

Copy of observations at  
Carlin, Battle Mountain  
and Austin.

# OBSERVATIONS

FOR

# TIME.

*Austin*

U. S. ENGINEER OFFICE.

Explorations West of the 100th Meridian.

ASTRONOMICAL DEPARTMENT.

No. ~~7~~ 5

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1 + 43.682  
2 + 21.925  
3 - 0.253  
4 - 21.568  
5 - 43.785



Station *Carlin Nev May 11<sup>th</sup> 1871*

Object	<i>Polaris LG</i>		<i>α Virginis</i>		<i>β Virginis</i>	
Illum. and Description	<i>East</i>		<i>"</i>		<i>"</i>	
Factor	A.	(Azimuth)				
"	B.	(Level)				
"	C.	(Collimation)				
"	F.	(For Broken transits)				
Levels	<i>E</i>	<i>W</i>	<i>E</i>	<i>W</i>	E.	W.
"	<i>48</i>	<i>25</i>	<i>31</i>	<i>46</i>		
"	<i>27.5</i>	<i>45</i>	<i>3.2</i>	<i>25</i>		
"	<i>75.5</i>	<i>70</i>	<i>83</i>	<i>71</i>		
Sums		<i>-5.5</i>		<i>-12.0</i>		
Threads						
"	<i>1</i>				<i>13</i>	<i>2 38.6</i>
"	<i>2</i>		<i>12 53</i>	<i>17.2</i>	<i>3</i>	<i>0.8</i>
"	<i>3</i>	<i>12 48</i>	<i>42.0</i>	<i>37.6</i>		<i>21.0?</i>
"	<i>4</i>					<i>44.2</i>
"	<i>5</i>				<i>4</i>	<i>5.5</i>
<i>sum</i>						
Means.						
Transit mean Thread						
Cor. for Rate						
" " Level						
" " Coll						
" " Azim						
Reduced Transit						
Tabular A. R.						
Error of Chron.						
Observed A. R.						

P. W. Hamel Recorder  
 E. P. Austin Observer.

$\gamma$  Bootis

$\tau$  Virginis

$\alpha$  Draconis

E	W
54	24
<u>34</u>	<u>43</u>
88	67

21

13 23 1.1  
 24.4  
 47.0  
 24 10.3  
 33.2

13 29 35.5  
 57.8  
 30 19.5  
 40.8  
 31 2.7

13 34 19.8  
 35 11.8  
 36 1.0  
 36 53.8  
 37 46.5

Station *Carlin Nev May 12<sup>th</sup> 1871*

Object	<i>w Ursa Maj</i>	<i>&amp; Ursa Maj</i>	<i>♄ Leonis</i>	
Illum. and Description	<i>West</i>			
Factor	A.	(Azimuth)		
"	B.	(Level)		
"	C.	(Collimation)		
"	F.	(For Broken transits)		
Levels	<i>E 26</i>	<i>W 26.5</i>		
"	<i>34</i>	<i>19.5</i>		
	<i>60</i>	<i>46.0</i>		
Sums	<i>- 14.</i>			
Threads				
"	<i>1</i>	<i>10 40 43.5</i>	<i>10 49 20.3</i>	<i>11 1 39.8</i>
"	<i>2</i>	<i>41 13.6</i>	<i>50 7.6</i>	<i>2 3.4</i>
	<i>3</i>	<i>44.5</i>	<i>55.4</i>	<i>26.6</i>
	<i>4</i>	<i>42 13.6</i>	<i>57 41.2</i>	<i>49.7</i>
	<i>5</i>	<i>44.5</i>		<i>3 13.4</i>
<i>Sum</i>				
Means.				
Transit mean Thread				
Cor. for Rate				
" " Level				
" " Coll				
" " Azim				
Reduced Transit				
Tabular A. R.				
Error of Chron.				
Observed A. R.				

P W Hamel Recorder  
 E Peckham Observer.

$\delta$  Crateris       $\lambda$  Draconis       $\eta$  Leonis       $\gamma$  Cephei 26

West

E 39    W 25  
 $\frac{34.5}{73.5}$      $\frac{31.1}{56}$   
 -17.5

			24	49.7		
		11	17	48.7	25	11.3
11	8	6.7	18	53.0	33.3	27
		28.5	19	55.3	54.8	29
		51.4	21	1.0	26	17.2
						30
						32
						32.8

Means  
 Transit mean Time  
 Cor. for Rate  
 " " Level  
 " " Coll  
 " " Axim  
 Reduced Transit  
 Tabular A. R.  
 Error of Chron  
 Observed A. R.

Station *Carlin* rev *May 12<sup>th</sup>* 1871

Object	<i>B Leonis</i>	<i>γ Ursae Major</i>	<i>α Virginis</i>
Illum. and Description	<i>West</i>	<i>West</i>	<i>East</i>
Factor	A. (Azimuth)		
"	B. (Level)		
"	C. (Collimation)		
"	F. (For Broken transits)		
Levels		<i>E 39 W 29.5</i>	
"		<i>25 34</i>	
		<i>74 63.5</i>	
Sums		<i>-10.5</i>	<i>E. 41 W. 28</i>
			<i>38 36.5</i>
			<i>79 58.5</i>
			<i>-18.5</i>
Threads			
" 1	<i>11 36 55.4</i>		<i>11 53 6.3</i>
" 2	<i>37 18.2</i>		<i>29.2</i>
3	<i>40.6</i>	<i>42 14.0</i>	<i>50.9</i>
4	<i>38 3.3</i>	<i>50.2</i>	<i>54 13.4</i>
5	<i>26.8</i>	<i>43 28.8</i>	<i>35.4</i>
<i>Sums</i>			
Means.			
Transit mean Thread			
Cor. for Rate			
" " Level			
" " Coll			
" " Azim			
Reduced Transit			
Tabular A. R.			
Error of Chron.			
Observed A. R.			



Station Berlin Nov May 12<sup>th</sup> 1871

Object	♄ Corvi		κ Draconis		γ Virginis	
Illum. and Description	East					
Factor	A.	(Azimuth)				
"	B.	(Level)				
"	C.	(Collimation)				
"	F.	(For Broken transits)				
Levels					E.	W.
"					39	33
					45	28
					<u>84</u>	61
Sums					-23.0	
Threads						
"	1			12 20	58.4	12 29 37.1
"	2	12 18	3.2	22	4.8	59.5
	3		25.4	23	9.0	30 20.9
	4		48.5	24	15.8	42.9
	5	19	11.0	25	20.5	31 4.8
Sums						
Means.						
Transit mean Thread						
Cor. for Rate						
" " Level						
" " Coll						
" " Azim						
Reduced Transit						
Tabular A. R.						
Error of Chron.						
Observed A. R.						

P W Hamel Recorder  
E P Austin Observer.

32 Camelop

E Virginis

		12	50	14.4
12	39	53.0		36.8
	43	23.0		59.0
	46	59.0	57	21.4
				43.6

Station Berlin New day 13<sup>th</sup> 1871

Object	$\gamma$ Leonis	$\lambda$ Draconis	$91^{\text{st}}$ Leonis
Illum. and Description	East		
Factor A.	(Azimuth)		
" B.	(Level)		
" C.	(Collimation)		
" F.	(For Broken transits)		
Levels	E 16 W 38		E. W.
"	<del>22.5</del> 38.5	<del>32.</del> 70	
Sums	+ 31.5		
Threads			
" 1	11 15 42.3		
" 2			
3	16 26.0	18 59.5	25 28.5
4	47.8	20 3.5	50.4
5	17 9.4	21 7.3	26 11.5
Sums			
Means.			
Transit mean Thread			
Cor. for Rate			
" " Level			
" " Coll			
" " Azim			
Reduced Transit			
Tabular A. R.			
Error of Chron.			
Observed A. R.			

P W Hamel Recorder  
 E. P. Austin Observer.

$\gamma$  Cephei LG

$\beta$  Leonis

$\gamma$  Ursaecolaj  
 East

$\iota$  Virginis  
 West

E 22  
16  
 38  
 +36.5

W 33  
39.5  
 72.5

E 22.5  
16  
 38.5  
 +36.5

W 34  
41  
 75

11 28 56.5  
 30 30.2  
 32 8.3

11 36 51.8  
 37 15.0  
 37.0  
 59.8  
 38 22.4

11 40 59.1  
 41 37.8  
 42 14.2  
 51.8  
 43 29.0

11 48 6.0  
 27.8  
 49.7  
 49 10.0

Station Carlin Nev May 13<sup>th</sup> 1871

Object	o Virginis		4 Draconis		γ Virginis	
Illum. and Description	West					
Factor	A.	(Azimuth)				
"	B.	(Level)				
"	C.	(Collimation)				
"	F.	(For Broken transits)				
Levels					E.	W.
"						
Sums						
Threads						
"	1	11 53 1.4	11 57 55.5	12 7 41.8		
"	2	23.4	59 42.0	8 3.4		
	3	45.8	12 1 30.8	25.5		
	4	54 7.6	3 15.0	47.0		
	5	29.8	5 6.7	9 9.2		
Means.						
Transit mean Thread						
Cor. for Rate						
" " Level						
" " Coll						
" " Azim						
Reduced Transit						
Tabular A. R.						
Error of Chron.						
Observed A. R.						

Observer. \_\_\_\_\_

13 Comae

*S* Corvi

*B* Corvi

$$\begin{array}{r} E\ 16 \\ 22 \\ \hline 38 \\ +42.5 \end{array}$$

$$\begin{array}{r} W\ 43.5 \\ 37 \\ \hline 80.5 \end{array}$$

$$\begin{array}{r} E\ 23 \\ 16 \\ \hline 39 \\ +42.5 \end{array}$$

$$\begin{array}{r} W\ 37.5 \\ 44 \\ \hline 81.5 \end{array}$$

12 12 9.8  
 34.2  
 59.0  
 13 22.6  
 47.5

12 17 32.6  
 55.0  
 18 18.0  
 40.4  
 19 3.2

12 21 55.8  
 22 19.3  
 42.8  
 23 6.4  
 30.2

Station Berlin Nov May 16<sup>th</sup> 1871

Object	λ Draconis		91 <sup>v</sup> Leonis		γ Cephei 16	
Illum. and Description	East					
Factor	A.	(Azimuth)				
"	B.	(Level)				
"	C.	(Collimation)				
"	F.	(For Broken transits)				
Leve's	826		W 34.5		E. W.	
"	<u>29</u>		<u>32</u>			
	55		665			
Sums	+11.5					
Threads						
"	1					
"	2					
	3			11 25	35.4	11 29 21.5
	4	11	20	0.5	57.5	30 56.5
	5		21	3.3	26 19.0	32 33.8
Sums						
Means.						
Transit mean Thread						
Cor. for Rate						
" " Level						
" " Coll						
" " Azim						
Reduced Transit						
Tabular A. R.						
Error of Chron.						
Observed A. R.						

P W Flamel Recorder  
 E. P. Austin Observer.

B Leonis      γ Ursae Majoris      β Virginis      α Virginis

$$\begin{array}{r} 8 \quad 30.5 \\ \underline{31} \\ 61.5 \\ + 8.5 \end{array}$$

$$\begin{array}{r} W \quad 35. \\ \underline{35} \\ 70 \end{array}$$

	11	41	0.9	11	47	51.8	11	53	8.9
			39.3		48	14.0			31.8
11	37	43.5	42	15.8	36.0				
	38	6.3		53.7	57.4		54	15.4	
		28.4	43	30.9	49	19.5			37.6

Station Berlin Nov May 16<sup>th</sup> 1871

Object	E Carvi		y Virginis		13 Comae		
Illum. and Description	West						
Factor	A.	(Azimuth)					
"	B.	(Level)					
"	C.	(Collimation)					
"	F.	(For Broken transits)					
Levels	E 30	W 40.			E.	W.	
"	<u>29.5</u>	<u>41.</u>					
Sums	59.5	81					
	+ 21.5						
Threads							
" 1	11	57	57.5	12	7	49.4	12 12 15.2
" 2		58	21.1		8	11.3	39.8
3			45.0			33.0	13 4.4
4		59	8.0			54.5	28.4
5			32.1				53.3
Sums							
Means.							
Transit mean Thread							
Cor. for Rate							
" " Level							
" " Coll							
" " Azim							
Reduced Transit							
Tabular A. R.							
Error of Chron.							
Observed A. R.							

Observer.

$\delta$  Carvi

K Draconis

$\gamma$  Virginis

21 Cassiopeae LG

$$\begin{array}{r} \text{E } 29.5 \\ \underline{30.0} \\ 59.5 \\ + 26.5 \end{array}$$

$$\begin{array}{r} \text{W } 43 \\ \underline{43} \\ 86 \end{array}$$

12 17 41.4  
~~18 26.8?~~  
 18 26.8!  
 1 49.0  
 19 12.2

12 20 59.0  
 22 1.0  
 23 10.0  
 24 14.0  
 25 20.8

12 29 38.9  
 30 0.0  
 21.1  
 43.8  
 31 6.0

12 33 13.0  
 34 30.0  
 35 50.2  
 37 9.5

P W Flamed Recorder

Station Berlin New May 16<sup>th</sup> 1871

Object	126an Ven	E Virginis		
Illum. and Description	West			
Factor	A.	(Azimuth)		
"	B.	(Level)		
"	C.	(Collimation)		
"	F.	(For Broken transits)		
Levels			E 31.	W 44
"			33	43
			64	87
Sums			+23.	
Threads				
"	1			
"	2	12 44 45.4	12 50 37.8	
	3	45 13.7	51 0.3	
	4	40.8	22.6	
	5	46 9.4	44.5	
Sums				
Means.				
Transit mean Thread				
Cor. for Rate				
" " Level				
" " Coll				
" " Azim				
Reduced Transit				
Tabular A. R.				
Error of Chron.				
Observed A. R.				

# St Whales Records

E.P. Austin Observer.

May 19<sup>th</sup> 1871

o Virginis  
East

8 Corvi

4 Draconis

13 Comae

E 32 W 38.5  
 $\frac{29}{61}$       $\frac{34}{65.5}$   
 + 4.5

E 33.5 W 35  
 $\frac{35}{68.5}$       $\frac{33.5}{68.5}$   
 0

11 53 1.4     11 57 42.2  
           24.2     58 6.5  
           46.2     29.7  
 54 8.3     53.1  
 30.5     59 16.4

12 2 23.5     12 12 38.8  
           4 12.3     13 2.7  
           6 0.0     27.7  
                           51.9

Station *Carlin Nev* May 19<sup>th</sup> 1871

Object	<i>S Carvi</i>		<i>B Carvi</i>		<i>21 Cassiope</i>	
Illum. and Description	<i>East</i>		<i>East</i>		<i>West</i>	
Factor	A.	(Azimuth)				
"	B.	(Level)				
"	C.	(Collimation)				
"	F.	(For Broken transits)				
Levels			E 36.0	W 34.0	E.	W.
"			<u>38.0</u>	<u>31.5</u>	32.0	39.0
			74.0	65.5	<u>35.0</u>	<u>36.0</u>
Sums			<del>8.5</del>		67.0	75.0
					+8.0	
Threads						
"	1	12 17 27.4	12 21 49.4			
"	2	51.0	22 13.0			
	3	18 12.8	36.3	12 33 230		
	4	36.4	23 0.4	34 45.0		
	5	58.9	24.4	36 6.0		
<i>Sums</i>						
Means.						
Transit mean Thread						
Cor. for Rate						
" " Level						
" " Coll						
" " Azim						
Reduced Transit						
Tabular A. R.						
Error of Chron.						
Observed A. R.						

St. Wheeler Recorder  
E. P. Austin Observer.

32 Camelop	N Virginia	S Virginia	S Virginia West			
	$\begin{array}{r} E\ 34.5 \\ \underline{38.5} \\ 73.0 \\ +2 \end{array}$	$\begin{array}{r} W\ 39.5 \\ \underline{35.5} \\ 75.0 \end{array}$	$\begin{array}{r} E\ 38.5 \\ \underline{35.0} \\ 73.5 \\ +3.5 \end{array}$	$\begin{array}{r} W\ 37.0 \\ \underline{40.0} \\ 77.0 \end{array}$	$\begin{array}{r} E\ 34.0 \\ \underline{38.5} \\ 72.5 \\ +7.5 \end{array}$	$\begin{array}{r} W\ 42.0 \\ \underline{38.0} \\ 80.0 \end{array}$
12 42 3.8	12 57 37.0	13 12 42.3	13 22 29.0			
	58.2	13 4.8	50.6			
45 37.0	58 20.6	27.0	23 12.5			
49 7.0		49.0	34.4			
52 43.0	59 4.6	14 11.6	56.7			

Station Berlin New May 23<sup>d</sup> 1871

Object	γ Virginis		32 Camelopard		ε Virginis			
Illum. and Description	East							
Factor	A.	(Azimuth)						
"	B.	(Level)						
"	C.	(Collimation)						
"	F.	(For Broken transits)						
Levels		E	29.5	W	46.0	E.		W.
"			<del>28</del>		46.5	27.5		48.5
			57.5		92.5	<u>31.5</u>		45
Sums			+35			59.0		93.5
						+34.5		
Threads								
"	1			212	37	29.2		
"	2	12	30	1.8	3	41	12	50
	3				4	44	28.2	51
	4				5	48	9.0	26.0
	5							47.8
Sums								
Means.								
Transit mean Thread								
Cor. for Rate								
" " Level								
" " Coll								
" " Azim								
Reduced Transit								
Tabular A. R.								
Error of Chron.								
Observed A. R.								

W J Bradley Recorder  
 E. P. Austin Observer.

Polaris L6

2 Virginis

$\gamma$  Draconis

$\xi$  Ophiuchi  
 East

E 32      W 46  
 $\frac{32}{64}$        $\frac{46}{92}$   
 +28.0

E 30.5      W 50.  
 $\frac{35}{65.5}$        $\frac{45}{95}$   
 +29.5

E 39      W 44  
 $\frac{45}{84}$        $\frac{38}{82}$   
 -2.0

	13	12	55.4					
		13	18.1				16	24
13	2		39.4	16	17	43.8	25	20.3
		14	1.9		18	29.8		43.6
			23.8		19	15.7	26	5.5



W J Bradley Recorder  
 E. P. Austin Observer.

ε Ursellin      α Herculis      α Ophiuchi West      β Draconis East

846 W 45  
 $\frac{49}{95}$   $\frac{42}{87}$   
 -8.

848 W 44  
 $\frac{50}{98}$   $\frac{42}{86}$   
 -12.

851 W 41  
 $\frac{49}{100}$   $\frac{43}{85}$   
 -16.

16 53 31.0

55 17.0

57 54.2

17 0 38.2

17 4 7.0

28.8

50.0 52.3

17 8 34.0

58.8

9 23.0

45.9

10 10.4

17 21 42.4

22 19.5

54.0

23 32.8 ? 30?

24 9.2 ? 6?

W. J. Bradley Recorder

Station Berlin Nev May 23 1871

Object	α Draconis			
Illum. and Description	East			
Factor	A.	(Azimuth)		
"	B.	(Level)		
"	C.	(Collimation)		
"	F.	(For Broken transits)		
Leve's	850.5	W 42		E. W.
"	50.0	43		
	<u>1005</u>	85		
Sums	-15.5			
Threads				
" 1	17	31 12.8		
" 2		32 14.0		
3		33 13.5		
4		34 14.0		
5		35 14.8		
Sums				
Means.				
Transit mean Thread				
Cor. for Rate				
" " Level				
" " Coll				
" " Azim				
Reduced Transit				
Tabular A. R.				
Error of Chron.				
Observed A. R.				

F. H. Hlett

Barlin Nev May 24<sup>th</sup> E. P. Austin Observer.

$\gamma$ Cephei East	$\beta$ Leonis	$\gamma$ Uscellaj	$\delta$ Virginis
-------------------------	----------------	-------------------	-------------------

$E\ 33.5$   $W\ 20.$   
 $\frac{38}{71.5}$   $\frac{15.5}{35.5}$   
 $-36.0$

	11 37 27.4	11 41 46.6	
11 29 23.0	49.8	42 23.5	11 48 41.8
30 56.8	38 12.7	43 0.8	49 3.9
32 34.5	35.2	39.0	25.5

Station *Carlin Nev* May 24<sup>th</sup> 1871

Object	<i>o Virginis</i>		<i>4 Draconis</i>		<i>13 Comae</i>		
Illum. and Description	<i>Clump East</i>						
Factor	A.	(Azimuth)					
"	B.	(Level)					
"	C.	(Collimation)					
"	F.	(For Broken transits)					
Levels		<i>E 36.5</i>	<i>W 22.5</i>	<i>E 36</i>	<i>W 26</i>		E. W.
"		<i>39</i>	<i>20</i>	<i>40</i>	<i>22</i>		
		<i>75.5</i>	<i>42.5</i>	<i>76</i>	<i>48</i>		
Sums		<i>-33.</i>		<i>-28</i>			
Threads							
"	<i>1</i>	<i>11</i>	<i>53</i>	<i>15.5</i>		<i>12</i>	<i>12</i> <i>22.8</i>
"	<i>2</i>			<i>38.4</i>	<i>11</i>	<i>59</i>	<i>43.5</i> <i>12</i> <i>47.4</i>
	<i>3</i>			<i>59.6</i>	<i>12</i>	<i>1</i>	<i>29.8</i> <i>13</i> <i>11.5</i>
	<i>4</i>		<i>54</i>	<i>21.8</i>	<i>3</i>		<i>18.5</i> <i>35.8</i>
	<i>5</i>			<i>44.4</i>	<i>5</i>		<i>6.5</i> <i>59.7</i>
<i>Sums</i>							
Means.							
Transit mean Thread							
Cor. for Rate							
" " Level							
" " Coll							
" " Azim							
Reduced Transit							
Tabular A. R.							
Error of Chron.							
Observed A. R.							

H. Klett Recorder  
 E. P. Austin Observer.

S barri

B barri  
 East

21 Cassiop LG  
 West

32 Camelop

E 39.5 W 26.0  
 $\frac{40.5}{80.0}$   $\frac{24.5}{50.5}$   
 -29.5

E 38 W 28  
 $\frac{34.5}{72.5}$   $\frac{31.5}{59}$   
 -13.5

12 17 47.4  
 18 11.3  
 33.0  
 56.2  
 19 18.4

12 22 11.4  
 35.5  
 58.6  
 23 23.0  
 45.8

12 32 30.0  
 33 52.8?  
 35 12.0

12 39 58.5  
 43 31.5  
 47 0.0

Station *Carlin Nev May 24<sup>th</sup> 1871*

Object	<i>ε Virginis</i>		<i>θ Virginis</i>		<i>Polaris 16</i>	
Illum. and Description	<i>West</i>					
Factor	A.	(Azimuth)				
"	B.	(Level)				
"	C.	(Collimation)				
"	F.	(For Broken transits)				
Levels	<i>E</i>	<i>39</i>	<i>W</i>	<i>29</i>		<i>E. W.</i>
"	<i>6</i>	<i>42</i>		<i>26</i>		
		<i>81</i>		<i>55</i>		
Sums		<i>-26</i>				
Threads						
"	<i>1</i>	<i>12 50</i>	<i>22.4</i>	<i>12 57</i>	<i>54.8</i>	
"	<i>2</i>		<i>43.6</i>	<i>38</i>	<i>15.9</i>	
	<i>3</i>	<i>57</i>	<i>6.6</i>		<i>38.0</i>	<i>13 7 2.0</i>
	<i>4</i>		<i>28.4</i>		<i>59.5</i>	
	<i>5</i>		<i>51.0</i>	<i>59</i>	<i>21.4</i>	
<i>Sums</i>						
Means.						
Transit mean Thread						
Cor. for Rate						
" " Level						
" " Coll						
" " Azim						
Reduced Transit						
Tabular A. R.						
Error of Chron.						
Observed A. R.						

F Klett Recorder  
 E. P. A. Observer.

2 Virginis

E Serpentis

5 Ursellin

$\beta'$  Scarpia  
 West

E 36.5 W 31.5  
 $\frac{34}{70.5}$   $\frac{34}{65.5}$   
 -5.0

E 35 W 41  
 $\frac{41}{76}$   $\frac{36}{77}$   
 +9.0

13 13 1.4  
 23.1  
 45.8  
 14 7.6  
 30.3

15 39 45.7  
 40 7.0  
 40 29.3

15 44 2.3  
 45 45.8  
 47 35.2

15 52 33.0  
 55.8  
 53 18.9  
 42.0  
 54 5.6

Station *Carlin Nev May 24<sup>th</sup> 1871*

Object	<i>♄ Ophiuchi</i>	<i>τ Herulis</i>	<i>γ Draconis</i>
Illum. and Description	<i>West</i>	<i>East</i>	
Factor	A.	(Azimuth)	
"	B.	(Level)	
"	C.	(Collimation)	
"	F.	(For Broken transits)	
Levels	<i>E 38.5</i>	<i>W 41.</i>	E. W.
"	<i>41.</i>	<i>38.5</i>	
	<i>79.5</i>	<i>79.5</i>	
Sums	<i>0.</i>		
Threads			
" 1			<i>16 16 . 4.6</i>
" 2	<i>16 2 35.6</i>	<i>16 10 42.8</i>	<i>51.3</i>
3	<i>58.0</i>	<i>11 14.0</i>	<i>17 36.0</i>
4	<i>3 19.4</i>	<i>45.5</i>	<i>18 23 0</i>
5	<i>41.4</i>	<i>12 17.8</i>	<i>19 8.7</i>
<i>Means</i>			
Transit mean Thread			
Cor. for Rate			
" " Level			
" " Coll			
" " Azim			
Reduced Transit			
Tabular A. R.			
Error of Chron.			
Observed A. R.			

*Means*

F. Klett Recorder  
 E.P.A. Observer.

7 Scorpii 5 Ophiuchi  $\gamma$  Herculis & Camelopardalis  
 East

$$\begin{array}{r} 8 \ 44 \\ 0 \ 42 \\ \hline 86 \end{array}$$

$$\begin{array}{r} W \ 38.5 \\ \quad 40.5 \\ \hline 79.0 \end{array}$$
  
 -7.

$$\begin{array}{r} 8 \ 43.5 \\ 0 \ 43.5 \\ \hline 87 \end{array}$$

$$\begin{array}{r} W \ 41 \\ \quad 41 \\ \hline 82 \end{array}$$
  
 -5.

16 22 26.6  
     51.4  
 23 15.4  
     40.6  
 24 4.7

16 25 26.8  
     49.4  
 26 11.1

16 32 54.9  
     33 23.0  
     51.0  
 34 ~~19.4~~  
     47.2

16 37 29.5  
     38 23.0

Station Battle Mountain Nev June 1<sup>st</sup> 1871

Object	E Virginis		d Virginis		s Virginis	
Illum. and Description	West					
Factor	A.	(Azimuth)				
"	B.	(Level)				
"	C.	(Collimation)				
"	F.	(For Broken transits)				
Levels	E 38.5	W 34	E 35	W 39	E.	W.
"	$\frac{32}{70.5}$	$\frac{41}{75}$	$\frac{38}{73}$	$\frac{36}{75}$		
Sums	+4.5	+0.086	+2.0	+0.038		+0.150
Threads						
" 1	12	53 43.5	13	16 21.4	13	26 5.8
" 2		54 5.3		43.5		27.2
3		27.9	17	6.4		50.0
4		50.8		27.8	27	11.2
5		55 13.2		50.8		33.4
Sums		140.7		149.9		127.6
Means.	12	54 28.14	13	17 5.98	13	26 49.52
Transit mean Thread						
Cor. for Rate						
" " Level						
" " Coll						
" " Azim						
Reduced Transit						
Tabular A. R.			13	18 25.01	13	28 8.32
Error of Chron.						
Observed A. R.						

S Hutchins Recorder  
E. P. Austin Observer.

m Virginis    γ Uro Maj    γ Bootis    50 Cass L C

E 32.5    W 41  
 $\frac{36}{68.5}$      $\frac{38}{79}$   
 +10.5    +<sup>s</sup>20.0

+0.206

+0.212

E 32    W 41.5  
 $\frac{36}{68}$      $\frac{38}{79.5}$   
 +11.5    +0.218

13 32 48.4  
 33 10.3  
 32.0  
 54.4  
 34 16.9

162.0

13 40 4.8  
 39.3  
 41 14.0  
 47.0  
 42 22.3

127.4

13 46 30.2  
 52.8  
 47 16.2  
 39.4  
 48 2.6

141.2

13 49 49.0  
 50 59.5  
 52 9.8  
 53 18.5

136.8

13 33 32.40

13 41 13.48

13 47 16.24

13 51 34.20

13 42 28.88

13 42 28.88

13 48 33.75

1 52 25.28

Station Battle Mountain Nev June 1<sup>st</sup> 1871

Object	$\gamma$ Herculis	$\alpha$ Scorpii	15-Draconis
Illum. and Description	East		
Factor	A.	(Azimuth)	
"	B.	(Level)	
"	C.	(Collimation)	
"	F.	(For Broken transits)	
Levels	$\begin{array}{r} 843 \\ 37 \\ \hline 80 \end{array}$	$\begin{array}{r} W29 \\ 36 \\ \hline 65 \end{array}$	$\begin{array}{r} 37 \text{ E.} \\ 43 \\ \hline 80. \end{array}$
"			$\begin{array}{r} 36 \text{ W.} \\ 30.5 \\ \hline 66.5 \end{array}$
Sums	+15. -0.285	-0.271	-13.5 -0.257
Threads			
" 1		16 19 24.3	16 25 7.5
" 2	16 14 7.7	48.4	26 10.0
3	14 39.3	20 12.0	27 9.7
4	15 11.8	36.2	28 11.2
5	43.3	21 0.8	29 11.8
Sums	102.1	121.7	50.2
Means.	16 14 55.52	16 20 12.34	16 27 10.04
Transit mean Thread			
Cor. for Rate			
" " Level			
" " Coll			
" " Azim			
Reduced Transit			
Tabular A. R.	16 15 53.75	16 21 31.80	16 28 18.52
Error of Chron.			
Observed A. R.			

S H Recorder  
 E P A Observer.

$\alpha$  Camelopardalis E Urs Minor  $\delta$  Ophiuchi  $\beta$  Draconis  
 East

E 42.5 W 31  
 $\frac{37}{79.5}$   $\frac{37}{68}$   
 -11.5 -0.219

E 38 W 37.5  
 $\frac{44}{82}$   $\frac{31.5}{69}$   
 -13.  $\overset{S}{-0.247}$

E 37.5 W 38  
 $\frac{43}{80.5}$   $\frac{34}{73}$   
 -7.5 -0.143

16 39 45.0 16 58 33.5  
 40 38.0 17 1 18.5  
 41 34.0 3 58.5  
 117.0 110.5

clouds  
 17 26 20.2  
 clouds  
 17 13 11.8  
 clouds  
 27 31.7  
 51.9

16 40 39.00 17 1 16.83

17 26 55.95

4 41 11.41 16 59 25.98

17 27 33.34

Station *Battle Mountain Nev June 2d 1871*

Object	<i>S Corvi</i>		<i>K Draconis</i>		<i>γ Virginis</i>	
Illum. and Description	<i>East</i>					
Factor	A.	(Azimuth)				
"	B.	(Level)				
"	C.	(Collimation)				
"	F.	(For Broken transits)				
Levels		<i>E 40.5</i>	<i>W 40</i>		<i>E.</i>	<i>W.</i>
"		<i>50</i>	<i>32</i>			
		<i>90.5</i>	<i>72</i>			
Sums		<i>-18.5</i>				
Threads						
"	1			<i>12 24 52.0</i>	<i>12 33 3.8</i>	
"	2			<i>25 58.3</i>	<i>25 9</i>	
	3			<i>27 2.3</i>	<i>47.3</i>	
	4	<i>12 22 11.5</i>		<i>28 8.0</i>	<i>34 9.4</i>	
	5		<i>34.4</i>	<i>29 12.8</i>	<i>31.0</i>	
<i>Sums</i>						
Means.						
Transit mean Thread						
Cor. for Rate						
" " Level						
" " Coll						
" " Azim						
Reduced Transit						
Tabular A. R.						
Error of Chron.						
Observed A. R.						



Station *Battle Mountain Nev June 2d 1871*

Object	<i>2 Virginis</i>	<i>5 Virginis</i>	<i>γ Ursae Maj</i>
Illum. and Description	<i>West</i>		
Factor	A.	(Azimuth)	
"	B.	(Level)	
"	C.	(Collimation)	
"	F.	(For Broken transits)	
Leve's	<i>E 49.5</i>	<i>W 40.5</i>	
"	<i>46</i>	<i>44</i>	<i>45 E. 43 W.</i>
	<i>95.5</i>	<i>84.5</i>	<i>30</i>
			<i>95</i>
Sums	<i>-11.0</i>		<i>-12.0</i>
Threads			
" 1		<i>13 26 9.5</i>	<i>13 40 7.4</i>
" 2		<i>30.8</i>	<i>41.5</i>
3		<i>53.5</i>	<i>41 16.8</i>
4	<i>13 17 31.4</i>	<i>27 14.9</i>	<i>49.5</i>
5		<i>54.0</i>	<i>42 23.5</i>
<i>Sums</i>			
Means.			
Transit mean Thread			
Cor. for Rate			
" " Level			
" " Coll			
" " Azim			
Reduced Transit			
Tabular A. R.			
Error of Chron.			
Observed A. R.			

S H Recorder  
EPA Observer.

50 Cassiopeia & Draconis

E 43.5	W 47	E 48	W 42
<del>47</del>	<del>43.5</del>	<del>48</del>	<del>42</del>
90.5	90.5	93	87
0.		-6.0	

13	48	47.5	13	58	0.5
	49	57.0			52.8
	51	5.0		59	46.0
	52	16.5	14	'0	34.4
	53	26.5		1	28.0

Station Battle Mountain Nev June 3<sup>d</sup> 1871

Object	<i>√ Carri</i>	<i>K Draconis</i>	<i>γ Virginis</i>
Illum. and Description	<i>East</i>		
Factor	A. (Azimuth) +0.866	- 1.491	+0.661
"	B. (Level) 5.75-	+ 2.598	750
"	C. (Collimation) 1.039	2.996	1.000
"	F. (For Broken transits)		
Leve's		<i>E 32 W 36</i>	E. W.
"		<i>6 37 69</i>	<i>31 67</i>
Sums	-0.038	-2. -0.038	-0.075
Threads			
" 1		12 24 44.8	12 33 5.3
" 2	12 21 29.2	25 50.3	27.4
<del>3</del>	51.4	26 55.0	49.0
4	22 14.0	28 0.8	34 10.6
5	37.0	29 6.5	32.7
Sums	131.6	157.4	125.0
Means.	12 22 2.90	12 26 55.48	12 33 49.00
Transit mean Thread			
Cor. for Rate			
" " Level	-0.2	-0.10	0.06
" " Coll			
" " Azim			
Reduced Transit			
Tabular A. R.		12 27 59.50	
Error of Chron.			
Observed A. R.			

S H Recorder  
E. P. A.

Observer: \_\_\_\_\_

35 Virginis	12 Can Ven	ε Virginis	θ Virginis
+ .595	+ 0.036	+ 495	+ .716
807	1286	893	704
1003	1287	1.021	1.004
834 W 37 $\begin{array}{r} 39.5 \\ 75.5 \\ \hline \end{array}$		$\begin{array}{r} 42.5 \\ 38.5 \\ 81 \\ \hline \end{array}$	$\begin{array}{r} W 29.5 \\ 33.5 \\ 63 \\ \hline \end{array}$
-5. -0.095	-0.218 <sup>s</sup>	-18 -0.342 <sup>s</sup>	-0.342 <sup>s</sup>
12 39 15.3	12 47 49.2	12 53 43.5	13 1 13.8
	48 17.9	54 6.5	36.4
59.2	45.3	54 27.8	57.7
40 20.9	49 13.4	50.4	2 19.5
43.0	41.8	55 13.2	41.8
138.4	167.6	141.4	169.2
12 40 4.60	12 48 45.82	12 54 28.28	13 1 57.84
-0.8	-0.28	-31	-24
	12 50 0.38	12 50 0.38	13 3 17.29

Station Battle Mountain Nev June 3<sup>d</sup> 1871

Object	Polaris LG	A Casiope LG	5 Virginis
Illum. and Description	East	West	
Factor A.	(Azimuth) +32 190	+2.692	+0.650
" B.	(Level) -26 312	-0.992	0.760
" C.	(Collimation) 41.574	-2.869	1.000
" F.	(For Broken transits)		
Levels		8 36 W 38	38 E. 36.5 W.
"		6 40.5 W 34	43 32
		76.5 72	81. 58.5
Sums*	-0.342	-4.5 -0.086	-12.5 -0.238
Threads			
" 1			13.26 9.5
" 2		13 19 21.5	31.4
3	13 6 30.0?	20 22.5	52.9
4		21 25.8	27 14.4
5		22 28.5	36.6
Sums		98.3	144.8
	-105.2	-31.40	
Means.	6 19.48	13 20 54.58	13 26 52.96
Transit mean Thread		23.18	
Cor. for Rate			
" " Level	+9.00	-0.9	-1.8
" " Coll			
" " Azim			
Reduced Transit			
Tabular A. R.	1 11 10.25	1 21 38.12	13 28 8.31
Error of Chron.			
Observed A. R.			

S H Recorder  
 E Sed Observer.

m Virginis	$\gamma$ Urs Maj	$\gamma$ Bantis	50 Cassiopeae
+0.759	-0.252	+1.389	+2.959
.667	+1.534	984	-1.222
1.010	1.554	1.058	-3.201
	$\begin{array}{r} 8 \ 36 \\ 42 \\ \hline 78 \end{array} \quad \begin{array}{r} W \ 40 \\ 34 \\ \hline 74 \end{array}$		$\begin{array}{r} 6 \ 42 \\ 39.5 \\ \hline 81.5 \end{array} \quad \begin{array}{r} W \ 35 \\ 37 \\ \hline 72 \end{array}$
-0.157	-4. -0.076	-0.128	-9.5 -0.180
13 32 52.5	13 40 5.8	13 46 32.4	
33 14.4	39.8	55.4	13 50 1.5
36.7	41 13.6	47 18.5	51 9.8
58.2	46.8	41.3	52 19.0
34 20.5	42 21.5	48 46	53 29.3
182.3	127.5	152.2	59.6
			-35.04
13 33 36.46	13 41 13.50	13 47 18.44	13 57 44.90
			9.86
-10	-11	-13	+2.22
	13 42 28.85	13 48 33.74	1 52 25.40

Station Battle Mountain Nev June 3<sup>d</sup> 1871

Object	α Draconis		ε Serpentis		§ 2 <sup>nd</sup> dlin
Illum. and Description	West		East		
Factor	A.	(Azimuth) -0.975		+0.587	-2.978
"	B.	(Level) 2.155		814	+3.874
"	C.	(Collimation) 2.366		1.004	4.886
"	F.	(For Broken transits)			
Levels					32 E. 44 W.
"					<u>32</u> <u>38</u>
					71 82
Sums		-0.180		+0.209	+11. +0.209
Threads					
"	1		15	42 26.4	
"	2	13 58 50.0		48.3	15 45 49.3
	3	59 41.8		43 10.0	47 32.8
	4	14 0 32.2		32.3	49 19.8
	5	1 24.8		54.0	
Sums		148.8		171.0	101.9
Means.		14 0 7.20		15 43 10.20	15 47 33.97
Transit mean Thread					
Cor. for Rate					
" " Level		-0.39		+0.17	+0.78
" " Coll					
" " Azim					
Reduced Transit					
Tabular A. R.		14 0 56.20		15 44 24.72	15 48 49.11
Error of Chron.					
Observed A. R.					

S. H. Recorder  
E. P. A. Observer.

$\delta$ Scorpii	$\beta$ Scorpii	$\gamma$ Herculis	$\alpha$ Scorpii
+0.962	+ 919	-0.152	+1024
0492	5.29	+1448	439
1.080	1.060	1.456	1.113

E  $\frac{33}{40}$  W  $\frac{45}{38.5}$   
73. 83.5

E  $\frac{39}{36}$  W  $\frac{42}{45}$   
75 87

+0.204 +10.5 +0.200 +0.214 +12. +0.228

15 51 29.8	15 55 57.0	16 13 35.4	16 19 28.4
53.5	56 20.4	14 7.6	53.3
52 17.0	43.3	38.5	20 17.5
	57 6.5	15 10.7	41.8
	29.4	42.5	21 5.5
100.3	156.6	134.7	146.5

15 51 53.43 15 56 43.32 16 14 38.94 16 20 17.30

+ .10 + .11 + .31 + .10

15 52 44.17 15 57 57.93 16 15 53.75 16 21 31.82

Station *Battle Mountain Nev* June 3<sup>d</sup> 1871.

Object	<i>15<sup>h</sup> <math>\alpha</math> Draconis</i>			
Illum. and Description	<i>East</i>			
Factor	A.	(Azimuth) <i>-1330</i>		
"	B.	(Level) <i>+245.9</i>		
"	C.	(Collimation) <i>2.803</i>		
"	F.	(For Broken transits)		
Levels		<i>E 38 W 44</i>		
"		<i>36 46.5</i>		
		<i>74 90.5</i>		
Sums		<i>+165 +0.314</i>		
Threads				
"	1	<i>16 25 1.3</i>		
"	2	<i>26 4.0</i>		
	3	<i>27 3.0</i>		
	4	<i>28 4.2</i>		
	5	<i>29 4.8</i>		
<i>Sums</i>		<i>17.3</i>		
Means.		<i>16 27 3.46</i>		
Transit mean Thread				
Cor. for Rate				
" " Level		<i>+0.77</i>		
" " Coll				
" " Azim				
Reduced Transit				
Tabular A. R.		<i>16 28 18.51</i>		
Error of Chron.				
Observed A. R.				

June 4<sup>th</sup> 1871

S. H. Recorder  
 E. P. A. Observer.

$\gamma$  Virginis  
 West

32 Camelopard

$\epsilon$  Virginis

$\theta$  Virginis

E 22.5 W 28  
 $\frac{30.5}{53}$   $\frac{21}{49}$

E 27 W 29  
 $\frac{33.5}{60.5}$   $\frac{22}{51}$

E 30 W 29  
 $\frac{35}{65}$   $\frac{24}{54}$

-4.

-9.5

-11.0

12 33 10.0  
 32.0  
 53.8  
 34 15.0  
 37.6

12 43 32.5  
 47 7.0  
 50 36.0

12 53 47.4  
 54 9.6  
 32.2  
 54.0  
 55 16.6

13 1 18.8  
 40.5  
 2 3.3  
 24.8  
 47.0

Station Battle Mountain Nev June 4<sup>th</sup>

Object	Polaris & C		α Virginis		γ Virginis	
Illum. and Description	West					
Factor	A.	(Azimuth)				
"	B.	(Level)				
"	C.	(Collimation)				
"	F.	(For Broken transits)				
Levels	E	30	W	31	34 E.	31 W.
"		35		26.5	40	25
		65		57.5	74	56
Sums		-7.5			-18.	
Threads						
"	1			13 16	26.3	13. 26 10.5
"	2				48.4	32.4
	3	13	9	35.0	17	11.0 54.6
	4				32.8	27 15.4
	5				55.4	38.0
Sums						
Means.						
Transit mean Thread						
Cor. for Rate						
" " Level						
" " Coll						
" " Azim						
Reduced Transit						
Tabular A. R.						
Error of Chron.						
Observed A. R.						

1871

S H Recorder  
 E P A Observer.

m Virginis y Ursae maj  
 East

y Bootis

50 Cassiopeae 46

E 45- W 21  
 6 40 25.5  
 55. 46.5

-38.5

E 46 W 21  
 6 42 26  
 88 47

-41.

13 32 53.8

33 16.3

38.0

34 0.5

22.0

13 40 8.5

42.8

41 15.7

50.3

42 25.0

13 46 34.2

57.5

47 20.2

44.0

48 6.5

13 49 59.5

51 10.0

52 18.4

Station *Battle Mountain Nev June 4<sup>th</sup> 1871*

Object	$\tau$ Virginis	$\delta$ Draconis	$\kappa$ Virginis
Illum. and Description	<i>East</i>		
Factor	A.	(Azimuth)	
"	B.	(Level)	
"	C.	(Collimation)	
"	F.	(For Broken transits)	
Levels		<i>E 42 W 26</i>	E. W.
"		<i>6 49 91</i>	<i>13 45</i>
Sums		<i>-46</i>	
Threads			
" 1		<i>13 58 1.8</i>	
" 2		<i>58 54.3</i>	
3	<i>13 53 53.0</i>	<i>59 44.0</i>	<i>14 4 49.2</i>
4	<i>54 14.8</i>	<i>14 0 36.5</i>	<i>5 11.3</i>
5	<i>36.4</i>	<i>1 27.8</i>	<i>32.8</i>
<i>Sums</i>			
Means.			
Transit mean Thread			
Cor. for Rate			
" " Level			
" " Coll			
" " Azim			
Reduced Transit			
Tabular A. R.			
Error of Chron.			
Observed A. R.			

7.6689m	6.3027	-0.00	47	+000	2	+45	38
7.5852m	6.2714	-	38		2	36	37
7.6603m	7.2592	-	46		18	28	38

$$a = +1.307$$

$$c = +0.184$$

0

+0.94	+18	+1.12	+13	-99	+13	+13
+42.07	-7.63	34.44	+33.10	-1.34	-22	-0.09
+1.04	+0.18	1.22	-15	1.37	-25	-25
+0.85	+0.18	1.03	-12	1.15	-3	-03
-0.33	+0.28	-0.05	-93	0.98	+14	+14
+0.51	-0.19	+0.32	-67	-0.99	+13	+13
+3.87	+0.58	+4.45	+322	1.23	-11	-4
-1.27	-0.43	-1.70	-250	-0.80	+32	+18
+0.49	-0.19	+0.30	-0.92	-1.22	-10	-10
-0.44	-0.30	-0.74	-1.91	-1.17	-5	-04

11 24

+ 1.12

181

181

135

169

81

625

9

121

169

16

324

100

16

1630

Observer.

8.13  
17 24  
9.11

0.10  
6.66  
16.76  
15.42

.218  
43  
17  
7

9.11  
8.66  
8.63  
8.85  
9.12  
9.09

8885  
8

34 44  
32.32  
67.6

16 32  
24 95  
8.63  
26 79  
357  
18  
3054

19  
56  
760  
1280

23 94  
14  
24 08

49.41  
8.85

49  
2464  
9.05

.076  
23  
99

12.8  
6

.290  
294  
122

45  
17  
19.6  
9.12

1628  
1881  
11

7748  
341  
7783

672  
2231  
1559

78936  
70525  
526  
8999

4316  
433  
39  
2444  
244  
22

346  
0800  
692  
1080  
023

108027  
6745  
1849  
67

738  
122  
103

142

Observer.

d Boatis  
East

S 43.5 W 26  
6 50 19.5  
73.5 45.5

-48.0

14 7 48.8

8 12.3

35.1

58.4

9 21.6

Station Battle Mountain Nev June 5<sup>th</sup> 1871

Object	32 Camelop	12 Can Ven	E Virginis
Illum. and Description	East		
Factor	A. (Azimuth)		
"	B. (Level)		
"	C. (Collimation)		
"	F. (For Broken transits)		
Levels	E 27.5 6.18 45.5	W 20.5 30. 50.5	21 E. 29.5-W. 29 22 50 51.5
Sums	+5.0		+1.5
Threads			
" 1			
" 2	12 43 41.5	12 48 20.3	
3		47.8	12 54 33.6
4	50 43.5	49 16.0	56.8
5		43.8	55 18.4
Sums			
Means.			
Transit mean Thread			
Cor. for Rate			
" " Level			
" " Coll			
" " Azim			
Reduced Transit			
Tabular A. R.			
Error of Chron.			
Observed A. R.			

Observer. *W. H. ...*

*A Virginis*

*A Cassiopeæ 6 S Virginis*

*m Virginis*

*E 28  
6 34  
62*

*W 29  
22  
51*

*-11.*

*E 28  
6 35  
63*

*W 30  
23  
53*

*-10.*

*13 1 20.7  
43.3  
2 4.5  
26.3  
48.2*

*13 18 18.8  
19 22.0  
21 25.8  
22 29.8*

*13 26 12.4  
34.5  
55.8  
27 18.2  
39.5*

*13 32 54.8  
33 17.5  
39.4  
34 1.8  
23.7*

Station Battle Mountain Nev June 5<sup>th</sup> 1871

Object	γ Urs Maj		γ Bootis		τ Virginis	
Illum. and Description	West					
Factor	A.	(Azimuth)				
"	B.	(Level)				
"	C.	(Collimation)				
"	F.	(For Broken transits)				
Levels	E 32.5 W 26				26 E. 32.5 W.	
"	6 <u>26</u> 58.5		33 <u>59</u>		<u>32.5</u> 26	
Sums	+0.5				58.5 58.5	
Threads					0.0	
"	1				13 53 9.6	
"	2	13 40 42.4	13 46	57.7	31.5	
	3	41 16.8	47	21.4	53.4	
	4	49.2		43.8	54 15.0	
	5	42 23.8	48	7.2	37.2	
Sums						
Means.						
Transit mean Thread						
Cor. for Rate						
" " Level						
" " Coll						
" " Azim						
Reduced Transit						
Tabular A. R.						
Error of Chron.						
Observed A. R.						

Observer. \_\_\_\_\_

$\alpha$  Draconis

$\kappa$  Virginis

$\alpha$  Bootis  
West

$$\begin{array}{r} 526 \\ 633 \\ \hline 59 \end{array} \quad W \quad \begin{array}{r} 33 \\ 26 \\ \hline 59 \end{array}$$

0.0

13 57 59.7

58 51.5

59 43.8

14 0 34.0

1 26.4

14 4 50.0

5 11.4

34.0

14 7 48.8

8 12.3

35.8

58.5

9 21.8

Station Battle Mountain Nov June 7<sup>th</sup> 1871

Object	γ Uris Major		γ Bootis		50 base LG
Illum. and Description	East				
Factor	A.	(Azimuth)			
"	B.	(Level)			
"	C.	(Collimation)			
"	F.	(For Broken transits)			
Leve's	E 17.5	W 33.5			
"	6 29.5	22.			
	46.5	55.5			
Sums	+9.0				19 E. 35 W. 31 23 50 58 +8.
Threads					
" 1	13 40	13.3	13 46	38.8	
" 2		47.6	47	2.3	13 50 4.8
3	41	20.2		25.0	51 17.0
4		55.0		48.4	52 23.0
5	42	29.2	48	11.5	
Sums					
Means.					
Transit mean Thread					
Cor. for Rate					
" " Level					
" " Coll					
" " Azim					
Reduced Transit					
Tabular A. R.					
Error of Chron.					
Observed A. R.					

Observer. *W. H. ...*

*ε Virginis & Draconis & Boatis*

$$\begin{array}{r} 9 \ 33.5 \\ 6 \ 25.5 \\ \hline 59.0 \end{array} \quad W \quad \begin{array}{r} 22 \\ 30. \\ \hline 52 \end{array}$$

-7.

$$\begin{array}{r} 9 \ 36.5 \\ 6 \ 25.5 \\ \hline 62.0 \end{array} \quad W \quad \begin{array}{r} 19.5 \\ 30. \\ \hline 49.5 \end{array}$$

-12.5

13 58 6.2

58.8

13 53 57.3 59 48.5

54 19.4 14 0 41.8

41.5 1 33.0

14 7 52.8

8 16.5

39.5

9 3.2

26.0

Station Battle Mountain Nev June 10<sup>th</sup> 1871

Object	α Virginis		Polaris L C		δ Virginis		
Illum. and Description	West						
Factor	A.	(Azimuth) +0.716		+32,190		+0.792	
"	B.	(Level) 0.704		-26.310		+0.638	
"	C.	(Collimation) 1,004		-41,574		+1,017	
"	F.	(For Broken transits)					
Leve's	E	$\frac{27}{24}$	W	$\frac{23}{26}$	E	$\frac{30}{26}$	W.
"		$\frac{51}{51}$		$\frac{49}{49}$		$\frac{56}{56}$	
Sums		-2.	<sup>5</sup> -0.038		-2	<sup>5</sup> -0.038	-0.057
Threads							
" 1		13	1	23.4		13	16 30.5
" 2				45.2			53.4?
3			2	7.4	13	9	18.0 17 15.3
4				28.4			36.8
5				50.8			59.7
Sums				155.2			195.7
							+6.66
Means.		13	2	704	13	9	24.66 13 17 15.14
Transit mean Thread							
Cor. for Rate		0.055			0.187		0.307
" " Level			-0.03		+1.00		-0.04
" " Coll			+0.18		-7.63		+0.18
" " Azim			+0.94		+42.07		+1.04
Reduced Transit							
Tabular A. R.		13	3	17.24	1	11	15.42 13 18 24.95
Error of Chron.							
Observed A. R.							

Observer. 1003

♄ Virginis			m Virginis			γ UMa West			γ Bootis East		
+0.650			+0.759			-0.252			+0.389		
+0.760			0.667			+1.531			0.984		
+1.000			+1.010			+1.554			1.058		
$\begin{array}{r} \text{C } 33 \\ 6 \text{ } 32 \\ \hline 65 \end{array} \quad \text{W } 30 \\ \quad \quad \quad 31 \\ \hline 61$						$\begin{array}{r} \text{E } 35 \\ 6 \text{ } 33 \\ \hline 68 \end{array} \quad \text{W } 81 \\ \quad \quad \quad 64 \\ \hline 64$			$\begin{array}{r} \text{E } 39 \\ 6 \text{ } 37 \\ \hline 76 \end{array} \quad \text{W } 29 \\ \quad \quad \quad 31 \\ \hline 80$		
-4. -0.076			-0.076			-4. -0.076			-46. -0.304		
13 26 14.8			13 32 57.8			13 40 11.8			13 46 38.4		
36.5			33 20.0			45.0			47 1.8		
58.6			42.0			41 20.3					
27 20.1			34 3.3			53.8			47.7		
42.2			25.8			42 28.0			48 11.0		
172.2			148.9			158.9			98.9		
13 26 58.44			13 33 41.78			13 41 19.78			13 47 24.72		
0.469			0.580			0.708			0.809		
-0.06			-0.05			-0.12			-0.30		
+0.18						+0.28			-0.19		
+0.85						-0.33			+0.51		
13 28 8.26						13 42 28.73			13 48 33.69		



Observer.

A Boatis East	γ Urs Min West	δ Scarpia	β' Scarpia
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-0.336	-2978	+0.962	+0.919
+1606	+3,874	0.492	0.529
1641	4.886	1.080	1.060

$\begin{array}{r} 844 \\ 6 \frac{45}{89} \end{array}$	$\begin{array}{r} 31 \\ W \frac{30}{61} \end{array}$	$\begin{array}{r} 844 \\ 6 \frac{42}{86} \end{array}$	$\begin{array}{r} 25 \\ W \frac{27}{52} \end{array}$	$\begin{array}{r} 844 \\ 6 \frac{41.5}{85.5} \end{array}$	$\begin{array}{r} 27 \\ W \frac{30}{57} \end{array}$	
-28.	-0.532	-34.	-646	-28.5	<sup>s</sup> -542	-0.608

14 18 30.8		15 50 48.7	15 56 3.0
19 7.0	15 45 54.0	51 12.5	26.8
42.2	47 41.2	36.2	50.0
20 18.8	49 29.0	58.8	57 12.2
54.8		52 23.2	35.8
153.6	124.2	179.4	127.8

14 19 42.72	15 47 41.40	15 51 35.88	15 56 49.56
	41.57		
1.347	2814	2879	2966
-0.85	-2.56	-0.27	-0.32
-0.30	+0.90	+0.21	+0.20
-0.44			

14 20 49.96	15 48 48.83	15 52 44.21	15 57 57.98
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Station *Battle Mountain Nev June 10<sup>th</sup> 1871*

Object	<i>Gr 2320</i>	<i>T Hercules</i>	<i>2 Scorpiu</i>	
Illum. and Description	<i>West</i>			
Factor	A.	(Azimuth) $-1.241$	$-0.152$	$+1.024$
"	B.	(Level) $+2.383$	$+1.448$	$+0.439$
"	C.	(Collimation) $+2.687$	$1.456$	$+1.113$
"	F.	(For Broken transits)		
Levels	$\begin{matrix} S & 49 & W & 29 \\ 6 & 46.5 & 11 & 31 \\ \hline & 95.5 & & 60 \end{matrix}$		$\begin{matrix} 42 & E. & 24 & W. \\ 40 & & 26 & \\ \hline 82 & & 50 & \end{matrix}$	
Sums	$-35.5$ $-6.74$	$-0.641$	$-32.0$ $-0.608$	
Threads				
" 1	16 2 58.0	16 13 42.2	16 19 34.8	
" 2		14 13.5	58.5	
3	4 54.0	45.5 ?	20 23.7	
4	5 52.4	15 16.4 ?	47.2	
5	6 52.0	49.5	21 12.8	
<i>Sums</i>	$216.4$	$167.1$	$177.0$	
	$-14.73$			
Means.	16 5 9.10	16 14 45.42	16 20 23.40	
Transit mean Thread	4 54.37			
Cor. for Rate	3.101	3.265	3.359	
" " Level	$-1.61$	$-0.93$	$-0.27$	
" " Coll	$+0.49$	$+0.27$	$+0.20$	
" " Azim				
Reduced Transit				
Tabular A. R.	16 6 2.00	16 15 53.76	16 21 31.88	
Error of Chron.				
Observed A. R.				

adapted values of constants

June 10  $C = +0.184^S$

a before signals

+ 1.307

after signals

+ 0.116<sup>S</sup>

hourly rate  $-0.114^S$