

KG  
11 365  
332

*East Transit*

*OBSERVATIONS*

*1866 May 1<sup>st</sup> to Sept. 2<sup>nd</sup> incl.*



1866phae.proj..333L

KG-11365.332

June. 11. 66. -

$$\text{Observations give } a = -0.^s.18. -1.^{log}.255$$

$$b = -0.^s.26. -1.^{log}.415$$

$$c = +0.^s.25. -1.^{log}.398$$

$$m = -0.^s.31. -1.^{log}.491$$

$$n = -0.^s.05. -2.^{log}.699$$

$c$  is for mean wire, V.C. Ill<sup>W</sup>.

June 11 66

$$a = -0.^s.11$$

$$b = -0.^s.18$$

$$c = -0.^s.28.$$

$$m = -0.^s.20.$$

$$n = -0.^s.04$$

$c$  is for mean wire V.C. Ill<sup>W</sup>

collimation & azimuth disturbed (in evening.)

June. 15. <sup>h</sup>

$$m = -0.^{sec}.37$$

$$n = +.20$$

$$c = -.90 \text{ V.C. Ill. E } \underline{\text{mean}} \text{ wire}$$

$$a = -.40$$

$$b = -.14 \text{ } (-.10 \text{ June } 20)$$

June 23  $m = + 0^{Sec} . 014$   
 $n = - 0 . 163$   
 $a = + 0 . 13$   
 $b = - 0 . 10$

$c = + 0 . 05$  2ll. E.

June 25.  $c = + 0 . 30$  2ll. E.

June 27  $c = - 0 . 167$  2ll. W.

Values from obs of July 2<sup>nd</sup>.

$m = + 0^{Sec} . 096$

$n = - 0 . 210$

$a = + 0 . 220$

$b = - 0 . 070$

$c = - 0 . 167$  (mean wire. 2ll. W.)



Harvard College Observatory

Transits from May 1<sup>st</sup>

1866.

to Sept. 2, 1866.

Values given by Mr. Austin May 13<sup>th</sup>  
(Ill. & E.)

$$a = -0^s.377. \quad \text{KA } 11365.332$$

$$b = -0^s.280.$$

$$c = -0^s.155. \quad -\bar{1}.19033$$

$$m = -0^s.460.$$

$$n = +0^s.090. \quad \log 2.95424$$



1<sup>st</sup> reading

2<sup>nd</sup> End

E. end 75

45.5

May. 15<sup>th</sup> Level. Error - 0<sup>s</sup>.327

$$a \text{ (assumed value)} = -0^s.377$$

$$b = -0^s.327$$

$$c = -0^s.155. \quad -\bar{1}.19033$$

$$m = -0^s.496.$$

$$n = +0^s.058. \quad -2.76342$$

May. 28<sup>th</sup>

$$a = +0^s.125$$

$$b = -0^s.307$$

$$c = +0^s.152. \quad -1.18184$$

$$m = -0^s.442.$$

$$n = 294. -\bar{1}.47283$$

(equatorial interval)  
For Ill. W. add .16 to mean of wires to reduce to middle wire

" " " deduct .16 from middle wire " " mean "



Date

Observer

Illumin'n

Star

Mag.

 $\delta$ 

Wire a

" b

" c

" 1

" 2

" 3

" 4

" 5

" d

" e

" f

Sum

Mean

Red'n to

m

n. tan.  $\delta$ c. sec.  $\delta$  $r$ 

T

a

 $\Delta T$

Date *May. 1. 66*

Observer

Illumin'n *East. West.*

Star

Mag.

$\delta$

Wire	a	to middle wire.	+ 40 <sup>sec.</sup> . 81	+ 41 <sup>sec.</sup> . 21
"	b	"	+ 27. 21	+ 27. 31
"	c	"	+ 13. 38	+ 13. 76
"	1	"	+ 6. 78	+ 6. 84
"	2	"	+ 3. 30	+ 3. 57
"	3	"	0. 00	+ 0. 00
"	4	"	- 3. 57	- 3. 30
"	5	"	- 6. 84	- 6. 78
"	d	"	- 13. 76	- 13. 38
"	e	"	- 27. 31	- 27. 21
"	f	"	- 41. 21	- 40. 81

Equatorial Intervals

Sum

Mean

Red'n to

m

n. tan.  $\delta$

c. sec.  $\delta$

r

T

a

$\Delta T$

The above values of Equatorial  
Austin. from ~~his~~ observations  
and  $\gamma$  Pegasi.



Date

Observer

Illumin'n

East.

West.

Star

Mag.

 $\delta$ 

Wire	a	To mean of Wires	+ 40. <sup>sec.</sup> 88	+ 41. <sup>sec.</sup> 14
"	b	" "	+ 27. 28	+ 27. 24
"	c	" "	+ 13. 45	+ 13. 69
"	1	" "	+ 6. 85	+ 6. 77
"	2	" "	+ 3. 37	+ 3. 50
"	3	" "	+ 0. 07	- 0. 07
"	4	" "	- 3. 50	- 3. 37
"	5	" "	- 6. 77	- 6. 85
"	d	" "	- 13. 69	- 13. 45
"	e	" "	- 27. 24	- 27. 28
"	f	" "	- 41. 14	- 40. 88

Intervals  
Equatorial.

Sum

Mean

Red'n to

m

n. tan.  $\delta$ c. sec.  $\delta$ 

r

T

a

 $\Delta T$ 

Intervals are those deduced by Mr.  
of  $\alpha$  Cygni,  $\alpha$  Pis. Aust.,  $\alpha$  Pegasi,  $\alpha$  Androm,

Date *May. 1<sup>st</sup> / 66.*Observer *S.P.L.*Illumin'n *E.*Star  *$\alpha$  Urs. Min.*Mag. *2.* $\delta$  *+ 88° 35' 37"*

Wire a

" b

" c

" 1 *1. 03 53.7*" 2 *1. 06 10.7*" 3 *1. 08. 31*" 4 *1. 10. 56.7*" 5 *1. 13. 13.4*

" d

" e

" f

Sum *42 45 5*Mean *1. 8 33.1*

Red'n to

m

n. tan.  $\delta$ c. sec.  $\delta$  $r$ T *1. 9*

a

 $\Delta T$



Date

Observer

Illumin'n

Star

Mag.

 $\delta$ 

Wire a

" b

" c

" 1

" 2

" 3

" 4

" 5

" d

" e

" f

Sum

Mean

Red'n to

m

n. tan.  $\delta$ c. sec.  $\delta$  $r$ 

T

a

 $\Delta T$

Date	April 30 <sup>1</sup> 1866	Apr 30	Apr. 30.
Observer	E. P. Austin.	E. P. A	E. P. A
Illumin'n	E.	E.	E.
Star	B. Virginis	$\gamma$ Urs. Maj.	$\epsilon$ Draconis
Mag.			
$\delta$		+ 54°. 25'	+ 78.22
Wire	a	11. 44 36.1	
"	b	11 42 16.2	44 59.9
"	c	30.	45 23.5
"	1	36.4	34.2 12 4 20.8
"	2	40.	40.9 37.
"	3	43.1	46.0 54.9
"	4	46.9	52.4 5. 11.9
"	5	50.1	58.2 29.
"	d		
"	e		
"	f		
Sum	216.5	231.7	153.6
Mean	11. 42. 43.3	11. 45. 46.34	12. 4. 54.72
Red'n to			
m		- 46	- .46
n. tan. $\delta$		+ 13	+ .44
c. sec. $\delta$		- 39	- 1.12
r		- 72	- 1.14
T		45 45.62	4 53.58
a		11 46. 48.03	12. 5. 56.17
$\Delta T$		1 02.42	1 2.59

At Sid 0 April 30  $\Delta T = +59^s.31$   
 Hourly rate + 0.253



Date		April 30/66	Apr. 30.	Apr. 30.
Observer		E.P.A.	E.P.A.	E.P.A.
Illumin'n		E.	E.	E.
Star		$\alpha$ Leonis.	$\alpha$ Cephei	$\alpha$ Urs. Maj.
Mag.				
$\delta$		+ 11° 14	+ 65° 30	+ 62° 27
Wire	a	10 40 31.7	10	10. 53.
"	b	45.7	42 47.4	
"	c	59.6	43 20.2	57.1
"	1	41 6.5	37.0	54. 11.0
"	2	09.8	45.3	19.5
"	3	13.4	53.9	25.9
"	4	16.3	44. 1.9	33.9
"	5	20.6	10.	40.9
"	d		25.6.	55.8.
"	e		59.5.	55. 25.0
"	f		45. 32.1	
Sum		66.6	148.1	131.2
Mean		10 41 13.32	10 43 53.62	10. 54. 26.24
Red'n to				
m		- 46	- .46	- .46
n. tan. $\delta$		+ .02	- .20	+ .17
c. sec. $\delta$		- 23	+ .54	- 50
r		- 67	+ .12	- 79
T				
a		1 12 65	43 53 50	25.45
		10 42 14.33	22 44 55.50	10. 55. 27.70
$\Delta T$		1 1.68	1 2.60	1 2.25

Date	April. 30/46	Apr. 30.	Apr. 30.
Observer	E.P.A.	E.P.A.	E.P.A.
Illumin'n	E	E.	E
Star	$\delta$ Leonis	$\tau$ Leonis.	$\lambda$ Draconis
Mag.			
$\delta$	$+21^{\circ} 14'$	$+3^{\circ} 35'$	$+70^{\circ} 03'$
Wire			
a	11 5 15.0	11 19 22.2	
"	b 29.6	35.9	
"	c 44.4	49.7	11 21 46.4
"	1 51.7	56.3	22. 5.6
"	2 55.2	59.8	15.3
"	3 58.8	20. 2.9	25.0
"	4 6 2.8	7.0	36.1
"	5 6.2	9.9	46.1
"	d 13.8		
"	e		
"	f		
Sum	44.7	15.9	128.1
Mean	11 5 58.94	11. 20. 304	11 22 25.62
Red'n to			
m	-.46	-.46	-.46
n. tan. $\delta$	+0.4	+0.01	+ .25
c. sec. $\delta$	- 24	- 23	- 66
r	-.66	- 68	- 87
T	58 28	2.46	2 24.75
a	11 7 0.48	11 21. 4.66	11 23 26.83
$\Delta T$	1 2.20	1 2.20	1 2.08



Date		Apr. 30. <sup>b</sup> 1866	Apr. 30. <sup>h</sup>	Apr. 30. <sup>h</sup>
Observer		E. P. A.	E. P. A.	E. P. A.
Illumin'n		E. P. A.	E. P. A.	E. P. A.
Star		$\gamma$ Leonis.	$\gamma$ Cephei.	$\beta$ Leonis.
Mag.		-0°.05'	+76°.53'	+15°.18'
$\delta$				
Wire	a	11 28 25.2		
"	b	38.7		
"	c	52.2		
"	1	58.9	11 32 19.0	11 41 6.6
"	2	29 2.6	33.9	10.5
"	3	5.6	49.7	13.7
"	4	9.2	33 4.6	17.5
"	5	12.9	20.0	20.8
"	d			
"	e			
"	f			
Sum		29.2	127.2	6.91
Mean		11 29 5.84	11 32 49.44	11 41 13.82
Red'n to				
m		-.46	-.46	-.46
n. tan. $\delta$		+0.0	-.38	+0.2
c. sec. $\delta$		-.22	+ .99	-.23
r		-.68	+ 15'	-.67
T		9 5' 16	32 49 59	41 13 15
a		11. 30. 7.29	11 33 51.95	11. 42. 15.27
$\Delta T$		1 2 13	1 2.36	1 2.12

Date	May. 2 <sup>nd</sup> 66	May 2	May. 2
Observer	S.P.L.	S.P.L.	S.P.L.
Illumin'n	E.	E.	E.
Star	$\alpha$ Urs. Maj	$\delta$ Leonis	$\delta$ Crateris
Mag.	2	2.3	3.4
$\delta$	$+62^{\circ}.30'$	$+27^{\circ}.18'$	$-14^{\circ}.1'$
Wire	a		
"	b		
"	c	10 53 45.2	11 05 32.1
"	1	53 59.1	39.5
"	2	54 06.8	42.9
"	3	" 13.9	46.7
"	4	" 21.6	50.6
"	5	" 28.6	54.2
"	d	" 43.2	6 01.6
"	e		
"	f		
Sum	38.4	27.6	08.6
Mean	10. 54 14.06	11. 5 46.80	11 11 26.94
Red'n to			
m	$-0^s.460$	$-0.460$	$-0.460$
n. tan. $\delta$	$+0^s.173$	$+0.046$	$+0.022$
c. sec. $\delta$	$-0^s.335$	$-0.174$	$-0.160$
$\tau$	$-0^s.622$	$-0.588$	$-0.642$
T	10 54 13.43	5. 46 21.2	11. 11. 26.29
a	10. 55. 27.64	11 07 00.46	11. 12 40.61
$\Delta T$	1. 14. 21	1. 14. 25	1. 14. 32

At sid  $0^h$  May 2  $\Delta T = 1^m 11^s.40$



Date	<i>May. 2<sup>nd</sup> 66</i>	
Observer	<i>S. P. L.</i>	
Illumin'n	<i>E.</i>	
Star	<i><math>\tau</math> Leonis.</i>	
Mag.	<i>5</i>	
$\delta$	<i>+3°.38'</i>	
Wire	a	
"	b	
"	c	
"	1	<i>11 19 44.4.</i>
"	2	<i>47.9</i>
"	3	<i>51.</i>
"	4	<i>54.3</i>
"	5	<i>57.8</i>
"	d	
"	e	
"	f	
Sum	<i>15.4</i>	
Mean	<i>11 19 57.08</i>	
Red'n to		
m	<i>- 0.460</i>	
n. tan. $\delta$	<i>+ 0.005</i>	
c. sec. $\delta$	<i>- 0.155</i>	
$r$	<i>- 0.610</i>	
T	<i>11 19 50.47</i>	
a	<i>11 21 04.64</i>	
$\Delta T$	<i>1.14.17</i>	

Date	May. 3/66	May. 3 <sup>rd</sup>
Observer	S.P.L.	S.P.L.
Illumin'n	E.	E.
Star	$\alpha$ Uro. Min	$\delta$ Geminorum
Mag.	2.	3 <sup>rd</sup> 4.
$\delta$	$+88.36$	$+22^{\circ}.13'$
Wire	a	
"	b	
"	c	7 10 33.9
"	1	1 03 41 40.9
"	2	06 02.2 44.7
"	3	08 20.1 48
"	4	10. 46.8 52.2
"	5	12. 58.8 55.6
"	d	11. 02.9
"	e	
"	f	
Sum	41 .489	38.2
Mean	8 21.78	7 10 48.32
Red'n to		
m		$-0^{\circ}.460$
n. tan. $\delta$		$+0.037$
c. sec. $\delta$		$-0.167$
$\tau$		$-0.590$
T		7 10 47.73
a		7 12 07.73
$\Delta T$		1 .20.00

M. O. h sid. time May 3.  $\Delta T = 1^m 18^s.25$



Date	May. 4/66	May. 4.	May 4.
Observer	S.P.L	S.P.L	S.P.L.
Illumin'n	E.	E.	E.
Star	<i>i. Mrs. Maj</i>	<i>a. Mrs. Maj.</i>	<i><math>\delta</math>. Leonis</i>
Mag.	3	2.	2.3
$\delta$	+ 48.33.	+ 62° 28'	+ 21° 15'
Wire	a		11 04 49.4
"	b	10 53 01.1	05 04.
"	c	8. 48. 15.2.	18.8
"	1	25.2.	45.5
"	2	30.4	52.9
"	3	35.3	59.8
"	4	40.7	54 07.8
"	5	45.7	15.6
"	d	56.	48.
"	e	54 59.1	06 02.7
"	f		17.3
Sum	248.5.	01.8	059
Mean	8. 48. 35.5010	54 00 26	11 05 33 26.
Red'n to	Mean of Wires	Mean	Mean
m	- 0.460	- 0.460	- 0.460
n. tan. $\delta$	+ .102	+ .173	+ .046
c. sec. $\delta$	- .234.	- .335	- .174
r	- 0.592.	- .622	- .588
T	8. 48. 34.90	10 53 59.63	11 .05. 32.67
a	8. 50. 02.12	10 55 27.57	11 07 00.43
$\Delta T$	1. 27.22	1. 27 94	1. 27.76

Date		May 4 <sup>h</sup> /66	May 4 <sup>h</sup>	May 4 <sup>h</sup>
Observer		S. P. L.	S. P. L.	S. P. L.
Illumin'n		E.	E.	E.
Star		$\delta$ Crateris	$\tau$ Leonis	$\lambda$ Draconis
Mag.		3.4	5	3.4
$\delta$		$-14^{\circ}.04'$	$+3^{\circ}.35'$	$+70^{\circ}.04'$
Wire	a	11 10 31.4		
"	b	45.4		
"	c	59.7	11 19 23.9	
"	1	11 06.3	30.6	11 21 38.7
"	2	09.9	34.1	49.1
"	3	13.2	37.2	58.9
"	4	17.2	41.	22 09.2
"	5	20.5.	44.2	19.2
"	d	27.9	51.3	
"	e	41.6.		
"	f	56.		
Sum		29.3	262.3	55.1
Mean		11 11 13.57	11 19 37.47	11 21. 59.02
Red'n to		Mean	Mean	Mean
m		$-0.460$	$-0.460$	$-0.460$
n. tan. $\delta$		$- .022$	$+ .005$	$+ .248$
sec. $\delta$		$- .160$	$- .155$	$- .454$
$\tau$		$- .642$	$- .610$	$- .666$
T		11 11 12.92	11. 19 36.86	11. 21 59.35
a		11 12 40.59	11 21 04.62	11 23 26.66
$\Delta T$		1 27 67	1 27.76	1. 28 35



Date *May. 4. 66.*Observer *S. P. L.*Illumin'n *E.*Star *91. Leonis. (v)*Mag. *5.4<sup>0</sup>* $\delta$  *- 0° 05'*Wire a *11 27 59.2*" b *28 12.8*" c *26.6*" 1 *33.1*" 2 *36.7*" 3 *39.9*" 4 *43.3*" 5 *46.9*" d *53.9*" e *29. 07.4*" f *21.1*Sum *209*Mean *11 28 40.08*Red'n to *Mean*m *- 0<sup>s</sup>. 460*n. tan.  $\delta$  *. 000*c. sec.  $\delta$  *- . 155* $\tau$  *- . 615*T *11 28 39.46*a *11 30 07.25* $\Delta T$  *1. 27.79**M. Sid. O. h. O m. May. 4. <sup>b</sup>  $\Delta T = + 1. 24. 95$* 

*from. S. Leonis. } Greatest deviation from mean 0<sup>s</sup>. 08*  
*" i. Urs maj }*  
*" 5 Crateri }*  
*" 2 Leo }*  
*" 91 Leo }*

*M. 11.38. Pendulums were weighted with additional shot.*

Date	May. 6. <sup>b</sup> /66	May. 6	May. 6.	
Observer	J.W.	J.W.	J.W.	
Illumin'n	E.	E.	E.	
Star	12 Can. Final	$\theta$ Virg.	$\alpha$ Virg.	
Mag.				
$\delta$	+ 39°. 03'	- 4°. 49	- 10°. 28.	
Wire	a			
"	b			
"	c			
"	1	12 48 18	13 01 36.4	13 16 43.7
"	2	23	40.	47.
"	3	26.9	43.2	50.4.
"	4	31.6	46.8	54.2.
"	5	35.9	50.	57.7
"	d			
"	e			
"	f			
Sum	185.4	216.4	253.0	
Mean	12 48 27.08	13 01 43.28	13 16 50.60	
Red'n to	Mean	Mean	Mean	
m	- 0 <sup>s</sup> 460	- 0 <sup>s</sup> 460	- 0 <sup>s</sup> 460	
n. tan. $\delta$	+ .073	- .009	- .017	
c. sec. $\delta$	- .199	- .156	- .157	
r	- .586	- .625	.634	
T	12. 48. 26.49	13. 01. 42.65	13. 16. 49.96	
a	12 49 47.29	13 03 03.22	13 18 10.70	
$\Delta T$	1. 20.80	1. 20.57	1. 20.74	

M. Sid. Oh. May. 6.  $\Delta T = 1.22.78$ .



Date	May. 6. <sup>b</sup> 66.	May. 6. <sup>t</sup>	May. 6. <sup>h</sup>	
Observer	J.W.	J.W.	J.W.	
Illumin'n	E.	E.	E.	
Star	$\alpha$ Draconis.	$\alpha$ Bootis.	$\epsilon$ Bootis.	
Mag.				
$\delta$	+65°.01'	+19°.52'	+27°.38.	
Wire	a			
"	b			
"	c			
"	1	13 59 11.7	14. 08. 07.7	14 37 42.6.
"	2	19.6	11.2.	46.5.
"	3	27.3	14.9	50.3.
"	4	36.2	18.6.	54.3.
"	5	44.	22.4	58.2
"	d			
"	e			
"	f			
Sum	138.8	74.8	251.9	
Mean	13. 59. 27.76	14. 08. 14.96	14 37. 50.38	
Red'n to	Mean	Mean	Mean	
m	-0°.460	-0°.460.	-0°.460.	
n. tan. $\delta$	+ .193	+ .032	+ .059	
c. sec. $\delta$	- .367	- .165	- .175	
$r$	+ .634	- 593	- 576.	
T	13. 59 27.12	14. 08. 14.36	14 37 49.80	
a	14 00 48.19	14 09 35.20	14 39 10.33	
$\Delta T$	1. 21.07	1 20.84	1. 20.53	

Between the observations of  $\alpha$  Virginis &  $\alpha$  Draconis  
 some shot was taken out of the pendulum.

Date	May. 7. /66.	May 7	May. 7
Observer	S.P.L.	S.P.L.	S.P.L.
Illumin'n	E.	E.	E.
Star	$\alpha$ Orionis.	$\alpha$ Can. Maj.	$\alpha$ Can. Min.
Mag.	1	1	1
$\delta$	$+7^{\circ}22'$	$-16^{\circ}32'$	$+5^{\circ}33'$
Wire	a		
"	b		
"	c	5 46. 22.6.	6 37 41 7 30 44.6.
"	1	28.9	47.9 51.3
"	2	32.2	51.5 54.7
"	3	35.6	55. 58.
"	4	38.9	58.9 31 01.7
"	5	42.7	38 02.1 04.9
"	d	49.2	09.4. 12.
"	e		
"	f		
Sum	250.1	25.8	47.2
Mean	5 46 35.73	6. 37 55.11	7. 30. 58.17
Red'n to	mean wire	mean	mean
m	$-0^{\circ}.460$	$-0.460$	$-0.460$
n. tan. $\delta$	$+ .011$	$- .027$	$+ .009$
c. sec. $\delta$	$- .145$	$- .162$	$- .156$
$\tau$	$- .605$	$- .649$	$- .607$
T	5 .46 .35.12	6. 37 54.46	7 30 57.56
a	5 47 55.30	6 39 14.74	7. 32 17.75
$\Delta T$	1. 20.18	1. 20.28	1 .20 .19

$\Delta T$  at Sid oh. May. 7. 1.<sup>m</sup> 20.<sup>s</sup> 45.



Date	May 7
Observer	S. P. L.
Illumin'n	E.
Star	$\beta$ . Geminorum
Mag.	1.2.
$\delta$	+ 28.20.
Wire	a
"	b
"	c
"	1
"	2
"	3
"	4
"	5
"	d
"	e
"	f
Sum	33 8
Mean	$\gamma$ 35 47.69
Red'n to	mean
m	- .460.
n. tan. $\delta$	+ .048
c. sec. $\delta$	- .128.
r	- .588.
T	$\gamma$ 35 47.10
a	$\gamma$ 37 07.31
$\Delta T$	1.20.21

Date	May. 8 <sup>5</sup> /66	May. 8.
Observer	S.P.L.	S.P.L.
Illumin'n	E.	E.
Star	$\alpha$ Canis Min	$\beta$ Gemin.
Mag.		
$\delta$	+ 5° 33.	+ 28.20.
Wire	a	
"	b	
"	c	
"	1	51.6 7. 35 40.2
"	2	55.1 44.2
"	3	58.4 48.
"	4	31 02. 52.
"	5	05.2. 55.8
"	d	12.2
"	e	
"	f	
Sum	49.5	00.2
Mean	7. 30. 58.5	7. 35. 48.04
Red'n to	Mean wire.	Mean.
m	-0.460	-0.460
n. tan. $\delta$	+ .009	+ .048.
c. sec. $\delta$	- .156	- .176
$\tau$	- .607	- .588.
T	7 30 57.89	7. 35 47.45
a	7 32 17.84	7. 37 07.42
$\Delta T$	1. 19.95	1. 19.97

$\Delta T$ . May. 8 at Sid. 0.<sup>h</sup> = +1.20.07



Date *May 10. 66.*  
 Observer *S.P.L.*  
 Illumin'n *E.*

Star *a Urs. Min.*  
 Mag. *2.*  
 $\delta$  *+88. 34.*

Wire	a	<i>0 40 33.</i>
"	b	<i>49 47</i>
"	c	<i>59 13.9</i>
"	1	<i>1 03 39.6</i>
"	2	<i>05. 58.4</i>
"	3	<i>08. 13.5</i>
"	4	<i>10. 44.8</i>
"	5	<i>12. 55.1</i>
"	d	<i>17 36.4</i>
"	e	<i>26. 57.2</i>
"	f	<i>36. 18.4</i>

Sum *12. 31. 51.3*  
 Mean *1. 08. 21.03*

Red'n to  
 m  
 n. tan.  $\delta$   
 c. sec.  $\delta$

$\tau$

T

a

$\Delta T$   
*Atmosphere. bad.*

Date	May. 10. 66.	May. 10 <sup>1</sup>	May. 10.	
Observer	S. P. L.	S. P. L.	S. P. L.	
Illumin'n	E.	E.	E.	
Star	$\alpha$ Can. Maj.	$\alpha$ Can. Min.	$\beta$ Gem.	
Mag.	1	1	1.2	
$\delta$	$-16^{\circ}.32$	$+5^{\circ}.34$	$+28^{\circ}.21$	
Wire	a			
"	b			
"	c	6 37 42	7 30 45.5	7 35. 33.4
"	1	49.	52.2	40.9
"	2	52.4	55.6	48.8
"	3	55.8	59.	48.8
"	4	59.9	31 02.6	52.9
"	5	38. 03.1	05.9	56.4
"	d	10.2	12.6	36. 04.4
"	e			
"	f			
Sum	32.4	233.4	42.6	
Mean	6 37 56.06	7 30 59.06	7 35 48.80	
Red'n to	Mean	Mean	Mean.	
m	$-0.460$	$-1.460$	$-4.60$	
n. tan. $\delta$	$-.027$	$+0.09$	$+0.48$	
c. sec. $\delta$	$-.162$	$-1.56$	$-1.76$	
T	6 37 55.01	7 30 58.45	7 35 48.25	
$\epsilon T$	$-.649$	$-.607$	$-.588$	
a	6 39 14.69	7 32 17.81	7 37 07.39	
$\Delta T$	1 19.28	1 19.36	1. 19. 18.	



Date	May. 11 <sup>th</sup> 66	May. 11.	May. 11.
Observer	S.P.H.	S.P.H.	S.P.L.
Illumin'n	E.	E.	E.
Star	$\gamma$ Leonis (2)	$\beta$ Leonis.	$\gamma$ Uro. Maj.
Mag.	5.4	2.	2.3.
$\delta$	$-0^{\circ} 5'$	$+15^{\circ} 19'$	$+54^{\circ} 26'$
Wire	a		
"	b		
"	c	11 28 35.1	11 40 42.6
"	1	41.7	49.7
"	2	45.2	53.1
"	3	48.6	56.4
"	4	52.1	41.
"	5	53.6	03.7
"	d	29. 02.5	10.6.
"	e		52.7
"	f		
Sum	11 40.8.	36.19.	2041
Mean	11 28. 48.69	11 40 56.59	11 45 29.16
Red'n to	mean	mean.	
m	$-0^s.460$	$-0^s.460$	
n. tan. $\delta$	$+ .000$	$+ .025$	
c. sec. $\delta$	$- .155$	$- .161$	
$r$	$- .615$	$- .596$	
T	11 . 28 48.07	11 40.55 .90	
a	11 30 07.18	11 42 15.16	
$\Delta T$	1 19.11	1. 19.26	

Date	May. 11. / at	May. 11.
Observer	S.P.L.	S.P.L.
Illumin'n	E.	E.
Star	$\alpha$ Virginis	$\eta$ Virginis
Mag.	4	3.4
$\delta$	$9^{\circ} 29'$	$+0.5'$
Wire	a	
"	b	
"	c	11 54 52.8 12. 11. 33.2
"	1	59.4 39.7
"	2	57 03. 43.1
"	3	06.2 46.4
"	4	10 50.1
"	5	13.2 53.2
"	d	20.1 12. .2
"	e	
"	f	
Sum	44.7	25.9
Mean	11 57 06.39	12 11. 46.56
Red'n to	mean	
m	-0.460	-0.460
n. tan. $\delta$	+ .015	+ .000
c. sec. $\delta$	- .157	- .155
$r$	- .602	- .615
T	11 57 05.78	12. 11. 45.94
a	11 58 24.93	12 13 05.13
$\Delta T$	1. 19.15	1 19 19

May. 11. <sup>16</sup> at Sid  $0^h$   $\Delta T = +1.19.23$  <sup>m sec.</sup>



Date	May. 12.	May. 12.	May. 12.
Observer	Srk	S.P.L.	Srk
Illumin'n	E.	E.	E.
Star	$\alpha$ Tauri	$\beta$ Geminorum	$\eta$ Virginis
Mag.	1.	1.2	3.4
$\delta$	+ 16°. 14	+ 28.21	+ 0°. 5
Wire	a		
"	b		
"	c	4 26 41.6	7 35 33.7
"	1	48.9	41.1
"	2	52.4	45.2
"	3	55.7	48.8
"	4	59.4	52.9
"	5	27 03.	56.7
"	d	10.1	36 04.5
"	e		12 00.2
"	f		
Sum	.31.1	42.9	.27.6
Mean	4 26. 55.87	7 35 48.98	12 11 46.80
Red'n to	mean	mean	mean
m	- 0.460	- 0.460	- .460
n. tan. $\delta$	+ .026	+ .048	+ .000
c. sec. $\delta$	- 162	- .176	- .155
r	- .596	- .588	- .615
T	4. 26. 55.27	7. 35 48.39	12. 11 46.18
a	4 28 14.45	7 37 07.36	12 13 05.13
$\Delta T$	1 18.88	1. 18.97	1 18.95
	Not used.		

Date	May. 12	May. 12	May 12
Observer	S.P.L.	S.P.L.	S.P.L.
Illumin'n	E.	E.	E.
Star	$\alpha$ Can Maj	$\beta$ Corvi	$\gamma$ Virg. (mean)
Mag.	1		
$\delta$	$-16^{\circ}.32$	$-22.40$	$-0.43'$
Wire	a		
"	b		
"	c	6 37 42	12 25 50.9 12 33 22.6
"	1	49.4	58. 29.3
"	2	52.8	26 01.6 32.7
"	3	56.3	05.2 35.9
"	4	38	09.1 39.6
"	5	03.3	12.7 42.9
"	d	10.4	20.2 49.9
"	e		
"	f		
Sum	34.2	37.7	252.9
Mean	6 37 56.31	12 26 05.39	12 33 36.13
Red'n to	mean	mean	mean
m	-460	-460	-460
n. tan. $\delta$	-0.27	-0.38	-0.01
c. sec. $\delta$	+162	-168	-155
r	-649	666	-616
T	6 37 55.66	12 26 04.72	12 33 35.51
a	6 39 14.67	12 27 23.59	12 34 54.40
$\Delta T$	1.19.01	1.18.87	1.18.89

$\Delta T$ . May. 12. Sid.  $0^h = +1^m 19^s 04$

Greatest variation from mean.  $^s.05$



Date	May. 14. /66	May. 14.	May. 14.
Observer	S.P.L.	S.P.L.	S.P.L.
Illumin'n	E.	E.	E.
Star	$\alpha$ . Can. Min.	$\beta$ . Gem.	$\beta$ . Corvi.
Mag.	1	1.2	2.3
$\delta$	$+5^{\circ} 34'$	$+28^{\circ} 21'$	$-22^{\circ} 40'$
Wire	a		
"	b		
"	c	7 30 46.8	7 35 34.5 12 25 51.8
"	1	53.3	42. 58.9
"	2	56.8	45.9 26 02.6
"	3	36. 49.5	06.2
"	4	03.8	53.9 10.2
"	5	07.2	57.3 13.8
"	d	14.1	36 05.2 21.2
"	e		
"	f		
Sum	02.1	48.3	44.7
Mean	7 31 00.30	7 35 49.76	12. 26. 06.39
Red'n to	Mean	Mean	Mean
m	-460	-460	-460.
n. tan. $\delta$	+009	+048	-038
c. sec. $\delta$	-156	-176	-168
r	-607	-588	-646
T	7 30 59.69	7 35 49.12	12. 26. 05.72
a	7. 32 17.76	7 37 07.34	12. 27. 23.57
$\Delta T$	1 18.07	1 18.22	1 17.85

Date	May. 14 <sup>1</sup> / <sub>66</sub>	May 14	May. 14
Observer	S.P.L.	S.P.L.	S.P.L.
Illumin'n	E.	E.	E.
Star	$\gamma$ Virginis	12 Can. Venat.	$\theta$ Virginis
Mag.	-0° 43'	+39° 03	-4° 50'
$\delta$			
Wire	a		
"	b		
"	c	12 33 23.8	12 48 12.5
"			13 01 32.5
"	1	29.3	21.
"	2	33.8	25.5
"	3	37.	29.6
"	4	40.6	34.3
"	5	44.	38.6
"	d	50.9	47.3
"	e		59.8
"	f		
Sum	259.4	208.8	321.2
Mean	12 33 37.06	12 48 29.83	13 01 45.89
Red'n to	mean	mean	mean
m	-460	-460	-460
n. tan. $\delta$	-001	+073	-008
c. sec. $\delta$	-155	-200	-155
r	-616	-587	-623
T	12 33 36.44	12 48 29.24	13 01 45.16
a	12 34 54.39	12 49 47.19	13 03 03.10
$\Delta T$	1 17.95	1 17.95	1. 17.84

At Sid. O<sup>h</sup> May. 14.  $\Delta T = 1.18.19$



Date	May 15	May 15	May 15
Observer	S.P.H.	S.P.H.	S.P.H.
Illumin'n	E	E	E
Star	a Can Maj.	a Gum.	a Can Min.
Mag.	-16.32	+32.11	+5.34
$\delta$			
Wire	a		
"	b		
"	c		
"	1		
"	2		
"	3		
"	4		
"	5		
"	d		
"	e		
"	f		
Sum	44.0	25.3	07.6
Mean	6 37 57.71	7 24 46.47	7 31 01.88
Red'n to	mean	mean	
m	-460	-460	
n. tan. $\delta$			
c. sec. $\delta$			
r			
T			
a	6 39 14.63	7 26 03.	7 32 17.76
$\Delta T$			

Date May 15/66

Observer S.R.L.

Illumin'n E.

Star  $\beta$  Gem

Mag.

 $\delta$  $+28^{\circ} 21'$ 

Wire a

" b

" c

7 35 35.2

" 1

42.7

" 2

46.6

" 3

50.5

" 4

54.6

" 5

58.5

" d

36. 05.9

" e

" f

Sum

54

Mean

7 35 50.57

Red'n to

m

-460

n. tan.  $\delta$ c. sec.  $\delta$ 

r

T

a

7. 37. 07.12

 $\Delta T$  91May 15<sup>th</sup> at Sid. Obs. 1. 17. 42.Clock Thermom.  $46^{\circ}.7$  at time of obs.



Date	May. 19 <sup>th</sup> 66	May. 19 <sup>th</sup>	May 19 <sup>th</sup>
Observer	S. P. L.	S. P. L.	S. P. L.
Illumin'n	E	E	E
Star	$\alpha$ Tauri.	$\beta$ Orionis.	$\alpha$ Can Maj.
Mag.	1	1	1
$\delta$	+16°.14	-8°.22	-16°.32
Wire	a	5 07 44	
"	b	57.9	
"	c	08 11.5	6 39 20.2
"	1	18.3	27.3
"	2	22.	31.
"	3		34.1
"	4		38.
"	5		41.5
"	d		48.8
"	e	4 29 01.60	
"	f		
Sum			240.39.
Mean			6 39 34.41
Red'n to			mean
m			-.496
n. tan. $\delta$			-.017
c. sec. $\delta$			-16.1
r			-640
T			6. 39. 33.77
a	4 28 14.18	5 08 05.82	6 39 14.60
$\Delta T$			19.17

May. 17. Clock stopped & new connecting  
wire put in. May 17/18 Hanny

Clock Thermometer  $68^{\circ}.7$ 

Date	May 19/66	May 19.
Observer	S.P.L.	S.P.L.
Illumin'n	E.	E.
Star	$\alpha$ Gem.	$\alpha$ Can/Min.
Mag.		
$\delta$	$+32^{\circ}.11$	$+5^{\circ}.34$
Wire	a	
"	b	
"	c	7 26 07.2 7 32 24.2
"	1	15.2 31.1
"	2	19.2 34.6
"	3	23. 37.9
"	4	27.3 41.4
"	5	31.2 44.6
"	d	39.3 51.7
"	e	
"	f	
Sum	162.4	265.6
Mean	7 26 23.20	7 32 37.94
Red'n to	mean	mean
m	-.496	-.496
n. tan. $\delta$	+036	+006
c. sec. $\delta$	-183	-156
r	-.643	-.646
T	7 26 22.55	7 32 37.29
a	7 26 02.96	7 32 17.72
$\Delta T$	19.59	19.57

May 19. 7.30 and 7  $\Delta T = -19^{\circ}.58$



Date	May 23. 76.	May 24. 66	May 24. 66
Observer	S.F.L.	S.F.L.	S.F.L.
Illumin'n	E.		
Star	$\alpha$ Leonis.	$\times$ Ophiuchi	$\alpha$ Herculis
Mag.	1.		
$\delta$	$+12^{\circ} 37'$	$+9^{\circ} 35'$	$+33^{\circ} 46'$
Wire	a		
"	b		
"	c	16 52 08.5	16 58 25.8~
"	1	10 02 05.3	15.2 33.6
"	2	08.9	18.7 38.
"	3	12.4	21.9 41.7
"	4	16.3	25.6 45.9
"	5	19.5	28.8 50.
"	d	36.1	58.4
"	e		
"	f		
Sum	62.4	154.8	293.4
Mean	10 02 12.48	16 52 22.11	16.58 41.91
Red'n to	mean	mean	mean
m	-0.496	-0.49	-0.49
n. tan. $\delta$	+ .013	+ .01	+ .04
c. sec. $\delta$	- .659	- .16	- .19
r	- .642	- .64	- .64
T	10 02 11.83	16 52 21.46	16.58 41.27
a	10 01 15.17	16 51 22.10	16.56 41.87
$\Delta T$	- 56.66	- 59.36	- 59.40

Between the observations of  $\times$  Ophiuchi &  $\alpha$  Herculis all the shots were taken out of clock pendulum.

$\Delta$  7 May 23 at Sid O. = - 53.1

Clock thermometer.  $+ 16^{\circ}$

Date May 24. 66. A

Observer S.P.L.

Illumin'n E

Star  $\alpha$  Herculis -

Mag.

 $\delta$ 

+ 14°. 33.

Wire a

" b

" c

17 09 20.8

" 1

28.

" 2

31.2

" 3

34.6

" 4

38.2

" 5

41.9

" d

49.

" e

" f

Sum

243.7

Mean

17 09 34.82

Red'n to

mean

m

- 0.50

n. tan.  $\delta$ 

+ .01

c. sec.  $\delta$ 

- 16

 $\tau$ 

- .65

T

17. 09. 34.17

17 08 34.78

a

 $\Delta T$ 

- 59.39



Date	May. 24 <sup>th</sup> / 100	May. 24 <sup>th</sup>	
Observer	S.P.L.	S.P.L.	
Illumin'n	E.	E.	
Star	$\alpha$ Leonis	$\gamma$ Herculis	
Mag.			
$\delta$	+ 12 <sup>h</sup> .37	+ 20 <sup>h</sup> .31	
Wire	a		
"	b		
"	c	10 02 02	10 13 22.2
"	1	08.4	29.1
"	2	12.1	32.8
"	3	15.5	36.3
"	4	19.3	40.
"	5	22.6	43.6
"	d	29.7	50.9
"	e		
"	f		
Sum	109.6	254.9	
Mean	10 02 15.66	10 13 36.41	
Red'n to	mean		
m	-0.50	-.50	
n. tan. $\delta$	+ .01	+ .02	
c. sec. $\delta$	- .16	- .14	
r	- .65	- .62	
T	10 02 15.01	10 13 35.79	
a	10 01 15.16	10 12 36.00	
$\Delta T$	- 59.85	- 59.79	

$$\Delta T \text{ May. 24<sup>th</sup> at Sid. 0<sup>h</sup> - 59<sup>s</sup>.57$$

Date	May 26	May 26	May 26
Observer	S.P.L.	S.P.L.	S.P.L.
Illumin'n	E.	E	E
Star	$\alpha$ Can. Min.	12 Can Ven	$\theta$ Virg
Mag.	1		
$\delta$	$+5^{\circ} 34'$	$+39^{\circ} 03'$	$-4^{\circ} 50'$
Wire	a		
"	b		
"	c	7 33 06.4	12 50 32.3 13 03 52.2
"	1	12.8	40.7 59.1
"	2	16.2	45.2 04 02.2
"	3	19.5	49.4 05.7
"	4	23.2	54 09.3
"	5	26.7	58 12.9
"	d	33.9	51 07 19.5
"	e		
"	f		
Sum	138.7	46.6	40.9
Mean	7 33 19.81	12 50 49.51	13 04 05.84
Red'n to	mean	mean	mean
m	-.50	-.50	-.50
n. tan. $\delta$	.00	+08	+
c. sec. $\delta$	-.16	-20	-.16
$\tau$	-.66	-62	-66
T	7 33 19.15	12 50 48.89	13 04 05.18
a	7 32 17.66	12 49 47.06	13 03 03.13
$\Delta T$	-1.01.49	1.01.83	1.02.05

$\Delta T$  at Sid 0<sup>h</sup> May 26 = -1<sup>m</sup> 01<sup>s</sup> 56

Clock Ther.  $+69^{\circ}$



Date	May 26.	May 26.	May 26.
Observer	S.P.L.	S.P.L.	S.P.L.
Illumin'n	E	E	E
Star	$\alpha$ Virg.	$\xi$ Virg.	$\eta$ Urs. Maj.
Mag.	-10.28	+0.05'	+49.59'
Wire	a		
"	b		
"	c	13 18 59.9	13 28 43.5
"	1	19 06.5	50.1
"	2	09.8	53.6
"	3	13.2	57.1
"	4	16.6	29.00.5
"	5	20.1	03.5
"	d	27.	10.3
"	e		41.
"	f		
Sum	33.1	38.6	1982
Mean	13 19 13.3	13.28.56.94	13.41.19.74
Red'n to	mean	mean	mean
m	-.50	-.50	-.50
n. tan. $\delta$	-.01		+07
c. sec. $\delta$	-.16	-.16	-.19
$r$	-.67	-.66	-.62
T	13 19 12.63	13 28 56.28	13.43.19.74
a	18.10.65	13.27.54.31	13.42.17.42
$\Delta T$	1 01 98	1.01.97	1.02.32





Date	May. 28 <sup>+</sup>	May. 28.	May. 28
Observer	S.P.L.	S.P.L.	S.P.L.
Illumin'n	W.	W.	W.
Star	$\alpha$ Virg	$\delta$ Virg.	$\eta$ Urs. Maj.
Mag.	1		
$\delta$	$-10^{\circ}.28'$	$+0^{\circ}.05'$	$+49^{\circ}.59'$
Wire	a		
"	b		
"	c	13 17 14.4	13 26 58.5
"	1	21.4	27 05.3
"	2	24.8	08.6
"	3	28.5	12.2
"	4	31.9	15.6
"	5	35.3	19.1
"	d	42.1	25.9
"	e		
"	f		
Sum	198.4	25.2	245.2
Mean	13.17 28.34	13.27 12.17	13.41 35.03
Red'n to	mean	mean	mean
m	-.14	-.14	-.14
n. tan. $\delta$	+06	.00	-35.
c. sec. $\delta$	.00	.00	.00
r	-08	-14	-49
T	13.17 28.26	13.27 12.03	13.41 34.54
a	13.18 10.61	13.27 54.30	13.42 17.39
$\Delta T$	+42.35	+42.27	+42.85

Date	May 28 <sup>th</sup>	May 28 <sup>th</sup>	May 28 <sup>th</sup>
Observer	S.P.L.	S.P.L.	S.P.L.
Illumin'n	W.	W.	W.
Star	$\eta$ Bootis	50 Cassiopeæ	$\alpha$ Draconis
Mag.			
$\delta$	+19°.04'	+108°.14'	+65°.01'
Wire	a		
"	b		
"	c	13 47 23.9	13 50 38.4
"	1	31.1	59.3
"	2	34.6	57 10.4
"	3	38.2	21.1
"	4	41.8	32.1
"	5	45.6	42.6
"	d	52.4	52 05.2
"	e		
"	f		
Sum	267.6	29.1	37.4
Mean	13 47 38.23	13 51 21.30	14 00 05.34
Red'n to	mean	mean	mean
m	-14		
n. tan. $\delta$	-10		
c. sec. $\delta$	.00		
r	-24		
T	13 47 37.99		
a	13 48 20.43	(a+12 <sup>h</sup> ) 13 52 03.80	14 00 47.78
$\Delta T$	42.44		



Date	May 28	May 28	May 28
Observer	S.P.L.	S.P.L.	S.P.L.
Illumin'n	W.	W.	W.
Star	$\alpha$ Bootis	$\alpha$ Cassiopeae	5 Urs. Min.
Mag.			
$\delta$	$+19^{\circ} 53'$	$+13^{\circ} 12'$	$76.16$
Wire	a		
"	b		
"	c	14 16 48.1	14 26 13.2
"	1	17 04.6	42.4
"	2	14 08 49.3	13.9
"	3	53.1	31.8
"	4	56.7	27 11.4
"	5	39.3	25.1
"	d	56.7	39.8
"	e		28 07.9
"	f		
Sum	14 08 53.03	215.6	15.7
Mean		14 17 22.23	14. 27 10.81
Red'n to	mean	mean	mean
m	-.14		
n. tan. $\delta$	-.10		
c. sec. $\delta$	.00		
r	-.24		
T	14. 08 52.79		
a	14 09 35.18	18 04.40	14 27 53.31
$\Delta T$	42.39		

Date	May 28/66	May 28/	May 28/
Observer	S.P.L.	S.P.L.	S.P.L.
Illumin'n	W.	W.	W.
Star	$\alpha$ Librae	$\alpha$ Librae	$\beta$ Urs. Min.
Mag.	- 15.26	- 15.29'	+ 74.42'
$\delta$			
Wire	a		
"	b		
"	c	14 42 23.2	14 42 34.9
"	1	30.5	42. 50 02.9
"	2	34.1	45.4 15.1
"	3	37.7	49.1 28.1
"	4	41.1	52.5 41.
"	5	44.4	55.9 54.5
"	d	51.3	43. 02.9 51. 19.2
"	e		
"	f		
Sum	262.3	42.7	17.
Mean	14 42 37.47	14 42 48.95	14 50 28.14
Red'n to m	mean	mean	
n. tan. $\delta$	-14	-14	
c. sec. $\delta$	+08	+08	
$r$	-06	-06	
T	14 42 37.41	14 42 48.89	
a	14 43 19.58	14 43 31.02	14 51 10.39
$\Delta T$	+42.17	42.13	



Date	May. 28.
Observer	S.R.L.
Illumin'n	W.
Star	48. Cephei
Mag.	
$\delta$	102.46'
Wire	a
"	b
"	c
"	1
"	2
"	3
"	4
"	5
"	d
"	e
"	f
Sum	
Mean	
Red'n to	
m	
n. tan. $\delta$	
c. sec. $\delta$	
$\tau$	
T	(at 12h =)
a	15 03 25.50
$\Delta T$	

Date	May 30. 66	May 30	May 30.
Observer	S.P.L.	S.P.L.	S.P.L.
Illumin'n	W.	W.	W.
Star	$\alpha$ Leonis.	$\gamma$ Leonis	$\eta$ Leonis (10)
Mag.	1		
$\delta$	$+12^{\circ}37'$	$+20^{\circ}31'$	$-0^{\circ}05'$
Wire	a		
"	b		
"	c	10 00 22	10 11 49.6
"	1	29.1 (1)	53.1
"	2	32.5 (3)	56.9
"	3	36.1 (4)	12. 00.4
"	4	39.4 (5)	04.
"	5	43.	
"	d	49.8	
"	e		
"	f		
Sum	10 00 351.9	44	195.5
Mean	10 00 35.84	10. 11 56.80	11 29 29.93
Red'n to	mean	mean	mean
m	-14	-14	-14
n. tan. $\delta$	-09	-10	.00
c. sec. $\delta$	.00	-00	.08
r	-23	-26	11 29 27.79
T	10 00 35.61	10 11 56.54	11 29 27.79
a	10 01 15.03	10 12 35.81	11 30 06.93
$\Delta T$	+39.42	+39 27	+39.14

May. 30. a.p.h.  $\Delta T = +40$   
 May. 30. at Sid. 0<sup>h</sup>  $\Delta T = +.40 \text{ sec.}$



Date	May. 31. <sup>st</sup> 66	May. 31.	May. 31.
Observer	S.P.L.	S.P.L.	S.P.L.
Illumin'n	W.	W.	W.
Star	$\alpha$ Can Min	$\beta$ Gem.	$\alpha$ Leo
Mag.			
$\delta$	$+5^{\circ} 34'$	$+28^{\circ} 21'$	$+12^{\circ} 37'$
Wire	a		
"	b		
"	c	7 31 26.1	7 36 13.9
"	1	32.9	21.6
"	2	36.3	25.3
"	3	39.9	29.2
"	4	43.1	33.1
"	5	46.8	37.
"	d	53.4	44.6
"	e		
"	f		
Sum	278.5	7/204.7	261.9
Mean	7 31 39.79	7 36 29.24	10 00 37.41
Red'n to	mean wire	mean	mean
m	-.14	-.14	-.14
n. tan. $\delta$	-.09	-.16	-.9
c. sec. $\delta$	.00	.00	
r	-.17	-.30	-.23
T	7 31 39.62	7 36 28.94	10 00 37.18
a	7 32 17.49	7 37 07.13	10 01 15.02
$\Delta T$	+37.87	+38.19	+37.84

May. 31.<sup>st</sup> at Sid.  $0^{\circ} 32' 49'' + 38.49$

Date	June 1 <sup>st</sup> 66	June 1 <sup>st</sup>	June 1 <sup>st</sup>
Observer	S.P.L.	S.P.L.	S.P.L.
Illumin'n	W.	W.	W.
Star	$\alpha$ Gem.	$\alpha$ Can	Min. $\beta$ Gem
Mag.			
$\delta$	$+33^{\circ}11'$	$+5^{\circ}34'$	$+28^{\circ}21'$
Wire	a		
"	b		
"	c	$\gamma$ 25 10.5	$\gamma$ 31 27.5
"	1	18.6	34.3
"	2	22.6	37.6
"	3	26.9	41.2
"	4	30.8	44.6
"	5	34.9	48.
"	d	42.6	54.7
"	e		
"	f		
Sum	186.9	287.9	214.9
Mean	$\gamma$ 25 26.70	$\gamma$ 31 41.13	$\gamma$ 36 30.70
Red'n to m	mean wire	mean	mean
n. tan. $\delta$	-.14	-.14	-.14
c. sec. $\delta$	-.20	-.03	-.16
$\tau$	-34	.17	30
T	$\gamma$ 25 26.36	$\gamma$ 31 40.96	$\gamma$ 36 30.40
a	$\gamma$ 26 03.15	$\gamma$ 32 17.50	$\gamma$ 37 07.13
$\Delta T$	36.79	36.54	36.73

$\Delta T$ . June 1<sup>st</sup> at Sid.  $O^h = +37^{\circ}12'$   
 Clock Thermometer  $+65^{\circ} F$ . at observation.



Date	June 2. <sup>nd</sup> 66	June 2	June 2
Observer	S.P.H.	S.P.H.	S.P.H.
Illumin'n	W.	W.	
Star	$\alpha$ Gem.	$\beta$ Gem.	
Mag.	+ 33.11	$\beta$ 7 28.21	
Wire	a		
"	b		
"	c	7 25 12.5	7 36 16.9
"	1	20.4	24.8
"	2	24.3	28.3
"	3	28.3	32.4
"	4	32.3	36.
"	5	36.5	40.3
"	d	44.3	47.7
"	e		
"	f		
Sum	198.6	226.4	
Mean	7 25 28.37	7 36 32.34	
Red'n to	mean.	mean.	
m	-.14	-.14	
n. tan. $\delta$	-.20	-.16	
c. sec. $\delta$	.00	.00	
r	-.34	-.30	
T	7 25 28.03	7 36 32.04	
a	7 26 02.87	7 37 07.16	
$\Delta T$	34.84	35.12	

$\Delta T$ . June. 2<sup>nd</sup> at. Sid. O.<sup>h</sup> = + 35.<sup>sec</sup> 48  
 Thermom + 68.7.

Date	June. 7. 1866 June 7				June. 7					
Observer	S.P.L.				S.P.L.					
Illumin'n	W.				W.					
Star	$\alpha$ Orionis.				$\alpha$ Gem.					
Mag.	1.									
$\delta$	$+7^{\circ}23''$				$+33^{\circ}11'$					
					$+52^{\circ}28'$					
Wire	a									
"	b									
"	c	5	47	14.7	7	25	20	14	19	50
"	1			21.7	-	-	-		20	04.3
"	2			24.9	-	-	-			06.9
"	3			28.6	-	-	-			12.5
"	4			31.9	-	-	-			18.
"	5			35.2	-	-	-			23.9
"	d			42.	-	-	-			34.2
"	e									
"	f									
Sum				199.	7	25	20	14	20	12.40
Mean		5	47	28.45	7	25	36.1	14	20	12.40
Red'n to		mean				mean		mean		
m				-14			-14			
n, tan. $\delta$				-09			-20			
c. sec. $\delta$				.00			.00			
r				-23			-34			
T		5	47	28.22	7	25	3576			
a		5	47	55.28	7	26	0283			
$\Delta T$				+27.06			+27.07			



Date	June 7.	June. 7	June. 7.
Observer	S.P.H.	S.P.H.	S.P.H.
Illumin'n	W.	W.	W.
Star	5 Urs. Min.	$\beta$ . Urs. Min.	$\beta$ . Bootis
Mag.			
$\delta$	+ 76°. 17'	+ 74°. 42'	+ 40.55.
Wire	a		
"	b		
"	c	14 26 25.4	14 49 48.4 14. 56. 10.6.
"	1	54.6	50. 55.1. 19.6.
"	2	27 08.6	28.3 24.4
"	3	13.5	41.2. 29.
"	4	37.7	53.7. 33.
"	5	52.	57. 07.2. 38.
"	d	28. 20.	31.5. 46.6.
"	e		
"	f		
Sum	41.8	45.4	201.2
Mean	14 27 23.1	14. 50. 40.77	14 56 28.74.
Red'n to	mean	mean.	mean.
m	-31.	-31.	-31
n. tan. $\delta$			-04
c. sec. $\delta$			+ 35
r			.70
T			14. 56. 28.04
a			14 56 56.07
$\Delta T$			28.03

Consto m.n. re determined June. 11.

Date	June 9. 66	June 9	June 9
Observer	S.P.L.	S.P.L.	S.P.L.
Illumin'n	W.	W.	W.
Star	$\alpha$ Aurigae.	$\epsilon$ Orionis.	$\alpha$ Orionis.
Mag.			
$\delta$	+45.51	-1° 18'	+7° 23'
Wire	a		
"	b		
"	c		
"	1		
"	2		
"	3		
"	4		
"	5		
"	d		
"	e		
"	f		
Sum	164.2	13.6	222.5
Mean	5 06. 23.46	5 29 01.94	5 47 31.78
Red'n to	mean	mean	mean
m	-31	-31	-31.
n. tan. $\delta$	-05	00	.00
c. sec. $\delta$	-36	-25	-26
r	-72	-56	.57
T	06 22.74	01 38	31.21
a	5 06 47.97	5 29 24.99	5 47 55.29
$\Delta T$	25.23	23.62	24.08



Date	June 9	June 9	June 9
Observer	S.P.L.	S.P.L.	S.P.L.
Illumin'n	W.	W.	W.
Star	$\alpha$ Can Min.	$\beta$ Gem.	$\alpha$ Virg.
Mag.			
$\delta$	$+5^{\circ} 34'$	$+28^{\circ} 21'$	$+9^{\circ} 58'$
Wire	a		
"	b		
"	c		
"	1		
"	2		
"	3		
"	4		
"	5		
"	d		
"	e		
"	f		
Sum	258	305.2	40.5
Mean	$\gamma$ 31. 524	$\gamma$ 36. 43.60	11 57 57.21
Red'n to	mean	mean	mean
m	-31	-31	-31
n. tan. $\delta$	.00	-03	-01
c. sec. $\delta$	-26	-28	-26
r	-57	-62	-58
T	53.43	42.98	56.63
a	$\gamma$ 32 17.59	$\gamma$ 37 07.14	11 58. 24.63
$\Delta T$	24.16	24.16	28.00

Date	June 9 <sup>h</sup> 46 June 9 <sup>h</sup> June 9 <sup>h</sup>		
Observer	S.P.L.		
Illumin'n	E.		
Star	5 Uls Min. α Librae. 3 Uls Min.		
Mag.			
δ	+76°.17 -15°.29' +74°.49 50.6		
Wire	a		
"	b		
"	c	14 27 27.6	14 42 50.14 49 50.6
"	1	54.4	56.7 50.16.
"	2	28.09.7	43.00.6 28.9.
"	3	23.6	03.7 41.2
"	4	28.6	07.4 55.
"	5	52.7	10.9 57.06.8
"	d	29.22.	18. 33.4.
"	e		
"	f		
Sum		48.6	26.3. 51.9.
Mean		14 27 24.08	14 42 03.76 14 50 41.70
Red'n to	mean	mean	mean
m	-31	-31	
n. tan. δ		+01	
c. sec. δ		+28	
τ		-01	
T		03.74	
a	14 27 52.67	14 43.31.	14 51 09.91
ΔT		27.26	

ΔT. June 9. at Sid 0<sup>h</sup> = +23.91  
 Clock London same second in winding  
 ΔT. June 9 " Sid 12<sup>h</sup> = +27.59



Date	June 9 <sup>th</sup>	
Observer	S.P.L.	
Illumin'n	E	
Star	$\beta$ Bootis	
Mag.	+ 40.55	
$\delta$		
Wire	a	
"	b	
"	c	14 56.11
"	1	19.6
"	2	24.3
"	3	28.2
"	4	33.5
"	5	37.6
"	d	46.5
"	e	
"	f	
Sum	200.7	
Mean	14. 56. 28.67	
Red'n to	mean	
m	-31	
n. tan. $\delta$	-04	
c. sec. $\delta$	+35	
r	00	
T	14 56 28.67	
a	14. 56. 56.06	
$\Delta T$	27.39	

Date	June 11. / 66	June 11	June 11.	
Observer	S.P.L.	S.P.L.	S.P.L.	
Illumin'n	E.	E.	E.	
Star	a Can. maj.	a Can. Min.	$\beta$ Gem	
Mag.				
$\delta$	$-16^{\circ}.32'$	$+5^{\circ}.34'$	$+28^{\circ}.21'$	
Wire	a			
"	b			
"	c	6 39 34.52	7 31 39.7	7 36 27.3
"	1	43	46.3	35.1
"	2	46.6.	49.8.	39.
"	3	49.9.	53.	42.8
"	4	53.6.	56.8.	46.6
"	5	57.	32. 00.	50.3
"	d	39 04.2	.07	58.4
"	e			
"	f			
Sum	50.3	12.6.	299.5.	
Mean	6 38 50.04.	7 31 53.23	7 36 42.79	
Red'n to	mean	mean	mean	
m	-31	-31	-31.	
n. tan. $\delta$	+01.	00	-03	
c. sec. $\delta$				
r				
T				
a	6 39 14.52	7 32 17.59	7 37 07.14.	
$\Delta T$				

25.41

$$a = -.64$$

$$b = -.14$$

$$c = -.25 \text{ sec E}$$



Date

June 11 / 66

Observer

S. P. L.

Illumin'n

E. for c. 1/2 W. for 4 1/2 hr.

Star

a Uro. Min.

Mag.

2

 $\delta$  $+91^{\circ} 24'$ 

Wire

a

"

b

"

c

13 00 45.4

"

1

05 19.6

"

2

07 32.3

"

3

Transit reversed.

"

4

11 51.5

"

5

14 10 2

"

d

18 49 5

"

e

"

f

Sum

Mean

Red'n to

m

n. tan.  $\delta$ c. sec.  $\delta$  $\tau$ 

T

a

 $\Delta T$

Date	June 11. 66.	June 11.	June 11.
Observer	S.P.L.	S.P.L.	S.P.L.
Illumin'n	W.	W.	W.
Star	$\eta$ Urs. Mij.	50 Cassiopea	$\alpha$ Bootis
Mag.			
$\delta$	+ 49°. 59.	+ 108°. 14'	+ 19°. 53'
Wire	a		
"	b		
"	c	13 41 32	14 08 56.4
"	1	42.5	13 51 17.4
"	2	47.9	28.
"	3	53.1	39.
"	4	58.3	50.5
"	5	42 03.9	52 00.9
"	d	14.	23.1
"	e		
"	f		
Sum	11.7		16.8
Mean	13 41 53.10		14 09 10.97
Red'n to			
m	- 31		- 31
n. tan. $\delta$	- 06		- 02
c. sec. $\delta$	- 39		- 29
r	- 76		- 62
T	52.34		10.35
a	13. 42. 17.13		14 09 35.09
$\Delta T$	24.79		24.74
	23		



Date	June 11.	June 11
Observer	S.P.L.	S.P.L.
Illumin'n	W.	W.
Star	$\epsilon$ Cassiopeae.	5 hrs. min.
Mag.		
$\delta$	+ 113°. 12'	+ 76°. 18'
Wire	a	
"	b	
"	c	14 17 06.3. 14 26 31.1
"	1	22.7. 27 00.4.
"	2	31.7. 14.
"	3	39.9. 29.3
"	4	49. 43.5
"	5	57. 57.6.
"	d	18. 15.1 28. 25.8.
"	e	
"	f	
Sum	31.7	21.7
Mean	14 17 38.81	14 27 28.82
Red'n to		
m		
n. tan. $\delta$		
c. sec. $\delta$		
r.		
T		
a	2 18 05.09.	14 27 52.47
$\Delta T$		

$$a = - 41$$

$$c = - 1.0$$

$$d = - 11.$$

Date	June 15 <sup>th</sup> 66.	June 15	June 15
Observer	S.P.L.	S.P.L.	S.P.L.
Illumin'n	E.	E.	
Star	$\alpha$ Aurigae	$\epsilon$ Bootis	$\alpha$ Librae
Mag.	1		
$\delta$	+45.51	+27° 38.	-15° 29'
Wire	a		
"	b		
"	c	5 06 11	14 38 38.2 14 43. 00
"	1	20	45.8. 07
"	2	25.	49.8 10.3
"	3	29.9	53.3 14.
"	4	35.3	57.3 17.7
"	5	39.8	39 01.2 21.1
"	d	49.7	08.9 28.3.
"	e		
"	f		
Sum	210.7	14.5	98.4.
Mean	5 06 30.10	14 38 53.50	14 43 14.06
Red'n to	mean	mean	mean
m	-37	-37	-37
n. tan. $\delta$	+20	+10	+06
c. sec. $\delta$	-1.30	-1.19	-x. 94
$\tau$	-1.47	-1.29	-1.37
T	5 06 28.63	14 38 51.21	12.69
a	5 06 48 05.14	39 10.25	14 43 30.98
$\Delta T$	19.42	18.03	<del>27</del> 18.29

$\Delta T$  June 15 at Sid. 15h = + 18° 15'



Date	June 15 <sup>th</sup>	June 15 <sup>th</sup>	June 15 <sup>th</sup>
Observer	S.P.L.	S.P.L.	S.P.L.
Illumin'n	E.	E.	E.
Star	$\beta$ Uro. min	$\beta$ Bootes	48 Cephei
Mag.			
$\delta$	$+ 74^{\circ}.42'$	$+ 40^{\circ}.54'$	$+ 102^{\circ}.46'$
Wire	a		
"	b		
"	c	14 50. 03.7	14 56. 26.4 15 02. 03.9
"	1	29.1	30. 34.1
"	2	42.2	35. 49.2
"	3	54.1	39.1 03 06.4
"	4	51 08.	43.8 21.
"	5	21.1	48. 36.5
"	d	46.4	57.5 06.3
"	e		
"	f		
Sum	246.	274.8	37.4
Mean	14 50 54.94	14 56. 39.26	15 03 05.39
Red'n to	mean	mean	mean
m	-37	-37	-37
n. tan. $\delta$	+73	+17	-88
c. sec. $\delta$	-3.42	-1.19	+4.08
$\tau$	-3.06	-1.39	+2.93
T	51.88	37.87	08.32
a	14 51 09.61	14 56. 56. 3 03 26.69	
$\Delta T$	17.73	18.13	18.37

Date	June 15. 66.	June 15. 67	June 15. 68	
Observer	S.P.L.	S.P.L.	S.P.L.	
Illumin'n	E.	E.	E.	
Star	$\beta$ Librae.	$\alpha$ Scorpii	15 Draconis	
Mag.				
$\delta$	$-8^{\circ}.53$	$-26^{\circ}.08'$	$+69^{\circ}.03'$	
Wire	a			
"	b			
"	c	15 09 20.1	16 27 25.	
"	1	26.9	43.4	
"	2	30.3	16 20 54.6	53.1
"	3	33.9	58.1	28. 02.2
"	4	37.3	21 02.5	12.2
"	5	40.6	06.5	21.2.
"	d	47.8		29. 00.0
"	e			
"	f			
Sum	236.9			
Mean	15 09 33.84			
Red'n to m	mean			
n. tan. $\delta$	- 37			
c. sec. $\delta$	- 03			
r	- 1.29			
T	32.55			
a	15 09 50.71	16 21 15.13	16 28 18.41	
$\Delta T$	18.16			



Date	June 15 <sup>h</sup>	June 15 <sup>h</sup>
Observer	S.P.L.	S.P.L.
Illumin'n	E.	E.
Star	$\alpha$ Camelopard.	$\epsilon$ Urs. Min.
Mag.		
$\delta$	$+113^{\circ}.53'$	$+82^{\circ}.15'$
Wire	a	
"	b	
"	c	16 39 52    16 58 02.3
"	1	40. 08.6    50.3
"	2	16.6    59 16.8
"	3	25.7    40.9
"	4	34.    17 00 07.4
"	5	42.4    32.1
"	d	59.1    01. 22.9
"	e	
"	f	
Sum	58.4	50.7
Mean	16 40 25.49	16 59 41.53
Red'n to	mean	mean
m	-37	-37
n. tan. $\delta$	-45	+1.10
c. sec. $\delta$	+2.22	-6.69
$\tau$	+1.40	-5.59
T	26.89	35.94
a	4 40 44.96	16 59 53.88
$\Delta T$	18.07	17.94

June 15<sup>h</sup> Clock Thermometer.  $+75^{\circ}.7^{\circ}$

Date	June 16		
Observer	SRL		
Illumin'n	E		
Star	α Can Min.		
Mag.	-16.32		
δ			
Wire	a		
"	b		
"	c	6 38.44.6	
"	1	51.3	
"	2	55.	
"	3	" 58.2	
"	4	39 02.2	
"	5	05.7	
"	d	12.9	
"	e		
"	f		
Sum	49.9		
Mean	6 38.58.56		
Red'n to	mean		
m	-.37		
n. tan. δ	-.06		
c. sec. δ	-.95		
τ	- 1.38		
T	6 38 57.18		
a	6 39 14.53		
Δ T	+ 17.35		



Date	June. 19. 46 June. 19. 47 June. 19. 48		
Observer	S.P.L.		
Illumin'n	H.		
Star	$\alpha$ Tauri.	$\alpha$ Aurigae.	$\beta$ Tauri.
Mag.	1	1	Var.
$\delta$	+ 18° 53.	+ 48. 51.	- 8° 22'.
Wire	a		
"	b		
"	c	4 27 47.5	5 06 15.1 5 07 39.1
"	1	54.5	25.1 46.2
"	2	57.8	29.8 49.7
"	3	28 01.8.	35. 53.2
"	4	05.	39.6 56.4
"	5	08.7.	44.4 08 00
"	d	15.6.	54. 06.5
"	e		
"	f		
Sum	10.9.	243.0	11.1
Mean	4 28 01.56	5 06 34.71	5 07 53.01
Red'n to	mean	mean	mean
m	-37	-37	-37
n. tan. $\delta$	+ 07	+ 23	- 03
c. sec. $\delta$	+ 95.	+ 1.37	+ 91.
r	+ 65	+ 1.23	+ 51
T	4. 28 02.21	5. 06 35.94	5. 07 53.52
a	4 28 14.58	5 06 48.14	5 08 06.03
$\Delta T$	12.37	12.20	12.51

$\Delta T$  at 6h. June 19. 47 + 12.29.

After the above observations, the collimation was reduced to 0. on mean wire, and the azimuth to 0. by adjustment of the instrument. The seeing was not good, but the uncorrected error in either case is supposed not to exceed .06.

Date	June. 19 <sup>th</sup>	June. 19 <sup>th</sup>	June. 19 <sup>th</sup>
Observer	S.P.L.	S.P.L.	S.P.L.
Illumin'n	W.	W.	W.
Star	$\alpha$ Gem.	$\alpha$ Can min	$\beta$ Gem.
Mag.			
$\delta$	+ 32° 11'	+ 5° 34'	+ 28° 20'
Wire	a		
"	b		
"	c	7 25 35.1	7 31 51.9
"	1	43.	58.7
"	2	47.	32 02.
"	3	51.	05.6
"	4	55.	08.9
"	5	59.2	12.2
"	d	26. 06.9	19.
"	e		
"	f		
Sum	57.2	38.3	25.3
Mean	7 25 51.03	7 32 05.47	7 36 55.04
Red'n to m	mean	mean	mean
n. tan. $\delta$			
c. sec. $\delta$			
$\tau$	-16	-11	-16
T	7 25 50.87	7 32 05.36	7 36 54.88
a	7 26 02.83	7 32 17.59	7 37 07.13
$\Delta T$	11.96	12.23	12.25

The above value of " $\tau$ " includes only the level correction

$\Delta T$  at C.h. (from above 3 Stars.) + 12.24  
 " " " " ( " preceding " " ) + 12.29  
 " " " " " mean of 6 " + 12.26



Date	June 20. 66 June 20. 66 June 20. 66.		
Observer	S.P.L.		
Illumin'n	E.		
Star	$\alpha$ Tauri	$\alpha$ Aurigae	$\beta$ Tauri Orioni
Mag.	1	1	Var.
$\delta$	$+18^{\circ}53'$	$+48^{\circ}51'$	$+8^{\circ}22'$
Wire	a		
"	b		
"	c	4 27 49.4 5 06 18.	5 07 41.7
"	1	56.8	27.3 48
"	2	28 00.3	32. 51.7
"	3	03.9	37. 55.
"	4	07.4	41.6 58.3
"	5	10.9	46.6 08. 02.
"	d	18.3	56.5 08.5
"	e		
"	f		
Sum	27	259.	25.2
Mean	4 28 03.86	5 06 37	5 07 55.3
Red'n to m	mean	mean	mean
n. tan. $\delta$			
c. sec. $\delta$			
r	-09	-14	-06
T	4. 28 03.77	5. 06 36.86	5 07 55.24
a	4 28 14.60	5 06 48.16	5 08 06.04
$\Delta T$	10.83	11.30	10 80

$$\Delta T \text{ at } 5^h = +10.97$$

Clock Thermometer  $+69^{\circ}$  F.

Date	June 21 <sup>st</sup> 66 June 21 <sup>st</sup>	
Observer	S.P.H. S.P.H.	
Illumin'n	E. E.	
Star	a Gem. a Can Min	
Mag.		
$\delta$	+ 32° 11' + 5° 34'	
Wire	a	
"	b	
"	c	7 25 37.8 7 31 54.5
"	1	45.7 32 01.2
"	2	50. 04.9
"	3	53.6 08.
"	4	58. 11.6
"	5	26 01.7 15.1
"	d	10.5 21.9
"	e	
"	f	
Sum	17.3	57.2
Mean	7 25 53.90	7 32 08.17
Red'n to	mean	mean
m		
n, tan. $\delta$		
c, sec. $\delta$		
r	-16	-11
T	7 25 53 74	7 32 08.06
a	7 26 03 11	7 32 17.80
$\Delta T$	9.37	9.74

$$\Delta T \text{ at Sid. } 7.30 = + 9^s.55$$



Date	June 21 <sup>st</sup>	June 21 <sup>st</sup>	June 21 <sup>st</sup>
Observer	S.P.H.	S.P.H.	S.P.H.
Illumin'n	E.	E.	E.
Star	$\gamma$ Virg.	$\alpha$ Cha	min 5 Urs. Min
Mag.			
$\delta$	$-0^{\circ} 53'$	$+91^{\circ} 24'$	$+76^{\circ} 17'$
Wire	a		
"	b		
"	c	12 34 37.6	13 00 50.1 14. 26. 46.8
"	1	39.1	05. 29.7 27. 14.1
"	2	41.7	7 41.4 29.2
"	3	44.9	10. 08.6 42.8
"	4	48.5	12 22. 58.
"	5	52.9	14. 45. 28. 11.4
"	d	58.6	19 11.9 41.2
"	e		
"	f		
Sum	365.3	28.7	03.5
Mean	12 34 45.04	13 10. 04.16	14 27 43.36
Red'n to	mean	mean	mean
m	+ 0.1	+ 0.1	+ .01
n. tan. $\delta$	. 00	+ 6.68	- 6.7
c. sec. $\delta$	+ 0.5	- 2.06	+ 2.1
$r$	+ .06	+ 4.64	- .45
T	12 34 45.10	13. 10 08.74	14. 27 42.91
a	12 34 54.05	13 10 16.80	14 27 51.87
$\Delta T$	8.95	8.06	8.96

Date	June 21	June 21	June 21
Observer	S.P.L.	S.P.L.	S.P.L.
Illumin'n	E	E	E
Star	$\alpha^2$ Libra	B Mus. mm	$\alpha$ Cancri
Mag.			
$\delta$	$-15^\circ.29$	$+74^\circ.42$	$+113^\circ.54$
Wire	a		
"	b		
"	c	14 43 08	14 50 09.1 16 40 02.4
"	1	15.	34.5 19.5
"	2	18.6	47.8 28.2(?)
"	3	21.9	51. 00.6 36.2
"	4	25.6	14. 44.3
"	5	29.	26.3 53.3
"	d	35.9	52.2 41. 09.2
"	e		
"	f		
Sum	154.	04.5	13.2
Mean	14 43 22.	14 51 00.64	16 40 36.17
Red'n to	mean	mean	mean
m	+01	+01	+01
n. tan. $\delta$	+05	-60	+37
c. sec. $\delta$	+05	+19	-12
$r$	+11	-40	+26
T	14 43 22.84	14 51 00.24	16 40 36.43
a	14 43 30.95	14 51 09.26	16 40 45.20
$\Delta T$	8.84	9.02	8.77



Date	June 21	June 21
Observer	S.P.L.	S.P.L.
Illumin'n	E.	E.
Star	$\epsilon$ Ophiuchi.	$\epsilon$ Urs. Min.
Mag.		
$\delta$	$+9^{\circ} 35'$	$+82^{\circ} 15'$
Wire	a	
"	b	
"	c	16 51 00 16 58 05.5
"	1	06.6 53.5
"	2	10. 59. 20.6
"	3	13.5 44.9
"	4	17.2 17 00 11.8
"	5	20.4 35.7
"	d	27.5 01 27.
"	e	
"	f	
Sum	95.2	19.
Mean	16 51 13.60	16 59 45.60
Red'n to	mean	mean
m	+01	+01
n. tan. $\delta$	-03	-1.20
c. sec. $\delta$	+05.	+ .37
$r$	+03	-.82
T	16 51 13.63	16. 59 44.78
a	16 51 22.32	16 59 53.60
$\Delta T$	8.69	8.92

Date	June 22 <sup>nd</sup> /66 June 22 <sup>nd</sup> June 22 <sup>nd</sup>		
Observer	S.P.H.		
Illumin'n	E		
Star	a Gem.		
Mag.	a Can Min. (B Gem)		
$\delta$	+ 32° 11' + 5° 34' + 28.21		
Wire	a		
"	b		
"	c	7 25. 39.5	7 31. 56.1
"	1	47.2	32 03. 51.6
"	2	51.3	06.4 55.6
"	3	55.4	09.9 59.6
"	4	59.8	13.2 37. 03.3
"	5	26. 03.5	16.4 07.1
"	d	11.8	23.6 15.1
"	e		
"	f		
Sum	.28.5	08.6	56.5
Mean	7 25. 55.50	7 32 09.80	7 36 59.50
Red'n to			
m	+ 01	+ 01	+ 01
n. tan. $\delta$	- 10	- 02	- 09
c. sec. $\delta$	+ 06	+ 05	+ 06
r	- 03	+ 04	- 02
T	7 25 55.47	7 32 09.84	7 36. 59.48
a	7 26 02.84	7 32 17.59	7 37 07.13
$\Delta T$	7.37	7.75	7.65

$\Delta T$  at Sid 7.30<sup>h</sup> = + 7.73



Date	June 23 <sup>rd</sup> 66 June 23 <sup>rd</sup> 66	
Observer	S.P.H. S.P.H.	
Illumin'n	E. E.	
Star	$\alpha$ Aurigae $\beta$ Orionis	
Mag.	48° 51' - 8° 22'	
$\delta$		
Wire	a	
"	b	
"	c	5 06 22.8
"	1	32.1
"	2	37.
"	3	41.8 5 08 00.01
"	4	47.
"	5	51.6
"	d	5 07 01.7
"	e	
"	f	
Sum	54	
Mean	5 06 42.09 5 08 00.01	
Red'n to	mean	mean
m	+01	+01
n. tan. $\delta$	-19	+02
c. sec. $\delta$	+08	-05
$\tau$	5 06 41.90	-02
T	5 06 41.90	07 59 99
a	5 06 48.20	5 08 06.07
$\Delta T$	6.30	6.08

$$\Delta J \text{ at } 5^h = 6.19.$$

Themer + 82° 7.

Th. +83°

Date	June 23 <sup>rd</sup> 66 June 23 <sup>rd</sup> 66 June 23 <sup>rd</sup> 66		
Observer	S.P.H.		
Illumin'n	W.		
Star	γ Virg.		
Mag.	12 Canis Major		
δ	a Uro. Min.		
	- 0°.53	+ 39°.0	+ 91°.25
Wire	a		
"	b		
"	c	12 34 34.9	12 49 23.9 13 00 46.8
"	1	41.7	32.6 05 13
"	2	45	36.9 07 37.2
"	3	48.7	41.7 09 50.4
"	4	51.9	45.7
"	5	55.4	50.1 14 30.2
"	d	35. 02.	58.8 19. 10
"	e		
"	f		
Sum	12 34. 29.61	289.7	
Mean	12 34 48.51	12 49 41.39	
Red'n to m	mean	mean	mean
n. tan. δ			
c. sec. δ			
r			
T			
a	12 34 54.03	12 49 46.61	1 10 18.69
Δ T			



1866phae.proj.: 333L

The 80°				
Date		June 25 <sup>h</sup> 1/46	June 25 <sup>h</sup>	June 25 <sup>h</sup>
Observer		S.P.L.	S.P.L.	S.P.L.
Illumin'n		W.	E.	E.
Star		$\alpha$ Tauri.	$\epsilon$ Cor. Bor.	15 Draconis
Mag.				
$\delta$			+ 27°. 16'	+ 69°. 04'
Wire	a			
"	b			
"	c	4 27 57	15 51 47	16 27 38.2
"	1	28 05	54.4	56.6
"	2	08.2	58.2	28 06.3
"	3	12	52 02.	15.2
"	4	15.4	06.	25.7
"	5	19	09.8	35.
"	d	26.1	17.3	54.2
"	e			
"	f			
Sum		503.5	147	51.2
Mean		4 28 11.93	15 52 02.10	16 28 15.6
Red'n to m		mean	mean	mean
n. tan. $\delta$				
c. sec. $\delta$				
r		-34	+26	
T		4 28 11 59	15 52 02.36	
a		4 28 14.70	15 52 04.57	16 28 18.19
$\Delta T$		3.81	2.21	

$\Delta T$                       + 2.77

$\Delta T$  at Sid 12<sup>h</sup> = + 2.54.

Date

June 25<sup>th</sup> 66.

Observer

S.P.L.

Illumin'n

E.

Star

a Camelop.

Mag.

 $\delta$ 

+ 113°.53'

Wire

a

"

b

"

c

"

1

"

2

16 40 34.5

"

3

' 44

"

4

52

"

5

"

d

"

e

"

f

Sum

130.5

Mean

16 40 43.5

Red'n to

mean

m

n. tan.  $\delta$ c. sec.  $\delta$  $\tau$ 

T

a

4 40 45.39

 $\Delta T$



Date	June 26. / 26 June 26.	
Observer	S.R.L. S.R.L.	
Illumin'n	E. E.	
Star	$\alpha$ Can Min. $\beta$ Gem.	
Mag.	1.	
$\delta$	+ 5.24 + 28.21	
Wire	a	
"	b	
"	c	7 32 02.3 7 36 50.1
"	1	09. 57.9
"	2	12.6 01.6
"	3	15.9 05.4
"	4	19.3 09.3
"	5	22.4 13.2
"	d	29.5 21.
"	e	
"	f	
Sum	7	38.5
Mean	7 32 15.85 7 37 05.7	
Red'n to m		
n. tan. $\delta$		
c. sec. $\delta$		
$\tau$	+30	+26.
T	7 32 16.15 7 37 05.96	
a	7 32 17.61 7 37 07.14	
$\Delta T$	1.46	1.18

$\Delta T$  at 7.30 = +1.32. Clk. Therm + 84° f.

Date	June 30/66 June 30/66 June 30/66		
Observer	S.P.L. S.P.L. S.P.L.		
Illumin'n	H. H. H.		
Star	$\alpha$ Tauri $\delta$ Aurigae $\epsilon$ Urs Min		
Mag.	1		
$\delta$	$+ 18^{\circ} 53'$ $+ 33.46$ $+ 82^{\circ} 15'$		
Wire	a		
"	b		
"	c	4 28 06.1 16 56 32	
"	1	13.3 40.7 16 59 11.8	
"	2	16.5 44.6 36.4	
"	3	20.4 48.8 17 00 02.6	
"	4	24. 52.8 27	
"	5	27.5 57 52.6	
"	d	34.2 57 04.8	
"	e		
"	f		
Sum		142. 40.7 10.4	
Mean		4 28. 20.29 16 56 48.67 17 00 02.08	
Red'n to		mean mean mean	
m			
n. tan. $\delta$			
c. sec. $\delta$			
r		- 21 - 29 - 1.21	
T		48 38 00 87	
a		28 20 09 4 28 14.80 16 56 42.04 16 59 52.90	
$\Delta T$		- 5.28 6.34 7.97	



Date	July 2 <sup>nd</sup> 66	July 2	July 2
Observer	S.P.H.	S.P.H.	S.P.H.
Illumin'n	W	W	W
Star	$\alpha$ Leonis	$\gamma$ Leonis	$\delta$ Leonis
Mag.			
$\delta$	+12° 37	+20° 31	+21° 15
Wire	a		
"	b		
"	c	10 01 10	10 12 30.2
"	1	16.9	37.9
"	2	20.3	41
"	3	24	45
"	4	27.5	48.3
"	5	31	52.1
"	d	37.9	59.2
"	e		
"	f		
Sum	167.6	313.7	00.4
Mean	10 01 23.94	10 12 44.81	11 07 08.63
Red'n to	mean	mean	mean
m	+10	+10	+10
n. tan. $\delta$	-05	-08	-08
c. sec. $\delta$	-19	-19	-19
r	-14	-17	-17
T	10 01 23.80	10 12 44.64	11 07 08.46
a	10 01 14.78	10 12 35.61	11 06 59.70
$\Delta T$	-9.12	-9.03	-8.76

Between the observations of  $\gamma$  Leonis and  $\delta$  Leonis the shot-thimbles were removed from the pendulums, filed down, and replaced.

Date	July 2. 66.	July 2	July 2
Observer	S.P.H.	S.P.H.	S.P.H.
Illumin'n	W.	W.	W.
Star	$\alpha$ Cassiop.	$\alpha$ Librae	$\alpha$ Librae
Mag.			
$\delta$	$113^{\circ} 12'$	$-15^{\circ} 26'$	$-15^{\circ} 29'$
Wire	a		
"	b		
"	c	14 17 40.	14 43. 14.1 14 43 25.4
"	1	56.9.	21.2 32.8
"	2	18. 05.2.	24.8 36.1
"	3	14.	28.5 40.
"	4	23.	32. 43.3
"	5	31.3	35.4 46.5.
"	d	49.1	42.1 53.7.
"	e		
"	f		
Sum	39.5	198.1	277.8.
Mean	14 18 14.21	14 43 28.30	14 43 39.69
Red'n to	mean	mean	mean
m	+10	+10	+10
n. tan. $\delta$	+49	+06	+06
c. sec. $\delta$	+46	-19	-19
$r$	+1.05	-03	-03
T	14 18 15.26	14 43 28.27	14 43 39.66
a	2 18 06.36	14 43 19.43	14 43 30.88
$\Delta T$	-8.90	-8.84	-8.78



Date	July 2	July 2	July 2
Observer	S.P.H.	S.P.H.	S.P.H.
Illumin'n	W.	W.	W.
Star	$\beta$ Urs Min.	$\beta$ Bootis	48 Cephei
Mag.			
$\delta$	$+74^{\circ}.42'$	$+40.55$	$102^{\circ}.46'$
Wire	a		
"	b		
"	c	14 50 26.8	14 56. 46.9 15 02 34.
"	1	53.	56. 03 04
"	2	57 05.4	57 00.1 19.1
"	3	19.1	05.2 35.
"	4	31.3	09.3 57.2
"	5	44.7	14. 04 06.2
"	d	52 09.8	22.7 37.1
"	e		
"	f		
Sum	10.1	34.2	06.6
Mean	14 51 18.59	14 57 04.89	15 03 35.23
Red'n to	mean	mean	mean
m	+10	+10	+10
n. tan. $\delta$	-77	-18	+92
c. sec. $\delta$	-68	-23	+82
r	-1.35	-31	1.84
T	14 51 17.24	14 57 04.58	15 03 38.07
a	14 51 08.56	14 56 55.77	3 03 28.38
$\Delta T$	-8.68	-8.81	-8.69

Date

July 2<sup>nd</sup> 66.

Observer

S.P.L.

Illumin'n

W.

Star

P. hirtae.

Mag.

 $\delta$  $-8^{\circ} 53'$ 

Wire

a

Rotations. (see next  
page.)

"

b

"

c

15 09 45.8 13 01 10.95

"

1

52.4

05 37.15

"

2

55.9

07 59.17

"

3

59.7

10 13.77

"

4

10 03.

12 39.27

"

5

06.3

14 54.45

"

d

13

19 36.80

"

e

"

f

Sum

56.1

2 11 56

Mean

15. 09. 59.44 13 10 18.79

Red'n to

mean

m

+10

n. tan.  $\delta$ 

+03

c. sec.  $\delta$ 

-18.

r

-05

T

59.39

a

15 09. 50.65

 $\Delta T$ 

-8.74

July 2  $\Delta T$  @ Sid. 12<sup>h</sup> - 8.80



Date		July. 3 <sup>rd</sup> 66.	July. 3 <sup>rd</sup>	July. 3 <sup>rd</sup>
Observer		S.P.L.	S.P.L.	S.P.L.
Illumin'n		W.	W.	W.
Star		Polaris.	Polaris.	Polaris.
Mag.				
$\delta$		+ 91° 24'		
Wire	a	First contact.	Bisection	Last contact
"	b			
"	c	13 01 06.8	13 01 10.5	13 01 16.
"	1	05 30.0	05 37.1	05 44.4
"	2	07 53.1	07 59.5	08 04.6
"	3	10 07.3	10 14.1	10 19.6
"	4	12 31.	12 40.1	12 45.9
"	5	14 49.2	14 54.4	14 59.8
"	d	19 30.8	19.37	19 42.4
"	e			
"	f			
Sum		71. 28.2	72. 12.7	72. 52.7
Mean		13 10 12.6	13 10 18.9	13 10 24.68
Red'n to				
m				
n. tan. $\delta$				
c. sec. $\delta$				
$\tau$				
T				
a				
$\Delta T$				

The seeing being very fine, took the star at its first contact, bisection, & last contact. In reducing to a mean, the bisection was given double weight. — See preceding page for result.

Date	July 3 <sup>rd</sup> 66				July 3				July 3								
Observer	S.P.H.				S.P.H.				S.P.H.								
Illumin'n	H.				H.				H.								
Star	$\gamma$ Leonis				$\epsilon$ Cor Bor				$\beta$ Scorpii								
Mag.																	
$\delta$					+ 27°.16'				-19°.26'								
Wire	a																
"	b																
"	c	10	12	29.9	15	51	58.1	15	57	36.							
"	1	37.2				52	06.	43.3									
"	2	40.7				09.6				47							
"	3	44.4				13.7				50.7							
"	4	48.1				17.2				54.1							
"	5	51.8				21.3				57.9							
"	d	59				28.9				58	04.9						
"	e																
"	f																
Sum	311.1				34.8				3.9								
Mean	10	12	44.44	15	52	13.54	15	57	50.56								
Red'n to											mean		mean				
m											+ 10		+ 10				
n. tan. $\delta$											- 11		+ 07				
c. sec. $\delta$											- 20		- 19				
$\tau$											- 21		- 02				
T											15	52	13	33	15	57	50.54
a	10	12	35.60	15	52	04.83	15	57	42.03								
$\Delta T$											-8.50		-8.51				

$\Delta T$  at 16<sup>h</sup> - 8<sup>s</sup>.51 Therm. + 78°



Date	July 5/66	July 5.	July 5
Observer	S.P.H.	S.P.H.	S.M.S.
Illumin'n	H.	H.	W
Star	$\gamma$ Leonis.	$\beta$ Leonis.	$\beta$ Urs. Min.
Mag.			
$\delta$	+20° 31'	+15.19.	+74 42
Wire	a		
"	b		
"	c	10 12 29.6.	11 42 09.1
"	1	37	16.
"	2	40.5.	19.5
"	3	44.2	23.2
"	4	47.8	26.7
"	5	51.7	30.2
"	d	58.8	37.1
"	e		
"	f		
Sum	309.6	161.8.	123.9
Mean	10 12 44.23	11 42 23.11	14 51 17.70
Red'n to	mean	mean	
m	+10	+10	+11
n. tan. $\delta$	-08	-07	-99
c. sec. $\delta$	-19	-19	-44
r	-17	-16	-1.32
T	10 12 44.06	11. 42 22.95	14 51 16.38
a	10 12 35.58	11 42 14.52	14 51 8.35
$\Delta T$	-8.48	-8.43	-8.03

Date	July 5 '66	July 5	July 5
Observer	G M S	G M S	G M S
Illumin'n	w	w	w
Star	$\beta$ Librae	$\alpha$ Coronae	$\alpha$ Serpentis
Mag.	-8 53	+27 10	+6 51
$\delta$			
Wire a			
" b			
" c		15 28 56.2	15 37 37.3
" 1	15 9 52.3	29 4.1	44.0
" 2	55.8	7.4	47.4
" 3	59.3	11.8	50.9
" 4	10 2.7	15.5	54.6
" 5	6.2	19.5	58.0
" d		26.9	38 4.8
" e			
" f			
Sum		81.4	357.0
Mean		15 29 11.63	15 37 51.00
Red'n to m		+ 11	+ 11
n. tan. $\delta$		- 14	- 03
c. sec. $\delta$		- 13	- 12
$\tau$		- 16	- 04
T		15 29 11.47	15 37 50.96
a		15 29 3.10	15 37 42.66
$\Delta T$		- 8.37	- 8.30



Date	July 5	July 5	July 5
Observer	S M S	S M S	S M S
Illumin'n	w	w	w
Star	$\epsilon$ Serpenti	Groomb. 2320	15 Draconis
Mag.			
$\delta$	+4 53	+68 10	+69 3
Wire	a		
"	b		
"	c	15 44 5.4	16 5 32.2
"	1	12.3	51.0
"	2	15.6	59.7
"	3	19.2	6 9.1
"	4	22.7	18.4
"	5	26.2	27.7
"	d	32.5	45.4
"	e		49 4.2
"	f		
Sum	133.9	63.5	185.5
Mean	15 44 19.13	16 6 9.07	16 28 26.50
Red'n to			
m	+ 11	+ 11	+ 11
n. tan. $\delta$	- 02	- 67	- 71
c. sec. $\delta$	- 12	- 31	- 33
r	- 03	- 87	- 93
T	15 44 19.10	16 6 8.20	16 28 25.57
a	15 44 10.89	16 52 59.99	16 28 17.87
$\Delta T$	- 8.21	- 8.21	- 7.70

$\Delta T$  at  $15^h 45^m$  (rejecting 15 Draconis) -  $8^s 23$

Date	July 6			July 6			July 6		
Observer	G M S			G M S			G M S		
Illumin'n	E			E			E		
Star	$\alpha$ Lyrae			$\beta$ Lyrae			$\zeta$ Aquilae		
Mag.									
$\delta$	38 40			33 13			13 40		
Wire	a								
"	b								
"	c	18 32	18.2	18 45	3.3	18 59	12.5		
"	1	26.7		11.1		19.4			
"	2	31.1		15.3		22.9			
"	3	35.5		19.2		26.2			
"	4	39.8		23.4		30.0			
"	5	44.0		27.3		33.3			
"	d	52.9		35.5		40.4			
"	e								
"	f								
Sum	248.2			135.1		184.7			
Mean	18 32	35.46		18 45	19.30	18 59	26.39		
Red'n to									
m	+11			+11		+11			
n. tan. $\delta$	-22			-18		-07			
c. sec. $\delta$	+15			+14		+12			
$\tau$	+04			+07		+16			
T	18 32	35.50		18 45	19.37	18 59	26.55		
a	18 32	27.04		18 45	10.91	18 59	18.01		
$\Delta T$	-8.46			-8.46		-8.54			

$$\Delta T \text{ at } 18^h 45^m - 8.549$$



Date	July 9	July 9	July 9
Observer	S M S	S M S	S M S
Illumin'n	w	w	w
Star	$\alpha^2$ Librae	$\beta$ Urs Min	$\beta$ Bootis
Mag.	-15 29	+74 42	+40 55
Wire	a		
"	b		
"	c	14 43 24.9	14 50 25.6
"	1	31.9	51.6
"	2	35.3	51 4.8
"	3	39.0	18.2
"	4	42.4	30.1
"	5	46.2	43.9
"	d	53.3	52 9.0
"	e		
"	f		
Sum	273.0	123.2	30.6
Mean	14 43 39.00	14 50 17.60	14 57 4.37
Red'n to			
m	+20	+20	+20
n. tan. $\delta$	+07	-96	-23
c. sec. $\delta$	-12	-46	-16
$r$	+15	-1.22	-19
T	14 43 39.15	14 51 16.38	14 57 4.18
a	14 43 30.80	14 51 8.07	14 56 55.65
$\Delta T$	-8.35	-8.31	-8.53

Date	July 9			July 9			July 9			
Observer	G M S			G M S			G M S			
Illumin'n	W			W			W			
Star	$\beta$ , Scorpii			Groomb. 2320			$\tau$ Herculis			
Mag.	-19 26			+ 68 10			+ 46 38			
$\delta$										
Wire	a									
"	b									
"	c	15	57	35.9	16	5	32.1	16	15	33.7
"	1			43.1			50.6			44.0
"	2			46.3			59.9			48.5
"	3			50.2		6	9.1			53.9
"	4			53.8			18.3			58.7
"	5			57.6			27.8	16		3.9
"	d			58 4.5			45.8			13.5
"	e									
"	f									
Sum				351.4			63.6			376.2
Mean		15	57	50.20	16	6	9.09	16	15	53.74
Red'n to										
m				+ 20			+ 20			+ 20
n. tan. $\delta$				- 09			- 65			- 28
c. sec. $\delta$				- 13			- 32			- 18
$\tau$				- 02.1			- 77			- 26
T		15	57	50.18	16	6	8.32	16	15	53.48
a		15	57	41.99	16	5	59.83	16	15	44.93
$\Delta T$				- 8.19			- 8.49			- 8.55



Date	July 9			July 9			July 9			
Observer	G M S			G M S			G M S			
Illumin'n	w			w			w			
Star	$\kappa$ Ophiuchi			$\omega$ Draconis			$\psi'$ Drac. pr.			
Mag.	+ 9 35			+ 68 49			+ 72 13			
$\delta$										
Wire	a									
"	b									
"	c	16	51	16.9	17	37	18.6	17	43	47.6
"	1	23.9			37.5			44	9.9	
"	2	27.6			46.7			21.0		
"	3	31.0			56.6			32.1		
"	4	34.2			38	6.0		44.0		
"	5	37.9			15.2			55.0		
"	d	44.7			34.5			45	17.1	
"	e									
"	f									
Sum		216.2			395.3			226.7		
Mean		16	51	30.89	17	37	56.47	17	44	32.39
Red'n to										
m		+20			+20			+20		
n. tan. $\delta$		-04			-68			-82		
c. sec. $\delta$		-12			-33			-39		
r		+04			-81			-1.01		
T		16	51	30.93	17	37	55.66	17	44	31.38
a		16	51	22.32	17	37	47.44	17	44	23.02
$\Delta T$		-8.61			-8.22			-8.36		

Date	July 9			July 9			July 9					
Observer	G M S			G M S			G M S					
Illumin'n	w			w			w					
Star	$\mu$ Sagittarii			51 Cephei L0			$\sigma$ Sagittarii					
Mag.				92 46								
$\delta$	- 21 5			+ 87 14			- 26 27					
Wire	a											
"	b											
"	c	18	5	42.5	18	31	46.5	18	46	54.0		
"	1			49.9		34	4.5		47	1.8		
"	2			53.1		35	16.3			5.6		
"	3			57.0		36	24.6			9.2		
"	4	6		0.6		37	41.1			13.0		
"	5			4.1		38	48.5			16.8		
"	d			11.1		41	12.5			24.1		
"	e											
"	f											
Sum			398.3			194.0				64.5		
Mean	18	5	56.90	18	36	27.71	18	47		9.21		
Red'n to												
m				+ 20						+ 20		
n. tan. $\delta$				+ 10			+ 5.43			+ 13		
c. sec. $\delta$				- 13			+ 2.49			- 13		
r				+ 17			+ 8.12			+ 20		
T	18	5	57.07	18	36	35.83	18	47		9.41		
a	18	5	48.46	6	36	28.43	18	47		0.92		
$\Delta T$				- 8.61			- 7.40			- 8.49		

$$\Delta T \text{ at } 16^h 45^m - 8^s.51$$



Date	July 9	July 9	July 9
Observer	GMS	GMS	GMS
Illumin'n	W	W	W
Star	1st contact 51	Bepphi. L C.	Last contact.
Mag.		Bisection	
$\delta$			
Wire	a		
"	b		
"	c	18 31 41.2	18 31 47.1 18 31 51.1
"	1	34 1.5	34 4.0 34 7.9
"	2	35 13.5	35 15.6 35 19.8
"	3	36 21.4	36 24.1 36 28.4
"	4	37 37.2	37 41.9 37 44.3
"	5	38 46.2	38 48.1 38 51.2
"	d	41 10.1	41 12.0 41 15.5
"	e		
"	f		
Sum			
Mean			
Red'n to			
m			
n. tan. $\delta$			
c. sec. $\delta$			
r			
T			
a			
$\Delta T$			

Date	July 10	July 10	July 10
Observer	GMS	GMS	GMS
Illumin'n	w	w	w
Star	$\delta$ Ophiuchi	$\tau$ Herculis	$\alpha$ Scorpii
Mag.			
$\delta$	- 3 21	+ 46 38	- 26 8
Wire	a		
"	b		
"	c		
"	1		
"	2		
"	3		
"	4		
"	5		
"	d		
"	e		
"	f		
Sum			
Mean			
Red'n to			
m			
n. tan. $\delta$			
c. sec. $\delta$			
r			
T			
a			
$\Delta T$			

$$\Delta T \text{ at } 16^h 15^m - 8.49$$



Date	July 12	July 12	July 12
Observer	G M S	G M S	G M S
Illumin'n	w	w	w
Star	$\alpha$ Cor. Bor.	$\alpha$ Serpentes	$\epsilon$ Serpentes
Mag.	+27 10	+6 51	+4 53
Wire	a		
"	b		
"	c	15 28 56.0	15 37 37.1
"	1	29 3.8	44.0
"	2	7.4	47.3
"	3	11.5	50.9
"	4	15.2	54.2
"	5	19.2	57.9
"	d	26.5	38 4.6
"	e		
"	f		
Sum	79.6	356.0	133.1
Mean	15 29 11.37	15 37 50.86	15 44 19.01
Red'n to			
m	+17	+17	+17
n. tan. $\delta$	-15	-03	-02
c. sec. $\delta$	-14	-12	-12
r	-12	+02	+03
T	15 29 11.25	15 37 50.88	15 44 19.04
a	15 29 3.03	15 37 42.61	15 44 10.83
$\Delta T$	-8.22	-8.27	-8.21

$$\Delta T \text{ at } 15^h 30^m - 8.23$$

Date	July 13	July 13	July 13
Observer	GMS	GMS	GMS
Illumin'n	w	w	w
Star	$\alpha'$ Herculis	$\beta$ Ophiuchii	$\alpha$ Ophiuchii
Mag.	+14 33	-24 3	+12 39
$\delta$			
Wire	a		
"	b		
"	c	17 8 29.2	17 18 7.8
"	1	36.3	15.4
"	2	39.7	19.0
"	3	43.3	22.8
"	4	46.8	26.6
"	5	50.3	30.2
"	d	57.2	37.7
"	e		
"	f		
Sum	302.8	159.5	376.8
Mean	17 8 43.26	17 18 22.79	17 28 53.83
Red'n to			
m	+17	+17	+17
n. tan. $\delta$	-07	+12	-06
c. sec. $\delta$	-13	-14	-12
$\tau$	-03	+15	-01
T	17 8 43.23	17 18 22.94	17 28 53.82
a	17 8 35.02	17 18 14.79	17 28 45.72
$\Delta T$	-8.21	-8.15	-8.10

$\Delta T$  at  $17^h 15^m$  -8.15



Date	July 14	July 14			
Observer	G M S	G M S			
Illumin'n	W	W			
Star	$\beta$ , Scorpii	$\eta$ Herculis			
Mag.	-19 26	+39 11			
$\delta$					
Wire	a				
"	b				
"	c	15 57 35.4	16 38 11.2		
"	1	42.7	20.0		
"	2	46.2	24.4		
"	3	49.8	28.9		
"	4	53.7	33.3		
"	5	57.0	38.0		
"	d	58 4.3	46.0		
"	e				
"	f				
Sum		349.1	201.8		
Mean	15 57	49.87	16 38 28.83		
Red'n to					
m		+17	+17		
n. tan. $\delta$		+10	-23		
c. sec. $\delta$		-13	-16		
r		+14	-22		
T	15 57	50.01	16 38 28.61		
a	15 57	41.96	16 38 20.52		
$\Delta T$		-8.05	-8.09		

$$\Delta T \text{ at } 16^h 15^m - 8.07$$

Date	July 16.	July 16	July 16
Observer	S.P.L.	S.P.L.	S.P.L.
Illumin'n	W.	E.	E.
Star	Polaris	$\epsilon$ Cor Bor.	$\beta'$ Scorpii
Mag.			
$\delta$	+ 91.24	+ 27.16	- 19.26
Wire	a		
"	b		
"	c	13 01.20.4	15 51 57 15 57 35.1
"	1	05 48.	52 04.6 42.
"	2	08 16.3	08.6 45.8
"	3	Revised Ill.E.	12.2 49.2
"	4	13 05	16.3 53.
"	5	15 28.3	20.0 56.8
"	d	20 00.	27.9 58.04
"	e		
"	f		
Sum.		26.6	46.9
Mean		15 52 12.37	15 57 49.56
Red'n to	mean	mean	
m		+ 17	+ 17
n. tan. $\delta$		- 15	+ 10
c. sec. $\delta$		+ 22	+ 21
$r$		+ 24	+ .48
T		12.61	50.04
a		15 52 04.70	15 57 41.94
$\Delta T$		- 7.91	8.90



Date	July 16.	July 16.	July 16.
Observer	S.P.H.	S.P.H.	S.P.H.
Illumin'n	E	E	E
Star	$\delta$ Ophiuchi	$\alpha$ Scorpii	15. Draconis
Mag.	- 19.26'	- 26.08	+ 69.04
$\delta$	3.21		
Wire	a		
"	b		
"	c	16 07 16.3	16 21 07.3
"	1	22.8	14.7
"	2	26.4	18.6
"	3	29.7	22.3
"	4	33.1	26.4
"	5	36.8	30.
"	d	42.7	37.8
"	e		
"	f		
Sum	208.8	157.1	55.4
Mean	16 07 29.83	16 21 22.3	16 28 25.06
Red'n to			
m	+ 17	+ 17	+ 17
n. tan. $\delta$	+ 01	+ 15	
c. sec. $\delta$	+ 20	+ 22	
r	+ 38	+ 54	
T	30.21	22.84	
a	16 07 22.27	16 21 15.07	16 28 17.42
$\Delta T$	7.94	7.75	

$$\Delta T \text{ at Sid.}^L 12^h = -7^s.93$$

Date	July 16.	July 17	July 17
Observer	SRH	SRH	SRH
Illumin'n	E	E	E
Star	$\alpha$ Camelopard	$\alpha$ Hercules	$\beta$ Draco
Mag.			
$\delta$	$113^{\circ} 53$	$+14.33$	$+52.24$
Wire	a		
"	b		
"	c	16 40 20.1	17 08 28.8
"	1	37	35.4
"	2	45.6	38.9
"	3	54.2	42.4
"	4	41. 02.8	46.1
"	5	11.1	49.5
"	d	27.	57.
"	e		
"	f		
Sum	17.8	298.1	242.3.
Mean	16 40 53.97	42.59 17	27 34.62
Red'n to			
m	+17	+17	+17
n. tan. $\delta$		-08	-37
c. sec. $\delta$		+20	+33
r		+29	+13
T		42.88	34.75
a	4 40 46.37	17 08 35	17 27 26.86
$\Delta T$		7.88	7.89



Date	July 17	July 17
Observer	SRH	SRH
Illumin'n	E	E
Star	$\mu$ Herculis.	$\gamma$ Draconis.
Mag.		
$\delta$	+ 27.48.	+ 57.31.
Wire	a	
"	b	
"	c	17 41. 7.9 17 53. 18.5
"	1	15.2 29.
"	2	19.4. 34.7.
"	3	23.2. 40.
"	4	27.1 45.7
"	5	31.0 57.
"	d	38.5 54. 02.3
"	e	
"	f	
Sum	162.3.	41.2.
Mean	17 41 23.19.	17 53 40.17
Red'n to		
m	+ 17	+ 17
n. tan. $\delta$	- 15	- 37
c. sec. $\delta$	+ 23	+ 32.
r	+ 25	+ 12.
T	23.44.	40.29
a	17 41 15.63	17 53 32.60
$\Delta T$	7.81.	7.69

$$\Delta T \text{ at Sid. } 12^h = -7^s.83.$$

Date	July 19 <sup>th</sup> 66			July 19			July 19			
Observer	S.P.H.			S.P.H.			S.P.H.			
Illumin'n	W.			W.			W.			
Star	$\eta$ Draconis			15 Draconis			$\epsilon$ Hercules			
Mag.										
$\delta$	$+61^{\circ}.49'$			$+69.04$			$+31^{\circ}.51'$			
Wire	a									
"	b									
"	c	16	21	52.3	16	27	47.9	16	36	08.6
"	1	22. 07			28 07.1			16.7		
"	2	13.9			16.4			<u>20.7</u>		
"	3	21.6			26.6			24.7		
"	4	28.5			35.7			28.9		
"	5	35.9			45.6			32.8		
"	d	49.7			29 03.6			40.6		
"	e									
"	f									
Sum		289			029			1730		
Mean		16	22	21.27	16	28	26.13	16	36	24.71
Red'n to		mean			mean			mean		
m		+17			+17			+17		
n. tan. $\delta$		-37			-52			-12		
c. sec. $\delta$		-46			-62			-26		
$\tau$		-66			-97			24.26		
T		16	22	20.61	25.16			24.50		
a		16	22	13.34	16	28	17.30	16	36	18.44
$\Delta T$		7.27			7.86			8.06		



Date	July 19	July 19	July 19
Observer	S.R.L.	S.R.L.	S.R.L.
Illumin'n	W.	W.	W.
Star	$\eta$ Hercules.	$\alpha$ Camelopard.	$\delta$ Urs. Min.
Mag.			
$\delta$	$+39^{\circ} 11'$	$113.54'$	$+86.37'$
Wire	a		
"	b		
"	c	16 38 11.	16 40 20 18 13 08.1
"	1	20.	36.1 15. 03.4
"	2	24.2	45. 59.6
"	3	28.9	52.9 16 01.6
"	4	33.1	41. 01.4 53.5
"	5	37.8	10. 17 56.6
"	d	46.1	42. 27 19 45.8
"	e		
"	f		
Sum	201.1	12.4	50.6
Mean	16 38 28.73	16 41. 53.20	18. 15. 58.80
Red'n to	mean	mean	mean
m	+17	+17	+17
n. tan. $\delta$	-16	+45	-3.36
c. sec. $\delta$	-28	+55	-3.72
$r$	28.46	+1.17	-6.91
T		54.37	51.89
a	16 38 20.45	4 40 46.55	18 15 44.10
$\Delta T$	1' 8.01	7.82	7.79

$$\begin{aligned}
 m &= +17 \\
 n &= -20 \\
 a &= +26 \\
 b &= -01 \\
 c' &= -22
 \end{aligned}$$

Date	July. 19 <sup>h</sup> 46.	July. 19 <sup>h</sup>
Observer	S.H.L.	S.H.L.
Illumin'n	W.	W.
Star	51 Cephei	$\mu$ Herculis
Mag.		
$\delta$	+92°. 46'	27. 48
Wire	a	
"	b	
"	c	18 31 50.6 17 41 08.5
"	1	34 05 16.1
"	2	35 19.6 19.8
"	3	36 26.1 24.
"	4	37 42.5 27.7
"	5	38 51.1 31.6
"	d	41 15. 39.1
"	e	
"	f	
Sum	29.9	166 8.
Mean	18 36 29.99 17 41 23.83	
Red'n to	mean.	
m	+ .17	+ 17
n. tan. $\delta$	+ 4.16	- 11
c. sec. $\delta$	+ 4.58	- 25
$\tau$	+ 8.91	- 19
T	38 90.5	23.64
a	6 36 30.38.17 41 15.12	
$\Delta T$	8.52	8.02

$$\Delta T \text{ at Sidl. } 12^h \text{ July } 19^h = -7^s.99$$

$$\left. \begin{array}{l} m = +.17 \\ n = -.20 \\ c' = -.22 \text{ all } W. \end{array} \right\} \text{ From obs. of July. } 19^h$$



Date	July 22		July 22		July 22	
Observer	G M S		G M S		G M S	
Illumin'n	E		E		E	
Star	$\epsilon$ Urs. Min.		$\delta$ Ofhni chi		$\omega$ Draconis	
Mag.	82 15		-24 3		68 49	
Wire	a					
"	b					
"	c	16 58	19.6	17 18	8.0	17 37 18.2
"	1	16 59	7.7		15.3	36.6
"	2		33.7		18.9	46.1
"	3		58.6		22.4	55.1
"	4	17 0	25.2		26.7	38 5.2
"	5		50.0		30.2	14.1
"	d	1	49.8		37.8	33.4
"	e					
"	f					
Sum			406.6		159.3	388.7
Mean		16 59	59.51	17 18	22.76	17 37 55.53
Red'n to						
m		+ 12		+ 12		+ 12
n. tan. $\delta$		-1.47		+ 09		+ 52
c. sec. $\delta$		+1.04		+ 15		+ 39
r		- 31		+ 36		- 01
T		16 59	59.20	17 18	23.02	17 37 55.52
a		16 59	50.54	17 18	14.75	17 37 47.26
$\Delta T$		-8.66		-8.37		-8.26

Date	July 22	July 22	July 22
Observer	GMS	GMS	GMS
Illumin'n	E	E	E
Star	$\gamma^1$ Drac. fr.	$\gamma^2$ Sagittarii	$\mu$ , Sagittarii
Mag.			
$\delta$	72 13	30 25	-21 5
Wire	a		
"	b		
"	c	17 57 8.2	18 5 42.3
"	1	44 8.9	49.3
"	2	20.1	52.9
"	3	30.6	56.4
"	4	42.8	6 0.1
"	5	53.5	4.0
"	d	45 16.2	39.7
"	e		
"	f		
Sum	218.9	166.7	396.4
Mean	17 44 31.27	17 57 23.81	18 5 56.63
Red'n to			
m	+ 12	+12	+12
n. tan. $\delta$	- 62	+ 12	+ 08
c. sec. $\delta$	+ 0.46	+ 16	+ 15
$r$	- 04	+40	+35
T	17 44 31.23	17 57 24.21	18 5 56.98
a	17 44 22.54	17 57 15.78	18 5 48.47
$\Delta T$	-8.69	-8.43	-8.51



Date	July 22	July 22
Observer	G M S	G M S
Illumin'n	E	E
Star	$\delta$ Urs. Min.	$\alpha$ Lyrae
Mag.		
$\delta$	86 37	38 40
Wire	a	
"	b	
"	c	
	12 31	18 32 18.3
"	1	13 54.2 26.5
"	2	14 52.1 31.0
"	3	15 48.1 35.3
"	4	16 50.3 39.3
"	5	17 47.3 43.7
"	d	19 46.3 52.8
"	e	
"	f	
Sum	361.4	246.9
Mean	18 15 51.63	18 32 35.27
Red'n to		
m	+12	+12
n. tan. $\delta$	-3.37	-16
c. sec. $\delta$	+2.36	+18
$\tau$	-5.89	+14
T	18 15 50.74	18 32 35.41
a	18 15 43.47	18 32 27.01
$\Delta T$	-7.27	-8.40

$\Delta T$  at 18<sup>h</sup> 45<sup>m</sup> - 8.32

Date	July 24	July 24	July 24
Observer	G M S	G M S	G M S
Illumin'n	E	E	E
Star	Groomb. 2320	$\tau$ Herculis	$\alpha$ Scorpii
Mag.			
$\delta$	68 10	46 38	-26 8
Wire a			
" b			
" c	16 5 31.5	16 15 33.9	16 21 8.4
" 1	49.2	43.4	15.7
" 2	58.8	48.5	19.5
" 3	6 7.8	53.3	23.3
" 4	17.0	58.5	27.2
" 5	26.1	16 3.1	31.0
" d	44.9	13.5	38.7
" e			
" f			
Sum	55.3	374.2	163.8
Mean	16 6 7.90	16 15 53.46	16 21 <del>26.26</del> 23.40
Red'n to			
m	00	00	00
n. tan. $\delta$	-75	-32	+15
c. sec. $\delta$	+38	+20	+16
$\tau$	-37	-12	+31
T	16 6 7.53	16 15 53.34	16 21 23.71
a	16 5 59.14	16 15 44.65	16 21 15.01
$\Delta T$	-8.39	-8.69	-8.70



Date	July 24			July 24		
Observer	G M S			G M S		
Illumin'n	E			E		
Star	15 Draconis			$\alpha$ Camelopardis		
Mag.						
$\delta$	69 4			113 54		
Wire	a					
"	b					
"	c	16	27	47.5	16	40 21.5
"	1	28	6.1			38.9
"	2		15.8			46.7
"	3		25.0			55.8
"	4		35.0		41	4.0
"	5		44.5			12.6
"	d	29	4.0			28.3
"	e					
"	f					
Sum		177.9		387.8		
Mean		16	28 25.41	16	40	55.40
Red'n to						
m		00		00		
n. tan. $\delta$		-78		+68		
c. sec. $\delta$		+39		-35		
r		-39		+33		
T		16	28 25.02	16	40	55.73
a		16	28 17.06	4	40	46.81
$\Delta T$		-7.96		-8.82		

$\Delta T$  at  $16^h 15^m - 8^s.51$

Date	July 26	July 26	July 26
Observer	G.M.S	G.M.S	G.M.S
Illumin'n	w	w	w
Star	$\epsilon$ Herculis	$\zeta$ Ophiuchi	$\eta$ Herculis
Mag.			
$\delta$	+46 38	-10 17	+39 11
Wire	a		
"	b		
"	c	16 29 44.7	16 38 11.4
"	1	44.0	51.7
"	2	48.7	55.0
"	3	53.8	58.7
"	4	58.8	30 2.0
"	5	16 3.7	5.5
"	d	13.1	12.2
"	e		
"	f		
Sum	376.1	409.8	203.2
Mean	16 15 53.73	16 29 58.54	16 38 29.03
Red'n to			
m	-02	-02	-02
n. tan. $\delta$	-14	+02	-11
c. sec. $\delta$	-26	-18	-23
r	-42	-18	-36
T	16 15 53.31	16 29 58.36	16 38 28.67
a	16 15 44.60	16 29 49.87	16 38 20.33
$\Delta T$	-8.71	-8.49	-8.34



Date	July 26	July 26
Observer	GMS	GMS
Illumin'n	W	W
Star	$\alpha$ Camelopardalis	$\epsilon$ Urs. Min.
Mag.		
$\delta$	+ 66 6	+ 82 15
Wire	a	
"	b	
"	c	16 40 21.7 16 58 18.3
"	1	37.8 59 10.2
"	2	46.2 35.0
"	3	54.3 0 1.5
"	4	41 3.2 25.7
"	5	11.5 52.5
"	d	28.6 1 40.8
"	e	
"	f	
Sum	383.3	4.0
Mean	16 40 54.76 17 0 0.57	
Red'n to		
m	-02	-02
n. tan. $\delta$	+ 29	-96
c. sec. $\delta$	+ 44	-1.33
$\tau$	+7.8	-2.31
T	16 40 55.47 16 59 58.26	
a	4 40 46.92 16 59 49.96	
$\Delta T$	-8.55	-8.30

$\Delta T$  at 16<sup>h</sup> 30<sup>m</sup> - 8.48

Date	July 29	July 29	July 29
Observer	GMS	GMS	GMS
Illumin'n	w	w	w
Star	$\eta$ Herculis	$\alpha$ Camelopardalis	$\kappa$ Ophiuchus
Mag.	39 11	113 54	9 35
$\delta$			
Wire a			
" b			
" c	16 38 12.0	16 40 22.1	16 51 17.7
" 1	20.8	38.3	24.7
" 2	25.1	47.1	28.0
" 3	29.8	55.0	31.7
" 4	34.1	41 4.1	35.0
" 5	38.5	12.2	38.5
" d	46.9	29.2	45.2
" e			
" f			
Sum	207.2	388.0	220.8
Mean	16 38 27.60	16 40 55.43	16 51 31.54
Red'n to			
m	- 01	- 01	- 01
n. tan. $\delta$	- 04	+ 11	- 01
c. sec. $\delta$	- 32	+ 62	+ 25
r	- 37	+ 72	- 27
T	16 38 29.23	16 40 56.15	16 51 31.27
a	16 38 20.28	4 40 47.11	16 51 22.17
$\Delta T$	- 8.95	- 9.04	- 9.10



Date	July 29	July 29	July 29
Observer	G.M.S	G.M.S	G.M.S
Illumin'n	W	W	W
Star	$\epsilon$ Urs. Min.	$\alpha$ , Hercules	$\delta$ Ophiuchus
Mag.			
$\delta$	82 15	14 33	-24 2
Wire	a		
"	b		
"	c	16 58 19.0	17 8 30.2
"	1	59 9.7	37.2
"	2	59 34.9	40.5
"	3	17 0 2.1	44.6
"	4	0 26.5	47.8
"	5	0 52.1	51.3
"	d	1 41.2	58.3
"	e		38.7
"	f		
Sum		5.5	309.9
Mean	17 0 0.79	17 8 44.27	17 18 23.90
Red'n to			
m	-01	-01	-01
n. tan. $\delta$	-37	-01	+02
c. sec. $\delta$	+1.85	-26	-27
r	-2.23	-28	-26
T	16 59 58.56	17 8 43.99	17 18 23.64
a	16 59 49.54	17 8 34.91	17 18 14.71
$\Delta T$	-9.02	-9.08	-8.93

$$\Delta T = -9.02 \text{ at } 17^h 0^m$$

Date	July 31/66	July 31	July 31
Observer	S.P.H.	S.P.H.	S.P.H.
Illumin'n	W.	W.	W.
Star	$\eta$ Draconis	$\xi$ Ophiuchi	$\eta$ Aurulis
Mag.	3.2	3.2	3
$\delta$	$+61^{\circ}49'$	$-10^{\circ}18'$	$+39^{\circ}11'$
Wire	a		
"	b		
"	c	16 21 53.6	16 29 45.5
"	1	22 08.	52.6
"	2	15	55.8
"	3	22.8	59.5
"	4	29.7	30 02.9
"	5	37.	06.4
"	d	51.	13.1
"	e		47.4
"	f		
Sum	37.1	55.8	210.1
Mean	16 22 22.44	16 29 59.40	16 38 30.01
Red'n to	mean	mean	mean
m	+ 05	+ 05	+ 05
n. tan. $\delta$	- 26	+ 03	- 11
c. sec. $\delta$	- 38	- 18	- 24
r	- 59	- 10	- 30
T	16 22 21.85	59 34	16 38 29.71
a	16 22 12.90	16 29 49.82	16 38 20.24
$\Delta T$	- 8.95	- 9.52	- 9.47



Date	July 31	July 31	July 31
Observer	S.P.H.	S.P.H.	S.P.H.
Illumin'n	W.	W.	W.
Star	$\alpha$ Ophiuchi	$\delta$ Urs. min	51 Cephei(H)
Mag.	3.4	4.5	5
$\delta$	+ 9.35	+ 86.° 36'	+ 92.° 45'
Wire	a		
"	b		
"	c	16 51 18	18 12 05.3 18 31 57.4
"	1	24.7	14 01.8 34 13.1
"	2	28.3	59. 35. 26.2
"	3	32.	15 58.8 36. 34
"	4	35.3	16. 54.4 <u>34. 53</u>
"	5	38.7	17. 53. <u>39. 06.4</u>
"	d.	45.4	19. 44. <u>41. 39.8</u>
"	e		
"	f		
Sum	222.4	36.9	49.9
Mean	16 51 31.77	18 15 56.70	18 36 <u>36.90</u>
Red'n to	mean	mean	mean
m	+ 05	+ 05	+ .05
n. tan. $\delta$	- 02	- 2.35	+ 2.94
c. sec. $\delta$	- 18	- 3.04	+ 3.78
$r$	- 15	- 5.34	+ 6.77
T	16 51 31 62	51 36 18 36 43 67	
a	16 51 22.15	18 15 41.15	18 36 33.93
$\Delta T$	- 9.47	- 10.21	- 9.44

$$m = + 05$$

$$n = - 14$$

$$b = - 06$$

$$c' = - 18$$

$$a = + 14$$

Date	Aug 2 <sup>nd</sup> 46	Aug 2	Aug 2
Observer	S.P.L.	S.P.L.	S.P.L.
Illumin'n	W	W	W
Star	$\eta$ Hercules	$\alpha$ Hercules	$\beta$ Ophiuchi
Mag.	3	Var	5
$\delta$	+ 39°. 11'	+ 14°. 32'	- 24. 03
Wire	a		
"	b		
"	c	17 08 28.7	17 18 07.5
"	1	35.8	15.
"	2	39.1	18.7
"	3	42.9	22.7
"	4	46.2	26.3
"	5	49.9	30.
"	d	56.7	37.
"	e		
"	f		
Sum		299 3	157 2
Mean		17 08 42.76	17 18 22.46
Red'n to		mean	mean
m		+ 37	+ 37
n. tan. $\delta$		- 04	+ 06
c. sec. $\delta$		- 16	- 17
$\tau$		+ 17	+ 26
T		17 08 42.93	17 18 22.72
a	16 38 20.23	17 08 34.88	17 18 14.69
$\Delta T$		- 8.05	- 8.03

Owing to pp error in the assumed "0" of the Chronograph sheet each transit, is above entered as having occurred too early by two seconds. Hence the correct results are

$$\alpha \text{ Hercules } \Delta T = -10.05$$

$$\beta \text{ Ophiuchi } \Delta T = -10.03$$

$$\kappa \text{ " } \Delta T = -10.19$$

$$3 \times 30.27$$

$$\text{at } 17^{\text{h}} \Delta T = -10.09$$



Date	Aug 2
Observer	S.H.
Illumin'n	W
Star	$\alpha$ Ophiuchi
Mag.	3.4
$\delta$	+9° 35'
Wire	a
"	b
"	c
"	1
"	2
"	3
"	4
"	5
"	d
"	e
"	f
Sum	2101
Mean	16 51 30.14
Red'n to	mean
m	+37
n. tan. $\delta$	-.02
c. sec. $\delta$	-16
r	+19
T	16 51 30.33
a	16 51 22.14
$\Delta T$	-8.19

Date	Aug 5			Aug 5			Aug 5					
Observer	G M S			G M S			G M S					
Illumin'n	E			E			E					
Star	Groenb. 966 LC			$\beta$ Draconis			w Draconis					
Mag.	<sup>10.5</sup> <del>7.4</del> 3			+ 52 24			68 49					
$\delta$												
Wire	a											
"	b											
"	c											
"	1	17	21	34.2	17	27	25.2	17	37	37.2		
"	2			47.8			31.4			47.2		
"	3		22	1.7			37.3			56.9		
"	4			15.8			43.1	38		7.5		
"	5			29.7			49.0			16.9		
"	d											
"	e											
"	f											
Sum				9.2			186.0			285.7		
Mean		17	22	1.84	17	27	37.20	17	37	57.14		
Red'n to												
m				+ 18			+ 18			+ 18		
n. tan. $\delta$				+ 74			- 26			- 52		
c. sec. $\delta$				- 18			+ 08			+ 13		
$\tau$				+ 74			00			- 21		
T		17	22	2.58	17	27	37.20	17	37	56.93		
a		5	21	52.09	17	27	26.47	17	37	46.44		
$\Delta T$				- 10.49			- 10.73			- 10.49		

$$\Delta T = -10.62 \text{ at } 17^h 45^m$$

$$c \text{ assumed} = +0.048$$

Star	$a - (\text{Mem} + c \sec \delta)$	$\tan \delta$
$w$ Drae.	- 10.83	+ 2.58
$\beta$ Drae	- 10.81	+ 1.30
	- 21.64	+ 3.88
$\mu$ Sag.	- 10.50	- 0.39
Groenb. 966 LC	- 9.57	- 3.72
	- 20.07	- 4.11

$$n = \frac{-21.64 + 20.07}{+3.88 + 4.11} = -0.20$$

$$a \text{ assumed} = +0.27$$

$$\therefore m = +0.18$$



Date	Aug 5	Aug 5
Observer	G M S	G M S
Illumin'n	E	E
Star	$\mu$ Herculis	$\mu'$ Sagittarii
Mag.		
$\delta$	+27 48	-21 5
Wire		
a		
b		
c		
1		18 5 51.1
2		55.0
3	17 41 26.0	58.8
4		6 2.8
5		6.6
d		
e		
f		
Sum		294.3
Mean		18 5 58.86
Red'n to		
m	+18	+18
n. tan. $\delta$	-11	+08
c. sec. $\delta$	+05	+05
r	+12	+31
T	17 41 26.12	18 5 59.17
a	17 41 15.45	18 5 48.41
$\Delta T$	-10.67	-10.76

Date	Aug 6	Aug 6	Aug 6
Observer	G M S	G M S	G M S
Illumin'n	E	E	E
Star	$\zeta$ Ophiuchi	$\eta$ Herculis	$\alpha$ Camelopardalis
Mag.			
$\delta$	- 10 17	+ 39 11	113
Wire	a		
"	b		
"	c		
"	1	16 29 53.1	16 38 21.6
"	2	56.8	26.3
"	3	30 0.3	30.9 16 40 58.1
"	4	4.2	35.9
"	5	7.9	40.3
"	d		
"	e		
"	f		
Sum	2.3	155.0	
Mean	16 30 0.46	16 38 31.00	
Red'n to			
m	+ 06	+ 06	+ 06
n. tan. $\delta$	+ 0.2	- 0.9	+ 2.5
c. sec. $\delta$	+ 0.5	+ 0.6	- 1.2
$\tau$	16 30 + 13	+ 0.3	+ 1.9
T	16 30 0.59	16 38 31.03	16 40 58.29
a	16 29 49.74	16 38 20.12	4 40 47.58
$\Delta T$	- 10.85	- 10.91	- 10.71

Assumed  $c = + 0.05$

$\epsilon$ Urs Min	- 11.18	+ 7.35
$\eta$ Herculis	- 10.94	+ 0.82
$\delta$ Herculis	- 11.13	+ 0.67
	- 33.25	+ 8.84
$\kappa$ Ophiuchi	- 10.88	+ 0.17
$\zeta$ Ophiuchi	- 10.77	- 0.18
$\alpha$ Camelopardalis	- 10.40	- 2.26
	- 32.05	- 2.27

$$n = \frac{-1.20}{11.11} = -0.11$$

$$\text{Assumed } b = -0.03$$

$$\therefore m = +0.06$$



Date	Aug 6	Aug 6	Aug 6
Observer	G M S	G M S	G M S
Illumin'n	E	E	E
Star	$\kappa$ Ophiuchi	$\delta$ Herculis	$\epsilon$ Urs. Min.
Mag.			
$\delta$	+ 9 35	+ 33 46	+ 82 15
Wire	a		
"	b		
"	c		
"	1	16 51 25.6	16 56 44.0
"	2	29.2	48.2
"	3	33.0	52.8
"	4	36.5	57.1
"	5	40.2	57 1.3
"	d		
"	e		
"	f		
Sum	164.5	263.4	295.8
Mean	16 51 32.90	16 56 52.68	16 59 59.16
Red'n to			
m	+06	+06	+06
n. tan. $\delta$	-02	-07	-81
c. sec. $\delta$	+05	+06	+37
$r$	+09	+05	-38
T	16 51 32.99	16 56 52.73	16 59 58.78
a	16 51 22.07	16 56 41.61	16 59 48.35
$\Delta T$	-10.92	-11.12	-10.43

$$\Delta T \text{ at } 16^h 45^m = -10.82$$

Date	Aug 8	Aug 8	Aug 8	
Observer	G M S	G M S	G M S	
Illumin'n	w	w	w	
Star	$\beta$ Ophiuchi	Groomb. 966 LC	$\beta$ Draconis	
Mag.				
$\delta$	-24 3	105 3	+52 24	
Wire	a			
"	b			
"	c			
"	1	17 18 18.1	17 21 34.7	17 27 25.9
"	2	22.0	48.6	32.0
"	3	25.9	22 3.1	37.9
"	4	29.8	16.6	43.6
"	5	33.8	30.4	49.7
"	d			
"	e			
"	f			
Sum	129.6	13.4	189.1	
Mean	17 18 25.92	17 22 2.68	17 27 37.82	
Red'n to				
m	+ 11	+ 11	+ 11	
n. tan. $\delta$	+ 04	+ 35	9.12	
c. sec. $\delta$	- 06	+ 19	- 08	
$\tau$	+ 09	+ 65	- 09	
T	17 18 26.01	17 22 3.33	17 27 37.73	
a	17 18 14.60	5 21 52.36	17 27 26.39	
$\Delta T$	-16.41	-10.97	-11.34	

Assumed c =	-0.05		
$\psi$ Drac pr	-11.55	+3.12	
w Drac	-11.26	+2.58	$n = \frac{-1.00}{10.64} = -0.094$
$\beta$ Drac	-11.35	+1.30	
	-34.16	+7.00	Assumed b = +0.02
$\mu$ Herculis	-11.39	+0.53	
$\beta$ Ophiuchi	-11.26	-0.45	$\therefore m = +0.11$
Groomb. 966 LC	-10.51	-3.72	
	-33.16	-3.64	



Date	Aug 8	Aug 8	Aug 8		
Observer	G M S	G M S	G M S		
Illumin'n	w	w	w		
Star	$\omega$ Draconis	$\mu$ Herculis	$\psi'$ Drac. pr.	$\psi'$ Drac. seq.	
Mag.					
$\delta$	68 49	+27 48	+72 13		
Wire	a				
"	b				
"	c				
"	1	17 37 37.3	17 41 18.5	17 44 9.9	11.4
"	2	47.8	22.9	21.5	23.2
"	3	57.9	27.0	33.3	35.2
"	4	38 7.8	31.0	45.2	47.1
"	5	17.7	34.9	57.0	58.9
"	d				Mean $\Delta\alpha$
"	e				15.78
"	f				
Sum	288.5	134.3	166.9		
Mean	17 37 57.70	17 41 26.86	17 44 33.38		
Red'n to					
m	+11	+11	+11		
n. tan. $\delta$	-25	-05	-30		
c. sec. $\delta$	-14	-06	-16		
$r$	-28	00	-35		
T	17 37 57.42	17 41 26.86	17 44 33.03		
a	17 37 46.30	17 41 15.41	17 44 21.67		
$\Delta T$	-11.12	-11.45	-11.36		

$$\Delta T \text{ at } 17^h 30^m = -11^s.28$$

Date	Aug 10	Aug 10	Aug 10
Observer	G M S	G M S	G M S
Illumin'n	w	w	w
Star	$\delta$ Urs. Min.	$\alpha$ Lyrae	$\delta$ Sgittarii
Mag.			
$\delta$	86 36	38 39	-26 28
Wire	a		
"	b		
"	c		
"	1	18 32 29.6	18 47 5.2
"	2	18 15 52.1	34.4
"	3	15 52.6	39.1
"	4		48.6
"	5		48.3
"	d		
"	e		
"	f		
Sum		195.0	
Mean	18 15 52.6	18 32 39.00	
Red'n to			
m	+05	+05	
n. tan. $\delta$	-1.01	-05	
c. sec. $\delta$	-1.01	-08	
r	-1.97	-08	
T	18 15 50.63	18 32 38.92	
a	18 15 38.17	18 32 26.82	18 47 0.93
$\Delta T$	-12.46	-12.10	

Assumed  $c = -0.06$

$\delta$  Urs Min -13.42 +16.84

$\alpha$  Lyrae -12.10 +.80

$\zeta$  Aquilae -12.30 +24

$\delta$  Sgitt. -12.22 -35

-24.52 -11

$$n = \frac{-1.00}{17.75} = -0.06$$

Assumed  $b = \pm 0.00$

$$\therefore m = +0.05$$



Date	Aug 10	Aug 10	Aug 10
Observer	G M S	G M S	G M S
Illumin'n	w	w	w
Star	50 Draconis	5 Aquilae	4 Sagittarii
Mag.			
$\delta$	75 16	13 40	-19 11
Wire			
a			
b			
c			
1		18 59 23.0	19 9 55.7
2		26.7	59.7
3	18 50 57.1	30.2	10 3.3
4		34.1	7.2
5		37.9	11.2
d			
e			
f			
Sum		151.9	17.0
Mean		18 59 30.38	19 10 3.46
Red'n to			
m		+05'	+05'
n. tan. $\delta$		-01	+02'
c. sec. $\delta$		-06	-06
r		-02	+01
T		18 59 30.36	19 10 3.41
a	18 50 44.25	18 59 18.02	19 9 51.12
$\Delta T$		-12.34	-12.29

$$\Delta T \text{ at } 18^h 45^m = -12^s.30$$

Date	Aug 11	Aug 11	Aug 11
Observer	G M S	G M S	G M S
Illumin'n	w	w	w
Star	1 Aquilae	$\alpha$ Lyrae	51 Cephei L.C.
Mag.	-8 20	+38 39	92 45
$\delta$			
Wire a			
" b			
" c			
" 1	18 28 3.4	18 32 30.1	
" 2	6.9	34.8	18 35 32.7
" 3	10.7	39.5	36 47.5
" 4	14.3	43.7	38 4.2
" 5	17.9	48.7	
" d			
" e			
" f			
Sum	53.2	196.8	144.4
Mean	18 28 10.64	18 32 39.36	18 36 48.13
Red'n to			
m	+05	+05	+05
n. tan. $\delta$	+01	-04	+1.04
c. sec. $\delta$	-06	-08	+1.25
r	00	-07	+2.34
T	18 28 10.64	18 32 39.29	18 36 50.47
a	18 27 58.01	18 32 26.81	6 36 37.70
$\Delta T$	-12.63	-12.48	-12.77

Assumed  $c = -0.06$

50 Dra.	-13.11	+3.80	
$\alpha$ Lyrae	-12.47	+0.80	$m = \frac{-1.40}{26.73} = -0.05$
$\beta$ Lyrae	-12.55	+0.66	
	-38.13	+5.26	Assumed $b = 0.00$
1 Aquilae	-12.57	-0.15	$\therefore m = +0.05$
$\sigma$ Sagittarii	-12.48	-0.50	
51 Cephei	-11.68	-20.82	
	-36.73	-21.47	



Date	Aug 11	Aug 11	Aug 11	
Observer	G M S	G M S	G M S	
Illumin'n	w	w	w	
Star	$\beta$ Lyrae	$\sigma$ Sagittarii	$\delta$ Draconis	
Mag.				
$\delta$	+ 33 12	- 26 28	75 16	
Wire	a			
"	b			
"	c			
"	1	18 45 14.8	18 47 5.5	18 50 28.3
"	2	19.1	9.3	43.1
"	3	23.4	13.7	57.6
"	4	27.5	17.4	51 12.0
"	5	32.1	21.5	26.5
"	d			
"	e			
"	f			
Sum	117.0	67.4	287.5	
Mean	18 45 23.40	18 47 13.48	18 50 57.50	
Red'n to				
m	+ 05	+ 05	+ 05	
n. tan. $\delta$	- 03	+ 02	- 19	
c. sec. $\delta$	- 07	- 07	- 20	
r	- 05	00	- 34	
T	18 45 23.35	18 47 13.48	18 50 57.16	
a	18 45 10.78	18 47 0.93	18 50 44.19	
$\Delta T$	- 12.57	- 12.55	- 12.97	

$\Delta T$  at 18 45 -12.66

Date	Aug 12	Aug 12	Aug 12		
Observer	GMS	GMS	GMS		
Illumin'n	w	w	w		
Star	$\alpha'$ Herculis	$\beta$ Draconis	$\psi$ Drac. pr.		
Mag.					
$\delta$	+14 32	+52 24	72 13		
Wire	a				
"	b				
"	c				
"	1	17 8 40.0	17 27 27.3	17 44 10.9	
"	2	43.9	33.5	22.9	24.3
"	3	47.6	[39.4]	34.7	36.5
"	4	51.2	45.4	46.6	48.4
"	5	55.0	51.2	58.3	60.1
"	d				Mem Sa
"	e				1:70
"	f				
Sum	237.7	196.8	173.4		
Mean	17 8 47.54	17 27 39.36	17 44 34.68		
Red'n to					
m	+10	+10	+10		
n. tan. $\delta$	-0.3	-17	-41		
c. sec. $\delta$	-07	-11	-23		
r	00	-18	-54		
T	17 8 47.54	17 27 39.18	17 44 34.14		
a	17 8 34.74	17 27 26.28	17 44 21.43		
$\Delta T$	-12.80	-12.90	-12.71		

Assumed  $c = -0.07$

$$\begin{array}{rcl}
 \psi \text{ Drac. pr.} & -12.72 & -13.02 \\
 \beta \text{ Drac.} & -12.97 & +1.30 \\
 & -25.99 & +4.42 \\
 \alpha' \text{ Herculis} & -12.73 & +26 \\
 \gamma^2 \text{ Sag.} & -12.64 & -59 \\
 & -25.37 & -33
 \end{array}$$

$$n = \frac{-0.62}{4.75} = -0.13$$

$$\text{Assumed } b = -0.02$$

$$\therefore m = +0.10$$



Date	Aug 12		
Observer	G. M. S.		
Illumin'n	w		
Star	$\gamma^2$ Sagittarii		
Mag.			
$\delta$	-30 25'		
Wire	a		
"	b		
"	c		
"	1	17 57	20.1
"	2		24.2
"	3		28.5
"	4		32.3
"	5		36.7
"	d		
"	e		
"	f		
Sum		17 57	141.8
Mean		17 57	28.36
Red'n to			
m			+10
n. tan. $\delta$			+08
c. sec. $\delta$			-08
r			+10
T		17 57	28.46
a		17 57	15.62
$\Delta T$			-12.82

$$\Delta T \text{ at } 17^h 30^m = -12.81$$

Date	Aug. 13. 46			Aug 13 <sup>h</sup>			Aug 13		
Observer	S.R.L.			S.R.L.			S.R.L.		
Illumin'n	E.			E.			E.		
Star	51. Cephei. & Aquilae.						$\beta$ Aquilae		
Mag.	87. +3.92 <sup>u</sup> 47 +8° 31						+6° 05.		
$\delta$									
Wire	a								
"	b								
"	c	+8 34 22							
"	1	18	34	22	19	44	23.8	19	48. 53
"	2		35	37.5			27.4		56.7
"	3		36	50.7			31.1	49.	00.2
"	4		38	06.7			34.9		04.
"	5		39	21.6			38.5		07.5
"	d								
"	e								
"	f								
Sum		18.5			155.7			01.4	
Mean		18	36	51.7	19	44	31.1	19.	49. 00.3
Red'n to		middle wire			mid. wire			mid wire	
m		+10			+10			+10	
n. tan. $\delta$		+2.72			+02			- 02	
c. sec. $\delta$		- 80			+02			+ 02	
r		2 02			+10			+10	
T		18	36	53.72		31.20		00	40
a		6	36	38.75	19	44	17.79	19	48 47.04
$\Delta T$		14.95			13.45			13.36	

$$\Delta T @ 20^{\circ} = -13^{\circ} 39.$$



1866phae.proj..333L

Date *Aug 13 / 66*  
Observer *S.P.H.*  
Illumin'n *E*

Star *2 Uis Min*  
Mag. *+ 88.54*  
 $\delta$

Wire a  
" b  
" c  
  
" 1  
" 2  
" 3  
" 4  
" 5  
  
" d  
" e  
" f

Sum  
Mean

Red'n to *mid wire*  
m  
n. tan.  $\delta$   
c. sec.  $\delta$

r

T

a *79 58 51.54*

$\Delta T$

Date	Aug. 14. 66.	Aug. 14.	Aug. 14.	
Observer	S.P.L.	S.P.L.	S.P.L.	
Illumin'n	E.	E.	E.	
Star	$\delta$ Uho. Min.	$\gamma$ Aquilae	$\alpha$ Lyra	
Mag.				
$\delta$	$86^{\circ} 37'$	$- 8^{\circ} 20'$	$+ 38^{\circ} 40'$	
Wire	a			
"	b			
"	c	18 11 45.6	18 27 54.8	18 32 21.6
"	1	13 49.7	28 04.1	31.
"	2	14 50.7	08.	35.4
"	3	15 51.7	11.3	40.1
"	4	16 52.9	15.1	44.9
"	5	17 53.9	18.5	49.6
"	d	19 58.3	26.	59.
"	e			
"	f			
Sum		.02.8	139.8	287.6
Mean	18 15 51.83	18 28 11.4	18 32 40.23	
Red'n to	mid. wire.			
m	+ 01	+ 01	+ 01	
n. tan. $\delta$	- 1.68	+ 02	- 08	
c. sec. $\delta$	- .33	- 02	- 03	
$\tau$	- 2.00	+ 01	- 10	
T	49.83	11.41	40.13	
a	18 15 36.79	18 27 57.99	18 32 26.75	
$\Delta T$	13.04	13.42	13.38	

$$\Delta T \text{ at Sid. } 12^h = -13.40.$$

$$c = \overset{S}{-}.02 \text{ 2ll E.}$$

$$m = +.01$$

$$n = -.10.$$

$$a = +.14$$

$$b = .00$$



Date	Aug. 11		
Observer	S. H.		
Illumin'n	E		
Star	51 Cephei		
Mag.			
$\delta$	+ 92°. 36'		
Wire	a		
"	b		
"	c		
"	1		
"	2	18	35 35.8
"	3		36. 50.4
"	4		38. 06.6
"	5		
"	d		
"	e		
"	f		
Sum		32.8	
Mean	18	36.	50.93
Red'n to			
m		+ 0.1	
n. tan. $\delta$		+ 2.08	
c. sec. $\delta$		+ 41	
r		2.50	
T		53.43	
a	6	36	39.11
$\Delta T$		14.32	

Date	Aug. 16	Jul	Aug. 16.	Aug. 16
Observer	S.P.L.		S.P.L.	S.P.L.
Illumin'n	E.		E.	E.
Star	δ Urs. Min 1 Aquilae 51 Ceph			
Mag.	4.5		4.5	+92° 5
δ	+86° 36'		-8° 20'	+92° 45'
Wire	a			
"	b			
"	c	18. 11 48.8	18 27 57.8	18 31 51.3
"	1	13 51.5	28 04.9	34. 21.9
"	2	14 50.9	08.3	35. 34.9
"	3	15 55.	12.3	36. 52.5
"	4	16 54.	15.8	38 06.8
"	5	17 54.	19.5	39. 21.
"	d	19 59.	27.	41. 56.2
"	e			
"	f			
Sum		13.2	25.6	04.6
Mean		18 15 53.3	18. 28. 12.23	18 36 52.09
Red'n to	Mid. Wire			
m		+08	+08	+08
n. tan. δ		-158	+01	+1.87
c. sec. δ		-65.	-024	+ 83
τ		-224	-02	+ 2.88
T		51.16	12.21	54.80
a		18 15 36.35	18 27 57.97	36 40.08
ΔT		9° - 14.88	14.34	14.79

From Obs. of δ Urs. Min & 51 Ceph.

$$n = -09$$

$$m = +08$$

The values of b & c are assumed to be unchanged

(a)



Date	Aug. 16.	Aug. 16.
Observer	S.P.L.	S.P.L.
Illumin'n	E.	E.
Star	$\delta$ Sagittarii	$\epsilon$ Aquilae
Mag.	2.3	3
$\delta$	$-26^{\circ}28'$	$+13^{\circ}40'$
Wire	a	
"	b	
"	c	18 45 59 18 59 17.4
"	1	46.06.9 24.9
"	2	11 28.6
"	3	15 32.3
"	4	19.1 36.
"	5	23.1 39.7
"	d	31.3 47.2
"	e	
"	f	
Sum	45.4	226.1
Mean	15 46 15.06	18 59 32.30
Red'n to		
m	+08	+08
n. tan. $\delta$	+05	-02
c. sec. $\delta$	-04.	-04
$\tau$	+09	+02
T	46 15 11	32.32
a	18 46 60.89	18 59 17.98
$\Delta T$	14.29	14.34

$$\Delta T \text{ at Sid.}^{\circ} 18.30 = -14.29$$

Seeing bad.

Stars flutter on the wires unusually. Results of this evening must be discarded in estimating wire intervals.

(Aug 18) It appeared by obs. of Aug. 17 that a very considerable change of level had taken place, since the  $14^{\circ}$  probably affecting obs. of Aug. 16. by  $\pm 5.10$ . The resulting value of  $\Delta T = 14.39$ ; and the entry in the clock record has been altered to this

Date	Aug. 17. 46.	Aug. 17	Aug. 17
Observer	S.P.L.	S.P.L.	S.P.L.
Illumin'n	W.	W.	W.
Star	$\epsilon$ Aquilae	$\alpha$ Aquilae	$\gamma$ Aquilae
Mag.			
$\delta$	$+13^{\circ}.40'$	$-7^{\circ}.19'$	$+10^{\circ}.18'$
Wire	a		
"	b		
"	c	18 59 17.9	19 29 44.38 19 39.56.4
"	1	25.3	51.5 40.04
"	2	29.	55.2 07.7
"	3	32.7	59. 11.
"	4	36.3	02.2 14.9
"	5	40.2	06.2 18.5
"	d	47.9	13.7 26.
"	e		
"	f		
Sum	229.3	52.1	138.5
Mean	18 59 32.76	19 29. 58.87	19 39 11.5
Red'n to	Mid. Wire		
m	+21	+21	+21
n. tan. $\delta$	-02	+01	-01
c'. sec. $\delta$	+04	+04	.00
$\tau$	+20	+22	+20
T	329.9	59.09	11.70
a	18 59 17.97	19 29. 44.13	19 39 56.46
$\Delta T$	14.98	14.96	15.24

$\Delta T$  at 19<sup>h</sup> sid. Time = 14.97. ( $\gamma$  Aquilae. rejected for discrepancy of mean time error)



Date *Aug. 18. 1904*Observer *S.P.H.*Illumin'n *W.*Star  *$\eta$  Serpentis.*Mag. *3* $\delta$   *$-2^{\circ} 56'$* 

Wire a

" b

" c

*18 14 26*

" 1

*33.4*

" 2

*37.1*

" 3

*40.7*

" 4

*44.2*

" 5

*47.9*

" d

*55.3*

" e

" f

Sum *284.6*Mean *18 14 40.66*

Red'n to

m *+21*n. tan.  $\delta$  *00*o. sec.  $\delta$  *00*r *+21*T *40.87*a *18 14 25.49* $\Delta T$  *15.38* $\Delta T$  at *8. h* Sid. Time =  *$-15^s.38$*

Date	Aug 20	Aug 20	Aug 20
Observer	G M S	G M S	G M S
Illumin'n	w	w	w
Star	$\alpha$ Lyrae	$\beta$ Lyrae	$\gamma$ Draconis
Mag.			
$\delta$	38 40	33 13	75 17
Wire	a		
"	b		
"	c		
"	1	18 32 32.7	18 45 18.0
"	2	37.5	22.4 18 50 45.3
"	3	42.4	26.6 51 0.0
"	4	46.7	30.9 14.2
"	5	52.0	35.2
"	d		
"	e		
"	f		
Sum	211.3	133.1	179.5
Mean	18 32 42.26	18 45 26.62	18 50 59.83
Red'n to			
m	+20	+20	+20
n. tan. $\delta$	-0.6	-0.5	-27
c. sec. $\delta$	-0.3	-0.2	-0.8
r	+11	+13	-15
T	18 32 42.37	18 45 26.75	18 50 59.68
a	18 32 26.65	18 45 10.65	18 50 42.61
$\Delta T$	-[15.72]	-16.10	-16.07

Assumed  $c = -0.02$ 

50 Draconis -16.14 +3.80

 $\gamma$  Draconis -16.04 +2.41reject. focus {  $\frac{1}{2}$   $\alpha$  Lyrae [-7.79] [+0.40]

had on wire. { -32.18 +6.21

 $\frac{1}{2}$   $\alpha$  Lyrae [-7.79] [+0.40] $\beta$  Lyrae -15.95 +0.66 $\delta$  Sag. -15.83 -0.35

-31.78 +0.31

$$n = \frac{-0.40}{5.90} = -0.07$$

Assumed  $b = +0.10$ 

$$\therefore m = +0.20$$



Date		Aug 20	Aug 20	Aug 20
Observer		G M S	G M S	G M S
Illumin'n		W	W	W
Star		$\zeta$ Aquilae	$\delta$ Sagittarii	$\delta$ Draconis
Mag.		13 40	- 19 11	67 26
Wire	a			
"	b			
"	c			
"	1	13 59 26.3*	19 9 59.3	19 12 31.5
"	2	30.1	10 3.0	40.5
"	3	33.8	7.0	50.2
"	4	~	10.5	59.5
"	5	41.43	14.6	13 9.2
"	d			
"	e			
"	f			
Sum			34.5	250.9
Mean			19 10 6.90	19 12 50.18
Red'n to				
m			+ 20	+ 20
n. tan. $\delta$			+ 02	- 15
c. sec. $\delta$			- 02	- 05
$\tau$			+ 20	00
T			19 10 7.10	19 12 50.18
a			19 9 51.05	19 12 34.09
$\Delta T$			- 16.05	- 16.09

$$\Delta T = -16^s.08 \text{ at } 19^h 0^m$$

\* Record confused by other breaks.

Date	Aug 21	Aug 21	Aug 21
Observer	G. M. S.	G. M. S.	G. M. S.
Illumin'n	w	w	w
Star	$\mu$ Herculis	$\psi$ Drac. fr.	$\gamma^2$ Sagittarii
Mag.			
$\delta$	+27 48	72 13	-30 25
Wire	a		
"	b		
"	c		
$\psi$ Drac. foll.			
15.3	17 41 23.4	17 44 13.9	17 57 23.5
27.2	27.3	25.3	27.6
39.2	31.6	37.3	31.8
50.5	35.6	49.1	36.0
3.0	39.8	45 1.3	40.1
Mean $\Delta\alpha$			
1.66			
"	d		
"	e		
"	f		
Sum	157.7	186.9	159.0
Mean	17 41 31.54	17 44 37.38	17 57 31.80
Red'n to m	+24	+24	+24
n. tan. $\delta$	-06	-34	+06
c. sec. $\delta$	00	00	00
r	+18	-10	+30
T	17 41 31.72	17 44 37.28	17 57 32.10
a	17 41 15.20	17 44 20.84	17 57 15.34
$\Delta T$	-16.52	-16.44	-16.59

Assumed  $c = 0.00$ 

$S$ Urs. Min	-18.22	+16.84	
$\psi$ Drac.	-16.54	+3.12	$n = \frac{-2.47}{28.21} = -0.11$
$\frac{1}{2} \mu$ Herc.	-8.17	+2.6	
	-42.93	+20.22	Assumed $b = +0.10$
$\frac{1}{2} \mu$ Herc.	-8.17	+2.6	$\therefore m = +0.24$
$\gamma^2$ Sag.	-16.29	-5.9	
22 Camel.	-16.00	-2.66	
	-40.46	-2.99	



Date	Aug 21			Aug 21			Aug 21		
Observer	G M S			G M S			G M S		
Illumin'n	w			w			w		
Star	22 Camelopardis			5 Urs. Min.					
Mag.									
$\delta$	110 38			86 36					
Wire	a								
"	b								
"	c								
"	1	18	4	22	18	13	50.2		
"	2	12.7		14		52.0			
"	3	22.9		15		52.5			
"	4	33.2		16		54.2			
"	5	43.0		17		54.9			
"	d								
"	e								
"	f								
Sum			114.0			263.8			
Mean	18	4	22.80	18	15	52.76			
Red'n to									
m			+24			+24			
n. tan. $\delta$			+29			-1.85			
c. sec. $\delta$			00			00			
$\tau$			+53			-1.61			
T	18	4	23.33	18	15	51.15			
a	6	4	6.80	18	15	34.54			
$\Delta T$			-16.53			-16.61			

$$\Delta T = -16.54 \text{ at } 18^h 0^m$$

Date	Aug 22	Aug 22	Aug 22
Observer	GMS	GMS	GMS
Illumin'n	w	w	w
Star	$\gamma$ Draconis	$\gamma^2$ Sagittarii	22 Camelopardalis
Mag.			
$\delta$	+ 51 30	- 30 25	170 38
Wire	a		
"	b		
"	c		
"	1	17 57 23.7	
"	2	18 4 2.3	18 4 2.3
"	3	42.7	27.8
"	4	48.3	32.0
"	5	54.1	36.2
"		54 0.2	40.4
"	d		
"	e		
"	f		
Sum	242.1	160.1	115.8
Mean	17 53 48.42	17 57 32.02	18 4 23.16
Red'n to			
m	+25	+25	+25
n. tan. $\delta$	-18	+08	+37
c. sec. $\delta$	00	00	00
$\tau$	+07	+33	+62
T	17 53 48.49	17 57 32.35	18 4 23.78
a	17 53 31.82	17 57 15.49	6 4 6.83
$\Delta T$	-16.67	-16.86	-16.96

Assumed  $c = 0.00$

$\delta$  Urs Min -19.21 +16.84  
 $\gamma$  Draconis -16.60 +1.26  
 $\gamma^2$  Sagittarii -16.53 -0.59  
 22 Camelopardalis -16.28 -2.66  
 -32.81 -3.25

$$n = \frac{-3.00}{21.35} = -0.14$$

Assumed  $b = +0.09$

$$\therefore m = +0.25$$



Date	Aug 22
Observer	G M S
Illumin'n	w
Star	S Mrs. Min.
Mag.	
$\delta$	86 36
Wire	a
"	b
"	c
"	1
"	2
"	3
"	4
"	5
"	d
"	e
"	f
Sum	266.8
Mean	18 15' 53.36
Red'n to	
m	+25
n. tan. $\delta$	-2.36
c. sec. $\delta$	00
r	-2.11
T	18 15' 51.25
a	18 15' 34.15
$\Delta T$	-17.10

$$\Delta T \text{ at } 18^h 0^m = -16.88$$

Date	Aug 24	Aug 24	Aug 24
Observer	G.M.S.	G.M.S.	G.M.S.
Illumin'n	E	E	E
Star	$\mu$ Herculis	$\psi$ Drac. fr.	$\gamma$ Drac.
Mag.			
$\delta$	+27 48	72 13	+51 30
Wire	a		
"	b		
"	c		
"	1	17 41 24.8	17 44 14.6
"	2	29.0	26.9
"	3	33.0	38.1
"	4	37.1	50.3
"	5	41.1	45 2.0
"	d		54 1.0
"	e		
"	f		
Sum	165.0	191.9	247.7
Mean	17 41 33.00	17 44 38.38	17 53 49.54
Red'n to			
m	+15	+15	+15
n. tan. $\delta$	-0.3	-19	-0.8
c. sec. $\delta$	+0.8	+2.3	+1.1
r	+2.0	+19	+18
T	17 41 33.20	17 44 38.57	17 53 49.72
a	17 41 15.14	17 44 20.62	17 53 31.76
$\Delta T$	-18.06	-17.95	-17.96

Assumed  $c_1 = +0.07$

$\psi$ Drac fr.	-17.99	+3.12	
$\gamma$ Drac.	-17.89	+1.26	$m = -0.47 = -0.06$
$\frac{1}{2} \mu$ Herc	-8.97	+0.26	7.63
	-44.85	+4.64	assumed $b = +0.08$
$\frac{1}{2} \mu$ Herc	-8.97	+0.26	$\therefore m = +0.15$
$\gamma$ Sagittarii	-17.89	-0.59	
22 Camelopard. L.C.	-17.52	-2.66	
	-44.38	-2.99	



Date	Aug 24			Aug 24		
Observer	S.M.S			S.M.S		
Illumin'n	E			E		
Star	$\gamma^2$ Sagittarii			22 Camelp. LC		
Mag.	-			-		
$\delta$	- 30 25'			110 38		
Wire	a					
"	b					
"	c					
"	1	17	57	24.9	18	4 4.1
"	2			29.2		14.7
"	3			33.1		24.8
"	4			37.5		35.0
"	5			41.6		45.1
"	d					
"	e					
"	f					
Sum			166.3			123.7
Mean		17 57	33.26	18 4		24.74
Red'n to						
m			+ 15'			+ 15'
n. tan. $\delta$			+ 04			+ 16
c. sec. $\delta$			+ 08			- 20
r			+ 27			+ 11
T		17 57	33.53	18 4		24.85
a		17 57	15.45	6 4		7.02
$\Delta T$			- 17.88			- 17.83

$$\Delta T \text{ at } 18^h = -17.98$$

Date		Aug 25	Aug 25	Aug 25
Observer		G.M.S	G.M.S	G.M.S
Illumin'n		E	E	E
Star		$\gamma$ Aquilae	$\alpha$ Aquilae	$\beta$ Aquilae
Mag.				
$\delta$		+ 10 17	+ 8 31	+ 6 4
Wire	a			
"	b			
"	c			
"	1	19 40 7.4	19 44 28.9	19 48 58.2
"	2	11.2	32.5	49 1.9
"	3	14.8	36.2	5.4
"	4	18.6	40.0	9.2
"	5	22.2	43.6	12.8
"	d			
"	e			
"	f			
Sum		74.2	131.2	27.5
Mean		19 40 14.84	19 44 36.24	19 49 5.50
Red'n to				
m		+ 15	+ 15	+ 15
n. tan. $\delta$		- 01	- 01	- 01
c. sec. $\delta$		+ 07	+ 07	+ 07
r		+ 21	+ 21	+ 21
T		19 40 15.05	19 44 36.45	19 49 5.71
a		19 39 56.41	19 44 17.82	19 48 46.98
$\Delta T$		- 18.64	- 18.63	- 18.73

Assumed  $n = -0.06$   
 "  $c_1 = +0.07$  } as Aug 24  
 "  $b = +0.08$

$\Delta T$  at  $19^h 45^m = -18.67$



Date	Aug 27. 66		Aug. 27.	Aug. 27.	
Observer	S.R.L.		S.R.L.	S.R.L.	
Illumin'n	E.		E.	E.	
Star	$\epsilon$ Aquilae		$\alpha$ Sagittarii	$\delta$ Draconis	
Mag.	+ 13.40		- 19.11	+ 67.25'	
$\delta$					
Wire	a				
"	b				
"	c	18 59 22.4	19 09 54.9		
"	1	29.9	10 02.8	19 12 34.4	
"	2	33.8	06.4	44.	
"	3	37.4	10.1	53.4	
"	4	41.	14.1	13 02.9	
"	5	44.8	18.	12.1	
"		52.2	25.8		
"	d				
"	e				
"	f				
Sum		261.5	(10.1/2) 12.1	26.8	
Mean		18 59 37.36	19 10 10.30	19 12 53.37	
Red'n to					
m		+ 10	+ 10	.10	
n. tan. $\delta$		- 02	+ 04	- 27	
c. sec. $\delta$		.00	00	00	
$r$		+ 08	14	- 17	
T		37.44	10 44	53.20	
a		18 59 17.85	19 09 50.98	19 12 33.80	
$\Delta T$		19.59	19.46	19.40	

$$m = .10$$

$$n = -11$$

$$c' = 00$$

$$b = +04$$

Date	Aug 27. 66.		Aug. 27.	
Observer	S.R.L.		S.R.L.	
Illumin'n	E		E	
Star	Polaris VII. 67		x Aquilae	
Mag.				
$\delta$	168°.44. 111°.16		- 7.19	
Wire	a			
"	b			
"	c	19 16. 35.2	19 29 48.9	
"	1	55.	56.1	
"	2	17. 04.7	59.9	
"	3	15.1	30 03.6	
"	4	24.8	07.2	
"	5	35.	10.9	
"	d	55.2	18.1	
"	e			
"	f			
Sum		45.	204.7	
Mean	19 17	15.00	19 30. 03.53	
Red'n to				
m		+10	+10	
n. tan. $\delta$		+29	+02	
c. sec. $\delta$		00	.00	
r		39	12	
T		15.39	03.65	
a	7 16	55.97	19 29 44.06	
$\Delta T$		19.42	19.59	

Assumed.  $c' = .00$   
 $b = +04$   
 $n = -11$

$$\Delta T \text{ al. } 19^h 15 = - 19.56$$



Date	Aug. 28. / 46	Aug. 28.	Aug. 28.
Observer	S.R.H.	S.R.H.	S.R.H.
Illumin'n	E.	E.	E.
Star	$\beta$ Lyrae.	$\epsilon$ Aquilae	$\delta$ Sagitt.
Mag.			
$\delta$	$+33^{\circ} 13'$	$+18^{\circ} 59'$	$-19^{\circ} 11'$
Wire	a		
"	b		
"	c	18 45 13	18 59 22.7 19 09. 55.1
"	1	21.5	30.1. 10. 02.9.
"	2	26.	34. 06.9.
"	3	30.4	37.6. 10.7.
"	4	34.4	41.2. 14.6.
"	5	39.	45. 18.2.
"	d	47.6	52.6. 26.
"	e		
"	f		
Sum	211.9.	263.2.	14.4.
Mean	18 45 30.27	18 59 37.6.	19 10. 10.63
Red'n to			
m	+10.	+10	+10.
n. tan. $\delta$	-07.	-03	+04
c. sec. $\delta$	.00	.00	.00
$\tau$	+3	+07	+14
T	30.30	37.67	10.77
a	18 45 10.57	18 59 17.84	19 09 50.97
$\Delta T$	19.79	19.83	19.80

$$\Delta T \text{ at } 19^{\circ} = -19.81^{\circ}$$

Date	Aug 30			Aug 30			Sept 1		
Observer	SPL			SPL			GMS		
Illumin'n	E			E			E		
Star	$\delta$ Aquilae			$\kappa$ Aquilae			$\delta$ Cephei L.C.		
Mag.	+ 2.51			- 7.19					
$\delta$									
Wire	a								
"	b								
"	c								
"	1	19	19	0.8	19	29	57.2		
"	2			4.3		30	1.0		7.8
"	3			8.0			4.7	18	37 <del>7.8</del>
"	4			11.7			8.2		
"	5			15.0			11.7		
"	d								
"	e								
"	f								
Sum				39.8			22.8		
Mean		19	19	7.96	19	30	4.56		
Red'n to									
m				+ 0.15			+ 15		+ 22
n. tan. $\delta$				- 01			+ 02		+ 1.25
c. sec. $\delta$				00			00		00
r				+ 14			+ 17		+ 1.47
T		19	19	8.10	19	30	4.73	6 36	46.72
a		19	18	47.49	19	29	44.03	18 37	9.27
$\Delta T$				- 20.61			- 20.70	6 36	46.72
									- 22.55

Assumed  $c' = 0.00$   
 $b = +0.04$   
 $n = -0.11$

$\Delta T$  at  $19^h 30^m$  = - 20.66  
 Aug 30.



Date	Sept 1	Sept 1	Sept 1
Observer	G M S	G M S	G M S
Illumin'n	E	E	E
Star	$\beta$ Lyrae	$\sigma$ Sagittarii	$\delta$ Draconis
Mag.			
$\delta$			
Wire	a		
"	b		
"	c		
"	1	18 45 23.4	18 47 13.9
"	2	27.7	18.0
"	3	32.0	22.0
"	4	36.3	26.0
"	5	40.5	30.1
"	d		
"	e		
"	f		
Sum	159.9	110.0	24.8
Mean	18 45 31.98	18 47 22.00	18 51 4.96
Red'n to			
m	+22	+22	+22
n. tan. $\delta$	-04	+03	-23
c. sec. $\delta$	00	00	00
r	+18	+25	-01
T	18 45 32.16	18 47 22.25	18 51 4.95
a	18 45 10.44	18 47 0.69	18 50 42.70
$\Delta T$	-21.72	-21.56	-22.25

Assumed  $c' = 0.00$

$\delta$ Draconis	-22.26	+3.80	$n = -\frac{1.41}{25.78} = -0.06$
$\beta$ Lyrae	-21.54	+0.66	
	-43.80	+4.46	
$\sigma$ Sagittarii	-21.31	-0.50	Assumed $b = +0.12$
$\delta$ Cephei	-21.08	-20.82	$\therefore m = +0.22$
	-42.39	-21.32	

Sept 1.  $\Delta T$  at 18<sup>h</sup> 45<sup>m</sup> = -21.51 (rejecting  $\delta$  Cephei.)

Date	Sept 2			Sept 2			Sept 2			
Observer	G M S			G M S			G M S			
Illumin'n	E			E			E			
Star	$\delta$ Urs Min			1 Aquilae			$\alpha$ Lyrae			
Mag.	86 36			- 8 20			38 39			
$\delta$										
Wire	a									
"	b									
"	c									
"	1	18	13	52.1	18	28	12.3	18	32	39.1
"	2		14	52.9			16.0			43.7
"	3		15	53.3			19.6			48.3
"	4		16	55.1			23.3			53.0
"	5		17	55.7			26.7			57.4
"	d									
"	e									
"	f									
Sum	269.1			97.9			241.5			
Mean	18	15	53.82	18	28	19.58	18	32	48.30	
Red'n to										
m	+28			+28			+28			
n. tan. $\delta$	-2.02			+0.2			-1.0			
c. sec. $\delta$	00			00			00			
$\tau$	-1.74			+30			+18			
T	18	15	52.08	18	28	19.88	18	32	48.48	
a	18	15	30.08	18	27	57.76	18	32	26.40	
$\Delta T$	-22.00			-22.12			-22.08			



Date	Sept 2	Sept 2	Sept 2
Observer	G M S	G M S	G M S
Illumin'n	E	E	E
Star	$\beta$ Lyrae	$\sigma$ Sagittarii	50 Draconis
Mag.			
$\delta$	33 12	-26 28	75 16
Wire a			
" b			
" c			
" 1	18 45 23.5	18 47 14.4	18 50 36.3
" 2	28.0	18.4	50.8
" 3	32.2	22.3	51 4.8
" 4	36.7	26.3	19.3
" 5	40.7	30.4	33.5
" d			
" e			
" f			
Sum	161.1	111.8	24.7
Mean	18 45 32.22	18 47 22.36	18 51 4.94
Red'n to			
m	+28	+28	+28
n. tan. $\delta$	-08	+06	-46
c. sec. $\delta$	00	00	00
r	+20	+34	-18
T	18 45 32.42	18 47 22.70	18 51 4.76
a	18 45 10.42	18 47 0.68	18 50 42.62
$\Delta T$	-22.00	-22.02	-22.14

Assumed  $c' = 0.00$ 

$\delta$ Urs Min	-23.74	+16.84
50 Draconis	-22.32	+3.80
$\alpha$ Lyrae	-21.90	+1.80
	-67.96	+21.44
$\beta$ Lyrae	-21.80	+1.66
1 Aquilae	-21.82	-15
$\sigma$ Sagittarii	-21.68	-50
	-65.30	+01

$$m = \frac{-2.66}{21.43} = -0.12$$

Assumed  $b = +0.13$ 

$$\therefore m = +0.28$$

$$\Delta T \text{ at } 18^h 30^m = 3.06$$

$$= -22^s.06$$

Date \_\_\_\_\_

Observer

Illumin'n

Star

Mag.

४

Wire a

" b

" c

“ 1

2

3

4

5

" d

" e

64	f
----	---

Sum

Mean

Red'n to

m

 $n \cdot \tan. \delta$ c. sec.  $\delta$ 

7

T

a

 $\Delta T$



















