APPENDIX No. 5—Continued.

October 10, 1846.—*Camp* 70.

DETERMINATION OF TIME.

Equal altitudes of sun.

Time, a. m.—Oct. 11.	Double altitudes of sun's upper limb.	Time, p. m.—Oct. 10.	Chronometer fast.
h. m. s.	*Deg. min.*	*h. m. s.*	*h. m. s.*
4 57 49.3	74 00	9 52 44.5	7 37 37.67
4 57 18.2	73 50	9 53 16.0	7 37 38.07
4 56 45.0	73 40	9 53 49.0	7 37 38.16
4 56 12.5	73 30	9 54 20.8	7 37 38.00
4 55 41.5	73 20	9 54 51.0	7 37 37.79
4 55 09.2	73 10	9 55 25.5	7 37 38.07
4 54 37.3	73 00	9 55 56.0	7 37 38.55
4 54 04.7	72 50	9 56 26.3	7 37 37.59
4 53 33.5	72 40	9 56 59.0	7 37 38.50
4 53 01.0	72 30	9 57 30.0	7 37 37.90
4 52 28.8	72 20	9 58 01.2	7 37 37.63
4 51 25.3	72 00	9 59 04.5	7 37 37.87

Mean of 12 observations, 7*h.* 37*m.* 37.99*s.*

DETERMINATION OF INDEX ERROR.

	Min. sec.
On the arc	31 30
Off the arc	31 50

Index error = + 10″.

APPENDIX No. 5—Continued.

October 11, 1846.—*Camp* 70.

DETERMINATION OF TIME.

Equal altitudes of the sun.

Time, a. m.	Double altitudes of sun's upper limb.	Time, p. m.	Chronometer fast.
h. m. s.	*Deg. min.*	*h. m. s.*	*h. m. s.*
4 51 25.3	72 00	9 56 54.5	7 37 35.60
4 51 57.0	72 10	9 56 21.7	7 37 35.05
4 52 28.8	72 20	9 55 50.3	7 37 35.25
4 53 01.0	72 30	9 55 19.0	7 37 35.70
4 53 33.5	72 40	9 54 46.0	7 37 35.45
4 54 04.7	72 50	9 54 18.8	7 37 37.45 rej.
4 54 37.3	73 00	9 53 43.0	7 37 35.85
4 55 09.2	73 10	9 53 09.0	7 37 34.80
4 55 41.5	73 20	9 52 38.5	7 37 35.70
4 56 12.5	73 30	9 52 05.8	7 37 34.85
4 56 45.0	73 40		
4 57 18.2	73 50		
4 57 49.3	74 00		
Ther. 60°.		Ther. 80°.	

Mean of 9 observations, 7*h.* 37*m.* 55.36*s.*

APPENDIX No. 5—Continued.

October 12, 1846.—*Camp* 70.

DETERMINATION OF TIME.

Time, p. m.			Double altitudes of *a* Andromedæ, in the east.			Chronometer fast.		
h.	*m.*	*s.*	*Deg.*	*min.*	*sec.*	*h.*	*m.*	*s.*
3	07	55.0	100	34	25	7	37	29.1
3	09	03.8	101	01	50	7	37	32.1 rej.
3	10	07.5	101	30	10	7	37	27.8
3	11	07.8	101	55	40	7	37	27.0
3	12	08.2	102	19	25	7	37	30.4 rej.
3	13	31.2	102	55	30	7	37	26.9
3	14	29.8	103	20	10	7	37	26.4
3	15	43.8	103	50	05	7	37	28.7
3	16	40.5	104	14	00	7	37	28.2
3	17	27.2	104	33	10	7	37	28.9

Thermometer 42°.

Time, p. m.			Double altitudes of *a* Lyræ, in the west.			Chronometer fast.		
h.	*m.*	*s.*	*Deg.*	*min.*	*sec.*	*h.*	*m.*	*s.*
3	21	45.0	115	52	10	7	37	31.9
3	22	26.8	115	35	40	7	37	31.5
3	23	06.0	115	20	30	7	37	31.9
3	23	49.8	115	03	20	7	37	31.7
3	24	40.2	114	43	30	7	37	31.3
3	25	27.8	114	24	50	7	37	31.2
3	26	15.8	114	06	10	7	37	32.5
3	27	02.0	113	48	20	7	37	31.9
3	28	05.5	113	22	50	7	37	30.2

Thermometer 42°.

	h.	*min.*	*sec.*
Chronometer fast by 8 obs. of east star.....	7	37	27.88
Chronometer fast by 9 obs. of west star.....	7	37	31.57
Mean.....	7	37	29.72

APPENDIX No. 5.—Continued.

October 13, 1846.—*Camp* 70.

Time, p. m.			Double altitudes of *a* Lyræ, in the west.		
h.	*m.*	*s.*	*Deg.*	*min.*	*sec.*
3	46	40.8	104	32	30
3	47	47.3	104	07	30
3	48	49.0	103	43	40
3	49	51.2	103	20	20
3	50	36.5	103	01	50
3	51	40.5	102	37	10

Thermometer 42°.

APPENDIX No. 5—Continued.

October 13, 1846—*Camp* 71, *west side of the Rio del Norte.*

Time, p. m.			Double altitudes of *a* Andromedæ.		
h.	*m.*	*s.*	*Deg.*	*min.*	*sec.*
3	37	49.1	114	46	00
3	39	17.5	115	23	10
3	40	14.0	115	45	45
3	41	17.3	116	12	30
3	42	08.0	116	34	15
3	42	57.8	116	54	40

Thermometer 42°.

APPENDIX No. 5—Continued.

October 15, 1846.—*Camp* 73, *on a small stream—first camp after leaving the Del Norte.*

DETERMINATION OF TIME.

Time, p. m.			Double altitudes of *a* Andromedæ, in the east.			Chronometer fast.		
h.	*m.*	*s.*	*Deg.*	*min.*	*sec.*	*h.*	*m.*	*s.*
3	57	13.2	108	39	15	8	19	06.7
3	58	20.8	109	08	15	8	19	05.2
3	59	04.2	109	27	10	8	19	03.6 rej.
3	59	45.7	109	44	00	8	19	05.0
4	00	32.5	110	03	30	8	19	05.4
4	01	20.7	110	23	05	8	19	07.8
4	01	58.5	110	38	40	8	19	07.7

Time, p. m.			Double altitudes of *a* Lyræ, in the west.			Chronometer fast		
h.	*m.*	*s.*	*Deg.*	*min.*	*sec.*	*h.*	*m.*	*s.*
4	22	34.5	103	28	35	8	19	10.6
4	23	35.0	103	04	40	8	19	09.6
4	24	41.2	102	38	40	8	19	08.9
4	25	24.5	102	22	20	8	19	10.2
4	26	19.5	102	01	20	8	19	11.2
4	26	57.1	101	47	05	8	19	12.1
4	27	47.6	101	27	45	8	19	12.3

Thermometer 66°.

	h.	*m.*	*s.*
Chronometer fast by 6 observations of east star...	8	19	06.30
" 7 " west star...	8	19	10.70
Mean.....	8	19	08.50

APPENDIX No. 5—Continued.

October 15, 1846.—*Camp* 73.

DETERMINATION OF LATITUDE.

Time, p. m.	Double altitudes of Polaris.	Latitude.
h. m. s.	*Deg. min. sec.*	*Deg. min. sec.*
4 07 21.8	67 34 40	32 54 37 rej.
4 08 05.2	67 35 40	32 54 53
4 08 57.5	67 36 20	32 54 56
4 09 33.5	67 36 50	32 54 59
4 10 30.0	67 37 45	32 55 08
4 11 25.8	67 38 10	32 55 04
4 12 26.5	67 39 15	32 55 15
4 13 50.0	67 39 55	32 55 10
4 14 30.0	67 40 10	32 55 04

Mean of 8 observations, 32° 35′ 04″.

APPENDIX No. 5—Continued.

October 17, 1846.—*Camp* 75.

DETERMINATION OF TIME.

Time, p. m.	Double altitudes of *a* Andromedæ in the east.	Chronometer fast.
h. m. s.	*Deg. min. sec.*	*h. m. s.*
3 35 11.8	99 49 50	8 25 53.9
3 36 11.8	100 14 55	8 25 54.0
3 36 58.0	100 35 10	8 25 51.8
3 37 49.5	100 56 10	8 25 53.2
3 38 38.5	101 16 40	8 25 53.4
3 39 30.0	101 38 15	8 25 53.3
3 40 13.5	101 55 50	8 25 54.9

Thermometer 38°.

Time, p. m.	Double altitudes of *a* Lyræ in the west.	Chronometer fast.
h. m. s.	*Deg. min. sec.*	*h. m. s.*
3 45 10.2	117 29 55	8 25 57.8
3 46 15.2	117 03 30	8 25 55.3
3 47 06.8	116 43 50	8 25 56.6
3 47 56.2	116 24 20	8 25 56.2
3 48 56.2	116 00 25	8 25 54.9
3 49 47.8	115 40 25	8 25 55.4
3 51 16.0	115 06 25	8 25 56.8

	h.	*m.*	*s.*
Chronometer fast by 7 obs. of east star.....	8	25	53.50
Chronometer fast by 7 obs. of west star.....	8	25	56.14
Mean.....	8	25	54.82

APPENDIX No. 5—Continued.

October 17, 1846.—*Camp* 75.

DETERMINATION OF LATITUDE.

Time, p. m.	Double altitudes of *b* Aquarii, near the meridian.	Latitude.
h. m. s.	*Deg. min. sec.*	*Deg. min. sec.*
3 57 57.0	102 04 40	32 42 18
3 59 04.0	102 05 50	32 42 08
4 00 13.0	102 07 00	32 42 03
4 01 40.0	102 07 50	32 42 05
4 02 54.4	102 08 30	32 41 59
4 03 56,0	102 08 05	32 42 18
4 05 00.0	102 08 10	32 42 16
4 06 16.5	102 07 55	32 42 15
4 07 22.0	102 07 40	32 42 10
4 08 17.0	102 07 25	32 42 02
4 09 33.0	102 06 35	32 41 58
4 10 46.5	102 04 50	32 42 15
4 11 44.0	103 03 25	32 42 22

Thermometer 38°

Time, p. m.	Double altitudes of Polaris.	Latitude.
h. m. s.	*Deg. min. sec.*	*Deg. min. sec.*
4 16 53.8	67 16 30	32 42 09
4 18 04.0	67 16 50	32 41 58
4 18 47.2	67 17 50	32 42 15
4 19 45.0	67 18 30	32 42 17
4 20 57.8	67 18 50	32 42 03
4 21 50.0	67 19 25	32 42 05
4 22 36.0	67 20 20	32 42 18
4 23 10.5	67 20 40	32 42 17
4 23 42.0	67 21 15	32 42 26

Thermometer 38°.

	Latitude of camp.
	Deg. min. sec.
Latitude by 13 obs. of *b* Aquarii	32 42 10
Latitude by 9 obs. of Polaris	32 42 12
Mean	32 42 11

APPENDIX No. 5—Continued.

October 19, 1846.—*Camp* 77.

DETERMINATION OF TIME.

Time, p. m.	Double altitudes of *a* Lyræ, in the west.	Chronometer fast.
h. m. s.	*Deg. min. sec.*	*h. m. s.*
5 10 51.3	82 39 10	8 28 01.6
5 11 42.0	81 50 00	8 28 02.0
5 12 29.9	81 32 10	8 28 03.0
5 13 20.8	81 13 10	8 28 04.1
5 14 03.0	80 56 40	8 28 02.9
5 15 06.8	80 32 40	8 28 03.7
5 16 16.0	80 05 55	8 28 02.6

Thermometer 50°.

Mean of 7 observations, 8*h*. 28*m*. 02.84*s*.

DETERMINATION OF LATITUDE.

Time, p. m.	Double altitudes of Polaris.	Latitude.
h. m. s.	*Deg. min. sec.*	*Deg. min. sec.*
5 20 51.8	68 11 20	32 50 31
5 21 48.0	68 12 20	32 50 46
5 22 49.5	68 12 40	32 50 40
5 23 34.2	68 13 30	32 50 55
5 24 12.0	68 14 00	32 50 61
5 25 43.8	68 14 40	32 50 59
5 26 27.5	68 15 20	32 50 70
5 27 15.0	68 15 30	32 50 66
5 28 51.0	68 15 40	32 50 55

Thermometer 50°.

Mean of 9 observations, 32° 50′ 54″.

APPENDIX No. 5—Continued.

October 20, 1846.—*Camp* 78, *on the Rio Gila.*

DETERMINATION OF LATITUDE.

Time, p. m.	Double altitudes of *b* Aquarii, near the meridian.	Latitude.
h. m. s.	*Deg. min. sec.*	*Deg. min. sec.*
3 50 18.0	101 48 50	32 49 48
3 51 05.8	101 49 40	32 49 50
3 52 01.0	101 50 30	32 49 53
3 52 49.7	101 50 45	32 50 07
3 53 41.0	101 51 50	32 49 52
3 54 28.0	101 51 55	32 50 02
3 55 19.8	101 52 20	32 50 01
3 56 23.0	101 52 50	32 49 54
3 57 25.8	101 52 55	32 49 53
3 58 02.8	101 52 40	32 50 00
3 59 20.8	101 51 50	32 50 16
4 00 15.5	101 51 20	32 50 19
4 01 22.0	101 50 50	32 50 14
4 02 28.2	101 50 20	32 50 03
4 03 06.5	101 49 50	32 50 00
4 04 19.2	101 48 10	32 50 09

Time, p. m.	Double altitudes of Polaris.	Latitude.
h. m. s.	*Deg. min. sec.*	*Deg. min. sec.*
4 28 08.0	67 43 20	32 50 01
4 29 05.5	67 44 10	32 50 05
4 29 38.0	67 44 50	32 50 15
4 30 16.8	67 45 20	32 50 21
4 31 07.0	67 45 40	32 50 16
4 31 52.1	67 46 15	32 50 21
4 32 34.0	67 46 30	32 50 15
4 33 12.8	67 46 55	32 50 16
4 33 47.0	67 47 20	32 50 18

Thermometer 50°.

	Deg. min. sec.
Latitude by 16 observations of *b* Aquarii,	32 50 01
Latitude by 9 observations of Polaris,	32 50 14
Mean	32 50 08 lat. of camp.

APPENDIX No. 5—Continued.

October 20, 1846.—*Camp* 78.

DETERMINATION OF TIME.

Time, p. m.	Double altitudes of *a* Andromedæ in the east.	Chronometer fast.
h. m. s.	*Deg. min. sec.*	*h. m. s.*
4 10 38.3	117 46 30	8 30 29.2
4 11 39.0	118 11 55	8 30 29.6
4 12 25.7	118 31 35	8 30 29.6
4 13 15.0	118 52 35	8 30 29.0
4 14 11.2	119 15 55	8 30 29.8
4 15 04.0	119 39 00	8 30 27.8
4 15 53.0	119 59 40	8 30 27.7

Thermometer 50°.

Time, p. m.	Double altitudes of *a* Lyræ in the west.	Chronometer fast.
h. m. s.	*Deg. min. sec.*	*h. m. s.*
4 19 33.8	101 20 05	8 30 29.2
4 20 17.8	101 04 10	8 30 32.2
4 21 00.8	100 47 30	8 30 32.2
4 21 49.7	100 28 20	8 30 31.8
4 22 38.0	100 08 55	8 30 30.0
4 23 17.8	99 53 10	8 30 29.4
4 24 04.0	99 35 35	8 30 30.2

Thermometer 50°.

	h. min. sec.
Chronometer fast by 7 obs. of east star	8 30 28.96
Chronometer fast by 7 obs. of west star	8 30 30.71
Mean	8 30 29.83

APPENDIX No. 5—Continued.

October 22, 1846.—*Camp* 80, *on the Gila.*

DETERMINATION OF LATITUDE.

Time, p. m.			Double altitudes of *b* Aquarii, near the meridian.			Latitude.		
h.	*m.*	*s.*	*Deg.*	*min.*	*sec.*	*Deg.*	*min.*	*sec.*
3	46	12.0	102	10	50	32	38	29
3	47	08.8	112	12	20	32	38	19
3	48	07.5	103	13	30	32	38	15
3	49	02.8	102	14	50	32	37	59
3	49	47.8	102	15	30	32	37	56
3	50	40.7	102	16	25	32	37	55
3	51	24.9	102	16	30	32	37	42
3	52	14.0	102	16	10	32	38	10
3	53	15.8						
3	54	29.0	102	15	55	32	38	21
3	55	17.5	102	15	50	32	38	19
3	56	09.8	102	15	30	32	38	19
3	56	54.0	102	15	00	32	38	23
3	57	38.0	102	14	30	32	38	28
3	58	21.0	102	14	00	32	38	23
3	59	20.5	102	13	20	32	38	16
4	00	18.5	102	12	20	32	38	18
4	01	03.8	102	11	40	32	38	07

Thermometer 62°.

Mean of 17 observations, 32° 38′ 13″.

APPENDIX No. 5—Continued.

October 22, 1846.—*Camp* 80, *on the Gila.*

DETERMINATION OF TIME.

Time, p. m.			Double altitudes of *a* Andromedæ in the east.			Chronometer fast.		
h.	*m.*	*s.*	*Deg.*	*min.*	*sec.*	*h.*	*m.*	*s.*
4	04	53.8	116	53	05	8	34	42.2
4	05	58.8	117	20	20	8	34	42.6
4	06	51.0	117	43	05	8	34	40.8
4	07	37.0	118	02	20	8	34	41.2
4	08	45.6	118	30	10	8	34	43.9
4	09	37.8	118	53	00	8	34	41.9
4	10	24.8	119	13	10	8	34	41.1

Thermometer 62°.

Time, p. m.			Double altitudes of *a* Lyræ in the west.			Chronometer fast.		
h.	*m.*	*s.*	*Deg.*	*min.*	*sec.*	*h.*	*m.*	*s.*
4	13	45.0	102	01	25	8	34	42.1
4	14	34.8	101	43	10	8	34	43.2
4	15	25.8	101	23	30	8	34	43.7
4	16	13.2	101	04	30	8	34	44.3
4	16	55.0	100	48	40	8	34	45.4
4	17	43.2	100	29	10	8	34	43.6
4	18	28.0	100	12	00	8	34	44.1

	h.	*m.*	*s.*
Chronometer fast by 7 observations of east star	8	34	41.96
" " 7 " west star	8	34	43.77
Mean.....	8	34	42.86