KG
11366
v.436

Fundamental Stars for Zones.
From Oct 17, 1871 to December 28, 1871
B4

Charles W. Sever, University Bookstore, Cambridge.

with N. C.

Date Oct 17 1871 Observer WAR
Recorder W. A. R. & Am.
n = +.15

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =
log γ

Star.	+ ε Cygni 1		+ η Cephei 2 1,83		+ 32 Vulpeculae 3 1,52		+ ν Cygni 4 1,86		+ 13 H Ceph. 1 1,53	
	2041		20	2043	2049		2053		2135? ✗	
T_δ	20 40 54.5	20 40 50.0	23.2	42 37.6	48 59.5	49 4.7	52 15.3	52 6.9	57 21.2	57 22.9
T_m	56.9	24. 51.3	42 27.5	42 39.6	1.8	5.8	18.0	8.7	34 — 29.7	24.0
T_e	1.3	4 52.5	32.1	46 41.4	4.2	7.4	20.7	11.2	44.8 46.5 33.3	35 27.0
T_f	4.2	29 40 38 51.27	~~37.6~~ 40.5	84 42 118.6 39.53	8.9	49 17.9 5.97	26.1	52 26.8 8.93	3 52.3 37.0	28.5
T_g	6.7	25	44.9	44	11.2		28.7		76 59.9 40.3	31.1
T_h	9.1	24	— 49.0	41	13.5		31.5		3.6 3.7	35 86.6 28.87
Sum	11.8	27	53.2	42	15.9		34.2		— 7.5 3.9	
Mean	—		57.4	42	18.2		36.9		11.2 3.7	
Red. to T_m	18.9	4.1	6.0?	86	~~20.9~~ 22.7		42.4		15.1 3.9	
Sum = s	21.6		10.6	46	25.1		45.1		22.5 7.4	
$\frac{1}{5}(T_m - T_s)$	23.9?	23	14.7	41	27.5		47.7		26.2 3.7	
T	6		42 49.01		~~48~~ 49 13.50		52 31.51		35 30.2 4.0	
RA	0.98		40.86		5.22		23.29		34 ~~7.44~~ 59.34	
RA — T	71		8.15		8.28		8.22		8.10	
— n tang δ			9		2		4		8	
ΔT + m			8.24		8.30		8.26		8.18	
										8.24
$T_m - T_\delta$										30
A	3 45.4		3 24.1		4 0.4		2 46.2		4 35.4	26
C	46.3		20.3		1.0		48.0		32.3	18 8.98
Sum	11.7		44		1.7		14.2		80	8.25
Mean	45.85		22.20		0.85		47.10		34.00	.50
Red. for runs										8.75 = S6
Red. to hor. wire										
Red. to meridian										
Division error										
Sum										
Pointer	50		0		45		40		25	
App. z										
log a′										
A′ log β										
λ log γ										
log tang z										
log r										
r										
z										
$\phi - z = \delta(O)$										
δ (C)										
δ (C — O)										

Date Oct 17 1871 Observer W.A.R
n Recorder A.M.

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =

log γ

Star.	× 47 5 + Pegasi		× 6 π₂ Cygni		× 47 7 16 Pegasi	
T_δ	21 21 39 38 44.9	38 39.1	21 42	42 16.8	21 21 47 47 8.2	46 56.9
T_m	47.0	40.6		19.3	10.3	58.6
T_e	49.3	42.3		42 16.1 18.05	12.7	59.9
T_f	53.8	38 2.0 40.67			17.3	46 25.4 58.47
T_g	56.0		17.86 11.6		20.5	
T_h	58.4		17.93 14.8	32	24.0 21.8	
Sum	0.7		18.00 18.0	32	24.0 26.3	
Mean	3.0		18.13 21.0	30	30.8	
Red. to T_m	7.6		17.84 24.1	31	33.1	
Sum = s	9.7		17.91 27.3	32	35.2	
$\frac{1}{5}(T_m - T_s)$	12.0		17.98 30.5	32	47 ~~47~~ 21.84 ~~21.93~~	
T	38 ~~39~~ 58.40 ~~58.49~~		17.95		13.44	
RA	50.02		6.22		8.49	
RA — T	− 8.47		11.78		8.49	
— n tang δ	− 0				2	
ΔT + m	8.49				8.51	
$T_m - T_\delta$						
A	4 37.7		0 52.8		3 32.5	
C	39.2		49.3		34.7	
Sum	169		102.1		7.2	
Mean	4 38.45		0 51.05		3 33.60	
Red. for runs						
Red. to hor. wire						
Red. to meridian						
Division error						
Sum						
Pointer	15		40		0	
App. z						
log a′						
A′ log β						
λ log γ						
log tang z						
log r						
r						
z						
φ — z = δ (O)						
δ (C)						
δ (C — O)						

wire S. C.

Date Oct 17/1871 Observer N A R

Recorder A. M.

n .08

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =

log γ

Star.	+ .22 8 20 Pegasi		+ −01 8 α Aquarii		+ +10 10 ι Pegasi		+ +09 11 ι Piscium		+ +2,36 cephei 41 N Cass.	
	21 21 55		21 59		22 1		23 34		23 4	
T_δ	54 45.5	54 54.8	59 7.0	59 7.5	22 0 56.6	0 1 44.0	23 33 16.8	23 33 8.5	41 25.2	41 3.4
T_m	47.5	56.8	9.2	8.5	58.8	45.0	18.8	20 9.6	30.4	7.5
T_e	49.6	31 54 11.6 55.80	11.1	9.9 25.9	1.1	46.3 15.3	20.9	21 10.9 29.0	35.7	9.9 20.8
T_f	53.8	42	15.1	59 8.63	5.5	1 45.10	25.0	41 33 9.67	46.5	41 6.93
T_g	56.0		17.2	59 40.6	7.8	1 36.4	27.0	20 42.0	51.9	42 28.8
T_h	58.2	2.2	19.3	41.6	10.1	1 37.6	29.2	22 43.7	57.2	31.6
Sum	0.2	2.0	21.4	43.0 52	12.5	38.1 22.1	30.3	21 45.2 20 10.9	2.4	34.0 44
Mean	2.3	21	23.3	59 41.73	14.7	1 37.37	33.3	40 43.63	7.5	42 31.47
Red. to T_m	6.5	42	27.4		19.2		37.3	22	18.3	
Sum = s	8.6	21	29.6		21.5		39.5		23.1	
$\frac{1}{5}(T_m - T_s)$	10.8	22	31.7		23.7		~~41.5~~ 41.9	20	28.3	
T	54 58.09		59 19.30		1 10.14		33 29.15		41 56.95	
RA	50.27		11.48		2.32		21.35		48.94	
RA — T	− 7.82		7.82		− 7.82		7.80		− 8.01	
— n tang δ	+ 2				+ 1		+ 1		+ 18	
ΔT + m	7.80		7.82		7.81		7.79		7.83	
$T_m - T_\delta$										
A	2 42.4		4 6.8	4 52.4	4 22.0	0 45.6	2 41.8	2 27.2	3 10.2	3 53.9
C	48.6		14.0	58.9	44.3	48.8	44.9	30.3	4.1	49.5
Sum	110		208	113	663	144	6.7	57.5	143	103
Mean	2 45.50		4 10.40	4 55.65	4 33.15	0 47.20	2 43.35	2 28.75	3 7.15	51.40
Red. for runs										
Red. to hor. wire										
Red. to meridian										
Division error										
Sum										
Pointer	50		15		35	40	35		15	
App. z										
log a'										
A' log β										
λ log γ										
log tang z										
log r										
r										
z										
φ — z = δ (O)										
δ (C)										
δ (C — O)										

b = −05

m = −07 + 07

80
82
81
79
80
80
4 48 5
4 51
149
~~7.77~~

Date Oct 17 1871 Observer W. A. R.

n Recorder A. M.

Barom. =

Att. Therm. =

Ex. Therm. =

log B =

log T =

log β =

log γ

Star.	133 + φ Pegasi	12	15.3 + ρ Cass.	13
	23 46		23 48	
T_δ	45 53.0	45 45.4	47 44.3	47 28.6
T_m	55.1	46.1	48.0	27 31.0
T_e	57.3	48.7	52.8	58 33.5
T_f	1.6	45 20.2 46.73	0.2	7.4 47 3.1 31.03
T_g	3.7	46 29.0	4.0	38 48 38.1
T_h	5.9	30.6	7.6	36 42.0
Sum	8.0	32.0?	11.5	99 44.7
Mean	10.2	46 1.6 30.53	15.2	3.9 48 48 41.60
Red. to T_m	14.6		22.7	7.5
Sum = s	16.8		26.6	3.5
$\frac{1}{5}(T_m - T_s)$	18.9		30.5	3.5
T	46 5.92		48 7.70 ~~7.58~~ 70	
RA	58.00		0.00	
RA — T	−7.82		−7.70	
— n tang δ	+ 2		+ 12	
ΔT + m	7.80		7.58	
$T_m - T_\delta$				
A	3 23.4	4 19.2	1 25.4	2 16.7
C	28.7	23.2	23.2	14.3
Sum	12.1	42.4	86	110
Mean	3 26.05	4 21.20	1 24.30	2 15.50
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer	55		35	
App. z				
log a'				
A' log β				
λ log γ				
log tang z				
log r				
r				
z				
φ — z = δ (O)				
δ (C)				
δ (C — O)				

Date Oct 17 1871 Observer A.M.

n −.08 Recorder W.A.R.

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =

log γ

Star.	+ 1.57 4 ζ Cephei		+ −15 15 θ Aquarii		+ −.02 16 γ Aquarii		+ 126 3 Lacertae		1 → +118 α 7 Lacertae 18	
	22 7		22 10		22 15		22 19		22 26	
T_δ	22 6 9.9	22 6 1.3	9 59.3	9 52.3	14 56.3	14 46.5	18 19.6	18 3.9	25 49.5	25 38.1
T_m	13.6	2.7	1.3	53.3	59.3	47.8	22.7	5.5	53.0	39.5
T_e	17.5	4.0	3.3	55.5	1.4	48.7	26.1	7.9	56.2	41.7
T_f	25.0	6 80 2.67	7.4	9 11.1 53.70	5.4	14 230 47.67	32.7	18 17.3 5.77	2.6	25 119.3 39.77
T_g	28.8	7 11.0	9.5	10 33.4	7.5	15 25.0	35.6	19 3.8	5.8	26 36.4
T_h	32.6	13.4	11.6	35.1	9.6	26.6	39.3	~~6.0~~ 5.8	8.8	38.6
Sum	36.4	15.6	13.6	37.0	11.6	15 11.6 25.80	42.6	8.1	12.0	40.3
Mean	40.5	7 100 13.33	15.7	10 15.5 35.17	13.7		46.0	19 17.7 5.90	15.2 32	26 115.3 38.43
Red. to T_m	47.8		19.9		17.7		52.6		21.2 60	
Sum = s	51.8		22.0		19.9		55.9		24.8 56	
$\frac{1}{5}(T_m - T_s)$	55.5		24.0		21.7		59.0		26 27.9 31	
T	6 32.67		~~9~~ 10 11.60		15 9.46		18 39.30		~~25~~ 8.85 ~~8.84~~	
RA	4.96		3.74		1.68		31.59		0.93	
RA — T	7.71		7.86		7.78		7.71		7.91	
— n tang δ										
ΔT + m										
$T_m - T_\delta$										
A	4 23.8	0 15.2	2 28.5	3 23.8	4 15.3	66.0	3 10.3	4 0.0	0 58.2	1 49.3
C	20.7	12.1	34.9	30.1	22.3	72.0	7.5	57.3	55.5	46.5
Sum	4.5	7.3	63.4	53.9	37.6	138.0	17.8	117.3	13.7	15.8
Mean	4 22.25	0 13.65	2 31.70	3 26.95	4 18.80	5 9.00	3 8.90	3 58.65	0 56.85	47.90
Red. for runs										
Red. to hor. wire										
Red. to meridian										
Division error										
Sum										
Pointer	45	(45) 15	45		20		15		45	
App. z										
log a′										
A′ log β										
λ log γ										
log tang z										
log r										
r										
z										
ϕ — z = δ (O)										
δ (C)										
δ (C — O)										

Date Oct 17 1871 Observer C. A. M.
n Recorder W. A. R.

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =

log γ

	.42 19		1.84 22		21 21		22	
Star.	× τ Pegasi		× 4 Cass.		× 70 Pegasi		× 72 Pegasi	
	23 14		23 19		23 23		23-28	
T_δ	23 14 12.0	23 14 5.8	18 52.0	18 29.6	22 35.6	22 26.3	27 29.4	27 17.2
T_m	14.3	6.8	56.0	40 31.6	37.7	27.5	31.8	18.2
T_e	16.5	8.0	0.3	43 35.0	39.8	29.1	34.2	19.8
		20.6	~~9.7~~	18 6.2		22.9		25.2
T_f	21.0	14 6.87	13.4	43 18 32.07	44.0	22 27.63	35.9	27 18.40
T_g	23.2	14 48.9	17.8	44 19 49.9	46.1	23 9.6	41.2	28 5.4
T_h	25.4	50.8	22.0	42 52.0	48.1	11.2	43.7	6.8
Sum	27.5	14 99.7 49.85	26.4	44 54.3	50.2	12.3	46.0	8.2
Mean	30.0		35.0	86 19 6.2 52.07	52.3	23 3.1 11.03	48.4	28 20.4 6.80
Red. to T_m	34.4		39.5	45	56.5		53.3	
Sum = s	36.6		43.7	42	58.6		55.6	
$\frac{1}{5}(T_m - T_s)$	38.9		31.52		60.7		58.0	
T	14 25.44 ~~25.44~~		12		22 48.15 ~~48.16~~		27 43.68	
RA	17.60		19.52		40.25		35.72	
RA — T	7.84		19 17.75		7.91		7.86	
— n tang δ			10.11					
ΔT + m			7.64					
$T_m - T_\delta$								
A	0 42.2	1 33.7	3 52.4	4 43.8	4 30.8	0 28.9	0 59.0	1 53.5
C	41.0	33.2	49.1	38.0	34.2	33.0	58.7	52.6
Sum	3.2	.9	101.5	81.8	5.0	61.9	17.7	61
Mean	0 41.60	1 33.45	3 50.75	4 40.90	4 32.50	0 30.95	0 58.85	1 53.05
Red. for runs								
Red. to hor. wire								
Red. to meridian								
Division error								
Sum								
Pointer	20		45		15	20	45	
App. z								
log a′								
A′ log β								
λ log γ								
log tang z								
log r								
r								
z								
φ — z = δ (O)								
δ (C)								
δ (C — O)								

Date oct 17/1871 Observer A. M.

n Recorder N.A.R.

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =

log γ

Star. × λ Androm. ,92 23

	23	31		
T_δ	31	8.3	30	52.4
T_m		11.0		53.8
T_e		14.0		55.3
T_f		20.0	30	11.5 53.83
T_g		23.0	31	44.8
T_h		25.8		46.7
Sum		28.7		48.3
Mean		31.7	31	19.8 46.60
Red. to T_m		37.6		
Sum = s		40.6		
$\frac{1}{5}(T_m - T_s)$		43.5		
T	31	25.85		
RA		18.14		
RA — T		7.71		
— n tang δ				
ΔT + m				
$T_m - T_\delta$				
A	2	29.4	3	19.6
C		29.1		17.8
Sum		5		174
Mean	2	29.25	3	18.70
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer	35			
App. z				
log a′				
A′ log β				
λ log γ				
log tang z				
log r				
r				
z				
φ — z = δ (O)				
δ (C)				
δ (C — O)				

7.71
86
78
71
91
84
91
~~86~~
71
643
7.80

Date Oct 22 1871 Observer NAR Barom. = log B =

Att. Therm. = log T =

n Recorder A.M. Ex. Therm. = log β = log γ

Star.	+ 4 94 ε Cygni	+ 3– B1 + ν Cygni	+ 5– 61 Cygni	+ 6 τ Cygni
T_δ	20 41 20 41	20 53 20 52	21 1 21 00	21 10 21 9
T_m				
T_e				
T_f				
T_g				
T_h				
Sum				
Mean				
Red. to T_m				
Sum = s				
$\frac{1}{5}(T_m - T_s)$				
T				
RA				
RA — T				
— n tang δ				
ΔT + m				
$T_m - T_\delta$				
A				
C				
Sum				
Mean i				
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer				
App. z				
log a′				
A′ log β				
λ log γ				
log tang z				
log r				
r				
z				
φ — z = δ (O)				
δ (C)				
δ (C — O)				

Date oct 21 1871 Observer W. A. R. Barom. = log B =
n Recorder A. M. Att. Therm. = log T = log γ
Ex. Therm. = log β =

Star.	+ α ~~Cygni~~ 38 β Cephei? B1		+ δ Cephei		+ γ Lacertae 9				
	21 16		X	22 25	22 26				
T_δ	21 18		22 24 ~~44~~	22 24 11.4	22 25 46.3	25 39.1			
T_m			(9.7) 13.6	39 14.1	49.6	33 42.6			
T_e			17.4	38 15.9	52.8	32 44.2			
T_f			25.2	78 24 11.4 18.80	2.2	9.4 25 5.9 41.97			
T_g			29.2	40	5.4	32			
T_h			32.9	37	8.5	31			
Sum			36.8	39 24 53.5	11.7	32 26 34.0			
Mean			40.6	38 56.7	15.0	33 35.4			
Red. to T_m			48.4	78 59.0	~~44~~	37.6			
Sum = s			52.3	39 24 19.2 56.40	24.4	94 26 17.0 35.67			
$\frac{1}{5}(T_m - T_s)$			56.2	39	27.5	31			
T			3623 24 32.94		(30.7) 941	32			
RA					26 8.55				
RA — T									
— n tang δ									
ΔT + m									
$T_m - T_\delta$									
A			3 12.0	3 41.8	1 4.3	1 48.8			
C			4.2	35.3	57.8	41.3			
Sum			162	771	2.1	101			
Mean			3 8.10	3 38.55	1 1.05	1 45.05			
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer			35		45				
App. z									
log a'									
A' log β									
λ log γ									
log tang z									
log r									
r									
z									
φ — z = δ (O)									
δ (C)									
δ (C — O)									

Date Oct 21 1871 Observer A. M. Barom. = log B =

Att. Therm. = log T = ——— log γ

n Recorder W. W. R Ex. Therm. = log β =

Star.	10 + 10 Lacertae		11 + η Pegasi		12 + 13 Lacertae		13 + λ Pegasi		+ ι ~~Pegasi~~ Cephei
	22 34		22 37		22 39		22 41		22 45
T_δ	22 33 22.7	22 33 8.8	36 53.1	36 38.4	38 14.0	38 21.8	40 15.7	40 ~~1.8~~	46.0 44 26.0
T_m	25.2	10.7	55.5	39.8	16.8	22.9	17.8	4.2	51.0 28.0
T_e	26.9	12.2	57.8	41.0	19.4	23.8	20.3	5.9	56.0 31.1
T_f	33.2	33 31.7 10.57	2.6	36 119.2 39.73	24.9	38 8.5 22.83	24.6	7.0	6.0 44 85.1 28.37
T_g	35.8		4.9		27.6		26.9	40 17.1 5.70	10.8
T_h	38.4		7.4		30.4		29.0		15.8
Sum	40.9	34 1.2	8.7	37 28.4	33.1	38 59.0	31.3	40 50.6	21.0 45 57.0
Mean	43.6	2.5	12.0	29.3	35.8	61.0	33.5	52.5	25.9 58.7
Red. to T_m	48.9	3.8	16.8	31.0	41.4	62.8	38.0	53.8	35.7 60.8
Sum = s	51.6	34 7.5 2.50	19.0	37 88.7 29.57	44.1	39 2.8 0.93	40.3	40 6.9 52.30	40.8 45 176.5 58.83
$\frac{1}{5}(T_m - T_s)$	54.2		21.5		46.8		42.4		45.8
T	33 421.4 38.31		37 79.3 7.21		38 334.3 30.39		40 319.8 29.07		?45 174.8 15.89
RA									
RA — T									
— n tang δ									
ΔT + m									
$T_m - T_\delta$									
A	0 8.9	3.4	4 53.5	0 57.1	4 45.7	0 24.8	4 25.8	0 23.2	2 9.5 59.1
C	4.5	-59.0	47.7	45.9	42.2	20.9	22.0	18.1	59.8 49.6
Sum	13.4	2.4	101.2	97.0	7.9	5.7	7.8	41.3	9.3 108.7
Mean	0 6.70	1.20	4 50.60	0 48.50	4 43.95	0 22.85	4 23.90	0 20.65	2 4.65 54.35
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer	0		45	50	10	15	25	30	50
App. z									
log a′									
A′ log β									
λ log γ									
log tang z									
log r									
r									
z									
φ — z = δ (O)									
δ (C)									
δ (C — O)									

see preceding page

Date Oct. 22 1871 Observer A. M.

n Recorder W. A. R.

Barom. =

Att. Therm. =

Ex. Therm. =

log B =

log T =

log β =

log γ

	× 5 B1	B1 × Cephei?	× 7 ~~6~~ B1 Cephei?	× 8 B1	× 9
Star.	4, Cygni	α Cygni	β Cygni	π Cygni	ξ Cephei
	20 53 1	21 16 x	21 27	21 42	+22 7
T_δ					
T_m					
T_e					
T_f					
T_g					
T_h					
Sum					
Mean					
Red. to T_m					
Sum = s					
$\frac{1}{5}(T_m - T_s)$					
T					
RA					
RA — T					
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A					
C					
Sum					
Mean					
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer					
App. z					
log a′					
A′ log β					
λ log γ					
log tang z					
log r					
r					
z					
φ — z = δ (O)					
δ (C)					
δ (C — O)					

Date Oct 22 1871 Observer A.M.
n Recorder N.A.R.

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T = ______
log β =

log γ

			14 B1		B1		57	
Star.	226 B Ceph.		+ 13 Lacertae		+ ι Cephei		+ ω Piscium	
	44 X		22.39		X 22	45	23 53	
T_δ							39.1	52 28.6
T_m							41.2	30.3
T_e							43.4	31.4
T_f							47.4	52 903 3010
T_g							49.5	
T_h							51.5	
Sum							53.6	53 11.6
Mean							55.7	12.9
Red. to T_m							59.8	13.6
Sum = s							61.9	53 81 1270
$\frac{1}{5}(T_m - T_s)$							63.9 7	
T							56 8.0 ~~51.64~~ 51.55	
RA								
RA — T								
— n tang δ								
ΔT + m								
$T_m - T_\delta$							3 22.1	4 19.6
A							27.0	24.9
C							9!	44.5
Sum							3 2455	4 2225
Mean								
Red. for runs								
Red. to hor. wire								
Red. to meridian								
Division error								
Sum								
Pointer							10	
App. z								
log a′								
A′ log β								
λ′ log γ								
log tang z								
log r								
r								
z								
φ — z = δ (O)								
δ (C)								
δ (C — O)								

Date Oct. 22 1871 Observer A. M.

n Recorder W. A. R.

Barom. =

Att. Therm. =

Ex. Therm. =

log B =

log T =

log β =

log γ

Star.	× α 18 @ Androm. 0 2		× 15 22 Androm 0 4		× 22 g Pegasi. 0 7	
T_δ	1 39.8	1 29.8	3 30.4	3 15.0	6 33.3	6 22.8
T_m	42.1	31.0	33.3	17.3	35.4	24.0
T_e	44.4	32.0	36.2	18.8	37.5	25.3
T_f	48.0	1 28 30.93	42.2	3 21.1 17.03	41.7	6 12.1 24.03
T_g	51.4		45.0		43.8	
T_h	53.8		48.0		46.0	
Sum	56.0		50.8	4 14.4	48.0	7 6.7
Mean	58.4	2 13.8	53.8	16.4	50.0	7.8
Red. to T_m	63.0	14.9	59.7	17.6	54.3	9.6
Sum = s	65.4	15.9 146	62.6	4 18.4 16.13	56.6	7 24.1 8.03
$\frac{1}{5}(T_m - T_s)$	67.7 59 1.0	2 14.87	65.5 52.76	5 5	58.8 50.54	
T	1 53.73		47.96		6 45.95	
RA						
RA — T						
— n tang δ						
ΔT + m						
$T_m - T_\delta$	0 7.5	59.9	1 49.1	2 46.1	4 32.4	0 30.1
A	7.3	59.4	48.0	45.0	37.0	35.5
C		13	171	111	9.4	5.6
Sum	0 7.40	59.65	1 48.55	2 45.55	4 34.70	0 32.80
Mean						
Red. for runs						
Red. to hor. wire						
Red. to meridian						
Division error						
Sum	0		0		50	55
Pointer						
App. z						
log a′						
A′ log β						
λ log γ						
log tang z						
log r						
r						
z						
φ — z = δ (O)						
δ (C)						
δ (C — O)						

Date oct 23 1871	Observer A. M.	Barom. =	log B =
		Att. Therm. =	log T =
n +.06	Recorder	Ex. Therm. =	log β =

log γ

	X +57 18	X n +16 18	X −.01 20	X +.42 22	X +.64 23	X +64 24	X ξ +1.57	X −.04 25	X −1 26	X ξ +18
Star	13 H Cephei ~~λ Pegasi~~	ε Pegasi	α Aquarii	ι Pegasi	π₁ Aquarii Pegasi	π₂ Aquarii Pegasi	ξ Cephei	ζ Aquarii	η Aquarii	ξ Peg
	21 35	21 38	21 59	22 ~~0~~ 1	22 4	22 4	22 ~~X~~ 7	22 15	22 29	22 35
T_δ	21 36 53.4	21 37 48.4	59 7.1	0 56.8	3 26.0	4 10.9	6 9.8	14 57.3	28 41.3	34 59.4
T_m	55.7	23 50.3	9.2	59.0	28.5	13.2	13.7	59.5	43.5	22 1.5
T_e	58.2	25 52.5	11.3	1.1	31.0	15.7	17.5	1.5	45.7	22 3.5
T_f	2.8	46 56.7	15.4	5.8	35.8	20.6	25.1	5.6	49.8	41 7.8
T_g	5.2	24 58.7	17.4	9.0	38.2	23.0	29.0	7.6	52.0	22 9.5
T_h	7.5	23 0.7	19.4	10.4	40.7	25.5	32.9	9.7	54.0	20 11.9
Sum	9.8	23 2.9	21.5	12.5	43.2	27.9	36.7	11.8	55.7	17 14.0
Mean	12.3	25 5.0	23.6	14.8	45.6	30.4	40.5	13.9	57.8	21 16.1
Red. to T_m	17.0	47 9.1	27.6	19.4	50.3	35.2	48.1	18.0	2.1	43 20.3
Sum = s	19.4	24 11.2	29.5	21.6	53.0	37.7	52.0	20.0	4.1	20 22.4
$\frac{1}{5}(T_m - T_s)$ 37	21.8	24 13.3	31.8	23.9	55.4	40.1	56.0	22.1	6.3	22 24.5
T ~~36~~	2.55 ~~7.56~~	38 0.80	59 19.46	1 10.39 ~~10.36~~	3 40.70 ~~40.70~~	4 25.47 ~~25.56~~	6 32.85	15 9.73	28 53.85 ~~53.84~~	35 11.93
RA	59.55	52.78	11.41	2.24	32.61	17.46	24.78	1.63	45.70	3.77
RA − T	−8.01	−8.02	−8.05	−8.14	−8.09	−8.10	−8.07	−8.10	−8.14	−8.16
− n tang δ	−.03	−.01	00	− 3	− 04	− 3	− 9	+ 0	0	− 1
ΔT + m	8.04	8.03	8.05	−8.17	−8.13	−8.13	−8.16	−8.10	−8.14	−8.17

$T_m - T_\delta$		8.04	8.17
A		03	13
C		05	13
		12	16
Sum		−8.03	10
Mean			14
			17
Red. for runs			30
Red. to hor. wire			−8.14
Red. to meridian			
Division error			
Sum			
Pointer			
App. z			
log a′			
A′ log β			
λ log γ			
log tang z			
log r			
r			
z			
φ − z = δ (O)			
δ (C)			
δ (C − O)			

Date Oct 27 1871 Observer A. M. Barom. = log B =

Att. Therm. = log T = log γ

n Recorder Ex. Therm. = log β =

Star.	× 20 1 Lacertae	× 21 η Aquarii	×4 22 ζ Pegasi	× 23 λ Pegasi	× 24 ω Pegasi	× 26 ι Cephei	× α Pisc Aust	× 25 7 α Peg.	× 8 π Cephei
	22 26	22 29	22 35	22 41	22 44	× 22 45	××	22 59	× 23 4
T_δ	22 26 3.1	22 27 ~~42.3~~ (42.3)	22 35 0.2	22 40 16.7	22 44 5.4	22 45	22 50 27.9	22 58 18.5	23 3 14.0
T_m	6.4	44.1	18 2.3	18.8	7.7		30.6	20.6	21.4
T_e	9.5	46.4	23 4.3	21.0	9.9		32.9	22.7	29.3
T_f	12.7	50.5	41 8.6	25.5	14.3	6.8	37.7	27.0	45.0
T_g	15.9	52.6	21 10.6	27.8	16.7	11.8	40.0	29.0	52.7
T_h	26 47.6 9.52	54.5	19 12.7	30.1	18.9	16.7	42.4	31.1	4 0.2
Sum		56.6	21 14.8	32.2	24.1	21.6	44.8	33.3	8.1
Mean		58.6	20 16.8	34.5	23.4	26.6 83.5	47.2	35.4	16.1
Red. to T_m		2.8	42 21.0	38.8	27.5	45 1670	52.0	39.7	31.6
Sum = s		4.8	20 23.1	41.2	30.2		54.3	41.7	39.3
$\frac{1}{5}(T_m - T_s)$		6.8	20 25.2	43.4	32.4		56.8	43.9	47.1
T	26 9.52	27 600.0 54.55	35 139.6 12.69	40 330.0 30.00	44 207.5 18.89	45 16.70	50 42.42	58 344.9 31.14	4 4.8 0.44
RA									
RA — T									
— n tang δ									
ΔT + m									
$T_m - T_\delta$									
A									
C									
Sum									
Mean									
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer									
App. z									
log a′									
A′ log β									
λ log γ									
log tang z									
log r									
r									
z									
φ — z = δ (O)									
δ (C)									
δ (C — O)									

Date Nov. 2 1871
Observer N&R
Recorder A. M. – N&R
n
Barom. =
Att. Therm. =
Ex. Therm. =
log B =
log T =
log β =
log γ

	× B1	× B1	× B1	× B1
Star.	α Cygni	ε Cygni	η Cephei	ι Cygni
	20 37	20 41	20 43	20 53
T_δ				
T_m				
T_e				
T_f				
T_g				
T_h				
Sum				
Mean				
Red. to T_m				
Sum = s				
$\frac{1}{5}(T_m - T_s)$				
T				
RA				
RA — T				
— n tang δ				
ΔT + m				
$T_m - T_\delta$				
A				
C				
Sum				
Mean				
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer				
App. z				
log a′				
A′ log β				
λ′ log γ				
log tang z				
log r				
r				
z				
φ — z = δ (O)				
δ (C)				
δ (C — O)				

Date Nov. 2 1871 Observer N.S.R. Barom. = log B =

Att. Therm. = log T =

n Recorder A.M. Ex. Therm. = log β = log γ

	× B1		× B1		× B1		× B2		× B2	
Star.	61 Cygni		τ Cygni		a C~~ygni~~ephei		κ Cass.		κ Draco	
	21 1		21 10		21 16		0 26		12 28	
T_δ										
T_m										
T_e										
T_f										
T_g										
T_h										
Sum										
Mean										
Red. to T_m										
Sum = s										
$\frac{1}{s}(T_m - T_s)$										
T										
RA										
RA — T										
— n tang δ										
ΔT + m										
$T_m - T_\delta$										
A							0 28.3	1 11.9	1 8.0	0 41.2
C							17.5	1.8	52.6	27.2
Sum										
Mean										
Red. for runs										
Red. to hor. wire										
Red. to meridian										
Division error										
Sum										
Pointer							10		55	
App. z										
log a′										
A′ log β										
λ log γ										
log tang z										
log r										
r										
z										
φ — z = δ (O)										
δ (C)										
δ (C — O)										

Date Nov 2 1871　Observer W.A.R.　Barom. =　log B =

n　Recorder A. M.　Att. Therm. =　log T =　log γ

Ex. Therm. =　log β =

Star.	+ ε Androm		+ α Cass. B2		+ ο Cass.		+ ζ Androm. B2	
	0 32		0 33		0 38		0 42	
T_δ 0	31 42.7	31 30.7		0	37 27.0	37 17.6		
T_m	45.0	33.0			30.1	20.6		
T_e	47.3	34.2			33.0	22.6		
T_f	52.1	31 79 32.63			39.1	37 0.8 20.27		
T_g	54.5				42.2			
T_h	56.8				45.3			
Sum	59.0				48.4			
Mean	1.4	32 15.7			51.4	38 6.5		
Red. to T_m	6.2	16.8			57.6	7.5		
Sum = s	8.4	18.0			60.8	9.6 23.6		
$\frac{1}{5}(T_m - T_s)$	10.8	18.9			63.6	38 7.87		
T	31 62.42 56.75	32 17.35			37 49.85 45.32			
RA								
RA — T								
— n tang δ								
ΔT + m								
$T_m - T_\delta$								
A	1 11.9	2 3.8	3 56.7	4 28.8	3 36.3	4 18.4	3 50.2	4 12.9
C	4.7	42.9	45.7	78.3	28.0	10.9 ~~16.4~~	44.0	6.9
Sum	16.6	10 46.7			64.3	9 ~~75.3~~		
Mean	1 8.30	1 5 2 23.35			3 32.15	4 ~~17.65~~ 14.65		
Red. for runs								
Red. to hor. wire								
Red. to meridian								
Division error								
Sum								
Pointer	45		30		45		45	
App. z								
log a′								
A′ log β								
λ′ log γ								
log tang z								
log r								
r								
z								
φ — z = δ (O)								
δ (C)								
δ (C — O)								

Date Nov. 2 1871
Observer W.A.R.
Recorder A. M.
n

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =
log γ

Star.	+ B2 η Cas 0 42		+ Polaris 1 13						
T_δ									
T_m									
T_e									
T_f									
T_g									
T_h									
Sum									
Mean									
Red. to T_m									
Sum = s									
$\frac{1}{s}(T_m - T_s)$									
T									
RA									
RA — T									
— n tang δ									
ΔT + m									
$T_m - T_\delta$									
A	0 57.2	1 29.2							
C	46.8	19.8							
Sum									
Mean									
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer	15								
App. z									
log a′									
A′ log β									
λ log γ									
log tang z									
log r									
r									
z									
φ — z = δ (O)									
δ (C)									
δ (C — O)									

Date Nov 21 1871 Observer A. M.
n Recorder W. A. R.

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =
log γ

Star.	22 6 β Cephei		x B1 λ Pegasi		x B1 13 Lacertae		x B1 λ Pegasi	
	x x		22 37		22 39		22 41	
T_δ	22 24 22.3	22 28 51.8						
T_m	30.6	55.1						
T_e	38.2	58.8						
T_f	55.0	61.7						
T_g	30 3.1	227.4 28 56.85						
T_h	11.5							
Sum	19.6	17.3						
Mean	27.9	21.3						
Red. to T_m	44.6	25.0						
Sum = s	53.0	63.6 212.0						
$\frac{1}{5}(T_m - T_s)$	31 1.3							
T	127.1 30 11.55							
RA								
RA — T								
— n tang δ								
$\Delta T + m$								
$T_m - T_\delta$								
A								
C								
Sum								
Mean								
Red. for runs								
Red. to hor. wire								
Red. to meridian								
Division error								
Sum								
Pointer								
App. z								
log a′								
A′ log β								
λ′ log γ								
log tang z								
log r								
r								
z								
$\phi - z = \delta\,(O)$								
δ (C)								
δ (C — O)								

Date Nov. 21 + 71 Observer A. M.

n Recorder J. R. R.

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T = ____________ log γ
log β =

	B_1		B_2		B_2		B_2		B_2	
Star.	+ i Cephei		+ a Androm		+ 22 Androm		+ J Pegasi		θ Androm.	
	22 45		0 2		0 4		0 7		0 10^{2} ?	
T_δ	22 44									
T_m										
T_e										
T_f										
T_g										
T_h										
Sum										
Mean										
Red. to T_m										
Sum = s										
$\frac{1}{6}(T_m - T_s)$										
T										
RA										
RA — T										
— n tang δ										
ΔT + m										
$T_m - T_\delta$										
A										
C										
Sum										
Mean										
Red. for runs										
Red. to hor. wire										
Red. to meridian										
Division error										
Sum										
Pointer										
App. z										
log a′										
A′ log β										
λ log γ										
log tang z										
log r										
r										
z										
φ — z = δ (O)										
δ (C)										
δ (C — O)										

Date Nov 6 1871 Observer N.A.R. Barom. = log B =

Att. Therm. = log T = log γ

n Recorder ~~N.A.R.~~ & A.m. Ex. Therm. = log β =

Star.	+ π_1 Pegasi		+ π_2 Pegasi		+ η Cephei		+ ζ Aquarii		(Nov 5) + Polaris
	22 4		22 4		22 7		22 15		0 1 13
T_δ	22 3 36.8	22 3 43.2	4 11.9	4 37.3	6 25.6	6 ~~44.2~~	14 58.6	14 48.5	4 56
T_m	39.4	26 44.0	14.4	39.1	29.6	43.0	0.7	50.2	5 25.3
T_e	41.5	21 44.7	16.8	41.2	Mid.gr. 33.3	43.8	2.7	51.3	6 58.7
T_f	Md.gr. ~~44.1~~	26 3 11.4 43.97	21.6	4 11.76 39.20	36.9	6 8 43.40	6.8	14 0.3 50.10	9 52.3
T_g	46.5	24	24.0		41.2 ~~41.2~~		8.8		11 13.1
T_h			26.4		165 6 ~~33.12~~		10.9		12 41.0
Sum			28.8				12.9	15 39.4	14 6.9
Mean			31.4				15.0	40.3	15 32.0
Red. to T_m			36.2				19.1	15 7.97 39.85	18 20.5
Sum = s			38.6				21.2		19 50.1
$\frac{1}{5}(T_m - T_s)$			41.6				23.3		21 12.6
T	3 41.66		4 26.46		6 33.32		15 10.91		12 ~~40.02~~ 40.19
RA	32.38		17.22		24.33		1.44		32.81
RA — T	9.28		9.24		8.99		9.47		7.21
— n tang δ									
ΔT + m									
$T_m - T_\delta$									
A	0 50.8		0 50.8		0 ~~− 2.2~~	57.8	4 24.1	0 31.2	
C	42.0		42.0		− 24.7	35.3	20.9	26.9	
Sum	92.8		92.8			93.1	5.0	58.1	
Mean	0 46.40		0 46.40		4	46.55	4 22.50	0 29.05	
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer	50		50		50		20	25	
App. z									
log a′									
A′ log β									
λ log γ									
log tang z									
log r									
r									
z									
φ — z = δ (O)									
δ (C)									
δ (C — O)									

Date Nov. 6 1871 Observer W. A. R. Barom. = log B =

Att. Therm. = log T = log γ

n Recorder A. M. Ex. Therm. = log β =

Star.	+ 31 Pegasi		+ δ Cephei		+ 72 Pegasi		+ λ Andromedae		+ κ κ Andromedae	
	22 15		22 25		23 28		23 31		23 34	
T_δ	18 20.4	18 8.8	24 11.0	24 3.0	23 27 30.6	23 27 19.1	31 9.3	30 57.0	33 58.1	33 48.7
T_m	23.7	10.2	14.6	5.3	33.0	20.1	12.2	59.0	0.9	50.8
T_e	27.0	12.7	18.3	7.7	35.3	21.6	15.1	60.4	3.7	52.7
T_f	33.6	18 31.7 10.57	26.1	24 16.0 5.33	40.1	27 60.8 20.27	21.0	30 176.4 58.80	9.5	33 2.2 50.73
T_g	36.9		34.1		42.6		24.0		12.4	
T_h	40.2		33.9		45.0		26.9		15.1	
Sum	43.5	19 3.0	38.0	25 13.2	47.3	28 6.8	29.8	31 55.3	18.0	34 36.3
Mean	46.8	6.0	41.7	15.7	49.7	8.2	32.8	56.9	20.8	38.2
Red. to T_m	53.5	6.7	49.4	18.0	54.5	9.8	38.7	59.0	26.5	39.8
Sum = s	56.7	19 14.7 4.90	53.3	25 16.9 15.63	56.9	28 24.8 8.27	41.5	31 21.2 57.07	29.2	34 24.3 38.10
$\frac{1}{5}(T_m - T_s)$	60.1		56.9		59.3		44.7		32.3	
T	18 40.22		24 33.94		27 44.94 ~~44.95~~		31 26.91		34 15.14	
RA	11.90		24.85		35.53		17.88		5.93	
RA — T	8.32		9.09		9.42		9.03		9.21	
— n tang δ										
ΔT + m										
$T_m - T_\delta$										
A	3 16.3	4 1.2	3 8.3	4 59.0	1 3.4	1 9 57.7	2 37.7	3 32.4	1 0.0	46.3
C	4.7	50.2	55.3	46.2	54.0	48.1	25.0	21.1	48.1	34.3
Sum	21.0	111.4	3.6	105.2	117.4	6.0 ~~5.2~~	62.7	53.5	108.1	80.6
Mean	3 9 10.50	3 55.70	3 1.80	4 52.60	0 58.70	1 ~~52.60~~ 53.00	2 31.35	3 26.75	0 54.05	40.30
Red. for runs										
Red. to hor. wire										
Red. to meridian										
Division error										
Sum										
Pointer	45		35		45		35		45	
App. z										
log a'										
A' log β										
λ' log γ										
log tang z										
log r										
r										
z										
φ — z = δ (O)										
δ (C)										
δ (C — O)										

Date Nov. 6 1871 Observer N.A.R.
n Recorder A. M.

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =

log γ

Star.	+ ε Piscin		+ β Androm		+ Polaris			nov 6 0 14 30 -3 47	
	0 56		1 3		1 13				
T_δ	0 56 14.4	0 — 56	2 27.9		0 4 18				
T_m	16.6		30.5		5 24.7	1 22.9			
T_e	18.8		33.0		6 55.8	1 31.1			
T_f	22.7		38.0		9 45.8	2 50.0			
T_g	24.8		40.5		11 9.0	1 23.2			
T_h	26.9		42.9		12 37.0	1 28.0			
Sum	29.0		45.4		14 2.9	1 25.9			
Mean	31.0		48.0		15 28.1	1 25.2			
Red. to T_m	35.1		52.9		18 18.8	2 49.7			
Sum = s	37.2		55.4		19 47.2	1 31.4			
$\frac{1}{6}(T_m - T_s)$	39.3		58.0		21 13.3	1 26.1			
T	56 26.89		2 42.95		12 ~~36.50~~ 36.76				
RA	17.57		33.86		12 32.42				
RA — T	9.32		9.09		4.38				
— n tang δ									
ΔT + m									
								.11 55	
$T_m - T_\delta$								149	211
A					2 17.8	2 34.6		1,1032 4 488	1,3243 0 355
C					57.6	14.2		423	328
Sum								911	683
Mean								4 4555	8416
Red. for runs								+ 65	+ 08
Red. to hor. wire								+ 1949	− 2760
Red. to meridian								—	—
Division error								5 0469	— 6.63
Sum									
Pointer					45			55 ~~5~~	0 ~~10~~
App. z								10 5.7	10 66
								10 6.1	
log a'								1.2	
A' log β									
λ log γ								1.7620	
log tang z								0177	
log r								1.7797	
r								+ 595	
z								11 5.6	
φ — z = δ (O)								48 17.0	
δ (C)									
δ (C — O)									

.11754
6.7367

Date Nov. 6 1871 Observer A.M.

Recorder W.H.R.

Barom. = 29.97
Att. Therm. = 65.0
Ex. Therm. = 49.0

log B = +.0054
log T = −.0013
log β = +.0041

log γ −.0002

n

+46 10
0 14 30
−3 47

		−24 43 67 06		+23 59 +18 24		−14 25 56 47		+36 14 +46 09		+27 55 +14 28
Star.		+ 41 M Cass Cephei?		+ ψ Pegasi		+ λ Cass		+ ω Pegasi iscum		+ γ Pegasi
		23 42		23 46		23 48		23 53		0 7
T_δ		23 41 26.0	41 1.3	23 45 54.4	23 45 44.0	47 46.3	47 30.6	52 40.6	52 38.0	57 8.4 56 57.7
T_m	27.5	14 23.7 31.2	52 3.7	56.5	44.8	50.1	32.3	42.7	39.0	34.7 11.8 6 23.8 59.0
T_e	29.5	24.9 36.6	54 6.8	58.7	45.8	53.7	34.5	44.8	39.7	36.8 15.0 24.9 0.6
T_f	31.6	26.0 42.2	106 118	3.0	146	1.4	74	48.9	267	39.0 18.4 26.0 197
T_g	35.6	~~24.9~~ 14 24.87 52.4	52 41 ~~3.9~~ 3.93	5.2	45 ~~44.9~~ 44.87	5.1	47 ~~32.5~~ 32.47	50.9	52 38.90	43.4 21.6 6 147 75.2 24.90 59.10
T_h	37.7	57.7	53	7.3		8.8		53.0		− 45.4 15.04
Sum	39.8	14 59.6 2.9	52 42 37.8	9.5	45 25.3	12.5	37.1	55.1		− 47.5
Mean	41.8	1.2 8.3	54 40.0	11.7	26.7	16.4	39.3	57.1		49.6
Red. to T_m	44.0	29 18.8	105 43.0	16.0	27.6	23.9	41.5	61.2		51.8
Sum = s	48.1	~~15~~ ~~45~~ 24.3	55 52 ~~403~~ 1208	18.3	~~365~~ 196	27.7	~~1185~~ 7	63.3		56.0
$\frac{1}{8}(T_m - T_s)$	50.1	15 1.23 29.5	42 40.27	20.3	45 26.53	31.2	~~39.6~~ 39.30	65.5		58.1 60.3
T	52.1	41 57.92		46 7.36		48 8.83		52 53.01	13 57	47.51 15.04
RA	14? 39.80	48.61		57.97		59.72		43.58		38.11
RA — T	9.54	9.71		9.39		9.11		9.43		9.40
— n tang δ	+ 1 − 6									
ΔT + m	30.32									
+44		9.7076 6.2911		.0947 6.2131		.8561 6.3578		.1150 6.7641		.1035 6.1200
$T_m - T_\delta$		538 1.7308	426 1.6294	225 1.3532	191 1.2810	363 1.5599	308 1.4884	141 1.1452		226 1.3541 · 11.6
A		3 10.0	4 0.0	3H 25.3	4 17.8	1 28.8	2 17.3	3 36.5		4 34.0 27.7
C		~~7.0~~ 527	3 42.2	~~27.8~~ 17.8	18.2	14.3	25	29.8		~~27.4~~ 27.7
Sum		27	7 42.2	~~43.1~~ 43.1	36.0	43.1	19.8	66.3		61.7
Mean		3 1.35	3 51.0	3 ~~2155~~ 21.55	4 18.00	1 21.55	2 9.80	3 33.15		4 30.85
Red. for runs		+.42	+.55	+.43	+.58	+.18	+.30	+.49		+.63
Red. to hor. wire		+27.44	− 21.73	+27.84	−23.75	+21.07	−22.10	+18.37		28.68
Red. to meridian		+.01	−.01							
Division error		3 29.20	29.91	3 53.9	3 54.8	1 47.8	1 48.0	3 52.01		5 00.16
Sum										
Pointer		15		55		35		10		50
App. z		18 29.6		58 54.4		36 47.9		13 52.0		55 0.2
log a′		1.7613								
A′ log β		+.0041								
λ log γ		−.0002		1.7652		1.7652		1.7652		1.7652
log tang z		1.7652		9.6479		9.4100n		9.8650		9.7241
log r		9.6630n		1.4131		1.1752n		+1.6302		+1.4893
r		1.4282n − 26.81		+25.9		− 14.97		+ 42.7		+ 30.9
z		18 2.8		59 20.3		36 32.9		14 34.7		55 31.1
φ — z = δ (O)		4 4.58		23 2.83		6 15.7		8 13.9		27 1.75
δ (C)		67 5 51.9		18 24 33.8		56 47 18.9		6 9 13.2		14 28 16.7
δ (C — O)		1 6.1		1 5.5		3.2		1 2.3		1 − 0.8

Date Nov 7/1871 Observer WAR Barom. = log B =

Att. Therm. = log T =

n Recorder A, M & WAR Ex. Therm. = log β =

log γ

Star.	+ 32 Vulpeculae		+ a Cephei —		× 1 Draco.		+ w Cygni B1	
	20 49		21 16		~~21~~ 19		20 37	
T_δ	20 48 59.8	48 56.9	15 12.9	15 0.8	17 (17.8)	140	21 36	
T_m	2.0	58.0	17.2	2.7	31.8 45.7	139		
T_e	4.5	59.2	21.5	4.9	18 14.8	291		
T_f	9.0	48 24 1 58.03	30.4	8.4 15 28.0	30.2	154		
T_g	11.3		34.7		44.1	139		
T_h	13.6		39.0		58.6	145		
Sum	16.0		43.4		19 14.3	157		
Mean	18.4		47.8		43.0	287		
Red. to T_m	22.9		56.5		59.4	144		
Sum = s	25.3		61.0		20 11.4	140		
$\frac{1}{5}(T_m - T_s)$	27.6		65.4					
T	49 13.67		15 39.07	39.04	~~17~~ 18 44.46	44.57		
RA	4.82		30.62	30.62	33.94	33.94		
RA — T	8.85		8.45	8.42	10.52	10.63		
— n tang δ								
ΔT + m								
$T_m - T_\delta$								
A								
C								
Sum								
Mean								
Red. for runs								
Red. to hor. wire								
Red. to meridian								
Division error								
Sum								
Pointer								
App. z								
log a′								
A′ log β								
λ log γ								
log tang z								
log r								
r								
z								
φ — z = δ (O)								
δ (C)								
δ (C — O)								

Date Nov. 1 1871 Observer W.A.R. Barom. = log B =
Att. Therm. = log T = log γ
n Recorder A.M. & W.A.R. Ex. Therm. = log β =

Star.	+ B1 η Cephei 20 43		+ B1 61, Cygni 21 01		+ B1 τ Cygni 21 10		+ B1 β Cephei 21 27		+ B1 π Cygni 21 42	
T_δ										
T_m										
T_e										
T_f										
T_g										
T_h										
Sum										
Mean										
Red. to T_m										
Sum = s										
$\frac{1}{5}(T_m - T_s)$										
T										
RA										
RA — T										
— n tang δ										
ΔT + m										
$T_m - T_\delta$										
A										
C										
Sum										
Mean										
Red. for runs										
Red. to hor. wire										
Red. to meridian										
Division error										
Sum										
Pointer										
App. z										
log a′										
A′ log β										
λ log γ										
log tang z										
log r										
r										
z										
φ — z = δ (O)										
δ (C)										
δ (C — O)										

Date Nov. 7 1871 Observer W. A. R.

n Recorder A. M.

Barom. =

Att. Therm. =

Ex. Therm. =

log B =

log T =

log β =

log γ

Star.	✗ 3 Lacertae	✗ B_2 φ Pegasi	✗ B_2 ρ Cass.	✗ B_2 ω Piscium
	22 18	23 46	23 48	23 53
T_δ				
T_m				
T_e				
T_f				
T_g				
T_h				
Sum				
Mean				
Red. to T_m				
Sum = s				
$\frac{1}{s}(T_m - T_s)$				
T				
RA				
RA — T				
— n tang δ				
ΔT + m				
$T_m - T_\delta$				
A				
C				
Sum				
Mean				
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer				
App. z				
log a'				
A' log β				
λ log γ				
log tang z				
log r				
r				
z				
φ — z = δ (O)				
δ (C)				
δ (C — O)				

Date Nov. 7, 1871 Observer A. M.
n Recorder W. A. R.

Barom. = 29.87
Att. Therm. = 64.00
Ex. Therm. = 50.9

log B = +0040
log T = – 12
log β = +0028

log γ – 0017

	×	+14 0 28.22	×	-3 0 45 21	×	+27 56 14 27	+	-33 57 76 14	~~+3 ×~~	XX +46 10
+08 Star.	a Androm.		22 Androm.		γ Pegasi.		Gr 29=Br 6		0 14 30	
	0 2		0 4		0 7		0 9		– 3° 47'	XX
T_δ	0 1 40.7	0 1 29.0	3 31.2	3 28.3	6 34.36	29.0	8 ~~18.4~~	8 44.6	14 27.1	14 20.3
T_m	43.0	30.1	34.1	29.6	36.4	30.0	26.6	48.5	29.0	21.4
T_e	45.3	31.4	37.0	30.2	38.5	31.2	34.7	51.8	31.1	22.3
T_f	50.0	905	42.9	881	42.8	902	53.0	1446 9	35.0	40
T_g	52.3	~~30.2~~ 1 30.17	45.8	~~29.4~~ 3 29.37	45.0	~~30.1~~ 6 30.07	1.3	~~48.2~~ 8 48.30	37.1	~~21.3~~ 14 21.33
T_h	54.7		46.6		47.1		-10.3		39.1	
Sum	57.0	2 17.1	51.7	4 13.9	49.1	7 12.5	18.7	10 18.4	41.2	15 4.2
Mean	59.4	19.7	54.7	16.1	51.4	14.1	27.8	22.5	43.3	5.5
Red. to T_m	63.8	21.7	60.3	18.7	55.5	15.3	45.0	25.7	47.5	6.8
Sum = s	66.4	585	63.3	187	57.6	189	53.2	666	49.5	165
$\frac{1}{5}(T_m - T_s)$	68.7	2 19.50	66.4	4 ~~16.2~~ 16.23	59.8	~~14.3~~ 7 13.97	62.3	~~22.2~~ 10 22.20	51.6	~~5.8~~ 15 5.50
T	1 54.66		3 48.73		6 47.05		9 10.12		14 39.23	
RA	45.84		40.16		38.10		1.97		– 9.01	
RA – T	8.82		8.57		8.95		8.15		+ 1	
– n tang δ									14 30.21	
ΔT + m										
	0619		9.5613	~~4.4035~~	1035		9.4940		.1165	
	1.3852	1.3944	1.2856	1.4853	1.2304	1.4346	1.9184	1.0828	1.2525	1.4200
$T_m - T_\delta$	24.5	24.8	19.3	27.5	17.0	27.2	81.9	12.1	17.9	26.3
A	0 10.1	1 8.1	2 5.6	2 48.6	4 42.6	0 38.4	0 8.4	0 34.1	4 13.6	0 11.8
C	58.3 ~~1.7~~	0 55.1	1 51.3	2 35.1	38.1	32.0	48.0 ~~12.2~~	19.4	7.8	8.4
Sum	8.4	2 03.2	3 56.9	5 23.7	80.7	70.9	11 6.4 ~~–3.8~~	56.5	21.4	20.2
Mean	0 4.20	1 1.60	1 58.45	2 41.85	4 40.35	0 35.45	59 58.20 ~~58.1~~	0 28.25	4 10.70	10.10
Red. for runs	+ .01	+ .07	+ .16	+ .23	+ .38	+ .05	.0	+ .04	+ .34	+ .01
Red. to hor. wire	+ 28.24	28.60	17.65	– 25.15	+ 21.57		25.54	3.78	+ 23.40	– 34.48
Red. to meridian	—									
Division error	—									
Sum	32.45	33.1	2 16.26	2 16.83	5 2.30	+ 1.0	0 23.65	24.5	4 34.44	35.63
Pointer	0 32.4	0 33.1	0		50	55	10		5	10
App. z	0 32.1		2 16.6		55 1.7		10 24.1		9 35.0	
log a'	1.7613									
A' log β	+ 28									
λ log γ	– 17	1.7624	1.7624	1.7	1.7624		1.7624		1.7620	
log tang z	1.7624 9.3564	8.7387n	8.7387n		9.7245		9.8265n		+0177	
log r	1.1591		–0.5011		+1.4869		–1.5886		+1.7997	
r	+ 144		– 3.2		+ 30.7		– 38.8		+ 85.5	
z	0 46.5		2 13.4		55 32.9		9 45.3		10 34.5	
φ – z = δ (O)	22 2.1		20 35.2		27 15.7		13 3.3		– 3 47 45.9	
δ (C)	23 2.8		21 39.1		16.8		14 25.5		1 28	
δ (C – O)	+ 1 0.7		+ 1 3.9		+ 1 1.1		+ 1 22		– 3 46 43.9	

Date May 1871
Observer A. M.
Recorder W. A. R.
n

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =

log γ

Star.	+ ε Piscium		+ B Androm.		+ Polaris.		+ δ Cass		+ η Piscium
	0 56		1 3		1 13		/ 1 18		1 25
T_δ	0 56 14.2	0 56 9.9	2 27.6	2 12.0	0 3 57.7		17 12.0	16 53.1	24 24.4
T_m	16.3	11.0	30.1	13.0	5 24.1	1 26.4	16.0	46 55.0	24.2
T_e	18.3	12.7	32.6	14.3	6 50.0	1 25.5	20.0	40 57.4	
T_f	22.4	56 33.6 11 20	37.8	2 93 13 10	9 39.4	249.4	28.1	81 16 15.5 55.17	v. opp page
T_g	24.5		40.2		11 6.2	1 26.8	32.3	42	
T_h	26.6		42.7		12 25.5	1 23.3	36.3	40	
Sum	28.7	44.5	45.1	3 4.6	13 54.6	1 25.1	40.4	41	
Mean	30.7	45.7	47.6	5.7	15 24.8	1 30.2	44.6	42	
Red. to T_m	34.8	47.1	52.7	7.0	18 13.8	249.0	52.6	80	
Sum = s	37.0	17 3 45.77	55.2	3 17 8 5.77	19 42.0	1 28.2	56.7	41	
$\frac{1}{5}(T_m - T_s)$	39.1		57.7		21 6.2	1 24.2	60.7	40	
T	56 26.60		2 42.66		0 12 31.66	31.03	17 36.34		
RA	17.57		33.85		32.02	32.03	27.87		
RA — T	9.03		8.81		— 0.36	— 1.00	8.47		
— n tang δ									
ΔT + m									
$T_m - T_\delta$									
A	0 50.8	1 37.0	1 47.8	2 44.5	2 17.2	2 43.1	4 40.0		1 50.5 2 45.3
C	44.0	28.9	35.0	34.0	57.3	24.0	22.5		44.0 38.0
Sum	94.8	65.9	82.8	78.5	13 74.5	67.1	62.5		94.5 83.3
Mean	0 47.40	1 27.95 32.95	1 41.40	2 39.25	2 37.25	2 33.55	4 31.25		1 47.25 2 41.65
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer	0		25		45		45		40
App. z									
log a'									
A' log β									
λ log γ									
log tang z									
log r									
r									
z									
ϕ — z = δ (O)									
δ (C)									
δ (C — O)									

Date Nov 7 1871
Observer A. M.
Barom. =
Att. Therm. =
Ex. Therm. =
log B =
log T =
log β =
log γ
n
Recorder W.A.R.

Star.	✗ v ν Persei.		✗ η Piscium	
	1 30		1 25	
T_δ	29 58.8	29 42.7	24 34.0	24 24.2
T_m	1.9	44.1	36.1	26.3
T_e	5.1	46.0	38.2	28.1
T_f	11.1	12.8 29 44.27	42.5	18.6 24 26.20
T_g	14.3		44.5	
T_h	17.2		46.6	
Sum	20.4	30 45.8	48.8	25 6.7
Mean	23.5	47.1	51.0	8.2
Red. to T_m	29.6	48.5	35.1	10.0
Sum = s	32.6	21.4 30 47.13	57.2	24.9 25 8.30
$\frac{1}{5}(T_m - T_s)$	30 35.7		59.5	
T	~~29~~ 17.29		24 46.68	
RA	8.50		37.67	
RA − T	8.79		9.01	
− n tang δ				
ΔT + m				
$T_m - T_\delta$				
A	4 50.8	0 46.3		
C	36.5	30.0		
Sum	87.3	76.3		
Mean	4 43.65	0 38.15		
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer	20	25		
App. z				
log a'				
A' log β				
λ log γ				
log tang z				
log r				
r				
z				
φ − z = δ (O)				
δ (C)				
δ (C − O)				

Date Nov 9 1871 Observer W. A. R. Barom. = log B =

Att. Therm. = log T = ———— log γ

n Recorder W A R & A. M. Ex. Therm. = log β =

Star.	× B1 a Cygni		× x Cygni		× a Cephei		× H Draco	× B1 η Cephei
	20 37		20 53		21 16		9 19	20 43
T_δ	20 31		52 15.0	52 5.3	15 12.4	14 55.0	17 16.9	
T_m			17.7	6.8	16.7	59.5	30.7	
T_c			3 20.4	8.4	21.0	61.3	45.4	
T_f			25.9	52 20.5 68.8	30.0	14 178.8 59.60	18 14.9	
T_g			28.4		34.3		28.8	
T_h			31.2		38.6		44.2	
Sum			33.7		42.8		58.1	
Mean			37.4		47.5		19 12.6	
Red. to T_m			42.0		56.1		42.1	
Sum = s			45.7		60.5		56.7	
$\frac{1}{5}(T_m - T_s)$			47.6 4		65.2		20 11.0	
T			34.59 ~~31.45~~		15 42.52 38.65		481.4 18 43.76	
RA			52 31.35					
RA — T								
— n tang δ								
ΔT + m								
$T_m - T_\delta$								
A	4 1.6		2 50.7		1 6.0			
C	3 52.3		43.3		52.4			
Sum			94.0		118.4			
Mean			2 47.00		0 59.20			
Red. for runs								
Red. to hor. wire								
Red. to meridian								
Division error								
Sum								
Pointer	35		40		20			
App. z								
log a′								
A′ log β								
λ′ log γ								
log tang z								
log r								
r								
z								
φ — z = δ (O)								
δ (C)								
δ (C — O)								

Date Nov 9 1871 Observer W.A.R. Barom. = log B =

Att. Therm. = log T =

n Recorder A.M. & W.A.R. Ex. Therm. = log β = log γ

Star.	× B1 61 Cygni 21 1	× B1 β Cephei 21 27	× B1 π_2 Cygni 21 42	× B1 ζ Cephei 22 7	× B1 3 Lacertae 22 19
T_δ					
T_m					
T_e					
T_f					
T_g					
T_h					
Sum					
Mean					
Red. to T_m					
Sum = s					
$\frac{1}{s}(T_m - T_s)$					
T					
RA					
RA — T					
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A					
C					
Sum					
Mean					
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer					
App. z					
log a′					
A′ log β					
λ′ log γ					
log tang z					
log r					
r					
z					
φ — z = δ (O)					
δ (C)					
δ (C — O)					

Date Nov. 9 1871 Observer WAR Barom. = log B =

Att. Therm. = log T =

n Recorder A.M. Ex. Therm. = log β = log γ

Star.	× B2 λ Androm	× B2 φ Pegasi	× B2 ρ Cass	× B2 ω Piscium	× Nov 8-9 Polaris S.P.	
	23 31	23 46	23 48	23 53	13 13	
T_δ	23 30				13 4 19.5	
T_m					5 42.5	
T_e					7. 9.5	
T_f					9 54.6	
T_g					11 24.9	
T_h					12 57.6	
Sum					14 16.3	
Mean					15 40.9	
Red. to T_m					18 35.0	
Sum = s					19 59.4	
$\frac{1}{5}(T_m - T_s)$					21 23.5	
T					~~12 51.16~~ 12 51.65	51.79
RA					31.50	31.50
RA — T					+19.66	20.29
— n tang δ						
ΔT + m						
$T_m - T_\delta$						
A				2 57.8	2 40.8	
C				38.4	19.3	
Sum				96.2	60 1	
Mean				2 48.10	2 60.05	
Red. for runs						
Red. to hor. wire						
Red. to meridian						
Division error						
Sum						
Pointer				0	0	
App. z						
log a′						
A′ log β						
λ′ log γ						
log tang z						
log r						
r						
z						
φ — z = δ (O)						
δ (C)						
δ (C — O)						

Date Nov 9 1871 | Observer ~~W.A.R.~~ A. M. | Barom. = 29.92 | log B = +.0046
n | Recorder ~~A. M.~~ W.A.R. | Att. Therm. = 68.2 | log T = − 14
Ex. Therm. = 30.0 | log β = +.0032 | log γ +.0162

+05

Star.	α Androm		22 Androm.		γ Pegasi		ε Piscium		β Androm	
	0 2		0 4		0 7		0 56		1 3	
T_δ	0 1 40.2	0 1 24.8	3 31.1	3 16.1	6 34.0	6 23.4	56 13.9	56 6.1	1 2 27.2	1 2 15.0
T_m	42.5	30.6	34.0	17.1	36.1	24.6	16.0	7.3	29.7	17.0
T_e	46.0	31.9	37.0	18.6	38.3	26.7	18.0	8.5	32.2	19.0
T_f	49.8	2 973	42.8	19.8	42.4	750	22.1	289	37.1	210
T_g	52.1	~~30.4~~ 1 30.77	45.6	316 3 17.90	44.7	6 25.00	24.2	~~76~~ 56 7.30	39.8	2 17.00
T_h	54.4		48.6		46.8		26.3		42.3	
Sum	56.8	2 16.8	51.7	4 14.5	48.9	7 3.0	28.2	56 48.5	44.8	3 4.4
Mean	59.1	19.0	54.5	15.8	51.0	4.5	30.4	49.9	47.4	5.6
Red. to T_m	63.7	20.9	60.3	17.1	55.1	6.6	34.6	51.3	52.3	6.9
Sum = s	66.0	567	63.1	174	57.3	141	36.7	1497	54.9	169
$\frac{1}{5}(T_m - T_s)$	68.4	2 18.90	66.1	4 15.80	59.4	7 4.70	38.8	56 ~~499~~ 49.90	57.4	~~56~~ 3 5.63
T	1 ~~54.40~~ 54.36		3 48.62		6 46.73		0 56 26.29		2 42.28	
RA	45.83		40.11		38.09		17.56		33.85	
RA — T	8.57		8.51		8.64		8.73		8.43	
— n tang δ										
ΔT + m										
	0619		9.9613		1035		.1141		0311	
	1.3802	1.3892	1.4871	1.4346	1.3365	1.2577	1.2718	1.3729	1.4031	1.3674
$T_m - T_\delta$	240	245	307	272	217	181	187	236	253	233
A	0 11.3	1 7.3	1 53.2	2 46.0	4 37.2	0 27.6	0 44.6	1 41.8	1 51.2	2 44.3
C	1.2	57.0 ~~−3.0~~	41.2	34.5	31.5	21.2	41.0	36.6	41.2	35.3
Sum	12.5	+4.3	94.3	80.5	68.7	48.8	85.6	78.4	92.4	79.6
Mean	0 6.25	1 2.15	1 47.~~15~~ 20	2 40.25	4 ~~33.43~~ 34.35	0 24.40	0 42.80	1 39.20	1 46.20	2 39.80
Red. for runs	+00	+05	+09	+.14	+24	+02	+04	+.09	+09	+ +.14
Red. to hor. wire	+27.67	−28.26	+28.08	−24.88	+27.54	−22.97	+24.32	−30.70	+27.18	−25.03
Red. to meridian										
Division error										
Sum	0 33.52	33.94	2 15.32	15.61	5 01.21	1.45	1 7.16	8.55	2 13.47	4.91
Pointer	0	0	0		50	55'	10		25	
App. z	0 33.9		2 15.5		55 1.3		11 7.6		27 14.2	
log a'	1.7614									
A' log β	+ 32									
λ log γ	+ 162 1.7808	1.7808		1.7808		1.7808		1.7808	1.7808	
log tang z	9.3967	8.7387		9.7245						
log r	1.1775	−0.5195		+1.5053						
r	+ 15.0		− 33.1	+ 32.0	+ 32.0					
z	0 48.9		1 42.2		55 33.3					
φ — z = δ (O)	21 59.7		21 36.2		27 15.3					
δ (C)	22 2.7		21 38.9		28 16.7					
δ (C — O)	1 3.0		1 2.5		1 1.4					

51.79
31.50
20.29

Date Nov. 9 1871 Observer A. M. Barom. = log B =

Att. Therm. = log T =

n Recorder W. A. R. Ex. Therm. = log β = log γ

+ o Piscium

Star.	+ Polaris		+ η Piscium		+ ν Persei		+ 43 Cas.	+ φ ~~Piscium~~ Persei.	
1 39	1 13		1 25		1 30		1 33	1 36	
T_δ	1 3 58.4		24 33.6	24 21.7	29 58.3	29 40.8		35 28.1	35 18.4
T_m	5 23.1	12.47	35.8	23.4	1.6	42.3		31.2	21.3
T_e	6 52.0	28.9	38.0	25.9	4.7	44.1		34.5	23.3
T_f	9 39.8	47.8	42.3 24	11/0 23.67	10.8 29	7.2 42.40		40.8 35	63.0 21.00
T_g	11 7.9	27.1	44.3		13.9			44.0	
T_h	12 34.5	26.6	46.5		– 16.8			47.1	
Sum	13 56.1	21.6	48.5	25 7.6	19.9	30 37.1		50.3	36 19.2
Mean	15 21.4	25.3	50.6	9.0	23.1	38.7		53.7	21.1
Red. to T_m	18 18.4	47.0	54.7	10.6	29.1	44.0		59.9	23.2
Sum = s	19 39.9	21.5	56.8 25	27.2 9.07	32.2 30	116.8 38.93		63.4 36	3.5 21.17
$\frac{1}{6}(T_m - T_s)$	21 10.6	30.7	59.0		35.4			66.6	
T	12 32.92	32.29	1 24 46.37		~~29~~ 30 16.89			35 47.24 ~~47.22~~	
RA	31.33	31.33	37.68		8.49			38.86	
RA — T	+ 1.59	+ 0.96	8.69		8.48			8.36	
— n tang δ									
ΔT + m									
$T_m - T_\delta$									
A	2 15.0	2 33.9	1 49.5	2 46.2	4 49.1	0 40.0	0 21.2	1 10.0	2 1.0
C	57.3 ~~2.7~~	15.9	43.0	40.9	35.7	26.0	5.4	55.0	46.5
Sum	12.3	49.8	12.5	7.1	84.8	66.0		125.0	107.5
Mean	2 6.15	2 24.90	1 46.25	2 43.55	4 42.40	0 33.00		1 2.50	1 53.75
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer	45		40		20	25	0	20	
App. z									
log a′									
A′ log β									
λ log γ									
log tang z									
log r									
r									
z									
φ — z = δ (O)									
δ (C)									
δ (C — O)									

Date Nov 29 1874 Observer A. M. Barom. = log B =

n Recorder A. M. Att. Therm. = log T =

Ex. Therm. = log β = log γ

		Star.	Gr. 29		0° 14′ 30″ – 3° 47′		43 Cass.		ν Piscium	
			0 9		+ +		1 33		1 38	
18.4		T_δ	8	8 35.2	—	14 32.7	32 30.5	32 7.3	38 34.0	38 24.0
21.3		T_m		37.9	—	33.3	35.5	10.1	36.0	25.8
23.3		T_e		41.3	—	34.8	40.8	12.4	38.1	27.1
63.0 21.00		T_f		11 44 ~~38~~	39.0 34.5	108	51.4	32 29.8 99.3	42.3	38 16.9 25.63
		T_g	52.7	8 38.13	39.1 39.1 34.0	22 14 33.6 33.60	56.9		44.4	
		T_h	1.3		36.7 38.8 39.1	21	− 2.6		46.4	
19.2		Sum	− 10.1	9 32.6	38.7 39.0 40.8	17 15 10.0	7.7	33 37.8	48.6	39 6.3
21.1		Mean	18.6	35.1	39.0 43.0	22 10.8	13.1	40.3	50.7	7.6
23.2 3.5		Red. to T_m	27.6	38.5	47.1	41 11.8	23.7	42.3	54.8	8.6
21.17		Sum = s	9 1103	162	49.3	22 26	29.3	33 120.4 40.13	57.8	39 225 750
		$\frac{1}{5}(T_m - T_s)$	503	9 ~~354~~ 3540	51.4	21 15 ~~109~~ 10.87	34.0		59.0	
		T	9 10.06		14 ~~39.00~~	38.92	~~32~~ 33 2.32		38 46.46	
		RA	1.87		− 8.64		53.98		37.86	
		RA — T	8.49		− 1		8.34		8.60	
		— n tang δ			30.35					
		ΔT + m								
			9.4940 1.9638	1.5403	1165 0.7404	1.5024				
		$T_m - T_\delta$	92.0	34.7	5.5	31.8				
0		A	0 43	0 21.8	4 27.5	2 21.9	0 21.2	1 7.8	2 3.4	2 57.8
5		C	50.0 ~~10.0~~	5.7	24.8	18.7	5.4	51.0 ~~9.0~~	56.2	50.3
5		Sum	11 43 5.7 28.5	27.5	52.3	20.6	26.6	118.8	119.6	8 1
75		Mean	57 57.150	0 13.75	4 26.15	2 20.30	0 13.30	0 59.40	1 59.80	2 54.05
		Red. for runs	01	+08	+ 22	+ 12				
		Red. to hor. wire	28.78	+ 10.31	+ 7.19	− 41.59				
		Red. to meridian								
		Division error								
		Sum	0 25.40	24.16	4 33.57	38.83				
		Pointer	10		5	10	0		30	
		App. z	10 25.00		9 38.8					
		log a′	1.7805		1.7804					
		A′ log β								
		λ′ log γ								
		log tang z	9 9.8265 m		+0177					
		log r	−1.6170		+1.7981					
		r	− 41.4		+ 62.8					
		z	9 43.6		10 41.6					
		φ — z = δ (O)	13 26.0	− 3	47 43.0					
		δ (C)	14 26.0 ?		+ 1 2.3					
		δ (C — O)	1. 00		3 46 40.7					

Date	Nov. 12	Observer	A. M.	Barom. =	log B =
				Att. Therm. =	log T =
n		Recorder	A. M.	Ex. Therm. =	log β =

log γ

Star.	× γ Delphini		× η Cephei	× Br 2749 = 12 B.C. 1879		× 77 Draco.
	20 41		20 43	20 53		21 7
T_δ	20 40 36.8	20	42 21.8	52 14.3	21	7 10.6
T_m	38.8		26.0	25.8		20.1
T_e	40.8		30.3	38.0		28.9
T_f	45.2		38.6	53 1.3		48.1
T_g	47.4		43.1	14.0		58.0
T_h	49.5		47.3	25.5		8 7.5
Sum	51.6		51.5	37.1		17.2
Mean	53.8		55.8	49.6		26.5
Red. to T_m	58.1		4.4	54 13.3		45.9
Sum = s	60.2		8.9	25.2		55.1
$\frac{1}{5}(T_m - T_s)$	62.3		13.0	37.3		9 5.2
T	544.5 40 49.50		520.7 42 47.34	281.4 53 25.58		82.1 8 ~~7.46~~ 7.55
RA						
RA — T						
— n tang δ						
ΔT + m						
$T_m - T_\delta$						
A						
C						
Sum						
Mean						
Red. for runs						
Red. to hor. wire						
Red. to meridian						
Division error						
Sum						
Pointer						
App. z						
log a′						
A′ log β						
λ′ log γ						
log tang z						
log r						
r						
z						
φ — z = δ (O)						
δ (C)						
δ (C — O)						

/

Date Nov. 13, 1871. Observer W. A. R. Barom. = log B =

Att. Therm. = log T =

n Recorder W. A. R. Ex. Therm. = log β = log γ

Star.	× a Cephei		× 1# Draconis S. C		
	2 / 16		9 19	16.8 34.3 45.5	
T_δ	15 11.0	14 48.3	18 15.0	17 16.8	/
T_m	15.1	41 50.8	29.2	30.4	
T_e	19.8	47 54.1	43.5	45.5	
T_f	28.2	84 14 3.2 51.07	58.7	18 15.0	
T_g	32.6	44	13.0	29.2	
T_h	37.4	48	42.7	-43.5	
Sum	41.8	44	56.7	58.7	
Mean	46.1	43	11.0	19 13.1	
Red. to T_m	54.8	87		42.7	
Sum = s	59.2	44		56.6	
$\frac{1}{5}(T_m - T_s)$	3.5	4.3		20 48 11.0	
T	15 409.5 37.23			18 ~~542.5~~ ~~49.39~~ 43.86	
RA					
RA — T					
— n tang δ					
ΔT + m					

$T_m - T_\delta$	
A	1 3.1
C	49.6
Sum	11 2.7
Mean	0 56.35
Red. for runs	
Red. to hor. wire	
Red. to meridian	
Division error	
Sum	
Pointer	20
App. z	
log a′	
A′ log β	
λ log γ	
log tang z	
log r	
r	
z	
φ — z = δ (O)	
δ (C)	
δ (C — O)	

Date 1871, Nov. 17.　　Observer　　Barom. =　　log B =

n　　Recorder　　Att. Therm. =　　log T =

Ex. Therm. =　　log β =　　log γ

Star.	K δ Piscium.	λ Androm.	γ Cephei.	Gr. 4163.?	ω Piscium.	α Androm.	γ Pegasi.	Gr. 29.	ι Ceti.
	23 → 21	23 31	23 34	+ +	23 53	0 2	0 7	0 9	0 13
T_δ	23 21 21.4	31 6.2	33 19.1	48 0.3	52 37.5	0 1 38.2	6 ~~31.6~~	8 15.5	12 47.6
T_m	23.6	9.0	28.3	9.2 7.6	39.6	3.1 40.3	33.7	24.0	8.5 49.6
T_e	25.6	12.0	37.0	8.7 16.0	41.6	2.0 42.7	35.9	32.6	8.6 51.7
T_f	29.7	17.8	55.4	18.4 29.6	45.7	4.1 47.3	40.1	50.1	17.5 56.0
T_g	31.8	20.9	4.6	9.2 36.6	47.7	2.0 49.6	42.3	58.6	8.5 58.1
T_h	34.0	23.7	13.6	9.0 44.0	50.0	2.3 52.0	44.4	7.5	8.9 0.1
Sum	36.1	26.8	22.7	9.1 51.5	52.0	2.0 54.2	46.5	15.8	8.3 23
Mean	38.1	29.6	31.7	9.0 58.5	54.0	2.0 56.6	48.6	24.6	8.8 4.3
Red. to T_m	42.2	35.6	49.7	18.0 13.1	58.2	4.2 61.1	52.9	41.9	17.3 8.4
Sum = s	44.2	38.6	59.0	9.3 20.3	60.3	2.1 63.6	55.1	30.6	8.9 10.6
$\frac{1}{5}(T_m - T_s)$	46.3	41.5	68.3	9.3 28.0	62.3	2.0 66.0	57.2	59.4	8.8 12.6
T	33 .91 21	31 23.79	~~33~~ 34 13.58	48 44.04	52 ~~47.91~~ 49.90	1 51.96	6 44.39	9 7.23	13 ~~7.93~~ 8.12
RA	33.41 27.53	17.69	7.76	38.50	43.49	45.75	38.03	1.40	~~13~~ 53.66
RA — T	6.38	6.13	5.82	5.54	6.42	6.21	6.36	5.93	~~7.27~~ 6.46
— n tang δ									
ΔT + m									

$T_m - T_\delta$									
A									
C									
Sum									
Mean									
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer									
App. z									
log a′									
A′ log β									
λ log γ									
log tang z									
log r									
r									
z									
φ — z = δ (O)									
δ (C)									
δ (C — O)									

Date　　Observer　　Barom. =　　log B =

Att. Therm. =　　log T =

n　　Recorder　　Ex. Therm. =　　log β =　　log γ

		×	×	×	×	× ~~#~~3	×	×	×	×
tu.	Star.	κ Cass.	π Androm.	ε Androm.	α Cass.	3 Androm.	η Cass.	ε Piscium.	β Androm.	τ Piscium.
13		0 26	0 30	0 32	0 33	0 42	0 43	0 56	1 3	1 5
47.6	T_δ	0 25 23.9	29 53.9	31 39.2	32 59.3			56 11.6	1 2 25.0	4 28.6
49.6	T_m	28.3	56.3	24 41.7	15 2.8			13.6	27.4	30.9
51.7	T_e	32.8	58.8	25 44.0	33 6.6			15.6	30.0	33.3
56.0	T_f	41.4	3.7	49 48.7	47 13.9			19.7	34.9	38.0
58.1	T_g	46.0	6.2	25 51.0	23 17.5			21.8	37.5	40.3
0.1	T_h	50.3	8.6	24 53.4	24 21.3			23.9	40.0	42.7
2.3	Sum	54.8	11.0	24 55.7	23 25.0			26.0	42.5	44.9
4.3	Mean	59.3	13.5	25 58.0	23 28.5			28.0	45.0	47.6
8.4	Red. to T_m	8.0	18.4	49 62.7	47 36.0			32.1	50.0	52.1
10.6	Sum = s	12.5	20.8	24 65.2	25 39.4			34.2	52.5	54.4
12.6	$\frac{1}{5}(T_m - T_s)$	16.9	23.3	25 67.4	22 43.4			36.3	55.0	55.7
~~9.3~~ 0.12	T	25 50.38	30 ~~8.60~~ 8.59	31 ~~53.37~~ 53.36	33 21.24			56 23.89	2 39.98	4 42.59
53.66	RA	44.45	2.28	47.14	15.19			17.54	33.81	36.50
8.27 6.46	RA — T	5.93	6.32	6.23	6.05			6.35	6.17	6.09
	— n tang δ									
	ΔT + m									
	$T_m - T_\delta$									
	A									
	C									
	Sum									
	Mean									
	Red. for runs									
	Red. to hor. wire									
	Red. to meridian									
	Division error									
	Sum									
	Pointer									
	App. z									
	log a′									
	A′ log β									
	λ′ log γ									
	log tang z									
	log r									
	r									
	z									
	φ — z = δ (O)									
	δ (C)									
	δ (C — O)									

Date 1871, Nov. 17 | Observer | Barom. = | log B =
n | Recorder | Att. Therm. = | log T = | log γ
Ex. Therm. = | log β =

Star.	× α Urs. Min.	× ν Persei.	× φ Persei.	× ο Piscium.	× ε Cass.	× ξ Piscium	× β Arietis.	× 50 Cass.	× γ Androm.
	1 13	1 30	1 36	1 39	1 45	1 47	1 48	1 53	1 56
T_δ		29 56.4	35 25.6	38 31.6	44 51.6	46 49.5	47 27.1	52 0.5	55 52.4
T_m		59.3	29 28.8	33.7	56.0	51.5	29.3	7.0	55.0
T_e		2.3	30 32.0	35.8	0.6	53.6	31.5	13.3	57.9
T_f		8.4	61 38.4	39.9	9.6	57.7	35.8	26.6	3.3
T_g		11.6	32 41.7	42.1	14.0	59.7	38.0	31.1	6.0
T_h	1 12 25.5	14.6	30 44.8	44.1	18.6	1.9	40.1	39.5	8.8
Sum	27.3	17.6	30 48.0	46.2	23.2	3.9	42.4	46.4	10.6
Mean		20.9	33 51.2	48.3	27.9	6.0	44.7	53.0	14.4
Red. to T_m		27.0	61 57.6	52.4	36.9	10.1	49.0	53 6.2	19.8
Sum = s		30.1 ~~31.1~~	31 60.8	54.5	41.4	12.1	51.1	12.7	22.6
$\frac{1}{5}(T_m - T_s)$		33.1	30 64.0	56.6	46.0	14.1	52.4	19.3	25.4
T	12 26.40	30 14.66	35 44.81	38 44.11	45 18.71	47 1.8.3	47 40.13	52 39.60	56 8.74
RA	28.59	8.47	38.84	37.89	12.93	55.41	33.92	33.99	2.67
RA — T	— 2.19	6.19	5.97	6.22	5.78	6.42	6.21	5.61	6.07
— n tang δ									
ΔT + m									
$T_m - T_\delta$									
A									
C									
Sum									
Mean									
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer									
App. z									
log a′									
A′ log β									
λ log γ									
log tang z									
log r									
r									
z									
φ — z = δ (O)									
δ (C)									
δ (C — O)									

1871phae.proj.144QR

Date
Observer
Barom. =
log B =

Att. Therm. =
log T =
log γ

n
Recorder
Ex. Therm. =
log β =

Star.	x α Arietis.	x β Trianguli.	x o Arietis? ~~o Ceti.~~	x ι Cass.	x ξ2 Ceti.	x 36 H Cass.	x δ Ceti.	x θ Persei.	x γ Ceti
	2 0	2 2		2 19	2 22	2 26	2 33	2 36	2 37
T_δ	1 59 50.1	2 1 46.9	11 55.0	18 6.3	21 18.0	25 21.1	32 49.1	35 15.3	36 33.9
T_m	52.3	49.4	5 57.1	13.2	49 17.0	27.7	51.2	18.5	36.0 21
T_e	54.6	51.9	35 58.9	18.6	54 19.0	34.7	53.3	21.6	38.0 20
T_f	59.0	56.8	49 3.1	29.0	104 23.2	48.1	57.4	27.7	42.1 41
T_g	1.3	59.4	26 5.0	34.2	52 24.3	55.0	59.4	31.0	44.3 22
T_h	3.5	1.9	25 7.2	39.4	52 27.3	1.7	1.6	34.0	46.4 21
Sum	5.7	4.3	24 9.3	44.7	53 29.4	8.5	3.6	37.1	48.3 19
Mean	7.9	6.8	25 11.4	50.1	54 31.5	15.1	5.7	40.2	50.3 20
Red. to T_m	12.3	11.7	49 13.5	0.4	103 35.6	28.6	9.7	46.4	54.5 42
Sum = s	14.7	14.2	25 17.5	5.7	53 37.7	35.5	11.8	49.6	56.6 21
$\frac{1}{5}(T_m - T_s)$	16.9	16.8	26 19.6	11.1	54 39.7	42.3	13.9	52.7	58.7 21
T	0 3.48	2 1.83	12 7.24	18 39.52	21 27.25	26 1.66	33 1.52	35 34.01	36 46.28
RA	57.30	55.61	52.59	33.48	20.97	55.84	55.16	27.50	39.53
RA — T	6.18	6.22	65	6.04	6.28	5.82	6.36	6.11	6.35
— n tang δ									
$\Delta T + m$									
$T_m - T_\delta$									
A									
C									
Sum									
Mean									
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer									
App. z									
log a′									
A′ log β									
λ log γ									
log tang z									
log r									
r									
z									
$\phi - z = \delta$ (O)									
δ (C)									
δ (C — O)									

Date 1871, Nov. 17.	Observer	Barom. =	log B =	
		Att. Therm. =	log T =	log γ
n	Recorder	Ex. Therm. =	log β =	

Star.	μ Ceti.	η Persei.	41 Arietis.	τ Persei	η Eridini.	α Ceti.	ρ Persei.	β Persei.	α Persei
	2 38	2 42	2 43	2 45	2 50	2 56	2 57	3 0	3 15
T_δ	2 37 55.0	41 6.8	42 19.3	44 56.5	50 4.4	55 29.2	56 48.9	59 40.6	3 14 58.6
T_m	57.1	10.3	21.6	0.8	6.5	31.3	51.6	22 43.2	1.8^{32}
T_e	59.2	14.0	23.9	4.1	8.5	33.4	54.3	27 45.9	5.0^{32}
T_f	3.3	21.3	28.5	11.0	12.6	37.4	59.5	52 57.3	11.2^{62}
T_g	5.5	25.0	30.8	14.4	14.8	39.4	2.1	26 54.1	14.4^{32}
T_h	7.5	28.5	33.1	17.6	16.8	41.4	4.9	28 56.8	17.6^{32}
Sum	9.6	32.2	35.4	21.1	19.0	43.5	7.3	59.5	20.8^{32}
Mean	11.7	34.8	37.7	24.4	21.0	45.7	10.0	2.2	23.9^{31}
Red. to T_m	15.8	42.9	42.3	31.1	25.1	49.7	15.2	7.4	30.2^{63}
Sum = s	17.8	46.6	44.6	34.6	27.2	51.9	17.8	10.3	33.3^{31}
$\frac{1}{5}(T_m - T_s)$	20.0	50.3	46.9	37.9	29.3	54.0	20.5	13.0	36.4
T	38 7.50	41 28.43	42 33.10	45 17.59	50 $16.8\overset{4}{3}$	55 41.54	57 4.74	59 56.75	15 17.56
RA	1.15	22.52	26.86	11.58	10.37	35.14	58.56	50.56	11.58
RA — T	6.35	5.91	6.25	6.01	6.46	6.40	6.18	6.19	5.98
— n tang δ									
ΔT + m									
$T_m - T_\delta$									
A									
C									
Sum									
Mean									
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer									
App. z									
log a′									
A′ log β									
λ′ log γ									
log tang z									
log r									
r									
z									
φ — z = δ (O)									
δ (C)									
δ (C — O)									

Date
Observer
Barom. =
log B =

n
Recorder
Att. Therm. =
log T =
log γ

Ex. Therm. =
log β =

Star.	o Tauri.	ξ Tauri.	f Tauri.	ε Eridini.	δ Persei.	η Tauri.	27 Tauri.	ζ Persei.	ε Persei.
	3 18	3 20	3 23	3 27	3 34	3 40	3 42	3 46	3 49
T_δ	3 17 49.2	20 7.6	23 41.9		33 36.9	39 45.2	41 25.7	45 56.8	49 6.0
T_m	51.4	9.6	20 43.9		39.8	47.4	22 27.9	59.2	24 8.5
T_e	53.5	11.7	21 46.1		42.9	49.6	22 30.1	1.6	24 11.3
T_f	57.6	15.9	42 50.2		49.1	54.1	45 34.7	6.4	48 16.6
T_g	59.6	18.0	21 52.4		52.0	56.4	23 36.9	8.9	25 19.3
T_h	1.8	20.1	21 54.5		55.1	58.7	24 39.2	11.2	23 22.0
Sum	3.7	22.2	21 56.6		58.1	0.9	22 41.4	13.6	24 24.6
Mean	5.8	24.3	21 58.7		1.1	3.1	22 43.6	16.1	25 27.3
Red. to T_m	9.9	28.3	40 62.9		7.2	7.6	45 48.2	20.8	47 32.6
Sum = s	12.0	30.5	22 65.0		10.3	9.9	23 50.4	23.4	26 35.3
$\frac{1}{5}(T_m - T_s)$	14.1	32.6	21 67.2		13.2	12.1	22 52.7	25.7	24 38.1
T	18 ~~1.71~~ 1.69	20 20.0~~8~~7	23 54.49		33 35.06	39 58.54	41 39.16	46 11.25	49 21.96
RA	55.37	13.64	48.24		48.97	52.38	32.87	5.08	15.73
RA — T	6.34	6.43	6.25		6.09	6.26	6.29	6.17	6.23
— n tang δ									
ΔT + m									
$T_m - T_\delta$									
A									
C									
Sum									
Mean									
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer									
App. z									
log a′									
A′ log β									
λ′ log γ									
log tang z									
log r									
r									
z									
φ — z = δ (O)									
δ (C)									
δ (C — O)									

Date 1871 Nov. 17	Observer	Barom. =	log B =
		Att. Therm. =	log T =
n	Recorder	Ex. Therm. =	log β =

log γ

Star.	x ξ Persei	x λ Tauri.	x Gr. 750.	x c Persei.	x γ Tauri.	5 x δ Tauri.
	3 51	3 54	3 58	~~3~~4 0	4 13	4 16
T_δ	3 50 30.7	53 28.9	56 30.2	59 10.3	4 12 24.0	15 26.3
T_m	33.1	30.9	54.5 243	13.3	26.1	28.4 3'
T_e	35.7	33.0	57 18.8 243	16.4	28.2	30.6 12
T_f	40.7	37.2	43.3 24.5	22.3	32.4	34.9
T_g	43.2	39.3	6 8.1 248	25.4	34.5	37.1
T_h	45.7	41.4		28.4	36.6	39.2
Sum	48.3	43.5		31.4	38.8	41.4
Mean	50.9	45.6		34.5	40.9	43.5
Red. to T_m	55.8	49.8		40.4	45.1	47.9
Sum = s	58.4	51.9		43.6	47.2	50.1
$\frac{1}{5}(T_m - T_s)$	60.8	54.1		46.7	49.4	52.2
T	50 45.75	53 41.47 2	57 18.98	59 28.43	12 36.65	15 39.23 4
RA	39.51	35.15		22.29	30.32	32.90
RA — T	6.24	6.26		6.14	6.33	6.83
— n tang δ						
ΔT + m						

$T_m - T_\delta$						
A						
C						
Sum						
Mean						
Red. for runs						
Red. to hor. wire						
Red. to meridian						
Division error						
Sum						
Pointer						
App. z						
log a′						
A′ log β						
λ′ log γ						
log tang z						
log r						
r						
z						
φ — z = δ (O)						
δ (C)						
δ (C — O)						

Date Nov. 18 1871 Observer W.A.R.

n Recorder

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =

log γ

Star.	Gr. 4163	x α Piscium	x α Androm	x γ Peg.	x Gr. 298	x * Cass	x π Androm	x ? δ Andr.	x α Cass
	8 ++	23 53	0 2	0 7 ✓	0 9	0 26	0 30	0 33 3	0 33
T_δ	23 47 39.6	52 37.1	0 1 37.5	6 31.1	8 14.6	25 23.4	29 53.3	31 38.8	32 58.8
T_m	48 6.8	39.1	39.7	33.2	23.4	27.8	55.8	41.1	2.3 35
T_e	14.0	41.2	42.1	35.4	32.4	32.2	58.3	43.3	6.0 37
T_f	28.6	45.2	46.7	39.6	49.3	41.0	3.1	48.0	13.3 7.3
T_g	36.2	47.3	49.1	41.7	57.7	45.4	5.7	50.5	17.0 37
T_h	43.4	49.4	51.6	43.8	7.0	49.8	8.0	52.8	20.5 35
Sum	50.9	51.5	53.8	45.9	15.4	54.4	10.5	55.1	24.2 37
Mean	58.2	53.6 57.8	56.1	48.0	24.0	58.8	13.0	57.4	28.0 38
Red. to T_m	49 12.8	59.9	60.9	52.2	40.8	7.6	17.9	62.3	35.3 7.3
Sum = s	20.0	62.0	63.2	54.5	50.0	12.0	20.3	64.7	38.9 36
$\frac{1}{5}(T_m - T_s)$	27.1		65.5	56.7	58.6	16.4	22.8	66.8	42.5 3.6
T	48 ~~43.41~~ 43.42	52 49.46	1 51.47	6 43.83	9 6.65	25 49.89	30 8.06	31 52.80	33 20.62
RA	38.44	43.48	45.74	38.02	1.35	44.42	2.27	47.13	15.17
RA − T	4.97	5.98	5.73	5.81	5.30	5.47	5.79	5.67	5.45
— n tang δ									
ΔT + m									

$T_m - T_\delta$									
A									
C									
Sum									
Mean									
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer									
App. z									
log a′									
A′ log β									
λ log γ									
log tang z									
log r									
r									
z									
ϕ — z = δ (O)									
δ (C)									
δ (C — O)									

Date Nov. 18 Observer Barom. = log B =

Att. Therm. = log T = log γ

n Recorder Ex. Therm. = log β =

Star.	× 21 Cass	× 5 54 η Androm	× η Cass	× γ Cass	× ε Piscium	× β Androm	× τ Piscium	× Polaris	× δ Cass
	0 37	0 42	0 42	0 49	0 56	1 3	1 5	1 13	1 18
T_δ	0 36 34.8			0 48 40.7	56 10.9	1 2 24.4	4 28.0	8 — 48.4	17 8.8
T_m	42.3	7.5		44.7	13.0	27.0	30.4	5 13.8	24.4 12.5
T_e	49.7	7.4		48.9	15.2	29.4	32.7	6 38.9	25.4 16.8
T_f	5.2	15.5		57.1	19.2	34.4	37.4	9 34.4	55.5 24.9
T_g	12.6	7.4		1.5	21.3	37.0	39.8	10 59.8	25.4 29.1
T_h	20.4	7.8		5.4	23.4	39.4	42.1	12 25.2	25.4 33.0
Sum	28.0	7.6		9.4	25.5	41.8	44.5	13 49.3	24.1 37.1
Mean	35.4	7.4		13.6	27.5	44.4	46.8	15 14.4	25.1 41.0
Red. to T_m	50.7	15.3		21.7	31.6	49.5	51.5	18 01.0 19 34.9	54.6 5 49.2
Sum = s	58.6	7.9		25.9	33.8	52.0	54.0	20 57.4	22.5 53.4
$\frac{1}{5}(T_m - T_s)$	65.6	7.0		30.0	35.8	54.5	56.3		57.4
T	37 ~~20.30~~ 20.30			49 ~~5.35~~ 535	56 23.35	2 39.44	4 4214	12 ~~2414~~ 24.14	17 33,02
RA	15.16			59.96	17,54	33.80	36,50	28,03	27,77
RA — T	5,14			6,39	5,84	5,64	5,64	— 3.80	5,25
— n tang δ									
ΔT + m									
$T_m - T_\delta$									
A									
C									
Sum									
Mean									
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer									
App. z									
log a′									
A′ log β									
λ′ log γ									
log tang z									
log r									
r									
z									
$\phi - z = \delta$ (O)									
δ (C)									
δ (C — O)									

Date Nov. 8 Observer Barom. = log B =

Att. Therm. = log T = log γ

n Recorder Ex. Therm. = log β =

Star.	η Piscium	ν Persei	φ Persei	ο Piscium	ε Cass	ζ Arietis	P. Arietis	δ Cass	a. ~~Andromedae~~ Arietis
	1 25	1 30	1 36	1 39 31.2	1 45	1 46	1 48	1 53	2 00
T_δ	1 24 30.7	29 55.7	35 25.2	38 33.2	20 44 51.0	46 23.9	47 26.6	51 59.8	59 49.7
T_m	32.9	58.6	28.4	32 35.3	21 55.4	25.1	28.7	52 6.6	52.0 23
T_e	35.1	1.8	31.5	31 39.4	41 59.9	27.4	30.8	13.2	54.1 21
T_f	39.2	8.0	38.0	65 41.6	22 9.4	31.7	35.4	26.2	58.6 45
T_g	41.4	11.1	46.1	31 43.6	20 13.8	33.7	37.5	32.5	0.8 22
T_h	43.5	14.2	44.5	34 45.7	21 18.4	36.1	39.6	39.3	3.0 22
Sum	45.7	17.1	47.5	30 47.8	21 23.0	38.2	41.9	46.0	5.3 23
Mean	47.8	20.2	50.8	33 52.0	42 27.5	40.4	44.1	52.7	7.5 22
Red. to T_m	52.1	26.4	57.0	62 54.0	28 36.5	44.6	48.4	53 5.5	12.0 45
Sum = s	54.2	29.4	60.3	33 56.1	21 40.8	46.8	50.6	12.4	14.3 23
$\frac{1}{5}(T_m - T_\delta)$	56.3	32.5	63.6	30	45.4	49.0	52.9	8 19.0	16.5 2.2
T	24 43.54	30 ~~14.10~~ 14.09	35 44.35	38 43.63	45 18.28	46 36.08	47 39.68	52 39.38	0 ~~3.07~~ 3.07
RA	37.67	8.46	38.83	37.88	12.91	30.12	33.91	33.98	57.30
RA — T	5.87	5.64	5.52	5.75	5.37	5.96	5.77	5.40	5.77
— n tang δ									
ΔT + m									
$T_m - T_\delta$									
A									
C									
Sum									
Mean									
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer									
App. z									
log a'									
A' log β									
λ log γ									
log tang z									
log r									
r									
z									
φ — z = δ (O)									
δ (C)									
δ (C — O)									

Date Nov. 18 Observer Barom. = log B =

Att. Therm. = log T = log γ

n Recorder Ex. Therm. = log β =

Star.	X β Trianguli	X (ξ1 ? Ceti) 6 Persei?	X ο Ceti	X ξ2 Ceti	X [illegible] Cam	X δ Ceti	X σ Persei	X γ Ceti	X μ Ceti
	2 2	~~8~~ 6	2 13	2 22	2 26	2 33	2 36	2 37	2 38
T_δ	2 1 46.4	6 6.2	12 46.1	21 14.5	25 20.6	32 48.6	35 14.8	36 33.5	37 54.5
T_m	48.8	8.3	48.2	16.6	27.1	50.8	18.0	35.5	20 56.6
T_e	51.3	10.3	50.3	18.6	34.1	52.8	20.9	37.6	21 58.8
T_f	56.2	14.5	54.3	22.7	48.0	56.9	27.1	41.7	41 2.8
T_g	58.7	16.6	56.4	24.8	54.4	59.0	30.5	43.8	21 4.9
T_h	1.3	- 18.6	58.6	26.9	1.1	1.0	33.5	45.9	21 7.0
Sum	3.8	20.5 22.7	0.6	29.0	7.9	3.0	36.6	47.8	19 9.0
Mean	6.4	26.9	2.7	31.0	14.3	5.1	39.6	50.0	22 11.1
Red. to T_m	11.3	29.0	6.9	35.2	27.8	9.3	46.0	54.0	40 15.4
Sum = s	13.8	31.1	8.9	37.2	34.7	11.3	49.0	56.0	20 17.4
$\frac{1}{6}(T_m - T_s)$	16.2	+7	11.0	39.3	41.4	13.3	52.1	58.2	22 19.5
T	2 1.29	6 18.61 ~~18.61~~	12 58.55	21 26.89 ~~26.86~~	26 1.04 ~~0.94~~	33 1.01	35 33.46	36 45.82 ~~45.67~~	38 7.00 ~~7.00~~
RA	55.61	12.65	52.59	20.97	55.83	55.16	27.90	39.53	1.15
RA — T	5.68	5.96	5.96	5.92	5.11	5.85	5.56	5.94	5.75
— n tang δ									
ΔT + m									
$T_m - T_\delta$									
A									
C									
Sum									
Mean									
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer									
App. z									
log a′									
A′ log β									
λ′ log γ									
log tang z									
log r									
r									
z									
φ — z = δ (O)									
δ (C)									
δ (C — O)									

Date Nov. 18 Observer Barom. = log B =

Att. Therm. = log T =

n Recorder Ex. Therm. = log β = log γ

Star.	x η Persei	x 4 Arietis	x τ Persei	x η Erid.	x a Ceti	x ρ Persei	x β Persei	x 48 Ceph. H	ζ Arietis
	2 42	2 43	2 45	2 50	2 56	2 57	3 0	3 5	~~x~~ x
T_δ	2 41 6.3	42 18.8	44 56.9	50 3.8	55 28.7	56 48.6	59 40.0	3 3 21.1	7 25.1
T_m	10.0	21.1	0.3	5.9	30.7	51.1	42.7	30.5	27.2
T_e	13.6	23.4	3.6	8.0	32.8	53.7	46.3	39.6	29.5
T_f	20.7	28.0	10.3	12.1	36.9	59.0	50.9	58.4	33.9
T_g	24.3	30.3	13.7	14.1	39.0	1.6	53.6	4 7.5	36.0
T_h	28.0	32.6	17.1	16.2	41.0	4.2	56.1	16.7	38.1
Sum	31.5	34.8	20.5	18.3	43.1	6.8	59.0	26.1	40.4
Mean	35.2	37.2	23.9	20.4	45.1	9.4	1.7	35.4	42.7
Red. to T_m	42.5	41.7	30.6	24.6	49.2	14.6	7.1	54.1	47.0
Sum = s	46.0	44.1	34.0	26.7	51.3	17.2	9.7	5 3.5	49.2
$\frac{1}{5}(T_m - T_s)$	49.6	46.5	37.2	28.7	53.3	20.0	12.4	12.6	51.4
T	41 27.97	42 32.59	45 17.10	50 16.25	55 41.01	57 4.20 ~~5.11~~ 4.20	59 56.23	4 16.86	7 38.23
RA	22.52	26.85	11.58	10.37	35.14	58.56	50.56	12.05	32.55
RA − T	5.45	5.74	5.52	5.88	5.80	5.64	5.67	4.81	5.68
− n tang δ									
ΔT + m									
$T_m - T_\delta$									
A									
C									
Sum									
Mean									
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer									
App. z									
log a′									
A′ log β									
λ log γ									
log tang z									
log r									
r									
z									
φ − z = δ (O)									
δ (C)									
δ (C − O)									

Date Nov 18 Observer Barom. = log B =

Att. Therm. = log T = ________

n Recorder Ex. Therm. = log β = log γ

Star.	× o Tauri	× ξ Tauri	× f Tauri	× ε Erid.	× δ Persei	× o Persei	× 17 Tauri	× η Tauri 27
	3 18	3 20	3 23	3 27	3 34	3 36	3 37	3 40
T_δ	3 17 48.7	20 4.1	23 41.5	26 47.4	33 36.4	36 8.6	37 8.7	39 44.7
T_m	50.8	9.1	43.6	49.5	39.4	11.0	10.9	47.0
T_e	52.9	11.3	45.6	51.5	42.4	13.4	13.0	49.1
T_f	57.0	15.5	49.8	55.7	48.5	18.3	17.6	53.6
T_g	59.2	17.6	52.0	57.7	51.5	20.6	19.8	55.9
T_h	1.2	19.6	54.0	59.8	54.6	23.2	22.0	58.1
Sum	3.2	21.6	56.2	1.9	57.5	25.6	24.3	0.4
Mean	5.3	23.7	58.3	4.0	0.6	28.0	26.6	2.6
Red. to T_m	9.5	27.8	62.4	8.2	6.7	32.8	31.1	7.1
Sum = s	11.6	29.9	64.6	10.2	9.7	35.3	33.4	9.4
$\frac{1}{5}(T_m - T_s)$	13.5	32.0	66.7	12.4	12.7	37.7	35.6	11.7
T	18 1.17	20 19.56	23 54.06	26 59.84	33 54.56	36 23.14	37 22.09	39 58.15 ~~56.20~~
RA	55.36	13.65	48.26	54.08	48.99	17.42	16.35	52.41
RA — T	5.79	5.91	5.80	5.76	5.56	5.72	5.74	4.79
— n tang δ								
ΔT + m								
$T_m - T_\delta$								
A								
C								
Sum								
Mean								
Red. for runs								
Red. to hor. wire								
Red. to meridian								
Division error								
Sum								
Pointer								
App. z								
log a′								
A′ log β								
λ log γ								
log tang z								
log r								
r								
z								
φ — z = δ (O)								
δ (C)								
δ (C — O)								

Date Nov. 18 1871 Observer W.A.R. Barom. = log B =

n Recorder Att. Therm. = log T =

Ex. Therm. = log β = log γ

Star.	× 27 Tauri	× ζ Persei	× ε Persei	× ξ Persei	× λ Tauri	× Gr. 710
	3 42	3 46	3 49	3 51	3 54	3 58
T_δ	41 25.3	45 56.3	49 5.5	50 30.2	53 28.4	54 57.9
T_m	27.4	58.7	8.2	32.6	30.5	21 55 15.5
T_e	29.7	1.1	10.9	35.1	32.6	21 55 41.2
T_f	34.2	5.8	16.1	40.2	36.7	41 56 30.1
T_g	36.5	8.5	18.9	42.7	38.8	21 56 54.0
T_h	38.7	10.8	21.5	45.3	41.0	22 57 18.7
Sum	40.9	13.2	24.2	47.7	43.1	21 57 43.3 58 8.5
Mean	43.2	15.6	26.9	50.2	45.2	21 58 57.6
Red. to T_m	46.7	20.4	32.3	55.2	49.4	42 59 22.3
Sum = s	49.8	22.7	35.0	57.8	51.5	21 59 46.9
$\frac{1}{5}(T_m - T_s)$	52.2	25.2	37.6	60.4	53.6	21 210.0 57 19.09
T	41 38.60	46 10.75	49 21.55	50 45.22	53 40.98 ~~40.09~~	57 19.09
RA	32.90	5.11	15.77	39.54	35.18	
RA — T	5.70	5.64	5.78	5.68	5.89	
— n tang δ						
ΔT + m						

$T_m - T_\delta$						
A						
C						
Sum						
Mean						
Red. for runs						
Red. to hor. wire						
Red. to meridian						
Division error						
Sum						
Pointer						
App. z						
log a′						
A′ log β						
λ log γ						
log tang z						
log r						
r						
z						
φ — z = δ (O)						
δ (C)						
δ (C — O)						

Date Nov. 18-19 Observer J.R.K. Barom. = log B =

Att. Therm. = log T = log γ

n Recorder L.C. Ex. Therm. = log β =

Nov. 19 B1

Star.	× Polaris	×× ε Bootis	× β Urs Min		× 16 Pegasi				
	1 13	1	14 51		21 47				
T_δ	13 4 12.0	14 39 12.7	14 50 19.6				21 50		
T_m	5 36.8	14.9	26.8						
T_e	7 2.7	17.3	34.8						
T_f	9 54.2	21.9	50.5						
T_g	11 21.2	24.3	58.7						
T_h	12 47.8	26.8	51 6.1						
Sum	14 12.5	29.0	13.8						
Mean	15 41.7	31.3	21.9						
Red. to T_m	18 30.4	35.9	37.3						
Sum = s	19 55.5	38.2	45.0						
$\frac{1}{5}(T_m - T_s)$	21 21.7	40.7	02.8						
T	12 ~~47.77~~ 46.95 ~~47.77~~ 46.95	47.58 26.64	51 6.18 2						
RA	27.77	27.77 21.19	1.60						
RA — T	+ 19.18	19.81 5.45	4.51						
— n tang δ									
ΔT + m									
$T_m - T_\delta$									
A									
C									
Sum									
Mean									
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer									
App. z									
log a′									
A′ log β									
λ log γ									
log tang z									
log r									
r									
z									
φ — z = δ (O)									
δ (C)									
δ (C — O)									

Date Nov. 19 1871 Observer W.A.R.
n Recorder W.A.R.

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =
log γ

Star	+ B1 3 Cephei 22 7	226 B Ceph. + +	+ 2 Pegasi 22 37	B1 + 13 Lacertae 22 39
T_δ				
T_m				
T_e				
T_f				
T_g				
T_h				
Sum				
Mean				
Red. to T_m				
Sum = s				
$\frac{1}{5}(T_m - T_s)$				
T				
RA				
RA — T				
— n tang δ				
ΔT + m				
$T_m - T_\delta$				
A				
C				
Sum				
Mean				
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer				
App. z				
log a′				
A′ log β				
λ log γ				
log tang z				
log r				
r				
z				
φ — z = δ (O)				
δ (C)				
δ (C — O)				

Date Nov. 19 1871 Observer W.A.R.
n Recorder W.A.R.

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =

log γ

Star.	+ B_2 α Androm	+ B_2 21 Cass	+ B_2 ζ Androm	+ B_2 η Cass		+ Polaris
	0 2	0 37	0 42	0 42		1 13
T_δ						5 11.9
T_m						6 38.8
T_e						9 31.1
T_f						10 54.4
T_g						12 20.6
T_h						13 47.5
Sum					12 22.7 23.4 23.4 20.9 20.6 21.3	12 18.4 20.0 21.7 20.0 20.6 22.3
Mean						
Red. to T_m						
Sum = s						
$\frac{1}{8}(T_m - T_s)$						
T						
RA					Π	12 ~~20.50~~ 22.05
RA — T						27.44
— n tang δ						— 6.94
ΔT + m						
$T_m - T_\delta$						
A						
C						
Sum						
Mean						
Red. for runs						
Red. to hor. wire						
Red. to meridian						
Division error						
Sum						
Pointer						
App. z						
log a′						
A′ log β						
λ log γ						
log tang z						
log r						
r						
z						
φ — z = δ (O)						
δ (C)						
δ (C — O)						

Date Nov 22 1871 Observer W.A.R.

n Recorder W.A.R.

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =

log γ

Star.	+ B 1 ζ Cephei 22 7	+ B 1 δ Lacertae 22 19	226 B. Cephei + +	+ B 1 η Pegasi 22 37	+ B 1 13 Lacertae 22 39
T_δ					
T_m					
T_e					
T_f					
T_g					
T_h					
Sum					
Mean					
Red. to T_m					
Sum = s					
$\frac{1}{5}(T_m - T_s)$					
T					
RA					
RA — T					
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A					
C					
Sum					
Mean					
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer					
App. z					
log a′					
A′ log β					
λ log γ					
log tang z					
log r					
r					
z					
φ — z = δ (O)					
δ (C)					
δ (C — O)					

Date Nov. 22 1877 Observer W.A.R. Barom. = log B =

Att. Therm. = log T =

n Recorder W.A.R. Ex. Therm. = log β = log γ

	B1		B2		B2		+ 5 B2	
Star.	+ λ Pegasi		+ α Andromi		+ 22 Androm		4 Draco. L.C.	
	22 41		0 2		0 4		12 6	
T_δ								
T_m								
T_e								
T_f								
T_g								
T_h								
Sum								
Mean								
Red. to T_m								
Sum = s								
$\frac{1}{5}(T_m - T_s)$								
T								
RA								
RA — T								
— n tang δ								
ΔT + m								
$T_m - T_\delta$								
A								
C								
Sum								
Mean								
Red. for runs								
Red. to hor. wire								
Red. to meridian								
Division error								
Sum								
Pointer								
App. z								
log a′								
A′ log β								
λ log γ								
log tang z								
log r								
r								
z								
φ — z = δ (O)								
δ (C)								
δ (C — O)								

Date 1871 Nov. 23 Observer W.A.R.

n Recorder W.A.R.

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =

log γ

Star.	η Piscium.		ν Persei.		+ 43 Cass.		+ φ Persei		+ o Piscium	
					1 33		1 36		1 39	
T_δ					1 32 260 31.2	31 58.7				
T_m					36.7	1.6				
T_e					47.5	5.0				
T_f					52.7	32 185.3 1.77				
T_g					57.9					
T_h	circuit broken				3.1					
Sum					8.5					
Mean					19.2					
Red. to T_m					24.7					
Sum = s					30.0					
$\frac{1}{5}(T_m - T_s)$					32 57.95					
T					~~5775~~					
RA					5361					
RA — T					434					
— n tang δ										
ΔT + m										
$T_m - T_\delta$		25	0 4.0		0 15.6		0 2.2		20 4.2	
A		20	4 48.0		59.4		46.0		55.5	
C					15.0		108 2		119.7	
Sum					0 750		5410		5985	
Mean										
Red. for runs										
Red. to hor. wire										
Red. to meridian										
Division error										
Sum										
Pointer			25		0		20		50	
App. z										
log a′										
A′ log β										
λ log γ										
log tang z										
log r										
r										
z										
φ — z = δ (O)										
δ (C)										
δ (C — O)										

Date 1871 Nov 23 Observer W.A.R. Barom. = log B =

Att. Therm. = log T =

n Recorder W.A.R. Ex. Therm. = log β = log γ

Nov 25

	Star.	+ ε Cass.		+ Polaris.		+ Polaris	
		1 45		1 13		13 13	
+8 357	T_δ			1 3 48.4		1 3 44.7	
7. 103	T_m		12 25.4	5 11.2	22.8	5 8.7	24.0
5. 452 2494	T_e		22.0 20.7	6 36.1	24.9	6 34.2	25.5
+1 253	T_f		22.0 23.4	9 29.7	53.6	9 25.5	51.3
− 1.1	T_g		21.7	10 57.2	27.5	10 54.6	29.1
1 252	T_h		21.7 22.8	12 21.7	24.5	12 19.4	24.8
2 503	Sum			13 47.9	26.2	13 43.8	24.4
5 449	Mean			15 14.6	26.7	15 11.5	27.7
7 108	Red. to T_m			12 24.1		18 1.2	49.7
8 303	Sum = s			21.5 21.3		19 30.7	29.5
	$\frac{1}{5}(T_m - T_s)$			19.4 26.5		20 54.9	24.2
	T			20.6 22.7			
	RA			24.3 180.4		12 19.02	18.39
	RA − T		T 12 22.40	1 ~~2 22.30~~ 25.25	21.92 25.25	24.35	24.35
	− n tang δ			− 2.70	− 3.37	− 5.33	5.96
	ΔT + m						
	$T_m - T_\delta$						
	A	1 38.1				2 9.2	2 25.7
	C	20.8				52.4	8.2
	Sum	58.9				1.6	33.9
	Mean	1 29.45				2 0.80	2 16.95
	Red. for runs						
	Red. to hor. wire						
	Red. to meridian						
	Division error						
	Sum						
	Pointer	20				45	
	App. z						
	log a′						
	A′ log β						
	λ′ log γ						
	log tang z						
	log r						
	r						
	z						
	φ − z = δ (O)						
	δ (C)						
	δ (C − O)						

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Date 1871 Nov. 25. Observer Barom. = log B =

Att. Therm. = log T = log γ

n Recorder Ex. Therm. = log β =

Star.	+ η Piscium		+ ν Persei		+ 43 Cass.		+ φ Persei		+ o Piscium	
	1 25		1 30		1 33		1 36		1 39	
T_δ	1 24 21.6	24 20.8	29 53.5	24 45.2	32 25.1	33 39.5	35 32.9	36 2.0	35 28.9	38 22.8
T_m	30.8	22.1	56.5	47.0	30.5	54 42.3	36.1	32 3.1	30.9	23.9
T_e	32.7	23.6	59.7	48.7	36.0	55 46.0	29.3	3.2 4.7	33.1	25.1
T_f	37.1	24 6.5 22.17	5.8	29 20.9 46.97	46.6	06 33 7.8 42.60	35.8	6.5 36 9.8 32.7	37.2	38 11.8 23.93
T_g	39.2		8.8		51.7	51	38.9	3.1	39.3	
T_h	41.2		– 11.9		– 57.1	54	42.0	3.1	41.4	
Sum	43.5		15.0		2.4	58	45.2	32	43.4	
Mean	45.6		18.1		7.7	53	48.5	33	45.5	
Red. to T_m	49.8		24.2		18.4	107	54.9	6.4	49.7	
Sum = s	51.9		27.3		23.9	55	58.1	3.2	51.7	
$\frac{1}{5}(T_m - T_s)$	54.1		30.3		29.3	54	64.3	32	53.9	
T	24 41.32		30 11.92		32 57.16		35 42.09		38 41.36	
RA	37.62		8.43		53.75		38.79		37.87	
RA — T	– 3.68		– 3.49		– 3.41		– 3.30		– 3.49	
— n tang δ										
ΔT + m					–					
$T_m - T_\delta$										
A	1 49.3		4 54.0		1 6.2		1 44.6		2 4.8	
C	45.2		40.1		49.9		31.1		59.2	
Sum	145		94.1		116.1		75.7		4.0	
Mean	1 47.25		4 47.05		0 58.05		1 37.85		2 2.00	
Red. for runs										
Red. to hor. wire										
Red. to meridian										
Division error										
Sum										
Pointer	40		20		0		20	8	50	
App. z										
log a′										
A′ log β										
λ′ log γ										
log tang z										
log r										
r										
z										
φ — z = δ (O)										
δ (C)										
δ (C — O)										

Date 1871, Nov. 27. Observer W.A.R. Barom. = log B =

n Recorder W.A.R. Att. Therm. = log T = log γ

Ex. Therm. = log β =

Star.	+ Br. 3077.		+ γ Piscium.		+ τ Pegasi.	
	2 3 7		23 11.		23 14	
T_δ	23 29	30 48.8	33 21.4	33 13.8	37 6.7	36 55.3
T_m	(47.1) 50.8	50.7	23.4	14.8	9.0	56.5
T_e	54.7	39 54.1	25.5	16.1	11.1	58.0
T_f	2.3	76 30 3.6 57.20	29.6	33 14.7 14.90	15.5	36 19.8 56.60
T_g	6.0	37	31.7		17.7	
T_h	9.4	34	33.7		20.1	
Sum	13.1	37	34.7		22.3	
Mean	16.6	35	37.7		24.5	
Red. to T_m	2 34.2	76	42.0		29.1	
Sum = s	28.1	39	43.9		31.3	
$\frac{1}{5}(T_m - T_s)$	31.8	37	46.1		33.6	
T	30 104.1 9.46		33 369.7 33.61		37 220.9 20.08	
RA						
RA — T						
— n tang δ						
ΔT + m						
$T_m - T_\delta$						
A	1 50.0		2 41.2		0 38.7	
C	37.4		35.3		29.3	
Sum	874		765		680	
Mean	1 43.70		2 38,25		0 34.00	
Red. for runs						
Red. to hor. wire						
Red. to meridian						
Division error						
Sum						
Pointer	5		45		20	
App. z						
log a′						
A′ log β						
λ′ log γ						
log tang z						
log r						
r						
z						
φ — z = δ (O)						
δ (C)						
δ (C — O)						

1871phae.proj.144OR

Date Nov 29 Observer A. M. Barom. = log B =
Att. Therm. = log T =
n Recorder A. M. Ex. Therm. = log β = log γ

Star.	+ β Cephei		226 B Ceph.		+ Polaris				
	21 27		+ +		1 13				
T_δ	26 48.3								
T_m	54.0	57							
T_e	0.3	63	30 34.8						
T_f	6.2	59		9 21.6					
T_g	12.4	62		10 47.6					
T_h				12 13.3					
Sum				13 38.8					
Mean				15 5.3					
Red. to T_m									
Sum = s									
$\frac{1}{s}(T_m - T_s)$									
T	27 0.24			12 ~~13.72~~ 13.82	13.09				
RA				22.32	22.32				
RA — T				8.60	9.23				
— n tang δ									
ΔT + m									
$T_m - T_\delta$									
A									
C									
Sum									
Mean									
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer									
App. z									
log a′									
A′ log β									
λ′ log γ									
log tang z									
log r									
r									
z									
φ — z = δ (O)									
δ (C)									
δ (C — O)									

Date Dec 1 1871　　Observer A. M.　　Barom. =　　log B =

n　　Recorder A. M.　　Att. Therm. =　　log T =　　log γ

Ex. Therm. =　　log β =

Star.	+ Polaris	B2 + υ Persei		B2 + γ Androm		B2 + α Arietis		B2 + γ Trianguli	
	1 13	1 30		1 56		2 00		2 10	
T_δ		1 29 50.4	1 30 35.6	55 46.7	55 35.2	59 44.3	59 35.2	2 9 28.0	9 17.0
T_m		53.5	37.7	49.3	37.4	46.6	36.9	30.5	18.5
T_e		56.5	39.8 23.1	52.0	39.4 22.0	48.9	38.6 207	32.7	20.3 55.8
T_f	~~1 5 37.7~~	2.6	37.10	57.6	37.33	53.2	36.90	37.8	18.60
T_g	9 14.7	5.7		0.2		55.6		40.4	
T_h	10 40.0	8.8		3.0		57.8		42.7	
Sum	12 6.7	11.9		5.7		59.9		45.2	
Mean	13 32.1	14.9		8.4		2.2		47.6	
Red. to T_m	14 59.4	21.0		14.0		6.6		52.5	
Sum = s		24.1		16.8		8.9		54.9	
$\frac{1}{5}(T_m - T_s)$		27.2		19.7		11.1		57.4	
T	12 6.58	96.6 5.55 8.78		33.4 56 3.04		635.1 57.74		469.4 42.70	
RA	12 20.98	20.98							
RA — T	−14.40	−15.03							
— n tang δ									
ΔT + m									
$T_m - T_\delta$									
A		0 45.3		0 40.6		1 50.7		3 69	
C		26.6		22.8		33.3		51.1	
Sum		71.9		63.4		84.0		112.0	
Mean		0 35.95		0 31.70		1 42.00		2 56.00	
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer		25		40		30		5	
App. z									
log a'									
A' log β									
λ log γ									
log tang z									
log r									
r									
z									
φ — z = δ (O)									
δ (C)									
δ (C — O)									

Date Dec 1 1871 Observer A. M. Barom. = log B =

Att. Therm. = log T = log γ

n Recorder A. M. Ex. Therm. = log β =

	B2		B2		B2	
Star.	+ i Cass		+ o Persei		+ B Persei	
	2 19	c.	2 36		3 00	
T_δ	2 18 1.9	17 40.1	2 35 21.7	35 45.5	59 34.8	59 20.8
T_m	7.2	43.2	25.0	46.9	37.5	22.0
T_e	12.5	46.4	28.2	48.6	40.3	23.4
T_f	22.9	9.4 43.30	31.2	21.0 47.00	45.6	6.2 22.07
T_g	28.1		34.4		48.3	
T_h	33.4		140.5 28.10		50.9	
Sum	38.6				53.7	
Mean	43.9				56.4	
Red. to T_m	54.3				61.7	
Sum = s	59.6				64.5	
$\frac{1}{5}(T_m - T_s)$	64.8				67.2	
T	36.72 18 33.58				56 0.9 50.99	
RA						
RA — T						
— n tang δ						
ΔT + m						
$T_m - T_\delta$						
A	4 31.6		3 15.6		0 50.9	
C	8.3		54.8		32.2	
Sum	39.9		130.4		83.1	
Mean	4 19.95		3 5.20		0 41.55	
Red. for runs						
Red. to hor. wire						
Red. to meridian						
Division error						
Sum						
Pointer	30		40		55	
App. z						
log a'						
A' log β						
λ' log γ						
log tang z						
log r						
r						
z						
φ — z = δ (O)						
δ (C)						
δ (C — O)						

Date Dec 2 1871 Observer A. M. Barom. = log B =

n Recorder A. M. Att. Therm. = log T = log γ

Ex. Therm. = log β =

			B2		B2		B2	
Star.	+ Polaris		+ τ Piscium +		+ η Piscium		+ υ Persei	
	1 13		1 5		1 25		1 30	
T_δ			1 4 22.0	4 16.2	24 24.8	24 15.3	29 49.6	29 34.0
T_m			24.4	17.8	26.9	16.9	52.6	35.8
T_e			26.6	19.6	29.0	18.3	55.6	37.8
T_f	~~8 37.0~~		31.3	20.6 17.87	33.3	20.5 16.83	1.7	17.6 35.87
T_g	9 14.1		33.6		35.4		4.8	
T_h	10 40.4		36.1		37.5		8.0	
Sum	12 4.7		38.4		39.6		10.9	
Mean	13 31.0		40.8		41.7		14.0	
Red. to T_m	14 55.2		45.4		46.0		20.1	
Sum = s			47.8		48.1		23.2	
$\frac{1}{5}(T_m - T_s)$			50.2		50.3		26.2	
T	12 5.18	4.85	396.6 36.05		412.6 37.51		86.7 7.88	
RA	20.24	20.24						
RA — T	-15.06	-15.69						
— n tang δ								
ΔT + m								
$T_m - T_\delta$								
A			3 46.7		1 53.0		4 50.9	
C			30.2		42.2		30.9	
Sum			76.9		95.2		81.8	
Mean			3 38.45		1 47.60		4 40.90	
Red. for runs								
Red. to hor. wire								
Red. to meridian								
Division error								
Sum								
Pointer			55		40		20	
App. z								
log a'								
A' log β								
λ' log γ								
log tang z								
log r								
r								
z								
φ — z = δ (O)								
δ (C)								
δ (C — O)								

Date Dec 2 1871 Observer A. M.
n Recorder A. M.

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =
log γ

Star.	B2 + β Arietis 1 48		B2 + γ Androm 1 56		B2 + α Arietis 2 00	
T_δ	47 20.6	47 12.6	35 45.8	56 26.8	59 43.7	59 35.8
T_m	22.8	14.0	48.5	28.1	45.8	37.0
T_e	25.0	15.1 11.7	51.3	29.6 245	48.1	38.8 21.6
T_f	29.3	1390	56.8	28.17	52.5	37.20
T_g	31.5		59.5		54.7	
T_h	33.7		2.3		57.1	
Sum	35.9		5.0		59.3	
Mean	38.1		7.7		1.5	
Red. to T_m	42.5		12.3		5.9	
Sum = s	44.6		16.1		8.1	
$\frac{1}{5}(T_m - T_s)$	46.8		18.8		10.5	
T	370.8 33.62		251 56 228		627.2 57.02	
RA						
RA — T						
— n tang δ						
ΔT + m						
$T_m - T_\delta$						
A	2 15.1		1 30.7		1 52.2	
C	0.3		14.7		35.2	
Sum	15.4		45.4		87.4	
Mean	2 7.70		1 22.70		1 43.70	
Red. for runs						
Red. to hor. wire						
Red. to meridian						
Division error						
Sum						
Pointer	10		40		30	
App. z						
log a′						
A′ log β						
λ′ log γ						
log tang z						
log r						
r						
z						
φ — z = δ (O)						
δ (C)						
δ (C — O)						

Date Dec 5-6 1871 Observer N.R. Barom. =

Att. Therm. =

n Recorder 87 Ex. Therm. =

log B =

log T = ________

log β =

log γ

Star.	+ Polaris	+ β ~~Urs Min~~ β Bootis P 9 C 6	+ α Bootis	+ ~~β Bootis~~ β Urs Min Dec 6
	13 13	14 57	14 10	14 51
T_δ	13 3 54.4	14 57 57.1	14 9 31.8	14 50 43.3
T_m	5 19.8	85.4 59.8	27 28 34.0	50.6
T_e	6 48.5	88.7 26	36.3	58.7
T_f	9 37.9	169.4 51	25 40.5	66.1
T_g	11 5.9	88.0 77	26 42.7	74.2
T_h	12 33.6	87.7	44.9	
Sum	13 57.8	84.2	47.1	
Mean	15 26.4	88.6	49.2	
Red. to T_m	18 16.8	170.4	53.6	
Sum = s	19 43.0	86.2	55.8	
$\frac{1}{5}(T_m - T_s)$	21 8.1	85.1	58.1	
T	13 12 32.02	58 2.46	14 9 44.91	14 50 58.58
RA	17.65	~~58.88~~ 5.01	47.17	2.07
RA — T	+14.37	−2.55	−2.26	−3.49
— n tang δ				
ΔT + m				

0 = +14.37 − 41.42

0 = − 2.26 + .36 + 14 − 2.12 −2.16

0 = −2.55 + .87 + 34 − 2.21

0 = − 3.49 + 3.65

0 = −16.63 + 41.78 n = +.40

0 = 1.23 + 3.29 n = +.38

$T_m - T_\delta$	
A	
C	
Sum	
Mean	
Red. for runs	
Red. to hor. wire	
Red. to meridian	
Division error	
Sum	
Pointer	
App. z	
log a′	
A′ log β	
λ log γ	
log tang z	
log r	
r	
z	
φ — z = δ (O)	
δ (C)	
δ (C — O)	

Date Dec. 9, 1871 Observer W. A. R.

n Recorder W. A. R.

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =

log γ

Star.	× B2 λ Androm. 23 31		+ B2 ρ Cass. 23 48		× B2 α Androm. 0 2		× B2 22 Androm. 0 4		+ Polaris 1 13
T_δ	23 30 54.6	23 30 49.8	47	48 8.3	0 1 26.8	0 1 17.6	3 17.2	3 9.4	
T_m	57.6	51.5		10.8	29.1	19.1	20.0	11.0	
T_e	0.4	54.0		12.8 31.9	31.4	20.9 57.6	23.0	12.7 33.1	
T_f	6.3	5.3 51.77	46.4	1063	36.1	1920	28.9	11.03	
T_g	9.3		50.1		38.4		31.7		
T_h	12.3		53.8		40.8		34.7		1 11 55.7 11 55.8
Sum	15.2		57.8		43.0		37.6		55.7 57.3 13 23.5 55.2
Mean	18.2		1.5		45.5		40.5		53.0 56.4 14 45.3 53.5
Red. to T_m	23.9		26.96 53.92		50.0		46.4		55.4
Sum = s	26.8				52.5		49.4		19 7.2 57.0
$\frac{1}{5}(T_m - T_s)$	30.2				54.8		57.2		20 32.3 57.3
T	134.8 12.25				448.4 40.76		381.6 34.69		~~1 11 56.36~~ 55.72 56
RA									12 15.42 15.57
RA — T									— 19.06 19.7
— n tang δ									
ΔT + m									
$T_m - T_\delta$									
A	2 41.8		2 6.2		0 13.1		1 57.2	2 11.6	2 28.5
C	27.1		47.3		— 1.8		40.2	46.9	4.3
Sum	68.9		113.5		11.3		97.4	118.5	32.8 ~~26.8~~
Mean	2 34.45		1 56.75		0 5.65		1 48.70	1 59.25	2 16.40 ~~13.40~~
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer	35		35		0		0		45
App. z									
log a′									
A′ log β									
λ log γ									
log tang z									
log r									
r									
z									
φ — z = δ (O)									
δ (C)									
δ (C — O)									

Date 1871 Dec. 9.
Observer W.A.R.
Recorder W.A.R.
n

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =

log γ

Star.	× B2 γ Trianguli		× B2 ι Cass.		× B2 θ Persei		× B2 τ Persei.	
	2 10		2 19		2 36		2 45	
T_δ	2 9 32.8	2 9 59.3	17	9 17 52.8	35 4.4	34 53.1	44 46.7	45 32.0
T_m	25.2	60.8		57.5	7.5	54.7	49.9	33.8
T_e	27.6	62.2 182.3		59.0 19.3	10.6	56.4 14.2	53.3	36.1 11.9
T_f	32.6	10 0.77	17.8	56.43	16.8	5473	0.1	33.97
T_g	35.0		22.6		20.0		3.2	
T_h	37.4		27.9		23.0		6.6	
Sum	39.9		~~23.4~~		26.1		10.0	
Mean	42.3		33.4		29.2		13.3	
Red. to T_m	47.2		38.5		35.4		20.0	
Sum = s	49.9		140.2 28.04		38.5		23.4	
$\frac{1}{5}(T_m - T_s)$	52.2				41.7		26.8	
T	(Ex[illegible]) 2.1				253.2 230.2		73.6 45 66.9	
RA								
RA — T								
— n tang δ								
ΔT + m								
$T_m - T_\delta$								
A	4 38.3		4 37.4		2 30.9		4 28.1	
C	42.5		14.9		11.3		9.9	
Sum	100.8		52.3		42.2		38.0	
Mean	4 50.40		4 26.15		2 21.10		4 19.00	
Red. for runs								
Red. to hor. wire								
Red. to meridian								
Division error								
Sum								
Pointer	5		30		40		5	
App. z								
log a′								
A′ log β								
λ′ log γ								
log tang z								
log r								
r								
z								
φ — z = δ (O)								
δ (C)								
δ (C — O)								

Date | Observer | Barom. = | log B =
Att. Therm. = | log T =
n | Recorder | Ex. Therm. = | log β = | log γ

Star.	× B2 ρ Persei (2 57		+ B2 β Persei 3 80						
T_δ	2 56 38.1	2 56 36.0	2 59 28.6	59 13.5					
T_m	40.8	37.6	32.3	14.8					
T_e	43.3	39.2	35.0	16.1					
T_f	48.5	22.8 37.60	40.4	14.4 14.80					
T_g	51.2		43.2						
T_h	53.8		45.9						
Sum	56.9		48.5						
Mean	59.0		51.3						
Red. to T_m	4.3		56.6						
Sum = s	6.8		59.3						
$\frac{1}{5}(T_m - T_s)$	9.5 592.2		2.0 510.1						
T	53.84		46.37						
RA									
RA — T									
— n tang δ									
ΔT + m									

$T_m - T_\delta$									
A	3 1.7		0 43.9						
C	44.9		28.7						
Sum	1066		72.6						
Mean	2 53.30		0 36.30						
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer	0		55						
App. z									
log a′									
A′ log β									
λ log γ									
log tang z									
log r									
r									
z									
φ — z = δ (O)									
δ (C)									
δ (C — O)									

Date Dec 12 1871 Observer W. A. R. Barom. = log B =

Att. Therm. = log T = log γ

n Recorder W. A. R. Ex. Therm. = log β =

Star.	+ B2 Q Cass 23 48		+ B2 a Androm 0 2		+ B2 22 Androme 0 4		38 B2 A Cass. ××	
$T_δ$	23 47 27.2 ~~23.0~~ 47	22.0 ~~15.6~~	0 1 24.6	0 1 12.7	0 3 14.9	0 3 12.3	1 21 1.4	1 21 0.1
T_m	32.7 24.7 ~~27.0~~	24.7 ~~17.2~~	27.0	14.3	17.8	13.0	7.0	3.3
T_e	36.7 30.5	26.8 ~~20.5~~	29.3	16.3	20.5	12.65	13.0	4.0 7.4
T_f	44.3 ~~38.2~~	13.5 24.50	34.0	13.3 14.43	26.6		24.0	24.7
T_g	48.0 47.0		36.3		29.5		31.0	
T_h	51.7 45.7		38.6		32.4		36.8	
Sum	55.5 49.4		41.0		35.5		42.7	
Mean	59.2 ~~53.1~~		43.3		38.4		48.7	
Red. to T_m	6.8 ~~7.6~~		45.0		41.1		0.4	
Sum = s	10.5 ~~4.5~~		50.4		47.1		6.5	
$\frac{1}{5}(T_m - T_s)$	14.3 ~~8.3~~		52.7		50.1		12.3	
T	56.89 56.72		38.66		32.47		36.79	
RA								
RA — T								
— n tang δ								
ΔT + m								
$T_m - T_δ$								
A	1 30.8		0 9.6		2 2.5		2 50.1	
C	14.0		— 5.4		46.1		25.7	
Sum							47 39.40	
Mean								
Red. for runs								
Red. to hor. wire								
Red. to meridian								
Division error								
Sum								
Pointer	35		0		0		45	
App. z								
log a′								
A′ log β								
λ log γ								
log tang z								
log r								
r								
z								
φ — z = δ (O)								
δ (C)								
δ (C — O)								

Date Dec 12 1871 Observer W.A.R.

n Recorder W.A.R.

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =
log γ

Star.	+ Bz η Piscium 1 25		+ Bz ν Persei 1 30		+ Bz Polaris. 1 13
T_δ	1 24 18.3	1 24 23.7	1 29 42.8	1 29 40.2	1 3 15.6
T_m	20.3	25.0	45.8	41.5	4 41.8
T_e	22.4	26.0 14.7	48.9	42.8 4.5	7 8.4
T_f	26.4	24.90	55.0	41.50	8 59.6
T_g	28.7		58.1		10 24.6
T_h	30.9		11.3		11 51.7
Sum	33.0		4.3		13 17.7
Mean	35.1		7.4		14. 41.8
Red. to T_m	39.3		13.7		17 35.6
Sum = s	41.5		16.6		19 1.7
$\frac{1}{5}(T_m - T_s)$	43.7		19.7		20 27.7
T	30.8.7		1.24		11 51.47
RA					
RA — T					
— n tang δ					
ΔT + m					
$T_m - T_\delta$					
A	2 10.6		4 57.9		2 14.7
C	58.7		38.5		50.6
Sum					
Mean					
Red. for runs					
Red. to hor. wire					
Red. to meridian					
Division error					
Sum					
Pointer	40		20		45
App. z					
log a′					
A′ log β					
λ log γ					
log tang z					
log r					
r					
z					
φ — z = δ (O)					
δ (C)					
δ (C — O)					

Date Dec. 14, 1871. Observer W. A. R. Barom. = log B =

Att. Therm. = log T = ______ log γ

n Recorder W. A. R. Ex. Therm. = log β =

8.92035

	2,853 cos δ 9.57468		.44	.44	.61	.83	.71	.21	11.95
Star.	× 5 H. Camel.		× η Tauri	× 27 Tauri.	× ξ Persei	× ε Persei.	× ξ Persei	× λ Tauri.	× Gr. 750
	3 37		3 40	3 42	3 46	3 49	3 51	3 54	3 58
T_δ	3 36		3 39 30.7	3 41 11.3	3 45 42.3	3 48 51.7	3 50 16.3	3 53 14.7	3 27.9 54 36.5
T_m			33.0	13.5	44.8	54.3	18.7	16.8	34 55 0.1
T_e			35.3	16.0	47.2	57.1	21.3	18.7	38.6 55 25.3
T_f	~~6.26~~ 44.3	44.30	39.7	20.3	52.1	2.3	26.3	23.0	45.4 56 13.5
T_g	6.3 51.1	6.8 44.8	41.9	22.5	54.6	5.0	28.7	25.1	26.6 56 39.6
T_h	12.6 57.6	6.5 45.0	44.3	24.8	57.1	7.7	31.3	27.1	0 57 4.9
Sum	25.1 10.3	12.7 45.2	46.5	27.0	59.3	10.3	33.9	29.2	24.6 57 27.3
Mean	31.5 16.5	6.2 45.0	48.8	29.2	1.6	12.9	36.4	31.3	49.4 57 54.4
Red. to T_m	37.7 22.6	6.1 44.9	53.2	33.7	6.5	18.5	41.5	35.4	38.4 58 42.8
Sum = s		44.98	55.5	36.0	9.0	20.9	44.0	37.6	38.5 59 7.7
$\frac{1}{5}(T_m - T_s)$			57.8	38.3	11.4	23.6	46.7	39.7	38.5 59 31.6
T	3 36 ~~45.02~~ 44.28		39 44.25	41 24.78	45 56.90	49 7.66	50 31.37	53 27.15	~~57 03.98~~ 57 3.97
RA	3 36 54.03		52.60	33.09	53.2	16.03	35.77	35.39	
RA — T	−9.01		−8.35	−8.31	−8.42	−8.37	−8.40	−8.24	
— n tang δ					—				
ΔT + m									
$T_m - T_\delta$									
A									
C									
Sum									
Mean									
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer									
App. z									
log a'									
A' log β									
λ log γ									
log tang z									
log r									
r									
z									
φ — z = δ (O)									
δ (C)									
δ (C — O)									

Date 1871 Dec. 14 Observer Barom. = log B =

Att. Therm. = log T =

n Recorder Ex. Therm. = log β = log γ

		Star.	+ δ Tauri	+ ε Tauri.	+ α Tauri.	+ ν Eridani.	+ Polaris, Dec 14-15
			.31	34	.29	−06	41.82
			4 16	4 21	4 29	4 30	13 13
36.5	4.4	T_δ	4 15 12.0	4 20 47.3	4 28 13.7	4 29 35.0	
0.1	3.7	T_m	14.2	49.4	15.7	37.1	
25.3	3.9	T_e	16.4	51.6	17.8	39.1	1 6 39.55?
13.5	2.9	T_f	20.7	56.0	22.0	43.2	+5 42.50
39.6	4.7	T_g	22.8	58.1	24.2	45.3	
4.9	4.9	T_h	24.9	1.3	26.3	47.4	Very Rejected
27.3	2.9	Sum	27.2	2.5	28.4	49.4	
54.4	5.0	Mean	29.3	4.7	30.6	51.5	
42.8	4.2	Red. to T_m	33.5	8.9	34.9	55.6	
7.7	3.9	Sum = s	35.7	11.1	37.0	57.7	
31.6	3.5	$\frac{1}{5}(T_m - T_s)$	37.8	13.4	39.2	59.8	
~~3.98~~ 3.97	3.94	T	15 24.95	21 0.39	28 26.35	29 ~~47.38~~ 47.37	13 12 22.45
		RA	33.26	8.64	34.66	55.53	13 12 11.48
		RA — T	−8.31	−8.25	−8.31	−8.15	+11.57
		— n tang δ					
		ΔT + m					
		$T_m - T_\delta$					
		A					
		C					
		Sum					
		Mean					
		Red. for runs					
		Red. to hor. wire					
		Red. to meridian					
		Division error					
		Sum					
		Pointer					
		App. z					
		log a′					
		A′ log β					
		λ log γ					
		log tang z					
		log r					
		r					
		z					
		φ — z = δ (O)					
		δ (C)					
		δ (C — O)					

0 = −8.35	+44	+13	−8.20	1	1
.31	+44	+13	18	1	1
42	+.61	+17	25	6	36
37	+.83	+24	13	6	36
40	+.71	+21	19	0	0
24	+.21	+06	18	1	1
31	+.31	+09	22	3	9
25	+34	+10	15	4	16
31	+29	+09	22	3	9
.15	−06	−.2	17	2	4
311			189		.0113

0 = 8.31 + .41 8.19 .001255

0 = 9.01 + 2.89 $\frac{\pm .024}{3.1} = \pm .008$

n = +.29

b = +.18

m = b sec φ − n Tang φ

= +.16 − .39 = −.23

+8.19

− .23

dT = −8.42 = 8.48

n = 38

Date Dec. 18-19 Observer N.A.R. Barom. = log B =

Att. Therm. = log T = __________

n Recorder Ex. Therm. = log β = log γ

Star.	+ Polaris S.P.			ζ Virginis			
	13 Bad seeing 13				13 28		
T_δ	134	34.4		28	44.5		
T_m	6	3.2	28.8		46.6	21	
T_e	7	34.2	31.0		48.7	21	
T_f	10	19.8	25.6		52.8 54.7	41 19	
T_g	11	48.9	29.1		56.8	21	
T_h	− 13	13.8	24.9		58.8	20	0 = −11.61 − 0.0
Sum	14	40.9	27.1		1.0	22	0 = + 4.91 + 41.82
Mean	16	5.8	24.9		5.0	40	0 = 16.52
Red. to T_m	18	57.8	54.0		7.0	20	n = .40
Sum = s	20	25.2	27.4		9.1	21	
$\frac{1}{5}(T_m - T_s)$	21	47.4	22.2		~~111~~		
T	~~12~~ 13	~~12.84~~ 13.76	13.47	~~27~~	56.82		
RA	12	7.93	7.93	28	58.43		
RA — T		+4.91	+5.54		11.61		
— n tang δ							
ΔT + m							
$T_m - T_\delta$							
A							
C							
Sum							
Mean							
Red. for runs							
Red. to hor. wire							
Red. to meridian							
Division error							
Sum							
Pointer							
App. z							
log a′							
A′ log β							
λ log γ							
log tang z							
log r							
r							
z							
φ — z = δ (O)							
δ (C)							
δ (C — O)							

Date Dec 20 Observer W.A.R. Barom. = log B =

n Recorder W.A.R. Att. Therm. = log T =

Ex. Therm. = log β = log γ

	B1		B2		B2		B2		B2	
Star.	+ i Cephei		+ Q Cass		+ a Androm		+ 22 Androm		+ κ Cass.	
	22 45		23 48		0 2		0 4		0 26	
T_δ	22 44 22.7	22 44 5.5	23 47 23.0	23 47 15.6	0 1 18.7	0 1 8.5	0 3 9.8	1 3 7.6	0 25 3.8	0 24 53.8
T_m	27.8	8.9	27.0	17.2	21.0	10.0	12.3	9.0	8.3	56.0
T_e	32.7	11.6 26.0	30.5	20.5 53.3	23.3	11.6 30.1	14.8	12.0 28.6	12.7	58.6
T_f	42.7	867	38.2	17.77	28.0	10.03	20.7	9.53	21.5	59.6 28.0
T_g	47.7		42.0		30.4		23.6		25.9	57.00
T_h	52.2		45.7		32.8		26.5		30.6	
Sum	57.7		49.4		35.1		29.4		34.7	
Mean	2.7		53.1		37.4		32.3		39.2	
Red. to T_m	12.6		60.6		42.0		38.2		48.0	
Sum = s	17.3		64.3		44.4		41.0		52.7	
$\frac{1}{5}(T_m - T_s)$	22.4		68.3 50.21		46.8		44.0		56.8 33.42	
T	52.59		46.65		32.72		26.60		30.37	
RA										
RA — T										
— n tang δ										
ΔT + m										
$T_m - T_\delta$										
A	0 6.1		1 36.0		0 14.0		2 7.8		0 24.9	
C	56.5		14.0		55.2		47.8		1.8	
Sum										
Mean										
Red. for runs										
Red. to hor. wire										
Red. to meridian										
Division error										
Sum										
Pointer	52		35		0		0		10	
App. z										
log a′										
A′ log β										
λ log γ										
log tang z										
log r										
r										
z										
φ — z = δ (O)										
δ (C)										
δ (C — O)										

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Date Dec 20 1871 Observer W.A.R. Barom. = log B =
n Recorder W.A.R. Att. Therm. = log T = log γ
Ex. Therm. = log β =

Star.	B2 a Cass		B2 β Androm		Polaris		a Pegasi
	0 33		1 3		13 13		22 59
T_δ	0 32 39.6	0 32 36.2	1 2 5.8	1 1 53.0		1 8 20.7	22 57 56.4
T_m	43.1	37.4	8.3	54.2			58.6
T_e	47.0	38.8 22.4	10.8	56.0 13.2			0.4
T_f	54.0	37.47	15.7	54.40	1: 8 52.5	14 54.8	5.0
T_g	57.8		18.2		10 17.3		7.0
T_h	1.6		20.7		11 43.0		- 9.0
Sum	5.0		23.3		13 8.5		11.2
Mean	8.8		25.8		14 36.8		13.3
Red. to T_m	16.1		30.8		4 43		17.6
Sum = s	19.8		33.3		428 431		19.6
$\frac{1}{5}(T_m - T_s)$	23.5		35.8		432 (45.0)		21.8
T	1.48		20.77				58 9.11 ~~9.01~~
RA					11 ~~43.35~~ 43.62	~~42.72~~	22.71
RA — T					6.92	6.84	12.70
— n tang δ					~~22.33~~ 23.89	24.12	
ΔT + m							
$T_m - T_\delta$							
A	3 44.3		1 50.2		2 17.0	2 18.5	
C	21.5		31.3		50.6	2.3	
Sum					7.6	21.1	
Mean					2 3.80	2 10.55	
Red. for runs							
Red. to hor. wire							
Red. to meridian							
Division error							
Sum							
Pointer	30		25		45		
App. z							
log a′							
A′ log β							
λ log γ							
log tang z							
log r							
r							
z							
φ — z = δ (O)							
δ (C)							
δ (C — O)							

Date Dec 20 Observer WAR Barom. = log B =

n Recorder WAR. Att. Therm. = log T =

Ex. Therm. = log β = 21/22 log γ

Dec 21-22

Star.	× a Persei		× 2 H Camel		× [illegible] ? o Persei		× Polaris		× ζ Virginis
	3 15		3 19		3 21		13 13		13 28
T_δ	3-14 40.0	3 14 30.2	3 18 6.6	3 17 59.6	3 21 2.4	3 20 49.5			13 27 43.7
T_m	43.1	32.2	10.3	64.8	- 5.3	51.6			45.8
T_e	46.2	35.0 7.4	14.2	65.6 7.0	8.4	53.6 4.7			47.9
T_f	52.5	14 32.47	22.4	18 2.33	14.5	20 51.57			52.0
T_g	55.5		26.2		17.6		12 5.2		54.2
T_h	58.7		30.4		20.6		44		56.2
Sum	1.8		34.4		23.6		0.0 13.6 4.53		58.1
Mean	4.9		38.5		26.8				0.0
Red. to T_m	11.5		46.8		32.7		13 18 42.8		4.1
Sum = s	14.5		50.7		35.9	12 58.2 13 3.4 13 6.5	20 14.2 ?		6.1
$\frac{1}{5}(T_m - T_s)$	17.5		54.1		38.8		21 43.5	5.16	8.2
T	646.2 14 08.75		18 335.12 30.47		226.6 21 20.60		13 2.70	5.81	27 56.03
RA							12 5.69	- .55	8.70
RA — T							12 4.53		12.68
— n tang δ							+1.06		
ΔT + m									
$T_m - T_\delta$			4 D						
A	4 30.3		4 27.0		0 32.9				
C	7.4		4.4		10.3				
Sum	37.7		31.4		43.2				
Mean	4 18.85		4 15.70		0 21.60				
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer	55		50		50				
App. z									
log a′									
A′ log β									
λ log γ									
log tang z									
log r									
r									
z									
φ — z = δ (O)									
δ (C)									
δ (C — O)									

Date Dec 24 1871
Observer A. M.
Barom. =
log B =
Att. Therm. =
log T =
log γ
n
Recorder A. M.
Ex. Therm. =
log β =

Star.	× B2 γ Pegasi		× B2 κ Cass		× ζ Cass		× B2 α Cass.	
	0 6		0 26		0 30		0 33	
T_δ	0 6 8.1	0 6 6.5	24 59.4	24 51.9	28 12.2	28 0.6	32 35.2	32 18.3
T_m	10.2	7.3	4.0	55.1	15.6	2.3	38.7	20.2
T_e	12.4	6.9	8.3	57.0 140	19.1	4.4 7.3	42.3	21.9 60.4
T_f	16.6		16.9	5467	25.8	28 243	49.7	20.13
T_g	18.8		21.4		29.3		53.3	
T_h	21.0 23.0		25.9		32.9		56.9	
Sum	26.1		30.3		36.2		0.8	
Mean	29.4		34.6		39.6		4.5	
Red. to T_m	31.5		43.7		46.6		11.7	
Sum = s	33.6		47.9		50.1		15.3	
$\frac{1}{5}(T_m - T_s)$	2088		57.5		53.5		19.2	
T	2088		25.90		28 32.81		57.05	
RA	37.64		43.31		49.99		14.34	
RA — T	16.76		17.41		17.18		17.29	
— n tang δ								
ΔT + m								
$T_m - T_\delta$								
A	4 49.2		0 20.8		2 4.9		3 29.0	
C	41.7		6.8		57.8		15.7	
Sum					1167			
Mean					1 58.35			
Red. for runs								
Red. to hor. wire								
Red. to meridian								
Division error								
Sum								
Pointer	50		10		10		30	
App. z								
log a′								
A′ log β								
λ log γ								
log tang z								
log r								
r								
z								
φ — z = δ (O)								
δ (C)								
δ (C — O)								

Date Dec 24 1871 Observer A. M.

n

Recorder

Barom. =

Att. Therm. =

Ex. Therm. =

log B =

log T =

log β =

log γ

	B2		B2		B2		B2		B2
Star.	+ η Cass		× γ Cass		+ ε Piscium		+ β Androm.		+ Polaris
	0 42		0 49		0 56		1 3		1 13
T_δ	0 40 41.4	0 40 27.8	48 ~~[illegible]~~	47 54.5	55 48.2	55 40.1	1 2 1.4	1 1 48.7	8 41.6
T_m	45.0	36 29.6	170 21.1	56.8	50.1	41.8	3.8	50.2	10 3.7 221
T_e	48.8	38 31.6	25.3	59.3	52.2	43.5	6.4	52.2	11 35.8 321
T_f	56.4	7.6 89.0 29.67	33.7	20.6 56.87	56.5	5.4 41.80	11.4	1.1 50.37	12 57.6 218
T_g	0.2	3.8	37.5		58.5		13.9		14 22.3 247
T_h	3.8	36	41.6		0.5		16.3		1610
Sum	7.6	3.8	45.7		2.6		19.0		
Mean	11.4	3.8	50.0		4.7		21.4		
Red. to T_m	19.0	7.6	58.3		8.8		26.4		
Sum = s	22.9	3.9	2.4		10.9		29.0		
$\frac{1}{5}(T_m - T_s)$	26.8	3.9	6.5		13.0		31.5		
T	3.94		41.74		0.55		16.41		11 32.20
RA	21.02		59.10		17.26		33.43		3.74
RA — T	17.08		17.36		16.67		17.02		31.54
— n tang δ									
ΔT + m									
$T_m - T_\delta$									
A	0 28.1		2 14.8		1 48.3		1 48.2		2 2.2
C	14.5		0.1		41.8		37.5		45.3
Sum									
Mean									
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer	15		20		10		25		45
App. z									
log a′									
A′ log β									
λ′ log γ									
log tang z									
log r									
r									
z									
φ — z = δ (O)									
δ (C)									
δ (C — O)									

Date Dec 27 1871 Observer WAR

n Recorder WAR,2

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =

log γ

Star.	+ B2 β Androm.		+ B2 τ Piscium		+ ~~B2~~ Polaris		+ B2 ι Persei		B2 A. Cass
	1 3		1 5		1 13		1 30		+ +
T_δ	1 ~~1~~ 59.4 1	55.1 4	3.0 4	33.9	—		29 30.7	29 18.6	20 48.5 20 44.3
T_m	2.0	57.0	5.4	35.3	—		33.7	20.2	54.7 48.0
T_e	4.5	58.6	7.7	36.7	—		36.7	21.7	3.4 50.8
T_f	9.5	20.7 56.90	12.5	15.9 35.30	—		42.8	60.15 20.17	12.4 117.57
T_g	12.0		14.8		~~9~~ 9 59.2		45.9		18.6
T_h	14.5		17.3		11 27.9		48.9		24.3
Sum	17.0		19.6		12 52.7		52.1	30 11.7	30.4
Mean	19.5		21.9		14 17.8		55.1	12.7	35.8
Red. to T_m	24.5		26.7		11 ~~25.4~~ 25.4		1.2	13.9 8.13	47.8
Sum = s	27.0		29.0		~~28.0~~ 27.9		4.6	12.77	52.8
$\frac{1}{5}(T_m - T_s)$	29.5		31.4		26.5 ~~27.6~~ 26.5		7.6		59.6
T	159.4 14.49		17.21		25.5 ~~26.0~~ 25.5		53 9.3 49.03		24.18
RA					11 264 ~~26.60~~ 263.2	27.23			
RA — T					12 1.28	1.40			
— n tang δ					34.68	34.17			
ΔT + m									
$T_m - T_\delta$									
A	1 58.7								2 47.2
C	43.0								27.0
Sum									2 37.10
Mean									
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer	25								45
App. z									
log a'									
A' log β									
λ' log γ									
log tang z									
log r									
r									
z									
φ — z = δ (O)									
δ (C)									
δ (C — O)									

Date Dec 27 1871 Observer W.A.R.

n Recorder

Barom. =

Att. Therm. =

Ex. Therm. =

log B =

log T =

log β =

log γ

	B2		B2		B2		B2	
Star.	+ a Persei		+ o Tauri		+ Gr. 716		+ ζ Persei	
	3 15		3 18		3 31		3 34	
T_δ	3 14 33.7	14 28.2	17 24.3	17 18.8	30 18.1 ~~15.9~~	30 5.3	33 12.0	32 54.0
T_m	36.7	29.9	26.4	20.0	22.8 ~~18.0~~	9.8	15.0	57.0
T_e	40.0	32.1 90.2	28.5	21.1 59.9	27.3 ~~20.3~~	12.0 27.1	18.0	58.6 19.6
T_f	46.2	30.07	32.7	19.97	36.2	9.03	24.0	56.53
T_g	49.5		34.8		40.8		27.4	
T_h	52.5		36.8		45.2		30.2	
Sum	55.6		38.8	17 54.2	49.6	31 15.9	33.3	33 49.6
Mean	58.9	15 20.4	40.9	55.9	54.1	18.0	36.3	51.6
Red. to T_m	5.2	23.0	45.2	57.6	3.3	20.3	42.2	53.1
Sum = s	8.4	25.0	47.2	17.7 55.90	7.6	54.2 18.07	45.3	4.3 57.43
$\frac{1}{5}(T_m - T_s)$	11.5	8.4 22.80	49.3		12.0		48.4	
T	578.2 52.56		404.9 36.81		497.0 45.18		341.8 31.07	
RA								
RA — T								
— n tang δ								
ΔT + m								
$T_m - T_\delta$								
A	4 31.0	0 15.2			1 0.7		0 57.7	1 45.7
C	10.5	55.3			38.8		35.5	26.0
Sum								
Mean								
Red. for runs								
Red. to hor. wire								
Red. to meridian								
Division error								
Sum								
Pointer	55	0			35		0	0
App. z								
log a′								
A′ log β								
λ log γ								
log tang z								
log r								
r								
z								
φ — z = δ (O)								
δ (C)								
δ (C — O)								

1st Column = Dec 28

Date Dec 28 1871 Observer W.A.R. Barom. =
Att. Therm. =
n Recorder Ex. Therm. =

log B =
log T = ____________
log β =
log γ

	1.39 B2 .. ~~70~~		+ B2 70		.37		B2 −.15	
Star.	μ Cass		β Androm +		+ τ χ Piscium +		37 Ceti.	
	× +	Jan. 2	1 3	Jan. 2	1 5	Jan. 2	× +	Jan. 2 19.7
T_δ	0 59 ~~18.0~~	58 59.1	1 58.3	1 53.6	4 0.8	3 56.1	7 24.6	7 ~~9.7~~
T_m		2.6	1.0	56.4	3.0	58.2	26.7	21.7 ~~11.0~~
T_e		6.2	3.4	58.6	5.3	0.4	28.8	24.0 ~~12.2~~
T_f	18.0	12.1	8.5	3.6	9.5	4.8	32.9	28.0
T_g	21.3	16.6	10.9	6.0	11.8	6.9	35.0	30.0
T_h	24.9	20.1	13.4	8.6	13.9	9.2	37.0	32.1
Sum	28.4	23.6	15.8	11.0	16.1	11.5	39.1	34.2
Mean	32.0	27.2	18.4	13.6	18.4	13.6	41.1	36.3
Red. to T_m		34.2	23.4	18.7	22.7	18.0	45.4	40.4
Sum = s		37.8	26.0	21.2	25.0	20.2	47.5	42.5
$\frac{1}{s}(T_m - T_s)$		41.2	28.5	23.7	27.3	22.3	49.6	44.7
T	24.92	20.07	13.41	8.61	4 . 13.98	4 9.20	37.06	32.15
RA	+ 62	59	+31	+.29	+17	+16	− 7	−.07
RA − T	+19.58	24.32	19.58	+24.32	+19.58	24.33	19.58	24.33
− n tang δ	0 59 45.12	24.98	33.30	33.22	33.73	33.69	56.57	56.41
ΔT + m	− 2.58	− 2.48			− 2.33	− 2.28	2.25	2.20
$T_m - T_\delta$								
A								
C	0							
Sum	0 59 42.54	42.52			1 4 31.40	31.41	1 7 54.32	54.21
Mean	1 12.6	1 12.6	1 52.5				4 1.1	
Red. for runs	51.6	51.6	32.6				50.2	
Red. to hor. wire	1 2.10							
Red. to meridian								
Division error 1'								
Sum								
Pointer	5	5	25				55	
App. z								
log a′								
A′ log β								
λ′ log γ								
log tang z								
log r								
r								
z								
φ − z = δ (O)								
δ (C)								
δ (C − O)								

~~Dec 28 is to~~ The observations of Dec 28 are written in blue those of Dec 29 in red (except from 2^h 24^m to 2^h 8^m) and those of Jan 1 in black.

Date Dec 28 Observer Barom. = log B =

Att. Therm. = log T = log γ

n Recorder Ex. Therm. = log β =

	-06		1.57		.99				+ 2,69 B2	
Star.	39 Ceti		φ Cass		ξ Androm		+ Polaris +		δ Cass	
	x x	Jan. 2	x x	Jan. 2	x x	Jan. 2	1 13	Jan 1	x x	Jan 2
T_δ	1 9 33.9	9 29.0	1 11 18.7	11 13.7	1 14 10.5	14 5.6	1 17 55.5	16 59.7	20 47.1	20 43.0
T_m	35.9	31.0	22.7	17.6	13.3	8.5	18 35.3	18 28.7	53.5	48.5
T_e	38.0	33.1	26.1	21.3	16.2	11.4	19 57.1	19 52.5	59.3	54.2
T_f	42.0	37.3	34.0	29.0	22.0	17.2		9	11.1	6.2
T_g	44.1	39.3	37.7	32.8	24.9	20.1	11 22.1	11 18.2	17.1	12.0
T_h	46.2	41.4	41.7	36.7	28.0	23.0	25.1	18.9	22.8	17.8
Sum	48.2	43.4	45.3	40.4	30.8	26.0	22.6	16.8	28.7	24.0
Mean	50.4	45.5	49.4	44.4	33.6	28.7	11 20.86	23.9	34.6	29.7
Red. to T_m	54.4 56.5	49.6	57.0	52.0	39.4	34.6	24.50 20.14	15.06 17.90 15.54	46.6	41.6
Sum = s	58.5	51.6	0.7	56.0	42.4	37.5			52.7	47.6
$\frac{1}{5}(T_m - T_s)$		53.7	4.7	59.7	45.3	40.5			58.1	53.4
T	9 46.19	9 41.35	11 41.64	11 36.69	14 27.85	14 23.01	11 ~~23.27~~ 21.83	11 ~~17.97~~ 16.17	21 22.87	21 18.00
RA	-.03	-.03	+.71	+.68	+.44	+.42	12 0.35	11 56.40	+1.20	+1.13
RA — T	19.58	24.33	19.58	24.33	19.59	24.33	37.08	38.43	+19.59	24.34
— n tang δ	1 10 5.74	5.65	12 1.53	1.70	47.88	1 47.76			43.66	43.47
ΔT + m	-2.28	2.29	2.87	2.72	2.65	2.55				
$T_m - T_\delta$										
A								8	2 54.5	3 18.6
C									29.0	53.4
Sum	1 10 3.46	3.42	1 11 59.06	58.98	1 14 45.23	1 45.21			2 41.75	3 6.00
Mean										
Red. for runs										
Red. to hor. wire										
Red. to meridian										
Division error										
Sum										
Pointer								45	45	
App. z										
log a′										
A′ log β										
λ log γ										
log tang z										
log r										
r										
z										
φ — z = δ (O)										
δ (C)										
δ (C — O)										

Date Dec 28 1871 Observer J.A.R. Barom. = log B =

Att. Therm. = log T =

n Recorder Ex. Therm. = log β = log γ

	26 B_2		−.77 B_2		1.11 B_2		.84 B_2		
Star.	+ η Piscium +		B.A.C. 466		+ υ Persei +		τ Andromedae		
	1 25	Jan 1	++		1 30	Jan 1	++	Jan 1	
T_δ	1 24 5.0	24 7.1	26 37.1		29 29.7	29 25.6	32 25.2	32 21.2	
T_m	7.1	3.2	39.9		32.5	28.6	28.0	24.0	
T_e	9.2	5.3	42.3		35.6	31.8	30.5	26.6	
T_f	13.4	9.6	47.5		41.8	37.8	35.8	32.0	
T_g	15.7	11.7	50.2		44.9	41.0	38.5	34.6	
T_h	17.7	13.8	52.8		47.8	44.0	41.2	37.3	
Sum	19.9	16.0	55.5		50.9	47.1	43.9	39.8	
Mean	22.0	18.0	58.2		53.9	50.1	46.5	42.6	
Red. to T_m	26.2	22.3	3.1		0.2	56.3	51.8	48.0	
Sum = s	28.4	24.5	5.8		3.3	59.4	54.6	50.6	
$\frac{1}{5}(T_m - T_s)$	30.4	26.5	8.5		6.4	62.5	57.2	53.4	
T	17.72	13.82	52.81		47.91	44.02	41.20	37.28	
RA	+11	+10	−36		+49	+.44	+34	+34	
RA — T	+19.59	+23.43	+19.59		+19.59	23.43	+19.59	23.44	
— n tang δ	37.42	38.35	27 12.04		7.99	8.96	01.17	1.06	
ΔT + m							2.78	2.72	
							32 58.39	58.34	
$T_m - T_\delta$	Dec. 28	Jan. 1	Dec. 28		Dec. 28	Jan. 1	Dec. 28	Jan. 1	
A	1 50.0 2 46.1	2 6.8	4 43.6	0 27.1	0 12.9 37.4	4 52.7	2 54.2 3 35.8	2 51.7 3 40.3	
C	35.0 31.1	54.8	29.5	14.8	45.2 15.2	33.3	31.9 15.7	35.4 24.0	
Sum			4 36.55	0 20.70			27 43.05 28 25.75	27 43.55 28 32.15	
Mean									
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer	40	40	45	50	25	20	25	25	
App. z									
log a′									
A′ log β									
λ′ log γ									
log tang z									
log r									
r									
z									
φ — z = δ (O)									
δ (C)									
δ (C — O)									

Date Dec 28 1871 Observer V.A.R.

n

Recorder

Barom. =

Att. Therm. =

Ex. Therm. =

log B =

log T =

log β =

log γ

	1 34 43.18 .08 B2		+.15 B2		B2 76		−.20 B2		−.19 B2	
Star.	+ ν Piscium +		+ ο Piscium +		B.A.C. 544		χ Ceti		ζ Ceti	
	1 35	Jan 1	1 39	Jan 1	++		++	Jan 1	++	Jan 1
Tδ	1 34 13.7	34 9.8	38 5.4	38 1.6	40 30.1		42 45.4	42 41.5	44 36.2	44 40.6
Tm	15.7	11.8	7.4	3.6	32.5		47.5	43.6	38.2	42.7
Te	17.7	13.9	9.5	5.7	35.1		49.6	45.6	40.2	44.7
Tf	22.0	17.9	13.8	9.9	40.2		53.7	49.8	44.3	46.5
Tg	—	20.0	15.8	11.9	42.9		56.0	52.0	46.6	49.0
Th	26.0	22.0	17.9	14.0	45.5		58.0	54.1	48.6	2238
Sum	28.0	24.2	20.0	16.1	48.1		0.0	56.2	50.7	
Mean	30.1	26.2	22.0	18.2	50.6		2.0	58.3	52.8	
Red. to Tm	34.3	30.4	126.2	22.3	55.8		6.3	2.5	56.9	
Sum = s	36.5	32.4	28.3	24.5	58.5		8.5	4.6	57.2	
$\frac{1}{5}(T_m - T_s)$	38.5	34.5	30.3	26.5	61.1		10.7	6.6	61.2	
T	26.05	22.10	17.87	14.03	45.49		57.97	54.07	48.67	~~44.76~~ 44.76
RA	+.04	+.03	+.07	+.06	+.34		−.09	−.18	−.09	−.08
RA — T	19.60	23.44	19.60	23.44	19.60		19.60	23.44	19.60	23.44
— n tang δ	45.69	45.59	37.54	37.53	41 5.43		17.48	17.43	8.18	8.10
ΔT + m	−2.47	2.42								
	43.22	43.15								
Tm — Tδ	Dec. 28	Jan. 1	Dec. 28	Jan. 1	Dec 28		Dec. 28	Jan 1	Dec. 28	Jan 1
A	2 48.3	2 5.0 3 30.2	2 5.0 3 2.8	2 7.3 3 15.0	4 34.9	0 15.5	1 25.4 14.2	1 42.0 33.2	0 19.7 1 10.3	1 24.2
C	32.2	50.0 17.7	49.9 47.4	54.3 3.0	12.9	55.2	14.5 3.3	33.9 25.7	9.2 59.0	15.7
Sum					4 23.90	5 5.35				
Mean										
Red. for runs										
Red. to hor. wire										
Red. to meridian										
Division error										
Sum										
Pointer	30	30	50	50 40	0 5		40	40	20	20
App. z										
log a'										
A' log β										
λ log γ										
log tang z										
log r										
r										
z										
φ — z = δ (O)										
δ (C)										
δ (C — O)										

Date Dec 28 1871 Observer W.A.R.

n Recorder

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =
log γ

Star.	.37 B2 + β Arietis +		.42 B2 λ Arietis		−.40 B2 ν Ceti B2		+.89 B2 + γ Andromedae +		
	1 48	Jan 1	××	Jan 1	++		1 56.	Jan 1	
T_δ	1 47 1.0	46 57.0	50 14.2	50 10.4	53 25.5		55 26.0	55 22.0	
T_m	3.0	59.0	16.5	12.7	26.6		28.7	24.8	
T_e	5.2	1.3	18.7	14.9	29.8		31.4	27.4	
T_f	9.7	5.6	23.1	19.4	34.2		37.0	33.0	
T_g	11.8	7.9	25.4	21.5	36.5		39.7	35.8	
T_h	14.0	10.1	27.5	23.7	38.7		42.5	38.6	
Sum	16.2	12.3	29.8	25.9	41.0		45.0	41.2	
Mean	18.4	14.4	32.1	28.2	43.1		48.0	44.0	
Red. to T_m	22.8	18.7	36.5	32.6	47.6		53.3	49.4	
Sum = s	24.9	21.0	38.7	35.0	49.7		56.3	52.2	
$\frac{1}{5}(T_m - T_s)$	27.1	23.2	41.0	37.1	51.9		58.9	55.0	
T	14.01 14.49	10.05	27.39	23.76	38.60		42.44	38.49	
RA	+.17	+.15	+.18	+.17	−.18		+.40	+.36	
RA — T	19.60	23.44	19.60	23.45	19.60		19.61	23.45	
— n tang δ	33.78	33.64	47.37	47.38	53 58.02		2.45	56 2.30	
ΔT + m									
$T_m - T_\delta$	Dec.28.	Jan.1	Dec 28	Jan.1	Dec 28		Dec.28	Jan 1	
A	2 48.9 3 19.2	2 10.0 3 9.8	0 58.0 4 3.0	0 13.7 1 0.8	3 32.1	4 18.7	0 41.2 1 25.2	0 31.9	1 39.2
C	30.2 2.0	55.7 56.8	39.2 23.0	57.0 44.9	17.9	7.5	22.3 6.6	16.7	23.0
Sum									
Mean									
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer	10	10	25	25	0		40	40	
App. z									
log a′									
A′ log β									
λ′ log γ									
log tang z									
log r									
r									
z									
φ — z = δ (O)									
δ (C)									
δ (C — O)									

Date Dec 28 Observer Barom. = log B =

n Jan 1 Recorder Att. Therm. = log T =

Ex. Therm. = log β = log γ

	.42 B2		.68	B2	2.24	B2	1.21		2 10 57.22 .35	
Star.	+ α Arietis	+	+ β Trianguli +		+ 55 Cass	+	+ ι Persei +		+ θ Arietis	
	2 00	Jan 1	2 2	Jan 1	2 5	Jan 1	2 5		2 11	Jan 1
T_δ	1 59 24.0	59 20.1	27 1 20.7	1 16.8	3 36.5	3 33.3			10 27.3	23.3
T_m	26.1	22.3	23.1	19.2	41.8	53 38.3			29.3	25.5
T_e	28.4	24.5	25.4	21.7	46.9	57 43.0			31.6	27.8
T_f	32.9	29.0	30.5	26.7	57.0	101 53.0			35.8	32.2
T_g	35.1	31.2	33.0	29.1	2.1	5' 58.0			38.1	34.4
T_h	37.3	33.4	35.5	31.6	7.0	45 3.1			40.2	36.4
Sum	39.6	35.7	37.8	34.1	12.1	57 8.2			42.4	38.6
Mean	41.9	37.9	40.4	36.6	16.8	47 13.7			44.7	40.8
Red. to T_m	46.3	42.3	45.4	41.6	27.2	104 23.4			49.0	45.2
Sum = s	48.5	44.7	48.0	44.0	32.3	5' 28.4			51.2	47.3
$\frac{1}{5}(T_m - T_s)$	50.6	46.9	50.4	46.6	37.3	50 33.4			53.2	49.4
T	37.34	33.45	35.47	31.64	7.00	3.21			10 40.25	36.45
RA	+ 18	17	~~55.37~~ 55.38		27.61	27.58			0.03	0.02
RA — T	19.61	23.45	~~19.90~~		20.61				19.78	
— n tang δ	57.13	57.07								
ΔT + m			35.47	31.64	7.00	3.21			40.25	36.45
			+.31	+.27	+1.00	+1.90			+.16	+.14
$T_m - T_\delta$	2 0 57.13		19.61	23.45	19.64	23.48			19.65	23.49
A	57.13	57.07	55.39	55.36	27.64	27.59			11 00.06	0.08
	dec 28	Jan 1	dec 28	Jan 1	dec 28	Jan 1				
C	1 44.3 2 35.4	1 50.0 2 44.0	0 32.9 1 24.0	0 34.6 1 33.7	3 43.0	3 43.0	3 53.0		2.81	2.77
Sum	23.2 15.5	29.8 26.4	11.7 4.7	18.3 18.0	16.9	17.8	26.9		10 57.25	57.31
Mean										
Red. for runs										
Red. to hor. wire										
Red. to meridian										
Division error										
Sum										
Pointer	30	30	0	0	25	25				
App. z										
log a'										
A' log β										
λ' log γ										
log tang z										
log r										
r										
z										
φ — z = δ (O)										
δ (C)										
δ (C — O)										

Date Dec 28 1871 Observer W.A.R. Barom. = log B =
Att. Therm. = log T = log γ
n Dec 29 Jan 1 Recorder Ex. Therm. = log β =

−.06 +2.34 B2 2 21 18 10 +.14 B2 31 B2

Star.	× o Ceti	39 Arietis	× ι Cass	+ × ×	ξ₂ Ceti	+	27 Arietis	B2
	2 13	✗ +	2 19		× 2 2 22 20		✗ ✗	
T_δ		2 39 39.5	2 17 41.0	39.9 37.6	21 47.8 45.0	20 48.8	23	14.6
T_m		41.7	46.2	52 45.2 42.5	50.0 47.0	50.9		16.7
T_e		43.9	51.5	53 51.5 47.7	52.1 49.2	53.0		18.9
T_f		49.8	1.6	10 0.9 58.1	56.2 53.2	57.1	24.0	23.1
T_g		51.0	6.8	52 6.0 3.3	58.4 55.4	59.1	26.2	25.3
T_h		53.4	– 12.4	56 11.2 8.3	0.4 57.5	1.2	28.4	27.4
Sum		55.7	17.6	52 16.5 13.7	2.5 59.5	3.3	30.5	29.6
Mean		58.2	22.8	52 22.0 18.8	4.5 1.6	5.3	32.6	31.8
Red. to T_m		41.9	33.6	10 8 32.6 29.7	8.6 4.7	9.5		36.0
Sum = s		5.3	38.4	48 37.6 34.6	10.7 7.8	11.6		38.2
$\frac{1}{5}(T_m - T_s)$		7.5	43.6	52 42.8 40.1	12.8 9.9	13.6		40.4
T		39 53.45	12 32	11.38 8.58	0.36 57.32	21 1.29	28.34	27.45
RA		– 2	32.73	32.70		20.87	20.86	
RA — T		23.47	29.41			19.65		
— n tang δ		2 40 16.90						
ΔT + m			12.32	11.38 8.55	0.36 57.44	21 1.22	28.34	27.45
			+1.04	+1.04 +.94	+.07 +.06	+.07	+.14	+.14
$T_m - T_\delta$			+19.62	+20.51 +23.46	20.50 23.46	19.62	19.62	20.50
A		2 40 16.90	32.98	32.93 32.98	20.93 20.84	20.91	48.10	48.09
C		3.15			2.76 2.74	2.77	2.88	2.83
Sum		(13.75	ι Cassiopeiae	)	18.17 18.10	18.14	45.22	45.26
Mean		dec. 28 4 39.6 0 14.0	dec. 29 4 28.3	jan. 1 4 50.2 0 9.7	dec 28 4 44.7	jan. 1 4 45.8 0 52.4	dec 28 0 30.0	dec 29 4 51.9
Red. for runs		12.7 47.9	5.9	26.3 47.7	29.3	33.3 38.0	13.2	37.3
Red. to hor. wire					74.0			
Red. to meridian					4 37.00			
Division error								
Sum								
Pointer		30 35	30	30 35	25	25 30	15	10
App. z								
log a′								
A′ log β								
λ′ log γ								
log tang z								
log r								
r								
z								
φ — z = δ (O)								
δ (C)								
δ (C — O)								

Date Dec 28 Observer W. A. R. Barom. = log B =

Att. Therm. = log T =

n Recorder Ex. Therm. = log β = log γ

Star.	o Ceti −27	B2	5 Urs Min	B2 ×	ν Arietis .39	B2 × ×	× δ Ceti .00	B2	× η Ceti +.05	B2 ×
	×× · ·			× ×	2 32		2 33		2	37
T_δ	2 25 28.8	27.9	27 —	26 33.9	30 59.6	58.9 55.8	32 —		36 7.9	7.0
T_m	30.9	30.1	—	42.2	1.8	1.0 58.0	—		10.0	9.0
T_e	33.0	32.2	—	50.7	4.1	3.2 0.3	—		11.9	11.2
T_f	37.2	36.5	—	8.7	8.4	7.5 4.5	31.3		16.1	15.1
T_g	39.4	38.6	—	16.9	10.6	9.8 6.8	33.3		18.2	17.2
T_h	41.6	40.8	28.8	25.5	12.8	12.0 9.0	35.4		20.4	19.3
Sum	43.8	42.9	28.8 28.9 37.6	87 34.2	15.0	14.2 11.2	37.4		22.3	21.3
Mean	45.8	45.0	28.2 45.6	17.4 42.7	17.2	16.4 13.4	39.5		24.4	23.4
Red. to T_m	50.1	49.3	28.9 3.6	34.7 59.9	21.7	20.9 17.9	43.5		28.4	27.5
Sum = s	52.3	51.4	28.6 12.0	43.4 8.3	23.9	23.1 21.1	45.7		30.5	29.6
$\frac{1}{5}(T_m - T_s)$	54.5	53.6	28.8 20.8	52.0 17.2	26.1	25.3 22.4	47.8		32.6	31.7
T	41.58	40.75	26 ~~28.70~~	25.47	12.83	12.03 9.95			20.25	19.30
RA					32.71	32.70			38.87	38.87
RA — T					19.88				19.62	
— n tang δ										
ΔT + m	4158	4075			1283	12.03 993			2025	1930
	−13	−13			+18	+18 +16			+02	+02
$T_m - T_\delta$	19.61	20.50			19.62	20.51 23.47			19.62	20.51
A	26. 1.06	1.12			32.63	32.72 76		δ Ceti	39.89	39.83
C	(o Ceti Dec. 28	) Dec 29	(5 Urs. Min. Dec 28	) Jan 1	(ν Arietis Dec. 28	 Dec. 29	) Jan. 1	 Dec 28	(η Ceti Dec 28	) Dec 29 Jan 1
Sum	0 31.1	0 33.8	1 25.6	1 1.3 1 20.9	3 40.6 4 36.3	3 45.3	3 42.2 4 45.2	1 54.7	0 58.6	1 3.9 1 20.1
Mean	18.7	23.6	58.2	56.3 58.0	20.4 16.1	28.3	26.8 28.5	40.0	40.3	48.9 6.8
Red. for runs			1 11.90	11.76 18.9						
Red. to hor. wire				0 58.80 1 94.5						
Red. to meridian										
Division error										
Sum										
Pointer	10	10	40	40	55	55	55	35	40	40 40
App. z										
									36 4.1	
log a′									6.2	
A′ log β									8.2	
λ log γ									12.5	
log tang z									14.5	
log r									16.4	
r									18.5	
z									20.6	
φ — z = δ (O)									24.7	
δ (C)									26.6	
δ (C — O)									28.9	
									16.47	

Date Dec 28 1871 Observer W.A.R. Barom. = log B =

Att. Therm. = log T = log γ

n Recorder Ex. Therm. = log β =

	−.35 B2	2 42 23.61 .50 B2	2 45 44.0 1.29 B2	−~~4~~ 18
Star.	τ Eridani	+ 41 Arietis	+ τ Persei	δ Eridani
	44 +	2 43 + +	2 45 + +	~~8~~ +
T_δ	2 38 35.2 34.3	4 1 53.2 52.4 49.4	44 31.1 30.4 27.3	3 36 34.2
T_m	37.3 36.4	55.5 54.5 51.6	34.5 33.5 31 30.7	36.2
T_e	39.5 38.6	57.8 56.9 53.8	37.8 36.7 32 34.0	38.2
T_f	43.8 42.9	2.3 1.4 58.5	44.6 43.5 68 40.7	42.5
T_g	46.0 45.1	4.6 3.8 0.8	47.9 46.9 34 44.1	44.6
T_h	48.2 47.3	6.9 6.0 3.1	51.2 50.2 33 47.4	46.7
Sum	50.3 49.5	9.2 8.4 5.4	54.6 53.6 34 50.6	48.7
Mean	52.5 51.7	11.6 10.8 7.8	58.0 57.0 34 54.0	50.8
Red. to T_m	57.0 56.0	16.1 15.3 12.3	4.5 3.7 57 0.8	55.0
Sum = s	59.1 58.3	18.5 17.5 14.7	8.0 7.1 4 4.3	57.1
$\frac{1}{5}(T_m - T_s)$	61.3 60.5	20.8 19.8 16.9	11.4 10.5 7.6	59.1
T	46.70 47.33	6.95 6.07 3.12	57.24 50.28 47.41	~~30~~ 36 46.65
RA		26.82 26.82	11.39 11.38	−08
RA — T		19.87	20.15	20.56
— n tang δ				37 07.13
ΔT + m	48.20 47.33	6.95 6.07 3.12	57.24 50.28 47.41	~~46~~
	−16 −16	+22 +22 +20	+58 +58 +.52	
$T_m - T_\delta$	+19.63 +20.50	19.63 20.50 23.47	19.63 20.50 23.47	
A	39 7.67 7.67	26.80 26.79 26.79	45 11.45 11.36 11.40	37 7.13
C	−2.65 2.64	3.15 3.14 3.12	4.00 3.99 3.96	2.81
Sum	39 5.02 5.03	23.65 23.65 23.67	7.45 7.37 7.44	4.30
Mean	Dec. 28: 3 45.9 4 41.1 Dec. 29: 3 46.7	(Dec. 28: 4 21.1 0 11.7 Dec. 29: 4 21.8	Jan. 1: 4 19.0 0 11.6) (Dec. 28: 4 22.9 0 19.7 Dec. 29: 0 19.5	Jan. 1: 4 26.2 0 18.2)
Red. for runs	32.9 29.0 36.2	2.3 50.3 5.7	2.9 53.4 0.1 56.8 0.0	8.1 0.2
Red. to hor. wire				
Red. to meridian				
Division error				
Sum		(41 Arietis)	(τ Persei)	
Pointer	25 25	35 40 35 35	5 10 10	5 10
App. z				
log a′				
A′ log β				
λ log γ				
log tang z				
log r				
r				
z				
φ — z = δ (O)				
δ (C)				
δ (C — O)				

Date Dec 28 1871 Observer W.A.R.

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =

log γ

n

Recorder

	−2 4 16 +~~44~~ −35		+61		83		71		1.19	
Star.	~~δ Eridani~~ τ1 Eridani ×† 27 Tauri		× ζ Persei		ε Persei		ξ Persei		λ Persei	
			3 46 × ×		3 49 × ×		3 51 × ×		××	
$T_δ$	3 41 35.8		45 30.0	27.0	48 39.1	36.3	50 3.8	1.0	56 23.2	20.2
T_m	38.0		32.3	24.4 24	41.8	39.0	6.2	3.5	26.3	23.5 33
T_e	40.3		34.8	31.8 24	44.5	41.5	8.8	6.0	29.5	26.7 32
T_f	44.7		39.6	36.7 49	49.9	47.0	14.0	11.0	36.0	33.1 64
T_g	47.1		42.1	39.1 24	52.5	49.6	16.4	13.5	39.2	36.2 31
T_h	49.3		44.5	41.5 24	55.1	52.4	19.0	16.0	42.4	39.4 32
Sum	51.6		46.9	43.9 ~~45.9~~ 24	58.0	55.0	21.3	18.5	45.5	42.6 32
Mean	53.8		49.3	46.3 24	0.6	57.7	24.0	21.0	48.6	46.0 34
Red. to T_m	58.3		54.0	51.1 48	5.7	2.9	29.0	26.1	55.1	52.1 61
Sum = s	0.5		56.6	53.5 24	8.5	5.6	31.5	28.6	58.3	55.4 30
$\frac{1}{5}(T_m - T_s)$	2.8		58.8	56.1 26	11.2	8.3 ~~11.0~~	34.1	31.1	1.6	58.6 32
T	41 49.29		45 44.45	41.49 ~~41.49~~	48 55.17	52.30	50 18.92	16.03	56 42.34	39.44 ~~37.44~~
RA	+20		5.34	5.34	16.05	16.05	39.79	39.79	+54	+48
RA — T	20.56		20.89	23.94	20.88	23.75	20.87	23.76		
— n tang δ	49.29		+27	+.24	+32	+.33	+32	+28		
ΔT + m	49.29		44.45	41.49	55.17	52.30	16.92	16.03	42.34	39.44
	+16		+27	+24	+37	+33	+32	+28	+54	+48
$T_m - T_δ$	+20.56		20.56	23.50	20.56	23.50	20.56	23.50	20.57	23.51
A	42 40.69		5.28	5.28	16.10	16.13	39.80	39.81	3.45	3.43
C	2.83								−4.54	4.50
Sum	42 6.86								58.91	58.93
Mean										
Red. for runs										
Red. to hor. wire										
Red. to meridian										
Division error										
Sum										
Pointer										
App. z										
log a′										
A′ log β										
λ log γ										
log tang z										
log r										
r										
z										
φ — z = δ (O)										
δ (C)										
δ (C — O)										

Date Dec 28 1871 Observer W. A. R.

n

Recorder

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =

log γ

		.55			.31			.49				7.11		
Star.		ψ Tauri			B.A.C. 1272			β Tauri				ω Persei		
	- ıı	.+ +			+ +.			**				**		
T_δ	3 58	31.5	28.0	4.0	7.1	3.2	2	28.7	27.7	24.8	4	51.8	51.0	48.0
T_m		34.2	30.3		9.2	5.3		31.0	30.0	27.0		54.9	54.0	51.1
T_e		36.4	32.6		11.4	7.4		33.2	32.3	29.3		58.1	57.1	54.2
T_f		41.2	37.4		15.6	11.7		37.7	36.8	34.0		4.2	3.2	0.3
T_g		43.6	39.6		17.7	14.0		40.0	39.3	36.2		7.2	6.4	3.4
T_h		46.0	42.0		19.8	16.1		42.4	41.5	38.4		10.3	9.5	— 6.4
Sum		48.2	44.4		22.0	18.1		44.7	43.7	40.6		13.3	12.5	9.6
Mean		50.5	46.7		24.1	20.3		46.9	46.0	43.0		16.4	15.5	12.6
Red. to T_m		55.3	51.3		28.5	24.6		51.5	50.7	47.6		22.6	21.7	18.8
Sum = s		57.6	53.7		30.7	26.8		53.8	53.0	50.0		25.8	24.8	21.8
$\frac{1}{5}(T_m - T_s)$		60.0	56.1		32.8	29.0		56.1	55.2	52.3		28.7	28.0	25.0
T	58	45.89	42.01	0	19.90	16.05	2	42.36	41.47	38.47	4.	10.30	9.43 ~~9.42~~	6.47 ~~6.51~~
RA		+25	+25		+14	+14		+22	+22	+20		+50	+50	+44
RA — T		+19.67	23.54		19.67	23.51		19.67	20.58	23.51		19.67	20.58	23.51
— n tang δ		5.81	5.77		39.71	39.70		2.25	2.27	2.18		30.47	30.50	30.46
ΔT + m		3.67	3.66		3.39	3.38		3.62	3.62	3.61		4.52	4.52	4.51
		2.14	2.11		36.32	36.32.		58.63	58.65	58.57		25.95	25.98	25.95
$T_m - T_\delta$														
A														
C														
Sum														
Mean														
Red. for runs														
Red. to hor. wire														
Red. to meridian														
Division error														
Sum														
Pointer														
App. z														
log a′														
A′ log β														
λ log γ														
log tang z														
log r														
r														
z														
φ — z = δ (O)														
δ (C)														
δ (C — O)														

Date Dec 28 1871 Observer

n Recorder

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =

log γ

		−19				+1,76			.48				31			.28	
Star.		A Eridani				B.Ab.1313			χ Tauri				+ δ_2 Tauri			85 Tauri	
		× ×				×	×		××				4	16 +	+	××	
T_δ	4 7	46.4	45.4	42.6	9	55.7	51.8	14	14.1	13.3	10.4	16	10.4	9.6	6.6	24 0.6	23 30.1
T_m		48.5	47.5	44.6	20	59.7	56.0		16.4	15.6	12.6		12.6	11.7	8.7	2.7	32.3
T_e		50.6	49.6	46.7	21	4.0	0.0		18.7	18.0	14.8		14.7	13.8	10.9	4.9	34.3
T_f		54.5	54.0	50.9	42	12.3	8.4		23.3	22.5	19.4		18.8	18.2	15.1	9.1	35.6
T_g		57.0	56.0	53.0	21	16.5	12.6		25.5	24.7	21.6		21.1	20.3	17.3	11.3	40.7
T_h		59.0	58.1	55.1	21	20.6	16.7		27.9	27.0	24.1		23.3	22.5	19.5	13.4	42.8
Sum		1.1	0.3	57.2	21	25.0	20.9		30.1	29.2	26.2		25.5	24.6	21.6	15.4	45.0
Mean		3.3	2.4	59.3	21	28.9	25.0		32.4	31.5	28.5		27.6	26.8	23.7	17.7	47.1
Red. to T_m		7.4	6.5	3.5	22	37.3	33.4		36.9	36.1	33.0		31.8	31.0	28.1	21.9	51.4
Sum = s		9.4	8.6	5.6	41	41.4	37.6		39.2	38.4	35.3		34.1	33.2	30.3	24.1	53.5
$\frac{1}{5}(T_m - T_s)$		11.6	10.8	7.7	21	45.4	41.7		41.5	40.6	37.6		36.2	35.4	32.4	26.3	55.6
T	7	59.01	58.11	55.11	9	20.62	16.74	14	27.82	26.99	23.96	16	~~23.29~~ 23.28	22.46	19.47	13.40	42.85
RA		−.09	−.09	−.08		+.78	+.70		+.23	+.23	+.19		+.14	+.14	+.12	+.13	+.13
RA — T		19.67	20.58	23.51		19.68	23.51		19.68	20.58	23.52		19.68	20.59	23.52	19.68	20.59
— n tang δ	4 8	18.59	18.60	18.54		41.09	40.95		47.73	47.80	47.67		43.11	43.19	43.11	33.21	03.57
ΔT + m		3.03	3.03	3.02		5.65	5.61		3.65	3.65	3.65		3.47	3.47	3.47	3.46	
		15.56	15.57	15.52		35.42	35.34		44.08	.15	.02		39.64	39.72	39.64	29.85	
$T_m - T_\delta$																	
A																	
C																	
Sum																	
Mean																	
Red. for runs																	
Red. to hor. wire																	
Red. to meridian																	
Division error																	
Sum																	
Pointer																	
App. z																23 56.9	
																59.0	
log a'																1.1	
A' log β																5.3	
λ log γ																7.6	
log tang z																9.7	
log r																11.9	
r																13.9	
z																18.0	
φ — z = δ (O)																20.3	33.28
δ (C)																22.4	3.47 29.81
δ (C — O)																9.65	

11
23 52
33.28

Date Dec 28 Observer Y. A. R. Barom. = log B =
Att. Therm. = log T = ___ log γ
n Recorder Ex. Therm. = log β =

	26	+ .~~42~~ −26	4 34 30.24 +42	4 39 3.24 −06
Star.	Q Tauri	53 Eridani	+ τ Tauri + +	+ ω Eridani + +
	++	++	4 35	4 39
T_δ	4 26 2.7 1.8 58.8	31 47.2 46.2	34 0.6 33 59.7 56.9	38 34.5 33.4 30.5
T_m	4.8 3.9 1.0	49.2 48.3	2.9 2.0 59.0	36.5 35.6 32.5
T_e	6.9 6.0 3.0	51.3 50.6	5.1 4.2 1.2	38.6 37.6 34.6
T_f	11.1 10.1 7.3	55.7 54.7	9.6 8.7 5.7	42.6 41.7 38.7
T_g	13.3 12.4 9.5	58.0 56.8	11.8 10.9 8.0	44.6 43.7 40.8
T_h	15.4 14.6 11.6	0.0 59.0	14.1 13.1 10.1	46.7 45.9 42.9
Sum	17.6 16.5 13.6	2.1 1.1	16.2 15.3 12.4	48.9 48.0 44.9
Mean	19.7 18.7 15.7	4.2 3.2	18.5 17.7 14.5	50.9 49.8 47.0
Red. to T_m	23.9 23.0 20.1	8.4 7.4	23.0 22.1 19.0	55.0 54.0 51.1
Sum = s	26.0 25.1 22.3	10.5 9.6	25.2 24.4 21.3	57.1 56.1 53.2
$\frac{1}{5}(T_m - T_s)$	28.1 27.2 24.2	12.6 11.8	27.4 26.5 23.5	59.2 58.1 55.3
T	26 15.41 14.48 ~~11.56~~ 11.55 −21 32	59.63 ~~58.95~~ 5897	34 ~~14.03~~ 1404 13.15 10.15	38 46.78 45.81 42.86
RA	+11 +11 +10	−11 −11	33.90 33.90	6.44 6.44 6.43
RA — T	19.68 20.59 23.52	19.69 20.59	19.87 20.75	19.66 20.63
— n tang δ	26 35.20 35.18 35.17	2 19.51 19.43	14.03 13.15 10.15	−03 −03 −02
ΔT + m	3.46 3.46 3.46	3.06 3.05	+19 +.19 +.17 19.69 20.60 23.53	19.69 20.60 23.53
	31.74 31.72 31.71	16.45 16.38	34 33.91 33.94 33.85	06.44 6.48 6.37
$T_m - T_\delta$			3.67 3.67 3.67	3.20 3.20 3.19
A			30.24 30.27 30.18	3.24 3.28 3.18
C				
Sum				
Mean				
Red. for runs				
Red. to hor. wire				
Red. to meridian				
Division error				
Sum				
Pointer				
App. z				
log a′			1871 60	
A′ log β				
λ′ log γ				
log tang z				
log r				
r				
z				
φ — z = δ (O)				
δ (C)				
δ (C — O)				

Date Dec 28 Observer N.A.R. Barom. = log B =

Att. Therm. = log T =

n Recorder 451 5716 Ex. Therm. = log β = log γ

1.75 5 436.20 79

Star.	,25 o Orionis			× 10 β Camel			ω Aurigae			× a Aurigae 1,03			× β Orionis
	××			4 52	×	×	5 5×	×		5 7	×	×	5 9
T_δ	4 44 46.1	44.3	41.3	51 17.7	16.8	14.0 5 — 6	4 3.9			5 6 36.5	35.6	32.8 10	
T_m	47.3	46.4	43.3	21.9	20.9	18.0	6.5			39.6	38.6	35.8	
T_e	49.3	48.5	45.5	25.9	25.0	22.0	9.0	1		42.5	41.4	38.7	
T_f	53.6	52.7	49.9	34.3	33.4	30.5 34.7	14.2	−16.6		48.5	47.4	44.7	
T_g	55.7	54.8	51.9	38.4	37.6	38.8	16.9	− 19.2	26 26	51.4	50.3	47.6	
T_h	57.8	57.0	54.0	42.6	41.8	42.9	− 19.6 27	21.8		54.3	53.3	50.4	
Sum	0.0	59.1	56.1	46.5	45.8	47.1	26 22.2	27.1	53	57.2	56.3	53.5	
Mean	2.1	1.2	58.2	50.6	49.9	55.4	26 24.8	29.7	26	0.2	59.2	56.4	
Red. to T_m	6.4	5.3	2.5	59.1	58.2	59.6	30.1 53	32.3	26 166	5.9	5.1	2.3	
Sum = s	8.3	7.6	4.6	3.4	2.5	63.9	32.7 26	26	.6 .6 .7 .7	9.0	8.1	5.2	
$\frac{1}{5}(T_m - T_s)$	10.5	9.7	6.7	7.5	6.5	42.69	35.3		.7	12.0	11.1	8.2	
T	44 57.83	56.96	54.00	51 42.54 ~~42.63~~	41.67	38.81	4 19.56 ~~19.56~~	16.65 ~~16.56~~ 6		54.28	53.31	50.51	
RA	+11	+11	+10	63.15	63.15	63.15	40.52	40.52		14.57	14.52	14.54	
RA — T	19.69	20.60	23.53	20.52	21.48	24.34 +3	20.96	23.96		20.23	21.21	24.03	
— n tang δ	17.63	17.67	17.63	42.63	41.67	38.81	19.56	16.56		54.28	53.31	50.51	
ΔT + m	3.50	3.50	3.50	+81 19.70	+81 20.61	+70 23.70	+38 20.61	+32 23.70		+45 19.70	+45 20.62	+41 23.70	
	14.13	.17	.13	52 3.14	3.09	3.21	40.55	40.58		14.43	14.38	14.62	
$T_m - T_\delta$				5.99	5.99	5.99	−4.32	4.32					
A				57.15	57.10	57.26	36.23	36.26					
C													
Sum													
Mean													
Red. for runs													
Red. to hor. wire													
Red. to meridian													
Division error													
Sum													
Pointer													
App. z													
log a′													
A′ log β													
λ log γ													
log tang z													
log r													
r													
z													
φ — z = δ (O)													
δ (C)													
δ (C — O)													

Date Dec 28 1871 Observer W.A.R. Barom. = log B =

n Recorder Att. Therm. = log T = log γ

Ex. Therm. = log β =

	-1 2			5-4		4.00		2.66	
Star.	+ τ Orionis			+ β Tauri	✗	+ Gr. 966		+ 22 Camel	
	.5 62	✗	✗	5 18-		5 23	✗	6 5	✗
T_δ	5 10 51.8	50.4	48.0 17	38.2	34.5 21	30.7	29.9	6 3 50.2	49.2
T_m	53.7	52.9	50.0	40.5 2.3	36.8 2.3	38.9	37.7 7.8	53.8	54.7
T_e	55.8	55.0	52.0	42.8 2.3	39.2 2.4	46.1	45.8 8.1	1.6	0.7
T_f	0.2	59.1	56.1	47.5 4.7	43.8 4.6 22	2.3	1.8 16.0	13.6	12.4
T_g	2.1	1.2	58.2	49.8 2.3	46.3 2.5	10.7	9.3 7.5	19.1	18.3
T_h	4.2	3.3	0.3	52.2 2.4	48.5 2.7	18.6	17.4 8.1	25.0	24.4
Sum	6.3	5.3	2.4	54.5 2.3	50.8 2.3	26.2	25.1 7.7	30.8	30.1
Mean	8.3	7.5	4.4	56.9 2.4	53.2 2.4	34.0	33.3 82	36.6	35.9
Red. to T_m	12.5	11.5	5.6	1.5 4.6	57.9 4.2	50.0	49.0 15.7	48.8	47.5
Sum = s	14.5	13.6	10.8	3.8 2.3	0.2 2.3	58.0	56.9 79	54.4	53.2
$\frac{1}{5}(T_m - T_s)$	16.6	15.7	12.9	6.2 2.4	2.5 2.3 23	5.7	5.0 8.1	60.1	59.2
T	11 4.17	3.27 ~~3.27~~	0.34	17 52.17	48.52 ~~46.08~~ 22	18.29	17.38 ~~17.47~~	4 25.08	24.15
RA	23.86	23.87	23.88	12.29	12.31	39.79	39.80	45.93 64	45.94
RA − T	19.69	20.60	23.54	20.11	23.79	21.50	22.33	20.85	21.79
− n tang δ									
ΔT + m	4.17	3.27	0.34	52.17	48.52	18.29	17.47	25.08	24.15
	−05	−05	−05	+24	+.22	+1.78	+1.78	1.19	1.19
$T_m - T_\delta$	19.70	20.63	−23.55	19.71	23.55	19.71	20.63	19.73	20.66
A	23.82	23.85	23.84	12.12	12.29	39.78	39.88	46.00	46.00
C									
Sum									
Mean									
Red. for runs									
Red. to hor. wire									
Red. to meridian									
Division error									
Sum									
Pointer									
App. z									
log a′									
A′ log β									
λ′ log γ									
log tang z									
log r									
r									
z									
φ − z = δ (O)									
δ (C)									
δ (C − O)									

Date Dec 28 Observer W.A.R. Barom. = log B =

Att. Therm. = log T =

n Recorder Ex. Therm. = log β = log γ

				37		13		30		.18
Star.	+ δ Ursa min		p Gem?		13 Monoc		+ γ Gem.		+ 15 Monoc	
	18 12+	+ +			++		6 30	X	6 34	+
T_δ	6 12 —	9 39.63 283	20	48.1	25 27.1	26.1	29 46.6	45.7	33 23.8	22.8
T_m	→	10 14.2 2 540		50.2 21	29.2	28.1	48.6	47.8	25.9	24.8
T_e	—	50.3 2 18.7		52.3 21	31.2	30.4	50.8	49.7	27.9	27.0
T_f	⊼ —	11 58.4 1 9.5	57.9	56.8 45	35.4	34.4	55.0	54.2	32.1	31.0
T_g	8.0 12 33.5	12 33.2 345	?	58.9 21	37.3	36.5	57.3	56.3	34.1	33.2
T_h	8.1 13 8.2	13 8.6 8		1.2 23	39.5	38.6	59.5	58.6	36.2	35.3
Sum	9.4 14 28.9	13 43.0 345	7	3.3 21	41.5	40.7	1.5	0.6	38.4	37.3
Mean	7.9 —	14 17.6 1 9.5	7	5.5 22	43.5	42.8	3.6	2.8	40.2	39.4
Red. to T_m	83 16 1.7	15 27.7 2 18.7	Reject cloudy	10.0 45	47.8	46.8	8.0	7.0	44.5	43.6
Sum = s	82 9.2 —	16 2.0 2 5.58		12.2 22	50.0	49.0	10.2	9.2	46.6	45.6
$\frac{1}{5}(T_m - T_s)$	7.5 —	16 36.1 3 28.1		14.5 23	52.0	51.2	12.3	11.4	48.8	47.9
T	13 8.38 48	13 8.24		1.18 ~~1.27~~	25 39.50	3860 ~~38.10~~	29 59.40	58.50	33 36.23	35.26
RA	21.10	21.03		+17	+.06	+06	19.27	19.28	+08	+.08
RA — T	12.72	12.79		20.67	19.71	20.67	19.87	20.78	19.72	20.68
— n tang δ				1 22.31	59.27	59.33	59.40	58.50	56.03	56.02
ΔT + m				3.82	3.56	3.56	+13	+13	−3.57	−3.57
							19.71	20.67		
				18.29	55.71	55.77	19.24	19.30	52.46	52.45
$T_m - T_\delta$										
A										
C										
Sum										
Mean										
Red. for runs										
Red. to hor. wire										
Red. to meridian										
Division error										
Sum										
Pointer										
App. z										
log a′										
A′ log β										
λ′ log γ										
log tang z										
log r										
r										
z										
φ — z = δ (O)										
δ (C)										
δ (C — O)										

Date Dec 28 1871 Observer W. A. R.

n Recorder

Barom. =
Att. Therm. =
Ex. Therm. =

log B =
log T =
log β =

log γ

Star.	+ ^{47} ξ Gem	+	+ ^{23} ξ Gem		+ 51 H	+ Ceph.		
	6 36		6	38	6 ^{38} 41 07.0	38 8.0		
T_δ	6 35 30.0	29.1	37	34.1	38 50.6	436 51.8		
T_m	32.8 34.5	31.3		36.1	39 - 32.9	433 33.2		
T_e	39.1	33.7		38.2	40 15.5	435 16.5		
T_f	41.3	38.2		40.6	40 58.5	430 59.6		
T_g	43.6	40.6		44.6	1845	1891		
T_h	45.8	42.8		46.7				
Sum	48.2	45.0		48.8				
Mean	52.7	47.5		51.0				
Red. to T_m	55.0	51.9		55.1				
Sum = s	57.2	54.2		57.2				
$\frac{1}{5}(T_m - T_s)$		56.5		59.3				
T	35 43.61	42.80	37	46.70	39 32.90	33.82		
RA	3.61	3.62		6.53	40 1.92	2.04		
RA — T	20.00	20.82		19.83	29.02	28.55		
— n tang δ								
ΔT + m								

$T_m - T_\delta$								
A								
C								
Sum								
Mean								
Red. for runs								
Red. to hor. wire								
Red. to meridian								
Division error								
Sum								
Pointer								
App. z								
log a′								
A′ log β								
λ′ log γ								
log tang z								
log r								
r								
z								
φ — z = δ (O)								
δ (C)								
δ (C — O)