KG
11365
109

C. 2

North and South
Meridian marks.
July-1853 - and - to April 21, 1855
Level readings of
Transit Circle
New values of A & C Feb 10th 1854

KG 11365.109

New Values of A & C
Feb. 10th 1854
(From results of Chron. Expell)

June 1st - the last determination of the value of one revolution of the micrometer on the Transit Circle in AR = $2^s.285$ = $34''.275$
one division = $0''.343$.

Az. North mark = $0^s.33$.
Az. South mark = [illegible]

Az of N mark = ~~[illegible]~~ ~~[illegible]~~ $0^s.643$ from Chron. Ex.
" S " = ~~0.643~~ 2.107

Collimation changed March 2
1855 - Diaphragm removed

KG-11365,109

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1853

Ill. West   C.W.T.   Ext. Th. 81° Int. 80°

July 8th $5^h 30^m$ P.M.   Marks pretty distinct and steady. The branch of a tree similar to the one (perhaps the very one) which troubled us last year, conceals the dot when not swayed aside by the wind. Tel. points north

North	South	Zero
0^r286	0^r967	0^r060
280	950	058
281	965	061
271	957	058
280	958	055
398	297	292
0^r279t	0^r959t	.058t
.058	.058	

$0.221,t = 0^s.505$ $0.901t = 2^s.058$ s

0.505 n
$2.563 = s+n$
$1.553 = s-n$
$1.281 = \frac{s+n}{2}$
$.776 = \frac{s-n}{2}$

0.505 n 2.058 s

2.058 s
$2.563 = s+n$
$1.553 = s-n$
1.281 $\frac{s+n}{2}$
$.776$ $\frac{s-n}{2}$

col $= -1.384 + 1.281 = -0.103$
az $= -0.700 + 0.776 + 0.076$

col $= -1.350 + 1.281 = -0^s.069$
az $= -0.732 + 0.776 = +0^s.044$

Level

East	West
41.5	×45.0
42.9	×45.0
42.0	×44.8
×40.7	45.9
×41.0	46.1
×41.0	46.2
9.1	330
41.32t	45.30t
	41.32
	3.98
	1.99
	+0.12 lev error $= +0^s.12$

col, -0.103
az. $+0.076$
lev. $+0.120$

1853.

July - 25/26 Am. objects remarkably clear and steady
Wind 3 S.W, cum strat cloud. 10 -

NCB | Ext Ther. 74. Intl 75

South mark	North	Zero
0.972	0.254	
.980	.258	
.975	.262	
.975	.262	
.977	.264	
379	300	
0.976t	0.260t	
.058	.058	
0.918t = 2.s097	0.202t =	0.s462 n

sixth wire on the corner, left, of the sky light
mid wire to nearest side of chimney, just in contact –

.420
.423
.400

2.097 s
2.559 = s + n
1.635 = s - n
1.279 = $\frac{s+n}{2}$
.817 = $\frac{s-n}{2}$

s
2.097 s
0.459 m
2.556 = s+n
1.638 = s-m
1.278 = $\frac{s+m}{2}$
0.819 = $\frac{s-m}{2}$

s
0.459

col = -1.384 + 1.278 = -0.106
az = -0.700 + 0.819 = +0.119
col = -1.350 + 1.279 = - 0.s071
az = - 0.732 + 0.817 = + 0.s085

Aug 10/11 11h Am. Int. Th. + 82
Tel. points south

East	West
x 41.5	52.5
x 40.4	52.5
x 39.9	51.8
40.5	x 47.8
40.0	x 47.7
39.0	x 47.0
241.3	299 3
40 22t	49.88t
	40 22
	9.66
	4.83

lev. + 0.29
lev error = + 0.s29

Aug. 18/19 8^h A.M. Ill. West Ext. Th. 60° Int. Th. 64°

North mark pretty distinct, but unsteady — Branch of the tree in the way South mark very distinct but rather unsteady

C. W. T.

North	South	Zero
0^r240	0^r985	0^r060
253	990	060
245	987	060
235	975	065
230	981	070
203	418	315
0.240t	0.984t	0^r063t
.063	.063	

0.177t = 0^s.404 0.921t. = 2^s.104 s

~~0.406~~ ~~2.407~~ s.

0.406 n

0.404 n

2.513 = s+n 2.508 = s+n

1.701 = s−n 1.700 = s−n

1.256 = $\frac{s+n}{2}$ 1.254 = $\frac{s+n}{2}$

.850 = $\frac{s-n}{2}$ .850 = $\frac{s-n}{2}$

Tel. point south

East	West
51.5	× 59.8
51.0	× 60.0
51.0	× 60.5
× 51.7	60.0
−× 51.5	60.5
× 52.0	60.0
87	0.8
51.45t	60.13t
	51.45
	8.68
	4.34

lev. = + 0.28 lev error = +0°.28

col. = −1.384 + 1.256 = − 0.128

az = −0.700 + 0.850 = + 0.150

col = − 1.350 + 1.254 = − 0^s.096

az = − 0.732 + 0.850 = + 0^s.118

Aug 30th Found the Sun shining on Transit & piers—

Ill West

1853
Sept. 7/8 8^{h} A.M. C.W.T. solus Ext. Therm. +64° Int. Therm. 66°

North mark steady, but very much hidden by the branches of the tree, and often entirely so
South mark quite unsteady but very distinct
Wind N.N. East

Level Tel. points south

North	South	Zero	East	West
$0^{r}250$	$0^{r}970$	$0^{r}077$	×52.0	57.5
2[illegible]0	980	060	×51.4	58.5
259	978	063	+51.5	59.1
270	972	061	51.3	×59.1
265	983	062	51.9	×58.8
304	383	323	52.0	×59.0
$0^{r}261t$	$0^{r}977t$	$0^{r}064t$	101	352.0
065	$0^{r}065$		51.68t	58.67t

$0^{r}196t = 0^{s}.448$ $\quad 0^{r}.912t =$

$0^{s}.448$ m

$2^{s}.084$ s
0.448 m
2.532 = s+m
1.636 = s−m
$1.266 = \frac{s+m}{2}$
$.818 = \frac{s-m}{2}$

$2^{s}.084$ s
0.448 n
2.532 = s + n
1.636 = s − n
$1.266 = \frac{s+n}{2}$
$.818 = \frac{s-n}{2}$

58.67t
51.68
6.99
3.49
+0.22 lev error = $+0^{s}.22$

col = −1.384 + 1.266 = −0.118
az = −0.700 + 0.818 = +0.118

col = −1.350 + 1.266 = $-0^{s}.084$
az = −0.732 + 0.818 = $+0^{s}.086$

1858

Sept. 15/16 8^{h} A.M.

Ill. West

C.W.T.

South mark very unsteady and indistinct

North mark pretty steady but mostly hidden by tree-branches

Tel. points south

North	South	Zero	Level East	Level West
0^{r}290	0^{r}937	0^{r}070		
300	923	060	56.2	× 62.7
291	925	065	56.1	× 62.7
302	933	060	56.1	× 62.5
300	925	062	× 54.4	63.8
1483	143	317	× 54.7	63.2
0^{r}2966t	0^{r}9286t	0^{r}063t	× 54.5	63.2
063	063		320	181
			55.33t	63.02t

$0.2336t = 0^{s}.534$ $0.8656t = 1^{s}.976$ s

0.534 m

0.534 n

2.510 = s + n

1.442 = s − n

$1.255 = \frac{s+n}{2}$

$.721 = \frac{s-n}{2}$

2,000 s

0.534 m

2.534 = s + m

1.466 = s − m

$1.267 = \frac{s+m}{2}$

$0.733 = \frac{s-m}{2}$

55.33

7.69

3.84

+ ~~0.33~~ Lev error = + $0^{s}.26$

col. = − 1.384 + 1.267 = − 0.117

az. = − 0.700 + 0.733 = + 0.033

col = − 1.350 + 1.255 = − $0^{s}.095$

az = − 0.732 + 0.721 = − $0^{s}.011$

1853
Oct. 2/3 A.M. 8^h Ill. West C.W.T. Ext: Th. 44° Int: Th. 53°

North mark seen with great difficulty through the tufts of a tree
South mark tolerably steady

Telescope points south

North	South	Zero
0^r344	0^r870	0^r065
360	884	063
355	875	075
365	873	072
365	891	067
289	393	342
.358t	.879t	.068t
068	.068	

$0{\cdot}290^t = 0.\overset{s}{6}63$ $0.811t$ = $\overset{s}{1}.853$ s

0.663 n

1.853 s
0.663 n
2.516 = s+n
1.190 = s−n
$1.258 = \frac{s+n}{2}$
$.595 = \frac{s-n}{2}$

$\overset{s}{1}.853$ s
0.663 n
2.516 = s + n
1.190 = s − n
$1.258 = \frac{s+n}{2}$
$.595 = \frac{s+n}{2}$

Level

East	West
68.5	x 75.2
68.3	x 75.3
68.5	x 75.1
x 68.2	75.6
x 68.0	75.7
x 68.0	75.6
15	25
68.25t	75.42t

68.25
7.17
3.58
+ 0.26 lev error = + 0.26

col. = −1.884 + 1.258 = −0.126
az. = −0.700 + 0.595 = −0.105

col = −1.350 + 1.258 = $-\overset{s}{0}.092$
az = −0.732 + 0.595 = −0.137

Oct 8th $3^h\,30^m$ P.M.

Cl. west
Int. Ther. 60 – Ext. Ther. 62.
Hazy – calm

$r = 0''.45$

Level

MCD South	MCD North	East	West
$0^r.890$	$0^r.397$	×62.8	72.5
881	398	×62.4	72.4
883	390	×61.5	71.0
880	397	63.5	×67.5
881	380	63.6	×67.0
415	462	63.0	×67.0
0.883t	0.392t	168	417.4
2.066	066	62.8t	69.57t
			62.80
			6.77
			3.86
			+0.23 lev error = $+0^s.23$

$1^s.867 =$ 0.817t   0.326t $= 0^s.745\,n$

1.867 s   0.745

0.745 n

2.612 = s+n

1.122 = s−n

$1.306 = \frac{s+n}{2}$

$.561 = \frac{s-n}{2}$

$0^s.745\ n$
$\underline{1.867\ s}$
$2.612 = s+n$
$1.122 = s-n$
$1.306 = \frac{s+n}{2}$
$.561 = \frac{s-n}{2}$

CW.S. South	CW.S. North
$0^r.870$	$0^r.392$
.879	.385
.880	.395
.870	.386
.875	.390
5/374	446
.875t	0.389
1.066	0.066

0.809t $= 1^s.849$ 323t $= 0^s.738\,n$

1.849 s   0.738

0.738 n

2.587 = s+n

1.111 = s−n

$1.293 = \frac{s+n}{2}$

$.555 = \frac{s-n}{2}$

$0^s.738\,n$
$\underline{1.849\,s}$
$2.587 = s+n$
$1.111 = s-n$
$1.293 = \frac{s+n}{2}$
$.555 = \frac{s-n}{2}$

col = −1.384 + 1.306 = −0.078
az = −0.700 + 0.561 = −0.139

col. = −1.384 + 1.293 = −0.091
az. = −0.700 + 0.555 = −0.145

col = −1.350 + 1.306 = $-0^s.044$
az = −0.732 + 0.561 = $-0^s.171$

col = −1.350 + 1.293 = $-0^s.057$
az = −0.732 + 0.555 = $-0^s.177$

3.0
.03
.003

1853

Ill. West

Nov. 4th 4^h P.M. Tel. points north Ext. Th. +46° Int. Th. 54
Marks rather unsteady, particularly the northern one
Both indistinct

North	South	Zero	Level	
0^r411	0^r843	0^r070	East	West
402	841	070	72.3	× 73.2
423	842	065	72.5	× 73.0
413	844	060	72.7	× 72.6
422	842	067	× 68.3	77.0
71	12	332	× 68.7	76.9
0^r414t	0^r842t	0^r066t	× 69.0	76.5
0 066	0.066		423.5	29.2
$0.348t = 0^s.794$	$0^r.776t =$	$1^s.773$ s	70.58t	74.87t
0.794	1.774 s	0.794 n		70.58
	0.794 n	2.567 = s + n		4.29
	2.566 = s+n	0.979 = s − n		2.14
	0.980 = s − n	$1.283 = \frac{s+n}{2}$		+0.15 lev error = $+0^s.15$
	$1.284 = \frac{s+n}{2}$	$.489 = \frac{s-n}{2}$		
	$0.490 = \frac{s-n}{2}$			

col. = −1.384 + 1.284 = −0.100

az. = −0.700 + 0.490 = −0.210

col. = −0.10
az. = −0.21
lev. = +0.15

col = −1.350 + 1.283 = $-0^s.067$

az = −0.732 + 0.489 = $-0^s.243$

1853

Ill. West

Nov. 23/24 11^h A.M. = 23^h Nov. 23

Strong wind from N.W. Int. Th. +48° Ext. +43°

Both marks exceedingly steady and distinct

North	South	Zero	Level East	Level West Tel. point south
0^r413	0^r845	0^r070	×71.2	76.0
417	855	075	×71.0	76.0
403	852	060	×71.2	76.1
412	854	068	74.4	×72.2
416	858	070	73.8	×72.5
61	264	343	74.1	×72.0
0.412t	0^r853t	069t	15.7	~~268~~ 268
.069	069		72.62t	~~74.47~~ 74.4t

0.343t = $0^s.783$ 0.784t =

0.783n 1.791 s

0.783 n

2.574 = s+n

1.008 = s−n

1.287 = $\frac{s+n}{2}$

0.504 = $\frac{s-n}{2}$

$\overset{s}{1}.791$ s

0.783 n

2.574 = s + n

1.008 = s − n

1.287 = $\frac{s+n}{2}$

504 = $\frac{s-n}{2}$

72.62

1.78

0.89

+ 0.07 lev error = + $0^s.07$

col = −1.384 + 1.287 = − 0.097

az = − 0.700 + 0.504 = − 0.196

col = − 1.350 + 1.287 = − $0^s.063$

az = − 0.732 + 0.504 = − $0^s.228$

col = −0.10

az = −0.20

lev. = +0.07

Nov 25 P M Ext Ther +27°   Int Ther +39°
Lamp West
Image sharp & at times steady.

B at 4h 15m

North	South	Zero
0.492	0.800	0.067
.490	.802	.060
.492	.790	.061
.500	.797	.070
.485	.790	.070
5)2462	5)3979	5)328
0.492 5)2459 / 492	0.796t	0.066t
.066	066	

0.426t = $\overset{s}{0}.974\,n$

0.730t = $\overset{s}{1}.668\,s$

1.668s

$1.668\,s$
$0.974\,n$
$2.642 = s+n$
$0.694 = s-n$
$1.321 = \frac{s+n}{2}$
$.347 = \frac{s-n}{2}$

0.974n
1.668s
$2.642 = s+n$
$0.694 = s-n$
$1.321 = \frac{s+n}{2}$
$0.347 = \frac{s-n}{2}$

col = − 1,884 + 1,321 = − 0.063
az = − 0.700 + 0.347 = − 0.353

col = − 1,950 + 1.321 = − $\overset{s}{0}.029$
az = − 0.732 + 0.347 = − $\overset{s}{0}.385$

Ill. West

C.W.T.

Dec. 10th 4h P.M. Int. Th. +43. Ext. Th. +40

North	South	Zero	Level East	Level West	Tel. points south
O 365			84.1	× 80.0	
			83.8	× 80.1	
			83.3	× 80.1	
			× 80.4	83.0	
			× 80.4	82.35	
			× 80.5	82.2	
			125	7.9	
			82.08t	81.32t	

Marks too unsteady

81.32

0.66

0.33

lev. = − 0.03

lev error = $-0\overset{s}{.}03$

Ill. West

C.W.T.

Dec. 13 4^h P.M. Int. Th. 38° Ext. Th. +34°

North	South	Zero
$0^r.552$	$0^r.771$	$0^r.081$
550	780	065
530	790	072
520	780	072
551	780	080
203	401	370
$0^r.541^t$	$0^r.780^t$	0.074^t
074	074	
$0^r.467^t = 1^s.067$	$0^r.706^t$ =	
1.067^n	1.614^s	

$1^s.614$ s
1.067 n
$2.681 = s + n$
$.547 = s - n$
$1.340 = \frac{s+n}{2}$
$0.273 = \frac{s-n}{2}$

1.067^n
$2.681 = s+n$
$0.547 = s-n$
$1.340 = \frac{s+n}{2}$
$0.273 = \frac{s-n}{2}$

col. = −0.037
az. = −0.427
lev. = −0.030

col = −1.384 + 1.347 = −0.037
az = −0.700 + 0.273 = −0.427

col = −1.350 + 1.340 = $-0^s.010$
az = −0.732 + 0.273 = $-0^s.459$

1853
Sunday Dec. 18 Noon Ext. Th. +50° Int. +50° W.C.B.

North	South	Zero
0^r500	0^r810	0^r070
500	822	070
512	810	070
505	812	070
505	820	078
22	74	8
$0^r.504t$	0^r815t	0^r072t
.072	072	

$0^s.988 =$ $0.432t$ $0^r.743t =$ $1^s.698\,s$

0^r985m

$1.698\,s$

$0.985\,m$

$2.683 = s+m$

$0.713 = s-m$

$1.341 = \frac{s+m}{2}$

$0.356 = \frac{s-m}{2}$

$1^s.698\,s$
$\underline{0.988\,n}$
$2.686 = s+n$
$0.710 = s-n$
$1.343 = \frac{s+n}{2}$
$.355 = \frac{s-n}{2}$

col $= -1.384 + 1.341 = -0.043$
az $= -0.700 + 0.356 = -0.344$

col $= -1.350 + 1.343 = -0^s.007$
az $= -0.732 + 0.355 = -0^s.377$

1853 Ill. West

Dec. 23/24 8 A.M. Ext. Th. +20° Int. Th. + 28

Marks very distinct – but rather unsteady

South	North	Zero
0^r790	0^r323	0^r064
790	332	080
790	525	085
788	527	065
770	530	080
428	0^r137	379
0^r786t	0^r527t	$0^r07[illegible]t$
075	0 075	
$0^r716t = 1^s.622$	0^r452^t =	$1^s.033$ n
1.622 s	1.030 n	1.622 s
	1.622 s	2.655 = s + n
		.589 = s − n
		$1.327 = \frac{s+n}{2}$
		$.294 = \frac{s-n}{2}$

2.652 = s + n

0.592 = s − n

$1.326 = \frac{s+n}{2}$

$0.296 = \frac{s-n}{2}$

Level

East	West
× 92.5	89.0
× 92.4	89.3
× 92.2	89.1
92.0	× 89.6
92.2	× 89.5
92.0	× 89.2
13	17
92.22t	89.28t
89 28	
2.94	
1.47	

lev. − 0.11 level error = $-0^s.11$

col. = −1.384 + 1.326 = −0.058

az. = − 0.700 + 0.296 = −0.404

Col. = −0.06

az. = −0.40

lev. = −0.11

col = − 1.350 + 1.327 = − 0.023

az = − 0.732 + 0.294 = $-.0^s438$

1854
Feb. 9 5^h P.M. Clear Ext. Th. +38 C.W.T.

Marks too unsteady to be measured

Level

East	West
85.0	x 79.5
84.8	x 79.5
84.5	x 79.0
x 83.0	80.9
x 82.5	81.0
x 82.5	80.5
22.3	480.4
83.72t	80.07t
80.07	
3.65	
1.82	
−0.13	Lev error = $-0^s.13$

1854 , Ill. West See over

Feb. 10 $3^{h}..50^{m}$ P.M. Clear; strong breeze from N.W. Ext. Th. $+35^{\circ}$ C.W.T.

North	South	Zero
$0^{r}483$	$0^{r}830$	$0^{r}062$
480	820	072
479	831	080
480	830	075
472	820	080
394	131	369
$0^{r}479t$	$0^{r}826t$	$0^{r}074t$
.074	.074	

$0^{r}405t = 0^{s}.925$ $\quad 0.742t = 1^{s}.696\ s$

$n\ 0^{r}925$ $\quad s\ 1.709$

$s\ 1.709$

$s+n\ 2.634$

$s-n\ 0.784$

$\frac{s+n}{2}\ 1.317$

$\frac{s-n}{2}\ 0.392$

$1.696\ s$

$\underline{0.925\ n}$

$2.621 = s+n$

$0.771 = s-n$

$1.310 = \frac{s+n}{2}$

$0.385 = \frac{s-n}{2}$

col. $= -1.384 + 1.317 = -0.034$

az. $= -0.700 + 0.392 = -0.305$

col $= -1.350 + 1.310 = -0^{s}.040$

az $= -0.732 + 0.385 = -0^{s}.347$

New Values of A & C

Ill E $\quad A_1 = -0^{s}.732 \quad C_1 = -1^{s}.430$

Ill W $\quad A_2 = -0.732 \quad C_2 = -1.350$

In consequence of the disturbance of the intervals of the wires March 3rd 1855 a new value of the correction

Ill. E. (midwire − mean of 7) $= -0^{s}.018$

In stead of the old value " $= \underline{-0.045}$

Dif $\quad 0.027$

The new constants after March 3 1855 will then be

$A_1 = -0^{s}.732 \quad C_1 = -1^{s}.430 + 0^{s}.027 = -1^{s}.403$

$A_2 = -0.732 \quad C_2 = -1.350 - 0.027 = -1.377$

1854 Feb. 10th

Transit reversed to Ill E

Ill Wr.
G.P.B

N S
47 845
48 850
46 855
47t 85t
Zero 07 07
Dist 0.400t 0.785t Ill Wr
0.387 0.750 Ill E
2/0.013 2/0.030
0.007 0.015
= $0^s.016$ $0^s.034$ 0.025
0.034 045
0.050 0.070
$0^s.025$ Trs of S Ill E 0.015
0.045 Mid E of Mean Ill E, 0.055
0.070
0.015 Diur-ab-
$-0^s.085$ = Coll. mid wire + Diur-ab- + Dist mean to mid- Ill E
+0.055 = " Ill Wr

$n = 0.914$
$S = 1.782$
$S+n$ 2,696
$S-n$ 0.868
$\frac{1}{2}(S+n)$ 1.348
$\frac{1}{2}(S+n)$ 0.434
A_1 0.732
C_2 1.350
$a = -0^s.298$
$c = +0.0$[illegible]2 Ill W
.002

Trial of New Constants

By Reversal $c_1 = -0^s.085$ Ill E
" Mark c_1 −0.113 "
Reversal $c_2 = +0.055$ Ill Wr
Mark $c_2 = +0.002$ "

See also Sept. 13th

Ill. East   New Values of A & C

Feb. 10 $4^h.30$ P.M. Reversed the Transit-Circle

N   G. P. B

North	South	Zero
0.665	0.300	
685	340	
700	320	
250	0.320t	
0.683t	1.070	
1.070	0.750t	
0.387t		

C W Y

N	S
.670	.290
.669	.309
.660	300
19	0.300
0.666t	1.070
1.070	0.770t
404t C W Y	~~1.070~~
387 G P B	~~0.300~~ C W Y
0.393t = 0.898	~~0.320~~ G P B
	0.310
	1.070
	0.760 = 1.737

s = 1.737
n = 0.898
2.635 = s + n
0.839 = s − n
1.317 = $\frac{s+n}{2}$
0.420 = $\frac{s-n}{2}$
0.

.113

$a = -0.732 + 0.420 = -0\overset{s}{.}312$
$c = -1.430 + 1.317 = -0.113$

az − 0.31
col. − 0.11
lev. − 0.13

$col = -1.430 + 1.317 = -\overset{s}{0},113$
$az = -0.732 + 0.420 = -\overset{s}{0}.312$

Ill. East —

March 5/6 $8^h.30^m$ A.M. C.W.T. Ext. 7h +30 Int. 7h + 3½

South mark very indistinct — North tolerably well seen

North	South	Zero
649	312	$0^r.068$
635	320	070
650	328	070
645	325	070
640	325	278
219	110	$0^r.069t$
.644t	322t	
.070	1.070	
0.426t = $\overset{s}{0}.974$	0.748t = $\overset{s}{1}.709$	
$\overset{n}{0.974}$		

1.709 s
0.974 n
$2.683 = s + n$
$.735 = s - n$
$1.341 = \frac{s+n}{2}$
$.367 = \frac{s-n}{2}$

$\overset{s}{1.709}$
$\overset{n}{0.974}$
$2.683 = s+n$
$0.735 = s-n$
$1.341 = \frac{s+n}{2}$
$0.368 = \frac{s-n}{2}$

Level

East	West
× 89.3	87.5
× 89.0	87.2
× 89.0	87.0
86.0	× 87.0
87.5	× 87.0
87.5	87.0
50.3	7
86.38t	87.12t

47 1 2
1.26
.63
− 0.07 lev error = $-0^s.06$

col. = −0.09
az. = −0.36
lev. = −0.07

New values of A. & C.

col = −1.430 + 1.341 = −0.089
az = −0.732 + 0.367 = −0.365

col = −1.430 + 1.341 = $-\overset{s}{0}.089$
az = −0.732 + 0.367 = $-\overset{s}{0}.365$

New A & C

Date	Time	az	lev	Coll Ill E	Coll Ill W.	Thr Int	Thr Ext	
1851 & 52								
1851 Dec 5		-.156			-.113		24	
6			-.140				26	
28/29		-.373	-.120		+.168		44	
1852								
Jan 22		-.453	-.190		+.104		14	
22/23		-.421			+.262			
"		-.440			+.220		8	
27		-.351	-.150		+.139		23	
Feb 2		-.350	-.120		+.156		23	
11/12		-.242	-.100		+.110		36	
16		-.337	-.130		+137		32	
16		-338	-.090		+119		32	Reversal
16		-.342	-.140	-.259	-		32	
16		-.332	-.140	-.256			32	
23		-.301	-.090	-.169			41	
March 3		-.386	-.050	-.256			18	
16		-.201	-050	-.103			47	
26		-.272	-.020	-.174			45	
April 1		-.241	-.080	-.172			50	
16		-.320	-.110	-.269			44	
24		-.224	-.180	-.286			48	
28		-.198	-.110	-.210			47	
May 3		-.169	-.220	-.183			56	
18		-.044	-.130	-.171			63	
25		-.068	-.030	-.188			65	
29		-.010		-.249			66	
29		+.018	-.080	-.225			66	

See previous page

After March 1854 the Coll. cor. c_1 & c_2 were separately plotted for Ill E & W

Coll cor Ill E = −Coll Ill W − $0^s.030$ Those thus derived are in Red ink

New Constant of Marks Ill E {A_1 = − 0.732 C_1 = − 1.430
Ill W {A_2 = − 0.732 C_2 = − 1.350

Collimation includes red. to Mean of wires & Diurnal aberration

Observed values of Azimuth Level and Collimation Errors From Mark and Level readings.

Date		az	lev	Col		Thermometer		
				Ill E	Ill W	Int	Ext	
1852 June 10th	$6^h 50^m$ PM	$+0^s.018$	$0^s.00$	$-0^s.237$				
„ 21st	$5^h 30^m$ PM	+0.141	−0.05	−0.180			82°	
„ 21/22	$7^h 20^m$ AM	+0.132	+0.05	− 0.198			69	
„ 30th	$5^h 00^m$ PM	+0.152	+0.08	− 0.203		77°		
June 30/July 1			+0.07					
July 27th		+0.148	+0.20	−0.108	+0.078	76		
„ 28/29	6^h AM	+0.112		− .123	+0.093	67	62	
„ 30th	6^h AM	+0.129		− .110	+0.080		69	
„ 30th	PM	+0.135		− 118	+ 0.088	84	84	
„ 30th		+0.156		−0.106				Collimation adjusted.
„ 30th	6^h PM	+ 0.092		+0.029				
30	$6^h 20$	+0.070		+0.007	−0.037			
„ 31st	$6^h 15^m$ PM	+0.149	+ 0.18	+ .065	− 0.095	76	73	
Aug 3rd	5^h PM	+0.113	+0.15	+ .020	− 0.050			
„ 7th	3^h PM	+0.102		+.013	− 0.043	71	70	
„ 27/28	AM	+0.091	+0.21	+.047	−0.077	70	68	
Sept 5/6	9^h AM		+0.22			68		
„ 14th	$4^h 30^m$ PM	+0.011	+0.31	+.058	− 0.088	68	66	
„ 21st	4^h PM	+.0.031		.043	− 0.073	74	74	
„ 22nd	4^h PM	+0.047		.050	− 0.080	71.5	69.5	
„ 27th	$4^h 30^m$	+0.013		.041	− 0.071	62	56.5	
„ 28th	$4^h 45^m$ PM	− 0.016		.042	− 0.072	65.5	66.0	
× Oct 6/7		~~−0.015~~	+ 0.23		− ~~0.048~~			
„ 12th	$3^h 30^m$ PM	−0.015		.018	− 0.048	66	66	
„ 13th	$3^h 30$ PM	−0.090		.007	− 0.037	57	55.3	
„ 18/19	9^h AM	− 0.111	+ 0.22	.002	− 0.032	59	60	
„ 26th	4^h PM	−0.129	+ 0.11	+0.010	− 0.040	49	43	
Nov 4th	4^h PM	− 0.135	+ 0.16	−0.017	−0.013			
„ 4th	$4^h 30$ PM	− 0.175	+ 0.16	+ 0.011	−			
„ 17/18	9^h AM	−0.231	+ 0.11	− 0.101				
„ 27th	3^h PM	−0.187	+ 0.06	− 0.071				
Dec 8th	3^h PM	−0.093	0.00	−0.044		55	55	

New A α C

Date	az	lev	Col Ml E	Col Ml W	Temperature Int	Temperature Ext
1852 Dec 26/27 8h AM	- 0.254	- 0.01	- 0.134			27°
1853 Jan 8th 4h PM	- 0.326	- 0.07	- 0.055			45
" 15th 4h PM	- 0.343		- 0.118			35
" 29th 4h PM	- 0.451	- 0.09	- 0.067	~~28~~	28°	
Feb 9th 4h PM	- 0.378	- 0.17	- 0.148		34°	35
" 21st 5h PM	- 0.424	- 0.13	- 0.030		40	
March 2nd 4h 30m PM	- 0.438	- 0.16	- 0.085		42	40
" 18th 3h 45m	- 0.392	- 0.14	- 0.070		47	48
" 25th 4h 30m PM	- 0.297	- 0.11	- 0.079		47	44
" 25th 5h PM	- 0.276	- 0.11	- .084	+ 0.054		
May 6th	- 0.195	- 0.05	- .062	+ 0.032		
" 8/9	- 0.193		- .013	- 0.017	50	47
"						
" 16th 9h AM	- 0.006	+ 0.003	- .028	+ 0.002	64	68
" 30th AM	- 0.030	~~+0.028~~	- .004	- 0.026	66	62
" " 3h PM	- 0.041		- .006	- 0.024	76	75
June 27th	+ 0.036	+ 0.10	- .030	0.000		
" 28th 4h PM		+ 0.10			70	69
July 4th 9h AM	+ 0.064	+ 0.15	+ .006	- 0.036	75	76
" 8th 5h 30m PM	+ 0.044	+ 0.12	+ .039	- 0.069	80	81
" 25/26 AM	+ 0.085	+ ~~0.205~~	+ .041	- 0.071	75	74
Aug 10th 11th		+ 0.29		-		
" 18/19 8h AM	+ 0.118	+ 0.28	+ .066	- 0.096	64	60
Sept 7/8 8h AM	+ 0.086	+ 0.22	+ .054	- 0.084	66	64
" 15/16 8h AM	- 0.011	+ 0.26	+ .065	- 0.095		
Oct 2/3 8h AM	- 0.137	+ 0.26	+ .062	- 0.092	53	44
" 8th 3h 30m PM	- 0.171	+ 0.23	+ .014	- 0.044	60	62
" " " " "	- 0.177	+ 0.23	+ .027	- 0.057	60	62
Nov 4th 4h PM	- 0.243	+ 0.15	+ .037	- 0.067	54	46
" 23/24 11h AM	- 0.228	+ 0.07	+ .033	- 0.063	48	43
" 25 4h 15m PM	- 0.385		- .001	- 0.029	39	27
Dec 10th 4h PM		- 0.03			43	40
" 13th 4h PM	- 0.459	- 0.03	- .020	- 0.010	38	34
" 18th Noon	- 0.377		- .023	- 0.007	50	50
" 23/24 8h AM	- 0.438	- 0.11	- .007	- 0.023	28	20
1854 Feb 9th 5h PM		- 0.13				38

Date	az	level	Col Ill E	Col Ill W	Temperature Int	Temperature Ext
1854 Feb 10th 3h 50m PM	− 0.347		− 0.013	− 0.017		35°
" 10th 4h 30m PM	− 0.312	− ~~0.13?~~	− 0.113	−		
Mar 5/6 8h 30m AM	− 0.365	− 0.06	− 0.089		32°	30
16/17 8.30 "	− 0.241	− 0.05	− 0.093		35	42

Interpolated values of Az. Lev. & Coll Errors

date.	Az.	Lev.	Col. E	Col. W.
1852 Jan 27	−.35	−.15		+.14
29	−.35	−.14		+.14
Feb. 25	−.30	−.08	−.17	
27	−.31	−.07	−.18	
Mar. 2	−.38	−.05	−.25	
25	−.27	−.02	−.18	
26	−.27	−.02	−.18	
Apr. 1	−.24	−.08	−.17	
27	−.21	−.12	−.22	
28	−.20	−.11	−.21	
29	−.19	−.11	−.20	
30	−.18	−.11	−.20	
May 25	−.12	−.03	−.18	
26	−.11	−.03	−.19	
28	−.10	−.03	−.21	

Interpolated values of Azimuth Level and Collimation Errors.

Date			Az	Level	Collimation	
					Cl. E	Cl. W
1852	June	23	+ 0.138	+ 0.058	− 0.198	
	July	27	+ 0.148	+ 0.074		+ 0.078
	"	28	+ 0.130	+ 0.076		+ 0.085
	Aug	23	+ 0.095	+ 0.193		− 0.071
	"	24	+ 0.096	+ 0.200		− 0.072
	Sept	22	+ 0.047	+ 0.304		− 0.080
	"	23	+ 0.041	+ 0.300		− 0.078
	Oct	21	− 0.120	+ 0.175		− 0.035
	"	22	− 0.122	+ 0.154		− 0.036
	"	23	− 0.124	+ 0.140		− 0.037
	"	25	− 0.127	+ 0.117		− 0.039
	"	26	− 0.129	+ 0.110		− 0.040
	Nov	7	− 0.178	+ 0.153	− 0.020	
	"	15	− 0.225	+ 0.120	− 0.088	
	"	16	− 0.225	+ 0.110	− 0.095	
	"	17	− 0.231	+ 0.102	− 0.101	
	"	20	− 0.219	+ 0.102	− 0.092	
	"	24	− 0.203	+ 0.075	− 0.081	
	Dec	5	− 0.120	+ 0.018	− 0.051	
	"	7	− 0.102	+ 0.002	− 0.045	
	"	18	− 0.160	− 0.008	− 0.092	
	"	21	− 0.184	− 0.008	− 0.107	
	"	22	− 0.194	− 0.008	− 0.114	
1853	Jan	17	− 0.359	− 0.080	− 0.110	
	Feb	12	− 0.390	− 0.167	− 0.143	
	"	14	− 0.398	− 0.160	− 0.140	
	"	15	− 0.402	− 0.150	− 0.139	
	"	17	− 0.410	− 0.145	− 0.138	
	March	15	− 0.401	− 0.150	− 0.072	
	"	18	− 0.392	− 0.140	− 0.070	
	"	19	− 0.379	− 0.130	− 0.071	
	"	21	− 0.353	− 0.125	− 0.074	
	"	22	− 0.340	− 0.120	− 0.075	
	"	23	− 0.322	− 0.117	− 0.076	

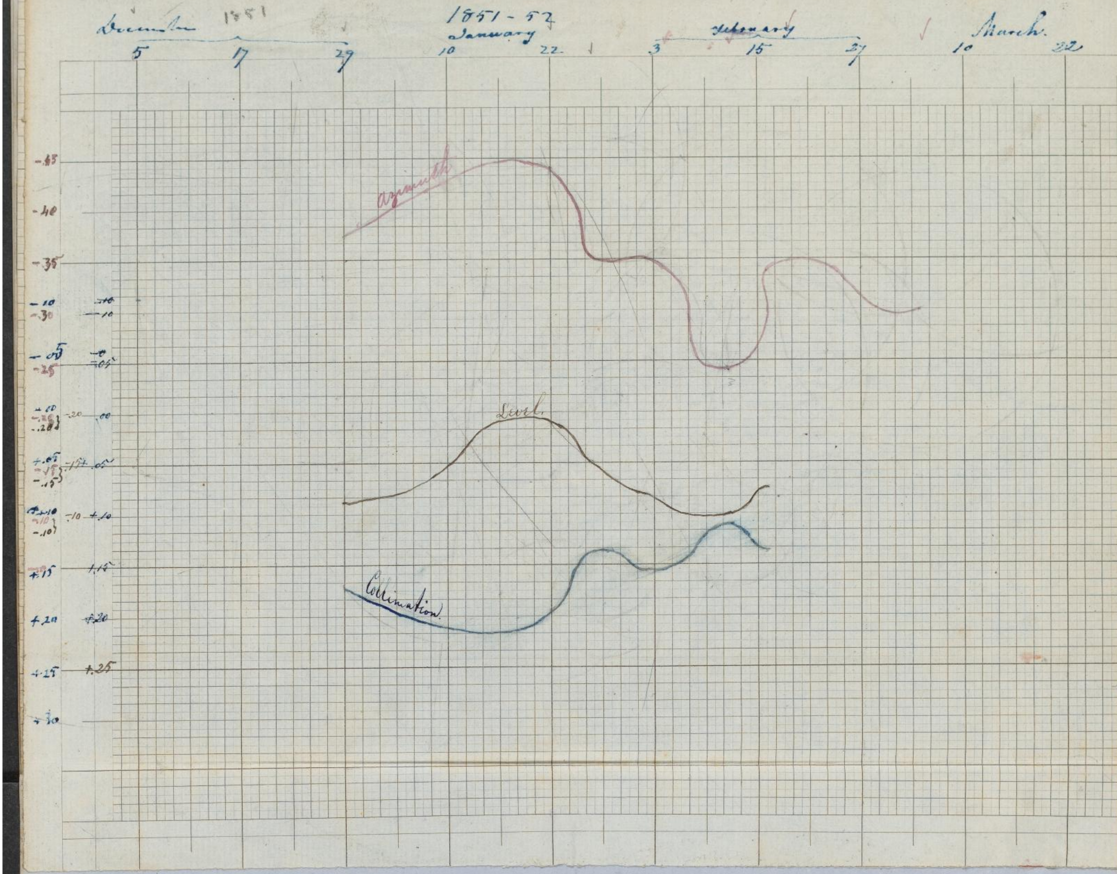
Interpolated values of Azimuth Level and Collimation Errors.

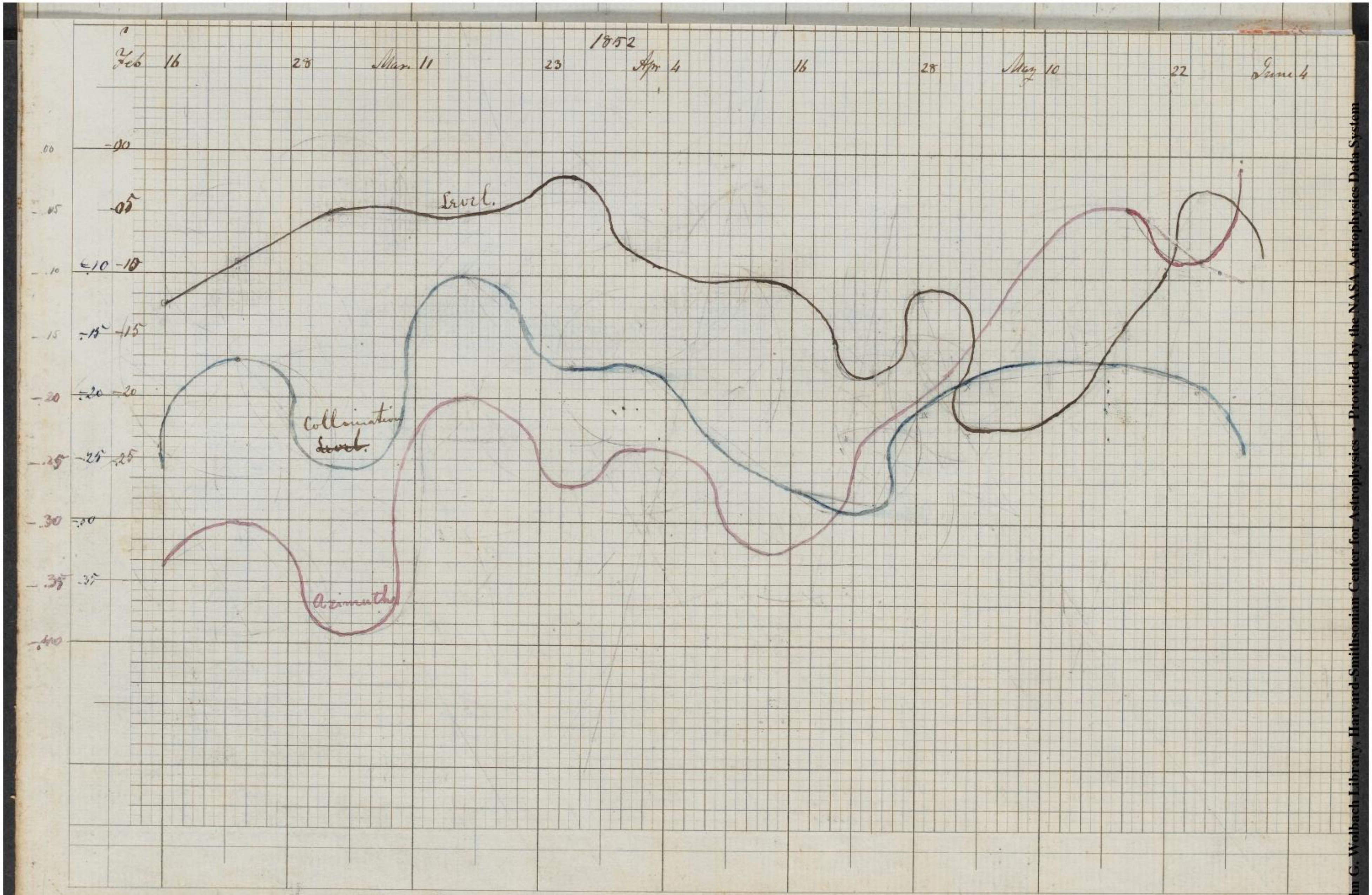
Date			Az	Level	Collimation Ill E	Collimation Ill W
1853	April	15	-0.237	-0.075		-0.105
	"	18	-0.231	-0.075		-0.103
	"	19	-0.229	-0.073		-0.103
	"	21	-0.225	-0.072		-0.100
	May	13	-0.032	-0.020		-0.018
	"	14	-0.023	-0.016		-0.022
	"	17	-0.007	0.000		0.000
	"	20	-0.013	+0.008		-0.006
	June	16	+0.011	+0.067		+0.005
	"	18	+0.002	+0.070		+0.008
	July	14	+0.045	+0.121		-0.060
	"	15	+0.047	+0.155		-0.060
	"	18	+0.053	+0.140		-0.078
	August	11	+0.107	+0.290		-0.088
	"	15	+0.112	+0.287		-0.092
	"	16	+0.113	+0.283		-0.093
	September	8	+0.074	+0.224		-0.085
	"	10	+0.050	+0.233		-0.087
	"	12	+0.026	+0.245		-0.091
	"	13	+0.014	+0.251		-0.092
	October	11	-0.179	+0.220		-0.033
	"	12	-0.181	+0.218		-0.032
	"	14	-0.243	+0.208		-0.030
	"	15	-0.200	+0.205		-0.031
	November	5	-0.242	+0.148		-0.067
	"	7	-0.240	+0.138		-0.067
	"	10	-0.241	+0.127		-0.074
	"	14	-0.238	+0.110		-0.078
	Dec	5	-0.462	+0.000		+0.003
	"	7	-0.464	-0.018		0.000
	"	8	-0.464	-0.020		-0.001
	"	9	-0.464	-0.025		-0.003
	"	10	-0.464	-0.028		-0.005
	"	13	-0.460	-0.028		-0.010
	"	14	-0.435	-0.032		-0.009

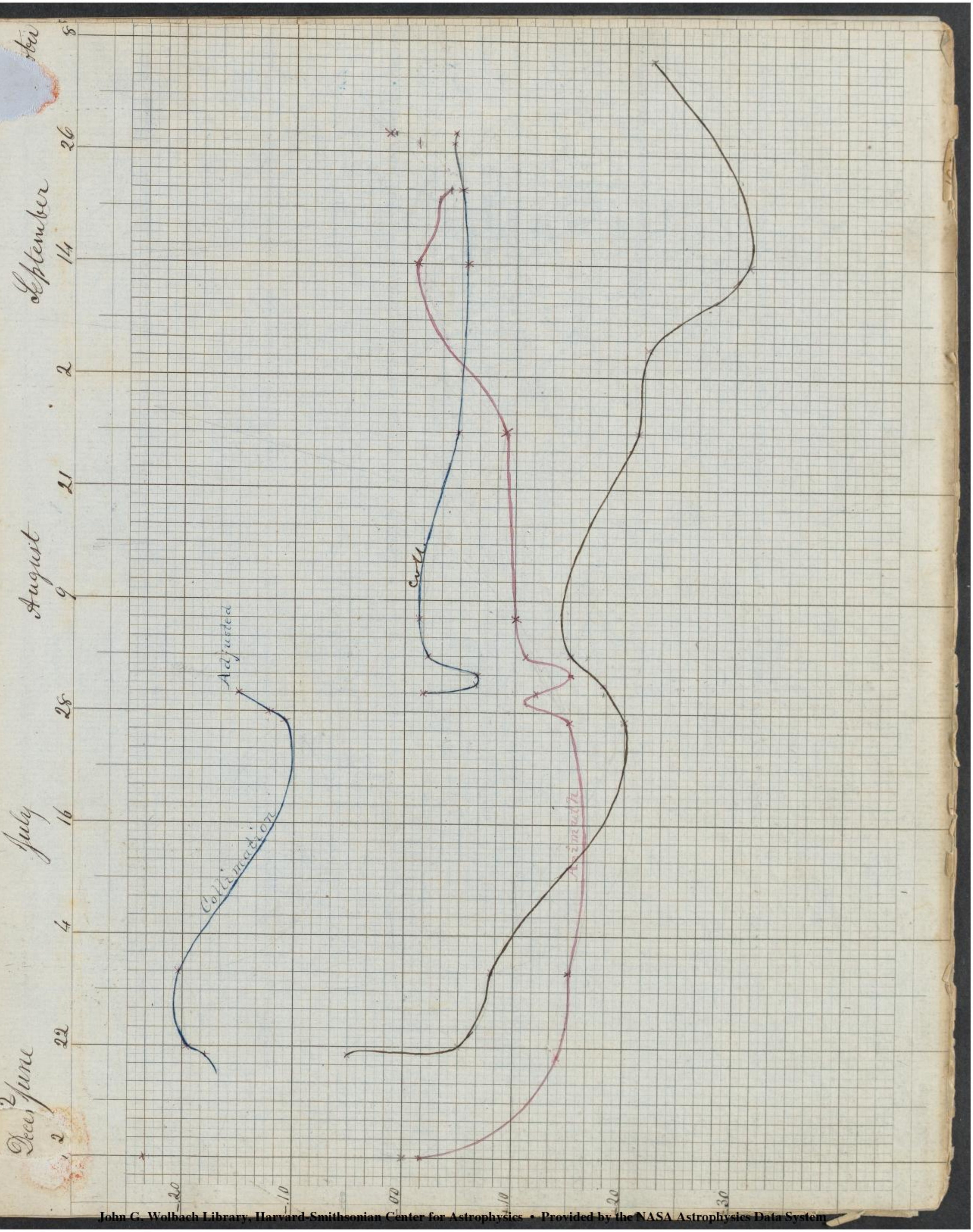
Interpolated values of Azimuth Level and Collimation Errors.

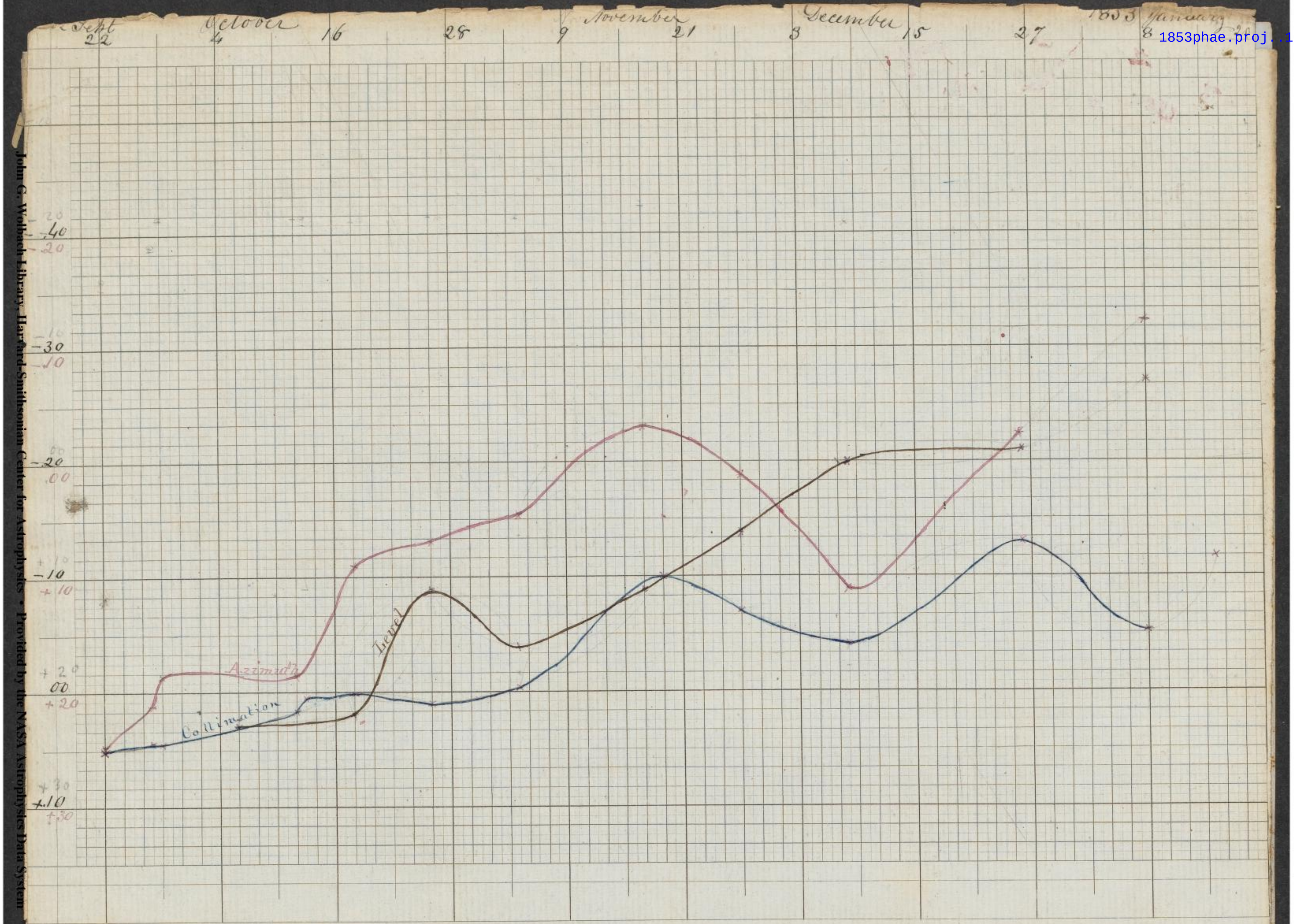
Date			Az	Level	Collimation	
					Cl E	Cl W
1854	January	4	-0.460	-0.110		-0.016
	"	7	-0.456	-0.141		-0.012
	"	9	-0.446	-0.148		-0.010
	February	3	-0.355	-0.141		+0.022
	"	4	-0.350	-0.140		+0.024
	"	6	-0.342	-0.134		+0.028
	"	9	-0.332	-0.128		+0.032
	"	10	-0.329	-0.125	-0.063	~~+0.063~~
	"	11	-0.332	-0.125	-0.068	

For a continuation of this table see end of this book

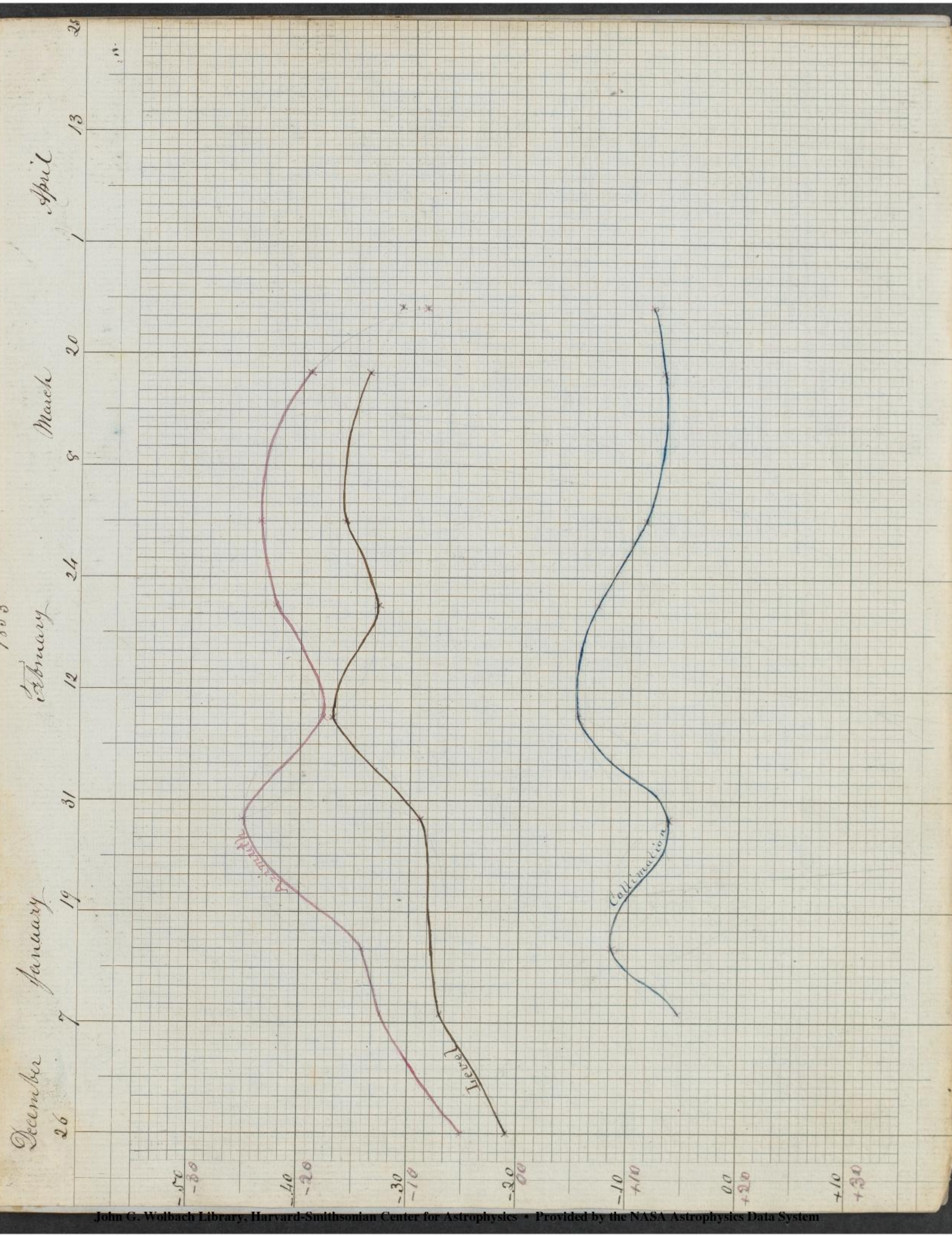

December 1851
1851-52
January
February
March
5
17
29
10
22
3
15
27
10
22
-.45
-.40
-.35
-.10
-.30
-.10
-.10
-.05
-.25
-.0
-.05
+.10
-.20
-.20
-.20
.00
+.05
-.15
-.15
-.15
.05
+.10
-.10
-.10
-.10
+.10
+.15
+.15
+.20
+.20
+.25
+.25
+.30
Azimuth
Level
Collimation

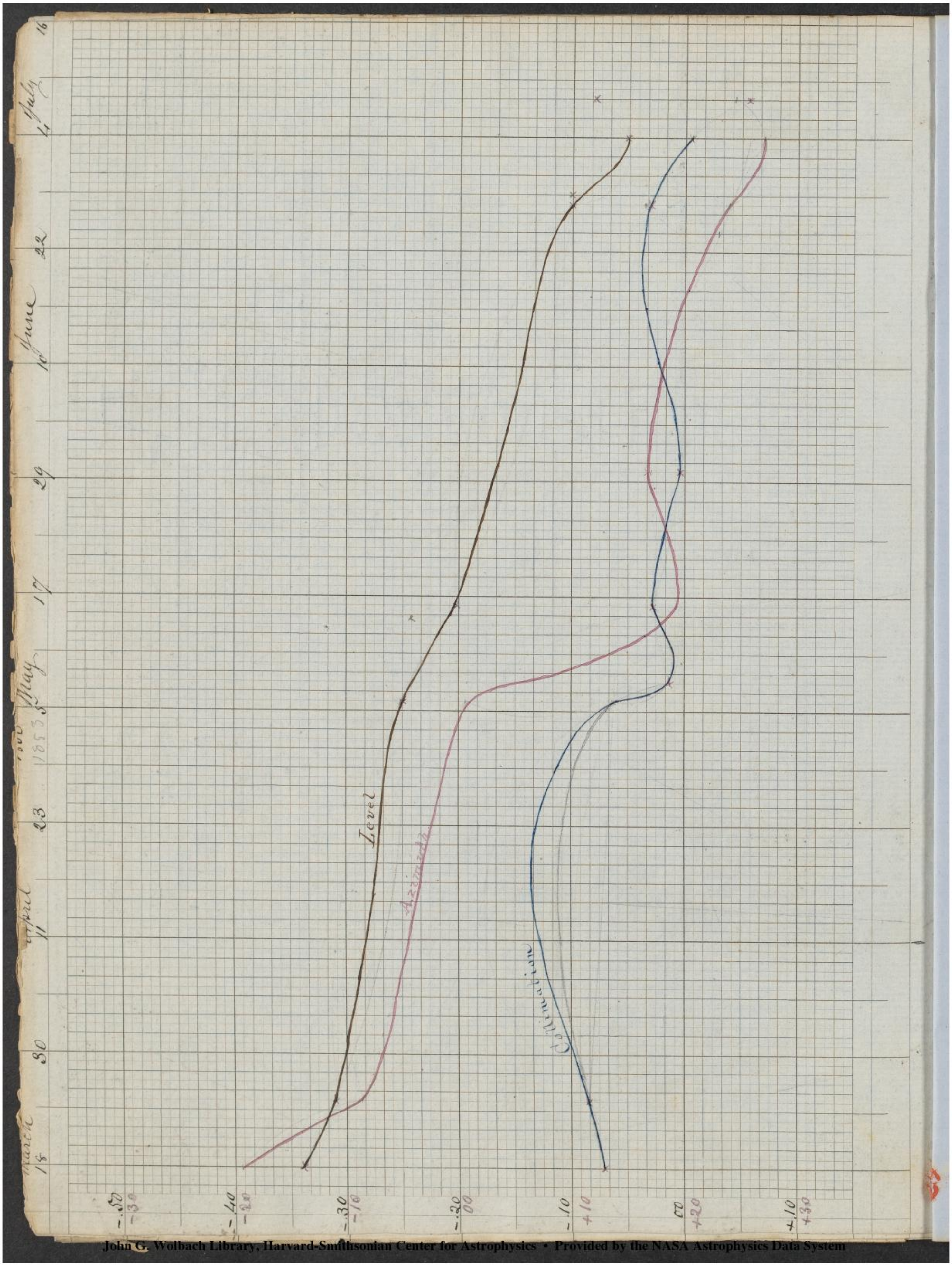

1852
Feb 16
28
Mar. 11
23
Apr 4
16
28
May 10
22
June 4
.00 -.00
.05 -.05
.10 -.10 -.10
.15 -.15 -.15
.20 -.20 -.20
.25 -.25 -.25
.30 -.30
.35 .35
.40
Level.
Collimation
~~Level.~~
Azimuth

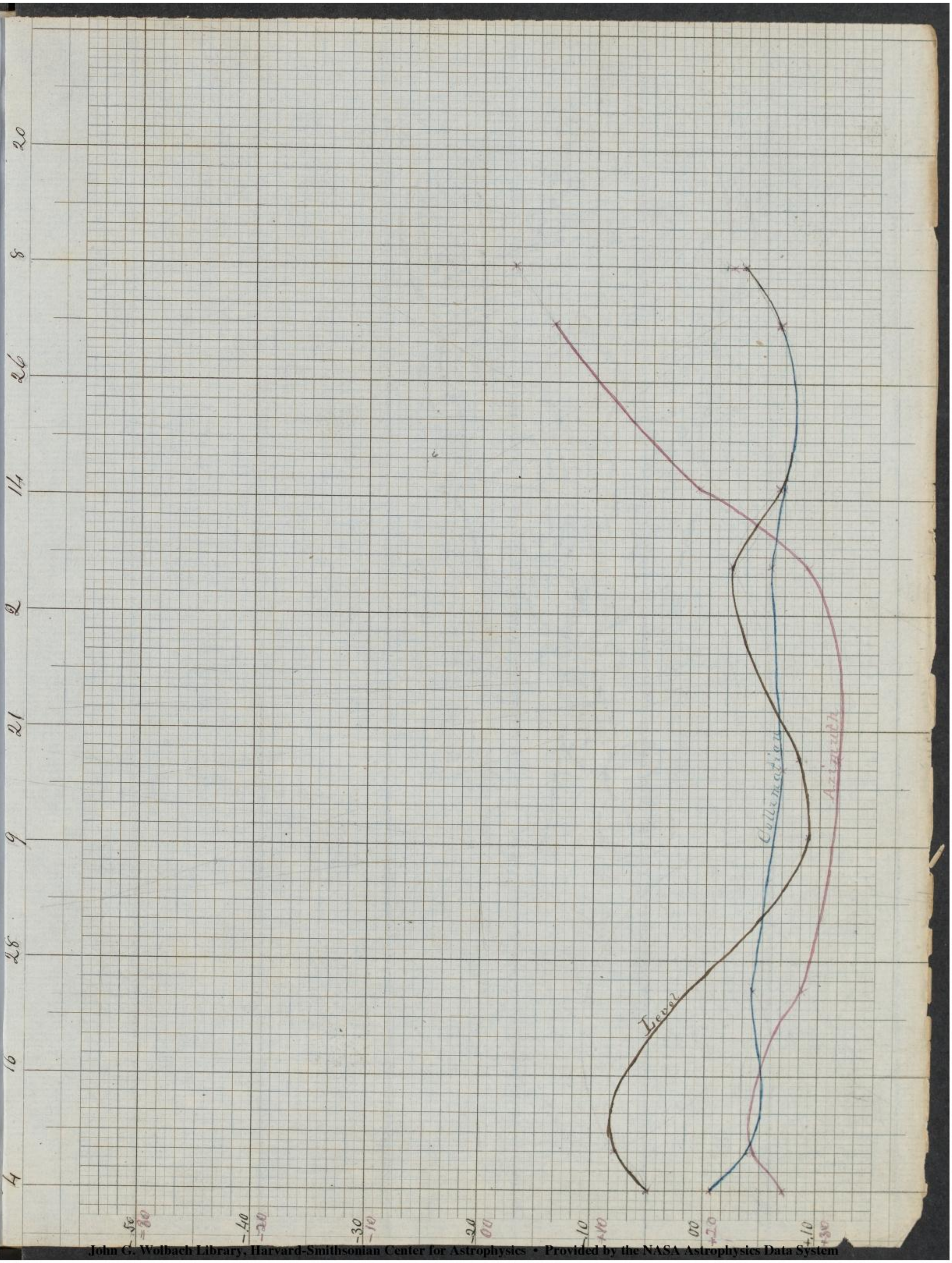

Decr 1
2
June 2
22
4
July 16
28
August 9
21
2
September 14
26
Oct 8
-20
-10
.00
+.10
+.20
+.30
Collimation
Adjusted
Coll
Azimuth

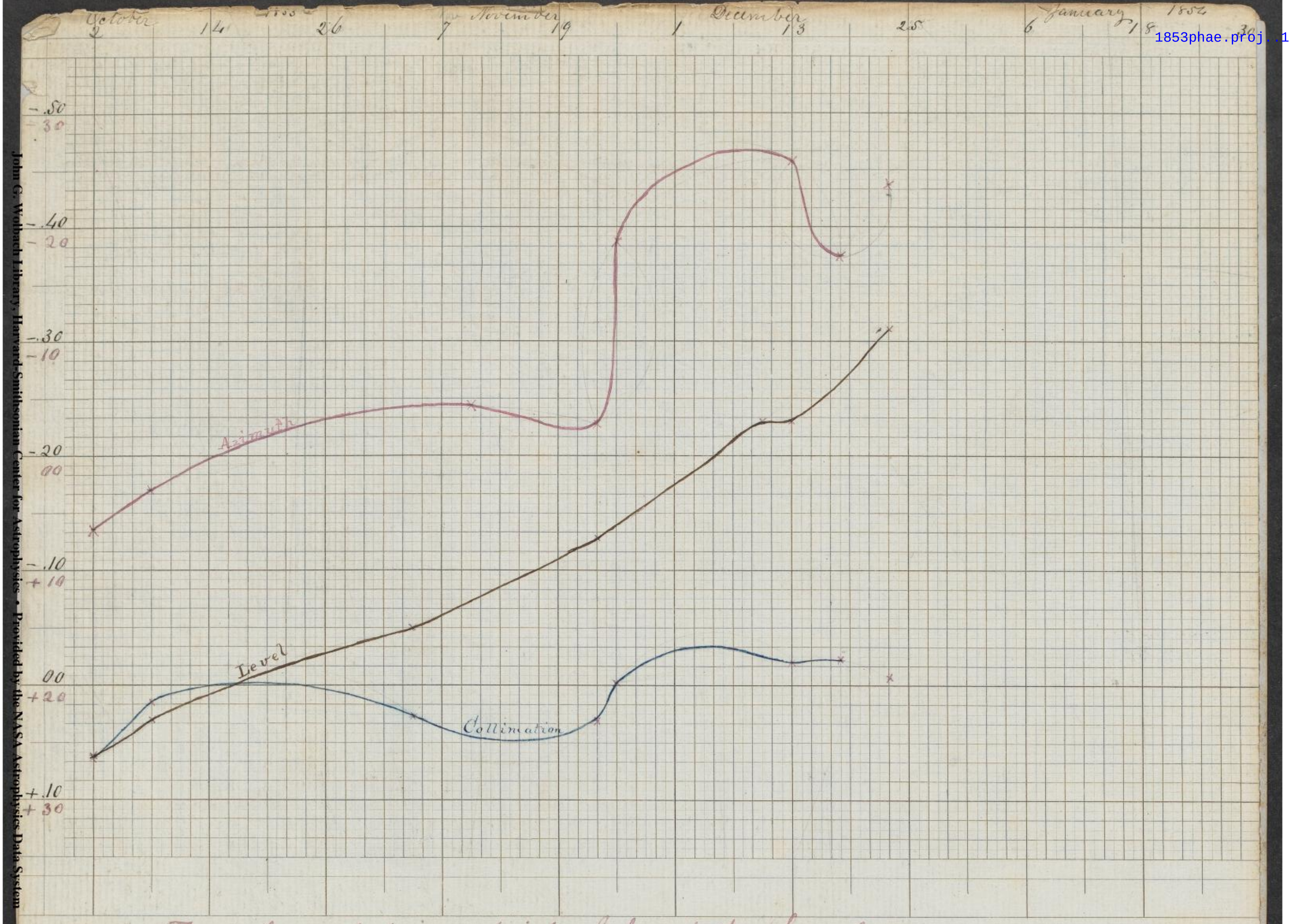


The scale marked in Red Ink belongs to the Level

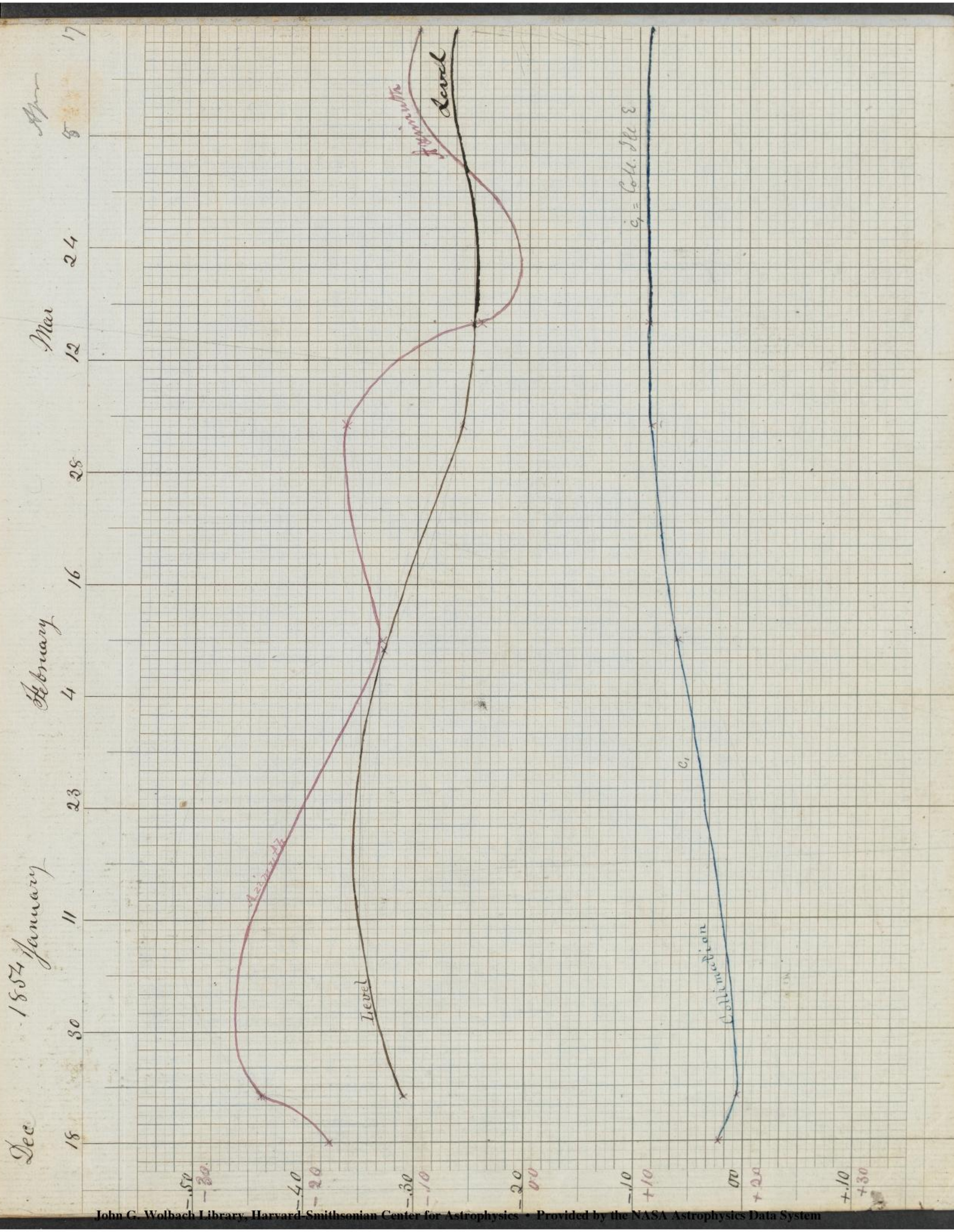

December
26
7
January
19
31
February
1853
12
24
8
March
20
April
1
13
25
-50
-30
-40
-20
-30
-10
-20
00
-10
+10
0.0
+20
+10
+30
Level
Azimuth
Collimation

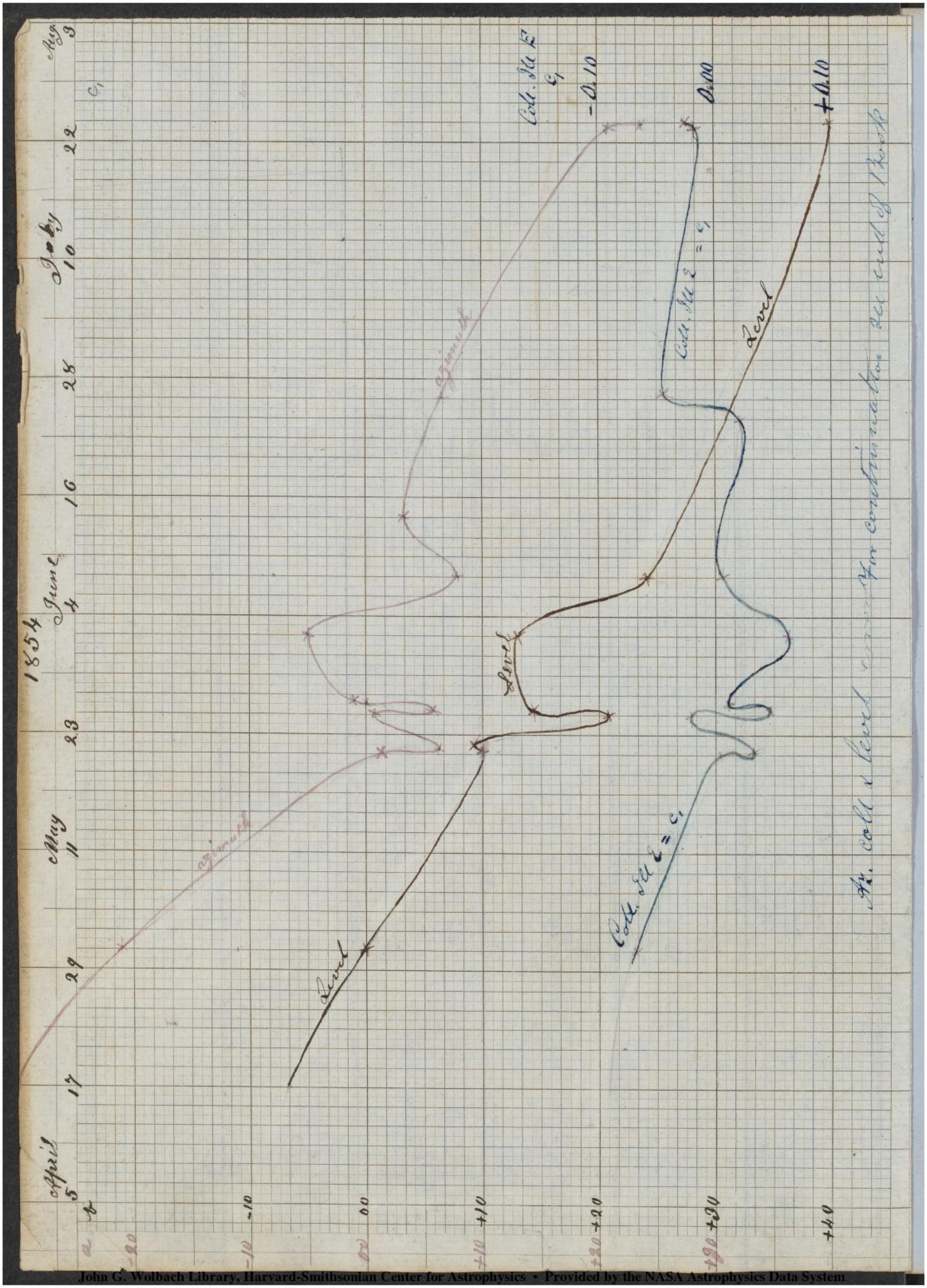

March
18
30
April
11
23
May 5
1853
17
29
June
10
22
July
4
16
-.50
-30
-.40
-20
-.30
-10
-.20
00
-.10
+10
00
+20
+.10
+30
Level
Azimuth
Collimation


20
8
26
14
2
21
9
28
16
4
-50
-30
-40
-20
-30
-10
-20
00
-10
+10
00
+20
+10
+30
Level
Collimation
Azimuth



The scale marked in red ink belongs to the Level


Dec
18
30
1857 January
11
23
February
4
16
28
Mar
12
24
Apr
5
17
-.50
-30
-.40
-20
-.30
-10
-.20
00
-.10
+10
00
+20
+.10
+30
Azimuth
Level
Collimation
c₁
Azimuth
Level
c₁ = Coll. Ill E


1854
April 5
17
29
May 11
23
June 4
16
28
July 10
22
Aug 3
a
-20
-10
00
+10
+20
+30
+40
c₁
Coll. Ill E
c₁
-0.10
0.00
+0.10
azimuth
azimuth
Level
Level
Level
Coll. Ill E = c₁
Coll. Ill E = c₁
Az. coll & level corr. For continuation see end of Book

Make a red ink cross at each projected observation

Write the numbers corresponding to a b & c in the corresponding colours red, black & blue & distinctly

Put only those numbers in which are sufficient to include the curve

Write in ~~blue~~ red black & blue the words azimuth, level & coll. I & E or W over each curve once or twice on each page

P_1

Put the years in clear numbers over each page

1854).

Ill East

March 16/17 $8^{h}.30^{m}$ Am. Int. Therm +35 Ext. Th. 42°

Both marks tolerably steady and distinct

North	South	Zero	Level East	Level West
$0^{r}687$	$0^{r}262$	$0^{r}065$		
700	261	062	80.0	×77.0
695	270	063	79.8	×76.8
690	260	060	79.3	×76.8
690	261	067	×77.5	78.0
3462	314	17	×77.5	78.0
$0^{r}692$	$0^{r}263$	$0^{r}063$	×77.5	78.0
.063	.063		6)471.6	44.6
$0^{r}.371$	$0^{r}.800$		78.60	77.43
0.846	1.828s		77.43	

0.846m

2.674 = s+n

0.982 = s−n

$1.337 = \frac{s+n}{2}$

$0.491 = \frac{s-n}{2}$

w −1.17

.58

lev. −.05 t.

$$\left.\begin{array}{l} col = -1.430 + 1.337 = -.093 \\ az = -0.732 + 0.491 = -.241 \end{array}\right\} t$$

Ill. East

a −$0^{s}.241$

b −0.050

c −0.093

Adopt the a, b & c with lines by the side of them

1854)

May 1st 23/24 $\overset{h}{6}..\overset{m}{40}$ A.M. Ill. East

Fine morning –

North Mark very indistinct – South Mark very well seen C.W.T.

reading South	North	Zero
0^r222 778	0^r665	0^r062
220	655	050
220	695	058
224	675	058
215	678	057
101	368	285
0^r220	0^r674	0^r057
057	0.057	
0^r.837	0^r.383	

s 1.913 0.875

n 0.875

s+n 2.788

s−n 1.038

$\frac{s+n}{2}$ 1.394

$\frac{s-n}{2}$ .519

Ill. East

$a = -0.^s213$

$b = 0.00$

$c = -0.036$

Level East	West
X 70.4	73.7
X 70.0	73.9
X 70.0	73.8
73.5	69.8 X
73.2	69.9 X
73.0	69.9 X
101	431 0
71.68	71.83
	71.68
	0.15
	0.07
	Ver.m. + 0.00 t

col. = −1.430 + 1.394 = −0.036 }
az. = −0.732 + 0.519 = −0.213 } t

May 17. 7 P.M. Expt No 63. Int Ill East

~~South~~ reading	North	Zero
~~.920~~	1.080 [illegible]	.052
~~.933~~	1.067	.060
~~.925~~	1.075	.058
~~.930~~	1.070	.057
~~.920~~	1.080	.050

1852. May 17/18 Am. Tel. East. Temp 74.

South real dist	North reading	Zero
$\overset{r}{0}$.930	$\overset{r}{0}$.760* clear	
.922	.770 steady	
.920 unsteady	.777	
	.750	
	.746	

* Tree top in the range

1854

May $\frac{21}{22}$ - Sun r. Ile East Ext Th 58 Int. 59

North reading		South	real dist.	Zero
0.76.5	~~+.235~~	~~0.890~~	0.110	0.060
.755	~~.245~~	~~.902~~	.098	.060
.758	~~.242~~	~~.890~~	+10	.052
.750	~~.250~~	~~.890~~	110	.051
.760	~~.240~~	~~0.910~~	099	0.068
0 .758		~~0.896~~	0.104	0.058
ω 0.300		~~0.954~~	0.058	
~~n 686~~		~~2.180~~	0.954	
½(s+w) ~~1.133~~	½(s−w)	~~.447~~	2.180	
c ~~+.003~~	ω	~~+.015~~	t.	

Ile East
$a = +0^s.208$
$b = +0.10$
$c = -0.190$

Level

	E		W		
				n	$0^s.300$
				s	2.180
	65.0	—	61.5	+	2.480
+	57.0	—	67.5		1.880
	64.5	—	62.0	+	+1.240
+	58.0	—	66.7		+0.940
	64.0	—	62.0	+	−0.732 A
+	59.0	—	66.0		−1.430 C

6/367.5
61.25

25.7
64.28
61.25
/3.03
1.51

W +

a = +0.208
c = −0.190
b = +0.10

Lev. error. + .10

Ther 61

reading

North	South	real dist	Zero
0.765	0.940	0.060	0.070
.760	.936	0.064	.050
.762	.934	.066	.060
.780	.925	075	.057
.760	.920	080	0.055
0.765	0.931	0.069	0.058
0.293	0.989	0.058	
0.673	2.261		
~~0.[illegible]~~	~~0.348~~	0.989	
$\frac{s+w}{2}$ 1.465	$\frac{s-w}{2}$ 0.795	S = 2.260	
c + .035	ω + .063	t.	

Level

E		W			
+64.5	—	62.0		s	2.260
56.0	—	69.3	+	n	0.673
+64.0	—	62.0			2.933
56.7	—	68.5	+		1.587
+63.0	—	62.2			1.466
57.0	—	68.0	+		0.793

6/361.2
60.2

6/32.0
65.4
60.2
/5.2
2.6

W +

Lev. err. +.09

−1.430
−0.732
c = +0.036
a = +0.061

on Coreys Hill in Brighton
Double Apple tree trunk abt. three feet East of mid[illegible] of the Circle.

Ile E
$a + 0^s.061$
$b + 0.09$
$c + 0.036$

1850

May 25 6 Am Illr East.

North	reading	South	reading	Reading	Zero
0.762	.238	~~0.910~~		090	0.052
.760		~~.900~~		.100	.036
.750		~~.890~~		.110	.050
.750		~~.890~~		.110	.040
0.740		~~0.890~~		.110	.040
		5/4480		20	1/218
0.752		0.896		104	0.044
.044		044		44	
.292 = 0.668 n		.940		940 = 2.1485	

6682 n
2.816 –
1.480
1.408
.740

Col. = – 1.430 + 1.408 = – $\overset{s}{0}$.022
Az = – 0.732 + 0.740 = + 0.008

Ill E
a = +$0\overset{s}{.}008$
b = +~~0.14~~ ,21
c = –0.022

Ill E – Tempr. 53.

Level Pos. hor. S.

	E	W
+	55	65.5
	59.5	61.5 +
+	56	65.0
	59.5	61.5 +
+	55	66.0
	59	62.0 +
	1/44	6/21 5
	57.3	63.6
		57.3
		6.3

-W +3.1
Lev. corr. + .21

Level. Pos. hor North

	E	W	Ther
	59.0	61.0 +	
+	57	62.0	
	58	61.5 +	
+	57	62.0	
	57	62 +	
+	57	62	
	57.5	61.7	

W +2.1 Lev. corr + .14

May 26 : slight rain, perfectly steady & well defined marks north & south

North	~~Reading~~	South	reading	reading	Zero
0.740	~~0.260~~	~~0.902~~	=	.098	$\overset{r}{0}$.037
.740	~~.260~~	~~.902~~		.098	.040
.750	~~.250~~	~~.900~~		.100	.050
.753	~~.247~~	~~.900~~		.100	.050
0.752	~~.248~~	~~.910~~		.090	.054
1/235	5/265	14		486	1.231
0.747	.253	0.903		0.097	.046
1.046	.046	.046		1.046	
0.299	.299	0.949		0.949	

61.7
57.5
4.2
2.1

0.683 2.269

1/2(+w) 1.476 , 1/2(e–w) 793
c + .046 a + .061

Ill E
a +$0\overset{s}{.}061$
b ± 0.14
c +0.046

May 26th. Ill East

Temp

marks steady

North	South		Zero
$\overset{r}{0}$.740	~~$\overset{r}{0}$.897~~	.103	0.050
.750	~~.893~~	107	.058
.750	~~.895~~	105	.065
.740	~~.900~~	100	.050
0.750	~~.893~~	108	.055
230	4477	0.105	278
0^r746	0^r895		$\overset{r}{0}$056
$\overset{r}{0}$056	0^r056		
0^n310	0^r951		c +.011
$\overset{s}{0}$.708	$\overset{s}{2}$.172 s		a .000

0.708 n

2.882 = s+n

1.464 = s−n

1.441 = $\frac{s+n}{2}$

.732 = $\frac{s-n}{2}$

Ill. E

a 0.000

b -----

c +0.011

26th. PM

During the eclipse Ther 60.

North	South	Zero
$\overset{r}{0}$.740	$\overset{r}{.}$890	.070
.738	.890	.052
.750	.897	.058
.745	.900	.053
0.740	.900	.050
213	4477	280
0^r743	0^r895	0^r056
.056	0.056	
0^r313	0^r951	
$\overset{s}{0}$.715	$\overset{s}{2}$.172 s	

+.14 +.

0.715 n

2.887 = s + n

1.457 = s − n

1.443 = $\frac{s+n}{2}$

0.721 = $\frac{s-n}{2}$

Ill E

a − $\overset{s}{0}$.011

b -----

c +0.013

col. = − 1.430 + 1.443 = +0.013 }

az. = − 0.732 + 0.721 = −0.011 } r.

1854
june 2 5h P.M.

Ill. East

Est. 7h +74°
Telescope points north

M.C.B.

North	South Reading	Zero
0.700	0.710	0.035
706	100	056
710	090	055
675	105	060
710	107	070
3501	512	276
0.700	0.102	0.055
0 055	1.055	
0.355	0.953	
0.811n	2.1783	
	0.811 n	

2.989 = s+n
1.367 = s−n
1.494 = $\frac{s+n}{2}$
.683 = $\frac{s-n}{2}$

col = −1.430 + 1.494 = +0.064 } t
az = −0.732 + 0.683 = −0.049 }

Level C.W.S. East	West
58.0	× 59.1
57.0	× 59.0
56.0	× 57.5
× 52.0	59.5
× 52.0	58.0
× 52.0	57.0
270	50.1
54.6	58.4
	54.5 −
	3.9
	1.9

Lev. Err. +0.13 t.

Ill. East
a −0.s049
b +0.13
c +0.064

June 8 — 4^{hm} Ill. East Ext Th. – 64 Int.

North	South		Zero	E	W
N.C.B.					
$0^{r}.783$	~~$0^{r}.922$~~	078	$0^{r}.060$	58.0	×61.5
.785	~~.930~~	070	.063	58.0	×61.0
.788	~~.922~~	078	.068	58.0	×61.0
.800	~~.924~~	076	.054	58.0	×60.5
0.790	~~0.920~~	080	0.058	×53	65
3946	118	0.076	303	×52.5	65
$0^{r}789$	$0^{r}924$		$0^{r}061$	×53	64.5
$0^{r}061$	$0^{r}061$			×53.5	64
$0^{r}272$ n	$0^{r}985$ s			44.0	22.5
$0^{r}.622$ n	2.250 s			55.50	62.81

0.622 n

2.872 = s+n

1.628 = s−n

$1.436 = \frac{s+n}{2}$

$0.814 = \frac{s-n}{2}$

55.50

7.31

3.65

+0.25

Lv. Err. +0.24

$$\left.\begin{array}{l} \text{col.} = -1.430 + 1.436 = +0.006 \\ \text{az.} = -0.732 + 0.814 = +0.082 \end{array}\right\} b.$$

Ill. E

a +0.082

b +0.24

c +0.006

1852,

June 24th P.M. Ill. East Thur 76

MCB

North	South	Reading	Zero
$\overset{r}{0}$ .705	~~$\overset{r}{0}$.923~~	0.077	North 0.047
.707 - Tree top interrupts?	~~.920~~	080	.050
.780 = .220	~~.910~~	090	.058
.772	~~.916~~	084	.060
.768	~~0.923~~	.077	0.050
.777	92		0^{n} 265
0.760 = .240	$\overset{n}{0}$ 918		0^{n} 053
369	0^{r} 053		
$\overset{r}{0}$ 754	$\overset{r}{0}$.971		
0.053	$\overset{s}{2}$.218 s		
$\overset{r}{0}$.299	$\overset{s}{0}$.684 n		
$\overset{s}{0}$ 684			

2.902 = s+n

1.534 = s−n

$1.451 = \frac{s+n}{2}$

$.767 = \frac{s-n}{2}$

$$\left.\begin{array}{l} \text{col.} = -1.430 + 1.451 + 0.021 \\ \text{az.} = -0.732 + 0.767 + 0.035 \end{array}\right\} t.$$

Ill E

$$\left\| \begin{array}{l} a = +0.035 \\ b = \text{------} \\ c = +0.021 \end{array} \right.$$

1854.

June $\frac{26}{27}$ Am   Ml.² East   Ther 63°

North		South		Zero
$\overset{r}{0}$.82.5 =	~~.175~~	~~$\overset{r}{0}$.91.0~~	0.090	0.055
.788	~~.212~~	~~.968~~	097	.0.50
.790	~~.210~~	~~.890~~	110	.0.65
.798	~~.202~~	~~.900~~	100	.062
.795	~~.205~~	~~.895~~	105	.060
3996		4498		282
.799		0.899		0^r056
.056		0 056		
.257		~~1.137~~		
$\overset{s}{0}$.587 n		0.955		

$\overset{s}{2}$.182 s

0.587 n

2.769 = s+n

1.595 = s−n

1.384 = $\frac{s+n}{2}$

0.797 = $\frac{s-n}{2}$

col = −1.430 + 1.384 = − 0.046 }
az. = −0.732 + 0.797 = + 0.066 } E.

Ml E

a +0.065
b - - - -
c −0.046

July $^{23}/_{24}$th 8 Adt 1854 W. C. B. Int Ther 79°

Ill East

Zero correction to be applied so as to the measured distances of the marks.

After excessive and long continued Heat.

N	S		Zero
0.840	0.992	1.008	0.055
.842	1.025	0.975	0. 047
.846	1.010	.990	.048
.840	1.005	.995	.050
.848	1.012	0.988	.047
	044	5/4956	
0.843	1.009	.991	0.049
1.049	Zero 0 049	049	
0.206 n		1.040	
0.471 m			

~~1.058~~ 54

1.0~~40~~ s

2.~~353~~ 479 s

0.471 m

2.82~~4~~ 50 = s + n

1.~~882~~ 408 = s − n

1.4~~12~~ 15 = $\frac{s+n}{2}$

.9~~41~~ 74 = $\frac{s-n}{2}$

col. = − 1.430 + 1.4~~12~~ 15 = − 0.0~~16~~ 33
az. = − 0.732 + 0.9~~41~~ 74 = + 0.2~~09~~ 42 } t

col = − 1.430 + 1.412 = − 0.018

az = − 0.732 + 0.941 = + 0.209

Ill East

a + 0.209
b + 0.39
c − 0.018

Level Ill East

E.	W.
41.2	51.1 x
40.9	51.3 x
40.9	51.2 x
x 37.2	54.0
x 37.6	53.4
x 38.2	52.4
236.0	13.4
39.33	52.23
	39.33
	12.90
	6.45
	~~+ 0.40~~ t.
	+ 0.39

col − 0.018
az + 0.209
lev. + 0.400

July 24 5^h P.M. W.C.B. Ill. East

Marks Clear - but unsteady

North	South	Zero	Zero
0^r875	$1^r.000$	0^r062	0^r053
860	1,050	063	060
860	1.090	055	055
880	0 985	063	053
880	1,025	0.63	055
355	5.070	306	0^r276
0^r871	1,014	0^r061	.055
1^r061	0^r061		
0,190	1^r947		
$\overset{s}{0}$434	$\overset{s}{2}$,376 s		
	0.434 m		
	2.810 = s+m		
	1.942 = s−m		
	1.405 = $\frac{s+m}{2}$		
	0.971 = $\frac{s-m}{2}$		

$$\left.\begin{aligned} col &= -1.430 + 1.405 = -0.025 \\ az &= -0.732 + 0.971 = +0.239 \end{aligned}\right\} t.$$

Ill East

a +0.239
b -----
c −0.025

1854
Aug 8/9

Ex Ther 55°
Ill East

North	South
Haron	1.055
very	075
northerly	045
	.107
	.140

1.094

Augt 12th

North	Ill East South	Ex The 72 Zero	Int 74
.806 = 194	0 .945	c.050	
.807	935	.048	
.808	938	.053	
.802	937	.065	
.800	0 .932	.053	
.803	.937	.054	
.251	.991		
.574	2.265		
½(2+w) 1.419	½(2+w) .845		
c - .011	+ .113		

$-1.430 + 1.419 = -0.011$

$-0.732 + 0.845 = +0.113$

Ill East

$a + 0\overset{s}{.}113$

b ----

$c - 0.011$

Aug $\frac{13}{14}$. Cl. East Int. Ther 70 Ext 64

	North		South		Zero	Level	
	$\overset{r}{0}$.860	$\overset{r}{0}$.140	$\overset{r}{0}$.962	0.	$\overset{r}{0}$.073	E	W
	.863		.940		.072		
	.862		.960		.076		
	.850		.950		.060		
	0.850		0.962		0.067		
	.857		.955		5/348		
	.213		1.025		$\overset{r}{0}$.069.6		
	.487		2.243				
½(e+w)	1.415	½(1−w)	.928 − 0.732 = + 196				
c	−.017	a	+.198				

Cl. East

a = +0.196
b = -----
c = −0.017

August 21st WCB obs — Eyther Lat

Ill East.

	N.		S.	Zero	Level E	W
	0.793	.207	935	0.070	43.6	55.6 +
	800		937	.065	43.7	55.6 +
WCB	800		927	.054	G.P.B. 43.5	55.7 +
	785		930	.060	+ 42.0	57.9
	782		932	.066	+ 42.7	57.0
	5)3960		11	315	+ 43.6	− 56.6
	792				6)19.1	6)38.4
	0.208		932	0,063	43.2	56.4
	.063		Zero 063			43.2
	.271		0.995			4)13.2
						west too high 6.6
						0.40

b .619 b 2.274

½(e+w) 1.447 ½(e−w) .827

c + .017 a + .095

Ill East

a +0.095
b +0.40
c +0.017

Sept. 12th Ile East Level

N	S	Zero
0.760	0.860	0.058
.790	.840	.060
.768	.860	.060
.778	.850	.066
0 .753	.853	0 .060
a .770	.853	0.061
a .291	0.914	
a. 665	2.089	
½(a+c) 1.377	½(a−c) .712	
c −.053	a −.020	

Ile East

a −0.020
b - - - - - -
c −0.053

Ill. East

Sept. 13 $6^h\,30^m$ P.M. Ill East Ext. Th. 57°½ Int. Th. 61°

W. C. B

South		North		Zero	
$0^r.875$	$=1^r.125$	$0^r.790$	.210	$0^r.072$	− 0.028
~~875~~		792		078	North GPB Zero
870		792		068	
0.873		0.792			
Zero ~~0.077~~		0.073			
~~1.200~~		0.281			
		$0^s.642$			

Level	
E	W
+ 53.2	− 70.0
+ 53.0	− 70.0
+ 53.7	− 69.2
58.5	− 64.5 +
58.4	− 64.0 +
58.6	− 64.0 +
335.4	6)401.7
55.9	66.9
	55.9
	11.0
	5.5
	+0.37 b

δ

Reads

0.125

125

~~1~~30

0.127

Zero 0.073

0.946 Div

s $2^s.162$

n 0.642

$s+n = 2.804$

$s-n$ 1.520

$\frac{s+n}{2} = 1.402$

$\frac{s-n}{2} = 0.760$

col. = − 1.430 + 1.402 = − 0.028 }
az. = − 0.732 + 0.760 = + 0.028 } p.

Rev

Ill E n = 0.642 δ = $2^s.162$

" W " = 0.663 δ = 2.011 Reversell

0.021 0.151

coll. mid. wire $-0^s.010$ $+0^s.076$ for Ill E

−0.010

066

Coll mid wire Mean +0.033 for Ill E −0.033 for Ill W

(Mean is W of mid. Ill E) cor to mean of 7 wires −0.045 - - - - - - - - +0.045

" for aberration −0.015 −0.015

$c_1 =$ −0.027 Ill E $c_2 =$ −0.003

By Reversal $c_1 = -0.027$ $c_2 = -0^s.003$

by Constants $c_1 = -0.028$ $c_2 = -0.013$

N.B. The reduction of recent transits of Polaris shows that the mid wire has not altered its place relatively to the mean of the 7 wires since 1848 by $0^s.005$

Ill. West

Sept. 13 $6^h.00$ P.M. Ill West

bad seeing

Reversed to Ill. West

G. P. B.

North	South	Zero
0^r330	0^r970	0^r07
380	950	
380	940	
19	16.	
0^r363	0^r958	
0.073	0.073	
0^r_s290	0^r_s880	
n 0.663	2.011	

s 2011

s−n 1.348

s+n 2.674

$\frac{s-n}{2}=0.674$

$\frac{s+n}{2}=1.337$

$$\left.\begin{array}{l}\text{col.}=-1.350+1.337=-0.013\\ \text{az}=-0.732+0.674=-0.058\end{array}\right\}\ L.$$

Transit Reversed

Sept 13th 6h P.M.

Ill East	Ill West
a +0.028	a −0.058
b +0.37	b +0.37
c −0.028	c −0.013

Sept. 14 3h P.M. Ill. west Ext Th. 63 Int Th. 64

	North	South	Zero	Zero
	0r330	0r952	0r068	0r052
	310	930	075	047
wcb	313	950	075	067
	330	952	065	042
	318	950	070	040
	101	234	353	248
	0r320	0r947	0r.071	0r049
Z	0.060	Z 0.060	049	
	0r.260	0r.887	120	
m	0.594	2.027	0.06.0 Z	
s	2.027			
s+n	2.621			
s−m	1.433			
$\frac{s+n}{2}$	1.310			
$\frac{s-n}{2}$	0.716			

Level

E		W	
59.0	—	63.2	+
59.2	—	63.0	+
58.8	—	63.2	+
+ 53.0	—	68.0	
+ 53.0	—	68.2	
+ 53.2	—	68.0	
36.2		133.6	
56.03		65.60	
		56.03	
		9.57	
		4.28	
		+ 0.29 t.	

$$\left.\begin{array}{l} \text{col.} = -1.350 + 1.310 = -0.040 \\ \text{az.} = -0.732 + 0.716 = -0.016 \end{array}\right\} \text{t.}$$

Ill W

a −0.016
b +0.29
c −0.040

1854

Septr. 19 – 4.30 P.M. Ill. West – Int. Th 74 Extl. Th 75.5

	North	South	Zero
	0r283	0r993	0r050
	280	992	055
W C B	288	995	063
	285	983	065
	290	990	064
	1426	1453	1297
	0.285	0.990	.059

Level E		Level W
49.2	—	57.8 +
48.1	—	57.8 +
48.5	—	57.5 +
+ 45.0	—	59.5
+ 45.0	—	59.0
+ 44.8	—	58.8
6/40.6		6/50.4
46.77		58.40
		46.77
		11.63
		5.81
		+ 0.37 t.

0.226 0.931

0.517 1.128

[illegible] 1.322 ½ ([illegible]) 0.805

c −.028 a +.073

	North	South	Zero
	0.286	0.980	
	.280	.988	
C.W.I.	.290	.980	
	.287	1.010	
	.283	1.013	
	5/1426	1.010	
	0.285	1.000	
		7/6881	
		0.984	

Ill W

a +0.073

b +0.37

c −0.028

δ 25/26 } Arm N ext th 61. Int
Zero

c .952 – 0.325

Sept 27^d Am 9^h Ill West Ext Ther 72 Int Th 71

South	North	Zero	Level
0.995	0.275	0.068	
.983	.277	.058	
.995	.260	.052	
.987	.280	.055	
0.980	.272	.060	
0.988	0.273	0.059	
0.928	0.214		
1.123	0.489		
1.306	0.817		
c -.044	ω + .085		

Ill W

a +0.085
b -----
c -0.044

After this date to avoid confusion - The readings of the micrometer are to be entered for the North & South marks. If the compliments are entered a note to that effect is to be added

Oct. 11th 4h M Ext. Ther. 64°.6. Int. Ther. 64° Ill. West.

	South	North	Zero		South	North	Zero
	$0^{r}.930$	$0^{r}.357$	$0^{r}.070$				
W.C.Bond.	.940	.375	.055	G.P.Bond.	$0^{r}.919$	$0^{r}.332$	$0^{r}.035$
	.937	.360	.060		.921	.350	.060
	.940	.373	.060		.914	.367	.067
	0.937	.365	0.062		.922	.370	.077
	4.684	330	0.307		0.930	0.352	.062
	$0^{r}.937$	$0^{r}.366$	$0^{r}.061$		5)4.606	5)1.771	301
z	0.061	0.061			0.921	0.354	0.060
	0.876	0.305					
	$1^{s}.996$	$0^{s}.697$					
	$+1^{s}.346$	$0^{s}.649$					
c	$-^{s}.004$	a $-0^{s}.083$					

South North Zero

Level Int. Ther. 65

East		West	
+52.8	——	65.2	
+52.6	——	65.6	
+52.3	——	65.7	
57.1	——	60.6	+
56.8	——	60.4	+
57.6	——	60.3	+
286		178	
54.77		62.97	
		54.77	
		8.20	
		4.10	

b. + $0^{s}.27$

Ill W

a − 0.083
b +0.27
c −0.004

1854 Oct 15/16 $8^h.30^m$ Anv. Ill. West Ext. Th. 42° Int. Th. +48°

W. C. B.

North	South	Zero	Level	
			− W	E
0^r395	0^r856	0^r075	+ 78.3	— 75.2
387	885	075	+ 78.3	— 75.1
382	890	085	+ 78.0	— 75.2
398	912	065	81.0	— 72.0 +
390	893	0^r073	80.6	— 72.0 +
1452	4436	373	80.5	— 71.8 +
0^r390	0^r887	0.075	6)476.7	6)213
0^r073	0^r073		79.45	73.55
0^r317	0^r814		∴ 73.55	
			5.90	
			2.95	$= +0^s.22$

153

Ill West

$a = -0^s.163$

$b = +0.220$

$c = -0.063$

1854 Oct 24th. 4 PM. Ill W. Ext. Ther. 49°7 Int. 52°.

W.B. North.	do. not well seen South.	Zero.
$0^r.455$	$0^r 872$	$0^r.062$
.457	.888	.068
.455	.882	.077
.460	.887	.080
0.460	0.880	0.070
5)2.287	5)4.409	5)0.357
$0^r 457$	$0^r.882$	$0^r 071$
0.071	0.071	
$0^r.386$	$0^r 811$	

$\frac{s+n}{2}$ +0.598 = 1^s367 A = $-0^s.248$

$\frac{s-n}{2}$ +0.212 = 0.484 l = $+0^s.017$

Ill Zr

a −0.248
b - - - -.
c +0.017

(154) Oct. 25th Ill West. 3h 50m RK.

Ext 54°
Int 56

North	South	Zero N.	S.		Level W.	E.
0r432	0r875	0r.060 est.	.062			
.445	.862	.063	.063	+	68.2	67.0
.421	.873	.063	.062	+	67.5	67.2
.414	.862	.075	.066	+	68.0	67.0
0.425	0.860	0.065	.066		74.0	60.0 +
5)137	5)332	5)326			74.0	60.1 +
0.427	0.866	.065			73.8	60.3 +
.065	.065 rightly applied				6) 425.5	6)381.6
0.362	0.801				70.9	63.6
					63.6	+ 3.65
					7.3	

$\frac{S+N}{2}$ = 0r581 = 1.329   c = − .021   b = + 0.256

$\frac{S-N}{2}$ = 0.219 = 0.502   a = − .230

Ill West		Ill East		
a	− 0.230	a	- - - -	- - - -
b	+ 0.260	b	~~+0.22~~	+ 0.22
c	− 0.021	c	~~− 0.027~~	− 0.023

1854. Oct 25th Ilt East 4h pm.

Ext ther 54°
Int. 56°

Level.

North mark	South	Zero.	W	E
could not be seen –	~~0^{r}~~		71.1	62.0 +
Haze –	0^{r}.230	0^{r}.080	72.2	61.0 +
0.237	.230	.060	72.0	61.8 +
0.071	.240	.073	+ 67.8	65.2
0.834	.250	.071	+ 68.0	64.9
0.801	0.235	0^{r}.070.	+ 67.8	65.5
033	185	4	− 1.1	6)20.4
0.016	0.237	0.071	69.8	63.4
			63.4 — 6.4	+ 3.2
			b = + 0.222	

+ 0^{s}.037 Coll mid wire Ilt E.
− 0.045 cor to Mean
− 0.015 ~~Ilt East~~ cor for aber
− 0.023 = coll by reversal Ilt E
~~− 0.021 " Marks~~ "

c_2 = − 0^{s}.007 = coll by reversals Ilt W
c_2 = − 0.021 = " Marks " Oct 25
− 0.003 " " " Oct 26

1854. Oct 26. Ill- East 4th. Rh

North	South	Zero.
0^r.663	0^r.213	0^r.077
.675	.220	.075
.673	.230	.073
.675	.230	.072
0.677	0.224	0.070
5) 3.363	5) 1.117	5) 365
0.673	0.223	0.073
0.073	0.073	
0. ~~600~~ 400	0. ~~151~~ 850	

~~$\frac{s+n}{2}$~~ ~~0.375~~ = ~~0^s.857~~ c. – ~~.583~~

~~$\frac{s-n}{2}$~~ ~~0.225~~ : ~~0^s.514~~ A. – ~~.218~~

0.673

Zer 1.073

0.400

$\frac{s+n}{2}$ = 0^r.625 = 1^s.429 c = – 0^s.003

$\frac{s-n}{2}$ = 0^r.225 = 0^s.514 a = – 0^s.218

Ill. East

a – 0.218

b - - - - -

c – 0.003

1854. Oct 27. 2d. E. 3.30. P.M. Ext. Ther 68°.5 Int. Ther. 67°

WCB. ~~North.~~	WCB. ~~South.~~	WCB. ~~Zero.~~
~~0.697~~	0.138	0.065
.718	.152	.052
.709	.145	.068
.710	.160	.055
0.712	0.142	0.053
5) 46	5) 237	5) 295
0.709	0.147	0.059
0.059	0.059	
~~0.650~~ 350	~~0.088~~ 912	

1.4

$\frac{s+n}{2} = 0.631 = 1.442\, c + .012$

$\frac{s-n}{2} = 0.281 = 0.642\, a - .090$

$c =$

Ilu E

a	−0.090
b	——
c	+0.012

1854

Oct. 31st Ext Th 68° Int Th 66

mer. Marks perfectly distinct and steady.

	North		South	Leo	Level	
					E	W
i –	0.750	1st –	.145	.056		
	737		.150	.060	+ 56.3	– 68.0
W.C.B.	935		.148	.053	+ 54.5	– 68.0
	.730		.153	.068	+ 56.0	– 67.0
	0 .726		.148	.067	57.2	– 64.0 +
	5/178		5/244	304	57.5	– 63.2 +
	0.736 – 0.264		.149 = 0.851	.061	57.3	– 63.0 +
	061		061		6/38.8	6/33.2
	0.325		0.912 = ɔ = 2.084		56.47	65.53

s+n 1.237 1.237 587
s–n 0.587 .177 84
.1414 671

0.742
2826
1.342 1.414 – 1.430
- 0.671 – 0.732

56.47
19.06
4.53

$\frac{s+n}{2}$ + .618 5 = 1″414 c = – .016 b = +0.30

$\frac{s-n}{2}$ + .293 5 0.671 a = – .061

– 0.31

Ille E

a – 0.061
b + 0.31
c – 0.016

Novr. 1.4 PM

North	South	Zero	Zero
1r − 0.748	+1r −0.123	.087 N	0.070 S
.742	123	.050 N	.072
.733	147	.060 N	.083
.750	145	.072 N	.082
0.743	.142	.062 N	.077
1 216	57 ~~580~~	.331	.384
43	.436		

.071

0 ~~.257~~
.328

0 ~~.864~~
.935

$\frac{s+n}{2}$ .631 = 1.443   c = +.013

$\frac{s-n}{2}$ = .303   1.694   a = −.038

Th. E

a −0.038
b - - - - -
c +0.013

1854 Ill. Σ. Ext Th 40 — Int Th 42.

Nov. 16th 4 PM

	N		S	Zero N	Level + East	West
	0.674		0.288	0.058	+ 76.2	83.5
	.689		.294	.072	+ 76.5	83.2
P.S.C	.690	P.S.C.	.280	.065	+ 76.6	83.0
	.678		.273	.068	80.0	78.5 +
	.685		.273	.081	79.3	78.5 +
	416		5)408	.077	79.0	78.7 +
	0.683		.2816	.451	6)467.6	6)485.4
	~~.344~~ .392		~~.718~~ .793	.075	77.93	80.90
						.)2.978
						1.488 4

$\frac{s+n}{2}$ ~~.592~~ = 1.~~183~~ .354

$\frac{s-n}{2}$ .200 = 0.458

c = − ~~.247~~ .076

a = − .274

b = + ~~0.71~~ +0.23

77.93
80.90
2.97

Ill Σ

a −0.274
b +0.23
c −0.076

1854. ~~Nov. 3~~ 3+ Dec. 1. ^{8h} P.M. Tr. Circle Ill. East — Ext Ther. 27.7
4 P.M. — Int. Ther. 32

Perfect definition.

	North	South	Zero
	0.632	0.365	0.075
	.630	.370	.073
M.B	.635	.368	.073
	.630	.365	.072
	0.640	0.367	0.070
	5) 167	5) 375	5) 363
	0.633	0.367	0.073
Zero	073	073	
Dist =	0.440	0.706	

$\frac{r+w}{2}$ 0.573 = 1.310 c = − .120

$\frac{r-w}{2}$ 0.133 0.304 a = − .428

b = + 0.02

E	Level	W	
+ 89.5	—	87.5	
89.0	—	88.0	
88.8	—	88.4	
87.5	—	90.0	+
87.5	—	90.0	+
87.8	—	89.5	+
6) 530.1		6) 533.4	
88.35		88.9	
		88.35	
		2) 55	
		.27	

Ill E

a − 0.428
b + 0.02
c − 0.120

Dec 2nd P.M.

N	S
0.60	0.37

1854

~~Nov~~ Dec. 6 4h P. M. Ext. +31° Int Th 34

Ill East

W. C. B.

North	South	Zero
0r585	0r432	0r098
595	400	085
600	420	090
587	425	092
588	420	087
2855	97	452
0r571	0r419	0r.090
0.519	0.671	

$\frac{s+n}{2}$ .595 = 1s360 c = -.070

$\frac{s-n}{2}$ .076 = .174 a = -.558

Reversed

Ill E

a -0.558
b ----
c -0.070

Ill W

a -0.527
b -0.06
c -0.067

Dec. 6^{h} 4^{h}30^{m} P.M. Ill. West

W.C.B.

North	South	Zero
0^{r}530	0^{r}727	0^{r}085
620	765	075
592	750	085
597	803	082
597	785	075
2936	3832	402
.587	0.766	0^{r}.080
Zero 080	0.080	
0.507	0.686	

$\frac{s+n}{2}$ = .596 = 1^{r}363

$\frac{s-n}{2}$ = .090 = .205

c = −.064

a = −.524

b = −0.06

Level

× East	W
+ 89.0 −	86.2
+ 88.5 −	87.0
+ 88.2 −	87.3
88.3 −	86.9+
88.5 −	86.7+
88.0 −	86.8+
25	40.8
88.42	86.80
	88.42
	1.62
	0.81
	−0.06

× West	East
× 86.8 −	88.3
86.7	88.5
86.8	88.0

J.

W.C.B.

1854

Decr 18th - Ill West - $3^h.30^m$ P.M. Ther + 24°

North	South	Diff
0.546	0.775	0.095
545	782	092
546	792	087
522	752	085
560	813	070
219	5) 414	5) 429
.544	.783	.085
.459	.698	

$\frac{s+n}{2}$ .598 1.322 c -.028

$\frac{s-n}{2}$ .119 .273 c = -.459

b = -0.11

Level

	E		W	
+	90.0	—	88.0	
+	89.0	—	89.0	
+	88.5	—	88.7	
	91.7	—	86.5	+
	91.3	—	86.0	+
	90.6	—	86.5	+
	6) 541.1		6) 524.7	
	90.18		87.45	

- 2.73

- 1.36

-0.11

Ill West

a -0.459
b -0.11
c -0.028

Ill East

a -0.485
b -0.02
c -0.159

Dec. 18 4^h P.M. Ill East — Ther 24

W.C.B

North	South	Zero
0^r 647	0^r 432	0^r 080
685	453	070
670	442	068
660	443	070
680	440	068
692	210	356
.658	.442	.071
.413	.629	

Level

	E		W	
+	88.0	—	87.5	
+	87.5	—	88.0	
+	87.0	—	88.2	
	88.0	—	87.0	+
	88.3	—	86.5	+
	88.0	—	86.2	+
	6)46 8		6)43.4	
	87.8		87.2	

− 0.6

− 0.3

$\frac{s+n}{2}$ = .521 = 1.191 c −.159

$\frac{s-n}{2}$ = .108 = .247 a −.485

b = −.02

1855 Jan 5th   Ill East – 4 Pell   Ext Th 39 Int 42

N.B. North	South	Zero S	Zero N		Level 5h E.	W. JMB
0.643	0.365	.090	.075	165	84.9	81.7 +
.626	.380	.083	.076	159	84.7	81.7 +
.640	.395	.080	.077	157	81.2 +	85.1
.643	.390	.080	.073	153	81.4 +	84.8
0.600	0.375	.082	0.072	154	122	133
92	605	.079			83.07	83.3
.618	.381				± 0.2	
N .461	S. 698				+ 0.1	

$\frac{S-N}{2}$ + .118 = $0^d.271$ $\tau = -0^d.025$

$\frac{S+N}{2}$ + .580 = 1.325   a = −0.461

b = + $0^d.01$

Ill East   Ill West

	Ill East		Ill West
a	−0.461	a	−0.468
b	+0.01	b	——
c	−0.025	c	+0.073

1855 Jan. 5. Ill. West

North.	South.	Zero
0r 570	0r 800	0r.085
590	842	.080
.578	.807	.083
.643	.818	
0.630	0.838	
~~4.250~~	105	9
0.598	0.821	.083
.083	.083	
.507	0.738	

$\frac{S\mp N}{2} + .625 = 0^d.264$ = r +.073

$\frac{S+N}{2} + .622 = 1^d.423$ a = −.468

Jan 22ᵈ 1855 Ill. West L 4½. Bad seeing
Windy ther = 41°.3

North	Zero	South
0ʳ.603	0ʳ.075	0ʳ.800
.587	.072	.793
.588	.070	.810
.600	.080	.808
.593	.070	.810
2971	367	4021
0.594.2	073.4	0.804.2
0.520.8		0.730.8

$\frac{s+n}{2}$ = 0ʳ 626 = 1ˢ.440 c = + 0ˢ090 }
$\frac{s-n}{2}$ = 0.105 = 0ˢ240 a = −0.492 }

Ill West

a −0.492
b - - - - -
c +0.090

1854

Jan 24 4^h P.M. Ill. West Ex Ther 29° Int. 32°

good seeing

North	South	Zero	Level E		Level W
0^{r}660	0^{r}812	0^{r}070			
670	822	080	+ 91.5	—	87.2
672	822	080	+ 90.7	—	88.0
665	822	070	+ 91.3	—	88.0
668	820	070	92.1	—	86.0 +
335	/98	370	92.2	—	86.0 +
0^{r}667	820	−0^{r}074	92.0	—	86.0 +
−0 074	74		6)9.8.		6)41.2
0^{r}593	.746		91.63		86.87
			86.87		
			/4.76		
			−2.38		

$\frac{s+n}{2} = 0^r670$ 1^{r}530 i + 0^{s}180

$\frac{s-w}{2} = +0^r076$ 0^{r}175 $a = -0.557$

$b = -0^s19$

Transeit circle reversed

January 24

1855

For results see next page

Jan. 24 $4^{h}.15^{m}$ Ill. East Exp 29. Int 32

South	North	Zero		Level E — W
0^r425	0^r621	0^r082	s 1.501	E — W
423	625	080	n 1.058	+89.1 — 87.0
428	627	087	2.559	+89.0 — 87.0
426	613	085	0.443	+88.5 — 87.3
428	615	0^r082	1.279	90.0 — 86.0 +
30	101	16	0.222	89.2 — 85.8 +
0^r426	0.620	0^r083	−1.430	89.0 — 86.0 +
1.083	1.083		−0.732	6/5348 6/391
0.657	0.463		c −0.151	89.1 86.5
1.501	1.058		a −0.510	86.5
				126
				1.3 = −0.10

.425
085
510
0.490

575
85
490

Ill W	Ill E
a −0.557	a −0.510
b −0.19	b −0.10
c +0.180	c −0.151

1855

Feb. 10th – 4 PM Ill East

Int Ther 22°.8 Ext Ther 20°.3

	South	North		Zero S	– Zero N
565	0.435	0.685	0.325	0.092+	0.080
	.423	.680		.092	.097
	.445	.660		.090	.090
	.437	.675		.082	.085
	0.433	0.670		.090	0.075
	5/173	/390		5/446	5/427
	0.438	0.673		0.089	0.085
	~~0.562~~	~~0.327~~			089
				Zero	0.087
Zero	1.087	1.087			
	0.649 – n	0.414 – s			
	1.485 s	0.937 s			
	0.937 n				

2.422 = s + n

0.548 = s – n

1.211 = $\frac{s+n}{2}$

0.274 = $\frac{s-n}{2}$

Col = – 1.430 + 1.211 = – 0s.219

Az = – 0.732 + 0.274 = – 0.458

Level

E		W	
	98.9 –	91.5	+
	98.5 –	92.2	+
	98.5 –	92.3	+
+	95.4 –	95.0	
+	95.2 –	95.0	
+	96.0 –	94.0	
	6/425	6/200	
	97.83	93.33	

93.33

)4.50

2″.25 = – 0s.19

Col – 0.22

az – 0.46

Ill E

a – 0.458

b – 0.19

c – 0.219

Feb. 28 $5^h\,30^m$ P.M. Ill. East Ext. Th +25°

W.C.B.

North	South	Zero
0^r680	0^r395	0^r086
683	415	082
692	410	083
680	412	078
672	415	090
407	47	419
$0^r.681$	0.409	0.084
1.084	1.084	
0.403	0.675	
$\overset{s}{0}.921$ n	1.542	

1.542 s
2.463 = n+s
0.621 = n−s
1.231 = $\frac{n+s}{2}$
0.310 = $\frac{n-s}{2}$

Level

E	W
+ 94.7 −	90.5
+ 93.8 −	91.3
+ 93.8 −	91.3
93.8 −	91.0 +
93.7 −	91.0 +
93.2 −	91.1 +
23.0	6.2
93.83	91.03
−91.03	
2.80	
1.40 − $\overset{s}{0}.17$	

Col −1.430 + 1.231 = −0.199
Az −0.732 + 0.310 = −0.422

Ill E

a −0.422
b −0.11
c −0.199

1853phae.proj

March 2nd 1855

Collimation changed

Diaphragm taken out-

See also April 10th 1855
when it was again altered-

By careful Micrometric measurements April 9th the correction to reduce the mid-wire to the mean of the seven was found to be $\frac{1}{2}(0^s.046 + 0^s.043) = 0^s.045$ or identically the same as before used & in the same direction

From Star passages (vide reduction of Chron. Exped- 1855)

I&E Mid - Mean $= -0^s.018 \pm 0^s.006$
Old value " $= -0.045$

New Collimation

March 6th 1855 Ill East Ther 41½
W.C.B. Obs

	North	South	Zero	Level E	Level W
	0.780	0.403	.095	+77.3	−81.6
	.782	.400	.085	+77.6	−81.4
	.770	.397	.075	+77.9	−81.1
WCB	.778	.405	.080	82.9	−75.6 +
	.783	.390	.075	81.5	−76.1 +
	.777	.406	390	81.1	−76.2 +
	4670	2401	0.078	6)478.3	6)472.0
	.778	0.400		79.72	78.67
	1.078	1.078		78.67	
	0.300	0.678		1.05	
				0.52 = −0.02	

0.686 n
1.549 s
2.235 = n+s
0.963 = n−s
$1.117 = \frac{n+s}{2}$
$0.481 = \frac{n-s}{2}$

Col − 1.430 + 1.117 = −0.313
Az − 0.732 + 0.481 = −0.251 WCB

S.S.C. obs

	North		South	Zero
	0.793		0.404	0.099
	.784		.391	.089
SSC	.766	SSC	.391	.082
	.758		.398	.077
	.773		.409	.080
	374		1993	427
	0.775		0.399	0.085
	1.085		1.085	
	0.310		0.686	

0.708 n 1.
1.568 s
2.276 = n+s
0.860 = n−s
$1.138 = \frac{n+s}{2}$
$0.430 = \frac{n-s}{2}$

Col. − 1.430 + 1.138 = −0.292
Az. − 0.732 + 0.430 = −0.302 S.C.

Note. Collimation altered on March 2nd 1855
Ill East
a − 0.276
b −0.02
c −0.302

1.78
10.89
.89

New Collimation

March 9th 1855 Ill East & Ther 42.~~6~~5
W. C. B. obs. Tw Ther 40. 0

North	South	Zero	Level
	0.374	0.075	
	.382	.080	
	~~.370~~	.090	
	.381	.078	
	.373	.089	
	.900		
	380		

R. S. C.

North	South	Zero
	0.363	0.095
	.368	.080
	.376	.097
	.363	.090
	0.364	0.087
		445

1855
March 9th

Ill East

Ext Ther 42.3. Int 41

P.S.C.

North	0.730	South	0.431	Zero S
0.732	0.086	0.426	0.086	0.090
.721	0.356	.436	0.655	.091
.721	0.814	.434	1.496 = s	.092
.721		.431	0.814 = m	.111
0.722		0.436	2.310	.103
3667		2163	0.682	487
			1.155	
733	0.730	432	0.341	097

North	South	MCB	Zero S
.730	442	-1.430	088
.728	423	-0.732	085
722	430	-0.275 = c	080
730	433	-0.391 = a	085
730	427		095
3640	2155		433
728	431		087

P.S.C. Level — Ml Level

Cross b. East — Cross b. West

	E	W	E	W
+	82.8	85.1	× 82.6	84.5
+	82.3	84.9	× 82.7	84.3
+	82.8	84.3	× 82.3	84.2
	82.9	80.4	86.2 ×	79.5
	82.5	80.4	85.4 ×	79.8
	82.4	80.4 +	83.6 ×	76.4

W C B N Zero N	P S C Zero N
080	0.079
080	0.091
075	0.072
075	0.090
080	0.085
390	417
078	083

Level THS — Level P.S.C

Cross bub East

E	W	E	W
82.6	84.5	82.8	85.1
82.7	84.3	82.3	84.3
82.3	84.2	82.6	84.3
16		17	13.7
82.5	84.3	82.5	84.6
84.3		84.6	
6.8		2.17	
83.4		83.1	
83.1			

1)35 155
82.6 82.6

Ill East

a −0.391
b −0.09
c −0.275

Cross West

E	W	E	W
86.2	79.5	82.9	80.4
85.4	79.8	82.5	80.4
83.6	76.4	82.4	80.4
22 8	8 8		

83.80 81.5
81.50
2.30
1.15 = −0.09

Order Ile East
A first wire

~~March~~ April 9th 1855 Ile West

Examination of the intervals of the wires

		1	Ile E			
G	A	$40^{r}87$	G ~~G~~ to D	=	$18^{r}.05$	
F	B	35.10	F B "	=	12.09	
E	C	29.09	E C "	=	5.79	
D	D	23.09	D D "	=	0.00	35.93
C	E	17.30	C E "	=	6.00	
B	F	11.00	B F "	=	12.01	
A	G	5.04	A ~~G~~ "	=	17.78	

35.79
7) 14
$0^{r}.02 = 0^{s}.046$

W. C. B. Apr 10th

A	35.891	A to D	17.791	
B	30.106	B "	12.006	
C	24.109	C "	6.009	
D	18.100	D "	0.000	35.806
E	12.320	E "	5.780	
F	6.011	F "	12.089	
G	0.033	G "	18.067	

35.936
7) 130
$0.019 = 0^{s}.043$

March 20 3^h P.M. Ext. Th +36°

W. C. B. Ill. East – (good seeing)

South	North	Zero	Level E	W
0^r428	0^r747	0^r085	86.5 —	82.0 +
428	750	075	86.5 —	82.2 +
436	755	082	86.3 —	82.2 +
428	742	078	+ 83.1 —	85.1
420	742	076	+ 83.0 —	85.0
140	236	396	+ 82.5 —	85.1
$\overset{r}{0}$.428	$\overset{r}{0}$.747	0.079	127 9	21.6
1.079	1.079		84.65	83.60
0.651	0.332		83.60	
1.486 s			1.05	
0.759 n			0.52	$-\overset{s}{0}.04$

2.245 n+s

0.727 n−s

1.122 $\frac{n+s}{2}$

0.363 $\frac{n-s}{2}$

col −1.430 + 1.122 = $-\overset{s}{0}.308$

Az −0.732 + 0.363 = −0.369

Level −0.040

Ill East

a −0.369

b −0.040

c −0.308

March 30th 5h 35m P.M. Ill. East
Ext. Th. + 53°

W.C.B.

South	North	Zero
0r427	0r710	0r075
402	725	081
400	713	085
410	704	085
406	697	070
45	49	)396
0.409	0.7006	0.079
1 079	1 079	
.670	0.369	
S 1.537	n 0.843	

n 0.843
2.374
0.688
1.187 − 1.430 = 0.243 Reversed
0.344 − 0.732 − 0.388

B
Level

E		W	
+ 80.0	—	79.6	
+ 78.5	—	80.2	
+ 77.5	—	80.4	
81.8	—	75.2	+
80.5	—	75.4	+
80.2	—	75.3	+
6)478.5		6)466.1	
79.8		77.7	
77.7			
2.1			
1.05 = −0.08			

Reversed
Ill. West

mark flickering
Ext Ther 51

W.C.B.

South	North	Zero
0r912	618	0r090
940	630	080
925	630	077
924	618	075
930	623	073
)131	)119	
0.926	0.624	
73	73	
.853	0.551	

Level

E		W	
79.0	−	73.5	+
78.7	−	73.6	+
78.5	−	73.5	+
+ 76.0	−	75.7	
+ 75.7	−	75.3	
+ 75.5	−	74.8	
434		26.4	
77.23		74.4	
74.40			
2.83			
1.42 = −0.10			

s 1.949 n 1.259
n 1.259
+ 3.208
+ 0.694
1.604 − 1.350 = + 0.254 c
0.345 − 0.732 − .387 a

Ill E
a − 0.388
b − 0.08
c − 0.243

Ill W
a − 0.387
b − 0.10
c + 0.254

1855
April $\frac{9}{10}$ Am Ill west W. C. B. Apr 9/10

Ill West

Intervals of wires and az. mer. marks

South	North	Zero S	Zero N [illegible]
$0^r.970$	$0^r.620$	$0^r.083$	$0^r.068$
.993	613	.083	0.072
970	600	.085	0.075
960	610	.075	0.085
968	610	090	0.078
4861	3053	416	.378
9722	6106	0832	0 0756
0.079	0.079	0.756	
0.893	0.531	0.0794	

δ = 2.041
n = 1.213
3254
0.828

a −0.318
b ----
c +0.277

coll = +1.627 − 1.350 = $+0^s.277$
az = +0.414 − 0.732 = −0.318
az = $-0^s.318$
coll = $+0^s.277$

$\delta = 2^s.041$ n = 1.213 Micrometer measures of intervals of wires
In the order of AR with illumination west. A being wire nearest ill end axis

A	A·B	B·C	C·D	D·E	E·F	F·G
$0^r.018$	$5^r.980$	6.335	$6^r.686$	$6^r.090$	6.085	5.865

After above obs. Diaphragm taken out – Collimation altered.
Took out the Diaphragm – appeared all right.

April 10th Measured again in the same order

A	A to B	B to C	C to D	D to E	E to F	F to G
$0^r.025$	$6^r.016$	$12^r.320$	18.090	24.110	30.100	35.895
.020	6.017	313	.100	.102	117	.887
Back .050	000	.328	.110	.116	100	.891
0.033	6.011	12.320	18.100	24.109	30.106	35.891

Expt the 50 int 46

A to D (mid)	18.065	Zero	South	North
D to G	17.805	0.100	0.950	0.607
B to D	12.074	.082	953	.595
D to F	12.010	.100	950	.593
C to D	5.770	.110	955	.590
D to E	6.020	0.100	0.952	0.592
			10	2977 (.595
			0.952	

A here is 1st wire transited by a star above pole Ill W

n = $1^s.135$
δ = 1.949
δ+n = 3.084
δ−n = 0.814
col = +1.542 − 1.350 = $+0^s.192$
az = +0.407 − 0.732 = −0.325

	South	North
	0.952	0.595
Zero	0.099	0.099
	0.853	0.496

New Coll } az = $-0^s.325$
coll = +0.192 afterwards Reduced

Collimation again altered on April 10th 1855

78
10
68

Final New coll April 10th P.M = ~~$+0^{s}.192$~~ $-0^{s}.040$ See below
Previous " $+0^{s}.277$

952	595	0.853	0.496
084	084	084	084
0.868	0.511	0.769	0412

Coll. Reduced

84 82
66 05

Zero	Zero	S	N
~~0.06~~3	0.105	0.865	0.513
~~05~~5	104	.843	.500
	104	.847	.490
		.862	.503
		.851	.500
		268	0.501
		0.854	0.104
		Zero 0.104	0.397
		0.750	

S 1.714
n 0.907
2.621
0807

Constant

Coll = $+1.310 - 1.350 = -0^{s}.040$ = New Coll
az = $+0.404 - 0.732 = -0.328$ = az

Ile W Note Previous to this obs. Coll Reduced

a −0.328
b ......
c −0.040

1855 Apl. 11-12

Ill west

Ext Th 39   Int 40°

very steady, good seeing

	South	North	Zero
NCB	0.835	$0^{r}.570$	$0^{r}.110$ South
	.835	.570	.103
	840	570	.105
	836	.567	.102
	.850	.565	.103
	196	.2842	523
	0.839~~2~~	568~~4~~	.104~~5~~
	0.104		

Level

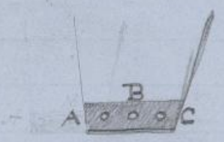
	E		W	
+	84.2	—	80.2	
+	84.2	—	80.2	
+	84.4	—	80.0	
	85.0	—	78.1	+
	84.9	—	78.1	+
	85.0	—	78.0	+
	277		4746	
	84.62		79.10	
	79.10			
	5.52			
	2.76 = −0.21			

	South	North	Zero
P.S.C	$0^{r}.821$	$0^{r}.559$	0.112
	.833	.561	.118
	.836	.560	.100
	.826	.559	.120
	0.830	0.550	0.112
	146	39	572
	829~~2~~	0.558	114~~8~~
above	839	0.568	
	0.834	0.563	
Zero	0.109	0.109	
	0.725	0.454	
s	1.656	n 1.037	
n	1.037		
	2.693		
	0.619		

1.346 − 1.350 = −0.004 c

0.310 − 0.732 = −0.422 a

North mark



B^{r} − C	B − A
1.835	$0^{r}.318$ (Comp)
.820	.305 "
.810	.317 "
827	.318
830	.315
122	

Ill W

a $-0^{s}.422$

b ~~−0.024~~ −0.21

c −0.004

N.B. Have revised the values a b & c
from March 1854 to date
April 21 1855 –

Those to be adopted have vertical lines next to || a
b
c

April 21st 5 P.M. Ill W — G.P.B

N	S	Zero
0.540	0.890	0.110
.492	.883	.103
.520	.877	110
52	10	0.108
0.517	0.883	

Zero 0.108 0.108
0.409 0.775
n 0.935 S 1.770
S 1.770
2.705
0.835
1.352 – 1.350 = +0.002
0.417 – 0.732 = –0.315

Ill W.
|| a – 0.315
b - - - -
c + 0.002

Observed values of azimuth, level and collimation Errors.

	Date.		a red. Az	b Hack. Level	c₁ blue. Coll ~~De.~~ E.	c₂ De. W.	Thr.	
1854.	Mar. 16/17	8 30. A.M.	-.243	-.05	-.093			-.241
	May. 1	6 40. A.M.	-.213	.00	-.036			
	17	7 P.M.						
	21/22	5 A.M.	+.015	+.10	+.003			+0.208 +0.10 -0.190 10 E.
	21/22		+.063	+.09	+.035			+0.061 +0.09 +0.036 E.
	25	6 A.M.	+.008	+.21	-.022			AM
	25		+.061	+.14	+.046			
	26		.000		+.011			
	26 ~~A~~	P.M.	-.011		+.013			
	June 2.	5 P.M.	-.049	+.13	+.064			
	8	4 P.M	+.082	+.24	+.006			
	24	. P.M	+.035		+.021			
	26/27.	. A.M	+.065		-.046			
	July 23/24	8. A.M.	+.209	+.40	-.018			+0.39
	24	5 P.M	+.239		-.025			
	Aug. 12		+.113		-.011			
	13/14		+.198		-.017			+.196
	21		+.095	+.40	+.017			
	Sept. 12		-.020		-.053			
	13	5 30 P.M	+.028	+.37	-.028			
	13	6 00 P.M	-.058	+.37		-.013		
	14	3 P.M	-.016	+.29		-.040		
	19	4 30 P.M	+.073	+.37		-.028		
	27	9 A.M	+.085			-.044		
	Oct 11	4 P.M.	-.083	+.27		.004		
	15/16	8 30 A.M	-.163	+.224		-.063		
	24	4 P.M	-.248			+.017		+0.017
	25	3 50 P.M.	-.230	+.260		-.021		+.260
	1	4 P.M		+.222	-0.023			+0.22
	26	4 30 P.M	-.218		-0.003	+.018		
	27	3 30 P.M	-.090		+0.012	+.012		

Observed values of Asimuth Level and Collimation Errors.

Date	a Az.	b Level	c1 Ill. E.	c2 Ill. W.	Thr.	C1	C2	Date	a As	b Level	c1 Ill E.	c2 Ill. W.	Thr.
1854. Oct. 31st.	-0.061	+0.31	-0.016										
Nov. 1. 4 P.M.	-0.038	.... -	+0.013										
Nov 16. 4 P.M.	-0.274	+0.23	-0.076										
Dec. 1st. 4 P.M.	-0.428	+0.02	-0.120										
Dec. 6. 4 P.M.	-0.558		-0.070										
„	-0.527	-0.06		-0.067									
„ 18. 3.30 P.M.	-0.459	-0.11		-0.028									
1855 „ 1855	-0.485	-0.02	-0.159										
Jan 5. 4. P.M.	-0.461	+0.01	-0.025										
„	-0.468			+0.073									
„ 22. 4.30 P.M.	-0.492	----		+0.090									
„ 24. 4.15	-0.557	-0.19		+0.180									
„	-0.510	-0.10	-0.151										
Feb. 10. 4 P.M.	-0.458	-0.19	-0.219										
„ 28. 5.30 P.M.	-0.422	-0.11	-0.199										
March 6	-0.276	-0.02	~~-0.302~~			-0.275							
„ 9	-0.391	-0.09	~~-0.275~~			-0.248							
„ 20 3. P.M.	-0.369	-0.040	~~-0.308~~			-0.281							
„ 30. 5.35 P.M.	-0.388	-0.08	~~-0.243~~			-0.216							
„	-0.387	-0.10		~~+0.254~~			+.227						
April 9/10 A.M.	-0.318			~~+0.277~~			+0.250						
„ 10	-0.328			~~-0.040~~			-0.067						
11-12.	-0.422	-0.21		~~-0.004~~			-0.031						
„ 21. 5 P.M.	-0.315			~~+0.002~~			-0.025						

1854)

Apr.–Oct. Interpolated values of azimuth, level, and collimation errors.

	a	level	Col. Ille E	col. Ille W
1854. Mar. 11	−.33	−.05	−.09	
Apr. 3	−.21	−.01	−.07	
4	−.21	−.01	−.07	
5	−.22	−.01	−.07	
7	−.23	−.02	−.07	
May 8	−.04	+.03	−.03	
June 2	−.05	+.13	+.07	
5	+.01	+.14	+.04	
9	+.09	+.19	+.02	
July 4	+.14	+.36	−.07	
5	+.15	+.36	−.07	
6	+.16	+.36	−.07	
7	+.18	+.37	−.07	
8	+.18	+.37	−.07	
17/18	+.22	+.39	.00	
31	+.21	+.41	.00	
Aug. 1	+.21	+.41	.00	
2	+.21	+.41	.00	
3	+.20	+.41	.00	
5	+.20	+.41	−.01	
15/16	+.13	+.40	.00	
28	+.05	+.37	+.02	
29	+.04	+.36	+.02	
30	+.03	+.36	+.02	
Sept 27	+.08	+.37	~~−.04~~	−0.04
28	+.08	+.37	~~−.04~~	−0.04
29	+.08	+.37	~~−.04~~	−0.04
30	+.08	+.37	~~−.04~~	−0.04
Oct 2	+.08	+.36	~~−.04~~	−0.04
5/6	0.00	+0.30		−0.05
7	−0.03	+0.30		−0.05
9/10	−0.06	+0.28		−0.06
16	−0.17	+0.22		−0.05
17/18	−0.19	+0.22		−0.04
19	−0.21	+0.23		−0.02
21	−0.23	+0.25		0.00

Oct — Feb. Interpolated values of azimuth, level & collim. Er.

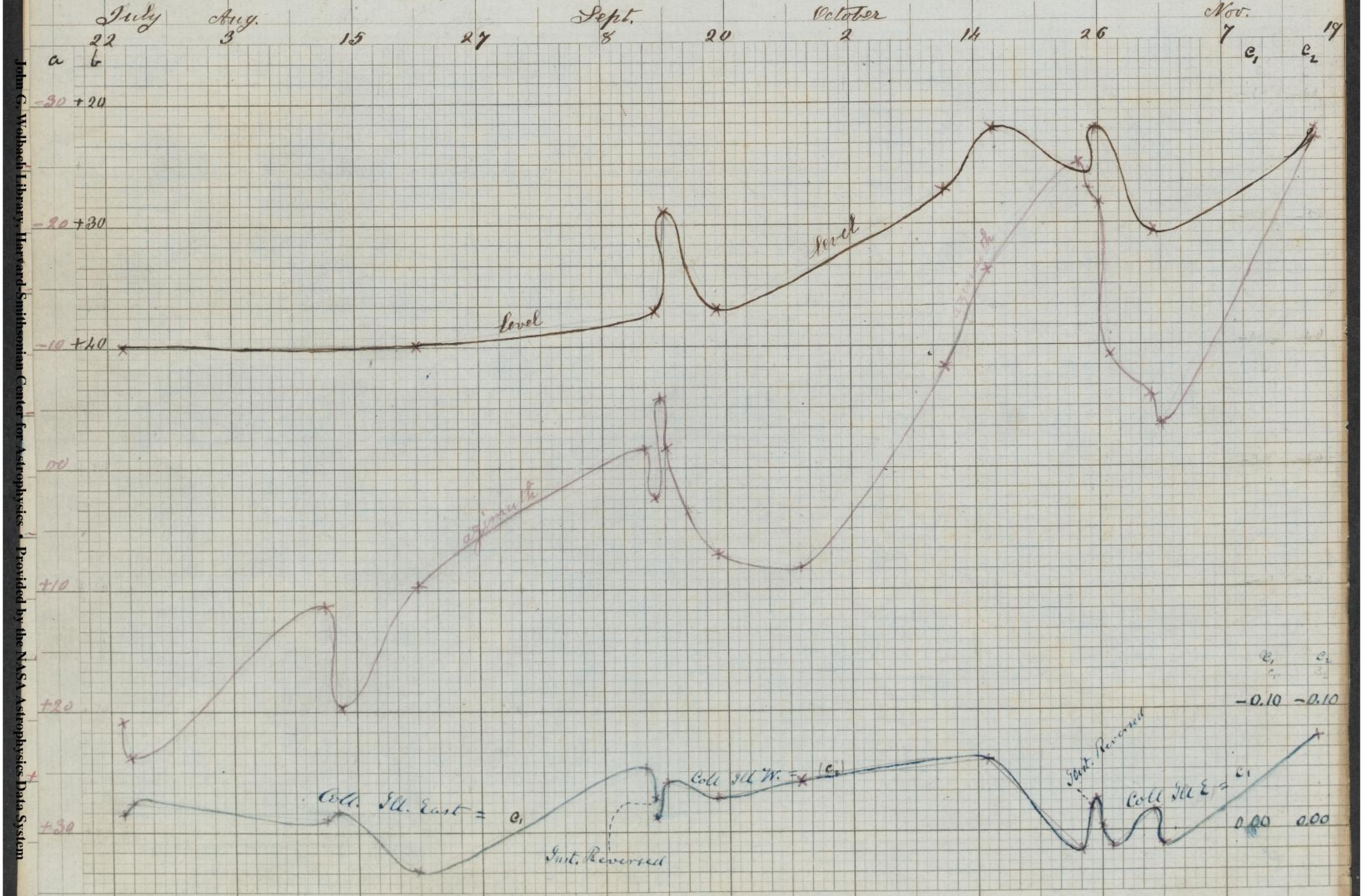
1854	Illum.	azim.	level	Collim.
1854 Oct. 22/23	West	-0.25	+0.25	+0.01
24	"	-0.248	+0.26	+0.02
24/25	"	-0.24	+0.26	0.00
25/26	East	-0.23	+0.24	-0.02
26	"	-0.218	+0.22	0.00
26/27	"	-0.15	+0.22	0.00
27	"	-0.09	+0.23	+0.01
28	"	-0.08	+0.25	+0.01
31/32	"	-0.05	+0.31	0.00
Nov. 2	"	-0.04	+0.31	+0.01
4	"	-0.07	+0.30	0.00
5/6	"	-0.09	+0.29	-0.01
7	"	-0.12	+0.29	-0.02
8	"	-0.14	+0.28	-0.03
9/10	"	-0.16	+0.27	-0.03
12/13	"	-0.21	+0.26	-0.05
13	"	-0.22	+0.25	-0.06
19/20	"	-0.30	+0.19	-0.09
20	"	-0.31	+0.18	-0.09
20/21	"	-0.31	+0.17	-0.09
23	"	-0.34	+0.14	-0.10
25	"	-0.36	+0.11	-0.11
26/27	"	-0.37	+0.09	-0.11
27/28	"	-0.39	+0.08	-0.12
28	"	-0.39	+0.07	-0.12
30/31	"	-0.41	+0.05	-0.12
Dec. 4/5	"	-0.53	-0.04	-0.09
5/6	"	-0.55	-0.05	-0.07
6/7	West	-0.53	-0.06	-0.07
7/8	"	-0.51	-0.07	-0.06
8/9	"	-0.57	-0.08	-0.06
2	East	-0.44	0.00	-0.12
9	West	-0.50	-0.08	-0.05
12	"	-0.48	-0.10	-0.04
12/13	"	-0.48	-0.10	-0.04
13/14	"	-0.47	-0.10	-0.04
1854	Ill.	az.	level	coll.
Dec. 14/15	West	-0.47	-0.10	-0.04
19	East	-0.48	-0.02	-0.15
20	"	-0.48	-0.01	-0.14
21	"	-0.48	-0.01	-0.13
24/25	"	-0.48	0.00	-0.11
25	"	-0.48	0.00	-0.10
30	"	-0.46	+0.01	-0.07
31/32	"	-0.46	+0.01	-0.06
1855				
Jan. 1	"	-0.46	+0.01	-0.05
8	West	-0.48	-0.02	+0.08
9/10	"	-0.48	-0.03	+0.08
12	"	-0.48	-0.06	+0.08
22	"	-0.492	-0.18	+0.090
23	"	-0.53	-0.19	+0.10
25	East	-0.51	-0.10	-0.15
27	"	-0.50	-0.11	-0.17
29	"	-0.49	-0.12	-0.18
30	"	-0.49	-0.12	-0.18
31	"	-0.49	-0.13	-0.19
Feb. 1/2	"	-0.48	-0.14	-0.19
2/3	"	-0.48	-0.15	-0.20
3	"	-0.48	-0.15	-0.20
5	"	-0.47	-0.17	-0.21
6	"	-0.47	-0.17	-0.21
10	"	-0.458	-0.19	-0.219
11/12	"	-0.45	-0.19	-0.22
12	"	-0.45	-0.19	-0.22
18	"	-0.43	-0.16	-0.22
20	"	-0.43	-0.15	-0.21
21	"	-0.43	-0.15	-0.21
23	"	-0.43	-0.14	-0.20
24	"	-0.43	-0.13	-0.20
25/26	"	-0.43	-0.12	-0.20
27	"	-0.43	-0.11	-0.20
28	"	-0.422	-0.11	-0.199
March 1	"	-0.39	-0.09	-0.20

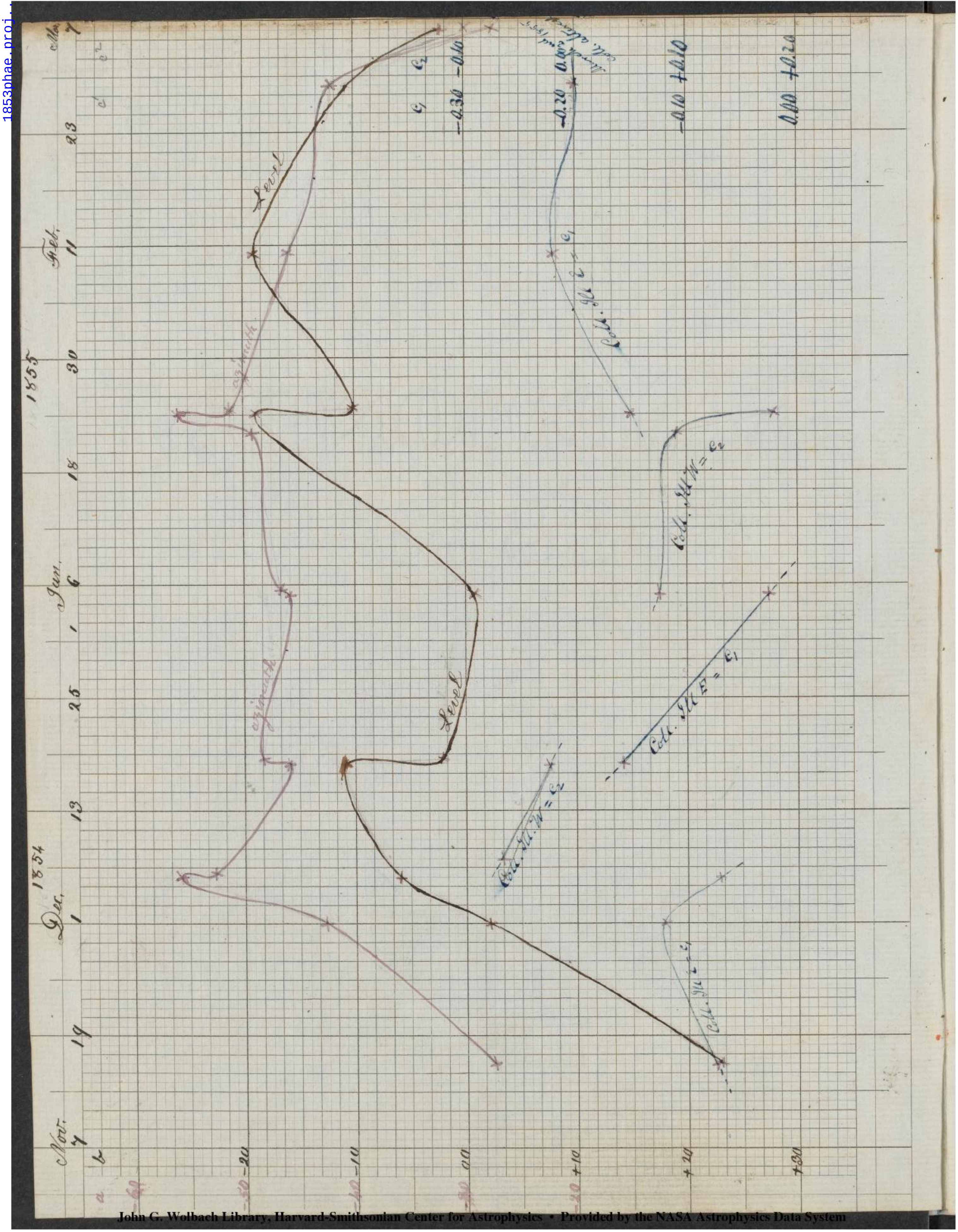
Feb—

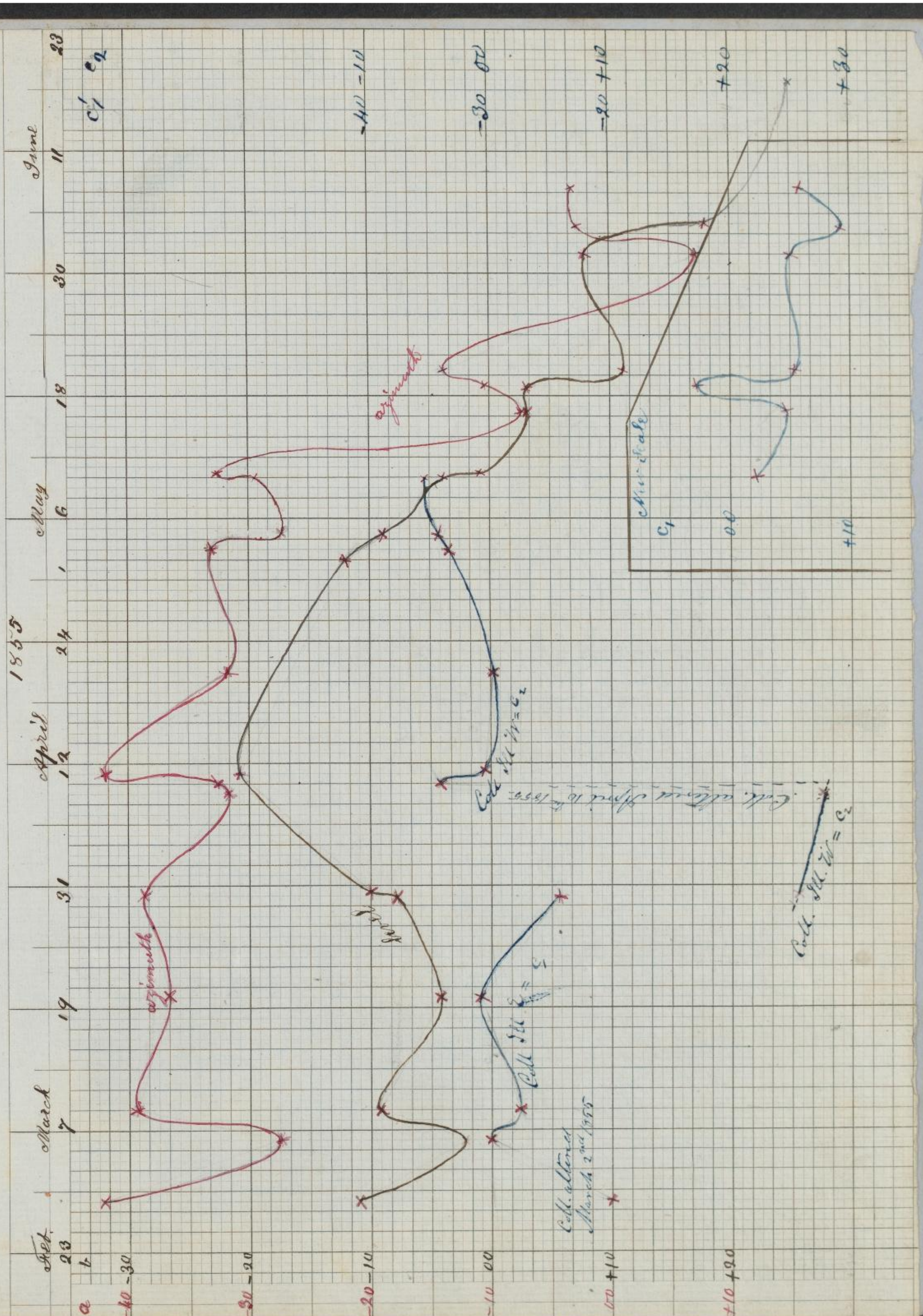
Interpolated Values of az., level, & Collim Errors.

Date	Ill.	az.	level	Coll.	Date	Ill. c_1	az. c_2	level	Coll.
1855					Coll changed				
Mar. 6	East	-0.276	-0.02	~~-0.302~~		-0.27			
12	"	-0.39	-0.08	~~-0.28~~		-0.25			
16	"	-0.38	-0.06	~~-0.30~~		-0.27			
19	"	-0.37	-0.04	~~-0.31~~		-0.28			
27	"	-0.38	-0.06	~~-0.27~~		-0.24			
28		-0.39	-0.07	~~-0.26~~		-0.23			
29	"	-0.39	-0.07	~~-0.25~~		-0.22			
30	"	-0.387	-0.09	~~-0.243~~		-0.22			
Apr. 3	West	-0.36	-0.14	~~+0.26~~		~~+0.23~~	+0.23		
3/4	"	-0.35	-0.15	~~+0.26~~		~~+0.23~~	+0.23		
4	"	-0.35	-0.15	~~+0.27~~			+0.24		
6	"	-0.33	-0.17	~~+0.27~~			+0.24		
7	"	-0.32	-0.18	~~+0.27~~			+0.24		
8/9	"	-0.32	-0.19	~~+0.28~~			+0.25		
9/10	"	-0.318	-0.20	~~+0.277~~	Coll altered		+0.25		
13	"	-0.41	-0.21	~~0.00~~			-0.03		
14	"	-0.40	-0.21	~~0.00~~			-0.03		
14/15	"	-0.40	-0.20	~~0.00~~			-0.03		
15/16	"	-0.38	-0.20	~~0.00~~			-0.03		
17	"	-0.37	-0.20	~~0.00~~			-0.03		
17/18	"	-0.36	-0.19	~~0.00~~			-0.03		
20		-0.33	-0.18						
21	"	-0.315	-0.18	~~+0.002~~			-0.03		
23	"	-0.31	-0.17	~~0.00~~			-0.03		
23/24	"	-0.31	-0.17	~~0.00~~			-0.03		
27	"	-0.32	-0.15	~~-0.01~~			-0.04		
27/28	"	-0.32	-0.15	~~-0.01~~			-0.04		
28/29	"	-0.33	-0.14	~~-0.02~~			-0.05		
May 2	"	-0.33	-0.12	~~-0.03~~			-0.06		
" 3	"	-0.33	-0.11	~~-0.04~~			-0.07		
" 3/4	"	-0.32	-0.10	~~-0.04~~			-0.07		
" 5/6	"	-0.27	-0.07	~~-0.05~~			-0.08		
" 7	"	-0.28	-0.06	~~-0.05~~			-0.08		
" 9/10	"	-0.29	-0.05	~~-0.05~~			-0.08		
	"	-0.30	-0.04	~~-0.05~~			-0.08		
" 10	East	-0.33	-0.01	~~+0.07~~		+0.10			

Curve of $\overset{red}{az} = a$ 1854 level error $= \overset{black}{b}$ coll. error $= \overset{blue}{c}$ 1854




Nov. 7
19
Dec. 1
1854
13
25
Jan. 1
6
18
1855
30
Feb. 11
23
Mar. 7
b
-20
-10
0.0
+10
+20
+30
a
-60
-50
-40
-30
-20
c1 c2
-0.30 -0.10
-0.20 0.00
-0.10 +0.10
0.00 +0.20
Level
azimuth
Level
azimuth
Coll. M.W = c2
Coll. M.E = c1
Coll. M.W = c2
Coll. M.c = c1
Coll. M.c = c1
Coll. altered
Level and 1855.


Feb. 23
March 7
19
31
April 12
24
1855
May 1
6
18
30
June 11
23
a
b
c₁
c₂
-40 -30
-30 -20
-20 -10
-10 00
00 +10
+10 +20
+20
+30
azimuth
level
Coll. Ill. W = c₂
Coll. altered March 2nd 1855
Coll. altered April 16th 1855
Micr. Scale
00
+10
Cm