KG
11365
333

02

H. C. O.

East Transit.

1866 Sept. 4

to

1867 May 24

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Time Book.

Sept. 4 1866

to

May 24 1867

with some observations
for errors of declination circles
as late as Nov. 1868

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Date		Sept.r 4th 1866.	Sept.r 4	Sept.r 4
Observer		S.P. Langley.	S.P.L.	S.P.L.
Illumin'n		East.	E.	E
Star		ε Aquilae.	π Capricorni	ε Delphini
Mag.		6.5	5	4
δ		+ 6° 54′	− 18° 39′	+ 10° 51
Wire	a			
"	b			
"	c	19 57 46.1	20 19 49	20 26 59.2
"	1	53.6	56.8	27 06.9
"	2	57.4	20 00.6	10.5
"	3	58.7	04.2	14.
"	4	04.5	08.2	17.6
"	5	08.	12.	21.3
"	d	15.4	19.5	28.8
"	e			
"	f			
Sum		05.7	30.3	38.3
Mean		19 58 00.81	20 20 04.33	20 27 14.04
Red'n to		mean wire		
m		+ 28	+ 28	+ 28
n. tan. δ		− 01	+ 04	− 02
c. sec. δ		00	.00	.00
r		+ 27	+ 32	+ 26
T		19 58 01.08	20 20 04.65	20 27 14.30
a		19 57 38.76.	20 19 42.32	20 26 51.81
Δ T		− 22.32	− 22.33	− 22.49

Δ T at Sid.b 20h = − 22s.38

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Date		Sept.r 6^d/64.			Sept.r 6			Sept.r 6			
Observer		S.K.L.			S.K.L.			S.K.L.			
Illumin'n		W			W			W			
Star		α Ophiuchi			γ Draconis			γ^2 Sagittarii			
Mag.											
δ		+12°.40			+51°.30′			-30.25			
Wire	a										
"	b										
"	c	17	28	53.8	17	53	31.6	17	57	21.8	
"	1		29	01.2			43.3			30.1	
"	2			04.8			48.9			34.4	
"	3			08.5			54.8			38.5	
"	4			12.2		54	01.7			42.7	
"	5			15.9			06.5			47.	
"	d			23.3			18.2			55.3	
"	e										
"	f										
Sum				59.7			25.			269.8	
Mean		17	29	08.53	17	53	55.	17	57	38.54	
Red'n to		mean									
m				+30			+30			+30	
n.tan.δ				-04			-21			+10	
c.sec.δ				-09			-14			-10	
r				+17			-05			+30	
T		17	29	08.70	17	53	54.95	17	57	38.84	
a		17.	28	45.04	17	53	31.31	17	57	15.21	
Δ T				-23^s.66			-23^s.64			-23^s.63	

Δ T at Sid. 18^h = -23^s.65

b = +.10
c′ = -.09
m = -.17 (from γ Draco. & γ^2 Sagitt.)

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Date			Sept 8			Sept 8			Sept 8			
Observer			G M Searle			G M S			G M S			
Illumin'n			W			W			W			
Star			λ Urs. Min.			α² Capricorni			κ Cephei			
Mag.												
δ			88	55		−12	57		77	18		
Wire	a											
"	b											
"	c											
"	1	19	52	44·9	20	10	57·3	20	13	17·7		
"	2		56	1·2		11	0·6			34·3		
"	3		59	12·6			4·6			50·3		
"	4	20	2	19·4			8·5		14	6·7		
"	5		5	33·4			12·2			23·2		
"	d											
"	e											
"	f											
Sum				51·5			23·5			252·2		
Mean		19	59	10·30	20	11	4·70	20	13	50·44		
Red'n to												
m				+ 50			+50			+ 50		
n. tan. δ				− 9·90			+04			− 84		
c. sec. δ				− 4·69			−09			− 40		
r				−14·09			+ ·45			− 75		
T		19	58	56·21	20	11	5·15	20	13	49·69		
										25·02		
a		19	58	30·28	20	10	40·31	20	13	~~26·76~~		
Δ T				−25·93			−24·84			−24·67		
			weight of	1		weight of	8		weight of	5		

c′ = −·09

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Date		Sept 8		
Observer		9 M S		
Illumin'n		W		
Star		e Delphini		
Mag.				
δ		+10 51		
Wire	a			
"	b			
"	c			
			8·8	
"	1	20 27	12·6	
"	2		16·2	
"	3		20·0	
"	4		23·5	
"	5			
"	d			
"	e			
"	f			
Sum			81·1	
Mean		20 27	16·22	
Red'n to				
m			+50	
n . tan. δ			−04	
c . sec. δ			−09	
r			+37	
T		20 27	16·59	
a		20 26	51·76	
Δ T			−24·83	
weight of 10				

$c' = -.09$
$n = -.19$
$b = +25$
$\therefore m = +.50$

Worked up by least squares, with weights as given above.

$\Delta T = -24.85$ at $20^h\ 15^m$

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Date		Sept 9	Sept 9
Observer		G M S	G M S
Illumin'n		W	W
Star		32 Camelop (fdl) 2 C	ε Piscium
Mag.			
δ		95 51	+7 10
Wire	a		
"	b		
"	c		
"	1	0 47 6·1	0 56 20·4
"	2	40·9	24·3
"	3	48 16·7	28·1
"	4	52·6	31·7
"	5	49 27·9	35·4
"	d		
"	e		
"	f		
Sum		84·2	139·9
Mean		0 48 16·84	0 56 27·98
Red'n to			
m		+41	+41
n . tan. δ		+1·47	−02
c . sec. δ		+88	−09
r		+2·76	+30
T		0 48 19·60	0 56 28·28
a		12 47 54·21	0 55 2·93
Δ T		−25·39	−25·35

$c' = -\cdot09$
$n = -\cdot15$
$b = +\cdot20$
$\therefore m = +\cdot41$

ΔT at $0^h 45^m = -25\cdot37$

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Date		Sept. 10. 766			Sep. 10			Sep. 10				
Observer		S.P.L.			S.P.L.			S.P.L.				
Illumin'n		W.			W.			W.				
Star		δ Ursa Min.			1 Aquilae			51 Cephei				
Mag.												
δ		+ 86°. 36′			− 8°. 20′			+ 92°. 45′				
Wire	a											
"	b											
"	c	18	11	53.7	18	28	08.6	18	32	11.9		
"	1		13	53.7			15.9		34	44		
"	2		14	54.9			19.7		35	57.5		
"	3		15	56.2			23.2		37	12.2		
"	4		16	58.			26.8		38	27.2		
"	5		17	58.			30.6		39	44.3		
"	d		20	02.5			37.9		42	13.5		
"	e											
"	f											
Sum		18	15	56.7	18	28	23.24	18	37	12.94		
Mean												
Red'n to												
m				+16			+16			+ .16		
n. tan. δ				−2.52			+02			+ 3.12		
c. sec. δ				− 1.34			− 08			+ 1.66		
r				− 3.70			+10			+ 4.94		
T		18	15	53.00	18	28	23.34		37.	17	88	
a		18	15	26.80	18	24	39.63	6	36	51.57		
Δ T				26.20			25.71			26.36		

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Date		Sept. 10. 66			Sept. 10			
Observer		S.P.L.			S.P.L.			
Illumin'n		W.			W.			
Star		β Lyrae.			δ Aquilae.			
Mag.								
δ		+ 33. 12			+ 2. 51.			
Wire	a							
"	b							
"	c	18	45	18.7	19	18	58.4	
"	1			27		19	05.3	
"	2			31.3			09	
"	3			35.8			12.9	
"	4			40			16.4	
"	5			44.4			20.	
"	d			53.			27.4	
"	e							
"	f							
Sum				250.2.			29.4.	
Mean		18	45	35.74.	19	19	12.77.	
Red'n to								
m				+ 16			+ 16	
n. tan. δ				− .10			.00	
c′ sec. δ				− 09			− 08	
r				+ 07			+ 08	
T		18	45	35.81	19	19	12.85	
a		18	45	10.25.	19	18	47.34.	
Δ T				25.56			25.51	

Δ J at Sid. t 18h = −25.s59

m = + 16
n = − 15 from δ Ursae min. + 51 Cephei
c′ = + 08 22. W.
b = + 02.

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Date		Sep. 12./66			Sep. 12.			Sep. 12.		
Observer		S.K.			S.K.			S.K.		
Illumin'n		E			E			E		
Star		γ Draco.			γ² Sagitt.			μ' Sagitt.		
Mag.		2.3			3.4			4		
δ		+51.°30			−30.°25			−21.03		
Wire	a									
"	b									
"	c	17	53	34.	17	57	24.2	18	05	58.4
"	1			45.8			32.7		06.	06.2
"	2			51.6			37.			10.1
"	3			57.5			41.1			14.
"	4		54	03.2			45.3			17.8
"	5			09			49.4			21.6
"	d			20.8			58.			29.5
"	e									
"	f									
Sum		17	53	41.7			287.7			37.6
Mean		17	53	57.39	17	57	41.10	18	06	13.94
Red'n to										
m				+16			+16			+16.
n. tan. δ				−18			+09			+06.
c'. sec. δ				+06			+05			+04
r				+04			+30			+26
T		17	53	57.43	17.	57	41.40	18.	06	14.20
a		17	53	30.14	17	57	15.12	18	05	47.88
Δ T				−26.29			−26.28			−26.32

c' = +.04 2ll.E.

Δ T @ Sid. 18.h = −26.s30

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Date		Sep. 13/66			Sep. 13.			Sep. 13.			
Observer		S.P.L.			S.P.L.			S.P.L.			
Illumin'n		E			E.			E.			
Star		ε Aquilae			δ Sagitt.			δ Draco.			
Mag.		3			5			3			
δ		+13°.40′			−19°.11′			+67.25.			
Wire	a										
"	b										
"	c	18	59	29.3	19	10	02.	19	12	22.4	
"	1			36.8			09.8			40.7	
"	2			40.6			13.5			50.8.	
"	3			44.4			17.2			59.8.	
"	4			48.			21.1.		13	09.1.	
"	5			51.7			25.			18.7	
"	d			59.2			32.7			37.9	
"	e										
"	f										
Sum											
Mean		18	59	44.29	19	10	17.33	19	12	59.85	
Red'n to											
m				+32			+32			+32	
n. tan. δ				−05			+07			−48	
c. sec. δ				+04			+04			+10	
r				+31			+43			−06	
T		18	59	44.60	19	10	17.76	19	12	59.79	
a		18	59	17.60	19	09	50.74	19	12	32.99	
Δ T				−27.00			−27.02			−26.80	

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Date		Sep. 13./66			Sep. 13./66.			
Observer		SPL			SPL.			
Illumin'n		E.			E			
Star		Piazzi 7. 67.			δ Aquilae			
Mag.		6			3.4			
δ		+111°.16′			+2°.57′			
Wire	a							
"	b							
"	c	19	16	42.9				
"	1		17	03.1				
"	2			13.7	19	19	10.7	
"	3			23.			14.1	
"	4			32.9			17.8	
"	5			43.				
"	d		18	03.2				
"	e							
"	f							
Sum				41.8			42.6	
Mean		19	17	23.11	19	19	14.2	
Red'n to								
m				+32			+32	
n . tan. δ				+57			−01	
c . sec. δ				−11			+04	
r				+72			+.35	
T		19	17	23.83	19	19	14.55	
a		7	16	57.05	19	18	47.30	
Δ T				−26.78			−27.25	

ξ Aquilae. −27.00 (wt 2) −54.00
δ Sagittarii −27.02 (wt. 2) −54.04 } ∴ Δ J @ Sid. $^{l}19^{k}$ = $-27.^{s}06$
δ aquilae. −27.25 (wt. 1) −27.25

$m' = +.^{s}32$
$n' = -.^{s}20$ } from δ Draco. T. Piazzi. VII. 67.
$c' = +.^{s}04$
$b = +.^{s}10$

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Date		Sep. 15/66	Sep. 15	Sep. 15
Observer		S.R.L.	S.R.L.	S.R.L.
Illumin'n		E.	E.	E.
Star		γ Aquilae	ζ Aquilae	β Aquilae
Mag.				
δ		+10°.17′	+8°.31	+6.04
Wire	a			
"	b			
"	c	19 40 09.3	19 44 30.8	19 49 00
"	1	16.7	38.1	07.2
"	2	19.7	41.9	10.7
"	3	24.2	45.6	14.6
"	4	28.	49.2	18.2
"	5	31.5	52.9	21.9
"	d	38.7	45 00.1	29.1
"	e			
"	f			
Sum		168.1	18.6	101.7
Mean		19 40 24.01	19 44 45.57	19 49 14.53
Red'n to				
m		+32	+32	+32
n. tan. δ		−04	−04	−04
c. sec. δ		+04	+04	+04
r		+32	+32	+32
T		19 40 24.33	19 44 45.83	19 49 14.85
a		19 39 56.07	19 44 17.52	19 48 46.67
Δ T		−28.26	−28.31	−28.18

Δ T @ 19.45 −28°.25

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Date		Sept 16			Sept 16			Sept 17			
Observer		G M S			G M S			G M S			
Illumin'n		E			E			E			
Star		β Lyrae			σ Sagittarii			32 Camel. (foll)			
Mag.								L.C.			
δ		+ 33	12		− 26	28		95	51		
Wire	a										
"	b										
"	c										
"	1	18	45	29·8	18	47	20·4	0	47	10·3	
"	2			34·2			24·7			45·4	
"	3			38·5			28·6		48	21·1	
"	4			42·8			32·7			55·8	
"	5			47·1			36·8		49	32·0	
"	d										
"	e										
"	f										
Sum				192·4			143·2			104·6	
Mean		18	45	38·48	18	47	28·64	0	48	20·92	
Red'n to											
m				+ 17			+ 17			+ 24	
n. tan. δ				− 10			+ 07			+ 1·56	
c. sec. δ				+ 05			+ 04			− 39	
τ				+ 12			+ 28			+ 1·41	
T		18	45	38·60	18	47	28·92	0	48	22·33	
a		18	45	10·11	18	47	0·43	12	47	53·60	
Δ T				− 28·49			− 28·49			− 28·73	

τ' = + 04
n = − 15
b = + 02
m = + 17

Δ T at $18^h\ 45^m = -28^s\cdot49$

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Date		Sept 17	Sept 17	Sept 17
Observer		G M S	G M S	G M S
Illumin'n		E	E	E
Star		ε Piscium	θ' Ceti	A Cassiop.
Mag.				
δ		+ 7 10	− 8 53	69 34
Wire	a			
"	b			
"	c			
"	1	0 56 24·4	1 17 44·1	1 21 35·1
"	2	28·2	48·0	45·6
"	3	31·8	51·5	55·3
"	4	35·4	55·3	22 5·8
"	5	39·1	59·0	16·4
"	d			
"	e			
"	f			
Sum		158.9	257.9	278·2
Mean		0 56 31·78	1 17 51·58	1 21 55·64
Red'n to				
m		+ 24	+ 24	+ 24
n. tan. δ		− 02	+ 03	− 43
c. sec. δ		+ 04	+ 04	+ 11
r		+ 26	+ 31	− 08
T		0 56 32·04	1 17 51·89	1 21 55·56
a		0 56 3·03	1 17 22·81	1 21 26·15
Δ T		− 29·01	− 29·08	− 29·41

$c' = +0.04$ $b = +0.07$

	e	w	ε	tan δ	w tan δ	wε tan δ	w tan² δ
32 Camel.	−26·93	4	+1·52	−9·73	−38·92	−59·14	378·6
ε Piscium	−28·79	6	−0·34	+ ·13	+ ·78	− 26	·1
θ' Ceti	−28·81	8	−0·36	− ·16	−1·28	+ 46	·2
A Cassiop.	−29·60	1	−1·15	+2·69	+2·69	− 3·09	7·2
					−36·73	−62·03	386·1

$e_0 = \frac{\Sigma(we)}{\Sigma w} = -28.45$

$e = \alpha - (\text{Mean} + c \sec\delta)$

$n = \frac{\Sigma(w\varepsilon \tan\delta)}{\Sigma(w \tan^2\delta)} = -0.16$ $\quad m = +0.24$

$\Delta T = e_0 - m - \frac{\Sigma(w \tan\delta)}{\Sigma w} n = -29.00$ at $1^h\,0^m$

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Date		Sept 22	Sept 22	Sept 22
Observer		G M S	G M S	G M S
Illumin'n		w	w	w
Star		γ Aquilae	α Aquilae	ε Draconis
Mag.				
δ		+10 18	+8 31	69 56
Wire	a			
"	b			
"	c			
"	1	19 40 20·0	19 44 41·3	19 48 49·5
"	2	23·7	45·1	59·7
"	3	27·3	48·7	49 10·3
"	4	30·8	52·2	20·7
"	5	34·7	56·0	31·6
"	d			
"	e			
"	f			
Sum		136·5	243·3	51·8
Mean		19 40 27·30	19 44 48·66	19 49 10·36
Red'n to				
m		+13	+13	+13
n. tan. δ		−02	−02	−27
c. sec. δ		−0·07	−0·07	−20
r		+04	+04	−34
T		19 40 27·34	19 44 48·70	19 49 10·02
a		19 39 56·02	19 44 17·44	19 48 38·92
Δ T		−31·32	−31·26	−31·10

$c' = -0.07$ $b = +0.03$ $m = +.13$

	e	w	ε	tan δ	w tan δ	w ε tan δ	w tan² δ
γ Aquilae	−31·21	5	−·14	+·18	+·90	−·13	·16
α Aquilae	−31·15	8	−·08	+·15	+1·20	−10	·18
ε Draconis	−31·24	4	−17	+2·74	+10·96	−1·86	30·04
τ Aquilae	−31·06	5	+01	+·12	+60	+01	·07
3 Urs. Maj.	−30·71	4	+36	−2·59	−10·36	−3·73	26·83
α² Capricorni	−30·96	4	+11	−·23	−92	−10	09
		30			+2·38	−5·91	57·37

$e_o = -31.07$

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1866phae.proj.:334L

Date		Sept 22			Sept 22			Sept 22			
Observer		G M S			G M S			G M S			
Illumin'n		w			w			w			
Star		τ Aquilae			3 Urs. Maj.			α² Capricorni			
Mag.					2 C.						
δ		+6	54		111	9		−12	57		
Wire	a										
"	b										
"	c										
"	1	19	58	2·4	19	59	39·2	20	11	3·8	
"	2			5·8			49·1			7·4	
"	3			9·7			58·8			11·3	
"	4			13·3	20	0	8·5			14·7	
"	5			17·0			18·7			18·6	
"	d										
"	e										
"	f										
Sum				48·2			294·3			55·8	
Mean		19	58	9·64	19	59	58·86	20	11	11·16	
Red'n to											
m				+13			+13			+13	
n . tan. δ				−01			+26			+02	
c . sec. δ				−07			+19			−07	
r				+05			+58			+08	
T		19	58	9·69	19	59	59·44	20	11	11·24	
a		19	57	38·51	7	59	28·34	20	10	40·13	
Δ T				−31·18			−31·10			−31·11	

$n = -\cdot 103$ $\quad -31\cdot 19$

$\Delta T = -31\cdot 07 - \cdot 13 + \cdot 08\ n = -31\cdot 21$ at 20^h

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Date		Sept 23		Sept 23		Sept 27	
Observer		G M S		G M S		G M S	
Illumin'n		W		W		W	
Star		τ Aquilae		α^2 Capricorni		κ Aquilae	
Mag.							
δ		+6 55		−12 57		−7 19	
Wire	a						
"	b						
"	c						
"	1	19 58 3·0		20 11 5·0 / 8 4		19 30 10·2	
"	2	6·5		12·0		13·8	
"	3	10·3		15·7		17·5	
"	4	14·1		19·5		21·0	
"	5	17·7				24·7	
"	d						
"	e						
"	f						
Sum		51·6		60·6		87·2	
Mean		19 58 10·32		20 11 12·12		19 30 17·44	
Red'n to							
m		+13		+13		+31	
n . tan. δ		−01		+02		00	
c . sec. δ		−07		−07		−07	
r		+05		+08		+23	
T		19 58 10·37		20 11 12·20		19 30 17·67	
a		19 57 38·50		20 10 40·11		19 29 43·62	
Δ T		−31·87		−32·09		−34·05	

Same instrumental corrections as for last night.

ΔT at 20^h = −31·98

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Date			Sept 27			Sept 27			Sept 27		
Observer			G M S			G M S			G M S		
Illumin'n			W			W			W		
Star			γ Aquilae			α Aquilae			ε Draconis		
Mag.											
δ			+10	17		+8	31		69	56	
Wire	a										
"	b										
"	c										
"	1	19	40	22·4	19	44	43·9	19	49	51·3 ~~33·5~~	
"	2			26·0			47·4		50	1·7	
"	3			29·8			51·1			12·4	
"	4			33·3			54·7			22·9	
"	5			37·1			58·3			33·5	
"	d										
"	e										
"	f										
Sum				148·6			255·4			61·8	
Mean		19	40	29·72	19	44	51·08	19	50	12·36	
Red'n to											
m				+31			+31			+31	
n . tan. δ				+01			+01			+11	
c . sec. δ				−07			−07			−20	
r				+25			+25			+22	
T		19	40	29·97	19	44	51·33	19	50	12·58	
a		19	39	55·94	19	44	17·36	19	48	38·61	
Δ T				−34·03			−33·97			−33·97	

	e	w	ε	tan δ	ε tan δ	tan² δ	
κ Aquilae	−33·75		−09	−13	+01	02	n = +·04
γ Aquilae	−33·71	equal	−05	+18	−01	03	b = +·26
α Aquilae	−33·65		+01	+15	00	02	m = +·31
ε Draconis	−33·55		+11	+2·74	+30	7·51	
	e_o = −33·66	4		+2·94	+30	7·58	

ΔT = −33·66 −·31 ~~+~~ 0·74 n = ~~−33·97~~ −34·00 at 19h 45m

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Date		Sept 28	Sept 28	Sept 28
Observer		G M S	G M S	G M S
Illumin'n		w	w	w
Star		γ Draconis	γ² Sagittarii	η Serpentis
Mag.				
δ		51 30	− 30 25	− 2 56
Wire	a			
"	b			
"	c			
"	1	17 53 53·0	17 57 40·5	18 14 51·8
"	2	58·8	45·8	55·5
"	3	54 4·7	49·0	59·0
"	4	10·4	53·0	15 2·7
"	5	16·1	57·3	6·3
"	d			
"	e			
"	f			
Sum		23·0	244·7	295·3
Mean		17 54 4·60	17 57 48·94	18 14 59·06
Red'n to				
m		+ 20	+ 20	+ 20
n . tan. δ		+ 15	− 07	− 01
c . sec. δ		− 09	− 08	− 07
r		+ 24	+ 05	+ 12
T		17 54 4·84	17 57 48·99	18 14 59·18
a		17 53 30·59	17 57 14·78	18 14 24·82
Δ T		− 34·25	− 34·21	− 34·36

e	w	ε	tan δ	ε tan δ	tan² δ	
− 33·90		+ 15	+ 1·26	+ 19	1·59	n = + ·12
− 34·08	equal	− 03	− 59	+ 02	35	b = + ·23
− 34·17		− 12	− 05	+ 01	00	m = + 20
			+ ·62	+ ·22	1·94	

$e_0 = -34·05$

$\Delta T = -34·05 - 20 - ·21\,n = -34·27$ at $18^h\,0^m$

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1866phae.proj. .334L

Date		Sept 30			Sept 30			Sept 30			
Observer		G M S			G M S			G M S			
Illumin'n		w			w			w			
Star		β Draconis			ψ' Draconis pr.			γ Draconis.			
Mag.											
δ		52	24					51	31		
Wire	a										
"	b										
"	c										
"	1	17	27	48·0	17	44	29·6	17	53	53·8 / 59·7	
"	2			54·1			41·2		54	5·5	
"	3			59·7			53·2			11·3	
"	4		28	5·7		45	4·6			17·4	
"	5			11·8			16·5				
"	d										
"	e										
"	f										
Sum				299·3			265·1			27·7	
Mean		17	27	59·86	17	44	53·02	17	54	5·54	
* Red'n to											
b sec φ = m				+ 42			+ 42			+ 42	
n(tan δ − tan φ) n. tan. δ				+ 01			+ 03			00	
c. sec. δ				− 11			− 23			− 11	
r				+ 32			+ 22			+ 31	
T		17	28	0·18	17	44	53·24	17	54	5·85	
a		17	27	24·63	17	44	17·83	17	53	30·52	
Δ T				− 35·55			− 35·41			− 35·33	

* Hansen's formula used hereafter, as indicated here.

b sec φ = ·09 of the level reading in divisions.

$e = \alpha - (T + b\sec\varphi + \frac{c}{\varepsilon}\sec\delta)(\tan\delta - \tan\varphi)$

−35·54	−12	+39	−05	15	$n = +^{s}014$
−35·38	+04	+2·21	+09	4·88	
−35·33	+09	+35	+03	12	
		2·95	+07	5·15	

$e_0 = -35·42$

$\Delta T = -35·42 \overline{+0·98}\ n = -35·43$ at $17^{h}45^{m}$

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Date		Oct 1			Oct 1			
Observer		G M S			G M S			
Illumin'n		W			W			
Star		γ Draconis			η Serpentis			
Mag.								
δ								
Wire	a							
"	b							
"	c							
"	1	17	53	54·2	18	14	53·5	
"	2		54	0·2			56·9	
"	3			6·2		15	0·6	
"	4			11·8			4·1	
"	5			17·7			7·7	
"	d							
"	e							
"	f							
Sum				30·1			2·8	
Mean		17	54	6·02	18	15	0·56	
Red'n to								
m				+34			+34	
n tan. δ				+08			−21	
c sec. δ				−11			−07	
r		17	54	6·33	18	15	0·62	
T				+31			+06	
a		17	53	30·48	18	14	24·77	
Δ T				−35·85			−35·85	

e	tan δ − tan φ
−35·77	~~+35~~
−36·06	−96

$n = +0.22$

$\Delta T = -35.85$ at $18^h\ 0^m$

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Date		Oct. 4.			Oct. 5.			Oct 5		
Observer		W.M.D. Jr.			W.M.D. Jr.			W.M.D. Jr.		
Illumin'n		W.			W.			W.		
Star		μ Herculis			π Capricorni.			α Cygni.		
Mag.										
δ		+ 27°. 48′			−18°. 39′			44°. 48′		
Wire	a									
"	b									
"	c									
"	1	17	41	48.0	20	20	12.3	20. 37.		22.2
"	2			51.9			15.9			27.1
"	3			56.0			19.8			32.3
"	4		42	0.1			23.7			37.0
"	5			3.2			27.4			42.4.
"	d									
"	e									
"	f									
Sum				279.2			99.1			161.0
Mean		17	41	55.84	20	20.	19.82	20	37	32.2
Red'n to										
$\bar{m}$				+21			+.21			+21
n. tan. δ				−01			−04			00
c´. sec. δ				−.08			−07			−10
τ				+12			+10			+11
T		17	41	55.96	20	20.	19.92	20	37	32.31
a		17.	41	14.24	20	19	41.87	20	36	54.53
Δ T				41 72			38. 05			37.78

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Date		Oct 5.	Oct 5	Oct 5.
Observer		W. M. A. Jr.	W. M. D. Jr.	W. M. D. Jr.
Illumin'n		W.	W.	W.
Star		ν Cygni.	ξ Cygni.	1 Pegasi.
Mag.				
δ		+ 40° 39′	+ 29° 41′	+ 19° 44′
Wire	a			
"	b			
"	c			
"	1	20. 52. 41.8	21. 7. 46.7	21. 16. 26.8
"	2	46.9	50.7	30.4
"	3	51.7	54.8	34.2
"	4	56.1	59.2	38.0
"	5	53 1.0	8 3.3	42.1
"	d			
"	e			
"	f			
Sum		257.5	274.7	171.5
Mean		20 52. 51.5	21 7 54.94	21. 16. 34.3
Red'n to				
$\overline{m}$		+.21	+21	+21
n. tan. δ		.00	−.01	−02
c′. sec. δ		−09	−.08	−07
r		+.12	+12	+12
T		20 52. 51.62	21 07 55.06	21 16 34.42
a		20 52 13.53	21 07 17.01	21. 15 56.47
Δ T		38.09	38.05	37.95

Rejecting μ Herculis.

Δ J @ bid. 21^h. $= -3^s.98$

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Date		Oct 4.	Oct 4	Oct 4.
Observer		G.M.S.	G.M.S.	G.M.S.
Illumin'n		W.	W.	W.
Star		τ Aquilae.	3 Urs. Maj. L.C.	α² Capricorni
Mag.				
δ		+ 6°. 54′	+ 111°. 08′	− 12°. 57′
Wire	a			
"	b			
"	c			
"	1	19 58 8.7	19. 59 46.3	20 11 10.2
"	2	12.1	56.6	13.8
"	3	15.8	20 0 6.8	17.7
"	4	19.4	16.7	21.0
"	5	23.1	26.8	25.1
"	d			
"	e			
"	f			
Sum		79.1	333.2	87.8
Mean		19 58 15.82	20 0 6.64	20 11 17.56
Red'n to				
$\overline{m}$		+21	+21	+21
n. tan. δ		−02	+11	−03
c. sec. δ		−07	+19	−07
r		+12	+29	+11
T		19 58 15.94	20 00. 06.93	20 11 17.67
a		19 57 38.29	7 59 29.22	20 10 39.94
Δ T		37.64	37.71	37.73

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Date		Oct. 4			Oct. 4			
Observer		G. M. S.			G. M. S.			
Illumin'n		W.			W.			
Star		κ Cephei.			π Capricorni			
Mag.								
δ		+77° 19′			− 18° 39′			
Wire	a							
"	b							
"	c							
"	1	20	13	26.9	20	20	12.2	
"	2			43.6			15.8	
"	3		14	0.4			19.4	
"	4			16.6			23.3	
"	5			32.7			27.6	
"	d							
"	e							
"	f							
Sum				300.2			98.3	
Mean		20	14	0.4	20	20	19.66	
Red'n to $\overline{m}$				+21			+21	
n, tan. δ				+11			−04.	
c. sec. δ				− 32			−07	
r				00			+10	
T		20	14	00.40	20	20	19.76	
a		20	13	22.70	20	19	41.89	
Δ T				37.70			37.87	

Δ J. Oct. 4 − 37.73 @ Sid. 20h

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1866phae.proj..334L

Date	Oct. 7. ^{h} 44.	Oct. 7	Oct. 7
Observer Illumin'n	G. M. S. W.	G. M. S. W.	G. M. S. W.
Star Mag. δ	i Cephei +65.° 30′	α Pis. Aust. − 30.° 19′	α Pegasi +14.° 30′
Wire a			
" b			
" c			
" 1	22 45 21.9	22 50 48.2	22 58 40
" 2	30.3	52.5	43.8
" 3	39.3	56.8	47.4
" 4	48.	51 00.9	51.
" 5	56.8	57 05.	55
" d			
" e			
" f			
Sum	19 6 3	4 43 4	3 57 2
Mean	22 45 39.26	22 50 56.68	22 58 47.45
Red'n to $\overline{m}$	+ 21	+ 21	+ 21
n. tan. δ	− 04	− 05	− 02
c′. sec. δ	− 17	− 08	− 07
r	− 01	+ 08	+ 12
T	22 45 39.25	22 50 56.74	22 58 47.57
a	22 45 00.28	22 50 17.85	22 58 08.78
Δ T	− 38.97	− 38.89	− 38.79

Δ J al. 22^h 50^m Sid. Time = − 38.^{s}88

n = + 03

C = − 07

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Date		Oct. 11.	Oct. 11
Observer		S. P. L.	S. P. L.
Illumin'n		W.	W.
Star		β Aquarii	ξ Aquarii.
Mag.			
δ		−6° 10′	−8° 27′
Wire	a		
"	b		
"	c		
"	1	21. ~~24. 38.9~~	21. 31. 12.8
"	2	25 — 6.4	16.6
"	3	−9.9	20.0
"	4	13.4	23.6
"	5	17.2	27.7
		20.7	
"	d		
"	e		
"	f		
Sum		67.6	100.7
Mean		21. 25 13.52	21 31 20.14
Red'n to			
m		+.21	+.21
n. tan. δ		−.03	−.03
c. sec. δ		−.07	−.07
r		+.11	+.11
T		21 25 13.63	21 31 20.24
a		21 24 33.23	21 30 40.06
Δ T		−40.40	−40 18

ΔT at $21^h\ 30^m$ = −40.29

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1866phae.proj..334L

Date	Oct 15	Oct 15	Oct 15
Observer	G. M. S.	G. M. S.	G. M. S.
Illumin'n	W	W	W
Star	σ Sagittarii	50 Draconis	ζ Aquilae
Mag.			
δ			
Wire a			
" b			
" c			
" 1	18 47 34.0	18 50 52.2	18 59 52.0
" 2	38.3	51 6.9	55.7
" 3	42.3	21.1	59.4
" 4	46.3	35.0	19 0 3.1
" 5	50.3	49.2	6.9
" d			
" e			
" f			
Sum	211.2	104.4	297.1
Mean	18 47 42.24	18 51 20.88	18 59 59.42
Red'n to			
$\overline{m}$	+34	+34	+34
n. tan. δ	−14	+29	−07
c. sec. δ	−08	−27	−07
r	+12	+36	+20
T	18 47 42.36	18 51 21.24	18 59 59.62
a	18 46 59.86	18 50 38.72	18 59 16.98
Δ T	−42.50	−42.52	−42.64

σ Sag	−42.64	−11
50 Dr.	−42.23	+30
ζ Aq	−42.71	−18
	−42.53	

Δ T at $18^h\ 50^m$ = −42.55

n from σ Sag. & 50 Drac. = +0.10 .

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Date	Oct 18	Oct 18	Oct 18
Observer	G M S	G M S	G M S
Illumin'n	W	W	W
Star	μ Capricorni	79 Draconis	α Aquarii
Mag.			
δ	−14 11	+73 4	−0 58
Wire a			
" b			
" c			
" 1	21 ~~22~~ 46 38·3	21 ~~22~~ 51 34·4	21 ~~22~~ 59 33·3
" 2	42·1	47·1	36·9
" 3	45·8	59·3	40·6
" 4	49·6	52 11·8	44·2
" 5	53·4	24·4	48·0
" d			
" e			
" f			
Sum	21 229·2	21 297·0	21 203·0
Mean	~~22~~ 46 45·84	~~22~~ 51 59·40	~~22~~ 59 40·60
Red'n to			
$\bar{m}$	+37	+37	+37
n . tan. δ	−21	+45	−18
c . sec. δ	−07	−24	−07
r	+09	+58	+12
T	21 46 45·93	21 51 59·98	21 59 40·72
a	21 46 2·39	21 51 16·46	21 58 57·12
Δ T	−43·54	−43 52	−43·60

$n = +0.19$ from μ Cap. & 79 Draconis

$\Delta T = -43.55'$ at $21^h\ 50^m$

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Date		Oct 22			Oct 24			Oct 24			
Observer		G M S			G M S			G M S			
Illumin'n		W			W			W			
Star		α Aquilae			Polaris			θ' Ceti			
Mag.											
δ		+8 31									
Wire	a										
"	b										
"	c										
"	1	19	44	55·7				1	18	3·8	
"	2			59·2						7·2	
"	3		45	2·9	1	12	8·9			10·7	
"	4			6·5						14·5	
"	5			10·2						18·1	
"	d										
"	e										
"	f										
Sum				14·5						54·3	
Mean		19	45	2·90	1	12	8·90	1	18	10·86	
Red'n to											
$\overline{m}$				~~+41~~			+34			+34	
n . tan. δ				−14			+8·00			−21	
c . sec. δ				−07			−2·87			−07	
r		19	45	~~+20~~			+5·47			+06	
T		19	45	3·10	1	12	14·37	1	18	10·92	
							26·47				
a		19	44	16·91	1	11	~~23·50~~	1	17	23·10	
Δ T				−46·19			−47·90			−47·82	

ΔT at $19^h 45^m$ = −46·19

$n = \frac{+8·13}{41·08} = +·20$

ΔT at $1^h 15^m$ = −47·82

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Date		Oct 25	Oct 25	Oct 25
Observer		G M S	G M S	G M S
Illumin'n		W	W	W
Star		θ' Ceti	A Cassiopeae	β Arietis
Mag.				
δ				
Wire	a			
"	b			
"	c			
"	1	1 18 4.6	1 ~~22~~ 21 54.2	1 47 59.2
"	2	8.0	22 ~~23~~ 5.3	48 3.0
"	3	11.8	14.9	7.0
"	4	15.2	25.6	10.8
"	5	19.2	35.9	14.7
"	d			
"	e			
"	f			
Sum		58.8	75.9	34.7
Mean		1 18 11.76	1 ~~22~~ 23 15.18	1 48 6.94
Red'n to				
$\bar{m}$		+30	+30	+30
n. tan. δ		−21	+36	−11
c. sec. δ		−07	−20	−07
r		+02	+46	~~+26~~ +12
T		1 18 11.78	1 22 15.64	1 48 7.06
a		1 17 23.11	1 21 26.82	1 47 18.71
Δ T		−48.67	−48.82	−48.35

from θ' Ceti & A Cassiop.

$n = \frac{+.42}{2.85} = +.15$

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Date		Oct 25		
Observer		G M S		
Illumin'n		W		
Star		50 Cassiopeiae		
Mag.				
δ				
Wire	a			
"	b			
"	c			
"	1	1 52	37.0	
"	2		49.1	
"	3	53	0.6	
"	4		11.7	
"	5		23.8	
"	d			
"	e			
"	f			
Sum			2.2	
Mean		1 53	0.44	
Red'n to				
m			+30	
n . tan. δ			+43	
c . sec. δ			−22	
r			+51	
T		1 53	0.95	
a		1 52	12.76	
Δ T			48.19	

From β Arietis & 50 Cassiopeiae.

$n = \frac{+.70}{2.67} = +.26$ Mean value $n = +0.20$

ΔT at $1^h\ 30^m = -48.51$ from all four

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Date		Oct 28	Oct 28	Oct 28
Observer		G M S	G M S	G M S
Illumin'n		w	w	w
Star		α Andromedae	α Cassiopeae	β Ceti
Mag.				
δ		+28 21	+55 48	−18 53
Wire	a			
"	b			
"	c			
"	1	0 2 13·1	0 33 37·2	0 37 37·2
"	2	17·1	43·2	41·1
"	3	21·5	50·0	45·0
"	4	25·5	56·6	48·5
"	5	29·6	34 3·1	52·6
"	d			
"	e			
"	f			
Sum		106·8	250·1	224·4
Mean		0 2 21·36	0 33 50·02	0 37 44·88
Red'n to				
m		+33	+33	+33
n . tan. δ		−13	+19	−42
c . sec. δ		−08	−12	−07
r		+12	+40	−16
T		0 2 21·48	0 33 50·42	0 37 44·72
a		0 1 31·92	0 33 0·81	0 36 55·10
Δ T		−49·56	−49·61	−49·62

From α Cassiop. & β Ceti $n = +0.34$

ΔT at $0^h\ 30^m = -49.60$

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Date		Oct 31			Oct. 31.			Oct 31			
Observer		G.W.S.			G.W.S.			G.W.S.			
Illumin'n		W.			W.			W.			
Star		π Aquarii.			γ Draconis 1.b.			η Aquarii			
Mag.											
δ											
Wire	a										
"	b										
"	c										
"	1	22	18	53.3	22	23	36.9	23	28	55.8	
"	2			56.9			53.2			54.2	
"	3		19	00.7		24	8.5		29	3.0	
"	4			4.2			23.9			6.4	
"	5			7.9			39.2			10.0	
"	d										
"	e										
"	f										
Sum				303.0			347.7			314.4	
Mean		22	19	00.60	22	24	9.54	23	29	2.88	
Red'n to											
m				+.18							
n . tan. δ				-.24			1.3				
c . sec. δ				-.07			+.30			-.07	
r				-.13							
T											
a											
Δ T											

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1866phae.proj..334L

Date		Oct. 31			Nov. 1			Nov. 1				
Observer		G.M.S.			W.M.D.			W.M.D.				
Illumin'n		W.			W.			W.				
Star		226 Cephei.			i Piscium.			Groombridge 4163				
Mag.												
δ												
Wire	a											
"	b											
"	c											
"	1	22	30	2.4	23	33	31.5	23	48	32.7		
"	2			16.4			35.4			46.1		
"	3			31.0			38.8			59.7		
"	4			45.8			42.5		49	12.8		
"	5		31	0.1			45.8			26.0		
"	d											
"	e											
"	f											
Sum				155.7			194.0			297.3		
Mean		22.	30	31.14	23	33	38.80	23	48	59.44		
Red'n to												
m												
n. tan. δ												
c. sec, δ				-.28			-.07			-.25		
r												
T												
a												
Δ T												

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Date		Nov. 1			Nov. 1.			Nov. 1				
Observer		W.M.D.			W.M.D.			W.M.D.				
Illumin'n		W.			W			W.				
Star		ω Piscium			α Andromedæ			4 Draconis (H)				
Mag.												
δ												
Wire	a											
"	b											
"	c											
"	1	23	52	54.3	0	0	7.4	0	5	45.0		
"	2			57.9			11.5		6	2.2		
"	3		53	1.4			15.3			20.3		
"	4			4.9			19.6			38.0		
"	5			8.8			23.9			55.8		
"	d											
"	e											
"	f											
Sum				307.3			77.7			401.3		
Mean		23	53	1.46	0	0	15.54	0	6	20.26		
Red'n to												
m				+.18			+.18			+.18		
n . tan. δ				-.24								
c . sec. δ				-.07			-.05			+.35		
r				-.13								
T												
a								0	5	47.68		
Δ T												

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Date		Nov 1.				Nov. 2.				Nov. 2							
Observer		W.M.D.				W.M.D.				W.M.D.							
Illumin'n		W.				W.				W.							
Star		12 Ceti.				γ Cephei.				Groombridge 4163							
Mag.																	
δ																	
Wire	a																
"	b																
"	c																
"	1	0	23	40.2		23	33	39.4		23	48	34.2					
"	2			43.8			34	15.9				46.7					
"	3			47.6				32.2			49	0.2					
"	4			50.9				48.7				12.8					
"	5			54.8			35	4.4				26.8					
"	d																
"	e																
"	f																
Sum				237.3				460.6				299.7					
Mean		0	23	47.46		23	34	32.12		23	48	59.94					
Red'n to																	
m																	
n . tan. δ																	
c . sec. δ								-.31				-.25					
r																	
T																	
a																	
Δ T																	

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Date		Nov 2.				Nov. 2.				
Observer		W.M.D.				W.M.D.				
Illumin'n		W.				W.				
Star		ω Piscium.				α Andromedae				
Mag.										
δ										
Wire	a									
"	b									
"	c									
"	1	23	52	34.8		0	0	7.8		
"	2		52	38.4				11.9		
"	3		53	2.2				16.2		
"	4			6.5				20.2		
"	5			9.5				24.2		
"	d									
"	e									
"	f									
Sum				310.4				80.3		
Mean		23	53	2.08		0	0	16.06		
Red'n to										
m										
n . tan. δ										
c . sec. δ				-.07				-.08		
r										
T										
a										
Δ T										

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Date	Nov. 1.	Nov. 1	Nov. 1	
Observer				
Illumin'n				
~~Star~~	Frodsham. 8421	Arnold.	236.	
Mag.	$9^h 46^m$ to 47^m	$9^h. 48^m$	$0^h. 41^m$ to 42^m	
δ	10.^{s} to 10.^{s}		by ten^s and five^s	
Wire a				
" b				
" c	0^h 31. 5.7	0^h 34^m 20.7	0^h 38 39.3	
	15.4		39 4.3	
" 1	25.3		14.0	(5^s)
" 2	35.8		19.0	
" 3	45.8		24.0	(5^s)
" 4	56.2		29.2	
" 5	32. 5.9		39.3	
			44.4	(5^s)
" d			49.2	
" e			54.0	(5^s)
" f			59.3	
Sum	250.1			
Mean	0^h 31 35.73			
Red'n to				
m				
n . tan. δ				
c . sec. δ				
r				
T				
a				
Δ T				

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Date	Nov. 2.	Nov. 2	Nov. 2.
Observer			
Illumin'n			
~~Star~~	236.	8421	Arnold.
Mag.			
δ	$0^h 6^m 30^s$ and $0^h 7^m 00^s$.	$9^h 17^m 0^s$ and $9^h 17^m 30^s$.	$9^h 19^m 30^s$ and $9^h 20^m 0^s$.
Wire a			
" b	$0^h\ 4\ 27.1$	$0^h\ 6\ 1.9$	$0^h\ 9\ 42.9$
" c	57.0	32.2	$10\ 13.1$
" 1			
" 2			
" 3			
" 4			
" 5			
" d			
" e			
" f			
Sum			
Mean			
Red'n to			
m			
n . tan. δ			
c . sec. δ			
τ			
T			
a			
Δ T			

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1866phae.proj..334L

Date		Nov 4			Nov 4			Nov 4				
Observer		G M S			G M S			G M S				
Illumin'n		W			W			W				
Star		32 Camelop. d.c.			ε Piscium			θ' Ceti				
Mag.												
δ												
Wire	a											
"	b											
"	c											
"	1	0	47	11·8	0	56	25·4	1	17	45·3		
"	2			46·7			29·1			48·9		
"	3		48	25·6			32·8			52·3		
"	4			59·0			36·4			55·9		
"	5		49	34·6			40·0			59·9		
"	d											
"	e											
"	f											
Sum				117·1			163·7			262·3		
Mean		0	48	23·42	0	56	32·74	1	17	52·46		
Red'n to $\bar{m}$				+·14			+14			+14		
n . tan. δ		−3·19			−23			−32				
c . sec. δ				+69			−07			−07		
r		−2·36			−16			−25				
T		0	48	~~23·11~~ 21·06	0	56	32·~~73~~ 32·58	1	17	52·~~47~~ 52·21		
a		12	47	54·30	0	56	3·24	1	17	23·11		
Δ T				[26·76]			−29·34			−29 10		

n = +0·30 from A Cassiop. & mean of the time stars. (32 Camelop rejected, very poorly observed owing to bad seeing.)

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1866phae.proj..334L

Date		Nov 4	Nov 4
Observer		G M S	G M S
Illumin'n		W	W
Star		A Cassiopeae	η Piscium
Mag.			
δ			
Wire	a		
"	b		
"	c		
"	1	1 21 34·3	1 25 44·9
"	2	45·2	48·8
"	3	55·4	52·6
"	4	22 6·2	55·3
"	5	16·2	59·8
"	d		
"	e		
"	f		
Sum		277·3	261·4
Mean		1 21 55·46	1 25 52·28
Red'n to			
m		+14	+14
n . tan. δ		+53	−20
c . sec. δ		−20	−07
r		+47	−13
T		1 21 ~~55·59~~ 55·93	1 25 ~~52·28~~ 52·15
a		1 21 26·78	1 24 22·93
Δ T		−29·15	−29·22

ΔT at $1^h\ 20^m$ = −29·20

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Date		Nov 4									
Observer											
Illumin'n											
Star		Chron. Arnold			~~Chron. Bond~~						
Mag.		424			~~2.96~~						
δ					Clock.						
Wire	a										
"	b										
"	c										
"	1	9	55	30	0	53	44.6	−9	1	45.4	
"	2			35			49.6			45.4	
"	3			40			54.7			45.3	
"	4			50		54	4.8			45.2	
"	5		56	0			14.5			45.5	
"	d										
"	e										
"	f										
Sum											
Mean								−9	1	45.36	
Red'n to					Corr. to Clock					−29.20	
$\bar{m}$					Reduction			+9	3	34.7	
n. tan. δ					Corr. to Chron.				+1	20.1	
c. sec. δ											
r											
T											
a											
Δ T											

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1866phae.proj..334L

Date		Nov 4		
Observer				
Illumin'n				
Star		Chron. Bond	Clock	Clock − Chron
Mag.		236		
δ				
Wire	a			
"	b			
"	c			
"	1	1 2 30	1 0 18·3	− 2 11·7
"	2	35	23·3	11·7
"	3	40	28·2	11·8
"	4	45	33·3	11·7
"	5	50	38·4	11·6
		55	43·3	11·7
"	d	3 0	48·4	11·6
"	e			
"	f			
Sum				
Mean				− 2 11·69
Red'n to				− 29·20
m				
n . tan. δ				− 2 40·89
c . sec. δ				
τ				
T				
a				
Δ T				

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1866phae.proj..334L

Date		Nov 5		Nov 5		
Observer		G M S		G M S		
Illumin'n		W		W		
Star		η Tauri		ζ Persei		
Mag.						
δ		23 41		31 29		
Wire	a					
"	b					
"	c					
"	1	3 37	54·0	3 44	5·2	
"	2		57·7		9·4	
"	3	38	2·2		13·8	
"	4		6·1		17·9	
"	5		10·0		22·1	
"	d					
"	e					
"	f					
Sum			10·0		68·4	
Mean		3 38	2·00	3 44	13·68	
Red'n to $\bar{m}$			+08		+08	
n . tan. δ			−07		−04	
c . sec. δ			−08		−08	
r			−07		−04	
T		3 38	1·93	3 44	13·64	
a		3 39	35·87	3 45	47·66	
Δ T		+1	33·94	+1	34·02	

n used as +0·14

$\Delta T = +1^m 33^s.98$ at $3^h 45^m$

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1866phae.proj..334L

Date		Nov 6			Nov 6			Nov 6				
Observer		G.M.S			G.M.S			G.M.S				
Illumin'n		W			W			W				
Star		κ Draconis & C.			α Cassiopeae			β Ceti				
Mag.												
δ		109	28		55	48		−18	53			
Wire	a											
"	b											
"	c											
"	1	0	27	44.1	0	33	11.4	0	37	11.7		
"	2			55.8			17.8			13.2		
"	3		28	6.1			24.3			19.1		
"	4			17.0			30.7			23.0		
"	5			27.8			37.4			26.8		
"	d											
"	e											
"	f											
Sum				30.8			121.6			95.8		
Mean		0	28	6.16	0	33	24.32	0	37	19.16		
Red'n to												
m				+~~.08~~ .14			+~~.08~~ .14			+.14		
n. tan. δ				−.52			+.08			−.18		
c. sec. δ			+	.21			−.12			−.07		
r				−.17			+.10			−.11		
T		0	28	5.99	0	33	24.42	0	37	19.05		
a		12	27	42.27	0	33	0.72	0	36	55.05		
Δ T				−23.72			−23.70			−24.00		

From κ Drac. & α Cassiop. $n = +0.14$ used

ΔT (double weight to β Ceti) = $-23^s.85$ at $0^h\ 30^m$

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Date		Nov 7			Nov 7			Nov 7			
Observer		G.M.S			G.M.S			G.M.S			
Illumin'n		E			E			E			
Star		~~o Piscium~~ Polaris			o Piscium			β Arietis			
Mag.											
δ											
Wire	a										
"	b										
"	c										
"	1				1	38	37.1	1	47	32.0	
"	2	1	9	12.7			40.6			35.9	
"	3		11	34.7			44.2			39.4	
"	4		14	8.2			48.0			43.5	
"	5						51.5			47.5	
"	d										
"	e										
"	f										
Sum				115.6			221.4			198.6	
Mean		1	11	38.53	1	38	44.28	1	47	39.72	
Red'n to											
m				+0.15			+15			+14	
n . tan. δ				+5.28			−10			−07	
c . sec. δ				+.82			+02			+02	
r				+6.25			+07			+09	
T		1	11	44.78	1	38	44.35	1	47	39.81	
a		1	11	23.64	1	38	23.18	1	47	18.76	
Δ T				−21.14			−21.17			−21.05	

From Polaris and o Piscium — From β Arietis & 50 back wf.

n +0.132 +0.127

ΔT at $1^h 25^m$ $-21^s.16$ at $1^h 50^m$ -21.05

Mean ΔT at $2^h 6^m$ $= -21^s.61$

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Date		Nov 7	Nov 7	Nov 7
Observer		G.M.S	G.M.S	G.M.S
Illumin'n		E	E	E
Star		50 Cassiopeae	~~α Arietis~~	~~α Draco~~
Mag.			5 Urs. Min Lc.	γ Ceti
δ				
Wire	a			
"	b			
"	c			
		10·3		
"	1	1 52 21·8	2 27 34·2	2 36 39·1
"	2	33·2	49·4	42·7
"	3	45·1	28 4·1	46·3
"	4	56·5	19·8	50·0
"	5		35·0	53·6
"	d			
"	e			
"	f			
Sum		166·9	22·5	231·7
Mean		1 52 33·38	2 28 4·50	2 36 46·34
Red'n to				
$\overline{m}$		+14	+12	+12
n. tan. δ		+27	−57	−10
c. sec. δ		+06	−08	+02
τ		+47	−53	+04
T		1 52 ~~33~~·85	2 28 3·97	2 36 46·38
a		1 52 12·80	14 27 43·05	2 36 25·46
Δ T		−21·05	−20·92	−20·92

From 5 Urs. Min. Lc. & γ Ceti

+0·113

at 2 16^m −20^s·92

From β Urs. Min. Lc. and 48 Cephei

+0·099

at 3^h 0^m −20^s·90

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Date		Nov 7			Nov 7				
Observer		G M S			G M S				
Illumin'n		E			E				
Star		β Ursæ Min Lc			48 Cephei				
Mag.									
δ									
Wire	a								
"	b								
"	c								
"	1	2	50	54·8	3	3	27·1		
"	2		51	8·5			43·8		
"	3			22·2		4	0·3		
"	4			35·5			16·6		
"	5			49·7			33·0		
"	d								
"	e								
"	f								
Sum				110·7			0·8		
Mean		2	51	22·14	3	4	0·16		
Red'n to									
m				+11			+11		
n . tan. δ				−46			+35 −08		
c . sec. δ				−08			+09		
r				−43			+55		
T		2	51	21·71	3	4	0·71		
a		14	51	0·82	3	3	39·81		
Δ T				−20·89			−20·90		

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1866phae.proj..334L

Date		Nov 8			Nov 8				
Observer		S M S			S M S				
Illumin'n		E			E				
Star		λ Aquarii			o Cephei				
Mag.									
δ									
Wire	a								
"	b								
"	c								
"	1	22	45	52·9	23	13	14·1		
"	2			56·7			23·5		
"	3		46	0·3			33·0		
"	4			4·0			42·6		
"	5			7·6			51·9		
"	d								
"	e								
"	f								
Sum				1·5			165·1		
Mean		22	46	0·30	23	13	33·02		
Red'n to									
$\overline{m}$				+19			+19		
n . tan. δ				−11			+15		
c . sec. δ				+02			+05		
r				+10			+39		
T		22	46	0·40	23	13	33·41		
a		22	45	40·28	23	13	13·28		
Δ T		2		−20·12			−20·13		

n = +·10

ΔT at 23^h = · −20·12

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1866phae.proj..334L

Date		Nov. 9			Nov 9			Nov 9			
Observer		G M S			G M S			G M S			
Illumin'n		E			E			E			
Star		π Capricorni			ε Delphini			α Cygni			
Mag.											
δ											
Wire	a										
"	b										
"	c										
"	1	20	19	59·8	20	27	9·5	20	37	9·3	
"	2		20	3·6			13·3			14·5	
"	3			7·3			17·0			19·3	
"	4			11 2			20·6			24·7	
"	5			15·1			24·3			29·9	
"	d										
"	e										
"	f										
Sum				37·0			84·7			97·7	
Mean		20	20	7·40	20	27	16·94	20	37	19·54	
Red'n to											
$\bar{m}$				+17			+17			+17	
n . tan. δ				− 12			−07			−01	
c . sec. δ				+ 02			+02			+03	
r				+07			+12			+19	
T		20	20	7·47	20	27	17·06	20	37	19·73	
a		20	19	41·27	20	26	50·78	20	36	53·59	
Δ T				−26·20			−26·28			−26·14	

n assumed = +·10

ΔT = −26·21 at $20^h 30^m$

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1866phae.proj..334L

Date		Nov 10			Nov 10			Nov 10			
Observer		G M S			G M S			G M S			
Illumin'n		E			E			E			
Star		α Aquarii			32 Urs. Maj. L C.			θ Aquarii			
Mag.											
δ											
Wire	a										
"	b										
"	c										
"	1	21	59	17.7	22	8	29.2	22	10	9.5	
"	2			21.3			37.9			13.2	
"	3			24.9			46.6			16.7	
"	4			28.7			54.7			20.5	
"	5			32.4		9	3.7			24.2	
"	d										
"	e										
"	f										
Sum				125.0			232.1			84.1	
Mean		21	59	25.00	22	8	46.42	22	10	16.82	
Red'n to											
$\overline{m}$				+23			+23			+23	
n . tan. δ				−20			−66			−22	
c . sec. δ				+02			−05			+02	
r				+05			−48			+03	
T		21	59	25 05	22	8	45.94	22	10	16.85	
a		21	58	56.79	10	8	17.88	22	9	48.48	
Δ T				−28.26			−28.06			−28.37	

n from 32 Urs. Maj. & 226 Cephei = +0.21

Δ T (double ut. to the time stars) at

$22^h\ 0^m = -28.^s23$

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Date		Nov 10		
Observer		G M S		
Illumin'n		E		
Star		226 Cephei		
Mag.				
δ				
Wire	a			
"	b			
"	c			
"	1	22	29 57.4	
"	2		30 12.2	
"	3		26.4	
"	4		41.0	
"	5		54.9	
"	d			
"	e			
"	f			
Sum			131.9	
Mean		22	30 26.38	
Red'n to				
$\bar{m}$			+23	
n . tan. δ			+62	
c . sec. δ			+08	
r			+93	
T		22	30 27.31	
a		22	29 59.24	
Δ T			-28.07	

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Date		Nov 12			Nov 12	
Observer		G M S			G M S	
Illumin'n		E			E	
Star		ε Delphini			α Cygni	
Mag.						
δ						
Wire	a					
"	b					
"	c					
"	1	20	27	11·9	20 37	12·3
"	2			15·4		16·9
"	3			19·1		21·9
"	4			22·9		27·0
"	5			26·5		32·0
"	d					
"	e					
"	f					
Sum				95·8		110·1
Mean		20	27	19·16	20 3	22·02
Red'n to						
$\overline{m}$				+20		+20
n . tan. δ				+00		+00
c . sec. δ				+02		+03
τ		~~20~~	~~27~~	~~19·38~~	~~20 3~~	~~22·25~~
T		20	27	19·38	20 3	22·25
a		20	26	50·74	20 36	53·51
Δ T				− 28·64		28·74

ΔT ~~ΔT at t =~~ − 28·64 at $20^h\ 30^m$

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Date	Nov 13	Nov 13	Nov 13
Observer	G M S	G M S	G M S
Illumin'n	E	E	E
Star	ε Delphini	Groomb. 3241	α Cygni
Mag.			
δ			
Wire a			
" b			
" c			
" 1	20 27 11·3	20 30 37·7	20 37 11·1
" 2	15·0	49·8	16·3
" 3	18·7	31 1·4	21·3
" 4	22·5	13·2	26·5
" 5	26·1	25·1	31·5
" d			
" e			
" f			
Sum	93·6	7·2	106·7
Mean	20 27 18·72	20 31 1·44	20 37 21·34
Red'n to $\bar{m}$	+22	+22	+22
n. tan. δ	+04	−12	00
c. sec. δ	+02	+06	+03
r	+28	+16	+25
T	20 27 19·00	20 ~~31~~ 31 ~~33~~ 1·60	20 37 21·59
a	20 26 50·72	20 30 33·36	20 36 53·48
Δ T	−28·28	−28·24	−28·11

$n = -.057$ by least squares

$\Delta T = -28.21$ at $20^h\ 30^m$

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Date		Nov 14			
Observer		S M S			
Illumin'n		E			
Star		α Aquilae			
Mag.					
δ					
Wire	a				
"	b				
"	c				
"	1	19 44	36·4		
"	2		40·3		
"	3		44·0		
"	4		47·9		
"	5		51·3		
"	d				
"	e				
"	f				
Sum			219·9		
Mean		19 44	43·98		
Red'n to					
$\bar{m}$			+06		
n . tan. δ			+04		
c . sec. δ			+02		
r			+12		
T		19 44	44·10		
a		19 44	16·54		
Δ T			−27·56		

$\Delta T = -27^{s}.56$ at $19^{h}45^{m}$

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1866phae.proj..334L

Date		Nov 16				Nov 16				Nov 16			
Observer		G M S				G M S				G M S			
Illumin'n		E				E				E			
Star		∝ Ceti				48 Cephei				ζ Arietis			
Mag.													
δ													
Wire	a												
"	b												
"	c												
"	1	2	55	40·1		3	3	33·4		3	7	35·6	
"	2			43·7				50·1				39·4	
"	3			47·5			4	6·1				43·2	
"	4			50·9				21·8				47·3	
"	5			54·2				39·3				51·1	
"	d												
"	e												
"	f												
Sum				236·4				30·7				216·6	
Mean		2	55	47·28		3	4	6·14		3	7	43·32	
Red'n to													
m				+15				+15				+15	
n . tan. δ				−08				+35				−05	
c . sec. δ				+02				+09				+02	
r				+09				+59				+12	
T		2	55	47·37		3	4	6·73		3	7	43·44	
a		2	55	20·60		3	3	39·99		3	7	16·70	
Δ T				−26·77				−26·74				−26·74	

n = +·10 from 48 Cephi. & ∝ Ceti

ΔT = − 26·75 at 3h 0m

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1866phae.proj..334L

Date	Nov 17	Nov 17	Nov 17
Observer	G M S	G M S	G M S
Illumin'n	E	E	E
Star	o Cephei	θ Piscium	λ Draconis L C
Mag.			
δ			
	excellently observed.		
Wire a			
" b			
" c			
" 1	23 13 20·6	23 21 33·0	23 23 30·3
" 2	29·8	36·6	41·0
" 3	39·2	40·2	51·6
" 4	48·6	43·8	24 2·4
" 5	58·0	47·5	13·1
" d			
" e			
" f			
Sum	196·2	201·1	258·4
Mean	23 13 39·24	23 21 40·22	23 23 51·68
Red'n to			
m	+13	+13	+13
n . tan. δ	+16	−09	−40
c . sec. δ	+05	+02	−06
r	+34	+06	−33
T	23 13 39·58	23 21 40·28	23 23 51·35
a	23 13 12·90	23 21 13·42	11 23 24·64
Δ T	−26·68	−26·86	−26·71

$n = +.11$ from o Cephei & λ Draconis L C.

$\Delta T = -26.75$ at $23^h\ 20^m$

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1866phae.proj..334L

Date		Nov 18	Nov 18	Nov 18
Observer		G M S	G M S	G M S
Illumin'n		&	&	&
Star		o Piscium	β Arietis	50 Cassiopeae
Mag.				
δ				
Wire	a			
"	b			
"	c			
"	1	1 38 40.7	1 47 38.2	1 52 16.3
"	2	42.5	42.0	28.0
"	3	43.1	46.0	39.7
"	4	53.7	49.8	51.3
"	5	53.3	53.6	53 2.7
"	d			
"	e			
"	f			
Sum		250.3	229.6	198.0
Mean		1 38 50.06	1 47 45.92	1 52 39.60
Red'n to				
$\bar{m}$		+04	+04	+04
n . tan. δ		00	00	00
c . sec. δ		+02	+02	+06
r		+06	+06	+10
T		1 38 50.12	1 47 45.98	1 52 39.70
a		1 38 23.17	1 47 18.77	1 52 12.70
Δ T		−26 95	−27.21	−27.00

n assumed = 0.00

ΔT at $1^h\ 45^m$ = −27.05

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1866phae.proj.334L

Date		Nov 21		
Observer		S.N.S.		
Illumin'n		E		
Star		α Cygni		
Mag.				
δ				
Wire	a			
"	b			
"	c			
"	1	20 37 10.7		
"	2	16.0		
"	3	21.1		
"	4	26.2		
"	5	31.2		
"	d			
"	e			
"	f			
Sum		105.2		
Mean		20 37 21.04		
Red'n to				
$\overline{m}$		+21		
n . tan. δ		+01		
c . sec. δ		+03		
r		+25		
T		20 37 21.29		
a		20 36 53.29		
Δ T		−28.00		

n assumed = +0.10

ΔT at $20^h\ 30^m$ = −28.00

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1866phae.proj..334L

Date		Nov 23			Nov 23		
Observer		GMS			GMS		
Illumin'n		E			E		
Star		θ' Ceti			A Cassiopeae		
Mag.							
δ							
Wire	a						
"	b						
"	c						
"	1	1	17	44.4	1	21	33.6
"	2			48.1			44.2
"	3			51.8			54.9
"	4			55.3		22	5.9
"	5			59.0			15.5
"	d						
"	e						
"	f						
Sum				258.6			274.1
Mean		1	17	51.72	1	21	54.82
Red'n to							
$\bar{m}$				+03			+03
n . tan. δ				−11			+18
c . sec. δ				+02			+06
r				−06			+27 ~~5.89~~
T		1	17	51.66	1	21	55.09
a		1	17	23.03	1	21	26.46
Δ T				−28.63			−28.63

$m = +.10$

$\Delta T = -28.63$ at $1^h\ 20^m$

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1866phae.proj..334L

Date		Nov 25			Nov 25			Nov 25					
Observer		G M S			G M S			G M S					
Illumin'n		E			E			E					
Star		ω Piscium			α Andromedae			4 Draconis I C					
Mag.													
δ													
Wire	a												
"	b												
"	c												
"	1	23	52	50.5	0	1	52.3	0	5	42.0			
"	2			54.1			56.1			59.3			
"	3			57.9			59.7		6	17.4			
"	4		53	1.5		2	4.3			35.7			
"	5			5.1			8.4			55.0			
"	d												
"	e												
"	f												
Sum				289.1			0.8			89.4			
Mean		23	52	57.82	0	2	0.16	0	6	17.88			
Red'n to													
$\bar{m}$				+02			+02			+02			
n . tan. δ			+10	+~~06~~		+04	~~−03~~		+69	~~46~~ −10			
c . sec. δ				+02			+02			~~+02~~			
r			+14	~~−02~~		+08	~~+07~~		+61	~~54~~			
				96			24			49			
T		23	52	57.~~80~~	0	2	0.~~17~~	0	6	18.~~35~~			
a		23	52	29.18	0	1	31.64	12	5	49.71			
				−28.78			−28.60			−28.78			
Δ T				~~−28.60~~			~~−28.53~~			~~−28.60~~			

$n = \frac{-12}{+08}$ from ω Piscium & 4 Draconis

ΔT at $0^h\ 0^m = -28.72$

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Date		Nov 26		
Observer		G.M.S		
Illumin'n		E		
Star		α Cygni		
Mag.				
δ				
Wire	a			
"	b			
"	c			
"	1	20 37	11·4	
"	2		16·6	
"	3		21·5	
"	4		26·6	
"	5		31·8	
"	d			
"	e			
"	f			
Sum			107·9	
Mean		20 37	21·58	
Red'n to				
$\bar{m}$			+02	
n . tan. δ			00	
c . sec. δ			+03	
τ		20 37	21·63	
T				
a		20 36	53·18	
Δ T			−28·45	

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1866phae.proj..334L

Date		Nov 27			Nov 27			Nov 27			
Observer		G M S			G M S			G M S			
Illumin'n		E			E			E			
Star		γ Cygni			ζ Cygni			α Cephei			
Mag.											
δ											
Wire	a										
"	b										
"	c										
"	1	20	52	31·2	21	7	36·1	21	15	36·6	
"	2			36·4			40·2			44·8	
"	3			40·7			44·5			52·4	
"	4			45·7			48·7		16	0·1	
"	5			50·2			52·7			7·9	
"	d										
"	e										
"	f										
Sum				204·2			222·2			261·8	
Mean		20	52	40·84	21	7	44·44	21	15	52·36	
Red'n to											
$\overline{m}$				+19			+19			+19	
n . tan. δ				−01			−04			+11	
c . sec. δ				+03			+02			+04	
τ				+21			+17			+34	
T		20	52	41·05	21	7	44·61	21	15	52·70	
a		20	52	12·30	21	7	16·00	21	15	24·04	
Δ T				−28·75			−28·61			−28·66	

$n = +.11$ by least squares

$\Delta T = -28.67$ at $21^h\ 0^m$

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Date	Nov 30	Nov 30	Nov 30
Observer	G M S	G M S	G M S
Illumin'n	E	E	E
Star	21 Cassiopeae	ε Piscium	θ' Ceti
Mag.			
δ			
Wire a			
" b			
" c			
		25·7	
" 1	0 37 2·7	0 56 29·2	1 17 45·9
" 2	15·8	33·0	49·7
" 3	29·2	36·7	53·3
" 4	42·4	40·3	57·0
" 5	55·9		18 0·4
" d			
" e			
" f			
Sum	146·0	164·9	266·3
Mean	0 37 29·20	0 56 32·98	1 17 53·26
Red'n to			
$\bar{m}$	+06	+06	+06
n . tan. δ	−05	+02	+02
c . sec. δ	+07	+02	+02
r	+08	+10	+10
T	0 37 29·28	0 56 33·08	1 17 53·36
a	0 36 59·15	0 56 3·10	1 17 22·99
Δ T	−30·13	−29·98	−30·37

n from all by least squares = −·02

ΔT at $1^h\ 0^m$ = −30·15

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Date		Nov. 30			Nov 30			
Observer		G M S			G M S			
Illumin'n		E			E			
Star		A Cassiopeae			η Piscium			
Mag.								
δ								
Wire	a							
"	b							
"	c							
"	1	1	21	35·2	1	24	45·5	
"	2			46·0			49·2	
"	3			56·4			52·9	
"	4		22	6·8			56·7	
"	5			17·1		25	0·3	
"	d							
"	e							
"	f							
Sum				281·5			264·6	
Mean		1	21	56·30	1	24	52·92	
Red'n to								
$\overline{m}$				+06			+06	
n . tan. δ				−04			+01	
c . sec. δ				+06			+02	
r				+08			+09	
T		1	21	56·38	1	24	53·01	
a		1	21	26·25	1	24	22·85	
Δ T				− 30·13			− 30·16	

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Date		Dec. 2,	Dec 2	Dec 2
Observer		S M S	S M S	S M S
Illumin'n		E	E	E
Star		o Piscium	50 Cassiop.	α Arietis
Mag.				
δ				
Wire	a			
"	b			
"	c			
"	1	1 38 47·0	1 52 ~~31·6~~ 20·3	2 0 5·2
"	2	50·7	31·6	9·0
"	3	54·2	43·4	12·7
"	4	58·1	54·9	16·7
"	5	39 1·3	53 6·6	20·8
"	d			
"	e			
"	f			
Sum		271·3	216·8	64·4
Mean		1 38 54·26	1 52 43·36	2 0 12·88
Red'n to $\bar{m}$		−05	−05	−05
n. tan. δ		−03	+09	−02
c. sec. δ		+02	+06	+02
r		−06	+10	−05
T		1 38 54·20	1 52 43·46	2 0 12·83
a		1 38 23·12	1 52 12·39	1 59 41·82
Δ T		−31·08	−31·07	−31·01

n = +0·04 from o Pisc. & 50 Cassiop.

ΔT = −31·05 at $1^h\ 50^m$

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1866phae.proj..334L

Date		Dec 3			Dec. 3.			Dec. 3.			
Observer		G M S			G M S			G M S			
Illumin'n		E			E			E			
Star		α Cygni			γ Cygni			61' Cygni			
Mag.											
δ											
Wire	a										
"	b										
"	c										
				14·2							
"	1	20	37	19·1				21	1	17·6	
"	2			24·3						22·1	
"	3			29·3	20	52	~~43~~			26·7	
"	4			34·4			48·3			31·5	
"	5						53·1			25·9	
"	d										
"	e										
"	f										
Sum				121·3						133·8	
Mean		20	37	24·26				21	1	26·76	
Red'n to											
$\overline{m}$				−02						−02	
n . tan. δ				00						−01	
c . sec. δ				+03						+03	
r				+01						00	
T		20	37	24·27				21	1	26·76	
a		20	36	53·03	20	52	12·19	21	0	55·23	
Δ T				−31·24						−31·53	

ΔT = −31·34 at $20^h\ 45^m$ (½ wt. to 61' Cygni poorly observed.)

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1866phae.proj..334L

Date		Dec 4	Dec 4	Dec 4
Observer		J M S	J M S	J M S
Illumin'n		E	E	E
Star		α Ceti	48 Cephei	ζ Arietis
Mag.				
δ				
Wire	a			
"	b			
"	c			
"	1	2 55 1·8		3 6 57·4
"	2	5·3		7 1·3
"	3	8·9	3 3 28·0	5·1
"	4	12·4	45·3	8·9
"	5	16·0	4 1·7	12·9
"	d			
"	e			
"	f			
Sum		44·4		25·6
Mean		2 55 8·88		3 7 5·12
Red'n to $\bar{m}$		−02		−02
n . tan. δ		00		00
c . sec. δ		+02		+02
r		00		00
T		2 55 8·88		3 7 5·12
a		2 55 20·65		3 7 16·78
Δ T		+11·77		+11·66

n assumed = 0

ΔT = +11·71 at $3^h\ 0^m$

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1866phae.proj..334L

Date		Dec 5			Dec 5			Dec 5			
Observer		G M S			G M S			G M S			
Illumin'n		E			E			E			
Star		α Cygni			ν Cygni			α Cephei			
Mag.											
δ											
Wire	a										
"	b										
"	c										
"	1	20	36	30·3	20	51 ~~52~~	50·2 4·6	21	14	55·9	
"	2			35·4			55·3		15	3·6	
"	3			40·3			59·9			11·5	
"	4			45·7		52	4·6			19·2	
"	5			50·7			9·3			26·7	
"	d										
"	e										
"	f										
Sum				202·4			299·3			56·9	
Mean		20	36	40·48	20	51	59·86	21	15	11·38	
Red'n to											
m				+10			+10			+10	
n . tan. δ				00			00			−06	
c . sec. δ				+03			+03			+04	
r				+13			+13			+08	
T		20	36	40·61	20	51	59·99	21	15	11·46	
a		20	~~52~~ 36	52·99	20	52	12·15	21	15	23·73	
Δ T				+12·38			+12·16			+12·27	

n = −·06 from α Cephei & mean of α & ν Cygni

ΔT = +12·27 at $20^h 50^m$

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1866phae.proj..334L

Date		Dec. 9				Dec 9				Dec 9							
Observer		G M S				G M S				G M S							
Illumin'n																	
Star		α Aquarii				32 Urs. Maj. b c				θ Aquarii							
Mag.																	
δ																	
Wire	a																
"	b																
"	c																
"	1	21	58	34.1		22	7	47.0		22	9	26.0					
"	2			37.7				55.7				29.8					
"	3			41.3			8	4.2				33.0					
"	4			45.0				13.7				37.0					
"	5			48.4				22.2				40.2					
"	d																
"	e																
"	f																
Sum				206.5				22.7				166.0					
Mean		21	58	41.30		22	8	4.54		22	9	33.20					
Red'n to																	
$\bar{m}$				+04				+04				+04					
n. tan. δ				+08				+28				+10					
c. sec. δ				+02				−05				+02					
τ				+14				+27				+16					
T		21	58	41.44		22	8	4.81		22	9	33.36					
a		21	58	56.41		10	8	19.77		22	9	48.10					
Δ T				+ 14.97				+ 14.96				+ 14.74					

n = −0.09 from α Aquarii & 32 Urs. Maj. b c.

ΔT = + 14.92 at 22h 0m (½ wt. to θ Aquarii, seeing bad.)

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1866phae.proj..334L

Date		Dec 10			Dec 10			
Observer		G M S			G M S			
Illumin'n								
Star		ζ Cygni			α Cephei			
Mag.								
δ								
Wire	a							
"	b							
"	c							
"	1	21	6	52·0	21	14	52·2	
"	2			56·0		15	0·2	
"	3		7	0·2			8·1	
"	4			4·5			15·6	
"	5			8·9			23·4	
"	d							
"	e							
"	f							
Sum				1·6			39·5	
Mean		21	7	0·32	21	15	7·90	
Red'n to								
$\overline{m}$				+03			+03	
n . tan. δ				+03			−09	
c . sec. δ				+02			+04	
r				+08			−02	
T		21	7	0·40	21	15	7·88	
a		21	7	15·81	21	15	23·55	
Δ T				+15·41			+15·67	

n used as −0·09

ΔT = +15·54 at $21^h\ 10^m$

d.)

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1866phae.proj..334L

Date		Dec 11			Dec 11			Dec 11			
Observer		G M S			G M S			G M S			
Illumin'n		e			e			e			
Star		e Tauri			15 Draconis & C			α Camelop.			
Mag.											
δ											
Wire	a										
"	b										
"	c										
"	1	4	20	28·4	16	27	34·5	4	40	20·0	
"	2			32·3			44·4			29·7	
"	3			35·6			55·1			38·1	
"	4			40·0		28	5·0			47·2	
"	5			43·8			15·5			55·9	
"	d										
"	e										
"	f										
Sum				180·1			274·5			190·9	
Mean		4	20	36·02	16	27	54·90	4	40	38·18	
Red'n to											
$\overline{m}$				00			00			00	
n . tan. δ				+ 04			+ 25			− 09	
c . sec. δ				+ 02			− 06			+ 05	
r				+ 06			+ 19			− 04	
T		4	20	36·08	16	27	55·09	4	40	38·14	
a		4	20	52·39	16	28	11·03	4	40	54·09	
Δ T				+ 16·31			+ 15·94			+ 15·95	

n = − 0·07 from 15 Drac. & C. & α Camelop.

ΔT = +16·15 at $4^h\ 30^m$ (½ wt. to the fidus.)

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1866phae.proj..334L

Date		Dec 11		
Observer		G M S		
Illumin'n		C		
Star		ι Aurigae		
Mag.				
δ				
Wire	a			
"	b			
"	c			
"	1	4 48 56.7		
"	2	49 0.9		
"	3	5.2		
"	4	9.8		
"	5	14.1		
"	d			
"	e			
"	f			
Sum		26.7		
Mean		4 49 5.34		
Red'n to				
$\overline{m}$		00		
n . tan. δ		+02		
c . sec. δ		+02		
r		+04		
T		4 49 5.38		
a		4 48 21.58		
Δ T		+16.20		

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1866phae.proj..334L

Date		Dec 13	Dec 13
Observer		J. M. S.	J. M. S.
Illumin'n		E	E
Star		32 Camelop. (Gill)	ε Piscium
Mag.			
δ			
Wire	a		
"	b		
"	c		
"	1	0 46 30·3	0 55 38·5
"	2	47 3·3	42·1
"	3		45·6
"	4	wire gave out.	49·4
"	5		53·1
"	d		
"	e		
"	f		
Sum			228·7
Mean			0 55 45·74
Red'n to $\bar{m}$			+03
n . tan. δ			00
c . sec. δ			+02
τ			0 55 45·79
T			
a			0 56 2·98
Δ T			+17·19

$\Delta T = +17.19$ at $1^h\ 0^m$

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1866phae.proj..334L

Date	Dec 15	Dec 15	Dec 15
Observer	G M S	G M S	G M S
Illumin'n	E	E	E
Star	κ Draconis 1C	α Cassiopeae	β Ceti
Mag.			
δ			
Wire a			
" b			
" c			
" 1	0 27 5.2	0 32 29.0	0 36 29.3
" 2	16.0	35.2	33.2
" 3	26.1	41.8	37.1
" 4	37.3	48.3	41.0
" 5	48.7	54.7	44.6
" d			
" e			
" f			
Sum	133.3	209.0	185.2
Mean	0 27 26.66	0 32 41.80	0 36 37.04
Red'n to			
$\overline{m}$	−13	−13	−13
n. tan. δ	−11	+02	−04
c. sec. δ	−06	+04	+02
r	−30	−07	−15
T	0 27 26.36	0 32 41.73	0 36 36.89
a	12 27 44.58	0 32 59.93	0 36 54.67
Δ T	+18.22	+18.20	+17.78

n from κ Draconis 1C, & α Cassiopeae = +.03

Δ T at $0^h\ 30^m$ = +18.07

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1866phae.proj..334L

Date		Dec 18			Dec 18			Dec 18		
Observer		G.M.S			G.M.S			G.M.S		
Illumin'n		E			E			E		
Star		i Cephei			α Pisc. Aust.			α Vegæi		
Mag.										
δ										
Wire	a									
"	b									
"	c									
"	1	22	44	21·2	22	49	50·0	22	57	41·7
"	2			29·9			53·9			45·6
"	3			38·7			58·0			49·2
"	4			47·6		50	2·2			53·0
"	5			55·9			6·5			56·8
"	d									
"	e									
"	f									
Sum				193·4			290·6			246·3
Mean		22	44	38·68	22	49	58·12	22	57	49·26
Red'n to										
$\bar{m}$				−11			−11			−11
n. tan. δ				00			00			00
c. sec. δ				+05			+02			+02
r				−06			−09			−09
T		22	44	38·62	22	49	58·03	22	57	49·17
a		22	44	57·41	22	50	16·81	22	58	7·93
Δ T				+18·79			+18·78			+18·76

n from i Cephei & α Pisc. Aust = ·00

ΔT at $22^h 50^m$ = +18·78

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1866phae.proj..334L

Date		Dec 20	Dec 21	Dec 20
Observer		G M S	G M S	G M S
Illumin'n		E	E	E
Star		α^2 Geminorum	α Can. Min.	η Geminorum
Mag.				
δ				
Wire	a			
"	b			
"	c			
"	1	7 25 39.3	7 31 54.0	7 44 54.2
"	2	43.7	57.8	58.1
"	3	47.8	32 1.1	45 2.2
"	4	52.2	5.0	6.2
"	5	55.9	8.5	10.2
"	d			
"	e			
"	f			
Sum		238.9	6.4	10.7
Mean		7 25 47.78	7 32 1.28	7 45 2.18
Red'n to				
m		− 23	− 23	− 23
n . tan. δ		− 01	− 02	− 01
c . sec. δ		+ 02	+ 02	+ 02
r		− 22	− 23	− 22
T		7 25 47.56	7 32 1.05	7 45 1.96
a		7 26 7.50	7 32 21.48	7 45 22.36
Δ T		+19.94	+20.43	+20.40

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1866phae.proj..334L

Date		Dec 20	
Observer		G M S	
Illumin'n		E	
Star		ε Draconis 2C	
Mag.			
δ			
Wire	a		
"	b		
"	c		
		7 47	52.5?
"	1	7 48	3.0
"	2		14.1
"	3		24.0
"	4		35.1
"	5		
"	d		
"	e		
"	f		
Sum			68.7
Mean		7 48	13.74
Red'n to			
m			−23
n . tan. δ			−07
c . sec. δ			−06
r			−36
T		7 48	13.38
a		19 48	33.79
Δ T			+20.41

n = +02 from ε Draconis & mean of

~~ε~~ α & ζ Can. Min. & φ Geminorum

α Gem. double - poorly observed.

ΔT = +20.29 at 7h 40m

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1866phae.proj..334L

Date		Dec 26	Dec 26	Dec 26
Observer		9 M S	9 M S	9 M S
Illumin'n		W	W	W
Star		ι Cephei	α Psc. Aust.	α Pegasi
Mag.				
δ				
Wire	a			
"	b			
"	c			
"	1	22 44 13·1	22 49 41·7	22 57 33·8
"	2	21·7	46·2	37·7
"	3	30·5	50·3	41·3
"	4	39·0	54·3	44·9
"	5	47·9	58·6	48·9
"	d			
"	e			
"	f			
Sum		152·2	251·1	206·6
Mean		22 44 30·44	22 49 50·22	22 57 41·32
Red'n to				
m		+03	+03	+03
n. tan. δ		+12	−14	−06
c. sec. δ				
		−26	−13	−11
r				
		−11	−24	−14
T		22 44 ~~30·38~~ 30·33	22 49 ~~50·04~~ 49·98	22 57 ~~41·22~~ 41·18
a		22 44 57·06	22 50 16·71	22 58 7·84
		+26·73	+26·73	+26·66
ΔT		~~+26·68~~	+26·67	+26·62

n = +·09 from ι Cephei & α Psc. Aust.
26·71

ΔT = ~~+26·68~~ at 22h 50m

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1866phae.proj..334L

Date		Dec 28			Dec 28			Dec 28			
Observer		J M S			J M S			J M S			
Illumin'n		W			W			W			
Star		λ Draconis 20			ν Piscium			Groomb. 4163			
Mag.											
δ											
Wire	a										
"	b										
"	c										
"	1	23	22	38·7	23	32	31·0	23	47	30·2	
"	2			49·1			34·6			43·1	
"	3			59·4			38·3			56·9	
"	4		23	10·5			41·6		48	9·0	
"	5			21·2			45·7			22·1	
"	d										
"	e										
"	f										
Sum				298·9			191·2			281·3	
Mean		23	22	59·78	23	32	38·24	23	47	56·26	
Red'n to $\bar{m}$				−11			−11			−11	
n . tan. δ				− 88			− 20			+ 60	
c . sec. δ				+ 32			− 11			− 39	
r				− 67			− 42			+ 10	
T		23	22	59·11	23	32	37·82	23	47	56·36	
a		11	23	27·65	23	33	6·35	23	48	24·94	
Δ T				+ 28·54			+ 28·53			+ 28·58	

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1866phae.proj..334L

Date		Dec 28			Dec 28			Dec 28		
Observer		S M S			S M S			S M S		
Illumin'n		W			W			W		
Star		ω Piscium			α Andromedæ			γ Pegasi		
Mag:										
δ										
Wire	a									
"	b									
"	c									
"	1	23	52	53·5	0	0	54·8	0	5	48·0
"	2			57·0			58 8			51·5
"	3		53	0·6		1	3·1			55·3
"	4			4·1			7·1			59·0
"	5			8·0			11·2		6	2·8
"	d									
"	e									
"	f									
Sum				3·2			15·0			276·6
Mean		23	53	0·64	0	1	3·00	0	5	55·32
Red'n to										
$\overline{m}$				−11			−11			−11
n. tan. δ				−19			−09			−16
c. sec. δ				−11			−13			−11
r				−41			−33			−38
T		23	53	0·23	0	1	2·67	0	5	54·94
a		23	52	28·80	0	1	31·18	0	6	23·37
Δ T				+28·57			+28·51			+28·43

$n = +0·24$ from λ Drac. L. C. & Groomb. 4163

$\Delta T = +28·53$ at $23^h\ 50^m$

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Date		Dec 30			Dec 30			Dec 30			
Observer		v Piscium			Gr. 4163			v Piscium			
Illumin'n		9 M S W			9 M S W			9 M S W			
Star		v Piscium			Gr. 4163			v Piscium			
Mag.											
δ											
Wire	a										
"	b										
"	c										
"	1	23	31	48·1	23	46	48·0	23	51	10·4	
"	2			51·5		47	0·3			14·0	
"	3			55·3			13·6			17·8	
"	4			58·9			26·2			21·3	
"	5		32	2·4			39·7			25·0	
"	d										
"	e										
"	f										
Sum				276·2			67·8			88·5	
Mean		23	31	55·24	23	47	13·56	23	51	17·70	
Red'n to $\bar{m}$				+ 01			+ 01			+ 01	
n . tan. δ				− 11			+ 33			− 11	
c . sec. δ				− 11			− 39			− 11	
r				− 21			− 05			− 21	
T		23	31	55·03	23	47	13·51	23	51	17·49	
a		23	33	6·33	23	48	24·80	23	52	28·77	
Δ T			+ 1	11·30		+ 1	11·29		+ 1	11·28	

n = +0·13 from Gr. 4163 & mean of the two tinie stars

ΔT = +1 11·29 at $23^h\ 45^m$

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1866phae.proj..334L

Date		Dec 30			
Observer		W Horne			
Illumin'n		W			
		star preceding			
Star		α Andromedae			
Mag.					
δ					
Wire	a				
"	b				
"	c				
"	1	23	58	23·1	
"	2			27·3	
"	3			31·4	
"	4			35·8	
"	5			40·1	
"	d				
"	e				
"	f				
Sum					
Mean					
Red'n to					
$\overline{m}$					
n . tan. δ					
c . sec. δ					
r					
T					
a					
Δ T					

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1866phae.proj..334L

Date		1867 Jan 3			Jan 3			Jan 3			
Observer		G M S			G M S			G M S			
Illumin'n		W			W			W			
Star		ω Piscium			α Andromedæ			γ Pegasi			
Mag.											
δ											
Wire	a										
"	b										
"	c										
"	1	23	51	7.8	0	0	9.0	0	5	2.2	
"	2			11.4			13.3			5.9	
"	3			14.7			17.5			9.7	
"	4			18.9			21.6			13.3	
"	5			22.6			25.5			17.1	
"	d										
"	e										
"	f										
Sum				75.4			86.9			48.2	
Mean		23	51	15.08	0	0	17.38	0	5	9.64	
Red'n to $\bar{m}$				−09			−09			−09	
n . tan. δ				+05			+02			+04	
c . sec. δ				−08			−09			−08	
r				−12			−16			−13	
T		23	51	14.96	0	0	17.22	0	5	9.51	
a		23	52	28.73	0	1	31.08	0	6	23.29	
Δ T			+1	13.77		+1	13.86		+1	13.78	

$n = -0.06$ from mean of time stars, and K Drac.

$\Delta T = +1\ 13.80$ at $0^h\ 5^m$

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1866phae.proj..334L

Date		Jan 3			Jan 4			Jan 4			
Observer		G M S			G M S			G M S			
Illumin'n		W			W			W			
Star		κ Draconis L.C.			α Androm.			γ Pegasi			
Mag.											
δ											
Wire	a										
"	b										
"	c										
"	1	0	26	9.8	0	0	9.0	0	5	1.9	
"	2			21.4			12.9			5.4	
"	3			32.0			17.1			9.1	
"	4			42.6			21.2			13.0	
"	5			53.4			25.2			16.8	
"	d										
"	e										
"	f										
Sum				159.2			85.4			46.2	
Mean		0	26	31.84	0	0	17.08	0	5	9.24	
Red'n to											
m				−09			−17			−17	
n . tan. δ				+22			+02			+04	
c . sec. δ				+24			−09			−08	
r				+37			−24			−21	
T		0	26	32.21	0	0	16.84	0	5	9.03	
a		12	27	46.02	0	1	31.07	0	6	23.28	
Δ T			+1	13.81		+1	14.23		+1	14.25	

re. L. C.

$\Delta T = +1^m\ 14^s.24$ at $0^h\ 5^m$

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1866phae.proj..334L

Date		Jan 7			Jan 7			Jan 7			
Observer		G M S			G M S			G M S			
Illumin'n		W			W			W			
Star		β Arietis			50 Cassiopeae			α Arietis			
Mag.											
δ											
Wire	a										
"	b										
"	c										
"	1	1	44	14.6	1	48	51.0	1	56	37.3	
"	2			18.3		49	3.0			41.3	
"	3			22.2			14.5			45.2	
"	4			26.1			26.1			49.1	
"	5			29.9			37.8			53.3	
"	d										
"	e										
"	f										
Sum				111.1			72.4			226.2	
Mean		1	44	22.22	1	49	14.48	1	56	45.24	
Red'n to											
$\overline{m}$				-11			-11			-11	
n . tan. δ				-05			+21			-05	
c . sec. δ											
				-09			-26			-09	
τ				-25			-16			-25	
T		1	44	21.97	1	49	14.32	1	56	44.99	
a		1	47	18 37	1	52	10.79	1	59	41.50	
Δ T		+ 2		56.40	+ 2		56.47	+ 2		56.51	

$n = +10$ from 50 Cassiop. & mean of β & α Arietis

$\Delta T = +2\ 56.46$ at $1^h\ 50^m$

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1866phae.proj..334L

Date	Jan 14	Jan 14	Jan 14
Observer	G M S	G M S	G M S
Illumin'n	W	W	W
Star	α Andromedæ	η Piscium	β Arietis
Mag.			
δ			
Wire a			
" b			
" c			
" 1	0 0 58·1	1 23 50·0	1 46 45·9
" 2	1 2·2	54·1	49·9
" 3	6·3	57·8	53·5
" 4	10·4	24 1·4	57·1
" 5	14·5	5·2	1·2
" d			
" e			
" f			
Sum	31·5	288·5	267·6
Mean	0 1 6·30	1 23 57·70	1 46 53·52
Red'n to			
m.	−20	−20	−20
n. tan. δ	−10	−17	−15
c. sec. δ	−09	−08	−09
r	−39	−45	−44
T	0 1 5·91	1 23 57·25	1 46 53·08
			18·27
a	0 1 30·92	1 24 22·37	1 47 41·40
Δ T	+25·01	+25·12	+25·19

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1866phae.proj..334L

Date		Jan. 14		
Observer		G.M.S		
Illumin'n		W		
Star		50 Cassiopeae		
Mag.				
δ				
Wire	a			
"	b			
"	c			
			51	22.3
"	1	1	~~52~~	~~9.0~~
"	2			32.9
"	3			45.0
"	4			56.2
"	5		52	9.0
"	d			
"	e			
"	f			
Sum				225.4
Mean		1	51	45.08
Red'n to				
$\overline{m}$				−20
n.tan. δ				+59
c.sec. δ				−25
τ				+14
T		1	51	45.22
a		1	52	10.39
Δ T				+25.17

n = +0.28 from 50 Cassiop. & mean of β Arietis & η Piscium

ΔT = +25.12 at $1^h\ 15^m$

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1866phae.proj..334L

Date		Jan 22	Jan 22	Jan 22
Observer		G M S	G M S	G M S
Illumin'n		W	W	W
Star		β Arietis	50 Cassiopeae	α Arietis
Mag.				
δ				
Wire	a			
"	b			
"	c			
"	1	1 46 43·2	1 51 19·6	1 59 6·2
"	2	47·0	31·0	10·0
"	3	50·7	42·6	14·0
"	4	54·7	53·4	17·8
"	5	58·7	52 6·0	22·0
"	d			
"	e			
"	f			
Sum		254·3	212·6	70·0
Mean		1 46 50·86	1 51 42·52	1 59 14·00
Red'n to				
m		26 −~~35~~	26 −~~35~~	26 −~~35~~
n. tan. δ		−05	+21	−05
c. sec. δ		−09	−26	−09
r		−40	−31	−40
T		1 46 50·46	1 51 42·21	1 59 13·60
a		1 47 18·16	1 52 9·90	1 59 41·28
Δ T		+27·70	+27·69	+27·68

n = +10 from 50 Cassiop. & mean of three stars

ΔT = +27·69 at $1^h\,50^m$

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1866phae.proj..334L

Date		Jan 28	Jan 28	Jan 28
Observer		G M S	G M S	G M S
Illumin'n		W	W	W
Star		65 Ceti	ι Cassiopeae	5 Urs Min L C
Mag.				
δ				
Wire	a			
"	b			
"	c			
"	1	2 7 ~~14.1~~ 5 21.1	2 17 22.2	2 26 48.6
"	2	24.5	31.7	27 4.9
"	3	28.3	41.0	20.0
"	4	32.1	50.0	34.9
"	5	35.8	58.9	50.0
"	d			
"	e			
"	f			
Sum		141.8	2038	98.4
Mean		2 5 28.36	2 17 40.76	2 27 19.68
Red'n to				
$\overline{m}$		−09	−09	−09
n . tan. δ		−15	+ 26	−95
c . sec. δ		−08	20	+34
r		−32	−03	−70
T		2 5 28.04	2 17 40.73	2 27 18.98
a		2 5 57.37	2 18 10.13	14 27 48.34
Δ T		+29.33	+29.40	+29.36

$n = +0.19$ from ι Cass. & 5 Urs Min L C

$\Delta T = +29.36$ at $2^h\ 15^m$

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1866phae.proj..334L

Date		Feb 4			Feb 4			Feb 4			
Observer		G.M.S.			G.M.S.			G.M.S.			
Illumin'n		W			W			W			
Star		α Arietis			ι Cassiopeæ			5 Ursæ Min.			
Mag.								L.C.			
δ											
Wire	a										
"	b										
"	c										
"	1	1	59	1·5	2	17	19·9	2	[26	46·5]	
"	2			5·3			29·0		27	1·9	
"	3			9·3			38·2			17·6	
"	4			13·3			47·3			32·3	
"	5			17·2			56·5			48·0	
"	d										
"	e										
"	f										
Sum				46·6			190·9			86·3	
Mean		1	59	9·32	2	17	38·18	2	27	17·26	
Red'n to $\bar{m}$				−05			−05			−05	
n. tan. δ				−03			+08			−30	
c. sec. δ				−08			−20			+34	
r				−16			−17			−01	
T		1	59	9·16	2	17	38·01	2	27	17·25	
a		1	59	41·07	2	18	9·80	14	27	49·04	
Δ T				+31·91			+31·79			+31·79	

n = +·06 from ι Cassiop. & 5 Ursæ Min. L.C.

$\Delta T' = +31·83$ at $2^h\ 10^m$

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1866phae.proj..334L

Date	Feb 11	Feb 11	Feb 11
Observer	G M S	G M S	G M S
Illumin'n	W	W	W
Star	α Ceti	ζ Arietis	α Persei
Mag.			
δ			
Wire a			
" b			
" c			
" 1	2 54 37.3	3 6 33.0	3 14 4.7
" 2	41.0	36.7	10.1
" 3	44.7	40.7	15.7
" 4	48.2	44.5	21.1
" 5	51.9	48.5	27.0
" d			
" e			
" f			
Sum	223.1	203.4	78.6
Mean	2 54 44.62	3 6 40.68	3 14 15.72
Red'n to			
$\overline{m}$	− 09	−09	−09
n . tan. δ	− 19	−13	+ 06
c . sec. δ	− 08	− 09	−12
τ	− 36	− 31	−15
T	2 54 44.26	3 6 40.37	3 14 15.57
a	2 55 19.98	3 7 16.11	3 14 51.30
Δ T	+ 35.72	+ 35.74	+ 35.73

$n = +.23$ from α Ceti & α Persei

$\Delta T = +35.73$ at $3^h\ 5^m$

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1866phae.proj..334L

Date		Feb 17			Feb 17			
Observer		S M S			S M S			
Illumin'n		W			W			
Star		γ Geminorum			δ Draconis 2 C			
Mag.								
δ								
Wire	a							
"	b							
"	c							
"	1	6	29	18·2	7	11	32·6	
"	2			21·9			42·1	
"	3			25·6			51·2	
"	4			29·2			0·9	
"	5			33·3			10·3	
"	d							
"	e							
"	f							
Sum				128·2			257·1	
Mean		6	29	25·64	7	11	51·42	
Red'n to								
$\overline{m}$				−10			−10	
$\overline{n \cdot \tan. \delta}$				−05			−27	
$\overline{c \cdot \sec. \delta}$				−08			+21	
r				−23			−16	
T		6	29	25·41	7	11	51·26	
a		6	30	3·00	19	12	28·86	
Δ T				+37·59			+37·60	

$n = +08$

$\Delta T = +37{\cdot}60$ at $7^h\ 0^m$

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1866phae.proj..334L

Date		Feb. 25	Feb 25	Feb. 25
Observer		G M S	G M S	G M S
Illumin'n		W	W	W
Star		α Ceti	α Persei	δ Persei
Mag.				
δ				
Wire	a			
"	b			
"	c			
"	1	2 54 39.7	3 14 7.1	3 32 45.1
"	2	43.4	12.7	50.3
"	3	47.1	18.3	55.7
"	4	50.7	23.9	33 0.9
"	5	54.5	29.1	6.6
"	d			
"	e			
"	f			
Sum		235.4	91.1	278.6
Mean		2 54 47.08	3 14 18.22	3 32 55.72
Red'n to				
$\overline{m}$		−.09	−.09	−.09
n. tan. δ		−.07	+.02	+.01
c. sec. δ		−.08	−.12	−.12
r		−.24	−.19	−.20
T		2 54 46.84	3 14 18.03	3 32 55.52
a		2 55 19.75	3 14 50.91	3 33 28.45
Δ T		+32.91	+32.88	+32.93

n = +.08 from mean of α and δ Persei, and α Ceti

ΔT = + 32.91 at $3^h\ 15^m$

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Date		Mar. 8				Mar 8				
Observer		G M S				G M S				
Illumin'n		W				W				
Star		α Ceti				α Persei				
Mag.										
δ										
Wire	a									
"	b									
"	c									
"	1	2	54	49.6		3	14	16.5		
"	2			53.1				22.2		
"	3			56.8				27.7		
"	4		55	0.3				33.2		
"	5			4.1				38.9		
"	d									
"	e									
"	f									
Sum				283.9				138.5		
Mean		2	54	56.78		3	14	27.70		
Red'n to										
m				− 21				− 21		
n . tan. δ				− 12				+ 04		
c . sec. δ				− 08				− 12		
r				− 41				− 29		
T		2	54	56.37		3	14	27.41		
a		2	55	19.59		3	14	50.63		
Δ T				+ 23.22				+ 23.22		

$n = +.14$

$\Delta T'$ at $3^h 5^m = +23.22$

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1866phae.proj..334L

		Mar	Mar	Mar
Date		Feb 15	Feb 15	Feb 15
Observer		G M S	G M S	G M S
Illumin'n		W	W	W
Star		α Tauri	α Aurigae	β Orionis
Mag.				
δ				
Wire	a			
"	b			
"	c			
"	1	4 27 56.0	5 6 27.7	5 7 47.7
"	2	59.8	33.1	51.3
"	3	28 3.5	38.6	54.9
"	4	7.3	43.6	58.6
"	5	11.3	49.0	8 2.3
"	d			
"	e			
"	f			
Sum		17.9	192.0	274.8
Mean		4 28 3.58	5 6 38.40	5 7 54.96
Red'n to				
$\bar{m}$		−.15	−.15	−.15
n. tan. δ		−.09	+.02	−.17
c. sec. δ		−.08	−.12	−.08
r		−.32	−.25	−.40
		3.26	38.15	54.56
T		4 28 ~~3.16~~	5 6 ~~38.17~~	5 7 ~~54.37~~
		17.75	52.71	9.12
a		4 28 ~~18.26~~	5 6 ~~53.44~~	5 8 ~~9.64~~
		+14.49	+14.56	+14.56
Δ T		~~+15.10~~	~~+15.27~~	~~+15.29~~

$n = +.\overset{16}{\cancel{17}}$ from α Aurigae & β Orionis

ΔT at 5^h = ~~+15.21~~ +14.54

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1866phae.proj..334L

Date		Mar 19	Mar 19
Observer		G M S	G M S Chron 236
Illumin'n		W	W eye & ear
Star		ε Bor. Bor	β¹ Scorpii
Mag.			
δ			
Wire	a		
"	b		
"	c		
"	1	15 51 38·8	15 57 18·0
"	2	43·0	21·4
"	3	47·0	25·5
"	4	50·8	29·5
"	5	55·2	32·4
"	d		
"	e		
"	f		
Sum		234·8	126·8
Mean		15 51 46·96	15 57 25·36
Red'n to			
m		−·19	−·19
n. tan. δ		−·31	−1·01
c. sec. δ		−·09	−·08
☿ T		15 51 46·37	15 57 24·08
T			
a		15 52 6·00	15 57 43·72
Δ T		+19·63	+19·66

n = +·80

Correction to chron. 236 =

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Date	Mar 22	Mar 22	Mar 22
Observer	G M S	G M S	G M S
Illumin'n	W	W	W
Star	α Ursæ Maj.	δ Leonis	δ Crateris
Mag.			
δ			
Wire a			
" b			
" c			
" 1	10 55 11.5	11 6 51.4	11 12 31.8
" 2	19.4	55.2	35.5
" 3	27.3	59.1	39.1
" 4	34.9	7 3.0	42.9
" 5	43.0	6.7	46.8
" d			
" e			
" f			
Sum	136.1	295.4	196.1
Mean	10 55 27.22	11 6 59.08	11 12 39.22
Red'n to			
$\bar{m}$	−15	−15	−15
n . $\overline{\tan. \delta}$	+22	−11	−26
c . sec. δ	−17	−09	−08
τ	−10	−35	−49
T	10 55 27.12	11 6 58.73	11 12 38.73
a	10 55 31.92	11 7 3.60	11 12 43.53
Δ T	+4.80	+4.87	+4.80

n = +0.22 from α Ursæ Maj. & δ Crateris

ΔT at $11^h\ 5^m$ = +4.82

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Date		Mar 29			Mar 29			Mar 29
Observer		G M S			G M S			G M S
Illumin'n		W			W			W
Star		α^2 Geminorum			α Can. Min			β Geminorum
Mag.								
δ								
Wire	a							
"	b							
"	c							
"	1	7	~~25~~ 26	~~20~~	7	~~31~~ 32	19.9	7 ~~36~~ 37 9.2
"	2			5.1			23.7	13.2
"	3			9.1			27.2	17.3
"	4			13.4			30.8	21.8
"	5			17.9			34.5	25.8
				22.1				
"	d							
"	e							
"	f							
Sum				67.6			136.1	87.3
Mean		7	~~25~~ 26	13.52	7	32	27.22	7 ~~36~~ 37 17.46
Red'n to								
m				−13			−13	−13
n. tan. δ				~~+32~~ +15			~~+15~~ 32 +15	+15
c. sec. δ				−09			−08	−09
r				−11			+11	−07
T		7	26	13.41	7	32	27.33	7 ~~36~~ 37 17.39
a		7	26	7.25	7	32	21.27	7 37 11.40
Δ T		−6.16		~~+53.84~~	−6.06		~~+53.94~~	−5.99 +54.01

n = −.40 from mean of the other two α Can Min 8

ΔT at $7^h\ 30^m$ = ~~+53.93~~ − 6.07

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Date		Apr 2		
Observer		GMS		
Illumin'n		W		
Star		α Orionis		
Mag.				
δ				
Wire	a			
"	b			
"	c			
"	1	5	48	4·2
"	2			7·9
"	3			11·6
"	4			15·1
"	5			18·9
"	d			
"	e			
"	f			
Sum				57·7
Mean		5	48	11·54
Red'n to				
m				− 10
n . tan. δ				− 24
c . sec. δ				− 08
r				− 42
T		5	48	11·12
a		5	47	58·62
Δ T				− 12·50

n assumed = + 0·31 from determ. of Apr 6

Δ T = − 12·50 at 5h 45m

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Date				
Observer Illumin'n				
Star Mag. δ				
Wire	a			
"	b			
"	c			
"	1			
"	2			
"	3			
"	4			
"	5			
"	d			
"	e			
"	f			
Sum Mean				
Red'n to m n . tan. δ c . sec. δ				
r				
T a				
Δ T				

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Date

Observer

Illumin'n

Star

Mag.

δ

$$\Theta = -26''.8 + 26''.\sin(107°30' + x)$$

		x	A	b	adopted	adopted Θ	b	a + b
Wire	a	0	-6".8	-6.5		-6".6	1.8	-4.8
"	b	10	-13.5	13.8		13.6	3.8	-9.8
"	c	20	-1.0	5.0		3.0	6.0	+3.0
		30	-5.1	7.0		6.0	9.2	+3.2
"	1	40	-2.0	7.2		4.6	12.7	+8.6
"	2	50	-7.5	12.5	10.3	12.0	16.8	+5.2
"	3	60	-7.2	10.3		8.7	23.2	+14.5
"	4	70	-24.9	30.0		27.9	25.4	-2.5
"	5	80	-34.3	36.5		35.4	30.2	-5.2
		90	-42.0	43.2		42.6	34.5	-8.1
"	d	100	-43.4	44.5		44.0	38.8	-5.2
"	e	110	-43.8	45.2		44.5	42.5	-2.0
"	f	120	-44.2	49.0		46.6	45.8	-0.8
		130	-49.9	50.5		50.0	48.6	-1.4
Sum		140	-50.8	50.9		50.8	50.7	-0.1
Mean		150	-51.3	50.8		51.0	52.1	+1.1
		160	-49.9	47.8		48.9	52.8	+3.9
Red'n to		170	-48.9	50.6		49.7	52.6	+2.9
m		180	-47.1	48.3		47.7	51.7	+4.0
n . tan. δ		190	-40.0	38.1		40.0	50.0	+10.0
c . sec. δ		200	-47.3	49.9		48.6	46.8	-1.8
		210	-47.2	46.2		46.7	44.4	-2.3
τ		220	-46.1	46.6		46.3	40.9	-5.4
		230	-43.5	43.2		43.3	36.8	-6.5
T		240	-43.7	44.8		44.2	32.4	-11.8
		250	-24.0	28.2		26.1	28.2	+2.1
a		260	-19.0	21.9		20.0	23.4	+3.4
		270	-9.5	14.9		14.9	19.1	+4.2
Δ T		280	-10.0	9.5		10.0	14.8	+4.8
		290	-8.4	9.9		9.0	11.1	+2.1
		300	-4.0	4.9		4.5	7.8	+3.3
		310	-4.0	4.0		4.0	5.0	+1.0
		320	-2.5	3.5		-3.0	2.9	-0.1
		330	-1.8	1.5		-1.6	1.5	-0.1
		340	+0.8	-3.8		-1.0	0.8	-0.2
		350	-7.1	-5.0		-6.5	1.0	-5.5
						963.3		
		mean				-26".8		

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Date

Observer

Illumin'n

$c = 1.0\,(120 + 4x)$

Star

Mag.

δ

errors arising from diplicity of wires

Wire	a	0	− 0.3	0.3	− 0.5	.2
"	b	10	− 0.2	0.0	+ .2	.2
"	c	20	+ 1.0	1.0	+ 0.8	.2
		30	+ 0.5	0.5	+ 1.1	.6
"	1	40	+ 1.4	1.4	+ 0.8	.6
"	2	50	− 0.8		+ 0.2	1.0
"	3	60	+ 0.4		− 0.5	.9
"	4	70	− 0.2		− 0.9	.7
"	5	80	− 0.9		− 0.9	.0
		90	− 1.9		+ 0.5	1.4
"	d	100	− 0.2		+ 0.2	.4
"	e	110	+ 0.1		+ 0.8	.7
"	f	120	+ 1.3		+ 0.8	.5
		130	− 0.2		+ 0.8	1.0
Sum		140	− 0.1		− 0.9	1.0
Mean		150	+ 0.5		− 0.9	1.0
		160	+ 1.9		− 0.9	1.0
Red'n to		170	− 1.3		0.9	0.4
m		180				
n . tan. δ						
c . sec. δ						
τ						
T						
a						
Δ T						

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C − F − A + H
C + H − A + F

Date

Observer
Illumin'n

Star
Mag.
δ

		K	A	H	C	F	α	B	δ − α	
Wire	a	0	0	0.0	+7.5	−6.0	−0.0	+6.7	+6.7	0
"	b	10	0	−5.8	+8.0	−2.5	2.9	+2.7	−0.2	10
"	c	20	0	−22.2	+10.8	−9.0	11.1	9.9	−1.2	20
		30	0	−62.5	+8.9	−11.2	31.2	10.1	−21.1	30
"	1	40	0	−76.5	+7.0	−8.2	38.2	7.6	−30.6	40
"	2	50	0	−96.9	+5.0	−9.5	48.4	7.2	−41.2	50
"	3	60	0	−121.0	+3.0	−18.2	60.5	+10.6	−49.9	60
"	4	70	0	−99.5	−14.5	−2.5	49.7	−6.0	−55.7	70
"	5	80	0	−86.5	−21.0	+10.2	43.2	−15.6	−58.8	80
		90	0	−70.2	−27.9	+19.8	35.1	−23.8	−58.9	90
"	d	100	0	−59.5	−30.5	+22.8	+29.7	−26.6	−56.3	100
"	e	110	0	−47.8	−33.8	+31.0	23.9	32.4	−56.3	110
"	f	120	0	−48.5	−34.5	+35.3	25.7	34.9	−60.6	120
		130	0	−30.8	−39.0	+42.4	15.4	40.7	−56.1	130
Sum		140	0	−26.3	−40.2	+41.2	13.1	40.7	−53.8	140
Mean		150	0	−25.0	−37.8	+51.2	12.5	44.5	−57.0	150
		160	0	−19.9	−38.5	+51.2	9.9	44.8	−54.7	160
Red'n to		170	0	−19.5	−34.5	+56.5	9.7	45.5	−55.2	170
m		180	0	−21.8	−31.5	+52.0	+10.9	−41.7	−52.6	180
n . tan. δ		190	0	−24.8	−23.5	+46.7	12.4	35.1	−47.5	190
c . sec. δ		200	0	−21.9	−33.6	+38.1	10.9	35.8	−46.7	200
		210	0	−26.9	−31.9	+11.5	13.4	21.7	−35.1	210
r		220	0	−28.0	−30.4	−3.0	14.0	−13.7	−27.7	220
		230	0	−35.7	−28.0	−32.5	17.8	+2.2	−15.6	230
T		240	0	−45.6	−28.5	−56.0	22.7	13.7	−8.8	240
		250	0	−37.5	−13.6	−62.5	18.7	24.4	+5.7	250
a		260	0	−31.8	−6.5	−55.0	15.9	24.2	8.3	260
		270	0	−31.0	+0.5	−53.5	15.5	27.0	11.5	270
Δ T		280	0	−27.5	+3.0	−42.2	13.7	22.6	8.9	280
		290	0	−20.5	+2.4	−32.4	10.2	18.4	8.2	290
		300	0	−18.0	+5.0	−27.2	9.0	16.1	7.1	300
		310	0	−15.5	+11.0	−20.5	7.7	15.7	8.0	310
		320	0	−13.2	+11.2	−13.6	6.6	12.4	5.8	320
		330	0	−9.4	+11.5	−13.5	4.7	12.5	6.8	330
		340	0	−5.6	+11.9	−9.0	2.8	10.4	7.6	340
		350	0	−0.0	+7.5	−3.8	−0.0	+6.7	+6.7	350
		360							910.3	
									mean −25.3	

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Date				
Observer				
Illumin'n				
Star				
Mag.				
δ				
Wire	a			
"	b			
"	c			
"	1			
"	2			
"	3			
"	4			
"	5			
"	d			
"	e			
"	f			
Sum				
Mean				
Red'n to				
m				
n . tan. δ				
c . sec. δ				
r				
T				
a				
Δ T				

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1867 Apr 10

Date

Observer G M S

Illumin'n

Eastern Circle (Ill. w)

Star Mag.		A	B	C	D	Mean
δ	0	−0".2	−0".9	−7".9	−2".1	−3.3
	10	+0.3	−1.5	−15.9	−6.0	−5.8
Wire	a	−11.6	−1.4	−21.9	−8.0	−10.7
"	b	−13.5	−1.8	−26.8	−9.9	−13.0
"	c	−22.9	−3.0	−40.1	−16.3	−20.6
	50	−33.8	−4.9	−46.9	−18.0	−25.9
"	1	−19.8	−4.9	−47.7	−18.0	−22.6
"	2	−6.3	−4.0	−42.0	−12.8	−16.3
"	3	−4.8	−3.0	−40.0	−12.0	−15.9
"	4	−2.0	−5.1	−42.2	−14.8	−16.0
"	5	+10.0	−3.9	−34.8	−7.8	−9.2
	110	+12.0	−6.1	−34.0	−20.0	−12.0
"	d	+16.5	−7.2	−30.8	−16.0	−9.4
"	e	+21.0	−8.0	−29.9	−18.4	−8.8
"	f	+32.8	+1.0	−18.9	−8.0	+1.7
	150	+41.5	−0.7	−10.0	−6.0	+6.2
Sum	160	+388	−0.6	−14.0	+10.4	+8.6
Mean	170	+34.0	−0.8	−13.0	+17.7	+9.5
	180	+30.7	−2.1	−14.4	+22.9	+9.3
Red'n to	190	+26.0	−2.7	−0.4	+31.0	+13.5
m	200	+21.9	−3.0	−12.0	+27.8	+8.7
n. tan. δ	210	+20.9	−3.2	−8.1	+32.8	+10.6
c. sec. δ	220	+19.2	−2.1	−8.9	+37.8	+11.5
	230	+14.8	−2.8	−12.9	+34.0	+8.3
r	240	+8.5	−1.6	−23.1	+38.1	+5.5
	250	+8.9	+0.1	−14.3	+26.1	+7.7
T	260	+9.0	−2.0	−6.8	+34.2	+8.6
	270	+10.0	+0.2	+3.9	+35.3	+12.3
a	280	+3.8	−1.6	−5.3	+19.8	+4.2
	290	+7.9	−6.0	+0.3	+19.8	+5.5
Δ T	300	+8.2	−4.9	+2.3	+18.0	+5.9
	310	+8.8	−3.8	+8.6	+16.8	+7.6
	320	+13.9	+1.0	+14.0	+14.6	+10.9
	330	+22.4	+1.0	+24.8	+19.2	+16.8
	340	+16.0	+2.4	+15.1	+12.8	+11.6
	350	+8.0	+1.6	+5.3	+7.1	+5.5
	360	+3.2	+0.4	+0.3	+3.2	+1.8

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Wednesday, noon.

Date						
Observer						
Illumin'n						
			Western Circle (Ill W.)			
Star			76	9	7	8
Mag.						
δ			+4".6	+3".0	+5".9	+4".0
			+6.9	+16.5	+14.8	+9.0
Wire	a	−4.0	+1.7	+26.2	+22.8	+15.9
"	b		−28.0	+34.6	+24.1	+20.1
"	c		−54.8	+50.0	+34.8	+30.1
			−72.0	+54.5	+34.0	+36.0
"	1		−75.8	+59.3	+26.1	+41.0
"	2		−76.0	+59.0	+27.5	+39.6
"	3		−77.7	+57.0	+25.3	+38.9
"	4		−70.0	+59.0	+28.4	+42.3
"	5		−66.3	+58.4	+24.8	+32.3
			−57.0	+63.8	+28.9	+22.9
"	d		−56.0	+57.8	+27.0	−15.0
"	e		−52.0	+61.0	+28.2	−26.0
"	f		−57.8	+45.3	+20.3	−60.5
			−64.1	+35.4	+16.9	−85.8
Sum			−54.9	+38.0	+26.0	−80.2
Mean			−51.0	+45.5	+30.8	−74.1
			−48.6	+49.4	+32.0	−64.9
Red'n to			−43.0	+48.9	+33.8	−59.1
m			−36.6	+56.0	+30.9	−47.7
n. tan. δ			−41.0	+58.0	+6.6	−44.0
c. sec. δ			−36.8	+59.2	−3.4	−40.0
			−38.6	+62.9	−26.1	−31.7
r			−43.5	+65.7	−50.1	−30.0
			−45.1	+70.8	−66.9	−26.9
T			−37.1	+74.0	−60.8	−22.9
			−36.3	+72.7	−58.8	−24.7
a			−27.3	+77.2	−38.5	−11.8
			−26.0	+64.0	−35.0	−10.0
Δ T			−25.7	+28.5	−31.1	−16.0
			−27.0	+19.7	−26.3	−12.8
			−25.0	−4.0	−22.2	−21.1
			−31.2	−31.0	−29.8	−33.0
			−18.9	−23.7	−16.0	−24.1
			−6.2	−10.8	−7.0	−11.2
			0.0	+2.2	+1.2	−2.9

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Date		Apr 6			Apr 6			Apr 9			
Observer		G M S			G M S			G M S			
Illumin'n		W			W			W			
Star		β Leonis			γ Urs Maj.			δ Leonis			
Mag.											
δ											
Wire	a										
"	b										
"	c										
"	1	11	42	31·2	11	46	59·3	11	7	21·0	
"	2			35·1		47	5·3			25·0	
"	3			38·9			11·8			28·7	
"	4			42·6			17·5			32·7	
"	5			46·4			24·2			[36·5]	
"	d										
"	e										
"	f										
Sum				194·2			58·1			144·0	
Mean		11	42	38·84	11	47	11·62	11	7	28·80	
Red'n to											
m				−08			−08			−14	
n . tan. δ				−20			+15			−07	
c . sec. δ				−08			−14			−09	
r				−36			−07			−30	
T		11	42	38·48	11	47	11·55	11	7	28·50	
a		11	42	18·12	11	46	51·19	11	7	3·5$\frac{2}{3}$	
Δ T				−20·36			−20·36			−24·98	

$n = +0.31$

$\Delta T = -20.36$ at $11^h 45^m$

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Date		Apr 9	Apr 9	Apr 9
Observer		G M S	G M S	G M S
Illumin'n		W	W	W
Star		λ Draconis	β Leonis	γ Ursæ Maj
Mag.				
δ				
Wire	a			
"	b			
"	c			
"	1	11 23 35·1	11 42 36·0	11 47 4·0
"	2	45·5	39·8	10·1
"	3	55·9	43·7	16·3
"	4	24 6·6	47·2	22·5
"	5	17·1	51·1	29·0
"	d			
"	e			
"	f			
Sum		280·2	217·8	81·9
Mean		11 23 56·04	11 42 43·56	11 47 16·38
Red'n to				
$\overline{m}$		−14	−14	−14
n . tan. δ		+26	−09	+07
c . sec. δ		−24	−08	−14
r		−12	−31	−21
T		11 23 55·92	11 42 43·25	11 47 16·17
a		11 23 30·79	11 42 18·11	11 46 51·16
Δ T		−25·13	−25·14	−25·01

$n = +0.14$ from λ Draconis & β Leonis

$\Delta T = -25.07$ at $11^h\ 30^m$

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Apr. 11 Thursday

	Date	Rot. of screws	A	H	B	G
	Observer		+3·8	−2·7	−4·0	+5·8
0°	Illumin'n	+	+1·2	+2·0	−1·4	+2·5
			+0·1	+4·1	+2·5	−4·0
	Star	M	+1·7	+1·1		
	Mag.	R	−1·8	+3·4		
	δ		−6·0	−35·7	+3·1	+29·0
30°		−	−10·4	−31·6	0·0	+31·8
	Wire a		−14·0	−26·3	−4·3	+35·1
	" b					
	" c					
			−28·8	−77·2	−3·2	+53·2
60°	" 1	+	−26·9	−79·7	+0·9	+48·0
	" 2		−22·6	−81·2	+5·0	+43·2
	" 3					
	" 4					
	" 5		−3·5	−69·0	+1·7	+53·8
90°		−	+0·1	−71·3	−3·0	+60·9
	" d		+3·8	−76·2	−6·7	+63·0
	" e					
	" f					
			+24·1	−67·4	−6·9	+57·8
120°	Sum	+	+22·3	−63·8	−0·7	+51·6
	Mean		+18·2	−59·0	+3·7	+44·7
	Red'n to m		+35·2	−56·0	+4·8	+29·2
150°	n. tan. δ	−	+37·1	−59·2	−3·0	+38·5
	c. sec. δ		+39·8	−63·0	−10·0	+45·6
	r					
	T					
	a					
	Δ T					

R + when thread moves through more than 5 rev. for 5′ of limb

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G M S

Date	D	E	C	F
Observer	−0·1	+2·5	−2·0	+1·0
Illumin'n	+2·0	−1·2	−2·0	+2·0
	+4·5	−6·1	−4·0	+2·2
Star				
Mag.				
δ	−4·1	+11·5	−21·5	+19·1
	−5·2	+17·3	−22·1	+21·0
Wire a	−8·2	+20·1	−23·1	+21·2
" b				
" c				
	−12·0	+34·8	−39·3	+26·6
" 1	−10·1	+29·1	−38·0	+25·3
" 2	−7·7	+24·5	−36·1	+23·0
" 3				
" 4				
" 5	−11·0	+33·0	−39·1	+28·9
	−12·5	+40·7	−39·8	+30·1
" d	−14·0	+45·8	−39·9	+28·3
" e				
" f		focus bad		
	−17·9	−12·9	−23·9	+18·1
Sum	−10·0	−23·2	−24·1	+20·8
Mean	−0·9	−32·8	−24·5	+21·0
Red'n to		focus poor		
m	−2·0	−92·8	−12·2	+22·0
n . tan. δ	−7·9	−80·2	−12·8	+20·1
c . sec. δ	−14·6	−70·4	−11·0	+20·8
r				
T				
a				
Δ T				

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Date		Apr 12	Apr 12	Apr 12
Observer		S M S	S M S	S M S
Illumin'n		W	W	W
Star		α Hydrae	θ Urs. Maj.	ε Leonis
Mag.				
δ				
Wire	a			
"	b			
"	c			
"	1	9 21 28·1	9 24 17·1	9 38 42·0
"	2	31·9	23·0	46·1
"	3	35·3	29·0	50·0
"	4	39·1	34·7	54·0
"	5	42·8	40·8	58·1
"	d			
"	e			
"	f			
Sum		177·2	144·6	250·2
Mean		9 21 35·44	9 24 28·92	9 38 50·04
Red'n to				
m		− 07	− 07	− 07
n . tan. δ		− 05	+ 02	− 02
c . sec. δ		− 08	− 13	− 09
r		− 20	− 18	− 18
T		9 21 35·24	9 24 28·74	9 38 49·86
a		9 21 4·36	9 23 57·88	9 38 19·08
Δ T		− 30·88	− 30·86	− 30·78

m = +·05 by least squares

ΔT at $9^h\ 30^m$ = − 30·84

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Date

Observer

Illumin'n

Eastern Circle (corrected for runs)

Star Mag.			A – Mean	B – Mean	C – Mean	D – Mean
δ		0	+2·1	+1·4	−4·6	+1·2
		10	+6·1	+4·3	−10·1	−0·2
Wire	a	20	−0·8	+9·3	−11·2	+2·7
"	b	30	−0·5	+11·1	−13·8	+3·1
"	c	40	−2·2	+17·4	−19·5	+4·2
		50	−7·7	+20·9	−21·0	+7·9
"	1	60	+2·8	+17·6	−25·1	+4·6
"	2	70	+9·9	+12·3	−25·6	+3·5
"	3	80	+10·1	+11·9	−25·0	+2·9
"	4	90	+14·0	+11·0	−26·2	+1·3
"	5	100	+19·2	+5·2	−25·8	+1·3
		110	+24·1	+5·9	−22·1	−7·8
"	d	120	+25·9	+2·1	−21·6	−6·4
"	e	130	+29·8	+0·7	−21·3	−9·3
"	f	140	+31·3	−0·8	−20·7	−9·6
		150	+35·6	−7·0	−16·3	−12·2
Sum		160	+30·4	−9·3	−22·7	+1·6
Mean		170	+24·7	−10·3	−22·5	+8·0
		180	+21·6	−11·4	−23·7	+13·5
Red'n to		190	+12·8	−16·2	−13·9	+17·4
m		200	+13·4	−11·7	−20·6	+19·0
n . tan. δ		210	+10·4	−13·8	−18·6	+21·9
c . sec. δ		220	+7·8	−13·6	−20·3	+26·1
		230	+6·5	−11·1	−21·0	+25·5
r		240	+3·0	−7·1	−28·3	+32·3
		250	+1·2	−7·6	−21·8	+28·1
T		260	+0·5	−10·5	−15·3	+25·5
		270	−2·2	−12·1	−8·4	+22·8
a		280	−0·3	−5·7	−9·4	+15·6
		290	+2·5	−11·3	−5·2	+14·1
Δ T		300	+2·4	−10·6	−3·6	+11·9
		310	+1·3	−11·2	+1·0	+9·0
		320	+3·2	−9·8	+3·2	+3·6
		330	+5·8	−15·8	+8·0	+2·2
		340	+4·6	−9·2	+3·6	+1·2
		350	+2·6	−3·9	−0·2	+1·5
		360	+1·4	−1·4	−1·5	+1·4

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Apr. 14

	Date		A	H	B	G
	Observer					
+	Illumin'n	180°	+35·9	−55·3	−2·7	+47·9
			+33·3	−53·0	+1·8	+43·8
	Star		+31·2	−51·2	+6·8	+36·1
	Mag.					
	δ					
−		210°	+29·6	−55·0	+9·1 15	+47·8
	Wire a		+31·8	−55·1	+4·7	+50·2
	" b		+31·1	−57·0	+0·8	+54·4
	" c					
+	" 1	240	+18·5	−57·9	+2·0	+66·1
	" 2		+18·0	−55·5	+4·5	+61·9
	" 3		+18·0	−56·1	+11·2	+55·6
	" 4					
	" 5					
−		270	+21·6	−50·8	+14·9	+55·9
	" d		+23·2	−53·0	+10·0	+60·0
	" e		+26·0	−56·3	+5·9	+64·0
	" f					
					focus bad	focus bad
+	Sum	300	+31·2	−56·0	+4·0	+24·5
	Mean		+30·1	−51·3	+20·0	+14·8
			+28·1	−49·3	+33·0	−3·1
	Red'n to					
	m				focus bad	focus poor
−	n. tan. δ	330	+48·0	−57·4	+34·0	−63·6
	c. sec. δ		+50·0	−61·1	+24·6	−50·1
			+52·9	−64·5	+14·2	−43·6
	r					
	T					
	a					
	Δ T					

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Saturday Sunday 8/15 Monday

Date	D	E	C	F1
Observer				
Illumin'n	+24.5	−65.9	−9.0	+27.9
	+26.3	−68.1	−9.2	+30.0
Star	+26.9	−71.1	−9.0	+27.0
Mag.				
δ				focus bad
	+39.0	−55.9	+9.0	−8.9
Wire a	+38.5	−53.10	+3.1	−0.16
" b	+35.5	−50.0	−1.8	+6.7
" c				
			focus poor	focus poor
" 1	+36.8	−33.9	−14.9	−53.4
" 2	+39.0	−38.5	−11.2	−57.8
" 3	+42.0	−41.5	−6.3	−61.1
" 4				
" 5				
	~~+50.0~~ +45.9	−45.7	+18.8	−74.1
" d	~~+48.0~~ +44.8	−42.10	+19.1	−75.2
" e	+47.0	−38.0	+21.0	−75.2
" f				
Sum	+30.0	−31.8	+27.0	−53.2
Mean	+34.0	−37.0	+26.1	−49.4
	+36.5	−42.0	+25.0	−49.6
Red'n to				
m				
n. tan. δ	+45.0	−63.2	+52.3	−54.3
c. sec. δ	+42.2	−55.6	+52.9	−55.2
	+37.7	−50.5	+52.3	−55.4
r				
T				
a				
Δ T				

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Date

Observer

N at	Illumin'n	A	H	B	G	D	E	C	F
0°	Star Mag.	+1·7	+1·1	−1·0	+1·4	+2·1	−1·6	−2·7	+1·7
30	δ	−10·1	−31·2	−0·4	+32·0	−5·8	+16·3	−22·3	+20·4
60	Wire a	−26·1	−79·4	+0·9	+48·1	−9·9	+29·5	−37·8	+25·0
	" b								
90	" c	+0·1	−72·2	−2·3	+59·2	−12·5	+39·8	−39·6	+29·1
120	" 1	+21·5	−63·4	−1·3	+51·4	−9·6	−23·0	−24·2	+20·0
	" 2								
150	" 3	+37·4	−59·4	−2·7	+37·8	−8·2	−81·1	−12·0	+21·0
	" 4								
180	" 5	+33·5	−53·2	+2·0	+42·4	+25·9	−68·0	−9·1	+28·3
210	" d	+30·8	−55·7	+4·9	+50·8	+37·7	−53·0	+3·4	−0·9
	" e								
240	" f	+18·2	−56·5	+5·9	+61·2	+39·3	−38·0	−10·8	−57·4
270	Sum	+23·6	−53·4	+10·3	+60·0	+48·3	−41·9	+19·6	−74·8
	Mean								
300		+29·8	−52·2	+19·0	+12·1	+33·5	−36·9	+26·0	−50·7
	Red'n to								
330	m	+50·3	−61·0	+24·3	−52·4	+41·6	−56·4	+52·5	−55·0
	n . tan. δ								
	c . sec. δ								
	r								
	T								
	a								
	Δ T								

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Date

Observer

Illumin'n

Runs of microscopes for 10′ of limb.

	A	H	B	G	D	E	C	F
Star	−3·7	+6·8	+6·5	−9·8	+4·6	−8·6	−2·0	+1·2
Mag.								
δ	+8·0	−9·4	+7·4	−5·9	+4·1	−8·6	+1·6	−2·1
Wire a	+6·2	−4·0	+8·2	−10·0	+4·3	−10·3	+3·2	−3·6
" b								
" c	−7·3	+6·8	+8·4	−9·2	+3·0	−12·8	+0·8	+0·6
" 1	−5·9	+8·4	+10·6	−13·1	+17·0	−19·9	−0·6	+2·9
" 2								
" 3	−4·6	+7·0	+14·8	−16·4	+12·6	−22·4	−1·2	+1·2
" 4								
" 5	−2·7	+4·1	+9·5	−11·8	+2·4	−6·2	0·0	−0·9
" d	−1·5	+2·0	+8·3	−6·6	+3·5	−5·9	+10·8	−15·6
" e								
" f	−0·5	+1·8	+9·2	−10·5	+5·2	−7·6	+8·6	∓7·7
Sum	−4·4	+5·5	+9·0	−8·1	+3·0	−7·7	−2·2	+1·1
Mean								
	−3·1	+6·7	+29·0	−27·6	+6·5	−10·2	−2·0	+3·6
Red'n to								
m	−4·9	+7·1	+19·8	−20·0	+7·3	−12·7	0·0	+1·1
n. tan. δ								
c. sec. δ								
r								
T								
a								
Δ T								

The run = the excess of the number of screw revolutions over 10, expressed in ~~hundredths~~ sixtieths of a revolution, or seconds of arc.

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		A+H		B+G		C+F	
Date							
	0	+3·4	+2·8	+1·1	+0·4	−2·0	−1·0
Observer	10	+7·2		+15·0		−1·1	
Illumin'n	20	−9·9		+24·8		+0·9	
	30	−41·5	−41·3	+32·8	+31·6	−2·7	−1·9
Star	40	−77·7		+47·0		−5·3	
Mag.	50	−105·8		+49·6		−12·9	
δ	60	−95·6	−105·5	+54·4	+49·0	−21·6	−12·8
	70	−82·3		+55·0		−14·5	
Wire	a 80	−82·5		+54·0		−14·7	
"	b 90	−72·0	−72·1	+53·9	+56·9	−13·8	−10·5
"	c 100	−56·3		+54·5		−10·0	
	110	−47·0		+57·7		−5·1	
"	1 120	−39·5	−41·9	+50·6	+50·1	−3·8	−4·2
"	2 130	−31·0		+53·0		−1·7	
"	3 140	−25·0		+46·3		+1·4	
"	4 150	−22·6	−22·0	+34·7	+35·1	+6·9	+9·0
"	5 160	−16·1		+37·4		+12·0	
	170	−17·0		+44·7		+17·8	
"	d 180	−17·9	−19·7	+47·3	+44·4	+17·6	+19·2
"	e 190	−17·0		+46·2		+33·4	
"	f 200	−14·7		+53·0		+18·9	
	210	−20·1	−24·9	+54·8	+55·7	−1·5	+2·5
Sum	220	−17·6		+57·1		−12·3	
Mean	230	−23·8		+60·1		−39·0	
	240	−35·0	−38·3	+64·1	+67·1	−73·2	−68·2
Red'n to	250	−36·2		+70·9		−81·2	
m	260	−28·1		+72·0		−67·6	
n. tan. δ	270	−26·3	−29·8	+72·9	+70·3	−54·9	−55·2
c. sec. δ	280	−23·5		+75·6		−43·8	
	290	−18·1		+58·0		−34·7	
r	300	−17·5	−22·4	+23·6	+31·1	−28·8	−24·7
	310	−18·2		+15·9		−17·7	
T	320	−11·1		−3·0		−8·2	
	330	−8·8	−10·7	−30·0	−28·1	−5·0	−2·5
a	340	−2·9		−21·3		−0·9	
	350	+1·8		−9·2		−1·7	
Δ T	360	+3·2		+2·6		+1·5	

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		D + E		(A − H = 2α)	(C − F = 2β)	(½ diff = β − α)
Date						
		+1·9	+0·5	−5·8	−13·8	−4·0
Observer		+3·0		−6·6	−30·7	−12·0
Illumin'n		+7·9		−13·3	−44·7	−15·7
		+10·2	+10·5	+14·5	−50·9	−32·7
Star		+13·8		+31·9	−74·9	−53·4
Mag.		+18·0		+38·2	−80·9	−59·5
δ		+23·0	+19·6	+56·0	−73·8	−64·9
		+26·8		+69·7	−69·5	−69·6
Wire	a	+26·9		+72·9	−65·3	−69·1
"	b	+27·5	+27·3	+68·0	−70·6	−69·3
"	c	+24·5		+76·3	−59·6	−68·0
		+2·9		+71·0	−62·9	−67·0
"	1	−31·0	−32·6	+72·5	−57·8	−65·2
"	2	−44·4		+73·0	−58·1	−65·5
"	3	−68·5		+90·6	−39·2	−64·9
"	4	−91·8	−89·3	+105·6	−26·9	−66·2
"	5	−69·8		+93·7	−40·0	−66·8
		−56·4		+85·0	−43·8	−64·4
"	d	−42·0	−42·1	+79·3	−46·4	−62·8
"	e	−28·1		+69·0	−34·2	−51·6
"	f	−19·9		+58·5	−42·9	−50·7
		−11·2	−15·3	+61·9	−14·7	−38·3
Sum		−2·2		+56·0	−5·5	−30·8
Mean		+2·3		+53·4	+13·2	−20·1
		+8·1	+1·3	+52·0	+27·0	−12·5
Red'n to		+9·2		+54·0	+52·6	−0·7
m		+11·3		+46·1	+54·0	+4·0
n . tan. δ		+10·6	+6·4	+46·3	+62·7	+8·2
c . sec. δ		+8·0		+31·1	+33·2	+1·0
		+9·8		+33·9	+35·3	+0·7
r		+2·0	−3·4	+33·9	+33·4	−0·2
		+4·0		+35·8	+34·9	−0·5
T		−6·5		+38·9	+36·2	−1·3
		−13·8	−14·8	+53·6	+54·6	+0·5
a		−11·3		+34·9	+31·1	−1·9
		−4·1		+14·2	+12·3	−1·0
Δ T		+0·3		+3·2	−0·9	−2·0

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Date

Observer

Illumin'n

			A	B	C	D	Mean
			Corrected for runs				
Star		0	−1″.2	−1″.9	−7″.9	−2″.1	−3″.3
Mag.		10	+0.3	−1.5	−15.9	−6.0	−5.8
δ		20	−11.5	−1.4	−21.9	−8.0	−10.7
		30	−13.4	−1.8	−26.7	−9.8	−12.9
Wire	a	40	−22.6	−3.0	−39.9	−16.2	−20.4
"	b	50	−33.4	−4.8	−46.7	−17.8	−25.7
"	c	60	−19.6	−4.8	−47.5	−17.8	−22.4
		70	−6.3	−3.9	−41.8	−12.7	−16.2
"	1	80	−4.8	−3.0	−39.9	−12.0	−14.9
"	2	90	−2.0	−5.0	−42.2	−14.7	−16.0
"	3	100	+10.2	−3.8	−34.8	−7.7	−9.0
"	4	110	+12.2	−6.0	−34.0	−19.7	−11.9
"	5	120	+16.7	−7.1	−30.8	−15.6	−9.2
		130	+21.2	−7.9	−29.9	−17.9	−8.6
"	d	140	+33.1	+1.0	−18.9	−7.8	+1.8
"	e	150	+41.9	−0.7	−10.0	−5.9	+6.3
"	f	160	+39.1	−0.6	−14.0	+10.3	+8.7
		170	+34.2	−0.8	−13.1	+17.5	+9.5
Sum		180	+30.9	−2.1	−14.4	+22.8	+9.3
Mean		190	+26.3	−2.7	−0.4	+30.9	+13.5
		200	+22.1	−3.0	−1.9	+27.7	+8.7
Red'n to		210	+21.0	−3.2	−8.0	+32.5	+10.6
m		220	+19.3	−2.1	−8.8	+37.6	+11.5
n . tan. δ		230	+14.8	−2.8	−12.7	+33.8	+8.3
c . sec. δ		240	+8.5	−1.6	−22.8	+37.8	+5.5
		250	+8.9	+0.1	−14.1	+35.8	+7.7
r		260	+9.0	−2.0	−6.8	+34.0	+8.5
		270	+10.1	+0.2	+3.9	+35.1	+12.3
T		280	+3.8	−1.6	−5.3	+19.7	+4.1
		290	+8.0	−5.8	+0.3	+19.6	+5.5
a		300	+8.3	−4.7	+2.3	+17.8	+5.9
		310	+8.9	−3.6	+8.6	+16.6	+7.6
Δ T		320	+14.0	+1.0	+14.0	+14.4	+10.8
		330	+22.6	+1.0	+24.8	+19.0	+16.8
		340	+16.1	+2.3	+15.1	+12.7	+11.5
		350	+8.1	+1.6	+5.3	+7.0	+5.5
		360	+3.2	+0.4	+0.3	+3.2	+1.8

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Correction for Runs for 100" interpolated

Observer

Illumin'n	Azt	A	B	C	D	H	G	F	E
Star	0°	+0.6	−1.1	+0.3	−0.8	−1.1	+1.6	−0.2	+1.4
Mag.	10	+0.2	−1.1	+0.1	−0.8	−0.4	+1.4	−0.0	+1.4
δ	20	−0.8	−1.2	−0.1	−0.7	+0.7	+1.2	+0.2	+1.4
	30	−1.3	−1.2	−0.3	−0.7	+1.6	+1.8	+0.4	+1.4
Wire a	40	−1.6	−1.3	−0.4	−0.7	+2.0	+1.0	+0.5	+1.5
" b	50	−1.5	−1.3	−0.4	−0.7	+1.6	+1.3	+0.6	+1.6
" c	60	−1.0	−1.4	−0.5	−0.7	+0.7	+1.7	+0.6	+1.7
	70	−0.4	−1.4	−0.4	−0.6	+0.2	+1.8	+0.4	+1.8
" 1	80	+0.3	−1.4	−0.3	−0.4	−0.5	+1.7	+0.1	+1.9
" 2	90	+1.2	−1.4	−0.1	−0.5	−1.1	+1.5	−0.1	+2.1
" 3	100	+1.6	−1.5	0.0	−0.9	−1.4	+1.7	−0.2	+2.4
" 4	110	+1.6	−1.6	0.0	−1.6	−1.4	+1.9	−0.4	+2.8
" 5	120	+1.0	−1.8	+0.1	−2.8	−1.4	+2.2	−0.5	+3.3
	130	+0.9	−2.0	+0.1	−3.3	−1.3	+2.5	−0.4	+3.8
" d	140	+0.9	−2.3	+0.1	−2.9	−1.3	+2.6	−0.3	+3.9
" e	150	+0.8	−2.5	+0.2	−2.1	−1.2	+2.7	−0.2	+3.7
" f	160	+0.8	−2.5	+0.1	−1.4	−1.1	+2.6	−0.1	+3.0
	170	+0.8	−2.1	+0.1	−0.8	−0.9	+2.3	+0.1	+2.0
Sum	180	+0.8	−1.6	0.0	−0.4	−0.7	+2.0	+0.2	+1.0
Mean	190	+0.7	−1.5	−0.4	−0.3	−0.6	+1.7	+0.0	+0.5
	200	+0.5	−1.5	−1.2	−0.4	−0.4	+1.3	+2.0	+0.5
Red'n to	210	+0.3	−1.4	−1.6	−0.6	−0.3	+1.1	+2.6	+1.0
m	220	+0.3	−1.4	−1.8	−0.7	−0.3	+1.1	+3.0	+1.2
n. tan. δ	230	+0.2	−1.4	−1.7	−0.8	−0.2	+1.4	+2.4	+1.3
c. sec. δ	240	+0.1	−1.5	−1.4	−0.9	−0.3	+1.8	+1.3	+1.3
	250	+0.3	−1.5	−1.1	−0.8	−0.4	+1.7	+0.6	+1.3
r	260	+0.5	−1.5	−0.4	−0.6	−0.6	+1.6	−0.0	+1.3
	270	+0.7	−1.5	+0.4	−0.5	−0.9	+1.4	−0.2	+1.3
T	280	+0.6	−2.5	+0.7	−0.6	−1.0	+1.8	−0.4	+1.4
	290	+0.6	−3.7	+0.6	−0.8	−1.1	+2.8	−0.5	+1.5
a	300	+0.5	−4.8	+0.3	−1.1	−1.1	+4.6	−0.6	+1.7
	310	+0.6	−4.4	+0.2	−1.3	−1.1	+5.3	−0.5	+1.8
Δ T	320	+0.7	−3.9	+0.1	−1.3	−1.1	+4.8	−0.3	+2.0
	330	+0.8	−3.3	0.0	−1.2	−1.2	+3.3	−0.2	+2.1
	340	+0.7	−2.5	+0.1	+1.1	−1.2	+2.7	−0.2	+1.9
	350	+0.7	−1.8	+0.2	+0.9	−1.1	+2.2	−0.2	+1.6

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Differences from mean, of quantities on next page.

Date				
Observer				
Illumin'n				
Star				
Mag.				
δ	+10·0	− 3·9	−15·5	+9·5
	+9·1	−2·7	−10·9	+4·3
Wire	a	+9·3	−1·2	−10·5	+2·3
"	b	+8·5	−1·6	−9·6	+2·6
"	c	+8·5	−0·5	−9·6	+1·4
		+4·3	+2·2	−9·0	+2·4
"	1	+16·2	−2·4	−14·9	+1·2
"	2	+14·8	−4·3	−16·9	+6·5
"	3	+10·4	−3·6	−15·0	+8·3
"	4	+9·2	−4·8	−13·2	+8·7
"	5	+11·3	−3·6	−17·3	+9·5
		+12·3	−2·5	−17·0	+7·2
"	d	+12·1	−2·7	−17·4	+8·1
"	e	+11·2	−1·2	−17·6	+7·5
"	f	+11·1	+0·7	−17·0	+5·3
		+12·2	−5·8	−15·4	+8·9
Sum		+11·8	−6·3	−15·0	+9·5
Mean		+9·2	−3·6	−15·7	+10·0
		+8·5	−2·1	−16·1	+9·7
Red'n to		+6·9	−0·7	−16·0	+9·7
m		+7·9	+0·4	−16·7	+8·6
n . tan. δ		+7·8	−0·5	−16·4	+9·3
c . sec. δ		+8·3	+1·2	−19·0	+9·5
		+9·4	+2·1	−18·1	+6·5
r		+9·7	−0·3	−18·4	+8·9
		+9·3	−1·2	−17·5	+9·3
T		+8·8	−2·0	−16·7	+9·8
		+7·4	−1·8	−16·6	+10·9
a		+10·3	−5·6	−15·2	+10·4
		+9·6	−4·6	−15·0	+9·8
Δ T		+9·9	−6·3	−14·1	+10·6
		+8·7	−6·2	−13·9	+11·6
		+8·4	−5·9	−15·5	+13·1
		+9·0	−3·9	−13·1	+7·8
		+10·1	−2·1	−17·2	+9·0
		+9·5	−3·6	−15·6	+9·8
	Sum + 351·0	−90·8	−548·6	+287·5
	Mean + 9″75	−2·53	−15·24	+7·99

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Date

Observer

Illumin'n

Eastern Circle (Ill W)

Differences of the several microscopes from the mean of the 4.

Star Mag.	Microscopes at	A	B	C	D	Mean
δ	0	+1.8	−12.1	−23.7	+1.3	−8.2
	10	+6.1	−5.7	−13.9	+1.3	−3.0
Wire	a 20	−0.8	−11.3	−20.6	−7.8	−10.1
"	b 30	−0.5	−10.6	−18.6	−6.4	−9.0
"	c 40	−2.2	−11.2	−20.3	−9.3	−10.7
	50	−7.7	−9.8	−21.0	−9.6	−12.0
"	1 60	+2.8	−15.8	−28.3	−12.2	−13.4
"	2 70	+9.9	−9.2	−21.8	+1.6	−4.9
"	3 80	+10.1	−3.9	−15.3	+8.0	−0.3
"	4 90	+14.0	0.0	−8.4	+13.5	+4.8
"	5 100	+19.2	+4.3	−9.4	+17.4	+7.9
	110	+24.1	+9.3	−5.2	+19.0	+11.8
"	d 120	+25.9	+11.1	−3.6	+21.9	+13.8
"	e 130	+29.8	+17.4	+1.0	+26.1	+18.6
"	f 140	+31.3	+20.9	+3.2	+25.5	+20.2
	150	+35.6	+17.6	+8.0	+32.3	+23.4
Sum	160	+30.4	+12.3	+3.6	+28.1	+18.6
Mean	170	+24.7	+11.9	−0.2	+25.5	+15.5
	180	+21.6	+11.0	−3.0	+22.8	+13.1
Red'n to	190	+12.8	+5.2	−10.1	+15.6	+5.9
m	200	+13.4	+5.9	−11.2	+14.1	+5.5
n. tan. δ	210	+10.4	+2.1	−13.8	+11.9	+2.6
c. sec. δ	220	+7.8	+0.7	−19.5	+9.0	−0.5
	230	+6.5	−0.8	−21.0	+3.6	−2.9
τ	240	+3.0	−7.0	−25.1	+2.2	−6.7
	250	+1.2	−9.3	−25.6	+1.2	−8.1
T	260	+0.5	−10.3	−25.0	+1.5	−8.3
	270	−2.2	−11.4	−26.2	+1.3	−9.6
a	280	−0.3	−16.2	−25.8	−0.2	−10.6
	290	+2.5	−11.7	−22.1	+2.7	−7.1
Δ T	300	+2.4	−13.8	−21.6	+3.1	−7.5
	310	+1.3	−13.6	−21.3	+4.2	−7.6
	320	+3.2	−11.1	−20.7	+7.9	−5.2
	330	+5.8	−7.1	−16.3	+4.6	−3.2
	340	+4.6	−7.6	−22.7	+3.5	−5.5
	350	+2.6	−10.5	−22.5	+2.9	−6.9

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Date

Observer

Illumin'n

Star

Mag.

Mean				A	B	C	D
0·0	δ		0	+1·7	−1·0	−2·7	+2·1
−9·6	Wire	a		−0·5	+9·2	−12·7	+3·8
−19·6	"	b	30	+0·6	+19·2	−12·7	+3·8
	"	c					
−18·2				−7·9	+19·1	−19·6	+8·3
−18·2	"	1	60	−7·9	+19·1	−19·6	+8·3
	"	2					
	"	3					
−13·6	"	4	90	+13·7	+11·3	−26·0	+1·1
	"	5					
−3·4	"	d	120	+24·9	+2·1	−20·8	−6·2
	"	e					
	"	f					
+3·6			150	+33·8	−6·3	−15·6	−11·8
	Sum						
	Mean						
+13·1			186	+20·4	−11·1	−22·2	+12·8
	Red'n to						
	m						
+19·2	n. tan. δ		210	+11·6	−14·3	−15·8	+18·5
	c. sec. δ						
+13·1	r		240	+5·1	−7·2	−23·9	+26·2
	T						
+25·4			270	−1·8	−15·1	−5·8	+22·9
	a						
+27·1	Δ T		300	+2·7	−8·1	−1·1	+6·4
+42·2			330	+8·1	−17·9	+10·3	−0·6

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Date .

Observer

Illumin'n

Eastern circle, 2d series of measures. (corrected for runs)

	A at	A	B	C	D	Mean
Star	0	+1·7	−1·0	−2·7	+2·1	0·0
Mag.	30	−10·0	−0·4	−22·2	−5·8	−9·6
δ	60	−25·9	+0·9	−37·6	−9·8	−18·1
	90	+0·1	−2·3	−39·6	−12·4	−13·5
Wire a	120	+21·7	−1·3	−24·2	−9·4	−3·3
" b	150	+37·7	−2·7	−72·0	−8·0	+3·7
" c	180	+33·8	+2·0	−9·1	+25·8	+13·1
	210	+30·9	+4·9	+3·4	+37·5	+19·2
" 1	240	+18·2	+5·8	−10·8	+38·9	+13·0
" 2	270	+23·7	+10·1	+19·7	+48·1	+25·4
" 3	300	+29·9	+18·2	+26·1	+33·2	+26·8
" 4	330	+50·7	+23·5	+52·5	+41·2	+42·0
" 5						

Differences from mean for the several microscopes.

Microscope	at					mean
" d	0	+1·7	−15·3	−22·2	+1·1	−8·7
" e	30	−0·4	−8·6	−15·8	−6·1	−7·7
" f	60	−7·8	−18·5	−23·8	−11·7	−15·4
	90	+13·6	−1·0	−5·7	+12·7	+4·9
Sum	120	+25·0	+9·2	−0·7	+18·3	+12·9
Mean	150	+34·0	+19·0	+10·5	+25·9	+22·4
	180	+20·7	+11·2	−2·7	+22·7	+13·0
Red'n to	210	+11·7	+2·0	−12·6	+6·4	+1·9
m	240	+5·2	−6·4	−19·5	−0·8	−5·4
n. tan. δ	270	−1·7	−11·1	−26·1	+2·1	−9·2
c. sec. δ	300	+3·1	−14·3	−20·9	+3·8	−7·1
	330	+8·7	−7·2	−15·7	+8·3	−1·5

r

Differences from mean of quantities above

T	+10·4	−6·6	−13·5	+9·8
	+7·3	−0·9	−8·1	+1·6
a	+7·6	−3·1	−8·4	+3·7
	+8·7	−5·9	−10·6	+7·8
Δ T	+12·1	−3·7	−13·6	+5·4
	+11·6	−3·4	−11·9	+3·5
	+7·7	−1·8	−15·7	+9·7
	+9·8	+0·1	−14·5	+4·5
	+10·6	−1·0	−14·1	+4·6
	+7·5	−1·9	−16·9	+11·3
	+10·2	−7·2	−13·8	+10·9
	+10·2	−5·7	−14·2	+9·8
Sum	+113·7	−41·1	−155·4	+82·6
Mean	+9″·47	−3″·42	−12″·95	+6″·88

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Date

Observer

Illumin'n

Star

Mag.

δ

From the measures at every 10° combined with those made for runs at every 30°, we have, omitting

x = reading of microscope.

A = mean of A B C D + 9".6 + 12".3 sin(x − 61°) + 7".6 sin(2x + 154°)

B = " " " − 2.7 " " " "

C = " " " − 14.7 " " " "

D = " " " + 7.8 " " " "

representing the measures as follows

Sum of periodic terms			x	A comp.	A obs	B comp.	B obs	C comp.	C obs	D comp.	D obs
−7.4	"	c	0	+2.2	+1.8	−10.1	−13.7	−22.1	−22.9	+0.4	+1.2
−8.7			10	+0.9	+6.1	−11.4	−5.7	−23.4	−13.9	−0.9	+1.3
−9.8	"	1	20	−0.2	−0.8	−12.5	−11.3	−24.5	−20.6	−2.0	−7.8
−10.6	"	2	30	−1.0	−0.4	−13.3	−9.6	−25.3	−17.2	−2.8	−6.2
−10.6	"	3	40	−1.0	−2.2	−13.3	−11.2	−25.3	−20.3	−2.8	−9.3
−9.6	"	4	50	0.0	−7.7	−12.3	−9.8	−24.3	−21.0	−1.8	−9.6
−7.8	"	5	60	+1.8	−2.5	−10.5	−17.1	−22.5	−26.0	0.0	−11.9
−5.1			70	+4.5	+9.9	−7.8	−9.2	−19.8	−21.8	+2.7	+1.6
−1.5	"	d	80	+8.1	+10.1	−4.2	−3.9	−16.2	−15.3	+6.3	+8.0
+2.6	"	e	90	+12.2	+13.6	−0.1	−0.5	−12.1	−7.0	+10.4	+13.1
+6.9	"	f	100	+16.5	+19.2	+4.2	+4.3	−7.8	−9.4	+14.7	+17.4
+11.0			110	+20.6	+24.1	+8.3	+9.3	−3.7	−5.2	+18.8	+19.0
+14.7	Sum		120	+24.3	+25.4	+12.0	+10.1	0.0	−2.1	+22.5	+20.1
+17.6	Mean		130	+27.2	+29.8	+14.9	+17.4	+2.9	+1.0	+25.4	+26.1
+19.3			140	+28.9	+31.3	+16.6	+20.9	+4.6	+3.2	+27.1	+25.5
+19.8	Red'n to		150	+29.4	+34.8	+17.1	+18.3	+5.1	+9.2	+27.6	+29.1
+19.0	m		160	+28.6	+30.4	+16.3	+12.3	+4.3	+3.6	+26.8	+28.1
+17.0	n. tan. δ		170	+26.6	+24.7	+14.3	+11.9	+2.3	−0.2	+24.8	+25.5
+14.0	c. sec. δ		180	+23.6	+21.1	+11.3	+11.1	−0.7	−2.8	+21.8	+22.7
+10.3			190	+19.9	+12.8	+7.6	+5.2	−4.4	−10.1	+18.1	+15.6
+6.2	r		200	+15.8	+13.4	+3.5	+5.9	−8.5	−11.2	+14.0	+14.1
+2.0			210	+11.6	+11.0	−0.7	+2.0	−12.7	−13.2	+9.8	+9.1
−1.8	T		220	+7.8	+7.8	−4.5	+0.7	−16.5	−19.5	+6.0	+9.0
−5.0			230	+4.6	+6.5	−7.7	−0.8	−19.7	−21.0	+2.8	+3.6
−7.4	a		240	+2.2	+4.1	−10.1	−6.7	−22.1	−22.3	+0.4	+0.7
−8.9			250	+0.7	+1.2	−11.6	−9.3	−23.6	−25.6	−1.1	+1.2
−9.5	Δ T		260	+0.1	+0.5	−12.2	−10.3	−24.2	−25.0	−1.7	+1.5
−9.2			270	+0.4	−2.0	−11.9	−11.2	−23.9	−26.1	−1.4	+1.7
−8.5			280	+1.1	−0.3	−10.2	−16.2	−23.2	−25.8	−0.7	−0.2
−7.4			290	+2.2	+2.5	−10.1	−11.7	−22.1	−22.1	+0.4	+2.7
−6.1			300	+3.5	+2.7	−8.8	−14.6	−20.8	−21.2	+1.7	+3.4
−5.2			310	+4.4	+1.3	−7.9	−13.6	−19.9	−21.3	+2.6	+4.2
−4.7			320	+4.9	+3.2	−7.4	−11.1	−19.4	−20.7	+3.1	+7.9
−4.6			330	+5.0	+7.2	−7.3	−7.1	−19.3	−16.0	+3.2	+6.4
−5.1			340	+4.6	+4.6	−7.7	−7.6	−19.7	−22.7	+2.8	+3.5
−6.0			350	+3.6	+2.6	−8.7	−10.5	−20.7	−22.5	+1.8	+2.9

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The accordance is somewhat improved by a 3d term

Date
Observer
Illumin'n

+1".6 sin(3x + 85°) making the sum of the periodic terms

Star Mag.

	Wire		Discordances A	B	C	D
−5·8	"	c	+0·4	+3·6	+0·8	−0·8
−7·3			−5·2	−5·7	−9·5	−2·2
−8·9	"	1	+0·6	−1·2	−3·9	+5·8
−10·5	"	2	−0·6	−3·7	−8·1	+3·4
−11·3	"	3	+1·2	−2·1	−5·0	+6·5
−10·9	"	4	+7·7	−2·5	−3·3	+7·8
−9·4	"	5	+4·3	+6·6	+3·5	+11·9
−6·5			−5·4	+1·4	+2·0	+1·1
−2·4	"	d	−2·0	−0·3	−0·9	−1·7
+2·5	"	e	−1·6	+0·4	−5·1	−2·7
+7·6	"	f	−2·7	−0·1	+1·6	−2·7
+12·3			−3·5	−1·0	+1·5	−0·2
+16·3	Sum		−1·1	+1·9	+2·1	+2·4
+19·0	Mean		−2·6	−2·5	+1·9	−0·7
+20·2			−2·4	−4·3	+1·4	+1·6
+19·9	Red'n to		−5·4	−1·2	−4·1	−1·5
+18·3	m		−1·8	+4·0	+0·7	−1·3
+15·7	n . tan. δ		+1·9	+2·4	+2·5	−0·7
+12·4	c . sec. δ		+2·5	+0·2	+2·1	−0·9
+8·9			+7·1	+2·4	+5·7	+2·5
+5·3	r		+2·4	−2·4	+2·7	−0·1
+1·9			+0·6	−2·7	+0·5	+0·7
−1·1	T		0·0	−5·2	+3·0	−3·0
−3·7			−1·9	−6·9	+1·3	−0·8
−5·8	a		−1·9	−3·4	+0·2	−0·3
−7·5			−0·5	−2·3	+2·0	−2·3
−8·6	Δ T		−0·4	−1·9	+0·8	−3·2
−9·1			+2·4	−0·7	+2·2	−3·1
−9·2			+1·4	+5·0	+2·6	−0·5
−8·7			−0·3	+1·6	0·0	−2·3
−7·7			+0·8	+5·2	+0·4	−1·7
−6·6			+3·1	+5·7	+1·4	−1·6
−5·6			+1·7	+3·7	+1·3	−4·8
−4·7			−2·2	−0·2	−3·3	−3·2
−4·3			0·0	−0·1	+3·0	−0·7
−4·7			+1·0	+1·8	+1·8	−1·1
	Sum		+39·1 −41·5	+45·9 −50·6	+49·0 −43·2	+43·7 −44·1
	Mean disc.		2".2	2".7	2".6	2".4

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Date

Observer

Illumin'n

Star

Mag. $-33''.50$

δ

The following formula was deduced by J W for the quantity $\frac{1}{2}(C-F) - \frac{1}{2}(A-H)$ from the obsns. by G U S

$$+40''.28 \sin(x + 147°16') + 0''.81 \sin(2x + 162°48') + 8.02 \sin(3x + 63°51') + 1.31 \sin(4x + 49°38')$$

representing the obsns. as follows.

Wire			Computed	Observed	C − O
"	b				
"	c	0	−3.28	−3.00	−1.28
		10	−8.66	−12.00	+3.34
"	1	20	−17.26	−14.80	−2.46
"	2	30	−28.35	−32.70	+4.35
"	3	40	−40.50	−36.40	−4.10
"	4	50	−51.97	−49.60	−2.37
"	5	60	−61.17	−64.90	+3.73
		70	−67.23	−69.60	+2.37
"	d	80	−70.02	−69.10	−0.92
"	e	90	−70.16	−69.30	−0.86
"	f	100	−68.76	−68.00	−0.76
		110	−67.00	−67.00	0.00
Sum		120	−65.78	−65.20	−0.58
Mean		130	−65.39	−65.50	+0.11
		140	−65.75	−64.90	−0.85
Red'n to		150	−68.20	−66.20	−2.00
m		160	−66.07	−66.80	+0.73
n . tan. δ		170	−64.59	−64.40	−0.19
c . sec. δ		180	−61.24	−62.80	+1.56
		190	−55.80	−51.60	−4.20
r		200	−48.34	−50.70	+2.36
		210	−39.27	−38.30	−0.97
T		220	−29.24	−30.80	+1.56
		230	−19.11	−20.10	+0.99
a		240	−9.87	−12.50	+2.63
		250	−2.45	−0.76	−1.75
Δ T		260	+2.57	+4.00	−1.43
		270	+4.68	+8.20	−3.52
		280	+4.46	+1.00	+3.46
		290	+2.64	+0.70	+1.94
		300	+0.36	−0.20	+0.56
		310	−1.47	−0.50	−0.97
		320	−2.13	−1.30	−0.83
		330	−1.18	+0.56	−1.74
		340	−0.89	+2.10	−2.99
		350	−0.99	+1.00	−1.99

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Date				
Observer				
Illumin'n				
Star				
Mag.				
δ				
Wire	a			
"	b			
"	c			
"	1			
"	2			
"	3			
"	4			
"	5			
"	d			
"	e			
"	f			
Sum				
Mean				
Red'n to				
m				
n . tan. δ				
c . sec. δ				
r				
T				
a				
Δ T				

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Circles read next morning for η Bootis inst. may have been moved.

	Date			Apr 19		Apr 19			
	Observer			G M S		G M S			
	Illumin'n			W		W			
	Star			α Virginis		η Bootis			
	Mag.								
	δ			Eastern circle					
	Reading of microscopes			for 55′		for 25′			
351°	Wire	a	A		−13·2	22°		+46·0	
81°	"	b	B		−15·3	112		+57·3	
171°	"	c	C		−22·2	202		+36·9	
261°			D		−13·5	292		+47·5	
	"	1		54	44·0		25	46·9	
	"	2	Mean	351° 55′	16″·0	22°	25′	13″·1	
	"	3		Western circle					
	Reading of microscopes			for 5′					
8°	"	5	H		+14·4	337		−61·3	
278°			G		+12·8	247		−33·9	
188°	"	d	F		+16·0	157		−35·0	
98°	"	e	E	+5	11·0	67	+4	13·7	
	"	f		5	13·4		34	15·9	
			Mean	8° 4′	46″·6	337	35	44·1	
	Sum			=351	55 13·4	22	24	15·9	
	Mean				54 46·6		25	44·1	
	Refr.				1′ 18″·8		0′	24″·6	
	Red'n to								
	m			351	54 45·8	22	25	45·5	
	n . tan. δ			351	56 4·6	22	26	10·1	
	c . sec. δ								
		δ		−10	28 7·0	+19	3	49·5	
	r			349					
	T								
	a								
	Δ T								

See page of Apr 26 for the correct readings for these stars.

Barom	30·12·0
Attached	45·0
No 4 (Excl)	39·0

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Date	Apr 19	Apr 19	Apr 19
Observer	G.M.S	G.M.S	G.M.S
Illumin'n	W	W	W
Star	α Virginis	η Ursæ Maj.	η Bootis
Mag.			
δ			
Wire a			
" b			
" c			
" 1	13 18 47.0		13 48 56.1
" 2	50.5	13 42 54.8	59.9
" 3	54.1	43 0.5	49 3.9
" 4	58.0	6.1	7.5
" 5	19 1.5		11.2
" d			
" e			
" f			
Sum	271.1	1.4	18.6
Mean	13 18 54.22	13 43 0.47	13 49 3.72
Red'n to			
m	−.05	−.05	−.05
n. tan. δ	−.06	+.01	−.03
c. sec. δ	−.08	−.12	−.08
r	−.19	−.16	−.16
T	13 18 54.03	13 43 0.31	13 49 3.56
a	13 18 13.48	13 42 19.75	13 48 22.97
Δ T	−40.55	−40.56	−40.59

$n = +.05$ by least squares

$\Delta T = -40.57$ at $13^h\ 30^m$

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1866phae.proj..334L

Date		Apr 21			Apr 21			
Observer		G M S			G M S			
Illumin'n								
Star		ζ Ophiuchi			η Herculis			
Mag.								
δ								
Wire	a							
"	b							
"	c							
"	1	16	29	50·3	16	38	18·1	
"	2			54·1			22·8	
"	3			57·7			27·6	
"	4		30	1·3			32·1	
"	5			5·1			36·8	
"	d							
"	e							
"	f							
Sum				288·5			137·4	
Mean		16	29	57·70	16	38	27·48	
Red'n to								
m				+ 01			+ 01	
n . tan. δ				+ 04			00	
c . sec. δ				— 08			— 10	
r				— 03			— 09	
T		16	29	57·67	16	38	27·39	
a		16	29	52·16	16	38	21·88	
Δ T				— 5·51			— 5·51	

$n = -.04$

$\Delta T = -5.51$ at $16^h\ 30^m$

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Date		Apr 26			Apr 26			Apr 26			
Observer		G M S			G M S			G M S			
Illumin'n											
Star		ι Ursæ Maj.			θ Ursæ Maj.			β Cephei			
Mag.											
δ											
Wire	a										
"	b										
"	c										
"	1	8	50	5·4				9	26	45 3	
"	2			10·8						56·2	
"	3			16·4	9	24	7·7		27	7·0	
"	4			21·7							
"	5			27·2							
"	d										
"	e										
"	f										
Sum				81·5							
Mean		8	50	16·30	9	24	7·1	9	27	8·1	
Red'n to											
m				− 10			−10			− 10	
n . tan. δ				+ 10			+16			− 1·57	
c . sec. δ				− 12			− 13			+23	
r				− 12			− 07			−1·44	
T		8	50	16·18	9	24	7·03	9	27	6·66	
a		8	50	5·97	9	23	57·50	21	26	56·60	
Δ T				− 10·21			[− 9·53]			− 10·06	

n = + 0·43 from β Cephei & mean of ι Ursæ Maj & ε Leonis

ΔT = − 10·07 at $9^h\ 20^m$ (θ Ursæ Maj. rejected)

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Date		Apr 26		
Observer		G M S		
Illumin'n		W		
Star		ε Leonis		
Mag.				
δ				
Wire	a			
"	b			
"	c			
"	1	9	38	21·3
"	2			25·2
"	3			29·2
"	4			33·1
"	5			37·1
"	d			
"	e			
"	f			
Sum		9		145·9
Mean		9	38	29·18
Red'n to				
m				− 10
n . tan. δ				− 20
c . sec. δ				− 09
r				− 39
T		9	38	28·79
a		9	38	18·86
Δ T				− 9·93

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Date			Apr 26			Apr 19			Apr 19			
Observer			G M S			G M S			G M S			
Illumin'n			W			W			W			
Star			ι Ursæ Maj			α Virginis			η Bootis			
Mag.												
δ												
Wire	a											
"	b											
"	c											
		A	51°	5′	4″.3	352	54	46.8	21	35	46.0	
"	1	B		5′	21″.9			44.7			57.3	
"	2	C		4	50.5			37.8			36.9	
"	3	D		5	5.2			46.5			47.5	
"	4	mean	51	5	5.5	352	54	44.0	21	35	46.9	
"	5											
		H	308	53	31.8			14.4		23	58.7	
"	d	G		55	26.5			12.0		24	26.1	
"	e	F		55	8.8			16.0			25.0	
"	f	E		55	7.0			11.0			~~25.3~~ 13.7	
Sum												
Mean												
Red'n to m		Refr.		+ 0	6.3		− 1	18.8		− 0	24.6	
n. tan. δ			51	5	11.8	352	3	25.2	21	35	22.3	
c. sec. δ												
		δ	48	33	41.2	349	31	53.0	19	3	49.5	
Zero of circle			2°	31′	30″.6	2°	31′	32″.2	2°	31′	32″.8	
T												
a												
Δ T												

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Date	May 1	May 1		
Observer	G M S	G M S		
Illumin'n	W	W		
Star	α Aquilae	ε Draconis	ε Draconis	
Mag.				
δ			69 55 34.6	
			microscopes	
Wire a				
" b			A 72 26 36.8	
" c			B 49.0	
			C 13.0	
" 1	19 44 27.3	19 48 32.5	D 30.5	
" 2	30.8	43.2		
" 3	34.5	53.7	mean 72 26 32.3	
" 4	38.2	49 4.1	zero −2 31 31.9	
" 5	41.8	15.0	refr + 0 30.4	
" d			δ 69 55 30.8	
" e				
" f				
Sum	172.6	288.5		
Mean	19 44 34.52	19 48 53.70		
Red'n to				
m	+ 02	+ 02		
n . tan. δ	− 13	+ 31		
c . sec. δ	− 08	− 23		
r	−19	+10		
T	19 44 34.33	19 48 53.80		
a	19 44 18.80	19 48 38.28		
Δ T	−15.53	−15.52		

$n = +0.17$

$\Delta T = -15.52$ at $19^h 45^m$

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Date		May 10			May 10			May 10			
Observer		G M S			G M S			G M S			
Illumin'n		W			W			W			
Star		α Virginis			α Virginis			η Ursæ Maj.			
Mag.											
δ					349 31 52.9 −10 28 7.1 microscopes.						
Wire	a										
"	b				A	352	54 39.0				
"	c				B		40.1				
					C		45.1				
"	1	13	18	25.9	D		37.0	13	42	28.0	
"	2			29.7			~~37.8~~			33.7	
"	3			33.4		352	54 40.3			39.3	
"	4			36.9	H		15.5			44.8	
"	5			40.7	G		10.9			50.7	
					F		14.8				
"	d				E		15.2				
"	e										
"	f										
Sum				166.6	Refr	− 1	18.8			196.5	
Mean		13	18	33.32	352	53	28.5	13	42	39.30	
					zen	2	31 28.6				
Red'n to											
$\frac{\widetilde{m}}{n.\tan.\delta}$				− 01						− 01	
c. sec. δ				− 21						+ 05	
				− 08						− 12	
τ				− 30						− 08	
T		13	18	33.02				13	42	39.22	
a		13	18	13.48				13	42	19.68	
Δ T				− 19.54						− 19.54	

$n = +0.19$ from α Virginis and η Ursæ Maj.

$\Delta T = -19.49$ at $13^h 30^m$

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Date			May 10				May 10			
Observer			G M S				G M S			
Illumin'n			W				W			
Star			η Bootis				η Bootis			
Mag.										
δ							19 . 3		52·7	
							microscopes			
Wire	a									
"	b						A	21	35 45·0	
"	c						B		61·0	
							C		45·0	
"	1	13	48	34·8			D		49·9	
"	2			38·6				21	35 50·2	
"	3			42·8						
"	4			46·5			H	23	55·0	
"	5			50·3			G	24	22·0	
							F	24	16·0	
"	d						E	24	10·9	
"	e									
"	f									
Sum				213·0			Refr		−0 24·6	
Mean		13	48	42·60			21	35	25·6	
							zen	2	31 32·9	
Red'n to										
m				−01						
n . tan. δ				−11						
c . sec. δ				−08						
τ				−20						
T		13	48	42·40						
a		13	48	23·01						
Δ T				−19·39						

n = +0·19 from α Virginis & η Ursæ Majr.

ΔT = −19·49 at $13^h\ 30^m$

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Date		May 17	May 17	May 17
Observer		G M S	G M S	G M S
Illumin'n		W	W	W
Star		α Aquilae	τ Aquilae	3 Urs. Maj. L.b.
Mag.				
δ				
Wire	a			
"	b			
"	c			
"	1	19 44 32·6	19 57 53·8	19 59 32·0
"	2	36·5	57·3	42·2
"	3	40·0	58 1·0	52·2
"	4	43·8	4·8	20 0 2·4
"	5	47·3	8·3	12·4
"	d			
"	e			
"	f			
Sum		200·2	5·2	261·2
Mean		19 44 40·04	19 58 1·04	19 59 52·24
Red'n to $\overline{m}$		00	00	00
n. tan. δ		−05	−05	−21
c. sec. δ		−08	−08	+22
r		−13	−13	+01
T		19 48 39·91	19 58 0·91	19 59 52·25
a		19 44 19·25	19 57 40·18	7 59 31·58
Δ T		−20·66	−20·73	−20·67

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Date			May 17			May 17		
Observer			G M S			G M S		
Illumin'n			W			W		
Star			α^2 Capricorni			κ Cephei		
Mag.								
δ								
Wire	a							
"	b							
"	c							
"	1	20	10	55·5	20	13	10·3	
"	2			59·2			27·0	
"	3		11	3·0			43·2	
"	4			6·7			59·4	
"	5			10·4		14	16·0	
"	d							
"	e							
"	f							
Sum				14·8			215·9	
Mean		20	11	2·96	20	13	43·18	
Red'n to								
$\overline{m}$				00			00	
n. tan. δ				−07			+21	
c. sec. δ				−08			−36	
r				−15			−15	
T		20	11	2·81	20	13	43·03	
a		20	10	41·88	20	13	22·38	
Δ T				−20·73			−20·65	

n = +0·06 from 3 Urs Maj 2 & κ Cephei

$\Delta T = -20{\cdot}73$ at $20^h\ 0^m$

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Date		May 24			May 24			
Observer		G M S			G M S			
Illumin'n		W			W			
Star		α Urs Maj			δ Leonis			
Mag.								
δ								
Wire	a							
"	b							
"	c							
"	1	10	55	33·1	11	7	14·1	
"	2			40·8			17·9	
"	3			48·9			21·8	
"	4			56·8			25·7	
"	5		56	4·3			29·7	
"	d							
"	e							
"	f							
Sum				223·9			109·2	
Mean		10	55	48·78	11	7	21·84	
Red'n to								
m				+ 06			+ 06	
n . tan. δ				+ 22			− 12	
c . sec. δ				− 17			− 08	
r				+ 11			− 14	
T		10	55	48·89	11	7	21·70	
a		10	55	30·19	11	7	3·00	
Δ T				−18·70			−18·70	

$n = +\cdot 22$

$\Delta T = -18\cdot 70$ at $11^h\ 0^m$

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Date		July 18	1867		
Observer		L. W			
Illumin'n		Q			
Star					
Mag.		Micrometer	Micrometer		
δ		A	6		
Wire	a	0	0.0	+ 0.5	+ 0.2	− 36.6
"	b	10	− 4.5	−1.0	− 0.7	37.5
"	c	20	+ 0.8	+ 2.5	+ 1.6	35.2
		30	+ 0.5	− 1.0	− 0.2	37.0
"	1	40	− 0.5	+ 3.8	+ 1.6	34.2
"	2	50	− 1.5	− 2.0	− 1.7	38.5
"	3	60	− 5.2	− 4.5	− 4.8	41.6
"	4	70	− 9.5	− 7.5	− 8.5	45.3
"	5	80	− 13.0	− 12.0	− 12.5	49.3
		90	− 22.3	− 20.5	− 21.4	58.2
"	d	100	− 26.0	− 25.5	− 25.7	62.5
"	e	110	− 20.5	− 19.5	− 20.0	56.8
"	f	120	− 12.0	− 12.5	− 12.2	48.0
		130	+ 3.0	+ 1.3	+ 2.1	34.7
Sum		140	+ 24.2	+ 24.9	+ 24.5	12.3
Mean		150	+ 39.0	+ 34.5	37.2	+ 0.4
		160	+ 59.5	+ 59.5	59.5	22.7
Red'n to		170	+ 62.5	+ 59.5	61.0	24.2
m		180	+ 72.3	+ 74.0	73.1	36.3
n . tan. δ		190	+ 77.0	+ 75.0	76.0	39.2
c . sec. δ		200	+ 73.2	+ 71.5	72.3	35.5
		210	+ 76.2	+ 75.3	75.7	39.1
r		220	+ 73.5	+ 71.1	72.3	35.5
		230	+ 77.1	+ 77.0	77.0	40.2
T		240	+ 80.9	+ 79.0	79.9	43.1
		250	+ 84.8	+ 84.2	84.5	47.7
a		260	+ 89.0	+ 85.5	87.2	50.4
		270	+ 95.8	+ 94.5	95.1	58.3
Δ T		280	+ 98.5	+ 101.0	99.7	62.9
		290	+ 95.0	+ 95.2	95.1	58.3
		300	+ 89.0	+ 86.8	87.9	51.1
		310	+ 72.9	+ 71.5	72.2	35.4
		320	+ 53.5	+ 50.5	52.0	+ 15.2
		330	+ 36.2	+ 35.8	36.0	− .8
		340	+ 17.6	+ 17.2	17.4	19.4
		350	+ 10.5	+ 12.0	+ 11.2	− 25.6
		360		+ 0.5		

mean + 36".8

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Date			1868 May 6				
Observer			E Ø cA				
Illumin'n			E				
Star			Circle	B			
Mag.							
δ			A	B	C	D	
Wire	a	0	−0.7	+37.9	+4.0	~~+1.0~~	
"	b	10	−1.1	38.5	+2.0	−4.2	
"	c	20	−0.7	36.7	+4.0	−3.0	
		30	+0.3	42.1	12.9	+11.3	
"	1	40	+1.3	38.1	+3.9	+26.0	
"	2	50	−0.5	42.5	+0.8	+38.1	
"	3	60	+1.3	41.2	−0.7	+65.3	
"	4	70	+0.8	43.7	−5.1	+87.6	
"	5	80	−0.7	38.9	−12.8	+90.3	
		90	+1.0	38.1	−19.0	+102.3	
"	d	100	+1.9	39.5	−20.4	+104.3	
"	e	110	−1.0	38.0	−16.7	+100.5	
"	f	120	−1.8	31.0	−10.1	+96.0	
		130	0.0	37.3	+7.9	100.2	
Sum		140	−0.2	36.3	+32.2	99.0	Sun on wire ~~about~~ to cross off
Mean		150	+1.0	40.8	29.0	96.1	
		160	−1.7	33.0	+38.8	90.5	
			−2.9	22.8	+35.0	86.0	
Red'n to		170	+0.9	23.5	63.8	89.2	
m		180	−0.7	15.0	72.2	90.2	
n. tan. δ		190	−4.3	8.0	69.0	86.1	
c. sec. δ		200	+0.8	14.3	70.3	87.3	
		210	−0.2	27.6	71.3	94.9	
τ		220	−0.7	35.8	69.5	88.7	
		230	−2.0	60.7	71.0	92.1	
T		240	−1.7	79.5	77.6	96.9	
		250	−1.9	105.7	79.2	107.0	
a		260	−2.2	113.0	83.5	108.6	
		270	−1.2	131.6	94.1	115.5	
Δ T		280	−1.5	137.2	98.4	119.7	
		290	−0.7	134.4	94.3	117.4	
		300	−3.2	119.5	85.4	105.5	
		310	−0.5	111.9	73.5	95.5	
		320	+0.5	94.0	53.5	72.0	
		330	+2.9	73.0	41.5	51.1	
		340	−0.9	48.0	16.5	23.5	
		350	−0.5	42.0	9.5	13.5	

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Date			Aug 6 & 7			
Observer						
Illumin'n						
Star						
Mag.			Micrometer.		Micrometer.	
δ			A	B	C	D
Wire	a	0	0.0	+32.9	+4.1	−4.3
"	b	10	0.0	+33.4	+2.	−5.3
"	c	20	−2.9	+38.3	+1.4	−1.6
		30	+1.5	45.6	+2.9	+13.1
"	1	40	+1.0	43.7	+4.0	25.7
"	2	50	−1.1	41.2	−1.1	47.5
"	3	60	0.0	42.3	−3.4	65.2
"	4	70	+0.2	46.6	−8.0	87.0
"	5	80	−3.1	43.3	−14.1	90.4
		90	−2.5	42.8	−22.1	97.8
"	d	100	−1.9	40.6	−24.8	98.0
"	e	110	−1.2	42.3	−20.8	96.0
"	f	120	−2.0	35.1	−12.8	93.0
		130	−0.8	42.8	+1.6	95.9
Sum		140	−0.7	39.5	+26.2	96.2
Mean		150	−1.2	35.6	+38.2	95.2
		160	−6.7	21.7	+53.5	85.8
		170	+1.0	24.0	65.0	94.0
Red'n to		180	−2.7	15.8	72.2	92.4
m		190	−3.5	10.0	71.0	90.3
n. tan. δ		200	+1.8	19.0	75.1	96.1
c. sec. δ		210	+0.9	30.8	76.7	100.5
		220	+2.8	43.9	76.8	98.3
r		230	−1.2	66.8	75.3	97.8
		240	−1.2	83.0	79.7	102.7
T		250	−1.2	110.4	82.8	111.1
		260	+2.7	122.0	90.1	115.8
a		270	+6.1	145.8	102.7	127.7
		280	−4.3	140.4	99.1	122.9
		290	−4.1	+134.3	+94.5	+117.9
Δ T		300	+19.2	+143.7	+111.5	+124.5
		310	+ 6.5	+117.5	+ 83.	+ 102.
		320	+13.	+100.5	+ 68.	+ 82.3
		330	− 5.8	+ 67.7	+ 34.9	+ 44.
		340	+ 7.1	+ 57.1	+ 27.4	+ 29.6
		350	− 0.8	+ 43.9	+ 14.1	+ 13.

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Date			Nov 9								
Observer											
Illumin'n											
Star											
Mag.											
δ			1					A+C	B+D		
			A	B	C	D					
Wire	a	280	+1.4	+143.8	+106.4	+124.6	+107.8	+268	+1606	80.3	
"	b	290	+1.1	140.0	100.8	122.2	101.9	2622	1603	80.1	
"	c	300	+1.3	127.1	91.8	110.1	93.1	2372	1441	72.0	
		310	-1.7	111.0	74.3	95.6	72.6	2066	1340	67.0	
"	1	320	+3.5	94.2	57.7	74.5	61.2	1687	1076	53.8	
"	2	330	+5.9	82.5	45.0	56.5	50.9	1410	901	45.0	
"	3	340	+3.0	52.2	19.0	25.3	22.0	775	555	27.8	
"	4	350	-0.1	46.9	12.0	15.5	11.9	624	505	25.2	
"	5	00	+0.8	36.3	3.5	+0.3	4.3	366	323	16.1	
		10	-0.3	37.0	+0.5	-4.8	+0.2	327	325	16.2	
"	d	20	-2.1	34.0	+0.7	-1.6	-1.4	+324	338	16.9	
"	e										
"	f										
Nov 10											
Sum		290	+1.0	+140.0	+101.0	122.5	+111.0	+2625	1515	75.7	
Mean		300	+0.1	123.0	92.2	106.8	92.1	2298	1377	68.8	
		310	+1.9	111.1	80.8	98.4	82.7	2125	1298	64.9	
Red'n to		320	-0.6	89.2	54.1	71.0	53.5	1602	1067	53.3	
m		330	+1.5	63.8	38.8	51.1	37.3	1149	776	38.8	
n. tan. δ		340	+1.8	51.8	22.0	26.4	23.8	782	544	27.2	
c. sec. δ		350	0.0	46.2	13.5	16.4	13.5	626	491	24.5	
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