

ASTRONOMICAL DEPARTMENT.  
—  
SEXTANT  
ASTRONOMICAL OBSERVATIONS.

Book No. 30....., 1876.

ASTRONOMICAL RECORDS.

STATIONS:

Party No 5 - Cala: Carson  
City to Clerer's Ranch. Aug: 25  
to Nov 22<sup>nd</sup> Lt: Birnie

Engineer Department, U. S. Army.

Geographical Surveys West of 100th Meridian.



# List of Stars for 1876.

## STARS FOR SEXTANT OBSERVATIONS.

LATITUDE 32° TO 38° NORTH.

DATE.		STARS IN ORDER OF OBSERVATION.				REMARKS.
		1st.	2d.	3d.	4th.	
June 1 to June 15.	<del>June 1 to June 15.</del>	<del><math>\alpha</math> Virginis (S.)</del>	<del><math>\gamma</math> Ursæ Majoris (W.) 99° to 98°.</del>	<del><math>\alpha</math> Lyrae (E.) 98° to 99°.</del>	<del>Polaris (N.)</del>	<del><math>\alpha</math> Virginis crosses the meridian June 1 at 8<sup>h</sup> 38<sup>m</sup> 36<sup>s</sup> local time.</del>
June 15 to July 1.	<del>June 15 to July 1.</del>	<del><math>\gamma</math> Ursæ Majoris (W.) 99° to 98°.</del>	<del><math>\alpha</math> Serpentis (S.)</del>	<del><math>\alpha</math> Lyrae (E.) 98° to 99°.</del>	<del>Polaris (N.)</del>	<del><math>\alpha</math> Serpentis crosses the meridian July 1 at 9<sup>h</sup> 00<sup>m</sup> 39<sup>s</sup> local time.</del>
July 1 to July 30.	July 1 to July 30.	$\alpha$ Serpentis (S.)	Polaris (N.)	$\alpha$ Lyrae (E.) 118° to 119°.	Arcturus (W.) 119° to 118°.	$\alpha$ Serpentis crosses the meridian July 10 at <del>8<sup>h</sup> 50<sup>m</sup></del> local time, <u>about</u> or five minutes after $\alpha$ Lyrae <u>8<sup>h</sup> 20<sup>m</sup></u> attains double altitude, 110°.
July 30 to Aug. 15.	July 30 to Aug. 15.	Arcturus (W.)	<i>n</i> Ophiuchi. Lat 32 to 36 <i>N</i> Ophiuchi " 36, 38		$\alpha$ Cygni (E.)	Order of observation of these stars to be determined. $\alpha$ Ophiuchi crosses meridian August 1st, 1876 about 8 <sup>h</sup> <del>44<sup>m</sup></del> local time. <u>merid. passage n Ophiuchi 8h 14m</u> Atair crosses meridian September 1st at <del>8<sup>h</sup></del> , or about 24 minutes after $\alpha$ Cor. Borealis <u>8h 58</u> attains double altitude, 81°.
Aug. 15 to Sept. 30.	Aug. 15 to Sept. 30.	$\alpha$ Cor. Borealis (W.) 81° to 80°.	Markab (E.) 80° to 81°.	Polaris (N.)	Altair (S.)	$\epsilon$ Pegasi crosses meridian October 15th at about <del>8<sup>h</sup></del> , or about 20 minutes after $\alpha$ Andromedæ attains double altitude, 109° 30'.
Sept. 30 to Nov. 1.	Sept. 30 to Nov. 1.	$\alpha$ Andromedæ (E.) 109° 30' to 110° 30'.	$\alpha$ Lyrae (W.) 110° 30' to 109° 30'.	Polaris (N.)	$\epsilon$ Pegasi (S.)	Markab crosses meridian at 8 <sup>h</sup> <u>12<sup>m</sup></u> <del>11<sup>m</sup></del> , November 1, 1876
Nov. 1 to Nov. 15.	Nov. 1 to Nov. 15.	Altair (W.) 89° to 88° 30'.	$\alpha$ Arietis (E.) 88° to 89°.	Polaris (N.)	Markab (S.)	$\beta$ Ceti crosses meridian Nov. 15, 1876 at <del>8<sup>h</sup></del> local time. <u>about 8 h 55 m</u>
Nov. 15 to Nov. 30.	Nov. 15 to Nov. 30.	$\epsilon$ Pegasi (W.) 89° 30' to 88° 30'.	$\alpha$ Ceti (E.) 88° 30' to 89° 30'.	$\beta$ Ceti (S.)	Polaris (N.)	

NOTE.—The above stars should be observed in the order and at the altitudes given, for the purpose of simplifying the work and lessening the labor of computation.



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~~59-03-30~~

30-56-30

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39 31 32



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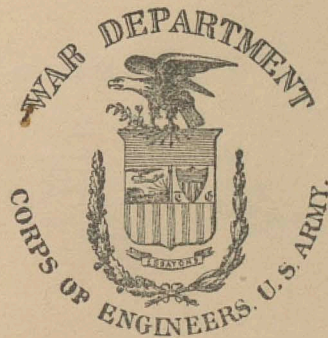


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U. S. ENGINEER OFFICE.

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FIELD ASTRONOMICAL RECORDS.

Book No. 5

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GEOGRAPHICAL AND GEOLOGICAL

EXPLORATIONS AND SURVEYS

West of the 100th Meridian.

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FIRST LIEUT. GEO. M. WHEELER,  
*Corps of Engineers,*  
IN CHARGE.

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1876.



Party No. 5 Cala. Section

From Carson City, Nevada.

To

Date

R. Rennie Jr. 1<sup>st</sup> Lt. 13<sup>th</sup> Reg. Observer.

, Time Recorder.

1876.

REMARKS.

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# SEXTANT ASTRONOMICAL OBSERVATIONS.

1

Sextant No. 1671 and artificial horizon of Mercury #9  
 Watch Chronometer No. 341152 by American } Sextant Observer, *Pinnie*  
 Station: *Rendezvous Camp* Date: *Aug 25. 1876* } *Leowles* Observer for time.  
*Leowles City Nev.*

Object observed.	Time of observation by chronometer.				Observed double altitudes.			Time of observation by chronometer.				Remarks.
	h	m	s	time				h	m	s	time	
<i>L. hor.</i>	9	23	22	1/2	81°	00	00	9	43	39	1/2	<i>mark ab 82-30</i>
		23	50	0					44	8	1/2	29.0
<i>55.0</i>		24	17	1/2					44	33	0	24.5
		24	43	0	80	30	00		59	1/2		26.5
		25	8	0					45	22	3/4	23.2
		25	34	0					45	57	0	28.3
	9	25	59	1/2	80	00	00	9	46	17	0	26.0
<i>Alaris</i>	9	31	47		<del>78</del>	30	35					<i>Index Error</i>
		32	17	1/2	<del>78</del>	32	5					0
		33	19	1/2	28	31	50					
		33	57	3/4		32	40					
		34	39	1/4	78	33	20					
		35	14	1/2		33	45					
		35	53	0		34	0					
		36	37	0		34	50					
		37	28	0		35	0					
		38	2	0		35	40					
		38	29	1/2								
		39	4	.5		36	10					
		39	33	0		36	25					
		40	2	3/4		36	30					
		40	40	0		36	50					
<i>altair</i>	9	48	51	1/2	118	42	30					
		49	11	1/2		42	35					
		49	49	1/4		41	40					
		50	33	1/2		41	25					
		51	5	3/4		39	35					
		51	47	1/4		39	0					
		52	11	3/4		38	10					
		52	39	0		37	40					
		53	19	0		36	30					

*Bar: 25.392*  
*Alt: 64.2*  
*Det: 61.2*



SEXTANT ASTRONOMICAL OBSERVATIONS.

Sextant No. 1671 and artificial horizon of Mercury

49

Chronometer No. 341152 by American

Binnie Sextant Observer.

Station: Rendezvous Camp Date: Aug 26, 76  
near Curson Riv.

Howles Observer for time.

Object observed.	Time of observation by chronometer.				Observed double altitudes.		Time of observation by chronometer.			Remarks.		
	h	m	sec	tenths			h	m	sec		tenths	
♄ Leo. Pol. (W)	9	21	18	5	81°	00'	27.0	40	10	0	Markab	
		21	46	5			27.0	39	43	0		
		22	13	0			26.5	39	16	0	Indix Error	
		22	39	5			26.3	38	49	1/2 5		
		23	5	5			27.7	38	23	1/4 2		+ 30" off
		23	31	1/2			26.8	37	55	1/2 5		
		23	56	0	80	00		9	37	28	3/4 7	225.9
		22	38	6	80	30			37	55	1/2 1	9 38 49.4
	22	38	6					37	23	1/4 2		
Polaris (N)	9	25	44	4	78	29	10				Bar. 25.314	
		26	32	0			10					Atm. 62.5
	9	27	9	0	78	30	40				Det. " 63.8	
		27	59	0	"	30	10					
		28	31	1/4	"	31	10					
		29	15	1/4	"	31	45					
		29	48	3/4	"	32	10					
		30	27	1/2	"	32	25					
		31	2	0	"	32	30					
	31	45	1/2	"	32	55						
Altair (S)	42	97	1/2	108	43	40						
	42	59	0		44	0						
	43	34	1/2		44	40						
	44	6	1/2		44	55						
	44	40	1/2		44	40						
	45	12	1/4		43	40						
	45	46	1/2		43	0						
	46	17	0		42	45						
	46	59	1/2		42	25						
	47	38	0		41	50						
	48	24	0		41	5						



*Longitude by Lunar Distance*  
**SEXTANT ASTRONOMICAL OBSERVATIONS.**

Sextant No. \_\_\_\_\_ and artificial horizon of Mercury

*Bornies Watch*  
 Chronometer No. \_\_\_\_\_ by \_\_\_\_\_

*Bornie* Sextant Observer.

Station:  *Rendezvous Camp* Date:  *Aug 31*  
 *Carron New*

*Macomb* Observer for time.

Object observed.	Time of observation by chronometer.	Observed double altitudes.	Time of observation by chronometer.	Remarks.
<i>a Lyrae</i>	<i>19 43 08</i>	<i>93 00 00</i>		
<i>29.2</i>	<i>43 37.2</i>			
<i>27.0</i>	<i>43 04.2</i>			
<i>25.8</i>	<i>44 30</i>			
<i>27.5</i>	<i>44 57.5</i>			
<i>27.8</i>	<i>45 25.3</i>			
<i>26.2</i>	<i>11 45 57.5</i>	<i>92 00 00</i>		
	<i>213.7</i>			
	<i>11 44 30.5</i>	<i>92 30</i>		
<i>Moon Q</i>	<i>11 47 24.3</i>	<i>50 25 15</i>		<i>Correct result read wrong</i>
	<i>48 42.0</i>	<i>" 16 05</i>		
	<i>49 36.0</i>	<i>" 08 40</i>		
	<i>50 28.0</i>	<i>40 00 50</i>		
	<i>11 51 52</i>	<i>49 55 10</i>		
	<i>135.5</i>	<i>249 104 120</i>		
	<i>11 49 27.1</i>	<i>50 09 12</i>		
<i>Saturn</i>	<i>11 53 31.3</i>	<i>78 20 35</i>		
<i>Moon W limb</i>	<i>54 52.3</i>	<i>19 20</i>		
	<i>55 41.2</i>	<i>18 55</i>		
	<i>56 23.2</i>	<i>18 45</i>		
	<i>11 56 54.3</i>	<i>18 10</i>		
	<i>24 20.2 3</i>	<i>93 16.5</i>		
	<i>11 55 28.4</i>	<i>78 19 09</i>		
<i>Saturn</i>	<i>11 59 55</i>	<i>24 51 55 X</i>		
<i>Moon W limb</i>	<i>12 00 01.2</i>	<i>51 30</i>		
	<i>12 02 16.5</i>	<i>missed</i>		
	<i>12 03 28.5</i>	<i>54 10</i>		
	<i>12 04 06.0</i>	<i>24 51 55 X</i>		
<i>Moon O</i>	<i>12 06 22.0</i>	<i>47 27 00 ?</i>		<i>and 28 second time</i>
	<i>12 07 27.0</i>	<i>47 15 50</i>		
	<i>12 08 06.8</i>	<i>47 09 30</i>		
	<i>12 08 47.0</i>	<i>47 02 20</i>		
	<i>12 09 22.1</i>	<i>46 52 10</i>		
	<i>12 10 02.6</i>	<i>46 49 10</i>		



SEXTANT ASTRONOMICAL OBSERVATIONS.

Sextant No. \_\_\_\_\_ and artificial horizon of Mercury

Chronometer No. *Binnies Watch* by

*Binnie*

Sextant Observer,

Station: *Rendezvous Camp*  
*Cameron River*

Date: *Aug 31 '76*

*Macomb*

Observer for time.

Object observed.	Time of observation by chronometer.	Observed double altitudes.	Time of observation by chronometer.	Remarks.
<i>Saturn</i>	12 12 32 1	77	50 30	
	12 13 24 2		47 35	
	12 14 07 3	45 00		
	12 14 59 1	42 25		
	12 15 46 0	77	39 30	
<i>α Arctis</i>	12 19 38.5	96	00 00	
	25.7 12 20 06 2		10 00	
	25.0 12 20 31 2	20 00		
	23.8 12 20 55 6	30 00		
	27.9 12 21 22 9	40 00		
	26.8 12 21 49 7	50 00		
	24.0 12 22 13 7	97	00 00	
	21.9 2			
	20 55 3			



# SEXTANT ASTRONOMICAL OBSERVATIONS.

5

Sextant No. *1671* and artificial horizon of Mercury *9*

Chronometer No.

by *Ames Watch Co*

*Brown*

Sextant Observer.

Station: *Camp 1 (Sutor)*

Date: *Sept 5*

*Spiller*

Observer for time.

Object observed.	Time of observation by chronometer.	Observed double altitudes.	Time of observation by chronometer.	Remarks.
<i>Altair</i>	8 56 30.3	118 33 45		<i>Clouds.</i>
	8 57 18.2	118 32 50		
	8 57 58.5	118 31 55		
<i>Marskade</i>	9 5 29.7	85° 30'		<i>Index Error +1.30</i>
	29.3 5 59.	40'		
	24.3 6 23.8	50		
	26.7 6 50.	86° 00		
	28.6 7 18.6	10		
	24.2 7 42.8	20		
30.4 8 13.2	30			
<i>Aquilar</i>	9 15 47.2	99 7 10"		=
	16 31.8	6 00		
	18 31.1	4 50		



Sextant No. \_\_\_\_\_ and artificial horizon of Mercury

Chronometer No. \_\_\_\_\_ by \_\_\_\_\_

Station: *Leunip*Date: *Sept 5*Sextant Observer. *Birnie*Observer for time. *Spiller**Autroo Base*

Object observed.	Time of observation by chronometer.			Observed double altitudes.			Time of observation by chronometer.			Remarks.
	h	m	s	h	m	s	h	m	s	
<i>α Andromeda</i>	10	23	23.5	107	00	00				
28.2		23	51.7		10					
26.8		24	18.5		20					
23.5		24	42		30					
25.7		25	7.7		40					
24.6		25	32.3		50					
26.9		25	59.2	109	00					
<i>β Pegasi</i>	10	29	14.8	119 <sup>0</sup>	25'	25				
		30	5.1		27	40				
	10	40	47.6	119	56	45				
		41	53.1		58	55				
		43	28.1	120	1	15				
		44	29.2		2	45				
		45	8.8		3	30				
		46	35.2		4	00				
47.63		47	47.8		4	10				
<i>Colours</i>		47	43.8		4	25				
		48	19.7		4	30				
			47.1		4	30				
		49	18.8		4	20				
		49	50.5		4	5				
		50	31.2		3	55				
		51	24.7		3	45				
		52	11		3	20				
<i>Polaris</i>	10	32	58.6	79	57	00				
		33	38.7		57	50				
		34	9.7		58	20				
		34	40.7		58	35				
		35	11.2		59	00				
		35	44.5		59	30				
		36	16.2							
		36	56.0	80	00	10				

*See next Page*



# SEXTANT ASTRONOMICAL OBSERVATIONS.



Sextant No. \_\_\_\_\_ and artificial horizon of Mercury

Chronometer No. \_\_\_\_\_ by \_\_\_\_\_

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

Station: \_\_\_\_\_

Date: \_\_\_\_\_

Observer for time. \_\_\_\_\_

Object observed.	Time of observation by chronometer.	Observed double altitudes.	Time of observation by chronometer.	Remarks.
<i>ε Pegasi</i>	10 52 44	120 2 55		
	53 19 5	<hr style="width: 100%;"/>		
<i>See preceding page</i>	54 11 2	1 50		
	54 51.	1 10		
<i>α Lyrae</i>	10 57 52.8	105 <sup>0</sup> 30		<i>Index Error - + 35"</i>
26.4	58 19.2	20		
25.8	58 44.5	10		
28.0	59 12.5	105 <sup>0</sup> 00		
26.3	59 38.8	50		
26.6	11 00 54	40		
24.4	50 29.8	104 <sup>0</sup> 30		







# SEXTANT ASTRONOMICAL OBSERVATIONS.

9<sup>3</sup>

Sextant No. 1671 and artificial horizon of Mercury

Watch Chronometer No. 341152 by American Co. } +9

Rivin Sextant Observer.

Station: Backlund Date: Sept 9 }  
Camp 2

Spiller Observer for time.

Object observed.	Time of observation by chronometer.			Observed double altitudes.			Time of observation by chronometer.			Remarks.
α Lyra	10	20	24.6	106	00	00	10	31	21.2	26.4
	28.7	20	53.3	105	50	00	30	54.8		25.7
	26.2	21	19.5		40	00	30	29.1		26.2
	27.0	21	46.5		30	00	30	02.9		26.7
	26.7	22	13.2		20	00	29	36.2		25.9
	26.6	22	39.8		10	00	29	10.3		27.1
	28.0	23	7.8	105	00	00	10	28	43.2	β Andromeda.
		10	21	20.47						
ε Pegasi	10	13	19.2	120	01	50				Watch 6 <sup>m</sup> = 36.3 slow.
		13	59.8		02	05				
		14	40.8		1	40				
		15	27.3 ?		1	35				
		16	10.8		0	50				
		16	43.8		0	35				
		17	18.0	120	00	00				
Polaris	14	34	08.7	80	22	20				Index Error + 20" off
		34	44.8		22	40				
		35	28.8		23	00				
		36	10.2		23	15				
		36	46.1		23	30				
		37	22.2		23	45				
		37	57.1		24	15				



SEXTANT ASTRONOMICAL OBSERVATIONS.

Sextant No. 1671 and artificial horizon of Mercury

Chronometer No. by 341.152 } Pirnie Sextant Observer.

Station: Camp 3 Date: Sept 11<sup>th</sup> } Cowles Observer for time.

Object observed.	Time of observation by chronometer.				Observed double altitudes.		Time of observation by chronometer.			Remarks.	
N. Cor Bor	7	55	9	5	80	00	27.7	8	52	7	
55 35.3	25.8	<del>55</del>	<del>34</del>	3			28.3	8	27	0	
	25.8	56	01	1			24.2		58	7	
			24				26.0		34	5	
	28.2		29	3			28.5	7	8	5	
57 44.5	24.2		53	5			29.0		40	0	
58 9.5	25.0	57	18	5				8	6	12	0
155.0	26.0		44	5	79	00					Markab.
25.8											
Polaris	7	59	46	5	78	55	5				
	8	0	19	5		"	15				
			52	5		55	50				
		1	21	0		56	40				
			57	0		57	0				
		2	<del>32</del>	5?							
			57	5		57	25				
		3	28	7		57	50				
alt	8	11	8	5	118	20	25				
			42	0		20	45				
		12	10	2		21	10				
			<del>49</del>	<del>2</del>		<del>20</del>	<del>05</del>				
		13	46	5		20	0				
		14	56	0		20	50				
		15	32	2		21	0				
			<del>40</del>	<del>8?</del>							
			43	5		20	0				
		17	16	0		19	20				
			59	0		18	45				
		18	34	9		18	0				

Index Error  
+ 25" (off)

Pirnie  
Cowles  
H. "



# SEXTANT ASTRONOMICAL OBSERVATIONS.

# 11

Sextant No. \_\_\_\_\_ and artificial horizon of Mercury

Chronometer No. \_\_\_\_\_ by \_\_\_\_\_

Station: *Camp 4* Date: *Sept 12, 1876*

*Log Cabin Carson River*

*Binnie* Sextant Observer.

*Cowles* Observer for time.

Object observed.	Time of observation by chronometer.				Observed double altitudes.		Time of observation by chronometer.				Remarks.	
	h	m	s	ms	h	m	h	m	s	ms		
<i>α Androm.</i>	9	48	4	5	110	30	25.5	10	0	11	2	<i>α Lyrae</i>
			29	7			25.5			42	7	
			56	7			26.5	59		17	2	
		49	24	5	111	00	28.7			50	7	
			47	2			25.8	58		22	0	
		50	12	5			24.2			56	2	
			40	0	111	30		9	57	32	0	
<i>ε Pegasi</i> <i>*1</i>	10	5	4	7	119	43	55					<i>Clouds.</i>
		6	12	5		43	30					
			58	0		"	"					
		8	5	2		42	45					
		9	31	7		41	45					
<i>Polaris</i> <i>*2</i>	10	14	33	7	80	52	25					<i>Index Error</i> <i>+ 40" (off)</i>
		15	22	7		33	0					
		16	0	7		33	30					
			48	0		33	55					
		17	33	2		34	30					
		18	25	7		35	0					
<i>Pegasi</i>	10	26	8	7	99	16	20					
		27	14	7	17	17	0					
		28	3	0								
		30	33	0	112	17	50					
		31	19	5								



SEXTANT ASTRONOMICAL OBSERVATIONS.

Sextant No. 1671 and artificial horizon of Mercury

Chronometer No. 341152 by

Station: Camp 5

Date: Sept 13<sup>th</sup>

Binnie  
Cowles

Sextant Observer.

Observer for time.

Object observed.	Time of observation by chronometer.				Observed double altitudes.			Time of observation by chronometer.				Remarks.
Corona	7	49	33	2	80	0	0					Index error, 0 Markab Ludov. Erson 0 before 50 after + 25" (off)
	27.5	50	0	7				27.5	3	25	0	
	24.8		25	5				27.5	2	37	5	
	25.5		51	0				25.5	2	30	0	
	26.0	51	17	0				26.5	2	4	5	
	26.0		43	0				26.5	1	38	0	
	25.0	52	8	0	79	00		27.0	1	11	5	
								8	0	44	5	
										966	0	
								8	02	4	3	
Altaie	<del>8</del>	<del>4</del>	<del>57</del>	<del>0</del>	<del>118</del>	<del>5</del>	<del>0</del>					Bar. At the D. "
	8	5	29	5	118	4	20					
		6	20	0		4	45					
			53	0		5	0					
		7	27	5		5	0					
			39	0		4	50					
		8	24	5		4	35					
			57	7		4	20					
		9	45	0		4	15					
		10	39	5		4	5					
		11	16	0		3	45					
			57	5		3	15					
	12	22	0		2	50						
Polaris	8	15	28	5	79	26	10					Watch 2 <sup>m</sup> 35.0 slow
		16	16	7		26	30					
		17	8	5		27	0					
		18	0	5		27	55					
		24	57	0		29	0					
		25	58	5		29	40					
		26	37	5		30	30					



# SEXTANT ASTRONOMICAL OBSERVATIONS.

# 13

Sextant No. *1671* and artificial horizon of Mercury

Chronometer No. *341152* by

Station: *Side Camp* Date: *Sept 18. 76* } *Prinic* Sextant Observer.  
*Spiller* Observer for time.

*Eleven mile Cañon 1 mile from Summit*

Object observed.	Time of observation by chronometer.			Observed double altitudes.			Time of observation by chronometer.			Remarks.
<i>d Cor Boo</i>	7	24	26.5	79	00	00	7	33	7.7	<i>Markab</i>
<i>28.5</i>			<i>55</i>		<i>50</i>	<i>10</i>			<i>40.8</i>	<i>26.9</i>
<i>24.5</i>		<i>25</i>	<i>19.5</i>		<i>40</i>		<i>32</i>	<i>13.7</i>		<i>27.5</i>
<i>d Cor Boo</i>			<i>45.2</i>		<i>30</i>			<i>46.2</i>		<i>25.9</i>
<i>25.7</i>					<i>20</i>		<i>31</i>	<i>20.3</i>		<i>27.3</i>
<i>26.5</i>		<i>26</i>	<i>11.7</i>		<i>10</i>			<i>58.0</i>		<i>27.3</i>
<i>26.0</i>			<i>37.7</i>		<i>78</i>	<i>00</i>		<i>7.30</i>	<i>25.7</i>	<i>↑</i>
<i>26.0</i>		<i>27</i>	<i>3.0</i>							
<i>altair</i>	7	35	26.7	117	57	30				<i>Index Error</i> <i>+ 40" (off)</i> <i>+ 30" (off)</i> <hr/> <i>+ 35" (off)</i>
		<i>36</i>	<i>24.7</i>		<i>58</i>	<i>40</i>				
		<i>37</i>	<i>04.4</i>		<i>59</i>	<i>10</i>				
		<i>37</i>	<i>40.4</i>		<i>59</i>	<i>40</i>				
		<i>38</i>	<i>21.8</i>	118	00	30				
		<i>38</i>	<i>56.2</i>		<i>01</i>	<i>00</i>				
		<i>39</i>	<i>36.1</i>		<i>01</i>	<i>30</i>				
		<i>40</i>	<i>11.3</i>		<i>00</i>	<i>20</i>			<i>?</i>	
		<i>40</i>	<i>51.8</i>		<i>01</i>	<i>00</i>				
		<i>41</i>	<i>26.7</i>		<i>00</i>	<i>30</i>				
		<i>41</i>	<i>58.2</i>	118	00	00				
		<i>42</i>	<i>43.1</i>	117	59	40				
		<i>43</i>	<i>19.8</i>		<i>59</i>	<i>40</i>				
		<i>43</i>	<i>51.8</i>		<i>59</i>	<i>05</i>				
		<i>44</i>	<i>24.8</i>		<i>58</i>	<i>05</i>				
		<i>44</i>	<i>56.3</i>		<i>58</i>	<i>20</i>				
<i>Polaris -</i>	7	47	20.0	79	26	40				
		<i>48</i>	<i>26.7</i>		<i>27</i>	<i>20</i>				
		<i>49</i>	<i>15.2</i>		<i>28</i>	<i>50</i>				
		<i>50</i>	<i>51.2</i>		<i>29</i>	<i>30</i>				
		<i>51</i>	<i>30.7</i>		<i>30</i>	<i>20</i>				
		<i>52</i>	<i>10.8</i>		<i>30</i>	<i>45</i>				
		<i>52</i>	<i>46.2</i>		<i>31</i>	<i>20</i>				
		<i>53</i>	<i>29.4</i>		<i>32</i>	<i>20</i>				
		<i>54</i>	<i>17.2</i>		<i>33</i>	<i>10</i>				
		<i>55</i>	<i>06.2</i>		<i>33</i>	<i>50</i>				



## SEXTANT ASTRONOMICAL OBSERVATIONS.

Sextant No. 1671 and artificial horizon of Mercury # 9  
 Watch Chronometer No. 341154 by American Co. Birnie Sextant Observer.  
 Station: West Gate Date: Sept 27 Spiller Observer for time.

Object observed.	Time of observation by chronometer.			Observed double altitudes.			Time of observation by chronometer.			Remarks.
∞ Andromedar.	9	01	39.6	108	00	00				
259		02	3.7		10	00				
260		02	29.7		20	00				
269		02	56.6		30	00				
250		03	21.6		40	00				
261		03	47.7		50	00				
282		04	16.2	109	00	00				
Polaris.	9	06	24.8	79	58	15				
		07	13.3		58	35				
		07	59.2		59	00				
		08	39.7		59	40				
		09	11.1	80	00	15				
		09	38.2		00	35				
		10	47.7		00	50				
∞ Pegasi	9	13	26.2	119	48	40				
		14	12.0		50	30				
		14	58.1		52	20				
		15	47.6		53	30				
		16	28.6		55	00				
		17	17.0		56	10				
		18	3.8		58	00				
		18	56.0		59	00				
		19	29.9		59	30				
		19	56.4	120	00	00				
		20	40.7	120	01	20				
		21	29.2		1	40				
		22	00.6		2	00				
		22	31.1		1	50				
		23	12.6		1	40				
		24	01.3		1	45				
		25	10.1		1	50				
		25	54.2		2	20				
		26	49.2		2	10				
		27	23.7		1	50				



# SEXTANT ASTRONOMICAL OBSERVATIONS.

# 15



Sextant No. *1671* and artificial horizon of Mercury *+9*  
 Watch Chronometer No. *341157* by *American* } *Birmie* Sextant Observer.  
 Station: *West Gate* Date: *Sept 22* } *Spiller* Observer for time.

Object observed.	Time of observation by chronometer.	Observed double altitudes.	Time of observation by chronometer.	Remarks.
<i>ε Pegasi</i>	<i>9 27 56.0</i>	<i>120 01 30</i>		
	<i>28 30.7</i>	<i>1 20</i>		
	<i>29 06.2</i>	<i>00 45</i>		
<i>α Lyra</i>	<i>9 32 07.1</i>	<i>106 00 00</i>		
	<i>27.0 32 34.1</i>	<i>50 00</i>		
	<i>25.5 32 59.6</i>	<i>40 00</i>		
	<i>28.1 33 27.7</i>	<i>30 00</i>		
	<i>25.6 33 53.3</i>	<i>20 00</i>		
	<i>27.7 34 21.0</i>	<i>10 00</i>		
	<i>26.1 34 47.1</i>	<i>105 00 00</i>		
	<i>9 33 27.1</i>			
			<i>Index Error + 35" (off)</i>	
			<i>Watch 1<sup>m</sup> 27.4 slow</i>	



Sextant No. *1671* and artificial horizon of Mercury

Chronometer No. \_\_\_\_\_ by \_\_\_\_\_  
 Station: *Chuck Wells* Date: \_\_\_\_\_

*St Birnie*  
*Sept 25 Cowles*  
 Sextant Observer, \_\_\_\_\_  
 Observer for time, \_\_\_\_\_

Object observed.	Time of observation by chronometer.			Observed double altitudes.	Time of observation by chronometer.			Remarks.			
<i>Alpha Coronae</i>	7	10	42	5	78	28	5	37	15	0	
<i>29.2</i>		11	11	7		26	0	6	46	5	
<i>26.0</i>		11	37	7		24	0	36	20	5	
<i>26.3</i>		12	4	10		24	0	5	56	5	
<i>25.5</i>		14	29	5		24	0	5	32	5	
<i>27.5</i>		12	44	0		25	5	35	8	5	<i>A. Andromedae</i>
<i>25.5</i>		13	09	5	77			7	34	43	0
			18	9					22	2	5
		11	59	8					59	9	
<i>Machab</i>											
<i>Altaire</i>	7	18	3	5	118	47	50				
			59	0		48	15				
		19	31	5		49	15				
		20	17	5	<i>miss</i>						
		21	7	0							
			44	5		50	20				
		22	28	5							
			55	0		51	55				
		23	33	2		52	30				
		24	19	0		52	45				
		25	7	2		52	20				
			46	0		51	45				
		26	48	5		50	10				
		27	43	2							
		28	37	5		49	50				
		29	17	0		49	30				
		30	7	5		49	30				
			43	5							

*Index error*  
*before + 35"*  
*after + 35"*  
*Review done*  
*for 3 stars obs.*  
*first.*



# SEXTANT ASTRONOMICAL OBSERVATIONS.

17

Sextant No. \_\_\_\_\_ and artificial horizon of Mercury

Chronometer No. \_\_\_\_\_ by \_\_\_\_\_

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

Station: \_\_\_\_\_ Date: \_\_\_\_\_

Observer for time. \_\_\_\_\_

Object observed.	Time of observation by chronometer.	Observed double altitudes.	Time of observation by chronometer.	Remarks.
P	<del>42 23 5</del>	<del>78 45 50</del>		
	<del>43 13 0</del>	<del>46 46 50</del>		
	<del>44 0 5</del>	<del>47 40</del>		
	<del>42 0</del>			
	<del>45 15 5</del>	<del>49 0</del>		
	<del>46 9 0</del>	<del>50 15</del>		
	<del>46 5</del>			
	47 26 0	50 15		
	51 5	50 40		
	48 12 5	50 55		
41 5	51 10			
44 8 0	51 15			
31 5	51 30			



# SEXTANT ASTRONOMICAL OBSERVATIONS.

Sextant No. *1671* and artificial horizon of Mercury *9*

Match Chronometer No. *341157* by *American Watch* } *Birmie* Sextant Observer.

Station: *Camp (4) Bench Creek* Date: *Sept 28* } *Opiller* Observer for time.

Object observed.	Time of observation by chronometer.			Observed double altitudes.			Time of observation by chronometer.			Remarks.	
	h	m	s	1	2	3	h	m	s		
<i>α Andromedae</i>	8	57	47.0	111	30	00		43.8		27.2	
		58	14.4		40	00	04	16.6		26.4	
		58	41.1		50	00		50.2		26.4	
		59	7.1	112	00	00	08	23.8		26.3	
		59	33.3		10	01		57.5		27.3	
		59	59.0		20	00		30.2		26.2	
		9	00	24.5		30	00	9 02	04.0		<i>∞ Lyræ -</i>
<i>ε Pegasi</i>	9	07	12.7	119	34	50					
		07	54.6		35	25					
		08	26.1		35	50					
		09	15.0		36	15					
		10	16.2		36	40					
		Clouds									
		12	42.2		37	00					
		13	20.4		36	30					
		13	47.8		36	40					
		14	36.8		36	10					
	15	36.1		35	30						
	16	14.8		34	55						
<i>Polaris</i>	9	19	42.8	80	39	30					
		20	28.5		40	20					
		21	02.8		40	40					
		21	29.9		40	55					
		22	10.8		41	10					
		22	43.7		41	35					
		23	15.8		41	50					
	23	44.4		42	10						

*Index Error + 1.00" (off)*



# SEXTANT ASTRONOMICAL OBSERVATIONS.

19

Sextant No. *1671* and artificial horizon of Mercury 9

Chronometer No. *341152* by *American* *Binnic* Sextant Observer.

Station: *Sherman's Peak* Date: *Sept. 29. 76* *Spiller* Observer for time.

*New Camp (L)*

Object observed.	Time of observation by chronometer.	Observed double altitudes.	Time of observation by chronometer.	Remarks.	
<i>♄ Andromedae</i>	8 55 <del>45</del> 4 <sup>2</sup>	111 30 00	9 02 43 2		
	<i>14.4</i> 56 9 8	40 00	02 16 7	<i>26.5</i>	
	<i>29.7</i> 56 39 5	50 00	01 49 2	<i>27.5</i>	
	<i>26.2</i> 8 57 5 7	112 00 00	01 23 5	<i>25.7</i>	
	<i>26.6</i> 57 32 3	10 00	00 54 7	<i>28.8</i>	
	<i>24.5</i> 57 56 8	20 00	00 31 8	<i>22.9</i>	
	<i>27.5</i> 58 24 3	112 30 00	9 00 04 3	<i>27.5</i> <i>α Lyra</i>	
			22 3 4		
		8 57 4 8		9 01 23 3	
	<i>♃ Pegasi</i>	9 05 31 6	119 30 30		<i>Index Error</i>
06 21 2		31 00		<i>+ 1' (off)</i>	
07 16 4		31 40			
07 49 8		32 05		<i>Match</i>	
08 29 8		32 35		<i>3<sup>rd</sup> 22.4 fact</i>	
09 08 8		33 10			
09 38 2		33 00			
10 36 2		32 55			
11 07 8		32 40			
11 36 2		32 05			
12 4 2	31 45				
12 37 0	31 20				
<i>♁ Polaris</i>	9 19 34 8	80 42 45			
	20 11 0	42 45			
	20 46 2	43 35			
	21 18 0	43 55			
	21 47 0	44 20			
	22 11 2	44 40			
	22 39 3	44 55			
23 35 2	45 10				



Sextant No. 1671 and artificial horizon of Mercury

Watch Chronometer No. 351157 by Anson Co. } Birnie Sextant Observer.

Station: Cherry Valley Date: Sept 30 } Spiller Observer for time.

Camp C

Object observed.	Time of observation by chronometer.		Observed double altitudes.	Time of observation by chronometer.		Remarks.
<i>α Lyrae</i>	8	58 22.8	112	30	00	
25.2		58 48.0		20	00	
26.4		59 14.4		10	00	
26.1		59 40.5	112	00	00	
28.5	9	00 9.0		50	00	
25.8		00 34.8		40	00	
27.0		01 1.8	111	30	00	
		1561 3				
		41 6				
<i>ε Pegasi</i>	9	03 09.2	119	25	40	
		54.8		26	10	
	4	30.2		27	05	
	5	8.2		27	25	
		44.8		27	35	
	6	28.0		28	05	
	6	56.8		28	20	
	7	24.8		28	20	
	8	05.2		28	20	
	8	54.8		27	55.2	
	9	49.8		28	05	
	10	29.2		27	40	
	10	59.8		27	30	
	11	28.2		27	10	
	11	58.4		26	45	
	12	22.2		26	25	
<i>Polaris</i>	9	17 16.8	80	51	25?	
		57.0		51	20	
	18	40.8		51	35	
	19	05.2		51	50	
	19	32.8		52	05	
	19	57.2		52	15	
	20	24.2		52	30	
	20	47.2		52	45	



# SEXTANT ASTRONOMICAL OBSERVATIONS.

21

Sextant No. 1671 and artificial horizon of Mercury

Chronometer No. 357174 by Smith's Co.

Station: Cherry Valley Date: Sept 30  
cont'd

Brimin  
Spiller

Sextant Observer.

Observer for time.

Object observed.	Time of observation by chronometer.	Observed double altitudes.	Time of observation by chronometer.	Remarks.
<i>B. Andromeda</i>	9 28 33 8	107 00 00		
26.7	29 00 5-	10 00		
26.5	27 0	20 00		
26.8	53 8	30 00		
26.0	30 19 8	40 00		
26.0	45 8	50 00		
27.4	31 13 2	108 00 00		
				<i>Index Error + 50" off</i>



SEXTANT ASTRONOMICAL OBSERVATIONS.

Sextant No. 1671 and artificial horizon of Mercury

Waltham Chronometer No. 307157 by Amos C. Birnie

Sextant Observer.

Station: Pattersons Rand Date: Oct 1<sup>st</sup>

Spiller

Observer for time.

Object observed.	Time of observation by chronometer.			Observed double altitudes.			Time of observation by chronometer.			Remarks.	
α Cor Bor	6	57	18	79	30	00	7	28	27.0		
		57	44 8	79	20	00		27	39 6		
	26.4	58	11 2		10	00		27	34 8		
	25.6	58	36 8	79	00	00		27	07 8		
	26.0	59	2 8		50	00		26	41 4		
	24.2	59	27 0		40	00		26	16 8		
	26.4	59	53 4	78	30	00	7	25	49.4		
		6	58	36 3				7	27		23 6 8
		7	4	33 2	117	58	40				08 1
			5	8 5		59	00				
Altair		5	47 5		59	50				α Andromadae	
		6	18 6	118	00	40					
		6	52 2		1	20					
		7	22 6		1	55					
		7	56 4		2	10					
		8	24 4		2	30					
		8	54 0		2	40					
		9	29 3		3	00					
		10	02 8		3	25					
		10	37 5		4	00					
		11	4 8		4	00					
			35 0		3	45					
		12	07 8		3	25					
		12	47 8		3	15					
		13	38 8		3	10					
	14	00 4		3	00						
		36 8		2	05						
	15	25 8		2	35						
	16	00 8		2	25						
		52 0		2	05						

Watch  
14<sup>m</sup> 28.7 fact



SEXTANT ASTRONOMICAL OBSERVATIONS.

Sextant No. 1671 and artificial horizon of Mercury

Watch Chronometer No. 3647 by *Swiss Co* } *Binni* Sextant Observer.

Station: *Pattersons Bend* Date: *Oct 1st* } *Spiller* Observer for time.

*continued*

Object observed.	Time of observation by chronometer.	Observed double altitudes.	Time of observation by chronometer.	Remarks.
1 Polaris	7 20 36 2	79 29 10		* 40"
	21 03 2		29 30	
	21 28 0		29 50	
	21 57 7		30 30	
	22 23 6		30 50	
	22 43 7		31 10	
	23 07 5		31 25	
	9 30 09 0		9 54 07 3	80 47 25
25.5	30 36 5		55 12 0	47 00
27.0	31 03 5		57 34 0	47 55
27.1	31 57 7			
26.8	32 24 5			
28.0	33 20 5			
	9 35 33 7	96 50 00		
26.8	36 00 0		40	
27.7			30	
27.7	36 55 5		20	
28.5	37 24 0		10	
26.2	7 50 2		00	
			50	
	40 11 5		40	
			30	
			20	
17 2 13	40 11 5	10		
5 11 4 3				
28.2				



SEXTANT ASTRONOMICAL OBSERVATIONS.



Sextant No. 1671 and artificial horizon of Mercury

Watch Chronometer No. 351154 by Amer<sup>u</sup> Co } Birnie  
 Station: Antones Ranch Date: Oct 4<sup>th</sup> } Spiller

Sextant Observer:  
 Observer for time.

Object observed.	Time of observation by chronometer.			Observed double altitudes.			Time of observation by chronometer.			Remarks.
☉ Coronae	6	49	59.4	79	00	00.	6	58	25.6	
	26.8	50	26.2	78	30	00	57	57.4		
	25.6		31.8		40	00	57	31.2		
	26.8	51	18.6		30	00	57	05.0		
	25.6		44.2		20	00	56	37.3		
	26.4	52	10.6		10	00	56	12.8		
	26.7		37.3	78	00	00	6	53	45.6	
♃ Altair	7	00	47.8	118	17	20	6	57	26.4	Marked
		01	35.5		18	35			04.9	
		02	18.8		18	45				
		02	53.3		19	05				
		03	21.1		19	30				
		04	20.0		20	30				
		04	54.2		20	35				
		05	19.7		20	30				
		05	48.4		20	25				
		06	13.8		20	05				
♄ Polaris	7	10	41.9	79	10	40				Watch 18 <sup>m</sup> 02.5 <sup>s</sup> fast
		11	18.7		11	15				
		11	58.8		11	35				
		12	24.5		11	50				
		12	50.6		12	15				
		13	16.6		12	35				
		13	38.2		12	55				
		14	04.7		13	10				

118 20 35  
 118 21 35  
 59 10 35  
 30 49 25  
 8 32  
 Index Error  
 + 35 off



# SEXTANT ASTRONOMICAL OBSERVATIONS.

20

Sextant No. *1671* and artificial horizon of Mercury *+9*  
 Watch Chronometer No. *351146* by *Am. Co.* } *Spiller* Sextant Observer.  
 Station: *Camp (La.) Desotoys Pk.* Date: *Oct 3* } *Birnie* Observer for time.

Object observed.	Time of observation by chronometer.	Observed double altitudes.	Time of observation by chronometer.	Remarks.
<i>α Syrac</i>	8 54 44.0	111 30 00		
	55 07.0	1 20 00		
	31.2	10 00		
	55 59.7	111 00 00		
	56 25.5	110 50 00		
	56 51.5	40 00		
	8. 57-18.5	57 17.3	30 00	
	57 44.5	20 00		
	58 11.2	10 00		
	58 37.8	110 00 00		
8 59 04.5	109 50 00			
<i>α Andromeda</i>	9 06 07.7	118 30 00		Index error +45" off
	23.5 31.5	40 00		
	29.0 07 00.5	50 00		
	21.0 21.5	119 00 00		Watch <sup>m s</sup> 16.34 fast
	29.7 49.2	10 00		
	25.1 08 17.3	20 00		
27.0 44.3	30 00			
<i>Polaris</i>	9 28 29.5	80 34 10		
	29 07.3	34 40		
	30 27.5	35 30		
	31 27.7	35 55		
	32 45.7	36 20		



SEXTANT ASTRONOMICAL OBSERVATIONS.

Sextant No. \_\_\_\_\_ and artificial horizon of Mercury

Chronometer No. \_\_\_\_\_ by \_\_\_\_\_

Station: *Borchman's Ranch*

Date: *Oct 11<sup>th</sup>*

*Bornie*  
*Cowles.*

Sextant Observer, \_\_\_\_\_

Observer for time, \_\_\_\_\_

Object observed.	Time of observation by chronometer.			Observed double altitudes.		Time of observation by chronometer.			Remarks.
<i>β Persei</i>	8	11	47	5	119	46	45		<i>Set watch back 30'</i>
		12	59	5		47	05		
		13	36	2		47	15		
		<del>14</del>	<del>25</del>	<del>5</del>		<del>47</del>	<del>5</del>		
		15	5	0		<del>47</del>	25	<i>hazy</i>	
<i>Polaris</i>	8	21	11	5	80	30	50		<i>Index Error + 45"</i>
		22	13	0		31	10		
		24	49	5		32	10		
		28	43	2		34	50		
		29	25	0		35	30		
		32	3	0		36	05		
		36	46	2		38	30		
		37	16	0		39	10		
			43	5		39	20		
		38	16	0		39	50		
			49	0		40	0		
		39	20	0		40	25		
		44	142	2		12	150		
		25	16	4	80	32	54		
<i>α Lyrae</i>	8	42	58	5	99	0	0		<i>good</i> <i>good</i> <i>"</i>
		27.5	43	26	0				
		27.2	43	53	2				
		29.3	44	22	5	97	30		
		27.2	44	49	7				
		25.3	45	15	0				
		26.2	45	42	2	97	00	00	
			256	1					<i>good</i>
	8	44	19	4					



# SEXTANT ASTRONOMICAL OBSERVATIONS.

and artificial horizon of Mercury

Sextant No. \_\_\_\_\_ by \_\_\_\_\_ Sextant Observer. \_\_\_\_\_  
 Chronometer No. \_\_\_\_\_ Date: *Oct 11 46* Observer for time. \_\_\_\_\_  
 Station: \_\_\_\_\_

Object observed.	Time of observation by chronometer.	Observed double altitudes.	Time of observation by chronometer.	Remarks.
<i>β Andromedae</i>				
<i>β Antaris</i>				
<i>γ Rigel</i>	<i>50 54 5</i>	<i>77 00</i>	<i>good</i>	<i>Clouds</i>
	<i>57 34 7</i>	<i>10</i>	<i>ii</i>	
	<i>52 8 0</i>	<i>Height 20</i>		



SEXTANT ASTRONOMICAL OBSERVATIONS.

Sextant No. 1671 and artificial horizon of Mercury

Chronometer No. by

Station: Silver Age.  
Camp 12

Date: Oct 15<sup>th</sup>

Binne  
Cawles

Sextant Observer.

Observer for time.

Object observed.	Time of observation by chronometer.				Observed double altitudes.	Time of observation by chronometer.				Remarks.
Polaris	7	32	10	5	80	4	30			
		32	49	7		4	45			
		33	23	0		5	0			
		33	50	0		5	20			
		34	26	5		5	35			
		35	6	5		6	0			
		35	34	0		6	20			
			49	2			15			
		33	54	3			21.4			
P. Androm.	7	52	4	5	111	30	0			before
25.5		52	30	0						Indep Err + 35"
25.5		52	55	5						
25.5		53	21	0						after
27.5		53	48	5						+ 45"
24.5		54	13	0						
27.2		54	40	2	112	30				mean 40"
			212	7						
		53	21	8						
	7	56	20	5?	112	30				late
23.5		56	46	0						
26.5		57	12	5						24.249
25.5		57	38	0						58.8
27.5		58	5	5						40.5
26.5		58	32	0						
25.5	7	58	57	5	111	30				
			212	0						
			38	8						
E. Pyraei	8	01	56	2	119	46	50			119 48 40
		2	53	0		47	25			59 54 20
		3	33	0		47	55			30 05 40
		4	33	5		48	30			9 18 45
		5	7	5		48	40			139 24
		5	47	2		48	42			
		6	51	7		48	40			
		7	24	5		49	35			
			58	5		48	15			







SEXTANT ASTRONOMICAL OBSERVATIONS.

Sextant No. \_\_\_\_\_ and artificial horizon of Mercury

Chronometer No. \_\_\_\_\_ by \_\_\_\_\_

Station: Washington Date: Oct 25

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

Observer for time. \_\_\_\_\_

Object observed.	Time of observation by chronometer.			Observed double altitudes.	Time of observation by chronometer.			Remarks.
<i>Markab</i>	8	44	35	5	129	38	30	
		49	14	7	130	2	0	
		54	15	0		21	55	
	9	0	25	0	130	39	5	
		2	19	0		41	55	
		3	2	5		43	0	
			53	0		43	40	
		4	24	5		44	15	
			53	2		44	40	
		5	33	5		45	50	
		6	6	0		46	5	
		6	57	0		46	20	
	7	21	0		46	45		
	7	47	5		47	10		
	8	17	5		47	15		
		12	2		47	0		
	9	57	5		46	55		
	10	29	3		46	40		
	11	0	0		46	15		
	11	31	7		45	55		
	12	9	0		45	40		
	12	37	0		45	5		

*Index Error*  
+ 35" (off)

23.253  
46.5  
52.0

130 47 15  
65 23 37.5  
24 36 22.5  
14 32 44  
39 09



# SEXTANT ASTRONOMICAL OBSERVATIONS.

Sextant No. \_\_\_\_\_ and artificial horizon of Mercury

Chronometer No. \_\_\_\_\_ by \_\_\_\_\_

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

Station: \_\_\_\_\_

Date: \_\_\_\_\_

Observer for time. \_\_\_\_\_

Object observed.	Time of observation by chronometer.	Observed double altitudes.	Time of observation by chronometer.	Remarks.
<i>Altaris</i>	9 15 57 2	71 30 00		1760
	28.3 16 25 5			1020
	27.5 16 52 0			28
	29.2 17 21 2			816
	27.3 17 48 5			204
	27.5 18 16 0			12856
29.2 18 45 2	70 30 00		28	
	265 6		6	
	12 8		168	
	20		17	
			1176	
			168	
			60/2856	
			47 1/2	
<i>Anclis</i>	9 23 58 5	102 30 0		
	24 25 5			
	4 52 0			
	25 18 5			
	5 46 0			
	26 11 0			
6 37 5	103 30 0			
	209 0			
	18 4			
<i>Polaris</i>	9 28 7 5	80 41 50		
	29 34 0	42 0		
	19 57 2	42 15		
	30 21 5	42 25		
	0 45 5	42 35		
	31 12 0	42 50		
	1 33 7	43 0		
	2 11 4	42 175		
	13 0	42 25		



SEXTANT ASTRONOMICAL OBSERVATIONS.

Sextant No. *1671* and artificial horizon of Mercury *9*  
 Chronometer No. \_\_\_\_\_ by *Bronie* Sextant Observer.  
 Station: *Lone* Date: *Oct 27* } *Cowles* Observer for time.

Object observed.	Time of observation by chronometer.				Observed double altitudes.		Time of observation by chronometer.			Remarks.		
<i>Polaris</i>	7	21	34	5	79	14	55			+ 30" (app)		
		22	4	0		15	15					
		22	27	7		15	25					
		22	51	0		15	50					
		23	15	5		49	16	00				
		23	46	0			16	15				
				178		7		160				
				178		7		160				
				39		8	15	36.6				
				39		8						
<i>Andromedae</i>	7	31	33	0	111	30	00	38	8	7		
		31	59	0		37	41	5				
		32	23	7		37	16	7				
		32	49	5		36	49	0				
		33	16	7		36	23	2				
		33	43	2		35	47	5				
		34	7	5		112	30	00	7	35	33	2
				232			6					219
				50		4				35	48	5
		<i>Pegasi</i>	7	40		42	2	120	41	45		
41	18			0	21	55						
41	52			2	42	20						
42	26			0	42	55						
42	59			2	43	15						
43	29			5	43	25						
44	7			2	43	30						
44	39			7	43	45						
45	19			5	43	55						
45	53			7	44	10						
46	25			2	44	10						
47	3			7	44	0						
47	43			7	43	40						
48	12			5	43	25						
48	43			2	43	15						
49	16			7	43	0						
49	53			0	42	45						
50	24	2	42	10								
										120 44 10 60 22 05 29 37 55 * 9 18 45 38 57		



# SEXTANT ASTRONOMICAL OBSERVATIONS.

Sextant No. \_\_\_\_\_ and artificial horizon of Mercury

Chronometer No. \_\_\_\_\_ by \_\_\_\_\_

Station: *McMahon's Camp* Date: *Oct 28*

*Birnie*  
*Cowles*

Sextant Observer.

Observer for time.

Object observed.	Time of observation by chronometer.			Observed double altitudes.			Time of observation by chronometer.			Remarks.			
<i>Altair</i>	8	2	27	5	91	0	0	36	13	5	<i>∞ amities.</i>		
		2	36	4				35	46	5			
		3	28	15				35	22	2			
		3	58	2				34	56	0			
		4	29	0				34	29	5			
		5	10	5				34	4	7			
	8	5	31	2	90	0	0	8	38	39		2	<i>Index error before + 20"</i>
			23	6					41	6			
			58	8					55	9			
<i>Polaris</i>	8	11	48	2	79	56	45				<i>23.587</i> <i>24.5</i> <i>26.0</i>		
		12	28	5		57	0						
		13	6	7		57	25						
		14	28	2		58	5						
		15	22	5		58	30						
	27	3	15	55	7	58	53	180					
		16	27	15		59	25	60					
	34	2	16	56	0	59	20	07	5				
<i>Mars</i>	8	38	46	2	130	48	35				<i>after + 20" (ft.)</i>		
		39	43	0		50	15						
		40	30	0		52	30						
		41	11	5		54	50						
		42	56	7		58	50						
		43	35	2	131	00	00						
		44	10	8		01	00						
		44	41	2		01	25						
		45	21	0		02	00						
		46	3	5		03	20						
		46	46	2		04	50						
		47	22	5		04	45						
		47	55	7		05	25						
		48	33	15		06	10						
		49	20	7		06	50						
		50	11	2		07	05						
		51	46	0		07	0						
		52	24	2		07	0						



## SEXTANT ASTRONOMICAL OBSERVATIONS.

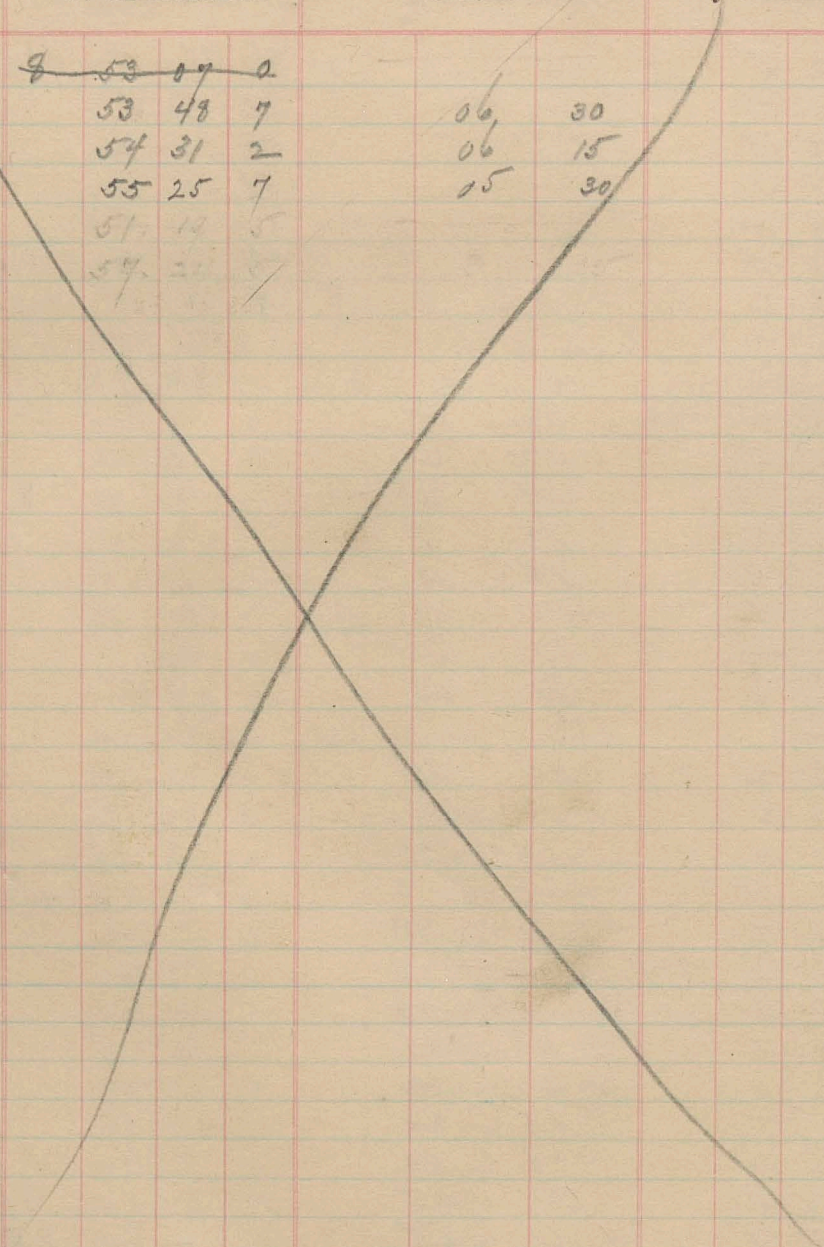


Sextant No. \_\_\_\_\_ and artificial horizon of Mercury \_\_\_\_\_  
 Chronometer No. \_\_\_\_\_ by \_\_\_\_\_ } Sextant Observer, \_\_\_\_\_  
 Station: \_\_\_\_\_ Date: \_\_\_\_\_ } Observer for time, \_\_\_\_\_

Object observed.	Time of observation by chronometer.	Observed double altitudes.	Time of observation by chronometer.	Remarks.
------------------	--	-------------------------------	--	----------

<del>7</del>	<del>53 07 0</del>			
	53 48 7			
	54 31 2			
	55 25 7			
	57 19 5			
	59 21 5			

06	30
06	15
05	30





# SEXTANT ASTRONOMICAL OBSERVATIONS.

Sextant No. 1671 and artificial horizon of Mercury

Watch Chronometer No. 3571177 by Amn. Water Co.

Station: Ellsworth Date: Nov 6

Binnic  
Spiller

Sextant Observer.

Observer for time.

Object observed.	Time of observation by chronometer.			Observed double altitudes.			Time of observation by chronometer.			Remarks.		
	h	m	s	1	2	3	h	m	s			
♄ Andromeda	6	56	46.2	111	30	00	03	21	6	26.8		
		24.6	57	10	8	40	00	02	54	8	27.0	
		25.5	57	36	3	50	00	02	37	8	26.7	
		26.9	58	3	2	112	00	00	02	01	1	25.8
		26.2	"	29	4	10	00	01	35	3	25.1	
		24.4	"	53	8	20	00	01	10	2	26.0	
		26.5	59	20	3	30	00	7	00	44	2	♄ Lyrae
			20	0					19	4	8	
♄ Lyrae ε Pegasi	7	15	50	8	120	39	10				<sup>5</sup> take 23.705 47.9 51.6	
		06	52	8		39	40					
		07	28	7		40	00					
		08	10	8		40	35					
		09	00	3		41	05					
		09	39	4		41	25					
		10	13	4		41	40					
		10	59	0		41	40					
		11	36	6		41	35					
		12	10	0		41	25					
		12	55	0		41	15					
		13	37	2		41	05					
		14	23	2		40	40					
	15	03	8		39	55						
♄ Polaris	7	18	46	4	79	36	05				Error + 35" (off)	
		19	03	0		36	30					
		20	08	0		37	00					
		20	39	0		37	20					
		21	00	8		37	35					
		21	30	8		38	00					
		22	05	4		38	20					
			16	6	4		11	0				
			32	3								
								15.7				
											120 41 40 60 20 50 29 39 10 9 18 45 18 07 55	



SEXTANT ASTRONOMICAL OBSERVATIONS.

Sextant No. 1671 and artificial horizon of Mercury <sup>#9</sup>

Watch Chronometer No. 341152 by *Am<sup>2</sup> Co* } *Bronie* Sextant Observer.

Station: *Welshes Ap<sup>9</sup>* Date: *Nov 7* } *Spiller* Observer for time.

Object observed.	Time of observation by chronometer.			Observed double altitudes.			Time of observation by chronometer.			Remarks.
<i>Andromedar</i>	6	55	21 8	111	30	00	7	01	59 0	25.2
	<i>25.4</i>		5 47 2		40	00			01	33 8
	<i>26.6</i>		56 13 8		50	00		01	08 0	27.8
	<i>24.4</i>		46 38 2	112	00	00		00	40 2	37.2
	<i>26.4</i>		57 04 8		10	00	7	00	13 0	26.8
	<i>25.0</i>		47 29 8	20	00			59	46 2	24.6
	<i>27.0</i>		57 56 8	30	00	6	59	21.6		
		21.2 4						22.1 8		
<i>o Pygari</i>	7	05	31 0	120	37	35				
		06	21 0		35	50				
		06	50 3		39	10				
		07	19 8		39	15				
		07	50 0		39	20				
		08	25 0		39	30				
		08	55 2		39	30	35			
		09	28 3		39	30	40			
		10	28 5		39	40				25.099
		11	10 0		39	35				43.8
		11	48 8		39	30				45.0
		12	26 3		39	10				
		12	51 8		38	55				
		13	18 8		38	34	40			
13	52 8	38	30							
<i>Polaris</i>	7	19	04 2	79	39	25				
		9	32 8		39	35				
		20	02 0		9	50				
		0	30 8		40	00				
		0	59 8		0	20				
		21	25 7		0	35				
			155 13			165				
		20	15 9			18				
			34 5							
			39	57.5						

*o Lyrae*

*Etrom +35" (off)*

120 39 40  
60 19 50  
29 40 10  
9 18



# SEXTANT ASTRONOMICAL OBSERVATIONS.

Sextant No. *1641* and artificial horizon of Mercury <sup>#9</sup>  
 Watch Chronometer No. *341152* by *Amer Water Co* *Binnis* Sextant Observer.  
 Station: *Ti-soo-pok Sp?* Date: *Nov 9* } *Spiller* Observer for time.

Object observed.	Time of observation by chronometer.	Observed double altitudes.	Time of observation by chronometer.	Remarks.
<i>Andromeda</i>	<i>6 53 06.1</i>	<i>111 30 00</i>	<i>6 57 21.8</i>	<i>23.7</i>
	<i>25.7 6 53 31.8</i>	<i>40 00</i>	<i>58 58.1</i>	<i>27.9</i>
	<i>25.2 53 57.0</i>	<i>50 00</i>	<i>8 30.2</i>	<i>26.4</i>
	<i>26.2 54 23.2</i>	<i>112 00 00</i>	<i>6 58 03.8</i>	<i>26.6</i>
	<i>25.1 54 48.3</i>	<i>10 00</i>	<i>7 37.2</i>	<i>26.7</i>
	<i>26.7 55 15.0</i>	<i>20 00</i>	<i>57 10.5</i>	<i>25.2</i>
		<i>30 00</i>	<i>6 56 45.3</i>	
<i>Pegasi</i>	<i>7 02 15.2</i>	<i>120 19 50</i>	<i>20.6 9</i>	<i>Lyrae</i>
	<i>03 33.8</i>	<i>20 55</i>	<i>3 8</i>	
	<i>04 03.8</i>	<i>21 20</i>		
	<i>04 38.2</i>	<i>21 45</i>		
	<i>05 24.0</i>	<i>22 05</i>		
	<i>06 09.2</i>	<i>22 35</i>		
	<i>07 28.4</i>	<i>22 15</i>		
	<i>08 06.8</i>	<i>22 05</i>		
	<i>08 44.5</i>	<i>21 50</i>		
	<i>09 25.2</i>	<i>21 40</i>		
	<i>10 10.2</i>	<i>21 10</i>		
<i>10 43.6</i>	<i>20 40</i>			
<i>Polaris</i>	<i>7 16 30.2?</i>	<i>79 54 40?</i>	<i>120 22 35</i>	
	<i>17 53.6</i>	<i>57 40</i>	<i>60 11 17</i>	
	<i>18 34.6</i>	<i>58 05</i>	<i>29 48 40</i>	
	<i>3 19 04.8</i>	<i>58 30</i>	<i>9 18</i>	
	<i>19 29.8</i>	<i>58 50</i>	<i>3/9 07</i>	
	<i>19 57.7</i>	<i>59 05</i>		
	<i>20 25.6</i>	<i>59 35</i>		
	<i>21 06.7</i>	<i>80 00 00</i>		
	<i>5 21 46.8</i>	<i>00 15</i>		
	<i>22 31.0</i>	<i>00 40</i>		
	<i>290 0</i>	<i>00 22.0</i>		
	<i>19 45.5</i>	<i>59 11.1</i>		

*Index + 35" (off)*



SEXTANT ASTRONOMICAL OBSERVATIONS.

Sextant No. \_\_\_\_\_ and artificial horizon of Mercury

Watch Chronometer No. 3415 by American } Sextant Observer, *Rhiller*

Station: *Tis-oo-pok* Date: *Nov. 9, 1876* } Observer for time, *Pirnie*

Object observed.	Time of observation by chronometer.	Observed double altitudes.	Time of observation by chronometer.	Remarks.
<i>Saturnus</i>	7 37 09 0 38 28 5 40 24 7	76 22 05 23 15 25 10	8 04 14 8 23.8 03 51 0 27.8	
<i>Aquilae</i>	7 48 44 3 49 15 2 49 45 7 50 16 5 51 17 2 51 44 0 52 17 5	87 30 20 10 87 00 86 20	03 23 2 27.7 02 55 5 25.1 02 30 4 23.9 8 01 39 5 27.0	<i>Aridis</i>
<i>Merkab</i> <i>Arctis</i>	8 12 10 5 8 21 48 3 23 30 0 26 05 0 28 48 0 29 41 9 31 14 5 33 18 0 8 34 57 8	130 22 20 130 46 40 47 50 49 50 50 10 49 50 48 30 45 15 130 43 10		
<i>Polaris</i>	8 38 42 0 41 21 5 44 34 5 45 46 0 46 37 5 47 34 0 48 38 0	80 35 05 35 45 37 50 37 25 37 20 38 45		



# SEXTANT ASTRONOMICAL OBSERVATIONS.

39

Sextant No. 1671 and artificial horizon of Mercury

Match Chronometer No. 341152 by Amer Watch Co

Birnie

Sextant Observer.

Station: Dead Horse Hill Date: Nov 12/76

Spiller

Observer for time.

Object observed.	Time of observation by chronometer.	Observed double altitudes.	Time of observation by chronometer.	Remarks.	
L Andromedae	6 48 09.8	111 30 00	4 43.8		
	8 36.5	40 00	54 18.8		
	49 02.8	50 00	3 51.3		
	9 29.0	112 00 00	53. 25.8		
	9 54.3	10 00	2 57.2		
	50 19.6	20 00	2 31.0		
	0 45.4	30 00	6 52 04.6		
	197.4		232.5		
	228.4				
			24.7		
o Pegasus	6 57 21.1	120 47 35		o Lyrae Index Error + 35" off 26.013 24.0 27.0 120 51 00 60 25 30 29 34 30 19 18 45 38 53 15	
	58 25.8	48 20			
	59 11.6	49 05			
	59 43.8	49 30			
	7 00 32.2	49 55			
	01 35.8	50 15			
	02 27.7	50 50			
	03 14.0	50 55			
	03 50.3	50 30			
	04 57.7	50 10			
	06 04.0	49 30			
	06 56.0	48 50			
	Polaris	7 12 07.2	79 28 40		
		12 47.8	29 00		
13 14.8		29 15			
13 47.0		29 30			
14 24.0		29 50			
15 04.6		30 15			
15 27.6		30 25			
15 52.2		30 30			
225.2		205			
180		12			
45		29 40.6			



SEXTANT ASTRONOMICAL OBSERVATIONS.

Sextant No. \_\_\_\_\_ and artificial horizon of Mercury

Chronometer No. \_\_\_\_\_ by \_\_\_\_\_

Station: *Dead Horse* Date: *Nov 13* } *Cowles*

Sextant Observer, \_\_\_\_\_

Observer for time, \_\_\_\_\_

Object observed.	Time of observation by chronometer.	Observed double altitudes.	Time of observation by chronometer.	Remarks.
<i>Syrac</i>				
<i>Agulac</i>	8 17 56	2 80 0 0		
26.7	17 22 5			
28.5	18 51 0			
27.7	19 18 7			
27.3	19 46 10			26.077
28.2	20 14 2			30.577
26.8	20 41 0	79 0 0		25.0
	249 6			
	19 18 5			
<i>Amul's</i>	8 24 15	5 99		
27.7	24 43 2			
22.8	25 6 0			
26.5	25 32 5			
26.2	25 58 7			
25.5	26 24 12			
25.3	26 50 5	99 0 0		
	230 6			
	25 32 9			

*Index error + 35"*



SEXTANT ASTRONOMICAL OBSERVATIONS.

Sextant No. \_\_\_\_\_ and artificial horizon of Mercury  
 Chronometer No. \_\_\_\_\_ by \_\_\_\_\_ } Sextant Observer.  
 Station: *Deep Hollow* Date: *Nov 14* } *Birnie*  
 Observer for time. *Cowles.*

Object observed.	Time of observation by chronometer.			Observed double altitudes.	Time of observation by chronometer.			Remarks.
<i>ε Regasi</i>	<i>6</i>	<i>50</i>	<i>50</i>	<i>2</i>	<i>120</i>	<i>22</i>	<i>35</i>	
		<i>51</i>	<i>48</i>	<i>5</i>		<i>23</i>	<i>45</i>	
		<i>52</i>	<i>23</i>	<i>0</i>		<i>25</i>	<i>20</i>	
		<i>54</i>	<i>58</i>	<i>5</i>		<i>27</i>		<i>+ 35"</i>
		<i>55</i>	<i>18</i>	<i>0</i>		<i>28</i>	<i>30</i>	
		<i>56</i>	<i>4</i>	<i>5</i>		<i>28</i>	<i>45</i>	
		<i>56</i>	<i>44</i>	<i>2</i>		<i>29</i>	<i>15</i>	
		<i>57</i>	<i>31</i>	<i>2</i>		<i>29</i>	<i>30</i>	
		<i>58</i>	<i>9</i>	<i>7</i>		<i>29</i>	<i>40</i>	<i>25.017</i>
		<i>58</i>	<i>51</i>	<i>2</i>		<i>29</i>	<i>45</i>	<i>42.0</i>
		<i>59</i>	<i>23</i>	<i>5</i>		<i>29</i>	<i>45</i>	<i>42.5</i>
	<i>7</i>	<i>0</i>	<i>16</i>	<i>7</i>		<i>29</i>	<i>30</i>	
		<i>0</i>	<i>53</i>	<i>2</i>		<i>29</i>	<i>20</i>	<i>120 29 45</i>
		<i>1</i>	<i>40</i>	<i>5</i>		<i>28</i>	<i>40</i>	<i>60 14 52.5</i>
	<i>2</i>	<i>18</i>	<i>2</i>		<i>28</i>	<i>35</i>	<i>29 45 8</i>	
	<i>3</i>	<i>11</i>	<i>7</i>		<i>27</i>	<i>45</i>	<i>9 18</i>	
							<i>39.04</i>	
<i>ρ Lyrae</i> <i>+ 35-</i>	<i>7</i>	<i>6</i>	<i>16</i>	<i>2</i>	<i>106</i>	<i>0</i>	<i>0</i>	<i>17 27 7</i>
		<i>6</i>	<i>43</i>	<i>0</i>				<i>17 2 2</i>
		<i>7</i>	<i>8</i>	<i>5</i>				<i>16 34 2</i>
		<i>7</i>	<i>37</i>	<i>2</i>				<i>16 10 7</i>
		<i>8</i>	<i>5</i>	<i>7</i>				<i>15 43 6</i>
		<i>8</i>	<i>29</i>	<i>5</i>				<i>15 17 2</i>
		<i>8</i>	<i>56</i>	<i>0</i>	<i>105</i>	<i>0</i>	<i>0</i>	<i>7 14 49 7</i>
			<i>196</i>	<i>1</i>				<i>184 7</i>
			<i>36</i>	<i>6</i>				<i>9 W</i>
								<i>β Andromedae</i>



# SEXTANT ASTRONOMICAL OBSERVATIONS.

43

Sextant No. \_\_\_\_\_ and artificial horizon of Mercury

Chronometer No. \_\_\_\_\_ by \_\_\_\_\_

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

Station: \_\_\_\_\_ Date: \_\_\_\_\_

Observer for time. \_\_\_\_\_

Object observed.	Time of observation by chronometer.	Observed double altitudes.	Time of observation by chronometer.	Remarks.
<i>β Andromedae</i>				
<i>Polaris</i>	8 6 48 0	80 21 35		
	3 7 39 0	21 50		
	8 20 5	22 15		
	8 46 7	22 25		
	9 38 5	22 50		
	5 10 18 0	23 05		
	10 50 5	23 25		
	261 2	206		
	8 54 4	22 29.3		
				<i>Index Error</i> <i>- 1' 35"</i>



SEXTANT ASTRONOMICAL OBSERVATIONS.

Sextant No. \_\_\_\_\_ and artificial horizon of Mercury

Chronometer No. \_\_\_\_\_ by \_\_\_\_\_

Station: *Sulphur spr* Date: *Nov 17*

*Bronie*  
*Cowles*

Sextant Observer.

Observer for time.

Object observed.	Time of observation by chronometer.			Observed double altitudes.			Time of observation by chronometer.			Remarks.			
	h	m	s	h	m	s	h	m	s				
♄ Androm	5	41	45	5	11	30	27.1	5	48	37	1	<i>Index Error</i> <i>+ 35" before</i> <i>+ 35" after</i> <i>Watch set back</i> <i>57 minutes</i> <i>before observation</i>	
	25.3	42	10	8			27.7	48	10	0			
	26.4	42	37	2			27.3	47	42	3			
	26.5	43	3	7			24.7	47	15	0			
	26.3	43	30	0			27.7	46	50	2			
	25.5	44	55	5	112	20	25.5	46	22	5			
	25.7	44	21	2	♄ Lyrae			5	45	57	0		
♃ Regasi	5	51	22	5	120	00	30				16	3	
		52	0	0		01	15						
		52	42	2		01	30						
		53	34	5		01	50						
		54	11	5		01	55						
		54	47	0		02	05						
		55	21	2		02	10						
		55	47	5		01	55						
		56	20	0		01	40						
		56	48	5		01	30						
		57	16	2									
		57	53	8		01	45						
		58	32	5		01	30						
		59	0	5		01	15						
	59	35	5		00	45							
	6	0	13	7	00	30							
Polaris	8	3	57	2	80	15	50						
		4	29	3		16	05						
		4	56	5		16	25						
		5	24	0		16	35						
		5	46	2		16	45						
		6	13	5		16	55						
		6	59	2		17	15						
			28	5	9			230					
		5	17	5		16	32.9						
			23	4									

*26.288*  
*32.0*  
*35.8*

*120 02 05*  
*60 01 01*  
*29 59 00*  
*9 18*  
*39 18*



# SEXTANT ASTRONOMICAL OBSERVATIONS.

Sextant No. \_\_\_\_\_ and artificial horizon of Mercury

Chronometer No. \_\_\_\_\_ by \_\_\_\_\_

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

Station: *Carsons Lake* Date: *Nov 19* }

Observer for time. \_\_\_\_\_

Object observed.	Time of observation by chronometer.	Observed double altitudes.	Time of observation by chronometer.	Remarks.		
<i>♄ Androm</i>	<i>56</i> <i>38</i> <i>59</i> <i>5</i>	<i>111</i> <i>30</i>		<i>Index Error</i> <i>before + 35"</i> <i>after + 35"</i>		
	<i>39</i> <i>28</i> <i>2</i>					
	<i>39</i> <i>53</i> <i>2</i>					
	<i>40</i> <i>24</i> <i>5</i>					
	<i>41</i> <i>7</i> <i>3</i>					
	<i>41</i> <i>9</i> <i>5</i>					
	<i>41</i> <i>36</i> <i>2</i>	<i>112</i> <i>30</i>				
	<i>41</i> <i>24</i> <i>4</i>					
	<i>42</i> <i>22</i> <i>1</i>					
	<i>43</i> <i>12</i> <i>5</i>	<i>112</i> <i>30</i>				
<i>♄ Lyrae</i>	<i>3</i> <i>39</i> <i>2</i>			<i>26.453</i> <i>40.0</i> <i>42.0</i>		
	<i>44</i> <i>8</i> <i>7</i>					
	<i>4</i> <i>33</i> <i>2</i>					
	<i>45</i> <i>5</i> <i>0</i>					
	<i>5</i> <i>26</i> <i>12</i>					
	<i>45</i> <i>52</i> <i>7</i>	<i>111</i> <i>30</i>				
	<i>117</i> <i>7</i> <i>5</i>					
	<i>38</i> <i>9</i>					
	<i>♄ Pegasi</i>	<i>56</i> <i>49</i> <i>58</i> <i>7</i>	<i>122</i> <i>2</i> <i>25</i>			<i>120 04 05</i> <i>60 02</i> <i>29 58</i> <i>19 18</i> <i>17</i>
		<i>55</i> <i>55</i> <i>2</i>	<i>3</i> <i>05</i>			
<i>51</i> <i>0</i> <i>5</i>		<i>3</i> <i>25</i>				
<i>51</i> <i>28</i> <i>2</i>		<i>3</i> <i>45</i>				
<i>52</i> <i>8</i> <i>0</i>		<i>3</i> <i>55</i>				
<i>23</i> <i>3</i>		<i>4</i> <i>05</i>				
<i>52</i> <i>0</i>		<i>4</i> <i>05</i>				
<i>53</i> <i>18</i> <i>2</i>		<i>4</i> <i>50</i>				
<i>42</i> <i>0</i>		<i>3</i> <i>59</i>				
<i>54</i> <i>12</i> <i>7</i>		<i>3</i> <i>45</i>				
<i>38</i> <i>0</i>		<i>3</i> <i>40</i>				
<i>55</i> <i>45</i> <i>2</i>		<i>3</i> <i>30</i>				
<i>56</i> <i>11</i> <i>0</i>		<i>3</i> <i>10</i>				
<i>39</i> <i>5</i>		<i>2</i> <i>55</i>				

*over*



## SEXTANT ASTRONOMICAL OBSERVATIONS.

Sextant No. \_\_\_\_\_ and artificial horizon of Mercury

Chronometer No. \_\_\_\_\_ by \_\_\_\_\_

Sextant Observer, \_\_\_\_\_

Station: Cassondale Date: Nov 19

Observer for time, \_\_\_\_\_

Object observed.	Time of observation by chronometer.	Observed double altitudes.	Time of observation by chronometer.	Remarks.
<u>Polaris</u>	<del>55 51 0 80</del> 5 59 28 7 80 <del>6 0 0 2</del> 0 29 5 14 15 0 51 0 14 25 6 1 16 5 14 45 1 42 2 14 55 2 19 7 15 15 2 47 5 15 25 286 6 180 20 9 120 42.8			



# SEXTANT ASTRONOMICAL OBSERVATIONS.

Sextant No. \_\_\_\_\_ and artificial horizon of Mercury

Chronometer No. \_\_\_\_\_ by *Bornie*

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

Station: *Lees Mill* Date: *Nov 24*

*Cowles*

Observer for time. \_\_\_\_\_

Object observed.	Time of observation by chronometer.	Observed double altitudes.	Time of observation by chronometer.	Remarks.
<i>Altair</i>	6 31 23 2	86 30	39 57 7	<i>err + 35" before</i>
29.3	1 52 5	24.5	9 33 2	
31.0	32 28 5	26.2	39 7 0	
29.7	2 53 2	23.8	8 43 2	
29.5	3 22 7	25.7	58 17 5	<i>23.5</i>
29.3	33 52 10	26.5	7 51 0	<i>22.2</i>
29.7	4 21 7	85 30 27.8	6 37 23 2	<i>P. Arctis</i>
	248 18		232 8	
	52 7		41 8	
<i>Arctis</i>	7 05 33 2	131 04 30		<i>26.007</i>
<i>Markab</i>	06 31 2	04 10		<i>32.0</i>
	07 08 6	04 25		<i>31.3</i>
	07 43 0	04 15		
	08 14 8	04 30		
	08 52 3	04 15		
	09 30 0	04 05		
	10 00 8	03 55		<i>Index Error</i>
	10 40 2	03 30		<i>+ 30"</i>
	11 04 8	02 55		
	11 32 2	01 45		
<i>Polaris</i>	7 14 27 8	80 20 25		<i>131 04 30</i>
	15 18 2	20 20		<i>65 32 15</i>
	16 08 5	20 30		<i>24 27 45</i>
	16 47 0	21 00		<i>14 32</i>
	17 58 6	21 30		<i>39 00</i>
	18 36 0	21 40		
	19 06 0	21 40		
	19 50 2	22 10		
	20 26 2	22 25		
	232 5	185		
	17	6		
	18 24 6	21 35		



SEXTANT ASTRONOMICAL OBSERVATIONS.

Sextant No. \_\_\_\_\_ and artificial horizon of Mercury \_\_\_\_\_  
 Chronometer No. \_\_\_\_\_ by \_\_\_\_\_ } Sextant Observer.  
 Station: *Cleavus Ranch* Date: *Nov 22* } *Binnig*  
 Observer for time. *Cowles*

Object observed.	Time of observation by chronometer.			Observed double altitudes.	Time of observation by chronometer.		Remarks.	
<i>Mars</i>	6	58	25	0	130	35	25	<i>Under error + 35"</i>
		59	26	5		38	15	
	7	10	37	6		41	20	
		1	29	2		42	30	
		2	15	2		43	35	
		2	49	2		44	50	
		4	10	7		44	20	
		4	42	15		47	33	
		5	6	2		48	20	
		5	42	2		49	0	
		7	21	5		51	30	
		8	22	2		51	0	
		8	49	3		51	35	
			26	7		51	40	
		10	2	5		51	45	
		10	31	2		51	40	130 51 45
		11	6	5		51	40	65 25 52
		11	37	7		51	0	24 34 8
		12	4	5		50	30	14 32 4
			50	0		50	35	39 07
		13	33	2		50	0	
		14	11	5		49	25	



# SEXTANT ASTRONOMICAL OBSERVATIONS.

Sextant No. \_\_\_\_\_ and artificial horizon of Mercury

Chronometer No. \_\_\_\_\_ by \_\_\_\_\_

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

Station: *Cleaver's Ranch* Date: *Nov 22* }

Observer for time. \_\_\_\_\_

Object observed.	Time of observation by chronometer.	Observed double altitudes.	Time of observation by chronometer.	Remarks.
<i>Polaris</i>	7 22 6 5	80 04 50		
	24 25 2	35 20		
	25 30 5	35 55		
	17 4 9 6 38 5	36 0		
	27 20 7	36 20		
	28 8 5	36 30		
<i>26</i>	7 17 8 42 0	36 40	35	215 18 395 56.4
				26 0.2 20.7 29.5
<i>Polaris</i>	7 32 58 7	96 00 00		
	37.5 33 31 2			
	31.0 34 2 2			
	30.3 4 32 5			
	31.5 35 7 0			
	31.0 5 35 0			
	30.7 36 5 7 97 0 0			
<i>Polaris</i>	7 40 8 15	116 0		
	28.8 0 37 5			
	29.7 41 17 2			
	27.3 1 34 5			
	27.7 42 2 2			
	28.3 2 30 5			
	30.2 7 43 0 7 115			
	121 3			
	34 5			