8	−	79.9	
+	76.7	−	80.0	
+	76.2	−	80.0	
	76.5	−	78.9	+
	76.2	−	78.7	+
	75.3	−	78.9	+
	2.7		2.4	
	76.45		79.40	

76.45
2)2.95
1.47 = +0.11

J. F. F.

N	S	pointing South Zero
0.543	.787	0.110
.538	.774	.105
.539	.787	.110
120	248	25
0.540	0.783	0.108
0.108	0.108	
0.432	0.675	
0.968	1.542	

1.542
2.530
0.554
$1.265 - 1.377 = -0.112 = c_2$
$0.277 - 0.732 = -0.455 = a$

$a = -0^{s}.45$
$b = +0.11$
$c_2 = -0.13$

1855 Dec. 6/7 Ill. West Ext. Th. 35°.5 In. Th. 37°.

N	9.F.F. S.	Zero
0,563	0.815	0.135
,546	0.796	0.130
,546	0.788	0.121
,552	0.808	0.131
,546	0.805	0.120
253	12	137
0.551	0.802	0.128
.128	0.128	
0.423	0.674	
0.967	1.540	
1,540		
2,507		
0,573		

$1.253 - 1.377 = -0.\overset{s}{1}24 = c_2$

$0.286 - 0.732 = -0.446 = a$

9.F.F.

Level

E	W
× 83.1	83.0
× 83.3	82.8
× 83.1	82.7
82.7	83.4 ×
82.0	83.6 ×
81.6	82.0 ×
6) 15.8	19.5
82.63	83.25
	82.63
	2) 0.62
	$0.31 = +\overset{s}{0}.02$

$a = -\overset{s}{0}.446$

$b = +0.02$

$c_2 = -0.124$

Dec. 13th 3 PM Ill. West

North	South	Zero
0.555	0.770	0.112
.540	.750	.107
0.560	0.790	0.123
.552	.770	42
.114	.114	.114
0.438	656	
1.001	1.499	
	1.001	
	2.500	
	.498	

$1.250 - 1.377 = -0.127 = c_2$

$.249 - 0.732 = -0.483 = a$

Dec $\frac{16}{17}$ - 11 Am   Ill. West   Ext Ther 41.5 . Int 41

Level . obj" South

E	W	S	N°	Zero
+ 82.2 —	83.1	.770	.610	.126
+ 81.6 —	83.0	.800	.542	.125
85.0 —	79.1 +	.765	.595	.135
84.7 —	79.1 +	2335	297	86
13 5	4.9	.778	.599	.129
83.37	81.07	.129	.129	
81.07		0.649	0.470	
2.30		1.483	1.075	
1.15 = − $\overset{s}{0}$.09		1.075		
		2.558		
		.408		

1.279 − 1.377 = −0.098

.204 − 0.732 = −0.528

a = −0.528

b = −0.09

c_2 = −0.098

Jan $\frac{3}{4}$. Ill West Ext Ther 16 . Int 28

Level - J. F. F. - object glass South

E	W
+ 95.1 —	91.3
+ 94.6 ~	91.6
96.1 ~	90.0 +
95.3 ~	90.0 +
21 1	2.9
95.27	90.72
90.72	
2/4.55	
− 2.27 = − 0.18	

after a month of cold weather

1856. Jan. 22° 3 P.M. Ill. West
W C B

N	S	Zero
	0.773	0.118
	.765	110
	.760	0.120

Object South
23° Am Ther E 24. Int 25
Level J.F.F

E	W
+ 98.0	− 93.8
+ 97.6	− 93.6
99.7	− 91.3 +
99.0	− 91.2
34.3	19.9
98.5	92.48
92.48	
6.02	
3.01 =	$\overset{5}{0}.15$

1856 after three months of steady cold

March 14th 3 P.M. mer. Marks. – Ill. West Ther. 37.5

North	South	Zero
0.565	0.745	0.120
572	770	125
574	770	120
565	755	.120
565	.770	0.115
5/341	310	0
0.568	0.762	0.120
−126	−120	
.448 = 1.028	.642 = 1.462	

Level – Obj. South

	E		W	
+	89.2	—	87.3	
+	88.4	—	87.3	
+	88.5	—	85.8	
	93.0	—	80.0	+
	92.0	—	80.0	+
	90.7		80.3	+
	6)541.8		6)20.7	
	90.30		86.45	
	86.45			
	3.85			
	1.92		−0.14	

n 1.028

s 1.462

s+n 2.490

s−n 0.434

$\frac{s+n}{2}$ 1.245 − 1.377 = coll − 0.132

$\frac{s-n}{2}$ 0.216 − 0.732 = az − 0.518

lev. − 0.140

1856

March $^{24}/_{25}$th 10h A.M. Ill. West.

J. F. F.

South	North	Zero
0.770	0.561	0,120
.777	.555	.124
.787	.550	.123
.788	.557	.126
.750	.562	.119
372	285	112
0.774	0.557	0.122
.122	.122	
0.652	0.435	
1.490	0.994	
0.994		
2.484		
0.496		

$1.242 - 1.377 = -0.135 = e_2$

$0.248 - 0.732 = -0.484 = a$

March $^{25}/_{26}$th Ext. Ther.

object South J. F. F.

E	W
× 83.2	81.3
× 83.2	80.9
× 83.1	80.7
85.4	77.4 ×
84.9	77.4 ×
84.1	77.3 ×
6) 23.9	6) 55.0
83.98	79.17
79.17	
2) 4.81	

$2.40 = -\overset{8}{0}.18 = b$

1856.
March 27. 3 P.M. – Ill. west

Ther. 24

Level
+ E – W
yesterday

unsteady

North	South	Zero
0.562	0.805	0.120
0.570	0.786	.120
0.560	0.786	0.120
192	277	—
0.564	0.792	
.120	.120	
.444	.672	
1.014	1.536	
1.536		
2.550		
.522.		

1.275 − 1.377 = − 0.102 = c_2
.261 − 0.732 = − 0.471 = a

Reversed
Illumination East

North	South
.0630	0.390
.605	.430
.623	.395
58	15
.619	.405
.120	.120
1.507	.715
0.525	
1.124	1.633
1.633	

2.777 − 1.403 = − 0.233 = c_1
.489 − 0.732 = − 0.487 = a
1.388 − 1.403 = − 0.015 = c_1
.244 − 0.732 = − 0.488 = a

+ 0.132
+ 0.015
− 0.488

1856

April $^{10}/_{11}$th 10^h A.M. Ext. Therm: 47°.5

Level J.T.Fr.

	E	W	
x	81.7	81.4	
x	81.3	81.4	
x	81.3	80.7	
	83.1	78.1	x
	82.3	78.4	x
	82.0	78.1	x
	11.7	~~58.1~~ 79.68	
	81.95		

79.68

2)2.27

$1.13 = -\overset{s}{0}.09 = b$

April $^{11}/_{12}$th 8^h A.M.

very unsteady J.T.T. Ill. East

S	N	Zero
0.255	0.672	0.135
.294	.674	.135
.280	.668	.125
.275	.660	.125
.270	.656	.130
374	330	150
0.275	0.666	0.130
.130	.130	
0.855	0.464	

1.953 1.060

1.060

3.013

0.893

1.506 − 1.403 = +0.103 = c,

0.446 − 0.732 = − 0.286 = a

April 13d. 5.30 P.M. Ill.n East

steady & clear

South	North	Zero
0.292	0.630	0.000
.300	.625	.100
.300	.635	.105
892	90	10.2
0.297	630	
1.102	1.102	
0.805	0.472	

s 1.839

n 1.075

s+n 2.914

s−n .764

1.457 − 1.403 = +0.054 = c_1

0.382 − 0.732 = −0.350 = a

1856 Ill East

April 23

South	North	Zero
1.244	645	.117
200	637	.118
220	660	.120
237	650	155
225	647	118
1126	239	
0.263	.640	
118	118	
.855	.4780	

s 1.953

n 1.098

s+n 3.051

s−n .855

$\frac{s+n}{2}$ 1.521 − 1.377 c = + .144

$\frac{s-n}{2}$ 0.427 − 0.732 a = − .305

b =

Transit reversed to Illm West

April 25th 1856

6^h. 10^m. Phil M C T

April 25th 1856 G. P. B Obs. Ill West Reversed

N.	S	Z
477	875	0.120
486	893	.137
480	878	.115
1443	2646	372
0.481	0.882	0.124 =
Zero 0.124	0.124	
r 0.357	0.758	

r 0.357 = $\overset{s}{0}$.816

r' −758 = 1.732

n .816

s 1.732

s + n 2.548

s − n 916

$\frac{s+n}{2}$ 1.274 − 1.377 c_2 = $-0.\overset{s}{1}03$ Collimation

$\frac{s-n}{2}$ 458 − 0.732 a = −0.274 Azimuth

b = −0.11 Level

− 0.63

Level

E W.

× 73.0 ~~73.1~~

× 73.4 ~~72.2~~

× ~~74.0~~ ~~71.3~~

~~104~~ ~~716~~

~~73.47~~ ~~72.20~~

~~72.20~~

~~1.27~~

~~Reversed~~ level

~~75.8~~ × ~~69.8~~

~~75.0~~ × ~~70.0~~

~~75.0~~ × ~~70.0~~

E W W S

× 73.0 − 73.1

+ 73.4 − 72.2

+ 74.0 − 71.3

74.8 − 69.8 +

75.0 − 70.0 +

75.0 − 70.0 +

25.2 6.4

74.20 71.07

71.07

3.13

1.56 = $-.\overset{s}{1}1$

1856

May $\frac{6}{7}$ – Illumination west – objective south

Level Ex Ther. 60. MT 55

E – W

+ 74.8 – 73.7

+ 74.1 – 73.8

+ 74.1 – 73.3

77.6 – 68.9 +

77.0 – 68.7 +

76.7 – 68.5 +

34 3 6.9

75.72 71.15

71.15

2) 4.57

$2.28 = -\overset{s}{0}.17 = b$

May 12th Ill west – (tolerably steady)

South North WCB

0.920 0.438

.960 .410

.933 .400

113 48

0.938 0.416

0.122 0.122

0.816 0.294

1.865 0.672

.672

2.537

1.199

$1.268 - 1.377 = -\overset{s}{0}.109 = c_2$

$0.596 - 1.732 = -0.136 = a$

1856 May 13/14th Ext. Therm. 54°. Int Th 50
w. c. B Illumination West. Level – J.F.F.

S	N	zero
0.910	0.408	0.120
.910	.402	.120
.907	.410	.123
.906	.430	.125
.902	.413	.120
35	63	8
0.907	0.413	0.122
.122	.122	
0.785	.291	

1.793 0.665
0.665
2.458
1.128
1.229 – 1.377 = – 0.148 = c_2
0.564 – 0.732 = – 0.168 = a

E	–	W	
+ 74.4	–	74.0	
+ 74.3	–	73.8	
+ 74.0	–	73.6	
77.2	–	69.9	+
76.8	–	70.0	+
76.6	–	69.8	+
33.9		11.1	
75.55		71.85	

75.55
71.85
2) 3.70
1.85 = – 0.14 = b

1856 May 14   5 PM   Ill West
W C B obs

3

	N	S
	0.39	.882
	0.37	.890
	0.38	.897
Mean	0.380	0.890
Zero	0.115	0.115
	0.265	0.775
	0.605	1.770
	1.770	
	2.375	
	1.165	

$1.188 - 1.377 = -0.189 = c_2$

$0.543 - 0.732 = -0.149 = a$

Reversed to Ill East

	N	S
	0.670	0.213
	.681	.210
	.687	.217
	0.679	0.213
Zero	0.115	0.115
	0.436	0.902
	0.997	2.061
	2.061	
	3.058	
	1.064	

$1.529 - 1.403 = +0.126 = c_1$

$0.532 - 0.732 = -0.200 = a$

1856 May 15/16 Ill East

Ext Th 62° Int 62°
Level – objective south

very steady

S	N	Zero
0.181	0.682	.119
.175	.676	.112
.189	.671	.103
.185	.689	.109
.180	.684	.118
10	2	61
0.182	0.680	0.112
.112	.112	
0.930	0.432	

E	W
+ 62.9	– 69.5
+ 62.9	– 68.3
+ 63.2	– 67.0
67.3	– 62.2 +
66.0	– 62.5 +
65.6	– 62.4 +
27.9	31.9
64.65	65.32
	64.65
	2) .67
	.33 = +0.02

2.125 0.988
0.988
3.113
1.137
1.556 – 1.403 = +0.153 = c,
0.568 – 0.732 = –0.164 = a

1856 May 25/26th

Cl. East   Ext. 5h. 45°   Int. 5h. 29°
J. T. T.   Object South

unsteady

S	N	Zero
0.250	0.796	0.115
.264	.809	.111
.247	.790	.121
.252	.791	.123
.249	.800	.112
262	486	82
0.252	0.797	0.116
116	.116	
0.864	0.319	

1.974   0.729
0.729
2.703
1.245
1.351 − 1.403 = −0.052 = c_1
.622 − 0.732 = −0.110 = a

Level

	E.	W
×	72.1	73.3
×	72.0	73.2
×	71.7	73.3
	73.2	71.7 ×
	72.7	72.0 ×
	72.4	72.0 ×
	14.1	15.5
	72.35	72.58

72.35
2/.23
.12-

b = +0.01

a = −0.110
b = +0.01
c_1 = −0.052

May. $\frac{28}{29}$ Ill^{n} East -

Definition perfect

			Level	
South	North	Zero	E	W
.257	.772	.120		
.243	.770	.130		
.252	.775	.132		
146	217	.112		
.249	.772	94		
.123	.123	.123		
.874	.351			

1.997 0.802

0.802

2.799

1.195

1.399 − 1.403 = −0.004 = c_1

0.597 − 0.732 = −0.135 = a

June 2d 1856
G.P.B obs

Ill East

Ext Th. 70°.7
~~Int Th~~.
No68 Barom. 30 042
att th 72.4

Level

Instrument pointing north

E	W
59.5	× 59.2
59.2	× 58.8
× 54.4	62.5
× 55.4	61.0
28.5	41.5
57.12	60.37
N	57.12
7.5	2) 3.25

$1.62 = +0^s.10 = 6$

Seeing too bad for measurements

Ex Ther +50. Int. 52.5

1856 June 7th Ill West

Level - by J. F. F

w. c. 23.

S	N	Zero
0.955	0.405	0.123
.940	.412	.120
.950	.400	.118
.940	.406	.110
.940	.380	.122
225	03	93
0.945	0.401	0.119
.119	.119	
0.826	0.282	

E		West
+ 68.8	—	71.4
+ 68.7	—	71.1
+ 69.2	—	70.6
71.5	—	68.0 +
70.6	—	68.5 +
70.5	—	68.2 +
59.3		57.8
69.88		69.63
69.63		
2) .25		

.12 = − 0.^{s}01 = b

1.888
0.645
2.533 $n+s$
1.243 $n-s$
1.266 $\frac{n+s}{2}$ − 1.377 = − 0.111 = c_2
0.621 $\frac{n-s}{2}$ − 0.732 = − 0.111 = α
~~0.020 = b~~

1856. June $\frac{17}{18}$. – 6 Am   Ill West   Ext Ther 73° Int 67°

Haze.   Level

S	N	Zero	E	W
0.917	0.318	0.102	× 58.4	62.8
.917	.300	.105	× 58.4	61.2
.934	.313	.103	× 57.8	60.5
68	31	10	55.1	61.3 ×
0.923	0.310	0.103	54.0	61.8 ×
.503	.103		54.2	61.0 ×
.820	0.207		37.9	8.1
1.874	0.473		56.32	61.35
0.473				56.32
2.347				2) 5.03
1.401				2.52 = + 0.17 = b

$1.179 - 1.377 = -0.204 = c_2$

$0.700 - 0.732 = -0.032 = a$

June $\frac{19}{20}$ – The diaphram of the Transit Circle was taken out

20th restored

micrometer readings of meridian marks, at 4.30 P.M.

South	North	Zero
0.873	0.290	100 = $\overset{2}{\cancel{1}}$.000
0.860	.227	.987
0.862	.250	.985
.195	167	0 .992
0.865	0.256	264
0.012	0.012	988
0.877	0.268	.012
2.004	0.612	
0.612		
2.616		
1.392		

add comp. of 100 = .013

$1.308 - 1.377 = -0.069 = c_2$

$0.696 - 0.732 = -0.036 = a$

June $\frac{20}{21}$.

S	N	Zero
.870	0.240	1.012
.890	240	1.000
.900	280	1.002
.880	255	014
.882	.240	1.005
4 2 2	255	
.884	0.251	
.005	.005	
.879	0.246	

2.009 0.562
0.562
2.571
1.447
$1.285 - 1.377 = -0.092 = c_2$
$0.723 - 0.732 = -0.009 = a$

Level 21st 10 Am
Ext. 87° - Int. 83 - f.6.

	East		West	
+	45.7	—	52.1	
+	44.3	—	57.5	
+	43.8	—	48.8	
	~~41.7~~	—	~~46.0~~	+
	38.1	—	46.0	+
	37.7	—	45.5	+
	37.4	—	45.0	+
	47.0		48.9	
	41.17		48.15	
	~~46.~~		41.17	
			2) 6.98	

$3.49 = +0.^{s}21$

June 23d Diaphragm adjusted before observing Polaris S.P.

1856 June 23/24th   2d. West   Ext Ther. 71.0

9. P.M.

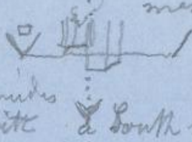
Level

E	W
× 57.2	58.9
× 57.1	58.6
× 56.8	58.6
54.7	60.0 ×
54.4	59.8 ×
54.0	59.6 ×
34.2	55.5
55.70	59.25
	55.70
	2/3.55
	1.77 = +0.11

$b = +0^s.11$

June $\frac{24}{25}$ Ill. West

Chimneys on south ⋮ the new building in Brookline meridian



The eastern chimneys viz. two separate buildings

coincides with ⋮ & South mark precisely

Marks seen Perfectly distinct W C B

Ex Th 68 ~~64~~ 63 W B

South	North	Zero
0.910	.255	0.990
.890	.248	0.993
.913	.245	1.000
2.713	148	
0.904	0.249	

2.065 0.569

0.569

2.634

1.496

$1.317 - 1.377 = -0.060 = c_2$

$0.748 - 0.732 = +0.016 = a$

Level. object South J. F.

	East		West	
+	59.1	—	60.8	
+	58.7	—	60.8	
+	58.7	—	60.0	
	58.1	—	60.7	+
	57.4	—	60.9	+
	57.0	—	61.0	+
	291.0		4.2	
	58.17		60.70	
			58.17	
			2) 2.53	
			~~1.76~~	
			1.26 = +0.08	

$a = +0^{s}.016$

$b = +0.08$

$c_2 = -0.060$

The "Dot" for the meridian mark on these chimneys may be four inches in diameter

June 27th

Diaphragm removed & a new set of wires substituted

1856. July 1st The Diaphragm of the Transit circle restored, after having four new wires adapted to it by Mr J. H. Temple —

approximate adjustment by South mark and side of the chimney. Zero of mic wire 100 = 0.000

Measures of central group of wires, by Micrometer.

A to B

A – B			B. C		C D		E
~~.988~~	n	r					
.917.083	2.483	1.566	2.566	4.000	1.000	5.570	7.063
.912.088	2.492	1.580	575	3.976	980	550	070
.910.090	2.500	1.590	.495	4.005	992	525	078
		236	76				
		1.574	2.525				

a	b	c	d	e
0.913 —	2.485 —	4.002 —	5.520 —	7.065
	1.572	1.517	1.518	1.545

Intervals   Illumination west –

July – a 0.932 .068 + 1.490 = 1.558   a: 0.000 – $\overset{r}{1}$.565 ε = $\overset{s}{3}$.58385

b – .558 – .442 + 0.992 = 1.434   b: 0.000 – 1.575   3.46935 – 0.11450

c – 434 – .566 + 1.525   c: 0.000 – 1.535   3.57515 + 04580

d: 0.000 – 1.546   3.55034 + 03589

July 1st 1856

1st Transit taken with new set of wires was β Leonis July 1st

1856 July 2/3) Ill. West
fine seeing

Ther. 64.7° Int 67]
object South.
J.F.F.

S	W.C.B. N	Zero
0.945	0.222	0.000
.951	.230	.000
.940	.230	.005
136	82	
.945	0.227	

Level

	E		W	
+	52.0	—	57.8	
+	57.7	—	57.5	
+	52.2	—	57.2	
	52.8	—	56.1	+
	52.7	—	56.0	+
	57.8	—	56.5	+
	132		1411	
	52.2		56.85	
			52.20	
			4.65	
			2.32 = +.14	

a_2 +0.088
b_2 +0.140
c_2 − ~~0.051~~ .078

2.159
579
~~1.419~~ 1.417 0.078
2.678 − 1.~~834~~ − 1.390 = − ~~0.051~~ = c_2
1.640 − 0.820 − 0.732 = +0.088 = a

New values of C_1 & C_2 assuming ~~that there is no reduction (mid-mean fixing) will be~~
For Reduction (mid-mean) Ill E = +0.027 ville Transit book Dec 1856

Ill E

$A_1 = -0.732$
−1.363
$C_1 = -$~~1.390~~

Ill W

$A_2 =$ ~~−~~ $0^s.732$
− 1.417
$C_2 =$ ~~−1.390~~

Illumination West

South	North	Zero
0.920	0.237	.000
.935	0.200	.005
920	0.225	.000
275	62	
0.925	0.221	.002
0.923	0.219	

2.109 0.501
0.501
2.610
1.608
1.417 0.112
1.305 − ~~1.390~~ = − ~~0.085~~ = c_2
0.804 − 0.732 = +0.072 = a

Reversed to Illumination East

1855phae.proj.r.1108

July 3° - Illumination East
south steady north obscure

South North Zero

.975 1.025 .718 = .282 .005
.962 .038 .730 .270 .007
.960 .040 .740 .260 0022

.897 103 188 212 .034
.966 1.034 .729 .271 .011
.011 .011

1.045 0.282
2.387 0.645
0.645 ~~1.390~~ 1.363 0.153
3.032 1.516 − ~~1.390~~ = +~~0.126~~ = c_1
1.742 .871 − 0.732 = +0.139 = a

July 4/5. found Four of the wires crooked, loose -

unsteady Readjusted - Illumination East.
South North - Zero.
1.020 .640 .000
1.010 .657 .000
0.995 adjusted

0.980 1.020 .720 - 280 .000
978 1.022 .690 - 310 995 - 0.005
1.000 1.000 .700 300 993 - 0.007

July 5th Coll altered

Wires refastened with lacquer
But distances wire not altered
unless unintentionally

S N Zero
0.980 720 .000
.978 690 − .005
1.000 .700 − .007
2.958 10 12
.986 .703 .004
1.010 .298

2.308 0.670
0.670
2.978
1.638 1.363 = +0.126
1.489 − ~~1.392~~ = +~~0.099~~ = c_1
0.819 − 0.732 = +0.087 = a

1856 July 6/7th Ill. East
Ext. Th. 64°.0

Level g. Fr. Fr.

	E	W	
×	53.9	64.2	
×	53.4	64.5	
×	53.1	64.4	
	56.7	60.5	×
	56.4	60.3	×
	56.2	60.4	×
	29.7	14.3	
	54.95	62.38	
		54.95	

2) 7.43
s
3.71 = + 0.24

From comparisons on 1st page of Mark Book for Dec 1855 no change could have taken place in the South mark on Mr Dixwell's estate —

July 9/10 – 6,,30 Am – Mr Dixwell has restored the braces of the Southern mark, very good, mer. marks, steady & clear — but alas, the wires are loose again, old ones crooked

South		North	Zero
1.110 –	890	722	0.000
110	890	725	0.001
113	887	720	.000
0.060	.941	0.722	000
082	.918	0.000	000
082	.918	0.278	000
	.5		
	0.901		

s
a −0.020
b +0.24
c −0.026

n 0.635
s 2.058
2.693
1.423
1.347 − 1.363 = − 0.026
0.712 − 0.732 = − 0.020

n 1.650
s 2.058
3.708
0.408
1.854 – 1.363 =
0.204 – 0.732 =

Illumination East

July. 11th very quick and clear. WCB.

South North Zero - Level

0.002 — 720 .944
000 ~ 692 .950
003 ~ 705 .947 —
5 2117 141
002 706 947
998 .294 .013
13 013
0.985 .281
2.250 .642
642
2.892
1.608 1.363 −0.083
1.446 = ~~1.358~~ = − ~~0.056~~ c,
804 = 0.732 = − 0.072 a,
+ 0.240 b

South North
Mean 0.002 0.706
Zero 947 947
0.944 0.241
2.157 0.550
0.550
2.707
1.607
1.353 − 1.363 = −0.010 = c,
0.804 − 0.732 = +0.072 = a

July 15/16 unsteady, very

South ~~North~~ Zero North
0.943 957 0. .585?
.943 945 650
.930 947 700
116 149 .740
.939 974 2090 0.697
zero .949 .026 697 949
1.010 949 .303 0.252
3 2.308
m 0.576
2.884
1.732
1.442 − 1.363 = + 0.079
0.866 − 0.732 = + 0.134

a + 0.134
b + 0.28
c + 0.079

Level
Ex Ther 84.
E W
+ 42.0 − 58.4
+ 41.7 − 58.3
+ 41.3 − 57.4
48.1 − 50.2 +
48.2 − 50.0 +
47.8 − 50.0 +
291 243
44.85 54.05
44.85
2) 9.20
4.60 = + .28

1856 July 17th Th East 8 AM.

PN East W. C. B. Obs.

South	Zero	North
940	000	722
930	000	730
945	− 998	725
957	000	745
950	− 995	725
2222		157
0.944	0.998	.731
0.998		998
1.054		0.267

S 2.108 0.610

n 0.610

2.918

1.798

+0.146

1.509 − 1.363 = + 0.146 c

0.899 − 0.732 = + 0.167 a

1856 July 30/31st

10h A.M. Ther 80

Level D. F. F.

$b = +0^s.31$

	E	W	
×	40.6	55.6	
×	40.7	55.3	
×	40.8	55.0	×
	44.5	50.7	×
	44.1	50.7	×
	47.7	50.6	×
	184	179	
	43.07	52.98	

43.07

2)9.91

4.95 = +.31

Augt. 1 Illumination East

wet bulb 72

Ther 78.

M C B South	North	Zero
940-1.	740.	.993
945.	730	.995
960	.723	.992
145	93	10
948	731	.993
7	7	
.941	.724	

0.948
993
1.045
2.388

0.731
0.993
0.262
0.599

2.150
1.654
3.804
0.496
1.902
.796

~~-1.390~~ 1.363 ~~-0.512~~ bc
~~-0.732~~ -0.064 ac

a_1 ~~-0.403~~
b_1 ~~+0.290~~
c_1 ~~+0.512~~

Level

	E	W	Ill.
+	37.4	53.0	
+	37.4	53.0	
+	38.4	52.1	
	42.6	47.2	+
	41.8	47.9	+
	41.1	48.6	+

238.7 1.8
39.78 50.30
39.78
10.52
5.26 = +.29

Ill. E
a +0.162
b +0.27
c +0.13

Instrument reversed

n 0.599
s 2.388
2.987
1.789

a +0.162
b +0.27
c +0.131

1.494 - 1.363 = +0.131 = c
0.894 - 0.732 = +0.162 = a

2.150
1.654
3.804
0.496
1.902 - 1.390 + .512 c
1.435 - 0.732 - .403 ac
+ .290 b

August 1st 1856 Illumination West

Reversed. W. C. B. Obs. Ther. 77°.7

Level J.L.

South	North	Zero
	175	988
	160	988
	160	993
	165	
Zero	010	
	0.175	

South

mark not visible

E	W
+37.6	− 57.3
+37.7	− 57.4
+38.1	− 50.4
43.6	− 45.5 +
42.2	− 46.2 +
41.2	− 47.0 +
0.4	29 18
40.07	48.63
	40.07
	8.56
	4.28 = 4.249

N mark Ill E ~~$1^s.647$~~ $0^s.599$ $0^r.175 = 0^s.399$

" . W ~~0.399~~ 0.399

2) 1.248 2) 0.100

0.624 0.050

	Ill E	Ill W
	0.050	0.050
Inst coll	+ ~~0.624~~	− ~~0.624~~
Diur. ab	− .015	− .015
cor (mid − mean)	+ .027	− .027
	c_1 = + ~~0.636~~ ,	c_2 = − ~~0.668~~
	+ 0.062	− 0.092

Ill W

a +0.16

b +0.27

c −0.16

August 7th Illumination West.

South	W.C.B. North	Zero	Clear and steady
			~~mean~~
.937	172	−0.017	~~0.983~~
.935	172	+0.006	~~1.006~~
.945	180	−0.004	~~.996~~
117	224	15	
939	.175	+ .005	
5	5		
.944	.180		
2.157			
.411			
2.568			
1.646			

1.417 −.133

1.284 = −~~1.390~~ = −~~0.116~~ = c_2

.823 = −0.732 = +0.091 = a_2

~~a_2 +0.091~~

~~b_2 +0.249~~

~~c_2 −0.116 .133~~

a $+0^s.091$

b - - - -

c −0.133

Aug 16th PM — West — Level — Ther 72

South	North	Zero	reads?
.942	.173	+0.008	.1.008
.930	.178	+ .012	.012
.937	.170	+.010	.010
10 9	11	30	
.936	.174	+ .010	
0.10	010		
0.946	.184		
2,162			
.420			
2.588			
1.742			

	East		West	
+	48.8	—	61.5	
+	49.1	—	61.2	
+	48.5	—	61.3	
	57.4	—	57.8	+
	57.7	—	57.1	+
	51.0	—	57.5	+
	0 5		356 4	
	50.1		59.4	
			50.1	
			9 3	
			4.65 = +0.294	

1.417 .126

1.291 = −1.~~3~~90 = −.~~099~~

0.871 = −0.732 = + .139

+ .264

a_2 + 0.099

b_2 + .244.

c_2 — .139

a +0.14

b +0.29

c −0.13

1.291 − 1.390 = −0.099 = a_2

0.871 − 0.732 = +0.139 = c_2

Augt 28th. PM — 3hm Th. 75.

	South	North —	Zero — Perfectly quiet and clear
	.895 + .020	.216 + .020	.980
	.890 + 017	.212 + .010	.983
	.905 + .010	.208 — .010	.990
	0.897	0.212	0.984
Zero	0.984	~~0.984~~	
	0.913	0.228	
	2.086	0.520	
	0.520		
	2.606		
	1.566		

a +0.05

b -----

c −0.11

1.303 − 1.417 = −0.114 = c

0.783 − 0.732 = +0.051 = a

1856

West

Sept. 8th. 3½ P.M.

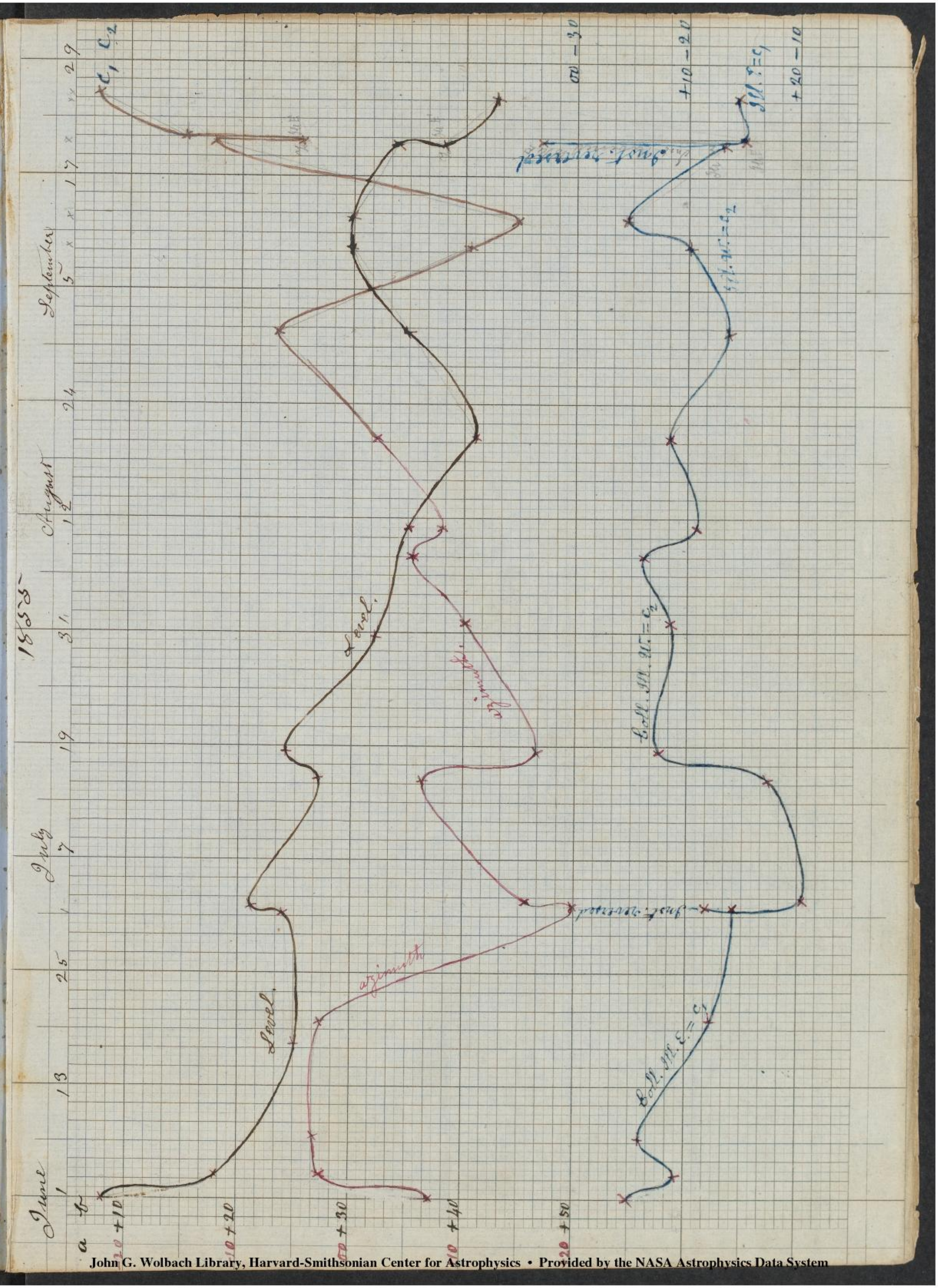
South add   north sub.

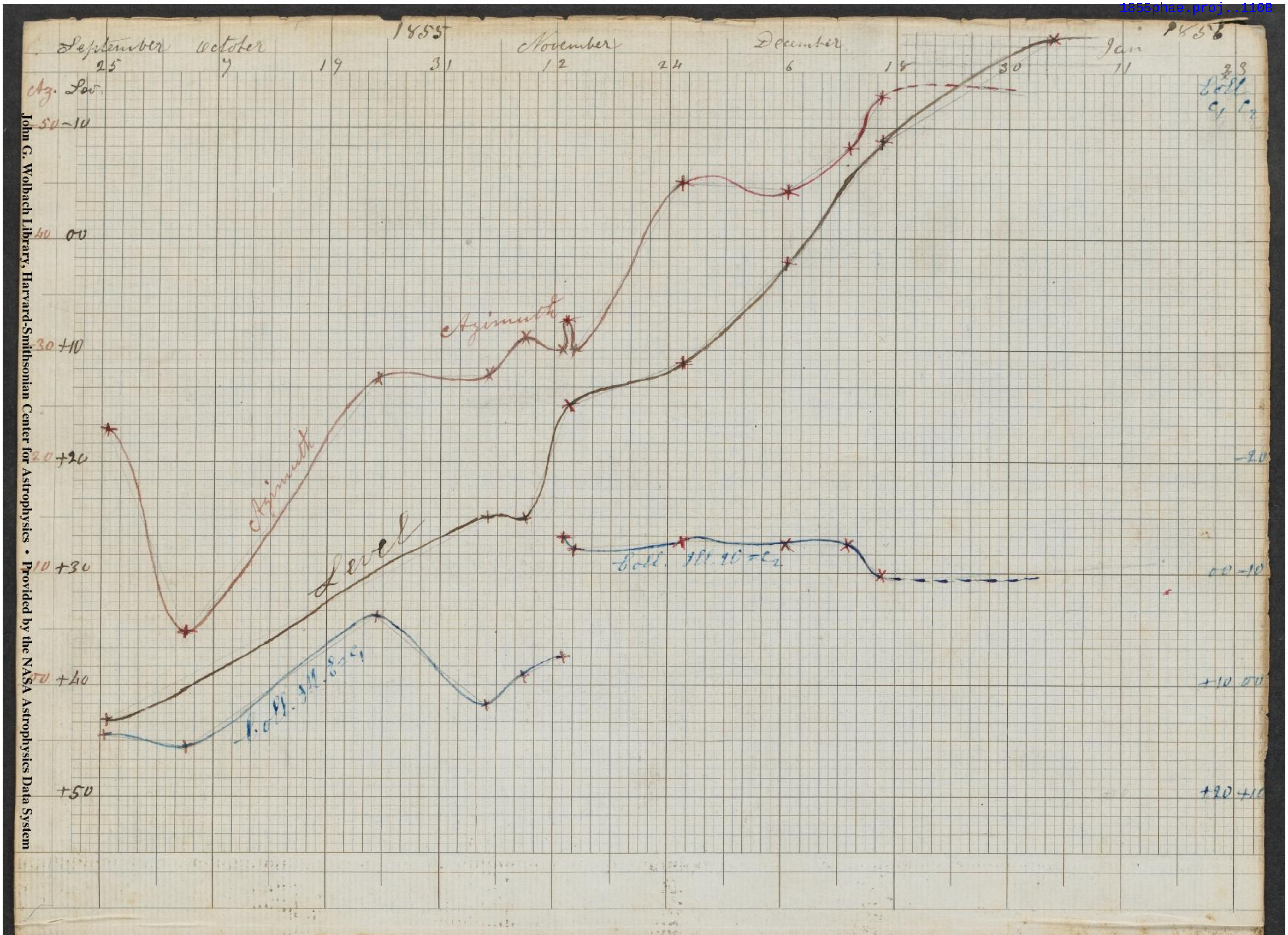
South	Zero	reads?	North	Zero	reads?	North	South
900	+.001	-990	.215	-.013	487	.200	.900
905	.010	-990	.215	.010	990	.215	
900	.010 21	-990	.200	-.010	990	.215	
.902	0.007	990	0.210	0.011		0.210	
~~490~~	0.011	490	~~-990~~				
0.917		490	0.220				
			0.503				

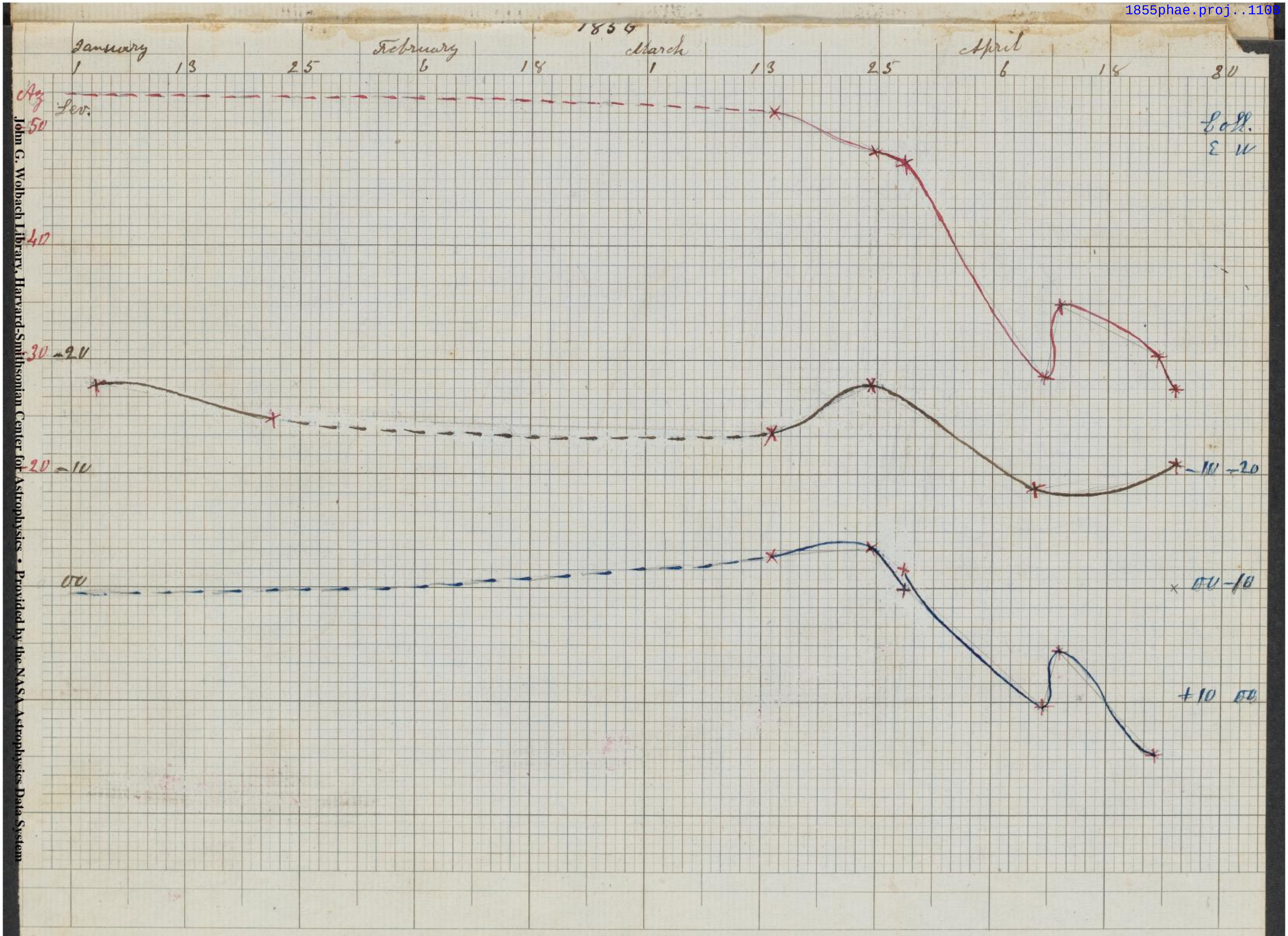
~~2.077~~ 2.084
2.55 0.503
2.587
2.532 1.581
1.622

~~1.266 - 1.390 = - .124 c₂~~
~~.841 - 0.732 = + .079 a₂~~
1.294 - 1.417 = -0.123
0.790 - 0.732 = +0.058

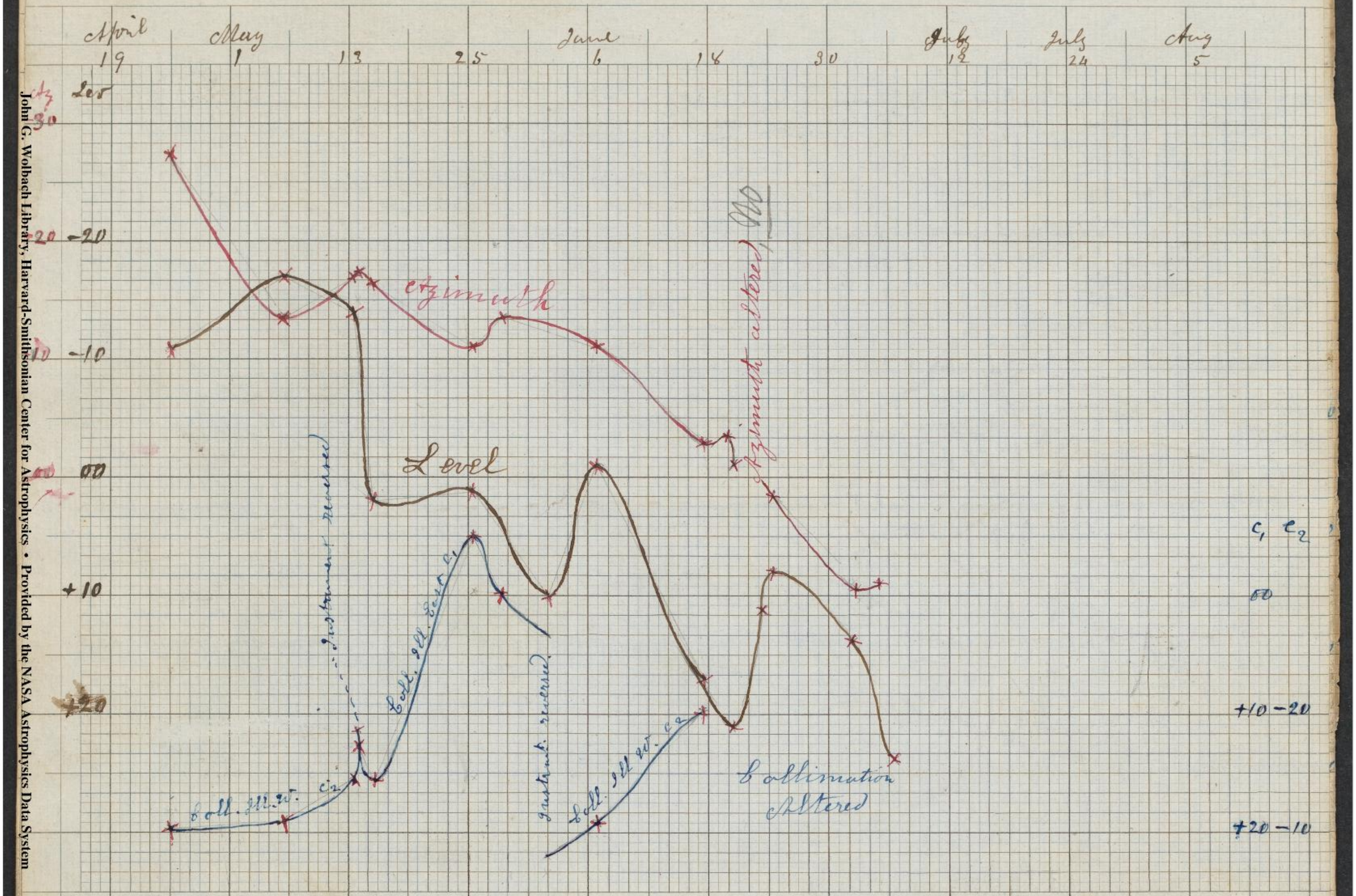
a_2 ~~+ .079~~ a +0.058
b_2 ~~+ .294~~ b ----
c_2 ~~- .124~~ c -0.123


1855
June
1
13
25
July
7
19
31
August
12
24
September
5
17
29
a
b
+10
+20
+30
+40
+50
c1 c2
ao −30
+10 −20
+20 −10
Level.
azimuth
Level.
azimuth.
Inst. reversed
Inst. reversed
Coll. M.E. = c1
Coll. M.W. = c2
M.W. = c2
M.E. = c1


September
October
1855
November
December
Jan
1856
25
7
19
31
12
24
6
18
30
11
23
Az. Lev.
50 -10
40 00
30 +10
20 +20
10 +30
00 +40
+50
Coll.
c1 c2
-20
00 -10
+10 00
+20 +10
Azimuth
Azimuth
Level
Coll. M. 8 = c1
Coll. M. 10 = c2


1856
January
February
March
April
1
13
25
6
18
1
13
25
6
18
30
Az
Lev.
-50
40
-30 -20
-20 -10
00
Coll.
Σ W
-10 -20
00 -10
+10 00

1856


April 19
May 1
13
25
June 6
18
30
July 12
July 24
Aug 5
Az
Lev
-30
-20 -20
-10 -10
00 00
+10
+20
c₁ c₂
00
+10 -20
+20 -10
Azimuth
Level
Azimuth altered, W
Instrument reversed
Instrument reversed
Coll. W. W. c₂
Coll. W. East c₁
Coll. W. W. c₂
Collimation Altered

Observed Values of Az. Level & Coll. Errors.

	Date		Ill.	az. (a)	Level (b)	Collimation	
						Ill. E (c₁)	Ill. W. (c₂)
				s	s	s	s
1855	May 2	5h P.M	West		− 0.12		
	" 3	6h "	"	−0.331			−0.062
	" 4/5		"	−0.272	− 0.09		−0.072
	" 10	5 P.M	"	−0.297	− 0.04		−0.081
	" 10	" "	East	−0.328	− 0.01	+0.022	
	" 16/17	9 A.M	"	−0.074	+ 0.03	+0.047	
	" 19	6 P.M	"	−0.105	+ 0.03	−0.029	
	" 20/21		"	−0.140	+ 0.11	+0.053	
	June 1		"	+0.072	+ 0.08	+0.050	
	" 3/4	9 A.M	"	−0.027	+ 0.18	+0.092	
	" 7/8	10½ "	"	−0.032		+0.059	
	" 17/18	11 "	"		+ 0.25		
	" 20	5 P.M	"	−0.027	~~+0.12~~	+0.123	
	July 1/2	10 A.M	"		+ 0.24		
	" 2	2 P.M.	West		+ 0.21		
	" 2	5 P.M	"	+0.198		+0.148	−0.187
	" 2/3		"	+0.157			−0.095
	" 15/16	9 A.M.	"	+0.063	+0.27		−0.127
	" 18/19		"	+0.166	+0.24		−0.226
	" 30/31	9 A.M.	"		+0.32		
	Aug. 1	6 P.M.	"	+0.100			−0.216
	" 8	6 P.M.	"	+0.051			−0.240
	" 11	6 P.M.	"	+0.079	+0.35		−0.191
	" 20/21	A.M	"	+0.022	+0.41		−0.217
	" 31/32	8 A.M	"	−0.066	+0.35		−0.163
	Sept. 9/10	9 "	"	+0.101	+0.30		−0.199
	" 12/13		"	+0.148	+0.30		−0.254
	" 20/21	8 A.M.	"	−0.122	+0.34		−0.167
	" "	10 "	East	−0.046	+0.38	−0.030	
	" 21	3 P.M.	"	−0.145		+0.149	
	" 25/26		"	−0.232	+0.43	+0.144	
	Oct 4	2 P.M.	"	−0.047		+0.157	
	" 24/25		"	−0.275		+0.037	
	Nov. 5	noon	"	−0.277	+0.25	+0.117	
	" 9		"	−0.311	+0.25	+0.091	
	" 13	5 P.M.	"	−0.299		+0.075	
	" "	"	West	−0.325		[illegible]	−0.133

Interpolated Values of Az. Level & Coll. Errors.

Date 1855	Ill.	az (a)	Lev. (b)	Collim. Ill. E. (c_1)	Ill. W. (c_2)	Date 1855	Ill.	az. (a)	Lev. (b)	Collim. Ill. E. (c_1)	Ill. W. (c_2)
		s	s	s	s			s	s	s	s
May 2	West	−0.33	−0.12		−0.06	July 1/2	East	+0.20	+0.24	+0.14	
" 3	"	−0.33	−0.11		−0.07	" 2/3	West	+0.16	+0.21		−0.09
" 3/4	"	−0.32	−0.10		−0.07	" 3/4	"	+0.14	+0.21		−0.09
" 5/6	"	−0.27	−0.07		−0.08	" 4	"	+0.14	+0.22		0.09
" 7	"	−0.28	−0.06		−0.08	" 5	"	+0.13	+0.22		−0.09
" 9/10	"	−0.29	−0.05		−0.08	" 9	"	+0.10	+0.25		−0.10
" 10	"	−0.30	−0.04		−0.08	" 13/14	"	+0.07	+0.27		−0.12
" 10	East	−0.33	−0.01	+0.02		" 15/16	"	+0.06	+0.27		−0.13
" 11	"	−0.32	0.00	+0.03		" 16/17	"	+0.08	+0.26		−0.15
" 12	"	−0.30	+0.01	+0.03		" 17	"	+0.12	+0.25		−0.18
" 14	"	−0.11	+0.02	+0.04		" 18/19	"	+0.17	+0.24		−0.23
" 15	"	−0.09	+0.03	+.05		" 24/25	"	+0.14	+0.28		−0.22
" 17	"	−0.07	+0.03	+0.04		" 25	"	+0.14	+0.28		−0.22
" 17/18	"	−0.08	+0.03	+0.03		" 30	"	+0.11	+0.32		−0.21
" 22	"	−0.13	+0.11	+0.06		" 31	"	+0.11	+0.32		−0.21
" 23	"	−0.11	+0.11	+0.06		" 31/32	"	+0.10	+0.32		−0.21
" 25/26	"	−0.04	+0.10	+0.05		Aug. 1	"	+0.10	+0.33		−0.22
" 28	"	+0.03	+0.08	+0.05		" 2	"	+0.10	+0.33		−0.22
" 28/29	"	+0.04	+0.08	+0.05		" 2/3	"	+0.09	+0.33		−0.22
" 29	"	+0.05	+0.08	+0.05		" 3/4	"	+0.09	+0.33		−0.23
" 30	"	+0.06	+0.08	+0.05		" 5/6	"	+0.06	+0.34		−0.23
" 31	"	+0.07	+0.08	+0.05		" 6	"	+0.06	+0.34		−0.24
June 2	"	+0.06	+0.13	+0.06		" 6/7	"	+0.06	+0.34		−0.24
" 4	"	−0.03	+0.18	+0.09		" 7/8	"	+0.05	+0.34		−0.24
" 4/5	"	−0.03	+0.19	+0.09		" 9	"	+0.06	+0.34		−0.23
" 5	"	−0.03	+0.19	+0.08		" 9/10	"	+0.07	+0.34		−0.21
" 8	"	−0.03	+0.22	+0.06		" 10/11	"	+0.08	+0.35		−0.20
" 9	"	−0.03	+0.22	+0.06		" 12/13	"	+0.08	+0.36		−0.19
" 11	"	−0.03	+0.23	+0.07		" 13	"	+0.07	+0.36		−0.19
" 12	"	−0.03	+0.23	+0.08		" 13/14	"	+0.07	+0.36		−0.19
" 15	"	−0.03	+0.25	+0.10		" 14	"	+0.07	+0.37		−0.19
" 15/16	"	−0.03	+0.25	+0.10		" 14/15	"	+0.06	+0.37		−0.19
" 17/18	"	−0.03	+0.25	+0.11		" 15	"	+0.06	+0.37		−0.20
" 18	"	−0.03	+0.25	+0.11		" 17/18	"	+0.04	+0.39		−0.20
" 20/21	"	−0.02	+0.25	+0.12		" 18	"	+0.04	+0.39		−0.21
" 21/22	"	−0.01	+0.25	+0.13		" 19	"	+0.03	+0.40		−0.21
" 27	"	+0.12	+0.25	+0.14		" 19/20	"	+0.03	+0.40		−0.21

Observed Values of Az. Level & Coll. Errors.

	Date 1855		Ill.	Az.(a)	Level(b)	Collim. Ill.E.(c_1)	Ill.W.(c_2)
1855	Nov 13/14	$11\frac{1}{2}^{h}$ A.M.	West	~~−0.249~~	+0.15		~~−0.123~~
	" 14		"	−0.249			−0.123
	" "		East	−0.269		+0.120	
	" "		"	−0.316		+0.134	
	" "		West	−0.286		~~−0.11~~	−0.115
	" "		"	−0.299			−0.121
	" 25/26		"	−0.450	+0.11	1	−0.130
	Dec. 6/7		"	−0.446	+0.02		−0.124
	" 13	3^{h} P.M.	"	−0.483			−0.127
	" 16/17	11^{h} A.M.	"	−0.528	−0.09		−0.098
1856							
	Jan. 3/4		"		−0.18		
	" 22		"		−0.15		
	Mar. 14	3 P.M.	"	−0.518	−0.14		−0.132
	" 24/25		"	−0.484	−0.18		−0.135
	" 28	3 P.M.	"	−0.471	~~+0~~		−0.102
	" "	"	East	−0.488		−0.015	
	Apr. 10/11	10^{h} A.M.	"		−0.09		
	" 11/12	8^{h} A.M.	"	−0.286		+0.103	
	" 13	5 P.M.	"	−0.350		+0.054	
	" 23		"	−0.305		+0.146	
	" 25		West	−0.274	−0.11		−0.103
	May 6/7		"	−0.136	−0.17		−0.109
	" 13/14		"	−0.168	−0.14		−0.148
	" 14		"	−0.149			−0.189
	" "		East	−0.200	~~+0.~~	+0.126	
	" 15/16		"	−0.164	+0.02	+0.153	
	" 25/26		"	−0.110	+0.01	−0.052	
	" 28/29		"	−0.135		−0.004	
	June 2		"		+0.10		
	" 7		West	−0.111	−0.01	~~+0.111~~	−0.111
	" 17/18		"	−0.032	+0.17	~~−0.204~~	−0.204

Collimation Altered

	" ~~19/20~~ 20th	4½ P.M.	West	−0.036			−0.069
	" 20/21			−0.009	+0.21		−0.092

Interpolated Values of Az. Level & Coll. Errors.

Date 1855	Ill.	Az. (a)	Lev. (b)	Coll. Ill. E (c_1)	Coll. Ill. W (c_2)	Date 1855	Ill.	Az. (a)	Lev. (b)	Coll. Ill. E (c_1)	Coll. Ill. W (c_2)
		s	s	s	s			s	s	s	s
Aug. 21	West	+0.02	+0.41		−0.22	Sept. 26	East	−0.23	+0.43	+0.14	
〃 23/24	〃	±0.02	+0.40		−0.21	〃 27/28	〃	−0.21	+0.43	+0.15	
〃 24	〃	−0.01	+0.40		−0.20	〃 28/29	〃	−0.19	+0.43	+0.15	
〃 27/28	〃	−0.04	+0.38		−0.18	Oct. 4/5	〃	−0.05	+0.40	+0.15	
〃 28	〃	−0.04	+0.38		−0.18	〃 7/8	〃	−0.07	+0.39	+0.14	
〃 28/29	〃	−0.05	+0.37		−0.17	〃 8/9	〃	−0.09	+0.38	+0.14	
〃 29/30	〃	−0.06	+0.37		−0.17	〃 9/10	〃	−0.10	+0.38	+0.13	
〃 30/31	〃	−0.06	+0.36		−0.16	〃 10/11	〃	−0.10	+0.37	+0.12	
Sept. 2/3	〃	−0.04	+0.33		−0.16	〃 14/15	〃	−0.16	+0.35	+0.10	
〃 3/4	〃	−0.02	+0.33		−0.17	〃 15	〃	−0.16	+0.35	+0.09	
〃 4	〃	−0.01	+0.32		−0.17	〃 17	〃	−0.19	+0.34	+0.08	
〃 4/5	〃	0.00	+0.32		−0.17	〃 18	〃	−0.20	+0.33	+0.07	
〃 5/6	〃	+0.03	+0.31		−0.18	〃 25	〃	−0.28	+0.29	+0.04	
〃 6/7	〃	+0.05	+0.31		−0.18	〃 25/26	〃	−0.28	+0.29	+0.04	
〃 7/8	〃	+0.07	+0.30		−0.19	〃 26	〃	−0.28	+0.29	+0.04	
〃 9/10	〃	+0.10	+0.30		−0.20	〃 26/27	〃	−0.28	+0.29	+0.05	
〃 10/11	〃	+0.13	+0.30		−0.21	〃 28/29	〃	−0.28	+0.28	+0.06	
						〃 30	〃	−0.28	+0.27	+0.08	
						〃 30/31	〃	−0.27	+0.27	+0.09	
						Nov. 2/3	〃	−0.27	+0.26	+0.11	
						〃 8	〃	−0.30	+0.25	+0.10	
Sept. 11	West	+0.14	+0.30		−0.24	〃 8/9	〃	−0.31	+0.25	+0.09	
12	〃	+0.15	+0.30		−0.26	〃 9	〃	−0.31	+0.25	+0.09	
13	〃	+0.13	+0.30		−0.25	〃 9/10	〃	−0.31	+0.25	+0.09	
14	〃	+0.09	+0.31		−0.24	〃 13		−0.32	+0.16	+0.08	−0.13
15	〃	+0.05	+0.32		−0.23	〃 13/14		−0.31	+0.15		−0.13
16	〃	+0.02	+0.33		−0.22	〃 14		−0.30	+0.15		−0.12
17	〃	−0.02	+0.33		−0.20	〃 14/15		−0.30	+0.14		−0.12
18	〃	−0.05	+0.33		−0.19	〃 18/19		−0.35	+0.13		−0.12
19	〃	−0.08	+0.33		−0.18	〃 19		−0.36	+0.13		−0.12
20	〃	−0.12	+0.34		−0.17	〃 19/20		−0.37	+0.13		−0.12
21	East	−0.14 − ~~.10~~	+0.35	+0.15		〃 20		−0.37	+0.13		−0.12
22	〃	−0.18 ~~.11~~	+0.37	+0.15		〃 21/22		−0.40	+0.13		−0.12
23	〃	−0.20 ~~.12~~	+0.39	+0.15		〃 24		−0.44	+0.12		−0.13
24	〃	−0.22 ~~.13~~	+0.41	+0.15		〃 25/26		−0.45	+0.11		−0.13
25	〃	−0.23 ~~.13~~	+0.43	+0.14		〃 26/27		−0.45	+0.11		−0.13

Observed Values of Az. Level & Coll. Err.

Date	Ill.	Az.(a)	Level(b)	Coll. Ill. E(c₁)	 Ill. W.(c₂)
Azi. & Collimation Altered		s			s
1856 June 23/24	West		$+0^{s}.11$		
" 24/25	"	±0.016	+0.08		−0.060
New wires inserted – Collimation Altered.					
July 2/3	West	+0.088	+0.14		−0.051
" 3	"	+0.072			−0.085
" "	East	+0.139		+0.126	
Collimation Altered					
July 5	East	+0.087		+0.099	
" 6/7 9h A.M.	"		+0.24		

Interpolated Values of Az. Level & Coll. Err.

Date	Ill.	Az.(a)	Lev.(b)	Coll. Ill.E(c_1)	Coll. Ill.W(c_2)
1855					
Nov. 29/30	west	-0.45	+0.09		-0.13
" 30	"	-0.45	+0.08		-0.13
" 30/31	"	-0.45	+0.08		-0.13
Dec. 2/3	"	-0.44	+0.06		-0.13
" 3/4	"	-0.44	+0.05		-0.13
" 4/5	"	-0.44	+0.05		-0.13
" 5/6	"	-0.44	+0.04		-0.13
" 6	"	-0.44	+0.03		-0.13
" 6/7	"	-0.44	+0.02		-0.13
" 7/8	"	-0.45	+0.01		-0.13
" 11	"	-0.47	-0.03		-0.13
" 11/12	"	-0.47	-0.04		-0.13
" 13/14	"	-0.49	-0.06		-0.12
" 14	"	-0.49	-0.06		-0.12
" 17	"	-0.53	-0.09		-0.10
" 17/18	"	-0.53	-0.10		-0.10
" 19	"	-0.54	-0.11		-0.09
" 19/20	"	-0.54	-0.11		-0.09
" 30/31	"	-0.53	-0.18		-0.10
1856					
Jan. 3/4	"	-0.53	-0.18		-0.09
" 7/8	"	-0.53	-0.18		-0.09
" 17/18	"	-0.53	-0.15		-0.10
Mar. 10	"	-0.52	-0.13		-0.12
" 11	"	-0.52	-0.13		-0.12
" 12	"	-0.52	-0.13		-0.13
" 14	"	-0.52	-0.14		-0.13
" 15	"	-0.52	-0.14		-0.13
" 16/17	"	-0.51	-0.14		-0.13
" 25	"	-0.48	-0.18		-0.13
" 25/26	"	-0.48	-0.17		-0.13
" 27	"	-0.48	-0.17		-0.11
" 29	East	-0.46	-0.16	-0.01	
" 30/31	"	-0.44	-0.15 ~~-0.14~~	+0.02	
Apr. 1	"	-0.42	-0.12 -0.14	+0.03	

Date	Ill.	Az.(a)	Lev.(b)	Coll. Ill.E(c_1)	Coll. Ill.W(c_2)
1856					
Apr. 2	East	-0.40	-0.13	+0.04	
" 5	"	-0.35	-0.12	+0.06	
" 7	"	-0.33	-0.10	+0.08	
" 8	"	-0.32	-0.10	+0.09	
" 9	"	-0.30	-0.09	+0.10	
" 10	"	-0.29	-0.09	+0.10	
" 11	"	-0.29	-0.09	+0.10	
" 13	"	-0.35	-0.08	+0.05	
" 17/18	"	-0.34	-0.08	+0.10	
" 25	E. & W.	-0.27	-0.11	+0.15	-.10
" 26	West	-0.25	-0.11		-0.10
" 27/28	"	-0.23	-0.12		-0.10
" 29	"	-0.21	-0.13		-0.10
May 1	"	-0.18	-0.14		-0.10
" 5/6	"	-0.14	-0.17		-0.11
" 6	"	-0.13	-0.17		-0.11
" 12	"	-0.16	-0.15		-0.13
" 14	W. & E.	-0.17	-0.11	+0.13	-0.17
" 15	East	-0.17	0.00	+0.15	
" 16	"	-0.16	+0.02	+0.15	
" 20/21	"	-0.13	+0.02	+0.06	
" 21	"	-0.13	+0.02	+0.04	
" 22	"	-0.12	+0.01	+0.02	
" 26/27	"	-0.11	+0.02	-0.04	
" 29	"	-0.13	+0.05	+0.01	
" 29/30	"	-0.13	+0.06	+0.01	
" 30	"	-0.13	+0.07	+0.02	
" 31	"	-0.13	+0.09	+0.02	
June 1/2	"	-0.13	+0.10	+0.03	
" 2	West	-0.13	+0.10		-0.08
" 3	"	-0.13	+0.10		-0.08
" 9	"	-0.10	+0.01		-0.12
" 11	"	-0.08	+0.05		-0.14
" 11/12	"	-0.08	+0.06		-0.15
" 12	"	-0.07	+0.07		-0.16
" 15	"	-0.04	+0.14		-0.19
" ~~15/16~~					

Observed Values of Az. Level & Coll. Err.

Date	Ill	Az. (a)	Level (b)	Coll Ill. E. (c_1)	Ill. W. (c_2)

Interpolated Values of Az. Level & Coll. Errors.

Date	Ill.	Az. (a)	Level (b)	Coll. Ill. E. (c_1)	Coll. Ill. W. (c_2)	Date	Ill.	Az. (a)	Level (b)	Coll. Ill. E. (c_1)	Coll. Ill. W. (c_2)
1856											
June 15/16	West	−0.04	+0.15		−0.19						
" 16	"	−0.04	+0.15		−0.19						
" 16/17	"	−0.03	+0.16		−0.20						
" 17	"	−0.03	+0.17		−0.20						
" 20	"	−0.04	+0.21		−0.07						
" 21	"	±0.00	+0.20		−0.10						
" 21/22	"	0.00	+0.20		−0.10						
" 22/23	"	0.00	+0.15		−0.10						
" 23	"	0.00	+0.13		−0.06						
" 23/24	"	0.00	+0.11		−0.06						
" 24	"	+0.01	+0.08		−0.06						
July 1	"	+0.08	+0.13		−0.05						
" 1/2	"	+0.09	+0.13		−0.05						
" 2/3	"	+0.09	+0.14		−0.05						
" 3	"	+0.09	+0.15		−0.09						
" 3	East			+0.12							
" 4/5	"	+0.09	+0.19	+0.10							
" 5	"	+0.09	+0.20	+0.10							
"											