

KG  
11365  
54

A.54





KG-11365.54

$$\begin{aligned}
 a' &= n \sin \alpha \\
 b' &= -\sin \alpha \\
 c' &= -\sin \alpha \\
 d' &= \cos \alpha
 \end{aligned}
 \quad
 \begin{aligned}
 (A_n + B) \sin \alpha \\
 -(B + C) \sin \alpha
 \end{aligned}$$

	$\log(A_n)/n$	$\log B/n$	$D$	$\gamma \sin T$	$\gamma \cos T$	$T$	$\log \gamma$	
						$263^\circ 16'$	$1.4296$	$58^\circ 48'$
July 17	$9.2787$	$0.5609$	$1.2159$	$1.3474$	$1.1753$	$236^\circ 41'$	$1.4285$	$239^\circ 25'$
27	$9.2061$	$0.5483$	$1.2234$	$1.2999$	$1.2648$	$228^\circ 38'$	$1.4248$	$79^\circ 46'$
Aug 6	$9.1279$	$0.4306$	$1.1625$	$1.2363$	$1.2978$	$220^\circ 57'$	$1.4197$	
16								
26								
Sept 5								

	$\log 750$	$62 \sin \alpha$	$64 \cos \alpha$	$25 \tan \alpha$
July 7	$85^\circ 11' 14''$	$83^\circ 21' 22''$	$85^\circ 6' 45''$	
17	13.2	24.2	42.8	
27	12.1	25.3	40.7	
Aug 6	11.6	25.7	36.9	







Polaris Cast 6K of P. W. July 12



KG 11365.54

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APR 28 1956

Instr. low					
July 6 <sup>th</sup>		July 8-10	July 12-16	July 18-20	
+40°	+0.381	same as for	-0.425	-0.393	+0.110
30	0.344	period	0.387	0.366	-0.371
20	0.323	preceding	0.369	0.354	9.041
+10	0.313	July 6 <sup>th</sup>	0.365	0.358	9.5692
0	0.316	last	0.371	0.371	
-10	0.329	book	0.389	0.396	
20	0.349		0.420	0.434	
30	0.368		0.469	0.491	
-40	+0.443		-0.544	-0.577	
n =	±0.027	n = +0.080	n = +0.071	8.651	
c =	+0.316	c = +0.316	c = ±0.071	9.56942	



1864 July 6<sup>th</sup> M. East.

continued on next page

JMS		W.A.R.		y. Wisc. minoris		57 Uxmi-B		37 Libine	
P. Linn		u. Bootis							
37.3		50.4		12.4				16.4	
40.7		54.6		23.2				19.9	
44.6		59.4		35.9		15 22 0.9			24.1
47.3		2.6		43.8		23 4.7			26.6
51.4		7.7		56.8		24 45.4			30.6
221.3		174.7		172.1				118.0	
11 41 44.26		15 18 58.94		15 20 34.42		15 21 57.29		15 26 23.60	
- 42 9.08						22 26.78			

59.2  
2.9  
2.8

1.5  
4.7  
7.9

43.3  
45.0  
47.8

24.6

8

See July 4

52.28

50.42

51.18



1864 July 6<sup>th</sup> M 2 cont.

H.R.

$\alpha$ Coronae	$\delta$ Serpenti	$\epsilon$ Serpenti	$\delta$ Serpenti	$\mu$ Serpenti
26.5	0.4	6.0	22.4	3.5
30.2	3.9	9.2	25.6	6.8
34.3	7.9	13.1	29.4	10.5
37.1	10.5	15.7	32.0	13.0
41.5	15.0	19.6	35.9	17.1
169.6	37.7	63.6	145.3	50.9
15 28 33.92	15 35 7.54	15 37 12.72	15 39 29.06	15 42 10.18
58.63		37.42		



2 September

Gr 750 2A

62 Wrenw B

Gr 779

5 Ophiurini

34.1

37.4 15 54 2.0

41.2 54 32.8

43.7 55 17.9

47.7 55 56.0

204.1

2 31.7

2 55.2

3 11.1

3 33.9

3 53.3

185.7

14.6

[48.6]

52.5

55.0

58.9

15 43 40.82 15 54 36.81

3 54 58.38

15 57 21.55

15 57 47.86

16 3 13.02 16 6 52.10

7 16.71

57.8	38.6	16.0	52.8
2.2	32.8	14.0	52.9
41.0	35.1	19.8	58.2

Lee 24y 3

25.7	19.0
24.7	20.0
26.0	21.3
47.7	

53° 21' 22" 0.93668

31.1	54.6	11.1	52.6
31.6	55.1	12.2	53.0
32.3	55.9		53.5
			54.0
			54.8
			54.9

36.24

37.44

36.83

36.72

36.81

C 21.78 2.92

D 21.82 25.18

E 21.05 59.05

B + 3.40

F - 0.34 52.16

D - 2.92 08

G - 4.84 06



1864 July 6<sup>th</sup> ME cont

N.A.R.

 $\epsilon$  Ophiuchi $\gamma$  Herculis $\beta$  Herculis

39.7	26.6	53.6
43.0	30.1	57.2
46.8	34.2	61.2
49.4	36.8	63.9
53.4	41.0	68.2
232.3	168.7	124.1

16 10 46.46 16 15 33.74 16 24 0.42

Clock Errors

N.A.R.

				$\Delta\alpha$	$\Delta\delta$
$\alpha$ Coronae	45 29	0.34	-24.37	24.367	-00
$\alpha$ Leporis	15 38	0.31	24.39	24.352	-03
$\delta$ Ophiuchi	16 7	0.32	24.29	24.327	+04, +06
	15 45		24.350		

1864 July 8<sup>th</sup> M E

next page

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Polaris sp	κ Virginis	θ Bootis	ρ Bootis	σ Bootis
13 5 9.6	36.2	3.2	31.3	18.7
7 49.3	39.6	8.7	35.0	22.6
9 31.5	43.4	14.8	39.3	26.9
12 1.8	46.0	19.0	42.3	29.8
14 14.5	50.0	(? 25.6)	46.9	34.5
106.7	215.2		194.8	132.5
13 9 45.34	13 17 43.04		14 25 38.96	14 28 26.50
1 9 49.83	18 4.56		25 0.49	

1<sup>st</sup> 2<sup>nd</sup> 3<sup>rd</sup> 4<sup>th</sup> 5<sup>th</sup>  
 3.6 15.0 4.5 3.2 5.5  
 10.8 50.4 56.5 25.1 1.2  
 12.0 52.0 2.2 31.2 3.4  
 15.6 3.8 32.4 16.2  
 5.4 36.2 18.9



1864. July 8<sup>m</sup> M 2

TTS

$\alpha$ Virginis	$\epsilon$ Bootis	$\epsilon$ Librae	$\beta$ Ursae minoris	$\gamma$ Scorpiae
26.7	36.3	—	21.7	14 55 41.7
32.0	40.0	59.8	34.0	45.4
35.8	44.0	3.8	48.2	49.5
38.3	47.1	6.4	57.8	52.3
42.2	51.7	10.6	12.7	56.7
177.0	219.4		174.4	24 5.6
14 35 35.40	14 38 43.88	14 43 3.42	14 50 46.88	14 55 49.12
	39 5.37	24.86	51 9.10	

3.32-56.28

3.45

38

51

next page

4 Bootis	c Bootis	B. Librae	Aug+10 3058	Aug+10 3074
58 10.6	15 0 53.6	9 16.8	11 2.3	17 47.4
14.5	57.1	20.1	5.6	50.7
18.6	1.4	23.8	9.5	
21.5	4.2	26.5	12.0	
26.0	8.5	30.4	16.0	0.7
91.2	121.8	117.6	15.4	
14 58 18.24	15 0 1.96	15 9 23.52	15 11 9.08	15 17 54.02
39.76		44.83		

54.09  
54.09  
53.87



1864 July 8 M E  
748

57 hrs Min 13 37 Librae

15 19 0.8  
20 22.215 21 59.9  
23 5.0  
24 46.2  
134.226 27.3  
29.7  
34.0

a Corinae

28 29.7  
33.4  
37.6  
40.5  
44.9  
196.1

a Sarpentes

37 4.4  
12.7  
16.5  
19.0  
22.9  
80.5

a Sarpentes

42 6.8  
10.1  
14.0  
16.5  
20.4  
67.815 21 50.8  
22 22.9315 28 37.22  
58.6115 37 16.10  
37.41

15 42 13.56

18 59.2  
6.8  
2.520 20.6  
22.2  
23.8

2

next page

$\gamma$ Serpens	$\delta$ Serpens	Gr 750 sp	Gr 750 Min 19	$\delta$ Serpens
49 45.2	51 53.1		56 26.2	16 6 48.8
48.5	56.6	54 9.0	54.0	52.0
52.4	52 0.7	39.1	57 26.5	55.8
55.4	3.5	55 23.7	48.6	58.4
59.2	7.7		58 22.7	2.3
260.4	121.6		178.0	217.3
	1.6			
15 49 52.08	15 52 0.32	15 54 43.36	15 57 20.60	16 6 55.46
		54 58.79	17.63	7 16.70

See table 3

B 40.24  
C 42.13  
D 43.72



1864 July 8 M8  
JAS

<i>Ophiuchi</i>		$\gamma$ <i>Herulis</i>		$\alpha$ <i>Scorpii</i> !		$\alpha$ <i>Draconis</i>		$\beta$ <i>Herulis</i>	
16	10	43.3	15	(30.3)	20	40.0	21	35.9	
		46.6		33.6		43.5-		42.9	
		(50.3)		37.5-		47.8		50.7	24 4.7
<i>Blattet</i>		(52.9)		40.2		50.5-		56.3	7.4
		(56.8)		44.4		54.9		4.6	11.6
						236.7		190.4	
								250.4	
				16 20	47.34	16 21	50.08		
				21	8.50				

End

$\gamma$ Scorpii	$\gamma$ Apsara	P. XIV 182	$\gamma$ Hercules
27 0.7	27 16.0		35 43.5
4.4	19.3		47.3
8.6	23.2	33 4.6	51.7
11.4	25.7	17.4	54.6
16.1	29.9	39.0	57.3
41.2	114.1		256.4
16 27 8.24	16 29 22.82		16 35 51.28
			36 12.56

## Check Errors

					$\Delta^*$	$\Delta^*$
$\alpha$ Virgin	13 18	0.30	-21.22	+21.161-06		
$\rho$ Bootis	14 36	0.52	21.11	21.081	-03	-03
$\epsilon$ —	14 39	0.40	21.09	21.066	-02	-02
$\alpha$ Librae	14 53	0.30	21.14	21.061-08		
$\phi$ Bootis	14 59	0.60	21.12	21.062	-08	-08
$\beta$ Librae	15 10	0.31	21.00	21.030	+03	+03
$\gamma$ Librae	15 29	0.40	20.99	21.007+02		
$\gamma$ Lupuli	15 38	0.33	20.98	20.997+02		
$\delta$ Opiculi	16 7	0.31	20.93	20.963	+03	+03
$\alpha$ Scorpii	16 21	0.31	20.85	20.967+10		
$\gamma$ Hercules	16 36	0.42	-20.66	20.929	+07	+07
				an		
	15 13		-21.026	+001		
	Rate	0.070				



1864 July 9 M.E.  
TAS

1864 phase

Planis		a Virgins		st Boetus				8 Boetus				a <sup>2</sup> Libral	
13	5.106.3	13	17	38.0				38	38.0			42	58.3
<del>13</del>	7 50.2			41.3	14	25	36.7		41.9			43	1.7
	9 34.7			45.2			41.0		46.0				5.6
	12 7.9			47.8			44.0		48.9				8.2
	14 15.8			54.9			48.6		53.9				12.3
	116.9			224.2					228.2				86.1
13	9 47.38	13	17	44.84	14	25	40.62	14	38	45.64	14	43	5.22
	50.65		18	4.55		26	<del>80.57</del>		39	5.36			24.85

14.8  
17.6  
19.6  
21.47 47.3  
49.4  
53.89 33.0  
34.0  
35.3  
36.412 4.6  
6.7  
9.5  
10.814 12.1  
14.7  
16.3  
11.80.0668 +7.80  
40.66 +3.96  
61 -0.39  
60 -3.40  
63 -7.97

see end

next page

4 Boötis	223 Gemelli	Bultrae	a Coronae	a Serpentes
58 16.1		15 9 18.4	28 31.3	37 11.2
/ 20.3		21.8	35.1	14.4
/ 23.3	37 23.1	25.6	39.3	18.1
/ 27.7	15 0 45.4	28.2	42.1	20.7
	17.7	32.2	46.7	24.6
		126.2	196.5	89.0
14 58 19.97		15 9 25.24	15 28 36.90	15 37 17.80
39.75		44.82	58.60	37.40

+ 7.54	20.520
+ 3.83	19.93
- 0.38	92
- 3.28	20.02
- 7.70	.00



1864 July 9 M &  
FAS

Serpentis

15 42 8.6  
11.9  
15.7  
18.1  
22.0  
76.3

y Serpentis

49 46.1  
50.3  
54.2  
56.7  
1.0  
209.1  
269.1

J Geospin

57 57.8  
58.4  
2.4  
5.2  
9.5  
130.3  
10.3

Gr 750 Sp

15 53 23.6  
54 10.1  
ink faded  
55 24.8  
56 4.9

B Serpini

ink faded

15 42 15.26

15 49 53.82

15 57 2.06

15 54 44.61  
54 58.98

Le July 3

A 44.24

B 44.34

D 44.82

E 45.04

next page

+ Doacoms		14 Horeulis		d Ophuchi		e Ophuchi		51 Cyg		H Sp	
58	52.1	16	5	33.4	6	57.4		18	33	2.8	
	52.5			37.4		53.7	10	48.2	34	25.4	
	3.7			43.2		57.5		57.9	35	17.7	
	8.3			46.7		0.0		54.5	36	35.1	
	16.3			52.3		4.0		58.4	37	42.6	
	135.1		21	3.5		165.6				123.6	
	15.1										
15	58	3.02	16	5	42.70	16	6	57.12	18	35	24.72
							7	16.70	6	35	36.09

33 0.8  
2.4  
5.1

34 23.1  
24.6  
26.0  
27.7

35 15.9  
17.7  
19.5

36 34.3  
35.0  
35.9

37 40.6  
42.0  
42.9  
44.8



July 1864. All East  
1748

1864p

110 Hercules	B Lyrae	o Sagittarii	o Serpentinae	o Serpentinae
18 39 25.4	44 39.4	46 27.3	49 5.1	49 6.6
28.7	43.4	31.0	8.3	9.8
33.0	48.0	35.2	12.2	13.7
36.7	50.9	( )	14.9	16.2
40.0	53.6	( )	18.6	22.2
162.8	237.3		59.1	68.5
18 39 32.56	18 44 57.46		18 49 11.82	18 49 13.70
	45 6.97			

next page

* full O. Lerp	$\epsilon$ Aquilae	$\omega$ Sagittarii	$\zeta$ Aquilae	$\pi$ Sagittarii
49 29.7	53 4.2	56 9.5	58 46.7	19 1 18.2
330	7.6		50.4	21.7
368	11.5	17.0!	54.2	25.7
39.4	14.1	19.9	56.8	28.3
43.3	18.3	24.0	0.8	32.5
182.2	55.7		209.1	126.4
18 49 36.44	18 53 11.14		18 58 53.82	19 1 25.28
			59 13.12	



1864 July 9 JLE  
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w Aquilae			J Aquilae			L <sup>2</sup> Sagittarii			γ Aquilae			Unidentified		
19	11	3.4	18	16.0		28	3.3		39	25.1	15	20	26.9	
		6.8		19.4			6.9			28.5		21	28.3	
		10.6		23.2			11.1			32.3		22	6.1	
		13.1		25.7			13.8			34.8		23	24	
		17.2		28.7			18.3			38.9			57.5	
		51.1		114.0			53.2			159.6			115.2	
19	11	10.22	19	18	22.80	19	28	10.60	19	39	31.92	15	22	17.04
		29.59			42.19			~30.01			51.30	3	22	24.23

20 25.8  
27.1  
27.4

Admitted

37 Librae

15 26 22.0

25.2

29.0

31.5-

33.6

14 3.3

1526 28.66

End

July 9<sup>m</sup> clock errors

					$\Delta x$	$\Delta z$
$\alpha$ Virginis	13 14	+0.30	-19.41	+19.430	+02	
$\gamma$ Bootis	14 26	0.42	19.47	19.358	-11	-12
$\epsilon$ —	14 39	0.40	19.32	19.344	+02	+02
$\delta$ Librae	14 43	0.30	19.33	19.340	+01	
$\eta$ Bootis	14 59	0.40	19.38	19.323	-06	-06
$\beta$ Librae	15 10	0.30	19.28	19.311	+03	+03
$\kappa$ Coronae	15 29	0.40	19.30	19.297	-01	
$\kappa$ Serpentes	15 38	0.33	19.27	19.281	+01	
$\delta$ Ophiuchi	16 7	0.31	19.27	19.250	-02	-02
$\beta$ Cygni	16 45	0.43	19.08	19.082	00	00
$\gamma$ Aquilae	16 59	0.35	18.95	19.067	+12	+11
$\alpha$ —	19 12	0.34	19.03	19.053	+02	+02
$\delta$ —	19 19	0.32	19.07	19.046	-02	-03
$\epsilon$ —	19 40	+0.34	19.04	19.023	-02	
$\lambda$ Sagittae	19 29	0.31	19.02	+19.034	+01	+01
	1640		-19.215	Corr		
Rate			+0.064	-003		



1864 July 10 East  
MAR

3 Herculis	12 Herculis	9 Camel	15 Apollonius	2 Hercules
16 35 46.3	37 50.0	40 1.3	50 52.2	54 42.2
50.0	54.1	11.3	53.6	46.0
54.5	59.0	17.4	59.4	50.2
57.7	2.2	27.0	2.0	53.2
2.2	7.4	34.8	6.0	57.4
210.7	172.7	91.8	175.2	24.9.5
	292.7			
16 35 54.14	16 37 58.53	16 40 18.36	16 50 59.04	16 54 49.90
36 12.54			51 17.29	

End

$\epsilon$ hrs min	$\alpha$ Ophiuchi
16 58 54.0	2 13.6
59 18.0	18.0
45.8	20.8
17 0 4.6	23.6
34.4	27.7
156.8	102.7
16 59 43.96	17 2 20.54
17 0 3.83	

Clock. Cor.

58 52.3  
53.9  
53.7

$\gamma$  Herulis  $+0.42$  -17.98  
 $\epsilon$  Ophiuchi  $+0.34$  17.91  
 16<sup>h</sup> 44<sup>m</sup> -17.945

17.2  
17.9  
19.0

44.5-  
43.7  
47.3

3.1  
4.3  
4.8  
6.0

3 136  
0 332  
34.1  
348  
333-



1864 July 12 Ill. West  
748

<u>Talans</u> $\eta$	<u>a Virginis</u>	<u>a<sup>2</sup> Librae</u>	<u>3<sup>rd</sup> Min</u>	<u><math>\phi</math> Bootis</u>
	13 17 42.1	14 43 2.3	50 28.5	58 16.5
	46.2	6.4	43.3	21.0
13 9 39.0	48.8	9.0	52.0	23.9
11 26.3	52.5	13.0	7.1	28.1
14 3.2	55.8	16.4	19.7	31.8
	265.4	47.1	151.6	121.3
			271.6	
13 9 26.97	13 17 49.08	14 43 9.42	50 28.50	58 16.50
53.50	18 4.51	24.82	54.32	141 58 24.26
				39.71

9 35.3  
38.2  
39.5  
40.7  
42.2!

11 23.3  
25.7  
29.8

14 58.9  
2.7  
4.0  
7.6

88° 34' 56" 1.60662

A 22.72 4 30.48

B 2 17.20

C 25.34 13.66

D 28.95 157.75

E 27.11 4 36.19

next page

c Boatis			B Librae			μ Boatis			323 Capsh 13			37 Librae		
15	0	59.4	9		22.5	18		59.5	20		24.8	26		26.0
	1	3.8			26.5	19		4.7	21		13.4			30.0
		6.6			29.1			7.9	22		10.5			32.6
		10.8			32.9			12.6			49.1			36.4
		14.3			36.0			16.8	23		48.0			39.7
		94.9			147.0			101.5			145.8			164.7
		34.9						41.5						
15	1	6.98	15	9	29.40	15	19	8.30	15	22	5.16	15	26	32.94
					44.79					22	25.79			



1864 July 12 M.D.  
T.H.S.

a Comae		6 Comae H Sp		a Serpentes		8 Serpini		Gr 750 Sp	
15	28	35.5	29	55.2	37	15.1	51	54.9	
		398		2.3		18.9		32	54 0.0
		429		10.3		21.5	52	16.0	44.7
		470		16.0		25.3		10.0	53 14.5
		506		24.6		28.6		13.6	56 2.4
		215.6		108.4		109.4		91.7	
				48.4				31.7	
15	28	43.12	15	29	37	21.88	15	52	54 40.67
		58.56		9.68		37.37		6.34	54 59.66

8541137 1.07624

A +79.75  
 B 40.45 +40.45  
 C 67 -4.03  
 D 39.78 -39.72  
 E 40.97 -81.43

see end

M42

Net Page

$\delta$ <i>Apollonius</i>	$\epsilon$ <i>Apollonius</i>	$\gamma$ <i>Coronatus</i>	$\alpha$ <i>Scorpii</i>	$\pi$ <i>Draconis</i>
16 6 345	10 48.9	15 35.6	20 45.6	
58.3	52.7	39.9	51.1	
1.0	55.5	42.6	52.8	
4.6	59.0	46.6	66.9	22 3.2
7.9	24	50.0	0.7	10 10.6
126.3	218.5	214.7	206.1	
	278.5			
16 7 1.26	16 10 55.70	16 15 42.94	16 20 53.22	
16.68			21 8.48	



1864 July 12 M W

M W

B Herulis

T Ursae

3 Aphid.

XVI 182  
M 16 3350 Alpha Wep  
M 16 34 30

16 24

2.8

27

6.3

27 21.9

32

34.0

34

25.8

7.0

10.8

25.7

33.2

9.7

13.8

28.3

9.0

49.9

13.7

17.8

32.0

28.5

6.0

17.2

21.7

35.3

33

45.7

35

30.4

50.4

70.4

143.2

172.4

52.4

16 24

10.08

16

27

14.08

16

29

28.64

16

33

10.48

16

32

34.0

34

33.0

34

25.2

33.4

25.8

9

9.0

49.1

28.3

49.6

28.8

50.7

35

5.2

33

45.7

6.0

6.8

30.0

30.8

next page

$\alpha$ Herculis	$\epsilon$ Scorpion	$\zeta$ Scorpion	$\zeta_2$ Scorpion	$\kappa$ Phoenice
37 52.9	41 2.4	44 5.2	44 4.5	50 57.9
57.8	7.3	10.2	47.1	57.0
1.1	10.5	13.8	50.5	1.0
5.8	14.8	18.7	53.5	5.4
10.1	18.9	23.2	0.0	8.7
127.7	41 53.9	73.1	194.6	129.5
7.7			254.6	
16 37 1.54	16 41 10.74	16 44 14.22	16 44 50.92	16 51 1.90
				17.27



1864 July 12 NLR

WAK

α Herculis			ε Urs Minor			ζ Upsilon Aurigae			α Herculis			π Herculis		
16	54	44.9	16	58	59.6	17	2	16.3	8	7.8		9	57.8	
		49.5		59	28.3			20.4		11.8			2.7	
		52.4			47.6			23.0		14.4			6.0	
		56.9		0	15.2			26.9		18.2			10.6	
		0.6			39.4			30.3		21.6			14.8	
		204.3			190.1			116.9		73.4			91.9	
		264.3											31.9	
16	54	52.86	16	59	50.12	17	2	23.38	17	8	14.76	17	10	6.38
			17	0	3.62					30.21				

58 58.9  
59.6  
6.4

59 27.4  
28.3  
29.1

46.6  
47.6  
48.6

145  
151  
161

0 38.2  
39.0  
40.0  
40.6

*Summ*

*nut page*

64 Camel B	B Draconis	a Phuchin	B Phuchin	q Draconis
	26 58.1	28 18.4	36 26.4	43 48.0
	27 4.6	22.4	30.6	44 0.5
17 18 32.3	8.7	26.7	33.1	92
19 2.1	15.0	28.9	36.9	21.1
47.9	20.2	32.1	40.1	31.0
	106.6	126.9	167.3	109.8
	46.6			49.8
17 18 27.98	17 27 9.32	17 28 25.38	17 36 33.46	17 44 9.96
5 18 47.17		40.77		

18 31.3  
32.4  
33.2

19 1.0  
2.1  
3.3

46.5  
48.1  
49.2

85° 6' 44" 1.06952

A +78.53

B +39.83

C 28.33 - 3.97

D 27.91 - 34.19

E 27.71 - 80.19



1864 July 12 M M  
M M R

Draconis full			y Draconis		70 Ophiuchi	in Sagittarii			41 Draconis
17	43	498	53	3.8	58 (164)	18	5	19.5	9 23.3
	44	2.5		10.0				23.8	45.9
		10.7		14.0				26.5	40.8
		22.8		20.3				30.4	22.6
		33.8		23.6				33.7	40.9
		119.6		73.7				136.1	133.5
		59.6							13.5
17	44	11.92	17	53	14.74	18	5	26.82	18 10 2.70
								62.05	

next page

23?

41 *Doacumis* *Serpentis*

I hrs Min

22 Samuel R

8 Aquilae

9 29.8 13 58.1  
 520) 14 2.0  
 7.1 4.4  
 28.6 8.2  
 47.2 11.4  
 84.1

18 16 3.2  
 17 6.9  
 18 1.9

22 3.4  
 21.7  
 43.1  
 57.3  
 19.2  
 144.7

18 53 8.4  
 12.3  
 15.0  
 18.8  
 22.3  
 76.8

18 14 4.82  
 10.12

18 16 9.10  
 16 19.91

18 22 40.94  
 204.7

18 53 15.36

16 1.6  
 2.8  
 3.1

17 5.0  
 6.7  
 8.1

59.2  
 2.0  
 4.6

86°36'25" 1.22781

A 8.84 -1 53.16

B 9.95 - 57.35

C 8.91 + 5.71



1864 July 12 Mm  
 wind W. 412

1864pha

60 Vulpes		B. Lycopodium		B. Lycopodium		L. Sagittaria		L. Lycopodium						
19	22	43.7	24	54.8	24	57.1	22	7.5	32	25.9				
		47.1		54.2		1.5		11.9		31.4				
		50.8	25	2.2		4.3		146		35.5				
		54.7		6.3		8.4	?	187		41.4				
		58.3		10.0		12.3	.	22.4		46.5				
		255.4		132.5		83.6		75.1		180.5				
				12.5		23.6								
19	22	51.08	19	25	2.50	19	27	4.72	19	28	15.02	19	32	36.10
											3005			

Admitted	Admitted	Admitted	Admitted	End Admitted
62 <i>Ursae Min</i> 13	40 <i>Ophiuchi</i>	4 <i>Ophiuchi</i>	8 <i>Sagittarii</i>	8 <i>Apollinae</i>
15	17 12 32.8	17 13 21.0	18 11 54.9	19 18 20.2
57 9.6	37.0	25.4	3.3	24.0
31.3	39.7	28.2	12 6.2	26.7
3.6	43.8	32.2	10.7	30.4
32.0	47.3	35.9	14.2	33.7
	200.6	162.7	94.3	135.0
			34.3	
15 57 34.36	17 12 44.12	17 13 28.56	18 12 6.86	19 18 27.00
46.98		43.84		42.21

## Clock - Errors

Mean for S

14.53 -15.818  
Rate 0.050

JHS

					$\Delta x$	$\Delta y$
$\alpha$ Virginis	13 18	-0.39	-15.82	+15.897	+0.08	
$\alpha$ Librae	14 43	0.40	15.80	15.826	+0.03	
$\gamma$ Bootis	14 59	0.38	15.83	15.813	-0.02	-0.02
$\beta$ Librae	15 10	0.39	15.78	15.804	+0.02	+0.02
$\alpha$ Coronae	15 29	0.38	15.82	15.788	-0.03	
$\alpha$ Serpentis	15 38	0.37	15.86	15.780	-0.08	
$\delta$ Ophiuchi	16 7	0.37	15.79	15.766	-0.02	+0.02
$\alpha$ Scorpii	16 21	0.45	15.71	15.755	+0.04	
$\kappa$ Ophiuchi	16 51	0.37	15.76	15.730	-0.01	-0.03
$\alpha$ Herculis	17 9	0.37	15.82	15.715	-0.10	
$\delta$ Ophiuchi	17 14	0.44	15.74	15.711	-0.03	+0.01
$\alpha$ Ophiuchi	17 29	0.37	15.76	15.698	-0.06	
$\mu$ Sagittarii	18 6	0.43	15.66	15.667	+0.01	+0.05
$\delta$ Apollinae	19 19	0.37	15.58	15.606	+0.03	+0.07
$\kappa$ Sagittarii	19 28	0.44	15.47	15.399	+0.13	+0.17

W.A.R.

Mean for R

17.34 -15.694  
Rate +0.050

83.21/23.24 0.93670

A 34.17 -57.83  
 B 34.26 -29.34  
 C 34.22 -2.92  
 D 34.78 25.18  
 E — 59.05

15.694  
 Cor(R)  
 +0.02  
 Cor S  
 .000



1864 July 13 Ill W

WNR

TAS

37 Librae

a Librae

γ Serpentes

α Serpentes

γ Serpentes

15 26 27.2  
 31.2  
 33.7  
 37.6  
 40.8  
 170.5

28 36.8  
 41.1  
 44.0  
 48.3  
 57.8  
 222.0

35 11.0  
 13.0  
 17.6  
 21.5  
 25.0  
 90.1

37 16.3  
 20.4  
 22.8  
 26.6  
 29.9  
 110.0

49 56.4  
 59.0  
 50 2.9  
 6.3

15 26 34.10

15 28 64.40  
 58.55

15 35 18.02

15 37 23.20  
 27.37

next page

J. Scoville		Gr 750 d2		B. Scoville		J. Phinchi		E. Phinchi	
52	0.3			57	14.5	55.9			50.2
	4.5				18.7	8 59.8	8		54.2
	7.2				21.5	2.4			56.7
	11.3				25.4	6.0			0.4
	14.7				28.9	9.3			3.8
	38.0				109.0	133.4			165.3
15	52	7.60	15 54 42.01	15	57 21.80	16 7 2.68	16 10 57.06		
			59.96		35.78				

See 12<sup>th</sup>

43.87

41.78

42.17



1864 July 13 M/W

H/S

o Serpentes

a Serpenti

n Draconis.

Zone \* 2

~~Zone~~

53.8

21 431

57.8

20 57.3

579

8 14.2

0.2

592

574

16.8

6.9

587

5.0

20.6

7.2

2.0

12.2

16 25 23.8

123.0

169.6

289.6

16 15 0.60

16 20 51.58

16 21 57.92

21 8.47

54.55 745

62 378

58 038

58 3.25

7.61

*Put page*

14 Ophiuchi	$\eta$ Herkulis	$\epsilon$ Scorpion	$\gamma$ & Scorpion	Sum * 0° 17'
34 32.0	37 54.1	41 4.1	44 43.3	
357	54.3	88	487	45 - 545
38.4	2.5	11.8	520	57.0
42.3	7.3	16.4	57.1	0.7
45.5	11.6	20.4	1.5	3.9
194.1	134.8	61.5	202.6	
	14.8		262.6	
16 34 38.82	16 37 2.96	16 41 12.30	16 44 52.52	16 45 57.32

5741

34

31

21



1864 July 13

JH8

$\epsilon$ Herculis			$\epsilon$ Urs Minor			$\alpha$ Ophiuchi			$\alpha$ Herculis			Aug +10 3408		
16	54	46.3	16	59	0.5	17	2	178	8	9.1		9	20.6	
		57.0			29.7			218		13.2			24.6	
		54.0			48.6			245		15.9			27.1	
		58.3	0		16.6			285		19.7			30.7	
		2.1			40.8			318		23.0			34.0	
		211.7			136.2			124.2		80.9			137.0	
		271.7												
16	54	54.34	16	59	51.24	17	2	24.88	17	8	16.16	17	9	27.40
			17	0	3.50						30.24			

next page

Arg+10 34 11	40 Ophiuchi	4 Ophiuchi	64 Camelopardalis	Arg+10 54 48
10 27.8	12 34.4	13 22.4		23 40.6
31.7	38.5	26.8	17 49.1	44.6
34.2	41.2	29.5	18 33.1	47.1
38.0	45.2	33.6	19 52.9	50.9
41.3	48.7	37.3	48.4	54.0
173.0	208.0	149.6		237.2
17 10 34.60	17 12 41.60	17 13 29.92 63.83	17 18 29.00 47.36	17 23 47.44

Lu 12<sup>m</sup>

28.93  
29.13  
28.71  
29.21



1864 July 13

748

Arg +20 3344

*a* *Apshuchi*

L XVII 177

*B* *Apshuchi**a* *Heraulin*

17	23	18.4	28	19.9	31	59.5	36	28.1	40	49.8
		22.1		24.0		3.4		32.0		54.2
		24.8		26.5		6.1		34.7		57.1
		26.5		30.3		9.8		38.3		1.2
		32.0		33.6		13.0		41.6		5.1
		125.8		136.3		91.8		174.7		167.4

17	25	25.16	17	28	24.86	17	32	6.36	17	36	34.94	17	40	57.68
					40.77								41	11.68

4' <i>Dracopis</i> <i>Dracopis</i>			4' <i>Dracopis</i> <i>Dracopis</i>			4' <i>Dracopis</i> <i>Dracopis</i>			4' <i>Dracopis</i> <i>Dracopis</i>			4' <i>Dracopis</i> <i>Dracopis</i>		
17	43	49.1	43	50.8	53	53	58	179	18	0	138			
		2.1		4.1		11.6		21.7			178			
		10.6		12.4		15.8		24.3			203			
		22.7		24.7		21.7		28.1			24.1			
		33.1		35.1		27.1		31.3			27.3			
		117.6		127.1		81.5		123.3			103.3			
		57.6		67.1										
17	43	11.52	17	43	13.42	17	53	16.30	17	58	24.66	18	0	20.66



1864 July 13

FAS

Sagittarii		40 Draconis		41 Draconis		8 Sagittarii		8 hrs Min	
18	5	21.0	9	24.7	9	31.2	12	0.2	14 16.2
		25.2		47.6		53.6		47	15 21.4
		27.9	10	2.2		8.2		7.6	16 4.8
		31.9		23.9		29.8		12.0	17 8.2
		35.4		42.6		48.9		15.7	18 3.6
		141.4		141.0		171.7		40.2	54.2
				21.0		57.7			
18	5	28.28	18 10	4.20	18 10	10.34	18 12	8.04	18 16 10.84
		42.05							19.74

next page

<i>a Lyrae</i>	37 Cygnus H 88	110 Hercules	<i>B Lyrae</i>	comp of <i>B Lyrae</i>
32 0.8		39 310	44 44.9	44 46.9
6.0	34 6.1	39 33.2	44 49.6	44 57.4
9.1	35 23.7	39 37.9	44 52.6	44 57.6
14.0	36 15.6	39 41.8	44 57.2	44 57.1
18.3	37 38.5	39 45.4	44 1.1	44 3.0
58.2		39 191.3	44 205.4	44 215.0
				44 275.0
18 32 9.64	18 35 16.23	18 39 38.26	18 44 53.06	18 44 55.0
23.52	35 36.69		45 6.98	

87° 41' 29" 0.1 1.31760

A +2 19.03  
 B 14.62 +1 10.52  
 C 16.66 - 7.02  
 D 15.08 -1 0.52  
 E 16.54 -2 21.96



1864 July 13

748

o Sagittarii

o Lerpentis Jov

o Lerpentis Jov

end

e Aquilar

o Sagittarii

18 46 32.9

49 70.6

49 120

53 9.7

56 15.2

14.4

13.9

13.8

19.3

40.2

17.0

18.5

16.4

22.6

44.4

20.9

22.3

20.3

26.1

48.0

24.1

25.6

23.6

29.7

87.0

94.3

83.8

112.3

18 49 17.40 18 49 18.86 18 53 16.76 18 56 22.46

Next Page

3 Aquilae	11 Sagittarii	8 Aquilae	2 Aurigae	3 Orionis
3-8 523	19 1 23.7	18 21.6	5 8 18.0	5 9 41.5
564	28.0	25.5	23.7	45.6
389	30.7	28.0	27.4	48.2
59 2.8	34.6	31.8	32.8	51.9
6.2	38.1	35.1	37.4	55.2
176.6	155.1	142.0	139.3	242.4
18 58 59.32	19 1 31.02	19 18 28.40	5 8 27.86	5 7 48.48
59 13.15		42.22	40.88	8 1.37



1864 July 13 M.W.

F.H.S. Amended

End

Spirius

\*

5 <sup>h</sup> 38	580	18	49	35.3
	53.9			39.2
	56.6			41.7
	0.6			43.5
	4.0			48.7
	165.1			210.4

6 38 57.02 18 49 42.08  
 39 10.03

## Clock Errors July 13

$\alpha$ Coronae	15 29	-0.38	14.53	+14.447	-08
$\alpha$ Serpenti	15 38	-0.37	14.54	14.438	-10
$\beta$ Serpenti	15 58	-0.62	14.40	14.418	+02 +03
$\alpha$ Serpi	16 21	-0.45	14.34	14.395	+06
$\alpha$ Norali	17 9	-0.37	14.40	14.347	-05
$\alpha$ Ophiuchi	17 14	-0.43	14.34	14.342	-00 +01
$\alpha$ —	17 29	-0.37	14.28	14.327	+05
$\mu$ Herculis	17 41	-0.38	14.38	14.315	-06 -05
$\mu$ Sagittarii	18 6	-0.42	14.19	14.290	+10 +11
$\alpha$ Cyrae	18 32	-0.42	14.20	14.264	+06
$\beta$ —	18 45	-0.40	14.30	14.251	-05 -04
$\xi$ Apollae	18 59	-0.37	14.20	14.237	+04 +05
$\delta$ —	19 19	-0.37	14.19	14.217	-03 +04
Mean	17 26		-14.330	(+012)	
Rate			+0.060		

Capella	5 7	-0.46	-13.48
Rigel	5 8	-0.39	13.28
Sirius	6 39	-0.41	13.42
	5 38		13.393

1864 July 14 Ill m  
7/18

vii End

next page

Polaris ip	a Virgin	c Bootis	n Bootis	323 Lyridae
13 5 2.4	13 17 44.9	15 1 2.1	19 24	20 28.9
7 13.2	48.9	6.5	75.	21 16.4
9 49.4	57.5	9.2	10.75	22 13.0
11 28.3	55.3	13.3	15.35	22 51.3
14 6.3	58.6	16.9	19.55	23 51.4
95.6	259.2	48.0	55.4	161.0
13 9 31.12	13 17 51.84	15 1 9.60	15 19 11.08	15 22 8.20
1 9 55.37	18 4.49			3 22 25.90

4 58.6  
2.4  
6.37 19.3  
13.4  
17.09 40.2  
46.0  
49.511 25.6  
28.0  
31.314 1.4  
6.5  
11.022 12.4  
13.423 51.1  
51.7



1864 July 14 M.W.  
H.S.

37 Librae	a Coronae	a Serpentis	n Serpentis	Aug 30 30 18
15 26 28.8	28 38.2	37 17.9	42 15.5	43 17.8
32.8	42.8	21.7	19.3	21.7
35.4	45.6	24.4	21.8	24.1
39.2	49.8	28.1	25.7	28.1
42.5	53.5	31.5	28.9	31.4
178.7	229.9	123.8	111.2	123.4
15 26 35.74	15 28 45.98	15 37 24.76	15 42 22.24	15 43 24.68
	58.54	37.36		

next page

100 40 h.p. 1

Fe X	209	γ Serpentes	δ Scorpion	β Scorpion	α Draconis
47	59.2	47	53.7	52	160
48	3.2		578	6.0	20.2
	5.8	50	0.4	8.7	22.9
	9.6		4.3	12.8	26.9
	12.8		7.7	16.4	30.3
	90.6	12	3.9	45.7	116.3
		3.9			
15	48 6.12	15 50 0.78	15 52 9.14	15 57 23.26	35.77



1864 July 14 S.M. 17  
 1748

♂ Aphrodisia			♀ Aphrodisia			♂ Scorpius			♀ Draconis			♂ Heracles		
16	6	57.3		10	57.7		20	48.5		21	44.7		24	35.7
		1.3			55.7			52.8			53.1			1.8
		3.9			58.3			53.7			59.6			12.6
		7.5			2.0			59.8			6.6			16.7
		10.8			5.3			35			13.4			20.2
		80.8			173.0			220.3			176.4			65.0
					293.0						296.4			
16	7	4.16	16	10	58.60	16	20	56.06	16	21	59.28	16	24	13.00
		16.67					21	8.47						

next page

$\gamma$ Scorpii	$\zeta$ Ophiuchi	$\zeta$ Herculis	$\eta$ Herculis	$\epsilon$ Scorpii
27 9.5	29 24.0		37 55.8	
13.7	28.7		0.8	+3.2
16.6	31.2	35-59.6	3.8	41 13.2
20.9	35.0	4.1	8.8	17.8
24.5	38.4	7.9	13.0	21.7
8 5.0	157.9		82.2	
			22.2	
16 27 17.00	16 29 31.58	16 36 0.04	16 37 4.44	
		12.50		

A 0.02 - 7.88  
 B 0.11 - 3.99  
 C 0.00 + 0.40



1864 July 14 11/27  
HLS

4 Scorpii			12 Ophiuchi & Hercules		& Mrs Min		12 Ophiuchi	
16	44	446	50	57.8	54	477	59	25-17 2 19.3
		50.0		1.8		523		30.7 23.5-
		53.4		4.5		55.3		52.7 26.0
		58.4		8.3		59.7	0	18.3 30.0
		2.9		11.6		3.5		42.2 33.3
		209.3		84.0		21 8.5		144.4 132.1
		249.3				278.5		
16	44	53.86	16	51 4.80	16	54 55.70	16	59 52.88
				17.27			17	0 3.37
								17 2 26.42

next page

40 <i>Opuntia</i>	8 <i>Opuntia</i>	64 Camel 138	5 <i>Opuntia</i>	70 <i>Opuntia</i>
12 35.7	13 23.8	17 14.1	28 21.3	58 19.1
40.0	28.2	51.1	25.4	23.3
42.7	31.1	18 34.9	28.0	25.7
46.5	35.2	19 5.8	31.9	29.5
50.1	38.8	52.1	35.2	32.8
21 5.0	157.1	158.0	141.8	130.4
17 12 43.00	17 13 31.42 43.83	17 18 31.60 47.57	17 28 28.36 40.77	17 58 26.08



1864 July 14 Mr.

JH8

Sagittarii			40 Draconis			41 Draconis			Sagittarii			2 Pers Min		
18	5	22.3	9	26.1	9	32.9	12	1.7	14	17.2				
		26.8		48.8		53.8		6.3	15	22.4				
		29.3	10	3.7	10	9.7		9.1	16	5.8				
		33.4		23.0		31.2		13.5	17	9.4				
		36.9		43.8		49.9		17.2	18	5.9				
		148.7		147.4		179.5		47.8		60.7				
				27.4		49.5								
18	5	29.74	18	10	5.44	18	10	11.90	18	12	9.56	18	16	12.14
		42.06											16	19.54

next page

57 Ceph A	110 Hercules	Lagatbarai	Serpentis pr	Serpentis fol
18 32 59.6	39 32.5	46 34.5	49 12.1	49 13.4
34 5.6	36.7	38.7	16.0	17.4
35 24.6	39.3	41.4	18.4	19.7
36 16.9	43.4	45.8	22.3	23.7
37 38.4	47.0	49.5	25.5	27.0
1 145.1	198.9	209.9	94.3	101.4
14 35 17.12	18 39 39.78	14 46 41.98	18 49 18.86	18 49 20.28
36.94				

32 58.3  
59.1  
1.5

34 4.7  
5.4  
6.8

35 23.5  
24.2  
26.1

36 16.0  
16.8  
17.8

37 36.9  
38.5  
39.7



1864 July 14 M W  
742

e Aquilae			o Sagittarii			3 Aquilae			π Sagittarii			15 Aquilae		
18	53	11.2	56	16.6		58	54.0		19	11	25.0	11	10.8	
		15.3		20.8			57.9				29.1		14.4	
		17.9		23.5			2.3				31.9		17.1	
		21.8		27.6			4.4				36.1		20.7	
		25.2		31.0			7.7				39.6			
		9 1.4		119.5			124.3				161.7			
18	53	18.28	18	56	23.90	48	59	0.86	32.34	19	11	17.40		
								13.15				29.63		

1888 0.82  
 1887 3.46  
 1886 0.24  
 17.37 2.97  
 17.57 0.97

						<sup>second</sup> Omitted		End	
<i>β Sagittarii</i>		<i>12 Virgo</i>		<i>δ Aquilae</i>		<i>β Delinae</i>		<i>γ Aquilae</i>	
12	35.1	16	10.6	18	23.2	15-7	25.2	19	39 32.1
	40.7		19.6		27.0		29.3		36.0
	44.5		30.0		29.7		31.8		38.4
	49.3		37.0		33.5		35.5		42.4
	54.3		47.8		36.7		38.8		45.8
	224.9		185.0		150.1		100.6		194.7
19	12 44.78	19	16 29.00	19	18 30.02	15	9 32.12	19	39 38.94
					42.23		44.77		51.35

## clock - Errors

<i>α Virginis</i>	13 15	-0.39	-13.04	+13.63	+02		
<i>β Virgae</i>	15 10	-0.39	13.04	12.945	-10	-07	
<i>α Corvinae</i>	15 29	-0.38	12.94	12.925	-02		
<i>α Serpentinae</i>	15 38	-0.37	12.97	12.916	-05		
<i>β Serpini</i>	15 58	-0.42	12.93	12.895	-04	-01	
<i>δ Ophiuchi</i>	16 7	-0.38	12.89	12.885	00	+02	
<i>α Serpini</i>	16 21	-0.45	12.86	12.871	+01		
<i>ξ Herculis</i>	16 36	-0.39	12.85	12.855	00	+03	
<i>ε Ophiuchi</i>	16 57	-0.37	12.84	12.839	00	+02	
<i>θ Ophiuchi</i>	17 14	-0.44	12.85	12.815	-04	-01	
<i>λ —</i>	17 29	-0.37	12.78	12.799	+02		
<i>μ Sagittarii</i>	18 6	-0.42	12.74	12.760	+02	+04	
<i>ξ Aquilae</i>	18 59	-0.37	12.66	12.705	+04	+07	
<i>ω —</i>	19 11	-0.37	12.60	12.692	+19	+11	
<i>δ —</i>	19 19	-0.37	12.58	12.669	+10	+13	
<i>γ —</i>	19 40	-0.37	12.78	12.662	-12		
	16 56		-12.834		+022		
Rate			0.063				



1864 July 15 - 1868

Polaris			3 Verginis			γ Serpenti			β Librae			57 Procyonis		
13	5	2.4	13	27	31.5				15	9	26.7	19	20.5	
	7	14.6			34.4						32.8	21	1.8	
	9	45.3			37.1	14	55	57.2			33.4	22	4.9	
	11	29.0			40.7			32			37.2	23	40.7	
	14	8.7			43.9			6.9			40.5	25	4.0	
		100.0			136.5						166.6		71.9	
13	9	32.00	13	27	37.30				15	9	33.72	15	22	14.38
		56.35			48.41						47.76			19.15

4 58.7  
2.2  
58

7 12.4  
13.7  
15.2  
17.0

9 43.2  
45.9  
47.9

11 26.2  
28.4  
29.7  
31.5

14 3.2  
7.7  
8.8  
10.3  
11.4

Mit page

<i>a Coronae</i>	<i>a Serpentis</i>	<i>Arg + 2° 30 01</i>	<i>w Serpentis</i>	<i>Arg + 10 31 54</i>
28 39.8	37 19.3	41 3.2		37 55.3
44.1	23.4	7.1		57.2
47.0	25.9	9.6	43 17.4	52 1.8
57.2	29.7	13.4	21.2	55
59.9	33.0	16.7	24.5	87
237.0	131.3	50.0		130.5
15 28 47.40	15 37 26.26	15 41 10.00		15 52 2.10
58.52	37.35			

6.69- 17.81  
 3.39 17.81  
 0.34 17.74



1864 July 15 -

548

+ Dracina			Arg + 20 3053			y Hercules			+ Scorpius 53			Arg + 0 3553		
15	58	588	16	1	418	15		400	20	500		29	505	
		63.			45.6			44.3		54.9			0.4	
		11.5			48.2			46.9		57.2			2.9	
		18.5			52.0			52.9		1.3			6.6	
		25.0			55.2			54.4		5.1			10.0	
		119.9			242.8			236.5		1680			76.4	
		59.9												
13	58	11.78	16	1	48.56	16	15	47.30	16	20	57.60	16	29	3.28
										21	8.46			

second

next page

$\epsilon$ Scorpion	$\gamma^1$ Scorpion	$\gamma^2$ Scorpion	$\alpha$ Antares	Aug +0° 3654
41 72	44 97	44 44.2	17 2 2007	5 433
15.8	15.0	57.6	24.6	47.4
14.8	18.3	58.0	27.4	49.8
13.4	23.3	54.0	31.3	53.6
23.3	27.8	46.4	34.6	56.8
77.5	94.1	157.2	138.1	250.8
		277.2		
16 41 15.50	16 44 18.82	16 44 55.44	17 2 27.72	5 50.16



1864 July 15 - M W  
 548

a Herculis			Arg + 10 34 08			Arg + 10 34 11			40 Ophiuchi			4 Ophiuchi		
17	8	12.2	9	23.4		10	30.7		12	37.3		13	25.4	
		16.3		27.6			34.6			41.5			29.8	
		18.9		30.1			37.0			44.3			32.6	
		22.7		33.9			40.8			48.2			36.7	
		26.0		37.1			44.1			51.8			40.4	
		96.1		152.3			187.2			223.1			164.9	
17	8	19.22	17	9	20.46	17	10	37.45	17	12	44.62	17	13	32.98
		30.19												43.63

next page

Arg + 0° 3678	Arg + 2° 3312	Arg + 2° 3314	Arg + 2° 3333	Arg + 10 3440
15 529	18 45.4	14 7.1	21 14.6	22 3.6
568	49.3	11.0	18.4	7.4
59.4	51.7	13.3	21.0	10.0
3.0	55.4	17.2	24.3	13.7
6.3	58.8	20.5	28.2	17.0
178.4	200.8	<del>20.3</del> 20.3	106.5	57.7
17 15 59.68	17 18 52.16	17 19 13.86	17 21 21.30	17 22 10.34



1864 July 13 - M W  
 1865 sec end

Aug + 10 34.48	a Ophiuchi	P. XVII 177	Aug + 10 35.09	Aug + 10 35.23
17 23 43.7	28 22.8	32 2.4	40 54.2	43 16.3
47.6	26.9	6.4	56.7	30.2
50.1	29.5	9.0	0.3	22.8
53.9	33.3	12.6	3.6	26.5
57.0	36.6	16.0		29.8
252.3	149.1	46.4		115.6
17 23 50.46	17 28 29.82	17 32 9.28	17 40 57.01	17 43 23.12
	40.76			

A 56.90  
 B 90  
 C 57.04  
 D .12  
 E

next page

Arg+10 35-24	Arg+10 35-27	Pz XVII 291	Arg+10 35-56	68 Ophiuchi
44 14.9	45 27.3	49 8.6	53 13.3	54 37.3
18.9	31.4	12.6	17.2	41.2
21.3	33.9	15.2	19.9	43.7
25.1	37.6	18.9	23.6	47.6
28.2	40.7	22.1	27.0	50.7
108.4	120.9	77.4	101.0	220.4
17 44 21.68	17 45 36.58	17 49 15.58	17 53 20.20	17 56 44.08



1864 July 15 - M/M  
FAS

70 Aphrodisia ju BAC			6137	Arg + 20 35-10	Arg + 20 35-17	n Sagittarii
17	38	208	18 0 16.7	2 24.3	3 19.3	5-239
		248	207	28.1	23.4	287
		27.3	23.2	30.5	25.9	308
		31.0	27.0	34.4	29.7	34.8
		34.3	30.3	37.6	32.9	384
		138.2	117.9	156.9	131.2	156.0
17	38	27.64	18 0 23.58	18 2 30.98	18 3 26.24	18 5 31.20
						42.06

next page

Arg +10 3629	Arg +10 3633	2 hrs Min	37 Ceph sp	4 Aquilae
7 39.0	8	18 14 16.6	18 34 9.7	18 58 53.4
42.8	26.4	15 24.9	35 26.2	59.5
45.4	29.0	16 7.1	36 18.4	2.1
49.2	32.6	17 11.1	37 41.0	5.4
52.4	36.0	18 5.5		9.3
228.8		65.5		132.2
18 7 15.76		18 16 13.10	18 35 19.08	18 59 21.44
		19.33	6 35 37.13	13.16

14 15.8  
16.7  
17.2

34 8.4  
9.1  
10.2  
11.1

35 24.8  
25.5  
26.6  
27.8

36 17.1  
17.8  
18.6  
20.3

37 37.4  
40.4  
41.5  
42.5

87° 14' 20" 1.31757  
A 2 19.02  
B 20.23 + 1 10.53  
C 19.18 - 7.02  
D 17.88 1 0.52  
E 19.05 2 21.95

A 29.31  
B 29.21  
C 29.34  
D 29.31



1864 July 15

Omitted

Omitted

Omitted

Morn I

Aug 20

33.44

\*

16 35-21.4

17 25-21.5

17 27 29.1

25.8

26.3

33.2

28.6

27.8

35.8

32.7

31.7

39.6

36.2

34.8

42.9

164.7

141.1

180.6

16 35 28.94

17 25 28.22

17 27 36.12

## Clock Error

					$\Delta$	$\Delta$
$\zeta$ Virginis	13.28	-0.37	-11.48	11.531	+0.05	+0.08
$\beta$ Librae	15.10	-0.39	11.43	11.429	.00	+0.03
$\alpha$ Coronae	15.29	-0.38	11.50	11.410	-0.09	
$\alpha$ Serpentis	15.38	-0.37	11.46	11.401	-0.06	
$\alpha$ Scorpii	16.21	-0.45	11.31	11.358	+0.05	
$\alpha$ Herculis	17.09	-0.37	11.34	11.310	-0.03	
$\delta$ Ophiuchi	17.14	-0.44	11.29	11.305	+0.02	+0.05
$\alpha$ —	17.29	-0.37	11.31	11.290	-0.02	
$\mu$ Sagittarii	18.06	-0.42	11.28	11.253	-0.03	.00
$\zeta$ Aquilae	18.59	-0.37	11.09	11.200	+0.11	+0.14
	16.30		-11.349		+0.030	
Rate			+0.000			





1864 July 16 D.M.

W.A.R.

x Herculis

3 Herculis

7 Scorpionis

sum

9 Camel

2 Scorpis

16 24 8.5

27 12.2

40 8.8

12.7

16.6

16.8

15.6

19.5

26.1

19.6

23.8

32.3

23.1

27.5

41.9

79.5

99.6

125.9

15.70

19.7

16.4

16 24 15.90

16 27

19.92

16 40 25.18

(41 20.7)

248

next page

3' Scorpii	3 <sup>2</sup> Scorpii	16 Apsara	8 Hercules	2 Apsara
44 10.9	44 47.7	51 0.6	54 50.7	17 2 22.0
164	62.9	4.6	58.2	
19.9	54.3	(7.3)	58.2	28.9
24.7	1.4	11.0	2.5-	32.7
29.2	5.8	14.5-	6.5-	36.0
101.1	164.1		173.1	
	284.1		293.1	
16 44 20.22	16 44 56.82	16 51 7.59	16 53 58.62	
		17.26		



1864 July 16 M W  
W AR

2 Hercules			11 Hercules			40 Cygnus			8 Cygnus			64 Camel		
17	8	13.4	1	10	3.5	12	38.6	13	(27.0)	17	17	16.0		
		17.5			8.5		42.8		31.2			53.0		
		20.2			11.6		45.5		34.1		18	38.1		
		24.0			16.2		49.5		38.1		19	8.0		
		27.3			20.4		53.1		41.7			55.0		
		102.4			60.2		229.5					170.1		
17	8	20.48	17	10	12.04	17	12	45.90	17	13	34.39	17	18	34.02
		30.19									43.83			48.05

17 13.9  
16.1  
18.6

52.5  
53.5

18 35.1  
38.5  
40.8

19 6.1  
7.4  
8.0  
10.3

A. 34.33 - 7.37  
B. 27 - 3.73  
C. 45 + 0.35  
D. 41 3.21  
E. (53) 7.53

53.3  
55.1  
56.7

next page

<i>a</i> <i>Sphurci</i>	<i>S</i> <i>Sphurci</i>	<i>w</i> <i>Hirculis</i>	<i>4</i> <i>Draconis</i>	<i>h</i> <i>Draconis</i>	<i>h</i> <i>Draconis</i>
		40 54.3	43 53.1	43 54.9	
28 28.1		58.6	44 6.2	44 8.1	
30.8		1.6	14.2	16.2	
34.7	36 42.6	5.7	26.6	28.4	
38.0	45.4	9.4	37.5	39.1	
		129.6	137.6	146.7	
			77.6	86.7	
17 28 31.15		17 41 1.92	17 44 15.52	17 44 17.34	
40.77		11.46			

31.14 686  
 31.22 348  
 31.15 0.35  
 31.09 299  
 700.



1864 July 16 MWR  
MAR

3	Disacornis	y. Dracornis	70	Apshuchi	$\mu$ Sagittarii	8	Mis. Rhin
17	50	51.8	53	9.6	5.8 (227)	18	5- 25.4
		59.2		14.0	262		29.6 16 15 26.1
		3.6		20.1	286		32.4
		10.5		26.1	324		36.3 17 12.2
		16.5		31.2	357		39.9 18 7.7
		141.6		103.0			163.6
		21.6					
17	50	4.32	17	53	20.60	18	5 32.72 18 16 14.94
							42.06 16 19.11

15- 23.2  
25.7  
29.417 10.5-  
12.0  
14.018 5.7  
8.9  
11.286° 36' 27" 0  
11.22786

A	14.63	1 53.07
B	14.85	57.35
C		5.71
D	15.23	49.23

next page

1st Argemone	6a Vul	B. Lygmic	comp type	B. Lygmic
19 18 26.1	22 47.4	25 5.0	1	32 0.8
30.0	53.7	25 5.0	25 72	6.9
32.6	56.5	8.0	10.1	10.7
36.4	0.6	12.0	14.5	16.7
39.6	4.4	15.8	17.8	22.8
164.7	164.6			57.9
	284.6			
19 14 32.94	19 22 56.92			19 32 11.55
42.24				



1864 July 16 SUN

Omitted WAK Omitted

8 Aphurci 3 Aphurci

16	10	547	16	29	27.4
		577			31.4
11		1.2			34.0
		5.1			37.9
		8.3			41.2
	12	7.0			171.9
		7.0			
16	11	1.40	16	29	34.38

end

## Clock - Errors

B Scorpis	15 58	-0.42	9.98	+10.002	+0.02
S Aphurci	16 7	-0.37	9.96	9.993	+0.03
K —	16 51	-0.37	10.04	9.949	-0.09
2 Hercules	17 9	-0.37	10.08	9.931	-0.15
B Aphurci	17 14	-0.44	9.88	9.926	+0.05
2 —	17 29	-0.37	9.99	9.911	-0.08
u Herculis	17 41	-0.38	9.92	9.899	-0.02
u Sagittarii	18 6	-0.42	9.76	9.874	+0.11
S Aquilae	19 19	-0.37	9.17	9.801	+0.13
	17 20		9.920		
Rate			1.060		

1864 July 18 SUN

W. AR

next page

3 Hercules 7 Scorpion

16<sup>2</sup> 24 11.5

15.8

18.4

22.5

26.0

94.2

27

15.2

19.7

22.6

26.8

30.6

114.9

3 Aphelion 30 Lupton H

29 30.5

34.4

37.0

40.8

44.2

186.9

34 15.4

33.5

39.9

35 16.4

(40.7)

3 Hercules

36 9.8

13.6

16 24 18.84 16 27 22.98 16 29 37.28

16 36 5.71  
12.46A 577 788  
B 579 4.00



1864 July 18 M W

WAP

$\kappa$ Herculis	$\eta$ Camel	$\kappa$ Apollon	$\epsilon$ Herculis	$\epsilon$ Leo Minor
16 38 1.2	40 12.0	51 3.7	54 53.6	16 59 6.7
6.4	19.8	7.6	58.2	36.4
9.1	29.1	10.2	1.2	55.2
14.5	35.7	14.0	5.5	17 0 22.9
18.9	45.1	17.2	9.4	17.6
50.9	141.7	52.7	127.9	166.8
			7.9	
16 38 10.18	16 40 28.34	16 51 10.56	16 57 1.58	16 59 57.76
		17.25		17 0 2.84

59 6.1  
6.6  
7.4

59 35.2  
36.3  
37.7

54.1  
55.1  
56.5

0 22.2  
22.8  
23.7

46.5  
47.7  
48.7

Hronlis

next page

n Aphurichi	a Aphurichi	40 Aphurichi	8 Aphurichi	64 Camel 13
17 2 25.7		12 41.7	13 29.8	17 17 20.1
29.3		45.8	34.2	58.5
31.8		48.5	37.0	18 43.2
35.8	8 26.7	52.5	41.1	19 12.1
39.1	30.4	56.1	44.6	58.1
161.1		244.6	186.7	192.0
17 2 32.22	17 8 23.44	17 12 48.92	17 13 37.34	17 18 38.40
	30.17		43.82	48.52

17 19.7  
20.5  
56.5  
59.0  
0.0

18 41.9  
43.0  
44.4

19 10.5  
12.1  
13.7

56.9  
57.1  
59.6

23.44 6.91  
19 3.51



1864 July 18 SUN  
MAR

3 Draconis		a Ophiuchi		3 Ophiuchi		in Hercules		4' Draconis			
17	27	6.7	28	27.2	36	35.5	40	57.1	45	56.2	
		13.3		31.0		39.3		1.5	46	9.2	
		17.7		33.8		41.7		4.4		17.3	
	(	23.3		37.7		45.7		8.8		29.7	
		29.0		41.0		49.0		12.4		40.6	
				170.7		211.4		81.2		153.0	
										93.0	
17	28	31.14	17	36	42.28	17	41	41.84	17	46	18.60.
		40.75						11.45			

next page

1864 pbae.

	4 <sup>1</sup> Draconifoli	2 Draconis	γ Draconis	γ Ophiuchi	μ Sagittarii
1.2	45-579	17 50 54.7	53 124	58 25.2	18 5 28.3
2	46 10.9	1.9	189	29.0	32.5
3	19.3	51 6.6	228	31.5	35.2
	31.7	13.3	288	35.3	39.4
	42.4	19.5	342	38.4	42.8
	162.2	96.0	117.8	159.4	178.2
	102.2	36.0			
0.	1746 20.44	17 57 7.20	17 53 23.42	17 58 31.88	18 5 35.14
					42.06



1864 July 18 MNR  
MAR

40 Draconis		41 Draconis		5 Sagittarii		22 Serpente		2 Urs Min	
18	9	31.1	9	37.5	12	7.6	14	6.9	16
		53.7		0.2		12.2		10.9	15
	10	8.3	10	15.0		13.4			16
		30.2		36.7		17.1			17
		49.1		55.2		20.3			18
		172.4		144.6		68.6			
		52.4		84.6					
18	10	10.48	18	10	16.92	18	12	15.52	18
						14	13.72	16	16.10
								16	18.64

15. 25.3  
27.1  
29.1  
7.0

16 7.9  
8.9  
10.6

17 12.8  
13.8  
14.6

18 8.4  
9.8  
11.4

See 16th

16.83  
16.35  
14.81  
16.43

next page

<i>J. Hyndal</i>	<i>Ca Vel</i>	<i>P. Lenz</i>	<i>comp B Lenz</i>	<i>L. Pagittari</i>
19 18 28.9	22 52.5	25 3.6	23 5.8	28 16.3
32.9	56.6	8.1	10.2	20.7
35.4	58.5	10.8	12.9	23.4
39.0	3.7	15.7	17.4	27.7
42.5	7.2	19.0	21.0	31.2
178.7	179.5	56.6	67.3	119.3
	299.5			
19 18 35.74	19 22 59.90	19 25 11.32	19 25 13.46	19 28 23.86
42.26				30.10



1864 July 18 MNR

End

$\theta$ Lygria	$\gamma$ Argemae	$\gamma$ Sagittarii	$\alpha$ Pro Mus
19 32 34.1	39 380	52 32.6	19 54 50.2
46.5	420	36.7	58 17.6
44.3	44.4	39.4	20 0 30.3
50.2	483	43.4	3 47.2
55.2	576	46.8	6 40.9
224.3	224.3	198.9	186.2

19 32 44.86 19 39 44.86 19 52 39.78 20 0 49.24  
 51.38 41.28

Clock-Connecting

1636  $\theta$  0.37 - 7.12  
 1651 - 0.36 - 7.07  
 17.9 - 0.36 - 7.09  
 17.14 - 0.36 - 7.08  
 17.29 - 0.36 - 7.07  
 17.41 - 0.36 - 7.07

See after July 19.

54 46.5  
 48.3  
 50.2  
 52.0  
 53.8

58 12.8  
 14.2  
 16.4  
 18.4  
 20.4  
 22.4

0 25.6  
 27.2  
 30.7  
 35.9

3 41.0  
 45.7  
 57.8

6 37.0  
 38.8  
 40.8  
 57.0

1864 July 19 All W

Next page

THS

MAR

Polaris	a Bootis	$\alpha$ Librae	$\alpha$ Scorpiae	$\gamma$ Draconis
13 5 14.6	14 9 17.1	43 124 16 20 55.7		22
7 27.5	21.5	16.4	0.1	0.0
9 55.7	24.1	19.1	2.9	15.5
11 40.4	28.0	23.8	7.0	13.6
	31.6	26.3	10.6	20.4
	122.3	97.0	76.3	

13 9 43.65	14 9 24.46	14 43 19.40	16 21 3.26
9 57.80	29.84	24.74	8.43

5- 11.2  
12.3  
14.0  
15.1  
16.9  
18.1

22.6  
25.8  
27.0  
28.7  
30.1  
31.2

9 52.8  
53.8  
55.4  
56.8  
57.0  
58.5

11 36.5  
37.6  
38.8  
39.5  
40.7  
42.0  
43.3  
44.6

1.60670

A 45.16 4 30.54  
B 44.69 2 17.19  
C 42.06 1 12.02  
D 42.81 1 57.69



1864 July 19 M.H.

W.A.R.

B Herentis	T Scorpii	3 Oppenhi	50 Lepsh H	22 Herentis
16 24 12.7	27 16.5	29 31.8		38 2.6
17.1	21.0	35.8		7.7
19.7	23.9	38.4	35 12	11.0
23.8	28.0	42.2		15.7
27.2	31.7	45.6	42.7	20.2
100.5	121.1	193.8		57.2
16 24 20.10	16 27 24.22	16 29 38.76		16 38 11.44

34 15.7  
16.7  
17.7

36.8  
37.3

35 17.3  
17.7

4.

next page

$\gamma$ Camel	$\kappa$ Aphiuchi	$\epsilon$ Herculis	$\epsilon$ Mus Mus	$\kappa$ Aphiuchi
40 13.1	17 57 5.0	54 54.8	16 59 8.2	17 2 26.4
21.1	8.9	59.5	59 37.4	30.5
30.4	11.5	55 2.4	56.4	33.1
36.6	15.5	6.8	0 24.3	36.9
46.3	18.7	10.6	48.5	40.3
147.5	59.6	134.1	176.8	167.2
		14.1		
16 40 29.50	16 57 11.92	16 55 2.82	16 59 58.96	17 2 33.44
	17.24		17 0 2.72	

57 78  
8.5



1864 July 19 M W  
M A R

π Herculis			40 Ophiuchi			64 Camel B			3 Ophiuchi			π Herculis		
17	10	7.8		12	42.9	17	17	21.8		36	36.7		40	58.5
		12.7			47.2		18	0.2			40.8			2.9
		15.9			49.9			44.2			43.3			5.8
		20.5			53.9		19	14.4			47.0			10.0
		24.6			57.3		20	0.3			50.3			13.6
		81.5			251.2			80.9			218.1			90.8

17	10	16.30	17	12	50.24	17	18	40.18	17	36	43.62	17	41	6.16
						5	18	48.74						11.35

17 20.2  
21.7  
23.6

58.9  
60.0  
1.7

18 42.6  
44.2  
45.9  
12.1

12.1  
14.4  
16.6

19 54.1  
0.2  
1.5

M. J. P. 1864

$\psi$ Draconis		$\phi$ Draconis		$\gamma$ Draconis		$\gamma$ Draconis		$\gamma$ Draconis	
43	57.5	43	57.4	50	56.0	53	138	58	264
	10.3		12.3		30		20.2		30.4
44	18.6	44	20.4		7.7		24.2		32.9
	30.7		32.5		14.8		30.1		36.7
	41.7		43.5		20.7		35.5		39.8
	158.8		168.1		102.2		123.8		166.2
	98.8		108.1		42.2				
17 44	19.76	17 44	21.62	17 57	8.44	17 53	24.76	17 58	33.24



1864 July 19 M.W.

WAK

u Sagittarii		40	Draconis		47	Draconis		I Sagittarii	γ Serpents					
18	5	29.6	9	32.3	9	39.1	12	8.9	14	6.1				
		33.8		55.4	10	1.5		13.4		12.1				
		36.5	10	10.0		16.1		16.3		14.7				
		40.6		31.9		37.6		20.8		18.4				
		44.0		57.4		56.9		24.3		21.7				
		166.5		180.0		151.2		83.7		75.0				
				60.0		91.2								
18	5	36.90	18	10	12.0	18	10	18.24	18	12	16.74	18	14	15.00
		42.06												

next page

<u>I was Min</u>	<u>I Aquila</u>	<u>Ca Vulpecula</u>	<u>Beygni</u>	<u>Pomp/Bey</u>
18 15 29.2	19 18 30.2	22 53.7	25 4.8	25 11
16 11.1	34.2	58.0	9.3	11.5
17 15.1	36.8	23 0.8	12.2	14.3
18 10.6	40.5	4.9	16.5	18.5
	43.7	8.5	20.0	22.3
	185.4	12 5.9	62.8	73.7
		5.9		
18 16 17.13	19 18 37.08	19 23 1.18	19 25 12.56	19 25 14.74
18.42	42.26			

15 27.4  
29.0  
31.3

16 9.3  
10.8  
13.2

17 13.6  
14.8  
17.0

18 7.9  
10.4  
11.1  
13.1

Lu 16<sup>th</sup>

27.53  
17.75  
16.81  
18.43



1864 July 19 Mm

WAP

ind

L<sup>2</sup> Sagittarii & Lygni

28 175 32 5.1

21.8 11.4

24.6 15.3

28.8 21.0

32.5- 26.1

125.2 78.9

19 28 25.06 19 32 15.78  
30.11

# Clock-Cross July 18

5 Hercules	-0.37	-7.12	16 36	+7.028	-0.09
κ Ophiurini	0.36	7.07	16 51	7.016	-0.06
α Hercules	0.36	7.49	17 9	6.996	-0.09
β Ophiurini	0.46	6.94	14	6.998	+0.05
δ ———	0.36	6.97	29	6.976	+0.01
μ Hercules	0.36	6.97	41	6.965	.00
μ Sagittarii	0.44	6.86	18 6	6.940	+0.08
δ Aquilae	0.37	6.89	19 19	6.888	-0.02
κ Sagittarii	0.46	6.70	28	6.860	+0.16
γ Aquilae	0.36	-6.88	40	6.848	-0.07

Preceding Ref  $-6.949$  17 57  
 Following "  $+0.061$   
 "  $+0.056$   
 "  $+0.089$



Work Errors July 19<sup>th</sup>

2145	$\alpha$ Bootis	-0.35 - 5.73	16.9		
	$\gamma$ Libra	-0.41 - 5.74	16.93		
2146	$\alpha$ Scapri	-0.67 - 5.64	16.21	+5.695	+0.6
	$\alpha$ Ophiuchi	-0.36 - 5.68	16.57	5.671	-0.1
	$\mu$ Herculis	-0.36 - 5.65	17.41	5.624	-0.3
	$\mu$ Sagitt	-0.44 - 5.60	18.6	5.601	0.0
	$\delta$ Aquilae	-0.37 - 5.55	19.19	5.532	-0.2
	$\nu$ Sagittarii	-0.46 - 5.53	19.28	5.524	-0.1
		-5.608	17.58		
	Per R	+0.056			
	Fully	+0.057			
		+0.056			





*Glenn H. Hall, 1864phae.proj...54S*

















