

KG  
11365  
390

Meridian Circle  
Record. Mr. Austin's  
record. Meridian to ~~Nov 10 1870~~  
Aug 16<sup>th</sup> 1870 - Mar 13 1871 Psh. 27 1871

Charles W. Sever, University Bookstore, Cambridge.



KG 11365, 390

1870phae.proj..391A  
Mémoire sur l'intégration des équations  
linéaires aux différences du second  
ordre et des ordres supérieurs à  
coefficients constants ou variables  
par M. Libri. - Mémoires de  
l'Institut de France. tome XIV p 96

Mémoire sur la variation des constantes  
arbitraires, comme l'ont établie, dans  
sa généralité, les mémoires de Lagrange  
et celui de Poisson. par M. F. And.  
Maurice. - Mémoires de l'Institut  
tome 19 p. 553 1845-

Mémoire sur l'intégration des  
équations linéaires aux différences  
finies et à une seule variable d'un  
ordre quelconque et à coefficients  
variables. par M. J. Briot. -

Mémoires de l'Institut. tome 19 p. 639

Sur le développement de l'anomalie  
 vraie et du rayon vecteur elliptique etc  
par Laplace. - Mémoires de l'Institut VI  
1823



JG 11365.390

Leçons sur divers points d'analyse  
in which he develops

$$(1 - 2\epsilon \cos \theta + \epsilon^2)^{-\frac{1}{2}}$$

d. L'Institut vol VIII. 1829

Mémoire sur la proportion des naissances  
des filles et des garçons par M. Poisson.

Containing much that is interesting on  
the analytical problem of probabilities

Mémoires d'Institut vol IX p 239

Examinee to X March 11 1867

Rapport sur l'ouvrage de M. Jacobi  
intitulé. Fundamenta Nova Theoriae  
functionum ellipticarum. Poisson

Mémoires d'Institut Tome 10

this is as little mathematical as  
possible.

Rapport Historique sur les progrès  
des Sciences Mathématiques depuis  
1789 et sur leur état actuel par

Lelambre 1808



Tome 1



Encke über die Bestimmung der  
elliptischen Elemente bei Planetenbahnen  
Abhandlungen der Akademie der  
Wissenschaften zu Berlin 1849

Sur une application curieuse de  
l'Analyse des probabilités  
à la détermination approximative  
des limites de la Perte d'une  
Batterie qu'on a un Corps d'Armée  
pendant un Combat. par  
M. V. Bouniakowsky. Membre  
Académie St. Pétersbourg. 1844-48

Ueber den Ausnahmefall einer  
doppelten Bahnbestimmung aus  
drei vollständigen geocentrischen  
Beobachtungen v. Encke.

Ast. Nachr. No. 640. vol. 27 1848  
having reference to Theor. Motus Ast. 142.

Breit. Journal du Collège Polytechnique  
20 cahier, Tome XIII p. 285.



Authority to give Alameda  
to learned Societies. Letter from  
Sept. March 2<sup>d</sup> 1853, p 15 of  
letter book.

Act of Congress approved 17<sup>th</sup> of  
June 1844 2<sup>d</sup> section, and the  
joint resolution approved 7<sup>th</sup> January  
1846 contain instructions in regard  
to the estimates.

Démonstration d'un théorème  
de M. Gauss. L'ouvrier journal  
vol XIII p 80. by Bertschner

Note à la suite d'un article  
de M. Bertrand sur un théorème  
de M. Gauss. vol XIII p 83 par  
Liquet. L'ouvrier journal

Théorème - Transon - D'A. Sur  
la détermination des orbites planétaires  
L'ouvrier t. IX p 389



$$\Delta^2 = r^2 + r'^2 - 2rr' \cos H$$

$$2\Delta \delta A = 2rr' \sin H \delta H$$

$$\delta A = \frac{rr' \delta H}{\Delta} = \frac{rr' \delta H}{\Delta}$$

in which case  $\Delta^2 = r^2 + r'^2$

$$\frac{rr' \delta \sin H}{\Delta}$$

$$1860.1^d = 2400411$$

D mea by

$$\begin{array}{r} 2400000 \\ 410 \\ - 1 \end{array}$$

-.5

$$\begin{array}{r} w = 354^\circ 3268.55 \\ 2 \quad 1161.52 \\ 13 \quad 635.03 \\ \hline 9^\circ 5065.10 \\ 6 \quad 2117.51 \\ 3 \quad 2947.59 \\ 49 \quad 7.17 \end{array}$$







April 30 1866

$$\Delta T = +1^m$$

$$\delta T = +0.287$$

$$\text{L. Series } T_0 = 10^h 41^m 13.32$$

$$\text{i. Cephei } T_1 = 10^h 43^m 53.62$$

$$e' = -0.17$$

$$t = 10^h 41^m 13.45$$

$$t' = 10^h 43^m 54.03$$

$$\hline 240.88$$

$$\begin{array}{r} 102 \\ -2.41 \\ -0.17 \\ \hline 714 \\ 102 \\ \hline -1734 \\ +40.97 \end{array}$$

$$\alpha + 12 \quad 10 \quad 44 \quad 55.50$$

$$\alpha \quad 10 \quad 42 \quad 14.33$$

$$\hline 241 \quad 17$$

$$240 \quad 88$$

$$\hline 241 \quad 29 \quad 12$$

$$\hline 241$$

$$\hline 1300$$

$$144$$

$$\text{Time L. Series } + 20$$

$$\text{i. Cephei } - 2.20$$

$$\hline 2.40$$

$$12045-4.72$$

$$\hline 86$$

$$1204 \quad 5-3.88$$

$$5-5617$$

$$\hline 102.31$$

$$1041 \quad 13.32$$

$$\hline 62$$

$$41 \quad 1270$$

$$42 \quad 14.33$$

$$\hline 101.63$$

$$43 \quad 53.62$$

$$\hline 15$$

$$43 \quad 5377$$

$$44 \quad 5550$$

$$\hline 10173$$



April 30 at 11<sup>h</sup> 25<sup>m</sup> sid time  $\Delta T = 6216$

$$\begin{array}{r} 14.21 \\ 14.25 \\ 14.32 \\ 14.17 \\ \hline 95 \end{array}$$

$$\begin{array}{r} 1 \ 14.28 \\ 1 \ 2.16 \\ \hline 12.13 \end{array}$$

$$\begin{array}{r} 2 \ 12.13 \\ 24 \overline{) 6065} \quad (.253 \\ \underline{48} \\ 126 \\ \underline{120} \\ 65 \end{array}$$

$$\begin{array}{r} 1055 \\ 67 \\ 72 \\ 81 \\ \hline 275 \\ 69 \end{array}$$

at 11 ~~to~~ 11

$$11.25$$

$$11.423$$

$$.253$$

$$34269$$

$$57115$$

$$22846$$

$$2890.019$$

$$\begin{array}{r} 6220 \\ \hline 59.31 \\ 607 \\ \hline 6538 \end{array}$$

$$\begin{array}{r} 1429 \\ 289 \end{array}$$

$$1^{st} \ 11.40$$

1870phae.proj. 1811



Capt Jacob. Micrometrical Measures of 120  
double and Multiple Stars

Note on the triplicity of  $\nu$  Scorpii.

Astronomical. Societys Notices vol XIX

The measures contained in this paper may  
be considered as a continuation of those given  
in the last vol. of Madras Results for 1848-52  
539  $\epsilon$  Cancri,  $\epsilon$  Musae Majoris,  $\alpha$  Centauri  
& Herculis.

Examine  $\nu$  Scorpii

& Hercules by Jacob vol XX p 253

It should be observed by daylight

Hypotion Lapells observations of vol XX p 292

He refers to his observations Monthly Notices

vol XIII p 181. Hypotion has been seen west  
by Lapell and Bond.

Period of Minimas deduced by him does  
not agree with the one generally received.

Lord Wrottesleys Catalogue of 398 double stars  
needs examination. Other interesting matter  
on double stars in vol XX

orbit of  $\eta$  Capricornae &c vol XXI p 66

$\mu^2$  Herulis Monthly Notices vol XVI p 68

Remarks by Lapell. it must be examined

It also in the same article communicates some  
observations of Saturn's Satellites.

Same vol.

Measures of Saturn by Hansen & LaPlace  
of other measurements of Saturn in the same  
volume by Kaiser &c.

α Centauri by Leht Jacot vol XVI h 119

Bonds Tons h 103

Observations of Double Stars by Powell - Measures  
in the same vol. orbit of α Centauri  
discussed

Antares, same vol XVII. Observations of difficulty  
of seeing companion - The great value of the half  
hour at and after sunset

Double Stars - vol 17. Catalogue of those discovered  
by Alvan Clark

Satellites of Saturn by Jacob. same vol

51 Librae vol XVIII h 317

γ Virginis same vol. Measures by Smyth  
h 316





$$(\rho + \Delta\rho)^2 d(\lambda + \Delta\lambda) =$$

$$(\rho^2 + 2\rho\Delta\rho + \Delta\rho^2)(d\lambda + d\Delta\lambda)$$

$$\rho^2 d\lambda + 2\rho\Delta\rho d\lambda + (\Delta\rho)^2 d\lambda$$

$$(\rho + \Delta\rho)^2 d\Delta\lambda + \rho^2 d\lambda$$

$$+ 2\rho\Delta\rho d\lambda + (\Delta\rho)^2 d\lambda$$

$$\frac{\delta(\rho^2 d\lambda) + \rho^2 d\lambda}{\rho^2 + \delta(\rho^2)} = d\lambda + \delta d\lambda$$

$$\delta \rho^2 d\lambda = n$$

$$\frac{n + \rho^2 d\lambda}{\rho^2 + \delta(\rho^2)} = d\lambda + \delta d\lambda$$

$$\delta d\lambda = \frac{n + \rho^2 d\lambda - d\lambda}{\rho^2 + \delta(\rho^2)}$$

$$\delta d\lambda = \frac{n + \rho^2 d\lambda - \rho^2 d\lambda - \delta(\rho^2) d\lambda}{\rho^2 + \delta(\rho^2)}$$

$$d\delta\lambda = \frac{n - \delta(\rho^2) d\lambda}{\rho^2 + \delta(\rho^2)}$$

$$d\delta\lambda = \frac{1}{\rho^2 + \delta(\rho^2)} (n - 2\rho\delta\rho d\lambda - (\delta\rho)^2 d\lambda)$$





$$\alpha = T + Ce + d + (n + e)(\tan \delta - \tan \varphi) + W \tan \delta$$

$$T + Ce + d + n \tan \delta + e \tan \delta - e \tan \varphi + \cancel{e \tan \delta}$$

$$-e - e \tan \delta + e \sec \delta$$

$$C = -1 - \tan \delta + \sec \delta$$

$$\alpha = T + Ce + d + (n + e) \tan \delta$$

$$= T +$$

$$= T + \cancel{d} - e - e \tan \delta + e \sec \delta + (n + e) \tan \delta - \tan \varphi$$

$$\Delta T = d - b \sec \varphi - e(1 + \tan \varphi)$$

$$d = \Delta T + b \sec \varphi + e(1 + \tan \varphi)$$

$$T + \Delta T + b \sec \varphi + e + e \tan \varphi$$

$$= T + e \tan \delta + e \sec \delta + n \tan \delta - n \tan \varphi + e \tan \delta - e \tan \varphi$$

$$= 1.59 + \frac{107}{139} \\ = 1.59 + 0.7698 \\ = 2.3598$$



## Peregrine Noon Mark

May 10

11 56 30

57 3

57 32

58 4

58 34

---

37 43

11 57 32.6

+ 1 5.3

---

11 58 37.9

3 48 7

---

12 2 26.6

E. 6 12 6 34

7 min 12 5

7 slow

---

1 34

correcting Noon Mark

---

- 22.6

Cor of Noon Mark - 22 6.6.

May 1<sup>2</sup>

$$\begin{array}{r}
 11 \ 56 \ 11 \\
 56 \ 44 \\
 57 \ 18 \\
 57 \ 46 \\
 58 \ 18 \\
 \hline
 36 \ 17 \\
 11 \ 57 \ 15.4
 \end{array}$$

$$\begin{array}{r}
 \text{all } 25.70 \\
 25 \ 72 \\
 25 \ 71 \\
 \hline
 3
 \end{array}$$

$$\begin{array}{r}
 25.71 \\
 25.74 \\
 \hline
 45- \\
 77
 \end{array}$$

$$\begin{array}{r}
 25.74 \\
 25.08 \\
 \hline
 .34
 \end{array}$$

$$25.75$$

$$25.78$$

$$\begin{array}{r}
 25.72 \\
 \hline
 15-
 \end{array}$$

$$25.74$$

$$25.75$$

$$79$$

$$80$$

$$234$$

$$78$$

$$71$$

$$\begin{array}{r}
 \text{all } 25.66 \\
 .68 \\
 .63
 \end{array}$$



M E

25, 27

25

26

18

M W

25 26

24

32

33

119

25.29

25.26

25.275-

26.08

8

25.70

25.27

.43

.17

~~.68~~

.05-

15) 68" (4)

Last determination of Collimation  
Thursday the 4 August 1870

M E. 25.26

W 25.29

axis 25.275-

Ill E. mid wire at 2612  
appears to right of Barboursport

26 32  
26 35-  
26 32

Ill ~~W~~ mid wire at 2612  
appears to right of Barboursport

26.08  
25.95-  
25.98  
18 01  
6.00  
6.33  
12.33  
6.16

86.84. 86.78. 70.75-

Ill. E

25.90

25.87

25.85-

26 2

at 26. Barboursport to  
~~alt right~~ mid wire to  
at right of Barboursport

Ill. W

Ill. W

26.46

26.46

26.43

15-

26 45-

25.87

12 32

at 26.10 mid wire to right  
of Barboursport





Investigation of the form  
of pivots of new direction  
Circle Aug 16 1870

10 All Thermom on E pier 67.8  
" " " " " " 68.0

micrometer wire Horizontal  
Circle Microm

270°	25.320 330 322 330 320 122 25.324	310°	25.282 290 290 285 303 <del>25.282</del> <del>25.282</del>	860°	25.125 128 118 129 130 130 126
280	25.340 337 328 334 324 163 25.333	320°	25.279 255 270 275 270	10°	25.095 090 094 100 085
290	25.329 315 320 344 320 128 25.326	330°	25.262 238 245 253 247	20°	25.040 033 035 055 052
300	25.309 320 319 312 312 5772 25.314	340°	25.222 125 225 208 218 98 220 350° 353 171 170 180 175 178	30°	25.007 24.995 990 995 25.007



40°	24.967 960 307 961 958 952 970	90°	24.827 818 149 840 837 827	140°	24.910 888 18 908 909 903
50°	24.938 925 123 925 927 915 918	100°	24.810 812 66 828 796 820	150°	24.936 922 178 935 940 945
60°	24.890 907 442 888 872 890 883	110°	24.840 830 168 835 835 828	160°	24.997 990 418 968 993 970
70°	24.875 870 330 866 870 842 873	120°	24.848 857 270 855 850 860	170°	25.040 030 126 008 023 025
80°	24.852 852 217 843 832 838 843	130°	24.870 848 290 857 865 850	180°	25.060 060 303 055 070 058

190°	25.111	240°	25.280
	110		297
86	110	352	293
117	125	290	285
	130		297

200°	25.156	250°	25.328
	138		300
273	160	31	290
155	162	306	328
	160		285

210°	25.193	260°	25.318
	190		325
470	187	124	314
194	190	325	332
	210		335

		270°	25.338
220°	25.225		320
	222	125	327
109	214	325	315
222	205		325
	243		

when pivot nearest is raised  
reading is

230°	25.252
258	252
252	270
	230
	254

West pivot raised, reading  
diminished, when screw  
head is down  
West pivot moved South  
increases reading, when screw



Micrometer head at right hand, 90° from former position.

270	28.287	320	25.085	10.	25.017
	290		092	08	000
435	296	420	085	25.002	24.983
287	282	.084	085		25.013
	280		073		24.995
280	25.258	330	25.067	20.	25.012
238	245	304	065	44	015
248	235	.061	040	.009	000
	245		062		24.995
	255		070		25.022
290	25.200	340	25.042	30	25.017
	198	140	030	48	010
478	196	.028	015	.010	003
196	192		028		010
	192		025		008
300	25.170	350	25.005	40	25.023
283	172	.043	013	137	020
.157	147	.009	24.995	.027	027
	152		25.020		037
	142		010		030
310	25.187	360	25.000	50	25.063
161	126	467	24.995	302	062
.132	132	.993	980	.060	050
	129		25.005		070
	737		24.987		057

60	25.093	110	25.280	160	25.480
415	080	1476	306		490
083	085	295	292	6	480
	064		318	481	476
	093		280		480
70	25.120	120	25. <del>328</del>	170	25.493
115	120	232	330	483	510
123	140	346	340	497	475
	115		358		500
	120		352		505
			352		
80	25.172	130	25.309	180	25.523
359	166	02	399	489	485
172	178	400	394	498	498
	176		403		495
	167		397		488
90	25.215	140	25.428	190	25.529
107	217	8	433	15	498
221	235	432	432	503	500
	220		435		490
	220		430		498
100	25.263	150	25.445	200	25.5
271	252	270	468	482	25.495
254	257	454	455	496	478
	255		450		485
	244		452		497
					527



210	25.492	260	25.344
	485	182	323
431	480	336	330
486	478		335
	496		350

220	25.462	270	25.290
	473		288
335	462	426	280
467	470	285	288
	468		280

230	25.488
178	445
440	433
	442
	440

$$m^i = a + b \cos \theta - c \sin \theta$$

$$\bar{m} = a + b \sin \theta + c \cos \theta$$

240	25.403
44	388
409	420
	423
	410

250	25.377
340	368
368	365
	358
	372

allans

31

270	25.324	25.287
280	333	248
290	326	196
300	<u>304</u>	<u>157</u>
310	<u>290</u>	132
320	270	084
330	249	061
340	<u>220</u>	<u>028</u>
350	171	25.009
0	<u>126</u>	24.993
10	089	25.002
20	<u>25.043</u>	<u>009</u>
30	24.999	010
40	961	027
50	<u>925</u>	060
60	<u>888</u>	<u>083</u>
70	866	123
80	843	172
90	830	221
100	<u>813</u>	<u>254</u>
110	834	295
120	854	346
130	<u>858</u>	<u>400</u>
140	<u>904</u>	<u>432</u>
150	936	454
160	24.984	481
170	25.025	497
180	<u>061</u>	<u>498</u>
190	117	503
200	155	496
210	194	486
220	222	467
	252	440

230	25.252	440
240	290	409
250	306	368
260	325	336
270	325	285

Measures with  
the micrometer of  
the pivot telescope  
of the distances  
between the wires  
of the circle to deter-  
mine the ~~use~~ value  
of micrometer  
on wire to apparent  
West ~~dir~~ East

34.87	32.15	29.40
84	16	40
88	12	40
<u>85</u>	<u>104</u>	
34.86	32.14	29.40
2.72		2.74
12 <sup>s</sup> 386		12.442
1 7 =	68"	2



270	25	345	3			
80	24	840	3	843	+10	13
90	24	840		830	+10	0
100		816		813	-14	17
110		825		834	+5	4
		<u>121</u>		<u>120</u>		
		830		830		

$$\begin{array}{r}
 19.03 \\
 13.77 \\
 \hline
 2) 5.26 \\
 2.63 \\
 17
 \end{array}$$

$$\begin{array}{r}
 18.41 \\
 26.3 \\
 \hline
 44.71 \\
 13.5 \\
 \hline
 13.2
 \end{array}$$

$$\begin{array}{r}
 13.75 \\
 13.79
 \end{array}$$

$$\begin{array}{r}
 35.20 \\
 17
 \end{array}$$

$$\begin{array}{r}
 34.87 \\
 84 \\
 88 \\
 \hline
 85 \\
 34.86
 \end{array}
 \quad
 \begin{array}{r}
 32.15 \\
 16 \\
 12 \\
 \hline
 14 \\
 32.14
 \end{array}
 \quad
 \begin{array}{r}
 29.40 \\
 40 \\
 40 \\
 \hline
 29.40
 \end{array}$$

$$2.72$$

$$2.74$$

$$\begin{array}{r}
 274) 12.442 \mid 4.54 \\
 10 \overline{) 96} \\
 1 \overline{) 820} \\
 3 \overline{) 760} \\
 1 \overline{) 20} \\
 1 \overline{) 26} \\
 24
 \end{array}$$

$$68''$$

$$\begin{array}{r}
 272) 12.386 \mid 4.55 \\
 10 \overline{) 88} \\
 1 \overline{) 5060} \\
 1 \overline{) 360} \\
 1 \overline{) 460} \\
 1 \overline{) 360}
 \end{array}$$

$$\begin{array}{r}
 60 \\
 7.5 \\
 6 \\
 \hline
 68.1
 \end{array}$$

Aug 17 1870. Lannet observer  
Circumpolar H. Verh.

270	24.613 580 581 605 <u>584</u> 163 593	330	24.697 695 699 708 693 192 <u>-698</u> 740 721 724 734 741 160 732	30	24.963 963 958 946 950 280 956 995 997 985 910 985 472 24.994
280	581 589 593 597 585 445 589	340	761 761 788 767 768 769	40	29.034 046 044 030 025 179 25.036
290	580 592 586 603 589 450 590	350	826 820 820 820 832 824	50	061 049 082 050 082 324 065
300	631 603 620 601 624 79 616	0	24.872 868 868 878 862 8 874 910 900 900 908 926 44 909	60	25.099 098 071 083 086 437 085
310	630 631 628 628 628 145 629	10	80	70	25.112 097 104 126 116 55 111
320	652 660 675 656 673 316 663	20		80	



90	25.138 146 119 116 122 <u>141</u> 128	150	25.029 010 014 014 018 <u>85</u> 017	220	24.733 737 732 727 <u>719</u> 148 730
100	140 130 136 130 125 <u>161</u> 132	160	24.989 970 969 985 975 <u>388</u> 978	230	24.709 701 690 712 <u>690</u> 02 700
110	143 129 120 129 139 <u>16</u> 132	170	940 937 925 926 936 <u>164</u> 933	240	24.656 675 656 671 <u>667</u> 325 665
120	120 109 108 109 110 <u>56</u> 111	180	880 888 890 879 895 <u>432</u> 886	250	647 639 645 644 <u>650</u> 225 645
130	25.092 089 090 098 092 <u>11</u> 092	190	839 850 849 850 844 <u>822</u> 809	260	640 638 637 618 <u>625</u> 158 632
140	050 060 040 060 050 <u>052</u>	200	810 20 804 750 769 756 757 <u>755</u> 87 757	270	625 639 618 611 629 <u>122</u> 24.624

270 635-  
 650  
 659  
 651  
633  
 226  
 646

270	24.593	24.607
280	589	657
290	590	700
300	616	721
310	629	772
320	663	801
330	698	834
340	732	856
350	769	858
360	824	873
370	874	871
380	909	872
390	956	864
400	24.994	847
410	25.036	815
420	065	777
430	085	742
440	111	697
450	128	651
460	132	616
470	132	570
480	111	523
490	092	471
500	052	437
510	017	408
520	978	397
530	933	371
540	886	365

886  
 190 24.846  
 200 804  
 210 757  
 220 730  
 230 700  
 240 665-  
 250 645-  
 260 632  
 270 624

365  
 24.372  
 371  
 394  
 406  
 448  
 477  
 525-  
 560  
 602



Gannett also

Mic H to left  
series reads

270	0°	330	24.827	30	24.865
			848		860
			833		860
			839		875
			822		860
			169		864
			834		
280	24.605				849
	599				834
	614				849
	609				830
	610				855
	97				237
	6.07				
280	651	340	842	40	
focus adj	648		858		
	661		858		
	671		860		
	655		864		
	286		282		
	657		856		
290	706	350	858	50	815
	691		862		818
	684		850		807
	714		858		830
	705		864		865
	20		242		75
	720		858		815
300	734	0	865	60	24.787
	723		885		793
	712		871		775
	709		858		763
	725		865		768
	703		364		386
	721		873		777
310	761	10	878	70	747
	773		866		725
	775		875		744
	773		865		750
	780		873		742
	362		357		208
	772		871		742
320	809	20	865	80	24.693
	797		877		695
	799		883		701
	801		865		693
	798		868		705
	05		58		487
	801		872		697

Aug 17

1870 All

90	24.654 645- 670 643 640 <hr/> 257 651	150	24.430 400 400 412 397 <hr/> 408 39	220	24.410 388 407 414 410 <hr/> 296 406
100	6.11 6.19 6.23 6.19 6.09 <hr/> 81 616	160	400 403 390 394 399 <hr/> 397 482	230	440 451 460 440 451 <hr/> 242 448
110	24.574 568 570 570 566 <hr/> 348 570	170	371 371 365 365 <hr/> 360 361 361 372 361 <hr/> 365 15	240	483 474 476 476 478 <hr/> 37 477
120	5.40 5.20 5.20 5.20 5.14 <hr/> 114 523	180	383 360 370 373 376 <hr/> 372 12	250	24.525 505 511 522 514 <hr/> 77 525
130	24.463 472 471 469 480 <hr/> 355 471	190	377 358 372 377 373 <hr/> 371	260	561 550 562 570 558 <hr/> 301 560
140	430 29 48 39 39 <hr/> 185 437	200	401 390 398 381 399 <hr/> 469 394	270	24.614 599 600 595 602 <hr/> 10 24.602



5 Collimator  
on or call

0.124

138

137

150

160

209

.142

Tel on  
or Call

638

640

635

645

649

207

25.641

S. col

25.453

.435

.420

.438

428

174

25.435

641

1076

25.538

after who  
S Cal on Tel on  
or Call. or  
Call~~152~~

693

107

696

100

678

102

704

080

702

108

473

97

695

100

Tel on S Call

505

483

487

463

510

448

490

695

592

538

.054

1.24  
6.20

18.6

0.54  
9384  
10044  
+1050Call + 1.00  
63  
+ 1.23

Declination  $317^{\circ} 7'$   
 $86^{\circ} 14'$

$44$   $14$   
 $315$   $46$

Collimation -

Micrometer readings -

S-coll. on N. coll. -

13.1  
 13.5  
 12.6  
 12.4  
 9.2

4 obs.

12.2 mean

Telescope on S-coll. -

25.522

546

531 4 obs

538

528

25.533

25.540

547

551

542

546

25.545

R Obs.

Telescope on N. coll. -

25.694

674

675 4 obs

679

683

25.681

25.690

674

690

692

692

25.688

R. obs.



Thur. 2.76.5 W. 77. Aug 19. 10 am  
 Investigation of Pivots. R. obs.  
 Microm. screw head below.

70	25.4500	320	361	10	160
	4389		362		160
	4403		367		184
	4371	365	366	161	160
441	439		368		163
	204				7
		330	337	20	124
280	452		333		130
	440		337	122	117
	447	337	340		121
445	442		337		119
	444		34		111
	25				
		340	300	30	070
	430		300		080
290	430	295	290	077	081
	436		290		081
433	432		296		074
	436		26		36
	14				
		350	250	40	035
			253		031
300	420	250	250	032	024
	422		257		034
415	412		248		035
	410		2		
	410	360	210	50	24.995
	74		210	997	25.002
310	383	208	200		24.993
	384		207		9.98
388	397		212		9.95
	383		39		
	393				

60	963	110	920	160	094
	860		940		093
965	967	937	940	087	082
	969		945		088
	967		938		080
			183		37
70	950	120	946	170	130
	952		949	131	130
946	947	948	949		131
	940		957		131
	943		940	180	175
	32		41		174
80	920	130	980	174	176
	922		970		171
923	923	973	976		173
	928		970		?
	921		970	190	220
	14				221
90	918	140	999	220	221
	925		002		220
922	923	001	010		228
	917		997		
	929		999	200	250
	112		57		256
100	918	150	050	251	246
	928		059		259
920	914	048	047		243
	920		040		
	920		043		
	100		39		



210	292	260	420
	300		418
	293		410
<u>297</u>	301	<u>416</u>	411
	299		420
	<u>35</u>		
220	330	270	418
	333		420
<u>329</u>	331	<u>422</u>	420
	323		420
	<u>330</u>		<u>430</u>
			108
230	360		
	356		
<u>358</u>	357		
	360		
	<u>358</u>		
	41		
240	386		
	391		
<u>387</u>	382		
	387		
	<u>389</u>		
	35		
250	406		
	400		
<u>403</u>	408	-	
	400		
	<u>400</u>		

Screw head at right hand

270	250	320	432	10	488
	240		416		484
	238		406		496
<u>237</u>	230	<u>422</u>	424	<u>486</u>	480
	228		432		480
	236		110		<u>28</u>
	231				
280	263	330	432	20	482
	280		440		483
	269		440		479
<u>273</u>	281	<u>439</u>	437	<u>481</u>	479
	273		447		482
	6		46		5
290	320	340	470	30	478
	317		480		468
	313	<u>473</u>	472	<u>467</u>	460
<u>314</u>	309		472		465
	810		470		465
	9		14		
300	359	350	490	40	431
	359		482	<u>436</u>	440
<u>355</u>	350	<u>484</u>	481		435
	352		482		430
	357		484		445
	27				
				50	418
310	382	360	492		418
	370		491	<u>417</u>	421
<u>382</u>	389	<u>493</u>	495		410
	382		492		418
	387		496		
			16		



60	380	110	160	160	991
	370		164		999
	360	<u>161</u>	160		999
<u>371</u>	370		161	<u>993</u>	989
	<u>376</u>		<u>161</u>		<u>985</u>
	6				13
70	335	120	121	170	986
	327		112		975
	326	<u>119</u>	120		981
<u>328</u>	320		120	<u>982</u>	984
	<u>333</u>		<u>120</u>		<u>982</u>
	41				-8
	286	130	080		
80	290	<u>076</u>	067	180	985
	300		068		980
<u>291</u>	290		082		986
	<u>288</u>		<u>083</u>	<u>983</u>	984
	4		0		<u>980</u>
	250	140	050		
90	243		046		
	240	<u>040</u>	036	190	990
<u>247</u>	257		036		972
	<u>247</u>		<u>032</u>	<u>982</u>	982
	37		50		983
	200	150	010		<u>982</u>
	205		20		9
	206	<u>013</u>	10	200	25,010
<u>206</u>	213		17		24,990
	<u>208</u>		<u>009</u>		990
	32		66	<u>994</u>	990
					<u>990</u>

210

021

260

190

022

194

019

022

189

190

013

184

016

185

44

93

220

040

270

226

042

238

045

053

230

226

048

226

041

235

24

230

230

079

Then E -76.9 W -77.2

071

072

070

070

070

070

240

119

104

111

117

101

113

4

258

154

157

150

149

136

149

246



R observations  
level high

Sun W	448	269	E W
	452	262	
	430	290	
			940.58
			2130.93
			4) 9.65
			2.41"
Sun E	352	363	
	390	393	
	363	351.1 = -1.928	
	<u>2408</u>	<u>1858</u>	

Adjusted level.

Sun E	338	351	E W
	370	314	
	370	314	
	<u>340</u>	<u>340</u>	
	340	358	
	354	329	
	<u>312</u>	<u>186</u>	
			935.20
			W 3010
			4) 5.10
			1.28"
			-1.024"

Horizontal of bubble level  
axis bad. 50

Error of Level by 1st  
set of readings on last  
page - 4. d 78

by last set <sup>d</sup> - 1.05  
Was Reobserver

Pointer	Wires	Har	Wire	Net		
270	25.441	237	120	24.948	25.119	
280	445	273	130	24.973	076	
290	433	314	140	25.001	040	
300	415	355	150	048	25.013	
310	388	382	160	087	24.993	
320	365	422	170	131	982	
330	337	439	180	174	983	
340	295	473	190	220	982	
350	230	484	200	251	24.994	
0	208	493	210	297	25.019	
10	161	486	220	329	045	
20	122	481	230	358	072	
30	077	467	240	387	171	
40	25.032	438	250	403	149	
50	24.997	417	260	416	189	
60	965	371	270	422	25.230	
70	946	328				
80	923	291				
90	922	247				
100	920	206				
110	937	161				



E. P. A. obs. Micrometer head vertical					
Aug 21 & 22	1870				
270	575	320	362	<del>370</del> 10	556
	583		373		537
	567	371	387	539	526
572	568		360		546
	568		374		530
	<sup>361</sup> 572				197
280	508	330	380	20	605
	507		379		600
	509	281	375	607	615
509	516		380		605
	508		390		608
	509				
290	459	340	384	30.	700
	460		395		682
	453	393	385	692	695
456	452		396		685
	456		403		697
					739
300	405	350	423	40-	775
	400	431	457		754
408	408		410	763	763
	415		436		757
	412		430		765
			156		
		360.	484	50	854
			469		872
310	389		468	863	859
	396	474	471		863
392	389		479		868
	394				
	390				

60	948	110	288	160	315
	950		279		326
<u>954</u>	948	287	285	<u>319</u>	320
	960		290		321
	963		<u>292</u>		<u>311</u>
			4		
70-	042	120	327	170	280
	038		337		262
038	039	<u>324</u>	313	<u>267</u>	270
	038		320		250
	035		322		<u>272</u>
					334
80	121	130	344	180	225
	110		328		213
<u>120</u>	133	<u>335</u>	338	<u>224</u>	230
	122		325		233
	<u>114</u>		340		<u>221</u>
					122
90	200	140	361	190	160
	180		355		178
<u>184</u>	182	<u>354</u>	357	<u>172</u>	168
	182		347		180
	<u>178</u>		354		<u>172</u>
	2				358
100	250	150	387	280	118
	230		330		108
<u>239</u>	242	<u>339</u>	340	<u>100</u>	085
	236		349		085
	<u>235</u>		325		<u>102</u>
	193		193		498



210	019	260	620	50	24.853	853+030
	005		610	60	24.953	121
	008		618	70	25.038	205
014	016	619	625	80	120	287
	020		620	90	184	351
	68		43	100	239	406
220	938	270	535	110	287	454
	950		539	120	324	491
439	939		556	130	335	502
	940	540	533	140	25.354	521
	930		538	150	339	506
	197		206	160	319	486
230	855	280	540	170	267	434
	860		485	180	224	391
855	850		487	190	172	339
	858	491	493	200	100	297
	850		495	210	25.014	181
	3.		493	220	24.939	106
240	762	270	24.572	230	855	+022
	785	280	509	240	770	-063
770	775	290	456	250	691	142
	770	300	408	260	619	214
	758	310	2312	270	540	293
250	691	320	392	280	24.491	-342
	708	330	371	whose observations of no account as telescope was not fastened in position		
691	683	340	381			
	688	350	393			
	683	0	431			
		10	474			
		20	539	294		
		30	607	226		
		40	692	141		
			24.763	-070		

Aug 22 1870 Also  
23<sup>h</sup> Son or Cull

(.515)  
553  
500  
507  
485  
532  
485  
09  
502

Tel on  
N Cull

25.398  
416  
404  
425  
425  
68

25.414  
25.463  
25.439

S Cull

463  
459  
471  
462  
460  
315  
463



Reaching Aug 23 1870  
Painter reaching 360°

6

1.1	59.8	59.4
0.7	59.8	58.8
0.8	60.0	59.2
0.9	59.9	59.1
41'	59"0	4' 59"2

44.4	42.5	43.6	43.0
44.0	43.0	43.0	42.4
43.8	43.4	43.0	43.0
44.1	43.0	43.2	42.8
4	58.9	5' 10.2	4 59.6

13	54.5	18	53.6	23	52.5	28	52.6
	53.3		53.0		52.3		51.3
	53.1		52.2		52.0		51.2
	53.6		52.9		52.3		51.7
	4	59.3		59.4		4	59.4

A 946° 0' 0" 11.2 B 318° 15'

11.8  
10.8  
11.4  
11.4  
1.6  
11.32

45° 15'	1	15.7	B 318 30	3	0.4	0.6
		15.4			0.8	0.3
		16.6			1.8	59.7
		15.9			1.0	0.2
					4	59.2

6 137 50 1	68	D 228 5- 2	13.4	13.3
	7.5		13.6	13.0
	7.3	47.5	13.2	13.1
	7.2	47.6	13.4	13.1
		48.0	459.7	
		47.7	49.0	
			1.3	

Aug 23 1870

483  
452  
488  
460  
480  
363  
473

25 364  
390  
373  
394  
362  
383  
25 377  
460  
419

25 450  
471  
453  
460  
468  
468

D

Aug 24 1870

367  
372  
419  
398  
390  
400  
402

25 433  
434  
445  
420  
465  
197  
439

25 500  
510  
497  
480  
397  
499

very bad  
could scarcely  
see mine

set at 25.470

430  
423  
412  
420  
422  
107

421

25.420

423  
420  
414  
405

82

25.416  
25.547  
963

25.481

25.550

542  
539  
558  
541  
234

25.547



Aug 26 1870

N Ball S Ball

25.393

391

390

398

400

22

394

25-414

419

415

430

435

13

423

8 h

set at 408  
for obs

25,465

475

482

470

485

27

475

581

1062

531

25,585

591

580

590

26

5865

13

124

25

2 - .148

11

123

Ball - 0.5 148

25.358

345

357

364

347

263

353

25.633

610

627

612

620

102

620

9.73

486

21 h

in crossing readings of  
right ascension micrometer  
I moves the wires to apparent  
right as towards microm  
head with the West  
consequently a greater reading

for the line of no collimation  
 then the setting corresponds  
 to collimation - for Jll W

Observations to get the  
 value of Declination  
 Micrometer

on CV Ball after mic of *sign*

26.475

269 50

460

460

456

460

26.462

4 14.7

13.7

13.4

11.8

4 12.9

3 57.5

57.2

57.8

3 57.5

4 7.9

6.7

5.1

4 7.2

12.3

11.5

11.6

4 11.8

269 41

34.548

521

525

533

544

171

4 14.7

14.3

14.2

4 14.4

4 59.5

3 57.6

58.2

57.3

4 57.7

4 59.8

4 6.1

6.9

6.4

5 6.5

5 0.7

12.0

11.4

11.6

11.7

5 0.1

34.534

26.462

8.072

5.1 0.02

3 00.02 (3 7.17

24 216

5786

56504

13560

1807

549



0	0							
1	26.2	2	0	7.6	1	55.6	1	30.9
	26.6			7.4		55.3		30.9
	<u>25.4</u>			<u>7.0</u>		<u>54.9</u>		<u>30.8</u>
	26.1			07.3		55.3	1	30.9
								62
	26.0	25	0	- 5	<del>302.2</del>	302.2		
	25.1		5	- 10	300.2-7	298.9	0	66
	25.3		10	- 15	298.9+6	299.3-4	298.94	
	25.5		15	- 20	300.7-12	299.4-5		
	+ 0.6		20	- 25	298.3+12	299.0-12	299.5-3	
			25	- 30	299.4+1	299.2-3		
	25.5		30	- 35	299.2-3	298.0+9		
	25.6		35	- 40	300.0+5	298.8+1		
	<u>24.7</u>		40	- 45	299.4			
	25.3							
	- .8							

25	25	25	20	25	20	15
5	23.0	5	24.0	10	25.4	
	21.9		23.7		25.3	
	<u>22.6</u>		<u>24.8</u>		<u>24.7</u>	
0	22.5	58.3	24.2	59.4	24.8	

25	30	25	25	25	20
0	23.8	5	25.0	10	<u>27.2</u>
	24.1		24.5		25.5
	<u>24.0</u>		<u>24.3</u>		25.5
	24.0	59.4	24.6	59.0	<u>25.7</u>
					25.6

25	35	25	30	25	25
	22.8		23.2		24.0
	21.5		22.7		23.7
	<u>22.0</u>		<u>22.8</u>		<u>23.5</u>
	22.1	59.2	22.9	59.2	23.7

25	40	35	30
	46.4		46.4
	45.9		46.1
	<u>46.3</u>		<u>46.1</u>
	46.2	0.0	46.2
			58.0

45	40	35	30
	41.0		42.2
	40.3		42.1
	<u>40.2</u>		<u>42.7</u>
	40.5	59.4	42.3

Obs. for error of readg microscopes -

E. side -

N. side -

Lower - upper -

S. side -

Lower - upper -

Readg of N. Lower microscope.  $45^{\circ}$  -

50 -	295	317
48.5	299	318
	<u>301</u>	<u>319</u>
48.3	298	318
47.2	<u>309</u>	<u>309</u>
	+ 1.1	+ 0.9

489  
475

August 26 1870  
West circle

490	26° 0'	06.0	06.5
474	25-55	<u>5.4</u>	<u>5.9</u>
		05.6	6.2
495			6.2
488	25° 0'	25-5	25-10
	10.50.6	5- <del>48.7</del>	0 47.8
	50.4	47.4	47.7
	<u>50.0</u>	47.8	46.8
	50.3	<u>47.5</u>	47.4
		2.7	0.2
		47.6	

25-15	25-10	25-5
0 12.6	5 13.3	10 15.5
12.2	14.0	14.2
<u>12.9</u>	<u>13.7</u>	<u>14.7</u>
12.6	58.9 13.7	58.9 14.8

25-20	25-15	25-10
0 9.9	5 10.3	10 11.0
9.9	9.4	10.0
<u>10.7</u>	<u>9.8</u>	<u>9.6</u>
10.2	5 9.3	10.2
	0.7	



August 27 1870

25.270

268

273

285

261

357

25.271

425

850

425

25.582

600

587

560

565

394

25.579

083  
166  
23

25.42

103

for mens W circle

A 135-0-

B 45.5

C 45.0

135 5

5.311

306

308

306

315

309

300.9

315.5

C

522

515

519

520

96

51.92

302.1

10.323

314

317

322

316

9.2

31.8

300.9

315.0

548

537

539

529

201

54.02

198

195

185

191

195

464

1928

225.5

B

124

129

131

135

132

151

13.02

300.34

195

197

194

200

203

989

1978

225.0

C

135

135

134

132

132

18

13.36

300.34

300.5

25.375

369

381

377

376

375

641

1016

5.08

636

638

650

630

650

204

641

25.375

25.646

10505

25.608

Calibration

August 27 1870  
Runs

A

135 5	135 0
045	073
050	067
049	065
<u>144</u>	<u>205</u>
048	068
	3020

B

5'	0'
.482	.484
.489	.479
<u>.481</u>	<u>.488</u>
12	251
.484	.484
	300.0

C

5'	0'
.266	.278
.265	.279
<u>.263</u>	<u>.277</u>
.265	.278
	3003

D

5'	0'
.511	.518
.516	.525
<u>.516</u>	<u>.521</u>
43	64
.574	.521
	300.7

August 29 1870  
Ball 9<sup>h</sup> 12

26.702
710
685
700
<u>701</u>
02
700

26.720
716
714
707
<u>711</u>
68
714

26.690
685
690
700
690
<u>685</u>
691

26.741
732
760
747
<u>747</u>
247
749
691
1430
720
<u>707</u>
13

700  
set at 670

S  
-0.02



August 29 1870

Ruso

135° 5'	135° 0'	4	
58.3	58.1	48.1	5- 47.3
58.0	58.1	47.7	46.8
58.5	58.6	48.0	47.1
58.0	58.5	48.4	47.7
57.8	59.0	48.0	47.3
58.1	58.7	48.0	47.2
300.6		289.2	
13		6	
37.8	38.3	20.0	21.5
37.8	37.5	19.5	21.1
37.1		4	20.9
38.0		7	21.1
38.5		18.1	21.0
37.9		19.5	21.1
300.4		301.6	

August 29 1870 21<sup>h</sup> 1/2

26.716	26.729
780	739
728	718
712	735
710	719
96	140
719	728
26.724	
72	
024	

e=-0.3

August 30 1870

26-785	26.718
770	708
782	710
770	703
790	695
<u>397</u>	<u>34</u>
779	105
705	
<u>84</u>	
742	

set at 740

at 8<sup>h</sup>

26.746	26.686
743	682
735	675
740	690
<u>741</u>	<u>333</u>
667	667
<u>7408</u>	
704	
<u>740</u>	
704	
<u>.036</u>	

A

B

+ .002  
- .02

6

18.2	19.2
18.0	18.3
18.1	18.1
17.2	18.2
18.0	18.6
<u>45</u>	<u>24</u>
179	185
300.6	

19.7	9.3
49.3	9.3
49.8	8.4
49.7	9.1
<u>39.8</u>	<u>9.9</u>
09.7	9.2
299.5	

37.2	39.4
37.7	39.1
37.3	38.8
37.9	39.0
37.5	39.2
37.5	39.1
301.6	

D

58.5	59.5
58.0	59.2
58.3	59.0
58.4	59.6
58.6	58.6
<u>58.4</u>	<u>59.2</u>
300.8	

E Pier 74.8  
W " 75.0

8<sup>h</sup>



September 1st 1870

26	71.5	727
	721	725
	697	733
	722	730
	720	718
	75	
	715	133
	727	727
	721	
	740	
	.19	

E Pin 74.1  
W " 74.8

719  
700  
19

C = -12

Runs

135° 6' 135° 0

59.1	59.1
58.7	59.0
58.0	58.4
57.9	58.3
58.6	58.5
58.3	58.78

300.2  
6

49.5 49.2  
49.0 48.7  
49.7 48.4  
49.4 49.0  
49.9 48.9  
49.5 48.8

299.3  
B

20.0	20.8
19.0	7
19.5	3
19.7	9
19.6	20.5
19.6	20.6

301.0

39.1	39.3
39.0	39.3
38.5	39.8
39.2	40.0
38.4	39.2
38.8	39.5

3007

Sept 5<sup>th</sup> 1870

26 746  
 735  
 745-  
 750  
740  
 21.6  
 765-  
 698  
43  
 722

26.700  
 693  
 690  
 695-  
700  
478  
 698

26.70  
26.722  
 .022

C = .03

A

1.6 26  
 1.5 25  
 0.6 26  
 2.0 29  
1.7 28  
 1.5 2.7  
 301.2

D

47.2 47.1  
 47.5 6.7  
 70 76  
 70 80  
6.9 6.8  
 47.1 47.2

EP 70.8

WP 71.2

300.1

E

228 46  
 229 42  
 224 34  
 226 45  
229 40  
 22.7 4.1  
 301.4

B

44.2 45.2  
 43.1 45.2  
 439 44.3  
 433 45.2  
43.9 44.8  
 43.7 44.9  
 301.2



Sept 6

E P 68.0 W P 68.2

Collimation

North.	26.723	South.	26.776
	721		778
	726		763
	733		785
	723		786
	<u>725</u>		<u>778</u>
	778		
	03		
	26.752		
	<u>26.700</u>		

Runs

A	E P	D
135 5 — 135.0	66.4 45.5 — 45.0	
508 508	W P 337 332	
507 504	66.7 332 333	
500 509	333 332	
502 502	328 342	
503 573	337 337	
<u>504</u> — 26	<u>17</u>	<u>26</u>
507	333	335

(00.3)  
C

(00.2) P

110	123
109 46	119
110 109	115 — 46
108	119 119
109	120 (01.0)

346	346
337	349
347	346 38
346 19	347
343	348
	349 (00.3)

Sept 7. 1870

Microscope G

314 55- 314 50				314 55- 314 50			
314 55	314 50	314 50	314 55	314 55	314 50	314 55	314 50
58.1	58.8	54.5	55.1	52.5	53.5	52.5	53.5
57.6	57.6	1	5	2.1	2	2.1	2
57.8	57.6	7	9	2.1	6	2.1	6
57.6	57.6	0	5	1.8	7	1.8	7
57.4	58.5	5	2	2.8	4.7	2.8	4.7
57.7	58.5	54.5	55.4	52.3	53.6	52.3	53.6
+0.8				+1.3		+1.3	
314 50 314 45				314 40 314 35			
314 50	314 45	314 45	314 40	314 40	314 35	314 40	314 35
51.2	52.1	52.4	53.3	54.1	55.6	54.1	55.6
1.2	2	9	0	53.9	54.9	53.9	54.9
6	5	4	1	54.0	5.9	54.0	5.9
2	3	8	3	53.9	5.4	53.9	5.4
8	3	3.2	8	54.1	5.5	54.1	5.5
51.4	52.3	52.7	53.5	54.0	55.5	54.0	55.5
+0.9		+0.8		+1.5		+1.5	
314 35 314 30				314 30 314 25			
314 35	314 30	314 30	314 25	314 30	314 25	314 30	314 25
498	510	498	512	498	512	498	512
502	16	500	504	500	504	500	504
506	11	497	508	497	508	497	508
506 18	09	496	504	496	504	496	504
506 504	12 512	496	509	496	509	496	509
+0.8		37	37	37	37	37	37
314 25 314 20				314 20 314 15			
314 25	314 20	314 20	314 15	314 20	314 15	314 20	314 15
495	503	481	492	481	492	481	492
496	500	487	492	487	492	487	492
489	501	486	496	486	496	486	496
486	509	478	488	478	488	478	488
490	497	483	495	483	495	483	495
48	503	48.3	49.3	48.3	49.3	48.3	49.3
490	0 1.3	314 10	314 5	314 10	314 5	314 10	314 5
457	467	476	490	476	490	476	490
452	466	478	494	478	494	478	494
445	464	478	491	478	491	478	491
450	465	479	493	479	493	479	493
450	463	484	498	484	498	484	498
450	463	484	493	484	493	484	493
450	463	484	493	484	493	484	493



Sept 7 1870

26. 687

706

692

690

700

26. 695

783

1478

739

26. 732

778

782

778

795

780

783

Runs

A.

36.2

35.5

37.1

36.5

36.6

36.4

300.1

36.3

5

4

8

5

36.5

17.3

79

18.7

18.6

17.7

18.0

17.8

0

8

2

7

17.5

299.5

M P 65.1

E D 64.9

Q 3

11 h

56.1

55.7

56.4

60

58

56.0

300.8

57.2

67

70

65

6.6

56.8

20.6

4

6

6

8

20.6

299.9

20.8

1

0

5

9

20.5

Sept 9

26.640  
 644  
 645  
 628  
 635  
 638  
 811

26.802  
 811  
 810  
 807  
 823  
 811

26.724  
 27.700  
 -0.24

24.8  
 96  
 430

A Runs D

3.1  
 26  
 3.5  
 3.1

3.1  
 4.1  
 3.3  
 3.5

44.2  
 5  
 1  
 44.3  
 43.5  
 -0.8

B  
 47.4  
 2  
 8  
 47.5  
 +4

48.2  
 47.6  
 48.0  
 47.9

6

225 23 4  
 3 3  
 2 7  
 22.3 23.5  
 +1.2



Obs. 1<sup>st</sup> star in a

Screen 14 10 8 1st

" 12 47.8 2<sup>nd</sup>" 13 10.7 3<sup>rd</sup>Sept 12<sup>th</sup> 1870

30.607	22.778
612	770
610	773
612	763
606	779
30.609	773
22.773	
<u>1382</u>	26.700
.691	
<u>700</u>	
+ .009	

52.0	53.5
3	2
8	0
51.6	52.2
<u>51.8</u>	<u>52.0</u>
52.1	53.2
301.1	

31.6	31.1
1	04
5	07
1	06
<u>4</u>	<u>1.1</u>
31.3	30.8
299.5	

37.0	37.3
5	0
3	2
3	0
<u>2</u>	<u>38.3</u>
37.3	37.4
300.1	

11.3	12.3
11.0	12.5
10.2	11.7
11.3	12.9
<u>10.9</u>	<u>12.2</u>
10.9	12.3
301.4	

Sept 13

30.649 22.695

52

691

60

685

48

678

47

690

30,651

688

688

26.670

26.700

+030

E. P 63.8

W P 63.7

A

136.0 - 134.55

36.8

34.6

36.1

35.0

36.3

35.2

36.1

35.2

36.1

34.0

36.8

40.

+1.5

D

45.0

44.55

19.0

19.6

19.1

19.7

19.4

20.5

19.2

19.9

18.5

20.2

19.0

20.0

-1.0

B

225 - 224.55

21.1

20.4

20.3

20.7

20.8

20.2

20.2

20.2

20.3

20.0

27

20.5

20.1

+00.4

b

315

314.55

555

554

558

550

558

543

558

352

560

547

39

46

558

549

+00.9



Sept 18 1870

26.698 found it impossible to  
 718 see the wire of  
 710 South collimator at all  
 710  
710  
 26.709

22<sup>h</sup>

26.626	26.752
626	752
644	735
651	756
<u>640</u>	<u>732</u>
637	746
<u>746</u>	
1383	
26.692	Net 26.700
+ 7.009	
+ 5.014	

Sept 19 1870<sup>AM</sup>

N Ball

4 5-5' 5-0'

26.522

26.795

537

53.9

W. P

505

804

40

53.5

62.1

5-16

813

3.3

53.2

E P

5-15

803

39

3.9

61.8

5038003.93.8

26.512

803

53.8

53.5

803

1315

26.658

677

300.3

.042

658

54

12

+5052

13

0'

5-5'

6

53<sup>1</sup> 2

0

5-5'

37.5

11.4

11.2

313

32.5

37.5

77

12.4

10.9

16

1.3

72

8.0

11.1

10.4

1.1

1.6

77

77

1.8

10.8

23

15

79

8.6

1.1

10.4

1.01.87.337.911.610.7

31.5

31.7

37.5

299.6

300.9

+299.8

Sept 19 23<sup>h</sup>

The instrument was moved in azimuth by slack-  
ing the screws and driving  
the y forward the  
paper distance



Sept 20

A

D

26.082

27.291

0'

55'

0'

080

308

45.3

45.1

35.8

35.7

081

313

46.2

5

5

084

292

45.2

7

3

0.65

300

45.1

6

6.1

26.078

27.301

7

46.0

6.2

6.0

1379

45.5

45.5

35.8

35.7

26.690

700

300.0

+010

299.9

+0.5012

B

6

0'

55'

55'

8 D

63.8

29.8

28.9

4.4

5.2

W D

63.8

29.7

5

4.8

3

28.8

1

3.8

8

29.4

6

4.2

5

29.4

29.3

4.2

8

29.5

28.7

4.3

5.5

299.2

301.2

Sept 21 1870

26.085

078

081

080

078

26 080

27.345

1.425

26.712

700

-012

-5015

27.341

345

359

347

335

M P 62.2

E P 62.4

0' A 55'

66 68

72 6.4

6.0 65

6.0 68

6.0 6.3

6.4 6.6

300.2

6

253 267

5 64

4 59

5 6.1

5 6.4

25.4 6.3

300.9

D 55'

54.6

53

49

52

55

55.1

299.7

B 55'

50.1 50.3

49.8 0.3

50.2 49.6

50.2 50.1

50.0 49.9

50.1 50.0

299.9



Sept 24 1870  
 Pointer 0° 0'

A		B		C		D	
-0	11.1	-0	44.0	-0	8.5	+0	37.9
	11.1		44.2		8.3		38.1
	11.1		44.2		8.7		38.3
	11.2		44.2		9.3		37.4
	<u>10.9</u>		<u>44.6</u>		<u>9.0</u>		<u>37.5</u>
-0	11.1	-0	44.2	-0	8.8	+0	37.8

Sept Oct 8 1870  
N Call

26.028  
028  
024  
031  
023

26.027  
27.360  
26.693

27.353  
368  
360  
360  
358

27.360  
set at 26.70

A		D		B		C	
0'	5-5'	0'	5-5'	0'	5-5'	0'	5-5'
0.5	08	00	00	10.2	108	13.3	14.3
0.9	17	00	03	10.6	108	1	3
0.7	1.7	05	00	10.2	100	6	1
1.1	1.1	05	00	10.0	105	8	2
1.0	1.1	0.5	0.1	10.2	10.0	3	2
<del>4.2</del>	1.3	0.3	0.1	10.2	10.4	13.4	14.2
+0.8							
	302.4		299.8		300.2		300.8

300.5  
E Pri 57.2 Bar 30.225  
W u 57.2 60.3  
open air 45.8



Oct 10 1870

22<sup>h</sup> 39<sup>m</sup>

Nbell

26.018

017

022

013

003

26.015

27 310

26 662

700

.038

76

5 15

0047

01 A 55

65

6.9

69

7

73

0

75

4

6.82

7.0

6.4

299.4

27 310

310

309

320

303310

01 D 55

94

8.4

3

7

4

9

8

5

89.4

9.5

8.8

299.3

0 B 55

17.6

17.5

1

3

3

6

1

0

62

17.3

17.3

300.0

C

01

55

20.1

21.8

8

8

7

5

1.0

1

922.2

20.7

21.7

301.0

Oct 13 1870

R	M.	A.
26.051	25.988	26.010
035	26.023	010
032	25.990	014
036	26.000	019
044	26.070	048
26.040	26.021	100
	<u>26.015</u>	<u>26.020</u>

27.338	27.326	27.337
<del>332</del>	339	326
<del>334</del>	326	352
336	313	335
330	300	320
324	27.321	320
340	26.015	700
340	26.668	27.334
27.334		26.020
26.040		26.667
26.687		700
700		0.33
		332
		337

A.	D.	B.	L.
0 55	0 55	0 55	0 55
209 220	227 235	305 308	358 362
205 218	224 226	311 312	357 370
207 213	231 221	309 310	355 361
216 215	229 221	307 310	356 362
210 210	230 221	308 313	352 365
45 76	157 128	90 55	28 327
209 215	230 226	308 311	355 365
207 207	230 230	308 308	355 355
300.6	299.6	300.3	301.0



Oct 18 1870

21  $\frac{1}{2}$  h

26.473	26.928
472	918
477	925
477	928
470	917
<u>26.474</u>	<u>26.923</u>
26.923	
26.698	

Oct 22 1870

26.431	26.877
440	870
424	865
450	887
<u>26.436</u>	<u>875</u>
26.875	
165-6	

0' 55"	
2.9	4.1
3.2	3.2
1.9	4.0
3.0	3.8
<u>2.3</u>	<u>4.2</u>
2.7	3.9

301.2

0' 55"	
2.2	1.6
1.5	0.9
1.6	1.6
1.9	1.0
<u>1.3</u>	<u>1.8</u>
1.7	1.3

299.6

0' 55"	
130	133
125	135
13.1	140
13.6	142
<u>12.2</u>	<u>12.8</u>
12.9	13.6

300.7

0' 55"	
16.4	17.2
15.5	17.0
15.9	16.6
16.4	17.9
<u>15.9</u>	<u>16.9</u>
16.0	17.1

301.1

Oct 23 1870

O' A	S-S	O' D	S-S	O' G	S-S	O' B	S-S
40.8	40.6	38.2	38.6	53.2	54.7	50.1	50.6
7	41.5	8.7	8.4	2	3	51.1	49.8
5	40.2	9.1	8.6	2	1	50.6	51.0
7	40.4	8.8	9.0	8	3	50.8	50.3
8				5	6	49.8	50.2
<u>40.7</u>	<u>40.2</u>	<u>8.3</u>	<u>38.7</u>	<u>53.4</u>	<u>54.4</u>	<u>49.8</u>	<u>50.2</u>
	40.6	38.6				50.5	50.4
299.9		300.1		301.0		299.9	

Nov 26 1870

N call

37	142
	138
	143
	147
	<u>152</u>
37.1	44
33	<u>716</u>
	860
35	430

33	717
	716
	720
	705
	<u>721</u>
33	716
ut	35.430

A

54.1	54.5
52.9	53.5
52.7	53.5
53.2	53.6
<u>54.2</u>	<u>53.7</u>
53.4	53.8
300.2	

B

0	55
60.0	59.2
59.0	9.5
59.8	9.6
60.2	9.7
<u>59.5</u>	<u>60.2</u>
59.7	59.6
299.9	

G

0	55
003	0.17
0.5	0.13
0.8	1.7
0.1	1.4
<u>0.9</u>	<u>1.8</u>
00.5	01.6
301.1	

D

0	55
59.6	58.3
8.8	7.5
9.6	8.5
8.0	8.4
<u>9.5</u>	<u>8.5</u>
59.1	58.2
399.1	



Nov 28 1870

37.260	33.733
187	41
260	732
194	732
201	725
37.196	33.733
33.733	
929	

35.465 set at 35.46

0' 55'	0' 55'	0' 55'
31.8	31.3	32.8
3	18	27
2	16	30
5	15	28
8	14	2.8
31.5	31.5	32.8
300.0		300.9

0' 55'	
242	247
241	234
24.6	25.3
240	242
24.1	23.7
24.2	24.3
300.1	

0' 55'	
303	289
291	93
295	95
298	91
300	30.0
1487	29.4
29.74	
299.7	

Nov 30 1870

ballimation determined by  
 Mr Rogers 35.462  
 set at 35.46

A		B	
0'	55"	0'	55"
174	<del>188</del>	25.7	26.6
179	<del>82</del>	25.6	26.6
180	<del>91</del>	26.0	26.7
180	<del>81</del>	26.2	27.2
17.5	<del>19.0</del>	<u>26.1</u>	<u>27.1</u>
17.6	18.7	25.9	26.8
	300.4		300.9

Dec 2 1870

37	231	33	725
	220		712
	241		739
	240		728
	<u>242</u>		<u>712</u>
			723

37 235

33 723

958

35.479

set at 35.48

A		B	
0	55"	0'	55"
094	104	15.0	16.6
96	106	14.2	4
10.2	105	15.7	2
10.2	096	15.0	7
10.0	<u>11.2</u>	<u>15.1</u>	<u>8</u>
9.9	10.5	15.0	16.5
	300.6		301.5



Dec 2 1870

measures to determine the  
~~forms~~ of errors of the  
 West circle

$0^0$	B	C	D	
A				
248	23.4	21.0	28.3	23.1 - .4
230	23.3	21.8	29.0	23.2 +1.5
255	22.6	21.6	29.3	21.6 +3.1
251	23.5	22.1	28.2	28.9 -4.2
230	23.4	21.6	29.8	18.8
25.1	23.2	21.6	28.9	24.7
	25.1	21.1	25.1	

$90^0$				
06.8	12.2	13.5	10.7	6.9 +3.8
06.9	12.2	13.2	9.8	12.3 -1.6
07.4	12.3	13.6	10.6	13.4 -2.7
06.2	12.2	13.2	10.0	10.3 +0.4
07.3	12.6	13.5	10.5	2.9
6.9	12.3	13.4	10.3	10.7
	6.9	6.9	6.9	

$180^0$				
08.0	15.0	4.5	2.0	7.6 - 3
7.2	15.1	4.4	1.5	15.1 +7.8
7.5	15.3	4.8	1.7	4.6 +2.7
8.0	15.1	4.3	1.8	1.8 +5.5
7.4	15.0	4.8	1.9	29.1
7.6	15.1	4.6	1.8	7.3
	7.6	7.6	7.6	

$270$				
11.6	8.6	58.2	2.2	11.2 -6.2
11.7	7.9	57.7	3.3	8.2 -3.2
11.0	8.0	58.0	2.5	58.1 +6.9
10.7	8.7	58.2	2.5	2.7 +2.3
11.2	8.2	58.2	3.3	20.2
11.2	8.2	58.1	2.7	5.0
	11.2	11.2	11.2	
		-13.1		

Dec 3 1870

37.200

195

200

180

213

37.198

33.754

952

35.478

33.747

739

767

758

760

754

Callimatars  
moved farther  
apart. and south  
one readjusted  
before the seals

set at 35.48

A

0'

5-5'

23.6

22.8

4

5

1

7

23.1

22.5

0'

22.2

22.6

21.9

22.1

22.1

22.2

0

29.5

29.0

28.7

29.6

28.4

29.0

5-5'

3.00

3.03

2.98

3.05

3.03

3.02

299.4 300.3

301.2

Dec 9

set at 35.44

37.195

190

170

180

191

185

33.694

688

695

691

700

33.694

37.185

35.440

A

0'

5-5'

30.2

30.2

0.2

1.2

0.3

0.0

0.2

0.8

0.3

0.6

30.2

30.7

300.5

B

0'

5-5'

37.7

38.2

78

82

71

81

77

82

75

82

37.6

38.2

300.6

381.5

300.9



Dec 14 1870  
at Call

37 330  
323  
318  
300  
321  
318  
33923  
35.620

33 939  
920  
930  
900  
930  
918  
923

set at 35.62

Dec 16 1870  
at Call S Call

37318  
323  
322

37.321  
33.852  
35.586

33.865  
842  
850  
852

set at 35.60

0 1 55.1  
35.3 346  
347 348  
34.6 354  
349 346  
34.8 343  
34.9 348  
299.9

0 1 55.1  
449 465  
34 456  
47 456  
51 45.5  
4.8 45.7  
45.0 45.8  
300.8

Dec 17 1870

N Coll

37.274	33926
254	937
266	932
260	921
<u>272</u>	<u>923</u>
37 265	928
<u>33 928</u>	
35 597	

put at 35.60

01	55'	01	5-5'
34.2	344	436	439
33.7	341	430	41
33.0	347	433	40
35.0	34.6	438	38
<u>34.2</u>	<u>33.8</u>	<u>43.5</u>	<u>4.6</u>
34.0	34.3	43.4	44.1

300.3

300.7



Dec  
N. Cook

1870

$$\begin{array}{r} 37 \ 240 \\ 248 \\ 250 \\ 240 \\ \underline{240} \end{array}$$

$$\begin{array}{r} 33 \ 912 \\ 05 \\ 13 \\ 10 \\ \underline{10} \end{array}$$

$$\begin{array}{r} 37 \ 244 \\ 33 \ 910 \\ \hline \end{array}$$

33 910

35.577

set at 35.58

$$\begin{array}{r} 01 \ 55 \\ \hline \end{array}$$

$$\begin{array}{r} 01 \ 55 \\ \hline \end{array}$$

$$\begin{array}{r} 588 \\ 83 \\ 87 \\ 94 \\ \underline{8.4} \\ 588 \end{array}$$

$$\begin{array}{r} 585 \\ 88 \\ 86 \\ 94 \\ \underline{8.4} \\ 587 \end{array}$$

299.9

$$\begin{array}{r} 68 \\ 67 \\ 69 \\ 73 \\ \underline{7.2} \\ 7.0 \end{array}$$

$$\begin{array}{r} 7.3 \\ 7.5 \\ 7.7 \\ 7.6 \\ \underline{7.8} \\ 7.6 \end{array}$$

300.6

1871 Jan 2 d

37	290	33	881
	310		885
	283		881
	289		895
	292		880
	<u>293</u>		<u>884</u>
37.	293		
33	884		
	<u>177</u>		
35	589		

1871 Jan 3 d

37.289	33.834
292	835
287	838
305	837
295	830
<u>294</u>	<u>835</u>
37.294	
835	
<u>35565</u>	

1871 Jan 4<sup>th</sup>

37	283
	290
	281
	280
	285
	<u>284</u>
37	284
33	883
<u>35584</u>	

38892	48.1	46.4
902	46.4	48.2
883	46.8	47.1
875	46.7	46.0
861	47.4	47.9
883	47.1	47.1
	300.0	

46	581	591
0'	580	583
	580	590
	572	587
	580	580
	393	436
	5786	5872
		5781
		086



1871 Jan 13

37.390

390

398

405

390

37.395

33.858

35.627

0.1

0.1.2

1.1

1.6

2.0

0.5

1.3

299.5

33.856

855

853

855

870

858

A

5

0.6

59.9

0.3

1.0

1.4

0.6

299.6

0.1

0.0

0.2

57.8

0.9

0.3

0.2

0.1

69

80

70

7.6

7.7

74

301.2

5.5

86

86

87

86

8.3

8.6

Jan. 14 1871 Collimation


S.C. 46.7  
 on 46.8  
 N.C. 45.1  
 43.6  
 45.8  
30  
 45.60

Telescope 37.542  
 on .515  
 N.C. .517  
 .511  
 .488  
 .515  
 .499  
 .515  
 .531  
 .515  
148  
 37.515  
 33.752  
 37.13

Telescope 33.751  
 on 743  
 750  
 S.C. 762  
 757  
263  
 33.752  
 1.881  
35.633

Set at  
 35.63

Jan. 14 1871 Runs

A  
 55'   
~~58.3~~ 1<sup>st</sup> two rejected  
 58.6 as read on  
 59.4 wrong part  
 59.9 of the  
 59.2 stroke  
 59.8  
 58.6  


---

 19  
 59.38  
 A 300.46

A  
 0'  
 58.6  
 59.3  
 58.9  
 59.0  
 58.8  


---

 4.6  
 58.92

C C'  
 55' 0'  
 6.6 5.8  
 6.9 6.0  
 7.0 6.7  
 6.4 5.9  
 6.3 5.7  


---

 3.2 .1  
 6.64 6.02  
 C 300.62



~~37.297~~  
~~287~~  
~~297~~  
~~276~~  
~~283~~  


---

37.289  
33.799  


---

1088  
34444

33.803  
782  
820  
770  
811  


---

187  
799

*Feb. 1 1871*  
*Collimation*  
Telescope on N. coll.      Telescope on S. coll.

37.442

.459

.454

.446

.442

---

37.448

33.689

---

3.759

3

33.683

.688

.682

.700

.692

---

33.689

33.689

1.879

---

35.568

Set at 35.575

Feb 1 1871 Runs.

$\begin{array}{r} 246 \\ 229 \\ 240 \\ 235 \\ 232 \\ \hline 162 \\ 232 \end{array}$ 
 $\begin{array}{r} 55 \\ 250 \\ 237 \\ 240 \\ 236 \\ 241 \\ \hline 204 \\ 244 \end{array}$

$\begin{array}{r} 329 \\ 334 \\ 324 \\ 324 \\ 330 \\ \hline 141 \\ 328 \end{array}$ 
 $\begin{array}{r} 323 \\ 318 \\ 314 \\ 321 \\ 319 \\ \hline 95 \\ 319 \end{array}$

300".9  
 N. Coll. on S. Coll.    Telesc. on N. Coll.    Tel. on S. Coll.  
 $\begin{array}{r} 49.5 \\ 51.6 \\ 48.0 \\ 50.9 \\ 51.1 \\ \hline 11 \\ 50.22 \end{array}$ 
 $\begin{array}{r} 37.434 \\ .430 \\ .425 \\ .438 \\ .430 \\ \hline 157 \\ 37.431 \end{array}$ 
 $\begin{array}{r} 33.706 \\ .722 \\ .705 \\ .681 \\ 1650 \\ \hline 3462 \\ 33.693 \end{array}$   
 $\begin{array}{r} 71.124 \\ 35.562 \end{array}$

Set at 35.575

Feb. 4 1871  
 N. Coll. on S. Coll.    Telesc. on N. Coll.    Tel. on S. Coll.  
 $\begin{array}{r} 44.0 \\ 47.7 \\ 45.78 \\ 49.9 \\ 51.0 \\ \hline 374 \\ 47.48 \end{array}$ 
 $\begin{array}{r} 37.349 \\ 350 \\ 348 \\ 347 \\ 359 \\ \hline 253 \\ 37.3506 \end{array}$ 
 $\begin{array}{r} 33.811 \\ .838 \\ .838 \\ .802 \\ .818 \\ \hline 107 \\ 33.8214 \end{array}$   
 N. Coll. 35.586    Set at 35.575



Feb 5 1871 Sunday

Feb. 6 1871

Collimation

S. Coll. on N. Coll. Tel. on N. Coll. Tel. on S. Coll.

420  
422  
437  
413  
433  
125  
425

37.289  
279  
277  
300  
297  
442  
37.2884

33.920  
917  
926  
900  
912  
75  
33.9150

11.2034  
No coll. 35.560

Set at 35.575

~~50 Draconis~~  
~~& Canis Maj~~

~~first time or three wires?~~

Feb 6 1871

Started 2<sup>h</sup> 40<sup>m</sup>  
 B Use skin

A Cuts 45'

16.670

A

A 2 0.6

G 2 8.0

n m

Y 259 36 + 50 8'  
 259 52 70 15-1-

15626

12957

A 0 11.2

G 0 17.8

Stopped 3<sup>h</sup> 17<sup>m</sup>



Feb. 10 1871  
Collimation E. P. A. obs.  
Tel. on N. Coll.

37.385  
 .380  
 .383  
 .384  
 .401  


---

 37.387

Tel. on S. Coll.

33.805  
 .800  
 .795  
 .806  
 .803  


---

 33.802

Mean 35.1189  
 .595  
 .15  


---

 .610

\* Set at 35.600

2 Ceter 45.1

17 303

1 39.6  
 45.3

2 Persei

22 Urs Minor 63-1.

stopped

3 22<sup>m</sup>

started

4 42<sup>m</sup>

30 180

55.8

21.8

Feb 10 1871

A

6

55'	0'
298	304
302	300
299	300
295	294
300	301
299	300
299	

55'	0'
392	394
394	382
396	390
392	394
392	390
394	390
300.4	

Feb 13 1871

collimation

S. coll. on N. coll.

Tel. on N. coll.

Tel. on S. coll.

541

509

488

478

479

494

480

483

493

506

---

4951

started

371348

.348

.354

.350

.341

---

37.348

1186

No coll. 35.593

Set wt 35.600

4<sup>h</sup> 49<sup>m</sup>

33.827

.862

.828

.840

.834

---

33.838



Feb 15 1871

Collimation

S. Coll. on N. Coll.

Tel. on N. Coll.

Tel. on S. Coll.

491  
 498  
 532  
 523  
 531  


---

 515

37.324  
 .334  
 .338  
 .344  
 .347  
 .347  
 .342  
 1364  
 1332  
 .342

37.3414

33.816  
 .819  
 1811  
 .807  
 1808  


---

 33.8122  
 37.3414  


---

 71.1536  
 35.5768

Set at 35.600

started 4<sup>h</sup> 40<sup>m</sup>

I. Arcturus  
 II. Orionis  
 & the others

Gr 966

stopped 6 8

Feb. 17 1871  
Collimation

S. Coll. on N. Coll. Telescope on N. Coll. on S. Coll.

428	37.385	33.814
432	.394	.807
438	.406	.822
448	.399	.826
439	.408	.822
<u>437</u>	<u>37.3984</u>	<u>33.8182</u>
	33.8182	
	<u>4.5802</u>	
	35.6083	
	15	

Set at 35.620

Feb. 18 1871 Collimation  
N. Coll. on S. Coll. Tel. on N. Coll. Tel. on S. Coll.

557	37.425	33.661
539	.430	.645
538	.425	.678
520	.448	.650
543	.435	.662
<u>538</u>	<u>37.4326</u>	<u>35.6592</u>
	10918	
	35.5459	

Set at 35.560



Feb 19 1871

started 5<sup>h</sup> 24<sup>m</sup>

2 Leporis E

E Orionis 43° 40'

new start 6 37

so Drac

E Boon May

Geminae re-observed 7 20

Feb. 22 1871

Collimation

S. Coll. on N. Coll. Feb. on N. Coll. Feb. on S. Coll.

585

37,326

33,810

545

322

804

585

320

788

529

362

808

524

331

799

520

37,332

33,804.5

554

11367

585

35,568

517

555

Set at 35,580

5499

started 5<sup>h</sup> 58<sup>m</sup>

Feb. 24 1871

Collimation

S. Coll. on N. Coll. Tel. on N. Coll. Tel. on S. Coll.

$$\begin{array}{r}
 613 \\
 593 \\
 587 \\
 582 \\
 \hline
 604 \\
 \hline
 5958
 \end{array}$$

$$\begin{array}{r}
 37.538 \\
 \hline
 545 \\
 548 \\
 549 \\
 \hline
 585 \\
 \hline
 37.5530 \\
 12036 \\
 \hline
 35.6018
 \end{array}$$

$$\begin{array}{r}
 33.639 \\
 636 \\
 670 \\
 656 \\
 \hline
 652 \\
 \hline
 33.6506
 \end{array}$$

Set at 35.60

Feb. 27 1871 Collimation

S. Coll. on N. Coll. Tel. on N. Coll. Tel. on S. Coll.

$$\begin{array}{r}
 594 \\
 576 \\
 598 \\
 592 \\
 \hline
 611 \\
 \hline
 5912
 \end{array}$$

$$\begin{array}{r}
 37.688 \\
 693 \\
 682 \\
 688 \\
 684 \\
 \hline
 35 \\
 37.687 \\
 33.555 \\
 \hline
 35.621
 \end{array}$$

periscope  

$$\begin{array}{r}
 33.553 \\
 562 \\
 562 \\
 579 \\
 \hline
 564 \\
 \hline
 33.558
 \end{array}$$
 550  
 558  
 553  
 557  
 558  
 555

set at 35.64



Feb 27 1871

started 5<sup>h</sup> 23<sup>m</sup>

E Orionis

W Draconis

Y<sup>2</sup> Draconis

L. Orionis

March 8 1871

Collimation

S. Coll. on N. Coll. Tel. on N. Coll. Tel. on S. Coll.

634

600

608

616

595

6106

37.712

711

713

701

705

37.7084

1.2538

33.558

542

549

5510

528

33.5454

N. coll. 35.627

Set at 35.627

March 13 1871

61.2

609

629

629

617

Set at  
35.650

37.842

829

854

850

851

1.275331418  
35.635

422

420

430

428











$$\begin{array}{r}
 3600 \\
 24 \\
 \hline
 14400 \\
 7200 \\
 \hline
 86400
 \end{array}$$

$$\begin{array}{r}
 240 \\
 \hline
 86640 \\
 8664
 \end{array}$$

$$34658$$

$$51984$$

$$51984$$

$$69312$$

$$7506489600) 7464960000 (9944$$

$$675584064$$

$$709119360$$

$$675584064$$

$$335352960$$

$$300259584$$

$$35093376$$

$$9944$$

$$39$$

$$89496$$

$$29832$$

$$38.7816$$

$$2184$$

$$864$$

$$864$$

$$3458$$

$$5184$$

$$6912$$

$$7464960000$$











1863  
Mar  
Jan. Feb. Mar. April ... travel  
May. June. July. ... November





300

112.3

3.75-

15.6  
3.0

2.04

18.6  
55.8  
4.65  
9.3  
69.7

Barclay. the asteroids for every 10<sup>th</sup>  
day from rectangular coordinates for every 20<sup>th</sup>  
estimate 4 days work by Safford.  
About \$250 for large papers graphs  
and rule for small distance  
calculations got \$150 for work \$750  
for all.

January 1861  
Jensen. Jan. Oct. Dec.  
Trenton, Nov.  
Trenton, July Aug. Sept. Feb.  
Ten week, March, April, May, Jan.

5.5 2 100-100



35

+ 0 38.7

Started 5-22





