

I slightly modified Thorstensen's code to print out the time between evening twilight and morning twilight. For Okie-Tex site (site code = o) near Kenton OK I used same time zone as for Oklahoma City.

W. Romanishin- August 2013 - email: wromanishin at ou.edu - Here is stuff from John T. intro:

***** 2021 Night-time Astronomical Calendar for Cerro Tololo *****

By John Thorstensen, Dartmouth College

This calendar is designed to provide information useful for the planning of nighttime observations. The format should minimize confusion; each line gives the phenomena for a single (local!) night, and each line is labeled with both evening and morning (local) day and date. Note that all times given are LOCAL CIVIL (zone) times. DAYLIGHT SAVINGS time is used, with a non-USA convention.

The rise/set times printed are the times at which the center of the object is 50 arcminutes below the geometrical horizon. At the given twilight, the center of the sun is 0.0 degrees below the geometrical horizon.

The moon positions (and rise/set times) are generated by an implementation of the Low-Precision formulae in the Astronomical Almanac. The Almanac states that the error seldom exceeds 0.3 degrees. Topocentric corrections are included. Comparisons with tables for Kitt Peak in the NAOA Newsletter indicate that the rise-set times are good to +/- 2 min or so. The moon's RA, Dec, and illuminated fraction are given for local midnight, regardless of whether the moon is actually up at that time. Note that the moonrise and moonset times are not printed if they occur near mid-day.

The LST at evening and morning twilight are tabulated. This gives an accurate idea of the range of RA's accessible during the night.

The JD is given (severely rounded off) for local midnight. Again, this avoids any ambiguity.

Some credits: The sidereal time and Julian date routines were originally coded in PL/I by Steve Maker of Dartmouth College. The algorithms originated in the old American Ephemeris. The routine to convert JD back to calendar date is adapted from Numerical Recipes in C, by Press et al.

CAUTIONS: I believe that the program which generates these tables is reasonably accurate. However, it has not been exhaustively tested, so you should be sure to run 'sanity checks' on the results. Also, in view of the approximations used, the results should not be used when high precision is needed. Extension to dates far from the present (1990) should be done with great caution. The code has not been tested for the eastern or southern hemispheres. Rise/set times are slightly inaccurate and rather confusing at circumpolar latitudes, where the concept of a 'night' is blurry.

The daylight savings time conventions (if used) are quite specific (to U. S., post-1986) and subject to change. I know that the code has many infelicities; if you should find actual errors, please notify John.Thorstensen@dartmouth.edu

[This output comes from a (hopefully) portable, completely self-contained program in the c language. It is available from the author and may be used freely for scientific or educational purposes. If you use it for profit, please contact the author to arrange a (modest!) fee. Source code is copyright John Thorstensen, 1990.]

MOON PHASES FOR 2021, at Cerro Tololo

Times and dates are given in local time, zone = 4 hr West.
 They are generally better than +/- 2 minutes.
 Daylight savings time used.

The end of the previous year and the beginning of the next
 are included for continuity.

NEW		1ST		FULL		LAST	
Dec 14	13 19	Dec 21	20 43	Dec 30	0 30	Jan 06	6 39
Jan 13	2 03	Jan 20	18 04	Jan 28	16 19	Feb 04	14 39
Feb 11	16 08	Feb 19	15 49	Feb 27	5 20	Mar 05	22 32
Mar 13	7 24	Mar 21	10 42	Mar 28	14 50	Apr 04	6 04
Apr 11	22 33	Apr 20	3 00	Apr 26	23 33	May 03	15 52
May 11	15 02	May 19	15 13	May 26	7 15	Jun 02	3 26
Jun 10	6 54	Jun 17	23 55	Jun 24	14 40	Jul 01	17 13
Jul 09	21 18	Jul 17	6 12	Jul 23	22 37	Jul 31	9 18
Aug 08	9 51	Aug 15	11 21	Aug 22	8 02	Aug 30	3 15
Sep 06	20 52	Sep 13	16 41	Sep 20	19 55	Sep 28	21 58
Oct 06	7 06	Oct 13	0 28	Oct 20	11 58	Oct 28	17 07
Nov 04	18 15	Nov 11	9 48	Nov 19	6 00	Nov 27	9 30
Dec 04	4 45	Dec 10	22 38	Dec 19	1 38	Dec 26	23 26
Jan 02	15 36	Jan 09	15 13	Jan 17	20 51	Jan 25	10 43

Calendar for Cerro Tololo, west longitude (h.m.s) = 4 43 16, latitude (d.m) = -30 09.9
 Rise/set times in Chilean time (4 hr W), for 2215 m above surroundings, DAYLIGHT time used, * shows clock reset.
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

***** 2021 JANUARY *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Fri Jan 01/Sat Jan 02	5 05	20 56	22 24	5 10	6 38	3 29	10 16	23 01	.....	90	9 29.1	20 21	6.8
Sat Jan 02/Sun Jan 03	5 09	20 56	22 25	5 11	6 39	3 33	10 21	23 41	.....	83	10 22.9	16 15	6.8
Sun Jan 03/Mon Jan 04	5 13	20 57	22 25	5 12	6 40	3 37	10 25	0 19	.....	74	11 15.0	11 20	6.8
Mon Jan 04/Tue Jan 05	5 16	20 57	22 25	5 13	6 41	3 41	10 30	0 53	.....	64	12 05.9	5 50	6.8
Tue Jan 05/Wed Jan 06	5 20	20 57	22 24	5 14	6 41	3 45	10 35	1 27	.....	53	12 56.3	0 02	6.8
Wed Jan 06/Thu Jan 07	5 24	20 57	22 24	5 15	6 42	3 48	10 40	2 02	.....	41	13 47.3	- 5 47	6.8
Thu Jan 07/Fri Jan 08	5 28	20 57	22 24	5 16	6 43	3 52	10 45	2 39	.....	30	14 39.9	-11 18	6.9
Fri Jan 08/Sat Jan 09	5 32	20 57	22 24	5 17	6 44	3 56	10 50	3 19	.....	20	15 34.9	-16 13	6.9
Sat Jan 09/Sun Jan 10	5 36	20 57	22 24	5 18	6 45	4 00	10 55	4 05	17 36	12	16 32.6	-20 11	6.9
Sun Jan 10/Mon Jan 11	5 40	20 57	22 24	5 19	6 46	4 03	11 00	4 57	18 45	6	17 32.9	-22 52	6.9
Mon Jan 11/Tue Jan 12	5 44	20 57	22 23	5 20	6 46	4 07	11 05	5 56	19 50	2	18 34.4	-24 02	6.9
Tue Jan 12/Wed Jan 13	5 48	20 57	22 23	5 21	6 47	4 11	11 10	.....	20 50	0	19 35.6	-23 38	7.0
Wed Jan 13/Thu Jan 14	5 52	20 57	22 23	5 22	6 48	4 14	11 15	.....	21 43	1	20 34.7	-21 45	7.0
Thu Jan 14/Fri Jan 15	5 56	20 56	22 22	5 23	6 49	4 18	11 20	.....	22 29	4	21 30.4	-18 39	7.0
Fri Jan 15/Sat Jan 16	6 00	20 56	22 22	5 24	6 50	4 21	11 25	.....	23 07	10	22 22.4	-14 38	7.0
Sat Jan 16/Sun Jan 17	6 04	20 56	22 21	5 26	6 51	4 25	11 30	.....	23 42	16	23 11.1	-10 02	7.1
Sun Jan 17/Mon Jan 18	6 08	20 56	22 21	5 27	6 52	4 28	11 35	.....	0 12	24	23 57.2	- 5 04	7.1
Mon Jan 18/Tue Jan 19	6 12	20 56	22 20	5 28	6 53	4 32	11 40	.....	0 42	33	0 41.6	0 01	7.1
Tue Jan 19/Wed Jan 20	6 16	20 55	22 20	5 29	6 54	4 35	11 45	.....	1 10	42	1 25.3	5 03	7.2
Wed Jan 20/Thu Jan 21	6 20	20 55	22 19	5 30	6 54	4 38	11 51	.....	1 39	52	2 09.2	9 54	7.2
Thu Jan 21/Fri Jan 22	6 24	20 55	22 19	5 31	6 55	4 42	11 56	.....	2 10	61	2 54.2	14 24	7.2
Fri Jan 22/Sat Jan 23	6 27	20 54	22 18	5 32	6 56	4 45	12 01	.....	2 44	70	3 41.2	18 24	7.2
Sat Jan 23/Sun Jan 24	6 31	20 54	22 17	5 34	6 57	4 48	12 06	.....	3 22	79	4 30.8	21 44	7.3
Sun Jan 24/Mon Jan 25	6 35	20 53	22 17	5 35	6 58	4 52	12 11	.....	4 06	86	5 23.2	24 09	7.3
Mon Jan 25/Tue Jan 26	6 39	20 53	22 16	5 36	6 59	4 55	12 16	18 21	4 55	92	6 18.4	25 29	7.3
Tue Jan 26/Wed Jan 27	6 43	20 52	22 15	5 37	7 00	4 58	12 21	19 16	5 51	97	7 15.5	25 31	7.4
Wed Jan 27/Thu Jan 28	6 47	20 52	22 14	5 38	7 01	5 01	12 26	20 08	.....	99	8 13.4	24 10	7.4
Thu Jan 28/Fri Jan 29	6 51	20 51	22 14	5 40	7 02	5 04	12 32	20 56	.....	100	9 10.8	21 28	7.4
Fri Jan 29/Sat Jan 30	6 55	20 51	22 13	5 41	7 03	5 07	12 37	21 39	.....	98	10 06.6	17 34	7.5
Sat Jan 30/Sun Jan 31	6 59	20 50	22 12	5 42	7 04	5 11	12 42	22 18	.....	93	11 00.7	12 41	7.5
Sun Jan 31/Mon Feb 01	7 03	20 50	22 11	5 43	7 04	5 14	12 47	22 55	.....	86	11 53.2	7 08	7.5

***** 2021 FEBRUARY *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Mon Feb 01/Tue Feb 02	7 07	20 49	22 10	5 44	7 05	5 17	12 52	23 29	.....	78	12 44.7	1 14	7.6
Tue Feb 02/Wed Feb 03	7 11	20 48	22 09	5 45	7 06	5 20	12 57	0 04	.....	67	13 36.1	- 4 42	7.6
Wed Feb 03/Thu Feb 04	7 15	20 48	22 08	5 46	7 07	5 23	13 02	0 39	.....	56	14 28.4	-10 20	7.6
Thu Feb 04/Fri Feb 05	7 19	20 47	22 07	5 48	7 08	5 26	13 07	1 18	.....	45	15 22.4	-15 22	7.7
Fri Feb 05/Sat Feb 06	7 23	20 46	22 06	5 49	7 09	5 29	13 12	2 01	.....	34	16 18.6	-19 30	7.7
Sat Feb 06/Sun Feb 07	7 27	20 45	22 05	5 50	7 10	5 31	13 17	2 50	.....	24	17 17.0	-22 26	7.7
Sun Feb 07/Mon Feb 08	7 31	20 45	22 04	5 51	7 11	5 34	13 22	3 44	17 39	15	18 16.8	-23 58	7.8
Mon Feb 08/Tue Feb 09	7 34	20 44	22 03	5 52	7 11	5 37	13 28	4 44	18 39	8	19 16.8	-23 59	7.8
Tue Feb 09/Wed Feb 10	7 38	20 43	22 02	5 53	7 12	5 40	13 33	5 47	19 34	3	20 15.3	-22 33	7.9
Wed Feb 10/Thu Feb 11	7 42	20 42	22 01	5 54	7 13	5 43	13 38	.....	20 21	1	21 11.3	-19 50	7.9
Thu Feb 11/Fri Feb 12	7 46	20 41	22 00	5 55	7 14	5 46	13 43	.....	21 02	0	22 04.1	-16 06	7.9
Fri Feb 12/Sat Feb 13	7 50	20 40	21 59	5 56	7 15	5 49	13 48	.....	21 38	2	22 53.7	-11 39	8.0
Sat Feb 13/Sun Feb 14	7 54	20 40	21 58	5 57	7 16	5 52	13 53	.....	22 10	6	23 40.6	- 6 45	8.0
Sun Feb 14/Mon Feb 15	7 58	20 39	21 57	5 59	7 16	5 54	13 58	.....	22 40	11	0 25.7	- 1 39	8.0
Mon Feb 15/Tue Feb 16	8 02	20 38	21 55	6 00	7 17	5 57	14 03	.....	23 09	18	1 09.6	3 28	8.1
Tue Feb 16/Wed Feb 17	8 06	20 37	21 54	6 01	7 18	6 00	14 08	.....	23 38	26	1 53.4	8 25	8.1
Wed Feb 17/Thu Feb 18	8 10	20 36	21 53	6 02	7 19	6 03	14 13	.....	0 08	34	2 37.8	13 03	8.1
Thu Feb 18/Fri Feb 19	8 14	20 35	21 52	6 03	7 20	6 05	14 18	.....	0 41	43	3 23.7	17 14	8.2
Fri Feb 19/Sat Feb 20	8 18	20 34	21 51	6 04	7 20	6 08	14 22	.....	1 17	53	4 11.8	20 47	8.2
Sat Feb 20/Sun Feb 21	8 22	20 33	21 49	6 05	7 21	6 11	14 27	.....	1 57	62	5 02.5	23 31	8.3
Sun Feb 21/Mon Feb 22	8 26	20 32	21 48	6 06	7 22	6 14	14 32	.....	2 44	71	5 55.9	25 15	8.3
Mon Feb 22/Tue Feb 23	8 30	20 31	21 47	6 07	7 23	6 16	14 37	17 04	3 36	80	6 51.7	25 47	8.3
Tue Feb 23/Wed Feb 24	8 34	20 30	21 46	6 08	7 24	6 19	14 42	17 57	4 34	88	7 49.0	24 59	8.4
Wed Feb 24/Thu Feb 25	8 38	20 29	21 45	6 08	7 24	6 22	14 47	18 46	5 36	94	8 46.7	22 48	8.4
Thu Feb 25/Fri Feb 26	8 41	20 28	21 43	6 09	7 25	6 24	14 52	19 32	6 41	98	9 43.8	19 17	8.4
Fri Feb 26/Sat Feb 27	8 45	20 27	21 42	6 10	7 26	6 27	14 57	20 13	.....	100	10 39.6	14 37	8.5
Sat Feb 27/Sun Feb 28	8 49	20 25	21 41	6 11	7 26	6 30	15 02	20 51	.....	99	11 34.1	9 04	8.5
Sun Feb 28/Mon Mar 01	8 53	20 24	21 39	6 12	7 27	6 32	15 06	21 27	.....	95	12 27.5	3 01	8.5

Calendar for Cerro Tololo, west longitude (h.m.s) = 4 43 16, latitude (d.m) = -30 09.9
 Rise/set times in Chilean time (4 hr W), for 2215 m above surroundings, DAYLIGHT time used, * shows clock reset.
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

***** 2021 MARCH *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twilight	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Mon Mar 01/Tue Mar 02	8 57	20 23	21 38	6 13	7 28	6 35	15 11	22 03	.....	89	13 20.7	- 3 12	8.6
Tue Mar 02/Wed Mar 03	9 01	20 22	21 37	6 14	7 29	6 38	15 16	22 39	.....	81	14 14.5	- 9 12	8.6
Wed Mar 03/Thu Mar 04	9 05	20 21	21 36	6 15	7 29	6 40	15 21	23 17	.....	71	15 09.5	-14 35	8.7
Thu Mar 04/Fri Mar 05	9 09	20 20	21 34	6 16	7 30	6 43	15 26	23 59	.....	60	16 06.3	-19 02	8.7
Fri Mar 05/Sat Mar 06	9 13	20 19	21 33	6 16	7 31	6 46	15 30	0 46	.....	49	17 04.9	-22 16	8.7
Sat Mar 06/Sun Mar 07	9 17	20 18	21 32	6 17	7 31	6 48	15 35	1 39	.....	38	18 04.5	-24 04	8.8
Sun Mar 07/Mon Mar 08	9 21	20 16	21 30	6 18	7 32	6 51	15 40	2 37	.....	27	19 04.0	-24 23	8.8
Mon Mar 08/Tue Mar 09	9 25	20 15	21 29	6 19	7 33	6 54	15 45	3 38	17 30	19	20 02.1	-23 14	8.8
Tue Mar 09/Wed Mar 10	9 29	20 14	21 28	6 20	7 33	6 56	15 49	4 40	18 18	11	20 57.7	-20 48	8.9
Wed Mar 10/Thu Mar 11	9 33	20 13	21 27	6 20	7 34	6 59	15 54	5 41	19 00	6	21 50.3	-17 20	8.9
Thu Mar 11/Fri Mar 12	9 37	20 12	21 25	6 21	7 35	7 02	15 59	6 40	19 37	2	22 39.8	-13 04	8.9
Fri Mar 12/Sat Mar 13	9 41	20 10	21 24	6 22	7 35	7 04	16 04	.....	20 10	0	23 26.8	- 8 17	9.0
Sat Mar 13/Sun Mar 14*	9 45	20 09	21 23	5 23	6 36	7 07	16 08	.....	20 40	1	0 11.9	- 3 13	9.0
Sun Mar 14/Mon Mar 15	10 49	19 08	20 21	5 23	6 37	7 09	16 13	.....	20 09	3	0 58.3	2 08	9.0
Mon Mar 15/Tue Mar 16	10 53	19 07	20 20	5 24	6 37	7 12	16 18	.....	20 38	7	1 41.8	7 10	9.1
Tue Mar 16/Wed Mar 17	10 57	19 06	20 19	5 25	6 38	7 15	16 22	.....	21 08	12	2 25.7	11 54	9.1
Wed Mar 17/Thu Mar 18	11 01	19 04	20 18	5 26	6 39	7 17	16 27	.....	21 39	19	3 10.8	16 13	9.1
Thu Mar 18/Fri Mar 19	11 04	19 03	20 16	5 26	6 39	7 20	16 32	.....	22 13	27	3 57.6	19 56	9.2
Fri Mar 19/Sat Mar 20	11 08	19 02	20 15	5 27	6 40	7 23	16 36	.....	22 52	36	4 46.7	22 53	9.2
Sat Mar 20/Sun Mar 21	11 12	19 01	20 14	5 28	6 41	7 25	16 41	.....	23 35	45	5 38.2	24 54	9.2
Sun Mar 21/Mon Mar 22	11 16	19 00	20 12	5 28	6 41	7 28	16 45	.....	0 24	55	6 32.0	25 49	9.3
Mon Mar 22/Tue Mar 23	11 20	18 58	20 11	5 29	6 42	7 31	16 50	.....	1 18	65	7 27.4	25 30	9.3
Tue Mar 23/Wed Mar 24	11 24	18 57	20 10	5 30	6 42	7 33	16 55	.....	2 17	74	8 23.7	23 51	9.3
Wed Mar 24/Thu Mar 25	11 28	18 56	20 09	5 30	6 43	7 36	16 59	.....	3 20	83	9 20.0	20 52	9.4
Thu Mar 25/Fri Mar 26	11 32	18 55	20 07	5 31	6 44	7 39	17 04	17 05	4 25	90	10 15.7	16 39	9.4
Fri Mar 26/Sat Mar 27	11 36	18 54	20 06	5 32	6 44	7 41	17 08	17 44	5 31	96	11 10.6	11 23	9.4
Sat Mar 27/Sun Mar 28	11 40	18 52	20 05	5 32	6 45	7 44	17 13	18 21	6 38	99	12 05.1	5 22	9.5
Sun Mar 28/Mon Mar 29	11 44	18 51	20 04	5 33	6 45	7 47	17 18	18 57	.....	100	12 59.5	- 1 03	9.5
Mon Mar 29/Tue Mar 30	11 48	18 50	20 02	5 33	6 46	7 50	17 22	19 34	.....	97	13 54.8	- 7 27	9.5
Tue Mar 30/Wed Mar 31	11 52	18 49	20 01	5 34	6 47	7 52	17 27	20 12	.....	91	14 51.7	-13 22	9.5
Wed Mar 31/Thu Apr 01	11 56	18 48	20 00	5 35	6 47	7 55	17 31	20 54	.....	84	15 50.5	-18 22	9.6

***** 2021 APRIL *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twilight	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Thu Apr 01/Fri Apr 02	12 00	18 46	19 59	5 35	6 48	7 58	17 36	21 41	.....	74	16 51.2	-22 06	9.6
Fri Apr 02/Sat Apr 03	12 04	18 45	19 58	5 36	6 48	8 01	17 40	22 33	.....	63	17 52.9	-24 18	9.6
Sat Apr 03/Sun Apr 04	12 08	18 44	19 56	5 36	6 49	8 03	17 45	23 30	.....	52	18 54.3	-24 54	9.7
Sun Apr 04/Mon Apr 05	12 11	18 43	19 55	5 37	6 50	8 06	17 49	0 31	.....	41	19 53.7	-23 57	9.7
Mon Apr 05/Tue Apr 06	12 15	18 42	19 54	5 38	6 50	8 09	17 54	1 33	.....	31	20 50.1	-21 39	9.7
Tue Apr 06/Wed Apr 07	12 19	18 40	19 53	5 38	6 51	8 12	17 58	2 35	.....	22	21 43.0	-18 17	9.8
Wed Apr 07/Thu Apr 08	12 23	18 39	19 52	5 39	6 51	8 14	18 03	3 34	16 39	14	22 32.6	-14 07	9.8
Thu Apr 08/Fri Apr 09	12 27	18 38	19 51	5 39	6 52	8 17	18 08	4 31	17 13	8	23 19.3	- 9 25	9.8
Fri Apr 09/Sat Apr 10	12 31	18 37	19 50	5 40	6 53	8 20	18 12	5 26	17 43	4	0 04.1	- 4 24	9.8
Sat Apr 10/Sun Apr 11	12 35	18 36	19 49	5 40	6 53	8 23	18 17	6 20	18 12	1	0 47.6	0 44	9.9
Sun Apr 11/Mon Apr 12	12 39	18 35	19 47	5 41	6 54	8 26	18 21	7 14	18 40	0	1 30.7	5 48	9.9
Mon Apr 12/Tue Apr 13	12 43	18 34	19 46	5 42	6 54	8 29	18 26	.....	19 09	1	2 14.2	10 39	9.9
Tue Apr 13/Wed Apr 14	12 47	18 33	19 45	5 42	6 55	8 32	18 30	.....	19 39	4	2 58.7	15 06	9.9
Wed Apr 14/Thu Apr 15	12 51	18 31	19 44	5 43	6 56	8 34	18 35	.....	20 12	8	3 44.8	19 01	10.0
Thu Apr 15/Fri Apr 16	12 55	18 30	19 43	5 43	6 56	8 37	18 39	.....	20 49	14	4 33.0	22 11	10.0
Fri Apr 16/Sat Apr 17	12 59	18 29	19 42	5 44	6 57	8 40	18 44	.....	21 30	21	5 23.3	24 29	10.0
Sat Apr 17/Sun Apr 18	13 03	18 28	19 41	5 44	6 57	8 43	18 48	.....	22 16	29	6 15.6	25 43	10.1
Sun Apr 18/Mon Apr 19	13 07	18 27	19 40	5 45	6 58	8 46	18 52	.....	23 08	38	7 09.4	25 48	10.1
Mon Apr 19/Tue Apr 20	13 11	18 26	19 39	5 45	6 59	8 49	18 57	.....	0 04	48	8 04.0	24 38	10.1
Tue Apr 20/Wed Apr 21	13 15	18 25	19 38	5 46	6 59	8 52	19 01	.....	1 04	58	8 58.6	22 11	10.1
Wed Apr 21/Thu Apr 22	13 18	18 24	19 37	5 46	7 00	8 55	19 06	.....	2 06	68	9 52.8	18 32	10.2
Thu Apr 22/Fri Apr 23	13 22	18 23	19 36	5 47	7 00	8 58	19 10	.....	3 10	78	10 46.4	13 48	10.2
Fri Apr 23/Sat Apr 24	13 26	18 22	19 36	5 48	7 01	9 01	19 15	16 15	4 15	87	11 39.7	8 10	10.2
Sat Apr 24/Sun Apr 25	13 30	18 21	19 35	5 48	7 02	9 04	19 19	16 51	5 21	94	12 33.3	1 55	10.2
Sun Apr 25/Mon Apr 26	13 34	18 20	19 34	5 49	7 02	9 07	19 24	17 26	6 30	98	13 28.1	- 4 35	10.2
Mon Apr 26/Tue Apr 27	13 38	18 19	19 33	5 49	7 03	9 10	19 28	18 04	7 41	100	14 24.8	-10 55	10.3
Tue Apr 27/Wed Apr 28	13 42	18 18	19 32	5 50	7 04	9 14	19 33	18 44	.....	98	15 24.2	-16 34	10.3
Wed Apr 28/Thu Apr 29	13 46	18 17	19 31	5 50	7 04	9 17	19 37	19 30	.....	94	16 26.4	-21 04	10.3
Thu Apr 29/Fri Apr 30	13 50	18 17	19 31	5 51	7 05	9 20	19 42	20 21	.....	86	17 30.4	-24 01	10.3
Fri Apr 30/Sat May 01	13 54	18 16	19 30	5 51	7 05	9 23	19 46	21 19	.....	77	18 34.8	-25 13	10.4

Calendar for Cerro Tololo, west longitude (h.m.s) = 4 43 16, latitude (d.m) = -30 09.9
 Rise/set times in Chilean time (4 hr W), for 2215 m above surroundings, DAYLIGHT time used, * shows clock reset.
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

***** 2021 MAY *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twilight	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Sat May 01/Sun May 02	13 58	18 15	19 29	5 52	7 06	9 26	19 51	22 21	.....	67	19 37.4	-24 42	10.4
Sun May 02/Mon May 03	14 02	18 14	19 28	5 52	7 07	9 29	19 55	23 25	.....	56	20 36.5	-22 40	10.4
Mon May 03/Tue May 04	14 06	18 13	19 28	5 53	7 07	9 33	20 00	0 28	.....	46	21 31.6	-19 27	10.4
Tue May 04/Wed May 05	14 10	18 12	19 27	5 53	7 08	9 36	20 04	1 28	.....	35	22 22.6	-15 22	10.4
Wed May 05/Thu May 06	14 14	18 12	19 26	5 54	7 09	9 39	20 09	2 26	.....	26	23 10.2	-10 42	10.5
Thu May 06/Fri May 07	14 18	18 11	19 25	5 54	7 09	9 42	20 13	3 22	.....	18	23 55.2	- 5 43	10.5
Fri May 07/Sat May 08	14 22	18 10	19 25	5 55	7 10	9 46	20 18	4 16	16 16	11	0 38.7	- 0 35	10.5
Sat May 08/Sun May 09	14 26	18 09	19 24	5 55	7 10	9 49	20 22	5 09	16 44	6	1 21.6	4 31	10.5
Sun May 09/Mon May 10	14 29	18 09	19 24	5 56	7 11	9 52	20 26	6 02	17 12	2	2 04.6	9 26	10.5
Mon May 10/Tue May 11	14 33	18 08	19 23	5 57	7 12	9 56	20 31	6 56	17 42	0	2 48.6	14 00	10.6
Tue May 11/Wed May 12	14 37	18 07	19 22	5 57	7 12	9 59	20 35	7 51	18 14	0	3 34.2	18 03	10.6
Wed May 12/Thu May 13	14 41	18 07	19 22	5 58	7 13	10 02	20 40	.....	18 49	2	4 21.7	21 26	10.6
Thu May 13/Fri May 14	14 45	18 06	19 21	5 58	7 14	10 06	20 44	.....	19 28	5	5 11.3	23 57	10.6
Fri May 14/Sat May 15	14 49	18 05	19 21	5 59	7 14	10 09	20 49	.....	20 13	10	6 02.9	25 28	10.6
Sat May 15/Sun May 16	14 53	18 05	19 20	5 59	7 15	10 13	20 53	.....	21 03	16	6 55.9	25 51	10.6
Sun May 16/Mon May 17	14 57	18 04	19 20	6 00	7 15	10 16	20 58	.....	21 57	24	7 49.5	25 01	10.7
Mon May 17/Tue May 18	15 01	18 04	19 20	6 00	7 16	10 20	21 02	.....	22 54	33	8 43.0	22 58	10.7
Tue May 18/Wed May 19	15 05	18 03	19 19	6 01	7 17	10 23	21 07	.....	23 54	43	9 35.8	19 46	10.7
Wed May 19/Thu May 20	15 09	18 03	19 19	6 01	7 17	10 27	21 11	.....	0 55	53	10 27.8	15 30	10.7
Thu May 20/Fri May 21	15 13	18 02	19 18	6 02	7 18	10 30	21 15	.....	1 58	64	11 19.2	10 21	10.7
Fri May 21/Sat May 22	15 17	18 02	19 18	6 02	7 18	10 34	21 20	.....	3 01	74	12 10.6	4 31	10.7
Sat May 22/Sun May 23	15 21	18 01	19 18	6 03	7 19	10 38	21 24	.....	4 07	84	13 03.1	- 1 45	10.7
Sun May 23/Mon May 24	15 25	18 01	19 17	6 03	7 19	10 41	21 29	15 56	5 15	92	13 57.5	- 8 06	10.8
Mon May 24/Tue May 25	15 29	18 01	19 17	6 04	7 20	10 45	21 33	16 34	6 26	97	14 55.0	-14 06	10.8
Tue May 25/Wed May 26	15 33	18 00	19 17	6 04	7 21	10 49	21 38	17 17	7 39	100	15 56.0	-19 15	10.8
Wed May 26/Thu May 27	15 36	18 00	19 17	6 04	7 21	10 52	21 42	18 05	.....	99	17 00.4	-23 03	10.8
Thu May 27/Fri May 28	15 40	18 00	19 16	6 05	7 22	10 56	21 46	19 01	.....	95	18 06.7	-25 07	10.8
Fri May 28/Sat May 29	15 44	17 59	19 16	6 05	7 22	11 00	21 51	20 03	.....	89	19 12.6	-25 19	10.8
Sat May 29/Sun May 30	15 48	17 59	19 16	6 06	7 23	11 03	21 55	21 09	.....	81	20 15.7	-23 46	10.8
Sun May 30/Mon May 31	15 52	17 59	19 16	6 06	7 23	11 07	22 00	22 15	.....	71	21 14.4	-20 48	10.8
Mon May 31/Tue Jun 01	15 56	17 59	19 16	6 07	7 24	11 11	22 04	23 19	.....	61	22 08.5	-16 48	10.9

***** 2021 JUNE *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twilight	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Tue Jun 01/Wed Jun 02	16 00	17 58	19 16	6 07	7 24	11 15	22 08	0 19	.....	51	22 58.2	-12 09	10.9
Wed Jun 02/Thu Jun 03	16 04	17 58	19 15	6 08	7 25	11 19	22 13	1 16	.....	41	23 44.7	- 7 07	10.9
Thu Jun 03/Fri Jun 04	16 08	17 58	19 15	6 08	7 25	11 23	22 17	2 11	.....	31	0 29.0	- 1 56	10.9
Fri Jun 04/Sat Jun 05	16 12	17 58	19 15	6 08	7 26	11 26	22 21	3 04	.....	23	1 12.2	3 14	10.9
Sat Jun 05/Sun Jun 06	16 16	17 58	19 15	6 09	7 26	11 30	22 26	3 58	.....	15	1 55.2	8 13	10.9
Sun Jun 06/Mon Jun 07	16 20	17 58	19 15	6 09	7 27	11 34	22 30	4 51	.....	9	2 38.9	12 53	10.9
Mon Jun 07/Tue Jun 08	16 24	17 58	19 15	6 10	7 27	11 38	22 34	5 45	16 15	5	3 23.9	17 04	10.9
Tue Jun 08/Wed Jun 09	16 28	17 58	19 15	6 10	7 28	11 42	22 39	6 41	16 49	1	4 11.0	20 37	10.9
Wed Jun 09/Thu Jun 10	16 32	17 58	19 15	6 10	7 28	11 46	22 43	7 36	17 28	0	5 00.2	23 22	10.9
Thu Jun 10/Fri Jun 11	16 36	17 58	19 15	6 11	7 28	11 50	22 47	.....	18 11	0	5 51.5	25 07	10.9
Fri Jun 11/Sat Jun 12	16 40	17 58	19 15	6 11	7 29	11 54	22 52	.....	18 59	3	6 44.3	25 45	10.9
Sat Jun 12/Sun Jun 13	16 44	17 58	19 15	6 11	7 29	11 58	22 56	.....	19 52	7	7 37.7	25 11	10.9
Sun Jun 13/Mon Jun 14	16 47	17 58	19 16	6 12	7 29	12 02	23 00	.....	20 49	12	8 31.0	23 25	10.9
Mon Jun 14/Tue Jun 15	16 51	17 58	19 16	6 12	7 30	12 06	23 04	.....	21 48	20	9 23.4	20 30	10.9
Tue Jun 15/Wed Jun 16	16 55	17 58	19 16	6 12	7 30	12 10	23 09	.....	22 48	28	10 14.7	16 33	10.9
Wed Jun 16/Thu Jun 17	16 59	17 58	19 16	6 12	7 30	12 14	23 13	.....	23 48	38	11 04.8	11 44	10.9
Thu Jun 17/Fri Jun 18	17 03	17 58	19 16	6 13	7 31	12 19	23 17	.....	0 50	49	11 54.5	6 15	10.9
Fri Jun 18/Sat Jun 19	17 07	17 58	19 16	6 13	7 31	12 23	23 21	.....	1 52	60	12 44.7	0 18	10.9
Sat Jun 19/Sun Jun 20	17 11	17 59	19 16	6 13	7 31	12 27	23 25	.....	2 57	71	13 36.3	- 5 49	10.9
Sun Jun 20/Mon Jun 21	17 15	17 59	19 17	6 13	7 31	12 31	23 30	.....	4 04	81	14 30.5	-11 48	10.9
Mon Jun 21/Tue Jun 22	17 19	17 59	19 17	6 14	7 32	12 35	23 34	.....	5 15	90	15 28.2	-17 12	10.9
Tue Jun 22/Wed Jun 23	17 23	17 59	19 17	6 14	7 32	12 39	23 38	15 51	6 27	96	16 30.1	-21 35	10.9
Wed Jun 23/Thu Jun 24	17 27	17 59	19 17	6 14	7 32	12 43	23 42	16 43	7 38	99	17 35.3	-24 28	10.9
Thu Jun 24/Fri Jun 25	17 31	18 00	19 18	6 14	7 32	12 48	23 46	17 42	.....	100	18 42.2	-25 32	10.9
Fri Jun 25/Sat Jun 26	17 35	18 00	19 18	6 14	7 32	12 52	23 50	18 48	.....	97	19 48.0	-24 43	10.9
Sat Jun 26/Sun Jun 27	17 39	18 00	19 18	6 14	7 32	12 56	23 54	19 55	.....	92	20 50.3	-22 14	10.9
Sun Jun 27/Mon Jun 28	17 43	18 01	19 18	6 15	7 32	13 00	23 58	21 02	.....	84	21 48.0	-18 29	10.9
Mon Jun 28/Tue Jun 29	17 47	18 01	19 19	6 15	7 32	13 05	0 02	22 06	.....	76	22 41.0	-13 52	10.9
Tue Jun 29/Wed Jun 30	17 51	18 01	19 19	6 15	7 32	13 09	0 06	23 06	.....	66	23 30.0	- 8 46	10.9
Wed Jun 30/Thu Jul 01	17 54	18 02	19 19	6 15	7 32	13 13	0 10	0 03	.....	56	0 16.1	- 3 28	10.9

Calendar for Cerro Tololo, west longitude (h.m.s) = 4 43 16, latitude (d.m) = -30 09.9
 Rise/set times in Chilean time (4 hr W), for 2215 m above surroundings, DAYLIGHT time used, * shows clock reset.
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

***** 2021 JULY *****

Date (eve/morn)		LMST	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi	
		midn	set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Thu Jul 01/Fri Jul 02		17 58	18 02	19 20	6 15	7 32	13 17	0 14	0 58	.....	46	1 00.4	1 50	10.9
Fri Jul 02/Sat Jul 03		18 02	18 02	19 20	6 15	7 32	13 22	0 18	1 51	.....	37	1 43.9	6 57	10.9
Sat Jul 03/Sun Jul 04		18 06	18 03	19 20	6 15	7 32	13 26	0 22	2 45	.....	28	2 27.7	11 45	10.9
Sun Jul 04/Mon Jul 05		18 10	18 03	19 21	6 15	7 32	13 30	0 26	3 39	.....	20	3 12.6	16 05	10.9
Mon Jul 05/Tue Jul 06		18 14	18 04	19 21	6 15	7 32	13 35	0 30	4 34	.....	13	3 59.2	19 48	10.9
Tue Jul 06/Wed Jul 07		18 18	18 04	19 22	6 15	7 32	13 39	0 34	5 29	.....	8	4 48.0	22 45	10.9
Wed Jul 07/Thu Jul 08		18 22	18 05	19 22	6 15	7 32	13 43	0 38	6 25	16 08	3	5 38.9	24 45	10.9
Thu Jul 08/Fri Jul 09		18 26	18 05	19 22	6 15	7 32	13 48	0 42	7 18	16 54	1	6 31.6	25 39	10.9
Fri Jul 09/Sat Jul 10		18 30	18 06	19 23	6 14	7 32	13 52	0 45	8 08	17 46	0	7 25.4	25 21	10.9
Sat Jul 10/Sun Jul 11		18 34	18 06	19 23	6 14	7 31	13 56	0 49	.....	18 43	1	8 19.1	23 49	10.9
Sun Jul 11/Mon Jul 12		18 38	18 07	19 24	6 14	7 31	14 01	0 53	.....	19 42	4	9 12.0	21 06	10.8
Mon Jul 12/Tue Jul 13		18 42	18 07	19 24	6 14	7 31	14 05	0 57	.....	20 42	10	10 03.6	17 21	10.8
Tue Jul 13/Wed Jul 14		18 46	18 08	19 24	6 14	7 30	14 09	1 00	.....	21 43	17	10 53.8	12 42	10.8
Wed Jul 14/Thu Jul 15		18 50	18 08	19 25	6 13	7 30	14 14	1 04	.....	22 44	25	11 43.0	7 23	10.8
Thu Jul 15/Fri Jul 16		18 54	18 09	19 25	6 13	7 30	14 18	1 08	.....	23 45	35	12 32.0	1 38	10.8
Fri Jul 16/Sat Jul 17		18 58	18 09	19 26	6 13	7 29	14 23	1 12	.....	0 47	46	13 21.8	- 4 19	10.8
Sat Jul 17/Sun Jul 18		19 02	18 10	19 26	6 13	7 29	14 27	1 15	.....	1 52	58	14 13.5	-10 10	10.8
Sun Jul 18/Mon Jul 19		19 05	18 10	19 27	6 12	7 29	14 31	1 19	.....	2 59	69	15 08.1	-15 36	10.8
Mon Jul 19/Tue Jul 20		19 09	18 11	19 27	6 12	7 28	14 36	1 22	.....	4 08	79	16 06.4	-20 13	10.7
Tue Jul 20/Wed Jul 21		19 13	18 11	19 28	6 12	7 28	14 40	1 26	.....	5 18	88	17 08.5	-23 35	10.7
Wed Jul 21/Thu Jul 22		19 17	18 12	19 28	6 11	7 27	14 45	1 30	.....	6 25	95	18 13.5	-25 21	10.7
Thu Jul 22/Fri Jul 23		19 21	18 12	19 28	6 11	7 27	14 49	1 33	16 27	7 27	99	19 19.2	-25 18	10.7
Fri Jul 23/Sat Jul 24		19 25	18 13	19 29	6 10	7 26	14 53	1 37	17 34	.....	100	20 23.1	-23 29	10.7
Sat Jul 24/Sun Jul 25		19 29	18 14	19 29	6 10	7 26	14 58	1 40	18 42	.....	98	21 23.0	-20 11	10.7
Sun Jul 25/Mon Jul 26		19 33	18 14	19 30	6 10	7 25	15 02	1 44	19 48	.....	94	22 19.2	-15 47	10.7
Mon Jul 26/Tue Jul 27		19 37	18 15	19 30	6 09	7 25	15 07	1 47	20 51	.....	88	23 10.8	-10 42	10.6
Tue Jul 27/Wed Jul 28		19 41	18 15	19 31	6 09	7 24	15 11	1 50	21 50	.....	80	23 59.0	- 5 17	10.6
Wed Jul 28/Thu Jul 29		19 45	18 16	19 31	6 08	7 23	15 15	1 54	22 47	.....	72	0 45.0	0 11	10.6
Thu Jul 29/Fri Jul 30		19 49	18 16	19 32	6 07	7 23	15 20	1 57	23 42	.....	62	1 29.6	5 30	10.6
Fri Jul 30/Sat Jul 31		19 53	18 17	19 32	6 07	7 22	15 24	2 01	0 36	.....	53	2 14.0	10 30	10.6
Sat Jul 31/Sun Aug 01		19 57	18 18	19 33	6 06	7 21	15 29	2 04	1 31	.....	43	2 59.1	15 03	10.6

***** 2021 AUGUST *****

Date (eve/morn)		LMST	----- Sun: -----				LST twilight:		----- Moon: -----				Twi-Twi	
		midn	set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Sun Aug 01/Mon Aug 02		20 01	18 18	19 33	6 06	7 21	15 33	2 07	2 25	.....	34	3 45.5	18 59	10.5
Mon Aug 02/Tue Aug 03		20 05	18 19	19 34	6 05	7 20	15 38	2 11	3 21	.....	26	4 33.8	22 09	10.5
Tue Aug 03/Wed Aug 04		20 09	18 19	19 34	6 04	7 19	15 42	2 14	4 16	.....	18	5 24.3	24 25	10.5
Wed Aug 04/Thu Aug 05		20 12	18 20	19 35	6 04	7 18	15 46	2 17	5 11	.....	11	6 16.7	25 37	10.5
Thu Aug 05/Fri Aug 06		20 16	18 20	19 35	6 03	7 18	15 51	2 20	6 02	.....	6	7 10.5	25 38	10.5
Fri Aug 06/Sat Aug 07		20 20	18 21	19 36	6 02	7 17	15 55	2 24	6 50	16 33	2	8 04.6	24 23	10.4
Sat Aug 07/Sun Aug 08		20 24	18 22	19 36	6 02	7 16	16 00	2 27	7 34	17 32	0	8 58.3	21 55	10.4
Sun Aug 08/Mon Aug 09		20 28	18 22	19 36	6 01	7 15	16 04	2 30	.....	18 33	1	9 50.7	18 20	10.4
Mon Aug 09/Tue Aug 10		20 32	18 23	19 37	6 00	7 14	16 08	2 33	.....	19 35	3	10 41.8	13 48	10.4
Tue Aug 10/Wed Aug 11		20 36	18 23	19 37	5 59	7 13	16 13	2 36	.....	20 37	7	11 31.7	8 32	10.4
Wed Aug 11/Thu Aug 12		20 40	18 24	19 38	5 58	7 12	16 17	2 39	.....	21 39	14	12 21.0	2 48	10.3
Thu Aug 12/Fri Aug 13		20 44	18 24	19 38	5 58	7 11	16 22	2 43	.....	22 41	23	13 10.5	- 3 09	10.3
Fri Aug 13/Sat Aug 14		20 48	18 25	19 39	5 57	7 11	16 26	2 46	.....	23 45	33	14 01.3	- 9 01	10.3
Sat Aug 14/Sun Aug 15		20 52	18 26	19 39	5 56	7 10	16 31	2 49	.....	0 50	44	14 54.3	-14 30	10.3
Sun Aug 15/Mon Aug 16		20 56	18 26	19 40	5 55	7 09	16 35	2 52	.....	1 58	55	15 50.3	-19 14	10.3
Mon Aug 16/Tue Aug 17		21 00	18 27	19 40	5 54	7 08	16 39	2 55	.....	3 06	67	16 49.7	-22 52	10.2
Tue Aug 17/Wed Aug 18		21 04	18 27	19 41	5 53	7 07	16 44	2 58	.....	4 13	77	17 52.1	-25 04	10.2
Wed Aug 18/Thu Aug 19		21 08	18 28	19 41	5 52	7 06	16 48	3 01	.....	5 15	86	18 55.9	-25 35	10.2
Thu Aug 19/Fri Aug 20		21 12	18 28	19 42	5 51	7 05	16 53	3 04	.....	6 10	93	19 59.1	-24 22	10.2
Fri Aug 20/Sat Aug 21		21 16	18 29	19 42	5 50	7 04	16 57	3 07	16 24	6 58	98	20 59.7	-21 36	10.1
Sat Aug 21/Sun Aug 22		21 19	18 29	19 43	5 49	7 02	17 01	3 10	17 30	7 38	100	21 56.8	-17 34	10.1
Sun Aug 22/Mon Aug 23		21 23	18 30	19 43	5 48	7 01	17 06	3 13	18 34	.....	99	22 49.9	-12 40	10.1
Mon Aug 23/Tue Aug 24		21 27	18 31	19 44	5 47	7 00	17 10	3 16	19 36	.....	96	23 39.8	- 7 16	10.1
Tue Aug 24/Wed Aug 25		21 31	18 31	19 44	5 46	6 59	17 15	3 19	20 34	.....	92	0 27.1	- 1 41	10.0
Wed Aug 25/Thu Aug 26		21 35	18 32	19 45	5 45	6 58	17 19	3 21	21 31	.....	85	1 12.8	3 51	10.0
Thu Aug 26/Fri Aug 27		21 39	18 32	19 45	5 44	6 57	17 24	3 24	22 26	.....	78	1 58.0	9 05	10.0
Fri Aug 27/Sat Aug 28		21 43	18 33	19 46	5 43	6 56	17 28	3 27	23 21	.....	69	2 43.4	13 54	10.0
Sat Aug 28/Sun Aug 29		21 47	18 33	19 46	5 42	6 55	17 33	3 30	0 16	.....	60	3 29.9	18 06	9.9
Sun Aug 29/Mon Aug 30		21 51	18 34	19 47	5 41	6 54	17 37	3 33	1 11	.....	51	4 18.0	21 34	9.9
Mon Aug 30/Tue Aug 31		21 55	18 34	19 47	5 40	6 52	17 41	3 36	2 06	.....	41	5 08.0	24 08	9.9
Tue Aug 31/Wed Sep 01		21 59	18 35	19 48	5 39	6 51	17 46	3 38	3 01	.....	32	5 59.9	25 40	9.9

Calendar for Cerro Tololo, west longitude (h.m.s) = 4 43 16, latitude (d.m) = -30 09.9
 Rise/set times in Chilean time (4 hr W), for 2215 m above surroundings, DAYLIGHT time used, * shows clock reset.
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

***** 2021 SEPTEMBER *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twilight	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Wed Sep 01/Thu Sep 02	22 03	18 35	19 48	5 37	6 50	17 50	3 41	3 54	.....	24	6 53.2	26 02	9.8
Thu Sep 02/Fri Sep 03	22 07	18 36	19 49	5 36	6 49	17 55	3 44	4 43	.....	16	7 47.3	25 10	9.8
Fri Sep 03/Sat Sep 04	22 11	18 36	19 49	5 35	6 48	17 59	3 47	5 28	.....	9	8 41.2	23 03	9.8
Sat Sep 04/Sun Sep 05	22 15	18 37	19 50	5 34	6 46	18 04	3 50	6 10	.....	4	9 34.3	19 44	9.7
Sun Sep 05/Mon Sep 06	22 19	18 38	19 50	5 33	6 45	18 08	3 52	6 47	17 22	1	10 26.2	15 24	9.7
Mon Sep 06/Tue Sep 07	22 23	18 38	19 51	5 32	6 44	18 13	3 55	7 22	18 24	0	11 17.1	10 13	9.7
Tue Sep 07/Wed Sep 08	22 27	18 39	19 51	5 30	6 43	18 17	3 58	.....	19 28	2	12 07.2	4 26	9.7
Wed Sep 08/Thu Sep 09	22 30	18 39	19 52	5 29	6 42	18 21	4 01	.....	20 31	6	12 57.5	- 1 38	9.6
Thu Sep 09/Fri Sep 10	22 34	18 40	19 52	5 28	6 40	18 26	4 03	.....	21 36	12	13 48.6	- 7 42	9.6
Fri Sep 10/Sat Sep 11	22 38	18 40	19 53	5 27	6 39	18 30	4 06	.....	22 43	20	14 41.6	-13 23	9.6
Sat Sep 11/Sun Sep 12	22 42	18 41	19 53	5 25	6 38	18 35	4 09	.....	23 51	30	15 37.2	-18 22	9.5
Sun Sep 12/Mon Sep 13	22 46	18 41	19 54	5 24	6 37	18 39	4 11	.....	0 59	41	16 35.7	-22 17	9.5
Mon Sep 13/Tue Sep 14	22 50	18 42	19 54	5 23	6 35	18 44	4 14	.....	2 06	53	17 36.8	-24 48	9.5
Tue Sep 14/Wed Sep 15	22 54	18 42	19 55	5 22	6 34	18 48	4 17	.....	3 09	64	18 39.2	-25 42	9.4
Wed Sep 15/Thu Sep 16	22 58	18 43	19 56	5 20	6 33	18 53	4 19	.....	4 05	74	19 41.3	-24 56	9.4
Thu Sep 16/Fri Sep 17	23 02	18 43	19 56	5 19	6 32	18 57	4 22	.....	4 54	84	20 41.3	-22 37	9.4
Fri Sep 17/Sat Sep 18	23 06	18 44	19 57	5 18	6 30	19 02	4 25	.....	5 36	91	21 38.2	-18 59	9.4
Sat Sep 18/Sun Sep 19	23 10	18 44	19 57	5 16	6 29	19 06	4 27	.....	6 13	96	22 31.5	-14 23	9.3
Sun Sep 19/Mon Sep 20	23 14	18 45	19 58	5 15	6 28	19 11	4 30	17 23	6 45	99	23 21.7	- 9 08	9.3
Mon Sep 20/Tue Sep 21	23 18	18 46	19 58	5 14	6 27	19 16	4 33	18 22	7 16	100	0 09.5	- 3 34	9.3
Tue Sep 21/Wed Sep 22	23 22	18 46	19 59	5 13	6 25	19 20	4 35	19 19	.....	98	0 55.7	2 04	9.2
Wed Sep 22/Thu Sep 23	23 26	18 47	20 00	5 11	6 24	19 25	4 38	20 15	.....	95	1 41.2	7 31	9.2
Thu Sep 23/Fri Sep 24	23 30	18 47	20 00	5 10	6 23	19 29	4 40	21 10	.....	90	2 26.9	12 35	9.2
Fri Sep 24/Sat Sep 25	23 34	18 48	20 01	5 09	6 22	19 34	4 43	22 06	.....	83	3 13.5	17 06	9.1
Sat Sep 25/Sun Sep 26	23 37	18 48	20 02	5 07	6 20	19 38	4 46	23 01	.....	76	4 01.5	20 53	9.1
Sun Sep 26/Mon Sep 27	23 41	18 49	20 02	5 06	6 19	19 43	4 48	23 57	.....	67	4 51.2	23 47	9.1
Mon Sep 27/Tue Sep 28	23 45	18 50	20 03	5 05	6 18	19 48	4 51	0 52	.....	58	5 42.6	25 40	9.0
Tue Sep 28/Wed Sep 29	23 49	18 50	20 04	5 03	6 17	19 52	4 53	1 45	.....	49	6 35.4	26 26	9.0
Wed Sep 29/Thu Sep 30	23 53	18 51	20 04	5 02	6 15	19 57	4 56	2 35	.....	39	7 28.9	25 58	9.0
Thu Sep 30/Fri Oct 01	23 57	18 51	20 05	5 01	6 14	20 01	4 59	3 21	.....	30	8 22.5	24 16	8.9

***** 2021 OCTOBER *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twilight	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Fri Oct 01/Sat Oct 02	0 01	18 52	20 06	4 59	6 13	20 06	5 01	4 04	.....	21	9 15.5	21 22	8.9
Sat Oct 02/Sun Oct 03	0 05	18 52	20 06	4 58	6 12	20 11	5 04	4 42	.....	13	10 07.5	17 22	8.9
Sun Oct 03/Mon Oct 04	0 09	18 53	20 07	4 57	6 11	20 15	5 06	5 18	.....	7	10 58.6	12 26	8.8
Mon Oct 04/Tue Oct 05	0 13	18 54	20 08	4 55	6 09	20 20	5 09	5 52	17 10	2	11 49.1	6 47	8.8
Tue Oct 05/Wed Oct 06	0 17	18 54	20 08	4 54	6 08	20 25	5 12	6 26	18 14	0	12 39.8	0 39	8.8
Wed Oct 06/Thu Oct 07	0 21	18 55	20 09	4 53	6 07	20 29	5 14	7 01	19 20	1	13 31.4	- 5 36	8.7
Thu Oct 07/Fri Oct 08	0 25	18 55	20 10	4 51	6 06	20 34	5 17	.....	20 28	4	14 24.9	-11 38	8.7
Fri Oct 08/Sat Oct 09	0 29	18 56	20 11	4 50	6 05	20 39	5 19	.....	21 37	10	15 21.0	-17 03	8.7
Sat Oct 09/Sun Oct 10*	0 33	18 57	20 12	4 49	6 03	20 44	5 22	.....	22 48	18	16 20.1	-21 24	8.6
Sun Oct 10/Mon Oct 11	23 36	19 57	21 12	5 47	7 02	20 48	5 25	.....	0 58	27	17 18.8	-24 22	8.6
Mon Oct 11/Tue Oct 12	23 40	19 58	21 13	5 46	7 01	20 53	5 27	.....	2 04	38	18 21.9	-25 46	8.5
Tue Oct 12/Wed Oct 13	23 44	19 59	21 14	5 45	7 00	20 58	5 30	.....	3 03	49	19 24.7	-25 27	8.5
Wed Oct 13/Thu Oct 14	23 48	19 59	21 15	5 43	6 59	21 03	5 33	.....	3 54	60	20 25.2	-23 32	8.5
Thu Oct 14/Fri Oct 15	23 52	20 00	21 16	5 42	6 58	21 07	5 35	.....	4 37	71	21 22.3	-20 15	8.4
Fri Oct 15/Sat Oct 16	23 56	20 01	21 17	5 41	6 57	21 12	5 38	.....	5 14	80	22 15.8	-15 55	8.4
Sat Oct 16/Sun Oct 17	0 00	20 01	21 17	5 39	6 55	21 17	5 41	.....	5 47	88	23 06.0	-10 53	8.4
Sun Oct 17/Mon Oct 18	0 04	20 02	21 18	5 38	6 54	21 22	5 43	17 14	6 18	94	23 53.7	- 5 26	8.3
Mon Oct 18/Tue Oct 19	0 08	20 03	21 19	5 37	6 53	21 27	5 46	18 11	6 46	98	0 39.7	0 10	8.3
Tue Oct 19/Wed Oct 20	0 12	20 04	21 20	5 36	6 52	21 32	5 49	19 07	.....	100	1 24.9	5 42	8.3
Wed Oct 20/Thu Oct 21	0 16	20 04	21 21	5 34	6 51	21 36	5 51	20 02	.....	100	2 10.3	10 57	8.2
Thu Oct 21/Fri Oct 22	0 20	20 05	21 22	5 33	6 50	21 41	5 54	20 57	.....	98	2 56.5	15 43	8.2
Fri Oct 22/Sat Oct 23	0 24	20 06	21 23	5 32	6 49	21 46	5 57	21 53	.....	94	3 44.1	19 49	8.2
Sat Oct 23/Sun Oct 24	0 28	20 06	21 24	5 31	6 48	21 51	5 59	22 48	.....	89	4 33.3	23 06	8.1
Sun Oct 24/Mon Oct 25	0 32	20 07	21 25	5 30	6 47	21 56	6 02	23 44	.....	82	5 24.3	25 22	8.1
Mon Oct 25/Tue Oct 26	0 36	20 08	21 26	5 28	6 46	22 01	6 05	0 37	.....	74	6 16.6	26 33	8.0
Tue Oct 26/Wed Oct 27	0 40	20 09	21 27	5 27	6 45	22 06	6 08	1 28	.....	66	7 09.7	26 32	8.0
Wed Oct 27/Thu Oct 28	0 43	20 09	21 28	5 26	6 44	22 11	6 10	2 15	.....	56	8 02.7	25 18	8.0
Thu Oct 28/Fri Oct 29	0 47	20 10	21 29	5 25	6 43	22 16	6 13	2 58	.....	47	8 55.0	22 53	7.9
Fri Oct 29/Sat Oct 30	0 51	20 11	21 30	5 24	6 42	22 21	6 16	3 37	.....	37	9 46.3	19 22	7.9
Sat Oct 30/Sun Oct 31	0 55	20 12	21 31	5 23	6 42	22 26	6 19	4 14	.....	27	10 36.6	14 53	7.9
Sun Oct 31/Mon Nov 01	0 59	20 13	21 32	5 22	6 41	22 31	6 22	4 48	.....	18	11 26.4	9 36	7.8

Calendar for Cerro Tololo, west longitude (h.m.s) = 4 43 16, latitude (d.m) = -30 09.9
 Rise/set times in Chilean time (4 hr W), for 2215 m above surroundings, DAYLIGHT time used, * shows clock reset.
 Moon info is for local midnight, even if moon is down. Program: John Thorstensen, Dartmouth College.

***** 2021 NOVEMBER *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twilight	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Mon Nov 01/Tue Nov 02	1 03	20 13	21 33	5 20	6 40	22 36	6 25	5 21	.....	11	12 16.2	3 42	7.8
Tue Nov 02/Wed Nov 03	1 07	20 14	21 34	5 19	6 39	22 41	6 27	5 55	17 57	5	13 07.0	- 2 32	7.8
Wed Nov 03/Thu Nov 04	1 11	20 15	21 35	5 18	6 38	22 46	6 30	6 31	19 04	1	13 59.7	- 8 48	7.7
Thu Nov 04/Fri Nov 05	1 15	20 16	21 36	5 17	6 38	22 51	6 33	.....	20 14	0	14 55.4	-14 40	7.7
Fri Nov 05/Sat Nov 06	1 19	20 17	21 37	5 16	6 37	22 56	6 36	.....	21 27	2	15 54.5	-19 41	7.7
Sat Nov 06/Sun Nov 07	1 23	20 17	21 38	5 15	6 36	23 01	6 39	.....	22 41	7	16 57.0	-23 24	7.6
Sun Nov 07/Mon Nov 08	1 27	20 18	21 39	5 14	6 35	23 06	6 42	.....	23 51	14	18 01.7	-25 27	7.6
Mon Nov 08/Tue Nov 09	1 31	20 19	21 40	5 13	6 35	23 11	6 45	.....	0 55	24	19 06.5	-25 40	7.5
Tue Nov 09/Wed Nov 10	1 35	20 20	21 42	5 12	6 34	23 16	6 48	.....	1 51	34	20 09.1	-24 09	7.5
Wed Nov 10/Thu Nov 11	1 39	20 21	21 43	5 12	6 33	23 21	6 51	.....	2 37	45	21 08.0	-21 09	7.5
Thu Nov 11/Fri Nov 12	1 43	20 22	21 44	5 11	6 33	23 26	6 54	.....	3 17	56	22 02.7	-17 02	7.4
Fri Nov 12/Sat Nov 13	1 47	20 23	21 45	5 10	6 32	23 31	6 57	.....	3 51	66	22 53.6	-12 09	7.4
Sat Nov 13/Sun Nov 14	1 51	20 23	21 46	5 09	6 32	23 36	7 00	.....	4 21	76	23 41.4	- 6 48	7.4
Sun Nov 14/Mon Nov 15	1 54	20 24	21 47	5 08	6 31	23 41	7 04	.....	4 50	84	0 27.2	- 1 16	7.4
Mon Nov 15/Tue Nov 16	1 58	20 25	21 48	5 07	6 31	23 46	7 07	.....	5 18	91	1 12.0	4 16	7.3
Tue Nov 16/Wed Nov 17	2 02	20 26	21 49	5 07	6 30	23 51	7 10	17 56	5 47	95	1 56.9	9 35	7.3
Wed Nov 17/Thu Nov 18	2 06	20 27	21 51	5 06	6 30	23 56	7 13	18 50	6 18	99	2 42.5	14 31	7.3
Thu Nov 18/Fri Nov 19	2 10	20 28	21 52	5 05	6 29	0 02	7 16	19 46	.....	100	3 29.6	18 51	7.2
Fri Nov 19/Sat Nov 20	2 14	20 29	21 53	5 05	6 29	0 07	7 20	20 41	.....	99	4 18.5	22 24	7.2
Sat Nov 20/Sun Nov 21	2 18	20 29	21 54	5 04	6 28	0 12	7 23	21 37	.....	97	5 09.3	25 01	7.2
Sun Nov 21/Mon Nov 22	2 22	20 30	21 55	5 03	6 28	0 17	7 26	22 32	.....	93	6 01.7	26 32	7.1
Mon Nov 22/Tue Nov 23	2 26	20 31	21 56	5 03	6 28	0 22	7 30	23 24	.....	88	6 54.9	26 52	7.1
Tue Nov 23/Wed Nov 24	2 30	20 32	21 57	5 02	6 28	0 27	7 33	0 12	.....	81	7 48.0	25 58	7.1
Wed Nov 24/Thu Nov 25	2 34	20 33	21 58	5 02	6 27	0 32	7 37	0 56	.....	72	8 40.3	23 54	7.1
Thu Nov 25/Fri Nov 26	2 38	20 34	21 59	5 01	6 27	0 37	7 40	1 35	.....	63	9 31.2	20 44	7.0
Fri Nov 26/Sat Nov 27	2 42	20 35	22 01	5 01	6 27	0 42	7 44	2 11	.....	54	10 20.8	16 37	7.0
Sat Nov 27/Sun Nov 28	2 46	20 35	22 02	5 01	6 27	0 47	7 47	2 45	.....	43	11 09.4	11 42	7.0
Sun Nov 28/Mon Nov 29	2 50	20 36	22 03	5 00	6 27	0 52	7 51	3 17	.....	33	11 57.7	6 09	7.0
Mon Nov 29/Tue Nov 30	2 54	20 37	22 04	5 00	6 26	0 57	7 54	3 49	.....	23	12 46.6	0 11	6.9
Tue Nov 30/Wed Dec 01	2 58	20 38	22 05	5 00	6 26	1 02	7 58	4 23	.....	14	13 37.1	- 5 59	6.9

***** 2021 DECEMBER *****

Date (eve/morn)	LMST midn	----- Sun: -----				LST twilight:		----- Moon: -----				Twilight	
		set	twi.end	twi.beg	rise	eve	morn	rise	set	%illum	RA	Dec	hours
Wed Dec 01/Thu Dec 02	3 01	20 39	22 06	4 59	6 26	1 07	8 02	5 00	17 48	7	14 30.5	-11 58	6.9
Thu Dec 02/Fri Dec 03	3 05	20 40	22 07	4 59	6 26	1 12	8 05	5 42	18 59	2	15 27.7	-17 24	6.9
Fri Dec 03/Sat Dec 04	3 09	20 40	22 08	4 59	6 26	1 17	8 09	.....	20 12	0	16 29.0	-21 46	6.9
Sat Dec 04/Sun Dec 05	3 13	20 41	22 09	4 59	6 26	1 22	8 13	.....	21 27	1	17 33.9	-24 37	6.8
Sun Dec 05/Mon Dec 06	3 17	20 42	22 10	4 59	6 26	1 27	8 17	.....	22 37	5	18 40.5	-25 38	6.8
Mon Dec 06/Tue Dec 07	3 21	20 43	22 11	4 59	6 26	1 31	8 21	.....	23 39	11	19 46.0	-24 45	6.8
Tue Dec 07/Wed Dec 08	3 25	20 44	22 11	4 59	6 27	1 36	8 25	.....	0 31	19	20 48.2	-22 10	6.8
Wed Dec 08/Thu Dec 09	3 29	20 44	22 12	4 59	6 27	1 41	8 29	.....	1 15	29	21 45.8	-18 16	6.8
Thu Dec 09/Fri Dec 10	3 33	20 45	22 13	4 59	6 27	1 46	8 32	.....	1 52	40	22 38.9	-13 29	6.8
Fri Dec 10/Sat Dec 11	3 37	20 46	22 14	4 59	6 27	1 51	8 37	.....	2 24	50	23 28.2	- 8 10	6.7
Sat Dec 11/Sun Dec 12	3 41	20 46	22 15	4 59	6 27	1 55	8 41	.....	2 53	60	0 14.8	- 2 37	6.7
Sun Dec 12/Mon Dec 13	3 45	20 47	22 16	4 59	6 28	2 00	8 45	.....	3 22	70	0 59.8	2 57	6.7
Mon Dec 13/Tue Dec 14	3 49	20 48	22 16	4 59	6 28	2 05	8 49	.....	3 50	79	1 44.4	8 19	6.7
Tue Dec 14/Wed Dec 15	3 53	20 48	22 17	4 59	6 28	2 10	8 53	.....	4 20	86	2 29.5	13 20	6.7
Wed Dec 15/Thu Dec 16	3 57	20 49	22 18	5 00	6 29	2 14	8 57	17 40	4 52	92	3 15.9	17 49	6.7
Thu Dec 16/Fri Dec 17	4 01	20 50	22 18	5 00	6 29	2 19	9 02	18 35	5 28	96	4 04.2	21 36	6.7
Fri Dec 17/Sat Dec 18	4 05	20 50	22 19	5 00	6 29	2 23	9 06	19 31	6 08	99	4 54.5	24 30	6.7
Sat Dec 18/Sun Dec 19	4 08	20 51	22 20	5 01	6 30	2 28	9 10	20 26	.....	100	5 46.8	26 20	6.7
Sun Dec 19/Mon Dec 20	4 12	20 51	22 20	5 01	6 30	2 32	9 15	21 19	.....	99	6 40.3	26 59	6.7
Mon Dec 20/Tue Dec 21	4 16	20 52	22 21	5 02	6 31	2 37	9 19	22 09	.....	96	7 34.0	26 24	6.7
Tue Dec 21/Wed Dec 22	4 20	20 52	22 21	5 02	6 31	2 41	9 23	22 54	.....	92	8 27.0	24 36	6.7
Wed Dec 22/Thu Dec 23	4 24	20 53	22 22	5 03	6 32	2 46	9 28	23 35	.....	86	9 18.5	21 41	6.7
Thu Dec 23/Fri Dec 24	4 28	20 53	22 22	5 03	6 32	2 50	9 32	0 12	.....	78	10 08.3	17 47	6.7
Fri Dec 24/Sat Dec 25	4 32	20 54	22 23	5 04	6 33	2 55	9 37	0 45	.....	70	10 56.6	13 06	6.7
Sat Dec 25/Sun Dec 26	4 36	20 54	22 23	5 05	6 33	2 59	9 42	1 17	.....	60	11 44.0	7 48	6.7
Sun Dec 26/Mon Dec 27	4 40	20 54	22 23	5 05	6 34	3 03	9 46	1 48	.....	49	12 31.3	2 04	6.7
Mon Dec 27/Tue Dec 28	4 44	20 55	22 24	5 06	6 35	3 07	9 51	2 20	.....	39	13 19.6	- 3 52	6.7
Tue Dec 28/Wed Dec 29	4 48	20 55	22 24	5 07	6 35	3 11	9 55	2 53	.....	28	14 10.1	- 9 45	6.7
Wed Dec 29/Thu Dec 30	4 52	20 55	22 24	5 07	6 36	3 16	10 00	3 32	.....	18	15 04.0	-15 15	6.7
Thu Dec 30/Fri Dec 31	4 56	20 56	22 24	5 08	6 37	3 20	10 05	4 16	17 45	10	16 02.0	-19 58	6.7
Fri Dec 31/Sat Jan 01	5 00	20 56	22 24	5 09	6 37	3 24	10 10	5 09	18 58	4	17 04.4	-23 28	6.7