

APPENDIX No. 5—Continued.

July 30, 1846.—Camp 30, near Bent's Fort.

DETERMINATION OF LATITUDE.

Time, p. m.			Double altitude of α Aquilæ, near the meridian.			Latitude.		
<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>Deg. min. sec.</i>	<i>Deg. min. sec.</i>	<i>Deg. min. sec.</i>			
6	24	18.8	120 40 40	38 02 37				
6	25	30.0	120 42 30	38 02 44				
6	26	47.5	120 46 10	38 02 14				
6	27	58.0	120 47 10	38 02 37				
6	29	05.5	120 48 50	38 02 33				
6	30	07.6	120 50 10	38 02 28				
6	31	16.5	120 50 50	38 02 36				
6	32	37.0	120 51 50	38 02 31				
6	33	37.0	120 52 10	38 02 32				
6	35	02.8	120 52 30	38 02 27				
6	36	26.0	120 53 00	38 02 04				
6	37	48.8	120 52 25	38 02 01				
6	38	57.1	120 51 00	38 02 21				
6	39	56.5	120 49 50	38 02 28				
6	41	04.6	120 48 55	38 32 15				
6	42	06.5	120 47 10	38 02 25				
6	44	38.0	120 42 50	38 02 22				
6	47	08.8	120 37 20	38 02 16				

Thermometer 68°.

Mean of 18 observations, 38° 32' 25".

On the site
On the site
Index error = 00"

APPENDIX No. 5—Continued.

July 31, 1846.—Camp 30, near Bent's Fort.

DETERMINATION OF LONGITUDE BY LUNAR DISTANCE.

Time, p. m.			α Aquilæ, and moon's west limb.	Double altitude of moon's upper limb.			Longitude.		
<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>Deg. min. sec.</i>	<i>Deg. min. sec.</i>	<i>h.</i>	<i>m.</i>	<i>s.</i>		
3	12	39.6	75 42 10	64 09 50	6	50	05.1		
3	16	04.0	75 41 30	63 34 10	6	48	45.1		
3	18	55.8	75 40 30	63 01 30	6	48	57.5		
3	21	04.0	75 39 30	62 41 40	6	49	55.9		
3	26	06.8	75 37 40	61 48 20	6	50	29.8		
3	28	11.8	75 37 00	61 23 50	6	50	29.8		
3	30	23.3	75 36 25	60 56 40	6	50	02.1		

Time, p. m.			Spica Virginis, and moon's west limb.	Moon's lower limb.			Longitude.		
<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>Deg. min. sec.</i>	<i>Deg. min. sec.</i>	<i>h.</i>	<i>m.</i>	<i>s.</i>		
3	40	33.0	24 26 40	57 46 50	6	55	13.7		
3	46	51.0	24 27 55	56 49 10	6	55	02.9		
3	48	54.0	24 28 40	56 01 40	6	52	19.2		
3	50	58.2	24 29 20	55 33 40	6	52	22.7		

Thermometer 78°.

	<i>h.</i>	<i>m.</i>	<i>s.</i>
Longitude by 7 observations of α Aquilæ	6	49	49.33
“ 4 “ “ Spica	6	53	44.12
Mean	6	51	46.72

APPENDIX No. 5—Continued.

July 31, 1846.—Camp 30, near Bent's Fort.

DETERMINATION OF TIME.

Time, a. m.			Double altitudes of sun's upper limb.	Time, p. m.			Chronometer fast.		
<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>Deg. min.</i>	<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>h.</i>	<i>m.</i>	<i>s.</i>
4	18	04.2	87 50	10	44	49.5	7	25	27.20
4	18	31.0	88 00	10	44	23.5	7	25	27.62
4	18	55.9	88 10	10	43	57.2	7	25	26.93
4	19	21.7	88 20	10	43	32.0	7	25	27.24
4	19	48.0	88 30	10	43	05.5	7	25	27.15
4	20	13.6	88 40	10	42	39.8	7	25	27.10
4	20	39.0	88 50	10	42	13.8	7	25	27.21
4	21	06.0	89 00	10	41	48.0	7	25	27.42
4	21	32.0	89 10	10	41	22.0	7	25	27.43
4	21	57.5	89 20	10	40	57.7	7	25	28.04
4	22	23.0	89 30	10	40	30.0	7	25	26.94

Thermometer 77°.

Mean of 11 observations, 7h. 25m. 27.50s.

<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>Deg. min. sec.</i>	<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>Deg. min. sec.</i>
7	25	27.50	89 30	10	40	30.0	89 30
7	25	27.50	89 30	10	40	30.0	89 30
7	25	27.50	89 30	10	40	30.0	89 30
7	25	27.50	89 30	10	40	30.0	89 30
7	25	27.50	89 30	10	40	30.0	89 30
7	25	27.50	89 30	10	40	30.0	89 30
7	25	27.50	89 30	10	40	30.0	89 30
7	25	27.50	89 30	10	40	30.0	89 30
7	25	27.50	89 30	10	40	30.0	89 30
7	25	27.50	89 30	10	40	30.0	89 30
7	25	27.50	89 30	10	40	30.0	89 30

<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>Deg. min. sec.</i>
7	25	27.50	89 30
7	25	27.50	89 30
7	25	27.50	89 30
7	25	27.50	89 30
7	25	27.50	89 30
7	25	27.50	89 30
7	25	27.50	89 30
7	25	27.50	89 30
7	25	27.50	89 30
7	25	27.50	89 30
7	25	27.50	89 30

APPENDIX No. 5—Continued.

July 31, 1846.—Camp 30, near Bent's Fort.

DETERMINATION OF TIME.

Time, p. m.			Double altitudes of Arcturus in the west.	Chronometer fast.		
<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>Deg. min. sec.</i>	<i>h.</i>	<i>m.</i>	<i>s.</i>
4	05	05.8	91 12 50	7	25	28.0
4	05	52.3	90 54 05	7	25	26.3
4	06	40.5	90 35 55	7	25	28.0
4	07	36.4	90 14 20	7	25	28.1
4	08	32.7	89 52 50	7	25	29.0
4	09	27.7	89 31 00	7	25	27.9
4	10	22.8	89 09 30	7	25	27.8

Time, p. m.			Double altitudes of α Aquilæ in the east.	Chronometer fast.		
<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>Deg. min. sec.</i>	<i>h.</i>	<i>m.</i>	<i>s.</i>
4	12	45.2	94 04 50	7	25	26.3
4	13	46.0	94 23 50	7	25	29.0
4	14	48.2	94 44 45	7	25	26.3
4	15	50.0	95 04 35	7	25	26.5
4	16	35.0	95 19 20	7	25	25.7
4	17	43.8	95 40 30	7	25	28.4
4	18	47.0	96 01 00	7	25	26.5

Chronometer fast by 7 obs. of west star	<i>h.</i>	<i>m.</i>	<i>s.</i>
Chronometer fast by 7 obs. of east star	7	25	27.87
			26.96
Mean	7	25	27.41

APPENDIX No. 5—Continued.

July 31, 1846.—Camp 30, near Bent's Fort.

DETERMINATION OF LATITUDE.

Time, p. m.			Double altitudes of Polaris.	Latitude.
<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>Deg. min. sec.</i>	<i>Deg. min. sec.</i>
4	27	45.2	75 00 30	38 02 45
4	28	50.0	75 01 15	38 02 43
4	30	06.3	75 01 50	38 02 33
4	31	20.5	75 02 50	38 02 36
4	32	07.5	75 04 00	36 02 55
4	33	07.0	75 04 40	38 02 52
4	34	08.8	75 05 30	38 02 52
4	35	19.6	75 06 05	38 02 43
4	36	13.0	75 06 30	38 02 36
4	44	03.0	75 13 00	38 02 55
4	45	20.7	75 13 30	38 02 40
4	46	26.8	75 14 20	38 02 40
4	47	09.0	75 14 50	38 02 39
4	48	05.5	75 15 40	38 02 46
4	48	46.6	75 16 05	38 02 39
4	49	35.2	75 16 50	38 02 45

Thermometer 76°.

Mean of 16 observations, 38° 02' 44".

Chronometer fast by 7 obs. of west star 7 52 57.81
 Chronometer fast by 7 obs. of east star 7 52 58.26
 Mean 7 52 57.41

APPENDIX No. 5—Continued.

July 31, 1846.—Camp 30, near Bent's Fort.

DETERMINATION OF LATITUDE.

Time, p. m.			Double altitudes of <i>a</i> Aquilæ, near the meridian.	Latitude.
<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>Deg. min. sec.</i>	<i>Deg. min. sec.</i>
6	22	36.0	120 44 30	38 03 17
6	24	28.5	120 47 30	38 03 48
6	25	38.0	120 49 50	38 03 20
6	26	55.2	120 51 10	38 03 17
6	28	05.2	120 52 05	38 03 16
6	29	00.0	120 52 40	38 03 10
6	30	08.0	120 52 40	38 03 20
6	31	18.2	120 52 00	38 03 11
6	32	21.0	120 51 30	38 03 54
6	34	04.7	120 51 30	38 03 31
6	34	47.5	121 51 05	38 03 23
6	35	35.0	120 50 00	38 03 34
6	36	39.8	120 48 20	38 03 49
6	37	41.8	120 47 50	38 03 24
6	38	37.8	120 45 50	38 03 44
6	39	25.5	120 45 20	38 03 18
6	40	07.0	120 43 20	38 03 40

Thermometer 68°.

Mean of 17 observations, 38° 03' 28".

Longitude by 14 observations of *a* Aquilæ 6 50 35.86
 Longitude by 38 observations of *a* Virginis 6 50 31.36
 Mean 6 50 33.61

APPENDIX No. 5—Continued.

July 31, 1846.—Camp 30.

DETERMINATION OF LONGITUDE.

Time, p. m.			Distance of α Aquilæ from moon's west limb.	Longitude.		
<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>Deg. min. sec.</i>	<i>h.</i>	<i>m.</i>	<i>s.</i>
3	12	39.6	75 42 10	6	50	05.1
3	16	04.0	75 41 30	6	48	45.1
3	18	55.8	75 40 30	6	48	57.5
3	21	04.0	75 39 30	6	49	55.9
3	26	06.8	75 37 40	6	50	29.8
3	28	11.8	75 37 00	6	50	29.8
3	30	23.3	75 36 25	6	50	02.1

Time, p. m.			Distance of α Virginis from moon's west limb.	Longitude.		
<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>Deg. min. sec.</i>	<i>h.</i>	<i>m.</i>	<i>s.</i>
3	40	33.0	24 26 40	6	55	13.7
3	46	51.0	24 27 55	6	55	02.9
3	48	54.0	24 28 40	6	52	17.2
3	50	58.2	24 29 20	6	52	22.7

APPENDIX No. 5—Continued.

August 1, 1846.—Camp 30.

DETERMINATION OF LONGITUDE.

Time, p. m.			Distance of α Virginis from moon's west limb.	Longitude.		
<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>Deg. min. sec.</i>	<i>h.</i>	<i>m.</i>	<i>s.</i>
3	24	02.0	37 40 05	6	53	22.0
3	27	34.5	37 41 30	6	53	30.1
3	29	27.8	37 42 05	6	53	11.0
3	31	30.0	37 43 00	6	53	38.3
3	33	31.5	37 43 40	6	53	24.2
3	35	48.0	37 44 25	6	53	11.0

Time, p. m.			Distance of α Aquilæ from moon's west limb.	Longitude.		
<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>Deg. min. sec.</i>	<i>h.</i>	<i>m.</i>	<i>s.</i>
3	39	46.5	65 37 15	6	50	24.7
3	41	50.2	63 36 30	6	50	36.8
3	43	39.7	63 35 50	6	50	48.8
3	45	43.5	63 34 55	6	51	31.0
3	48	29.2	63 33 50	6	52	04.1
3	49	58.5	63 33 20	6	52	04.1
3	51	24.6	63 32 50	6	52	07.2

Longitude by 14 observations of α Aquilæ	<i>h.</i>	<i>m.</i>	<i>s.</i>
Longitude by 10 observations of α Virginis.....	6	53	31.36

Mean	6	52	03.61
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Chronometer fast by 3 obs. of west star	7	27	00.52
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Chronometer fast by 7 obs. of east star	7	27	00.52
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Mean	7	27	00.52
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APPENDIX No. 5—Continued.

August 1, 1846.—Camp 30, near Bent's Fort.

DETERMINATION OF TIME.

Time, a. m.			Double altitudes of sun's upper limb.	Time, p. m.			Chronometer fast.		
<i>h.</i>	<i>m.</i>	<i>s.</i>		<i>Deg. min.</i>	<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>h.</i>	<i>m.</i>
5	41	17.5	118 00	9	21	28.0	7	25	28.42
5	41	47.8	118 10	9	20	57.7	7	25	28.33
5	42	18.0	118 20	9	20	27.0	7	25	28.10
5	42	47.2	118 30	9	19	57.0	7	25	27.71
5	43	17.6	118 40	8	19	26.7	7	25	27.78
5	43	48.0	118 50	9	18	55.8	7	25	27.54
5	44	19.0	119 00	9	18	25.8	7	25	28.05
5	44	48.8	119 10	9	17	55.7	7	25	27.92
5	45	18.6	119 20	9	17	25.3	7	25	27.64
5	46	20.2	119 40	9	16	24.2	7	25	27.81
5	46	50.8	119 50	9	15	55.8	7	25	28.02
5	47	21.0	120 00	9	15	23.2	7	25	27.84

<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>Deg. min. sec.</i>	<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>Deg. min. sec.</i>
7	27	02.3	91 36 40	7	27	02.3	91 36 40
7	27	04.0	91 49 50	7	27	04.0	91 49 50
7	27	02.9	92 07 30	7	27	02.9	92 07 30
7	27	04.9	92 27 25	7	27	04.9	92 27 25
7	27	05.1	92 46 00	7	27	05.1	92 46 00
7	27	04.1	93 02 40	7	27	04.1	93 02 40
7	27	06.9	93 17 40	7	27	06.9	93 17 40

Longitude by 11 observations of a Aquila 03 38 00
 Longitude by 10 observations of a Virgo 03 38 00
 Mean 03 38 00

APPENDIX No. 5—Continued.

August 3, 1846.—Camp 32.

DETERMINATION OF TIME.

Time, p. m.			Double altitudes of Arcturus in the west.	Chronometer fast.		
<i>h.</i>	<i>m.</i>	<i>s.</i>		<i>Deg. min. sec.</i>	<i>h.</i>	<i>m.</i>
3	42	40.2	96 04 00	7	27	03.3
3	45	35.7	94 55 50	7	27	03.0
3	47	24.0	94 14 05	7	27	03.7
3	48	17.8	93 52 30	7	27	01.9
3	49	02.7	93 35 30	7	27	03.0
3	49	52.5	93 16 10	7	27	03.1
3	50	31.6	93 01 00	7	27	03.1
3	51	18.8	92 41 50	7	27	01.2

Thermometer 76°.

Time, p. m.			Double altitudes of a Aquila in the east.	Chronometer fast.		
<i>h.</i>	<i>m.</i>	<i>s.</i>		<i>Deg. min. sec.</i>	<i>h.</i>	<i>m.</i>
3	54	06.0	91 36 40	7	27	02.3
3	54	46.8	91 49 50	7	27	04.0
3	55	38.5	92 07 30	7	27	02.9
3	56	40.0	92 27 25	7	27	04.9
3	57	36.1	92 46 00	7	27	05.1
3	58	25.2	93 02 40	7	27	04.1
3	59	13.1	93 17 40	7	27	06.9

Thermometer 76°.

Chronometer fast by 8 obs. of west star *h. m. s.* 7 27 02.79
 Chronometer fast by 7 obs. of east star 04.31
 Mean 7 27 03.55

APPENDIX No. 5—Continued.

August 3, 1846.—Camp 32.

DETERMINATION OF LATITUDE.

Time. p. m.			Double altitudes of Polaris.			Latitude.		
<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>Deg. min. sec.</i>			<i>Deg. min. sec.</i>		
4	03	41.0	74	15	05	37	44	59
4	04	36.6	74	15	55	37	45	06
4	05	28.5	74	16	30	37	45	01
4	06	35.0	74	16	55	37	44	55
4	07	11.8	74	17	40	37	45	01
4	08	09.7	74	18	05	37	44	54
4	09	03.5	74	18	35	37	44	50
4	09	46.3	74	18	55	37	44	45
4	10	39.0	74	19	55	37	44	55

Thermometer 75°.

Mean of 9 observations, 37° 44' 56".

Time. p. m.			Double altitudes of Polaris.			Latitude.		
<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>Deg. min. sec.</i>			<i>Deg. min. sec.</i>		
4	03	41.0	74	15	05	37	44	59
4	04	36.6	74	15	55	37	45	06
4	05	28.5	74	16	30	37	45	01
4	06	35.0	74	16	55	37	44	55
4	07	11.8	74	17	40	37	45	01
4	08	09.7	74	18	05	37	44	54
4	09	03.5	74	18	35	37	44	50
4	09	46.3	74	18	55	37	44	45
4	10	39.0	74	19	55	37	44	55

Thermometer 75°.

Mean of 9 observations, 37° 44' 56".

Chronometer last by 2 obs. of west star 04 51

Chronometer last by 7 obs. of east star 04 51

Mean 04 51

APPENDIX No. 5—Continued.

August 5, 1846.—Camp 34, on the Purgatory.

DETERMINATION OF LATITUDE.

Time, p. m.			Double altitudes of Polaris.			Latitude.		
<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>Deg. min. sec.</i>			<i>Deg. min. sec.</i>		
4	06	29.5	73	15	05	37	12	06
4	07	52.0	73	15	50	37	11	59
4	08	51.2	73	16	40	37	12	03
4	09	53.3	73	17	10	37	11	55
4	12	43.0	73	19	30	37	12	02
4	13	40.8	73	20	05	37	11	59
4	15	15.5	73	20	55	37	11	49
4	15	53.4	73	21	40	37	11	58
4	19	55.0	73	24	20	37	11	46
4	20	38.8	73	25	30	37	12	06
4	21	14.6	73	25	50	37	12	04
4	21	50.0	73	26	10	37	12	00
4	22	34.6	73	26	40	37	11	54

Thermometer 67°.

Wind very high; observations imperfect.

Mean of 13 observations, 37° 11' 59".

APPENDIX No. 5—Continued.

August 5, 1846.—Camp 34, on the Purgatory.

DETERMINATION OF TIME.

Time, p. m.			Double altitudes of <i>a</i> Aquilæ, in the east.			Chronometer fast.		
<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>Deg. min. sec.</i>	<i>h.</i>	<i>m.</i>	<i>s.</i>		
4	28	01.5	104 44 20	7	29	24.7		
4	29	21.3	105 06 55	7	29	26.9		
4	30	16.6	105 22 50	7	29	27.2		
4	31	24.0	105 41 50	7	29	28.6		
4	32	12.7	105 55 50	7	29	28.4		
4	33	14.5	106 13 30	7	29	28.2		
4	34	28.0	106 35 00	7	29	25.6		

Thermometer 67°.

Mean of 7 observations, 7h. 29m. 27.09s.

APPENDIX No. 5—Continued.

August 6, 1846.—Camp 35, in the Raton.

DETERMINATION OF LATITUDE.

Time, p. m.			Double altitudes of Polaris.			Latitude.		
<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>Deg. min. sec.</i>	<i>Deg. min. sec.</i>	<i>Deg. min. sec.</i>			
3	46	15.5	72 40 50	37 00 36				
3	47	57.8	72 41 40	37 00 25				
3	49	20.7	72 42 40	37 00 26				
3	50	48.8	72 43 40	37 00 22				
3	51	52.7	72 44 20	37 00 20				
3	53	05.5	72 45 20	37 00 24				
3	54	07.5	72 45 50	37 00 15				
3	55	28.0	72 46 30	37 00 06				
3	56	21.6	72 47 30	37 00 17				

Thermometer 64°.

Mean of 9 observations, 37° 00' 21".